

Integrated drives EMCA

FESTO



Characteristics

At a glance

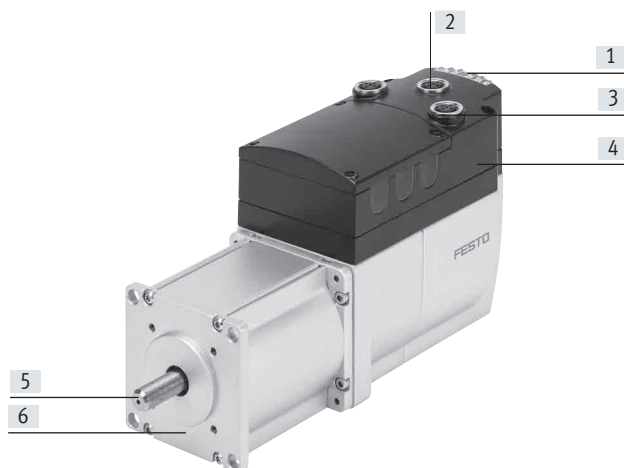
Integrated drive

- Brushless DC motor (EC motor) for positioning tasks with integrated power and control electronics. This prevents the need for long motor cables, improves the electromagnetic compatibility and reduces the installation time and space requirements
- 64 freely programmable position sets (target variable: position, speed or torque)
- Optional: integrated holding brake including holding brake control
- Safety function: "safe torque off" (STO)
- Selectable degree of protection:
 - Standard: IP54 housing and connection technology
 - Optional: IP65 housing and connection technology for increased requirements
- Absolute position sensing via:
 - Standard: single-turn absolute encoder
 - Optional: multi-turn absolute displacement encoder with integrated buffer, for saving the position values of movements for up to 7 days (without external power supply). The time can be extended using an external battery box (→ page 19)

Accessories

- Gear unit:
 - Standard: flange-mounted gear unit and angle step (available ex-stock)
 - Special gear unit on request
- Braking resistor:
 - Integrated chopper as braking resistor
 - Optional: external braking resistor (with mounting bracket)
- Pre-assembled cables
- Drive configuration using PositioningDrives
 - Sizing of EMCA and gear unit
 - Braking resistor required: Yes/No
- Commissioning via the Ethernet interface with Festo Configuration Tool (FCT)

The technology in detail



Bus protocols

CANopen®

PROFINET®

EtherNet/IP™

EtherCAT®

Modbus

- [1] LED indicators
- [2] Parameterisation interface
Modbus TCP interface (integrated in EMCA-DIO)
- [3] CANopen interface
PROFINET interface
EtherNet/IP interface
EtherCAT interface
- [4] Terminal box
- [5] Motor shaft
- [6] Motor flange

Characteristics

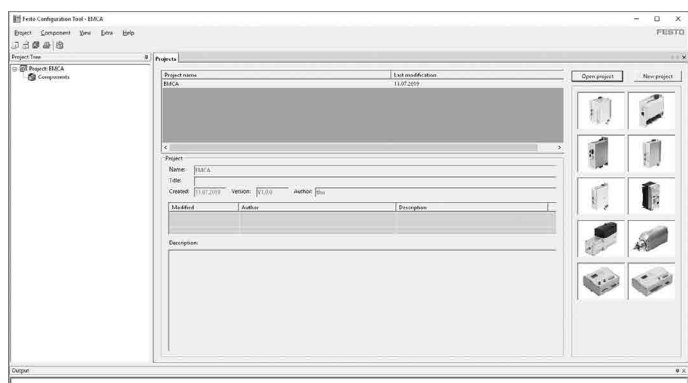
Libraries & tools → www.festo.com/sp/emca (software)

Function blocks for simplified programming as well as other software support

- FCT – Festo Configuration Tool – Plug-in for EMCA
- EMCA firmware updates
- CANopen EDS
- EtherNet/IP EDS
- EtherCAT ESI
- PROFINET GSDML
- Function blocks for Festo, Omron, Rockwell Studio 5000, CODESYS, Beckhoff TwinCAT, Siemens TIA Portal
- Modbus – Demonstrator

FCT software – Festo Configuration Tool

Software platform for electric drives from Festo (→ www.festo.com/sp/fct)



- All drives in a system can be managed and saved in a common project
- Project and data management for all supported types of equipment
- Simple to use thanks to graphically supported parameter entry
- Universal mode of operation for all drives
- Work offline at your desk or online at the machine

