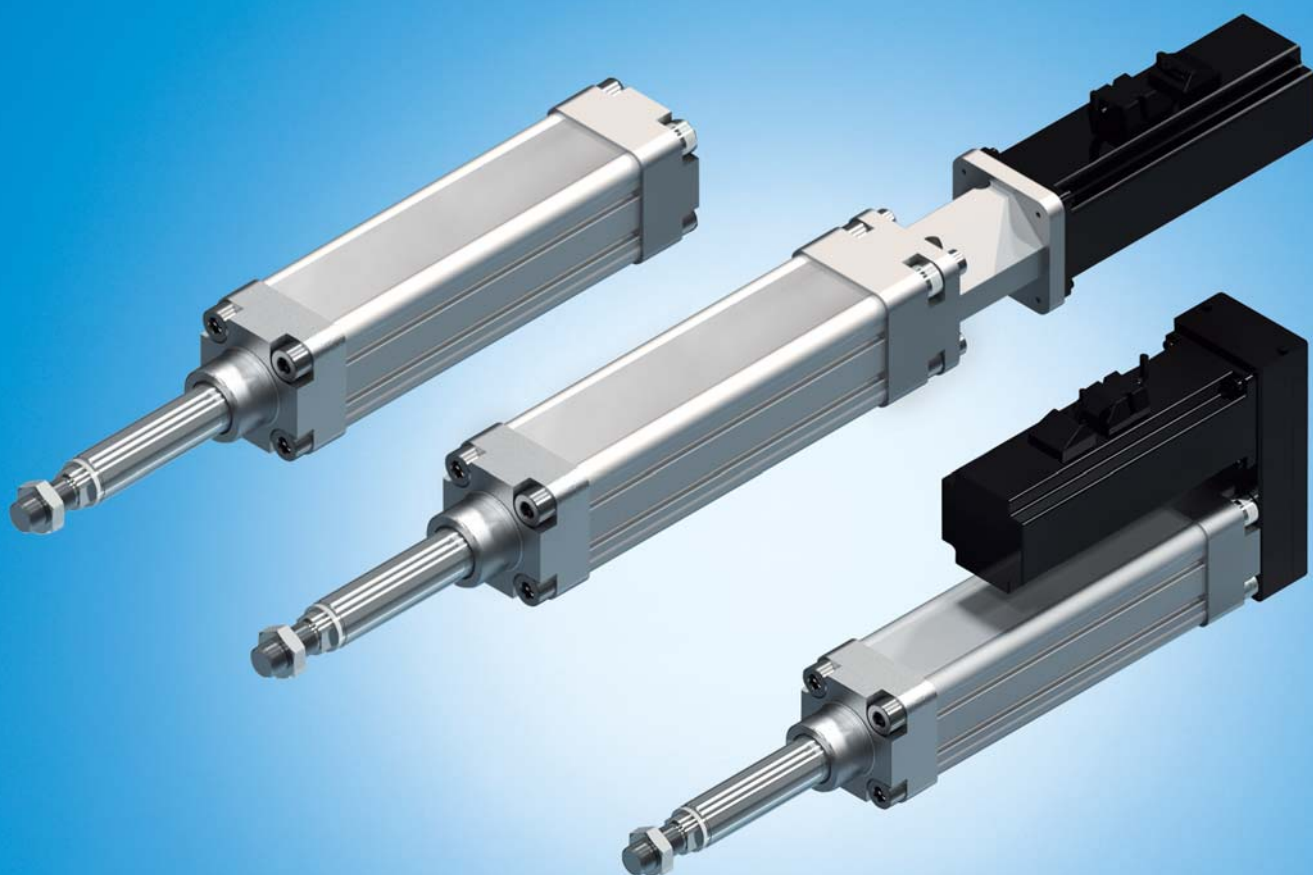


Electromechanical Cylinder EMC

R310EN 3306 (2009.02)

The Drive & Control Company

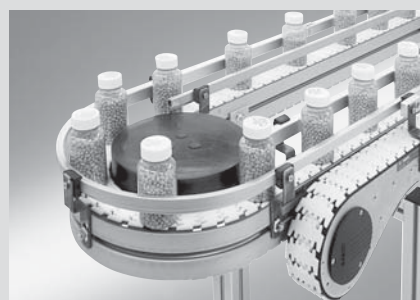
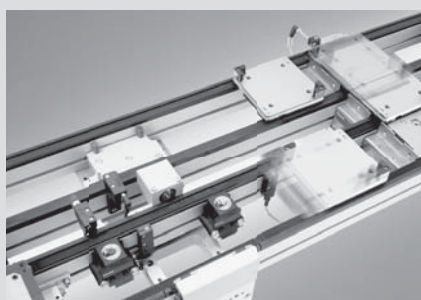
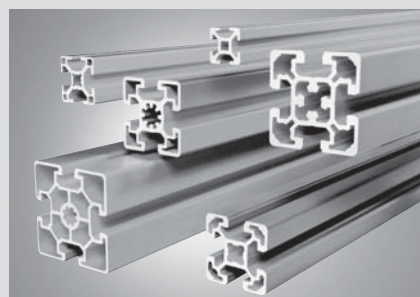
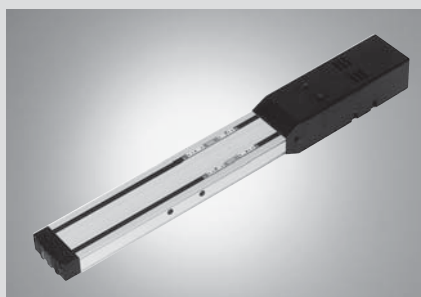
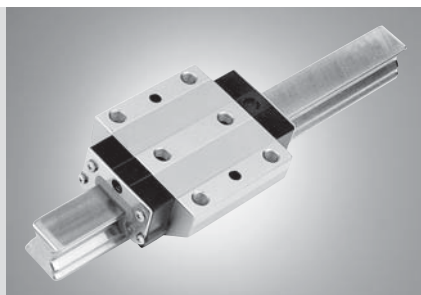
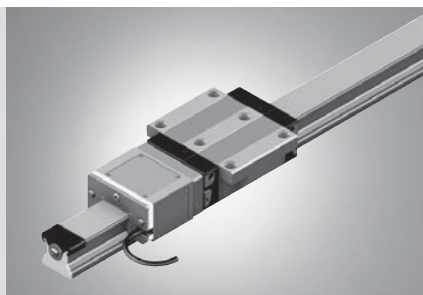


Linear Motion and Assembly Technologies

Ball Rail Systems
Roller Rail Systems
Linear Bushings and Shafts

Ball Screw Drives
Linear Motion Systems

Basic Mechanical Elements
Manual Production Systems
Transfer Systems



Bosch Rexroth
Mechatronik GmbH
Postfach 1164
97419 Schweinfurt
Ernst-Sachs-Straße 100
97424 Schweinfurt
Tel. +49 9721 937-0
Fax +49 9721 937-275
www.boschrexroth.com

Martin Hauk, DCL/MKT2
Tel. +49 9721 937-852, Fax +49 9721 937-959
martin.hauk@boschrexroth.de

16.06.2009

Catalog EMC R310EN 3306 (2009.02)

Dear Sir or Madam,

The current version of the catalog "Electromechanical Cylinder EMC", issue date 2009.02, contains the following amendments compared with the version dated 2008.09:

- EMC fixed lengths with shorter delivery periods have been added.
- Fastening elements for the model with belt side drive and motor have been adapted.
- Some fastening elements have been discontinued.
- The switches available for mounting have been adapted.
- The option number for the Group 5 end attachment was changed in the configuration.
- Permissible speeds are presented for each type of fastening.
- The maximum axial force diagram for the cylinder mechanics was changed

The PDF version in the Media folder and the printed version are available with immediate effect in all languages.

Best regards

Bosch Rexroth
Mechatronik GmbH
Martin Hauk

Electromechanical Cylinder EMC

Product Overview	4
Technical Data and Dimensions EMC	6
EMC with Motor Mount and Motor	8
EMC with Belt Side Drive	10
Motors	12
Overview	12
AC servo motors MSK	14
AC servo motors MSM	15
3-phase stepping motors VRDM	16
Switch Mounting Arrangements	17
Mounting Elements	20
For EMC with belt side drive and motor	20
For EMC with motor mount and motor	21
Part numbers – for re-ordering single parts	22
Dimensions	23
Lubrication	42
Calculations	44
Technical data	46
Permissible Speeds	48
Permissible Drive Torques	50
Maximum Axial Loading of Mechanical Cylinder System	52
Configuration and Ordering	54
Inquiry / Order Form	60
Notes	61

Product Overview

Electromechanical Cylinder EMC

Because of the actuator choices that electromechanical drive solutions offer, they are becoming more and more popular as an alternative to fluid driven technology. Rexroth has released an Electromechanical Cylinder EMC that can in many cases efficiently replace pneumatic cylinders and result in conceptual advantages. Combinations of the various technologies can also result in new application possibilities.

The mechanics are based on established rolled precision ball screw drives available in all current diameter and lead combinations. Performance characteristics such as positioning accuracy, thrust or speed can be optimized to meet the requirements of each specific application.

Through the use of generously sized angular-contact thrust ball bearings LAN, the load rating of the ball screw drive is used to its maximum potential. There are also many choices and possibilities when it comes to drive configurations and mounting elements.

System advantages

- Many sizes to choose from
- Integrated ball screw drive ensures exact positioning and powerful thrust capability
- Motor attachment via motor mount and coupling or belt side drive
- Compact construction
- Dynamic drive
- Extensive series of attachments to match every application area
- Quick assembly
- Compatible with other products from Bosch Rexroth
- Stainless steel piston rod
- Optional attachment of Rexroth standard components
- Particularly efficient in applications with a small number of axes
- Preferred stroke lengths: 100, 200, 320 and 400 mm

Ball screw drives used

EMC size	d ₀	Ball screw Lead P						
		5	10	16	20	25	32	40
32	12							
40	16							
50	20							
63	25							
80	32							
100	40							

EMC fixed lengths

The EMC is available in fixed lengths or freely configurable lengths.

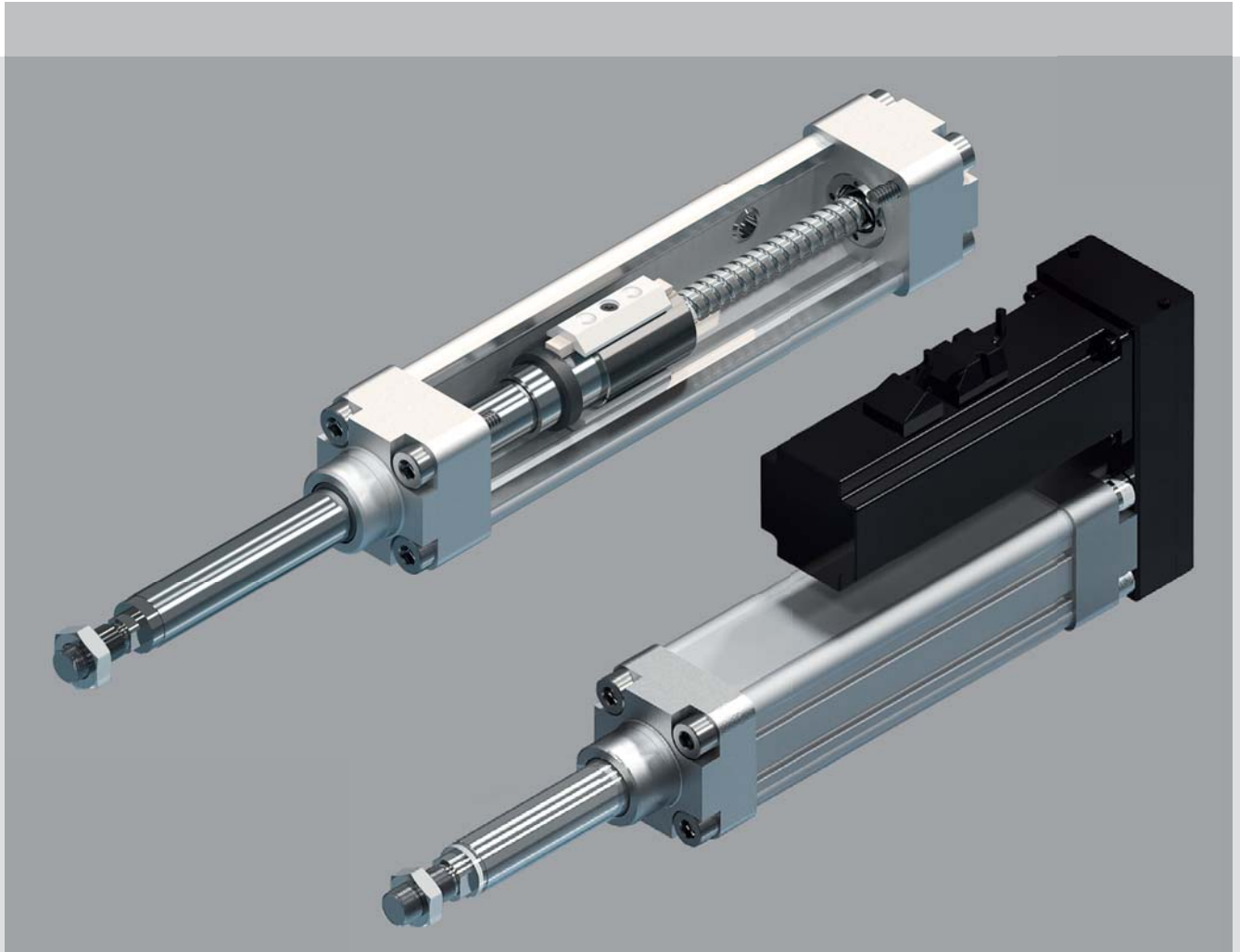
EMCs with fixed lengths have faster delivery times than EMCs with freely configurable lengths.

Note:

The faster delivery times apply only to the fixed-length EMC without attachments.

Fixed-length EMCs are as defined in the table. These EMCs have standard seals, reduced backlash, and tolerance grade T7.

EMC Size	Ball screw		Part number for stroke (mm)			
	d ₀ (mm)	Lead P (mm)	100	200	320	400
32	12	5	R1560 111 00	R1560 112 00	–	–
		10	R1560 121 00	R1560 122 00	–	–
40	16	5	R1560 211 00	R1560 212 00	R1560 213 20	R1560 214 00
		10	R1560 221 00	R1560 222 00	R1560 223 20	R1560 224 00
		16	–	R1560 232 00	–	–
50	20	5	R1560 311 00	R1560 312 00	–	R1560 314 00
		20	–	R1560 342 00	–	–
63	25	5	R1560 411 00	R1560 412 00	–	R1560 414 00
		10	–	R1560 422 00	–	R1560 424 00
		25	–	–	–	–
80	32	5	R1560 511 00	R1560 512 00	–	–
		10	–	R1560 522 00	–	R1560 524 00
		20	–	–	–	–
		32	–	–	–	–
100	40	5	–	R1560 612 00	–	–
		10	–	–	–	–
		20	–	–	–	R1560 644 00
		40	–	–	–	–



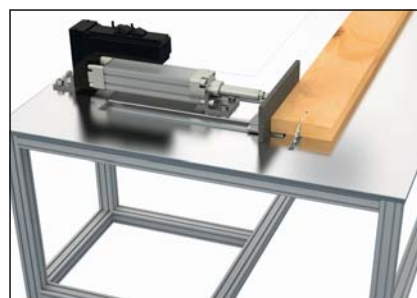
Application examples

There are many application areas where an EMC can be used, either as a replacement for, or in conjunction with pneumatic and hydraulic technology.



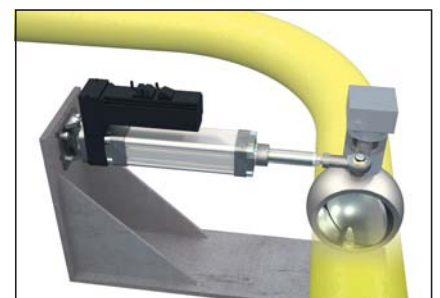
Packaging technology

Pallet table with three pneumatic and one EMC cylinder as a precise guide



Machine tools or woodworking machines

Adjustable mechanical stop for a saw



Dispensing systems

Valve timing

At www.boschrexroth.com/emc/, you can select and order your EMC using the Online Configurator.

Technical Data and Dimensions EMC

Sizes 32 to 100 follow the standard cylinder series according to ISO 15552

Built-in ball screw drives have a diameter of 12 mm to 40 mm.



The EMC size is selected according to:

- Thrust
- Stroke
- Linear speed

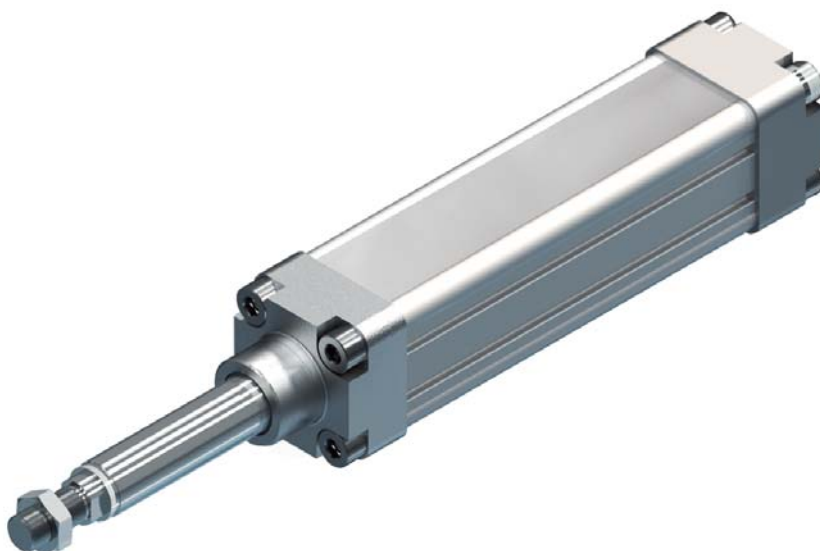
The actual values must be smaller than the maximum permissible values.

$$F < F_{\max \text{ EMC}}$$

Length calculation:

$$L_K = V_B + H$$

$$L_{\text{EMC}} = L_K + W_H + A_M$$



EMC size	Ball screw		Load capacities	Max. axial force ¹⁾		Max. drive torque at drive journal	Speed ²⁾		Stroke ³⁾
	d ₀ (mm)	Lead P (mm)		C _{EMC} (N)	F _{max EMC} (N)		M _p (Nm)	v _{max} (m/min)	
32	12	5	3800	500	0.50	34.0	750		
	12	10	2500	300	0.70	68.0	750		
40	16	5	12300	3000	3.20	23.0	750		
	16	10	9600	2800	5.00	46.0	750		
	16	16	9600	2100	6.00	73.6	750		
50	20	5	14300	6000	5.70	19.0	900		
	20	20	13300	3400	12.30	76.0	900		
63	25	5	15900	10000	14.80	16.5	1200		
	25	10	15700	10000	26.10	33.0	1200		
	25	25	14700	9400	41.70	82.5	1200		
80	32	5	21600	17000	18.60	15.0	1500		
	32	10	26000	17000	33.80	30.0	1500		
	32	20	19700	14700	52.00	60.0	1500		
	32	32	19500	10800	61.60	96.0	1500		
100	40	5	29000	21000	54.10	11.0	1500		
	40	10	29000	21000	58.40	22.0	1500		
	40	20	29000	21000	94.90	44.0	1500		
	40	40	29000	17600	124.60	88.0	1500		

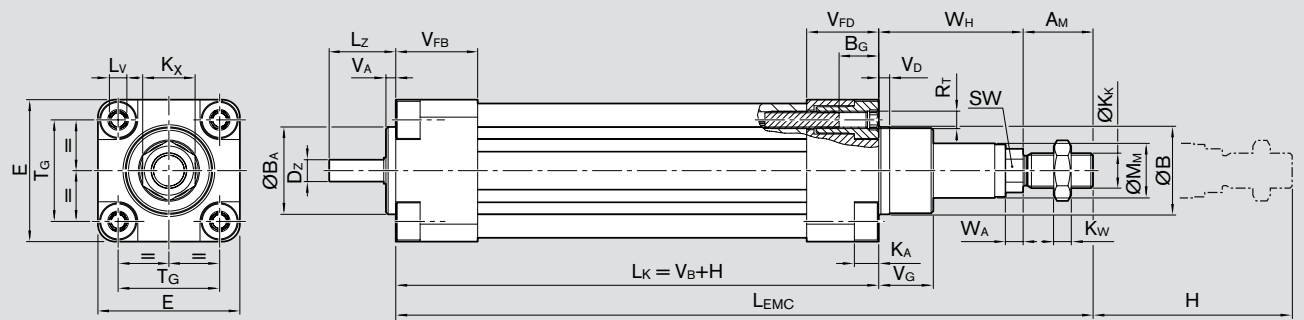
1) Maximum loading of the mechanical cylinder system. (The attainable forces may vary according to the EMC version and the type of fastening.)
Basic recommendation: $F \approx 0.25 \cdot F_{\max \text{ EMC}}$, see charts for "Maximum axial loading." This will prolong the life of the EMC.

2) v_{max} is dependent on the stroke, see "Permissible speeds" charts.

3) Stroke: H_{max} is the maximum possible stroke between the end stops. In actual applications, the effective stroke will be shorter than the stroke.
For more information, please refer to page 45.

