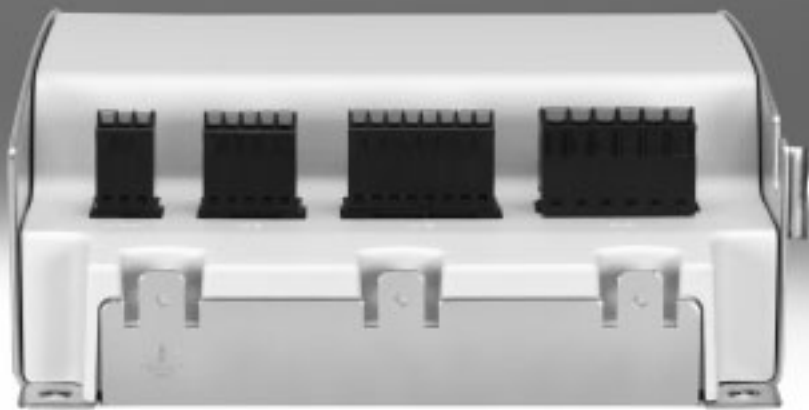


Motor controllers CMMO-ST

FESTO



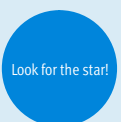
Festo core product range
Covers 80% of your automation tasks

Worldwide:
Superb:
Easy:

Always in stock
Festo quality at an attractive price
Reduces procurement and storing complexity

★ Generally ready for shipping ex works in 24 hours
Held in stock in 13 service centres worldwide
More than 2200 product

★ Generally ready for shipping ex works in 5 days
Assembled for you in 4 service centres worldwide
Up to 6×10^{12} variants per product series



Motor controllers CMMO-ST

Key features



At a glance

- The motor controller CMMO-ST is a closed-loop and open-loop position controller
- Separate load and logic supply
- Supports the safety function "safe torque off" (STO)
- Easy actuation via:
 - I/O interface
 - IO-Link or I-Port
 - Modbus TCP
- Monitoring of freely defined positions and torque ranges
- Backup file enables seamless device replacement
- H-rail mounting possible
- Encoder option (closed loop), in other words no step losses, following errors are corrected
- Parameterisation possible via:
 - Configuration package FCT (Festo Configuration Tool)
 - Ethernet interface with integrated web server

Communication system IO-Link

IO-Link

IO-Link is a standardised I/O technology (IEC 61131-9) which enables communication with sensors and actuators. This is a form of point-to-point communication. The data profile FHPP is transmitted via the physical interface.

Specific I-Port interface from Festo

The I-Port interface is based on IO-Link technology and enables communication with sensors and actuators. The advantage is that the connected devices are automatically detected by Festo (Plug and Work). The data profile FHPP is transmitted via the physical interface.

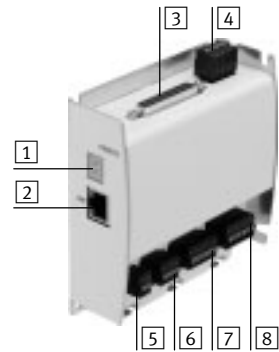
Communication system Modbus TCP

Modbus

Modbus TCP is an open communication protocol (IEC 61158) based on the master-slave architecture. It is an established standard for communication via Ethernet-TCP/IP in automation technology. The data profile FHPP is transmitted via the physical interface.

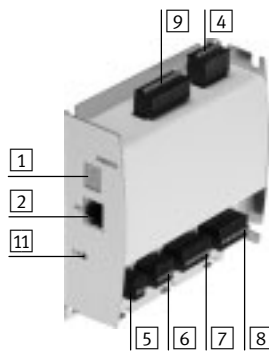
Description of the interfaces

With I/O interface



- 1 7-segment display
- 2 Ethernet interface (RJ45)
- 3 I/O interface
- 4 Voltage supply

With IO-Link interface



- 5 Reference switch
- 6 STO safety function
- 7 Encoder
- 8 Motor



- 9 IO-Link interface
- 10 Fastening bracket for mounting on an H-rail
- 11 Status of IO-Link connection

For actuating

Electric cylinder EPCO

Toothed belt axis ELGR

Rotary drive ERMO

Stepper motor EMMS-ST



IO-Link®, Modbus® is a registered trademark of its respective trademark holder in certain countries.

