

Servo motors EMMT-AS



## Servo motors EMMT-AS

Key features

### Everything from a single source

Motors EMMT-AS

→ Page 3



- Dynamic, brushless, permanently excited synchronous servo motors
- Extremely low holding torque – supports excellent synchronism even at low rotational speeds
- Digital absolute displacement encoder; choose from:
  - Single-turn
  - Multi-turn, no batteries
- Simple connection technology (OCP: one cable plug) – one connecting cable for supply and encoder
- Connector plug can be aligned with the motor
- Torque-optimised
- Speed-optimised
- Degree of protection:
  - IP40 (motor shaft)
  - IP67 (motor housing with connection technology)
  - IP67 (motor shaft with radial shaft seal made from PTFE)
- Motor temperature transmission, digital via EnDat 2.2; motor protection via CMMT-AS
- Optional:
  - Holding brake
  - Shaft with featherkey
  - Motor shaft with radial shaft seal

### Gear unit EMGA-EAS/-SAS

→ Page 11



- Low-backlash planetary gear
- Gear ratio  $i = 3$  and  $5$ , available from stock
- Life-time lubrication
- Degree of protection: IP54
- Other gear unit types, ratios, designs and versions on request

### Servo drive CMMT-AS

→ Internet: cmm



- Universal servo drive for synchronous servo motors
- Integrated EMC filters
- Integrated brake chopper
- Integrated braking resistor
- Integrated safety functions
- Position controller
- Speed controller
- Force controller
- Range of control functions
- Interfaces:
  - EtherCAT

### Motor cables NEBM

→ Page 12



- Suitable for energy chains
- Connection technology on motor side with degree of protection to IP67
- Can be used in a wide temperature range

### Axial and parallel kits EAMM

→ Internet: eamm



- Specific kits for all electro-mechanical axes from Festo
- Each kit includes the relevant necessary coupling housing, couplings and motor flange as well as all screws
- Optionally with degree of protection IP65

EtherCAT® is a registered trademark of its respective trademark holder in certain countries.

# Servo motors EMMT-AS


Type codes

		EMMT	-	AS	-	60	-	M	K	R	-	LS	-	R	S	B
<b>Type</b>																
EMMT	Motor															
<b>Motor type</b>																
AS	Servo motor															
<b>Motor flange size</b>																
60	60 mm															
<b>Length</b>																
S	Short															
M	Medium															
L	Long															
<b>Output shaft</b>																
-	Smooth shaft															
K	Shaft to DIN 6885 (with featherkey)															
<b>Rotary shaft seal</b>																
-	None															
R	With standard shaft seal															
<b>Winding</b>																
LS	Low voltage, standard															
HS	High voltage, standard															
<b>Electrical connection</b>																
R	Angled plug, rotatable															
<b>Measuring unit</b>																
S	Absolute encoder, single turn															
M	Absolute encoder, multi-turn															
<b>Brake</b>																
-	None															
B	With brake															

# Servo motors EMMT-AS

Technical data



 Note

Motors and motor controllers from Festo have been specially designed to be used together. Fault-free operation cannot be guaranteed in combination with third-party controllers.



Technical data							
Flange size		60					
Length		S		M		L	
Winding		LS	HS	LS	HS	LS	HS
Nominal voltage	[V DC]	325	565	325	565	325	565
Nominal current							
Without brake	[A]	1.6	1.6	2.4	2.4	3.2	3.2
With brake	[A]	1.4	1.4	2.2	2.2	3.0	3.0
Peak current	[A]	5.4	5.4	11.0	11.0	18.3	18.3
Nominal power							
Without brake	[W]	200	200	350	350	440	440
With brake	[W]	190	190	310	310	410	410
Nominal torque							
Without brake	[Nm]	0.64	0.64	1.1	1.1	1.4	1.4
With brake	[Nm]	0.6	0.6	1.0	1.0	1.30	1.30
Peak torque	[Nm]	1.6	1.6	3.4	3.4	5.6	5.6
Stall torque							
Without brake	[Nm]	0.7	0.7	1.24	1.24	1.66	1.66
With brake	[Nm]	0.66	0.66	1.15	1.15	1.56	1.56
Nominal rotary speed	[rpm]	3000					
Max. rotational speed	[rpm]	7100	12500	6800	11800	6800	11900
Motor constant	[Nm/A]	0.41	0.41	0.45	0.45	0.44	0.44
Winding resistance	[Ω]	11.7	11.7	4.85	4.85	2.68	2.68
Winding inductance	[mH]	21	21	11	11	7	7
Total output inertia moment							
Without brake	[kgcm <sup>2</sup> ]	0.169	0.169	0.286	0.286	0.403	0.403
With brake	[kgcm <sup>2</sup> ]	0.257	0.257	0.373	0.373	0.490	0.490
Shaft load							
Radial	[N]	320					
Axial	[N]	65					
Brake							
Operating voltage	[V DC]	24 (+6 ... -10%)					
Performance	[W]	11					
Holding torque (static)	[Nm]	2.5					
Mass moment of inertia	[kgcm <sup>2</sup> ]	0.074					

