Operating principles

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

In contrast, the cantilever axes and slide units move in and out of the working space.

Gantry axes

Powerful, fast and precise, for movement inside the working space.

→ More information on page 6

Cylinder

Fast and durable movement in and out of the working space.

→ More information on page 10

Slide units and cantilever axes

Resilient, precise and variable positioning in the working space.

→ More information on page 12

Linear motor axes

Highly dynamic and precise movement.

→ More information on page 14

Motors and controllers

Suitable for linear drives and scalable for any application.

→ More information on page 16

Functional safety

for technical safety measures according to the EC Machinery Directive

→ More information on page 19

Software tools

Use software support i to help create the ideal drive package in no time; including simple and reliable configuration and commissioning.

→ More information on page 20

Handling systems and solutions

System expertise in 2D and 3D for your task.

→ More information on page 22
Mechatronic Motion Solutions: overview electric drives

Management level

Control level

Controllers

Field level

Actuation

Drives

Pneumatic

Servopneumatic

Electric

PLC (ABB, Allen-Bradley, Rockwell, Siemens, etc.)

Modular controller CECX

Integrated controller FED-CEC

Motor controller CMFL SFC-LACI

Servo motor controller CMMP-AS CMMS-AS

Linear motor axes ELGL-LAS DNCE-LAS DFME-LAS ADNE-LAS

Gantry axes EGC DGE ELGA EGSK/EGSP

EGC-HD ELGR/ELGG

Grippers

Vacuum
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.

Various drive concepts
Depending on the requirements, it is best to use a toothed belt drive for good acceleration, high speeds and long strokes, while a spindle drive should be used for high feed forces and precise positioning. The recirculating ball bearing guide enables high loads on slide units and guides with transverse forces – even when moving.

Toothed belt and spindle axes EGC/EGC-HD

The new axis range in the mechatronic modular system consists of a comprehensive series with a numerous variants, e.g. for high dynamic response and speed, heavy loads and high torque. It is as suitable for individual, stand-alone solutions as it is for complete system solutions.

In profile
The large-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 – even with the new EGC-HD with heavy-duty guide for extremely high loads and torque resistance at high speeds and acceleration. Long strokes of up to 5000 mm are the standard with the EGC-HD. An additional advantage is the high performance of the axes, which often make it possible to choose a smaller design, especially with spindle axes!

The individual models

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

Spindle axis EGC-(HD)-BS
Precise drive for accurate and quiet operation with heavy loads and long strokes.

Passive guide axis EGC-FA
Drive less linear guide unit for supporting forces and torques in multi-axis applications.
Flexible motor mounting with EGC-(HD)-TB
- Motor mounting on four sides freely selectable
- Subsequent modification 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.

Reliable thanks to optional sensing
- Inductive proximity switch SIES-8 M
- Flush mounting of up to two sensors per profile slot

Additional inductive displacement encoder EGC-..-M
- Increased absolute accuracy, minimum resolution 2.5 µm
- Suitable for safety-oriented applications (second channel)
- System-intrinsic inaccuracies can be optimally adjusted

Variants:

Second slide
- For higher axial and lateral torques
- Freely moveable

Extended slide
- Longer guide
- For a higher axial torque

Protected slide
- Scraper on both sides of the slide unit
- Removes dirt particles and liquids from the external guide