FHPP – Festo Handling and Positioning Profile

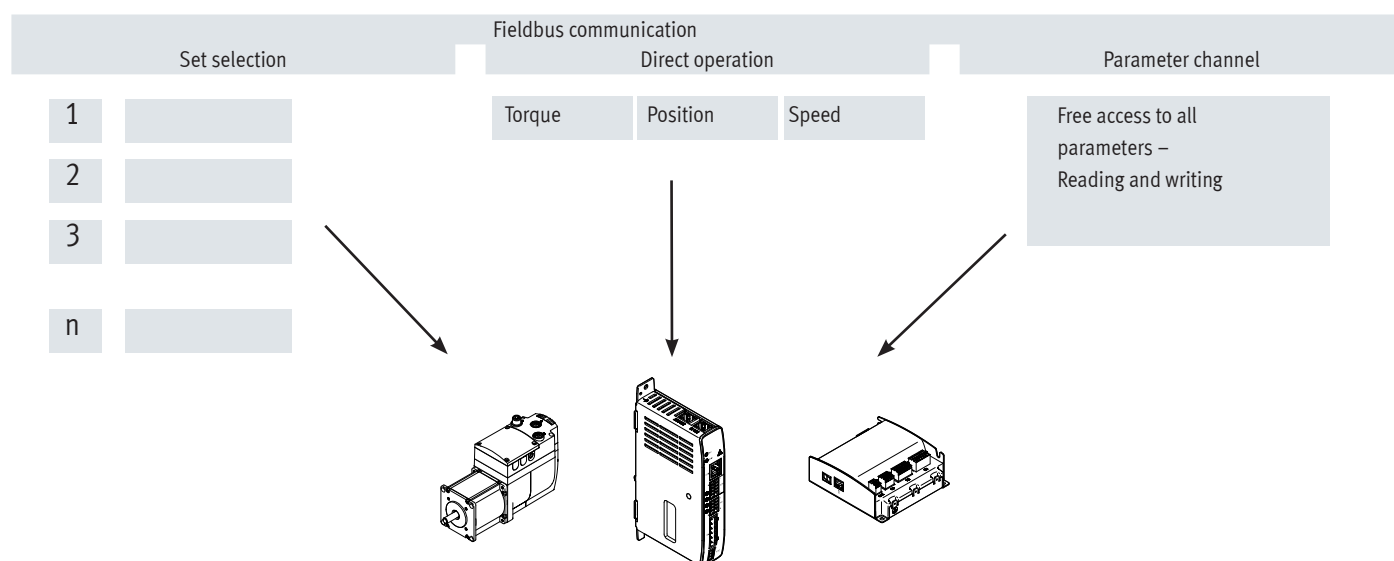
Optimised data profile

Festo has developed an optimised data profile, the "Festo Handling and Positioning Profile (FHPP)", tailored to specific handling and positioning tasks.

With the FHPP data profile, Festo motor controllers can be controlled using a fieldbus interface via standardised control and status bytes.

The following are defined, among others:

- Operating modes
- I/O data structure
- Parameter objects
- Sequence control

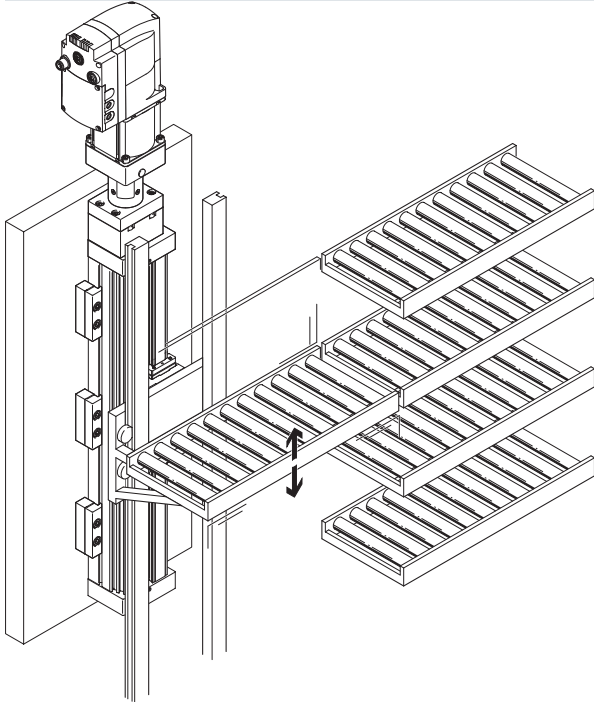


Characteristics

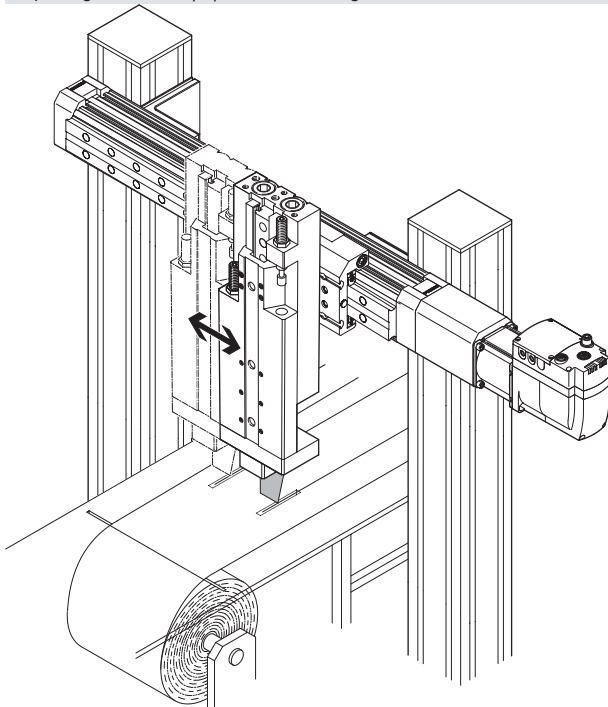
Application examples

- Printing press and post-pressing machines
- Packaging and labelling machines
- Woodworking machines
- Textile industry
- Medical technology
- Material transport
- Conveying
- Inscription
- Electronics manufacturing

