

eLINE Compact Modules eCKK / eCKR

with Ball Screw Drive and Toothed Belt Drive

R310EN 2603 (2009.07)

The Drive & Control Company

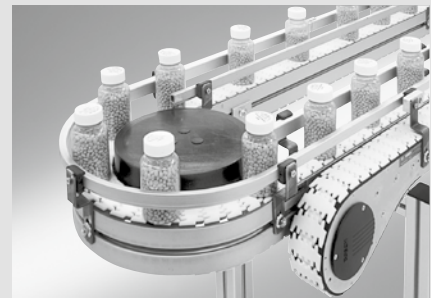
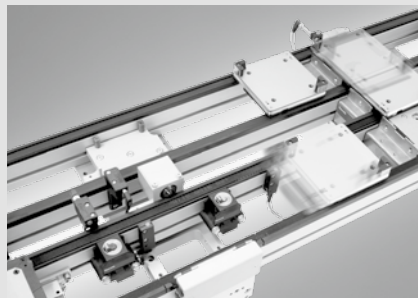
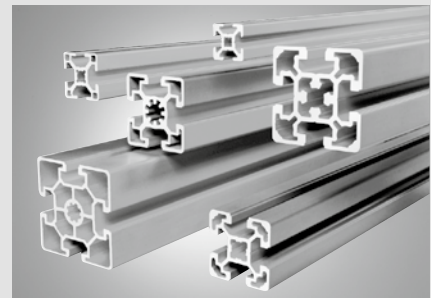
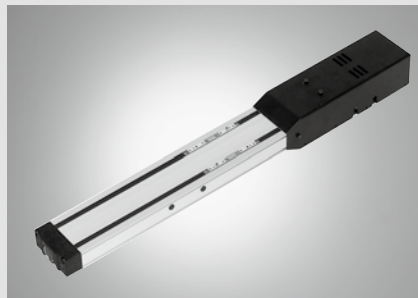
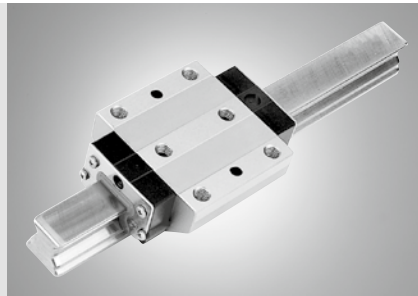
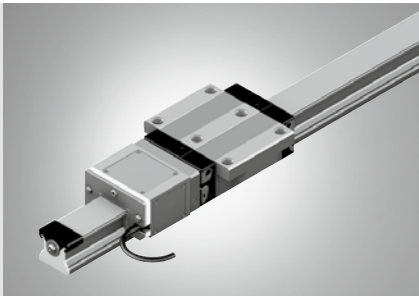


Linear Motion and Assembly Technologies

Ball Rail Systems
Roller Rail Systems
Linear Bushings and Shafts

Precision Ball Screw Assemblies
Linear Motion Systems

Basic Mechanical Elements
Manual Production Systems
Transfer Systems



eLINE Compact Modules

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Product Models

eLINE Compact Modules with integrated compact drive

are inexpensive, fast-delivery, ready-to-install linear motion systems with compact dimensions.

Available in two drive versions:

- eCKK: eLINE Compact Modules with ball rail system and ball screw drive
- eCKR: eLINE Compact Modules with ball rail system and toothed belt drive, motor attachment on either side

Further characteristics:

- Pre-installed compact drive
- Short or long carriages
- Connection plate as an accessory
- Fixed length increments
- Pre-assembled cable set
- Easy start-up
- Performance charts for instant identification of positioning time

Version 1a:

with positioning data set control

- Stepping motor with power output section and positioning control
- Can also be used without higher-level PLC (stand-alone). Automatic sequential data set processing.

Version 1b:

with Profibus interface

- Stepping motor with power output section and Profibus interface
- With pre-configured parameter sets

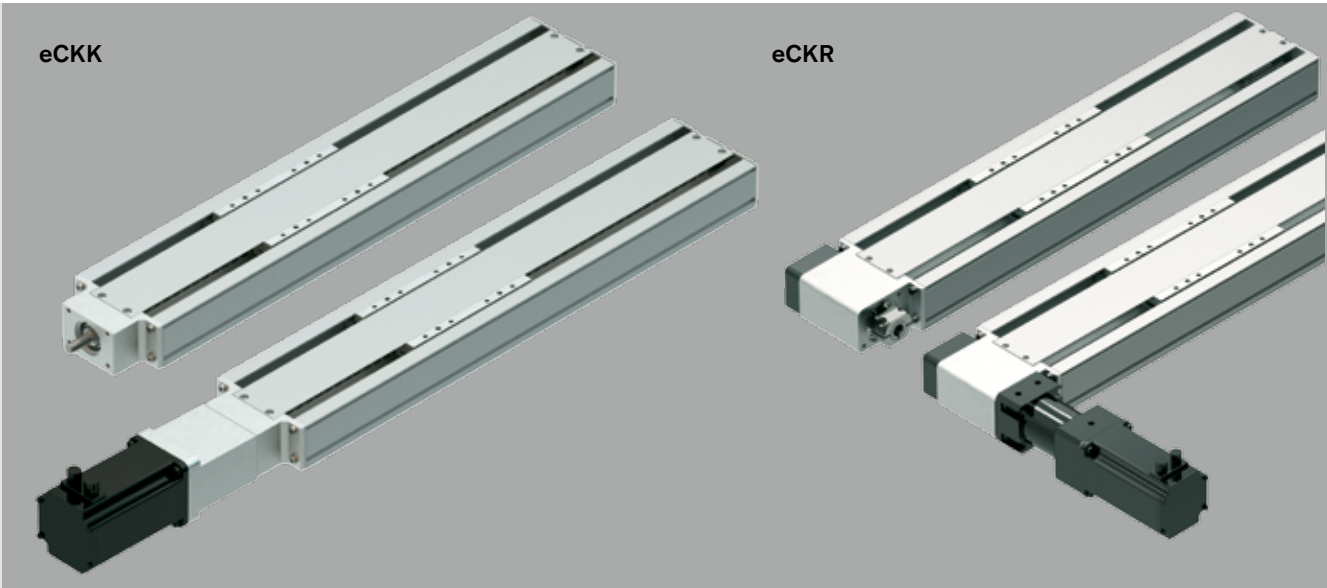


Version 2:

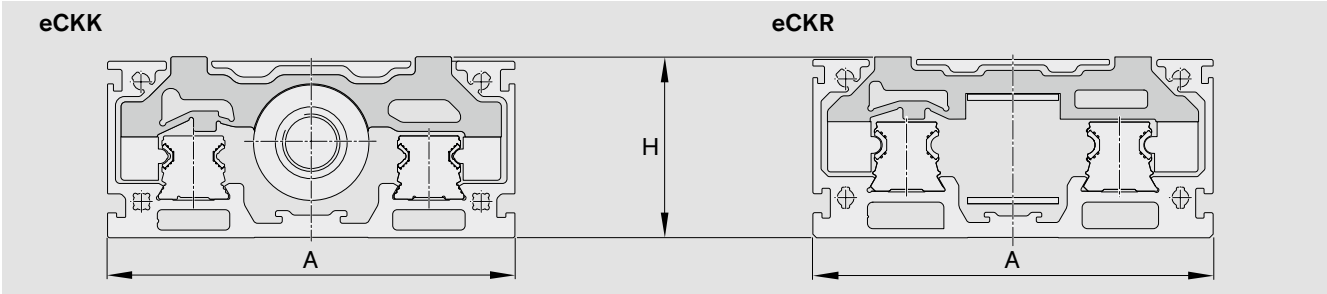
freely configurable

The advantages:

- Product design with a variety of options allows multiple configurations
- Freely selectable lengths/strokes
- Short or long carriages, with or without connection plate
- Adaptors for servo motors and stepping motors
- Freely selectable motor attachment options: motor mount and coupling, belt side drive, or gear reducer
- Variable switch mounting system and large choice of attachments



Version 1a / Version 1b / Version 2



The frame size relates to the width of frame.

Size	Frame size (mm)	
	A	H
eCKK / eCKR 90	90	40
eCKK / eCKR 110	110	50

Product Overview

Version 1a (with positioning data set control)

eLINE Compact Modules are economical, ready-to-install linear motion systems characterized by their compact design, good price/performance ratio and fast delivery.

The benefits:

- Pre-assembled compact drive with stepping motor with power output section and positioning control)
- Can also be used without higher-level PLC (stand-alone). Automatic sequential data set processing)
- Identical frame and connection dimensions as the current Compact Module series
- Ready-made parameter files make start-up very easy (downloads available on website "www.boschrexroth.com/eline_compactmodule")
- Easy to control by selecting motion tasks via digital inputs, or jog mode
- Manual movement (jog mode) via digital inputs
- "Teach" function makes it easy to enter target positions
- Two integrated zero-clearance eLINE ball rail systems provide optimized travel performance
- High travel speed with high precision and smooth operation over long lengths
- With reference switch, switch activation without switching cam
- Long-term zero-maintenance operation

eLINE Compact Modules eCKK

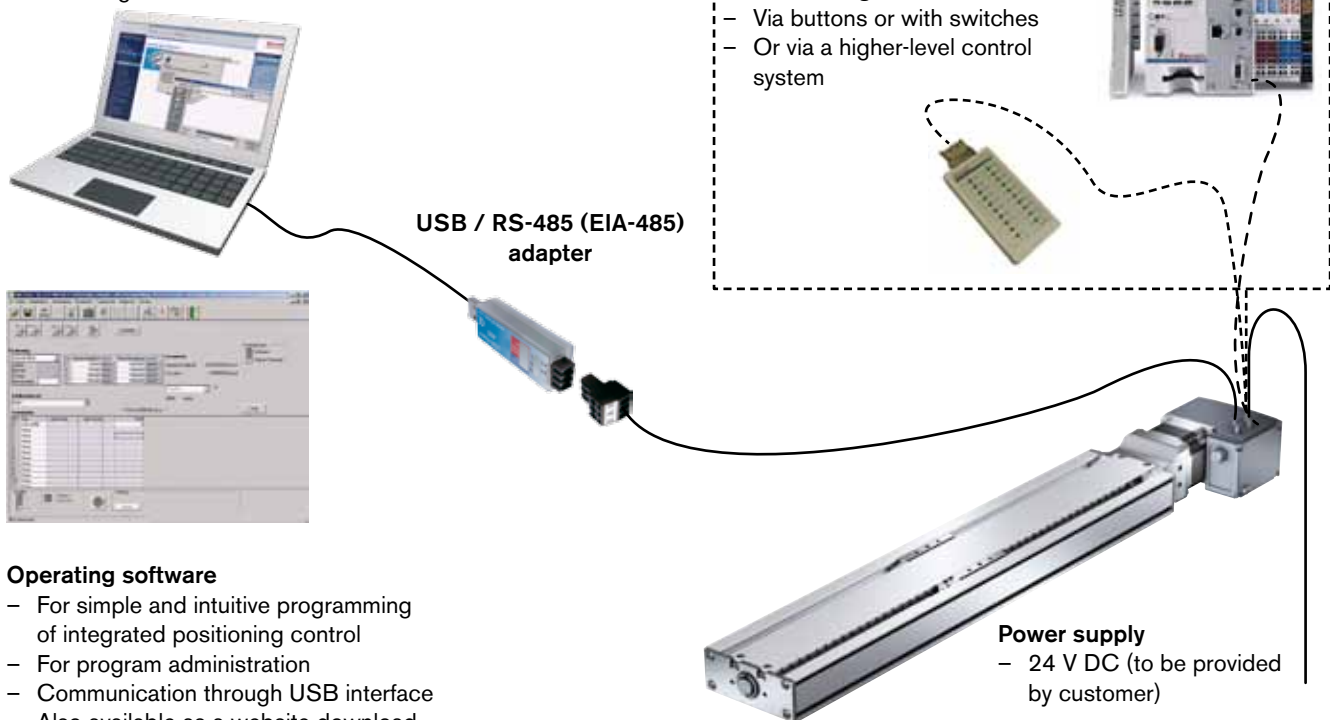
- with integrated compact drive
- with ball screw drive
- with eLINE ball rail systems

eLINE Compact Modules eCKR

- with integrated compact drive
- with toothed belt drive
- with eLINE ball rail systems

Parameter set

- Available as download from Bosch Rexroth website
- Matching set for each axis version

**Operating software**

- For simple and intuitive programming of integrated positioning control
- For program administration
- Communication through USB interface
- Also available as a website download

Version 1b (with Profibus interface)



eLINE Compact Modules are economical, ready-to-install linear motion systems characterized by their compact design, good price/performance ratio and fast delivery.

The advantages:

- Pre-assembled compact drive with stepping motor with power output section and Profibus interface
- Identical frame and connection dimensions as the current Compact Module series
- With pre-configured parameter sets (downloads available on website "www.boschrexroth.com/eline_compactmodule")
- Sample function blocks available for IndraLogic or Siemens S7 controllers
- Two integrated zero-clearance eLINE ball rail systems provide optimized travel performance.
- High travel speed with high precision and smooth operation over long travel ranges
- With reference switch, switch activation without switching cam
- Long-term zero-maintenance operation
- PLCopen-compliant function blocks available



eLINE Compact Modules eCKK

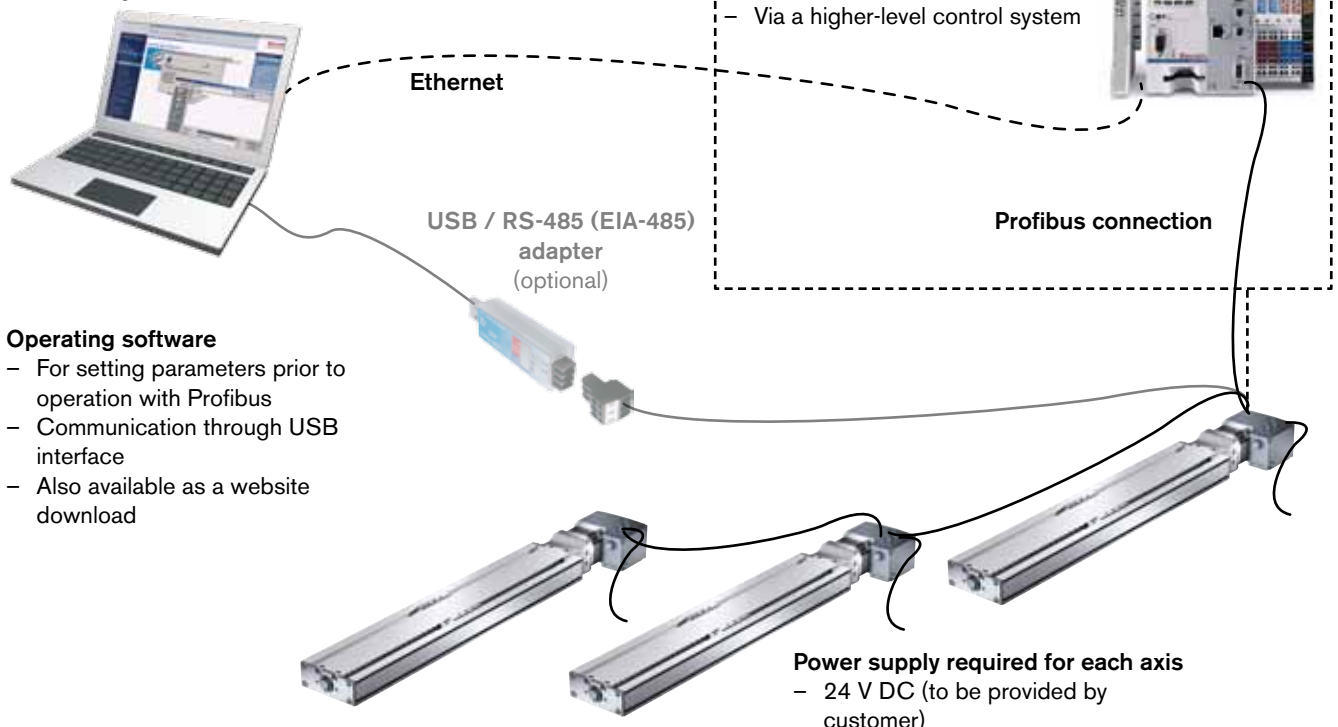
- with integrated compact drive
- with ball screw drive
- with eLINE ball rail systems

eLINE Compact Modules eCKR

- with integrated compact drive
- with toothed belt drive
- with eLINE ball rail systems

Parameter set

- Available as download from Bosch Rexroth website
- Matching set for each axis version



eLINE Compact Modules with Integrated Compact Drive

Easy Start-Up

Ready-to-run in just three steps

1. Connecting the mechanics and electrics (Version 1a and 1b)

Fasten the eLINE Compact Module to the mounting base with clamping fixtures (accessories).

Connect the cable set (accessory) and reference switch (provided) to the matching sockets in the box on the drive. The pre-assembled cables have mechanically coded connectors to avoid confusion and polarity reversal. Wire up the free cable ends to the customer-built electrical system and connect to the 24 V DC power supply.

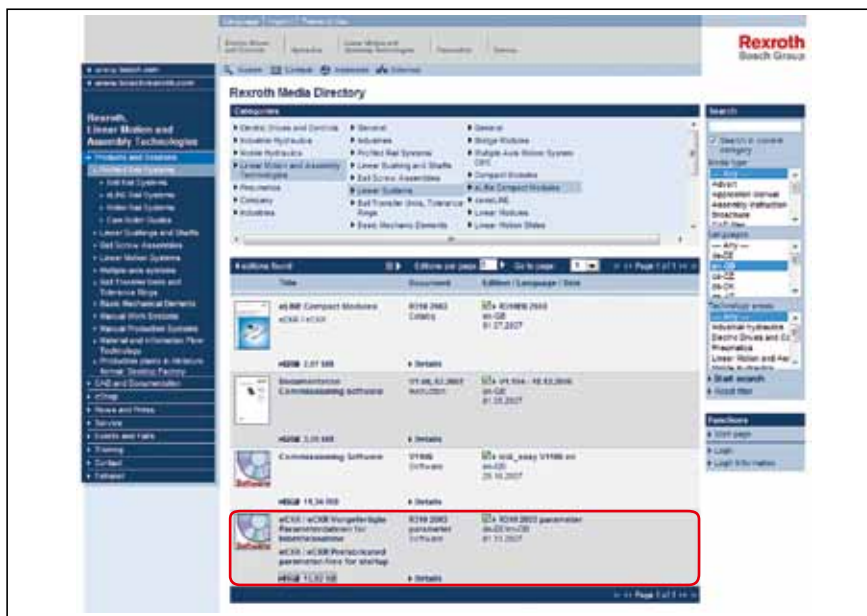


2. Setting the drive parameters (Version 1a, Version 1b with pre-configured parameters)

Download the ready-made parameter files from the Bosch Rexroth website. These files contain pre-compiled and tested parameter sets for each type and size of eLINE Compact Module, which considerably simplifies the set-up procedure.

The parameter sets are transmitted via the RS-485 (EIA-485) interface on the drive.

A USB adapter is available for communication with the PC (see Accessories).



3a. Programming of travel commands in the compact drive (Version 1a)

Download the IclA Easy start-up software from the Bosch Rexroth website. The IclA Easy allows convenient programming and editing of four different travel profiles and up to sixteen positioning data sets. Relative and absolute references can be freely combined.

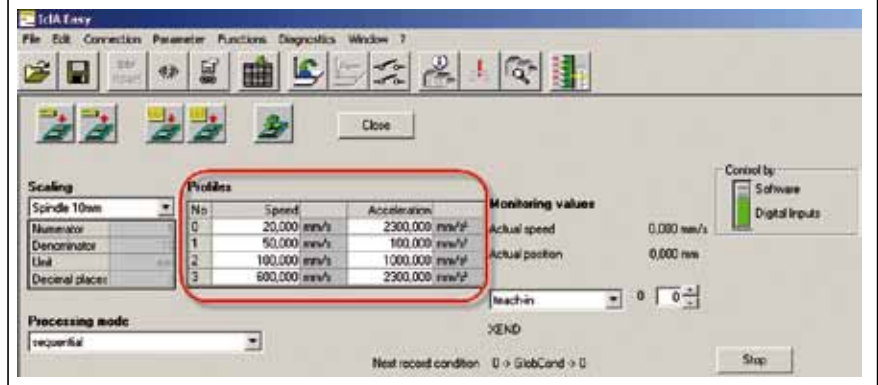
The travel commands are transmitted to the drive via the RS-485 (EIA-485) interface.

Up to 16 positions can be permanently stored in the drive (EPROM). Selection of the programmed positioning data sets can be performed directly (via digital I/Os) or sequentially (sequential data set processing). The target positions for the travel commands can be entered directly or registered and stored using the teach-in mode.

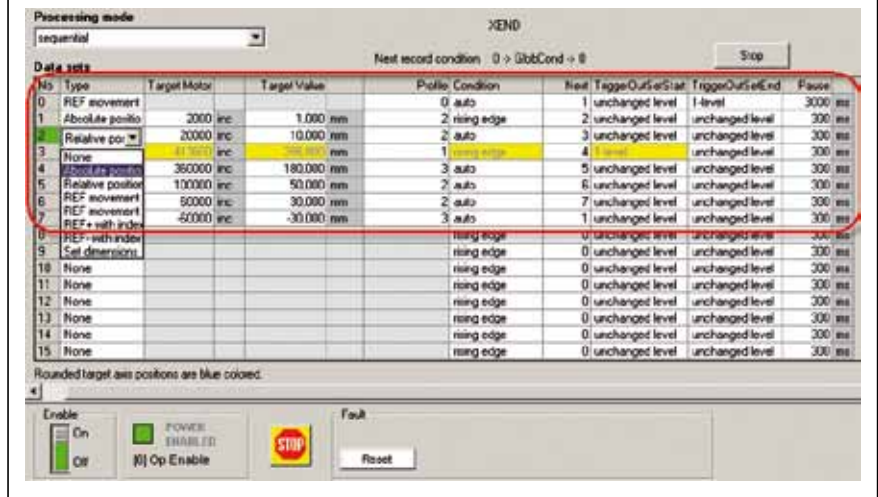
The programmed travel commands can be invoked via the IclA Easy software or via the hard-wired I/Os (using a hand-held operator control unit or a higher-level control system). eLINE Compact Modules can also be traversed manually in jog mode (even before initial start-up).

The IclA Easy software allows saving and retrieval of the compiled positioning programs, for easy creation and maintenance of a program library.

Creation of dedicated travel profiles



Programming of travel commands



3b. Programming of travel commands via Profibus interface (Version 1b)

Function blocks available for IndraLogic or Siemens S7 controllers (downloads on the web at www.boschrexroth.com/eline_compactmodule)



eLINE Compact Modules eCKK with Integrated Compact Drive

Technical Data

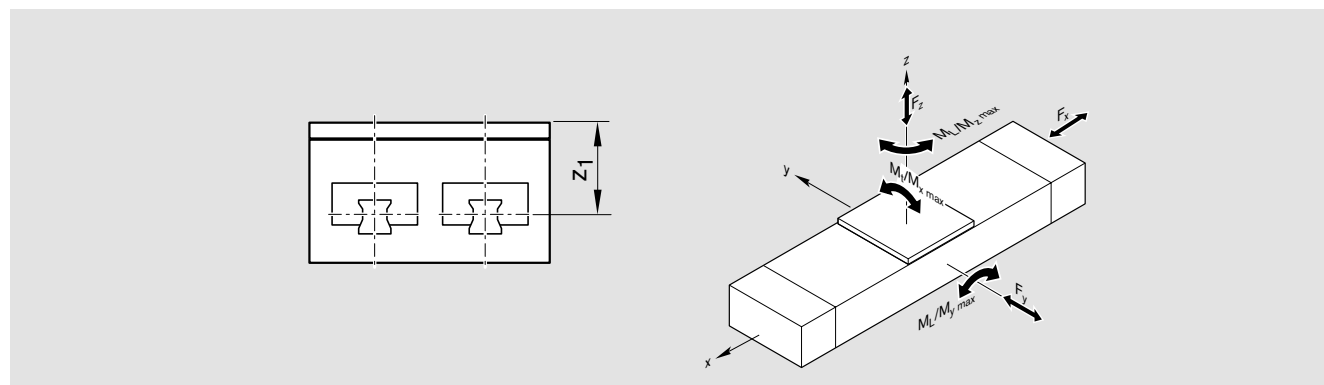
- All mechanical and electronic components from a single source
- Stepping motor with up to 16 parameterizable motion tasks
- Start-up requires minimal effort
- Wide variety of lengths and strokes available
- With eLINE ball screw drive



Size	Carriage length (mm) L_{ca}	Ball screw (mm) $d_0 \times P$	Dynamic load capacity C (N)			Dynamic load moments (Nm)		Mass of linear system m_s (kg) without connection plate	
						Torsional load moment M_t	Longitudinal load moment M_L		
eCKK 90	60	12 x 10	5000	1500	2550	166	29	$0.00408 \cdot L + 2.34$	$0.00408 \cdot L + 3.34$
	125		8100			270	200		
eCKK 110	82	16 x 10	11000	5800	3000	420	89	$0.00674 \cdot L + 4.01$	$0.00674 \cdot L + 5.86$
	165		17800			682	700		

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

Size	Carriage length (mm) L_{ca}	Maximum permissible forces (N)		Maximum permissible moments (Nm)		Planar moment of inertia (cm ⁴)		Moved mass of system (kg) m_{ca}	Maximum payload (kg) $m_{ex \max}$	Repeatability (mm)	Dimensions (mm) z_1
eCKK 90	60	$F_{x \max}$	$F_{y \max}$ $F_{z \max}$	$M_{x \max}$	$M_{y \max}$ $M_{z \max}$	I_y	I_z	0.15	15	± 0.05	22.0
	125										
eCKK 110	82	400	550	42.0	8.9 ¹⁾	31	238	0.27	30	± 0.05	24.5
	165										

1) Δ Consider the moment load capacity!**Note on dynamic load capacities and moments (see table)**

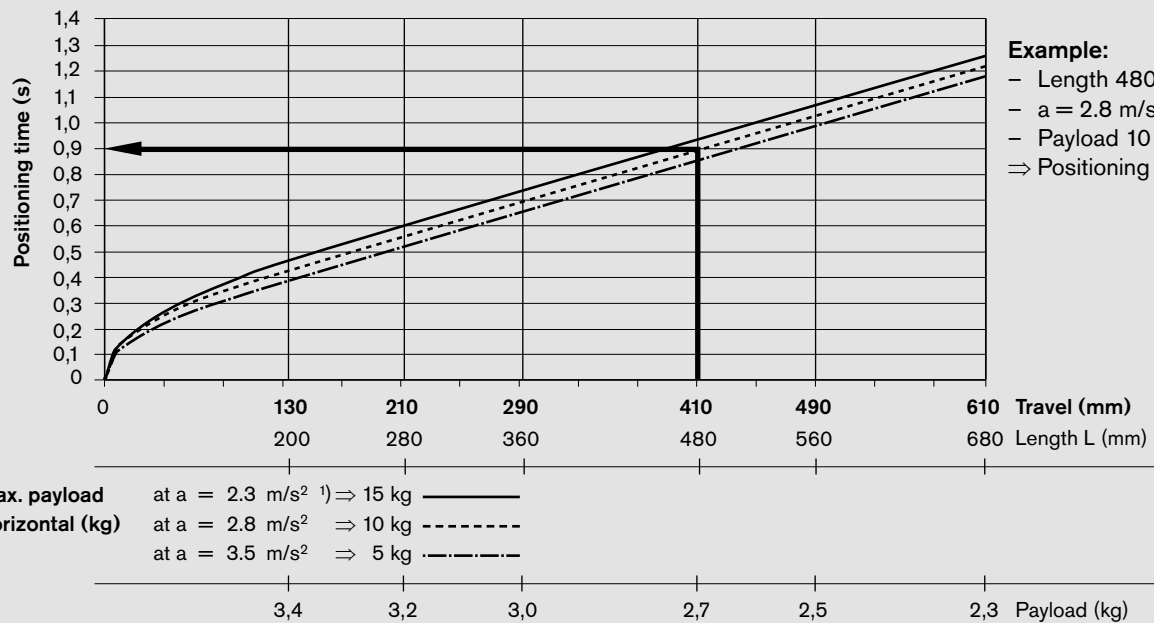
Determination of the dynamic load capacities and moments is based on a travel life of 100,000 m. Often only 50,000 m are actually stipulated. For comparison: Multiply values **C**, **M_t** and **M_L** from the table by 1.26.

