

Stepper motors EMMS-ST

FESTO



Stepper motors EMMS-ST

Key features

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Everything from a single source

Stepper motors EMMS-ST

→ 4



- 2-phase hybrid technology
- Optionally integrated encoder for "Servo Lite operation" (closed loop)
- Sinusoidal current impressing
- Optionally with holding brake
- Protection class IP54



Gear unit EMGA-SST

→ 11



- Planetary gear unit
- Gear ratio $i = 3$ and 5 , available ex-stock
- Other ratios and versions on request
- Life-time lubrication
- Protection class IP54

Motor controller CMMS-ST

→ Internet: cmms-st



- Position controller with setpoint specifications for position, speed and torque
- "Servo Lite operation" (closed loop) with optional encoder, in other words no step losses, current following errors are corrected
- Interfaces:
 - I/O interface
 - CANopen
 - Profibus DP
 - DeviceNet

Power supply units SVG

→ Internet: svg



- Sturdy mechanical system
- Input voltage 230 V AC / 115 V AC
- Output voltage 24, 48 V DC
- Output current 5, 10, 20 A

Motor and encoder cables NEBM

→ 12



- Can be used in a wide temperature range
- Screened cables
- Suitable for use with energy chains
- Protection class IP65

Axial kits EAMM

→ Internet: eamm



- Defined kits for all electromechanical axes from Festo

PROFIBUS®, DeviceNet®, CANopen® is a registered trademark of its respective trademark holder in certain countries.

Stepper motors EMMS-ST

Type codes

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		EMMS	–	ST	–	42	–	S	–	SEB	–	G2
Type												
EMMS	Motor											
Motor type												
ST	Stepper motor											
Flange dimensions												
42	42 mm											
57	57 mm											
87	87 mm											
Overall length options												
S	Small											
M	Medium											
L	Large											
Additional function												
S	Straight connection											
E	Encoder											
B	Brake											
Generation												
G2	Second generation											

Stepper motors EMMS-ST

Technical data

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General technical data		
Size		42
Motor		
Nominal voltage	[V DC]	48
Nominal current	[A]	1.8
Max. rotational speed	[rpm]	1,740
Holding torque	[Nm]	0.5
Stepper angle	[°]	1.8 ±5%
Winding resistance	[Ω]	1.75 ±10%
Winding inductance	[mH]	5.4
Output mass moment of inertia	[kgcm ²]	0.082/0.095 ¹⁾
Radial load on shaft	[N]	20
Axial load on shaft	[N]	7
Mass moment of inertia of rotor	[kgcm ²]	0.082
Brake		
Operating voltage	[V DC]	24 ±10%
Power	[W]	8
Holding torque	[Nm]	0.4
Mass moment of inertia	[kgcm ²]	0.013
Response delay	[ms]	2
Separation time	[ms]	10

1) With brake

Size	57-S	57-M
Motor		
Nominal voltage	[V DC]	48
Nominal current	[A]	5
Max. rotational speed	[rpm]	1,940
Holding torque	[Nm]	0.8
Stepper angle	[°]	1.8 ±5%
Winding resistance	[Ω]	0.15 ±10%
Winding inductance	[mH]	0.5
Output mass moment of inertia	[kgcm ²]	0.29/0.30 ¹⁾
Radial load on shaft	[N]	52
Axial load on shaft	[N]	10
Mass moment of inertia of rotor	[kgcm ²]	0.29
Brake		
Operating voltage	[V DC]	24 ±10%
Power	[W]	8
Holding torque	[Nm]	0.4
Mass moment of inertia	[kgcm ²]	0.01
Response delay	[ms]	2
Disconnection time	[ms]	10

1) With brake

Stepper motors EMMS-ST

Technical data

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General technical data			
Size	87-S	87-M	87-L
Motor			
Nominal voltage	[V DC]	48	
Nominal current	[A]	9.5	
Max. rotational speed	[rpm]	2,130	550
Holding torque	[Nm]	2.5	5.9
Stepper angle	[°]	1.8 ±5%	
Winding resistance	[Ω]	0.1 ±10%	0.23 ±10%
Winding inductance	[mH]	0.45	2.6
Output mass moment of inertia	[kgcm ²]	1/1.07 ¹⁾	1.9/1.97 ¹⁾
Radial load on shaft	[N]	200	
Axial load on shaft	[N]	65	
Mass moment of inertia of rotor	[kgcm ²]	1	1.9
Brake			
Operating voltage	[V DC]	24 ±10%	
Power	[W]	11	
Holding torque	[Nm]	2	
Mass moment of inertia	[kgcm ²]	0.07	
Response delay		2	2
Disconnection time		10	25