Adjusting sorting conveyors



Adjusting formats for paper or film cutting machines



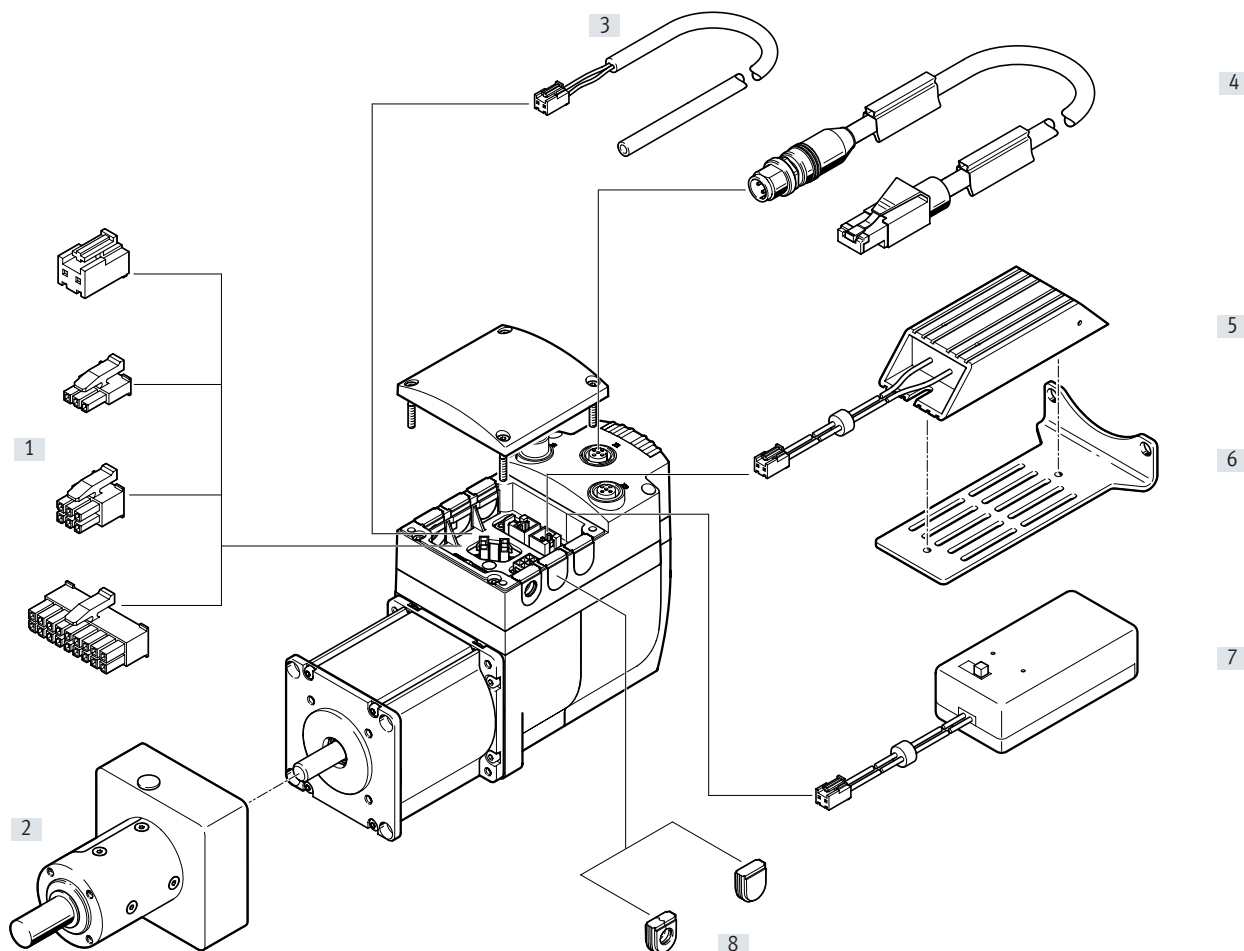
Type codes

001	Series	
EMCA	Motor with controller	
002	Motor type	
EC	EC motor	
003	Flange size, motors	
67	67	
004	Length	
S	Short	
M	Centre	
005	Nominal operating voltage	
1	24 V DC	
006	Electrical connection	
T	Terminal box	

007	Measuring unit	
E	Encoder	
M	Absolute encoder, multi-turn	
008	Brake	
	None	
B	With brake	
009	Bus protocol/activation	
DIO	Digital I/O interface	
EC	EtherCAT®	
EP	EtherNet/IP	
PN	Profinet	
CO	CANopen	
010	Degree of protection, electrical system	
	Standard	
S1	IP65	

Peripherals overview

Using the variant EMCA-...-CO as an example



Peripherals overview

Accessories			→ Page/Internet
[1]	Assortment of plugs NEKM	- Connector plugs for power supply, reference/limit switch etc. (for plugs X4, X6, X7, X8, X9 → page 13). - Not included in the scope of delivery of the EMCA	19
[2]	Gear unit EMGC	Increases the torque of the motor, while simultaneously reducing the rotational speed	18
[3]	Pre-assembled cable NEBM	For power supply, STO interface and I/O interface	20
[4]	Connecting cable NEBC-D12G4	To parameterise the integrated drive	20
[5]	Braking resistor CACR-LE2	Absorbs the energy that is supplied back into the intermediate circuit during braking or with external excitation	19
[6]	Mounting bracket EAHM-M1	For flexible mounting of the braking resistor	19
[7]	Battery box EADA	To save the position values in combination with the multi-turn absolute displacement encoder	19
[8]	Rubber seals	- Assortment of seals is included in the scope of delivery of the EMCA - Additional orders can be placed using the spare parts catalogue → www.festo.com/emca (documentation)	emca

Data sheet

-  Size 67-  Nominal voltage
24 V DC

Bus protocols

CANopen

PROFINET

EtherNet/IP

EtherCAT

 Modbus

General technical data

Controller operating mode	PWM-MOSFET power output stage
	Cascade controller with
	P position controller
	PI speed controller
	PI current regulator
Parameterisation interface	Ethernet
Ethernet, supported protocols	TCP/IP
Max. transmission rate	[Mbps] 100
Rotor position sensor	Absolute encoder, single-turn
	Absolute encoder, multi-turn displacement encoder
Rotor position sensor measuring principle	Magnetic
Resolution	
Single-turn	12 bit (4096 increments per revolution)
Multi-turn displacement encoder	12 bit (4096 increments per revolution) and 4,294,967,729 ($\pm 2,147,483,648$) revolutions; 32 bit
Operating time of multi-turn displacement encoder	Without external battery: 3 days (typically); 7 days (in the best case) ¹⁾
	With external battery: 6 months ²⁾
Indicators	LED
Type of mounting	Mounting flange with through-hole
Mounting position	Any

1) The maximum storage period depends on the charge status of the internal capacitor, the ambient temperature and ageing effects.

2) The maximum service life of the battery depends its state of charge, the ambient temperature and ageing effects.

Electrical data

Size	S	M
Nominal voltage	[V DC] 24 $\pm$ 20%	
Nominal current	[A] 6.9	7.2
Peak current	[A] 10.2	10.3
Nominal motor power	[W] 120	150
Peak motor power	[W] 158	200
Max. current, digital outputs	[mA] 100	
Switching logic, input/output	PNP	

Technical data – Motor

Size	S	M
Nominal rotary speed	[rpm] 3100	3150
Max. rotational speed	[rpm] 3500	3300
Nominal torque	[Nm] 0.37	0.45
Peak torque	[Nm] 0.85	0.91
Mass moment of inertia of rotor	[kg cm ²] 0.175	0.301
Permissible shaft load		
Axial	[N] 60	
Radial	[N] 100	

Data sheet

Technical data – Holding brake		
Holding torque	[Nm]	1
Power consumption	[W]	9
Mass moment of inertia	[kg cm ²]	0.021

Technical data					
Interfaces	I/O	CANopen	PROFINET	EtherNet/IP	EtherCAT
Number of digital logic outputs	4	2	2	2	2
Number of digital logic inputs	11	2	2	2	2