Performance Charts

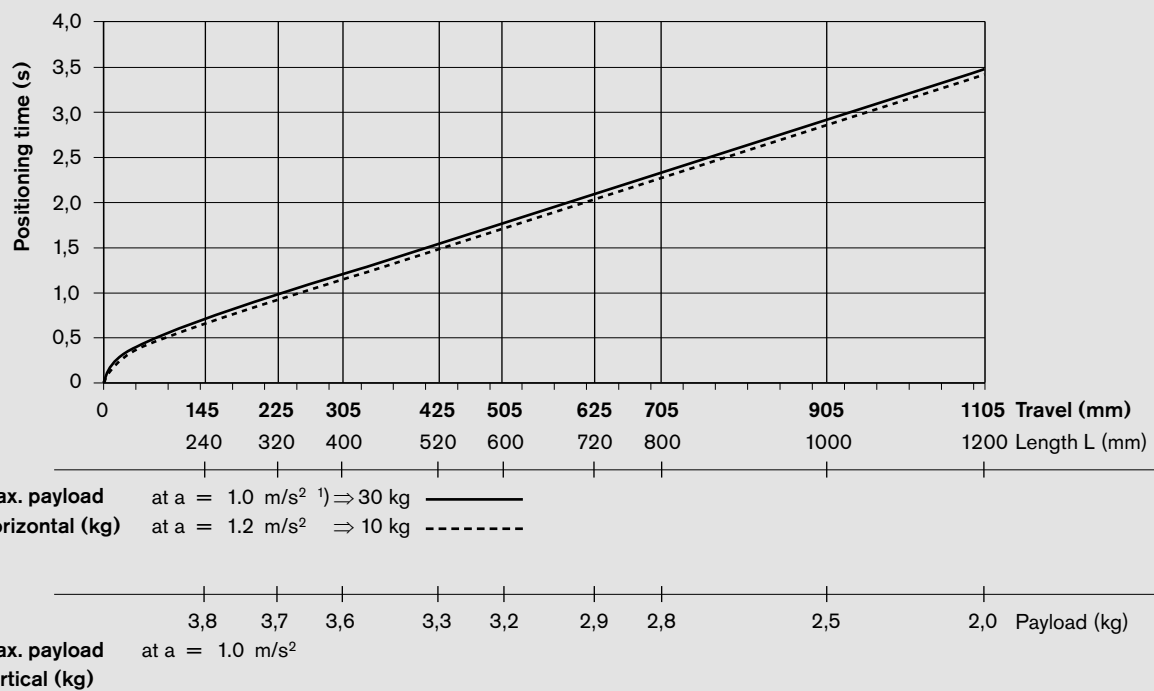
⚠ Values apply to moved short carriage only

Positioning time as a function of travel distance and length

eCKK 90, $L_{ca} = 60$ mm



eCKK 110, $L_{ca} = 82$ mm



1) Corresponds to the default settings in the parameter files from "www.boschrexroth.com/eline_compactmodule"

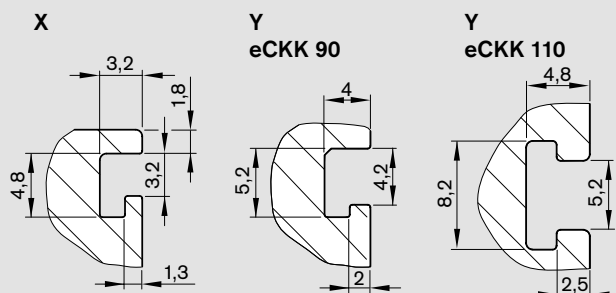
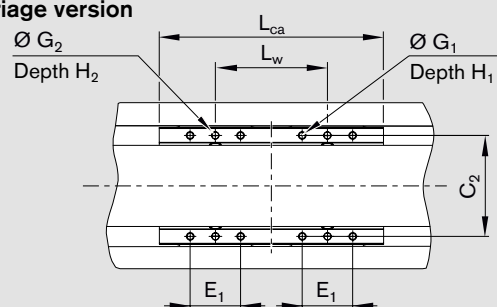
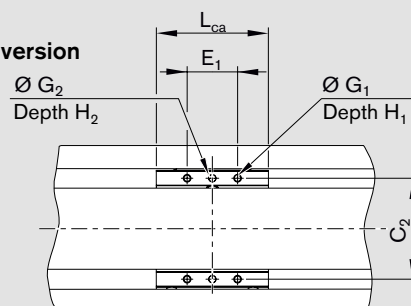
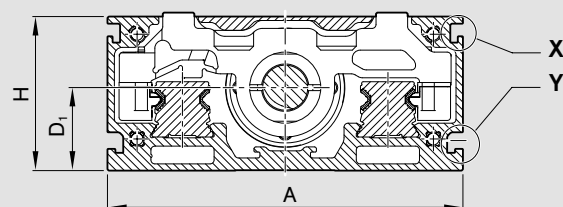
Technical drawing of the SMC SAE series pneumatic cylinder, showing front and side views with dimensions and labels.

Front View (Top):

- Cable bushing:** Indicated by a leader line pointing to the top of the head end.
- 9.5:** Dimension for the cable bushing height.
- L_m:** Dimension for the head end length.
- L₁:** Dimension for the head end to the start of the rod.
- L:** Total dimension for the rod length.
- L₃:** Dimension for the rod end length.
- Excess travel:** Indicated at both ends of the rod.
- Effective stroke / 2:** Indicated in the center of the rod.
- Max. travel / 2:** Indicated at the ends of the rod.
- L/2:** Dimension for the total rod length.
- L_{ca}:** Dimension for the rod diameter.

Side View (Bottom):

- 50:** Dimension for the head end height.
- M1:** Dimension for the head end height.
- Switch connection:** Indicated by a leader line pointing to the side of the head end.



1) Frame size	2) with brake	carr. = carriage
100	100	100
150	150	150
200	200	200
250	250	250
300	300	300
350	350	350
400	400	400
450	450	450
500	500	500
550	550	550
600	600	600
650	650	650
700	700	700
750	750	750
800	800	800
850	850	850
900	900	900
950	950	950
1000	1000	1000

Ordering Data

Length L (mm)	Maximum travel (mm)		Motor	Part numbers for compact drives R0361 with positioning data set control (Version 1a)		xxx xx (xxx xx from table) with Profibus interface (Version 1b)		
	Short carr.	Long carr.		Short carr.	Long carr.	Short carr.	Long carr.	
eCKK 90								
200	130		w/o br.	... 360 10	–	... 361 10	–	
			w/ br.	... 360 11	–	... 361 11	–	
280	210	145	w/o br.	... 360 14	... 364 14	... 361 14	... 365 14	
			w/ br.	... 360 15	... 364 15	... 361 15	... 365 15	
360	290	225	w/o br.	... 360 18	... 364 18	... 361 18	... 365 18	
			w/ br.	... 360 19	... 364 19	... 361 19	... 365 19	
480	410	345	w/o br.	... 360 24	... 364 24	... 361 24	... 365 24	
			w/ br.	... 360 25	... 364 25	... 361 25	... 365 25	
560	490	425	w/o br.	... 360 28	... 364 28	... 361 28	... 365 28	
			w/ br.	... 360 29	... 364 29	... 361 29	... 365 29	
680	610	545	w/o br.	... 360 34	... 364 34	... 361 34	... 365 34	
			w/ br.	... 360 35	... 364 35	... 361 35	... 365 35	
eCKK 110								
240	145		w/o br.	... 460 12	–	... 461 12	–	
			w/ br.	... 460 13	–	... 461 13	–	
320	225	140	w/o br.	... 460 16	... 464 16	... 461 16	... 465 16	
			w/ br.	... 460 17	... 464 17	... 461 17	... 465 17	
400	305	220	w/o br.	... 460 20	... 464 20	... 461 20	... 465 20	
			w/ br.	... 460 21	... 464 21	... 461 21	... 465 21	
520	425	340	w/o br.	... 460 26	... 464 26	... 461 26	... 465 26	
			w/ br.	... 460 27	... 464 27	... 461 27	... 465 27	
600	505	420	w/o br.	... 460 30	... 464 30	... 461 30	... 465 30	
			w/ br.	... 460 31	... 464 31	... 461 31	... 465 31	
720	625	540	w/o br.	... 460 36	... 464 36	... 461 36	... 465 36	
			w/ br.	... 460 37	... 464 37	... 461 37	... 465 37	
800	705	620	w/o br.	... 460 40	... 464 40	... 461 40	... 465 40	
			w/ br.	... 460 41	... 464 41	... 461 41	... 465 41	
1000	905	820	w/o br.	... 460 50	... 464 50	... 461 50	... 465 50	
			w/ br.	... 460 51	... 464 51	... 461 51	... 465 51	
1200	1105	1020	w/o br.	... 460 60	... 464 60	... 461 60	... 465 60	
			w/ br.	... 460 61	... 464 61	... 461 61	... 465 61	

Intermediate lengths available on request.

w/o br. = without brake; w/ br.) = with brake

Ordering example:

eLINE Compact Module eCKK 90. length 680 mm, with positioning data set control (Version 1a), long carriage (carr.), motor with brake (w/ br.), ➡ part number R0361 364 35

eLINE Compact Modules eCKR with Integrated Compact Drive

Technical Data

- All mechanical and electronic components from a single source
- Stepping motor with up to 16 parameterizable motion tasks
- Start-up requires minimal effort
- Wide variety of lengths and strokes available
- With toothed belt 25HTD3

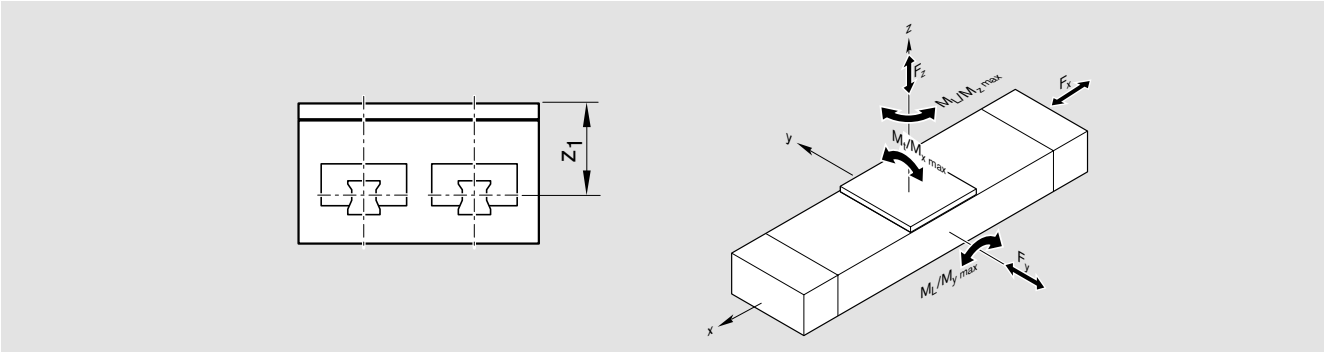


Size	Carriage length (mm) L_{ca}	Dynamic load capacity (N) Guideway C	Dynamic load moments (Nm)		Mass of linear system m_s without connection plate (kg)	
			Torsional load moment M_t	Longitudinal load moment M_L	Motor without brake	Motor with brake
eCKR 90	90	5000	166	29	$0.003462 \cdot L + 3.74$	$0.003462 \cdot L + 5.54$
	125	8100	270	200		
eCKR 110	100	11000	420	89	$0.005628 \cdot L + 6.42$	$0.005628 \cdot L + 8.22$
	165	17800	682	700		

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

Size	Carriage length (mm) L_{ca}	Maximum permissible forces (N)		Maximum permissible moments (Nm)		Planar moment of inertia (cm ⁴)		Moved mass of system (kg) m_{ca}	Maximum payload (kg) $m_{ex \text{ max}}$	Repeatability (mm)	Dimensions (mm) z_1
		$F_{y \text{ max}}$	$F_{z \text{ max}}$	$M_{x \text{ max}}$	$M_{y \text{ max}}, M_{z \text{ max}}$	I_y	I_z				
eCKR 90	90		250	16.6	$2.9^{1)}$	12	97	0.19	15	± 0.2	22.0
	125		405	27.0	20.0			0.28	30		
eCKR 110	100		550	42.0	$8.9^{1)}$	31	238	0.31	30	± 0.2	24.5
	165		890	68.2	70.0			0.56	60		

1) Consider the moment load capability!



Note on dynamic load capacities and moments (see table)

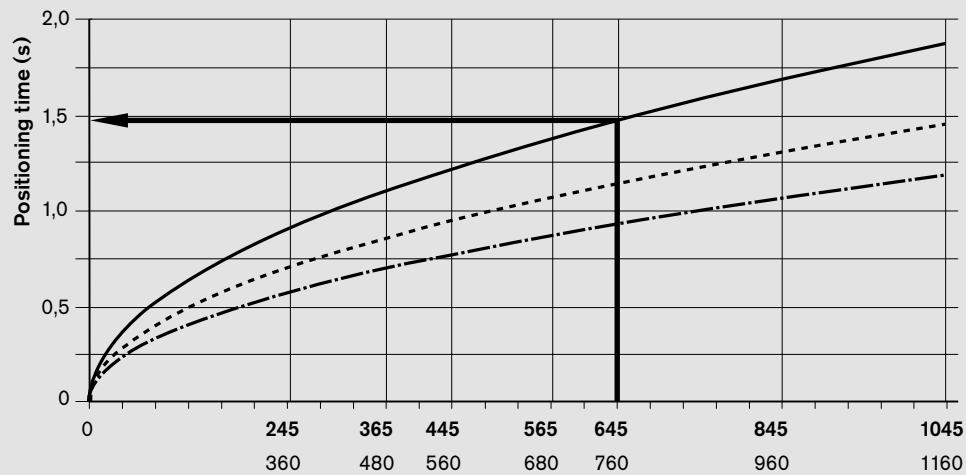
Determination of the dynamic load capacities and moments is based on a travel life of 100,000 m. Often only 50,000 m are actually stipulated. For comparison: Multiply values **C**, **M_t** and **M_L** from the table by 1.26.

Performance Charts

⚠ Values apply to moved short carriage only

Positioning time as a function of travel distance and length

eCKR 90, $L_{ca} = 90$ mm



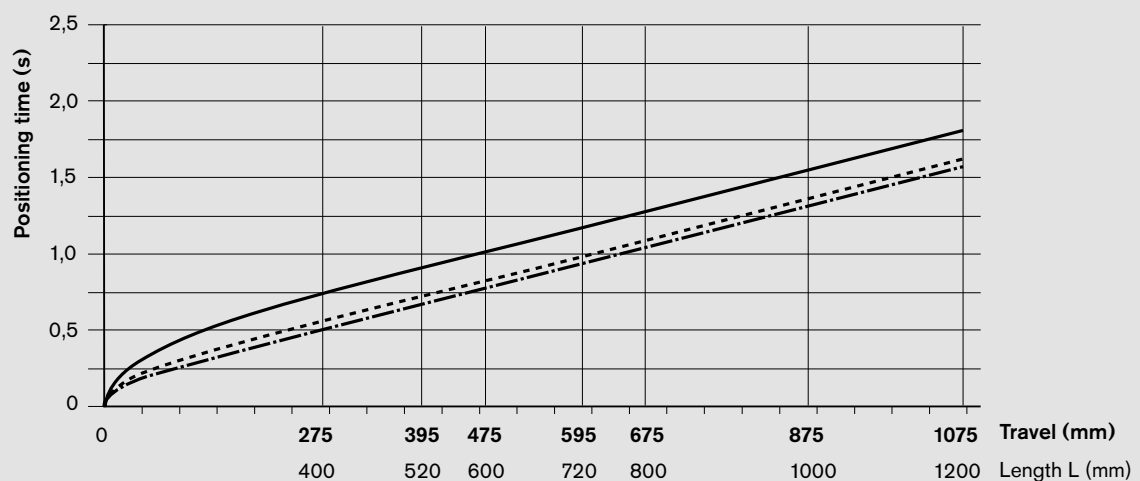
Example:

- Length 760 mm
 - $a = 1.2 \text{ m/s}^2$
 - Payload 10 kg
- ⇒ Positioning time 1.49 s

Max. payload horizontal (kg)	at $a = 1.2 \text{ m/s}^2$	⇒ 10 kg	—————
	at $a = 2.0 \text{ m/s}^2$ ¹⁾	⇒ 5 kg	- - - - -
	at $a = 3.0 \text{ m/s}^2$	⇒ 2.5 kg	- · - · -

Vertical applications not recommended

eCKR 110, $L_{ca} = 100$ mm



Max. payload horizontal (kg)	at $a = 2.0 \text{ m/s}^2$	⇒ 30 kg	—————
	at $a = 4.0 \text{ m/s}^2$ ¹⁾	⇒ 15 kg	- - - - -
	at $a = 5.5 \text{ m/s}^2$	⇒ 10 kg	- · - · -

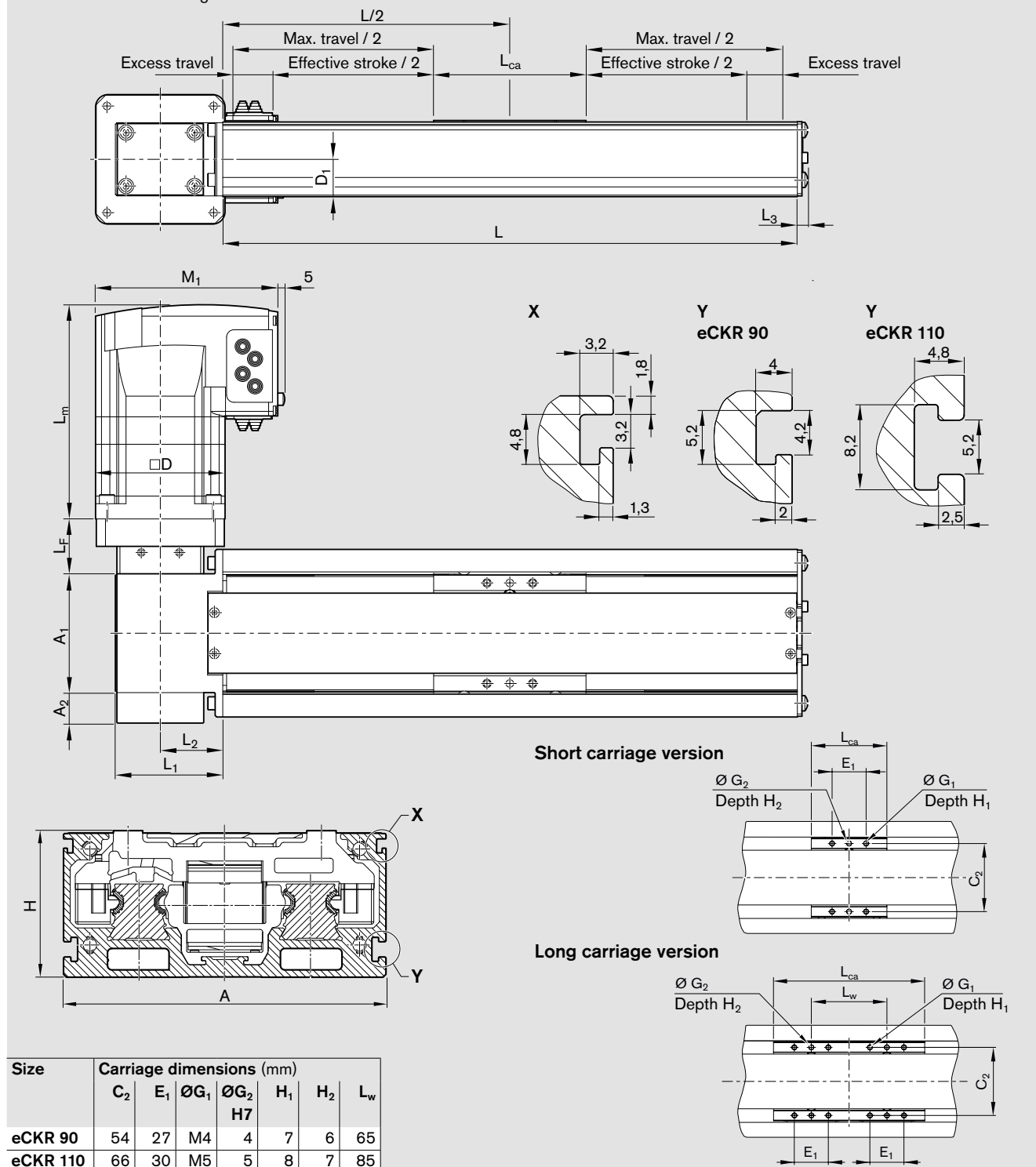
Vertical applications not recommended

1) Corresponds to the default settings in the parameter files from "www.boschrexroth.com/eline_compactmodule"

eLINE Compact Modules eCKR with Integrated Compact Drive

Dimensions

All dimensions in mm. Diagrams to different scales.

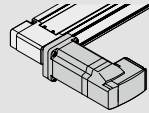
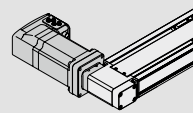
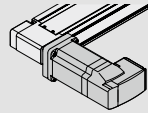
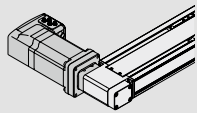


1) Frame size

2) with brake

carr. = carriage

Ordering Data

Length L (mm)	Maximum travel (mm)		Motor	Part numbers for compact drives R0363 xxx xx (xxx xx from table)							
				with positioning data set control (Version 1a)				with Profibus interface (Version 1b)			
	Motor attachment at right, MA10			Motor attachment at left, MA11		Motor attachment at right, MA10		Motor attachment at left, MA11			
											
	Short carr.	Long carr.		Short carr.	Long carr.	Short carr.	Long carr.	Short carr.	Long carr.	Short carr.	Long carr.
eCKR 90											
360	245	210	w/o br.	... 360 18	... 364 18	... 362 18	... 366 18	... 361 18	... 365 18	... 363 18	... 367 18
			w/ br.	... 360 19	... 364 19	... 362 19	... 366 19	... 361 19	... 365 19	... 363 19	... 367 19
480	365	330	w/o br.	... 360 24	... 364 24	... 362 24	... 366 24	... 361 24	... 365 24	... 363 24	... 367 24
			w/ br.	... 360 25	... 364 25	... 362 25	... 366 25	... 361 25	... 365 25	... 363 25	... 367 25
560	445	410	w/o br.	... 360 28	... 364 28	... 362 28	... 366 28	... 361 28	... 365 28	... 363 28	... 367 28
			w/ br.	... 360 29	... 364 29	... 362 29	... 366 29	... 361 29	... 365 29	... 363 29	... 367 29
680	565	530	w/o br.	... 360 34	... 364 34	... 362 34	... 366 34	... 361 34	... 365 34	... 363 34	... 367 34
			w/ br.	... 360 35	... 364 35	... 362 35	... 366 35	... 361 35	... 365 35	... 363 35	... 367 35
760	645	610	w/o br.	... 360 38	... 364 38	... 362 38	... 366 38	... 361 38	... 365 38	... 363 38	... 367 38
			w/ br.	... 360 39	... 364 39	... 362 39	... 366 39	... 361 39	... 365 39	... 363 39	... 367 39
960	845	810	w/o br.	... 360 48	... 364 48	... 362 48	... 366 48	... 361 48	... 365 48	... 363 48	... 367 48
			w/ br.	... 360 49	... 364 49	... 362 49	... 366 49	... 361 49	... 365 49	... 363 49	... 367 49
1160	1045	1010	w/o br.	... 360 58	... 364 58	... 362 58	... 366 58	... 361 58	... 365 58	... 363 58	... 367 58
			w/ br.	... 360 59	... 363 59	... 362 59	... 366 59	... 361 59	... 363 59	... 363 59	... 367 59
eCKR 110											
400	275	210	w/o br.	... 460 20	... 464 20	... 462 20	... 466 20	... 461 20	... 465 20	... 463 20	... 467 20
			w/ br.	... 460 21	... 464 21	... 462 21	... 466 21	... 461 21	... 465 21	... 463 21	... 467 21
520	395	330	w/o br.	... 460 26	... 464 26	... 462 26	... 466 26	... 461 26	... 465 26	... 463 26	... 467 26
			w/ br.	... 460 27	... 464 27	... 462 27	... 466 27	... 461 27	... 465 27	... 463 27	... 467 27
600	475	410	w/o br.	... 460 30	... 464 30	... 462 30	... 466 30	... 461 30	... 465 30	... 463 30	... 467 30
			w/ br.	... 460 31	... 464 31	... 462 31	... 466 31	... 461 31	... 465 31	... 463 31	... 467 31
720	595	530	w/o br.	... 460 36	... 464 36	... 462 36	... 466 36	... 461 36	... 465 36	... 463 36	... 467 36
			w/ br.	... 460 37	... 464 37	... 462 37	... 466 37	... 461 37	... 465 37	... 463 37	... 467 37
800	675	610	w/o br.	... 460 40	... 464 40	... 462 40	... 466 40	... 461 40	... 465 40	... 463 40	... 467 40
			w/ br.	... 460 41	... 464 41	... 462 41	... 466 41	... 461 41	... 465 41	... 463 41	... 467 41
1000	875	810	w/o br.	... 460 50	... 464 50	... 462 50	... 466 50	... 461 50	... 465 50	... 463 50	... 467 50
			w/ br.	... 460 51	... 464 51	... 462 51	... 466 51	... 461 51	... 465 51	... 463 51	... 467 51
1200	1075	1010	w/o br.	... 460 60	... 464 60	... 462 60	... 466 60	... 461 60	... 465 60	... 463 60	... 467 60
			w/ br.	... 460 61	... 464 61	... 462 61	... 466 61	... 461 61	... 465 61	... 463 61	... 467 61

Intermediate lengths available on request.

w/o br. = without brake; w/ br.) = with brake

Ordering example:

eLINE Compact Module eCKR 90, length 680 mm, with Profibus interface (Version 1b), motor attachment at right, MA10
long carriage (carr.), motor with brake (w/ br.), ➡ part number R0363 365 35

eLINE Compact Modules with Integrated Compact Drive

Switch Mounting

⚠ One sensor (provided) is needed as a reference switch when starting up the axis.

