

Cantilever axes EGSA, with spindle drive



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Key features

At a glance

The spindle driven cantilever axis EGSA reduces cycle times to an absolute minimum. This is thanks to a powerful mechanical system and a range of motor choices adapted to the requirements of the application.

In contrast to the electric cantilever axis DGEA designed for longer strokes, the EGSA demonstrates its strengths with short strokes.

Advantages:

- Maximum precision
- High dynamic response
- Repetition accuracy of ± 0.01 mm

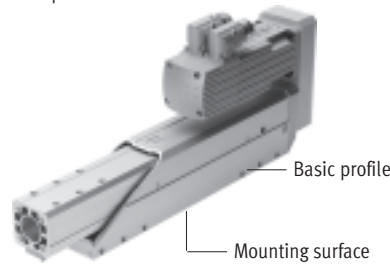
Complete system comprises cantilever axis, motor, motor controller and motor mounting kit

Spindle driven cantilever axis

With axial kit



With parallel kit



 Note

The spindle driven cantilever axis must only be mounted using the underside of the base profile (→ picture on left). The lateral holes on the base profile are provided for securing accessories (e.g. protective trunking).

Motor

→ 11



- 1 Servo motor EMMS-AS
- 2 Stepper motor EMMS-ST

 Note

A range of specially adapted complete solutions is available for the spindle driven cantilever axis EGSA and the motors.

Motor controller

Technical data → Internet: motor controller



- 1 Servo motor controller CMMP-AS
- 2 Stepper motor controller CMMS-ST

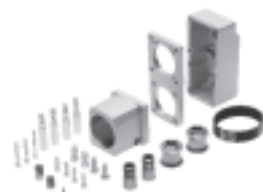
Motor mounting kit

→ 11

Axial kit



Parallel kit



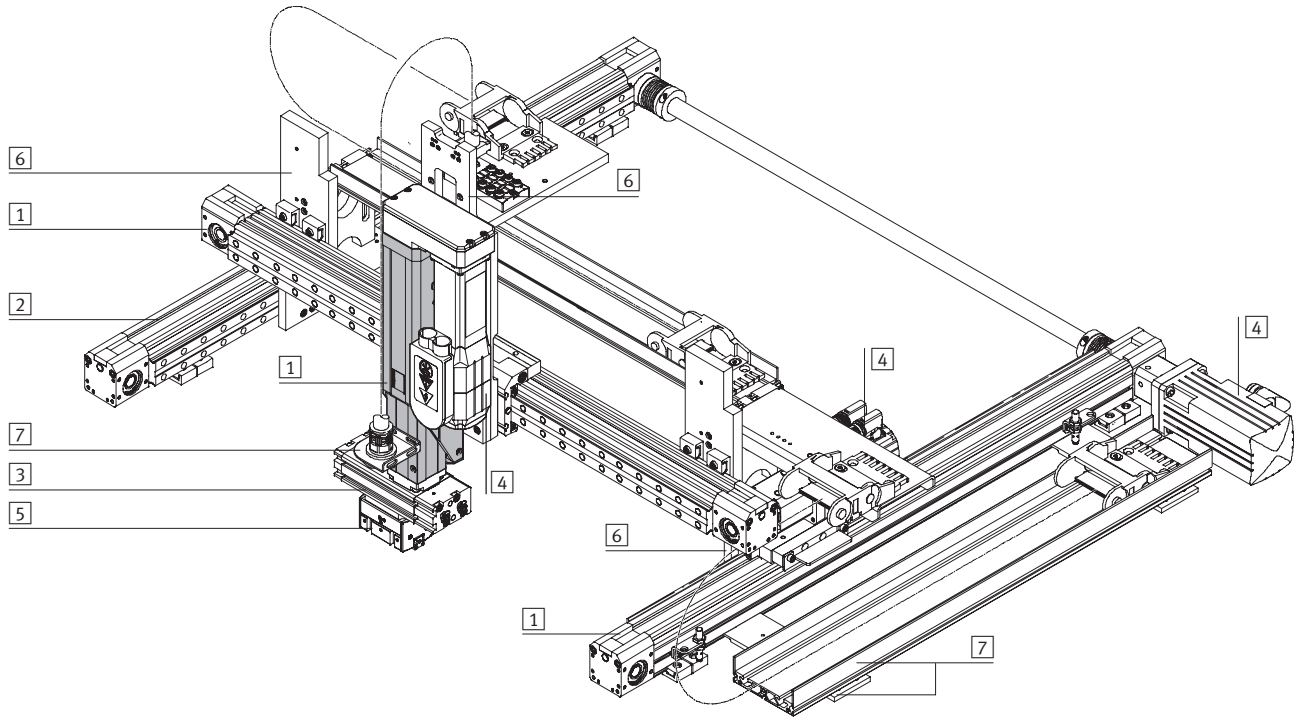
There are complete kits for both parallel and axial motor mounting.