Motor controllers CMMO-ST

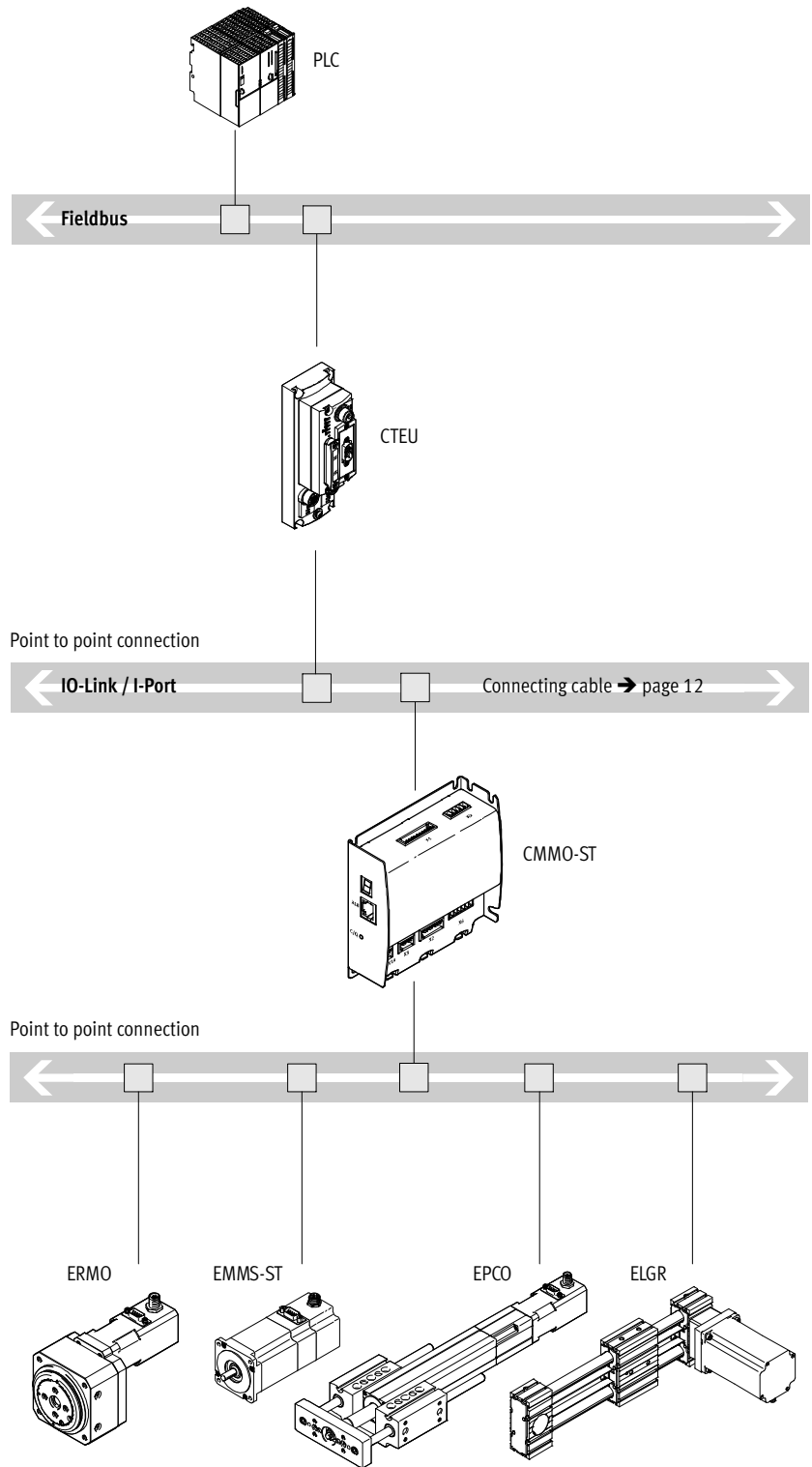
Key features

System overview

Fieldbus modules CTEU serve as an interface between the PLC controller and the motor controller CMMO-ST. This is then integrated into the control systems of various manufacturers using different bus nodes.

