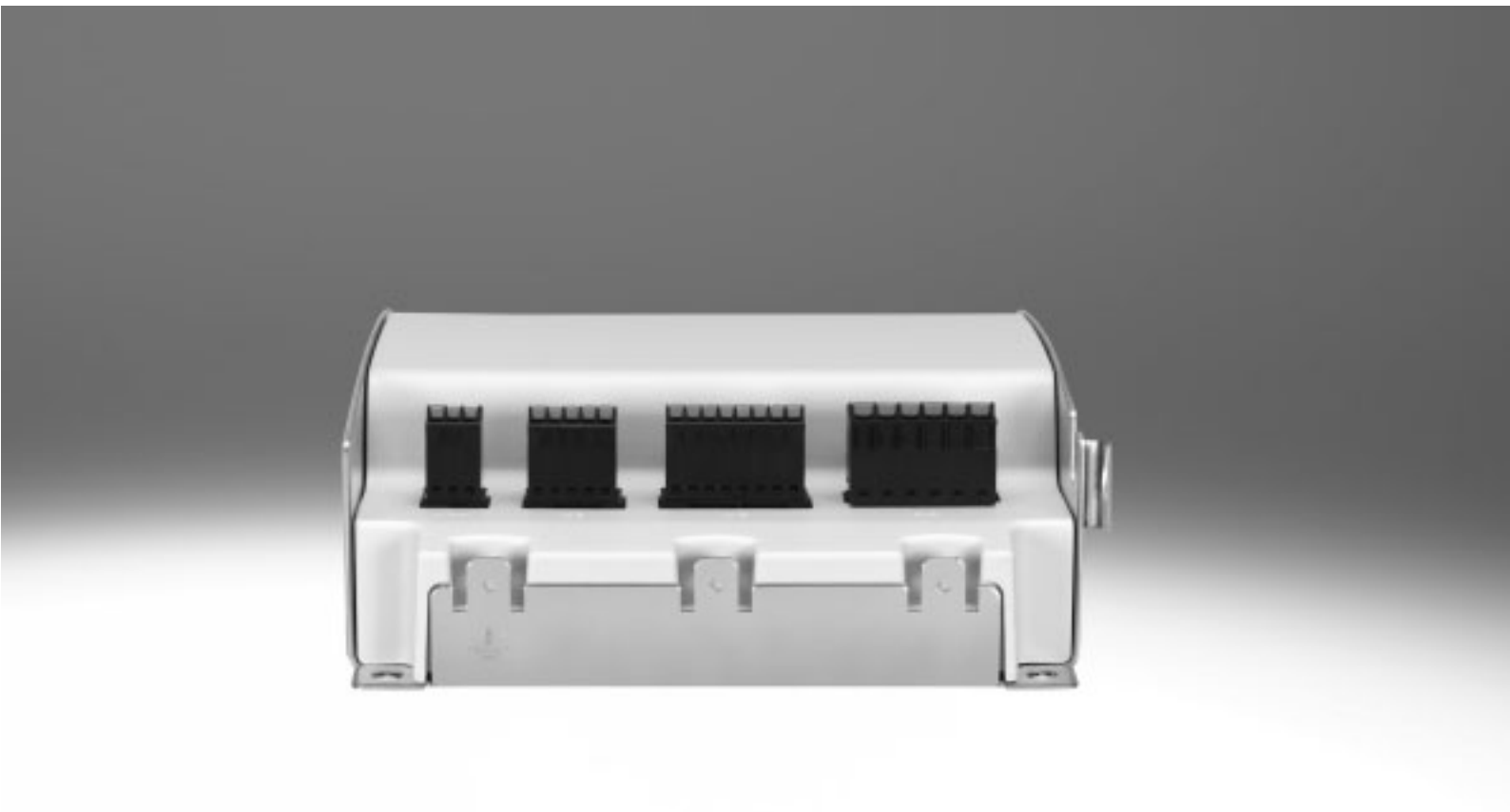
Motor controllers CMMO-ST

FESTO



New
IO-Link

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.

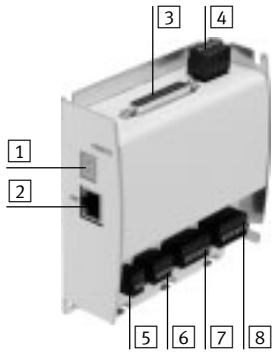
Communication system Modbus TCP

Modbus

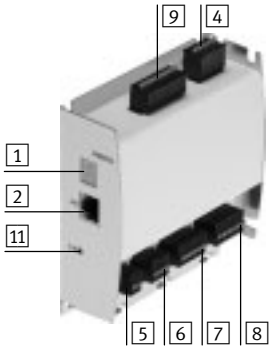
Modbus TCP is an open communication protocol (IEC 61158) based on the master-slave architecture. It is an established standard for communication via Ethernet-TCP/IP in automation technology.
The data profile FHPP is transmitted via the physical interface.