Cantilever axes EGSA, with spindle drive

Key features

FESTO

System product for handling and assembly technology



| System components and accessories | | |
|-----------------------------------|-------------------------|--|
| | Brief description | → Page/Internet |
| 1 | Axes | Wide range of combinations possible within handling and assembly technology axes |
| 2 | Guide axes | To increase force and torque capacity in multi-axis applications guide axes |
| 3 | Drives | Wide range of combinations possible within handling and assembly technology drive |
| 4 | Motors | Servo and stepper motors motor |
| 5 | Grippers | Wide range of variations possible within handling and assembly technology gripper |
| 6 | Adapters | For drive/drive and drive/gripper connections adapter kit |
| 7 | Installation components | For a clean, safe layout of electrical cables and tubing installation component |

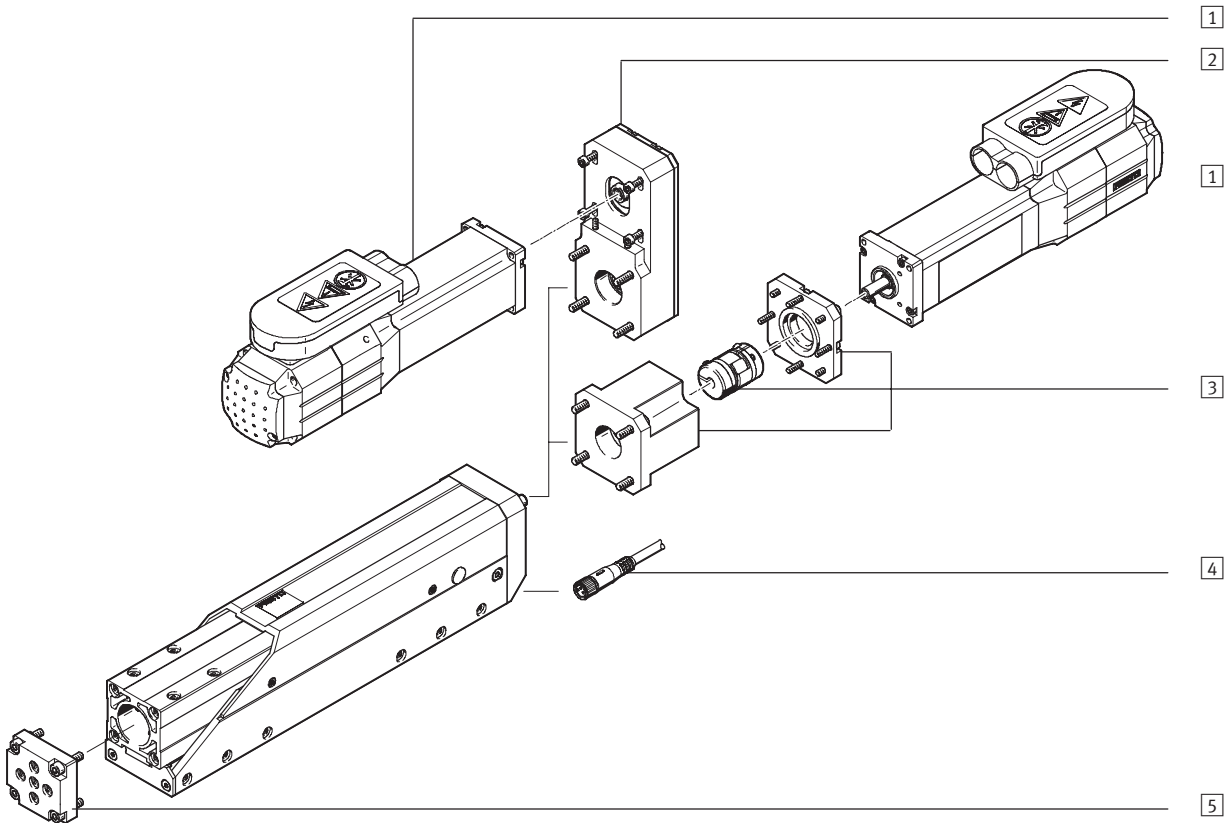
Cantilever axes EGSA, with spindle drive

Type codes and peripherals overview

Type codes

| | | | |
|--------------------|------------------------------------|----|-----|
| EGSA | | 50 | 100 |
| Type | | | |
| EGSA | Cantilever axis with spindle drive | | |
| Size | | | |
| Stroke [mm] | | | |

Peripherals overview

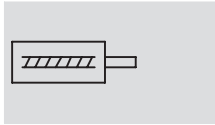




| Accessories | | |
|----------------------------|--|-----------------|
| Type | Brief description | → Page/Internet |
| 1 Motor EMMS | <ul style="list-style-type: none"> • Motors specially matched to the axis, with or without brake • The motor can be turned by 90° for mounting, depending on requirements. This means the connection side can be freely selected | 11 |
| 2 Parallel kit EAMM-U | For parallel motor mounting (consisting of: housing, clamping component, clamping sleeve, toothed belt pulley, toothed belt) | 11 |
| 3 Axial kit EAMM-A | For axial motor mounting (consisting of: coupling, coupling housing and motor flange) | 11 |
| 4 Connecting cable NEBU | For connecting the proximity sensor to a controller. The proximity sensor (N/C contact) is integrated in the spindle driven cantilever axis | 14 |
| 5 Adapter kit HMSV | Interface between the spindle driven cantilever axis and drive or gripper | 14 |