1) With brake

Technical data – Encoder		
Encoder, optical		
Operating voltage	[V DC]	5
Pulses/revolution	[1/rev]	500
Zero pulse		Yes
Line driver		RS422 protocol

Weight [g]						
Size	42	57-S	57-M	87-S	87-M	87-L
Product weight	360	870	1,100	1,950	3,050	4,200
With encoder	450	970	1,200	2,100	3,200	4,350
With brake	540	1,090	1,320	2,350	3,450	4,600
With encoder and brake	600	1,150	1,380	2,500	3,600	5,000

Operating and environmental conditions	
Insulation protection class	B
Heat class to EN 60034-1	B
Rated class to EN 60034-1	S1
Protection class: Motor shaft	IP54
Protection class: Motor housing, incl. connection technology	IP54
Ambient temperature	[°C] -10 ... +50
Storage temperature	[°C] -20 ... +70
Relative air humidity (non-condensing)	[%] 45 ... 80
CE marking (see declaration of conformity)	To EU EMC Directive ¹⁾
Certification	cULus recognized (OL)
	C-Tick
Note on materials	RoHS-compliant

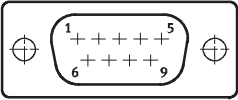
1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com → Support → User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Stepper motors EMMS-ST

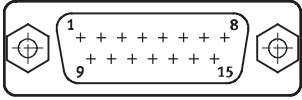
Technical data

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Pin allocation	
Motor connection	
Size 42, 57	Size 87

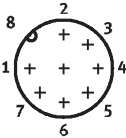


Pin	Function
1	String A
2	String A/
3	String B
4	String B/
5	–
6	–
7	Brake (24 V)
8	Brake (0 V)
9	–



Pin	Function
1	String A
2	String A
3	String A/
4	String A/
5	String B
6	String B
7	String B/
8	String B/
9	–
10	–
11	Brake (24 V)
12	Brake (0 V)
13	–
14	–
15	–

Encoder connection



Pin	Function
1	Signal trace A
2	Signal trace A/
3	Signal trace B
4	Signal trace B/
5	0 V
6	Signal trace N
7	Signal trace N/
8	5 V

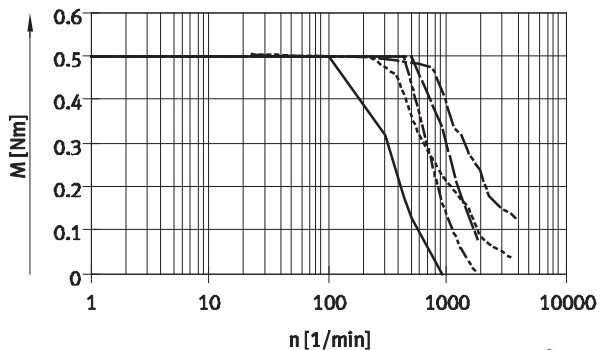
Stepper motors EMMS-ST

Technical data

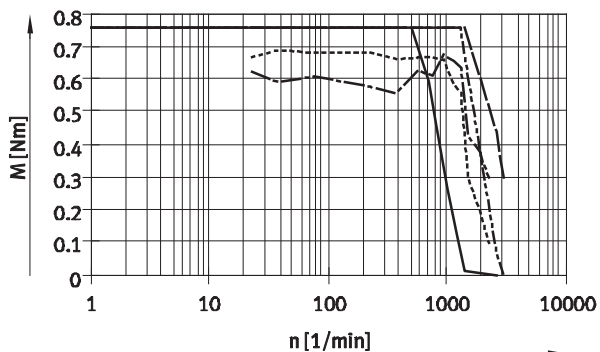
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Torque M as a function of rotational speed n

