

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 unit ratio $i = 3$ and 5 , available ex-stock
- Further designs and gear ratios on request
- Life lubrication
- Protection class: IP54

Motor controller CMMS-ST

→ Internet: cmms-st



- Positioning controller with setpoint specifications for positions, rotational speed and torque
- “Servo Lite operation” (closed loop) with encoder option, 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



- Robust hardware
- 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



- Screened cables
- Suitable for chain link trunking
- Protection class IP67

Axial kits EAMM

→ Internet: eamm



- Specified kits for all electromechanical axes from Festo

Stepper motors EMMS-ST

Type codes

		EMMS	–	ST	–	42	–	S	–	SEB
Type										
EMMS	Motor									
Motor type										
ST	Stepper motor									
Flange dimensions										
42	42 mm									
57	57 mm									
87	87 mm									
Gradation of the overall length										
S	Small									
M	Medium									
L	Large									
Additional function										
S	Straight connection									
E	Encoder									
B	Brake									

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
Holding torque	[Nm]	0.5
Stepper angle	[°]	1.8 ±5%
Winding resistance	[Ω]	1.75 ±10%
Winding inductance	[mH]	5.4
Drive 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%
Output	[W]	8
Holding torque	[Nm]	0.4
Mass moment of inertia	[kgcm ²]	0.013

1) With brake

Size	57-S	57-M
Motor		
Nominal voltage	[V DC]	48
Nominal current	[A]	5
Holding torque	[Nm]	0.8
Stepper angle	[°]	1.8 ±5%
Winding resistance	[Ω]	0.15 ±10%
Winding inductance	[mH]	0.5
Drive 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%
Output	[W]	8
Holding torque	[Nm]	0.4
Mass moment of inertia	[kgcm ²]	0.01

1) With brake

Stepper motors EMMS-ST

Technical data

General technical data			
Size	87-S	87-M	87-L
Motor			
Nominal voltage [V DC]	48		
Nominal current [A]	9.5		
Holding torque [Nm]	2.5	5.9	9.3
Stepper angle [°]	1.8 ±5%		
Winding resistance [Ω]	0.1 ±10%	0.23 ±10%	0.23 ±10%
Winding inductance [mH]	0.45	2.6	2.7
Drive mass moment of inertia [kgcm ²]	1/1.07 ¹⁾	1.9/1.97 ¹⁾	3/3.07 ¹⁾
Radial load on shaft [N]	200		
Axial load on shaft [N]	65		
Mass moment of inertia of rotor [kgcm ²]	1	1.9	3
Brake			
Operating voltage [V DC]	24 ±10%		
Output [W]	11		
Holding torque [Nm]	2		
Mass moment of inertia [kgcm ²]	0.07		

1) With brake

Technical data – Encoder		
Encoder, optical		
Operating voltage [V DC]	5	
Pulses/revolution [rpm]	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 to VDE 60034	B
Protection class: motor shaft	IP54
Protection class: motor housing with connection technology	IP54
Ambient temperature [°C]	–10 ... +50
Storage temperature [°C]	–20 ... +70
CE mark (see declaration of conformity)	In accordance with EU EMC directive ¹⁾
Relative air humidity [%] (non-condensing)	45 ... 80
Certification	C-Tick

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

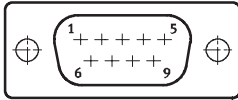
Technical data

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Pin allocation

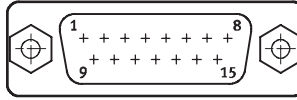
Motor connection

Size 42, 57



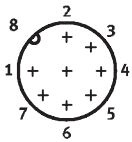
PIN	Function
1	String A
2	String A/
3	String B
4	String B/
5	–
6	–
7	Brake (24 V)
8	Brake (0 V)
9	–

Size 87



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

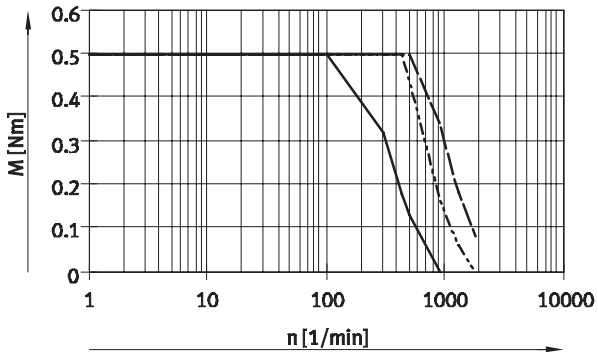
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Technical data