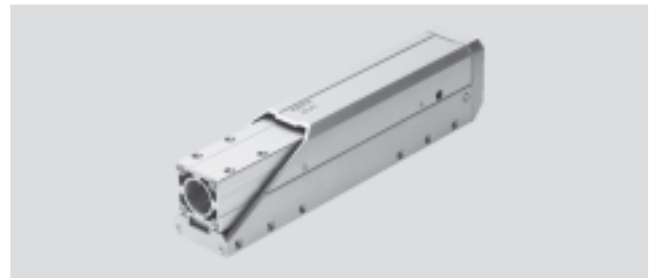
Cantilever axes EGSA, with spindle drive

Technical data

Function



-  - Size
50 and 60
-  - Stroke length
100 ... 300 mm



| General technical data | | | | |
|---|--|-----|-------|-----|
| Size | 50 | | 60 | |
| Constructional design | Electromechanical cantilever axis with recirculating ball bearing spindle and roller bearing guide | | | |
| Working stroke [mm] | 100 | 100 | 200 | 300 |
| Stroke reserve [mm] | -3/+7 | | -4/+9 | |
| Max. speed [m/s] | 1.0 | 1.5 | | 1.0 |
| Max. rotational speed [rpm] | 3,000 | | | |
| Max. acceleration ¹⁾ [m/s ²] | 15 | | | |
| Reversing backlash ²⁾ [mm] | ≤ 0.02 | | | |
| Repetition accuracy [mm] | ±0.01 | | | |
| Position sensing | Sensing of the reference point via integrated reference sensor (N/C contact) | | | |
| Type of mounting | Via female thread and centring sleeve | | | |
| Mounting position | Any | | | |

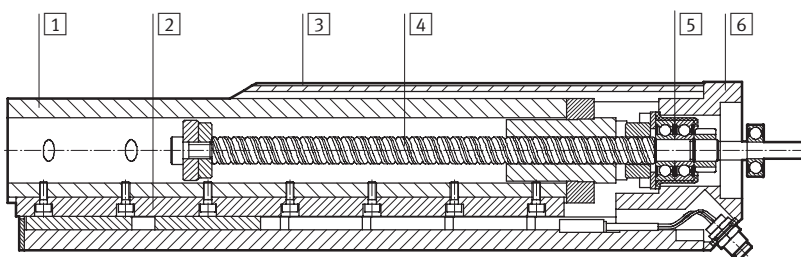
- 1) At max. effective load
- 2) In new condition

| Operating and environmental conditions | | | | |
|---|----------|--|------|--|
| Size | 50 | | 60 | |
| Ambient temperature ¹⁾ [°C] | 0 ... 50 | | | |
| Storage temperature [°C] | 0 ... 50 | | | |
| Duty cycle [%] | 100 | | | |
| Noise level [dB] | < 58 | | < 62 | |
| Protection class | IP20 | | | |
| Relative air humidity ²⁾ [%] | 0 ... 95 | | | |

- 1) Note operating range of proximity sensors and motors
- 2) Non-condensing

Materials

Sectional view



| Spindle driven cantilever axis | | |
|--------------------------------|------------------------|-----------------------------------|
| 1 | Cantilever profile | Wrought aluminium alloy, anodised |
| 2 | Guide rail | Rolled steel |
| 3 | Housing profile, cover | Wrought aluminium alloy, anodised |
| 4 | Ball screw | Steel |
| 5 | Ball bearing | Steel |
| 6 | Spindle bearing plate | Wrought aluminium alloy, anodised |
| - | Note on material | Conforms to RoHS |

Cantilever axes EGSA, with spindle drive

Technical data

| Weight | | | | | |
|--------------|------|-------|-------|-------|-------|
| Size | | 50 | 60 | | |
| Stroke | [mm] | 100 | 100 | 200 | 300 |
| Basic weight | [g] | 2,000 | 3,300 | 4,200 | 5,100 |
| Moving load | [g] | 750 | 1,350 | 1,800 | 2,250 |

| Mass moment of inertia | | | | | |
|--------------------------|-------------------------|-----|------|------|------|
| Size | | 50 | 60 | | |
| Stroke | [mm] | 100 | 100 | 200 | 300 |
| Total | [kgmm ²] | 2 | 21.9 | 29.8 | 37.8 |
| Per kg of effective load | [kgmm ² /kg] | 2.5 | 16.4 | | |

| Mechanical data | | | | | |
|---------------------------------|-----------|-----|------|--|--|
| Size | | 50 | 60 | | |
| Spindle diameter | [mm] | 10 | 12.7 | | |
| Spindle pitch | [mm/rev.] | 10 | 25.4 | | |
| Max. feed force F_{xmax} | [N] | 120 | 240 | | |
| Continuous feed force | [N] | 100 | 200 | | |
| Max. effective load, horizontal | [kg] | 5 | 10 | | |
| Max. effective load, vertical | [kg] | 3 | 6 | | |
| Continuous driving torque | [Nm] | 0.2 | 1 | | |
| Max. radial force ¹⁾ | [N] | 60 | 110 | | |

1) On the drive shaft

Calculation of the mean feed force F_{xm}

The peak feed force value must not exceed the maximum feed force within a movement cycle. In the case of vertical operation, the peak value is generally

achieved during the acceleration phase of the upwards stroke. If the maximum feed force is exceeded, this can increase wear and thus shorten

the service life of the ball screw spindle. The maximum speed must likewise not be exceeded.

