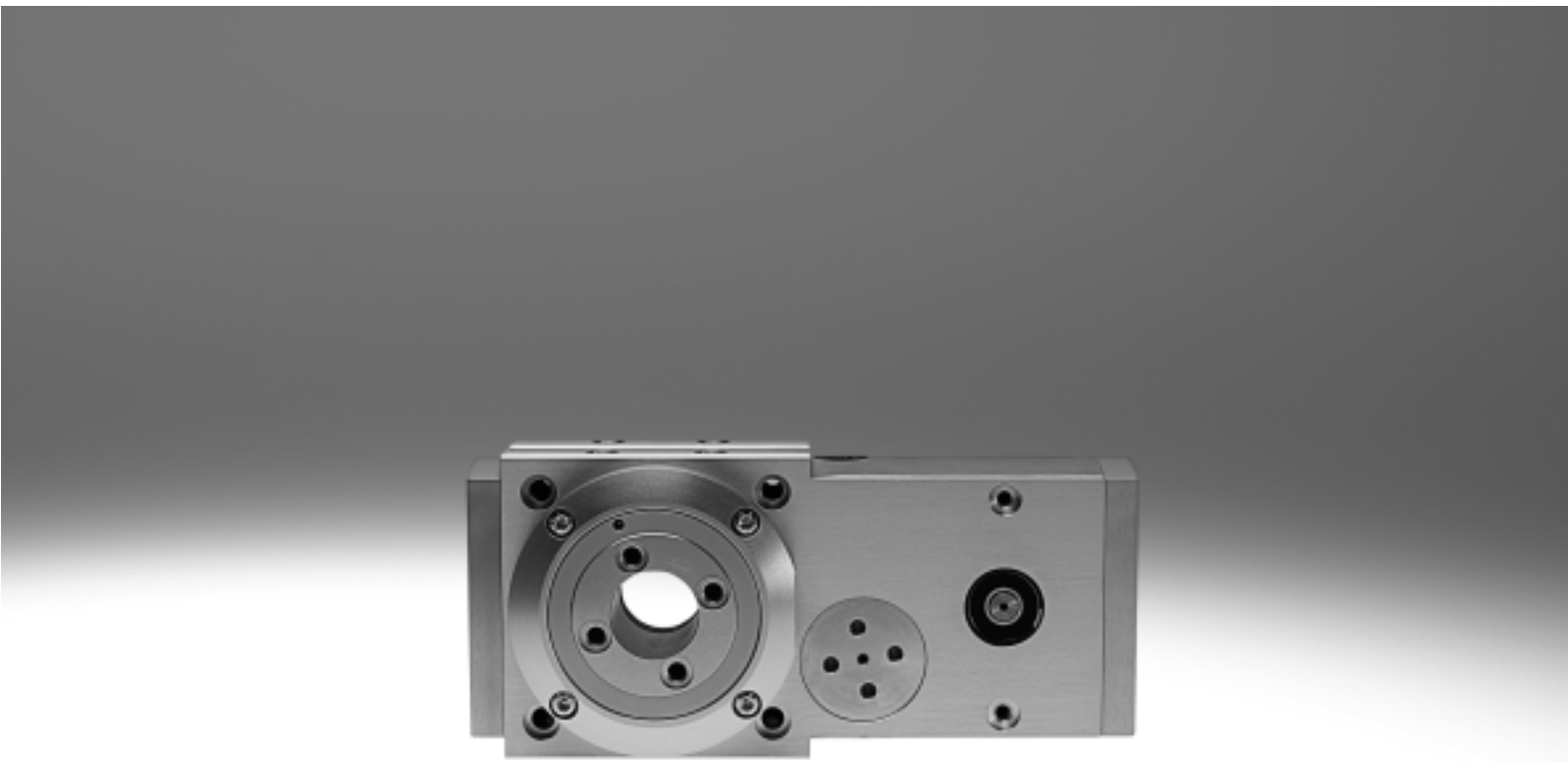
Rotary modules ERMB, electric

FESTO



Rotary modules ERMB, electric

Key features

At a glance

The rotary module ERMB facilitates unlimited and flexible rotation angles. The output interface is the same as on the semi-rotary drive DRQD.

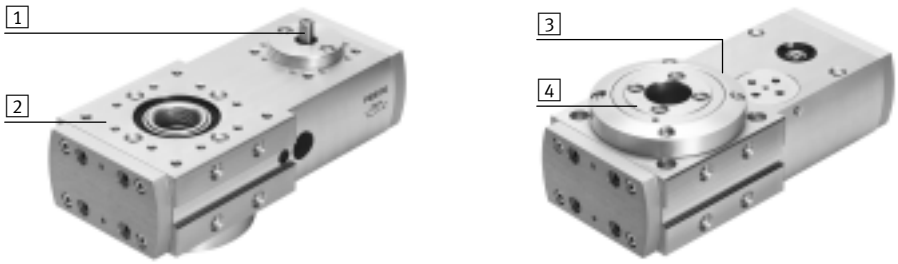
The motor's power is transmitted to the output pinion by means of a circulating toothed belt with a specific transmission ratio. The drive and output pinions run on separate bearings. The toothed belt is pretensioned at the factory by means of an eccentric tensioning roller.

Advantages:

- Stable arrangement of the output shaft bearings
- Pretensioned toothed belt means zero backlash
- Compact design

The technology in detail

1 Interface with the motor, via axial kit
2 Mounting interface
3 Mounting for proximity sensor SIEN in the retaining ring
4 Output interface:
Same as on the semi-rotary drive DRQD (with larger through-hole)



Sensing kit EAPS as an accessory

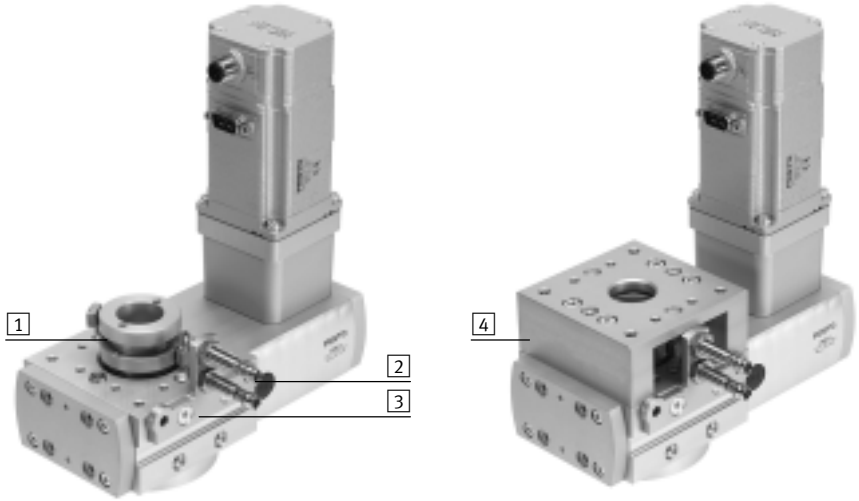
➔ 14

The sensing kit facilitates monitoring of the angle of rotation using adjustable cams. It can also be used for reference checking.

1 Trip cam support
2 Proximity sensor SIEN
3 Sensor bracket
4 Housing

Without housing

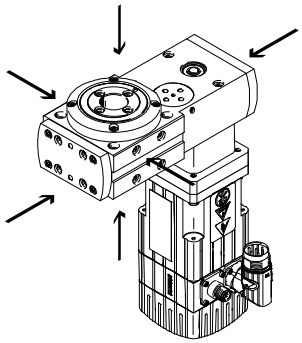
With housing



Mounting and installation options

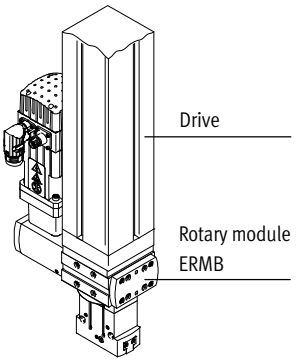
Mounting option

The rotary module can be attached on six sides.

