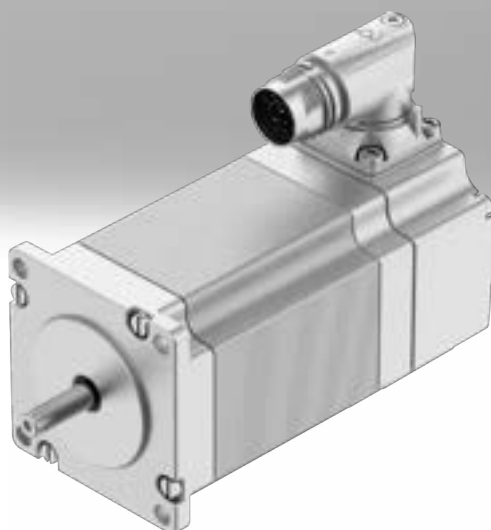


## Stepper motors EMMT-ST

**FESTO**



## Key features

### At a glance

- Two-phase hybrid technology
- 3 flange sizes available: M = 0.25 ... 9.4 Nm
- IP40 protection for motor shaft
- IP65 protection for motor housing with connection technology

#### Connection technology:

- Simple connection technology (OCP: one cable plug) – hybrid cable: motor cable and connecting cable for supply and encoder in one
- Plug can be rotated 310°

#### Digital absolute encoder system:

- Single-turn
- Multi-turn, battery-free

### Engineering tools

More information → [electric motion sizing](#)



Save time with smart engineering tools for the optimal solution. Our goal is to increase your productivity. Our engineering tools play an integral part in achieving this goal. They help you size your system correctly, tap into unimagined productivity reserves and generate additional productivity along the entire value chain. In every phase of your project, from the initial contact to the modernisation of your machine, you will come across a number of different tools which will be of use to you.

#### Electric Motion Sizing

- Create the optimum drive package quickly and reliably. Electric Motion Sizing calculates suitable combinations of electric axis, electric motor and servo drive using just a few application details. It provides you with all the relevant data including the bill of materials and documentation for the selected combination. This avoids design errors and results in significantly improved energy efficiency for the system. A smooth connection to the Festo Automation Suite also makes commissioning easier for you.

### Graphs

More information → [emmt-st](#)



The graphs shown in this document are also available online. There, precise values can be displayed.

### Measuring unit

| [S]  | Absolute encoder, single-turn | [M]   | Absolute encoder, multi-turn |
|--|-------------------------------|---|------------------------------|
| • The angular position is assigned to a unique value in coded form.  |                               | • A unique value in coded form is assigned to the angular position and each full turn.                  |                              |
| • The position is only sensed within one turn. All subsequent turns need to be counted by the higher-level device. |                               | • This type counts the full turns until the specified maximum is reached (including when switched off). |                              |
| • When switched off, the position is only sensed within one turn.  |                               | • Homing is only required once it has been installed in the application.                                |                              |
| • A homing run is required after switch-on.  |                               |   |                              |

### Brake

| [B] | With brake |
|-----|------------|
|-----|------------|

The holding brake should not be used as a safety brake.

## Type codes

| 001  | Series |
|------|--------|
| EMMT | Motor  |

| 002 | Motor type       |
|-----|------------------|
| ST  | Stepper motor ST |

| 003 | Flange size, motors [mm] |
|-----|--------------------------|
| 42  | 42                       |
| 57  | 57                       |
| 87  | 87                       |

| 004 | Length |
|-----|--------|
| L   | Long   |
| M   | Medium |
| S   | Short  |

| 005 | Electrical connection        |
|-----|------------------------------|
| R   | Angled connector, adjustable |

| 006 | Measuring unit                |
|-----|-------------------------------|
|     | None                          |
| M   | Absolute encoder, multi-turn  |
| S   | Absolute encoder, single turn |

| 007 | Brake      |
|-----|------------|
|     | None       |
| B   | With brake |

Datasheet

| General technical data - EMMT-ST-42                       |                          |     |         |             |     |           |
|---|--------------------------|-----|---------|-------------|-----|-----------|
| Flange size, motors [mm]                                  | 42 mm                    |     |         |             |     |           |
| Length  | [S]                      |     |         | [L]         |     |           |
| Measuring unit  | [ ]                      | [M] | [S]     | [ ]         | [M] | [S]       |
| Nominal operating voltage DC                              | 48 V                     |     |         |             |     |           |
| Nominal motor current                                     | 1.8 A                    |     |         | 3.4 A       |     |           |
| Continuous stall current                                  | 2 A                      |     |         | 3.7 A       |     |           |
| Peak current  | 2 A                      |     |         | 4 A         |     |           |
| Rated motor output <sup>1)</sup>                          | –                        |     | 17 W    | –           |     | 56 W      |
| Step angle with full step                                 | 1.8 deg                  |     |         |             |     |           |
| Stepping angle tolerance                                  | ±5%                      |     |         |             |     |           |
| Motor holding torque                                      | 0.25 Nm                  |     |         | 0.63 Nm     |     |           |
| Nominal torque <sup>1)</sup>                              | –                        |     | 0.24 Nm | –           |     | 0.54 Nm   |
| Peak torque   | 0.25 Nm                  |     |         | 0.63 Nm     |     |           |
| Nominal rotational speed <sup>1)</sup>                    | –                        |     | 600 rpm | –           |     | 1,000 rpm |
| Maximum speed   | 2,700 rpm                |     |         | 3,200 rpm   |     |           |
| Max. mechanical rotational speed                          | 9,000 rpm                |     |         |             |     |           |
| Motor constant  | 0.159 Nm/A               |     |         | 0.162 Nm/A  |     |           |
| Voltage constant, phase                                   | 12.1 mV/min              |     |         | 10.6 mV/min |     |           |
| Electric time constant                                    | 1.4 ms                   |     |         | 1.3 ms      |     |           |
| Thermal time constant                                     | 22 mins                  |     |         | 16 mins     |     |           |
| Thermal resistance  | 3.5 K/W                  |     |         | 2 K/W       |     |           |
| I <sup>2</sup> T time motor                               | 2 s                      |     |         |             |     |           |
| Number of phases  | 2                        |     |         |             |     |           |
| Number of pole pairs                                      | 50                       |     |         |             |     |           |
| Winding resistance phase                                  | 2.1 Ohm                  |     |         | 0.6 Ohm     |     |           |
| Winding inductance phase per individual phase (un-linked) | 3 mH                     |     |         | 0.8 mH      |     |           |
| Winding series inductance Ld (phase)                      | 1.6 mH                   |     |         | 1.45 mH     |     |           |
| Winding shunt inductance Lq (phase)                       | 3 mH                     |     |         | 0.8 mH      |     |           |
| Permissible axial shaft load                              | 10 N                     |     |         |             |     |           |
| Permissible radial shaft load                             | 28 N                     |     |         |             |     |           |
| Measuring flange  | 200 x 200 x 15 mm, steel |     |         |             |     |           |

1) No nominal operating point is defined for motors without encoders.