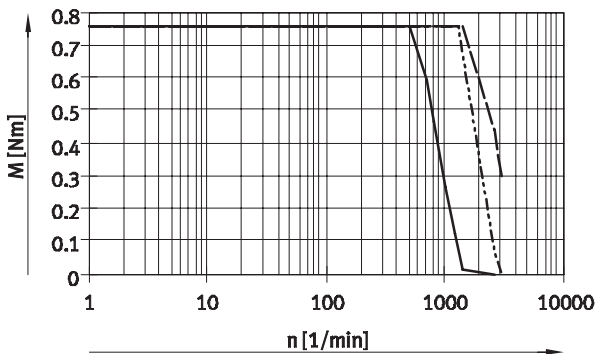
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Torque M as a function of rotational speed n

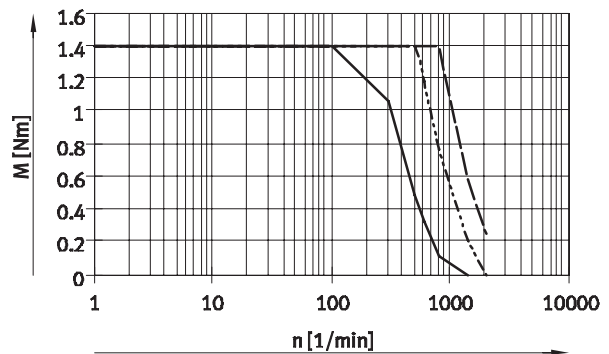
EMMS-ST-42



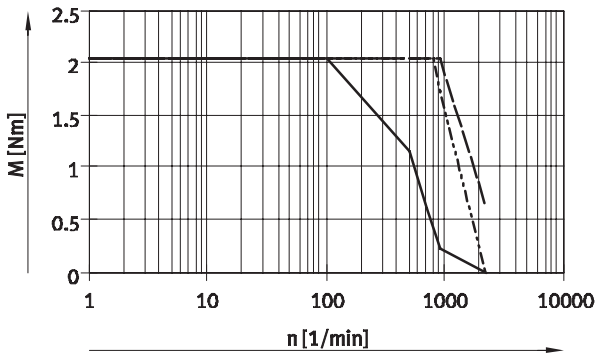
EMMS-ST-57-S



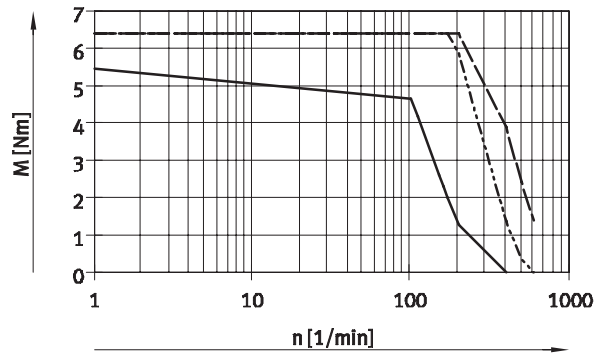
EMMS-ST-57-M



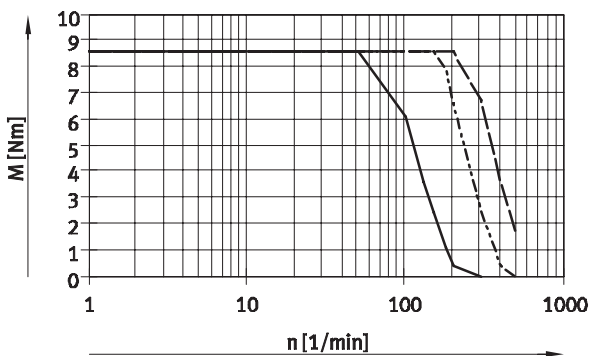
EMMS-ST-87-S



EMMS-ST-87-M



EMMS-ST-87-L



— 24VDC
 - - - 48VDC
 - · - 72VDC

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

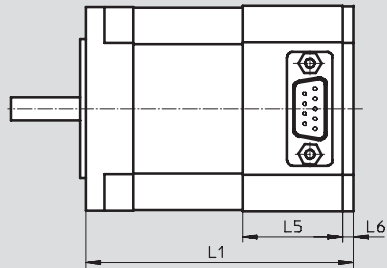
Technical data

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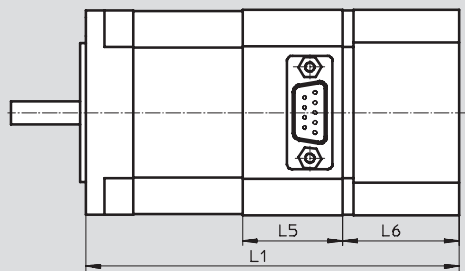
Dimensions