Technical data – Bus protocol					
Interfaces	Modbus TCP	CANopen	PROFINET	EtherNet/IP	EtherCAT
Position sets	64	64	64	64	64
Communication profile	FHPP	CiA 402 and FHPP	FHPP	FHPP	CiA 402 and FHPP
Max. fieldbus transmission rate	[Mbps]	100	1	100	100
Terminating resistor	[Ω]	–	120 (can be activated via DIP switch)	–	–
RPI (requested packet interval)	[ms]	–	–	5	–
Transmission services	–	–	–	Messaging: Implicit (T1) Explicit	–

Safety data	
Safety function to EN 61800-5-2	Safe torque off (STO)
Performance Level (PL) to EN ISO 13849-1	Category 3, Performance Level d
Safety integrity level (SIL) to EN 61800-5-2	SIL 2
Max. positive test pulse with logic 0	[μs] 10000
Max. negative test pulse with logic 1	[μs] 600
Proof test interval	20 years
PFH	1×10^{-9}
PDF	1.86×10^{-5}
Diagnostic coverage	[%] 90
Safe failure fraction (SFF)	[%] > 90
Hardware fault tolerance	1
Certificate issuing authority	German Technical Control Board (TÜV) 0 1/20 5/5514.0 0/16
CE marking (see declaration of conformity)	To EU EMC Directive ¹⁾ To EU Machinery Directive
Certification	c UL us - Recognized (OL) RCM trademark
Vibration resistance	Transport application test with severity class 2 to FN 942017-4 and EN 60068-2-6
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp → Certificates.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Weights [g]		
Size	S	M
Product weight	1900	2260
Plus holding brake	350	350
Plus multi-turn displacement encoder	25	25

Data sheet

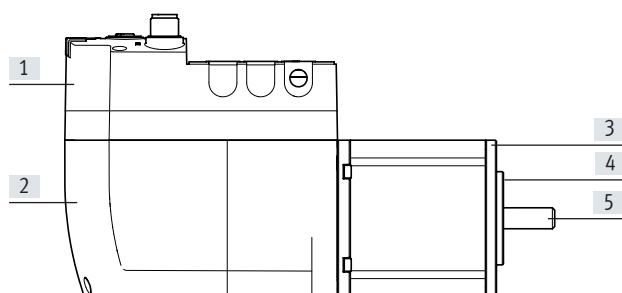
Operating and environmental conditions	
Characteristics of digital logic outputs	- Freely configurable in some cases - Not galvanically isolated
Characteristics of logic inputs	Galvanically connected to logic potential
Logic input specification	Based on IEC 61131-2
Protective function	i ² t monitoring Following error monitoring Software end-position detection Voltage failure detection Current monitoring Temperature monitoring
Degree of protection	
EMCA-..., motor shaft	IP54
EMCA-..., motor housing incl. connection technology	IP54
EMCA-...S1, motor housing incl. connection technology	IP65
Ambient temperature [°C]	0 ... +50
Note on ambient temperature	Power must be reduced by 1.75% per °C at ambient temperatures above 20 °C
Storage temperature [°C]	–25 ... +70
Relative humidity [%]	0 ... 95 (non-condensing)
Corrosion resistance CRC ¹⁾	1
Certification	RCM compliance mark
CE marking (see declaration of conformity)	To EU EMC Directive ²⁾
	To EU Machinery Directive
KC mark	KC EMC

1) Corrosion resistance class CRC 1 to Festo standard FN 940070

Low corrosion stress. Dry internal application or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp → Certificates.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

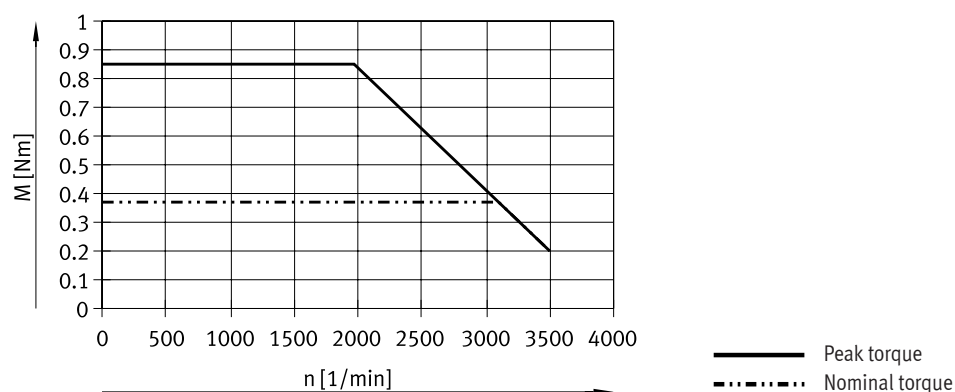


Materials		
Integrated drive		
Housing		
[1]	Terminal box	Glass fibre-reinforced plastic
[2]	Lower housing part	Die-cast zinc
–	Seals	NBR
Motor		
[3]	Profile barrel	Aluminium
[4]	Flange	Die-cast zinc
[5]	Shaft	Steel
Note on materials		RoHS-compliant
		Contains paint-wetting impairment substances