The following protocols are supported using the appropriate module:

- CANopen
- DeviceNet
- EtherCAT
- PROFIBUS
- PROFINET



For actuating:
 Electric cylinder EPCO
 Toothed belt axis ELGR
 Rotary drive ERMO
 Stepper motor EMMS-ST

Motor controllers CMMO-ST

Key features



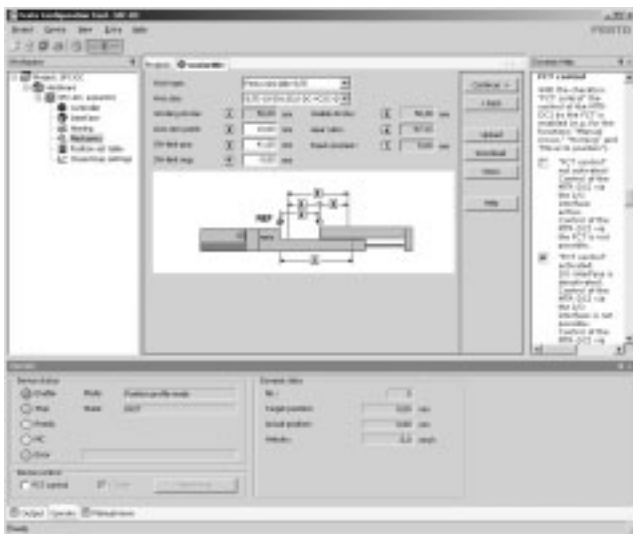
FCT software – Festo Configuration Tool

Software platform for electric drives from Festo



- All drives in a system can be managed and saved in a common project
- Project and data management for all supported device types
- Easy to use thanks to graphically supported parameter entry
- Universal mode of operation for all drives
- Work offline at your desk or online at the machine

Mechanical reference positions and limit positions



- Reference positions can be either edited or taught in
- Flexible adaptation to installation conditions
- Settings are displayed clearly

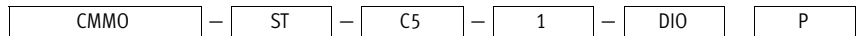
Position set table



- Up to 64 position sets ensure flexibility in positioning
- Absolute or relative positioning values can be used
- The following parameters can be set flexibly for each application:
 - Position
 - Speed
 - Acceleration
 - Braking ramps
- Force control
- Complete function test

Motor controllers CMMO-ST

Type codes



| Type | |
|-------------------------|-----------------------|
| CMMO | Motor controller |
| Motor technology | |
| ST | Stepper motor |
| Nominal current | |
| C5 | 5 A |
| Input voltage | |
| 1 | 24 V DC |
| Bus protocol/activation | |
| DIO | Digital I/O interface |
| LK | IO-Link interface |
| Switching input/output | |
| N | NPN |
| P | PNP |

Motor controllers CMMO-ST

Technical data

FESTO



| General technical data | | |
|--|--|------------------|
| Type CMMO-ST-... | -DIO | -LK |
| Operating mode | Cascade controller with | |
| | PI speed controller | |
| | PI current controller | |
| | P position controller | |
| | PWM MOSFET power output stage | |
| Operating mode | | |
| Open-loop operation | Sinusoidal current form | |
| Closed-loop operation | Controlled sinusoidal current, cascade controller for speed and position | |
| Display | 7-segment display | |
| Rotary position encoder | Encoder | |
| Encoder interface input | RS422 | |
| Parameterisation interface | Ethernet | |
| Ethernet, supported protocols | TCP/IP | TCP/IP, TCP mode |
| Protocol | – | IO-Link |
| | | I-Port |
| | | Modbus TCP |
| Position sets | 32 | 64 |
| Communication profile | – | FHPP |
| Number of digital logic inputs | 11 | 1 |
| Number of digital logic outputs | 11 | 3 |
| Characteristics of digital logic outputs | Freely configurable in some cases | |
| | Not galvanically isolated | |
| Adjustable current reduction | Via software | |
| Nominal current setting | Via software | |
| Braking resistor | [Ω] | 15 |
| Pulse power of braking resistor | [kVA] | 0.1 |
| Mains filter | Integrated | |
| Type of mounting | Screwed onto connecting plate, lying down or upright | |
| | Via H-rail | |
| Product weight | [g] | 290 |