Stroke H per customer specifications (minimum stroke 100 mm)

Shown in a retracted position



EMC size	Ball screw size	Dimensions (mm)														L _V	L _Z	K _W	M _M f8	R _T	SW
		A _M -0.1	B d11	B _A d11	B _G	D _Z h7	E ± 0.1	K _K	K _A	K _X											
32	12x5Rx2-4	22	30	30	16	5	47	M10x1.25	6.65	17	6	E11	18	6	18	M6	10				
	12x10Rx2-2	22	30	30	16	5	47	M10x1.25	6.65	17	6	E11	18	6	18	M6	10				
40	16x5Rx3-4	24	35	35	16	8	53	M12x1.25	6.65	19	6	E11	25	7	20	M6	13				
	16x10Rx3-3	24	35	35	16	8	53	M12x1.25	6.65	19	6	E11	25	7	20	M6	13				
	16x16Rx3-3	24	35	35	16	8	53	M12x1.25	6.65	19	6	E11	25	7	20	M6	13				
50	20x5Rx3-4	32	40	40	16	10	65	M16x1.5	11.15	24	8	E11	30	8	25	M8	17				
	20x20Rx3.5-3	32	40	40	16	10	65	M16x1.5	11.15	24	8	E11	30	8	25	M8	17				
63	25x5Rx3-4	32	45	45	16	15	75	M16x1.5	11.15	24	8	E11	35	8	30	M8	17				
	25x10Rx3-4	32	45	45	16	15	75	M16x1.5	11.15	24	8	E11	35	8	30	M8	17				
	25x25Rx3.5-3	32	45	45	16	15	75	M16x1.5	11.15	24	8	E11	35	8	30	M8	17				
80	32x5Rx3.5-4	40	55	55	16	18	95	M20x1.5	15.15	30	15	-0.05/-0.25	46	10	38	M10	22				
	32x10Rx3.969-5	40	55	55	16	18	95	M20x1.5	15.15	30	15	-0.05/-0.25	46	10	38	M10	22				
	32x20Rx3.969-3	40	55	55	16	18	95	M20x1.5	15.15	30	15	-0.05/-0.25	46	10	38	M10	22				
	32x32Rx3.969-3	40	55	55	16	18	95	M20x1.5	15.15	30	15	-0.05/-0.25	46	10	38	M10	22				
100	40x5Rx3.5-5	40	65	65	16	25	115	M20x1.5	15.15	30	15	-0.05/-0.25	57	10	50	M10	22				
	40x10Rx6-4	40	65	65	16	25	115	M20x1.5	15.15	30	15	-0.05/-0.25	57	10	50	M10	22				
	40x20Rx6-3	40	65	65	16	25	115	M20x1.5	15.15	30	15	-0.05/-0.25	57	10	50	M10	22				
	40x40Rx6-3	40	65	65	16	25	115	M20x1.5	15.15	30	15	-0.05/-0.25	57	10	50	M10	22				

EMC size	Ball screw size	Dimensions (mm)								
		T _G	V _A ± 0.1	V _B	V _{FB}	V _{FD}	V _G ± 0.1	V _D	W _A	W _H
32	12x5Rx2-4	32.5 ±0.35	4	132	30	30	16	5	6	33
	12x10Rx2-2	32.5 ±0.35	4	136	30	30	16	5	6	33
40	16x5Rx3-4	38.0 ±0.35	4	134	33	30	20	5	6	37
	16x10Rx3-3	38.0 ±0.35	4	143	33	30	20	5	6	37
	16x16Rx3-3	38.0 ±0.35	4	159	33	30	20	5	6	37
50	20x5Rx3-4	46.5 ±0.45	4	142	38	33	25	5	8	44
	20x20Rx3.5-3	46.5 ±0.45	4	180	38	33	25	5	8	44
63	25x5Rx3-4	56.5 ±0.55	4	148	40	33	25	5	8	44
	25x10Rx3-4	56.5 ±0.55	4	167	40	33	25	5	8	44
	25x25Rx3.5-3	56.5 ±0.55	4	199	40	33	25	5	8	44
80	32x5Rx3.5-4	72.0 ±0.60	4	158	44	35	33	5	10	54
	32x10Rx3.969-5	72.0 ±0.60	4	187	44	35	33	5	10	54
	32x20Rx3.969-3	72.0 ±0.60	4	195	44	35	33	5	10	54
	32x32Rx3.969-3	72.0 ±0.60	4	230	44	35	33	5	10	54
100	40x5Rx3.5-5	89.0 ±0.60	4	166	48	35	38	5	10	59
	40x10Rx6-4	89.0 ±0.60	4	185	48	35	38	5	10	59
	40x20Rx6-3	89.0 ±0.60	4	203	48	35	38	5	10	59
	40x40Rx6-3	89.0 ±0.60	4	258	48	35	38	5	10	59

All dimensions for stroke H = 0 mm

K_X = width across flats of the nut

SW = width across flats of the bolt

EMC with Motor Mount and Motor

This version makes it possible to exploit the maximum potential of the motor torque.

Length calculation:

$$L_{MF0} = L_{EMC} + L_{MF} + L_E$$

Attaching the mounting elements

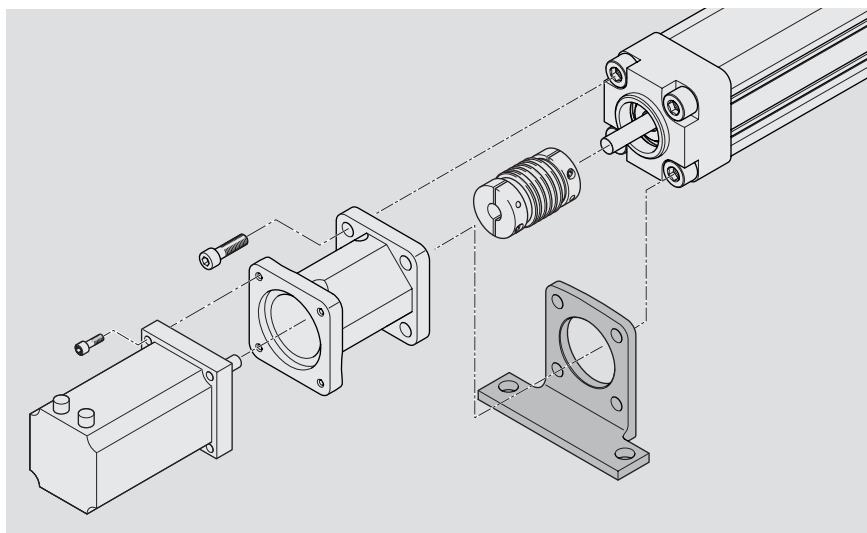
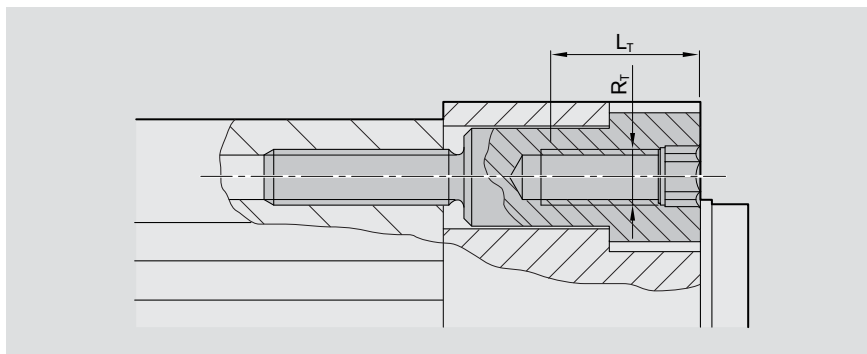
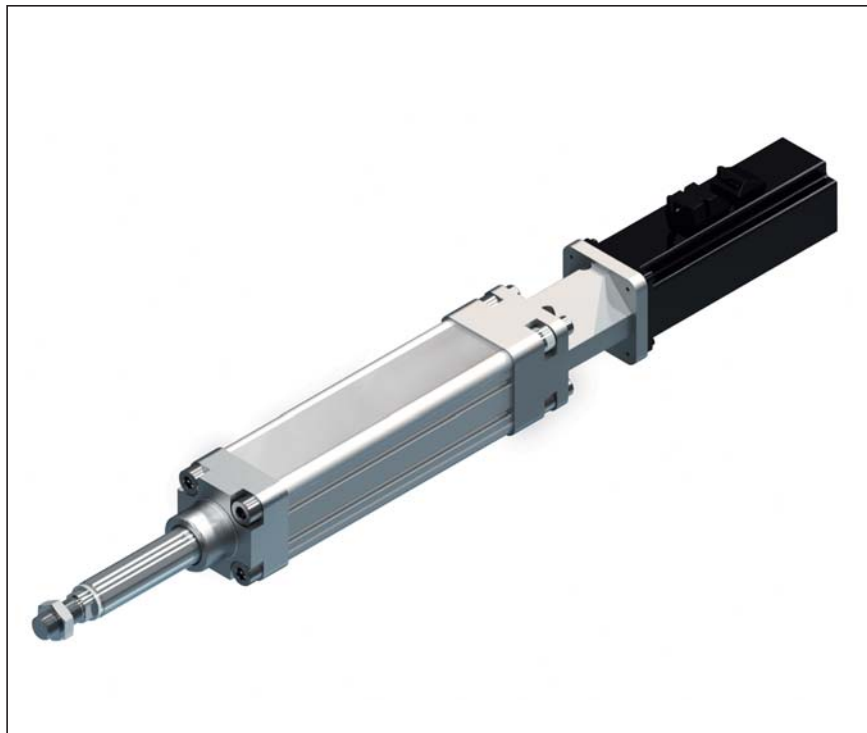
The mounting elements are attached using the "screw in screw" technique, and are screwed into the internal thread of the screw in the cylinder body. The fastening screws are included in the delivery of the mounting elements.

L_T = screw-in depth of the fastening screw

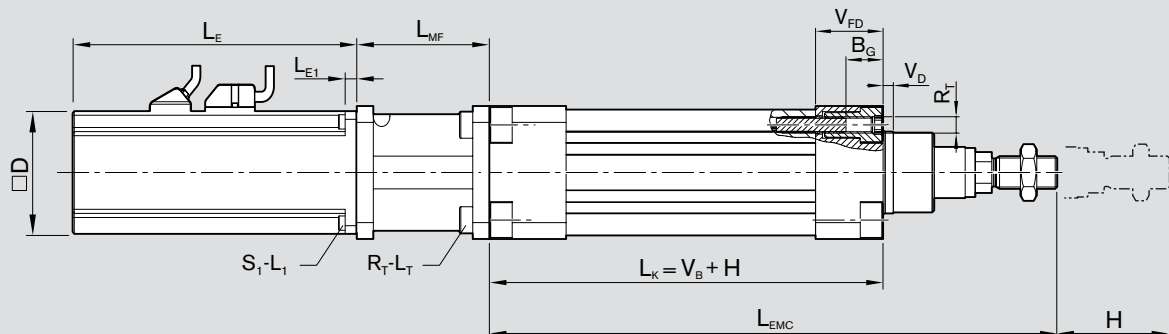
R_T = thread diameter

⚠ When an EMC with motor mount and motor is ordered with foot mounting, this will be delivered pre-assembled. If the foot mounting is to be retrofitted to the cylinder end cap, the motor mount has to be removed first.

For more information, see "Mounting Instructions for EMC," R320103103



Shown in a retracted position



EMC size	Motor	Dimensions (mm)												
		B _G	D	L _{MF}			L _E	L _{E1}	L _T	L ₁	R _T	S ₁	V _D	V _{FD}
					without brake	with brake								
32	MSM020B	16	42.0	45	109.0	140.5	7.0	25	12	M6	M3	5	30	
	MSM030B	16	60.0	55	111.0	144.0	7.0	25	18	M6	M4	5	30	
	MSK030C	16	54.0	55	188.0	213.0	7.0	25	18	M6	M4	5	30	
	VRDM368	16	57.2	45	116.0	116.0	5.0	25	18	M6	M4	5	30	
40	MSM020B	16	42.0	51	109.0	140.5	7.0	25	12	M6	M3	5	30	
	MSM030B	16	60.0	61	111.0	144.0	7.0	25	18	M6	M4	5	30	
	MSK030C	16	54.0	61	188.0	213.0	7.0	25	18	M6	M4	5	30	
	VRDM368	16	57.2	51	116.0	116.0	5.0	25	18	M6	M4	5	30	
50	MSM030C	16	60.0	73	138.5	171.5	7.0	25	18	M8	M4	5	33	
	MSK030C	16	54.0	73	188.0	213.0	7.0	25	18	M8	M4	5	33	
	MSK040C	16	82.0	73	185.5	215.0	8.0	25	22	M8	M6	5	33	
	VRDM397	16	85.0	73	110.0	110.0	10.0	25	25	M8	M6	5	33	
63	MSM040B	16	80.0	73	157.5	191.5	8.0	30	22	M8	M5	5	33	
	MSK040C	16	82.0	73	185.5	215.0	8.0	30	22	M8	M6	5	33	
	MSK050C	16	98.0	78	203.0	233.0	9.0	30	25	M8	M8	5	33	
	VRDM3910	16	85.0	73	140.0	140.5	10.0	30	25	M8	M6	5	33	
80	MSK040C	16	82.0	78	185.5	215.0	8.0	30	22	M10	M6	5	35	
	MSK050C	16	98.0	95	203.0	233.0	9.0	30	25	M10	M8	5	35	
	MSK060C	16	116.0	100	226.0	259.0	9.5	30	25	M10	M8	5	35	
	MSK076C	16	140.0	100	292.5	292.5	14.0	30	25	M10	M10	5	35	
	VRDM3910	16	85.0	78	140.0	140.0	10.0	30	25	M10	M6	5	35	
100	MSK060C	16	116.0	108	226.0	259.0	9.5	30	25	M10	M8	5	35	
	MSK076C	16	140.0	108	292.5	292.5	14.0	30	25	M10	M10	5	35	

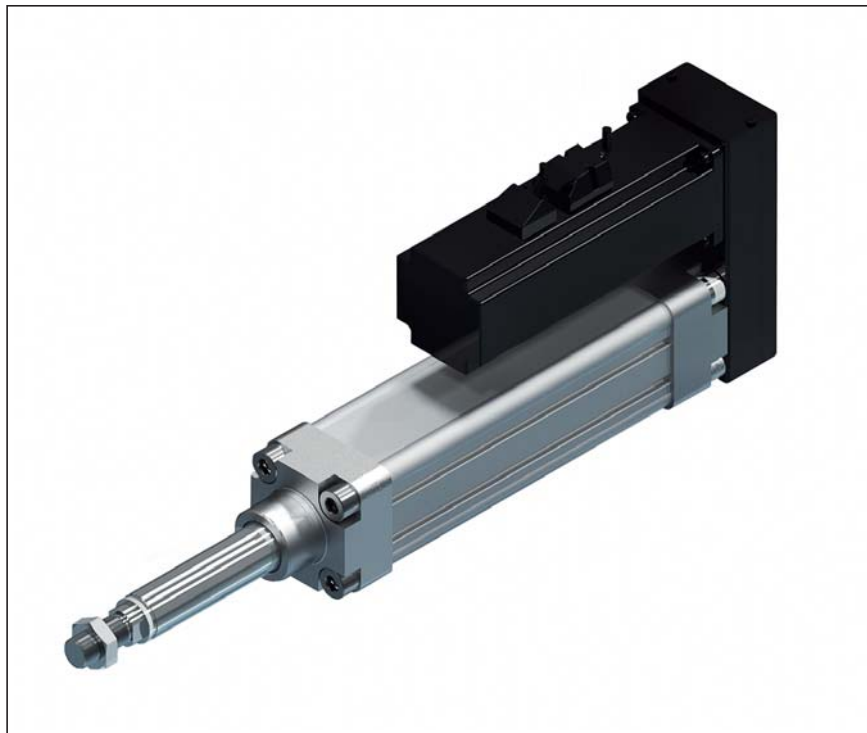
EMC with Belt Side Drive

This configuration of the EMC results in the shortest possible installation length. The reduction gear ratio is 1:1.

Mounting elements are attached at the rear end of the belt drive. The screws are included in the delivery of the mounting elements.

Length calculation:

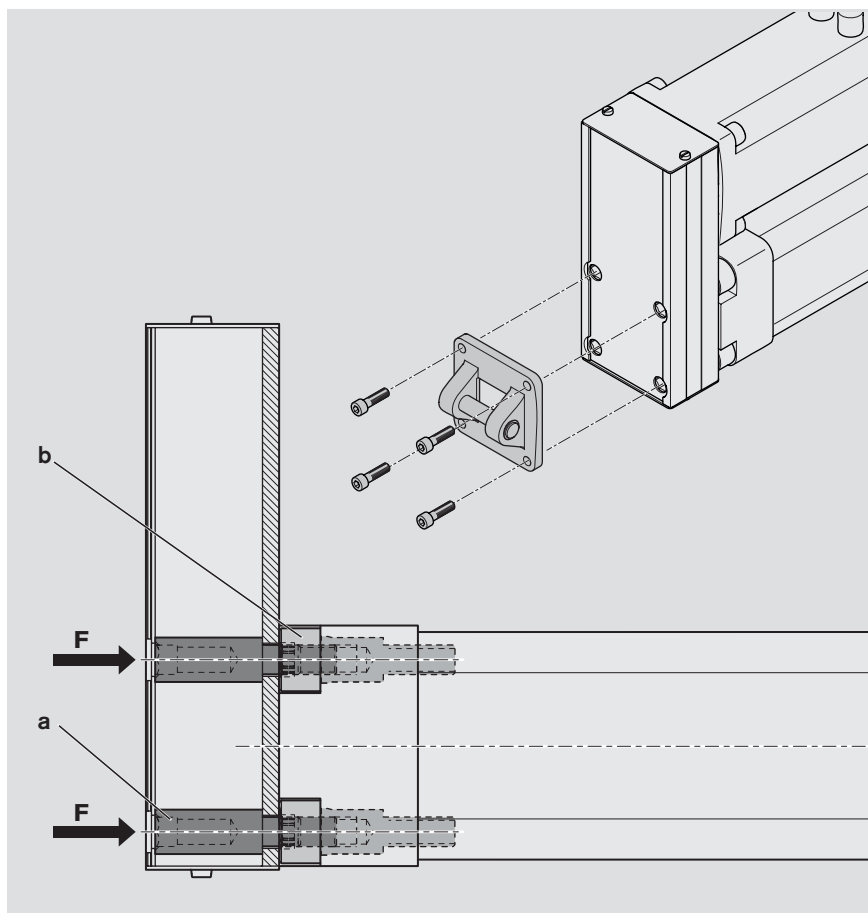
$$L_{sd0} = L_{EMC} + L_{sd}$$



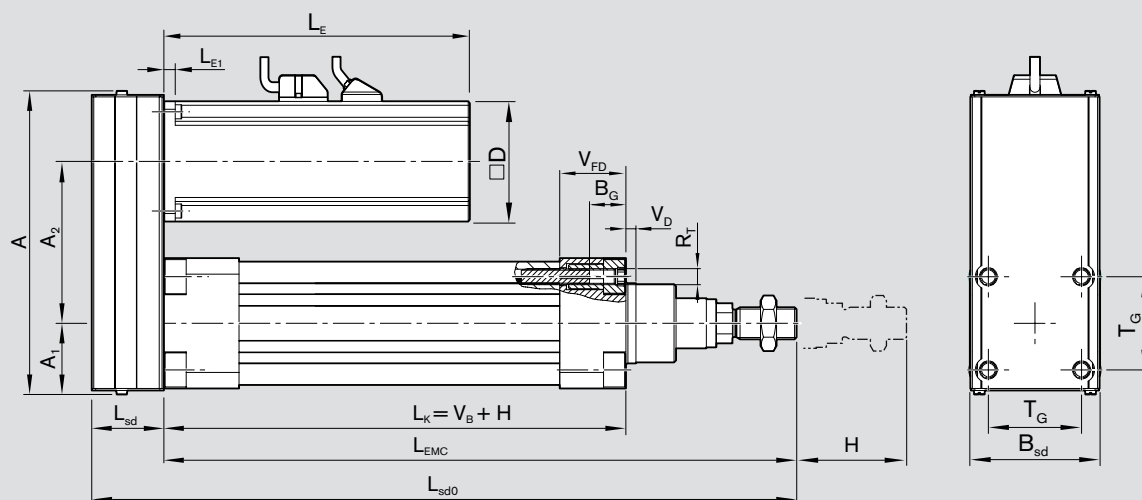
The stud bolts of the belt side drive absorb the forces exerted by the mounting elements via the screws with internal threads. The belt side drive itself is not part of the force flow.

- a) Stud bolt
- b) Screw with internal thread

The mounting elements are attached using the "screw in screw" technique, and are screwed into the internal thread of stud bolts (a).



Shown in a retracted position



EMC size	Motor	Dimensions (mm)													
		B _G	A	A ₁	A ₂	B _{Sd}			L _E	L _{E1}	L _{Sd}	T _G	R _T	V _D	V _{FD}
							without brake	with brake							
32	MSM020B	16	152.0	32.5	71.8	64.5	109.0	140.5	7.0	37.0	32.5	M6	5	30	
	MSM030B	16	152.0	32.5	71.8	64.5	111.0	144.0	7.0	37.0	32.5	M6	5	30	
	MSK030C	16	152.0	32.5	71.8	64.5	188.0	213.0	7.0	37.0	32.5	M6	5	30	
	VRDM368	16	152.0	32.5	71.8	64.5	116.0	116.0	5.0	37.0	32.5	M6	5	30	
40	MSM020B	16	141.0	32.5	64.3	64.5	109.0	140.5	7.0	37.0	38.0	M6	5	30	
	MSM030B	16	141.0	32.5	64.3	64.5	111.0	144.0	7.0	37.0	38.0	M6	5	30	
	MSK030C	16	141.0	32.5	64.3	64.5	188.0	213.0	7.0	37.0	38.0	M6	5	30	
	VRDM368	16	141.0	32.5	64.3	64.5	116.0	116.0	5.0	37.0	38.0	M6	5	30	
50	MSM030C	16	163.0	38.5	80.8	64.5	138.5	171.5	7.0	37.0	46.5	M8	5	33	
	MSK030C	16	163.0	38.5	80.8	64.5	188.0	213.0	7.0	37.0	46.5	M8	5	33	
	MSK040C	16	182.0	38.5	80.8	88.0	185.5	215.5	8.0	51.0	46.5	M8	5	33	
	VRDM397	16	182.0	38.5	80.8	88.0	110.0	110.0	10.0	51.0	46.5	M8	5	33	
63	MSM040B	16	212.0	54.0	89.7	116.0	157.5	191.5	8.0	66.0	56.5	M8	5	33	
	MSK040C	16	212.0	54.0	89.7	116.0	185.5	215.5	8.0	66.0	56.5	M8	5	33	
	MSK050C	16	212.0	54.0	89.7	116.0	203.0	233.0	9.0	66.0	56.5	M8	5	33	
	VRDM3910	16	212.0	54.0	89.7	116.0	140.0	140.5	10.0	66.0	56.5	M8	5	33	
80	MSK040C	16	252.0	54.0	132.2	116.0	185.5	215.5	8.0	66.0	72.0	M10	5	35	
	MSK050C	16	252.0	54.0	132.2	116.0	203.0	233.0	9.0	66.0	72.0	M10	5	35	
	MSK060C	16	252.0	54.0	132.2	116.0	226.0	259.0	9.5	66.0	72.0	M10	5	35	
	MSK076C	16	289.0	54.0	132.2	160.0	292.5	292.5	14.0	90.0	72.0	M10	5	35	
	VRDM3910	16	252.0	54.0	132.2	116.0	140.0	140.5	10.0	66.0	72.0	M10	5	35	
100	MSK060C	16	272.0	63.5	134.7	116.0	226.0	259.0	9.5	66.0	89.0	M10	5	35	
	MSK076C	16	289.0	64.5	134.7	160.0	292.5	292.5	14.0	90.0	89.0	M10	5	35	

Motors

Overview



The motor is selected after determining the main application data (geometry, drive type, required thrust, speed, and stroke).

The torque factors shown on the following page give a rough guide for motor pre-selection.

Type



The **MSK** range of IndraDyn S **servo motors** has a wide power spectrum and narrow size increments. The high torque density of these synchronous servo motors allows a particularly compact design with high torques.

Specification:

- Smooth shaft with shaft seal ring
- Multi-turn absolute encoder (Hiperface), 128 increments with 4096 revolutions. With this encoder type, the absolute axis position is saved even after the power is switched off.
- Cooling system: Natural convection
- Protection class IP65
- With or without holding brake

Product advantages:

- High operational reliability
- Compact construction
- High-performance and dynamic
- High torque density
- High protection rating IP65
- Maximum precision through optical encoder



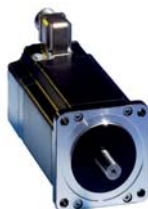
The maintenance-free ECODRIVE Cs **servo motors MSM** expand the digital drive technology portfolio in the lower power range. Offering high power density in a compact design with minimized flange dimensions, this range of motors is ideal for machine concepts for high dynamic processes.

Specification:

- Smooth shaft
- Multi-turn absolute encoder (Hiperface)
- Cooling system: Natural convection
- Protection class IP65
- With or without holding brake

Product advantages:

- High operational reliability
- Maintenance-free operation (through brushless design and the use of long-lasting grease-lubricated bearings)
- High performance data
- High dynamics (through favorable torque-inertia mass ratio)
- Simple cable management and quick start-up



VRDM stepping motors are designed to be sturdy and have maintenance-free operation. Thanks to their optimized internal geometry, these motors offer high power density, with up to 50% more torque than conventional stepping motors of comparable size.

