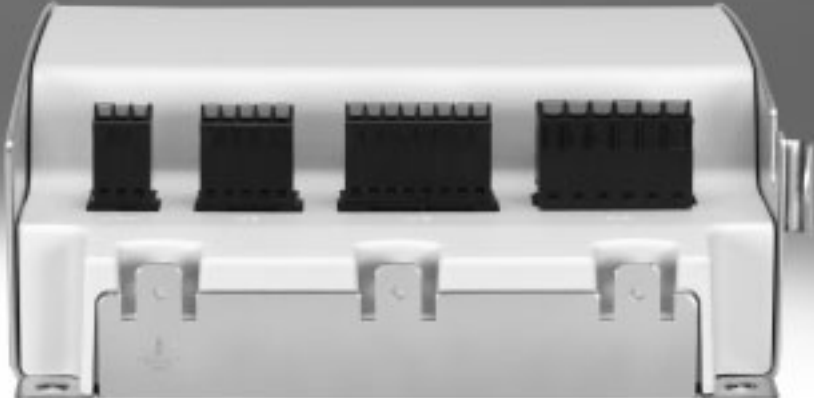


Motor controllers CMMO-ST



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

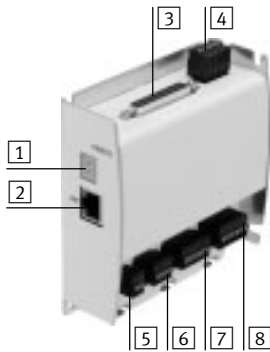
Modbus

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.