Weight [kg]			
Flange size		60	
Length		S	L
Without brake		1.18	1.91
With brake		1.50	2.23

# Servo motors EMMT-AS

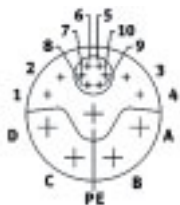
Technical data

Operating and environmental conditions		
Standard		IEC60034
Degree of protection		
Motor shaft		IP40
Motor housing incl. connection technology		IP67
With radial shaft seal		IP67
Ambient temperature	[°C]	-15 ... +40 (up to 80°C with derating of -1.5% per degree Celsius)
Storage temperature	[°C]	-20 ... +70
Temperature monitoring		Digital motor temperature transmission via EnDat 2.2
Rating class to EN 60034-1		S1
Thermal class to EN 60034-1		F
Relative humidity	[%]	0 ... 90
Corrosion resistance class CRC <sup>1)</sup>		0
CE marking (see declaration of conformity)		To EU Low Voltage Directive
		To EU EMC Directive <sup>2)</sup>
		To EU RoHS Directive
Certification		c UL us - Recognized (OL)
		RCM mark
Note on materials		RoHS-compliant
		Contains paint-wetting impairment substances

- 1) Corrosion resistance class CRC 0 to Festo standard FN 940070  
No corrosion stress. Applies to small, optically irrelevant standard parts such as threaded pins, circlips and clamping sleeves which are usually only available in a phosphated or burnished version (and possibly oiled) as well as to ball bearings (for components < CRC 3) and plain bearings.
- 2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://www.festo.com/sp) → Certificates.  
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Technical data – Encoders			
Measuring unit		Absolute, single turn	Absolute, multi-turn
Operating voltage	[V DC]	5	
Operating voltage range	[V DC]	3.6 ... 14	
Protocol		EnDat 2.2, digital channel only, max. cycle rate (CLOCK) ≤ 16 MHz	
Position values per revolution		262144	524288
Rotor position encoder resolution		18 bit	19 bit
Revolutions		-	4096 revolutions, 12 bits

## Pin allocation



PIN	Function
1	BR- Brake
2	-
3	-
4	BR+ Brake
5	Up Encoder power supply
6	0 V Encoder power supply
7	Data + Encoder communication
8	Data - Encoder communication
9	CLK + Encoder communication
10	CLK - Encoder communication
A	U Motor power supply
B	V Motor power supply
C	W Motor power supply
D	-
PE	PE Protective earth conductor