Specification:

- With encoder
- With or without holding brake

Product advantages:

- High power density
- Integrated thermal coil-control per EN-requirements for "safe isolation"
- Very quiet and almost resonance free operation

Possible combinations of mechanical cylinder system with motor and controller

		Servo motors MSK					Servo motors MSM				Stepping motors VRDM			
		MSK 030 C	MSK 040 C	MSK 050 C	MSK 060 C	MSK 076 C	MSM 020B	MSM 030B	MSM 030C	MSM 040B	VRDM 368	VRDM 397	VRDM 3910	VRDM 3913
Recommended controllers		HCS02.1E-W0012	HCS02.1E-W0028				DKC**.3-004	DKC**.3-008	DKC**.3-012	DKC**.3-018	SD3-26/28-R-U25-S2			
EMC size	32													
	40													
	50													
	63													
	80													
	100													

Torque factor

The attainable motor force depends on the chosen motor attachment option. The table at right shows the (static) axial force arising per 1 Nm torque at the screw.



For rough pre-selection, multiply the rated torque of the motor by the torque factor given in the table at right. The result is the maximum axial force for the chosen combination. The rated torque M_N of the selected motor can be found on the following pages.

The mechanical efficiency, belt transmission ratio and screw lead have already been taken into account.

The table serves as a rough guide for sizing the drive.

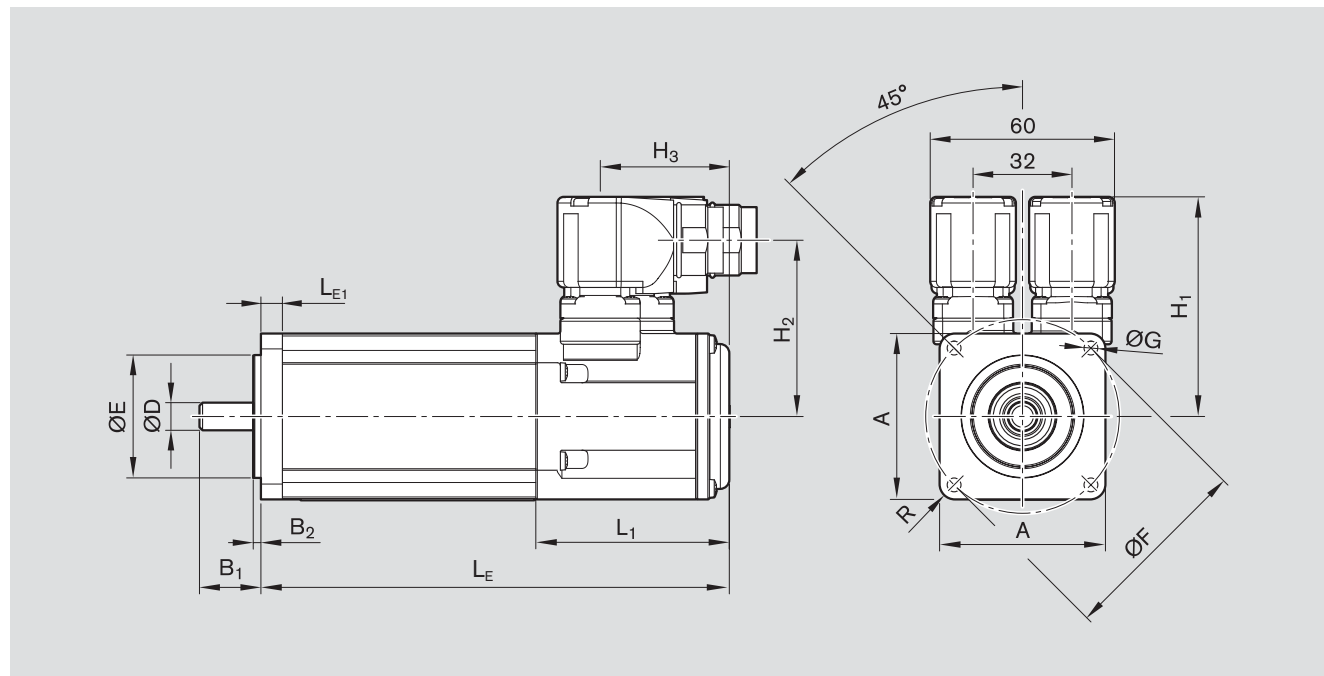
For precise drive selection and sizing the mass moment of inertia of the screw must also be considered! The technical data of the motors can be found on the following pages.

EMC size	Ball screw $d_0 \times P$	Torque factor	
		 (N/Nm)	 (N/Nm)
32	12x5	1131	1018
	12x10	565	509
40	16x5	1131	1018
	16x10	565	509
	16x16	353	318
50	20x5	1131	1018
	20x20	283	254
63	25x5	1131	1018
	25x10	565	509
	25x25	226	204
80	32x5	1131	1018
	32x10	565	509
	32x20	283	254
	32x32	177	159
100	40x5	1131	1018
	40x10	565	509
	40x20	283	254
	40x40	141	127

Motors

AC servo motors MSK

Dimensions



Motor type	Dimensions (mm)														
	A	B ₁	B ₂	$\varnothing D$ k6	$\varnothing E$ j6	$\varnothing F$	$\varnothing G$	H ₁	H ₂	H ₃	L _E w/o brake	L _E with brake	L _{E1}	L ₁	R
MSK 030C	54	20	2.5	9	40	63	4.5	71.5	57.4	41.5	188.0	213.0	7.0	–	R5
MSK 040C	82	30	2.5	14	50	95	6.6	83.5	69.0	31.0	185.5	215.5	8.0	42.5	R8
MSK 050C	98	40	3.0	19	95	115	9.0	85.5	71.0	43.5	203.0	233.0	9.0	55.5	R8
MSK 060C	116	50	3.0	24	95	130	9.0	98.0	84.0	37.0	226.0	259.0	9.5	48.0	R9
MSK 076C	140	50	4.0	24	110	165	11.0	110.0	95.6	57.5	292.5	292.5	14.0	79.0	R12

Motor data independent of EMC

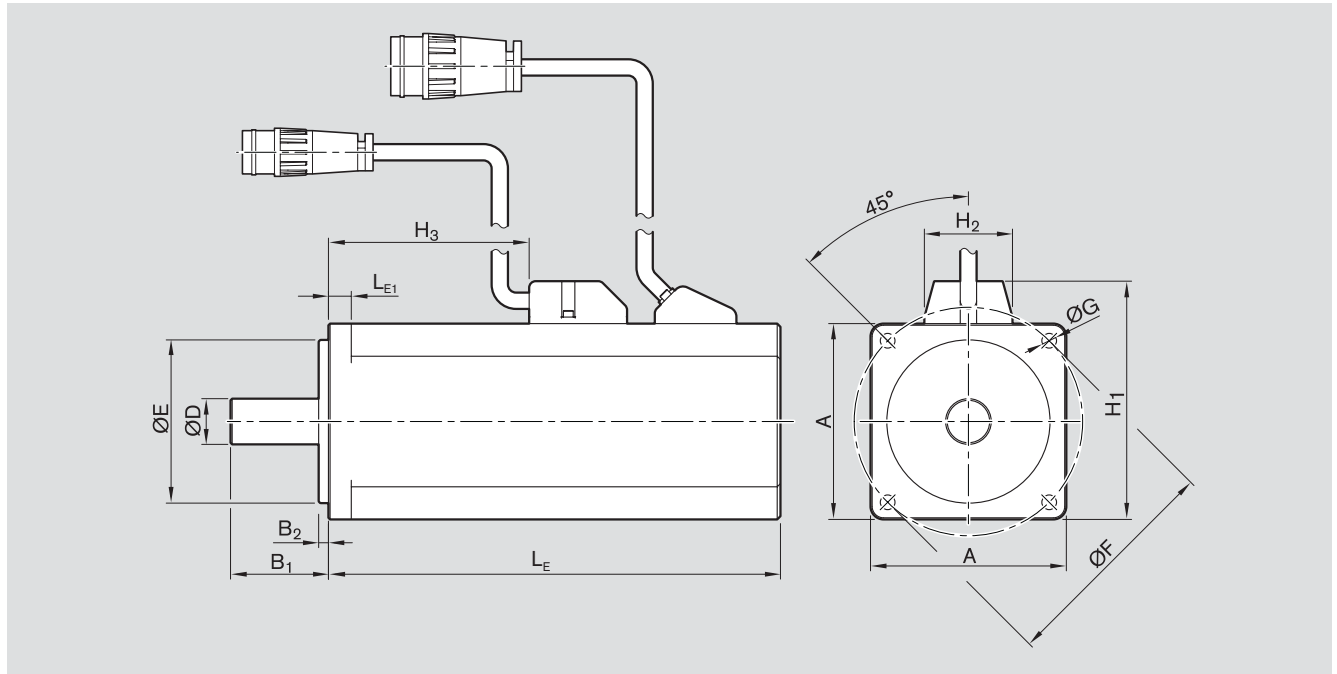
Description		Symbol	Unit	MSK030C-0900	MSK040C-0600	MSK050C-0600	MSK060C-0600	MSK076C-0450
Part number	with brake			R3471 085 03	R3471 086 03	R3471 089 03	R3471 090 03	R3471 093 03
	without brake			R3471 084 03	R3471 087 03	R3471 088 03	R3471 091 03	R3471 092 03
Maximum useful speed	n_{max}		(min ⁻¹)	9000	6000	6000	6000	4500
Maximum torque	M_{max}		(Nm)	4	8.1	15	24	43.5
Rated torque	M_N		(Nm)	0.8	2.7	5.0	8.0	12.0
Rotor mass moment of inertia without brake	J_{rot}		(10 ⁻⁶ kgm ²)	30	140	330	800	4300
Mass without brake	m		(kg)	1.9	3.6	5.4	8.4	13.8
Holding brake								
Holding torque	M_{Br}		(Nm)	1.0	4.0	5.0	10.0	11.0
Brake mass moment of inertia	J_{Br}		(10 ⁻⁶ kgm ²)	7	23	107	59	360
Mass of brake	m_{Br}		(kg)	0.2	0.3	0.7	0.4	1.1

Notes

The motors can be delivered complete with controllers. Please refer to the catalogs "ECODRIVE Cs" and "IndraDrive for Linear Motion Systems" for more information about motors and control systems.

AC servo motors MSM

Dimensions



Motor type	Dimensions (mm)												
	A	B ₁	B ₂	$\varnothing D$ h6	$\varnothing E$ h7	$\varnothing F$	$\varnothing G$	H ₁	H ₂	H ₃	L _E w/o brake	L _E with brake	L _{E1}
MSM 020B	42	24	2	8	22	48	3.4	55	27	38.8	109.0	140.5	7
MSM 030B	60	30	3	11	50	70	4.5	73	27	34.0	111.0	144.0	7
MSM 030C	60	30	3	14	50	70	4.5	73	27	61.5	138.5	171.5	7
MSM 040B	80	35	3	19	70	90	6.0	93	27	76.0	157.5	191.5	8

Motor data independent of EMC

Description		Symbol	Unit	MSM 020B	MSM 030B	MSM 030C	MSM 040B
Part number	with brake			R3471 069 03	R3471 071 03	R3471 073 03	R3471 075 03
	without brake			R3471 068 03	R3471 070 03	R3471 072 03	R3471 074 03
Maximum useful speed		n_{max}	(min ⁻¹)	5000	5000	3000	3000
Maximum torque		M_{max}	(Nm)	0.95	1.91	3.8	7.1
Rated torque		M_N	(Nm)	0.30	0.65	1.1	2.4
Rotor mass moment of inertia w/o brake		J_{rot}	(10 ⁻⁶ kgm ²)	3.20	10.00	17.00	67.00
Mass without brake		m	(kg)	0.50	0.96	1.5	3.1
Holding brake							
Holding torque		M_{Br}	(Nm)	0.29	1.27	1.27	2.45
Brake mass moment of inertia		J_{Br}	(10 ⁻⁶ kgm ²)	0.30	3.00	3.00	9.00
Mass of brake		m_{Br}	(kg)	0.20	0.40	0.4	0.7

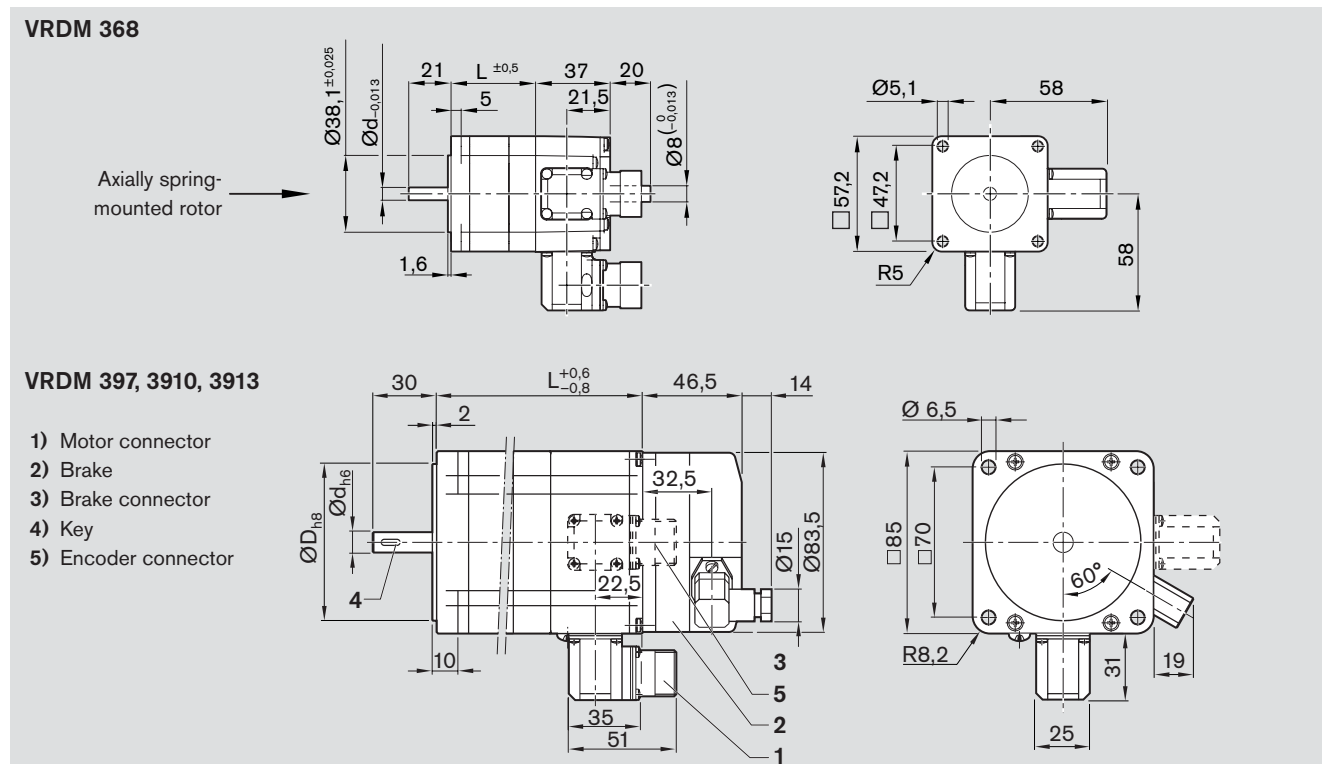
Notes

The motors can be delivered complete with controllers. Please refer to the catalogs "ECODRIVE Cs" and "IndraDrive for Linear Motion Systems" for more information about motors and control systems.

Motors

3-phase stepping motors VRDM

Dimensions



Motor type	Part number	Model		Shaft diameter d (mm)	Overall length L (mm)	Pilot diameter D (mm)
		Holding brake without	with			
VRDM 368	R3471 035 06	X		8 -0.013	79.0	38.1 ±0.025
	R3471 036 06		X			
VRDM 397	R3471 037 06	X		12 h6	67.5	60.0 h8
	R3471 038 06		X			
VRDM 3910	R3471 039 06	X		12 h6	97.5	60.0 h8
	R3471 040 06		X			
VRDM 3913	R3471 041 06	X		14 h6	127.5	60.0 h8
	R3471 042 06		X			

Motor data independent of EMC

Description	Symbol	Unit	VRDM 368	VRDM 397	VRDM 3910	VRDM 3913
Maximum permissible torque	M_{max}	(Nm)	1.5	2.0	4.0	6.0
Holding torque	M_H	(Nm)	1.70	2.26	4.52	6.78
Rotor mass moment of inertia w/o brake	J_{rot}	(10^{-4} kgm ²)	0.38	1.10	2.20	3.30
Step count	z		200/400/500/1000/2000/4000/5000/10000			
Stepping angle per step	a	(°)	1.8/0.9/0.72/0.36/0.18/0.09/0.072/0.036			
Encoder resolution			1000 increments/revolution			
Mass without brake	m	(kg)	2.00	2.05	3.10	4.20
Holding brake						
Holding torque	M_{Br}	(Nm)	1.0			6.0
Brake mass moment of inertia	J_{Br}	(10^{-4} kgm ²)	0.016			0.200
Mass of brake	m_{Br}	(kg)	0.5			1.5

Notes

The motors can be delivered complete with controllers. Please refer to the catalogs "ECODRIVE Cs" and "IndraDrive for Linear Motion Systems" for more information about motors and control systems.

Switch Mounting Arrangements

Overview of the switching system

- 1 Switch (magnetic field sensor)
- 2 T-slot for switch
- 3 Magnet¹⁾

**⚠ For short-stroke applications:
Consider the length of the switch!**

Magnetic field sensors with potted cables can be used with the EMC.

Version

- Hall sensor (PNP-NO) or
- Reed sensor (changeover)

Notes for mounting

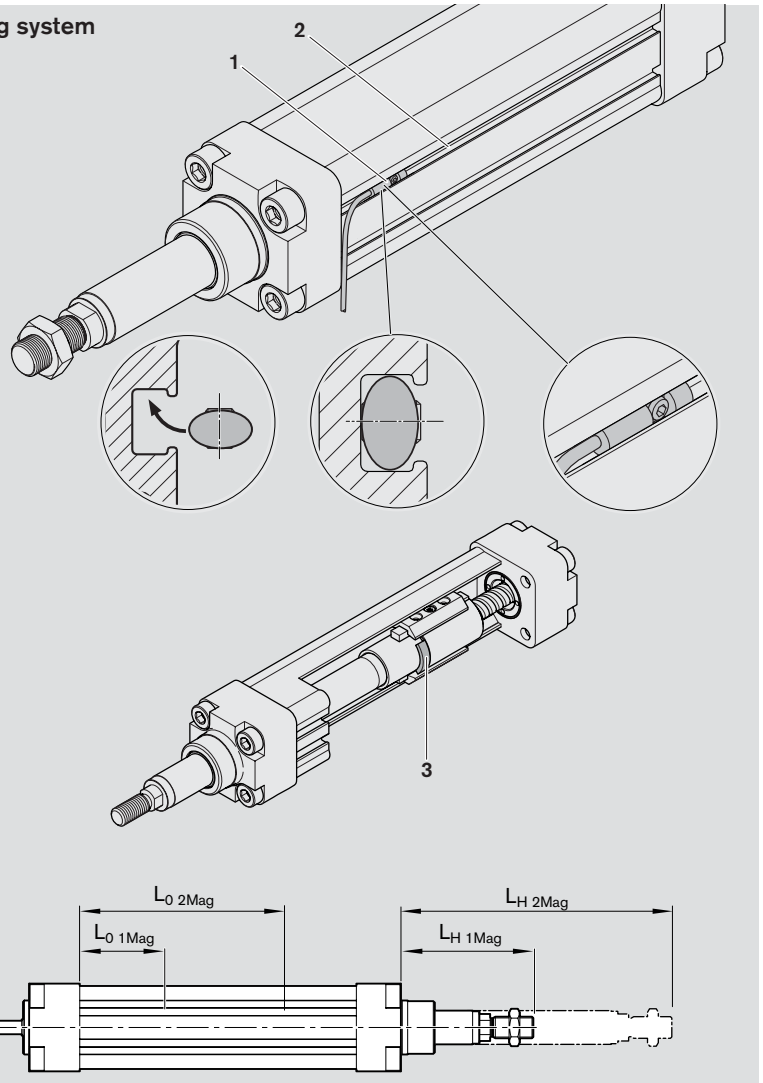
The magnetic field sensors (MFS) are pushed into the T-slot and fixed with set screws.

For details regarding the switching position, see mounting instructions.

For more information, see "Mounting Instructions for EMC," R320103103

1) Available from 1st quarter 2009

Switching system



Switch position

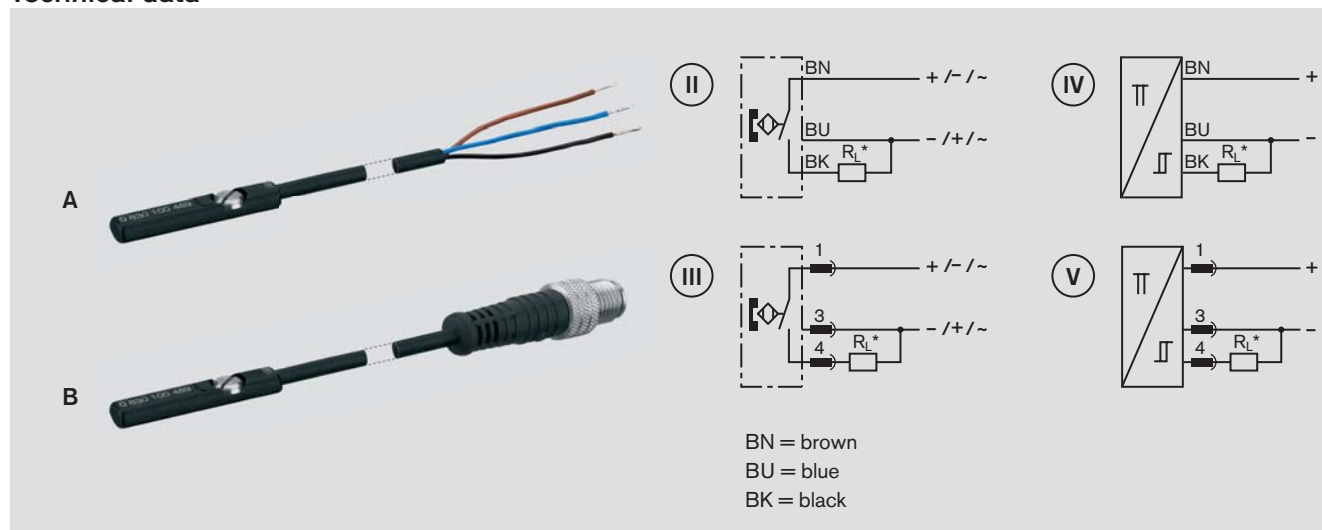
The dimensions in the table indicate the position of the magnet as a function of the stroke H.

⚠ The unit must not travel beyond these positions! If it does, there is a risk that the ball nut may collide with the housing.