$$F_x \leq F_{xmax}$$

and

$$v_x \leq v_{xmax}$$

Mean feed force (to DIN 69 051-4)

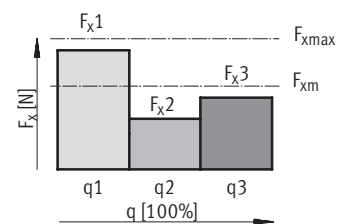
During operation, the continuous feed force may be briefly exceeded up to the maximum feed force. The continu-

ous feed force must, however, be adhered to when averaged over a movement cycle.

$$F_{xm} \leq F_{xcont}$$

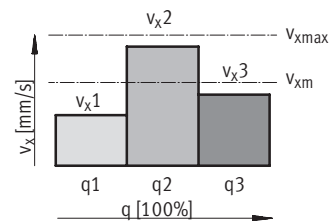
$$F_{xm} = \sqrt[3]{\sum F_x^3 \times \frac{v_x}{v_{xm}} \times \frac{q}{100}} =$$

$$F_{xm} = \sqrt[3]{F_{x1}^3 \times \frac{v_{x1}}{v_{xm}} \times \frac{q_1}{100} + F_{x2}^3 \times \frac{v_{x2}}{v_{xm}} \times \frac{q_2}{100} + F_{x3}^3 \times \frac{v_{x3}}{v_{xm}} \times \frac{q_3}{100} + \dots}$$



Mean feed speed (to DIN 69 051-4)

$$v_{xm} = \sum v_x \times \frac{q}{100} = v_{x1} \times \frac{q_1}{100} + v_{x2} \times \frac{q_2}{100} + v_{x3} \times \frac{q_3}{100} + \dots$$



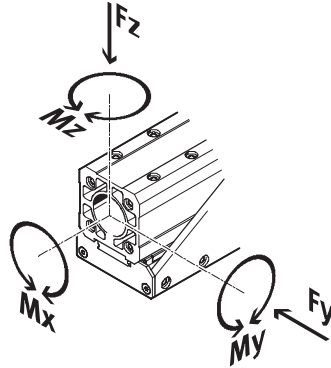
| | | | |
|-------------|-----------------------|------------|-----------------|
| F_x | Feed force | v_x | Feed speed |
| F_{xm} | Mean feed force | v_{xm} | Mean feed speed |
| F_{xmax} | Max. feed force | v_{xmax} | Max. feed speed |
| F_{xcont} | Continuous feed force | | |
| q | Time | | |

Cantilever axes EGSA, with spindle drive

Technical data

Characteristic load values of the guide

The indicated forces and torques refer to the centre of the guide rail. They must not be exceeded during dynamic operation. Special attention must be paid to the cushioning phase.



If the cantilever axis is simultaneously subjected to several of the forces and torques listed below, the following equation must be satisfied in addition to the indicated maximum loads:

$$\left| \frac{F_y}{F_{y_{max.}}} \right| + \left| \frac{F_z}{F_{z_{max.}}} \right| + \left| \frac{M_x}{M_{x_{max.}}} \right| + \left| \frac{M_y}{M_{y_{max.}}} \right| + \left| \frac{M_z}{M_{z_{max.}}} \right| \leq 1$$

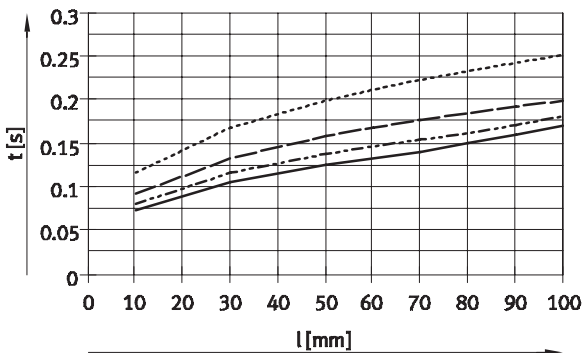
| Permissible forces and torques | | 50 | 60 |
|--------------------------------|------|-----|-----|
| Size | | 50 | 60 |
| $F_{y_{max.}}$ | [N] | 150 | 200 |
| $F_{z_{max.}}$ | [N] | 150 | 200 |
| $M_{x_{max.}}$ | [Nm] | 10 | 25 |
| $M_{y_{max.}}$ | [Nm] | 25 | 70 |
| $M_{z_{max.}}$ | [Nm] | 25 | 70 |

Note

Sizing software
PositioningDrives
→ www.festo.com

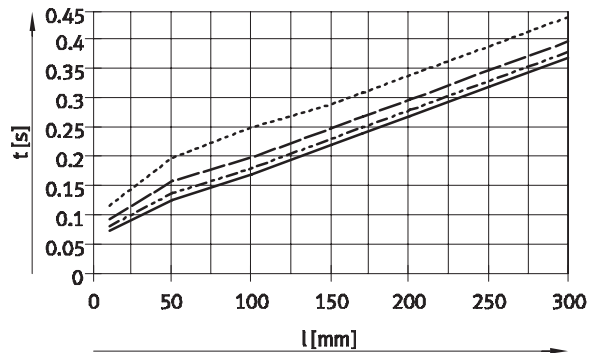
Positioning time t as a function of working stroke l and load m

EGSA-50-100 with servo motor EMMS-AS-40...