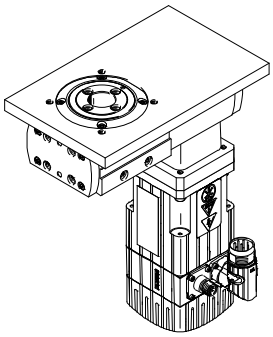


Installation option

As a front end



As a rotary table in a plate



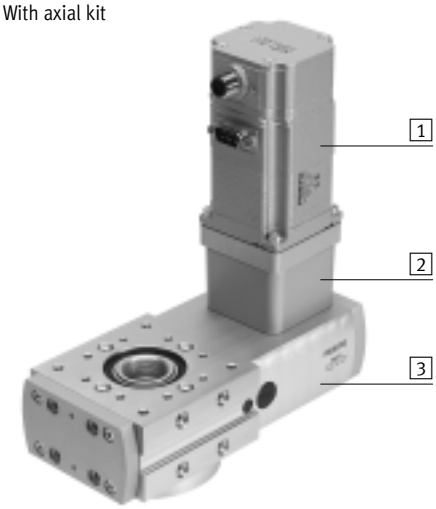
Rotary modules ERMB, electric

Key features

Total system comprising rotary module, motor and axial kit

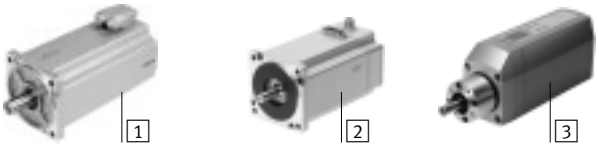
Rotary module ➔ 6

With axial kit



1 Motor
2 Axial kit
3 Rotary module

Motors ➔16

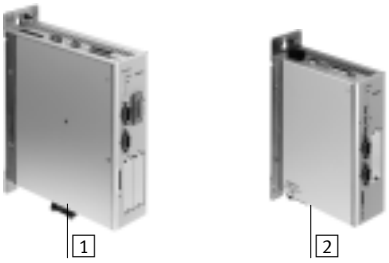


1 Servo motor EMME-AS, EMMS-AS
2 Stepper motor EMMS-ST
3 Motor unit MTR-DCI

Note

A range of specially adapted complete solutions is available for the rotary module ERMB.

Motor controllers Technical data ➔ Internet: motor controller



1 Servo motor controller CMMP-AS, SEC-AC
2 Stepper motor controller CMMS-ST

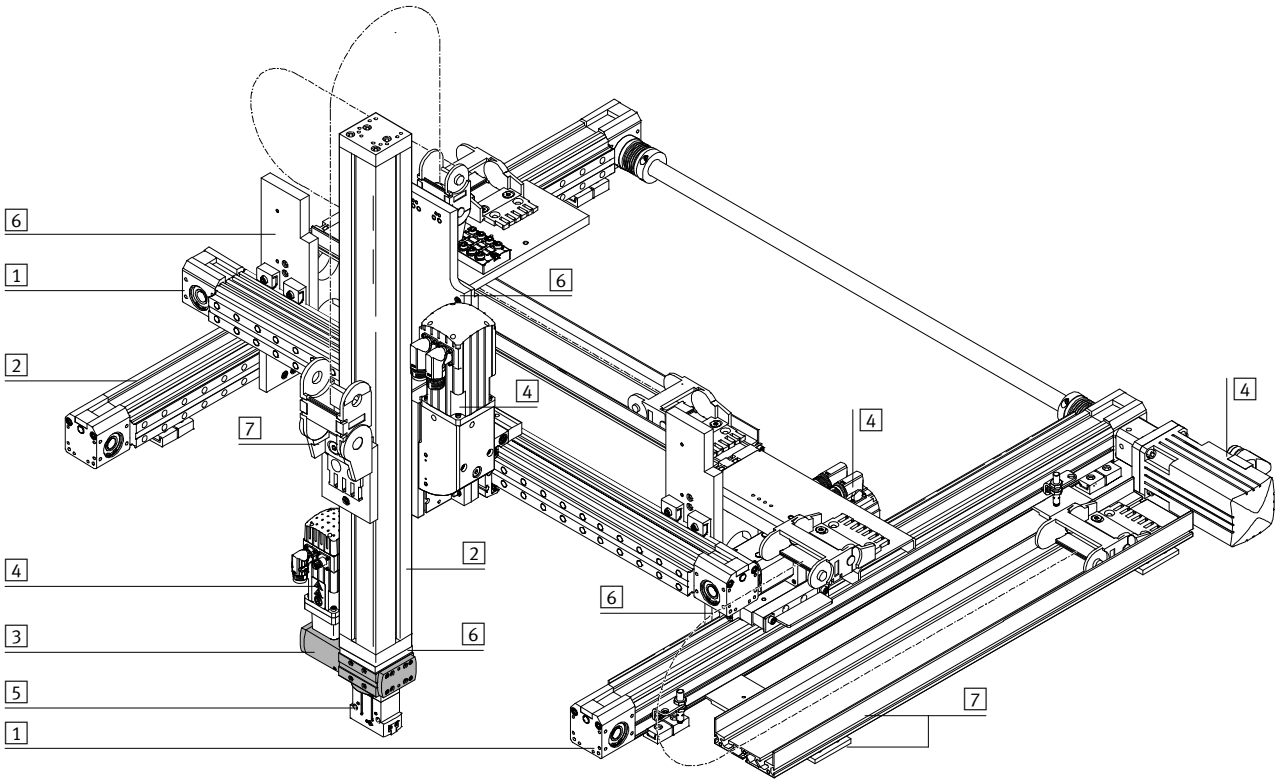
Axial kit ➔16

Kit comprising:
- Motor flange
- Coupling housing
- Coupling
- Screws

Rotary modules ERMB, electric

Key features

System product for handling and assembly technology



System components and accessories			
		Brief description	**➔ Page/Internet**
1	Axes	Wide range of combinations possible within handling and assembly technology	axes
2	Guide axes	For extending force and torque capacity in multi-axis applications	guide axes
3	Rotary module	Wide range of combinations possible within handling and assembly technology	rotary module
4	Motors	Servo or stepper motors, with or without gear unit	motor
5	Gripper	Wide range of variations possible within handling and assembly technology	gripper
6	Adapters	For drive/drive and drive/gripper connections	adapter kit
7	Installation components	For a clean, safe layout of electrical cables and tubing	installation component