EMC size	Ball screw size $d_0 \times P$ (mm)	Dimensions (mm)			
		At stroke 0 mm		At stroke H mm	
		$L_0 \text{ 1Mag}$	$L_0 \text{ 2Mag}$	$L_H \text{ 1Mag}$	$L_H \text{ 2Mag}$
32	12x5	42	55	42+H	55+H
	12x10	46	55	46+H	55+H
40	16x5	49	61	49+H	61+H
	16x10	58	61	58+H	61+H
	16x16	74	61	74+H	61+H
50	20x5	53	76	53+H	76+H
	20x20	91	76	91+H	76+H
63	25x5	57	76	57+H	76+H
	25x10	76	76	76+H	76+H
	25x25	108	76	108+H	76+H
80	32x5	61	94	61+H	94+H
	32x10	90	94	90+H	94+H
	32x20	98	94	98+H	94+H
	32x32	133	94	133+H	94+H
100	40x5	65	99	65+H	99+H
	40x10	84	99	84+H	99+H
	40x20	102	99	102+H	99+H
	40x40	157	99	157+H	99+H

Switch Mounting Arrangements

Technical data

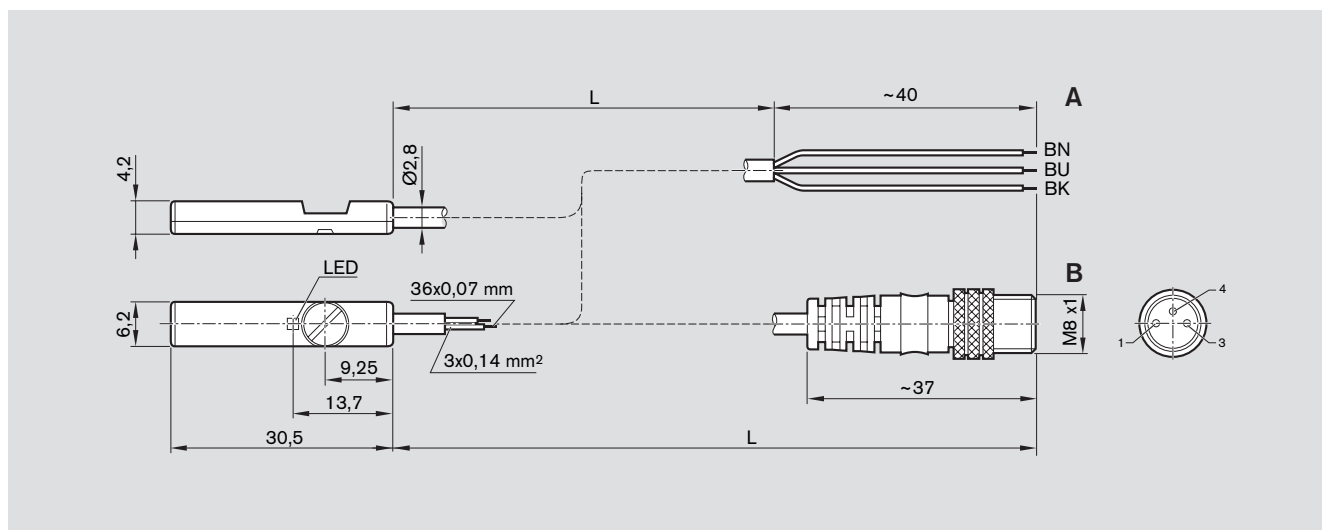


Part number	Con- nection type	Contact type	Symbol	Cable length L / Material (m)	Thermal operating range	Operating voltage	Max. switching current (A)
0830100629	A	Reed	II (3-wire)	3 PUR	-20 °C to +70 °C	AC/DC 10 ... 30 V	AC/DC 0.13
0830100630	A	Reed	II (3-wire)	5 PUR	-20 °C to +70 °C	AC/DC 10 ... 30 V	AC/DC 0.13
0830100434	B	Reed	III (3-wire)	0.3 PUR	-20 °C to +70 °C	AC/DC 10 ... 30 V	AC/DC 0.13
0830100436	B	Reed	III (3-wire)	0.5 PUR	-20 °C to +70 °C	AC/DC 10 ... 30 V	AC/DC 0.13
0830100631	A	Contactless PNP ¹⁾	IV (3-wire)	3 PUR	-10 °C to +70 °C	DC 10 ... 30 V	DC 0.10
0830100632	A	Contactless PNP ¹⁾	IV (3-wire)	5 PUR	-10 °C to +70 °C	DC 10 ... 30 V	DC 0.10
0830100435	B	Contactless PNP ¹⁾	V (3-wire)	0.3 PUR	-10 °C to +70 °C	DC 10 ... 30 V	DC 0.10
0830100437	B	Contactless PNP ¹⁾	V (3-wire)	0.5 PUR	-10 °C to +70 °C	DC 10 ... 30 V	DC 0.10

1) PNP-NC on request

A = Cable

B = M8x1 connector with knurled screw



Part number	Switching capacity	R_S	Voltage drop U at I_{max}	Operating current, not switched (without load)	Operating current, switched (without load)	Switching frequency	Short-circuit protection	Polarity safe
0830100629	3 W / 5 VA	15	≤ 3.6	—	—	< 300	No	Yes
0830100630								
0830100434								
0830100436								
0830100631	—	—	≤ 2.5	< 20	< 30	< 1000	Yes	
0830100632								
0830100435								
0830100437								

General characteristics:

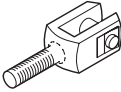
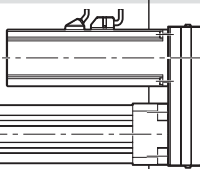
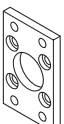
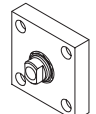
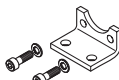
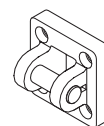
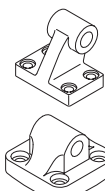
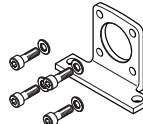
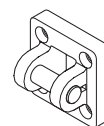
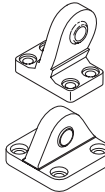
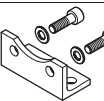
- Degree of protection: IP67 - IEC 60529 (DIN VDE 0470)
- Switching point accuracy (at constant temperature): ± 0.1 mm
- Indicator: LED (yellow = operating status: switched)
- Material of body: polyamide

Reed:

- R_S = protective resistor for Reed contact
- Shock resistance, max.: 30 g / 11 ms (contact closes)
- Vibration resistance: 11-55 Hz, 1 mm
- Switching response times ON / OFF: ~ 0.5 ms / ~ 0.1 ms

Mounting Elements

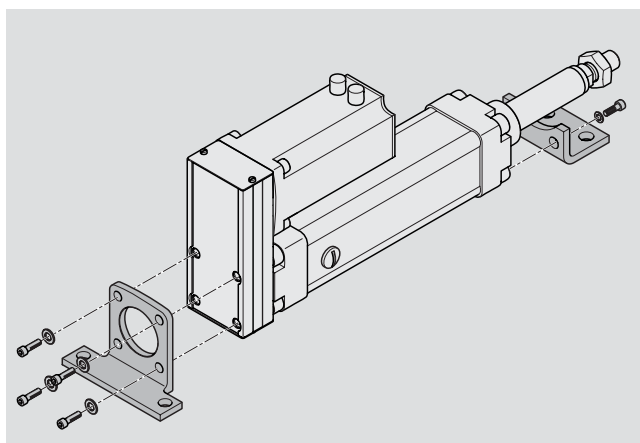
For EMC with belt side drive and motor

Group					
1	2	3	4	5	6
					
					
					
					
					
					

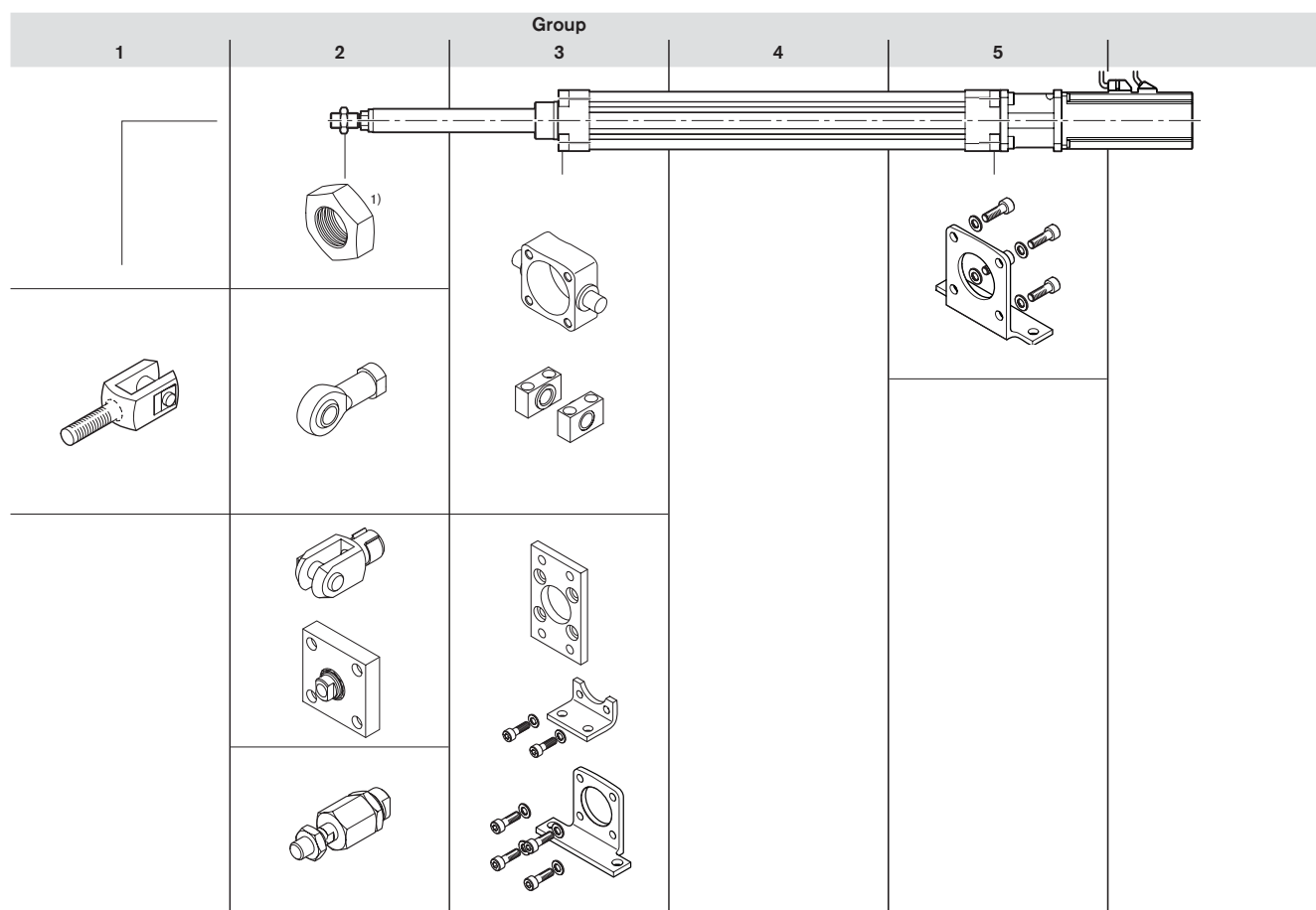
1) Nut is included in the scope of delivery. Can be ordered as an accessory.

Attaching the mounting elements

The mounting elements are screwed into the stud bolts in the belt side drive using the mounting screws included in the delivery.



For EMC with motor mount and motor



1) Nut is included in the scope of delivery. Can be ordered as an accessory.

Permissible forces when installing the unit using mounting elements

⚠ The permissible axial forces for the mechanical cylinder system are reduced when the mounting elements are used. The actual load must not exceed the values in the table.

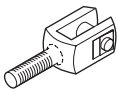
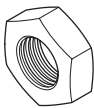
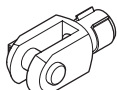
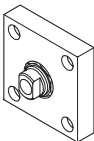
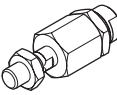
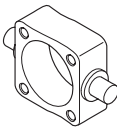
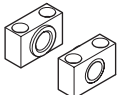
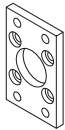
$$F < F_{\max \text{ EMC with mounting elements}}$$

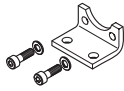
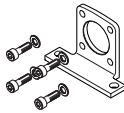
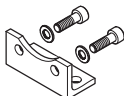
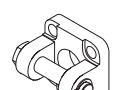
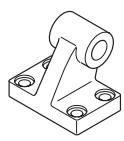
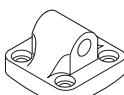
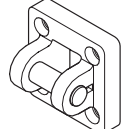
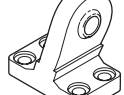
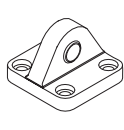
i The maximum attainable forces of the EMC/motor combination can be determined by referring to the "Calculations" section.

EMC size	Ball screw $d_0 \times P$ (mm)	Max. axial force (N)	
		$F_{\max \text{ EMC}}$	$F_{\max \text{ EMC with mounting elements}}$
32	12x5	500	500
	12x10	300	300
40	16x5	3000	2100
	16x10	2800	2100
	16x16	2100	2100
50	20x5	6000	3400
	20x20	3400	3400
63	25x5	10000	5000
	25x10	10000	5000
	25x25	9400	5000
80	32x5	17000	8000
	32x10	17000	8000
	32x20	14700	8000
	32x32	10800	8000
100	40x5	21000	12000
	40x10	21000	12000
	40x20	21000	12000
	40x40	17600	12000

Mounting Elements

Part numbers – for re-ordering single parts

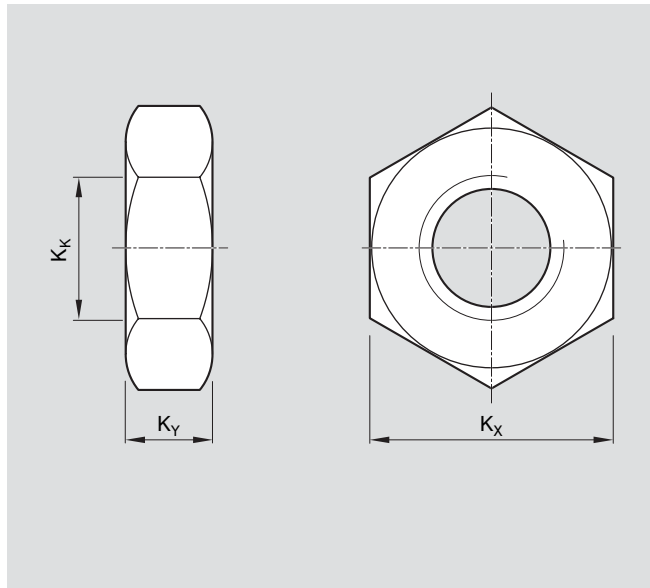
Group	Description	Size	Part number
1	Male clevis 	32	R3499 361 00
		40	R3499 362 00
		50	R3499 363 00
		63	
		80	R3499 365 00
		100	
2	Nut 	32	1823 300 020
		40	1823 300 021
		50	1823 300 030
		63	1823 300 030
		80	1823 300 031
		100	1823 300 031
2	Female spherical rod end bearing 	32	R3499 385 00
		40	R3499 386 00
		50	R3499 387 00
		63	
		80	R3499 389 00
		100	
2	Female clevis 	32	R3499 391 00
		40	R3499 392 00
		50	R3499 393 00
		63	
		80	R3499 395 00
		100	
2	Flexible coupling with mounting plate 	32	R3499 397 00
		40	R3499 398 00
		50	R3499 399 00
		63	
		80	R3499 401 00
		100	
2	Flexible coupling 	32	R3499 379 00
		40	R3499 380 00
		50	R3499 381 00
		63	
		80	R3499 383 00
		100	
3	Trunnion for rod end cover 	32	R3499 403 00
		40	R3499 404 00
		50	R3499 405 00
		63	R3499 406 00
		80	R3499 407 00
		100	R3499 408 00
3, 4	Bearing for trunnion, metal 	32	R3499 409 00
		40	R3499 410 00
		50	
		63	R3499 412 00
		80	
		100	R3499 414 00
3	Head/cap end flange mount 	32	R3499 421 00
		40	R3499 422 00
		50	R3499 423 00
		63	R3499 424 00
		80	R3499 425 00
		100	R3499 426 00

Group	Description	Size	Part number
3	Foot mount at head/cap end 	32	R3499 427 00
		40	R3499 428 00
		50	R3499 429 00
		63	R3499 430 00
		80	R3499 431 00
		100	R3499 432 00
3, 5	Foot mount 	32	R3499 439 00
		40	R3499 440 00
		50	R3499 441 00
		63	R3499 442 00
		80	R3499 443 00
		100	R3499 444 00
5	Foot mount, long, at cap end 	32	R3499 445 00
		40	R3499 446 00
		50	R3499 447 00
		63	R3499 448 00
		80	R3499 449 00
		100	R3499 450 00
5	Clevis mount, Delivery incl. pivot pin 	32	R3499 457 00
		40	R3499 458 00
		50	R3499 459 00
		63	R3499 460 00
		80	R3499 461 00
		100	R3499 462 00
6	Bearing block 	32	R3499 475 00
		40	R3499 476 00
		50	R3499 477 00
		63	R3499 478 00
		80	R3499 479 00
		100	R3499 480 00
6	Swivel mount 	32	R3499 481 00
		40	R3499 482 00
		50	R3499 483 00
		63	R3499 484 00
		80	R3499 485 00
		100	R3499 486 00
5	Clevis mount, for swivel bearing Delivery incl. pivot pin 	32	R3499 451 00
		40	R3499 452 00
		50	R3499 453 00
		63	R3499 454 00
		80	R3499 455 00
		100	R3499 456 00
6	Swivel bearing, high 	32	R3499 463 00
		40	R3499 464 00
		50	R3499 465 00
		63	R3499 466 00
		80	R3499 467 00
		100	R3499 468 00
6	Swivel bearing 	32	R3499 469 00
		40	R3499 470 00
		50	R3499 471 00
		63	R3499 472 00
		80	R3499 473 00
		100	R3499 474 00

Note: If required, guide units can be used for EMC sizes 32 to 63. More information can be found at www.boschrexroth.de and in the catalog R4990 506 50.

[illegible]

Nut

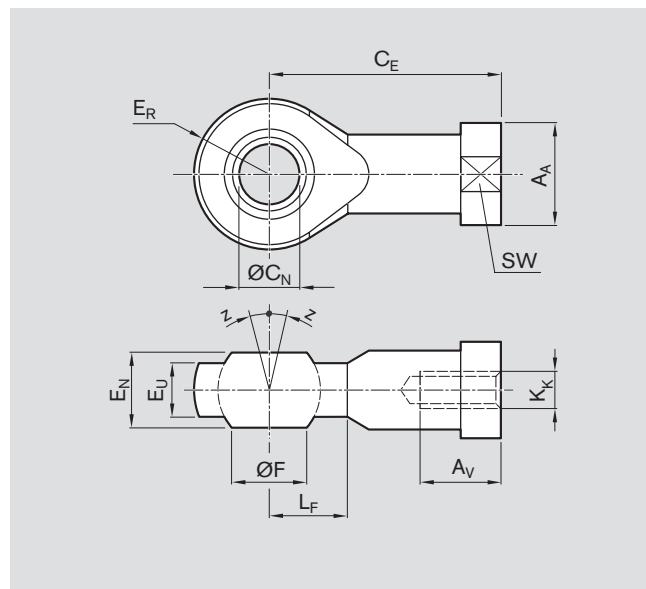


Material: galvanized steel

EMC size	Part number	Order quantity	Dimensions (mm)			Weight (kg)
			K _K	K _X	K _Y	
32	1823300020	50	M10x1.25	17	6	0.010
40	1823300021	50	M12x1.25	19	7	0.012
50	1823300030	25	M16x1.5	24	8	0.017
63						
80						
100	1823300031	25	M20x1.5	30	10	0.030

Mounting Elements

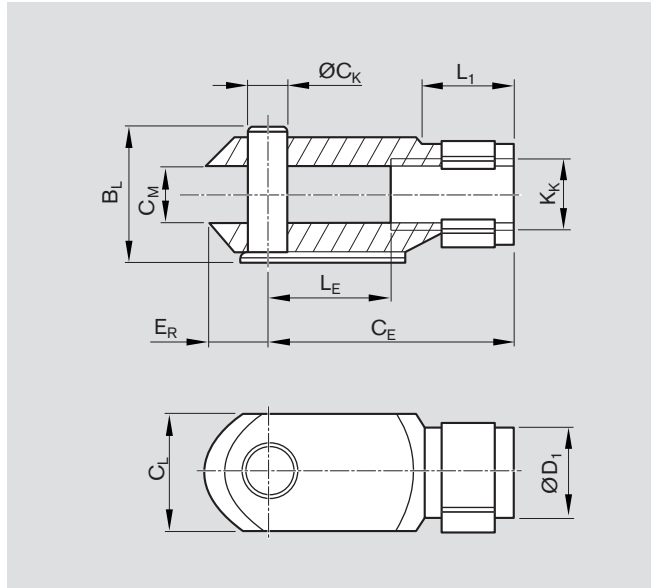
Female spherical rod end bearing



Material: galvanized steel

EMC size	Part number	Dimensions (mm)												Weight (kg)
		A _A	A _V	CE	ØC _N H7	E _N +0/0.1	E _R	E _U	ØF	K _K	L _F	SW	Z (°)	
32	R3499 385 00	19	20	43	10	14	14	10.5	12.9	M10x1.25	15	17	4	0.070
40	R3499 386 00	22	22	50	12	16	16	12.0	15.4	M12x1.25	17	19	4	0.105
50	R3499 387 00	27	28	64	16	21	21	15.0	19.3	M16x1.5	22	22	4	0.210
63														
80	R3499 389 00	34	33	77	20	25	25	18.0	24.3	M20x1.5	26	30	4	0.380
100														

SW = width across flats

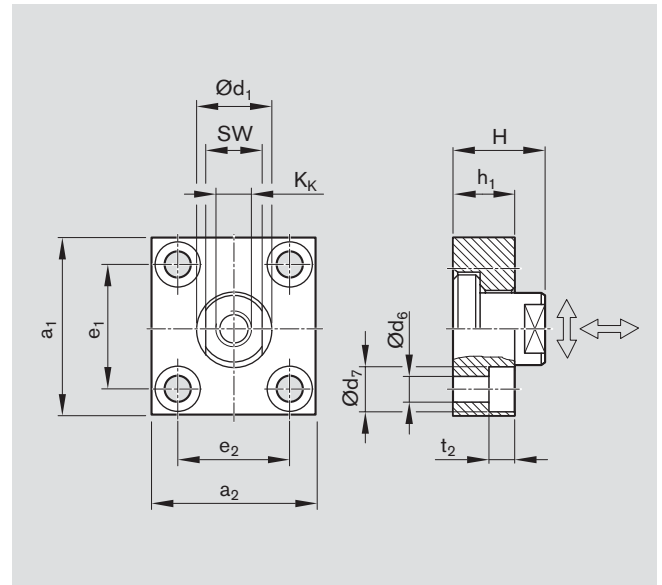
[illegible]