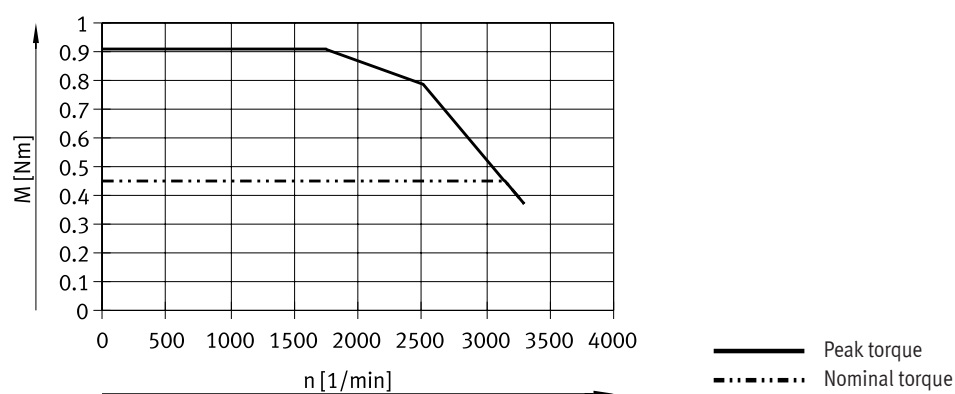
Data sheet

Torque M as a function of rotational speed n

EMCA-EC-67-S



EMCA-EC-67-M



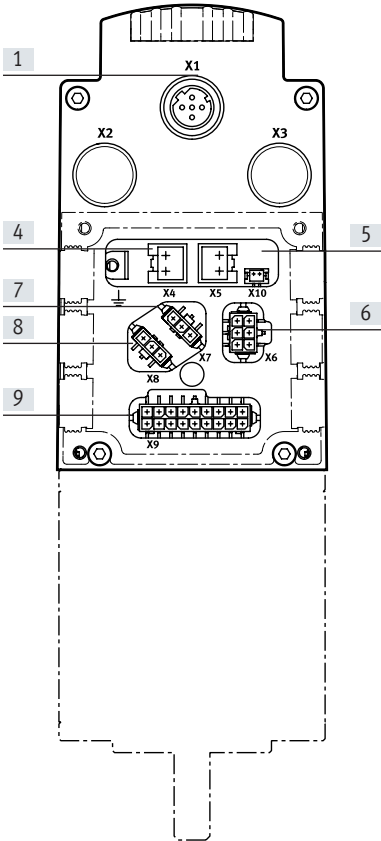
Note

Typical motor characteristic curves
(typical production tolerances $\pm 20\%$)
at nominal voltage.

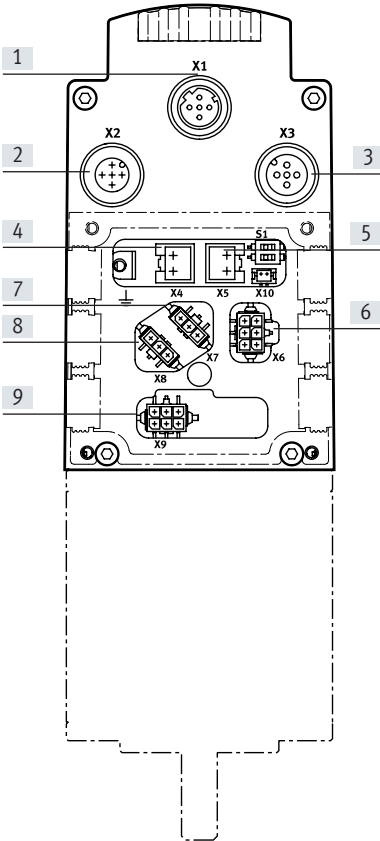
Data sheet

Pin allocation

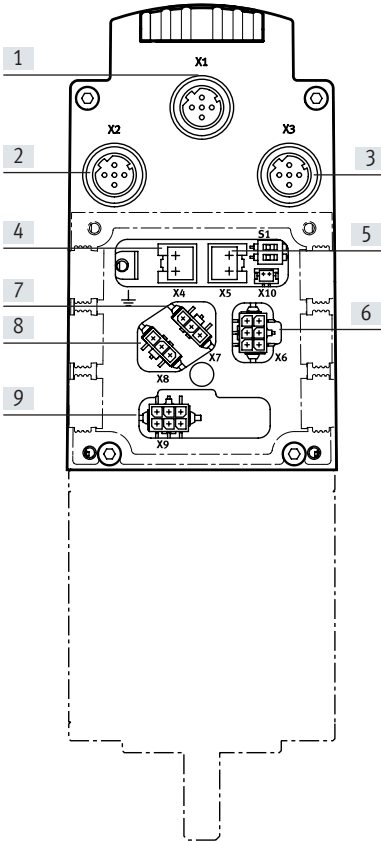
EMCA-...-DIO



EMCA-...-CO



EMCA-...-PN/-EP/-EC



[1] [X1] Parameterisation interface (Ethernet)			
		PIN	Function
	1	TD+	Transmitted data+
	2	RD+	Received data+
	3	TD-	Transmitted data-
	4	RD-	Received data-
	5	-	n.c.
	Housing		Shielding/functional earth

[2] [X2] CAN IN (CAN interface)			
		PIN	Function
	1	CAN shielding	Shielding
	2	n.c.	-
	3	CAN GND	CAN bus reference potential
	4	CAN H	CAN bus high
	5	CAN L	CAN bus low
	Housing		Shielding/functional earth

[3] [X3] CAN OUT (CAN interface)			
		PIN	Function
	1	CAN shielding	Shielding
	2	n.c.	-
	3	CAN GND	CAN bus reference potential
	4	CAN H	CAN bus high
	5	CAN L	CAN bus low
	Housing		Shielding/functional earth

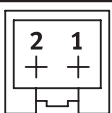
[2] [X2] PN OUT (PROFINET interface) [X2] EP OUT (EtherNet/IP interface) [X2] EC OUT (EtherCAT interface)			
		PIN	Function
	1	TD+	Transmitted data+
	2	RD+	Received data+
	3	TD-	Transmitted data-
	4	RD-	Received data-
	5	-	n.c.
	Housing		Shielding/functional earth

[3] [X3] PN IN (PROFINET interface) [X3] EP IN (EtherNet/IP interface) [X3] EC IN (EtherCAT interface)			
		PIN	Function
	1	TD+	Transmitted data+
	2	RD+	Received data+
	3	TD-	Transmitted data-
	4	RD-	Received data-
	5	-	n.c.
	Housing		Shielding/functional earth

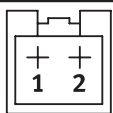
Data sheet

Pin allocation

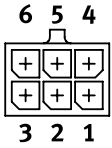
[4] [X4] Power supply

	PIN	Function
	1	24 V DC Power supply
	2	GND Reference potential

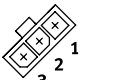
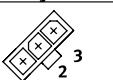
[5] [X5] Braking resistor

	PIN	Function
	1	ZK+ Connection for external braking resistor
	2	BR-CH

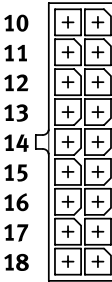
[6] [X6] STO interface

	PIN	Function
	1	NC1 Acknowledgement contact 1
	2	NC2 Acknowledgement contact 2
	3	24 V DC Voltage output
	4	STO1 Control input
	5	STO2 Control input
	6	GND Reference potential