## Datasheet

| General technical data - EMMT-ST-57                       |                          |           |     |             |         |     |
|---|--------------------------|-----------|-----|-------------|---------|-----|
| Flange size, motors [mm]                                  | 57 mm                    |           |     |             |         |     |
| Length  | [M]                      |           |     | [L]         |         |     |
| Measuring unit  | [ ]                      | [M]       | [S] | [ ]         | [M]     | [S] |
| Nominal operating voltage DC                              | 48 V                     |           |     |             |         |     |
| Nominal motor current                                     | 5.4 A                    |           |     | 5.2 A       |         |     |
| Continuous stall current                                  | 6.6 A                    |           |     | 6.1 A       |         |     |
| Peak current  | 8 A                      |           |     |             |         |     |
| Rated motor output <sup>1)</sup>                          | –                        | 87 W      |     | –           | 86 W    |     |
| Step angle with full step                                 | 1.8 deg                  |           |     |             |         |     |
| Stepping angle tolerance                                  | ±5%                      |           |     |             |         |     |
| Motor holding torque                                      | 1.12 Nm                  |           |     | 1.86 Nm     |         |     |
| Nominal torque <sup>1)</sup>                              | –                        | 0.83 Nm   |     | –           | 1.64 Nm |     |
| Peak torque   | 1.1 Nm                   |           |     | 2.1 Nm      |         |     |
| Nominal rotational speed <sup>1)</sup>                    | –                        | 1,000 rpm |     | –           | 500 rpm |     |
| Maximum speed   | 2,600 rpm                |           |     | 1,500 rpm   |         |     |
| Max. mechanical rotational speed                          | 8,000 rpm                |           |     |             |         |     |
| Motor constant  | 0.152 Nm/A               |           |     | 0.32 Nm/A   |         |     |
| Voltage constant, phase                                   | 13.1 mV/min              |           |     | 22.6 mV/min |         |     |
| Electric time constant                                    | 2.9 ms                   |           |     | 3.7 ms      |         |     |
| Thermal time constant                                     | 27 mins                  |           |     | 30 mins     |         |     |
| Thermal resistance  | 1.6 K/W                  |           |     | 1.3 K/W     |         |     |
| I <sup>2</sup> T time motor                               | 2 s                      |           |     |             |         |     |
| Number of phases  | 2                        |           |     |             |         |     |
| Number of pole pairs                                      | 50                       |           |     |             |         |     |
| Winding resistance phase                                  | 0.17 Ohm                 |           |     | 0.26 Ohm    |         |     |
| Winding inductance phase per individual phase (un-linked) | 0.5 mH                   |           |     | 0.95 mH     |         |     |
| Winding series inductance L <sub>d</sub> (phase)          | 0.7 mH                   |           |     | 1.75 mH     |         |     |
| Winding shunt inductance L <sub>q</sub> (phase)           | 0.5 mH                   |           |     | 0.95 mH     |         |     |
| Permissible axial shaft load                              | 15 N                     |           |     |             |         |     |
| Permissible radial shaft load                             | 75 N                     |           |     |             |         |     |
| Measuring flange  | 200 x 200 x 15 mm, steel |           |     |             |         |     |

1) No nominal operating point is defined for motors without encoders.

Datasheet

**General technical data - EMMT-ST-87**

|   |                          |     |     |             |     |     |             |     |     |
|---|--------------------------|-----|-----|-------------|-----|-----|-------------|-----|-----|
| Flange size, motors [mm]                                  | 87 mm                    |     |     |             |     |     |             |     |     |
| Length  | [S]                      |     |     | [M]         |     |     | [L]         |     |     |
| Measuring unit  | [ ]                      | [M] | [S] | [ ]         | [M] | [S] | [ ]         | [M] | [S] |
| Nominal operating voltage DC                              | 48 V                     |     |     |             |     |     |             |     |     |
| Nominal motor current                                     | 7.8 A                    |     |     | 7.5 A       |     |     | 8.4 A       |     |     |
| Continuous stall current                                  | 9.5 A                    |     |     | 8.2 A       |     |     | 10 A        |     |     |
| Peak current  | 12 A                     |     |     |             |     |     | 10 A        |     |     |
| Rated motor output <sup>1)</sup>                          | –                        |     |     | 159 W       |     |     | –           |     |     |
|   |                          |     |     | 87 W        |     |     | –           |     |     |
| Step angle with full step                                 | 1.8 deg                  |     |     |             |     |     |             |     |     |
| Stepping angle tolerance                                  | ±5%                      |     |     |             |     |     |             |     |     |
| Motor holding torque                                      | 2.4 Nm                   |     |     | 6.6 Nm      |     |     | 9.4 Nm      |     |     |
| Nominal torque <sup>1)</sup>                              | –                        |     |     | 1.9 Nm      |     |     | –           |     |     |
|   |                          |     |     | 5.9 Nm      |     |     | –           |     |     |
| Peak torque   | 2.7 Nm                   |     |     | 6.8 Nm      |     |     | 9.4 Nm      |     |     |
| Nominal rotational speed <sup>1)</sup>                    | –                        |     |     | 800 rpm     |     |     | –           |     |     |
|   |                          |     |     | 140 rpm     |     |     | –           |     |     |
| Maximum speed   | 2,200 rpm                |     |     | 600 rpm     |     |     | 430 rpm     |     |     |
| Max. mechanical rotational speed                          | 7,000 rpm                |     |     |             |     |     |             |     |     |
| Motor constant  | 0.24 Nm/A                |     |     | 0.79 Nm/A   |     |     | 1.06 Nm/A   |     |     |
| Voltage constant, phase                                   | 15.4 mV/min              |     |     | 56.6 mV/min |     |     | 78.9 mV/min |     |     |
| Electric time constant                                    | 1.75 ms                  |     |     | 8.5 ms      |     |     | 9 ms        |     |     |
| Thermal time constant                                     | 35 mins                  |     |     | 32 mins     |     |     | 37 mins     |     |     |
| Thermal resistance  | 0.89 K/W                 |     |     | 0.83 K/W    |     |     | 0.75 K/W    |     |     |
| I <sup>2</sup> T time motor                               | 2 s                      |     |     |             |     |     |             |     |     |
| Number of phases  | 2                        |     |     |             |     |     |             |     |     |
| Number of pole pairs                                      | 50                       |     |     |             |     |     |             |     |     |
| Winding resistance phase                                  | 0.13 Ohm                 |     |     | 0.27 Ohm    |     |     | 0.3 Ohm     |     |     |
| Winding inductance phase per individual phase (un-linked) | 0.35 mH                  |     |     | 2.3 mH      |     |     | 2.7 mH      |     |     |
| Winding series inductance Ld (phase)                      | 0.56 mH                  |     |     | 3.6 mH      |     |     | 4.1 mH      |     |     |
| Winding shunt inductance Lq (phase)                       | 0.35 mH                  |     |     | 2.3 mH      |     |     | 2.7 mH      |     |     |
| Permissible axial shaft load                              | 60 N                     |     |     |             |     |     |             |     |     |
| Permissible radial shaft load                             | 220 N                    |     |     |             |     |     |             |     |     |
| Measuring flange  | 250 x 250 x 15 mm, steel |     |     |             |     |     |             |     |     |

