Electric linear drives
Mechatronic Motion Solutions

Mechatronic Motion Solutions from Festo is a worldwide unique system which comprises components, modules and software. It combines all types of pneumatic, servopneumatic and (electro)mechanical motion, geared to your task. Irrespective of the control system environment you use, Mechatronic Motion Solutions provides the appropriate interfaces.

Mechatronic
Guarantees mechanical and electrical compatibility at all levels. All pneumatic and electric drives are equipped with compatible interfaces for mechanical, data and energy transmission, thus ensuring that different technologies can be combined in one system. And it enables complex handling and positioning systems to be set up easily and safely.

Motion
Stands for the comprehensive, multi-dimensional portfolio of linear and rotary drives as well as a large variety of mechanical and vacuum grippers.

With a host of benefits in the case of electric linear drives:
- Wide range of performance options
- Economical, precise, dynamic, sturdy or flexible
- Specially designed range of motors with uniform software packages

Solutions
Represents the decades of experience Festo has in the field of handling technology, across all industries and continents, as well as its expertise in the development of components and sophisticated systems. They range from pre-designed and calculated components to subsystems and complete systems. The result is a perfect electric drive package, made up of linear drive, gear unit, motor, controller and software; a single-axis solution tailored to the requirements of the application and in line with your specifications.
**Operating principles**

**Gantry axes** almost always play a crucial role in automating linear motion in handling technology. They combine a linear guide for the slide unit with a toothed belt or spindle drive, with the slide moving between the two axes.

In contrast, the **cantilever axes and slides** move in and out of the working space.

**Gantry axes**
Powerful, fast and precise, for movement inside the working space.
⇒ More information on pages 6 – 9

**Cantilever axes**
High load bearing, fast and durable, for moving in and out of the working space.
⇒ More information on pages 10 – 12

**Electric slides**
High load bearing, precise and variable, for positioning in the working space.
⇒ More information on page 13

**Linear motor axes**
Highly dynamic and precise movement.
⇒ More information on pages 14 – 15

**Motors and controllers**
Compatible with the linear drive and scalable for any application.
⇒ More information on pages 16 – 18

**Handling systems and solutions**
System expertise in 2D and 3D for your task.
⇒ More information on page 23

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**Software tools**
Software support to help create the ideal drive package in no time, including simple and reliable startup.
⇒ More information on pages 19 – 20

**Service**
On-site commissioning.
⇒ More information on pages 21 – 22
# Mechatronic Motion Solutions: an overview of the electric drive spectrum

## Coordinating level

<table>
<thead>
<tr>
<th>Control system</th>
<th>Coordinating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC (ABB, Allen-Bradley, Rockwell, Siemens etc.)</td>
<td>Modular controller CECX</td>
</tr>
<tr>
<td>Integrated controller FED-CEC</td>
<td>Servo motor controller CMMP-AS</td>
</tr>
</tbody>
</table>

## Control level

<table>
<thead>
<tr>
<th>Controller</th>
<th>Field level</th>
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</thead>
<tbody>
<tr>
<td>Actuation</td>
<td>Drives</td>
</tr>
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</table>

## Field level

<table>
<thead>
<tr>
<th>Drives</th>
<th>Actuation</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor controller SFC-DC</td>
<td>Motor controller SFC-LAC</td>
<td>Modular controller CECX</td>
</tr>
<tr>
<td>Motor controller SFC-LACI</td>
<td>Motor controller CMFL</td>
<td>Servo motor controller CMMP-AS</td>
</tr>
</tbody>
</table>

## Electric

<table>
<thead>
<tr>
<th>Handling axes</th>
<th>Linear motor axes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HME with linear motor</td>
<td>ELGL-LAS</td>
</tr>
<tr>
<td>SLT with DC-Motor</td>
<td>DNCE-LAS</td>
</tr>
</tbody>
</table>

## Pneumatic/servopneumatic

<table>
<thead>
<tr>
<th>Front Unit</th>
<th>Grippers</th>
<th>Vacuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schlitten</td>
<td>EGSL</td>
<td>ADNE-LAS</td>
</tr>
<tr>
<td>SLT with DC-Motor</td>
<td>DNCE-LAS</td>
<td>DFME-LAS</td>
</tr>
</tbody>
</table>
The new axis range in the mechatronic modular system consists of an extensive series with a multitude of options, e.g. for high dynamic response and speed, redefined rigidity, high force resistance. It is perfect both for individual, stand-alone solutions and for complete system solutions.