Motor controllers CMMO-ST

Technical data

| Electrical data | | | | |
|---|--------|---------|-------|------|
| Type CMMO-ST-... | | -DIOP | -DION | -LKP |
| General | | | | |
| Max. intermediate circuit voltage | [V DC] | 28 | | 31 |
| Nominal output current | [A] | 5.7 | | |
| Load supply | | | | |
| Nominal voltage | [V DC] | 24 ±15% | | |
| Nominal current | [A] | 6 | | |
| Peak current | [A] | 8 | | |
| Logic supply | | | | |
| Nominal voltage | [V DC] | 24 ±15% | | |
| Nominal current | [A] | 0.3 | | |
| Operating range of logic input | [V] | 24 | | |
| Max. current per output, (digital logic outputs) | [mA] | 100 | | |
| Switching logic, input/output | | PNP | NPN | PNP |

| Safety data | |
|--|--|
| Safety function to EN 61800-5-2 | Safe torque off (STO) |
| Performance Level (PL) to EN ISO 13849-1 | Category 3, Performance Level e |
| Safety integrity level (SIL) to EN 61800-5-2, EN 62061, EN 61508 | SIL 3/SIL CL 3 |
| Certificate issuing authority | TÜV 01/205/5252.01/15 |
| Proof test interval | 20a |
| PFH | 1.3×10^{-10} |
| Diagnostic coverage [%] | 90 |
| Safe failure fraction (SFF) [%] | 99.8 |
| Hardware fault tolerance | 1 |
| CE marking (see declaration of conformity) | To EU EMC Directive ¹⁾ To EC Machinery Directive |
| Shock resistance | To EN 60068-2-29 |
| Vibration resistance | As per EN 60068-2-6 |

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

| Technical data for CMMO-ST-...-LK (IO-Link) | |
|---|---|
| Connection technology | Cage clamp |
| Protocol version | Device V1.1 |
| Communication mode | COM3 (230.4 kbd) |
| Number of ports | Device 1 |
| Process data width OUT | Parameterisable 8 or 16 bytes Parameterisable FHPP or FHPP+FPC |
| Process data width IN | Parameterisable 8 or 16 bytes Parameterisable FHPP or FHPP+FPC |
| Min. cycle time [ms] | 1 |

Motor controllers CMMO-ST

Technical data

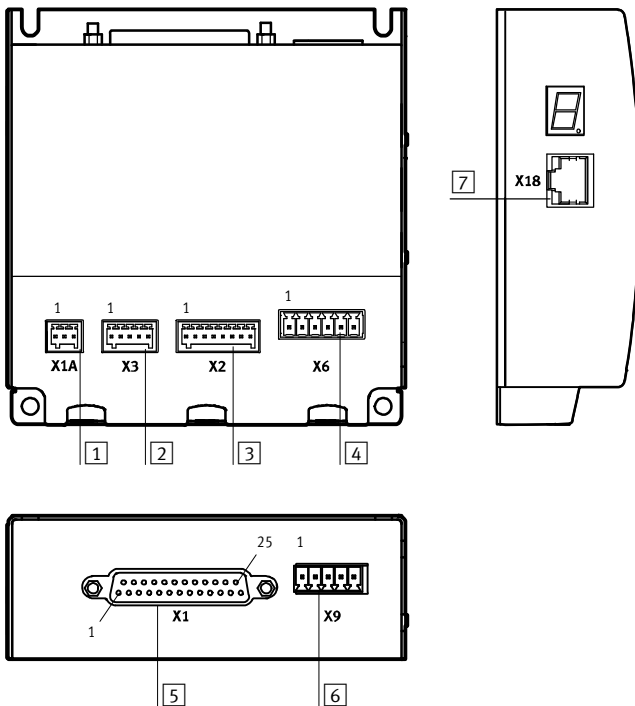
| Operating and environmental conditions | | |
|--|---|---------------------------|
| Type CMMO-ST-... | -DIO | -LK |
| Characteristics of digital logic outputs | Not galvanically isolated | |
| Characteristics of logic inputs | Galvanically connected to logic potential | |
| Logic input specification | Based on IEC 61131-2 | |
| Degree of protection | IP40 | |
| Protective function | I ² t monitoring | |
| | Following error monitoring | |
| | Software end-position detection | |
| | Voltage failure detection | |
| | Current monitoring | |
| Temperature monitoring | | |
| Ambient temperature | [°C] | 0 ... +50 |
| UL ambient temperature | [°C] | 0 ... +40 |
| Storage temperature | [°C] | -25 ... +75 |
| Relative air humidity | [%] | 0 ... 90 (non-condensing) |
| Approval certificate | c UL us listed (OL) | |
| | RCM mark | |
| CE marking (see declaration of conformity) | To EU EMC Directive ¹⁾ | |
| | To EC Machinery Directive | |
| KC marking | KC-EMV | |
| Note on materials | RoHS compliant | |