Rotary modules ERMB, electric

Type code and peripherals overview

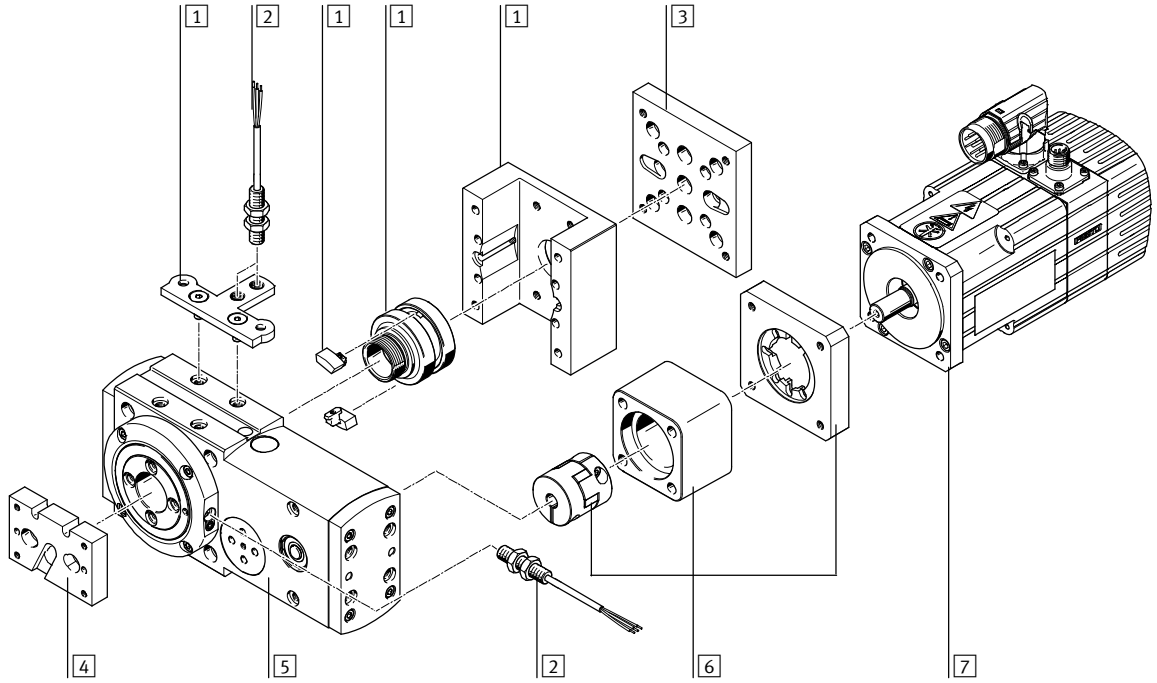
Type code

ERMB	–	25

Type	
ERMB	Rotary module

Size	
20	Size 20
25	Size 25
32	Size 32

Peripherals overview



Accessories

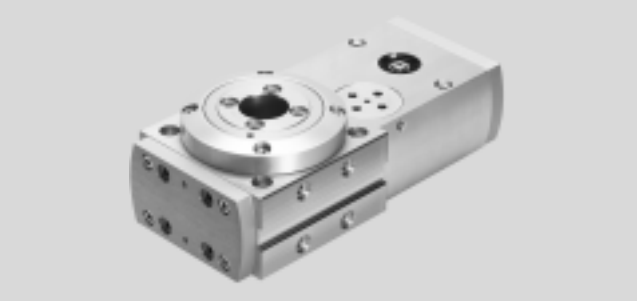
	Type	Brief description	➔ Page/Internet
1	Sensing kit EAPS	For indicating impermissible swivel angles, i.e. obstacles or areas that cannot be approached can be sensed using proximity sensors (comprising: housing, trip cam support, 2 cams and sensor bracket)	19
2	Proximity sensor SIEN	For use as a signal or safety check	19
3	Adapter kit	Interface between the rotary module and drive (the rotary module can be attached to a drive with or without a sensing kit)	adapter kit
4	Adapter kit	Interface between the rotary module and gripper	adapter kit
5	Rotary module ERMB	Facilitates unlimited and flexible rotation angles	6
6	Axial kit EAMM-A	For axial motor mounting (comprising: coupling, coupling housing and motor flange)	16
7	Motor EMMS, MTR-DCI	• Motors specially matched to the axis, with or without brake • The motor can be turned by 90° for mounting, depending on requirements. This means the connection side can be freely selected	16

Rotary modules ERMB, electric

Technical data

FESTO

- Ø - Size
20, 25, 32



General technical data				
Size		20	25	32
Constructional design		Electromechanical rotary module with toothed belt		
Drive shaft ∅	[mm]	6	8	12
Rotation angle		Infinite		
Repetition accuracy[1]				
with servo motor EMMS-AS	[°]	±0.03		
with stepper motor EMMS-ST[2]	[°]	±0.08		
with motor unit MTR-DCI	[°]	±0.05		
Positioning times		→ 8		
Transmission ratio		4.5:1	4:1	3:1
Position sensing		Via proximity sensor		
Mounting position		Any		
Product weight	[g]	850	1460	3250

1) As per FN 942 027
2) Depends on the encoder resolution

Mechanical data				
Size		20	25	32
Max. driving torque	[Nm]	0.7	2.2	8.5
Max. output torque[1]	[Nm]	3.15	8.8	25.5
No-load driving torque[2]	[Nm]	< 0.07	< 0.18	≤ 0.5
Max. input speed	[rpm]	1350	1200	900
Max. output speed	[rpm]	300	300	300
Max. mass moment of inertia[3]				
with servo motor EMMS-AS	[kgcm²]	50	200	1000
with stepper motor EMMS-ST	[kgcm²]	30	100	500
with motor unit MTR-DCI-...-G7	[kgcm²]	50	300	1000
with motor unit MTR-DCI-...-G14	[kgcm²]	200	1200	3700
Toothed belt pitch		2	3	5
Hollow shaft ∅	[mm]	20	24	28

1) Output torque less friction depends on speed
2) At maximum speed
3) Depends on the size of the motor. Suitable motors → 16

Operating and environmental conditions				
Size		20	25	32
Ambient temperature	[°C]	–10 ... +60		
Protection class		IP20		
Corrosion resistance class CRC[1]		2		
Noise level L_{pEq}[2]	[dB (A)]	32	49	53

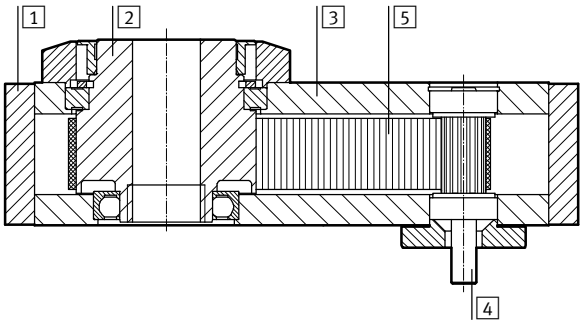
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) In combination with servo motor EMMS-AS

Rotary modules ERMB, electric

Technical data

Materials

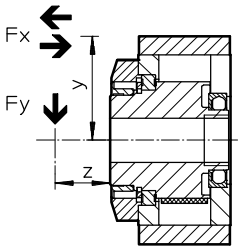
Sectional view



Rotary module		
1	End cap	Anodised aluminium
2	Output shaft	Wrought aluminium alloy, anodised
3	Housing	Wrought aluminium alloy, anodised
4	Drive shaft	High-alloy stainless steel
5	Toothed belt	Polychloroprene with glass fibres
–	Note on materials	Contains paint wetting impairment substances

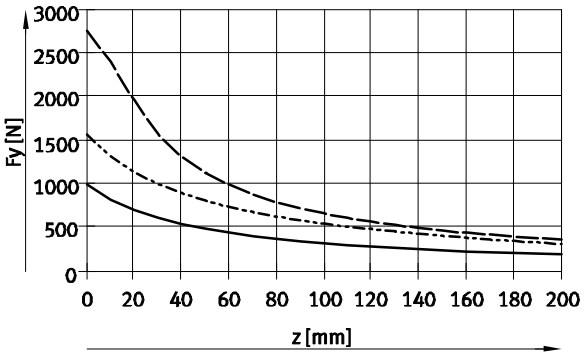
Maximum radial and axial force Fx/Fy on the output shaft as a function of the distance y/z

If the rotary module is subjected to several forces at once, the following equation must be satisfied in addition to the maximum loads indicated below.

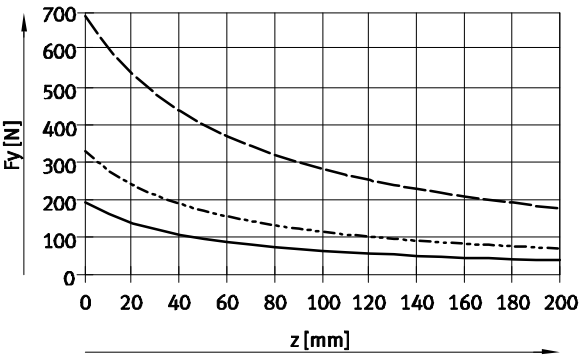


$$\frac{F_{y\,(z)}}{F_{y,\,max.\,(z)}} + \frac{F_{x,\,pushing\,(v)}}{F_{x,\,pushing,max.\,(v)}} + \frac{F_{x,\,pulling\,(v)}}{F_{x,\,pulling,max.\,(v)}} \leq 1$$

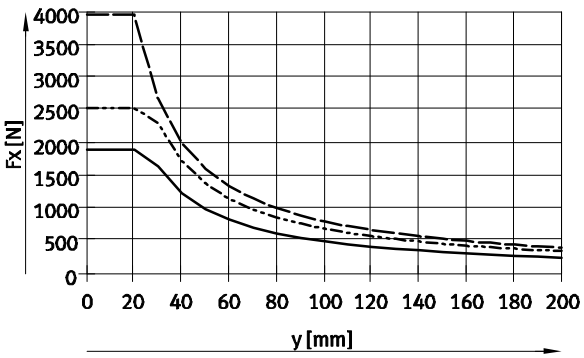
Max. radial force Fy, static



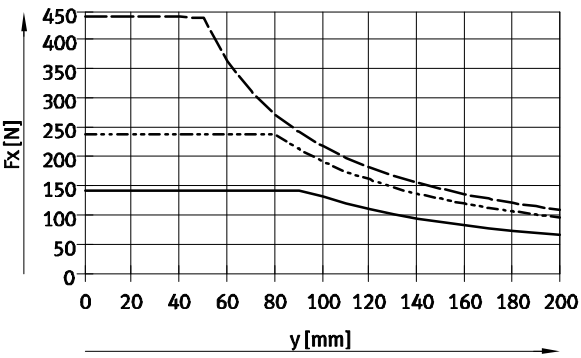
Max. radial force Fy, dynamic



Max. axial force Fx, static, pushing and pulling



Max. axial force Fx, dynamic, pushing and pulling

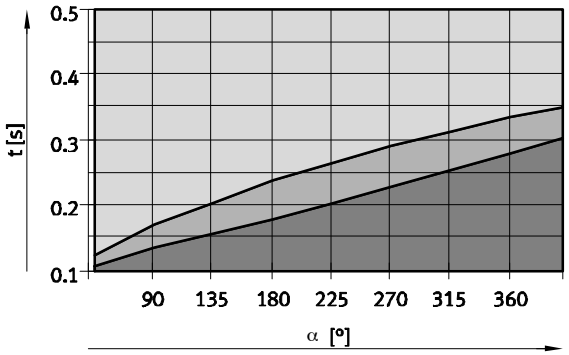


ERMB-20
ERMB-25
ERMB-32

Positioning time t as a function of the rotation angle α in combination with motor EMMS-.../motor unit MTR-DCI-...