— $m = 0$ kg
- - - $m = 1$ kg
- · - $m = 2$ kg
· · · $m = 3$ kg

EGSA-60-300 with servo motor EMMS-AS-55...

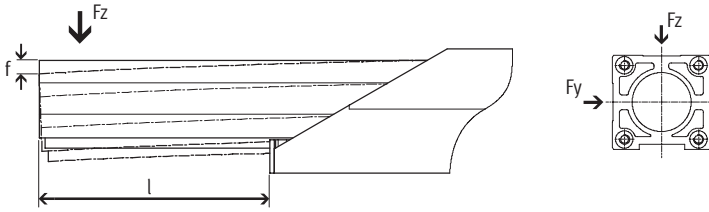


— $m = 0$ kg
- - - $m = 2$ kg
- · - $m = 4$ kg
· · · $m = 6$ kg

Cantilever axes EGSA, with spindle drive

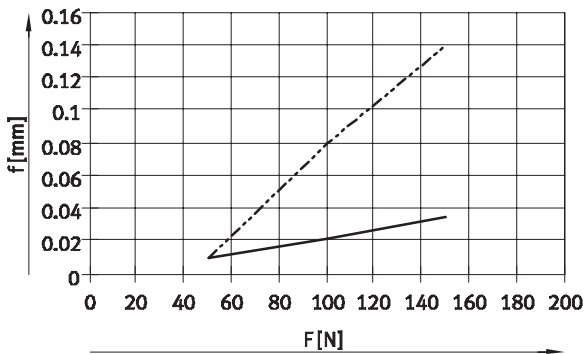
Technical data

Deflection f as a function of working stroke l and effective load F

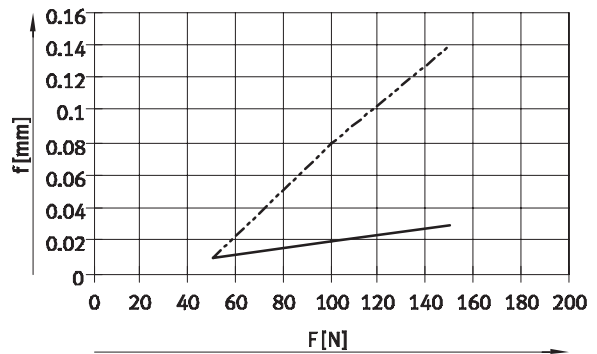


EGSA-50-100

Applied force F_y



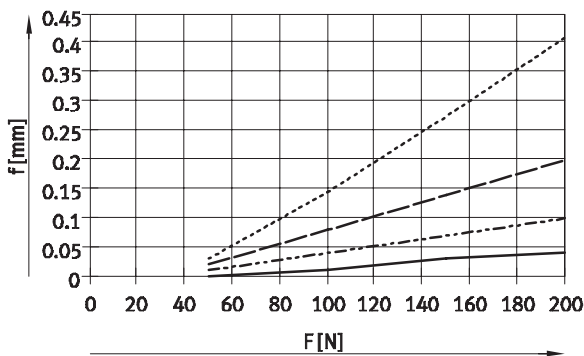
Applied force F_z



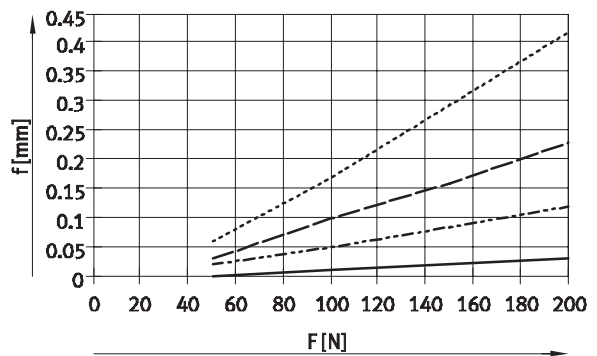
— $l = 0$ mm
 - - - $l = 100$ mm

EGSA-60-...