<table>
<thead>
<tr>
<th>Type</th>
<th>EGC-TB/BS-KF</th>
<th>EGC-HD-TB/BS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>50/70/80/120/185</td>
<td>125/160/220</td>
</tr>
<tr>
<td>Drive</td>
<td>Spindle drive/Toothed belt drive</td>
<td>Spindle drive/Toothed belt drive</td>
</tr>
<tr>
<td>Max. stroke [mm]</td>
<td>5000/8500 (10 000)</td>
<td>2400/5000</td>
</tr>
<tr>
<td>Max. speed [m/s]</td>
<td>2/5</td>
<td>1.5/5</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>±0.08 ... 0.02</td>
<td>±0.08 ... 0.02</td>
</tr>
<tr>
<td>Max. force Fx [N]</td>
<td>3000/2500</td>
<td>1300/1500</td>
</tr>
<tr>
<td>Max. torque load Mx [Nm]</td>
<td>529</td>
<td>900</td>
</tr>
<tr>
<td>Max. torque load My/Mz [Nm]</td>
<td>1820</td>
<td>1450</td>
</tr>
<tr>
<td>Options</td>
<td>Connection module for central lubrication</td>
<td>Connection module for central lubrication</td>
</tr>
</tbody>
</table>
**Electric toothed belt axis**
**ELGA-TB-G/ELGA-TB-RF**

The perfect addition to EGC axes. ELGA-TB-G with plain-bearing guide for simple positioning and handling tasks or as a drive axis for applications with external guides.

With its roller bearing guide and high feed forces, the ELGA-TB-RF is optimised for highly dynamic handling, even of medium to large-sized workpieces. A cover strip made of stainless steel protects the sturdy roller bearing guide and permits very high travel speeds.
- Speeds of up to 10 m/s
- Optionally suitable for contact with food

**Common features**
- Ready-to-install solution as a drive package for external guide
- Excellent dynamic response and flexibility, in part due to the possibility of connecting the motor to any of 4 positions
- Comprehensive accessories for easy installation
- Software integration, e.g. in PositioningDrives, simplifies design and commissioning
- Cover strip as protection in harsh environmental conditions and for reduced discharge of particles caused by toothed belt wear

**Technical data**

<table>
<thead>
<tr>
<th>ELGA-TB-G size (= width of the axis profile)</th>
<th>70</th>
<th>80</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide type</td>
<td>Plain-bearing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. stroke</td>
<td>[mm] 8500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. feed force Fmax</td>
<td>[N] 350 800 1300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. speed</td>
<td>[m/s] 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mx</td>
<td>[Nm] 5 10 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My</td>
<td>[Nm] 30 60 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mz</td>
<td>[Nm] 10 20 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>[mm] ±0.08</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Electric toothed belt axis ELGR/ELGG**

Ideal for applications with comparatively low requirements in terms of mechanical loads, dynamic response and precision in a cost-optimised design. Thanks to their great flexibility and a broad range of uses, the ELGR and the ELGG excel in applications that can be implemented easily and economically.

**Benefits**
- Flexible motor mounting in 4 positions; can also be modified at a later date
- Slide unit variants: extended slide unit, 1 or 2 additional slides
- Simple end-position sensing, easy to operate
- Simple engineering
  - Easy 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 unit**

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

**Movement in opposite directions ELGG:**
Both slide units are connected to the toothed belt and move synchronously in opposite directions.

**End-position sensing**

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

**Electric spindle axes EGSK/EGSP**

Always perfect when precision, repetition accuracy, compactness and rigidity are required: Electric spindles axes EGSK/EGSP. For standard tasks in the upper segment: EGSK. For high-end applications where greater precision and performance are required: EGSP series with caged ball bearing.

**Benefits**
- Repetition accuracy: 3 µm
- Service life expectancy: 10 000 km
- Housing made from solid steel which simultaneously functions as a guide
- Optional spindle cover in all sizes
Cylinders

Electric cylinder EPCO
Low-cost with optimised performance: EPCO. It is as simple as a pneumatic cylinder with the advantages of an electric drive – but at a lower cost and simpler than electric positioning systems. Together with the motor controller CMMO-ST, it forms the core of the Optimised Motion Series (OMS). Everything fits, is easy to select with one order code and the “WebConfig” and “WebDiag” software can be used for configuration and diagnostics.