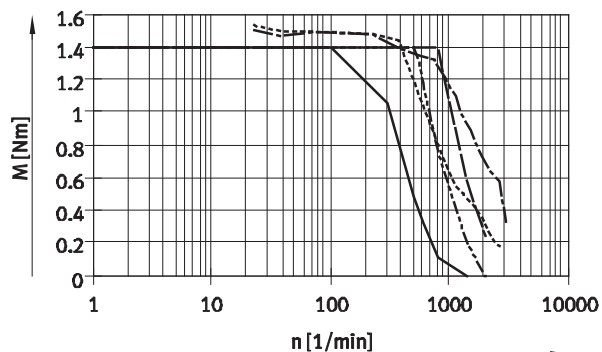
EMMS-ST-42



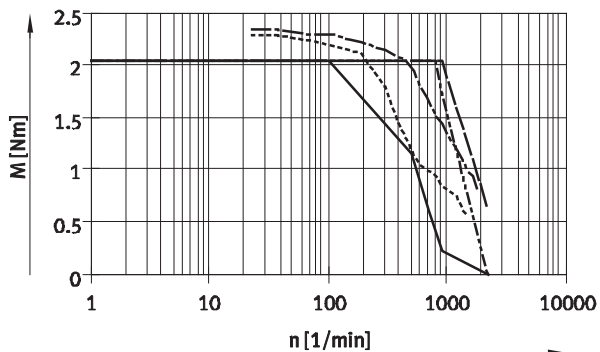
EMMS-ST-57-S



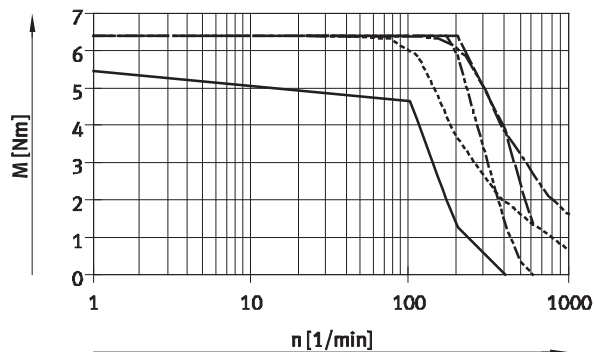
EMMS-ST-57-M



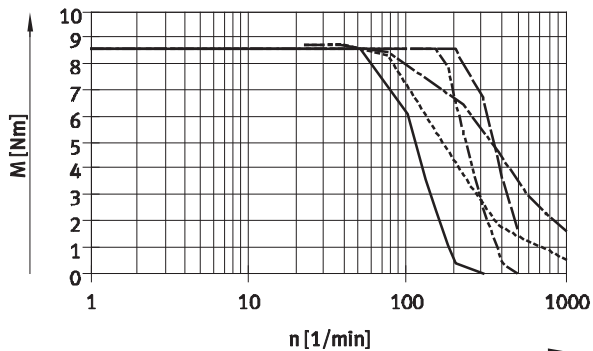
EMMS-ST-87-S



EMMS-ST-87-M



EMMS-ST-87-L



- 24 V DC
- - - 48 V DC
- · - 72 V DC
- · · - 24 V DC 1/4 step
- · - · - 48 V DC 1/4 step

Note

The characteristic curves apply in combination with the motor controller CMMS-ST. The size EMMS-ST-87 is operated with the motor controller CMMS-ST with max. 8 A.

Stepper motors EMMS-ST

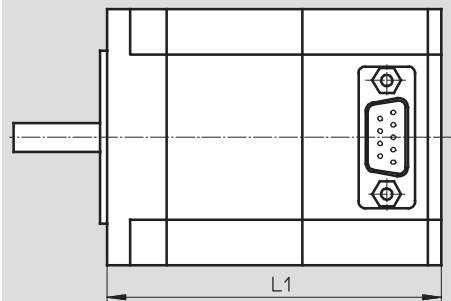
Technical data

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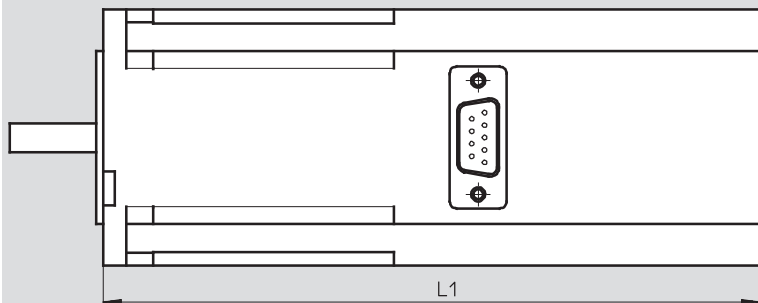
Dimensions