Switch activation is direct with this magnetic field sensor (no switching cam required).

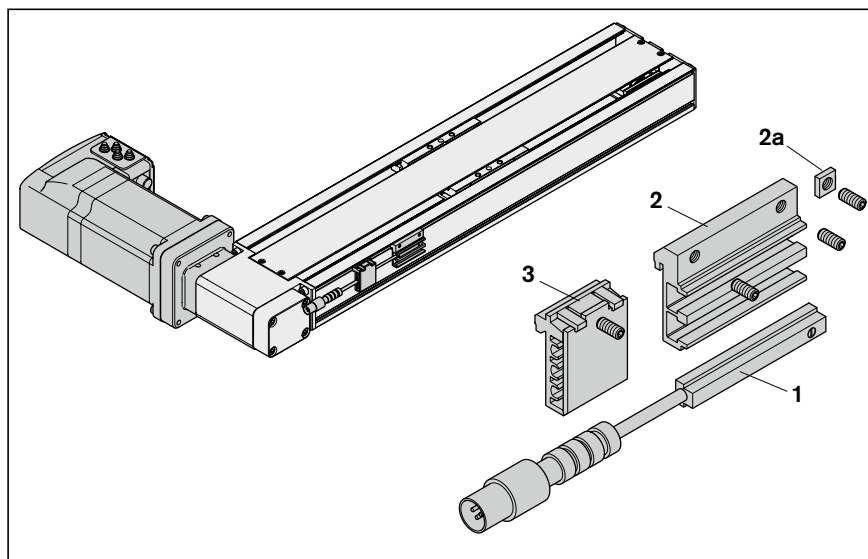
The sensor is to be mounted after the eLINE Compact Module has been fastened to the mounting base.

- The switches are slid into the upper T-slot on the sensor mount and secured with set screws. The square nut serves as a stop for the sensor, so it is not necessary to re-adjust the position when replacing a sensor.
- The plug of the sensor is connected directly to the motor (motor control).

Sensor mounting kit

consisting of:

- 1 Hall sensor
- 2 Sensor mount (material: plastic) incl. set screw (loose) and square nut **2a**
- 3 Cable holder (3 units, material: plastic) incl. set screw (loose)



Type	Part number
Sensor mounting kit with Hall sensor	R0375 300 08

Accessories for positioning data set control (Version 1a)

Cable set

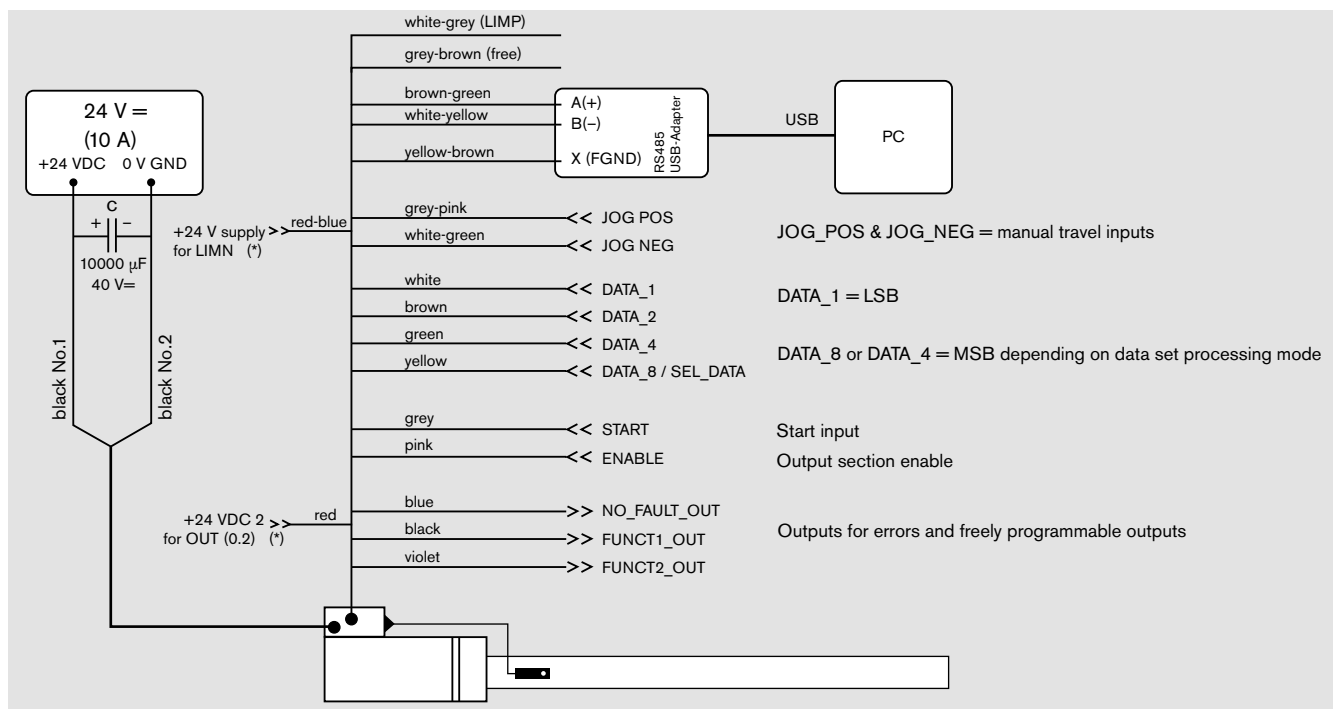
The cable set consists of the cable (black sheath) for the 24V power supply; the signal cable (gray sheath) for digital inputs and outputs; and the RS-485 (EIA-485) interface. The cable set is 5 m long.

The plugs are inserted through the side openings in the terminal box and engaged in the plug sockets.



Part number: R1130 695 74

Detailed description available in product manual IclA IDS MIO or at www.boschrexroth.com/eline_compactmodule



(*) +24 V supply for LIMN and +24 V DC for outputs are galvanically separated from the motor supply and can be powered separately.

Power supply: 24 V DC Important notes:

- Avoid reverse polarity +/- and overvoltage of the DC supply!
- Connect or disconnect DC power supply of the IclA-IDS-MIO only when de-energized (power pack switched off).
- Connect electrolytic capacitor 10000 µF 40 V DC in parallel to the 24 V DC supply to avoid overvoltages during braking.
- Grounding: All GNDs should be connected to the same potential

The axis can be moved manually (even without start-up tool) via the JOG inputs after the 24 V supply voltage has been switched on.

RS-485 (EIA-485) adapter on USB

An adapter is required to connect the motor (RS-485 (EIA-485)) to the PC (USB).
Part number: R1130 896 97

A 1.8-meter USB connection cable and the driver software are included with the delivery.



eLINE Compact Modules with Integrated Compact Drive

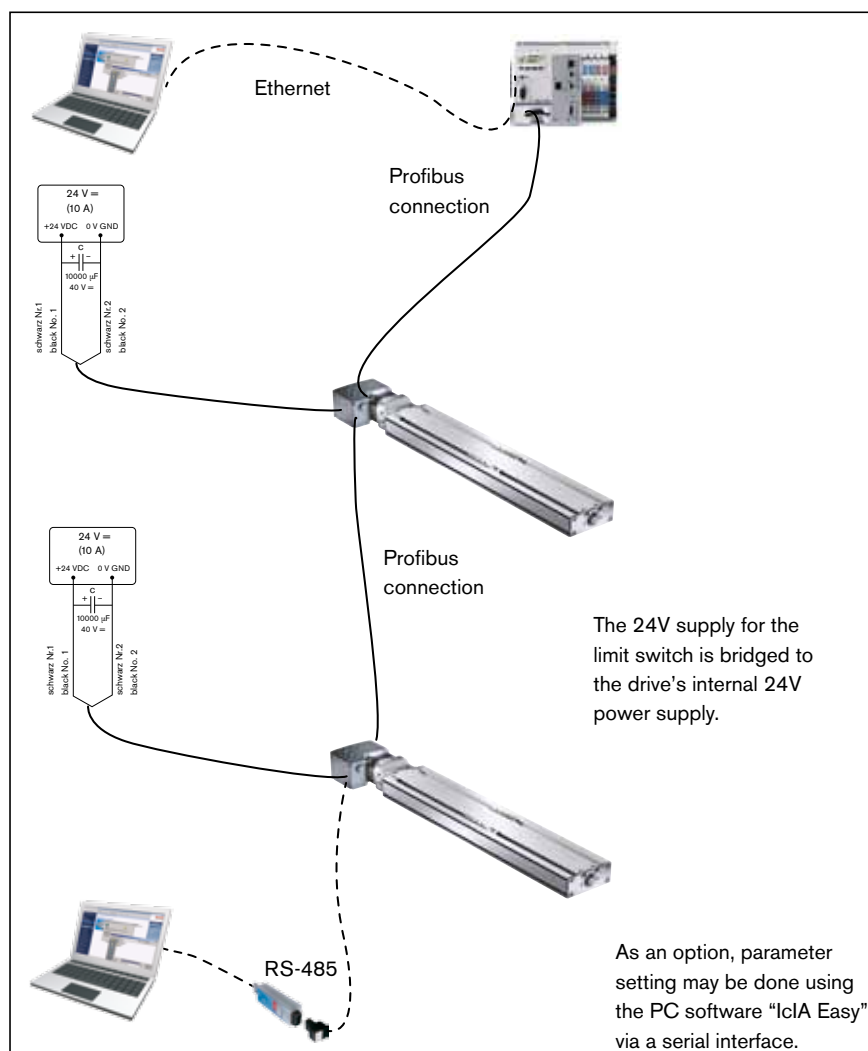
Accessories for Profibus interface (Version 1b)

Power supply cable set

The cable set consists of:

- Cable for 24V DC supply and connection of limit switch LIMN.
- Male and female connectors (M12) for Profibus connection.
- Blind cover for M12 female connector (last bus subscriber)

Length	Part number
5 m	R1130 695 76



In the version "with Profibus interface," the drive is delivered with pre-set (default) parameters. The parameters for the physical variables are set in units for rotary motion: travel in increments; rotary speed in rpm; acceleration in rpm/s

At the last slave (subscriber), the terminating resistors must be switched on (S2) in order to avoid line interference due to signal reflections.

Profibus connection cable

Between two bus subscribers

Length	Part number
1 m	R1130 695 79
2 m	R1130 695 80
5 m	R1130 695 81

Female connector M12; 5-pin, B-coded

Male connector M12; 5-pin, B-coded

**Profibus connection cable**

From control system with 9-pin DSub (e.g. IndraControl) to first bus subscriber.

Length	Part number
5 m	R1130 695 96

9-pin DSub

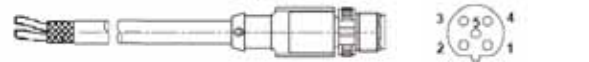
Female connector M12; 5-pin, B-coded

**Profibus connection cable**

To first bus subscriber, with flying leads at one end (for assembly by customer).

Length	Part number
5 m	R1130 695 77

Female connector M12; 5-pin, B-coded

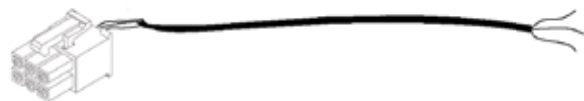
**Programming cable**

Serves to set the drive parameters. (Optional – for use with RS-485 (EIA-485) adapter on USB).

Note:

This programming cable should only be connected to the drive for initial start-up purposes. When using it, the drive housing cover must remain open.

Length	Part number
5 m	R1130 695 82

**USB adapter RS-485 (EIA-485)**

For optional drive parameter setting by the customer, an adapter is required.

Part number: R1130 896 97

The adapter is supplied together with a USB connection cable (1.8 m long) and the driver software.



eLINE Compact Modules – Freely Configurable

Product Overview, Version 2

eLINE Compact Modules are inexpensive, ready-to-install linear motion systems with compact design and are available in variable lengths.

Good price performance ratio – fast delivery.

The freely configurable eLINE Compact Modules have the same basic design as the eLINE Compact Modules with integrated positioning drive.

Differences versus eLINE Compact Modules with integrated positioning drive

- Variable lengths up to $L_{\max}$
- Choice of motors
- Choice of gear ratios

Structural design

- Extremely compact extruded aluminum profile (frame) with two integrated zero-clearance eLINE Ball Rail Systems
- Aluminum carriage in two different lengths

Attachments

- Maintenance-free servo or stepping motors with or without brake
- Switches
- Socket with mating plug for the switches
- Mounting duct made of profiled aluminum

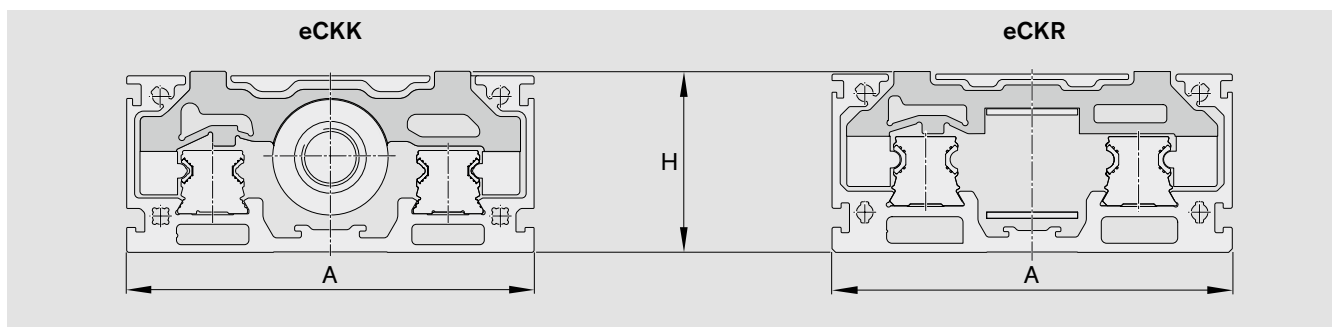


For mounting and maintenance, see
"Instructions for eLINE Compact Modules eCKK"

eLINE Compact Modules eCKK
with ball rail system and ball
screw drive



eLINE Compact Modules eCKR
with ball rail system and toothed
belt drive
Motor attachment on either side



The frame size relates to the width of frame.

Size	Frame size (mm)	
	A	H
eCKK / eCKR 90	90	40
eCKK / eCKR 110	110	50

eLINE Compact Modules – Freely Configurable

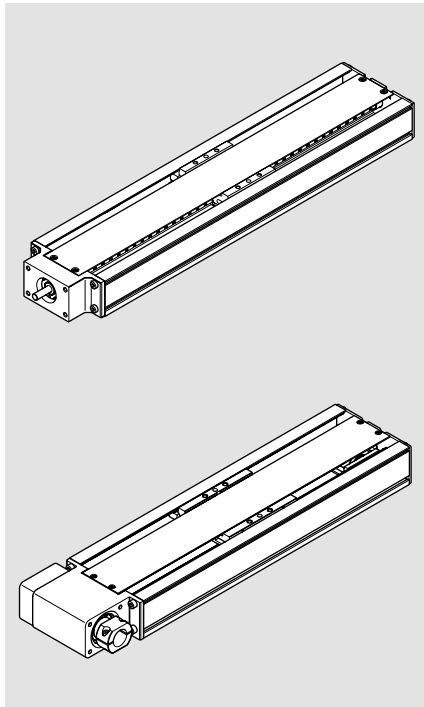
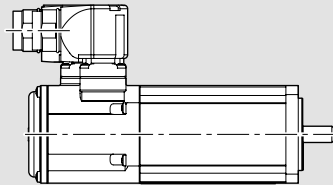
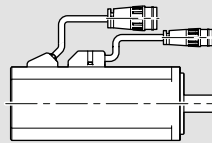
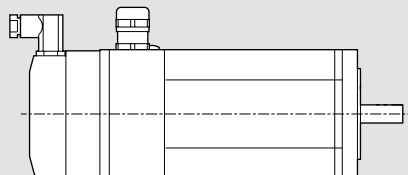
Product Overview of Motors and Controllers

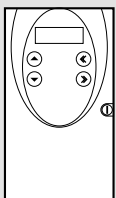
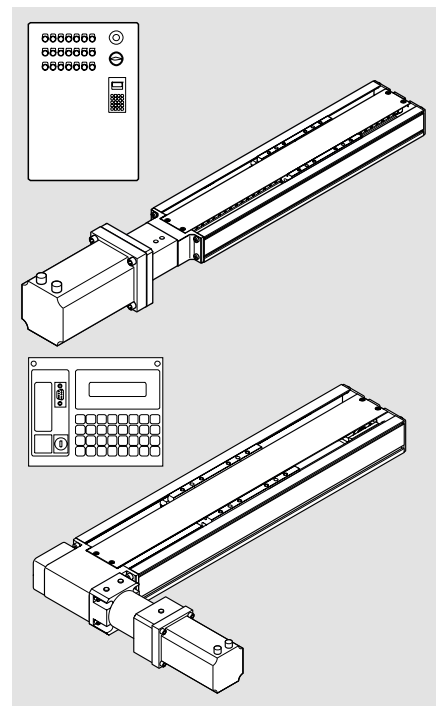
Motor selection based on drive controllers and control system

Several motor-controller combinations are available in order to provide the most cost-effective solution for every customer application.

When sizing the drive, always consider the motor-controller combination.

For more detailed information on motors and control systems, please refer to the catalogs "ECODRIVE Cs" and "IndraDrive for Linear Motion Systems."

**Digital AC servo motor****MSK****Digital AC servo motor****MSM****Three-phase stepping motor****VRDM**

**IndraDrive****ECODRIVE Cs****SD326
SD328****A complete solution**

eLINE Compact Modules are available as complete solutions with motor, controller, and control system.

eLINE Compact Modules eCKK – Freely Configurable

Structural Design

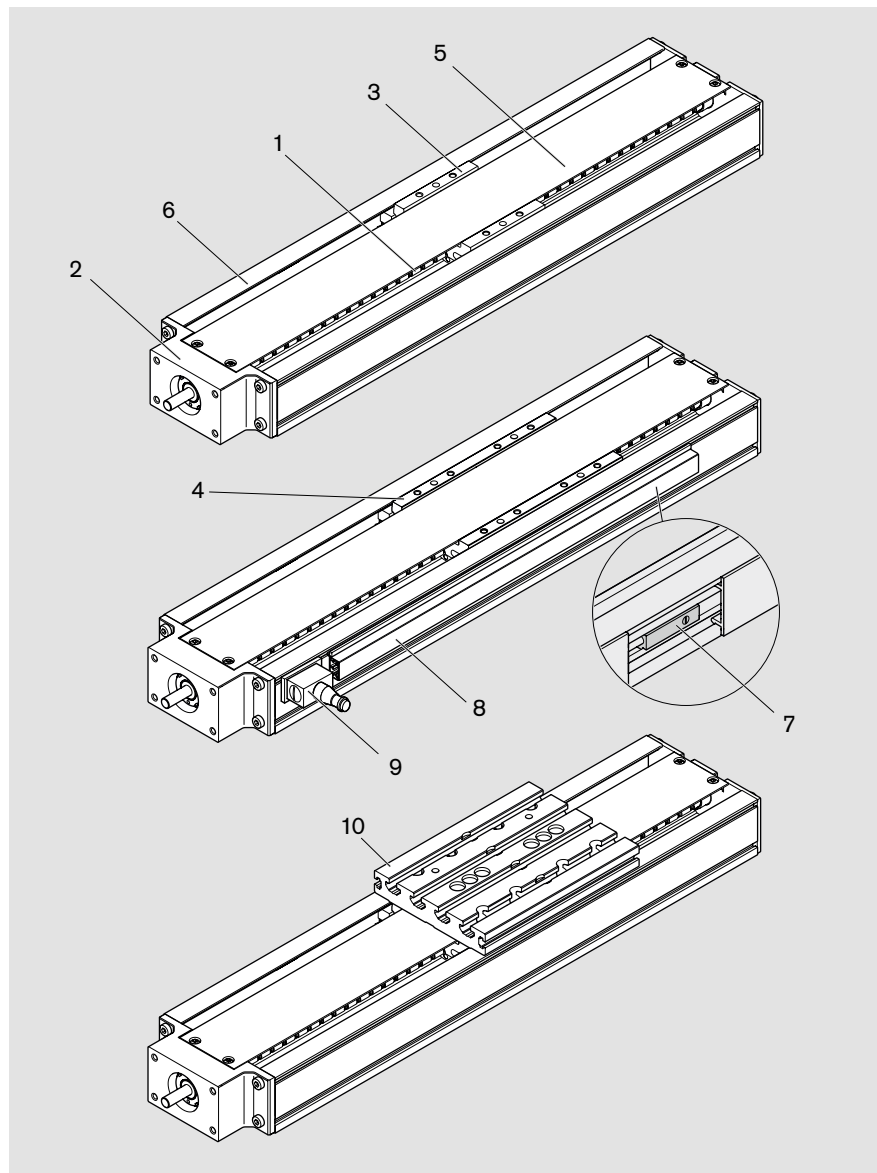
- eLINE ball screw drive
- Fixed bearing enclosure made of aluminum
- Motor mount and coupling or
- Timing belt side drive for motor attachment



- 1 eLINE ball screw with cylindrical screw-in nut
- 2 Fixed bearing enclosure
- 3 Short carriage version
- 4 Long carriage version
- 5 Aluminum cover
- 6 Frame

Attachments:

- 7 Magnetic field sensor
- 8 Mounting duct
- 9 Socket/plug
- 10 Connection plate



Motor attachment with motor mount and coupling

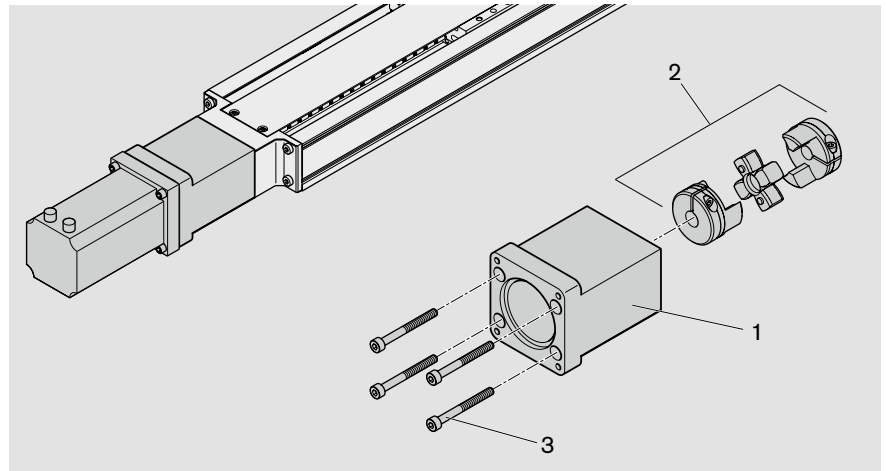
The motor mount serves to fasten the motor to the eCKK and acts as a closed housing for the coupling.

The motor's drive torque is transmitted stress-free through the coupling to the eLINE Compact Module's drive shaft.

Motor mount assembly (kit)

consisting of:

- 1 Motor mount
- 2 Coupling
- 3 Mounting screws



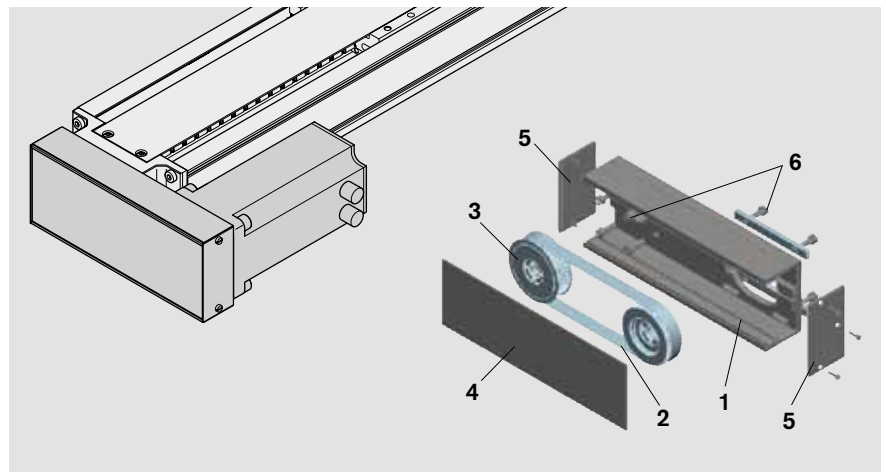
Motor attachment with timing belt side drive

On Compact Modules eCKK the motor can be attached via a side drive with timing belt. This makes the overall length shorter than when attaching the motor with a motor mount and coupling. The compact, closed housing serves as protection for the belt and as a motor bracket.