The cylinder
The electric cylinder with ball screw and non-rotating plain bearing-guided piston rod comes fully assembled in three sizes and with a fixed, optimally harmonised motor. The end-position cushioning reduces noise when approaching the end positions and the impact energy during homing. In addition, it is easy to clean thanks to CleanLook and it has a long service life of 10 000 km.

Connecting cables
• Pre-assembled cable sets, suitable for use with energy chains for motors and encoders
• In five standard lengths of up to 10 m, special length on request

The software
• Simple configuration thanks to the type code for with cylinder, motor, cable and motor controller = choose the right size and type quickly and easily
• Quick and easy commissioning via web server/browser concept

Cylinder options
• Piston rod with female thread
• Piston rod extension

Motor options
• Holding brake on motor
• Encoder on motor
• ServoLite – closed-loop operation with encoder
• Open-loop operation without encoder for cost-optimised applications

Cylinder mounting
• Can be screwed on from the front or using two mounting slots underneath
• Extensive mounting accessories for multiple installation situations, e.g. flange, swivel or foot mounting with numerous adapters

<table>
<thead>
<tr>
<th>Size</th>
<th>16</th>
<th>25</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. stroke [mm]</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Max. feed force [N]</td>
<td>125</td>
<td>350</td>
<td>650</td>
</tr>
<tr>
<td>Max. speed [mm/s]</td>
<td>300</td>
<td>500</td>
<td>460</td>
</tr>
<tr>
<td>Effective load horizontal/vertical [kg]</td>
<td>24/12</td>
<td>60/30</td>
<td>12/60</td>
</tr>
<tr>
<td>Repetition accuracy [µm]</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Electric piston rod
cylinder DNCE

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

Benefits

• Axial or parallel motor mounting – can be changed at any time

• Absolutely stick-slip free for optimum motion sequence

• Travel, speed, acceleration and force control can all be freely programmed and parameterised

• Freely programmable positions and travel profiles, including gentle acceleration

Electric cylinder with ball screw
drive ESBF

that is also durable – the ESBF easily masters the 10 000 km hurdle. It is suitable for all drive profiles and defined speeds. The many variants such as mounting accessories and adapter kits make it flexible, while the piston rod is plain-bearing guided and secured against twisting. Its Clean Look makes it suitable for use in the food and beverage industry.

• Universal, axial or parallel motor mounting

• Functional accessories, e.g. flange, swivel and foot mounting

• Optional features for use in the food and beverage industry

• Protection class IP40 with defined ventilation hole

• Protection class IP65 with G/18 connection

• Increased corrosion protection

• FDA approved lubricating grease for the piston rod

• Clean Look with smooth surfaces

• Bellows available for ESBG size 63 and 80

<table>
<thead>
<tr>
<th>Typ</th>
<th>DNCE lead screw</th>
<th>DNCE ball screw</th>
<th>ESBF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>25/40/63</td>
<td>25/40/63</td>
<td>63/80/100</td>
</tr>
<tr>
<td>Standard stroke [mm]</td>
<td>100 ... 800</td>
<td>100 ... 800</td>
<td>100 ... 400 (max. 1500 on request)</td>
</tr>
<tr>
<td>Spindle pitch [mm]</td>
<td>1.5 ... 4</td>
<td>4 ... 20</td>
<td>5 ... 50</td>
</tr>
<tr>
<td>Max. feed force [N]</td>
<td>1000</td>
<td>2500</td>
<td>17000</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>±0.07</td>
<td>±0.02</td>
<td>±0.015</td>
</tr>
<tr>
<td>Max. speed [mm/s]</td>
<td>70</td>
<td>1000</td>
<td>1350</td>
</tr>
</tbody>
</table>
Slide units and cantilever axes

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

**Various drive concepts**
Different drives are used depending on the requirements:

- Spindle drive for precision and effective load; toothed belt drives for dynamic response and long strokes.

**Motor mounting variants**
Greater flexibility thanks 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 the installation conditions. Another advantage: the open motor interface for in-house standards.