# Servo motors EMMT-AS

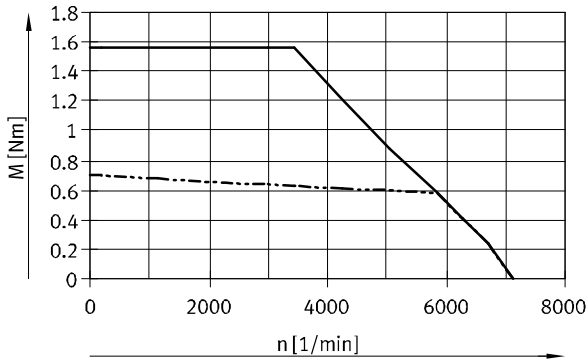
Technical data

## Torque M as a function of rotational speed n

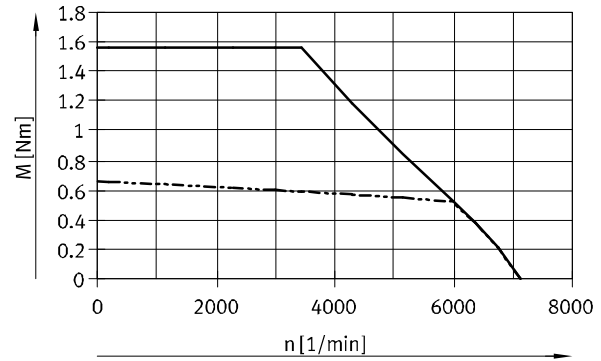
Flange size 60

Length S

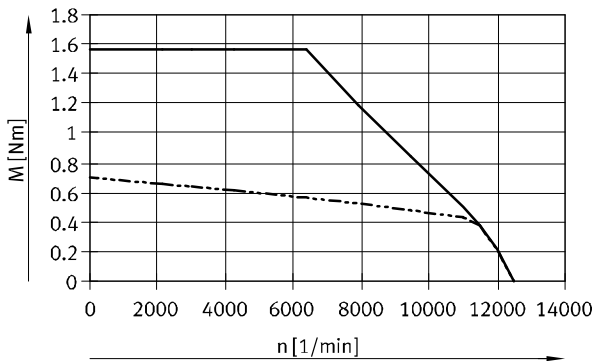
Winding LS (without brake)



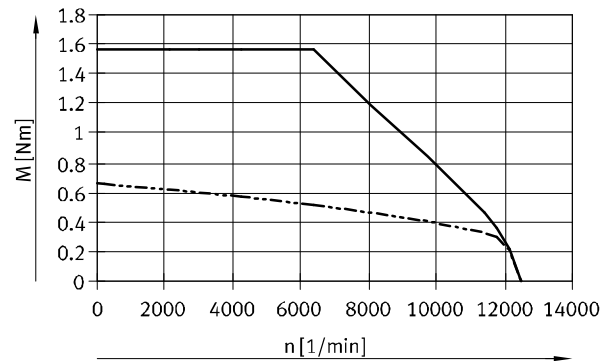
Winding LS-B (with brake)



Winding HS (without brake)

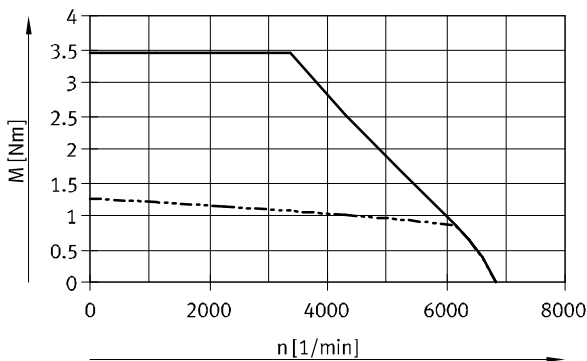


Winding HS-B (with brake)

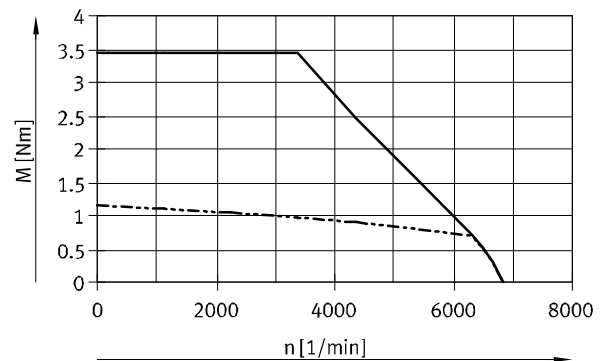


Length M

Winding LS (without brake)



Winding LS-B (with brake)



— Peak torque  
- - - Nominal torque

 Note

Typical motor characteristic curve with nominal voltage and ideal motor controller.

Note max. permissible rotational speeds of attachments and built-in components (such as brake, encoder etc.).