Download CAD Data → www.festo.com/us/cad

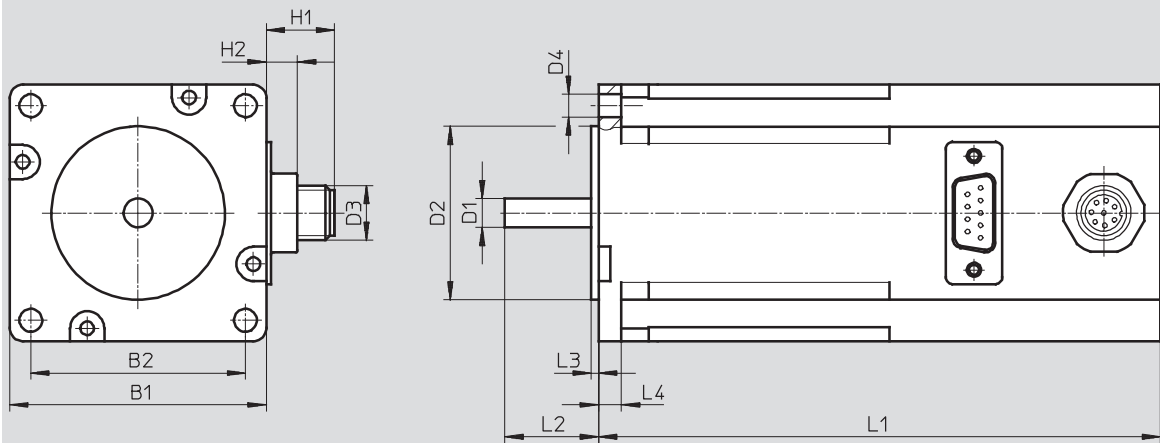
EMMS-ST-...-S



EMMS-ST-...-SB

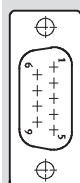


EMMS-ST-...-SE/SEB

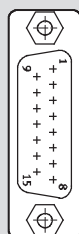


Plug pattern

9-pin Sub-D plug
with size 42, 57



15-pin Sub-D plug
with size 87



Stepper motors EMMS-ST

Technical data

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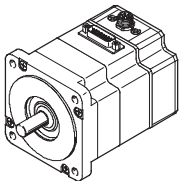
Type	B1	B2 ±0.2	D1 Ø	D2 Ø	D3	D4 Ø
EMMS-ST-42-S-S-G2	42.3	31	5-0.012	22-0.05	–	M3x4.5
EMMS-ST-42-S-SE-G2					M12	
EMMS-ST-42-S-SB-G2					–	
EMMS-ST-42-S-SEB-G2					M12	
EMMS-ST-57-S-S-G2	56.4	47.14	6.35-0.013	38.1±0.025	–	5
EMMS-ST-57-S-SE-G2					M12	
EMMS-ST-57-S-SB-G2					–	
EMMS-ST-57-S-SEB-G2					M12	
EMMS-ST-57-M-S-G2					–	
EMMS-ST-57-M-SE-G2					M12	
EMMS-ST-57-M-SB-G2					–	
EMMS-ST-57-M-SEB-G2					M12	
EMMS-ST-87-S-S-G2	85.85	69.5	11-0.013	73-0.046	–	6.6
EMMS-ST-87-S-SE-G2					M12	
EMMS-ST-87-S-SB-G2					–	
EMMS-ST-87-S-SEB-G2					M12	
EMMS-ST-87-M-S-G2					–	
EMMS-ST-87-M-SE-G2					M12	
EMMS-ST-87-M-SB-G2					–	
EMMS-ST-87-M-SEB-G2					M12	
EMMS-ST-87-L-S-G2					–	
EMMS-ST-87-L-SE-G2					M12	
EMMS-ST-87-L-SB-G2					–	
EMMS-ST-87-L-SEB-G2					M12	