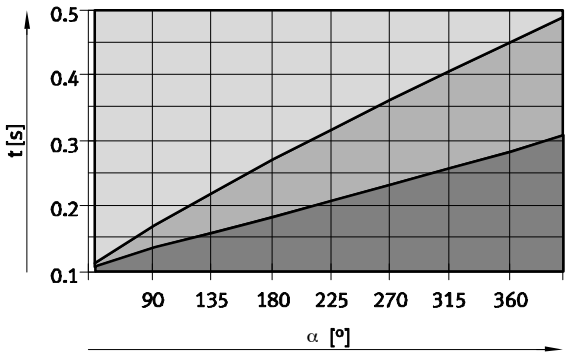
Size 20

with servo motor EMMS-AS



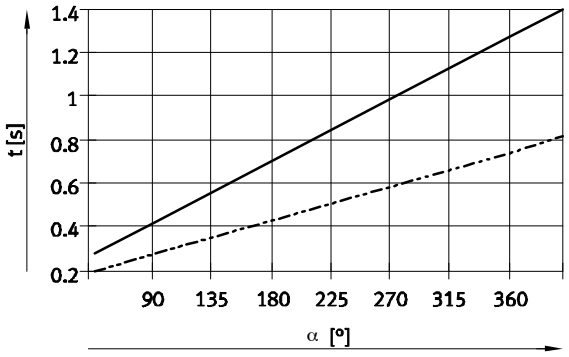
Extended operating range
Typical operating range, depending on motor size and load inertia
Unrealisable range

with stepper motor EMMS-ST



Extended operating range
Typical operating range, depending on motor size and load inertia
Unrealisable range

with motor unit MTR-DCI



Limit line for MTR-DCI-32-G14 at 0 ... 200 kgcm²
Limit line for MTR-DCI-32-G7 at 0 ... 50 kgcm²

- Note

The positioning time t ends with the controller signal MC (motion complete), i.e. on the drive side. Increased positioning times are to be expected at the output shaft depending on the motor type and eccentricity of the moving load.

For servo motor: 50 ... 100 ms
For stepper motor: 100 ... 200 ms

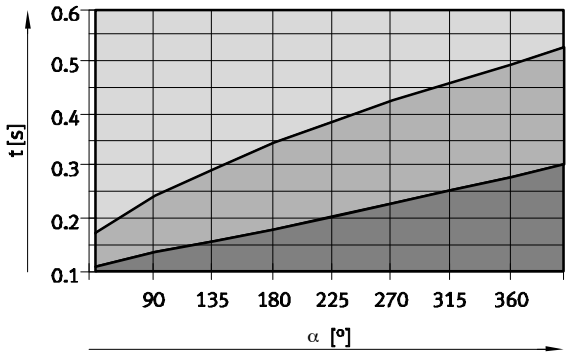
- Note

The "PositioningDrives" design tool compiles the optimum combination of rotary module and motor for the respective application with respect to mass moment of inertia, positioning time and positioning accuracy.
➔www.festo.com

Positioning time t as a function of the rotation angle α in combination with motor EMMS-.../motor unit MTR-DCI-...

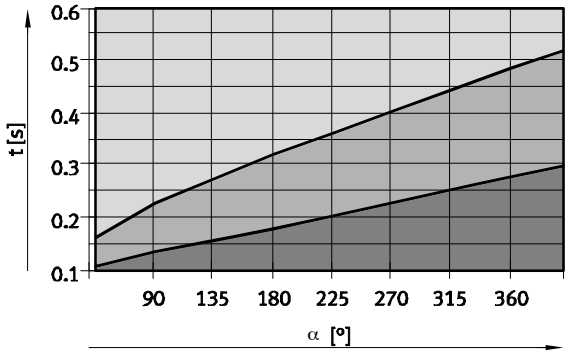
Size 25

with servo motor EMMS-AS



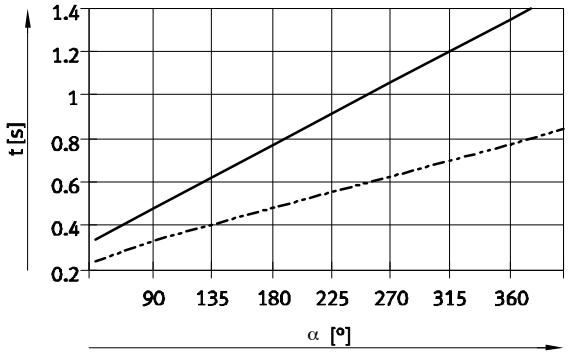
Extended operating range
Typical operating range, depending on motor size and load inertia
Unrealisable range

with stepper motor EMMS-ST



Extended operating range
Typical operating range, depending on motor size and load inertia
Unrealisable range

with motor unit MTR-DCI



Limit line for MTR-DCI-42-G14 at 0 ... 1200 kgcm²
Limit line for MTR-DCI-42-G7 at 0 ... 300 kgcm²

- Note

The positioning time t ends with the controller signal MC (motion complete), i.e. on the drive side. Increased positioning times are to be expected at the output shaft depending on the motor type and eccentricity of the moving load.

For servo motor: 50 ... 100 ms
For stepper motor: 100 ... 200 ms

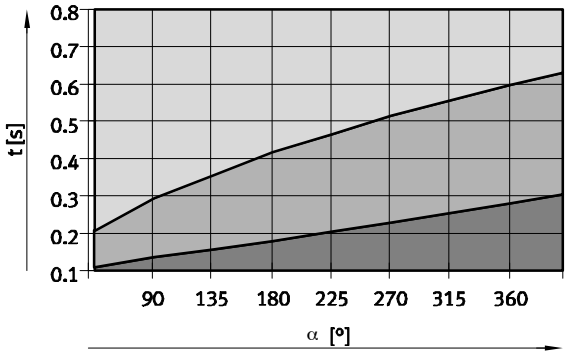
- Note

The "PositioningDrives" design tool compiles the optimum combination of rotary module and motor for the respective application with respect to mass moment of inertia and positioning time, positioning accuracy.
➔www.festo.com

Positioning time t as a function of the rotation angle α in combination with motor EMMS-.../motor unit MTR-DCI-...