1) No nominal operating point is defined for motors without encoders.

## Datasheet

## Technical data - Brakes

|                                 |  |                         |                        |
|---------------------------------|--|-------------------------|------------------------|
| Flange size, motors [mm]        | 42   | 57                      | 87                     |
| Brake holding torque            | 0.63 Nm  | 1.74 Nm                 | 4.26 Nm                |
| Operating voltage DC brake      | 24 V   |                         |                        |
| Brake current consumption       | 0.34 A   | 0.38 A                  | 0.49 A                 |
| Brake power consumption         | 8.2 W  | 9 W                     | 12 W                   |
| Brake coil resistance           | 70.9 Ohm                                       | 63.8 Ohm                | 49.2 Ohm               |
| Brake coil inductivity          | 146 mH   | 107 mH                  | 110 mH                 |
| Brake separation time           | 28 ms  | 32 ms                   | 44 ms                  |
| Brake closing time              | 41 ms  | 97 ms                   | 110 ms                 |
| DC brake response delay         | 8 ms   | 11 ms                   | 30 ms                  |
| Max. brake no-load speed        | 9,000 rpm                                      | 8,000 rpm               | 7,000 rpm              |
| Brake max. friction             | 1,500 J  | 6,000 J                 | 14,000 J               |
| Mass moment of inertia, brake   | 0.006 kgcm <sup>2</sup>                        | 0.024 kgcm <sup>2</sup> | 0.11 kgcm <sup>2</sup> |
| Switching cycles, holding brake | 10 million idle actuations (without friction!) |                         |                        |

## Technical data – Encoder

|  |                                   |                                  |                                   |                                  |                                   |                                  |
|--|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
| Flange size, motors [mm]   | 42                                |                                  | 57                                |                                  | 87                                |                                  |
| Measuring unit   | [S]                               | [M]                              | [S]                               | [M]                              | [S]                               | [M]                              |
| Rotor position sensor measuring principle                              | Magnetic                          |                                  |                                   |                                  |                                   |                                  |
| Rotary position encoder interface                                      | BiSS-C                            |                                  |                                   |                                  |                                   |                                  |
| Rotor position encoder, absolute detectable revolutions                | –                                 | 65,536                           | –                                 | 65,536                           | –                                 | 65,536                           |
| Rotor position encoder, DC operating voltage                           | 5 V                               |                                  |                                   | 14 V                             | 5 V                               | 14 V                             |
| Rotor position encoder, DC operating voltage range                     | 4.75 ... 5.25 V                   | 4.5 ... 5.5 V                    | 4.75 ... 5.25 V                   | 4.75 ... 15 V                    | 4.75 ... 5.25 V                   | 4.75 ... 15 V                    |
| Rotor position encoder, sinusoidal/cosinusoidal periods per revolution | 2                                 |                                  |                                   |                                  |                                   |                                  |
| Rotor position encoder, position values per revolution                 | 65,536                            | 131,072                          | 65,536                            | 131,072                          | 65,536                            | 131,072                          |
| Rotor position encoder resolution                                      | 16 bit                            | 17 bit                           | 16 bit                            | 17 bit                           | 16 bit                            | 17 bit                           |
| Rotor position encoder, system accuracy of angle measurement           | -540 ... 540 arcsec               | -310 ... 310 arcsec              | -540 ... 540 arcsec               | -310 ... 310 arcsec              | -540 ... 540 arcsec               | -310 ... 310 arcsec              |
| Rotor position encoder, max. operating speed                           | 5,500 rpm                         | 12,000 rpm                       | 5,500 rpm                         | 12,000 rpm                       | 5,500 rpm                         | 12,000 rpm                       |
| Rotor position encoder, temperature range                              | -40 ... 105 °C                    |                                  |                                   |                                  |                                   |                                  |
| MTTF, subcomponent <sup>1)</sup>                                       | 687 years, rotor position encoder | 20 years, rotor position encoder | 687 years, rotor position encoder | 20 years, rotor position encoder | 687 years, rotor position encoder | 20 years, rotor position encoder |

1) The data given applies to an encoder temperature/operating temperature of 40°C.