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Motor controllers CMMO-ST

Technical data

Pin allocation for CMMO-ST-...-DIO



1 Reference switch

| Pin | Function |
|-----|----------------------|
| 1 | +24 V (logic output) |
| 2 | Signal |
| 3 | 0 V |

2 STO safety function

| Pin | Function |
|-----|----------------------|
| 1 | +24 V (logic output) |
| 2 | STO 1 |
| 3 | STO 2 |
| 4 | Diagnostics 1 |
| 5 | Diagnostics 2 |

3 Encoder

| Pin | Function |
|-----|---------------|
| 1 | A |
| 2 | A/ |
| 3 | B |
| 4 | B/ |
| 5 | N |
| 6 | N/ |
| 7 | +5 V (output) |
| 8 | 0 V |

4 Motor

| Pin | Function |
|-----|-------------------------------|
| 1 | String A |
| 2 | String A/ |
| 3 | String B |
| 4 | String B/ |
| 5 | Brake +24 V (switched output) |
| 6 | Brake 0 V |

5 I/O interface, 25-pin Sub-D plug connector

| Pin | Function |
|-----|----------------------|
| 1 | Input 1 |
| 2 | Input 2 |
| 3 | Input 3 |
| 4 | Input 4 |
| 5 | Input 5 |
| 6 | Input 6 |
| 7 | Input 7 |
| 8 | Input 8 |
| 9 | Input 9 |
| 10 | Input 10 |
| 11 | Input 11 |
| 12 | Output 1 |
| 13 | Output 2 |
| 14 | Output 3 |
| 15 | Output 4 |
| 16 | Output 5 |
| 17 | Output 6 |
| 18 | Output 7 |
| 19 | Output 8 |
| 20 | Output 9 |
| 21 | Output 10 |
| 22 | Output 11 |
| 23 | n.c. |
| 24 | +24 V (logic output) |
| 25 | 0 V |

6 Power supply

| Pin | Function |
|-----|---------------|
| 1 | n.c. |
| 2 | n.c. |
| 3 | +24 V (logic) |
| 4 | 0 V |
| 5 | +24 V (load) |

7 Ethernet interface

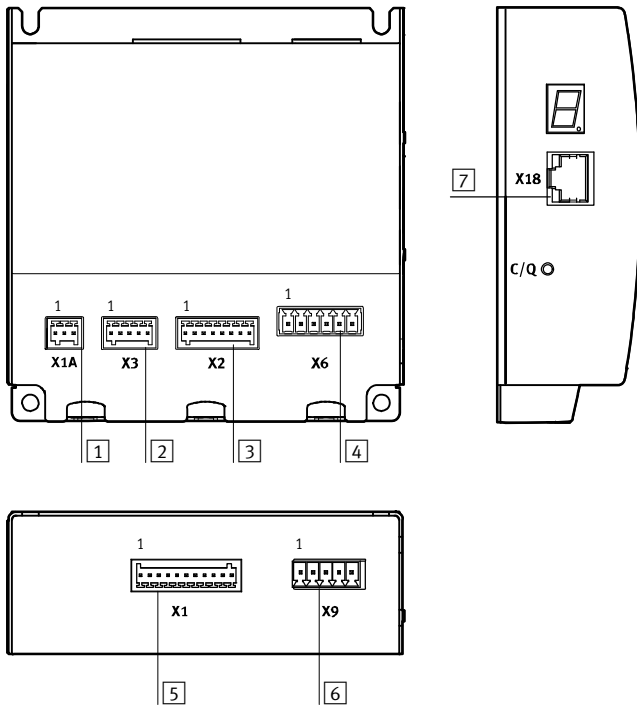
| Pin | Function |
|-----|------------------|
| 1 | Tx+ (Transmit +) |
| 2 | Tx- (Transmit -) |
| 3 | Rx+ (Receive +) |
| 4 | n.c. |
| 5 | n.c. |
| 6 | Rx- (Receive -) |
| 7 | n.c. |
| 8 | n.c. |

Motor controllers CMMO-ST

Technical data

FESTO

Pin allocation for CMMO-ST-...-LK



1 Reference switch

| Pin | Function |
|-----|----------------------|
| 1 | +24 V (logic output) |
| 2 | Signal |
| 3 | 0 V |

2 STO safety function

| Pin | Function |
|-----|----------------------|
| 1 | +24 V (logic output) |
| 2 | STO 1 |
| 3 | STO 2 |
| 4 | Diagnostics 1 |
| 5 | Diagnostics 2 |