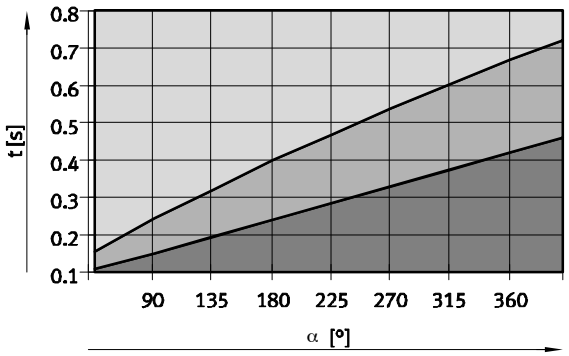
Size 32

with servo motor EMMS-AS



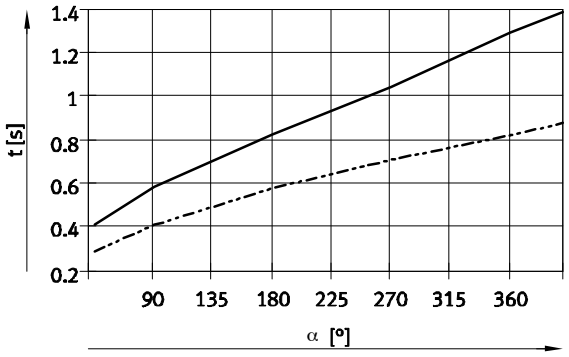
Extended operating range
Typical operating range, depending on motor size and load inertia
Unrealisable range

with stepper motor EMMS-ST



Extended operating range
Typical operating range, depending on motor size and load inertia
Unrealisable range

with motor unit MTR-DCI



Limit line for MTR-DCI-52-G14 at 0 ... 3700 kgcm²
Limit line for MTR-DCI-52-G7 at 0 ... 1000 kgcm²

- Note

The positioning time t ends with the controller signal MC (motion complete), i.e. on the drive side. Increased positioning times are to be expected at the output shaft depending on the motor type and eccentricity of the moving load.

For servo motor: 50 ... 100 ms
For stepper motor: 100 ... 200 ms

- Note

The "PositioningDrives" design tool compiles the optimum combination of rotary module and motor for the respective application with respect to mass moment of inertia and positioning time, positioning accuracy.
➔www.festo.com

Information on service life characteristic values

Within the framework of product qualification, the specified statistic load changes/switching cycles were achieved with 3 samples.

Definition of load change/switching cycle:
A switching cycle corresponds to two load changes: position A to position B and back.

Size		20	25	32
Guide value load changes	[Mio.]	30	40	40
Guide value switching cycles	[Mio.]	15	20	20
Mass moment of inertia at output	[kgcm^2]	24	80	400
Medium angle acceleration at output	[°/sec^2]	28000	20000	12000
Maximum angle speed at output	[°/sec]	1800	1800	1800

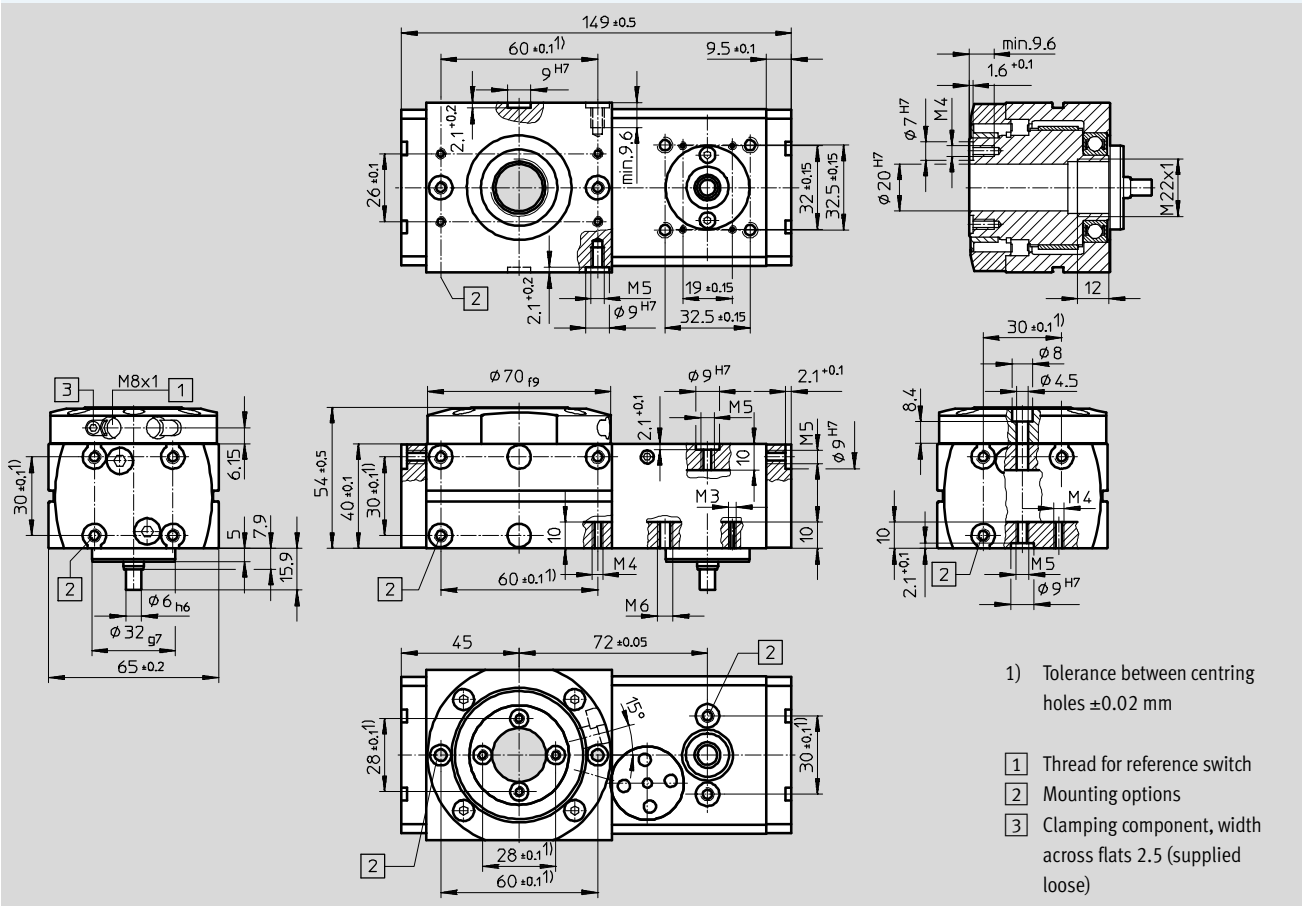
The above specified statistic load change/switching cycles were achieved under the following defined operating conditions: horizontally hanging fitting, 180° swivel angle, frequency 2 Hz, mass moment of inertia, acceleration (jerk-free) and max. angle speed as specified in the table, room temperature (23 ±5) °C.

Under different operating conditions, a shorter or longer service life is possible.
The conditions of use and safety regulations specified in the product documentation must also be taken into account.