In profile
The generously sized profiles of the EGC with their optimised cross section afford the drives maximum rigidity and load capacity. Their speed, acceleration and torque resistance set a new standard, especially with the new HD heavy duty version.

Gantry axes
Thanks to their construction with a slide unit, gantry axes permit movement between the two ends of the axis; in other words, directly inside the working space.

A range of drive options
The application is the decisive factor when choosing a drive.

For good acceleration and high speed together with long strokes, a toothed belt drive is the best choice; for high feed forces and exact positioning, a spindle drive. The recirculating ball bearing guide allows high transverse forces to be applied to slides and guides, even during movement.

The different versions

Toothed belt axis EGC-TB
Dynamic drive for high speeds together with high loads and long strokes.

Spindle axis EGC-BS
Precise drive for accuracy and smooth running together with high loads and long strokes.

Guide axis EGC-FA
Driveless linear guide unit to support forces and torques in multi-axis applications.

Toothed belt axis and spindle axis EGC
The new axis range in the mechatronic modular system consists of an extensive series with a multitude of options, e.g. for high dynamic response and speed, redefined rigidity, high force resistance. It is perfect both for individual, stand-alone solutions and for complete system solutions.
Flexible motor connection on EGC-TB/EGC-TB-HD

• Motor can be attached on 4 sides, freely selectable
• Subsequent modifications possible at any time

The benefits to you:
Define a standard attachment variant with one part number and modify it to alternative positions as and when needed

Technical specifications EGC-TB/BS-KF

<table>
<thead>
<tr>
<th>Size</th>
<th>50/70/80/120/185</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive</td>
<td>Spindle drive/ toothed belt drive</td>
</tr>
<tr>
<td>Max. stroke [mm]</td>
<td>5000/8500 (10,000)</td>
</tr>
<tr>
<td>Max. speed [m/s]</td>
<td>2/5</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>±0.1...0.02</td>
</tr>
<tr>
<td>Max. force Fx [N]</td>
<td>2500/3000</td>
</tr>
<tr>
<td>Max. torque load Mx [Nm]</td>
<td>529</td>
</tr>
<tr>
<td>Max. torque load My/Mz [Nm]</td>
<td>1820</td>
</tr>
<tr>
<td>Options</td>
<td>Connecting module for central lubrication</td>
</tr>
</tbody>
</table>

Reliable thanks to optional sensing

• SIES-8M inductive proximity sensor
• Flush mounting of up to 2 sensors in the profile slot
• Maximum of 4 sensors
• Output status displays: 2 yellow LEDs
• Repetition accuracy ≤ ±0.05 mm (radial)

Slide variants:

Second slide
• 1 active and 1 passive (freely movable) slide
• Adjustable, extended guide
• For greater axial and lateral torques
• More mounting options

Extended slide
• Longer guide
• For a greater axial torque
• More mounting options

Protected slide
• Scraper on both sides of the slide
• Removes dirt particles and liquids from the external guide
• For use in aggressive environments

Second slide
• 1 active and 1 passive (freely movable) slide
• Adjustable, extended guide
• For greater axial and lateral torques
• More mounting options
**Electric toothed belt axis**

**ELGR/ELGG**

Perfect for applications with comparatively low requirements in terms of mechanical load, dynamics and precision in a cost-optimised design. Thanks to their great flexibility and a broad range of applications, the ELGR and the ELGG excel in applications that are easy to implement and that can be solved economically.