## Datasheet

### Total output moment of inertia - EMMT-ST-42

|                                |                         |  |                         |  |                         |  |                         |  |                        |  |                         |  |
|--------------------------------|-------------------------|--|-------------------------|--|-------------------------|--|-------------------------|--|------------------------|--|-------------------------|--|
| Flange size, motors [mm]       | 42                      |  |                         |  |                         |  |                         |  |                        |  |                         |  |
| Length                         | [S]                     |  |                         |  |                         |  | [L]                     |  |                        |  |                         |  |
| Measuring unit                 | [ ]                     |  | [M]                     |  | [S]                     |  | [ ]                     |  | [M]                    |  | [S]                     |  |
| Brake                          | [ ]                     |  | [B]                     |  | [ ]                     |  | [ ]                     |  | [B]                    |  | [ ]                     |  |
| Total output moment of inertia | 0.035 kgcm <sup>2</sup> |  | 0.043 kgcm <sup>2</sup> |  | 0.041 kgcm <sup>2</sup> |  | 0.082 kgcm <sup>2</sup> |  | 0.09 kgcm <sup>2</sup> |  | 0.088 kgcm <sup>2</sup> |  |

### Total output moment of inertia - EMMT-ST-57

|                                |                       |  |                        |  |                         |  |                        |  |                        |  |                         |  |
|--------------------------------|-----------------------|--|------------------------|--|-------------------------|--|------------------------|--|------------------------|--|-------------------------|--|
| Flange size, motors [mm]       | 57                    |  |                        |  |                         |  |                        |  |                        |  |                         |  |
| Length                         | [M]                   |  |                        |  |                         |  | [L]                    |  |                        |  |                         |  |
| Measuring unit                 | [ ]                   |  | [M]                    |  | [S]                     |  | [ ]                    |  | [M]                    |  | [S]                     |  |
| Brake                          | [ ]                   |  | [B]                    |  | [ ]                     |  | [ ]                    |  | [B]                    |  | [ ]                     |  |
| Total output moment of inertia | 0.3 kgcm <sup>2</sup> |  | 0.33 kgcm <sup>2</sup> |  | 0.324 kgcm <sup>2</sup> |  | 0.48 kgcm <sup>2</sup> |  | 0.51 kgcm <sup>2</sup> |  | 0.504 kgcm <sup>2</sup> |  |

### Total output moment of inertia - EMMT-ST-87

|                                |                     |  |                         |  |                        |  |                       |  |                         |  |                        |  |                     |  |                         |  |                        |  |
|--------------------------------|---------------------|--|-------------------------|--|------------------------|--|-----------------------|--|-------------------------|--|------------------------|--|---------------------|--|-------------------------|--|------------------------|--|
| Flange size, motors [mm]       | 87                  |  |                         |  |                        |  |                       |  |                         |  |                        |  |                     |  |                         |  |                        |  |
| Length                         | [S]                 |  |                         |  | [M]                    |  |                       |  | [L]                     |  |                        |  |                     |  |                         |  |                        |  |
| Measuring unit                 | [ ]                 |  | [M]                     |  | [S]                    |  | [ ]                   |  | [M]                     |  | [S]                    |  |                     |  |                         |  |                        |  |
| Brake                          | [ ]                 |  | [B]                     |  | [ ]                    |  | [B]                   |  | [ ]                     |  | [B]                    |  |                     |  |                         |  |                        |  |
| Total output moment of inertia | 1 kgcm <sup>2</sup> |  | 1.116 kgcm <sup>2</sup> |  | 1.11 kgcm <sup>2</sup> |  | 1.9 kgcm <sup>2</sup> |  | 2.016 kgcm <sup>2</sup> |  | 2.01 kgcm <sup>2</sup> |  | 3 kgcm <sup>2</sup> |  | 3.116 kgcm <sup>2</sup> |  | 3.11 kgcm <sup>2</sup> |  |

### Weight

|                          |       |       |       |       |       |         |         |         |         |         |         |         |         |         |
|--------------------------|-------|-------|-------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Flange size, motors [mm] | 42    |       |       |       | 57    |         |         |         | 87      |         |         |         |         |         |
| Length                   | [S]   |       | [L]   |       | [M]   |         | [L]     |         | [S]     |         | [M]     |         | [L]     |         |
| Brake                    | [ ]   | [B]   | [ ]   | [B]   | [ ]   | [B]     | [ ]     | [B]     | [ ]     | [B]     | [ ]     | [B]     | [ ]     | [B]     |
| Product weight           | 370 g | 590 g | 560 g | 770 g | 900 g | 1,300 g | 1,260 g | 1,660 g | 2,050 g | 2,890 g | 3,490 g | 4,320 g | 4,660 g | 5,490 g |



## Datasheet

| Operating and environmental conditions                     |  |     |              |     |     |     |     |
|--|--|-----|--------------|-----|-----|-----|-----|
| Flange size, motors [mm]                                   | 42   |     | 57           |     | 87  |     |     |
| Length   | [S]  | [L] | [M]          | [L] | [S] | [M] | [L] |
| Conforms to standard                                       | IEC 60034  |     |              |     |     |     |     |
| Motor type to EN 60034-7                                   | IM B5, IM V1, IM V3  |     |              |     |     |     |     |
| Degree of protection                                       | IP40   |     |              |     |     |     |     |
| Note on degree of protection                               | IP40 for motor shaft without radial shaft seal, IP65 for motor housing including connection technology |     |              |     |     |     |     |
| Ambient temperature  | 0 ... 40°C   |     | -15 ... 40°C |     |     |     |     |
| Note on ambient temperature                                | Up to 80 °C with derating -2%/°C   |     |              |     |     |     |     |
| Storage temperature  | -20 ... 70 °C  |     |              |     |     |     |     |
| Max. winding temperature                                   | 130°C  |     |              |     |     |     |     |
| Temperature monitoring <sup>1)</sup>                       | Digital Motor temp. via BiSS-C   |     |              |     |     |     |     |
| Rating class according to EN 60034-1                       | S1   |     |              |     |     |     |     |
| Thermal class according to EN 60034-1                      | B  |     |              |     |     |     |     |
| Relative humidity  | 0 - 90%  |     |              |     |     |     |     |
| CE marking (see declaration of conformity) <sup>2)</sup>   | To EU EMC Directive<br>To EU RoHS Directive  |     |              |     |     |     |     |
| UKCA marking (see declaration of conformity) <sup>3)</sup> | To UK EMC regulations<br>To UK RoHS regulations  |     |              |     |     |     |     |
| Certification  | RCM<br>c UL us - Recognized (OL)   |     |              |     |     |     |     |
| Certificate-issuing authority                              | UL E342973   |     |              |     |     |     |     |
| Vibration resistant  | Transport application test with severity level 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                                      |     |              |     |     |     |     |
| Isolation resistance AC                                    | 0.6  |     |              |     |     |     |     |
| Electrical connection 1, Connection type                   | Hybrid plug  |     |              |     |     |     |     |
| LABS (PWIS) conformity                                     | VDMA24364 zone III   |     |              |     |     |     |     |
| Note on materials  | RoHS-compliant   |     |              |     |     |     |     |

1) Only possible with EMMT-ST-...-M (multiturn).