Mounting Elements

Flexible coupling with mounting plate



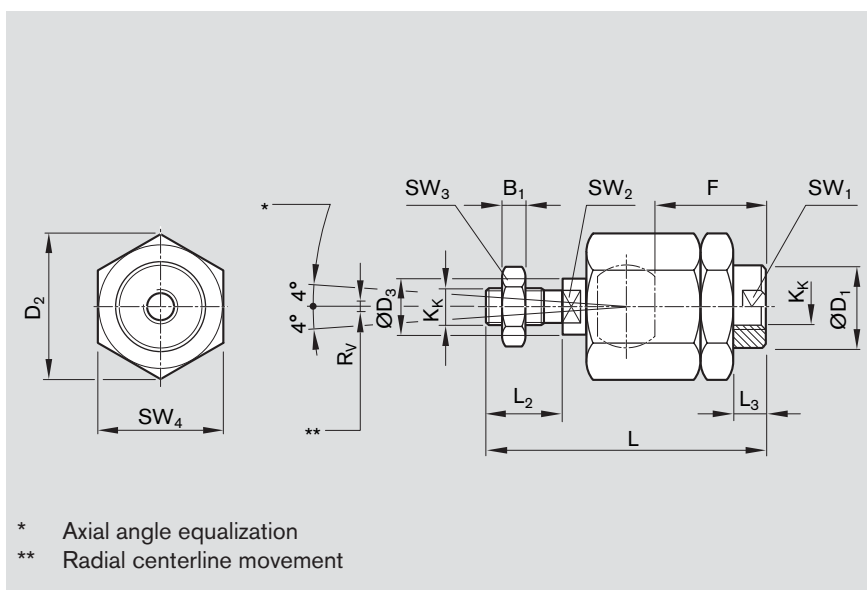
Material: galvanized steel



EMC size	Part number	Dimensions (mm)												Weight (kg)
		a ₁	a ₂	Ød ₁ H11	Ød ₆ H13	Ød ₇ H13	e ₁ H13	e ₂	h ₁	H	K _K	I ₂	SW	
32	R3499 397 00	60	37	20	6.6	11	36±0.15	23±0.15	15	24	M10x1.25	7	17	0.30
40	R3499 398 00	60	56	25	9.0	15	42±0.20	38±0.20	20	30	M12x1.25	9	19	0.40
50	R3499 399 00	80	80	30	11.0	18	58±0.20	58±0.20	20	32	M16x1.5	11	24	0.90
63														
80	R3499 401 00	90	90	40	14.0	20	65±0.30	65±0.30	20	35	M20x1.5	13	36	1.15
100														

SW = width across flats

Flexible coupling



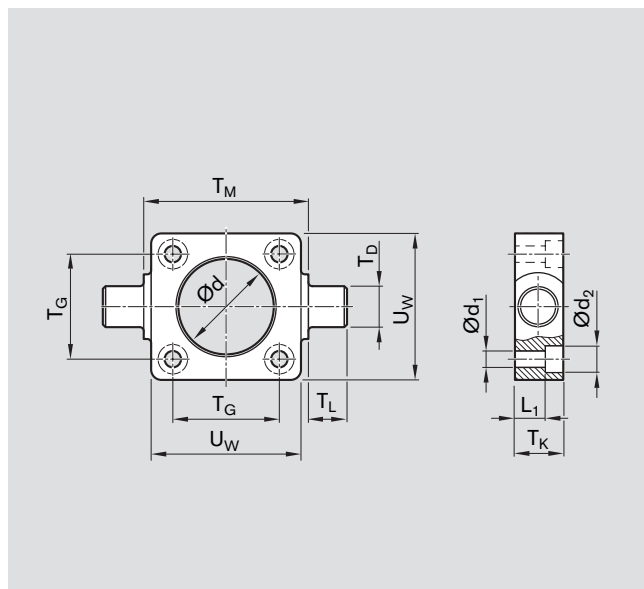
Material: galvanized steel

EMC size	Part number	Dimensions (mm)														Weight (kg)
		B ₁	ØD ₁	D ₂	ØD ₃	F	K _K	L ±2	L ₂	L ₃ ±1	SW ₁	SW ₂	SW ₃	SW ₄	R _V	
32	R3499 379 00	6	21.5	34	14	23	M10x1.25	73	20	7.5	19	12	17	30	0.7	0.21
40	R3499 380 00	7	21.5	34	14	24	M12x1.25	77	24	13.0	19	12	19	30	0.7	0.21
50	R3499 381 00	8	33.5	47	22	32	M16x1.5	108	32	9.0	30	19	24	42	1.0	0.65
63	R3499 383 00	10	33.5	47	22	41	M20x1.5	122	40	19.0	30	19	30	42	1.0	0.68
80																
100																

SW = width across flats

Mounting Elements

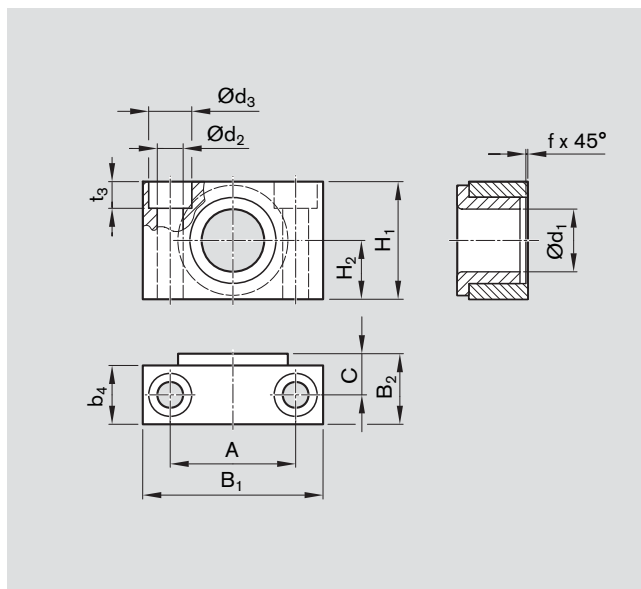
Trunnion for head end



Material: galvanized spheroidal graphite cast iron

EMC size	Part number	Dimensions (mm)										Weight (kg)
		$\varnothing d$ H11	$\varnothing d_1$	$\varnothing d_2$	L_1	T_D e9	T_G ± 0.2	T_K	T_L h14	T_M h14	U_W	
32	R3499 403 00	30	6.6	11	7.5	12	32.5	16	12	50	48	0.29
40	R3499 404 00	35	6.6	11	7.5	16	38.0	20	16	63	56	0.50
50	R3499 405 00	40	9.0	15	10.0	16	46.5	24	16	75	65	0.70
63	R3499 406 00	45	9.0	15	12.0	20	56.5	24	20	90	75	1.10
80	R3499 407 00	55	11.0	18	16.0	20	72.0	28	20	110	100	1.50
100	R3499 408 00	65	11.0	18	25.5	25	89.0	38	25	132	120	2.70

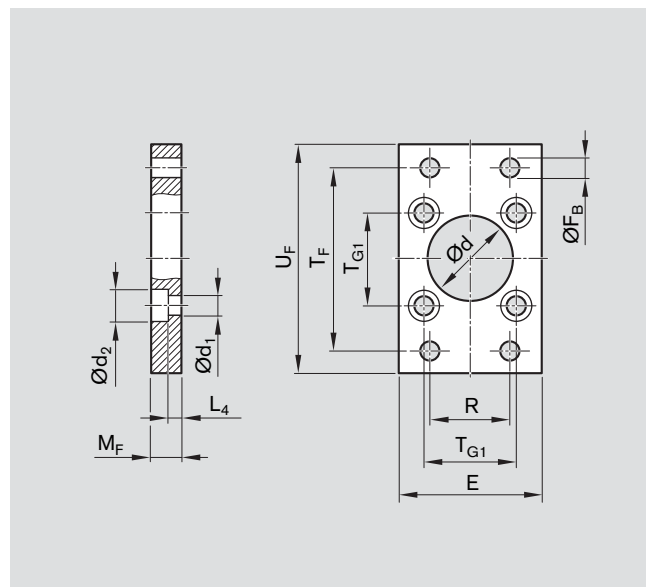
Bearing for trunnion, metal



Material: galvanized steel, with sintered bronze bushings, delivered in pairs

EMC size	Part number	Dimensions (mm)											
		A ±0.2	B ₁	B ₂	b ₄	C	d ₁	d ₂ H13	d ₃ H13	f x 45°	H ₁	H ₂ ±0.1	t ₃ +0.4
32	R3499 409 00	32	46	18.0	15	10.5	12	6.6	11	1.0	30	15	6.8
40	R3499 410 00	36	55	21.0	18	12.0	16	9.0	15	1.6	36	18	9.0
50													
63	R3499 412 00	42	65	23.0	20	13.0	20	11.0	18	1.6	40	20	11.0
80													
100	R3499 414 00	50	75	28.5	25	16.0	25	14.0	20	2.0	50	25	13.0

Head/cap end flange mount

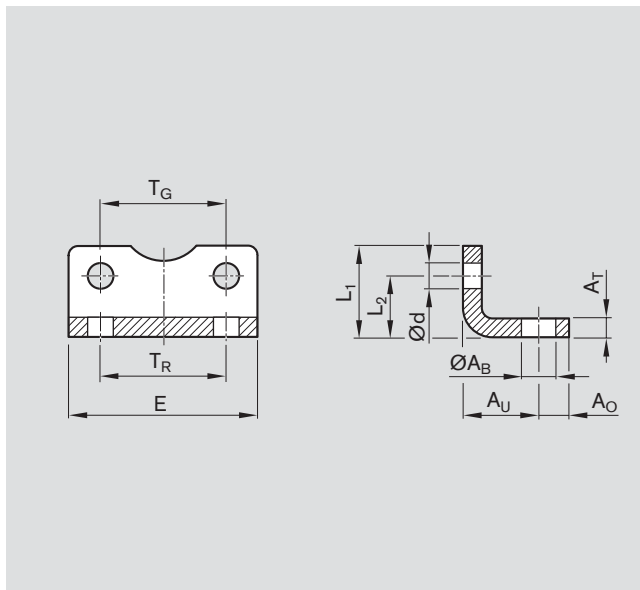


Material: galvanized steel

EMC size	Part number	Dimensions (mm)											Weight (kg)
		Ød	Ød₁ H13	Ød₂ H13	E	ØF_B	L₄	M_F	R	T_F	T_G1 ±0.2	U_F	
32	R3499 421 00	30	6.6 (M6x20)	11	50	7	4.5	10	32	64	32.5	80	0.3
40	R3499 422 00	35	6.6 (M6x20)	11	55	9	4.5	10	36	72	38.0	90	0.4
50	R3499 423 00	40	9.0 (M8x20)	15	65	9	6.0	12	45	90	46.5	110	0.8
63	R3499 424 00	45	9.0 (M8x20)	15	75	9	6.0	12	50	100	56.5	125	1.0
80	R3499 425 00	55	11.0 (M10x20)	18	100	12	8.0	16	63	126	72.0	154	1.7
100	R3499 426 00	65	11.0 (M10x20)	18	120	14	8.0	16	75	150	89.0	186	2.4

Mounting Elements

Foot mount at head/cap end

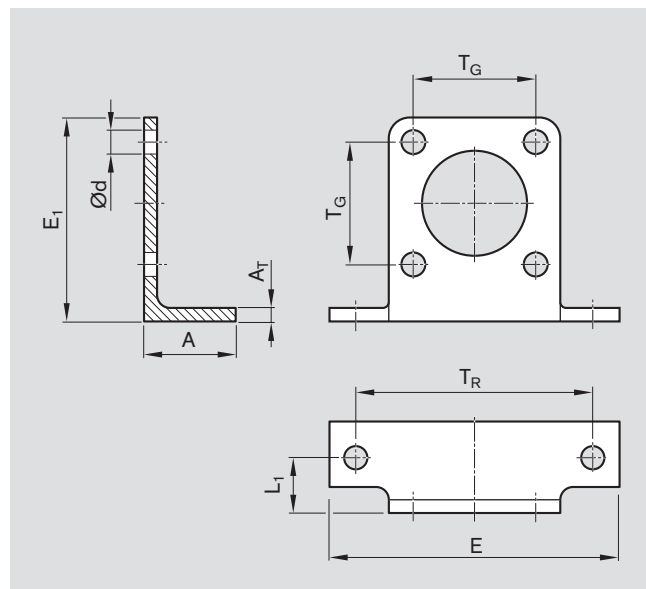


Material: galvanized steel

EMC size	Part number	Dimensions (mm)										Weight (kg)
		ØA _B	A _O	A _T ±0.7	A _U ±0.2	Ød	E	L ₁	L ₂	T _G ±0.2	T _R	
32	R3499 427 00	7.0	11	4.5	24	6.6	48	30	15.7	32.5	32	0.20
40	R3499 428 00	10.0	12	4.5	28	6.6	53	30	17.0	38.0	36	0.22
50	R3499 429 00	10.0	13	5.5	32	9.0	63	30	21.7	46.5	45	0.33
63	R3499 430 00	10.0	13	5.5	32	9.0	80	45	21.7	56.5	50	0.38
80	R3499 431 00	12.0	19	6.5	41	11.0	98	60	27.0	72.0	63	0.74
100	R3499 432 00	14.5	19	6.5	41	11.0	115	60	26.5	89.0	75	0.90

Two pieces plus fastening screws included in scope of delivery

Foot mount

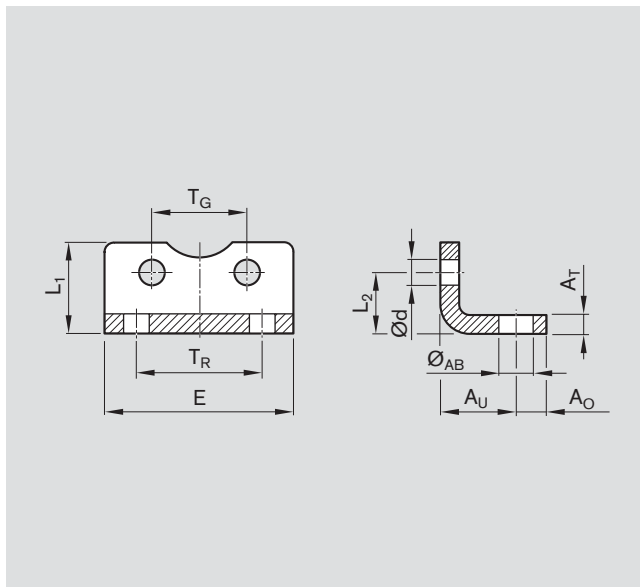


Material: galvanized steel

EMC size	Part number	Dimensions (mm)								Weight (kg)
		A ±0.2	A _T ±0.2	Ød +0.2	E	E ₁	L ₁ ±0.2	T _G ±0.2	T _R	
32	R3499 439 00	30	5	7	79	55.5	18	32.5	65	0.15
40	R3499 440 00	30	5	9	90	62.5	18	38.0	75	0.16
50	R3499 441 00	35	5	9	110	77.5	21	46.5	90	0.26
63	R3499 442 00	35	5	9	120	87.5	21	56.5	100	0.32
80	R3499 443 00	40	8	12	153	110.5	27	72.0	128	0.76
100	R3499 444 00	40	8	14	178	128.5	27	89.0	148	1.10

Mounting Elements

Foot mount, long, at cap end

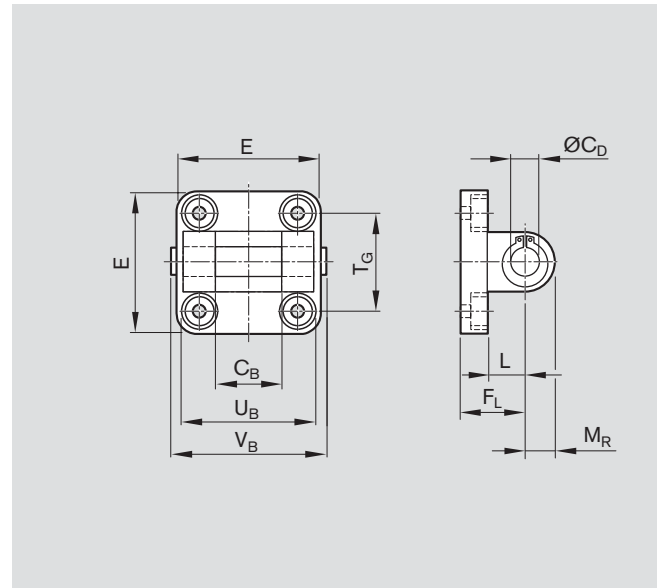


Material: galvanized steel

EMC size	Part number	Dimensions (mm)										Weight (kg)
		ØAB H13	AO	AT	AU	Ød	E	L1	L2	TG ±0,1	TR JS 14	
32	R3499 445 00	7.0	12	5	18	6.6	79	30	15.8	32.5	65	0.30
40	R3499 446 00	10.0	12	5	18	6.6	90	30	17.0	38.0	75	0.35
50	R3499 447 00	10.0	14	5	21	9.0	110	35	21.7	46.5	90	0.51
63	R3499 448 00	9.0	14	5	21	9.0	120	35	21.7	56.5	100	0.55
80	R3499 449 00	12.0	13	5	27	11.0	153	50	27.0	72.0	128	1.10
100	R3499 450 00	14.5	13	5	27	11.0	178	50	26.5	89.0	148	1.30

Two pieces plus fastening screws included in scope of delivery

Clevis mount

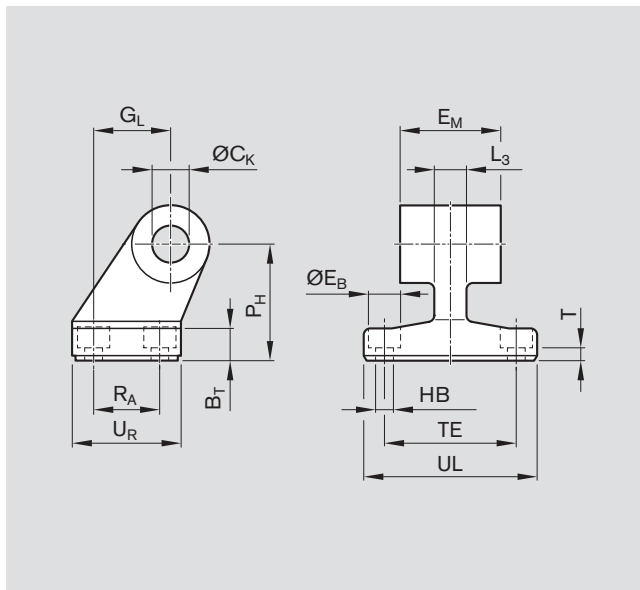


Material: aluminum

EMC size	Part number	Dimensions (mm)									Weight (kg)
		C_B H14	$\varnothing C_D$ H9	E max.	F_L ± 0.2	L min.	M_R	T_G ± 0.2	U_B h14	V_B	
32	R3499 457 00	26	10	47	22	12	11	32.5	45	50	0.09
40	R3499 458 00	28	12	54	25	15	13	38.0	52	57	0.11
50	R3499 459 00	32	12	65	27	15	13	46.5	60	65	0.18
63	R3499 460 00	40	16	75	32	20	17	56.5	70	76	0.25
80	R3499 461 00	50	16	94	36	20	17	72.0	90	96	0.51
100	R3499 462 00	60	20	112	41	25	21	89.0	110	117	0.70

Pivot pin and fastening screws included in scope of delivery

Bearing block

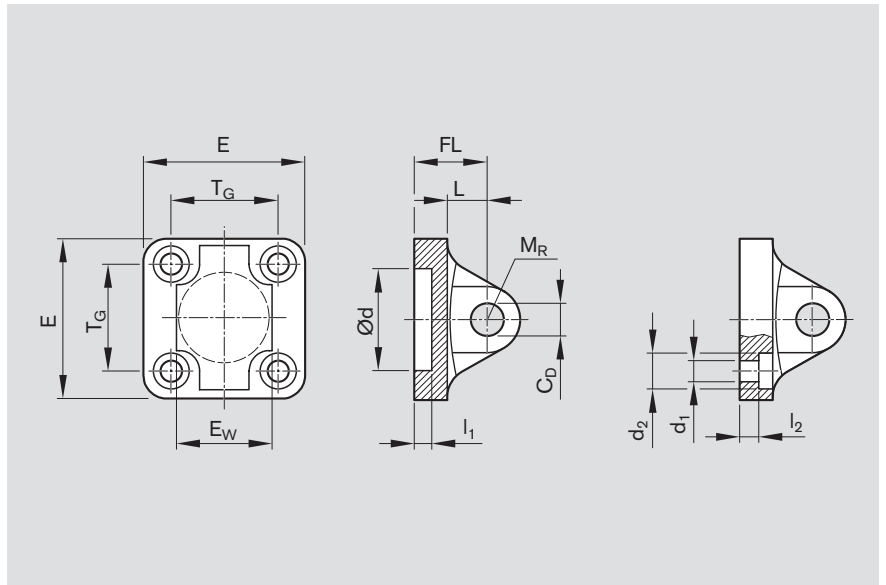


Material: galvanized spheroidal graphite cast iron

EMC size	Part number	Dimensions (mm)														Weight (kg)
		B _R	B _T	ØC _K H9	ØE _B H13	E _M -0.2/-0.6	G _L	ØH _B H13	L ₃	P _H JS15	R _A JS14	T	T _E JS14	U _L	U _R	
32	R3499 475 00	10	8	10	10	26	21	5.5	10	32	18	4	38	51	31	0.166
40	R3499 476 00	11	10	12	10	28	24	5.5	10	36	22	4	41	54	35	0.222
50	R3499 477 00	13	12	12	11	32	33	6.6	14	45	30	6	50	65	45	0.433
63	R3499 478 00	15	12	16	11	40	37	6.6	14	50	35	6	52	67	50	0.550
80	R3499 479 00	15	14	16	15	50	47	9.0	18	63	40	6	66	86	60	0.956
100	R3499 480 00	18	15	20	15	60	55	9.0	20	71	50	6	76	96	70	1.488

Mounting Elements

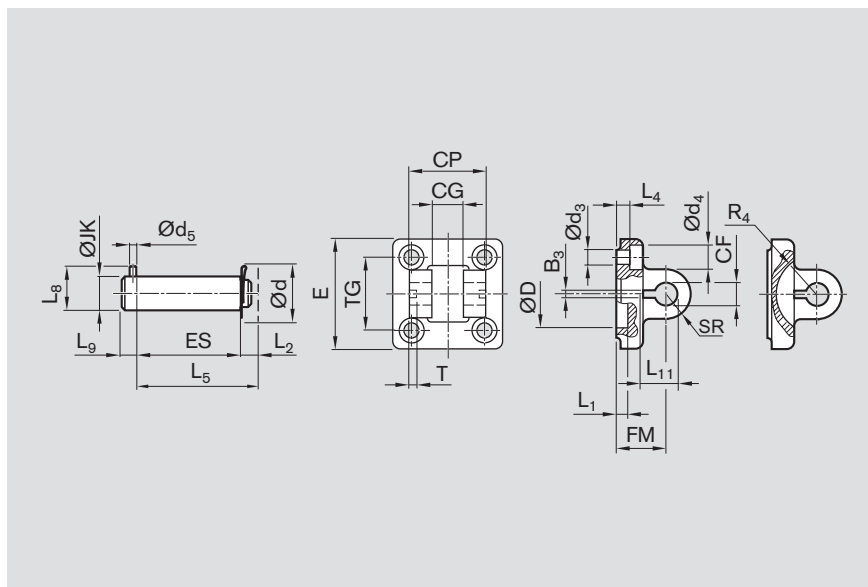
Swivel mount



Material: galvanized spheroidal graphite cast iron

EMC size	Part number	Dimensions (mm)												
		C _D	E	E _W	F _L	L	M _R	T _G	d	I ₁	I ₂	DIN 912	d ₁	d ₂
		H9		-0.2/-0.6	±0.2			±0.2	H11		±0.5		H13	H13
32	R3499 481 00	10	49	26	22	12	10	32.5	30	6.0	5.5	M6x18	6.6	11
40	R3499 482 00	12	55	28	25	15	12	38.0	35	6.0	5.5	M6x18	6.6	11
50	R3499 483 00	12	67	32	27	15	12	46.5	40	7.0	6.5	M8x20	9	15
63	R3499 484 00	16	77	40	32	20	16	56.0	45	8.0	6.5	M8x20	9	15
80	R3499 485 00	16	97	50	36	20	16	72.0	45	10.0	10.0	M10x20	11	18
100	R3499 486 00	20	115	60	41	25	20	89.0	55	8.5	10.0	M10x20	11	18