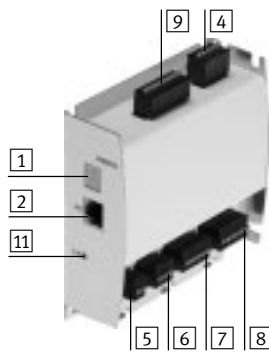
Description of the interfaces

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



Motor controllers CMMO-ST

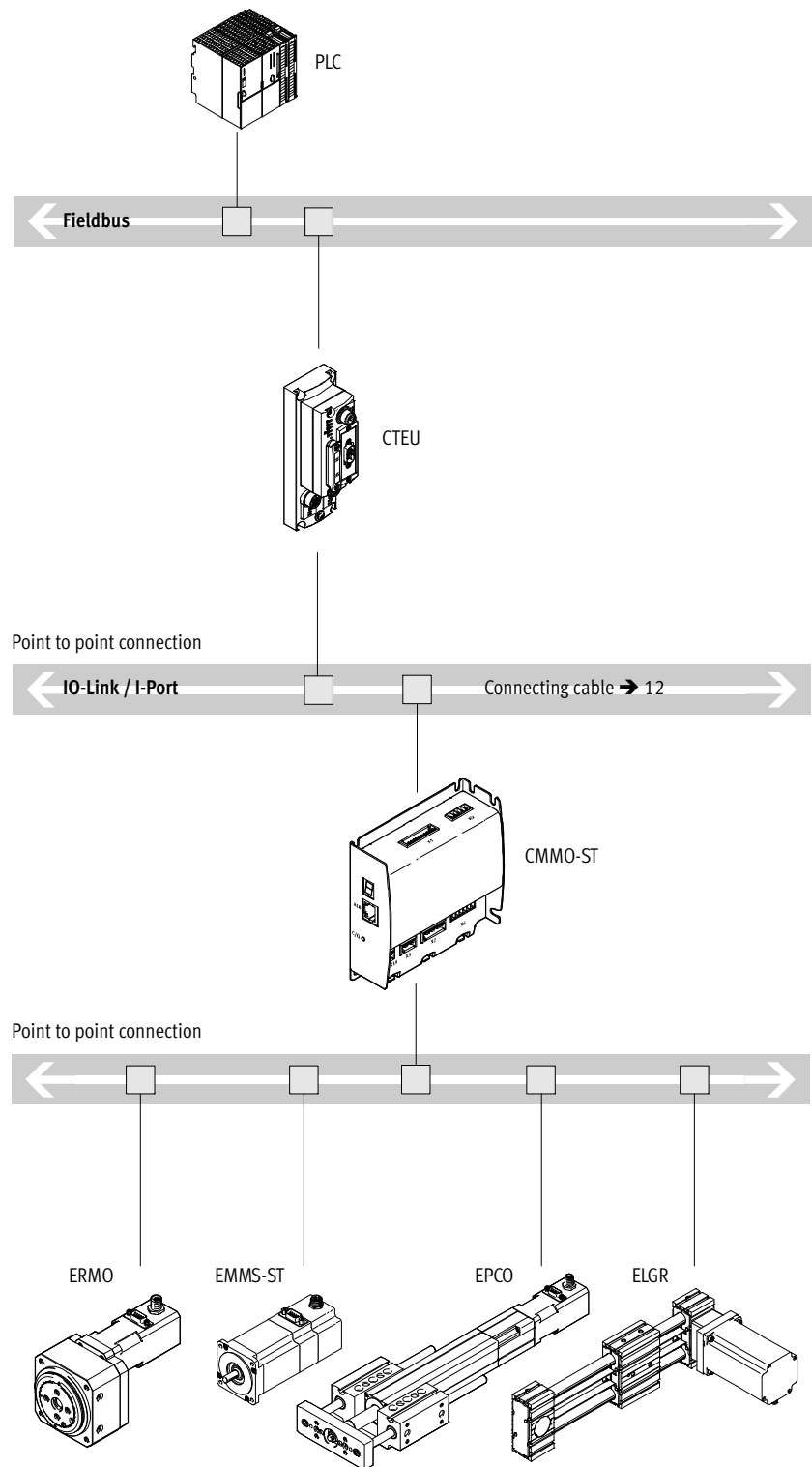
Key features

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

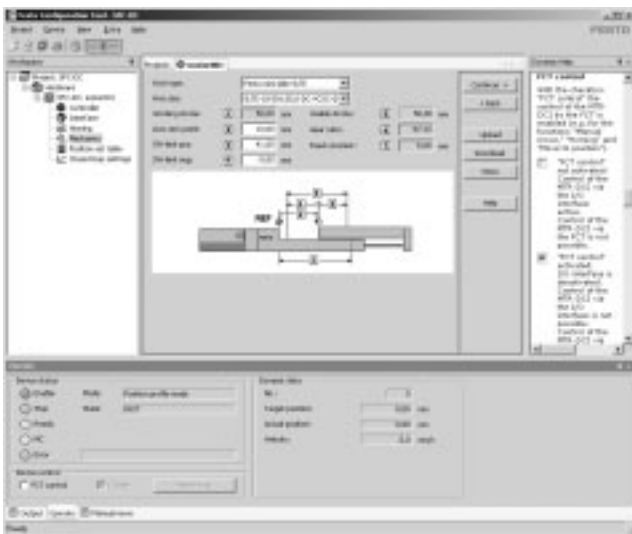
FCT software – Festo Configuration Tool

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

		CMMO	-	ST	-	C5	-	1	-	DIO		P
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



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

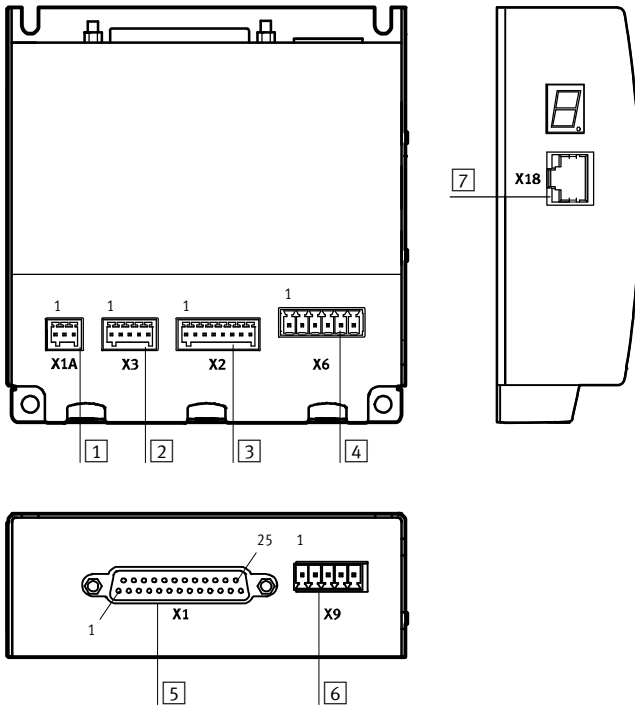
Operating and environmental conditions		
Type CMMO-ST-...	-DIO	-LK
Characteristics of digital logic outputs	Not galvanically isolated	
Characteristics of logic inputs	Galvanically connected to logic potential	
Logic input specification	Based on IEC 61131-2	
Degree of protection	IP40	
Protective function	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	
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)