Applied force F_y



Applied force F_z



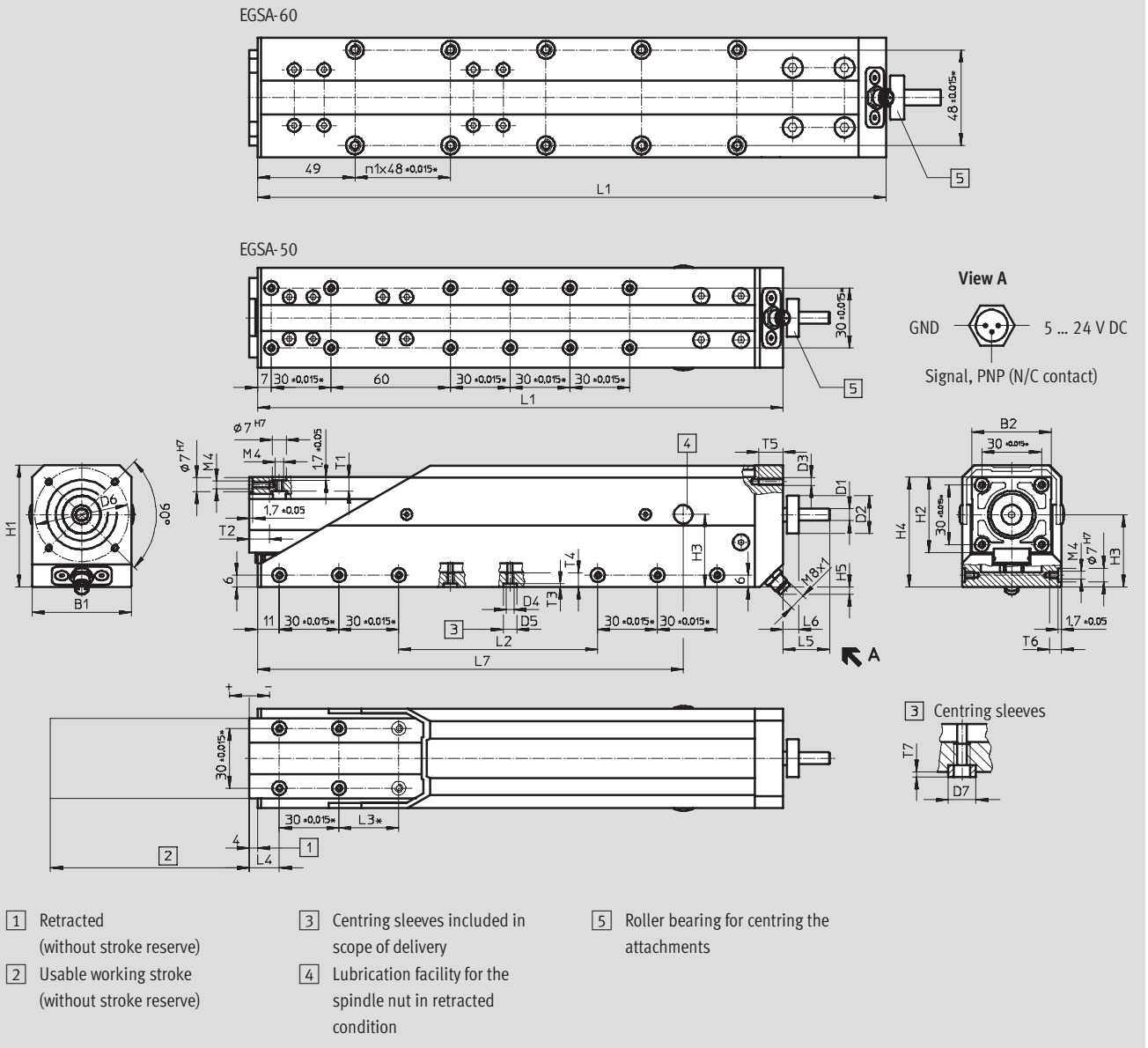
— $l = 0$ mm
 - - - $l = 100$ mm
 - · - $l = 200$ mm
 · · · $l = 300$ mm

Cantilever axes EGSA, with spindle drive

Technical data

Dimensions

Download CAD data → www.festo.com



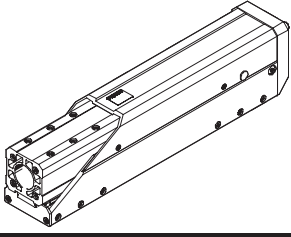
| Size | Stroke [2] | Stroke reserve | | B1 | B2 | D1 k6 ∅ | D2 -0.01 ∅ | D3 | D4 | D5 H7 ∅ | D6 ∅ | D7 ∅ | H1 | H2 | H3 |
|------|---------------|----------------|----------|----|----|---------------|------------------|----|----|---------------|---------|------------------|------|----|------|
| | | Retracted | Advanced | | | | | | | | | | | | |
| 50 | 100 | -3 | +7 | 50 | 40 | 6 | 19 | M4 | M4 | 7 | 47 | 7 _{js7} | 61.4 | 38 | 36.4 |
| | 200 | -4 | +9 | 60 | 48 | 8 | 22 | M5 | M6 | 9 | 60 | 9 _{h6} | 75 | 48 | 45 |
| | 300 | | | | | | | | | | | | | | |

| Size | Stroke [2] | H4 | H5 | L1 | L2 | L3* ±0.015 | L4 | L5 | L6 | L7 | n1 | T1 min. | T2 min. | T3 ±0.05 | T4 min. | T5 min. | T6 min. | T7 ±0.1 |
|------|---------------|----|-----|-----|-----|---------------|----|------|----|-----|----|------------|------------|-------------|------------|------------|------------|------------|
| | | | | | | | | | | | | | | | | | | |
| 60 | 100 | 69 | 1.3 | 316 | 152 | 30 | 20 | 27.5 | -9 | 258 | 4 | 10 | 14 | 2.2 | 12 | 11 | 15 | 1.8 |
| | 200 | | | 416 | 252 | | | | | 358 | 6 | | | | | | | |
| | 300 | | | 516 | 352 | | | | | 458 | 8 | | | | | | | |

* Tolerances for centring holes, ±0.2 for threaded holes

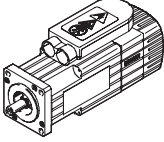
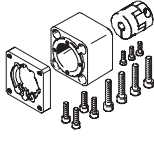
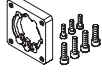