# Servo motors EMMT-AS

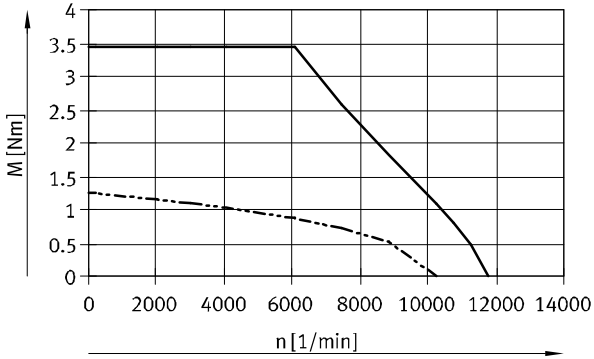
Technical data

## Torque M as a function of rotational speed n

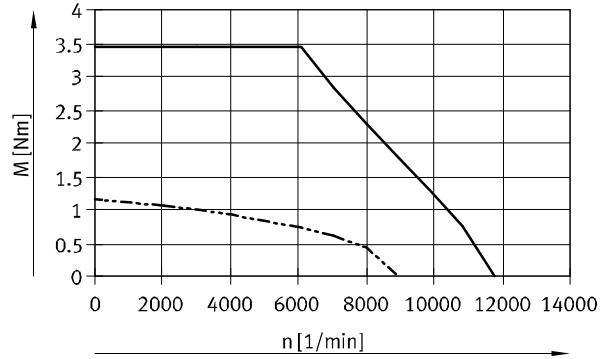
Flange size 60

Length M

Winding HS (without brake)

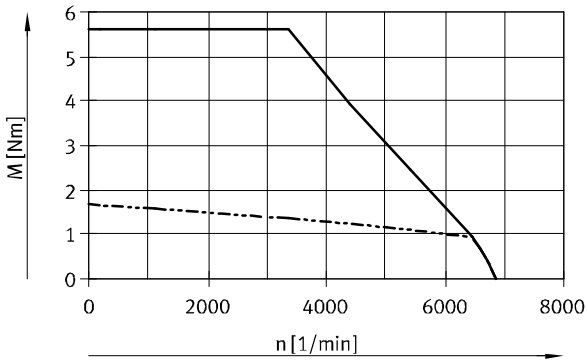


Winding HS-B (with brake)

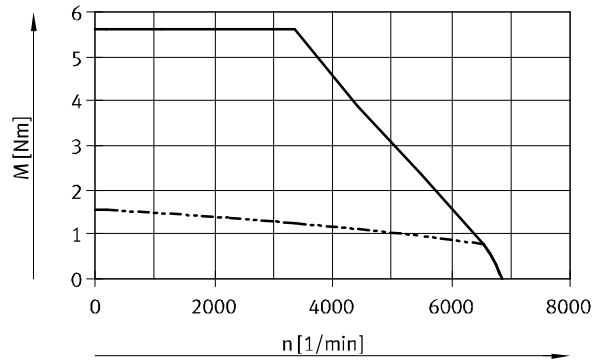


Length L

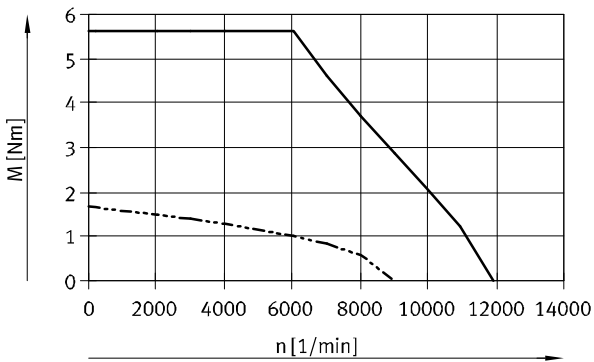
Winding LS (without brake)



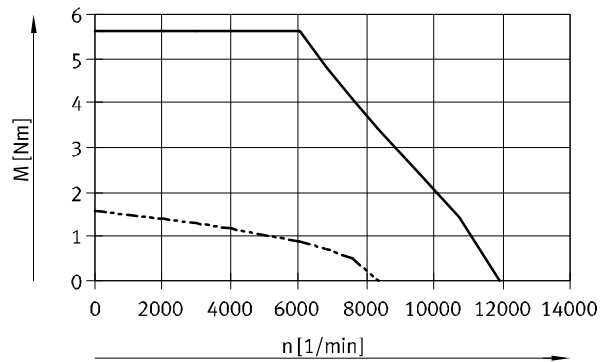
Winding LS-B (with brake)



Winding HS (without brake)



Winding HS-B (with brake)



- Peak torque
- - - Nominal torque

 Note

Typical motor characteristic curve with nominal voltage and ideal motor controller.