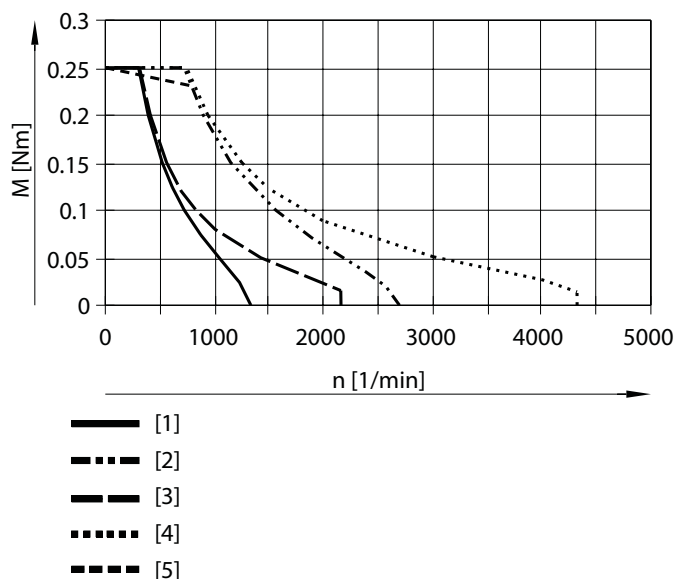
2) More information [www.festo.com/catalogue/emmt-st](http://www.festo.com/catalogue/emmt-st) → Support/Downloads.

3) More information [www.festo.com/catalogue/emmt-st](http://www.festo.com/catalogue/emmt-st) → Support/Downloads.

## Datasheet

### Torque M as a function of rotational speed n

EMMT-ST-42-S

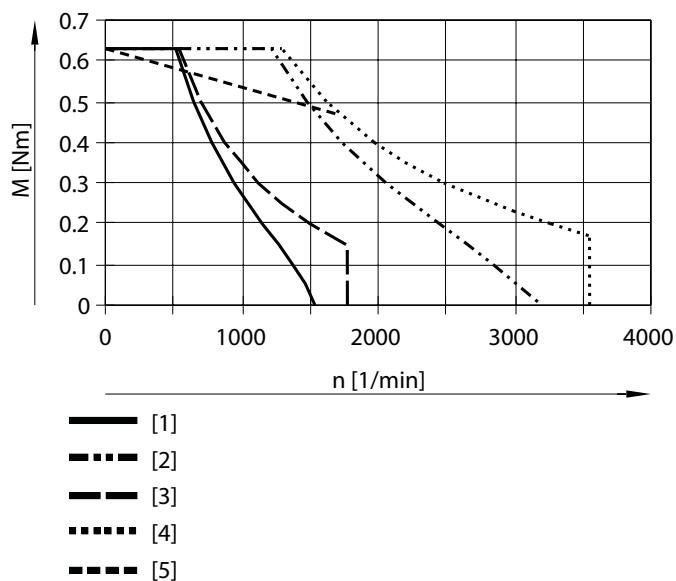


- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

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

Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

EMMT-ST-42-L



- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

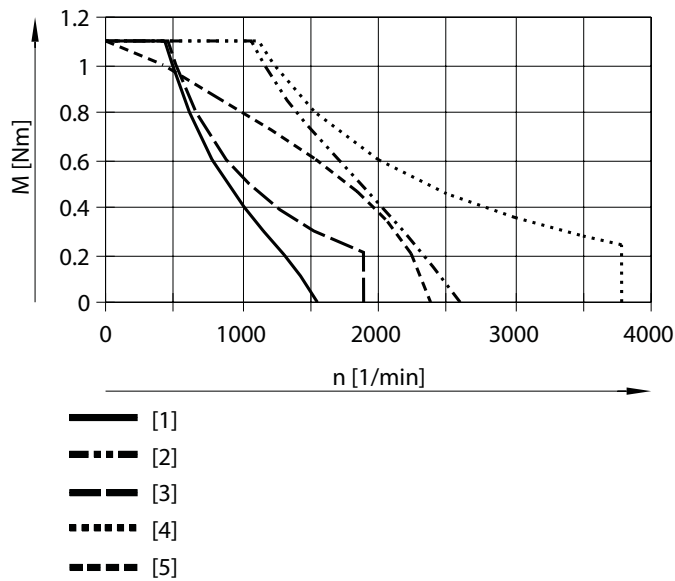
Typical motor characteristic curve with nominal voltage and optimal motor controller.

Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

## Datasheet

## Torque M as a function of rotational speed n

EMMT-ST-57-M

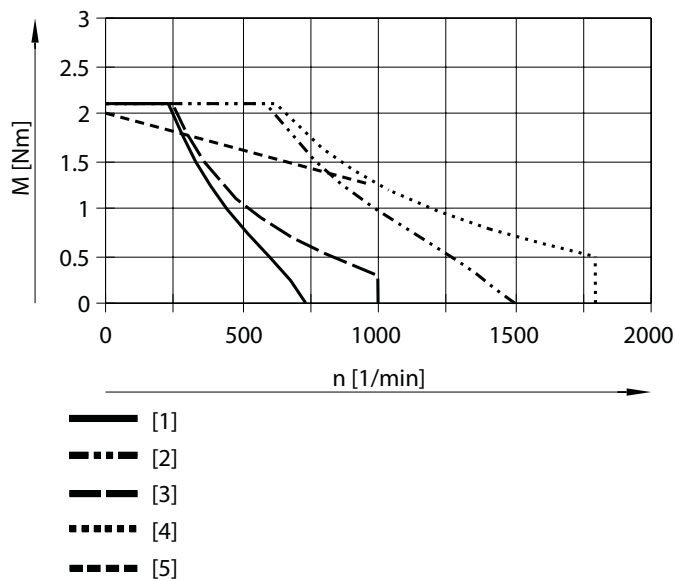


- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

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

Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

EMMT-ST-57-L



- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

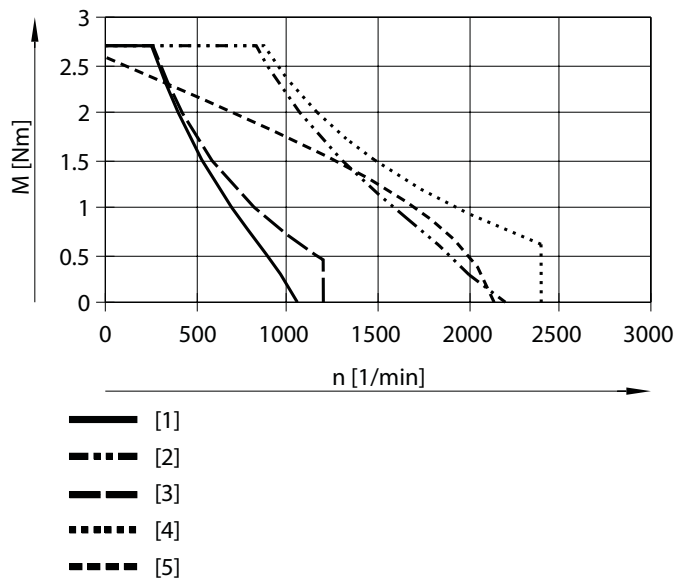
Typical motor characteristic curve with nominal voltage and optimal motor controller.

Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

Datasheet

Torque M as a function of rotational speed n

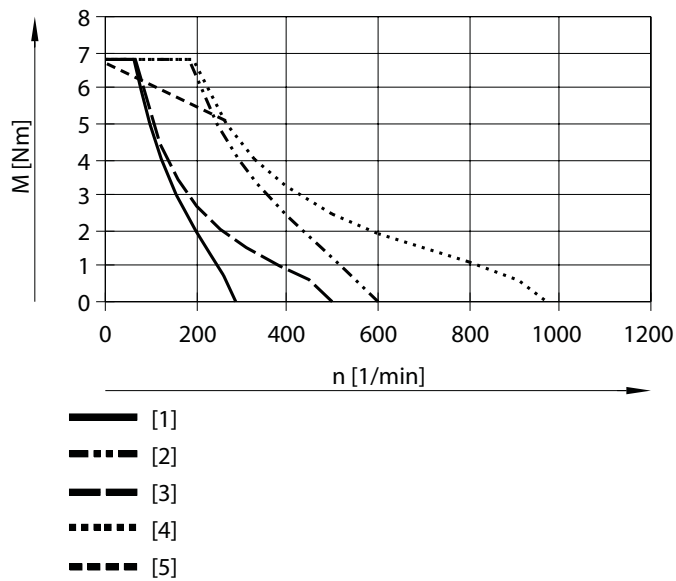
EMMT-ST-87-S



- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

Typical motor characteristic curve with nominal voltage and optimal motor controller.  
Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

EMMT-ST-87-M



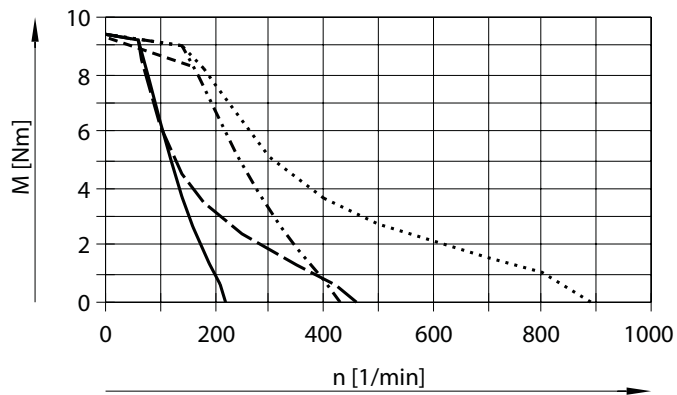
- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

Typical motor characteristic curve with nominal voltage and optimal motor controller.  
Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

## Datasheet

## Torque M as a function of rotational speed n

EMMT-ST-87-L



- [1]
- · - · [2]
- - - [3]
- · · · [4]
- - - [5]

- [1] Peak torque at 24 V DC
- [2] Peak torque at 48 V DC
- [3] Field weakened peak torque at 24V DC
- [4] Field weakened peak torque at 48V DC
- [5] Nominal torque

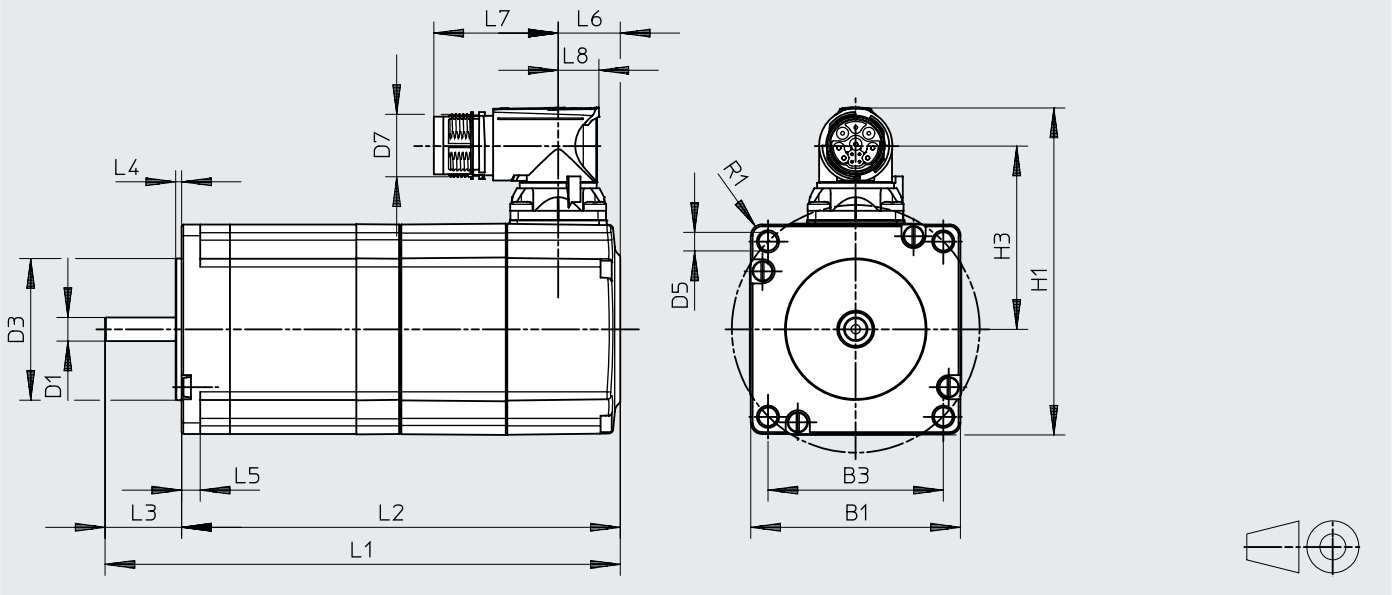
Typical motor characteristic curve with nominal voltage and optimal motor controller.