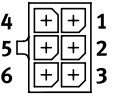
[7]/[8] [X7/X8] Limit and reference switches

	PIN	Function
	1	24 V DC Voltage output
	2	Switch 1 Signal input 1
	3	GND Reference potential
	1	24 V DC Voltage output
	2	Switch 2 Signal input 2
	3	GND Reference potential

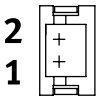
[9] [X9] I/O interface on EMCA-...-DIO

	PIN	Function (mode0/mode1)
	1	DIN Set selection 1
	2	DIN Set selection 2
	3	DIN Set selection 4
	4	DIN Set selection 8
	5	DIN Set selection 16
	6	DIN Set selection 32/jog+
	7	DOUT Ready
	8	DOUT Configurable
	9	24 V DC Voltage output
	10	DOUT Start confirmed/teach confirmed
	11	DOUT Motion complete
	12	DIN Control mode 0/1
	13	DIN Start/teach
	14	DIN Open brake, delete remaining path/jog-
	15	DIN Stop
	16	DIN Enabling / acknowledge error
	17	- n.c.
	18	GND Reference potential

[9] [X9] I/O interface on EMCA-...-CO/-PN/-EP/-EC

	PIN	Function
	1	DOUT Ready
	2	DOUT Configurable
	3	24 V DC Voltage output
	4	DIN Controller enabling
	5	DIN Sample input
	6	GND Reference potential

[10] [X10] External battery

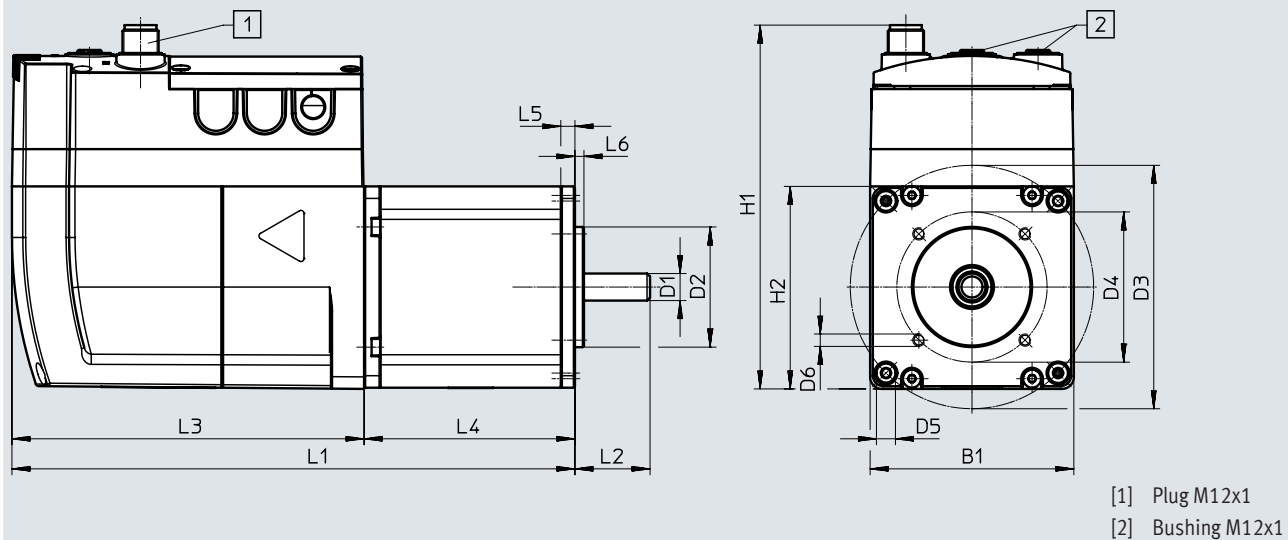
	PIN	Function
	1	Battery+ Connection for external battery
	2	Battery-

Data sheet

Dimensions

Download CAD data → www.festo.com

EMCA-...-CO



Type	B1	D1 ø h6	D2 ø h8	D3 ø ±0.2	D4 ø ±0.2	D5 ø +0.2	D6	H1 ±0.5
EMCA-...S	67	9	40	81	50	6.3	M4x5	121.1
EMCA-...M								

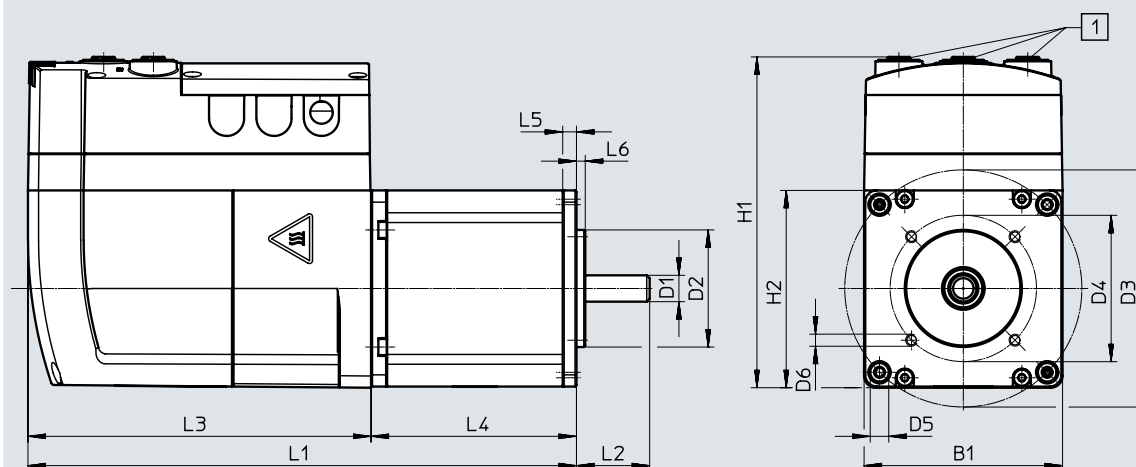
Type	H2	L1	L2 ±0.5	L3 ±0.3	L4 ±0.8	L5 ±0.3	L6 -0.1
EMCA-...S	67	169.9	25	117.2	52.7	4.7	3
EMCA-...M		187.4			70.2		