Type	H1	H2	L1	L2	L3	L4
EMMS-ST-42-S-S-G2	–	6.5	66±1	24±1	2	–
EMMS-ST-42-S-SE-G2	13		94±1.2			
EMMS-ST-42-S-SB-G2	–		114±1.3			
EMMS-ST-42-S-SEB-G2	13		127±1.3			
EMMS-ST-57-S-S-G2	–		73.5±0.8	20.6±0.5	1.6	5
EMMS-ST-57-S-SE-G2	13		102.5±1.1			
EMMS-ST-57-S-SB-G2	–		123.5±1.1			
EMMS-ST-57-S-SEB-G2	13		138±1.1			
EMMS-ST-57-M-S-G2	–		95±0.8			
EMMS-ST-57-M-SE-G2	13		124±1.1			
EMMS-ST-57-M-SB-G2	–		145±1.1			
EMMS-ST-57-M-SEB-G2	13		159.5±1.1			
EMMS-ST-87-S-S-G2	–		82.6±1	27±1	2	8.38
EMMS-ST-87-S-SE-G2	13		112.6±1.3			
EMMS-ST-87-S-SB-G2	–		132.6±1.3			
EMMS-ST-87-S-SEB-G2	13		152.6±1.3			
EMMS-ST-87-M-S-G2	–		114.9±1			
EMMS-ST-87-M-SE-G2	13		144.9±1.3			
EMMS-ST-87-M-SB-G2	–		164.9±1.3			
EMMS-ST-87-M-SEB-G2	13		184.9±1.3			
EMMS-ST-87-L-S-G2	–		144.9±1			
EMMS-ST-87-L-SE-G2	13		174.9±1.3			
EMMS-ST-87-L-SB-G2	–		194.9±1.3			
EMMS-ST-87-L-SEB-G2	13		214.9±1.3			

Stepper motors EMMS-ST

Technical data

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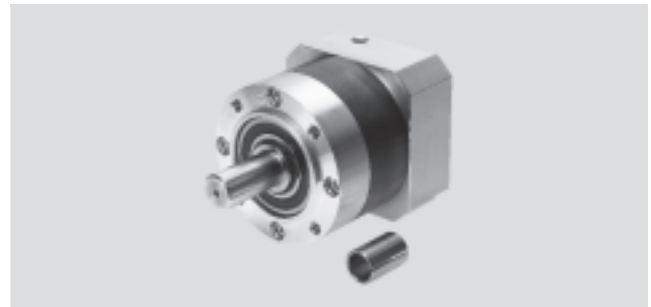
Ordering data					
	Size	Variant			Part No. Type
		Basic version	With encoder	With brake	
	42	■			1370470 EMMS-ST-42-S-S-G2
			■		1370471 EMMS-ST-42-S-SE-G2
				■	1370472 EMMS-ST-42-S-SB-G2
			■	■	1370473 EMMS-ST-42-S-SEB-G2
	57	■			1370474 EMMS-ST-57-S-S-G2
			■		1370475 EMMS-ST-57-S-SE-G2
				■	1370476 EMMS-ST-57-S-SB-G2
			■	■	1370477 EMMS-ST-57-S-SEB-G2
		■			1370478 EMMS-ST-57-M-S-G2
			■		1370479 EMMS-ST-57-M-SE-G2
				■	1370480 EMMS-ST-57-M-SB-G2
			■	■	1370481 EMMS-ST-57-M-SEB-G2
	87	■			1370482 EMMS-ST-87-S-S-G2
			■		1370483 EMMS-ST-87-S-SE-G2
				■	1370484 EMMS-ST-87-S-SB-G2
			■	■	1370485 EMMS-ST-87-S-SEB-G2
		■			1370486 EMMS-ST-87-M-S-G2
			■		1370487 EMMS-ST-87-M-SE-G2
				■	1370488 EMMS-ST-87-M-SB-G2
			■	■	1370489 EMMS-ST-87-M-SEB-G2
		■			1370490 EMMS-ST-87-L-S-G2
			■		1370491 EMMS-ST-87-L-SE-G2
				■	1370493 EMMS-ST-87-L-SB-G2
			■	■	1370494 EMMS-ST-87-L-SEB-G2