Timing belt side drive assembly (kit)

consisting of:

- 1 Pulley housing (aluminum)
- 2 Toothed belt
- 3 Belt pulleys with tensioning units
- 4 Cover plate
- 5 End covers with screws
- 6 Mounting screws



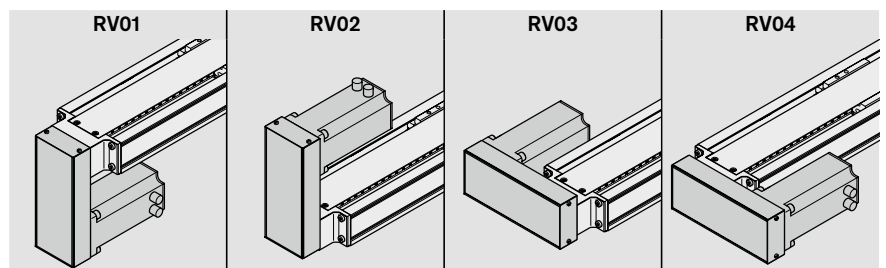
Available gear ratios:

$i = 1:1$

$i = 1:1.5$

The timing belt side drive can be installed in four directions:

- below: RV01
- above: RV02
- left: RV03
- right: RV04



eLINE Compact Modules eCKK – Freely Configurable

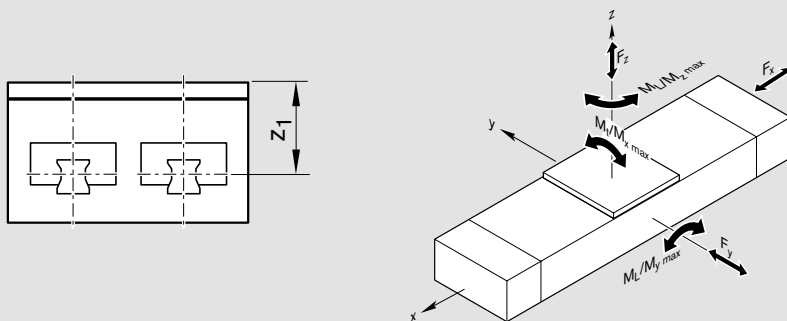
Technical Data

Size	Carriage length (mm) L_{ca}	Ball screw (mm) $d_o \times P$	Dynamic load capacity C (N)			Dynamic load moments (Nm)		Planar moment of inertia (cm ⁴)		Maximum length (mm) $L_{max}^{1)}$
			Guide-way	Ball screw	Fixed bearing	Torsional load moment M_t	Longitudinal load moment M_L	I_y	I_z	
eCKK 90	60	12 x 10	5000	1500	2550	166	29	12	97	680
	125		8100			270	200			
eCKK 110	82	16 x 10	11000	5800	3000	420	89	31	238	1200
	165		17800			682	700			

1) Length > 1200 mm: Option "with cover plate" not selectable beyond this length. See Components and Ordering Data

Size	Carriage length (mm) L _{ca}	Maximum permissible forces (N)		Maximum permis- sible moments (Nm)		Mass of linear system without connection plate (kg) m _s ²⁾	Moved mass of system (kg) m _{ca}	Maximum payload (kg) m _{ex max}	Repeatability (mm)	Dimen- sions (mm) z ₁
		F _{x max}	F _{y max} ¹ F _{z max}	M _{x max}	M _{y max} ¹ M _{z max}					
eCKK 90	60	200	250	16.6	2.9 ³⁾	0.00408 · L + 0.745	0.15	15	± 0.05	22.0
	125		405	27.0	20.0	0.00408 · L + 0.915	0.32	30		
eCKK 110	82	400	550	42.0	8.9 ³⁾	0.00674 · L + 1.405	0.27	30	± 0.05	24.5
	165		890	68.2	70.0	0.00674 · L + 1.745	0.61	60		

2) Without motor

3) Δ Consider the moment load capacity!Elasticity modulus $E = 70,000 \text{ N/mm}^2$ 

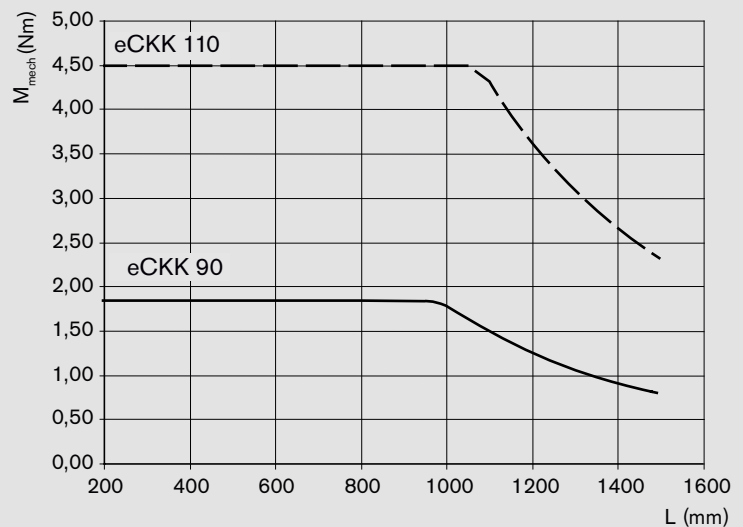
Note on dynamic load capacities and moments (see table)

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

Permissible drive torque M_{mech}

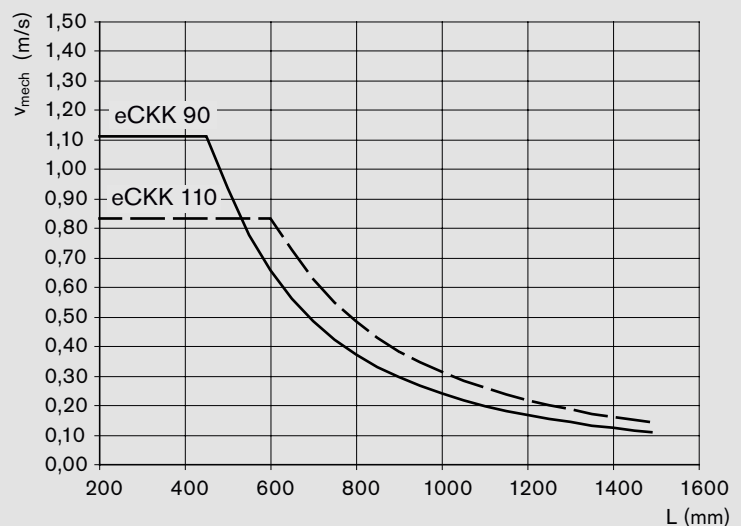
The values shown for M_{mech} are applicable under the following conditions:

- Horizontal operation
- No radial loads on ball screw journal



Permissible speed v_{mech}

Consider the motor speed!



Drive data eCKK with belt side drive

Motor	MSM 030C / MSK 030C / VRDM 3910 / VRDM 3913					
Frictional torque M_{Rsd} (Nm)	0.35					
		Permissible torque up to $L^{1)} = \dots$ at			Reduced mass moment of inertia at	
Gear ratio i			i = 1	i = 1.5	i = 1	i = 1.5
Size	Ball screw (mm) $d_o \times P$	L (mm)	M_{sd} (Nm)	M_{sd} (Nm)	J_{sd} (10^{-6} kgm)	J_{sd} (10^{-6} kgm)
eCKK 90	12 x 10	680	1.85	1.25	38	14
eCKK 110	16 x 10	1200	2.50	1.70	41	16

1) Permissible torque for greater lengths available upon request

M_{sd} = permissible torque at motor journal for system with side drive (take max. torque of motor M_{max} into account)

$M_{R\text{sd}}$ = frictional torque of timing belt side drive at motor journal

J_{sd} = reduced mass moment of inertia of timing belt side drive

i = timing belt side drive reduction

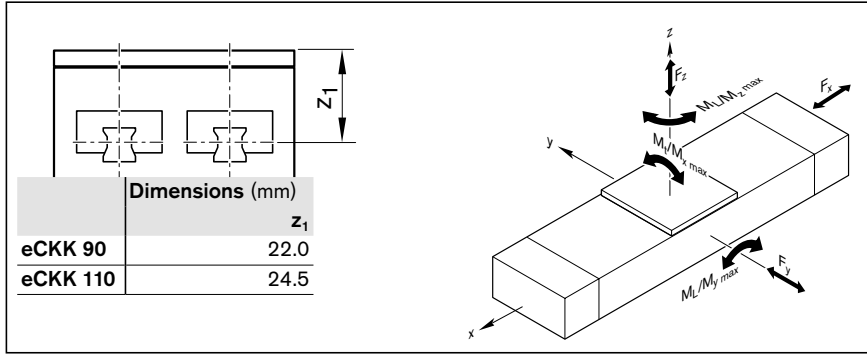
eLINE Compact Modules eCKK – Freely Configurable

Calculations

Calculation principles

Combined equivalent load on bearing of the linear guide

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



C = dynamic load capacity (N)

F_{comb} = combined equivalent load on bearing (N)

F_y = force in y-direction (N)

F_z = force in z-direction (N)

i = gear ratio of timing belt side drive

J_{br} = mass moment of inertia of motor brake (kgm²)

J_c = mass moment of inertia, coupling (kgm²)

J_{dc} = mass moment of inertia, drive train (kgm²)

J_{ex} = mass moment of inertia of mechanical system (kgm²)

J_m = mass moment of inertia, motor (kgm²)

J_s = mass moment of inertia of linear motion system (without external load) (kgm²)

J_{sd} = mass moment of inertia of timing belt side drive at motor journal (kgm²)

J_t = translatory mass moment of inertia of external load referred to the drive journal (kgm²)

J_{tot} = total mass moment of inertia (kgm²)

k_{J fix} = constant for fixed-length portion of mass moment of inertia (kgm²)

k_{J var} = constant for variable-length portion of mass moment of inertia (kgm²/mm)

k_{Jm} = constant for mass-specific portion of mass moment of inertia (10⁶ m²)

L = length of the linear system (mm)

L₁₀ = nominal life in meters (m)

L_h = nominal life in hours (h)

Nominal life

Nominal life of the guideway in meters:

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

Nominal life of the guideway in hours:

$$L_h = \frac{L_{10}}{3600 \cdot v_m}$$

Frictional torque M_R

for motor attachment via motor mount and coupling:

$$M_R = M_{Rs}$$

for motor attachment via timing belt side drive:

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

Mass moment of inertia of the linear motion system J_s referred to the drive journal

$$J_s = (k_{J \text{ fix}} + k_{J \text{ var}} \cdot L) \cdot 10^{-6}$$

Constants k_{Jfix}, k_{Jvar}, k_{Jm}
Frictional torque M_{Rs}

Size	Ball screw d ₀ x P	Constants				Frictional torque M _{Rs} (Nm)
		k _{Jfix} Short carriage version	Long carriage version	k _{Jvar}	k _{Jm}	
eCKK 90	12 x 10	3.630	4.056	0.011	2.533	0.08
eCKK 110	16 x 10	13.354	14.178	0.031	2.533	0.11

Mass moment of inertia of the mechanical system J_{ex} referred to the motor journal

Motor attachment via motor mount and coupling

$$J_{ex} = J_s + J_t + J_c$$

Motor attachment via timing belt side drive

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

Translatory mass moment of inertia of external load J_t referred to the drive journal

$$J_t = m_{ex} \cdot k_{jm} \cdot 10^{-6}$$

Mass moment of inertia of the drive train J_{dc} referred to the motor journal

$$J_{dc} = J_{ex} + J_{br}$$

Mass moment of inertia ratio

$$V = \frac{J_{dc}}{J_m}$$

Application area	V
Handling	≤ 6.0
Processing	≤ 1.5

m_{ex}	= moved external load	(kg)
M_L	= dynamic longitudinal moment load capacity	(Nm)
M_R	= frictional torque at motor journal	(Nm)
M_{Rs}	= frictional torque of the system	(Nm)
M_{Rsd}	= frictional torque of timing belt side drive at motor journal	(Nm)
M_t	= dynamic torsional moment load capacity	(Nm)
M_x	= torsional moment about the x-axis	(Nm)
M_y	= torsional moment about the y-axis	(Nm)
M_z	= torsional moment about the z-axis	(Nm)
$n_{m \max}$	= maximum permissible rotary speed of motor with controller	(min ⁻¹)
n_{mech}	= maximum permissible rotary speed of mechanical system	(min ⁻¹)
P	= screw lead	(mm)
V	= ratio of mass moments of inertia of drive train and motor	(-)
v_m	= average speed	(m/s)
v_{mech}	= maximum permissible rotary speed of mechanical system	(m/s)
z_1	= application point of the effective force	(mm)

Total mass moment of inertia J_{tot} referred to the motor journal

$$J_{tot} = J_{dc} + J_m$$

Maximum permissible rotary speed n_{mech} for mechanical system

$$n_{mech} = \frac{v_{mech} \cdot i \cdot 1000 \cdot 60}{P}$$

$$n_{mech} < n_{m \max}$$

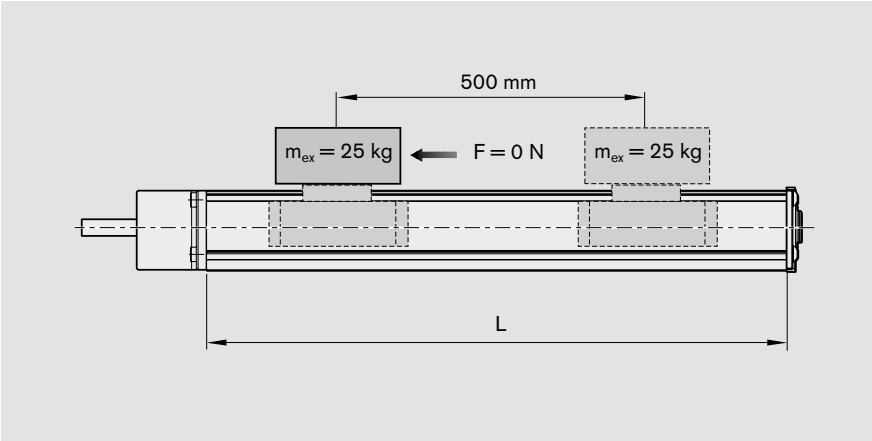
Coupling data

Size	Rated torque of coupling M_{cN} (Nm)	Mass moment of inertia J_c (10 ⁻⁶ kgm ²)	Coupling mass m_c (kg)
eCKK 90	14	12.13	0.092
eCKK 110	14	12.13	0.092

Calculations

Calculation example

When dimensioning the drive unit, always consider the motor-controller combination because the motor type and performance data (such as maximum usable speed and maximum torque) are dependent on the controller or control system used.



Given data

A mass of 25 kg is to be moved 500 mm at a maximum travel speed of 0.67 m/s. Based on the technical data and connection dimensions, the following module is selected:

eCKK 110

- One long carriage
- With a size MSK 030C AC servo motor attached via motor mount and coupling

Calculation of eCKK length L

s_e = excess travel
 s_{eff} = effective stroke
 L_{ca} = carriage length
 P = screw lead
 M_{Rs} = frictional torque of the system
 m_{ex} = moved external load

Excess travel	= $2 \cdot P = 2 \cdot 10 \text{ mm} = 20 \text{ mm}$
Max. travel	= $s_{eff} + 2 \cdot s_e$
	= $500 \text{ mm} + 2 \cdot 20$
	= 540 mm
eCKK length L	= $(s_{eff} + 2 \cdot s_e) + L_{ca} + 15$ (according to formula given under "Components and Ordering Data" for eCKK 110)
	= $540 + 165 + 15$
	= 720 mm

Frictional torque M_R

M_R	= M_{Rs} (see "Technical Data")
M_R	= 0.11 Nm

Mass moment of inertia, drive train

$$\begin{aligned}
 J_{\text{ex}} &= J_s + J_t + J_c \\
 J_s &= (k_{\text{Jfix}} + k_{\text{Jvar}} \cdot L) \cdot 10^{-6} \text{ kgm}^2 \\
 &= (14.178 + 0.031 \cdot 720 \text{ mm}) \cdot 10^{-6} \text{ kgm}^2 \\
 &= 36.498 \cdot 10^{-6} \text{ kgm}^2 \\
 J_t &= k_{\text{Jm}} \cdot m_{\text{ex}} \cdot 10^{-6} \text{ kgm}^2 \quad (k_{\text{Jfix}}, k_{\text{Jvar}}, k_{\text{Jm}} \text{ see "Constants" table}) \\
 J_t &= 2.533 \cdot 25 \text{ kg} \cdot 10^{-6} \text{ kgm}^2 \\
 J_t &= 63.325 \cdot 10^{-6} \text{ kgm}^2 \\
 J_c &= 12.130 \cdot 10^{-6} \text{ kgm}^2 \quad (\text{see "Coupling data"}) \\
 J_{\text{ex}} &= (36.498 + 63.325 + 12.130) \cdot 10^{-6} \text{ kgm}^2 \\
 J_{\text{ex}} &= 111.953 \cdot 10^{-6} \text{ kgm}^2 \\
 J_{\text{br}} &= 7 \cdot 10^{-6} \text{ kgm}^2 \quad (\text{see "Motors"}) \\
 J_{\text{dc}} &= J_{\text{ex}} + J_{\text{br}} \\
 J_{\text{dc}} &= 118.953 \cdot 10^{-6} \text{ kgm}^2
 \end{aligned}$$

$$V = \frac{J_{\text{dc}}}{J_m} \leq 6$$

$$J_m = 30 \cdot 10^{-6} \text{ kgm}^2 \quad (\text{see "Motors"})$$

$$V = \frac{118.953 \cdot 10^{-6} \text{ kgm}^2}{30 \cdot 10^{-6} \text{ kgm}^2}$$

$$V = 3.97 \leq 6$$

The selected motor MSK 030C is therefore suitable.

Rotary speed n

at $v = 0.67 \text{ m/s}$

$$n_{\text{mech}} = \frac{v \cdot i \cdot 1000}{P} = \frac{0.67 \text{ m/s} \cdot 1 \cdot 1000 \cdot 60}{10 \text{ mm}} = 4000 \text{ min}^{-1} < n_{\text{m max}}$$

$$v = 0.67 \text{ m/s}$$

Result

eCKK 110

Length: $L = 720 \text{ mm}$

Ball screw drive:

Diameter: 16 mm

Lead: 10 mm

Carriage version: Long

Motor attachment via motor mount and coupling

Motor with:

- a maximum usable speed $n_{\text{m max}} > 4000 \text{ min}^{-1}$
- mass moment of inertia $J_m > 19.83 \cdot 10^{-6} \text{ kgm}^2$
- maximum permissible drive torque $M_{\text{max}} < 4.5 \text{ Nm}$

Consider rated torque of coupling M_{cN} and frictional torque M_R
 $(M_{\text{cN}} = 14 \text{ Nm}; M_R = 0.11 \text{ Nm})$

The specific motor is selected:

- according to criteria from the table "AC servo motor data"
- by recalculating the drive unit with performance data from the "ECODRIVE Cs" and "IndraDrive for Linear Motion Systems" catalogs.

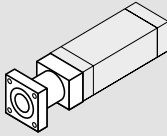
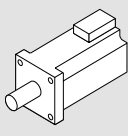
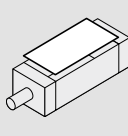
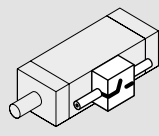
eLINE Compact Modules eCKK – Freely Configurable

eCKK 90 Components and Ordering Data

Part number, length R0361 300 00, ... mm	Type	Guideway	Drive unit		Carriage				
			Screw journal	Ball screw size $d_0 \times P$	Without connection plate Short carriage $L_{ca} = 60 \text{ mm}$	Without connection plate Long carriage $L_{ca} = 125 \text{ mm}$	With connection plate Short carriage $L_{ca} = 60 \text{ mm}$	With connection plate Long carriage $L_{ca} = 125 \text{ mm}$	
With ball screw without motor mount (OF)	OF01	01	Ø8	02	01	02	05	06	
With ball screw and motor mount (MF)	MF01		Ø8	02	–	02	–	06	
With ball screw and side drive (RV)	RV01 RV02 RV03 RV04		Ø8	02	–	02	–	06	

Please make sure that the selected combination is a permissible one (load capacities, moments, max. speeds, motor data, etc.)!

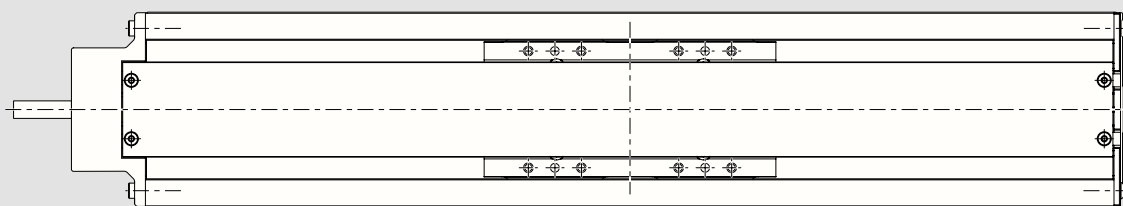
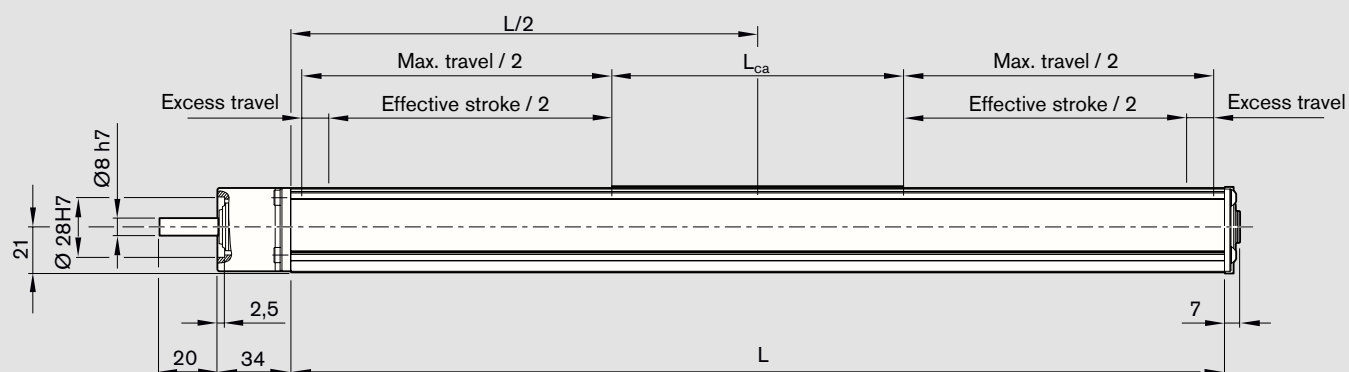
Order example: see "Inquiry/Order Form" section.

	Motor attachment			Motor = ...		Cover = ...		1st, 2nd, 3rd switch = ...				Documentation			
									Mounting duct = ...						
	Gear ratio	Attachment kit ¹⁾	for motor	without brake	with brake	without cover plate	with cover plate ³⁾						Standard report		
	i = 1	00	-	00		00	01	Without switches Without switch Without mounting duct00						10	
	i = 1		01	MSK 030C	84	85	00								01
			03	VRDM 368	35	36									
			05	MSM 030C	72	73									
			06	VRDM 397	37	38									
				VRDM 3910	39	40									
	i = 1		11	MSK 030C	84	85	00	01	Magnetic field sensor Reed sensor21Mounting ductSocket/ plug Hall sensor, PNP NC222517						
			13	MSM 030C	72	73									
			14	VRDM 3910	39	40									
	i = 1.5		21	MSK 030C	84	85	00	01	Magnetic field sensor with connector ²⁾ Reed sensor58 Hall sensor, PNP NC59						
			23	MSM 030C	72	73									

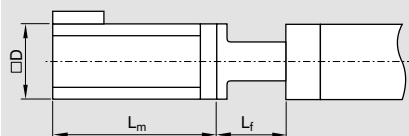
eLINE Compact Modules eCKK – Freely Configurable

eCKK 90 Dimensions

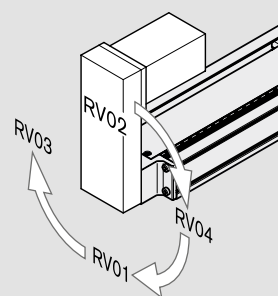
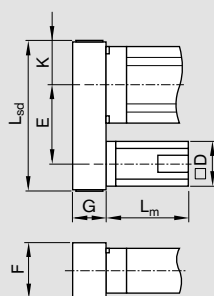
All dimensions in mm. Diagrams to different scales.



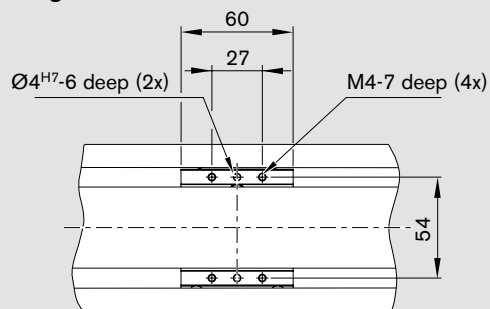
MF01



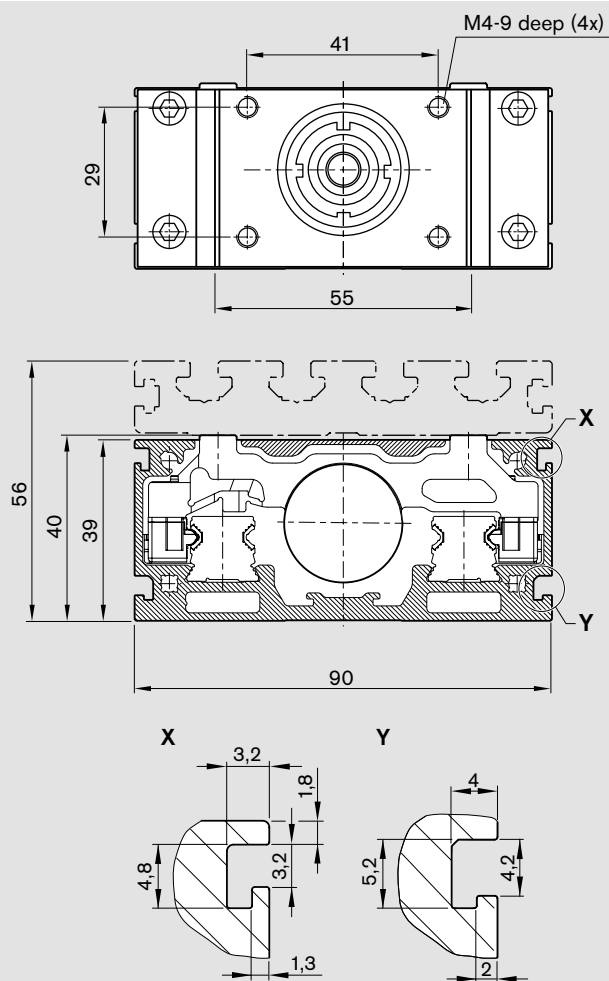
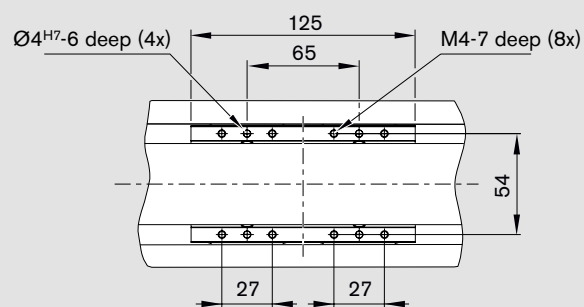
RV01 – RV04



Short carriage version



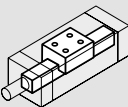
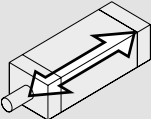
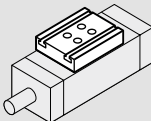
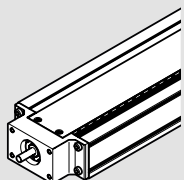
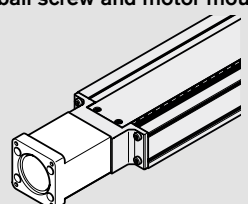
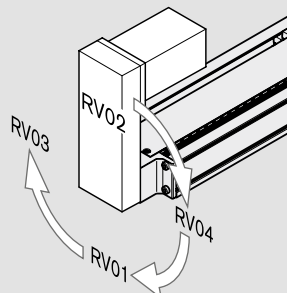
Long carriage version



Type	Motor	Dimensions (mm)									
		D	L _f	without brake	L _m with brake	F	G	K	i = 1	E i =1.5	L _{sd}
MF01	MSK 030C	54	70.0	188.0	213.0	–	–	–	–	–	–
	MSM 030C	60	72.0	138.5	171.5	–	–	–	–	–	–
	VRDM 368	57	50.0	116.0	157.0	–	–	–	–	–	–
	VRDM 397	85	71.5	110.0	156.5	–	–	–	–	–	–
	VRDM 3910	–	–	140.0	186.5	–	–	–	–	–	–
RV01 – RV04	MSK 030C	54	–	188.0	213.0	64.5	37	33.0	89.5	–	179
	MSM 030C	60	–	138.5	171.5	64.5	37	33.0	89.5	–	179
	VRDM 3910	85	–	140.0	186.5	88.0	51	35.5	105	–	200
	MSK 030C	54	–	188.0	213.0	64.5	37	33.0	–	115	191
	MSM 030C	60	–	138.5	171.5	64.5	37	33.0	–	115	191

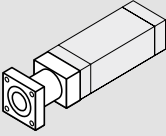
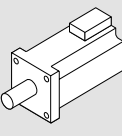
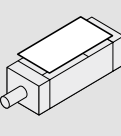
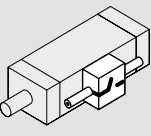
eLINE Compact Modules eCKK – Freely Configurable

eCKK 110 Components and Ordering Data

Part number, length R0361 400 00, ... mm	Type	Guideway 	Drive unit 		Carriage 				
			Screw journal	Ball screw size d ₀ x P 16 x 10	Without connection plate Short carriage L _{ca} = 82 mm	Long carriage L _{ca} = 165 mm	With connection plate Short carriage L _{ca} = 82 mm	Long carriage L _{ca} = 165 mm	
With ball screw without motor mount (OF) 	OF01	01	Ø11	02	01	02	05	06	
With ball screw and motor mount (MF) 	MF01		Ø11	02	–	02	–	06	
With ball screw and side drive (RV) 	RV01 RV02 RV03 RV04		Ø11	02	–	02	–	06	

Please make sure that the selected combination is a permissible one (load capacities, moments, max. speeds, motor data, etc.)!