**Benefits**
- Precise and free positioning with a repetition accuracy of max. ±0.02 mm
- Perfect for vertical applications such as press-fitting or joining
- Protected against contamination and small parts in the guide area because the spindle is fully closed; additional guide cover as optional
- Simple and low-cost sensing with integrated sensor slots on the right and left
- Suitable software tools for configuration, commissioning and more with the standardised FCT software package from Festo

**Electromechanical slide unit EGSL**
The electric slide unit range 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. Its strengths are shown to full advantage, especially in vertical applications and short-stroke slide functions with variable positioning such as high precision pushing, picking and inserting with linearity and parallelism in the 1/100 mm range – even with high mechanical loads.
**Cantilever axis with toothed belt drive DGEA**

For long strokes, high acceleration and speed with simultaneously good repetition accuracy: the DGEA cantilever axis with bearing guide and toothed belt drive. It comes into its own in handling systems and wherever large loads need to be moved on long strokes. Its excellent dynamic response is thanks to DGEA the reduced moving mass: the motor, gear unit and drive head are securely mounted, so only the main profile is moved with the load.

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

**Electromechanical mini-slides SLTE**

Complete package: the flat electric mini slide SLTE with precise and rigid guide for gentle acceleration and braking using lead screw spindles with effective loads of up to 4 kg. Freely positionable via motor controller SFC-DC with protection class IP 54.

**Improved oscillation behaviour: design feature Ω-drive**

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 oscillation behaviour.

**Table**

<table>
<thead>
<tr>
<th>Size</th>
<th>Guide</th>
<th>18</th>
<th>25</th>
<th>40</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Recirculating ball bearing guide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. nominal stroke [mm]</td>
<td>1 ... 800</td>
<td>1 ... 900</td>
<td>1 ... 1000</td>
<td></td>
</tr>
<tr>
<td>Max. effective horiz. load [kg]</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Max. effective vert. load [kg]</td>
<td>7</td>
<td>18</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Max. feed force [N]</td>
<td>230</td>
<td>400</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Max. speed [m/s]</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>±0.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Permissible forces and torques**

<table>
<thead>
<tr>
<th></th>
<th>F_{max.} [N]</th>
<th>F_{max.} [N]</th>
<th>M_{max.} [Nm]</th>
<th>M_{max.} [Nm]</th>
<th>M_{zmax.} [Nm]</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>2000</td>
<td>19</td>
<td>94</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>3080</td>
<td>3080</td>
<td>28</td>
<td>230</td>
<td>160</td>
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<tr>
<td></td>
<td>7300</td>
<td>7300</td>
<td>133</td>
<td>665</td>
<td>460</td>
</tr>
</tbody>
</table>
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 where maximum acceleration and speed as well as highly precise positioning matter.

Motor controller
CMMP-AS

More information on a matching motor controller can be found on page 16

Note:
The magnetic fields of the linear motor axes and cylinders are generally designed and screened in such a way that iron parts or iron chips are not attracted.

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.

Other features
• Dirt-repellent: the air bearing prevents non-adhesive materials from getting into the axis
• Clamping brake already integrated: The magnetic pre-tensioning also functions with vertical applications with maximum effective load
• Minimum stroke >0.1 mm is possible without damaging the bearing
• Multiple slides, each with its own motor controller, can be moved independently of one another along one axis

<table>
<thead>
<tr>
<th>Size</th>
<th>30</th>
<th>64</th>
<th>120</th>
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<tbody>
<tr>
<td>Slide size [mm]</td>
<td>210 (S)</td>
<td>210 (S)</td>
<td>310 (M)</td>
</tr>
<tr>
<td>Max. stroke (slide) [mm]</td>
<td>740</td>
<td>1750</td>
<td>1650</td>
</tr>
<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

The speed of the pneumatics together with the precision of the electrical components is ideal for pusher applications and sorting tasks. Protection class IP65 allows direct installation in the application.