Dimensions

Download CAD data ➔ **www.festo.com**

Size 20

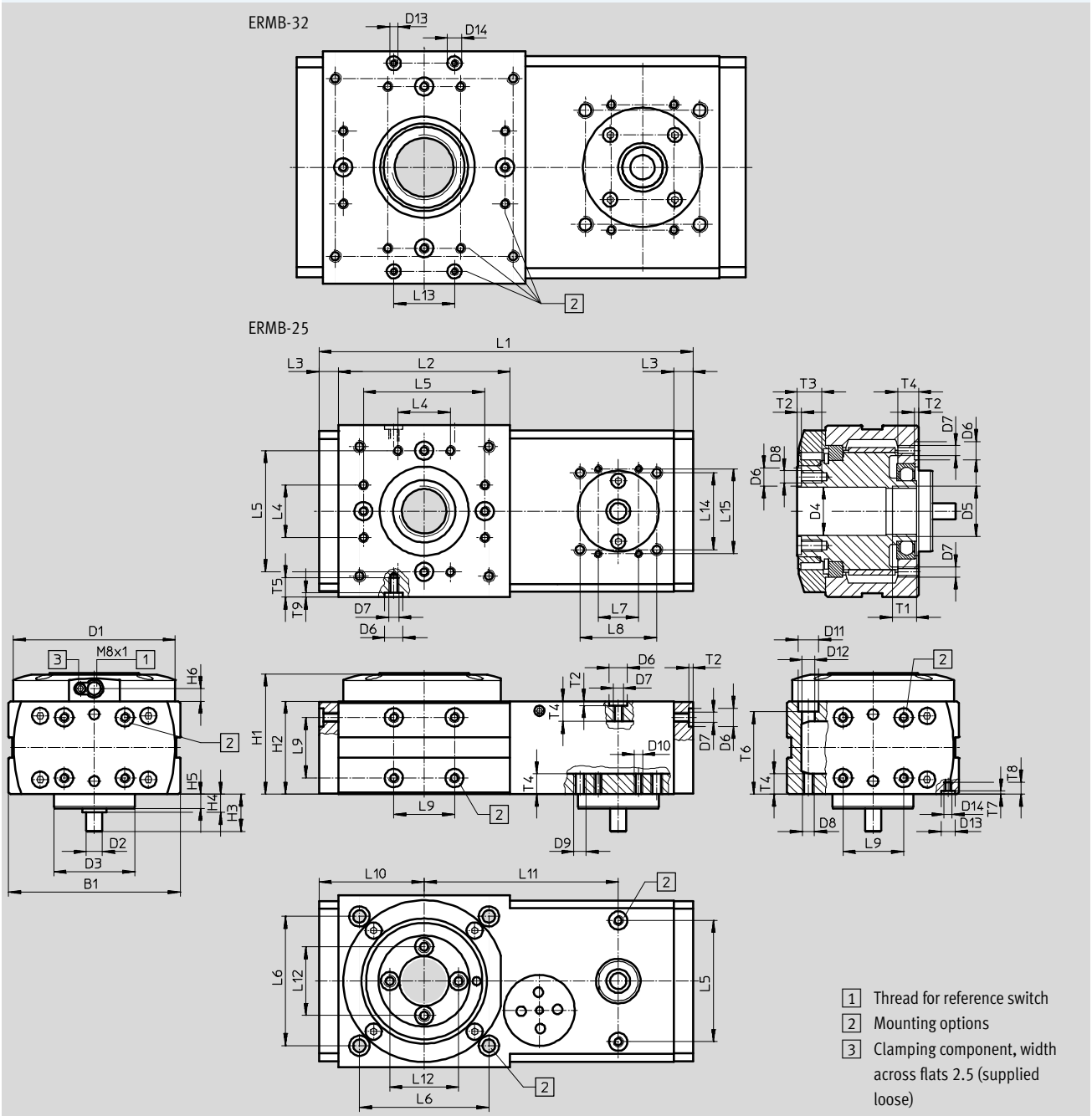


1) Tolerance between centring holes ±0.02 mm

1 Thread for reference switch
2 Mounting options
3 Clamping component, width across flats 2.5 (supplied loose)

Dimensions Download CAD data ➔ **www.festo.com**

Size 25/32



Rotary modules ERMB, electric

Technical data

Size	B1	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
		∅	∅	∅	∅		∅				
	±0.2	f9	h6	g7	H7		H7				
25	85	80	8	40	24	M25x1	9	M5	M6	M6	M4
32	115	112	12	60	28	M32x1.5	9	M5	M6	M8	M5

Size	D11	D12	D13	D14	H1	H2	H3	H4	H5	H6	L1
	∅	∅	∅								
			H7		±0.5	±0.1					±0.5
25	10	6.2	–	–	60	46	18.45	–	7	6.3	185
32	10	6.2	7	M4	76.05	60	23.5	6.5	6	9.4	222

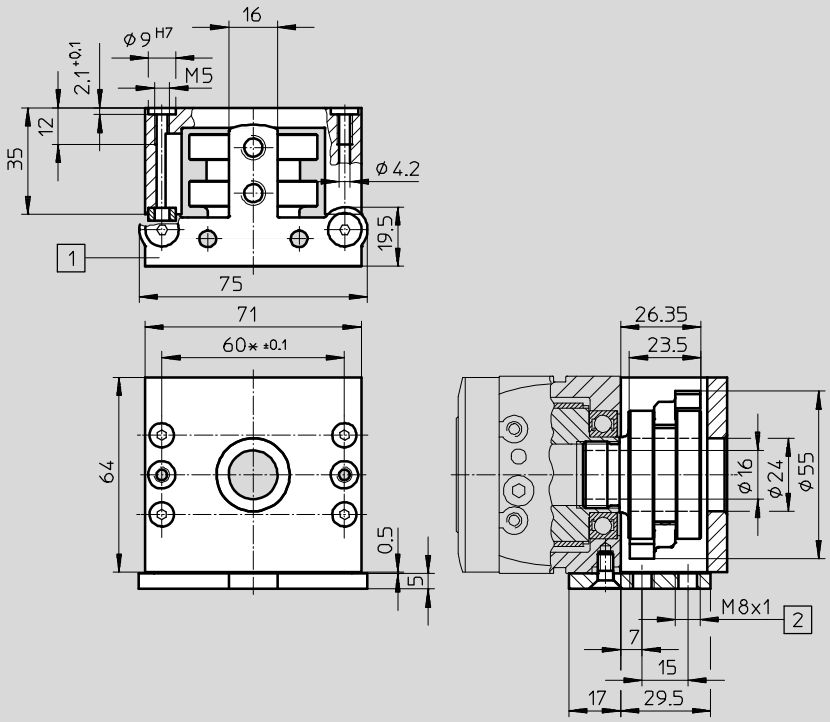
Size	L2	L3	L4	L5[1)]	L6	L7	L8	L9[1)]	L10	L11	L12[1)]	L13[1)]
	±0.2	±0.1	±0.1	±0.1		±0.15	±0.15	±0.1		±0.05	±0.1	±0.1
25	85	9.5	26	60	$64_{\pm 0.15}$	20	38	30	52	96	34	–
32	100	13	36	80	$88_{\pm 0.1}$	31	56.5	40	63	108	45	30

Size	L14	L15	L16	T1	T2	T3	T4	T5	T6	T7	T8	T9
	±0.15	±0.15	+0.2		+0.1	min.		min.		+0.1	min.	+0.2
25	38	42	–	12	2.1	12	10	9.6	$40.8_{\pm 0.2}$	–	–	2.1
32	56.5	62	103	12	2.1	12	10	10	54.3	1.6	7.6	2.1