**Benefits**
- Flexible motor mounting in 4 positions: on either axis end, on top or underneath; can also be moved to different position at a later date
- A range of optional slide variants: extended slide, 1 or 2 additional slides
- 2 functions with 1 additional slide: ELGR with same-direction slide motion for higher loads and better guidance; ELGG with bi-parting slide motion for centring or gripping functions or to open and close two-part doors
- Simple end-position sensing, easy to operate

**Simple engineering**
- Simple and reliable configuration with PositioningDrives software
- Convenient and easy commissioning with FCT software
- Open motor interface for in-house standards

**Movement options with an additional slide**

**ELGG with bi-parting motion:** Both slides are joined to the toothed belt and move synchronously in opposite directions.

**ELGR movement in the same direction:** One slide is joined to the toothed belt, while the second slide moves freely and provides an extended guide.

**End-position sensing**

Reliability thanks to optional end-position sensing: The SIES-8M inductive proximity sensor, together with a sensor switch and switch lug, can be built onto the axis afterwards at any time.

### Size (= width of the axis profile) 35 45 55

<table>
<thead>
<tr>
<th>Guide type</th>
<th>KF</th>
<th>GF</th>
<th>KF</th>
<th>GF</th>
<th>KF</th>
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<tr>
<td>Max. stroke [mm]</td>
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<td>1000</td>
<td>1500</td>
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<td>Max. feed force $F_{\text{max}}$ [N]</td>
<td>50</td>
<td>100</td>
<td>350</td>
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<tr>
<td>Max. speed [m/s]</td>
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<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>$M_x$ [Nm]</td>
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<td>1</td>
<td>5</td>
<td>2.5</td>
<td>10</td>
<td>5</td>
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<tr>
<td>$M_y$ [Nm]</td>
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<td>3</td>
<td>12</td>
<td>6</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>$M_z$ [Nm]</td>
<td>6</td>
<td>3</td>
<td>12</td>
<td>6</td>
<td>24</td>
<td>12</td>
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<td>Precision [mm]</td>
<td>±0.1</td>
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<td></td>
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</tbody>
</table>

*KF = ball-bearing guide, GF = plain-bearing guide*
Benefits

- Repetition accuracy up to 3 μm
- High life expectancy of 10,000 km – no servicing required!
- Uniform and smooth running properties
- Uniform design with housings in solid steel, which simultaneously function as guides
- Optional spindle cover in all sizes
- Optional sensor solution for SIEN-8M inductive sensor, can be mounted on left or right

Electric spindle axes EGSK/EGSP

Perfect when precision, repetition accuracy, compactness and rigidity are required: electric spindle axes EGSK/EGSP.

For standard tasks in the upper segment: EGSK. For high-end applications where higher precision and performance are required: EGSP series with caged ball guide.

Benefits

- High speed up to 10 m/s
- Minimal noise
- Integrated lubrication for 10,000 km running – no servicing required!

Electric toothed belt axis DGE-ZR-RF

High speed built in: the DGE-series variant with internal roller bearing guide is available in three sizes.

Benefits

- Feed forces up to 3000 N
- Self-retarding spindle with trapezoidal thread
- A range of guide and slide options

Electric positioning axis DMES

Positioning axis with trapezoidal threaded spindle for movement with high forces – in 4 sizes.
Cantilever axes

The design of cantilever axes permits movement in and out of the working space.

Cantilever axis with spindle EGSA

For short strokes, dynamic response and precision, with high effective loads at the same time: cantilever axis EGSA with roller bearing guide and spindle drive. Perfect for pick & place applications in handling systems or for guided and controlled pusher applications.

Motor mounting variants

Axial motor mounting

Parallel motor mounting

A range of drive options

Different drives for different applications: spindle drive for precision and effective load, toothed belt drive for dynamic response and long strokes. With integrated guide or as an electric cylinder.