Data sheet

Dimensions

Download CAD data → www.festo.com

EMCA-...-PN/-EP/-EC/-DIO



[1] Bushing M12x1

Type	B1	D1 Ø h6	D2 Ø h8	D3 Ø ±0.2	D4 Ø ±0.2	D5 Ø +0.2	D6	H1 ±0.5
With PROFINET, EtherNet/IP, EtherCAT interface								
EMCA-...-S	67	9	40	81	50	6.3	M4x5	113
EMCA-...-M								
With I/O interface								
EMCA-...-S	67	9	40	81	50	6.3	M4x5	111.5
EMCA-...-M								

Type	H2	L1	L2 ±0.5	L3 ±0.3	L4 ±0.8	L5 ±0.3	L6 −0.1
With PROFINET, EtherNet/IP, EtherCAT interface							
EMCA-...-S	67	169.9	25	117.2	52.7	4.7	3
EMCA-...-M		187.4			70.2		
With I/O interface							
EMCA-...-S	67	169.9	25	117.2	52.7	4.7	3
EMCA-...-M		187.4			70.2		

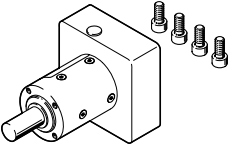
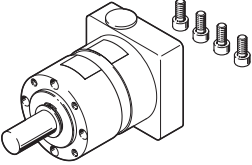
Data sheet

Ordering data		Measuring unit		Degree of protection IP54	Holding brake included	Part no.	Type
Size		Encoder, single-turn	Encoder, multi-turn				
Short	Medium						
Interface: I/O with Modbus TCP							
■		■		■		8061196	EMCA-EC-67-S-1TE-DIO
	■	■		■		8061197	EMCA-EC-67-M-1TE-DIO
■			■	■		8061199	EMCA-EC-67-S-1TM-DIO
	■		■	■		8061198	EMCA-EC-67-M-1TM-DIO
Interface: CANopen							
■		■		■		8034238	EMCA-EC-67-S-1TE-CO
	■	■		■		8034239	EMCA-EC-67-M-1TE-CO
■			■	■		8034240	EMCA-EC-67-S-1TM-CO
	■		■	■		8034241	EMCA-EC-67-M-1TM-CO
Interface: PROFINET							
■		■		■		8069725	EMCA-EC-67-S-1TE-PN
	■	■		■		8069726	EMCA-EC-67-M-1TE-PN
■			■	■		8069727	EMCA-EC-67-S-1TM-PN
	■		■	■		8069728	EMCA-EC-67-M-1TM-PN
Interface: EtherNet/IP							
■		■		■		8061201	EMCA-EC-67-S-1TE-EP
	■	■		■		8061202	EMCA-EC-67-M-1TE-EP
■			■	■		8061203	EMCA-EC-67-S-1TM-EP
	■		■	■		8061204	EMCA-EC-67-M-1TM-EP
■			■	■	■	607222	EMCA-EC-67-S-1TMB-EP
	■		■	■	■	604906	EMCA-EC-67-M-1TMB-EP
Interface: EtherCAT							
■		■		■		8069729	EMCA-EC-67-S-1TE-EC
	■	■		■		8069730	EMCA-EC-67-M-1TE-EC
■			■	■		8069731	EMCA-EC-67-S-1TM-EC
	■		■	■		8069732	EMCA-EC-67-M-1TM-EC

Ordering data – Modular product system

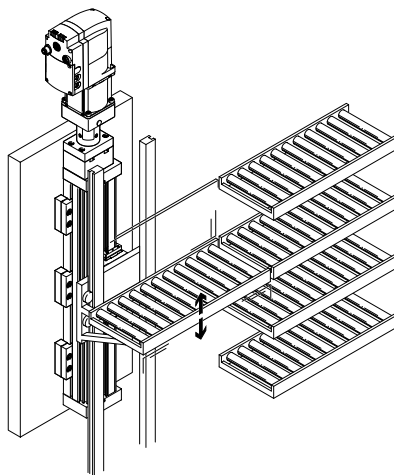
Ordering table		Conditions	Code	Enter code
Size	67			
Module no.	1509036			
Product type	EMCA motor with controller		EMCA	EMCA
Motor technology	EC motor		-EC	-EC
Flange size	67 mm		-67	-67
Overall length	Short		-S	
	Medium		-M	
Nominal operating voltage	24 V DC		-1	-1
Electrical connection	Terminal box		T	T
Measuring unit	Absolute encoder, single-turn		E	
	Absolute encoder, multi-turn displacement encoder		M	
Brake	Without			
	With holding brake		B	
Bus protocol/control	Digital I/O interface with Modbus TCP		-DIO	
	CANopen		-CO	
	PROFINET		-PN	
	EtherNet/IP		-EP	
	EtherCAT		-EC	
Degree of protection, electrical system	Standard			
	IP65		-S1	

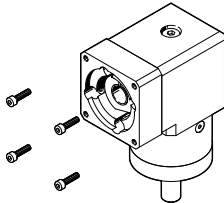
Accessories

Ordering data – Gear unit		Data sheets → Internet: emgc			
	Gear unit type	Gear ratio		Part no.	Type
	EMGC-40-P...	3	Single-stage	8000594	EMGC-40-P-G3-SEC-67
		4		8000595	EMGC-40-P-G4-SEC-67
		5		8000596	EMGC-40-P-G5-SEC-67
		7		8000597	EMGC-40-P-G7-SEC-67
		12	Two-stage	8000598	EMGC-40-P-G12-SEC-67
		16		8000599	EMGC-40-P-G16-SEC-67
		20		8000600	EMGC-40-P-G20-SEC-67
		25		8000601	EMGC-40-P-G25-SEC-67
		35		8000602	EMGC-40-P-G35-SEC-67
	EMGC-60-P...	3	Single-stage	8000612	EMGC-60-P-G3-SEC-67
		4		8000613	EMGC-60-P-G4-SEC-67
		5		8000614	EMGC-60-P-G5-SEC-67
		7		8000615	EMGC-60-P-G7-SEC-67
		10		8000616	EMGC-60-P-G10-SEC-67
		12	Two-stage	8000617	EMGC-60-P-G12-SEC-67
		16		8000618	EMGC-60-P-G16-SEC-67
		20		8000619	EMGC-60-P-G20-SEC-67
		25		8000620	EMGC-60-P-G25-SEC-67
		35		8000621	EMGC-60-P-G35-SEC-67
		40		8000622	EMGC-60-P-G40-SEC-67