Clevis mount, for swivel bearing



Material: galvanized spheroidal graphite cast iron

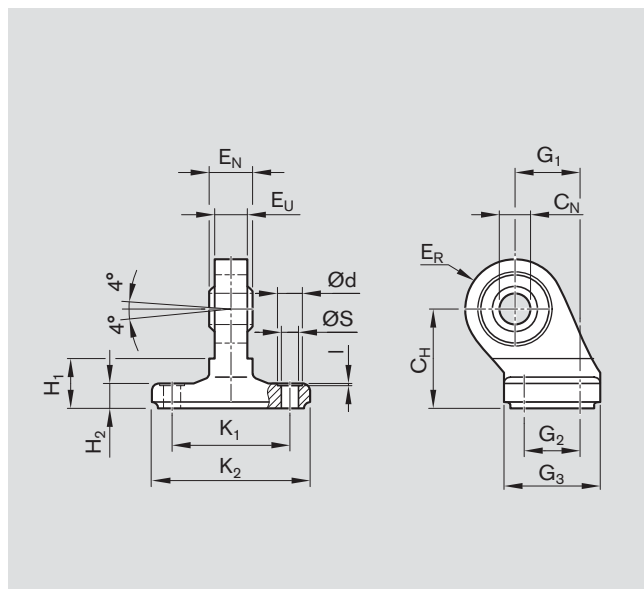
EMC size	Part number	Dimensions (mm)																
		B ₃ ±0.2	C _F F7	C _G D10	C _P d12	Ød	Ød ₃	Ød ₄	Ød ₅ H12	ØD	E	F _M ±0.2	ØJ _K h9	L ₁ ±0.5	L ₄	L ₈ -0.4	L ₁₁ ±0.3	R ₄
32	R3499 451 00	3.3	10	14	34	23	6.6	11	3	30	49	22	10	5.5	9	14	11.5	17
40	R3499 452 00	4.3	12	16	40	25	6.6	11	4	35	55	25	12	5.5	9	16	12.0	20
50	R3499 453 00	4.3	16	21	45	32	9.0	15	4	40	67	27	16	6.5	11	20	14.0	22
63	R3499 454 00	4.3	16	21	51	32	9.0	15	4	45	77	32	16	6.5	11	20	14.0	26
80	R3499 455 00	4.3	20	25	65	40	11.0	18	4	45	97	36	20	10.0	11	24	16.0	30
100	R3499 456 00	4.3	20	25	75	40	11.0	18	4	55	117	41	20	10.0	11	24	16.0	33

EMC size	Dimensions (mm)				Weight (kg)
	S _R	T ±0.2	T _G ±0.2	DIN 912	
32	11	3	32.5	M6x18	0.216
40	12	4	38.0	M6x18	0.286
50	15	4	46.5	M8x20	0.487
63	15	4	56.5	M8x20	0.676
80	20	4	72.0	M10x20	1.385
100	20	4	89.0	M10x20	2.036

Pivot pin included in scope of delivery

Mounting Elements

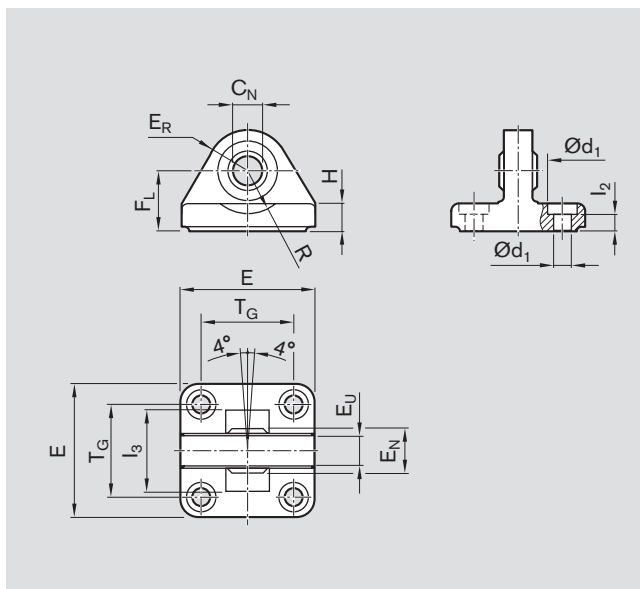
Swivel bearing, high



Material: galvanized spheroidal graphite cast iron

EMC size	Part number	Dimensions (mm)										
		C _H JS15	C _N H7	E _N -0.1	E _R	E _U	G ₁ JS14	G ₂ JS14	G ₃ max.	H ₁	H ₂	K ₁ JS14
32	R3499 463 00	32	10	14	16	10.5	21	18	31	16	10	38
40	R3499 464 00	36	12	16	18	12	24	22	35	16	10	41
50	R3499 465 00	45	16	21	21	15	33	30	45	23	12	50
63	R3499 466 00	50	16	21	23	15	37	35	50	23	12	52
80	R3499 467 00	63	20	25	27	18	47	40	60	32	14	66
100	R3499 468 00	71	20	25	30	18	56	50	70	33	15	76

Swivel bearing



Material: galvanized spheroidal graphite cast iron

EMC size	Part number	Dimensions (mm)													Weight (kg)
		ØC _N H7	Ød ₁ H13	E	E _N -0.1	E _R	E _U	F _L -0.2	H	I ₂	I ₃ min.	R	T _G ±0.2	DIN 912	
32	R3499 469 00	10	6.6	49	14	15	10.5	22	10.5	5.5	36	15	32.5	M6x18	0.214
40	R3499 470 00	12	6.6	55	16	18	12.0	25	11.0	5.5	42	16	38.0	M6x18	0.283
50	R3499 471 00	16	9.0	67	21	20	15.0	27	11.0	6.5	48	16	46.5	M8x20	0.428
63	R3499 472 00	16	9.0	77	21	23	15.0	32	—	6.5	55	18	56.5	M8x20	0.684
80	R3499 473 00	20	11.0	97	25	27	18.0	36	15.0	10.0	70	21	72.0	M10x20	1.212
100	R3499 474 00	20	11.0	117	25	30	18.0	41	20.0	10.0	80	21	89.0	M10x20	2.032

Lubrication

General notes

Standard lubrication practices for ball bearings also apply to the ball screws used in the EMC.

Grease lubrication

The advantage of grease lubrication is that the ball screw can run long distances on one supply of grease.

As a result, a lubricating system is not required in many cases.

All commercially available high-quality ball bearing lubricating greases may be used.

Read the lubricant manufacturer's specifications carefully! Never use greases with solid lubricant components (e.g. graphite or MoS₂).

For relubrication, grease cartridges containing Dynalub 510 are available from Rexroth.

Greases in accordance with DIN 51825-K2K and, for higher loads, KP2K of NLGI Class 2 in accordance with DIN 51818 are recommended for the longest possible lubrication intervals. Tests have shown that greases of NLGI Class 00 achieve only about 50% of the running performance of Class 2 at higher loads. The relubrication interval depends on many factors such as the degree of contamination, operating temperature, load, etc. The following values can thus serve only as a guide.

Relubrication intervals for NLGI-2 greases

Lubricating interval							
Revolutions (mill.)	Travel (km) with lead P =						
	5	10	16	20	25	32	40
50	250	500	800	1000	1250	1600	2000

Limit conditions:

Load = $\leq 0.2 \text{ C}$
 $n_{\min}$ = 100 min^{-1}
 $\text{Temp}_{\max. \text{ nut}}$ = $80 \text{ }^{\circ}\text{C}$
 $\text{Temp}_{\text{continuous nut}}$ = $60 \text{ }^{\circ}\text{C}$

Orientation: – any
 Operating mode: – no short strokes
 Sealing: – standard

Lubrication notes

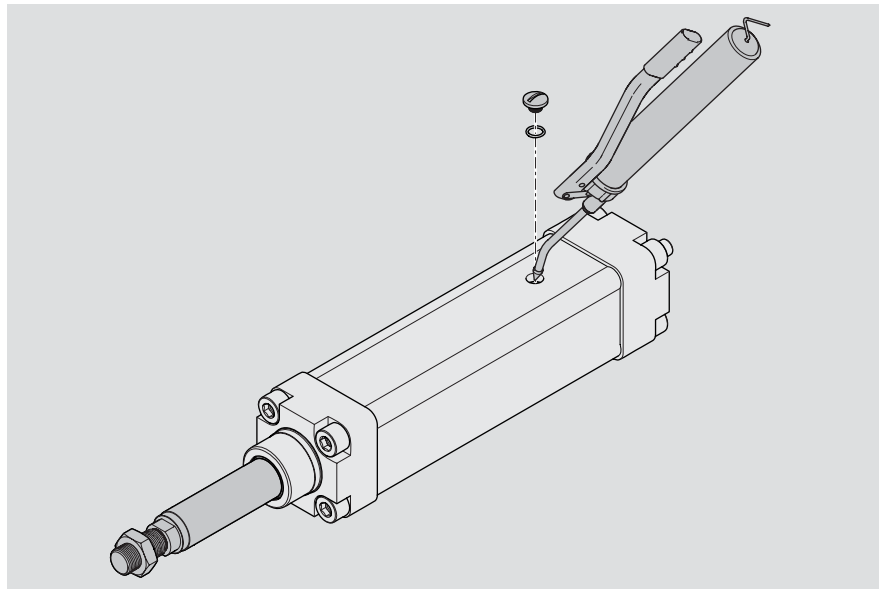
Basic lubrication is applied in-factory before shipment.

The EMC is designed for grease lubrication (using a manual grease gun with extension tube and nozzle).

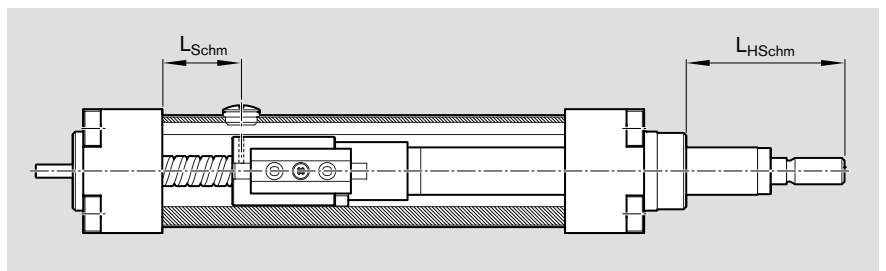
The only maintenance required is lubrication of the ball screw assembly via the lube port.

For lubrication, retract the piston to the position L_{HSchm} .

For more information, see "Mounting Instructions for EMC," R320103103



EMC size	Dimensions (mm)	
	L_{Schm}	$L_{HSchm} \pm 1.5$
32	25	67.5
40	25	71.5
50	30	91.5
63	40	119.5
80		
100		

**Recommended lubricants**

For lubricant intervals, see "Mounting Instructions for EMC," R320103103.

EMC size	Grease DIN 51825	Consistency class DIN 51818	Recommended grease	Part number (400 g cartridge)
32 - 100	KP2K	NLGI 2	Dynalub 510	R3416 037 00

⚠ Do not use greases containing solid particles (e.g. graphite or MoS_2)!

Relubrication quantities**For NLGI 2 greases:**

The EMC is delivered ready to operate. Lubrication before initial start-up is not required.



For relubrication, extend the EMC to the dimension L_{HSchm} .

EMC size	Ball screw $d_0 \times P$	Grease relube quantity (g)
32	12x5	0.30
	12x10	0.30
40	16x5	0.60
	16x10	0.80
	16x16	1.10
50	20x5	1.40
	20x20	2.20
63	25x5	1.40
	25x10	1.70
	25x25	3.10

EMC size	Ball screw $d_0 \times P$	Grease relube quantity (g)
80	32x5	2.00
	32x10	2.80
	32x20	3.20
	32x32	4.90
100	40x5	2.70
	40x10	7.30
	40x20	7.80
	40x40	12.90

Calculations

After pre-selection of the mechanical cylinder system, the mounting elements and the cylinder/motor combination, the calculations can now be performed.

The actual loads must be smaller than the maximum permissible loads for the mechanical cylinder system and the mounting elements.

Average speed and average load

- where the speed fluctuates, the average speed n_m is calculated as follows

$$n_m = \frac{q_1}{100} \cdot n_1 + \frac{q_2}{100} \cdot n_2 + \dots + \frac{q_n}{100} \cdot n_n$$

- where the load fluctuates and the speed is constant, the equivalent dynamic axial load $F_{m,ax}$ is calculated as follows

$$F_{m,ax} = \sqrt[3]{F_1^3 \cdot \frac{q_1}{100} + F_2^3 \cdot \frac{q_2}{100} + \dots + F_n^3 \cdot \frac{q_n}{100}}$$

- where both the load and speed fluctuate, the equivalent dynamic axial load $F_{m,ax}$ is calculated as follows

$$F_{m,ax} = \sqrt[3]{F_1^3 \cdot \frac{n_1}{n_m} \cdot \frac{q_1}{100} + F_2^3 \cdot \frac{n_2}{n_m} \cdot \frac{q_2}{100} + \dots + F_n^3 \cdot \frac{n_n}{n_m} \cdot \frac{q_n}{100}}$$

$F_{m,ax}$ = equivalent dynamic axial load (N)

n_m = average rotary speed (min⁻¹)

calculated using the average values for $F_{m,ax}$ and n_m .

q = discrete time step for phases 1 ... n (%)

Nominal life

Service life in revolutions L

$$L = \left(\frac{C}{F_{m,ax}} \right)^3 \cdot 10^6 \Rightarrow C = F_{m,ax} \cdot \sqrt[3]{\frac{L}{10^6}} \Rightarrow F_{m,ax} = \frac{C}{\sqrt[3]{\frac{L}{10^6}}}$$

$F_{m,ax}$ = equivalent dynamic axial load (N)

C = dynamic load capacity (N)

Service life in hours L_h

$$L_h = \frac{L}{n_m \cdot 60}$$

L_h = service life (h)

L = service life (revolutions) (–)

n_m = average rotary speed (min⁻¹)

$$\text{Machine operating hours} = L_h \cdot \frac{\text{Machine duty cycle}}{\text{Screw duty cycle}}$$

Drive torque and drive power

Drive torque M_p

Conversion of rotary to linear motion:

$$M_p = \frac{F \cdot P}{2000 \cdot \pi \cdot \eta}$$

M_p = drive torque (Nm)

M_{te} = transmitted torque (Nm)

F = operating load (N)

P = lead (mm)

η = mechanical efficiency (≈ 0.9)

η' = mechanical efficiency (≈ 0.8)

Transmitted torque M_{te}

Conversion of linear to rotary motion:

$$M_{te} = \frac{F \cdot P \cdot \eta'}{2000 \cdot \pi}$$

The dynamic drag torque must be taken into account for preloaded ball nut units.

Drive power P_a

$$P_a = \frac{M_p \cdot n}{9550}$$

P_a = drive power (kW)

M_p = drive torque (Nm)

n = rotary speed (min⁻¹)

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 J_s

of the EMC referred to the drive journal

$$J_s = (k_{J_{fix}} + k_{J_{var}} \cdot H) \cdot 10^{-6}$$

Mass moment of inertia J_{ex}

of the mechanical system 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 J_{dc}

of the drive train referred to the motor
journal

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

Mass moment of inertia ratio V

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

Application area	V
Handling	≤ 6.0
Processing	≤ 1.5

Total mass moment of inertia J_{tot}

referred to the motor journal

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

**Maximum permissible rotary
speed n_{mech}**

of mechanical system

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

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

Effektive stroke

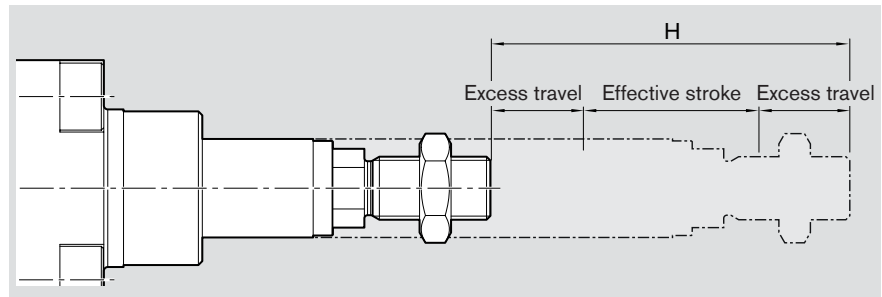
$$\text{Effektive stroke} = H - 2 \times \text{Excess travel}$$

i = gear ratio
 J_s = mass moment of inertia
of EMC
(without external load) (kgm²)
 $k_{J_{fix}}$ = constant for fixed-length
portion of mass moment
of inertia (10⁶ kgm²)
 $k_{J_{var}}$ = constant for variable-length
portion of mass moment
of inertia (10⁶ kgm²)
 H = stroke (mm)
 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)

J_{br} = mass moment of inertia,
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 EMC
(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)
 i = gear ratio of timing belt
side drive (–)
 k_{Jm} = constant for mass-specific
portion of mass moment
of inertia (10⁶ m²)
 m_{ex} = moved external load (kg)
 $n_{m \max}$ = 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_{mech} = maximum permissible linear
speed of mechanical system (m/s)

Technical data

Excess travel (recommended)



EMC size	Ball screw	screw lead P (mm)	Excess travel (mm)
32	12x5Rx3-4	5	20
	12x10Rx2-2	10	20
40	16x5Rx3-4	5	20
	16x10Rx3-3	10	20
	16x16Rx3-3	16	20
50	20x5Rx3-4	5	40
	20x20Rx3.5-3	20	40
63	25x5Rx3-4	5	40
	25x10Rx3-4	10	40
	25x25Rx3.5-3	25	40
80	32x5Rx3.5-4	5	40
	32x10Rx3.969-5	10	40
	32x20Rx3.969-3	20	40
	32x32Rx3.969-3	32	40
100	40x5Rx3.5-5	5	40
	40x10Rx6-4	10	40
	40x20Rx6-3	20	40
	40x40Rx6-3	40	40

Coupling data

EMC size	Ball screw d_0 (mm)	Motor type	Rated torque M_{cN} (Nm)	Mass moment of inertia J_c (10^{-6} kgm ²)	Mass m_c (kg)
32	12	MSM020B	1.90	2.1	0.04
		MSM030B	3.70	7.0	0.08
		MSK030C	3.70	7.0	0.08
		VRDM368	1.90	2.1	0.04
40	16	MSM020B	1.90	2.1	0.04
		MSM030B	10.00	35.0	0.17
		MSK030C	10.00	35.0	0.17
		VRDM368	1.90	2.1	0.04
50	20	MSM030C	14.50	63.0	0.27
		MSK030C	14.50	63.0	0.27
		MSK040C	14.50	63.0	0.27
		VRDM397	14.50	63.0	0.27
63	25	MSM040B	19.00	64.0	0.27
		MSK040C	19.00	64.0	0.27
		MSK050C	19.00	64.0	0.27
		VRDM3910	14.50	63.0	0.27
80	32	MSK040C	14.50	63.0	0.27
		MSK050C	74.00	210.0	0.70
		MSK060C	74.00	210.0	0.70
		MSK076C	74.00	210.0	0.70
		VRDM3913	14.50	63.0	0.27
100	40	MSK060	155.00	410.0	0.95
		MSK076C	155.00	410.0	0.95

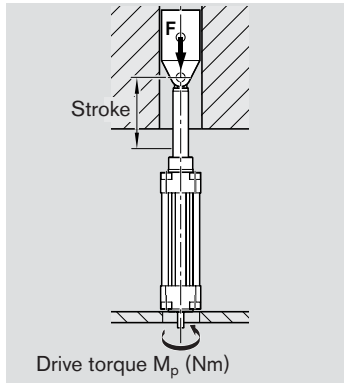
Frictional torque M_R of the EMC, constant for calculation of the mass moment of inertia J_s

EMC size	Ball screw Dimensions (mm)		Constants			EMC frictional torque M_R (Nm)
	d_0	Lead P	$k_{J \text{ fix}}$	$k_{J \text{ var}}$	$k_{J \text{ m}}$	
32	12	5	1.942	0.012	0.633	0.14
		10	2.377	0.013	2.533	0.17
40	16	5	9.437	0.032	0.633	0.26
		10	10.257	0.033	2.533	0.30
		16	12.335	0.040	6.485	0.35
50	20	5	25.371	0.085	0.633	0.33
		20	30.742	0.095	10.132	0.51
63	25	5	60.788	0.223	0.633	0.45
		10	76.223	0.256	10.132	0.55
		25	80.765	0.249	15.831	0.77
80	32	5	160.373	0.607	0.633	0.71
		10	172.111	0.647	2.533	0.86
		20	196.083	0.665	10.132	0.96
		32	242.697	0.684	25.938	1.13
100	40	5	486.375	1.568	0.633	1.04
		10	455.882	1.369	2.533	1.32
		20	499.344	1.408	10.132	1.42
		40	673.570	1.567	40.528	1.84

Specifications of timing belt side drive for motor attachment via timing belt side drive

EMC size	Motor	Mass moment of inertia on motor journal	Weight of timing belt side drive	Maximum torque	Frictional torque
		J_{sd} (10^{-6} kgm^2)	m_{sd} (kg)	M_{sd} (Nm)	$M_{R \text{ sd}}$ (Nm)
32	MSM020B	1.27	0.40	0.70	0.035
	MSM030B	1.27	0.40	0.70	0.035
	MSK030C	1.27	0.40	0.70	0.035
	VRDM368	1.27	0.40	0.70	0.035
40	MSM020B	3.70	0.40	3.20	0.160
	MSM030B	3.70	0.40	3.20	0.160
	MSK030C	3.70	0.40	3.20	0.160
	VRDM368	3.70	0.40	3.20	0.160
50	MSM030C	8.80	0.45	4.30	0.215
	MSK030C	8.80	0.45	4.30	0.215
	MSK040C	8.80	0.75	4.30	0.215
	VRDM397	8.80	0.75	4.30	0.215
63	MSM040B	46.15	1.45	13.00	0.650
	MSK040C	46.15	1.45	13.00	0.650
	MSK050C	46.15	1.45	13.00	0.650
	VRDM3910	46.15	1.45	13.00	0.650
80	MSK040C	123.00	1.90	18.00	0.900
	MSK050C	123.00	1.90	18.00	0.900
	MSK060C	123.00	1.90	18.00	0.900
	MSK076C	123.00	3.30	18.00	0.900
	VRDM3913	123.00	1.90	18.00	0.900
100	MSK060C	343.00	2.30	24.00	1.200
	MSK076C	343.00	3.70	24.00	1.200

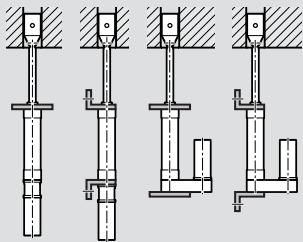
Permissible Speeds



The attainable speeds may vary according to the type of mounting.