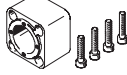
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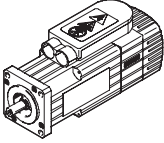
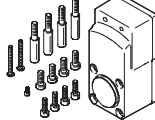
Technical data


| Ordering data | | | | |
|---|------|--------|---------------|--------------------|
| | Size | Stroke | Part No. | Type |
|  | 50 | 100 | 558199 | EGSA-50-100 |
| | 60 | 100 | 558200 | EGSA-60-100 |
| | | 200 | 558201 | EGSA-60-200 |
| | | 300 | 558202 | EGSA-60-300 |
| | | | | |

Cantilever axes EGSA, with spindle drive

Accessories

| Permissible axis/motor combinations with axial kit | | | | |
|---|---|---|---|---|
| Motor | Axial kit | Axial kit consisting of: | | |
| | | Motor flange | Coupling | Coupling housing |
|  |  |  |  |  |
| Type | Part No. Type | Part No. Type | Part No. Type | Part No. Type |
| EGSA-50 | | | | |
| with servo motor | | | | |
| EMMS-AS-40-... | 559798 EAMM-A-A19-40A | 558904 EAMF-A-28C-40A | 558901 EAMC-20-30-6-6 | 559801 EAMK-A-A19-28C |
| with stepper motor | | | | |
| EMMS-ST-42-... | 558895 EAMM-A-A19-42A | 558905 EAMF-A-28C-42A | 558902 EAMC-20-30-5-6 | 559801 EAMK-A-A19-28C |
| EGSA-60 | | | | |
| with servo motor | | | | |
| EMMS-AS-55-... | 559799 EAMM-A-A22-55A | 559800 EAMF-A-38C-55A | 557390 EAMC-30-35-8-9 | 559802 EAMK-A-A22-38C |
| EMMS-AS-70-... | 558898 EAMM-A-A22-70A | 558908 EAMF-A-38C-70A | 123042 EAMC-30-35-8-11 | 559802 EAMK-A-A22-38C |
| with stepper motor | | | | |
| EMMS-ST-57-... | 558897 EAMM-A-A22-57A | 558907 EAMF-A-38C-57A | 530088 EAMC-30-35-6.35-8 | 559802 EAMK-A-A22-38C |

| Permissible axis/motor combinations with parallel kit | |
|---|--|
| Motor | Parallel kit |
|  |  |
| Type | Part No. Type |
| EGSA-50 | |
| with servo motor | |
| EMMS-AS-40-... | 559785 EAMM-U-A19-40A |
| EGSA-60 | |
| with servo motor | |
| EMMS-AS-55-... | 559786 EAMM-U-A22-55A |
| EMMS-AS-70-... | 559787 EAMM-U-A22-70A |

 Note
 Technical data for motors
 → Internet: motor

Cantilever axes EGSA, with spindle drive

Accessories

Axial kit EAMM-A-...

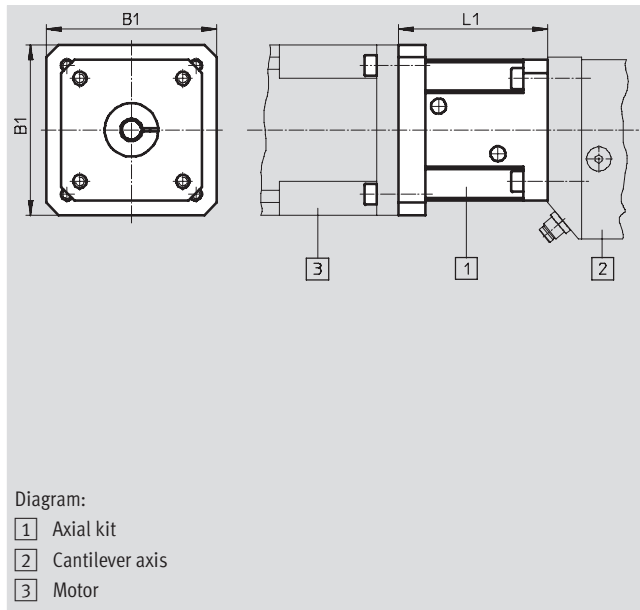
Material:

Coupling housing, motor flange:

Wrought aluminium alloy

Coupling hubs: Aluminium

Screws: Galvanised steel



| General technical data | | | | | |
|---|------|------|------|------|------|
| EAMM-A-... | A19- | | A22- | | |
| | 40A | 42A | 55A | 57A | 70A |
| Transferable torque [Nm] | 2.3 | 2.2 | 5.1 | 7.5 | 8 |
| Mass moment of inertia [kgmm ²] | 1.06 | 1.06 | 6.06 | 6.06 | 6.06 |
| Mounting position | Any | | | | |

| Operating and environmental conditions | |
|--|------------------|
| Ambient temperature [°C] | 0 ... 50 |
| Storage temperature [°C] | -25 ... +60 |
| Protection class ¹⁾ | IP40 |
| Relative air humidity [%] | 0 ... 95 |
| Corrosion resistance class CRC ²⁾ | 2 |
| Note on material | Conforms to RoHS |