Benefits
• Minimum positioning times of 30 ms
• Impressive thanks to the repetition accuracy of ±0.5 mm and constant force over the entire stroke range of max. 45 mm
• Teach-in function for strokes from 7.5 mm
• Long service life thanks to electronic end-position cushioning
Linear motor cylinder with piston rod DNCE-LAS

Optimised for small loads and high dynamic response: the electric linear motor cylinder DNCE-LAS. Ideal for pusher applications or if small loads have to be positioned within very short time, e.g. 40 ms for 15 mm stroke.

Benefits
- Minimum travel speeds of 2 mm/s – without stick-slip effect!
- Simplifies ordering, storage and assembly: any existing accessories can still be used as all of the mechanical interfaces, except for the longitudinal side, are compatible with the pneumatic cylinder series DNC.

Guided linear motor cylinder DFME-LAS

The electric linear motor cylinder DFME-LAS optimally handles high dynamic response with small loads, not least because the piston rod guide is integrated in the cylinder.

Benefits
- Minimum travel speeds of 3 mm/s – without stick-slip effect!
- All the mechanical interfaces are compatible with the pneumatic cylinder series DFM. Perfect for use with existing accessories.
- Optional: pneumatic clamping cartridge as holding brake.

All the required components such as linear motor, displacement encoder, 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.

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, displacement encoder, guide and reference switch are combined to form a ready-to-use guide axis.

• Can be configured and commissioned using the Festo Configuration Tool FCT. Simply enter the parameters and positioning records – and you're ready!

What both have in common: technology that makes work easy

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

• Can be configured and commissioned using the Festo Configuration Tool FCT. Simply enter the parameters and positioning records – and you’re ready!

• A complete solution from a single source: mechanical components, linear motor, displacement encoder and motor controller, including software tools for configuration and commissioning.

<table>
<thead>
<tr>
<th>Type</th>
<th>DNCE-LAS</th>
<th>DFME-LAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>Max. stroke (mm)</td>
<td>100/200/320</td>
<td>100/200/320/400</td>
</tr>
<tr>
<td>Max. speed (m/s)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Min. speed (m/s)</td>
<td>0.002</td>
<td>0.003</td>
</tr>
<tr>
<td>Continuous feed force (N)</td>
<td>36</td>
<td>55</td>
</tr>
<tr>
<td>Repetition accuracy (µm)</td>
<td>±20</td>
<td>±15</td>
</tr>
</tbody>
</table>
Motors and controllers

The controller and motor portfolio from Festo covers a broad spectrum 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 best suited to cam control and highly dynamic movements. The CMMS-AS shows its strengths with standard applications and positioning tasks with I/O connection. The double controller CMMD-AS takes on the task of running two servo motors independently of each other. Combining the internal components significantly increases levels of economic efficiency. They all feature safe and convenient commissioning, SD card slot, programming and parameterisation using software tools.

**Servo motor EMMS-AS**

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

**Motor controller CMMO-ST**

Simple and rapid selection with 1 order code. Everything matches perfectly thanks also to “WebConfig” and “WebDiag”, the integrated HTML web server for configuration and diagnostics.

Perfect in connection with electric cylinder EPCO

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

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

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

**Stepper motor EMMS-ST**

The stepper motor combines a long service life and full positioning functionality with 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.
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)

Integrated safety function
- Safe Torque Off (STO) with category 3, PLd integrated
- Additional safety functions can be realised using external components
- Solution examples available
- Safe stop with restart inhibit