Order example: see "Inquiry/Order Form" section.

Motor attachment			Motor = ...		Cover = ...		1st, 2nd, 3rd switch = ...	Documentation
							 Mounting duct = ...	
Gear ratio	Attachment kit ¹⁾	for motor	without brake	with brake	without cover plate	with cover plate ³⁾		Standard report
i = 1	00	-	00		00	01	Without switches Without switch Without mounting duct 00	10
i = 1	01	MSK 030C	84	85	00	01	With switches Magnetic field sensor	
	04	VRDM 397	37	38			Reed sensor 21 Mounting duct Socket/ plug	
	05	VRDM 3910	39	40			Hall sensor, PNP NC 22 25 17	
i = 1	11	MSK 030C	84	85	00	01	Magnetic field sensor with connector²⁾	
	15	MSM 030C	72	73			Reed sensor 58	
	19	VRDM 3913	41	42			Hall sensor, PNP NC 59	
	21	MSK 030C	84	85				
i = 1.5	25	MSM 030C	72	73				

1) Attachment kit also available without motor (when ordering: enter "00" for motor)

2) Including mounting accessories

3) Length > 1200 mm: The option "with cover plate" is not selectable.

Calculating the length of the eCKK 110

Short carriage version: $L = (\text{Effective stroke} + 2 \cdot \text{excess travel}) + L_{ca} + 13 \text{ mm}$

Long carriage version: $L = (\text{Effective stroke} + 2 \cdot \text{excess travel}) + L_{ca} + 15 \text{ mm}$

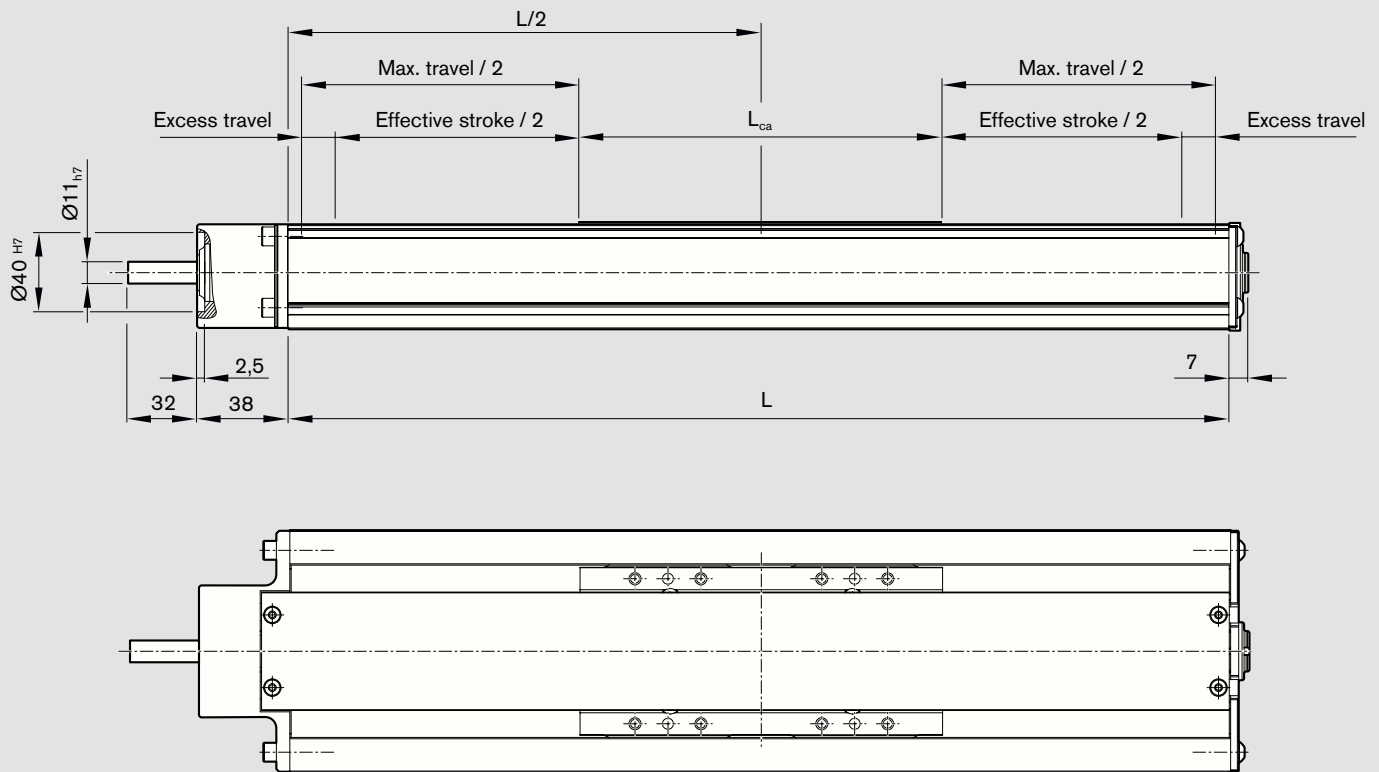
In most cases, the recommended limit for excess travel (braking distance) is:
Excess travel = 2 · screw lead P

Example:
Ball screw 16 x 10 (d₀ x P),
Excess travel = 2 · 10 = 20 mm

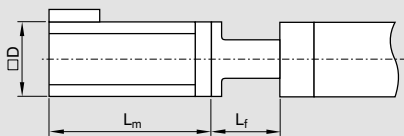
eLINE Compact Modules eCKK – Freely Configurable

eCKK 110 Dimensions

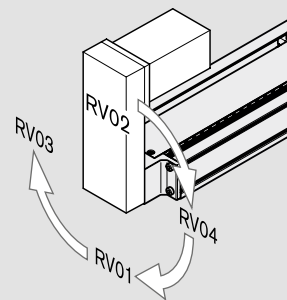
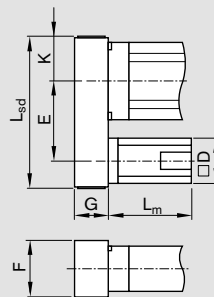
All dimensions in mm. Diagrams to different scales.



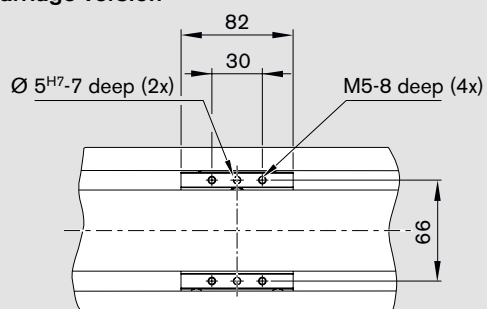
MF01



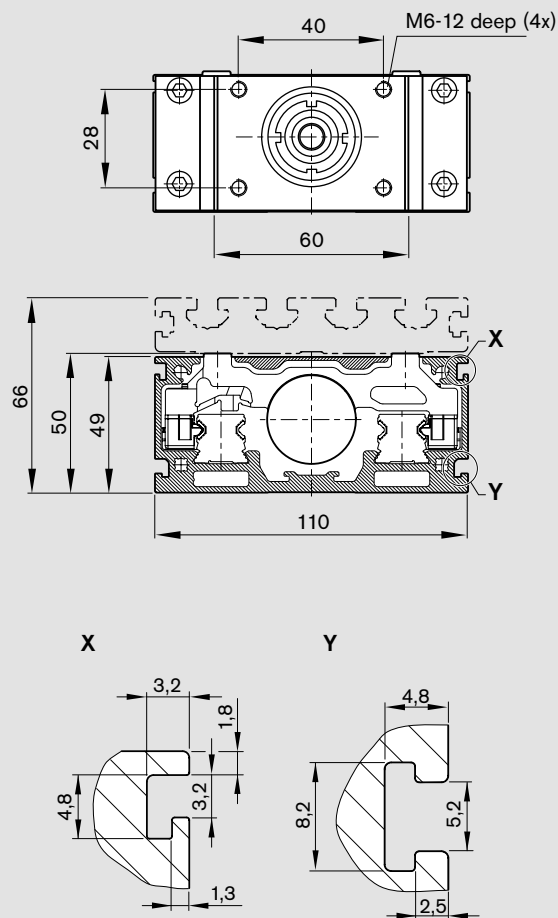
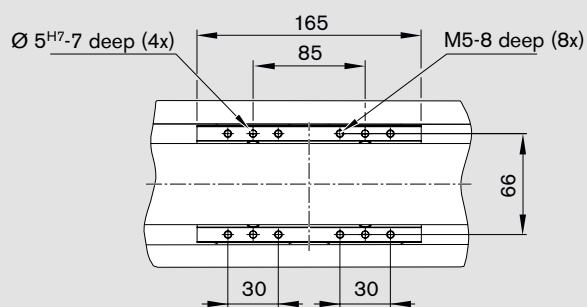
RV01 – RV04



Short carriage version



Long carriage version



Type	Motor	Dimensions (mm)									
		D	L _f	without brake	L _m with brake	F	G	K	i = 1	E i = 1.5	L _{sd}
MF01	MSK 030C	54	75.0	188.0	213.0	-	-	-	-	-	-
	MSM 030C	60	72.0	138.5	171.5	-	-	-	-	-	-
	VRDM 397	85	77.5	110.0	156.5	-	-	-	-	-	-
	VRDM 3910			140.0	186.5	-	-	-	-	-	-
RV01 – RV04	MSK 030C	54	-	188.0	213.0	64.5	37	33.0	103.5	-	179
	MSM 030C	60	-	138.5	171.5	64.5	37	33.0	103.5	-	179
	MSK 030C	54	-	188.0	213.0	64.5	37	33.0	-	115	191
	MSM 030C	60	-	138.5	171.5	64.5	37	33.0	-	115	191
	VRDM 3913	85	-	170.0	216.5	88.0	51	43.5	122.5	-	226

eLINE Compact Modules eCKR – Freely Configurable

Structural Design

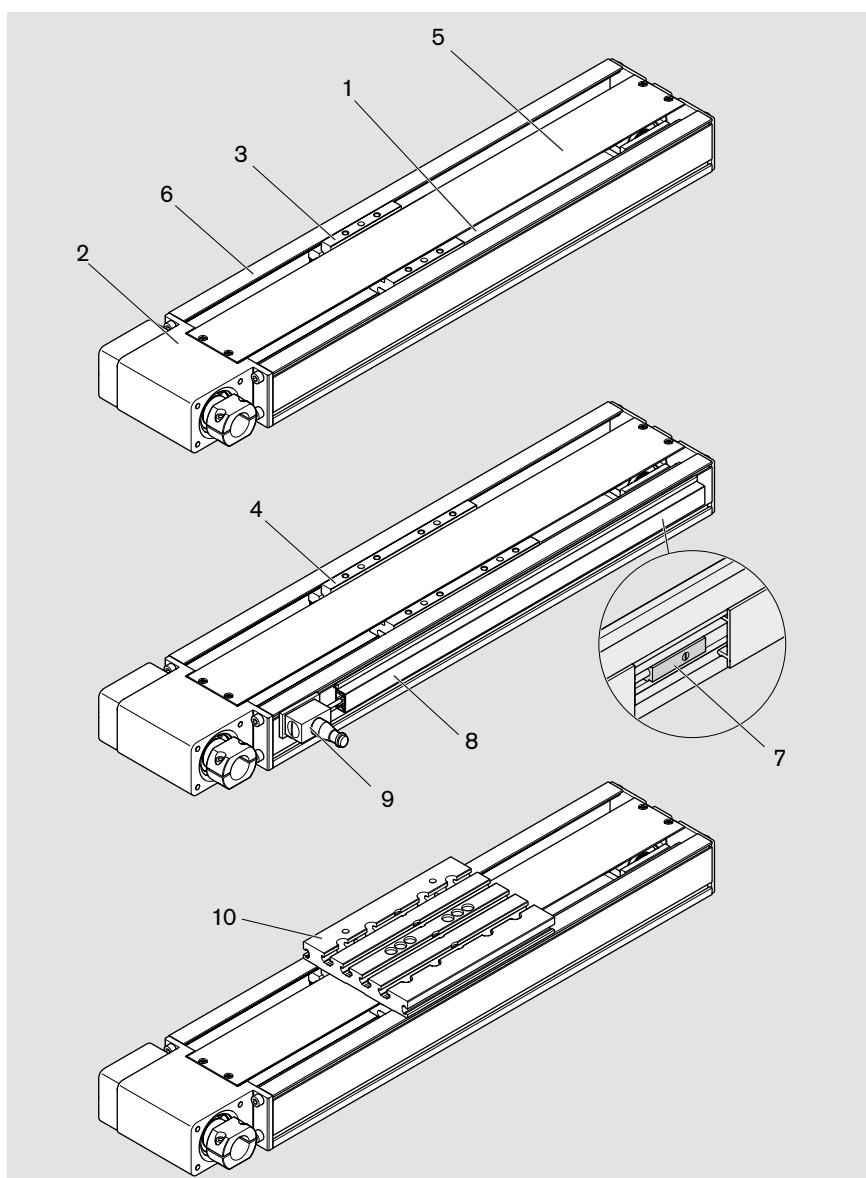
- Toothed belt 25HTD3
- Motor mount
or
- Gear reducer for motor attachment



- 1 Toothed belt
- 2 Drive end enclosure
- 3 Short carriage version
- 4 Long carriage version
- 5 Aluminum cover
- 6 Frame

Attachments:

- 7 Magnetic field sensor
- 8 Mounting duct
- 9 Socket/plug
- 10 Connection plate



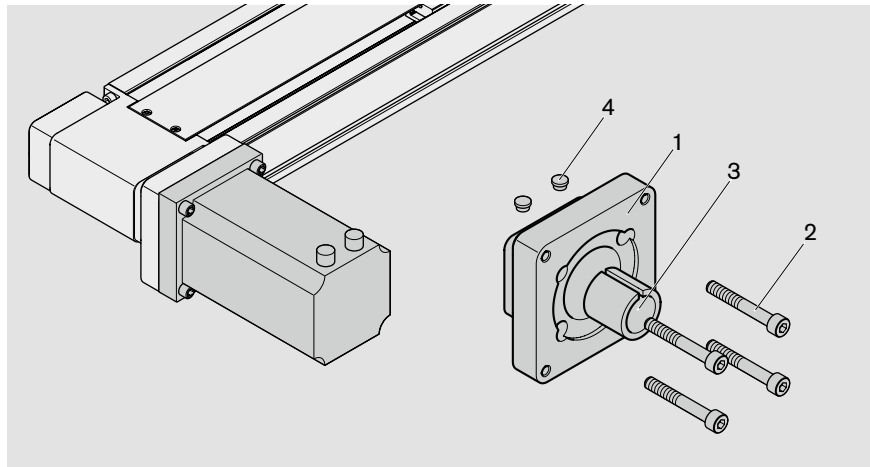
Direct motor attachment with $i = 1$

The motor is attached directly to the eCKR's drive end enclosure via a motor mount.

Motor mount assembly (kit)

consisting of:

- 1 Flange
- 2 Fastening screws
- 3 Reducer sleeve (if required)
- 4 Mounting hole plugs



Motor attachment via gear reducer

For all eLINE Compact Modules eCKR a planetary gear can be installed via a flange. The flange serves as a mounting point for the gearbox to the eCKR. This direct connection eliminates the need for a coupling, thereby minimizing torsional deflection.

Different gear ratios are available:

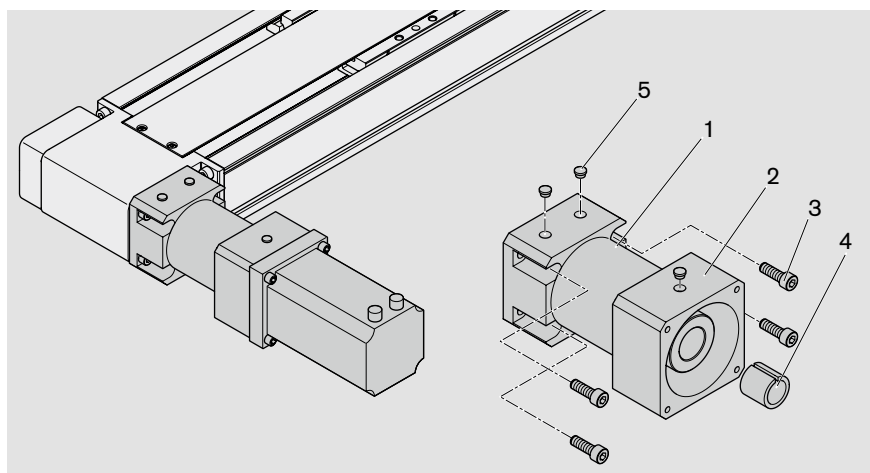
$i = 5$

$i = 8$

Motor mount assembly (kit)

consisting of:

- 1 Gear reducer
- 2 Adapter plate
- 3 Mounting screws for attachment to the eCKR
- 4 Reducer sleeve (if required)
- 5 Mounting hole plugs



Technical Data

Size	Carriage length (mm)	Dynamic load capacity Guideway (N)	Dynamic load moments (Nm)		Planar moment of inertia (cm ⁴)		Maximum length (mm)	Specific spring rate of toothed belt (25HTD3) (N/mm · m)		
			Torsional load moment	Longitudinal load moment						
	L _{ca}	C	M _t	M _L	I _y	I _z	L _{max} ¹⁾	C _{spec}		
eCKR 90	90	5000	166	29	12	97	2500	187.5		
	125	8100	270	200						
eCKR 110	100	11000	420	89	31	238				
	165	17800	682	700						

1) Length > 1200 mm: Option "with cover plate" not selectable beyond this length. See Components and Ordering Data

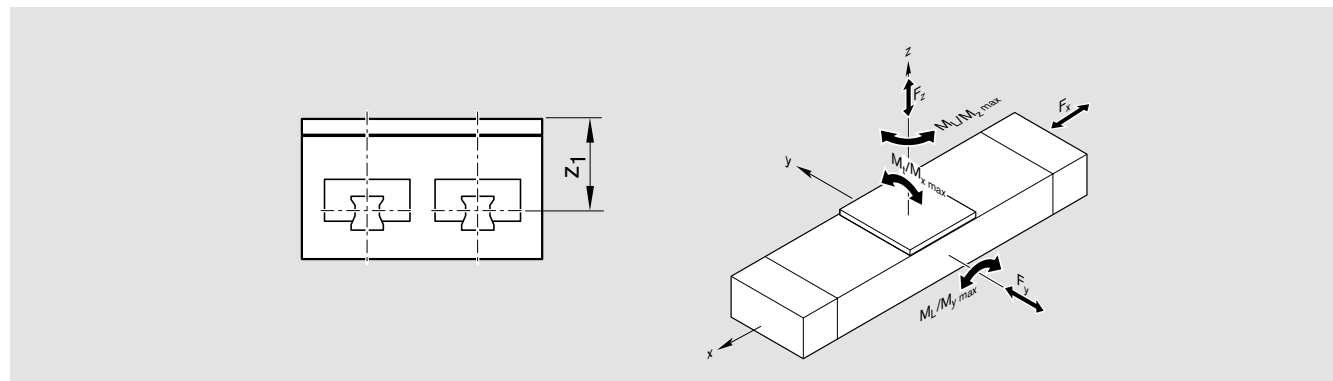
Size	Carriage length (mm) L_{ca}	Maximum permissible forces (N) $F_{y \max}, F_{z \max}$	Maximum permissible moments (Nm)		Mass of linear system without connection plate (kg) $m_s^{2)}$	Moved mass of system (kg) m_{ca}	Maximum payload (kg) $m_{ex \max}$	Repeat-ability (mm) z_1	Additional mass of gear reducer (kg) m_{ge}
			$M_{x \max}$	$M_{y \max}, M_{z \max}^{2.9)}$					
eCKR 90	90	250	16.6	20.0	$0.00346 \cdot L + 1.073$	0.19	15	± 0.2	22.0
	125	405	27.0	20.0					
eCKR 110	100	550	42.0	8.9 ³⁾	$0.00563 \cdot L + 1.710$	0.31	30	± 0.2	24.5
	165	890	68.2	70.0					

2) Without motor

3) Δ Consider the moment load capacity!

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

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



Note on dynamic load capacities and moments (see table)

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

Calculation of belt elongation ΔL_{tb}

The belt elongation/position offset resulting from external loading of the toothed belt can be approximately determined with the help of the following formula:

$$\Delta L_{tb} = \frac{(F_x \cdot L_{tb})}{c_{spec}}$$

c_{spec} = specific spring rate of toothed belt (N/mm · m)
 F_x = external load (N)
 L_{tb} = length of elongated toothed belt section (m)
 ΔL_{tb} = elongation of the toothed belt as a result of external loads (mm)

Drive data without motor

Size	Gear ratio i	Maximum drive torque ¹⁾ M_{mech} (Nm)	Lead constant u (mm)	Belt drive transmission force F at maximum drive torque (N)
eCKR 90	1	3.00	66.00	290
	5	0.60	13.20	
	8	0.37	8.25	
eCKR 110	1	4.90	90.00	340
	5	1.00	18.00	
	8	0.60	11.25	

1) Maximum 1,000 cycles/hour (only when using the gear reducer)

Drive data without motor (i = 1)

Size	Drive unit diameter d_3 (mm)	Lead constant u (mm)	Travel speed v_{mech} (m/s)	Reduced mass moment of inertia J_s (kgm ²)	
				Short carriage version	Long carriage version
eCKR 90	21.01	66	2	$(0.34 + 0.00017 \cdot L) \cdot 10^{-4}$	$(0.43 + 0.00017 \cdot L) \cdot 10^{-4}$
eCKR 110	28.65	90	2	$(0.97 + 0.00032 \cdot L) \cdot 10^{-4}$	$(1.45 + 0.00032 \cdot L) \cdot 10^{-4}$

Calculations

Combined equivalent load on bearing of the linear guide

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

Nominal life

Nominal life of the guideway in meters:

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

Nominal life of the guideway in hours:

$$L_h = \frac{L_{10}}{3600 \cdot v_m}$$

Frictional torque

for motor attachment via motor mount:

$$M_R = M_{R_s}$$

for motor attachment via gear reducer:

$$M_R = \frac{M_{R_s}}{i} + M_{R_{ge}}$$

C = dynamic load capacity (N)

F_{comb} = combined equivalent load on bearing (N)

F_y = force in y-direction (N)

F_z = force in z-direction (N)

i = gear ratio

L = length of the linear system (mm)

L_{10} = nominal life in meters (m)

L_h = nominal life in hours (h)

M_L = dynamic longitudinal moment load capacity (Nm)

M_R = frictional torque at motor journal (Nm)

M_{R_s} = frictional torque of the system (Nm)

$M_{R_{ge}}$ = frictional torque of gear reducer (Nm)

M_t = dynamic torsional moment load capacity (Nm)

M_x = torsional moment about the x-axis (Nm)

M_y = torsional moment about the y-axis (Nm)

M_z = torsional moment about the z-axis (Nm)

v_m = average linear speed (m/s)

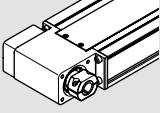
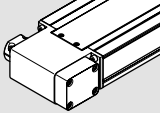
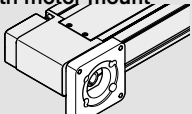
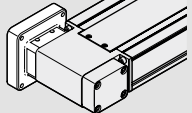
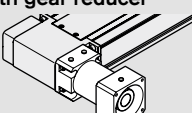
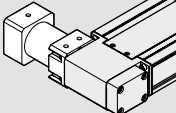
z_1 = application point of the effective force (mm)

Frictional torque, mass moments of inertia

Size	Gear reducer type	Gear ratio i	Mass moment of inertia of gear unit referred to the drive J_{ge} (kgm ²) · 10 ⁻⁴	Frictional torque	
				M_{R_s} (Nm)	$M_{R_{ge}}$ (Nm)
eCKR 90	PLE 40	5	0.019	0.35	0.05
		8	0.017		
eCKR 110	PLE 40	5	0.019	0.33	0.05
		8	0.017		

eLINE Compact Modules eCKR – Freely Configurable

eCKR 90 Components and Ordering Data

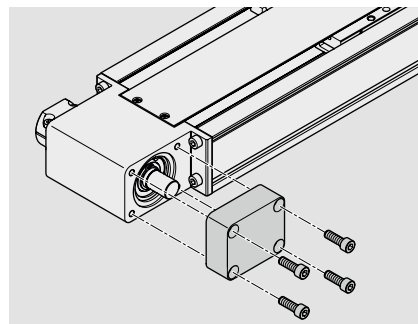
Part number, length R0363 300 00, ... mm	Type	Guideway	Drive unit			Carriage			
			drive side	with clamping hub	with gear reducer	Without connection plate		With connection plate	
						Short carriage	Long carriage	Short carriage	Long carriage
						$L_{ca} = 90 \text{ mm}$	$L_{ca} = 125 \text{ mm}$	$L_{ca} = 90 \text{ mm}$	$L_{ca} = 125 \text{ mm}$
Without motor mount 	MA05	01	right	06	–	01	02	05	06
Without motor mount 	MA06		left						
With motor mount 	MA10		right	06	–	–	02	–	06
With motor mount 	MA11		left						
With gear reducer 	MG10		right	–	08	–	02	–	06
With gear reducer 	MG11		left						

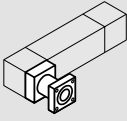
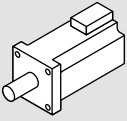
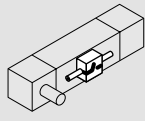
Please make sure that the selected combination is a permissible one (load capacities, moments, max. speeds, motor data, etc.)!

Order example: see "Inquiry/Order Form" section.

Note: Data on the performance of the eCKR with gear reducer can be found in the section "Performance Data."

On all versions, a second drive shaft end can be made available by removing the cover.