Stepper motors EMMS-ST

Accessories

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Gear unit EMGA



General technical data							
For motor size		42		57		87	
Gear unit type		EMGA-40-P-G...		EMGA-60-P-G...		EMGA-80-P-G...	
Gear ratio	[i]	3	5	3	5	3	5
Continuous output torque ¹⁾	[Nm]	11	14	22	22	85	110
Max. output torque	[Nm]	17.6	22	22	22	136	176
Torsional resistance	[Nm/arcmin]	1		2.3		6	
Torsional backlash	[deg]	0.4		0.27		0.15	
Moment of inertia ²⁾	[kgcm ²]	0.031	0.019	0.135	0.078	0.77	0.45
Efficiency	[%]	96					
Operating temperature ³⁾	[°C]	-25 ... +90					
Protection class		IP54					

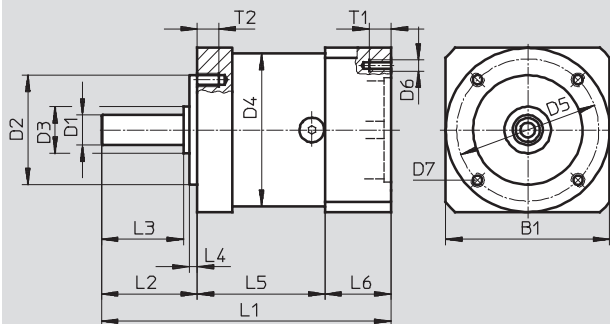
1) At the output shaft

2) In relation to the drive shaft

3) Note the temperature range of the motor

Dimensions

Download CAD Data → www.festo.com/us/cad



For size	B1	D1 Ø h7	D2 Ø h7	D3 Ø	D4 Ø	D5 Ø	D6	D7	L1	L2	L3	L4	L5	L6	T1	T2
42	40	10	26	12	40	34	Ø3.4	M4	92.5	26±0.6	23	2	39	27.5	5	6
57	60	11	40	17	60	52	M4	M5	106	35±0.8	30	3	47	24	8	8
87	90	20	60	25	80	70	M5	M6	135.5	40±0.8	36	3	60	35.5	12	10

Ordering data

For size	Gear ratio	Part No.	Type
42	3	549 428	EMGA-40-P-G3-SST-42
	5	549 429	EMGA-40-P-G5-SST-42
57	3	549 430	EMGA-60-P-G3-SST-57
	5	549 431	EMGA-60-P-G5-SST-57
87	3	549 432	EMGA-80-P-G3-SST-87
	5	549 433	EMGA-80-P-G5-SST-87

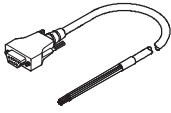
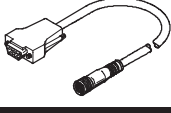
Stepper motors EMMS-ST

Accessories

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Technical data – Cables			
Designation	Motor cable		Encoder cable
Type	NEBM-S1G9-...	NEBM-S1G15-...	NEBM-M12G8-...
For size	EMMS-ST-42/57	EMMS-ST-87	EMMS-ST-42/57/87
Min. bending radius	[mm] 58	70	51
Ambient temperature	[°] –40 ... +70	–30 ... +70	–40 ... +70
Ambient temperature ¹⁾	[°] –40 ... +70	–5 ... +70	–40 ... +70
Cable composition	Screened		
Cable characteristics	Suitable for use with energy chains		
Protection class	IP65		
Material	Polyurethane		

1) With flexible cable installation

Ordering data			
	Cable length [m]	Part No.	Type
Motor cable			
	For EMMS-ST-42/57		
	5	550 740	NEBM-S1G9-E-5-LE6
	10	550 741	NEBM-S1G9-E-10-LE6
	15	550 742	NEBM-S1G9-E-15-LE6
	X length ¹⁾	550 743	NEBM-S1G9-E-...-LE6
	For EMMS-ST-87		
	5	550 744	NEBM-S1G15-E-5-LE6
	10	550 745	NEBM-S1G15-E-10-LE6
	15	550 746	NEBM-S1G15-E-15-LE6
	X length ¹⁾	550 747	NEBM-S1G15-E-...-LE6
Encoder cable			
	5	550 748	NEBM-M12G8-E-5-S1G9
	10	550 749	NEBM-M12G8-E-10-S1G9
	15	550 750	NEBM-M12G8-E-15-S1G9
	X length ¹⁾	550 751	NEBM-M12G8-E-...-S1G9

1) Max. 25 m

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Electromechanical actuators, motors, controllers & drives



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To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.



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