Benefits

• High dynamic response with high effective load – 15 m/s² with an effective load of up to 6 kg vertically or 10 kg horizontally
• Repetition accuracy of ±10 μm
• Flexible motor mounting – axial or parallel, can be changed at any time

Technical specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (drive width)</td>
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<td>50</td>
<td>60</td>
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<tr>
<td>Strokes</td>
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<td>100, 200, 300</td>
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<td>Max. acceleration</td>
<td>m/s²</td>
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<td>Max. feed force (axial force)</td>
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<td>Continuous thrust</td>
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<td>100</td>
<td>200</td>
</tr>
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<td>Repetition accuracy</td>
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<tr>
<td>Effective load</td>
<td>kg</td>
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<td>6</td>
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Permissible forces and torques

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</thead>
<tbody>
<tr>
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</tr>
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<td>[N]</td>
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<td>200</td>
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<td>[Nm]</td>
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<td>70</td>
</tr>
<tr>
<td>M&lt;sub&gt;zmax&lt;/sub&gt;</td>
<td>[Nm]</td>
<td>25</td>
<td>70</td>
</tr>
</tbody>
</table>
Cantilever axis with toothed belt drive DGEA

Long strokes, high acceleration and speed, combined with high repetition accuracy sum up the cantilever axis DGEA with roller bearing guide and toothed belt drive. It is superb in handling systems and wherever high effective loads need to be moved across long strokes. The EGSA’s excellent dynamic response is thanks to its reduced moving mass: the motor, gearing and drive head are permanently mounted, so only the main profile is moved with the load.

Benefits
- High repetition accuracy of ±50 μm
- Effective loads up to 20 kg vertically with maximum stroke of 1000 mm
- Protection against dirt: roller bearing guide integrated into profile
- Two connection directions for the motor: perpendicular to the profile or parallel via right-angle gear unit

Improved oscillation characteristics:
O-drive design characteristic
The cantilever axis is driven by a pinion fixed in the slide. It works “omega-like” along a fixed, finite toothed belt. The particularly flat design of the drive head considerably improves the oscillation characteristics.

Lean machine – DGEA with option-al right-angle gear unit and surface-mounted servo motor

<table>
<thead>
<tr>
<th>Technical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size [mm]</td>
</tr>
<tr>
<td>Guide</td>
</tr>
<tr>
<td>Max. nominal stroke [mm]</td>
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<tr>
<td>Max. effective load horizontal [kg]</td>
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<tr>
<td>Max. effective load vertical [kg]</td>
</tr>
<tr>
<td>Max. feed force [N]</td>
</tr>
<tr>
<td>Max. speed [m/s]</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
</tr>
<tr>
<td>Permissible forces and torques</td>
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<tr>
<td>$F_{\text{max}}$ [N]</td>
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<td>$F_{\text{max}}$ [N]</td>
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<td>$M_{\text{max}}$ [Nm]</td>
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<tr>
<td>$M_{\text{max}}$ [Nm]</td>
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</table>

All-inclusive: handling axis HME

For free adjustment of position, acceleration, speed and force or on-site control: the handling axis HME is available as a complete, ready-to-install system with motor controller SFC-LAC.
**Electric piston rod cylinder DNCE**

The electric piston rod cylinder with two different drive screws: self-retarding lead screw for slow and powerful movement, e.g. for format adjustments. Recirculating ball screw for high feed speeds and running performance, e.g. for dynamic push and pull applications.

**Benefits**

- Two different design principles with specific features, to match requirements: slow and powerful or highly dynamic
- Axial or parallel motor mounting – can be changed at any time
- Absolutely no stick-slip for optimum motion sequence
- Travel, speed, acceleration and force control can all be freely programmed and parameterised

**Note:** When combined with the intelligent servo motor MTR-DCI (→ see page 18) this is self-locking. This enhances safety and reliability when positions need to be retained even during power failure, for example with format adjustment or positioning tasks.

**Freely programmable travel profiles, including gentle acceleration.**
Electric slides

Electromechanical slide EGSL

The EGSL is ideally designed for outstanding performance when it comes to precision, high load capacity and dynamic response, even in compact spaces. This makes it a favourite for economical positioning, for strokes up to 300 mm.