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

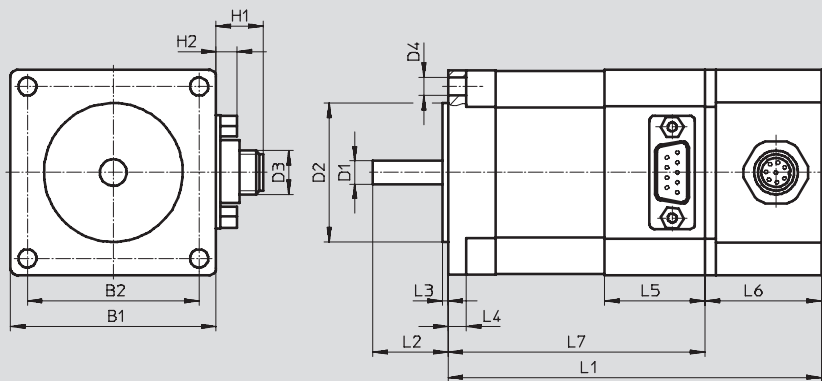
EMMS-ST-...-S



EMMS-ST-...-SB

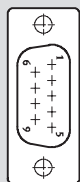


EMMS-ST-...-SE/SEB

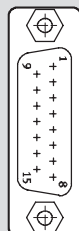


Plug assignment

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



15-pin Sub-D plug
with size 87



Stepper motors EMMS-ST

Technical data

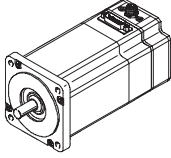
Type	B1	B2	D1 Ø	D2 Ø	D3	D4 Ø	H1	H2
EMMS-ST-42-S-S	42.3	31	5-0.012	22-0.05	-	M3x4.5	-	6.5
EMMS-ST-42-S-SE					M12		13	
EMMS-ST-42-S-SB					-		-	
EMMS-ST-42-S-SEB					M12		13	
EMMS-ST-57-S-S	56.4	47.14	6.35-0.013	38.1±0.025	-	5	-	
EMMS-ST-57-S-SE					M12		13	
EMMS-ST-57-S-SB					-		-	
EMMS-ST-57-S-SEB					M12		13	
EMMS-ST-57-M-S					-		-	
EMMS-ST-57-M-SE					M12		13	
EMMS-ST-57-M-SB					-		-	
EMMS-ST-57-M-SEB					M12		13	
EMMS-ST-87-S-S	85.6	69.5	11-0.013	73-0.046	-	6.6	-	
EMMS-ST-87-S-SE					M12		13	
EMMS-ST-87-S-SB					-		-	
EMMS-ST-87-S-SEB					M12		13	
EMMS-ST-87-M-S					-		-	
EMMS-ST-87-M-SE					M12		13	
EMMS-ST-87-M-SB					-		-	
EMMS-ST-87-M-SEB					M12		13	
EMMS-ST-87-L-S					-		-	
EMMS-ST-87-L-SE					M12		13	
EMMS-ST-87-L-SB					-		-	
EMMS-ST-87-L-SEB					M12		13	

Type	L1	L2	L3	L4	L5	L6	L7
EMMS-ST-42-S-S	66	24±1	2	-	24	2	-
EMMS-ST-42-S-SE	94					30	64±1
EMMS-ST-42-S-SB	114					50	
EMMS-ST-42-S-SEB	127					63	
EMMS-ST-57-S-S	73.5	20.6±0.5	1.6	5	27.5	3	-
EMMS-ST-57-S-SE	102.5					32	70.5±0.8
EMMS-ST-57-S-SB	123.5					53	
EMMS-ST-57-S-SEB	138					64.5	
EMMS-ST-57-M-S	95					3	-
EMMS-ST-57-M-SE	124					32	92±0.8
EMMS-ST-57-M-SB	145					53	
EMMS-ST-57-M-SEB	159.5					67.5	
EMMS-ST-87-S-S	82.6	27±1	2	8.38	31.4	3	-
EMMS-ST-87-S-SE	112.6					33	79.6±1
EMMS-ST-87-S-SB	132.6					53	
EMMS-ST-87-S-SEB	152.6					73	
EMMS-ST-87-M-S	114.9					3	-
EMMS-ST-87-M-SE	144.9					33	111.9±1
EMMS-ST-87-M-SB	164.9					53	
EMMS-ST-87-M-SEB	184.9					73	
EMMS-ST-87-L-S	144.9					3	-
EMMS-ST-87-L-SE	174.9					33	141.9±1
EMMS-ST-87-L-SB	194.9					53	
EMMS-ST-87-L-SEB	214.9					73	