	Motor attachment			Motor = ...		Cover = ...		1st, 2nd, 3rd switch = ...				Documentation	
													
	Gear ratio	Attachment kit ¹⁾	for motor	without brake	with brake	without cover plate	with cover plate ²⁾	Mounting duct = ...				Standard report	
	i = 1	00	-	00		00	01	Without switches				10	
								Without switch Without mounting duct		00			
								With switches					
								Magnetic field sensor					
	i = 1	05	VRDM 3910	39	40	00	01	Reed sensor	21	Mounting duct 25	Socket/ plug 17		
		06	VRDM 3913	41	42			Hall sensor, PNP NC	22				
		01	MSK 040C	86	87								
	i = 5	11	MSK 030C	84	85	00	01	Magnetic field sensor with connector ²⁾					
								Reed sensor	58				
	i = 10							Hall sensor, PNP NC	59				

1) Attachment kit also available without motor (when ordering: enter "00" for motor)

2) Including mounting accessories

3) Length > 1200 mm: The option "with cover plate" is not selectable.

Calculating the length of the eCKR 90

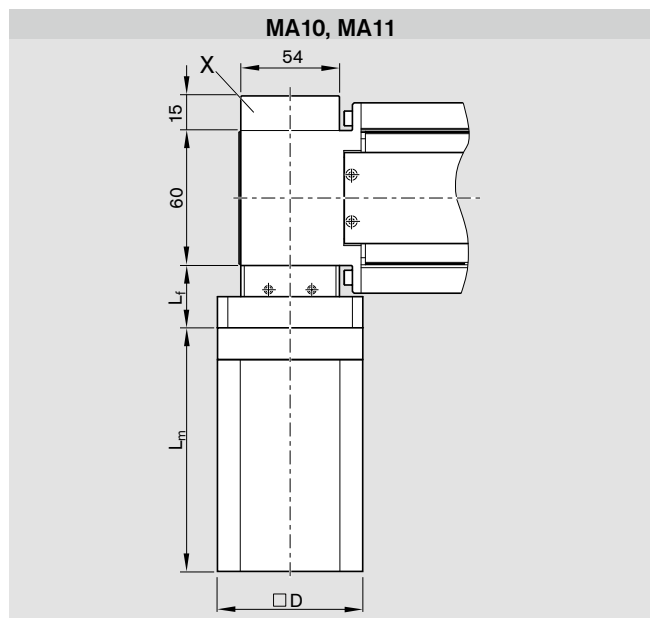
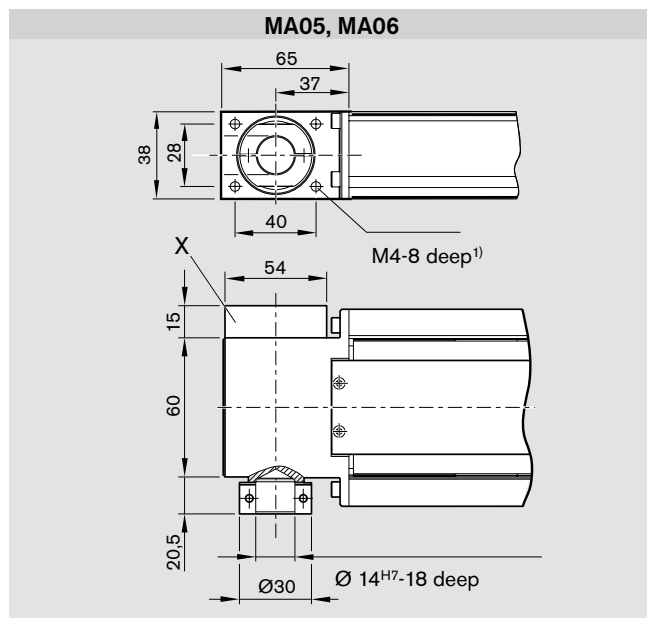
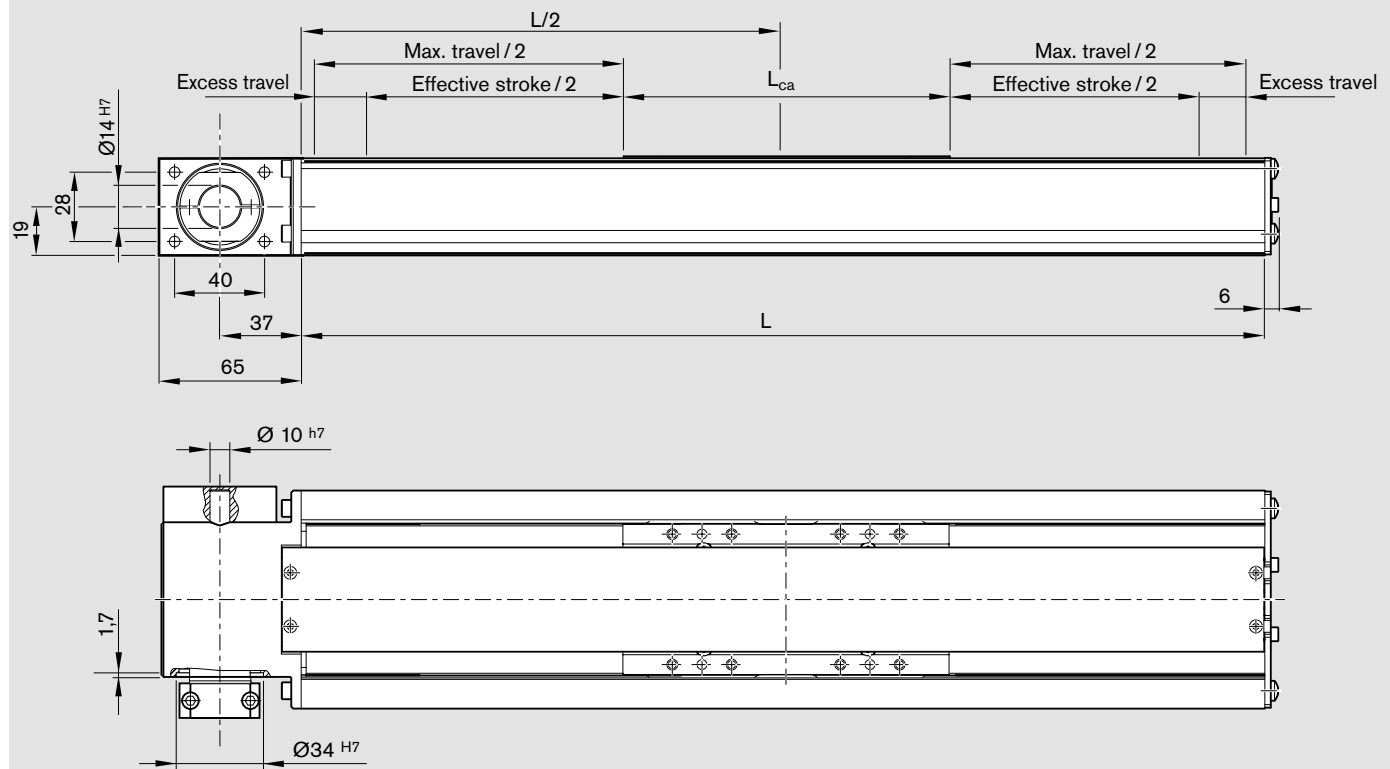
Short carriage version: $L = (\text{Effective stroke} + 2 \cdot \text{excess travel}) + L_{ca} + 25 \text{ mm}$

Long carriage version: $L = (\text{Effective stroke} + 2 \cdot \text{excess travel}) + L_{ca} + 25 \text{ mm}$

eLINE Compact Modules eCKR – Freely Configurable

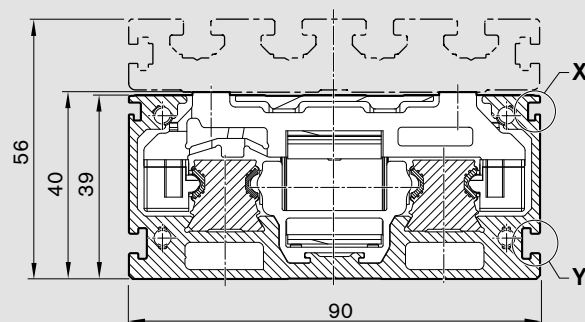
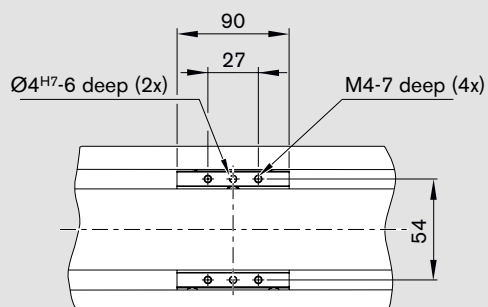
eCKR 90 Dimensions

All dimensions in mm. Diagrams to different scales.

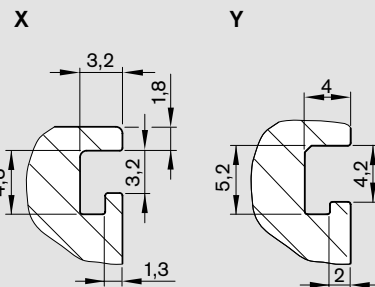
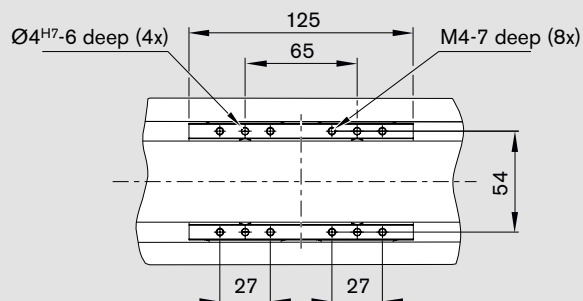


1) On both sides (also on second drive side, second shaft end)

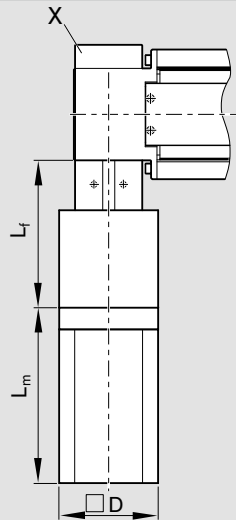
Short carriage version



Long carriage version

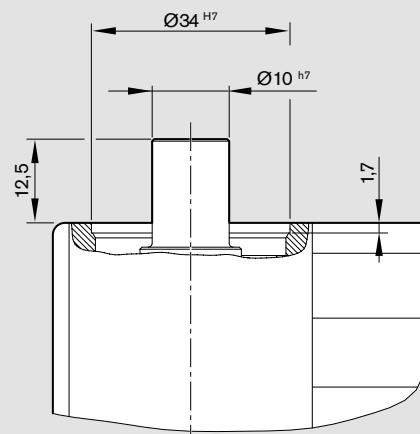


MG10, MG11



X

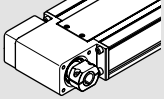
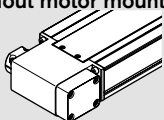
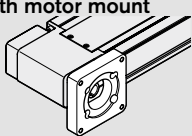
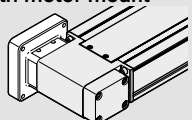
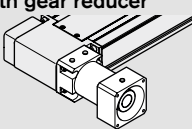
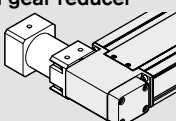
Second shaft end (with cover removed)



Type	Motor	Dimensions (mm)			
		D	L _f	with brake	L _m w/o brake
MA10, MA11	VRDM 3910	85	34.5	186.5	140.0
	VRDM 3913	85		216.5	170.0
	MSK 040C	82		215.5	185.5
MG10, MG11	MSM 020B	42	98.5	140.5	109.0
	MSM 030B	60	104.5	144.0	111.0
	MSK 030C	54	98.5	213.0	188.0

eLINE Compact Modules eCKR – Freely Configurable

eCKR 110 Components and Ordering Data

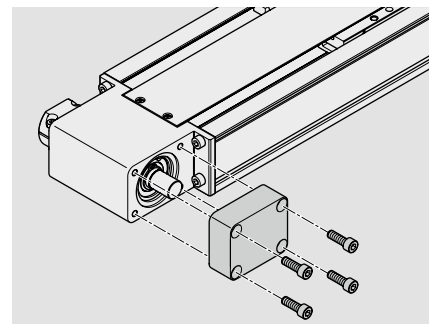
Part number, length R0363 400 00, ... mm	Type	Guideway	Drive unit			Carriage			
			drive side	with clamping hub	with gear reducer	Without connection plate		With connection plate	
						Short carriage $L_{ca} = 100 \text{ mm}$	Long carriage $L_{ca} = 165 \text{ mm}$	Short carriage $L_{ca} = 100 \text{ mm}$	Long carriage $L_{ca} = 165 \text{ mm}$
Without motor mount 	MA05	01	right	06	–	01	02	05	06
Without motor mount 	MA06		left						
With motor mount 	MA10		right	06	–	–	02	–	06
With motor mount 	MA11		left						
With gear reducer 	MG10		right		08	–	02	–	06
With gear reducer 	MG11		left						

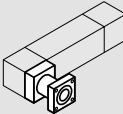
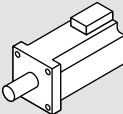
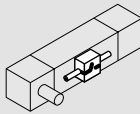
Please make sure that the selected combination is a permissible one (load capacities, moments, max. speeds, motor data, etc.)!

Order example: see "Inquiry/Order Form" section.

Note: Data on the performance of the eCKR with gear reducer can be found in the section "Performance Data."

On all versions, a second drive shaft end can be made available by removing the cover.



	Motor attachment			Motor = ...		Cover = ...		1st, 2nd, 3rd switch = ...				Documentation		
									Mounting duct = ...					
	Gear ratio	Attachment kit ¹⁾	for motor	without brake	with brake	without cover plate	with cover plate ³⁾						Standard report	
	i = 1	00	-	00		00	01	Without switches Without switch Without mounting duct 00						10
	i = 1	05	VRDM 3913	41	42	00	01	With switches Magnetic field sensor Reed sensor21 Hall sensor, PNP NC22 Mounting duct25 Socket/ plug17						
		01	MSK 050C	88	89									
	i = 5	11	MSK 030C	84	85	00	01	Magnetic field sensor with connector ²⁾ Reed sensor58 Hall sensor, PNP NC59						
		31	MSM 030C	72	73									
	i = 10	12	MSK 030C	84	85									

1) Attachment kit also available without motor (when ordering: enter "00" for motor)

2) Including mounting accessories

3) Length > 1200 mm: The option "with cover plate" is not selectable.

Calculating the length of the eCKR 110

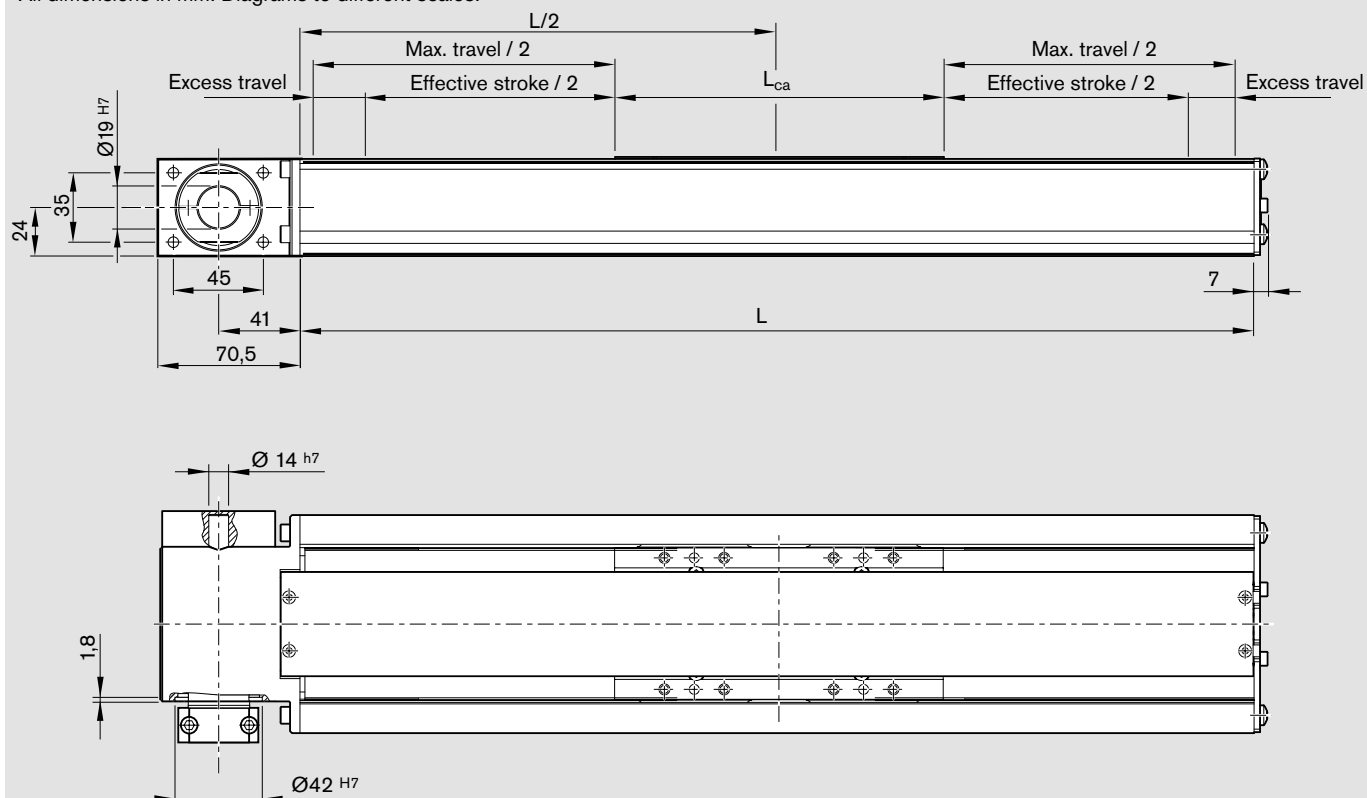
Short carriage version: $L = (\text{Effective stroke} + 2 \cdot \text{excess travel}) + L_{ca} + 25 \text{ mm}$

Long carriage version: $L = (\text{Effective stroke} + 2 \cdot \text{excess travel}) + L_{ca} + 25 \text{ mm}$

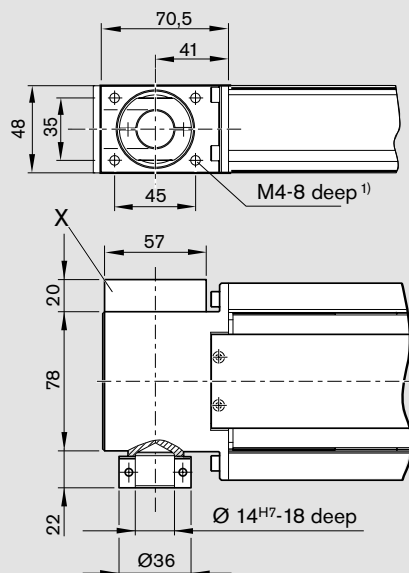
eLINE Compact Modules eCKR – Freely Configurable

eCKR 110 Dimensions

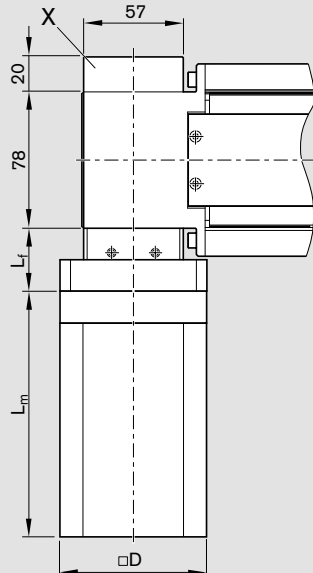
All dimensions in mm. Diagrams to different scales.



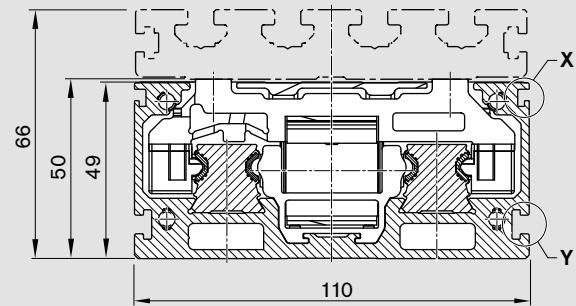
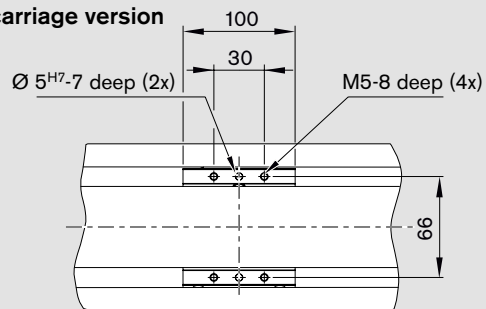
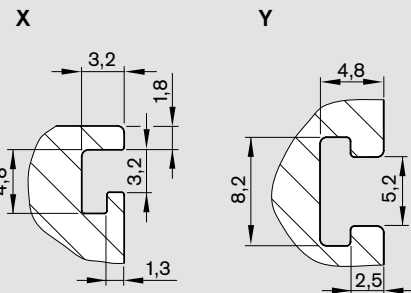
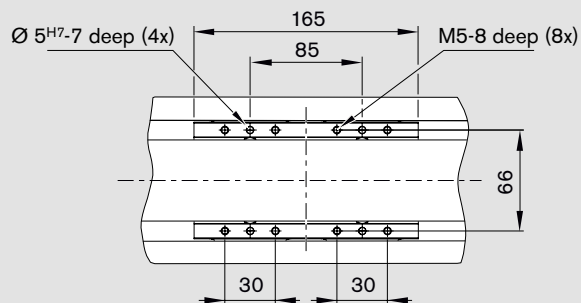
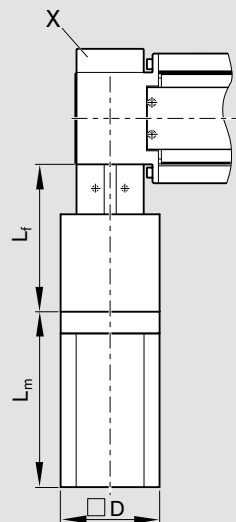
MA05, MA06



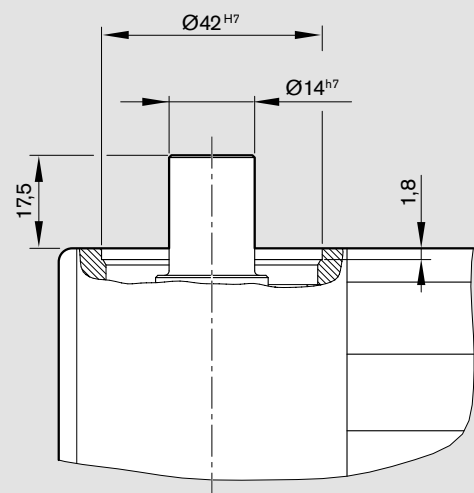
MA10, MA11



1) On both sides (also on second drive side, second shaft end)

Short carriage version**Long carriage version****MG10, MG11****X**

Second shaft end (with cover removed)



Type	Motor	Dimensions (mm)			
		D	L _r	with brake	L _m without brake
MA10, MA11	VRDM 3913	85	36	216.5	170.0
	MSK 050C	98	46	233.0	203.0
MG10, MG11	MSM 030B	60	106	144.0	111.0
	MSK 030C	54	100	213.0	188.5

eLINE Compact Modules eCKR – Freely Configurable

Performance data for horizontal operation**eCKR 90, i = 8, MSM 020B**Servo motor with brake and ECODRIVE Cs controller¹⁾

Connection voltage: 1 x 230 V

⚠ The tables contain performance data examples for different gearbox-motor-controller combinations. They are intended to serve as a guide for selection; exact values must be calculated based on individual cases.

Mass	(kg)	1	2	3	4	5
Acceleration time t_a	(ms)	13	16	19	21	24
Acceleration distance s_a	(mm)	4	5	6	7	8
Acceleration a	(m/s ²)	53	44	37	32	29
Speed v	(m/s)	0.69				
Repeatability	(mm)	± 0.2				

eCKR 90, i = 5, MSM 030BServo motor with brake and ECODRIVE Cs controller¹⁾

Connection voltage: 1 x 230 V

Mass	(kg)	1	2	3	4	5
Acceleration time t_a	(ms)	22	27	31	35	40
Acceleration distance s_a	(mm)	12	15	17	19	22
Acceleration a	(m/s ²)	50	41	36	31	28
Speed v	(m/s)	1.1				
Repeatability	(mm)	± 0.2				

eCKR 90, i = 8, MSM 030BServo motor with brake and ECODRIVE Cs controller¹⁾

Connection voltage: 1 x 230 V

Mass	(kg)	1	2	3	4	5	6	7	8	9	10
Acceleration time t_a	(ms)	28	31	34	36	39	42	45	48	50	53
Acceleration distance s_a	(mm)	10	11	12	13	14	14	15	16	17	18
Acceleration a	(m/s ²)	24	22	20	19	18	16	15	14	14	13
Speed v	(m/s)	0.69									
Repeatability	(mm)	± 0.2									

eCKR 90, i = 5, MSK 030CServo motor with brake and IndraDrive controller¹⁾

Connection voltage: 3 x 400 V

Mass	(kg)	1	2	3	4	5	6	7	8	9	10
Acceleration time t_a	(ms)	83	91	99	107	115	123	131	140	148	156
Acceleration distance s_a	(mm)	82	90	98	106	114	122	130	138	146	154
Acceleration a	(m/s ²)	24	22	20	18	17	16	15	14	13	13
Speed v	(m/s)	1.98									
Repeatability	(mm)	± 0.2									

eCKR 110, i = 5, MSM 030BServo motor with brake and ECODRIVE Cs controller¹⁾

Connection voltage: 1 x 230 V

Mass	(kg)	1	2	3	4	5
Acceleration time t_a	(ms)	19	24	29	34	39
Acceleration distance s_a	(mm)	14	18	22	26	30
Acceleration a	(m/s ²)	79	62	51	44	38
Speed v	(m/s)	1.50				
Repeatability	(mm)	± 0.2				

eCKR 110, i = 8, MSM 030BServo motor with brake and ECODRIVE Cs controller¹⁾

Connection voltage: 1 x 230 V

Mass	(kg)	1	2	3	4	5	6	7	8	9	10
Acceleration time t_a	(ms)	21	24	27	30	33	37	40	43	46	49
Acceleration distance s_a	(mm)	10	11	13	14	16	17	19	20	22	23
Acceleration a	(m/s ²)	45	39	35	31	28	26	24	22	20	19
Speed v	(m/s)	0.94									
Repeatability	(mm)	± 0.2									

eCKR 110, i = 5, MSK 030CServo motor with brake and IndraDrive controller¹⁾

Connection voltage: 3 x 400 V

Masse	(kg)	1	2	3	4	5	6	7	8	9	10
Beschleunigungszeit t_a	(ms)	45	52	59	66	73	80	87	93	100	107
Beschleunigungsweg s_a	(mm)	46	53	59	66	73	80	87	94	101	108
Beschleunigung a	(m/s ²)	44	38	34	30	28	25	23	22	20	19
Geschwindigkeit v	(m/s)	2.00									
Reproduzierbarkeit	(mm)	± 0.2									

eCKR 110, i = 8, MSK 030CServo motor with brake and IndraDrive controller¹⁾

Connection voltage: 3 x 400 V

Masse	(kg)	1	2	3	4	5	6	7	8	9	10
Beschleunigungszeit t_a	(ms)	80	86	92	98	103	109	115	121	126	132
Beschleunigungsweg s_a	(mm)	68	73	77	82	87	92	97	102	107	111
Beschleunigung a	(m/s ²)	21	20	18	17	16	15	15	14	13	13
Geschwindigkeit v	(m/s)	1.69									
Reproduzierbarkeit	(mm)	± 0.2									

1) For additional information, refer to the "IndraDrive" and "ECODRIVE Cs" catalogs.