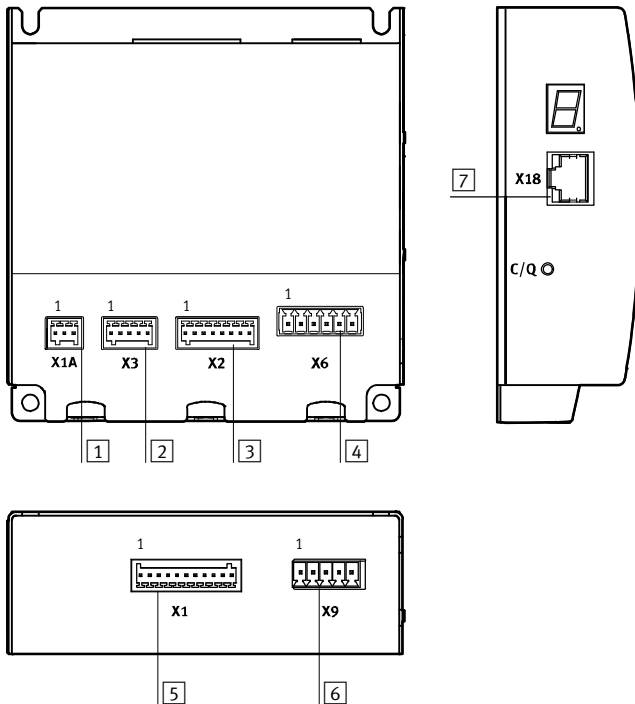
7 Ethernet interface

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

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/O (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)

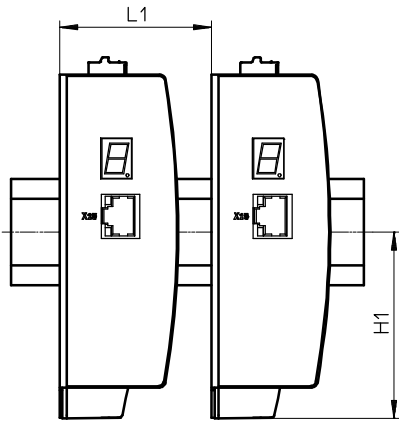
7 Ethernet interface

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

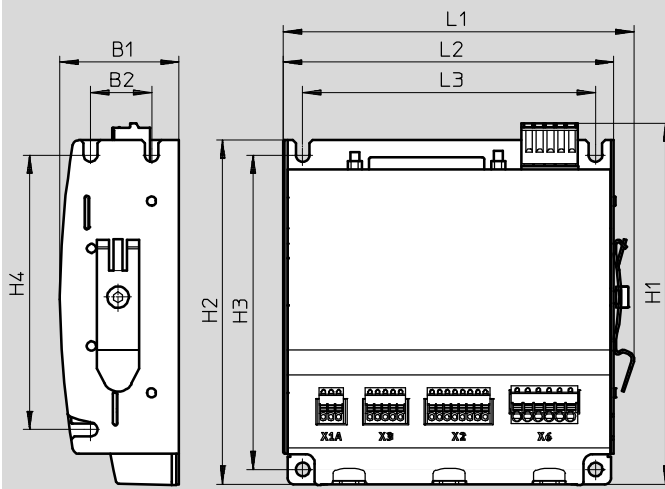
Minimum distance between two motor controllers



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

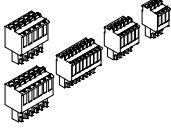
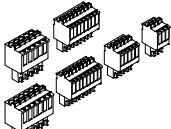
Ordering data

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

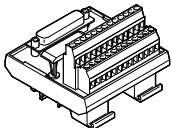
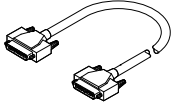
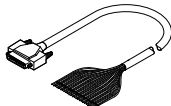
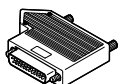
Motor controllers CMMO-ST

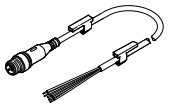
Accessories

FESTO

Ordering data			
	Description	Part No.	Type
Plug connector			
	Assortment of plug connectors for motor cable, encoder cable, power supply, reference switch, STO safety function	576005	NEKM-C-10¹⁾
	Assortment of plug connectors for motor cable, encoder cable, power supply, reference switch, STO safety function and IO-Link	2948940	NEKM-C-14¹⁾

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

Ordering data – Connection options from I/O interface to controller				
	Description	Cable length [m]	Part No.	Type
Connection block				
	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

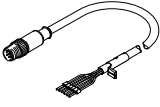
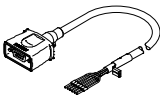
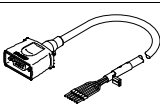
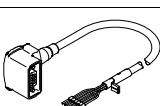
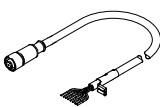
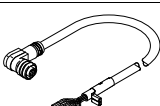
Ordering data – Cables ¹⁾				
	Description	Cable length [m]	Part No.	Type
Connecting cable between fieldbus module CTEU and motor controller CMMO-ST				
	<ul style="list-style-type: none"> – Min. bending radius: 75 mm – Suitable for use with energy chains – Ambient temp.: –25 ... +70 °C 	1	569840	NEBU-LE5-K-1-M12G5

1) Further cable variants on request.

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.