3 Encoder

| Pin | Function |
|-----|---------------|
| 1 | A |
| 2 | A/ |
| 3 | B |
| 4 | B/ |
| 5 | N |
| 6 | N/ |
| 7 | +5 V (output) |
| 8 | 0 V |

4 Motor

| Pin | Function |
|-----|-------------------------------|
| 1 | String A |
| 2 | String A/ |
| 3 | String B |
| 4 | String B/ |
| 5 | Brake +24 V (switched output) |
| 6 | Brake 0 V |

5 I/O interface with IO-Link

| Pin | Function |
|-----|------------------------------|
| 1 | +24 V (logic output) |
| 2 | 0 V |
| 3 | Parameterisable output 2 |
| 4 | Parameterisable output 1 |
| 5 | Ready/Error |
| 6 | Controller enable |
| 7 | n.c. |
| 8 | n.c. |
| 9 | L- (0 V IO-Link) |
| 10 | C/Q (IO-Link signal) |
| 11 | L+ (+24 V supply to IO-Link) |

6 Power supply

| Pin | Function |
|-----|---------------|
| 1 | n.c. |
| 2 | n.c. |
| 3 | +24 V (logic) |
| 4 | 0 V |
| 5 | +24 V (load) |

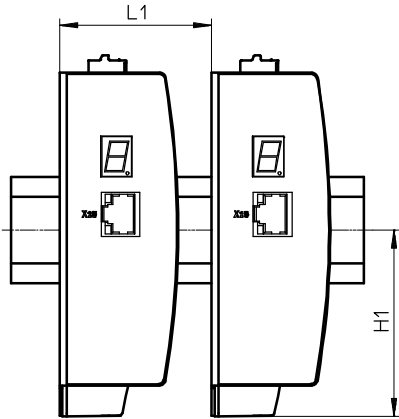
7 Ethernet interface

| Pin | Function |
|-----|------------------|
| 1 | Tx+ (Transmit +) |
| 2 | Tx- (Transmit -) |
| 3 | Rx+ (Receive +) |
| 4 | n.c. |
| 5 | n.c. |
| 6 | Rx- (Receive -) |
| 7 | n.c. |
| 8 | n.c. |

Motor controllers CMMO-ST

Technical data

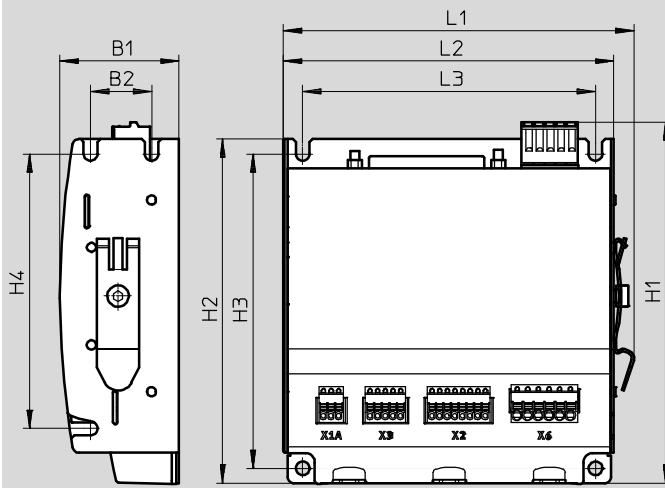
Minimum distance between two motor controllers



| Type | L1 | H1 |
|-------------|----|-------|
| CMMO-ST-... | 41 | 61.35 |

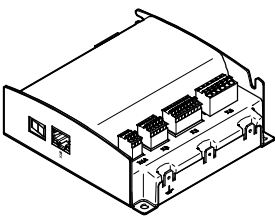
Dimensions

Download CAD data → www.festo.com



| Type | B1 | B2 | H1 | H2 | H3 | H4 | L1 | L2 | L3 |
|-------------|----|----|-------|-------|-------|----|-----|-------|----|
| CMMO-ST-... | 39 | 20 | 118.7 | 113.1 | 103.1 | 90 | 115 | 108.8 | 96 |

★ Core product range

| Ordering data | | | |
|---|----------------------------|-----------|-------------------|
| Motor controller | Description | Part No. | Type |
|  | With I/O interface | | |
| | Switching input/output PNP | ★ 1512316 | CMMO-ST-C5-1-DIOP |
| | Switching input/output NPN | ★ 1512317 | CMMO-ST-C5-1-DION |
| | With IO-Link | | |
| | Switching input/output PNP | ★ 1512320 | CMMO-ST-C5-1-LKP |