Benefits

• Precise and free positioning with repetition accuracy of up to ±0.02 mm
• Ideal for vertical applications such as press-fitting or joining
• Protected against contamination and small parts in proximity to the guide because the spindle is fully closed, plus additional guide cover as optional
• Simple and low-cost sensing with integrated sensor slots on the right and left
• Matching software tools for configuration, commissioning and more with the uniform FCT software package from Festo

Motor mounting variants

Greater flexibility due to different motor mounting options: lateral or axial. With axial mounting, the motor can be rotated 4 x 90° and is thus optimally adaptable to installation conditions. Another advantage: the open motor interface for in-house standards.

Complete package: the flat electric mini slide SLTE with precise and rigid guide for gentle acceleration and braking using a lead screw, for effective loads up to 4 kg. For variable positioning via motor controller SFC-DC with IP 54 protection.
Linear motor axes and cylinders

Maximum dynamic response and precision, maximum service life and minimum maintenance: these are the characteristics of Festo’s linear motor axes and linear motor cylinders. They are the right choice for applications requiring top speed and acceleration combined with highly precise positioning.

Motor controller
CMMP-AS

You can find more information about compatible motor controllers on page 16.

Note:
The magnetic fields of these axes and cylinders are structured and shielded so that iron parts or chips will not be attracted to them.

Linear motor with air bearing ELGL-LAS

The handling axis ELGL-LAS with innovative air bearing and magnetic pretensioning makes it possible: with this closed, ready-to-install system including linear motor, air bearing and displacement encoder, the slide hovers over the axis in a contactless, friction-free fashion and ensures non-wearing operation with minimal maintenance and a long service life.

Additional features
- Contamination repellent: the air bearing prevents non-adhering liquids and dust from penetrating into the axis
- Integrated locking brake: magnetic pretensioning also functions in vertical applications with maximum useful load
- Minimum stroke of less than 1 mm for maximum flexibility with repetition accuracy of ±10 µm
- Several slides, each with its own motor controller, can be moved along a single axis independent of each other.

Technical specifications

<table>
<thead>
<tr>
<th>Size</th>
<th>30</th>
<th>64</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide size [mm]</td>
<td>210 (S)</td>
<td>210 (S)</td>
<td>310 (M)</td>
</tr>
<tr>
<td>Max. stroke (1 slide) [mm]</td>
<td>740</td>
<td>1750</td>
<td>1650</td>
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<tr>
<td>Max. feed force [N]</td>
<td>44</td>
<td>119</td>
<td>164</td>
</tr>
<tr>
<td>Repetition accuracy [µm]</td>
<td>±10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electric short-stroke cylinder with linear motor ADNE-LAS and motor controller CMFL

Highly dynamic at up to 14 Hz between the end-positions: the ADNE-LAS. The speed of pneumatics combined with electrical precision is ideal for pusher applications and sorting tasks. Select from four motion cycles and start – done!

Benefits
- Minimal positioning times of 30 ms
- Teach-in function for strokes as of 7.5 mm
- Long service life thanks to electronic end-position cushioning
- Highest possible precision: convincing repetition accuracy and constant force over the entire stroke range
- Direct installation in the application thanks to IP 65 protection
All the required components such as linear motor, measuring system, guide and reference switch are combined to form a ready-to-use axis; if a guide is needed for piston rod movement, however, it must be supplied externally.

Benefits
• Minimum travel speeds of 20 mm/s without stick-slip effect
• Simplified ordering, warehousing and installation: any existing accessories can still be used because all the mechanical interfaces, with the exception of the long side, are compatible with the pneumatic cylinder series DNC.

Guided linear motor cylinder DFME-LAS

High dynamic response with small loads is no problem for the electric linear motor cylinder DFME-LAS, not least because the piston rod guide is integrated in the cylinder. That enables it to position small loads in the shortest possible time, for example in packaging systems, small parts assembly, or separating tasks. All required components such as the linear motor, measuring system, guide and reference switch are combined to form a ready-to-use guide axis.

Benefits
• Minimum travel speeds of 30 mm/s – with no stick-slip effect
• All the mechanical interfaces are compatible with the DFM pneumatic cylinder series. Perfect for use with existing accessories.
• Optionally: pneumatic clamping cartridge as holding brake

Long service life and virtually maintenance-free operation: internal plain bearing guide with integrated grease reserve keeps maintenance costs and downtimes to a minimum.