The performance ranges of the motors in combination with controllers from Festo

<table>
<thead>
<tr>
<th>Motor controller for motor type</th>
<th>CMMP-AS servo motor</th>
<th>CMMS-AS/CMMD-AS servo motor</th>
<th>CMMS-ST stepper motor</th>
<th>CMMO-ST stepper motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning records</td>
<td>255</td>
<td>63</td>
<td>63</td>
<td>7/31</td>
</tr>
<tr>
<td>Displacement encoder</td>
<td>Incremental/absolute</td>
<td>Incremental/absolute</td>
<td>Incremental</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>
<td>Valve or binary profile</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>
<td>Separate for all positions</td>
</tr>
<tr>
<td>Torque reduction</td>
<td>Separate for all positions</td>
<td>No</td>
<td>No</td>
<td>Separate for all positions</td>
</tr>
<tr>
<td>Record Linking</td>
<td>With branching</td>
<td>Linear</td>
<td>Linear</td>
<td>Linear</td>
</tr>
<tr>
<td>Safe torque off</td>
<td>Cat. 3, Pld (EN 13849), SIL2 (EN 61508)</td>
<td>Cat. 3, Pld (EN 13849), SIL2 (EN 61508)</td>
<td>Cat. 3, SIL (EN 13849), SIL2 (EN 61508)</td>
<td>EN 13849/Pld, EN 61508/SIL2</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>
<td>24 V DC</td>
</tr>
<tr>
<td>Motor current</td>
<td>Single-phase: 2.5 and 5 A</td>
<td>Three-phase: 5 and 10 A</td>
<td>CMMD-AS: 4 A (single-phase)</td>
<td>CMMS-AS: 2 x 4 A (can be set at up to 2 A/6 A as required)</td>
</tr>
<tr>
<td>Integrated positioning records</td>
<td>256</td>
<td>64</td>
<td>64</td>
<td>32</td>
</tr>
</tbody>
</table>
Intelligent servo motor MTR-DCI

An impressive feature of the MTR-DCI is its minimal wiring thanks 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.

Key features:
- Positioning run and teach mode
- Diagnostic function
- Thanks to protection class IP54, the SFC can be mounted close to the drive
- Only one cable required
- SFC motor controller available with or without control panel
- Control via I/O or field bus

Functions
- Compact design with integrated display
- Dirt-resistant profile thanks to smooth surfaces
- Closed-loop operation
- Protection class IP54
- Control via I/O or field bus
- Constant acceleration and braking
- Position control

Single-field controllers

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

Motor controller SFC-DC The SFC-DC motor controller together with the mini slide SLTE forms a ready-to-install solution.

Both single-field controllers are very easy to configure and commission using the FCT software for parameterisation and commissioning.
The EC Machinery Directive 2006/42/EC permits numerous safety functions as protective measures for sufficient risk. Motor controller CMM ... integrates the safety function STO as standard into all motor controllers in the CMM ... series. This allows easy implementation in accordance with the standards DIN EN 61800-5-2 and EN 60204-1. Implementing these safety functions in a practical manner requires different components that can easily be integrated in an overall concept.

Safety system CMGA
Safely monitors command input devices, safety sensors, safety switches, encoders and measuring systems and processes their input signals in order to guarantee the safe status of a handling unit by using suitable safety-oriented responses. There are numerous preprogrammed application programs for simple configuration. If required, in-house programming is possible.

Motor controller CMM ...
The safety function STO is integrated as standard into all motor controllers in the CMM ... series. This allows easy implementation of the emergency stop requirements with safe stop SS1 up to category 3, PLd. For further requirements, the series CMMP-AS- ... -M3 provides optional safety modules for safety functions up to category 4, PLe.

Intelligent solutions for monitoring linear axes
The slide position cannot be monitored directly by the encoder in the motor for safety critical applications since if there is a fault in the motor encoder, a secondary system is required to determine if the axis slide is moving. However, with an external linear displacement encoder mounted directly on the drive the axis slide position can be monitored and the information fed back to a safety system.

Solution examples
How do I implement safety functions with electric drive technology components?
Festo provides solution examples. Descriptions, parts lists, circuit diagrams, application programs and Sistema projects allow fast integration into your safety concept – with the appropriate documentation.

Ask our specialists