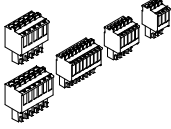
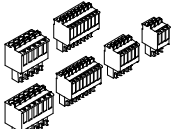
Festo core product range

- ★ Generally ready for shipping ex works in 24 hours
- ☆ Generally ready for shipping ex works in 5 days

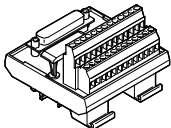
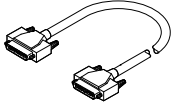
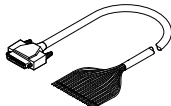
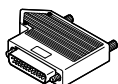
Motor controllers CMMO-ST

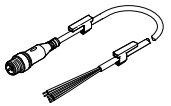
Accessories

FESTO

| Ordering data | | Part No. | Type |
|---|---|-----------|-------------------------|
| Plug connector | Description | | |
|  | Assortment of plug connectors for motor cable, encoder cable, power supply, reference switch, STO safety function | ★ 576005 | NEKM-C-10 ¹⁾ |
|  | Assortment of plug connectors for motor cable, encoder cable, power supply, reference switch, STO safety function and IO-Link | ★ 2948940 | NEKM-C-14 ¹⁾ |

1) Plug connectors are included in the scope of delivery of the motor controller.

| Ordering data – Connection options from I/O interface to controller | | | |
|---|---|------------------|-----------------------------------|
| Connection block | Description | Cable length [m] | Part No. Type |
|  | Ensures simple and clear wiring. The connection to the motor controller is established via the connecting cable NEBC-S1G25-K-.... | – | 8001371 NEFC-S1G25-C2W25-S7 |
| Connecting cable | | | |
|  | Connects the motor controller to the connection block. | 1.0 | 8001374 NEBC-S1G25-K-1.0-N-S1G25 |
| | | 2.0 | 8001375 NEBC-S1G25-K-2.0-N-S1G25 |
| | | 5.0 | 8001376 NEBC-S1G25-K-5.0-N-S1G25 |
| Control cable | | | |
|  | Is connected to the motor controller. The other end comprises individual flying leads. | 3.2 | ★ 8001373 NEBC-S1G25-K-3.2-N-LE25 |
| Plug connector | | | |
|  | 25-pin Sub-D plug connector. Each wire can be individually assembled using screw terminals. | – | ★ 8001372 NEFC-S1G25-C2W25-S6 |

| Ordering data – Cables ¹⁾ | | | |
|---|--|------------------|---------------------------|
| Connecting cable between fieldbus module CTEU and motor controller CMMO-ST | Description | Cable length [m] | Part No. Type |
|  | <ul style="list-style-type: none"> – Min. bending radius: 75 mm – Suitable for use with energy chains – Ambient temp.: –25 ... +70 °C | 1 | 569840 NEBU-LE5-K-1-M12G5 |

1) Further cable variants on request

Festo core product range

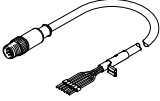
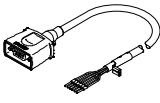
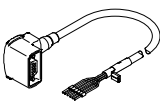
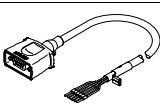
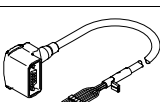
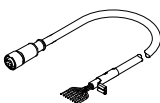
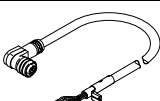
★ Generally ready for shipping ex works in 24 hours