Observe the maximum permissible rotational speed of add-on and installation components (such as encoder, brake etc.)!

Datasheet

Dimensions – EMMT-ST-42/-57/-87

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



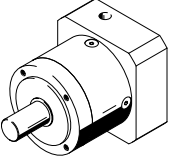
|            |     | B1   | B3    | D1      | D3      | D5  | D7  | H1   | H3   |
|------------|-----|------|-------|---------|---------|-----|-----|------|------|
|            |     |      | ±0.2  | ∅<br>h6 | ∅<br>h8 |     |     |      |      |
| EMMT-ST-42 | S   | 42   | 31    | 5       | 22      | M3  | M17 | 73.3 | 41.9 |
|            | S-B |      |       |         |         |     |     |      |      |
|            | L   |      |       |         |         |     |     |      |      |
|            | L-B |      |       |         |         |     |     |      |      |
| EMMT-ST-57 | M   | 56.4 | 47,14 | 6,35    | 38.1    | 5   | M17 | 88   | 49.3 |
|            | M-B |      |       |         |         |     |     |      |      |
|            | L   |      |       |         |         |     |     |      |      |
|            | L-B |      |       |         |         |     |     |      |      |
| EMMT-ST-87 | S   | 85.9 | 69.5  | 11      | 73      | 6.6 | M17 | 118  | 64.4 |
|            | S-B |      |       |         |         |     |     |      |      |
|            | M   |      |       |         |         |     |     |      |      |
|            | M-B |      |       |         |         |     |     |      |      |
|            | L   |      |       |         |         |     |     |      |      |
|            | L-B |      |       |         |         |     |     |      |      |

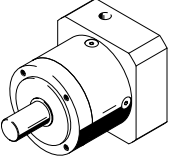
|            |     | L1    | L2    | L3   | L4   | L5 | L6   | L7   | L8 | R1  |
|------------|-----|-------|-------|------|------|----|------|------|----|-----|
|            |     |       | ±2    | ±0.5 | ±0.2 |    |      |      |    |     |
| EMMT-ST-42 | S   | 94    | 70    | 24   | 2    | -  | 16   | 33.4 | 11 | 2.3 |
|            | S-B | 124   | 100   |      |      |    |      |      |    |     |
|            | L   | 112   | 88    |      |      |    |      |      |    |     |
|            | L-B | 142   | 118   |      |      |    |      |      |    |     |
| EMMT-ST-57 | M   | 110.1 | 89.5  | 20.6 | 1.6  | 5  | 16.7 | 33.4 | 11 | 3   |
|            | M-B | 138.6 | 118   |      |      |    |      |      |    |     |
|            | L   | 131.1 | 110.5 |      |      |    |      |      |    |     |
|            | L-B | 159.6 | 139   |      |      |    |      |      |    |     |
| EMMT-ST-87 | S   | 121   | 94    | 27   | 2    | 8  | 16   | 33.4 | 11 | 5.5 |
|            | S-B | 149.5 | 122.5 |      |      |    |      |      |    |     |
|            | M   | 154.5 | 127.5 |      |      |    |      |      |    |     |
|            | M-B | 183   | 156   |      |      |    |      |      |    |     |
|            | L   | 184.5 | 158.5 |      |      |    |      |      |    |     |
|            | L-B | 213   | 186   |      |      |    |      |      |    |     |

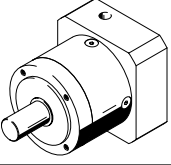
## Ordering data

| Ordering data<br>Length | Measuring unit                    | Brake          | Part no. | Type             |
|-------------------------|-----------------------------------|----------------|----------|------------------|
| <b>EMMT-ST-42</b>       |                                   |                |          |                  |
| Short [S]               | None                              | None           | 8156161  | EMMT-ST-42-S-R   |
|                         | Absolute encoder, single turn [S] |                | 8156162  | EMMT-ST-42-S-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156163  | EMMT-ST-42-S-RM  |
|                         | None                              | With brake [B] | 8156164  | EMMT-ST-42-S-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156165  | EMMT-ST-42-S-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156166  | EMMT-ST-42-S-RMB |
| Long [L]                | None                              | None           | 8156167  | EMMT-ST-42-L-R   |
|                         | Absolute encoder, single turn [S] |                | 8156168  | EMMT-ST-42-L-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156169  | EMMT-ST-42-L-RM  |
|                         | None                              | With brake [B] | 8156170  | EMMT-ST-42-L-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156171  | EMMT-ST-42-L-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156172  | EMMT-ST-42-L-RMB |
| <b>EMMT-ST-57</b>       |                                   |                |          |                  |
| Medium [M]              | None                              | None           | 8156173  | EMMT-ST-57-M-R   |
|                         | Absolute encoder, single turn [S] |                | 8156174  | EMMT-ST-57-M-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156175  | EMMT-ST-57-M-RM  |
|                         | None                              | With brake [B] | 8156176  | EMMT-ST-57-M-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156177  | EMMT-ST-57-M-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156178  | EMMT-ST-57-M-RMB |
| Long [L]                | None                              | None           | 8156179  | EMMT-ST-57-L-R   |
|                         | Absolute encoder, single turn [S] |                | 8156180  | EMMT-ST-57-L-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156181  | EMMT-ST-57-L-RM  |
|                         | None                              | With brake [B] | 8156182  | EMMT-ST-57-L-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156183  | EMMT-ST-57-L-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156184  | EMMT-ST-57-L-RMB |
| <b>EMMT-ST-87</b>       |                                   |                |          |                  |
| Short [S]               | None                              | None           | 8156185  | EMMT-ST-87-S-R   |
|                         | Absolute encoder, single turn [S] |                | 8156186  | EMMT-ST-87-S-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156187  | EMMT-ST-87-S-RM  |
|                         | None                              | With brake [B] | 8156188  | EMMT-ST-87-S-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156189  | EMMT-ST-87-S-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156190  | EMMT-ST-87-S-RMB |
| Medium [M]              | None                              | None           | 8156191  | EMMT-ST-87-M-R   |
|                         | Absolute encoder, single turn [S] |                | 8156192  | EMMT-ST-87-M-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156193  | EMMT-ST-87-M-RM  |
|                         | None                              | With brake [B] | 8156194  | EMMT-ST-87-M-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156195  | EMMT-ST-87-M-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156196  | EMMT-ST-87-M-RMB |
| Long [L]                | None                              | None           | 8156197  | EMMT-ST-87-L-R   |
|                         | Absolute encoder, single turn [S] |                | 8156198  | EMMT-ST-87-L-RS  |
|                         | Absolute encoder, multi-turn [M]  |                | 8156199  | EMMT-ST-87-L-RM  |
|                         | None                              | With brake [B] | 8156200  | EMMT-ST-87-L-RB  |
|                         | Absolute encoder, single turn [S] |                | 8156201  | EMMT-ST-87-L-RSB |
|                         | Absolute encoder, multi-turn [M]  |                | 8156202  | EMMT-ST-87-L-RMB |