Can be configured and commissioned using the Festo Configuration Tool FCT. Simply enter the parameters and position sets and you’re done!

A complete solution from a single source – mechanisms, linear motor, measuring system and motor controller, and with software tools for configuration and commissioning.

Technical specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>DNCE-LAS</th>
<th>DFME-LAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size [mm]</td>
<td>100, 200, 320</td>
<td>100, 200, 320, 400</td>
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<tr>
<td>Max. stroke [mm]</td>
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<tr>
<td>Max. speed [m/s]</td>
<td>0.02</td>
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<td>Min. speed [m/s]</td>
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<td>Max. feed force [N]</td>
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<tr>
<td>Repetition accuracy [μm]</td>
<td>±20</td>
<td>±15</td>
</tr>
</tbody>
</table>

Motor controller SFC-LACI

You can find more information about compatible motor controllers on page 18.
Motors and controllers

The controller and motor portfolio from Festo covers a wide range of servo and stepper motor functions and is optimally matched to all electric drives.

**Servo motor controllers**

CMMP-AS/CMMS-AS/CMMD-AS and servo motor EMMS-AS

The highly functional controller CMMP-AS is ideal for use as a cam controller with very dynamic motions and is available with the option of an additional 8 inputs and 8 outputs. The CMMS-AS comes to the fore in standard applications and positioning tasks with I/O connection. The double controller CMMD-AS takes on the task of guiding two servo motors independently of each other. The merging of internal components, such as the fieldbus interface or the intermediate circuit, results in a decisive improvement in cost-effectiveness.

They all feature safe and convenient commissioning, SD card slot, programming and parameterisation via software tools, as well as integrated safe standstill with restart blocking for safety-related applications.

**Servo motor EMMS-AS**

One servo motor for three controller types. As a permanently energised, brushless servo motor with eight torque ranges, this motor is designed for dynamic positioning tasks.

**Stepper motor controller CMMS-ST and stepper motor EMMS-ST**

Stepper motor technology in a genuine plug & work solution package: the single-axis position controller CMMS-ST combined with a stepper motor EMMS-ST, for single and multi-axis handling, with moving loads of up to 20 kg.

In the ServoLite operating mode, the combination of CMMS-ST and EMMS-ST provides you with a closed-loop servo system with maximum operational reliability and fast dynamic response. This sets the stepper motor controller CMMS-ST apart from conventional controllers.

**Stepper motor EMMS-ST**

The stepper motor offer a long service life and full positioning functionality at an attractive price. It is designed with a high degree of protection and with a plug system suitable for industrial use, optionally with brake and integrated encoder.
The performance ranges of the motors in conjunction with Festo controllers

Functions of the CMMx-AS
- SD card for parameters and firmware
- Automatic motor brake
- External braking resistor (optional)

Functions of the CMMS-ST
- SD card for parameters and firmware
- Automatic motor brake
- External braking resistor (optional)