Fitting instructions for EMGC-40

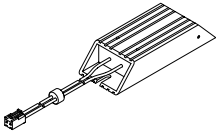
- Only suitable for vertical mounting position
- Suitable as a vertical axis where, for example, only the slide moves and not the axis
- Not suitable as a Z-axis as part of a 3-dimensional gantry, for example



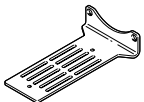
Ordering data – Right-angle gear unit		Data sheets → Internet: emgc		
	Gear unit type	Gear ratio	Part no.	Type
	EMGC-67-A-G1	1	2321480	EMGC-67-A-G1-SEC-67

Accessories

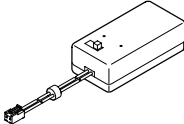
Ordering data – Braking resistor

	Resistance value [Ω]	Nominal power [W]	Weight [g]	Degree of protection	Cable length [mm]	Dimensions [mm]	Part no.	Type
	6	60	140	IP65	300	Length: 102 Width: 40 Height: 21	8047913	CACR-LE2-6-W60

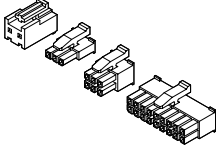
Ordering data – Mounting bracket

	Description	Weight [g]	Part no.	Type
	For flexible mounting of the braking resistor	106	8080406	EAHM-M1-AB

Ordering data – Battery box

	Description	Degree of protection	Cable length [mm]	Dimensions [mm]	Part no.	Type
	- To save the position values in combination with the multi-turn absolute displacement encoder - It contains a standard 9 V battery (6LR61)	IP40	135	Length: 68 Width: 33 Height: 25	8047912	EADA-A-9

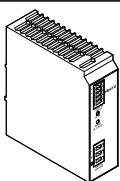
Ordering data – Assortment of plugs

	Description	For bus protocol/control	Part no.	Type
	Connector plugs for power supply, reference/limit switch etc. (for plugs X4, X6, X7, X8, X9 → page 13) Not included in the scope of delivery of the EMCA	CANopen, PROFINET EtherNet/IP, EtherCAT	8034242	NEKM-C-20
		I/O interface with Modbus TCP	8034243	NEKM-C-21

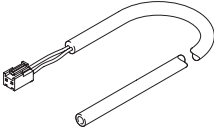
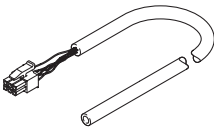
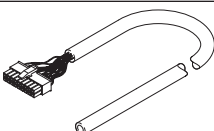
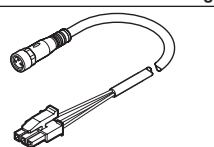
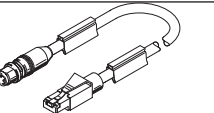
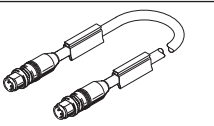
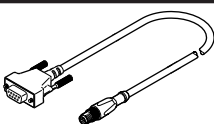
Ordering data – Safe Torque Off (STO) connector with jumpers

	Description	Part no.	Type
	- Connector with jumpers between pin 3, 4 and 5 to bypass Safe Torque Off (STO) circuit (for plug X6) - When STO is not used, order instead of STO cable (Part No. 4977493) Not included in the scope of delivery of the integrated drive	13119892	NEBM-G6-CS

Ordering data – Fixed power supply units

	Description	Input voltage range [V AC]	Nominal output voltage [V DC]	Nominal output current [A]	Part no.	Type
	Power supply for motor controller	100 ... 240	24	10	2247682	CACN-3A-1-10

Accessories

Ordering data – Pre-assembled cable				
	Description	Cable length [m]	Part no.	Type
For power supply (plug X4) for EMCA-...-CO/-PN/-EP/-EC/-DIO				
	Electrical connection: One end: pre-assembled with plug, other end: open cable end	10	4977492	NEBM-L4G2-E-10-N-LE2
		15	13119270	NEBM-L4G2-E-15-N-LE2-CS
For STO interface (plug X6) for EMCA-...-CO/-PN/-EP/-EC/-DIO and I/O interface (plug X9) for EMCA-...-CO/-PN/-EP/-EC				
	Electrical connection: One end: pre-assembled with plug, other end: open cable end	10	4977493	NEBM-L5G6-E-10-N-LE6
		15	13119271	NEBM-L5G6-E-15-N-LE6-CS
For I/O interface (plug X9) for EMCA-...-DIO				
	Electrical connection: One end: pre-assembled with plug, other end: open cable end	10	4977494	NEBM-L5G18-E-10-N-LE18
For limit switch and homing sensors for EMCA-...-CO/-EP/-DIO				
	Electrical connection: One end: pre-assembled with plug connector, other end: M8 plug	0.3	13119890	NEBU-M8G3-K-3-3P-CS
Ordering data – Connecting cable				
	Cable length [m]	Weight [g]	Part no.	Type
For parameterisation interface (plug X1)				
	1	89	8040451	NEBC-D12G4-ES-1-S-R3G4-ET
	3	219	8040452	NEBC-D12G4-ES-3-S-R3G4-ET
	5	347	8040453	NEBC-D12G4-ES-5-S-R3G4-ET
	10	674	8040454	NEBC-D12G4-ES-10-S-R3G4-ET
For PROFINET; EtherNet/IP; EtherCAT interface (plug X2, X3)				
	0.5	57	8040446	NEBC-D12G4-ES-0.5-S-D12G4-ET
	1	93	8040447	NEBC-D12G4-ES-1-S-D12G4-ET
	3	223	8040448	NEBC-D12G4-ES-3-S-D12G4-ET
	5	350	8040449	NEBC-D12G4-ES-5-S-D12G4-ET
	10	679	8040450	NEBC-D12G4-ES-10-S-D12G4-ET
Ordering data – Fieldbus adapter for CANopen				
	Description	Part no.	Type	
	- For connecting standard M12 CANopen cables 9-pin Sub-D plug to 5-pin round M12 plug - Bus terminating resistor must be connected externally	540324	FBA-CO-SUB-9-M12	

 **Note**
Spare parts:
→ www.festo.com/emca
(documentation)

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