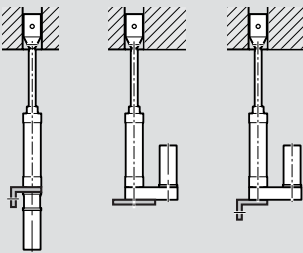
Case I

All types of fixed mounting. Fixed mounting at head end or head and cap end (flange or foot mounting).



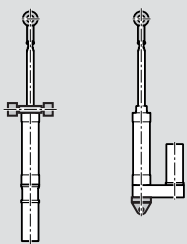
Case II

All types of fixed mounting. Fixed mounting at cap end (flange or foot mounting).

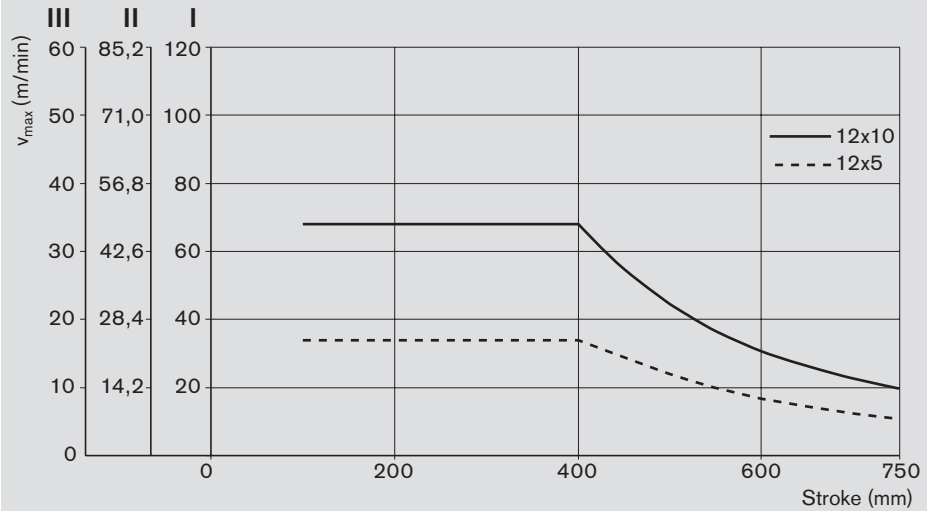


Case III

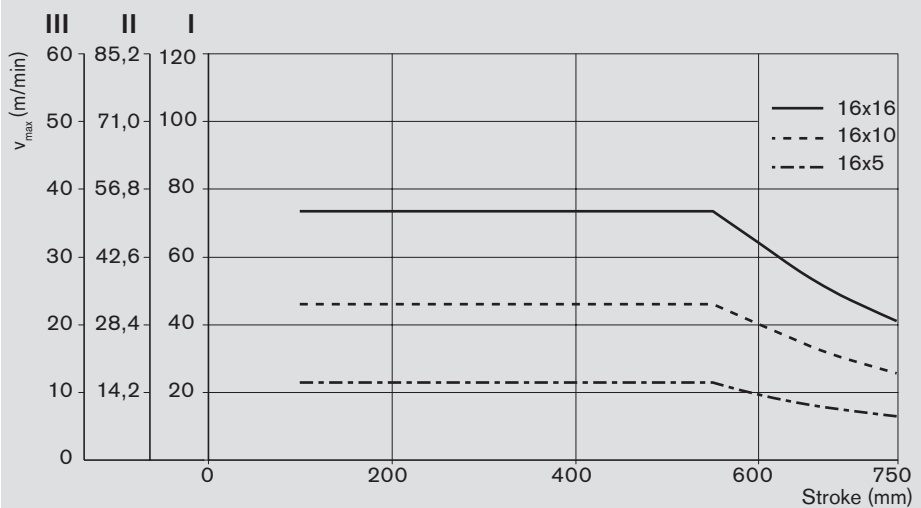
All types of articulated mounting. Pivotal or swivel mountings.



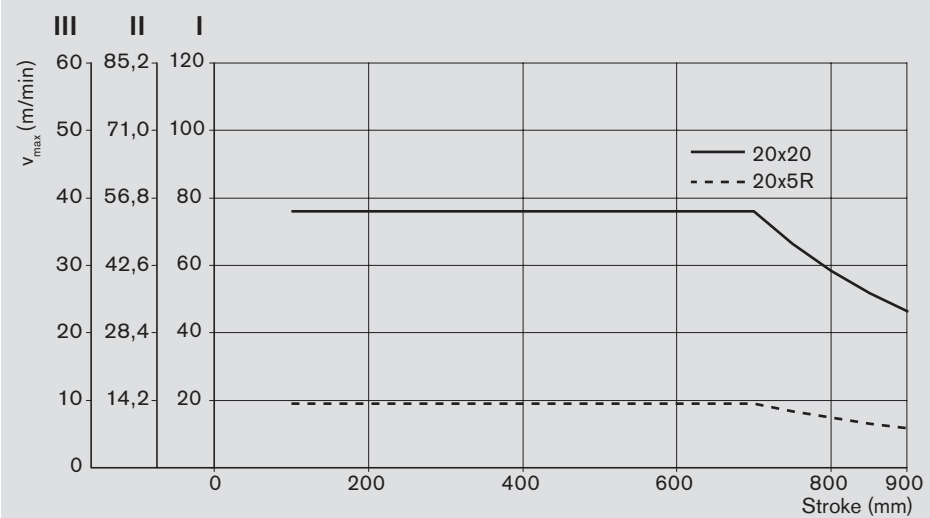
EMC 32



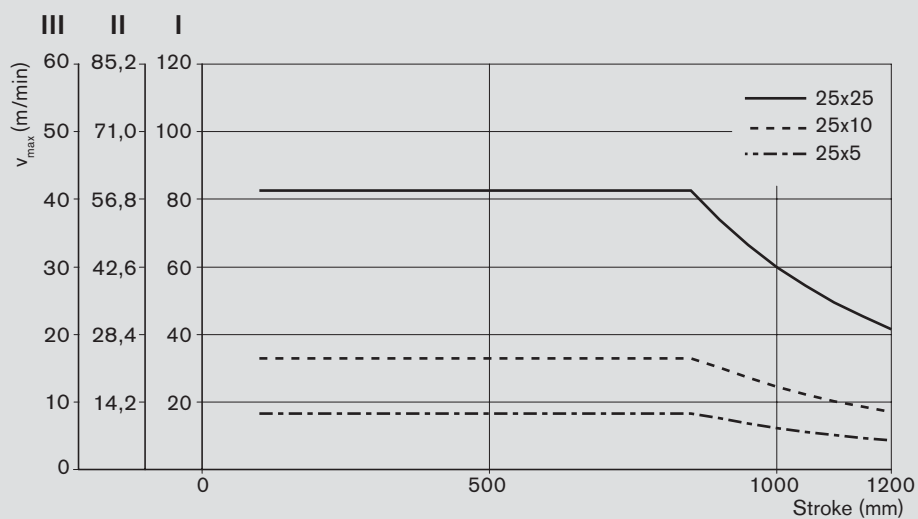
EMC 40



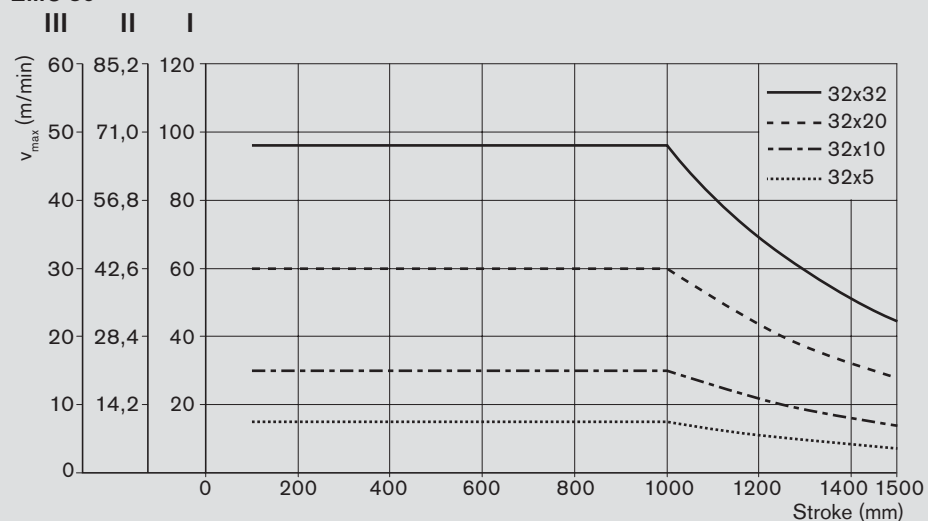
EMC 50



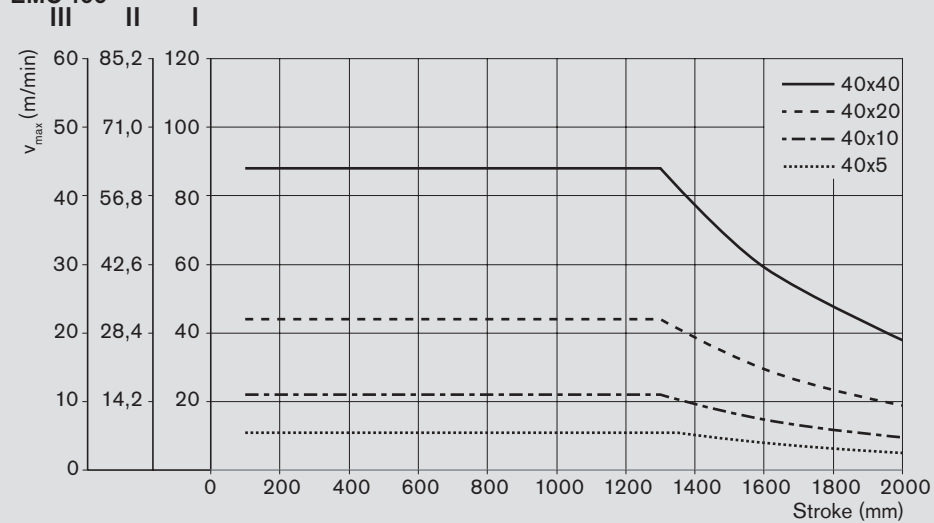
EMC 63



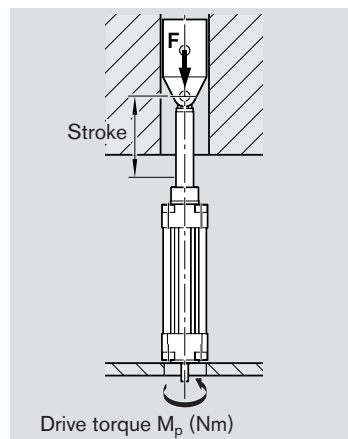
EMC 80



EMC 100



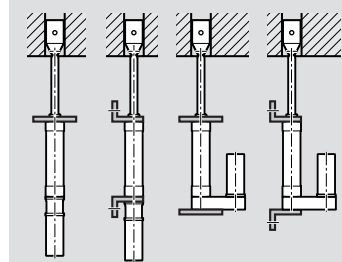
Permissible Drive Torques



The attainable torques may vary according to the EMC version and the type of mounting.

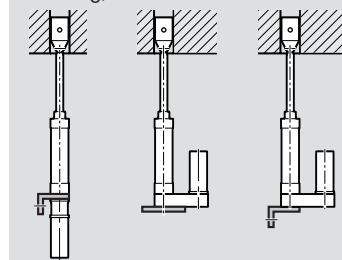
Case I

All types of fixed mounting. Fixed mounting at head end or head and cap end (flange or foot mounting).



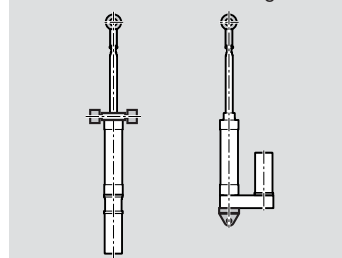
Case II

All types of fixed mounting. Fixed mounting at cap end (flange or foot mounting).

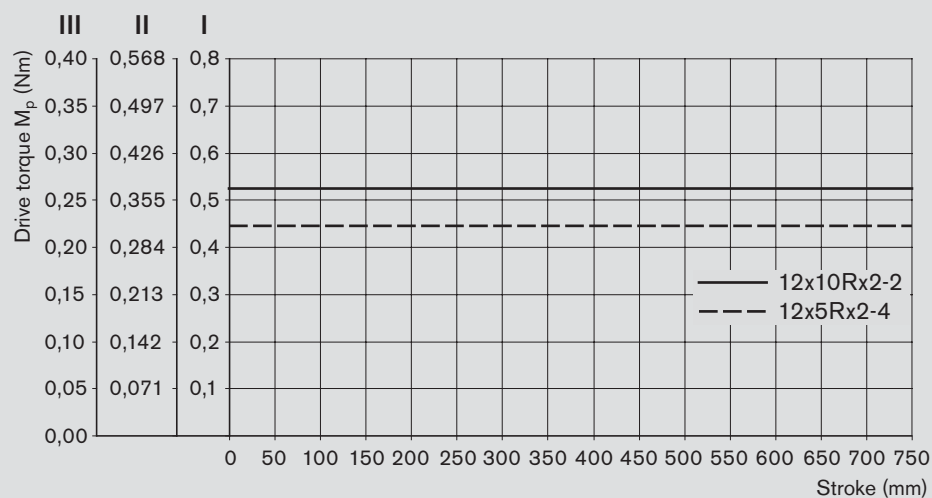


Case III

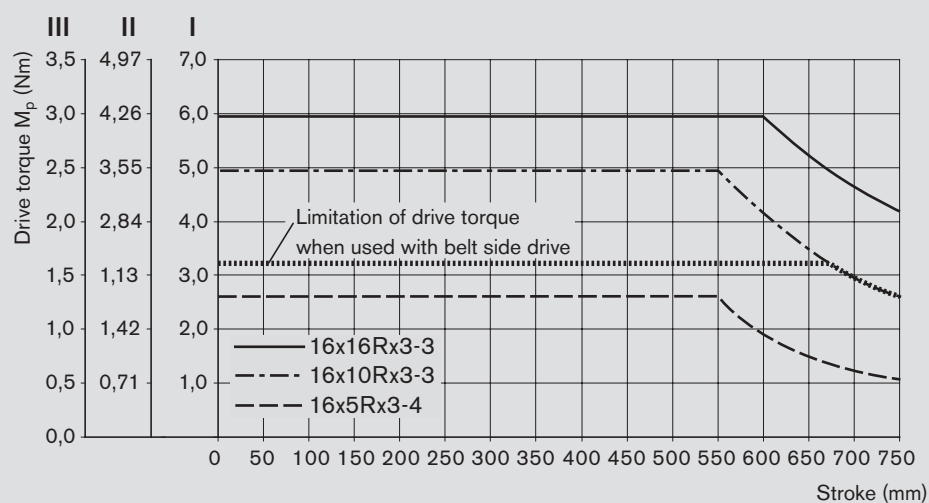
All types of articulated mounting. Pivotable or swivel mountings.



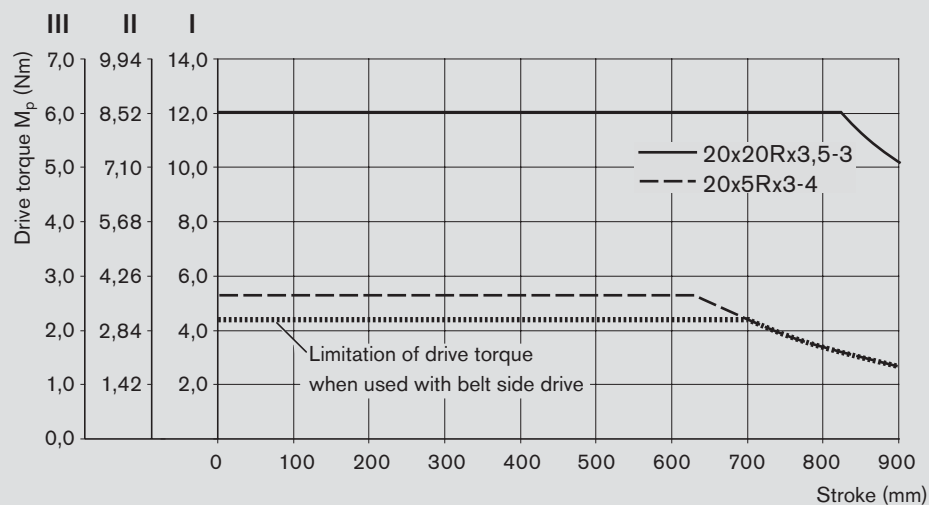
EMC 32

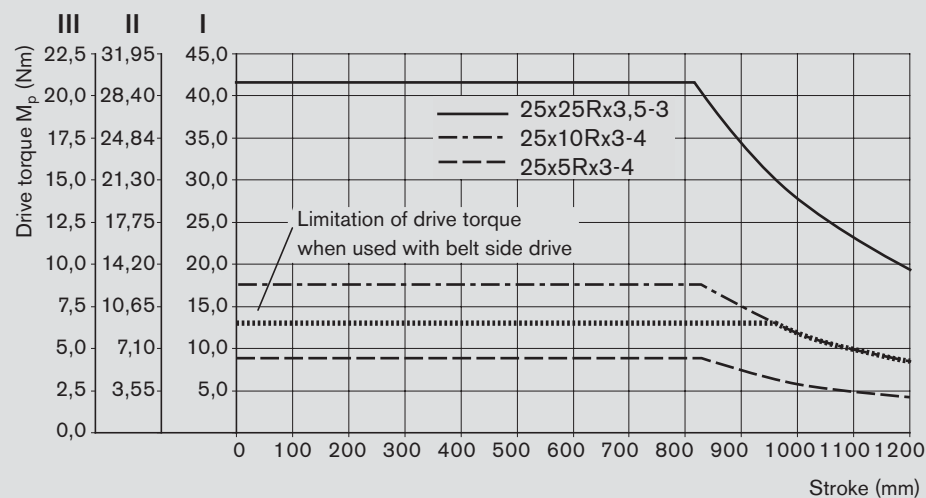
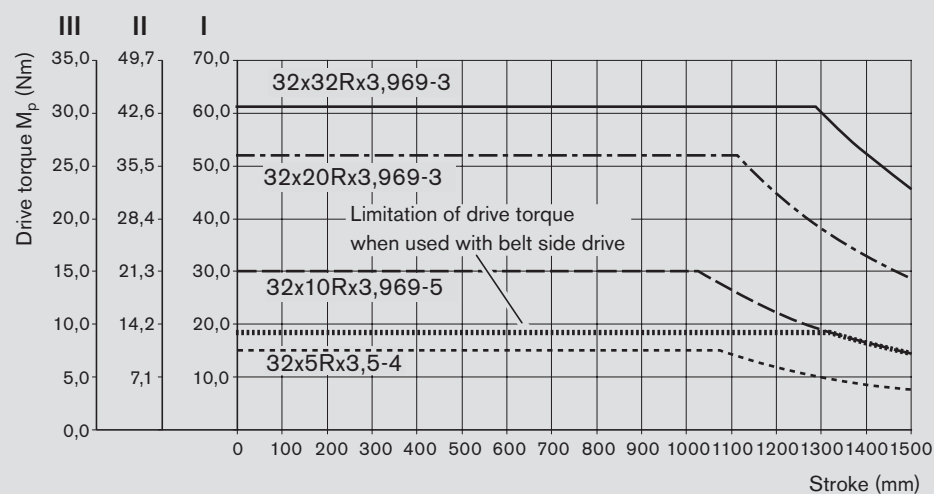
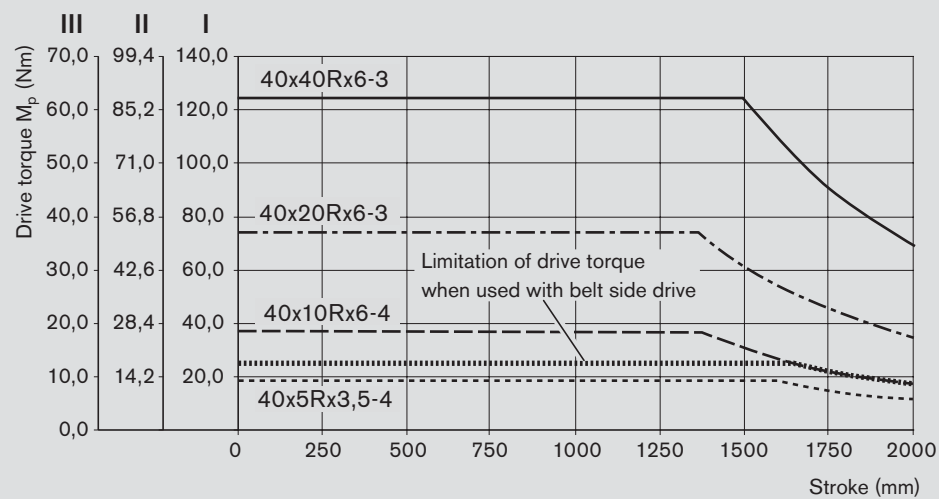


EMC 40

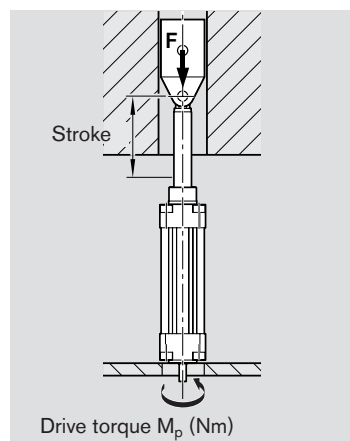


EMC 50



EMC 63**EMC 80****EMC 100**

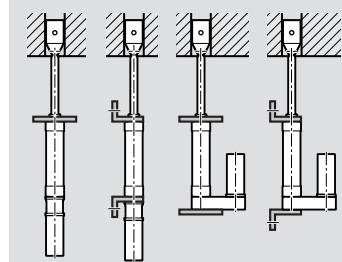
Maximum Axial Loading of Mechanical Cylinder System



The attainable forces may vary according to the type of mounting.

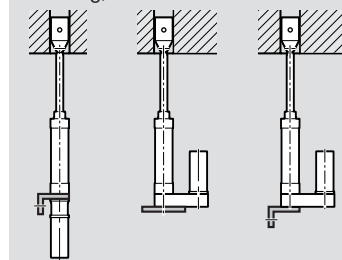
Case I

All types of fixed mounting. Fixed mounting at head end or head and cap end (flange or foot mounting).



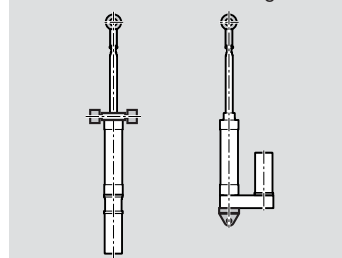
Case II

All types of fixed mounting. Fixed mounting at cap end (flange or foot mounting).