Accessories

Connecting shafts

- Compensate for misalignments
- Are backlash-free and torsionally stiff
- Bridge large distances between axes
- Can be mounted radially using split clamping hubs (installation and removal without shifting pre-aligned axes)
- Dynamically balanced

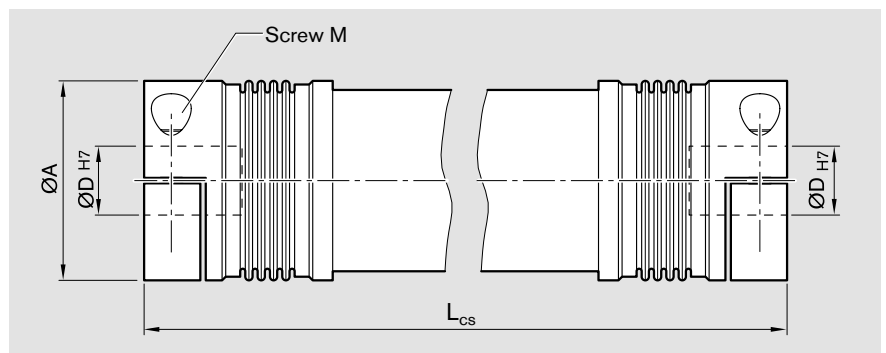
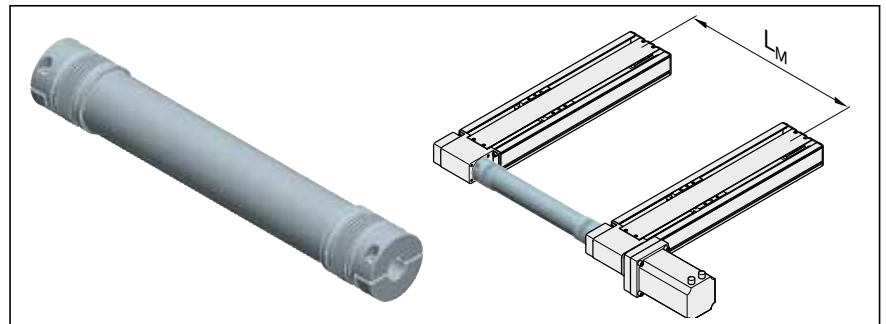
Material

Gaiter: highly flexible stainless steel
Connecting tube and clamping hub: aluminum

Ordering data

Please state the part number and length L_{cs} .

For example: R0391 510 16,
 $L_{cs} = 550$ mm



	Part number	Dimensions (mm)						M_A (Nm)	M_S (Nm)	M_{cs} (Nm)	Mass moment of inertia (10^{-6} kgm ²)	Weight (kg)
		A	D	M	$L_{cs \text{ min}}$	$L_{cs \text{ max}}$	L_{cs}					
eCKR 90	R0391 510 16	40	10	M4	100	3000	$L_M - 65$	5	17	10	$0.028 \cdot L_{cs}(\text{mm}) + 80$	$0.0007 \cdot (L_{cs}(\text{mm}) - 100) + 0.34$
eCKR 110	R0391 510 20	40	14	M4	100	3000	$L_M - 93$	5	17	10		

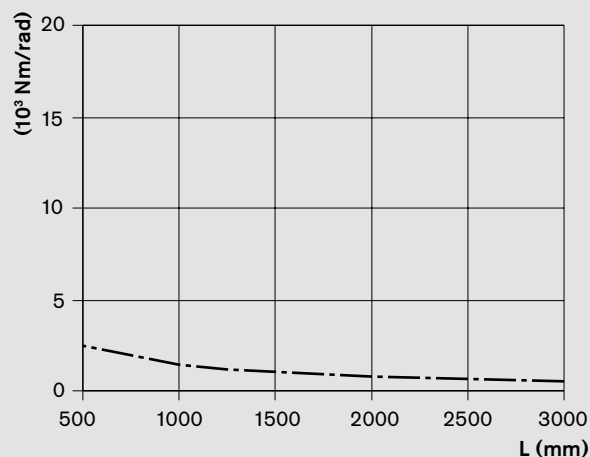
M_A = tightening torque of screws

L_M = center-to-center distance between eLINE Compact Modules

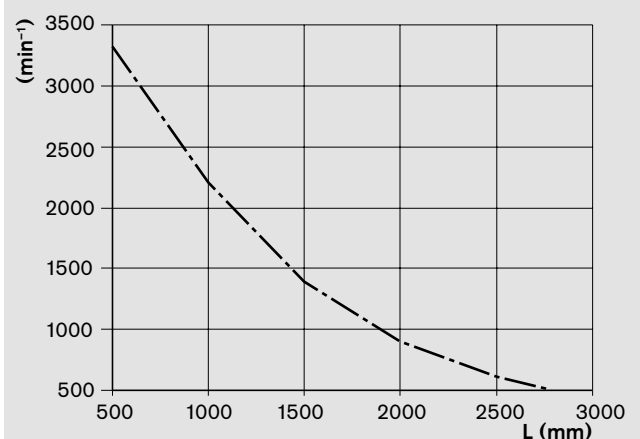
M_S = peak torque of connecting shaft

M_{cs} = rated torque of connecting shaft

Torsional stiffness c_T



Maximum rotary speed n

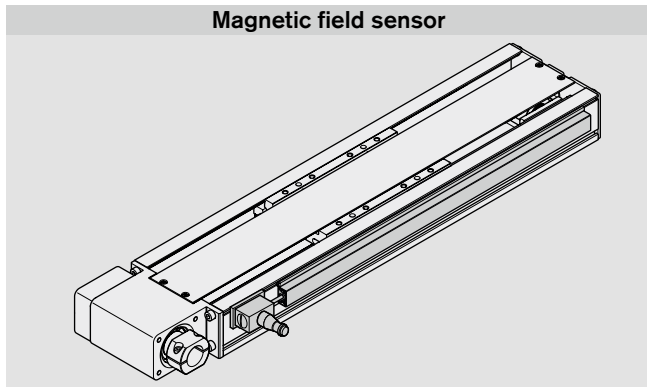


--- eCKR 90 / eCKR 110

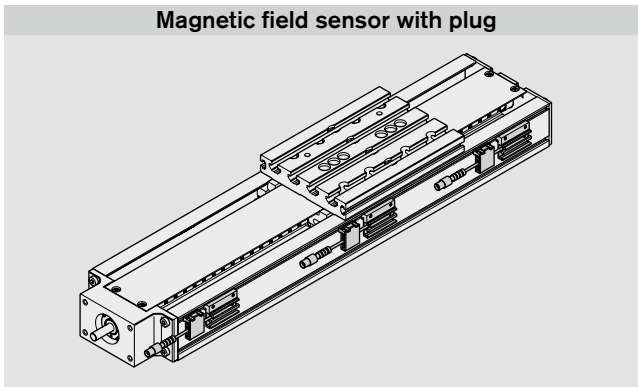
eLINE Compact Modules – Freely Configurable

Switching Systems Overview

Magnetic field sensor



Magnetic field sensor with plug

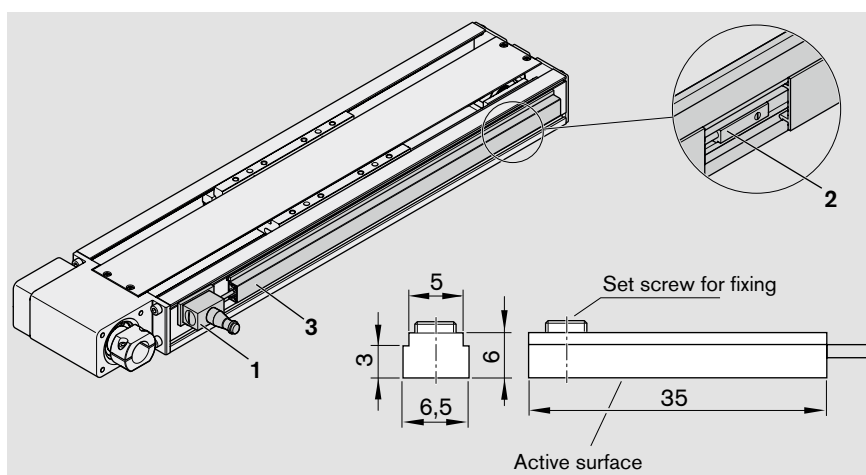


Magnetic field sensor

Hall and Reed sensor

- 1 Socket and plug
- 2 Switch
- 3 Mounting duct
(aluminum alloy, black anodized)

⚠ The magnetic field sensors are suitable for travel speeds up to 2 m/s. Short stroke: Take the length of the switch and socket into consideration!



Magnetic field sensors with potted cable.

Version:

- Hall sensor (NC) or
- Reed sensor (change-over)

Notes on mounting:

Switches (sensors) may only be installed after the eLINE Compact Module has been fixed to the mounting base.

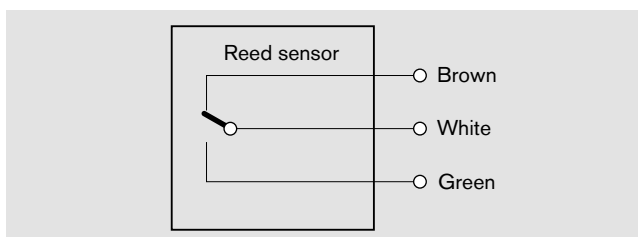
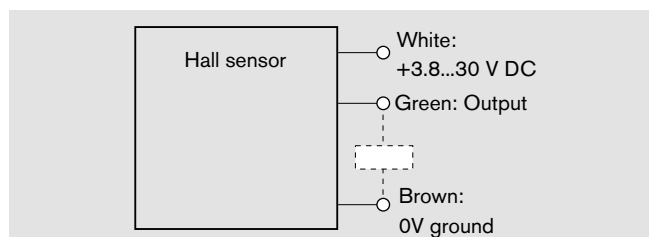
A mounting duct is required for installation of the switches.

Hall sensor	
Contact type	PNP NC
Operating voltage	3.8–30 V DC
Power consumption	max. 10 mA
Output current	max. 20 mA
Cable length	2 m (10 m upon request)
Housing protection class	IP 66
Short-circuit protection	No
Maximum travel speed	2 m/s

Reed sensor	
Contact type	Change-over
Switching voltage	max. 100 V DC
Switching current	max. 0.5 mA
Cable length	2 m (10 m upon request)
Housing protection class	IP 66
Maximum travel speed	2 m/s

Pin assignment

Important: 2 switching points!



Switch mounting arrangements

Mounting duct

Function:

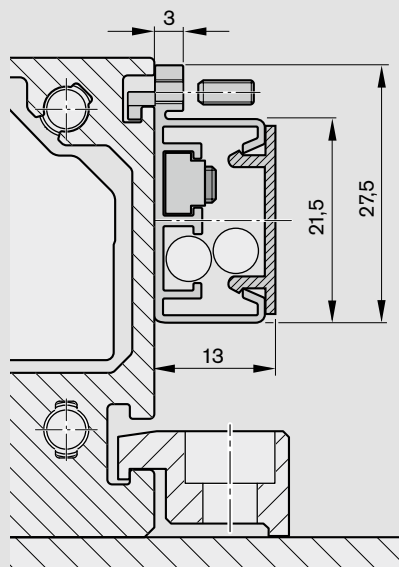
- To attach and secure magnetic field sensors
- Cable routing

Mounting instructions:

The mounting duct is hooked into the T-slots of the module frame and secured with set screws.

Set screws are provided.

The switches are slid into the upper T-slot of the mounting duct and secured with set screws.



Socket and plug

Attach the socket on the side with the magnetic field sensor.

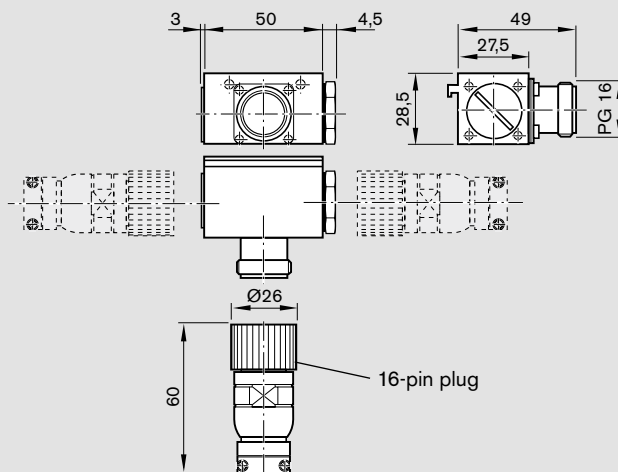
The socket and plug have 16 pins.

The socket and plug are not wired.

This allows optimal assignment of switch positions during start-up.

One plug is provided.

The plug can be installed in three directions.



Ordering the magnetic field sensors and accessories

Item		Part numbers
1	Socket-plug	R0375 400 00
2	Magnetic field sensor	
	– Reed sensor	R3476 009 03
	– Hall sensor (PNP NC)	R3476 010 03
3	Mounting duct	R0396 620 18

Switching Systems Overview

Magnetic field sensor with plug

With magnetic field sensors, switch activation is direct (without switching cam). The switch positions can be adjusted freely over the entire travel range. The sensor should only be mounted after the eLINE Compact Module has been fastened to the mounting base.

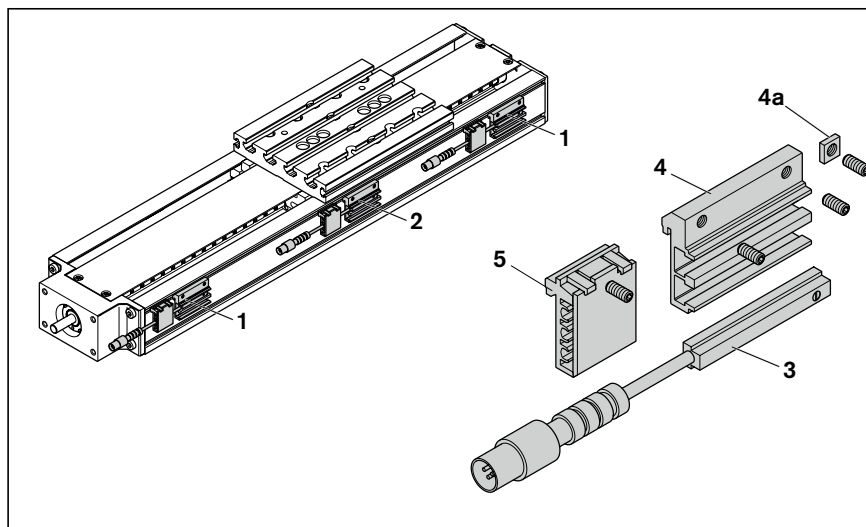
Switch positions:

- 1 Limitation at end of stroke (recommendation: Reed or Hall sensor)
- 2 Reference point at middle of stroke (recommendation: Hall sensor)

Sensor mounting assembly

consisting of:

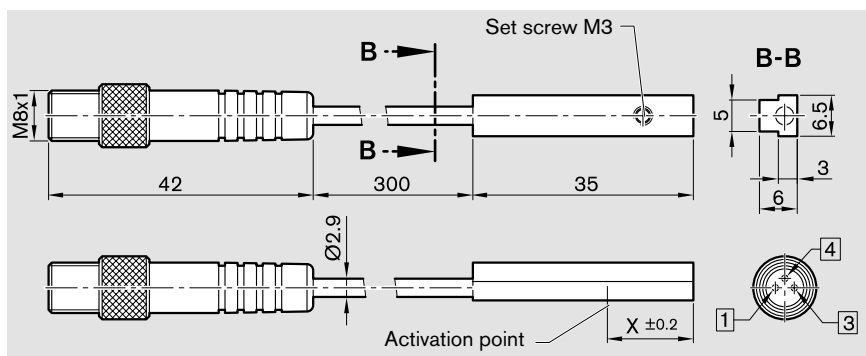
- 3 Sensor (Hall or Reed)
- 4 Sensor mount incl. set screws (loose) and square nut 4a
- 5 Cable holder (3 units) incl. set screw (loose)



Version	Part number
Sensor mounting assembly with Reed sensor	R0375 300 07
Sensor mounting assembly with Hall sensor	R0375 300 08

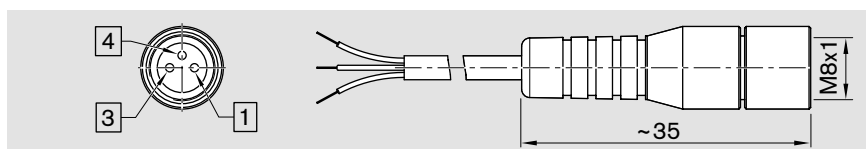
Sensor configuration:

Dimension X (mm)	
Reed sensor	Hall sensor
9.00	13.65



Extension cable for sensor (Reed/Hall)

The extension cable (approx. 5 m) is supplied complete with a female connector M8x1 for connection to the sensor.



Extension cable					
Part number	Connector contact	1	3	4	Protection class
R3476 025 03	to core	brown (+ 3.8 ...30 VDC)	blue (0V ground)	black (output)	IP 66 when connected

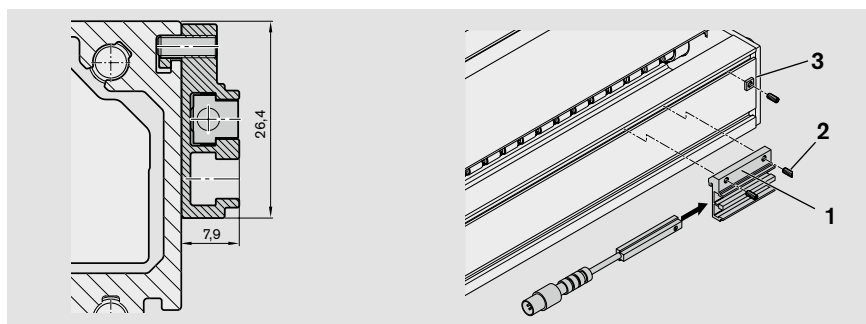
Sensor mount

A sensor mount (1) is required to attach the sensors. It is hooked into the upper slot on the Compact Module and secured with set screws (2).

The sensors are slid into the respective slot on the sensor mount and secured with set screws.

The square nut (3) with set screw serves as a positive stop for the sensor (switch position when changing sensors).

Parts are included with the sensor mounting assembly.



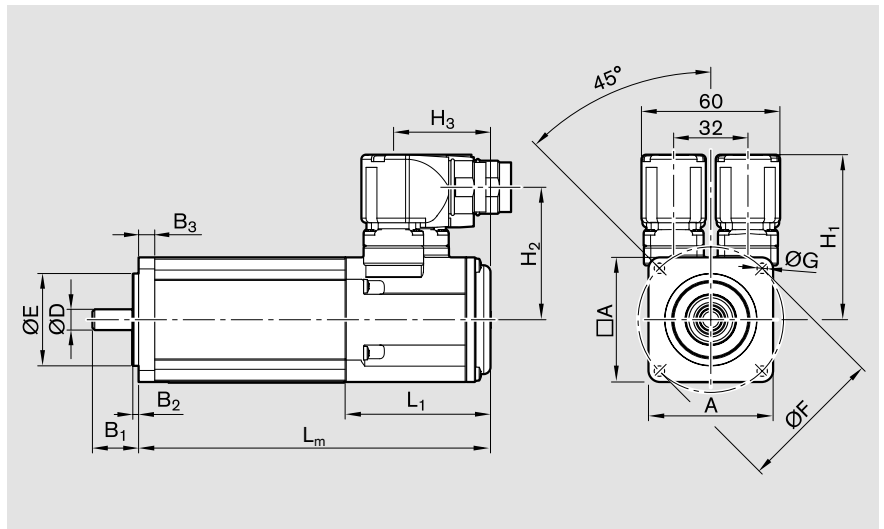
Motors

AC servo motors MSK

Notes

All MSK motors have an absolute multi-turn encoder (Hyperface, 128 increments with 4096 revolutions).

The motors can be supplied complete with controller and control unit. For more information on motors, controllers and control systems, see Rexroth catalog "IndraDrive for Linear Motion Systems."



Motor	Dimensions (mm)													
	A	B ₁	B ₂	B ₃	$\varnothing D$ k6	$\varnothing E$ j6	$\varnothing F$	$\varnothing G$	H ₁	H ₂	H ₃	L _m		L ₁
MSK 030C	54	20	2.5	7.0	9	40	63	4.5	71.5	57.4	42.0	w/o brake	188.0	213.0
MSK 040C	82	30	2.5	8.0	14	50	95	6.6	83.5	69.0	31.0	with brake	215.5	42.5
MSK 050C	98	40	3.0	9.0	19	95	115	9.0	85.5	71.0	43.5		203.0	233.0
														55.5

Motor data

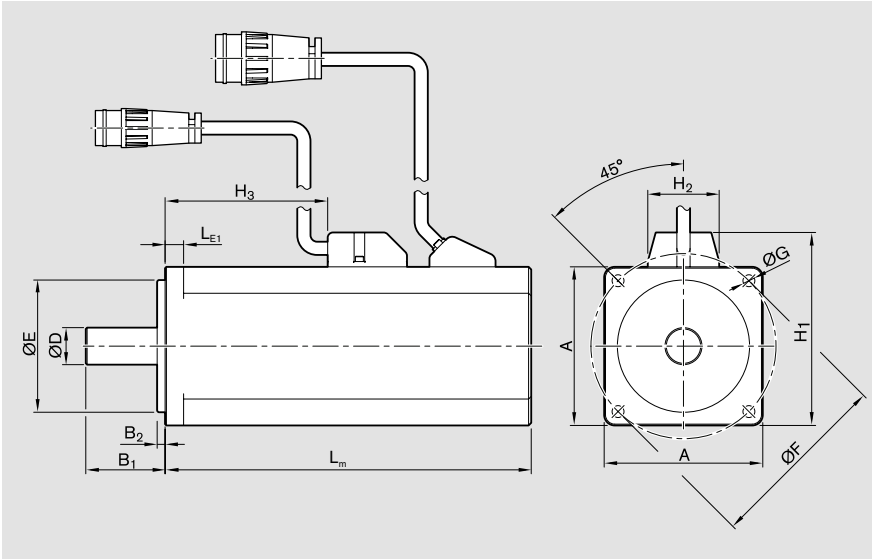
Description	Symbol	Unit	MSK030C-0900	MSK040C-0600	MSK050C-0600
Maximum usable speed	n_{max}	(min ⁻¹)	9000	6000	6000
Maximum torque	M_{max}	(Nm)	4	8.1	15
Rated torque	M_N	(Nm)	0.8	2.7	5.0
Motor mass moment of inertia	J_m	(10 ⁻⁶ kgm ²)	30	140	330
Mass without brake	m_m	(kg)	2.1	3.6	5.4
Holding brake					
Holding torque	M_{br}	(Nm)	1.0	4.0	5.0
Brake mass moment of inertia	J_{br}	(10 ⁻⁶ kgm ²)	7	23	107
Mass of brake	m_{br}	(kg)	0.25	0.32	0.7

Motors

AC servo motors MSM

Notes
 All MSM motors have an absolute multi-turn encoder.

The motors can be supplied complete with controller and control unit.
 For more information on motors, controllers and control systems, see the “ECODRIVE Cs” catalog.



Motor	Dimensions (mm)												
	A	B ₁	B ₂	L _{E1}	$\varnothing D$ h6	$\varnothing E$ h7	$\varnothing F$	$\varnothing G$	H ₁	H ₂	H ₃	without brake	L _m with brake
MSM 020B	42	24	2	7	8	22	48	3.4	55	27	38.8	109.0	140.0
MSM 030B	60	30	3	7	11	50	70	4.5	73	27	34.0	111.0	144.0

Motor data

Description	Symbol	Unit	MSM 020B	MSM 030B
Maximum usable speed	n_{max}	(min ⁻¹)	5000	5000
Maximum torque	M_{max}	(Nm)	0.95	1.91
Rated torque	M_N	(Nm)	0.32	0.64
Motor mass moment of inertia	J_m	(10 ⁻⁶ kgm ²)	3.2	10.0
Mass without brake	m_m	(kg)	0.50	0.96
Holding brake				
Holding torque	M_{br}	(Nm)	0.29	1.27
Brake mass moment of inertia	J_{br}	(10 ⁻⁶ kgm ²)	0.4	3.0
Mass of brake	m_{br}	(kg)	0.2	0.4

3-phase stepping motors VRDM

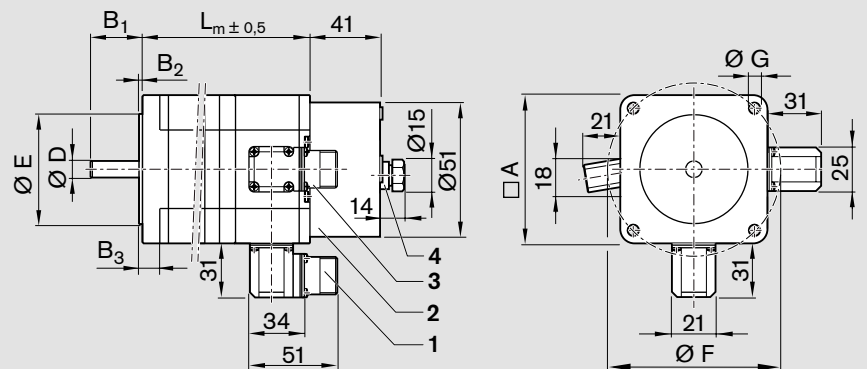
Notes

All VRDM motors are equipped with an encoder for rotation monitoring.

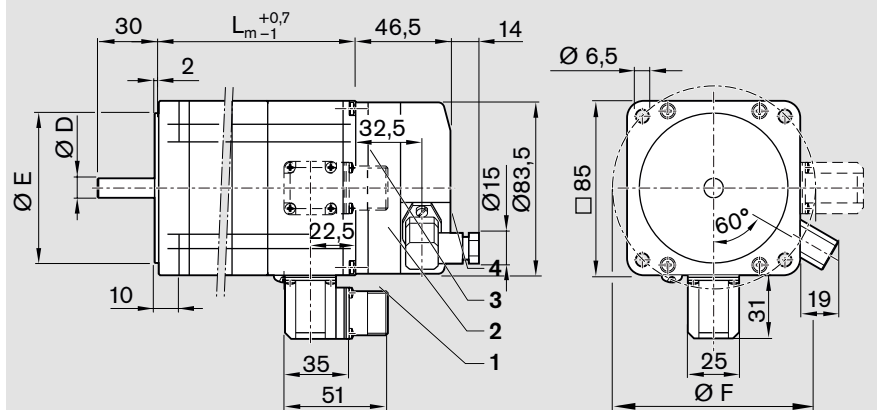
The motors can be delivered complete with controllers.