1) Tolerance between centring holes ±0.02 mm

Dimensions Download CAD data ➔ **www.festo.com**

Sensing kit EAPS-R1-20-S for size 20



- Note

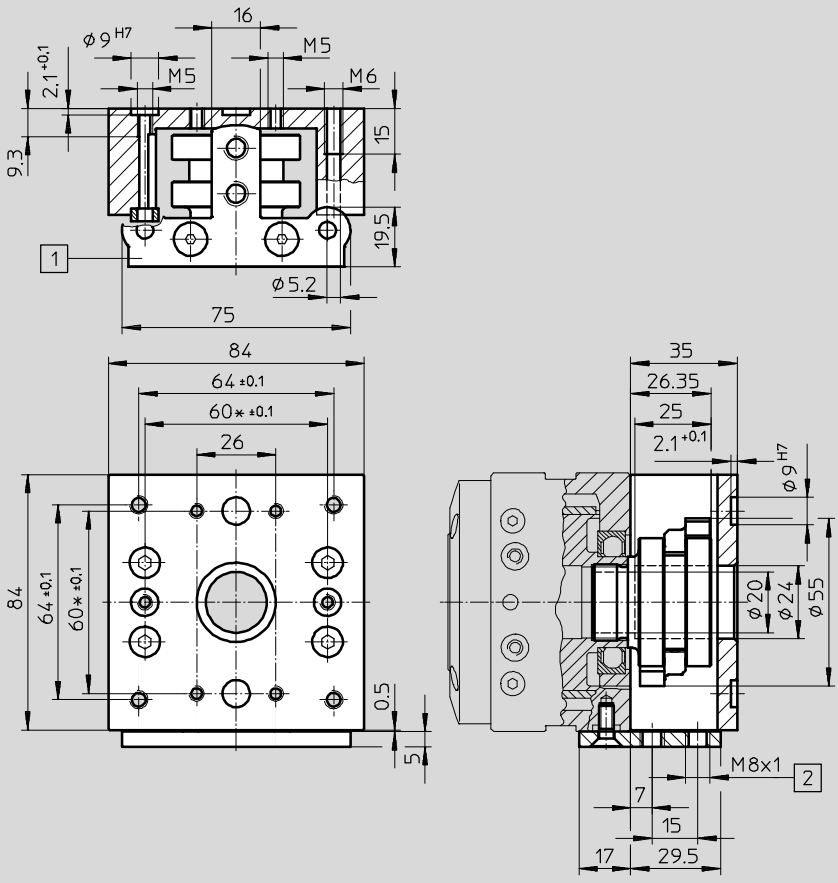
Ordering data ➔ 19

* Tolerance between centring holes ±0.02 mm

1 Bracket for proximity sensor SIEN-M8B

2 Thread for proximity sensor SIEN-M8B

Sensing kit EAPS-R1-25-S for size 25



- Note

Ordering data ➔ 19

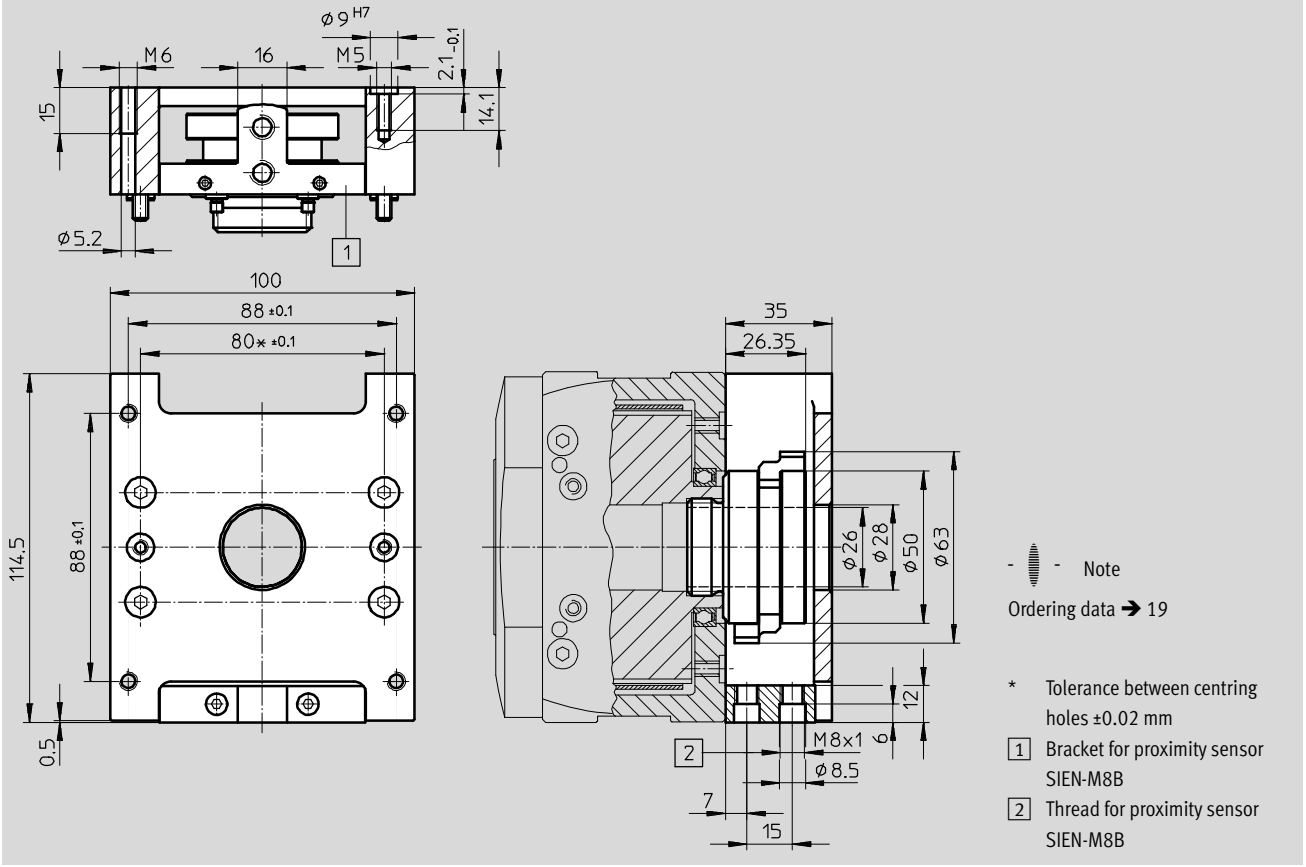
* Tolerance between centring holes ±0.02 mm

1 Bracket for proximity sensor SIEN-M8B

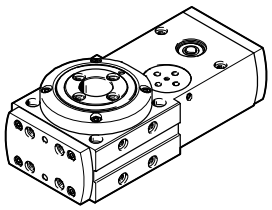
2 Thread for proximity sensor SIEN-M8B

Dimensions Download CAD data ➔ **www.festo.com**

Sensing kit EAPS-R1-32-S for size 32



Ordering data

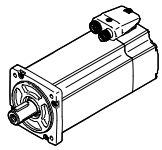
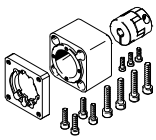
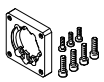
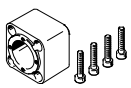
	Size	Part No.	Type
	20	**552706**	**ERMB-20**
	25	**552707**	**ERMB-25**
	32	**552708**	**ERMB-32**

Accessories

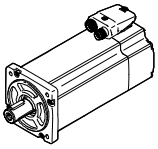
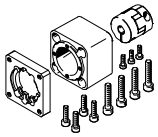
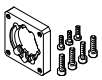
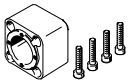
Note

Depending on the combination of motor and drive, it may not be possible to reach the maximum feed force of the drive.

Permissible axis/motor combinations with axial kit – Without gear unit

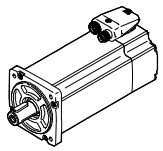
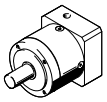
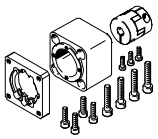
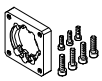
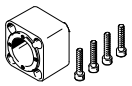
Motor/motor unit[1]	Axial kit	Axial kit comprising:		
		Motor flange	Coupling	Coupling housing
				
Type	Part No. Type	Part No. Type	Part No. Type	Part No. Type
ERMB-20				
with servo motor				
EMME-AS-40-...	**2207441** **EAMM-A-D32-35A-40P**	**–**	**533708** **EAMC-30-32-6-8**	**2207509** **EAMK-A-D32-35-40P**
EMMS-AS-40-...	**560281** **EAMM-A-D32-35A-40A**	**–**	**558312** **EAMC-30-32-6-6**	**560280** **EAMK-A-D32-35-40A**
with stepper motor				
EMMS-ST-42-...	**543148** **EAMM-A-D32-42A**	**552164** **EAMF-A-28B-42A**	**543419** **EAMC-16-20-5-6**	**552155** **EAMK-A-D32-28B**
EMMS-ST-57-...	**550980** **EAMM-A-D32-57A**	**530081** **EAMF-A-44A/B-57A**	**551002** **EAMC-30-32-6-6.35**	**551006** **EAMK-A-D32-44A/C**
With motor unit				
MTR-DCI-32S-...	**543149** **EAMM-A-D32-32B**	**–**	**543420** **EAMC-16-20-6-6**	**552156** **EAMK-A-D32-32B**

1) The input torque must not exceed the maximum permissible transferable torque of the axial kit.

Permissible axis/motor combinations with axial kit – Without gear unit				Technical data ➔ Internet: eamm-a
Motor[1]	Axial kit	Axial kit consisting of:		
		Motor flange	Coupling	Coupling housing
				
Type	Part No. Type	Part No. Type	Part No. Type	Part No. Type
ERMB-25				
With servo motor				
EMMS-AS-55-...	**543153** **EAMM-A-D40-55A**	**529942** **EAMF-A-44A/B-55A**	**543423** **EAMC-30-32-8-9**	**552157** **EAMK-A-D40-44A/C**
EMME-AS-60-...	**1977000** **EAMM-A-D40-60P**	**1956846** **EAMF-A-44C-60P**	**562682** **EAMC-30-32-8-14**	**552157** **EAMK-A-D40-44A/C**
EMMS-AS-70-...	**550981** **EAMM-A-D40-70A**	**529943** **EAMF-A-44A/B-70A**	**551004** **EAMC-30-32-8-11**	**552157** **EAMK-A-D40-44A/C**
With stepper motor				
EMMS-ST-57-...	**543154** **EAMM-A-D40-57A**	**530081** **EAMF-A-44A/B-57A**	**543421** **EAMC-30-32-6.35-8**	**552157** **EAMK-A-D40-44A/C**
With motor unit				
MTR-DCI-42S-...-G7	**543155** **EAMM-A-D40-42B**	**–**	**543422** **EAMC-30-32-8-8**	**552158** **EAMK-A-D40-42B**
MTR-DCI-42S-...-G14	**543156** **EAMM-A-D40-42C**	**–**	**543422** **EAMC-30-32-8-8**	**552159** **EAMK-A-D40-42C**
ERMB-32				
With servo motor				
EMMS-AS-70-...	**543161** **EAMM-A-D60-70A**	**529945** **EAMF-A-64A/B-70A**	**543424** **EAMC-42-50-11-12**	**552160** **EAMK-A-D60-64B**
EMME-AS-80-...	**1977073** **EAMM-A-D60-80P**	**1977113** **EAMF-A-64A/C-80P**	**551005** **EAMC-42-50-12-19**	**551007** **EAMK-A-D60-64C**
EMME-AS-100-...	**550983** **EAM-A-D60-100A**	**529947** **EAMF-A-64A/C/D-100A**	**551005** **EAMC-42-50-12-19**	**551007** **EAMK-A-D60-64C**
EMMS-AS-100-...	**550983** **EAM-A-D60-100A**	**529947** **EAMF-A-64A/C/D-100A**	**551005** **EAMC-42-50-12-19**	**551007** **EAMK-A-D60-64C**
With stepper motor				
EMMS-ST-87-...	**543162** **EAMM-A-D60-87A**	**533140** **EAMF-A-64A/B-87A**	**543424** **EAMC-42-50-11-12**	**552160** **EAMK-A-D60-64B**
With motor unit				
MTR-DCI-52S-...-G7	**543163** **EAMM-A-D60-52B**	**–**	**533709** **EAMC-42-50-12-12**	**552161** **EAMK-A-D60-52B**
MTR-DCI-52S-...-G14	**543164** **EAMM-A-D60-52C**	**–**	**533709** **EAMC-42-50-12-12**	**552162** **EAMK-A-D60-52C**