Accessories

| Planetary gear for EMMT-ST-42  |            | Datasheets → Internet: emga |          |                      |
|--|------------|-----------------------------|----------|----------------------|
|  | Gear ratio | Product weight              | Part no. | Type                 |
|  | 3:1        | 350 g                       | ☆ 549428 | EMGA-40-P-G3-SST-42  |
|  | 5:1        | 350 g                       | ☆ 549429 | EMGA-40-P-G5-SST-42  |
|  | 8:1        | 400 g                       | 8141762  | EMGA-40-P-G8-SST-42  |
|  | 12:1       | 450 g                       | 8141763  | EMGA-40-P-G12-SST-42 |

| Planetary gear for EMMT-ST-57  |            | Datasheets → Internet: emga |          |                      |
|--|------------|-----------------------------|----------|----------------------|
|  | Gear ratio | Product weight              | Part no. | Type                 |
|  | 3:1        | 900 g                       | ☆ 549430 | EMGA-60-P-G3-SST-57  |
|  | 5:1        | 900 g                       | ☆ 549431 | EMGA-60-P-G5-SST-57  |
|  | 8:1        | 900 g                       | 8141764  | EMGA-60-P-G8-SST-57  |
|  | 12:1       | 1100 g                      | 8141765  | EMGA-60-P-G12-SST-57 |




| Planetary gear for EMMT-ST-87   |            | Datasheets → Internet: emga |          |                      |
|---|------------|-----------------------------|----------|----------------------|
|   | Gear ratio | Product weight              | Part no. | Type                 |
|  | 3:1        | 2100 g                      | ☆ 549432 | EMGA-80-P-G3-SST-87  |
|   | 5:1        | 2100 g                      | ☆ 549433 | EMGA-80-P-G5-SST-87  |
|   | 8:1        | 2100 g                      | 8141766  | EMGA-80-P-G8-SST-87  |
|   | 12:1       | 2600 g                      | 8141767  | EMGA-80-P-G12-SST-87 |



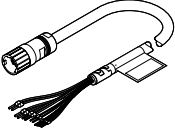
## Accessories

## Recommended cable cross section as a function of cable length and servo drive CMMT-ST

|                  | Up to 5 m | Up to 10 m | Up to 20 m | Up to 25 m |
|------------------|-----------|------------|------------|------------|
| EMMT-ST-42-S-... | Q6        | Q6         | Q6         | Q6         |
| EMMT-ST-42-L-... | Q6        | Q6         | Q7         | Q7         |
| EMMT-ST-57-M-... | Q6        | Q7         | Q9         | Q9         |
| EMMT-ST-57-L-... | Q6        | Q7         | Q9         | Q9         |
| EMMT-ST-87-S-... | Q7        | Q9         | Q9         | Q9         |
| EMMT-ST-87-M-... | Q7        | Q9         | Q9         | Q9         |
| EMMT-ST-87-L-... | Q7        | Q9         | Q9         | Q9         |

|   |                          |
|---|--------------------------|
|  | Q6 = 0.5mm <sup>2</sup>  |
|  | Q7 = 0.75mm <sup>2</sup> |
|  | Q9 = 1.5mm <sup>2</sup>  |

## Ordering data – Motor cable

|  | Cable cross section <sup>1)</sup> | Bending radius, flexible cable installation | Cable characteristic       | Cable length | Part no. | Type                        |
|--|-----------------------------------|---|----------------------------|--------------|----------|-----------------------------|
|  | 0.5 mm <sup>2</sup>               | 78.75 mm                                    | Suitable for energy chains | 2.5 m        | 8181670  | NEBM-M17G12-EH-2.5-Q6N-LE12 |
|  |                                   |   |                            | 5 m          | 8181668  | NEBM-M17G12-EH-5-Q6N-LE12   |
|  |                                   |   |                            | 7.5 m        | 8190096  | NEBM-M17G12-EH-7.5-Q6N-LE12 |
|  |                                   |   |                            | 10 m         | 8195457  | NEBM-M17G12-EH-10-Q6N-LE12  |
|  | 0.75 mm <sup>2</sup>              | 78.75 mm                                    | Suitable for energy chains | 2.5 m        | 8195458  | NEBM-M17G12-EH-2.5-Q7N-LE12 |
|  |                                   |   |                            | 5 m          | 8195459  | NEBM-M17G12-EH-5-Q7N-LE12   |
|  |                                   |   |                            | 7.5 m        | 8195460  | NEBM-M17G12-EH-7.5-Q7N-LE12 |
|  | 0.5 ... 1.5 mm <sup>2</sup>       | 78.75 ... 81 mm                             | Suitable for energy chains | 0.5 ... 25 m | 8181663  | NEBM-LX/M17-                |

1) For NEBM-LX/M17-...: choice of cable lengths: 0.5 ... 25 m, in 0.5 m grid and all cable cross-sections Q6, Q7, Q9

## Ordering data – Mounting flange for fitting the motor cable plug (e.g. on the control cabinet)

|   | Note on materials | Part no. | Type        |
|---|-------------------|----------|-------------|
|  | RoHS-compliant    | 8191777  | NEAM-MF-M17 |