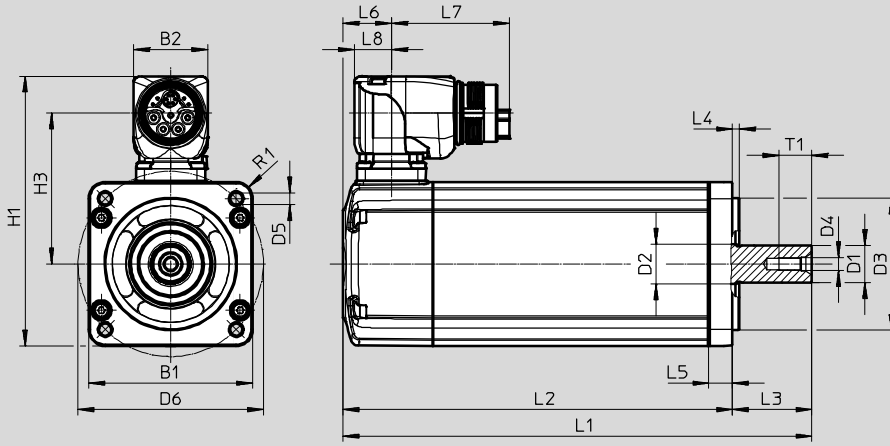
Note max. permissible rotational speeds of attachments and built-in components (such as brake, encoder etc.).

# Servo motors EMMT-AS

Technical data

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)



Size	Length	B1	B2	D1 ∅ h6	D2 ∅	D3 ∅ h7	D4	D5 ∅
60	S	62	28	14	15	50	M5	4.3
	M							
	L							

Size	Length	D6 ∅ ±0.3	H1	H3	L1		L2	
						With brake	±2	With brake ±2
60	S	70	102	57	144.5	177.3	114.5	147.3
	M				164.5	197.3	134.5	167.3
	L				184.5	217.3	154.5	187.3

Size	Length	L3	L4	L5	L6	L7	L8	R1	T1
60	S	30	2.5	9	18.4	44.7	14	6	12.5
	M								
	L								

 Note

Only motors without featherkey should be used in combination with parallel and axial kits (EAMM-U/EAMM-A).



# Servo motors EMMT-AS

Technical data

Ordering data								Part no.	Type code
Length			Winding		Measuring unit		Brake		
Short	Medium	Long	Low voltage, standard	High voltage, standard	Encoder, single turn	Encoder, multi-turn			
Flange size 60									
■			■		■			5242196	EMMT-AS-60-S-LS-RS
■			■			■		5242197	EMMT-AS-60-S-LS-RM
■			■		■		■	5242198	EMMT-AS-60-S-LS-RSB
■			■			■	■	5242199	EMMT-AS-60-S-LS-RMB
■				■	■			5242200	EMMT-AS-60-S-HS-RS
■				■		■		5242201	EMMT-AS-60-S-HS-RM
■				■	■		■	5242202	EMMT-AS-60-S-HS-RSB
■				■		■	■	5242203	EMMT-AS-60-S-HS-RMB
	■		■		■			5242204	EMMT-AS-60-M-LS-RS
	■		■			■		5242205	EMMT-AS-60-M-LS-RM
	■		■		■		■	5242206	EMMT-AS-60-M-LS-RSB
	■		■			■	■	5242207	EMMT-AS-60-M-LS-RMB
	■			■	■			5242208	EMMT-AS-60-M-HS-RS
	■			■		■		5242209	EMMT-AS-60-M-HS-RM
	■			■	■		■	5242210	EMMT-AS-60-M-HS-RSB
	■			■		■	■	5242211	EMMT-AS-60-M-HS-RMB
		■	■		■			5242212	EMMT-AS-60-L-LS-RS
		■	■			■		5242213	EMMT-AS-60-L-LS-RM
		■	■		■		■	5242214	EMMT-AS-60-L-LS-RSB
		■	■			■	■	5242215	EMMT-AS-60-L-LS-RMB
		■		■	■			5242216	EMMT-AS-60-L-HS-RS
		■		■		■		5242217	EMMT-AS-60-L-HS-RM
		■		■	■		■	5242218	EMMT-AS-60-L-HS-RSB
		■		■		■	■	5242219	EMMT-AS-60-L-HS-RMB