Controller comparison table

<table>
<thead>
<tr>
<th>Motor controller for motor type</th>
<th>CMMP-AS</th>
<th>CMMS-AS/CMMD-AS</th>
<th>CMMS-ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque at standstill [Nm]</td>
<td>~25</td>
<td>~4.7</td>
<td>~8.5</td>
</tr>
<tr>
<td>Peak torque [Nm]</td>
<td>~48</td>
<td>~9.2</td>
<td>~8.5</td>
</tr>
<tr>
<td>Speed [rpm]</td>
<td>~10000</td>
<td>~10000</td>
<td>~3000</td>
</tr>
<tr>
<td>Positioning records</td>
<td>255</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>System of measurement</td>
<td>Incremental/absolute</td>
<td>Incremental/absolute</td>
<td>Incremental</td>
</tr>
<tr>
<td>Extended I/O interface</td>
<td>Flexible configuration</td>
<td>4 working modes</td>
<td>4 working modes</td>
</tr>
<tr>
<td>Notification of remaining distance</td>
<td>Separate for all positions</td>
<td>1 for n</td>
<td>1 for n</td>
</tr>
<tr>
<td>Torque reduction</td>
<td>Separate for all positions</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Record linking</td>
<td>With branching</td>
<td>Linear</td>
<td>Linear</td>
</tr>
<tr>
<td>Safe standstill</td>
<td>To EN 954-1 Cat3</td>
<td>To EN 954-1 Cat3</td>
<td>–</td>
</tr>
<tr>
<td>Primary voltage</td>
<td>100 ... 230 V AC</td>
<td>100 ... 230 V AC</td>
<td>24 ... 75 V DC</td>
</tr>
<tr>
<td>Motor current</td>
<td>Single-phase: 2,5 and 5 A</td>
<td>CMMD-AS: 4 A (single-phase)</td>
<td>8 A (peak 12 A)</td>
</tr>
<tr>
<td></td>
<td>Three-phase: 5 and 10 A</td>
<td>CMMD-AS: 2x 4 A (can be adjusted as desired up to 2 A/6 A)</td>
<td></td>
</tr>
<tr>
<td>Integrated positioning records</td>
<td>256</td>
<td>64</td>
<td>64</td>
</tr>
</tbody>
</table>
Intelligent servo motor MTR-DCI

This innovative servo motor with its wide torque range is ideally suited for positioning tasks. It combines all necessary components in one: motor, gear unit, motor controller and power electronics.

An impressive feature of the MTR-DCI is its minimal wiring due to the integration of the controller; only one voltage source and only one fieldbus connection or multi-pin plug are required. The entire commissioning process is performed on-site or from a PC using a simple teach-in function, thanks to an optional LCD screen and clearly structured menus. It is also supported by the FCT (Festo Configuration Tool) software.

Single-field controllers

SFC-DC, SFC-LAC and SFC-LACI
These single-field controllers offer simple configuration and commissioning using FCT software for parameterisation and commissioning.

Motor controller SFC-DC
The SFC-DC motor controller together with SLTE or HGPLE forms a ready-to-install solution.

Position controller SFC-LACI
and the linear motor cylinders DNCE-LAS and DFME-LAS form a ready-to-install solution.

Functions
- Compact design with integrated display screen
- Profile is insensitive to dirt due to smooth surfaces
- Closed-loop operation
- Protection class IP54
- Activation via I/O or fieldbus
- Constant acceleration and braking
- Position control

Features:
- Positioning run and teach mode
- Diagnostic function
- Thanks to IP54 protection, the SFC can be mounted close to the drive
- Only one cable needed

The motor controller SFC is available with or without control panel
Activation via I/O or fieldbus
The PositioningDrives software tool prevents design errors and energy waste by helping you to choose the right components. Designing drive mechanics, gear units and motors separately can increase safety factors or result in oversized electric drive units and wasted energy.

Toothed belt drives, spindle drives or direct drives, servo motors, stepper motors or DC motors, ball bearing guides or plain-bearing guides – the plethora of options to choose from presents the user with a major challenge: calculating the correct drive.

Once a few application details have been entered, the PositioningDrives software calculates the ideal combination from the extensive, harmonised range of electric linear axes, motors, gear units, controllers and software. By specifying various project parameters, the tool also calculates the characteristic load values for the selected drive quickly and reliably.

This is also suitable for third-party motors, once the technical parameters have been entered.

**Typical program interfaces**

**Application parameters** such as mounting position, mass, stroke and precision need to be entered. You also have the option of specifying the required process time and preselecting the drive technology.

**Select the desired solution package**

For easy selection, these are sorted by motor and axis technology, component utilisation, cycle time or price.

**Detailed results**

The program also provides detailed results such as motor characteristic curve, dynamic coefficients, system data, product data and parts list. These results are saved as a file and can be used for ordering and machine documentation.
Software tools – faster project planning and design, commissioning and operation

More intelligent automation
Festo continuously focuses on frequent analysis and identification of potential.

This has resulted in combining the new FHPP software platform with the tried and tested FCT Festo configuration tool. It ensures uniform operation and ideal interface management of all motor controllers, from the fieldbus to the drive system.