☆ Generally ready for shipping ex works in 5 days

Motor controllers CMMO-ST

Accessories

FESTO

| Ordering data – Cables ¹⁾ | | | | | |
|---|---|--|------------------|-----------|--------------------------|
| | For type | Description | Cable length [m] | Part No. | Type |
| Motor cable | | | | | |
|  | EPCO-16 ERMO-12/-16 EMMS-ST-28 | Straight plug connector – Min. bending radius: 62 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1449600 | NEBM-SM12G8-E-1.5-Q5-LE6 |
| | | | 2.5 | ★ 1449601 | NEBM-SM12G8-E-2.5-Q5-LE6 |
| | | | 5.0 | ★ 1449602 | NEBM-SM12G8-E-5-Q5-LE6 |
| | | | 7.0 | ★ 1449603 | NEBM-SM12G8-E-7-Q5-LE6 |
| | | | 10.0 | ★ 1449604 | NEBM-SM12G8-E-10-Q5-LE6 |
|  | EPCO-25/-40 ELGR-35 ERMO-25/-32 EMMS-ST-42/-57 | Straight plug connector – Min. bending radius: 62 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1450368 | NEBM-S1G9-E-1.5-Q5-LE6 |
| | | | 2.5 | ★ 1450369 | NEBM-S1G9-E-2.5-Q5-LE6 |
| | | | 5.0 | ★ 1450370 | NEBM-S1G9-E-5-Q5-LE6 |
| | | | 7.0 | ★ 1450371 | NEBM-S1G9-E-7-Q5-LE6 |
| | | | 10.0 | ★ 1450372 | NEBM-S1G9-E-10-Q5-LE6 |
|  | EPCO-25/-40 ELGR-35 ERMO-25/-32 EMMS-ST-42/-57 | Angled plug connector – Min. bending radius: 62 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1450736 | NEBM-S1W9-E-1.5-Q5-LE6 |
| | | | 2.5 | ★ 1450737 | NEBM-S1W9-E-2.5-Q5-LE6 |
| | | | 5.0 | ★ 1450738 | NEBM-S1W9-E-5-Q5-LE6 |
| | | | 7.0 | ★ 1450739 | NEBM-S1W9-E-7-Q5-LE6 |
| | | | 10.0 | ★ 1450740 | NEBM-S1W9-E-10-Q5-LE6 |
|  | ELGR-45/-55 EMMS-ST-87 | Straight plug connector – Min. bending radius: 80 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1450834 | NEBM-S1G15-E-1.5-Q7-LE6 |
| | | | 2.5 | ★ 1450835 | NEBM-S1G15-E-2.5-Q7-LE6 |
| | | | 5.0 | ★ 1450836 | NEBM-S1G15-E-5-Q7-LE6 |
| | | | 7.0 | ★ 1450837 | NEBM-S1G15-E-7-Q7-LE6 |
| | | | 10.0 | ★ 1450838 | NEBM-S1G15-E-10-Q7-LE6 |
|  | ELGR-45/-55 EMMS-ST-87 | Angled plug connector – Min. bending radius: 80 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1450943 | NEBM-S1W15-E-1.5-Q7-LE6 |
| | | | 2.5 | ★ 1450944 | NEBM-S1W15-E-2.5-Q7-LE6 |
| | | | 5.0 | ★ 1450945 | NEBM-S1W15-E-5-Q7-LE6 |
| | | | 7.0 | ★ 1450946 | NEBM-S1W15-E-7-Q7-LE6 |
| | | | 10.0 | ★ 1450947 | NEBM-S1W15-E-10-Q7-LE6 |
| Encoder cable | | | | | |
|  | EPCO-16/-25/-40 ELGR-35/-45/-55 ERMO-12/-16/-25/-32 EMMS-ST-28/-42/-57/-87 | Straight plug connector – Min. bending radius: 68 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1451586 | NEBM-M12G8-E-1.5-LE8 |
| | | | 2.5 | ★ 1451587 | NEBM-M12G8-E-2.5-LE8 |
| | | | 5.0 | ★ 1451588 | NEBM-M12G8-E-5-LE8 |
| | | | 7.0 | ★ 1451589 | NEBM-M12G8-E-7-LE8 |
| | | | 10.0 | ★ 1451590 | NEBM-M12G8-E-10-LE8 |
|  | EPCO-25/-40 ERMO-25/-32 EMMS-ST-42/-57/-87 | Angled plug connector – Min. bending radius: 68 mm – Suitable for use with energy chains – Ambient temp.: –40 ... +80 °C | 1.5 | ★ 1451674 | NEBM-M12W8-E-1.5-LE8 |
| | | | 2.5 | ★ 1451675 | NEBM-M12W8-E-2.5-LE8 |
| | | | 5.0 | ★ 1451676 | NEBM-M12W8-E-5-LE8 |
| | | | 7.0 | ★ 1451677 | NEBM-M12W8-E-7-LE8 |
| | | | 10.0 | ★ 1451678 | NEBM-M12W8-E-10-LE8 |

1) Other cable lengths on request.

Festo core product range

- ★ Generally ready for shipping ex works in 24 hours
- ☆ Generally ready for shipping ex works in 5 days