# Servo motors EMMT-AS

Ordering data – Modular product system

Ordering table				
Size	60	Condi- tions	Code	Enter code
<b>M</b> Module no.	<b>4808568</b>			
Series	EMMT		<b>EMMT</b>	EMMT
Motor technology	AC synchronous		<b>-AS</b>	-AS
Motor flange size	60 mm		<b>-60</b>	-60
Length	Short		<b>-S</b>	
	Medium		<b>-M</b>	
	Long		<b>-L</b>	
<b>O</b> Output shaft	Smooth shaft			
	Shaft to DIN 6885		<b>K</b>	
Radial shaft seal	None			
	With standard shaft seal		<b>R</b>	
<b>M</b> Winding	Low voltage, standard		<b>-LS</b>	
	High voltage, standard		<b>-HS</b>	
Electrical connection	Angled connector, rotatable		<b>-R</b>	-R
Measuring unit	Absolute encoder, single turn		<b>S</b>	
	Absolute encoder, multi-turn		<b>M</b>	
Brake	None			
	With brake		<b>B</b>	

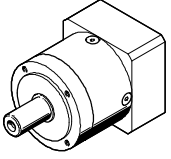
**M** Mandatory data


**O** Options

Transfer order code

## Servo motors EMMT-AS

Accessories

Ordering data – Gear unit				
	Motor interface	Gear ratio	Part no.	Type code
	60P	3	<b>2297686</b>	<b>EMGA-60-P-G3-EAS-60</b>
		5	<b>2297687</b>	<b>EMGA-60-P-G5-EAS-60</b>

Ordering data – Radial shaft seal				
	Description	Weight [g]	Part no.	Type code
	<ul style="list-style-type: none"> <li>• Achieves degree of protection to IP67 together with the sealing ring</li> <li>• The shaft seal must be replaced after a maximum of 5000 operating hours, subject to the working conditions</li> <li>• Information on installation/replacement → <a href="http://www.festo.com/sp">www.festo.com/sp</a></li> </ul>	13	<b>8079786</b>	<b>EASS-RS-T-A-4P-15-30-B7</b>


# Servo motors EMMT-AS

Accessories

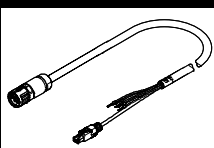
**Recommended cable cross section at an ambient temperature of 40 °C as a function of cable length and max. motor current**

	Up to 5 m	Up to 10 m	Up to 20 m	Up to 30 m	Up to 40 m	Up to 50 m	Up to 75 m	Up to 100 m
EMMT-AS-60...								


- 0.75 mm<sup>2</sup>
- 1.5 mm<sup>2</sup>

 **Note**  
 Depending on the drive controller used, the max. cable lengths may also be shorter.

Technical data – Motor cables		
For motor	EMMT-AS-60	
Type code	NEBM-M23G15-...	
Cable composition	4x 0.75 mm <sup>2</sup> + 1x (2x 0.75 mm <sup>2</sup> ) + 1x (2x 0.24 mm <sup>2</sup> + 2x2x0.15 mm <sup>2</sup> )	
	Shielded	
Contamination level	1	
Min. bending radius		
With fixed cable installation	[mm]	≥ 48
With flexible cable installation	[mm]	≥ 90
Ambient temperature		
With fixed cable installation	[°C]	-40 ... +90
With flexible cable installation	[°C]	-25 ... +80
Cable property	Suitable for use with energy chains	
Degree of protection	IP67 (in assembled state)	
Material	TPE-U (PUR)	
Note on materials	RoHS-compliant	
CE marking (see declaration of conformity)	To EU Low Voltage Directive	

Ordering data – Motor cable			
	Cable length [m]	Part no.	Type code
	2.5	5251374	NEBM-M23G15-EH-2.5-Q7N-R3LEG14
	5	5251375	NEBM-M23G15-EH-5-Q7N-R3LEG14
	7.5	5251376	NEBM-M23G15-EH-7.5-Q7N-R3LEG14
	10	5251377	NEBM-M23G15-EH-10-Q7N-R3LEG14
	15	5251378	NEBM-M23G15-EH-15-Q7N-R3LEG14
	20	5251379	NEBM-M23G15-EH-20-Q7N-R3LEG14
	X length <sup>1)</sup>	5251373	NEBM-M23G15-EH-...-Q7N-R3LEG14

1) Cable length can be selected between 0.5 ... 99.9 m in increments of 0.1 m.

 **Note**  
 Cable lengths > 25 m possible following technical clarification.  
 For motors with holding brake, the max. cable length is 50 m.