Stepper motors EMMS-ST

Technical data

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Ordering data					
	Size	Variant			Part No. Type
		Basic version	With encoder	With brake	
	42	■			549 404 EMMS-ST-42-S-S
			■		549 405 EMMS-ST-42-S-SE
				■	549 406 EMMS-ST-42-S-SB
			■	■	549 407 EMMS-ST-42-S-SEB
	57	■			549 408 EMMS-ST-57-S-S
			■		549 409 EMMS-ST-57-S-SE
				■	549 410 EMMS-ST-57-S-SB
			■	■	549 411 EMMS-ST-57-S-SEB
		■			549 412 EMMS-ST-57-M-S
			■		549 413 EMMS-ST-57-M-SE
				■	549 414 EMMS-ST-57-M-SB
			■	■	549 415 EMMS-ST-57-M-SEB
	87	■			549 416 EMMS-ST-87-S-S
			■		549 417 EMMS-ST-87-S-SE
				■	549 418 EMMS-ST-87-S-SB
			■	■	549 419 EMMS-ST-87-S-SEB
		■			549 420 EMMS-ST-87-M-S
			■		549 421 EMMS-ST-87-M-SE
				■	549 422 EMMS-ST-87-M-SB
			■	■	549 423 EMMS-ST-87-M-SEB
		■			549 424 EMMS-ST-87-L-S
			■		549 425 EMMS-ST-87-L-SE
				■	549 426 EMMS-ST-87-L-SB
			■	■	549 427 EMMS-ST-87-L-SEB

Stepper motors EMMS-ST

Accessories

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Gear unit EMGA

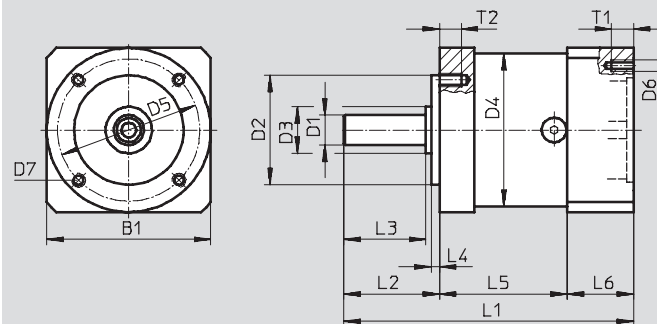


General technical data							
For motor size		42		57		87	
Gear unit type		EMGA-40-P-G...		EMGA-60-P-G...		EMGA-80-P-G...	
Gear unit ratio	[i]	3	5	3	5	3	5
Continuous output torque ¹⁾	[Nm]	11	14	22	22	85	110
Max. drive torque	[Nm]	17.6	22	22	22	136	176
Torsional resistance	[Nm/arcmin]	1		2.3		6	
Torsional backlash	[deg]	0.4		0.27		0.15	
Moment of inertia ²⁾	[kgcm ²]	0.031	0.19	0.135	0.078	0.77	0.45
Efficiency	[%]	96					
Operating temperature ³⁾	[°C]	-25 ... +90					
Protection class		IP54					

- 1) At the drive shaft
2) Referred 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 unit 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

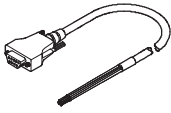
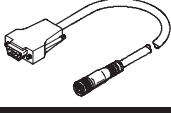
Stepper motors EMMS-ST

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 design	Screened		
Cable attribute	Suitable for drag chain		
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



Pneumatics
Pneumatic linear and rotary actuators, valves, and air supply



PLCs and I/O Devices
PLC's, operator interfaces, sensors and I/O devices

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Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 12,000 employees in 56 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

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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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