Available software tools:
You can download software tools from our website: www.festo.com

FCT software – Festo Configuration Tool for commissioning
- All the drives in a system can be managed and saved in a common project
- Project and data management for all supported device types
- Simple to use thanks to graphically-supported parameter entry
- Universal mode of operation for all drives
- Working offline at your desk or online at the machine

FHPP – Festo Handling and Positioning Profile
Festo has developed an optimised data profile, the “Festo Handling and Positioning Profile (FHPP)”, specifically tailored to handling and positioning applications.

The FHPP data profile enables Festo motor controllers to be controlled, with fieldbus interface, via standardised control and status bytes.
Commissioning service for axis systems

Getting there quicker
Smooth interaction of the axis system with the overall system is essential for maximum system productivity. The selection and assembly of an axis system is one thing, fast and reliable commissioning of an axis system is another. What at first only appears to be a small step can, in reality, repeatedly prove to be a real marathon. In order for everything to run as it should, we recommend the Festo commissioning service for axis systems.

Services at a glance
- For reliable operation: checking of wiring, connections, travel paths and energy chains
- For optimum paths: axis configuration and parameterisation
- For maximum performance: optimisation of the control parameters and homing
- For tested safety: actuation of the axes in test mode
- For secure knowledge: data backups and documentation
- For reliable operation: briefing machine operators, e.g. on error diagnostics and troubleshooting or on changing the position values

Fast
Time-saving commissioning for maximised efficiency is a matter of course for our experts and completion of your system on schedule is guaranteed.

Reliable
Our experts know exactly what they have to watch out for when commissioning, thus ensuring that your axis system operates reliably at all times.

Optimally adapted
Maximum axis system performance, e.g. with regard to cycle time, thanks to optimum configuration and parameterisation as well as homing.

We will support you during commissioning, regardless of the number of axes.
All-inclusive benefits – ready-to-install solutions

Build it yourself, or have it built – it’s up to you. But complete systems can save you as much as 50%.

With ready-to-install handling systems you can dispense with virtually all the complex processes involved in the development and construction of such systems. Tell us what your requirements are and we will design, order, commission, test and deliver. We can also assemble your system and put it into operation, on request. You concentrate on your core tasks; we take care of the rest. That not only saves time and money, but brings maximum reliability with regard to function and optimal settings.

We offer: design engineering, documentation, CAD models, assembly, checking and testing, commissioning and servicing.

Engineering
Competent engineers support you right from the outset.
• Technical advice
• Expert knowledge based on the latest technological standards

Examples of CAD models from the standard multi-axis modular system

Linear gantry with cantilever axis (Z)
Heavy-duty linear gantry with toothed-belt axis (Y) and spindle axis (Z)
Three-dimensional gantry with toothed belt axis (XY) and spindle axis (Z)

Documentation
Documentation for your handling systems includes:
• Detailed documentation of your handling system on CD or paper

Individually or complete – your decision

• Management of all engineering tasks
• Designs from the mechatronic multi-axis modular system

• Construction drawing as instructions for assembly, including parts list
• Circuit diagrams in EPLAN or Promis
Handling systems from Festo’s multi-axis modular system

Pick and place:  
Slim, precise, clearly laid out  
• Horizontal cantilever axis combined with slide or another cantilever axis for Z-movement

Linear gantries:  
Sturdy for high loads and long strokes in 2D  
• Horizontal gantry axis combined with slide or cantilever axes for Z-movement

Cantilevers:  
Compact and extremely sturdy for long strokes  
• 2 parallel horizontal gantry axes plus one pick and place unit with short Z stroke, preferably slide unit

Three-dimensional gantries:  
Highest precision and very sturdy for high loads and long strokes in 3D  
• 2 horizontal gantry axes plus 1 horizontal gantry axis at right angles, plus any drive for Z-movement, preferably cantilever axes

Tripod:  
Unrestricted, precise and extremely dynamic movement in space; tripod kinematics with electric gantry axes in pyramid form for high rigidity  
• High effective loads with high dynamic response due to low moving masses (without motors or axes)
Festo worldwide