1) The input torque must not exceed the maximum permissible transferable torque of the axial kit.

Permissible axis/motor combinations with axial kit – With gear unit Technical data ➔ Internet: eamm-a

Motor[1]	Gear unit	Axial kit	Axial kit consisting of:		
			Motor flange	Coupling	Coupling housing
					
Type	Type	Part No. Type	Part No. Type	Part No. Type	Part No. Type
ERMB-25					
With servo motor					
EMME-AS-40-...	**EMGA-40-P-G...-EAS-40**	**560282** **EAMM-A-D40-40G**	**550986** **EAMF-A-44A/B-40G**	**558029** **EAMC-30-32-8-10**	**552157** **EAMK-A-D40-44A/C**
EMMS-AS-40-...	**EMGA-40-P-G...-SAS-40**	**560282** **EAMM-A-D40-40G**	**550986** **EAMF-A-44A/B-40G**	**558029** **EAMC-30-32-8-10**	**552157** **EAMK-A-D40-44A/C**
With stepper motor					
EMME-ST-42-...	**EMGA-40-P-G...-SST-42**	**560282** **EAMM-A-D40-40G**	**550986** **EAMF-A-44A/B-40G**	**558029** **EAMC-30-32-8-10**	**552157** **EAMK-A-D40-44A/C**
ERMB-32					
With servo motor					
EMMS-AS-55-...	**EMGA-60-P-G...-SAS-55**	**560283** **EAMM-A-D60-60G**	**550987** **EAMF-A-64A/B-60G**	**543424** **EAMC-42-50-11-12**	**552160** **EAMK-A-D60-64B**
EMMS-AS-70-...	**EMGA-60-P-G...-SAS-70**	**560283** **EAMM-A-D60-60G**	**550987** **EAMF-A-64A/B-60G**	**543424** **EAMC-42-50-11-12**	**552160** **EAMK-A-D60-64B**
With stepper motor					
EMMS-ST-57-...	**EMGA-60-P-G...-SST-57**	**560283** **EAMM-A-D60-60G**	**550987** **EAMF-A-64A/B-60G**	**543424** **EAMC-42-50-11-12**	**552160** **EAMK-A-D60-64B**

1) The input torque must not exceed the maximum permissible transferable torque of the axial kit.

Note

Note the maximum permissible drive torque of the ERMB.

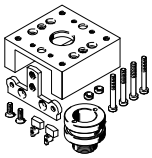
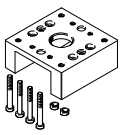
The motor current may need to be limited.

Ordering data – Centring sleeves

	For size	Brief description	Number	Part No.	Type	PU[1]
	20	For centring loads and attachments (centring sleeves are included in the scope of delivery of the rotary module)	2	**186717**	**ZBH-7**	10
			2	**150927**	**ZBH-9**	
	25, 32		4			

1) Packaging unit

Ordering data

	For size	Brief description	Weight [g]	Part No.	Type	PU[1]
Sensing kit EAPS-...-S						
	20	Kit with housing (trip cam support, 2 cams, sensor bracket)	258	**558392**	**EAPS-R1-20-S**	1
	25		406	**558393**	**EAPS-R1-25-S**	
	32		560	**558394**	**EAPS-R1-32-S**	
Sensing kit without housing EAPS-...-S-WH						
	20	Kit without housing (trip cam support, 2 cams, sensor bracket)	86	**558395**	**EAPS-R1-20-S-WH**	1
	25		90	**558396**	**EAPS-R1-25-S-WH**	
	32		136	**558397**	**EAPS-R1-32-S-WH**	
Cam EAPS-...-CK						
	20, 25, 32	For sensing positions (2 cams included in the scope of delivery)	5 each	**558398**	**EAPS-R1-CK**	2
Sensor bracket EAPS-...-SH						
	20, 25	For attaching proximity sensors to the rotary module	24	**558399**	**EAPS-R1-20-SH**	1
	32		30	**558400**	**EAPS-R1-32-SH**	
Housing EAPS-...-H						
	20	For protecting the sensing kit and as mounting interface for the drive	172	**560673**	**EAPS-R1-20-H**	1
	25		316	**560674**	**EAPS-R1-25-H**	
	32		424	**560675**	**EAPS-R1-32-H**	

Ordering data – Proximity sensors, inductive Technical data ➔ Internet: sien

	Contact	Connection	Part No.	Type
	N/O contact	Cable, 2.5 m	**150386**	**SIEN-M8B-PS-K-L**
		Plug connector	**150387**	**SIEN-M8B-PS-S-L**
	N/C contact	Cable, 2.5 m	**150390**	**SIEN-M8B-PO-K-L**
		Plug connector	**150391**	**SIEN-M8B-PO-S-L**

Ordering data – Connecting cables Technical data ➔ Internet: nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	**541333**	**NEBU-M8G3-K-2.5-LE3**
			5	**541334**	**NEBU-M8G3-K-5-LE3**

Adapter kit
HAPB, HMSV

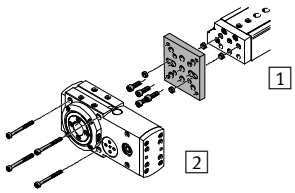
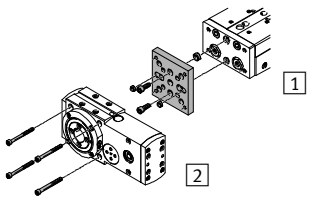
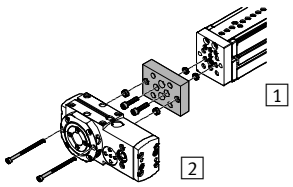
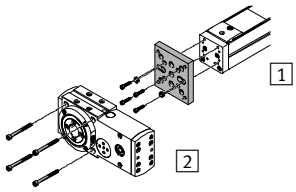
Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant

- Note

The kit includes the individual mounting interface as well as the necessary mounting material.

Permissible drive/drive combinations with adapter kit

Download CAD data ➔ **www.festo.com**

Combination	1 Drive	2 Drive	Adapter kit		
	Size	Size	CRC[1]	Part No.	Type
DGSL/ERMB	DGSL	ERMB	HAPB		
	16, 20, 25	20	2	**558306**	**HAPB-38**
	20, 25	25		**558307**	**HAPB-39**
	25	32		**558308**	**HAPB-40**
SLT/ERMB	SLT	ERMB	HAPB		
	20	20	2	**558306**	**HAPB-38**
	25	25		**558307**	**HAPB-39**
EGSL/ERMB	EGSL	ERMB	HAPB		
	45, 55, 75	20	2	**558306**	**HAPB-38**
	75	25		**558307**	**HAPB-39**
	75	32		**558308**	**HAPB-40**
DGEA/ERMB	DGEA	ERMB	HAPB		
	18, 25	20	2	**558306**	**HAPB-38**
	25, 40	25		**558307**	**HAPB-39**
	40	32		**558308**	**HAPB-40**

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.