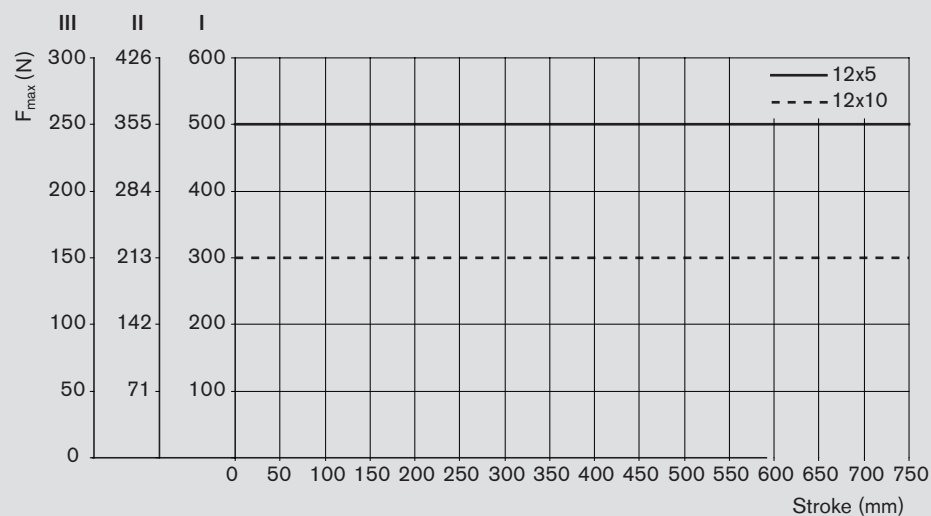


Case III

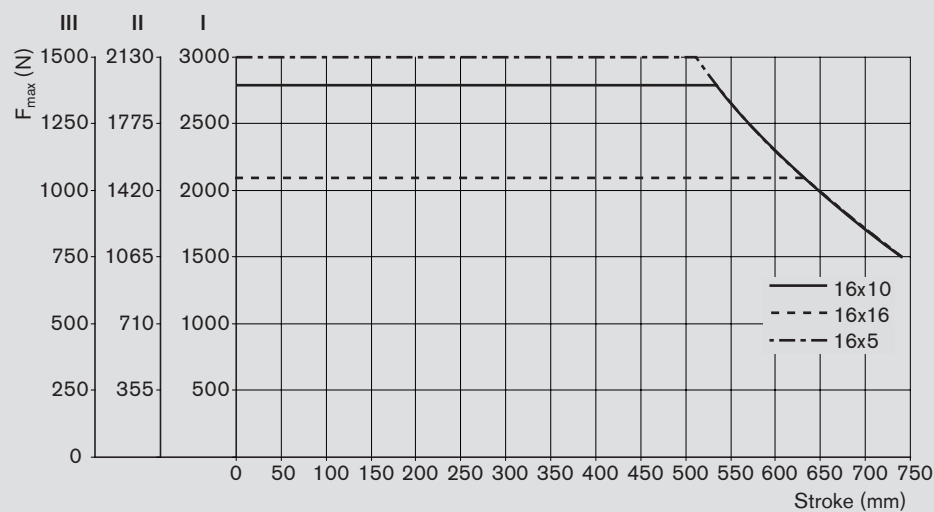
All types of articulated mounting. Pivotable or swivel mountings.



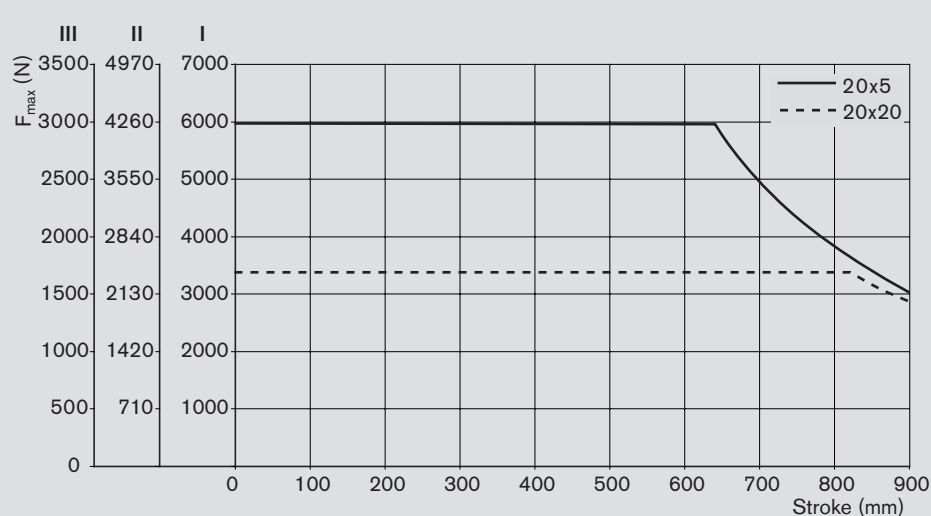
EMC 32

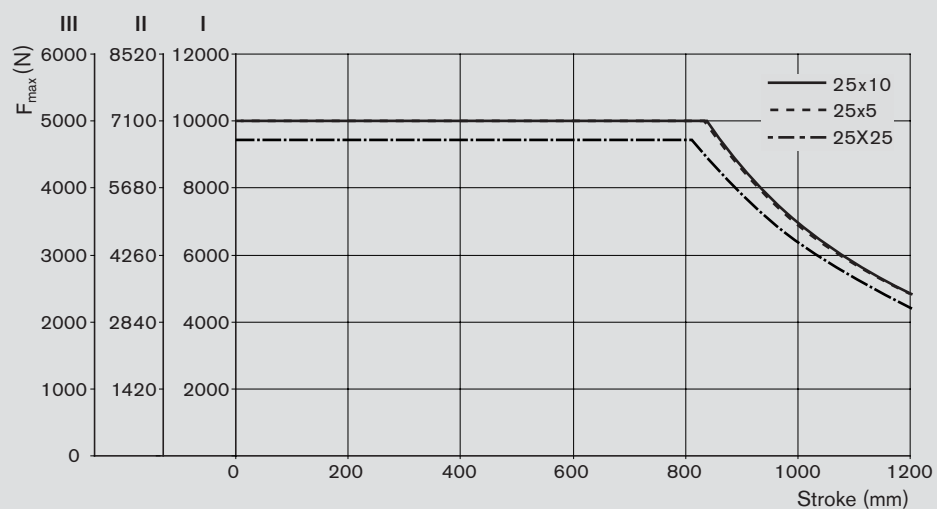
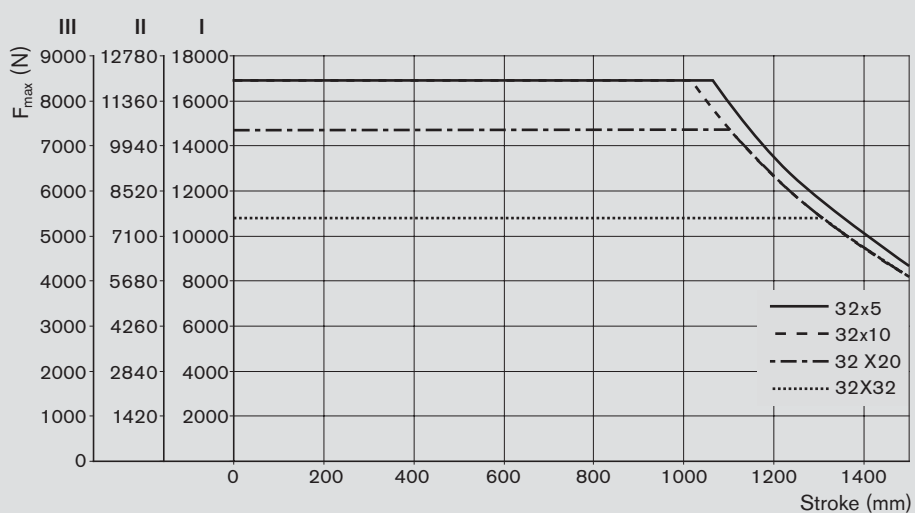
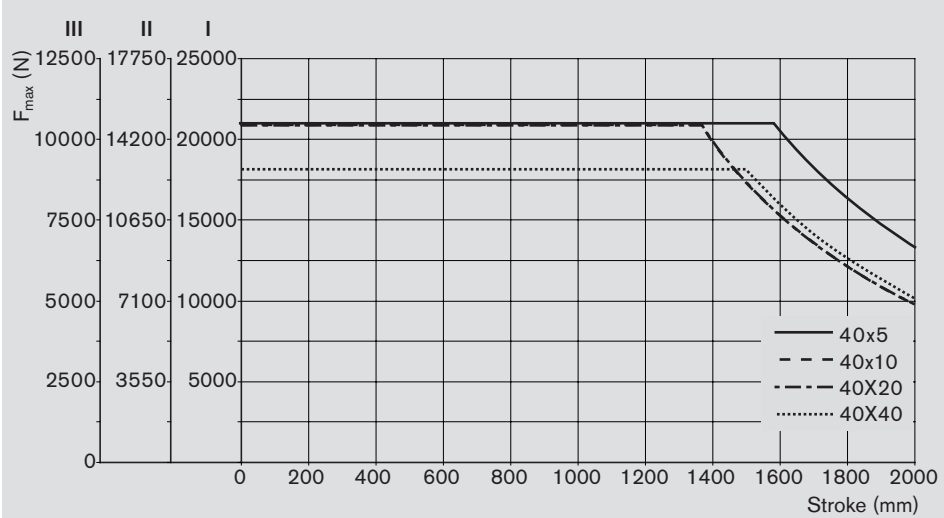


EMC 40



EMC 50



EMC 63**EMC 80****EMC 100**

Configuration and Ordering

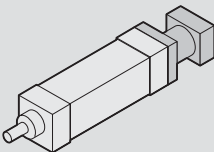
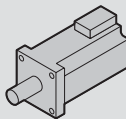
Size Part number	Mechanical cylinder system							
	Screw lead (mm)	Keyway w/o with		Stroke (mm)	Seal system	Preload	Tolerance grade	Ball nut
EMC32 R156010000	5	[01]	[11]	...	Standard [1]	Reduced backlash [1]	T7	Standard [00]
	10	[02]	[12]					
EMC40 R156020000	5	[01]	[11]	...	Standard [1]	Reduced backlash [1]	T7	Standard [00]
	10	[02]	[12]					
	16	[03]	[13]					
EMC50 R156030000	5	[01]	[11]	...	Standard [1]	Reduced backlash [1]	T7	Standard [00]
	20	[04]	[14]					

Ordering example:

Ordering data		
Option	Option code	Description
EMC	EMC50	Electromechanical Cylinder size 50
Screw lead/keyway	[11]	Screw lead 5 mm, with keyway
Stroke	[200]	Rated stroke 200 mm
Seal system	[1]	Standard
Preload	[1]	Reduced backlash
Tolerance grade	[T7]	Tolerance grade T7
Ball nut	[00]	Standard
Version	[RV02]	Belt side drive, mounted as per Fig. 2, RV02
Motor attachment	[23]	Attachment kit: Belt side drive for motor MSM 030C
Motor	[73]	Motor MSM 030C with brake
Documentation	[01]	Standard documentation
Mounting elements	Group 1	[01] Male clevis
	Group 2	[01] Female spherical rod end bearing
	Group 3	[06] Foot mount
	Group 4	[00] None
	Group 5	[09] Foot mount
	Group 6	[00] None

When ordering:

Please state the option number given in the box as appropriate (e.g. [01]).

Version				Motor			Documentation		
									
Fig. 1, Fig. 2		Gear ratio	Attachment kit for motor	without brake	with brake				
OF01			00	00					
MF01			01	MSM020B	68	69	without	00	
			02	MSM030B	70	71			
			05	MSK030C	84	85			
			10	VRDM368	35	36			
RV01 RV02 RV03		Standard i = 1	21	MSM020B	68	69			
			22	MSM030B	70	71			
			25	MSK030C	84	85			
			30	VRDM368	35	36			
OF01			00	00					
MF01			01	MSM020B	68	69			Standard
			02	MSM030B	70	71			
			05	MSK030C	84	85			
			10	VRDM368	35	36			
RV01 RV02 RV03		Standard i = 1	21	MSM020B	68	69			
			22	MSM030B	70	71			
			25	MSK030C	84	85			
			30	VRDM368	35	36			
OF01			00	00					
MF01			03	MSM030C	72	73	Standard	01	
			05	MSK030C	84	85			
			06	MSK040C	86	87			
			11	VRDM397	37	38			
RV01 RV02 RV03		Standard i = 1	23	MSM030C	72	73			
			25	MSK030C	84	85			
			26	MSK040C	86	87			
			31	VRDM397	37	38			

Version

Motor mount

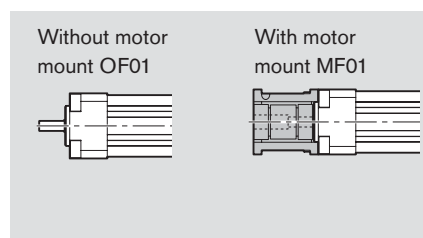


Fig. 1

Timing belt side drive

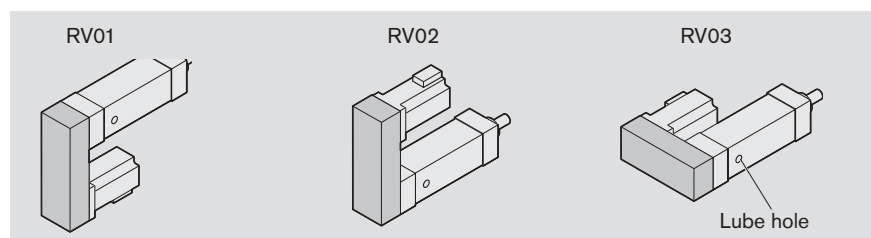
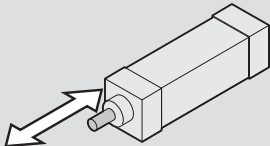


Fig. 2

Configuration and Ordering

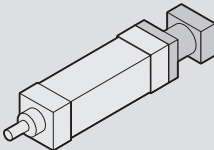
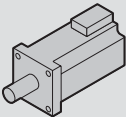
Size Part number	Mechanical cylinder system							
								
	Screw lead (mm)	Keyway w/o with		Stroke (mm)	Seal system	Preload	Tolerance grade	Ball nut
EMC63 R156040000	5	01	11	...	Standard 1	Reduced backlash 1	T7	Standard 00
	10	02	12					
	25	05	15					
EMC80 R156050000	5	01	11	...	Standard 1	Reduced backlash 1	T7	Standard 00
	10	02	12					
	20	04	14					
	32	06	16					
EMC100 R156060000	5	01	11	...	Standard 1	Reduced backlash 1	T7	Standard 00
	10	02	12					
	20	04	14					
	40	07	17					

Ordering example:

Ordering data		
Option	Option code	Description
EMC	EMC80	Electromechanical Cylinder size 80
Screw lead/keyway	[11]	Screw lead 5 mm, with keyway
Stroke	[200]	Rated stroke 200 mm
Seal system	[1]	Standard
Preload	[1]	Reduced backlash
Tolerance grade	[T7]	Tolerance grade T7
Ball nut	[00]	Standard
Version	[RV02]	Belt side drive, mounted as per Fig. 2, RV02
Motor attachment	[27]	Attachment kit: Belt side drive for motor MSK 050C
Motor	[89]	Motor MSK 050C with brake
Documentation	[01]	Standard documentation
Mounting elements	Group 1	[01] Male clevis
	Group 2	[01] Female spherical rod end bearing
	Group 3	[06] Foot mount
	Group 4	[00] None
	Group 5	[09] Foot mount
	Group 6	[00] None

When ordering:

Please state the option number given in the box as appropriate (e.g. [01]).

Version			Motor			Documentation
						
Fig. 1, Fig. 2	Gear ratio	Attachment kit for motor	without brake	with brake		
OF01		00	00			
MF01		04 MSM040B	74	75		
		06 MSK040C	86	87		
		07 MSK050C	88	89		
		11 VRDM3910	39	40		
RV01 RV02 RV03	Standard i = 1	24 MSM040B	74	75		
		26 MSK040C	86	87		
		27 MSK050C	88	89		
		31 VRDM3910	39	40		
OF01		00	00			
MF01		06 MSK040C	86	87		
		07 MSK050C	88	89		
		08 MSK060C	90	91		
		09 MSK076C	92	93		
		12 VRDM3913	41	42		
RV01 RV02 RV03	Standard i = 1	26 MSK040C	86	87		
		27 MSK050C	88	89		
		28 MSK060C	90	91		
		29 MSK076C	92	93		
		32 VRDM3913	41	42		
OF01		00	00			
MF01		08 MSK060C	90	91		
		09 MSK076C	92	93		
RV01 RV02 RV03	Standard i = 1	28 MSK060C	90	91		
		29 MSK076C	92	93		

without00

Standard01

Version

Motor mount

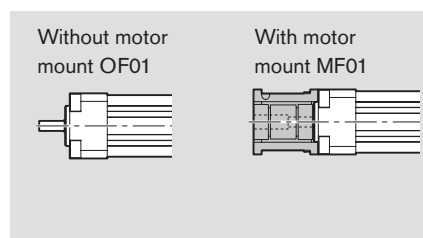


Fig. 1

Timing belt side drive

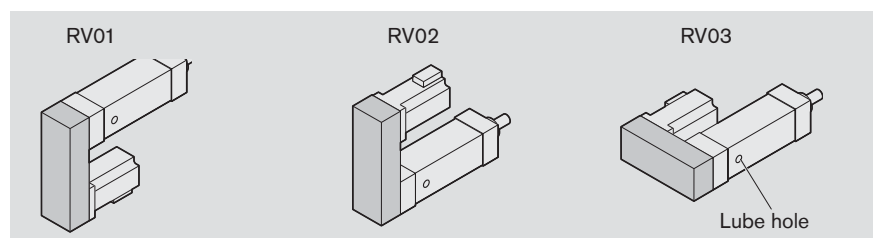
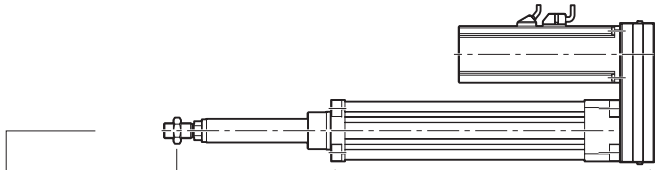
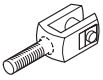
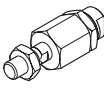
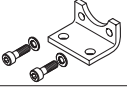
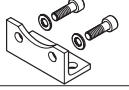
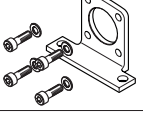
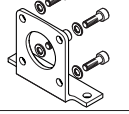
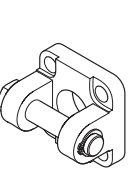
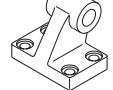
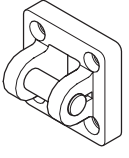


Fig. 2

Configuration and Ordering

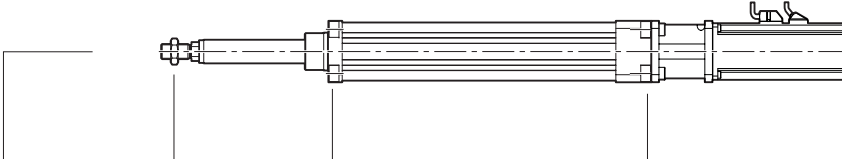
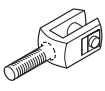
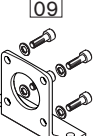
Mounting elements for
version RV01 to RV03
(with belt side drive)

	Group					
	1	2	3	4	5	6
						
Without mounting element	[00]	[00]	[00]	[00]	[00]	[00]
		 ¹⁾				
						
						
						
						
						
						
						
						
						
						

1) Nut is included in the scope of delivery. Can be ordered as an accessory.

⚠ If no mounting elements are required, option [00] must be selected for each group.

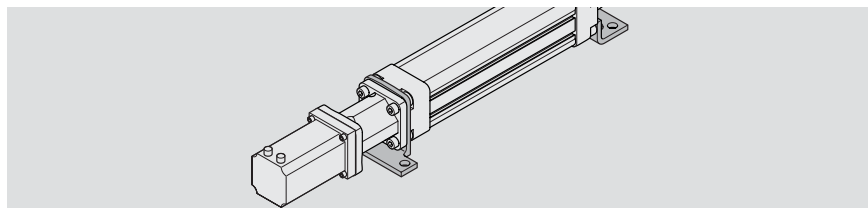
Mounting elements for
version MF01
(with motor mount)

	Group					
	1	2	3	4	5	6
						
Without mounting element	00	00	00	00	00	00
						
	01					
						
						
						
						
						

1) Nut is included in the scope of delivery. Can be ordered as an accessory.

⚠ If no mounting elements are required, option 00 must be selected for each group.

All mounting elements are supplied as loose parts along with the delivery. The foot mount for MF01, option 06 and 09, is delivered ready-mounted. Foot mounts are mounted so that the T-slot for switches and the lube hole are accessible from the side of the unit.



Inquiry / Order Form

Bosch Rexroth AG
Linear Motion and Assembly Technologies
Ernst-Sachs-Straße 100
97424 Schweinfurt, Germany

Fax +49 9721 937-288

For explanations of the ordering parameters, see pages 56-61, "Configuration and Ordering."

Ordering example: EMC80		
Ordering data		Description
Size	= EMC80	
Screw lead/keyway	= 11	Screw lead 5 mm, with keyway
Stroke	= 200	Rated stroke 200 mm
Seal system	= 1	Standard
Preload	= 1	Reduced backlash
Tolerance grade	= T7	Tolerance grade T7
Ball nut	= 00	Standard
Version	= RV02	Standard
Motor attachment	= 27	Attachment kit: Belt side drive for motor MSK 050C
Motor	= 89	Motor MSK 050C with brake
Documentation	= 01	Standard documentation
Mounting elements	Group 1	= 01 Male clevis
	Group 2	= 01 Female spherical rod end bearing
	Group 3	= 04 Head/cap end flange mount
	Group 4	= 00 None
	Group 5	= 09 Foot mount
	Group 6	= 00 None

To be completed by customer: Inquiry ☐ / Order ☐

Electromechanical Cylinder EMC

Size	=	_____
Screw lead	=	_____
Stroke	=	_____
Seal system	=	1
Preload	=	1
Tolerance grade	=	T7
Ball nut	=	00
Version	=	_____
Motor attachment	=	_____
Motor	=	_____
Documentation	=	01
Mounting elements	Group 1	= _____
	Group 2	= _____
	Group 3	= _____
	Group 4	= _____
	Group 5	= _____
	Group 6	= _____

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

Comments:

From

Company: _____
Address: _____

Name: _____
Department: _____
Telephone: _____
Telefax: _____

Notes

Notes

Bosch Rexroth AG
Linear Motion and
Assembly Technologies
Ernst-Sachs-Straße 100
97424 Schweinfurt, Germany
Tel. +49 9721 937-0
Fax +49 9721 937-275
www.boschrexroth.com/brl

Australia

Bosch Rexroth Pty. Ltd.
3 Valediction Road
Kings Park, NSW 2148, Sydney
Tel. +61 2 9831 7788
Fax +61 2 9831 5553

Great Britain

Bosch Rexroth Limited
Cromwell Road
St. Neots, Huntingdon
Cambs. PE19 2ES
Tel. +44 1480 223 298
Fax +44 1480 470 789

Canada

Bosch Rexroth Canada Corp.
3426 Mainway Drive
Burlington, Ontario L7M 1A8
Tel. +1 905 335-5511
Fax +1 905 335-4184

USA

Bosch Rexroth Corporation
14001 South Lakes Drive
Charlotte, NC 28273
Tel. +1 800 REXROTH
+1 800 739 7684
Fax +1 704 583 0523

Singapore

Bosch Rexroth Pte. Ltd.
15D Tuas Road
638520 Singapore
Tel. +65 6861 8733
Fax +65 6861 1825

Your sales partner

Subject to technical modifications