- 1 Motor connector
- 2 Brake
- 3 Encoder connector
- 4 Brake connector

VRDM 368



VRDM 397 VRDM 3910 VRDM 3913



Motor	Dimensions (mm)										
	A	B ₁	B ₂	B ₃	ØD	ØE	ØF	ØG		without brake	with brake
VRDM 368	57.2	21	1.6	5	8 _{-0.013}	38.1 _{±0.025}	66.7	5.2		116.0	157.0
VRDM 397	85.0	30	2.0	10	12 _{h6}	60.0 _{h8}	99.0	6.5		110.0	156.5
VRDM 3910	85.0	30	2.0	10	12 _{h6}	60.0 _{h8}	99.0	6.5		140.0	186.5
VRDM 3913	85.0	30	2.0	10	14 _{h6}	60.0 _{h8}	99.0	6.5		170.0	216.5

Motor data

Description	Symbol	Unit	VRDM 368	VRDM 397	VRDM 3910	VRDM 3913
Maximum torque	M _{max}	(Nm)	1.50	2.00	4.00	6.00
Motor mass moment of inertia	J _m	(10 ⁻⁶ kgm ²)	38	110	220	330
Motor holding torque	M _m	(Nm)	1.74	2.26	4.52	6.78
Mass without brake	m _m	(kg)	1.1	2.5	3.1	4.2
Step count	z	(-)	200 / 400 / 500 / 1000 / 2 000 / 4 000 / 5 000 / 10 000			
Stepping angle per step	α	(°)	1.8 / 0.9 / 0.72 / 0.36 / 0.18 / 0.09 / 0.072 / 0.036			
Encoder resolution			1000 increments/revolution			
Holding brake						
Brake holding torque	M _{br}	(Nm)	1	6	6	6
Brake mass moment of inertia	J _{br}	(10 ⁻⁶ kgm ²)	1.6	20	20	20
Mass of brake	m _{br}	(kg)	0.5	1.5	1.5	1.5

eLINE Compact Modules with Integrated Compact Drive

Motors, Compact Drives, Version 1a and 1b

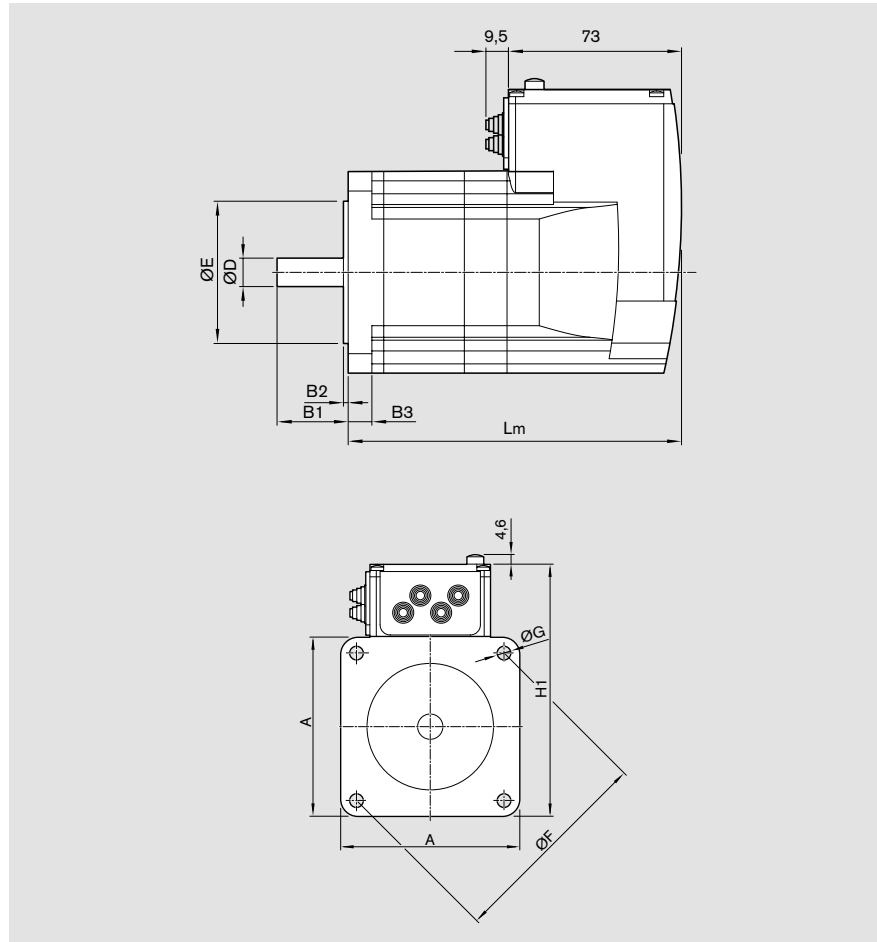
Note

All compact drives have a missed-step detection feature.
Missed steps are detected at the latest after one full motor revolution.

The motors are equipped with either of the following:

- integrated positioning data set control
- Profibus interface

The voltage supply for all compact drives is 24 V DC.



eCKK eCKR	Motor	Dimensions (mm)										
		A	B ₁	B ₂	B ₃	H ₁	ØD	ØE	ØF	ØG	without brake	L _m with brake
eCKK 90	ILS1X ¹⁾ 527S	57.2	21	1.6	5	92.2	6.35 _{-0.013}	38.1 _{±0.025}	66.7	5.2	115.9	158.15
eCKK 110	ILS1X ¹⁾ 851S	85.0	30	2.0	10	119.6	12 _{h6}	60.0 _{h8}	99.0	6.5	140.6	187.3
eCKR 90	ILS1X ¹⁾ 851S	85.0	30	2.0	10	119.6	12 _{h6}	60.0 _{h8}	99.0	6.5	140.6	187.3
eCKR 110	ILS1X ¹⁾ 853S	85.0	30	2.0	10	119.6	14 _{h6}	60.0 _{h8}	99.0	6.5	200.6	247.3

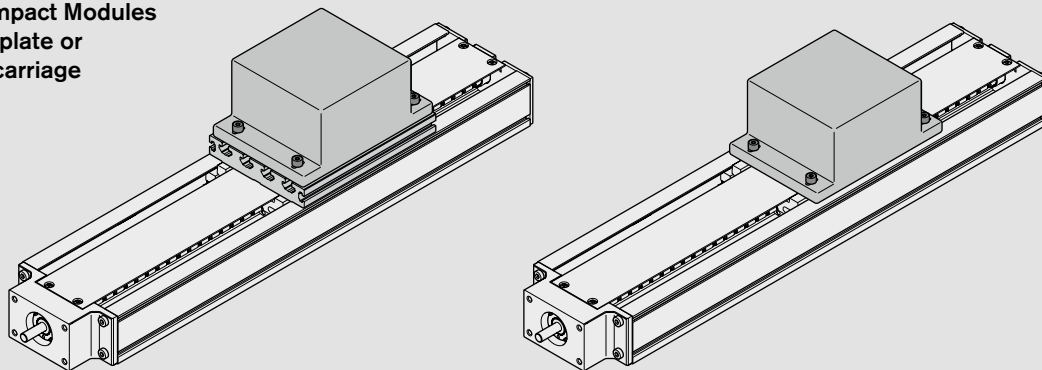
1) X = M for Version 1a (eLINE Compact Module with integrated compact drive with positioning data set control)

X = B for Version 1b (eLINE Compact Module with integrated compact drive with Profibus interface)

Description	Symbol	Unit	eCKK 90	eCKK 110	eCKR 90	eCKR 110
Maximum torque	M _{max}	(Nm)	0.3	0.7	0.7	2.0
Maximum rotary speed at maximum torque	n _{max}	(min ⁻¹)	3600	1800	1800	480
Motor mass moment of inertia	J _m	(10 ⁻⁶ kgm ²)	22	110	110	330
Motor holding torque	M _m	(Nm)	0.3	0.7	0.7	2.0
Mass without brake	m _m	(kg)	1.6	2.6	2.6	4.7
Step count	z	(-)	20 000			
Stepping angle per step	α	(°)	0.018			
Encoder resolution			-			
Holding brake						
Brake holding torque	M _{br}	(Nm)	1.2	6.0	6.0	6.0
Brake mass moment of inertia	J _{br}	(10 ⁻⁶ kgm ²)	7.0	26.6	26.6	26.6
Mass of brake	m _{br}	(kg)	0.2	1.8	1.8	1.8
Brake power rating	P	(W)	7.5	22.0	22.0	22.0

Overview of Fastening and Attachment Options

Fastening a customer attachment
to the eLINE Compact Modules
– via connection plate or
– directly to the carriage

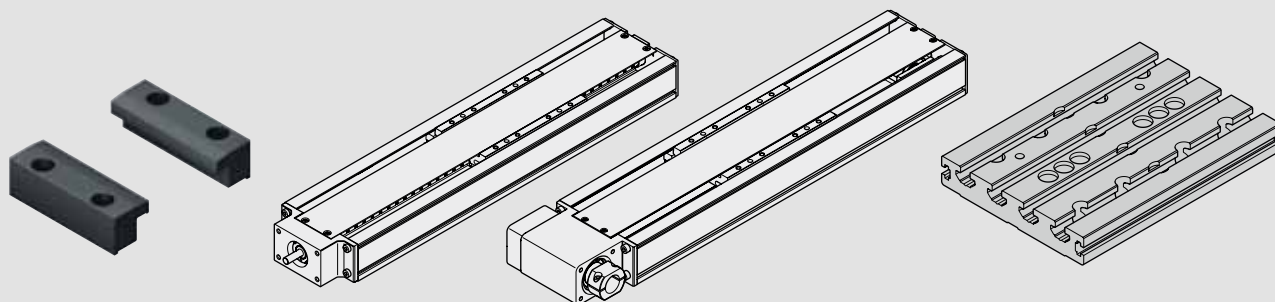


Fastening to carriage

Clamping fixtures

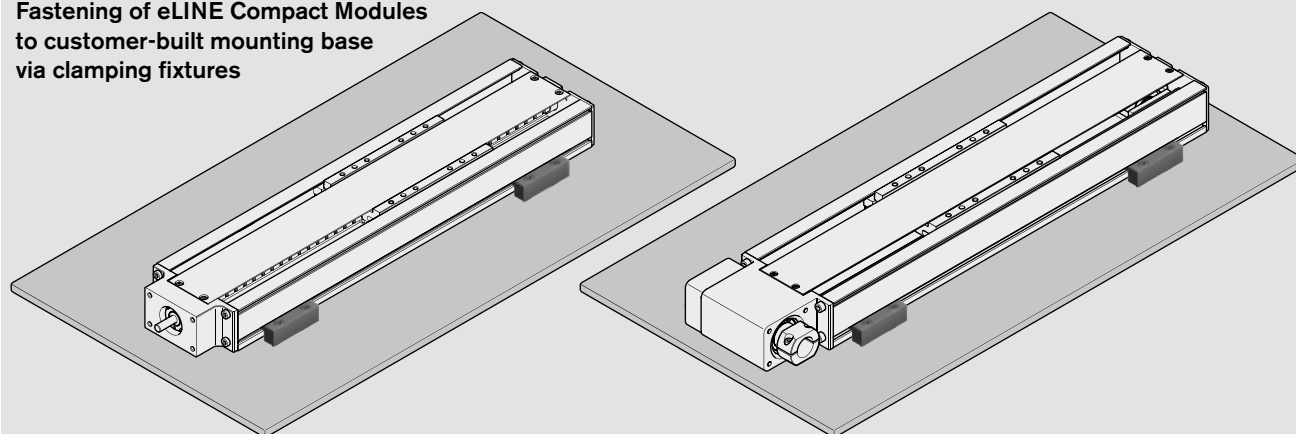
eLINE Compact Modules
eCKR or eCKK

Connection plate



Fastening to frame

Fastening of eLINE Compact Modules
to customer-built mounting base
via clamping fixtures

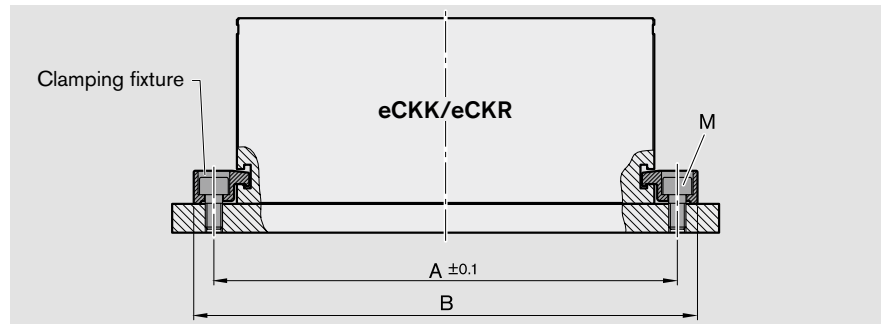


Mounting Accessories

Clamping fixtures

Fastening to customer-built mounting base

**⚠ Do not secure or support the eLINE Compact Module at the end enclosures!
The frame is the load-bearing part!**



Tightening torques for the fastening screws
at friction factor 0.125
Strength class 8.8

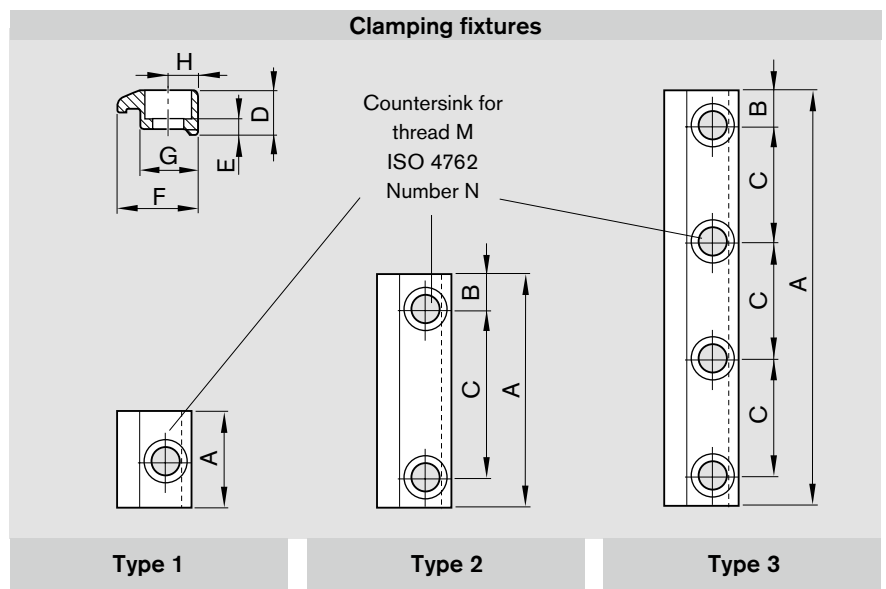
8.8	M4	M5	M6
Nm	2.7	5.5	9.5

	A (mm)	B (mm)	M
eCKx 90	102	112	M4
eCKx 110	126	140	M5, M6

Clamping fixtures

Recommended number of clamping fixtures:

- Type 1: 6 pieces per meter and side
- Type 2: 4 pieces per meter and side
- Type 3: 3 pieces per meter and side



	For thread	Type	Number of holes N	Dimensions (mm)								Part number
				A	B	C	D	E	F	G	H	
eCKx 90	M4	1	1	25	–	–	9	4.6	14.5	10.5	5	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	77	8.5	20						R0375 310 26
eCKx 110	M5	3	4	107	8.5	30	11.5	4.8	19.3	14.0	7	R0375 410 02
		3	4	77	8.5	20						R0375 410 26
	M6	1	1	25	–	–	11.5	5.3	19.3	14.0	7	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

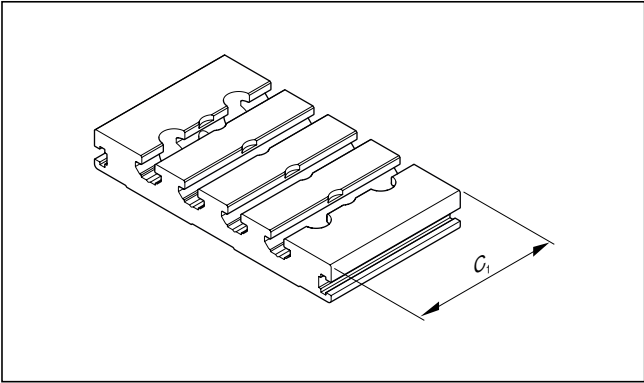
eLINE Compact Modules

Connection Plates

For the short carriage

Connection plates are fastened to the carriage with screws and pins.
(Screws and pins are included in the delivery.)

	Part number	Masse (kg)
eCKx 90	R0375 300 25	0,18
eCKx 110	R0375 400 25	0,23



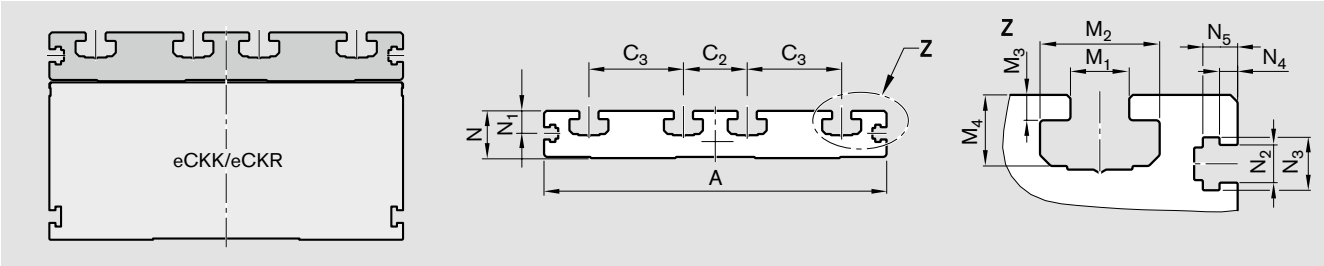
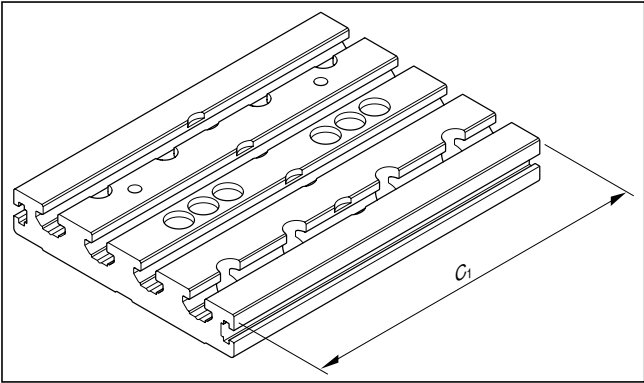
	Dimensions (mm)													
	A ¹⁾	C ₁	C ₂	C ₃	N	N ₁	N ₂	N ₃	N ₄	N ₅	M ₁	M ₂	M ₃	M ₄
eCKx 90	90	60	20	20	16	7.6	4.2	7.3	2	4.3	6	12	3.5	7.7
eCKx 110	110	60	20	20	16	9.5	5.2	7.3	2.5	4.8	6	12	3.5	7.7

1) Frame size

For the long carriage

Connection plates are fastened to the carriage with screws and pins.
(Screws and pins are included in the delivery.)

	Part number	Masse (kg)
eCKx 90	R0375 300 26	0,36
eCKx 110	R0375 400 26	0,58



	Dimensions (mm)													
	A ¹⁾	C ₁	C ₂	C ₃	N	N ₁	N ₂	N ₃	N ₄	N ₅	M ₁	M ₂	M ₃	M ₄
eCKx 90	90	125	20	20	16	7.6	4.2	7.3	2	4.3	6	12	3.5	7.7
eCKx 110	110	155	20	20	16	9.5	5.2	7.3	2.5	4.8	6	12	3.5	7.7

1) Frame size

Sliding blocks and springs

For fastening attachments on the connection plate

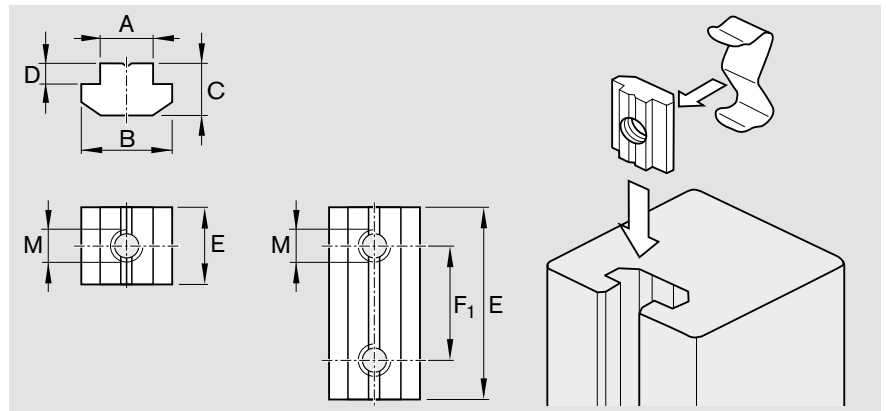
The spring serves as a mounting and positioning aid.

Tightening torques for the fastening screws

at friction factor 0.125

Strength class 8.8

	8.8	M4	M5
	Nm	2.7	5.5

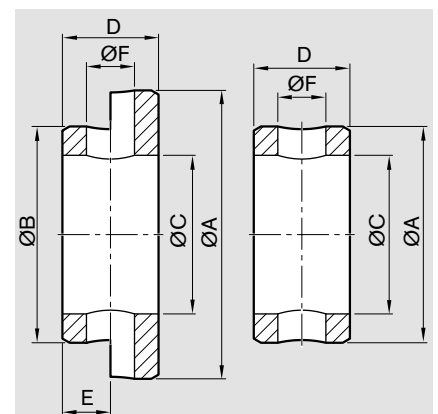
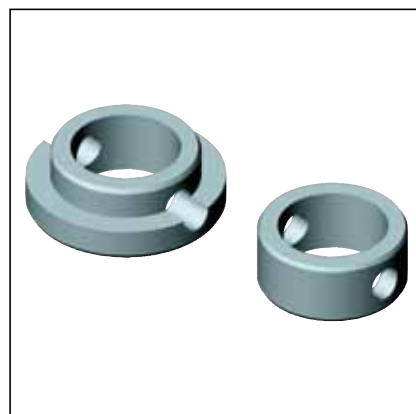


	For thread	Dimensions (mm)						Part number of sliding block	Part number of spring
		A	B	C	D	E	F ₁		
eCKx 90/110	M4	6	11.5	4	1	12	–	R3447 014 01	R3412 010 02
	M5					45	30	R0391 710 09	–
	M5					12	–	R3447 015 01	R3412 010 02

Centering rings

The centering rings serve as a positioning aid. They create positive-locking connections with good reproducibility.

Material: steel (corrosion-resistant)



Ø Size	Dimensions (mm)						Part number
(mm)	A k6	B k6	C ±0.1	D -0.2	E +0.2	ØF	
5	5	–	3.4	3.0	–	1.6	R0396 605 42
7	7	–	5.5	3.0	–	1.6	R0396 605 43
9	9	–	6.6	4.0	–	2.0	R0396 605 44
12	12	–	9.0	4.0	–	2.0	R0396 605 45
7 - 5	7	5	3.4	3.0	1.5	1.6	R0396 605 47
9 - 5	9	5	3.4	3.5	1.5	1.6	R0396 605 48
9 - 7	9	7	5.5	3.5	1.5	1.6	R0396 605 49
12 - 7	12	7	5.5	3.5	1.5	1.6	R0396 605 77
12 - 9	12	9	6.6	4.0	2.0	2.0	R0396 605 50

Maintenance

Long-term maintenance-free operation is achievable due to the pre-lubricated eLINE Ball Rail Systems and the pre-lubricated Ball Screw. Initial lubrication is done in-factory prior to shipment. The service life of the initial lubrication applies to normal operating conditions.

Normal operating conditions

Ambient temperature: 10 °C ... 40 °C
Load: < 5% C
Travel speed: < 1 m/s

For special operating conditions – e.g. special installation type, short stroke, or the presence of dust or solvents – the lubrication intervals must be adapted to the specific application.

Service life of initial lubrication

	Service life (km)	Grease	Part number (400 g cartridge)
eCKK	2000	Dynalub 510	R3416 037 00
eCKR	8000	Dynalub 510	R3416 037 00



The ball screw assembly and the ball rail systems can be relubricated in order to extend their service life.

- Remove the cover (1).
- Using a brush, apply a light film of grease (recommended: Dynalub 510) to the ball screw and to the running tracks on the sides of the guide rails.
- Move the carriage along the entire travel range several times.
- Use a cloth to remove the excess grease at the end positions.
- Fasten the cover (1).

Grease: Lithium soap grease KP2K (DIN 51825) with consistency class NLGI 2 (DIN 51818)

⚠ Do not use greases with solid lubricant components (such as graphite or MoS₂ additives)!

Order Example (Version 2)

Order data			Explanation
eLINE Compact Module (part number): R0363 300 00, 1770 mm			eLINE Compact Module eCKR 90, length = 1770 mm
Type	=	MG10	With gear reducer according to illustration MG10
Guideway	=	01	Ball Rail System
Drive unit	=	08	Drive end enclosure for attaching gear reducer
Carriage	=	06	Carriage with length $L_{ca} = 125$ mm with connection plate
Motor attachment	=	11	For motor MSK 030C, $i = 5$
Motor	=	85	Motor MSK 030C with brake
Cover	=	00	Without cover
1st switch	=	21	Reed sensor
2nd switch	=	21	Reed sensor
Mounting duct / cable duct	=	25	Mounting duct, delivered as separate part
Socket-plug	=	17	Socket-plug, delivered as separate part
Documentation	=	10	Standard report

Please make sure that the selected combination is a permissible one (load capacities, moments, max. speeds, motor data, etc.)!

Inquiry / Order Form

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D-97419 Schweinfurt, Germany

Telephone +49 9721 937-0

Telefax +49 9721 937-350
(direct)

Rexroth eLINE Compact Modules

To be completed by customer: Inquiry ☐ / Order ☐		Single parts: (Part number):
eLINE Compact Module _____		
(Part number): R _____, length _____ mm		
Type	=	
Guideway	=	
Drive unit	=	
Carriage	=	
Motor attachment	=	
Motor	=	
Cover	=	
1st switch	=	
2nd switch	=	
3rd switch	=	
Mounting duct / cable duct	=	
Socket-plug	=	
Documentation	=	

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

From

Company: _____

Address: _____

Name: _____

Department: _____

Telephone: _____

Telefax: _____

Further information

- Project planning manuals
- Parameter files
- Function blocks
- Start-up software
- Instructions

can be found on the Internet at **www.boschrexroth.com/eline_compactmodule**

- 3D CAD generator, and “IndraDrive for Linear Motion Systems” and “ECODRIVE Cs” catalogs are also available on the Internet.

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