1) Only with combined attachment of motor and axis

2) Corrosion resistance class 2 to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

| Dimensions and ordering data | | | | | |
|------------------------------|----|------|------------|----------|----------------|
| Type | B1 | L1 | Weight [g] | Part No. | Type |
| EAMM-A-A19-40A | 49 | 49 | 240 | 559798 | EAMM-A-A19-40A |
| EAMM-A-A19-42A | 49 | 55.5 | 270 | 558895 | EAMM-A-A19-42A |
| EAMM-A-A22-55A | 58 | 59 | 430 | 559799 | EAMM-A-A22-55A |
| EAMM-A-A22-57A | 58 | 59 | 430 | 558897 | EAMM-A-A22-57A |
| EAMM-A-A22-70A | 70 | 61.5 | 480 | 558898 | EAMM-A-A22-70A |

Cantilever axes EGSA, with spindle drive

Accessories

Parallel kit EAMM-U-...

Material:

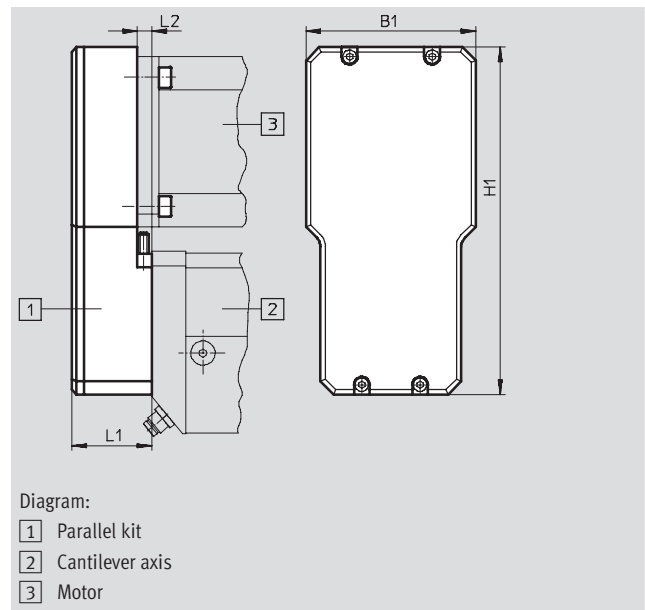
Housing, end cap, drive pulley:

Wrought aluminium alloy

Clamping sleeve: Corrosion-resistant steel

Toothed belt: Polychloroprene

Screws: Galvanised steel



| General technical data | | | | |
|------------------------|----------------------|-------|-------|-------|
| EAMM-U-... | | A19- | A22- | |
| | | 40A | 55A | 70A |
| Transferable torque | [Nm] | 1 | 3 | 3 |
| No-load driving torque | [Nm] | 0.05 | 0.1 | 0.2 |
| Mass moment of inertia | [kgmm ²] | 2.868 | 9.630 | 10.13 |
| Max. rotational speed | [rpm] | 6,000 | 4,000 | 4,000 |
| Mounting position | | Any | | |

| Operating and environmental conditions | |
|--|------------------|
| Ambient temperature | [°C] 0 ... 50 |
| Storage temperature | [°C] -25 ... +60 |
| Protection class ¹⁾ | IP40 |
| Relative air humidity | [%] 0 ... 95 |
| Corrosion resistance class CRC ²⁾ | 2 |
| Note on material | Conforms to RoHS |

1) Only with combined attachment of motor and axis

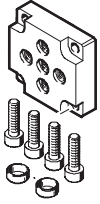
2) Corrosion resistance class 2 to Festo standard 940 070



Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

| Dimensions and ordering data | | | | | | |
|------------------------------|----|-----|----|-----|------------|------------------------------|
| Type | B1 | H1 | L1 | L2 | Weight [g] | Part No. Type |
| EAMM-U-A19-40A | 49 | 107 | 30 | 7 | 270 | 559785 EAMM-U-A19-40A |
| EAMM-U-A22-55A | 58 | 133 | 32 | 4.5 | 410 | 559786 EAMM-U-A22-55A |
| EAMM-U-A22-70A | 70 | 143 | 33 | 6 | 540 | 559787 EAMM-U-A22-70A |

Cantilever axes EGSA, with spindle drive

Accessories

| Ordering data – Adapter kits | | | | |
|---|---|----------|---------------|----------------|
| | Remarks | For size | Part No. | Type |
|  | Drive/drive connections, drive/gripper connections → Internet: hmsv | 50 | 560017 | HMSV-61 |
| | | 60 | 560018 | HMSV-62 |
| | | | 560019 | HMSV-63 |

| Ordering data – Connecting cables | | | | Technical data → Internet: nebu | |
|---|------------------------------|------------------------------|------------------|---------------------------------|----------------------------|
| | Electrical connection, left | Electrical connection, right | Cable length [m] | Part No. | Type |
|  | Straight socket, M8x1, 3-pin | Cable, open end, 3-wire | 2.5 | 541333 | NEBU-M8G3-K-2.5-LE3 |
| | | | 5 | 541334 | NEBU-M8G3-K-5-LE3 |
|  | Angled socket, M8x1, 3-pin | Cable, open end, 3-wire | 2.5 | 541338 | NEBU-M8W3-K-2.5-LE3 |
| | | | 5 | 541341 | NEBU-M8W3-K-5-LE3 |