Description of the interfaces

With I/O interface



With IO-Link interface



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

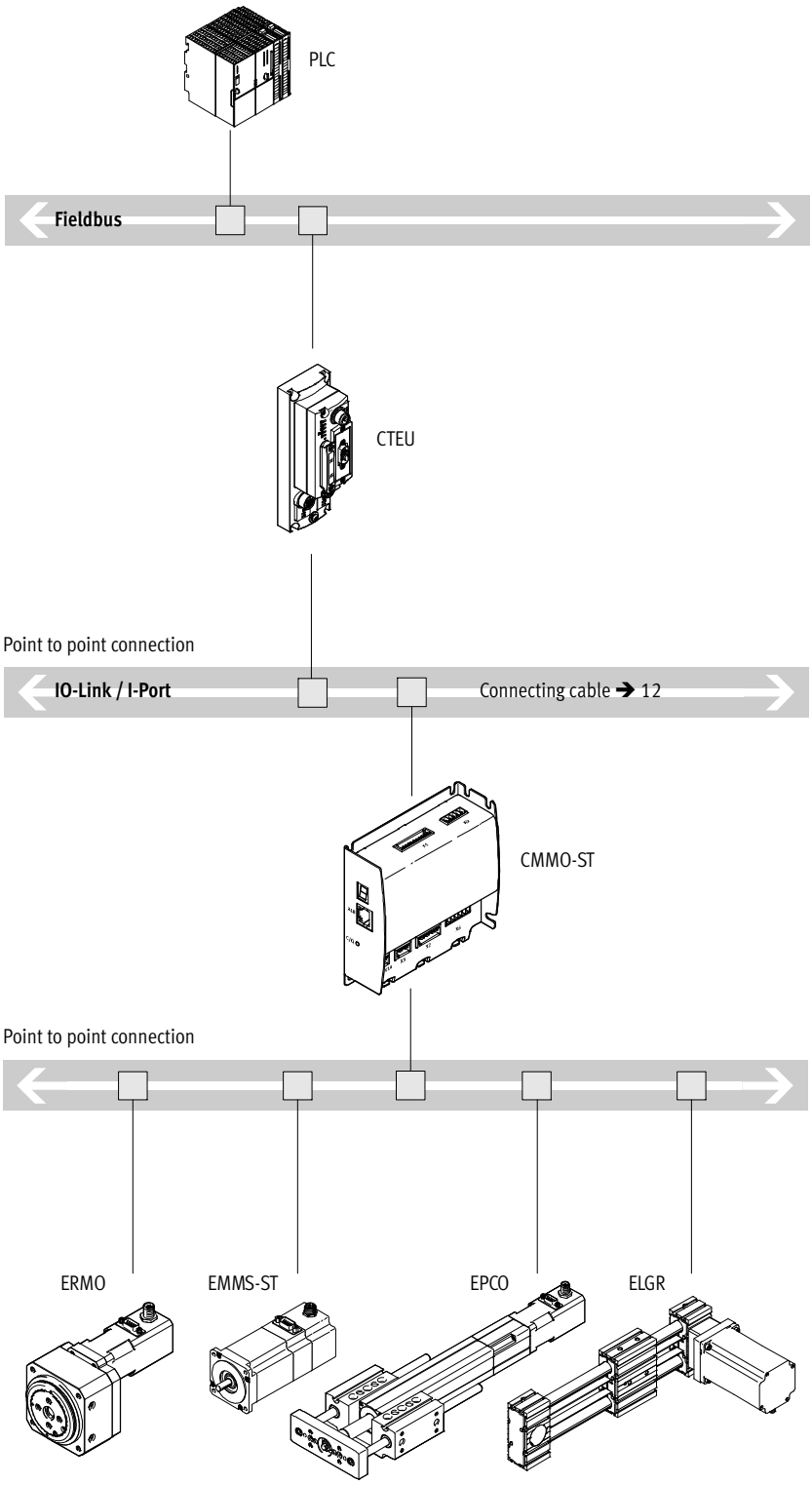
Motor controllers CMMO-ST

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

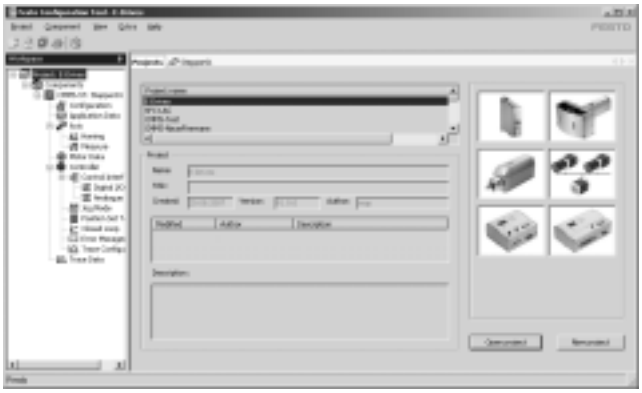
New
IO-Link

Motor controllers CMMO-ST

Key features

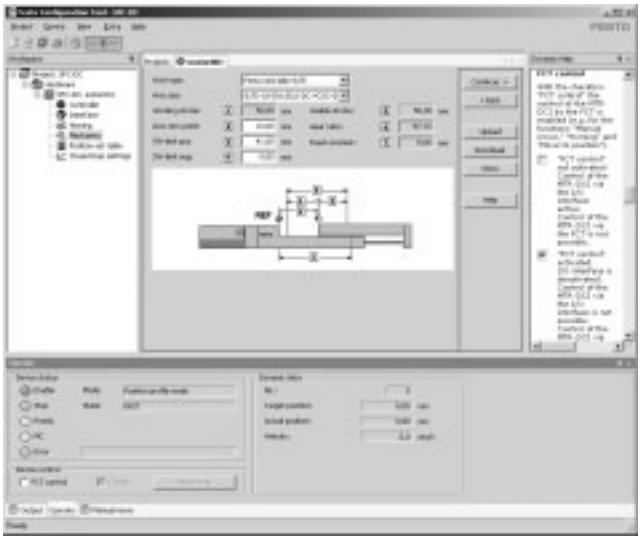
FCT software – Festo Configuration Tool

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



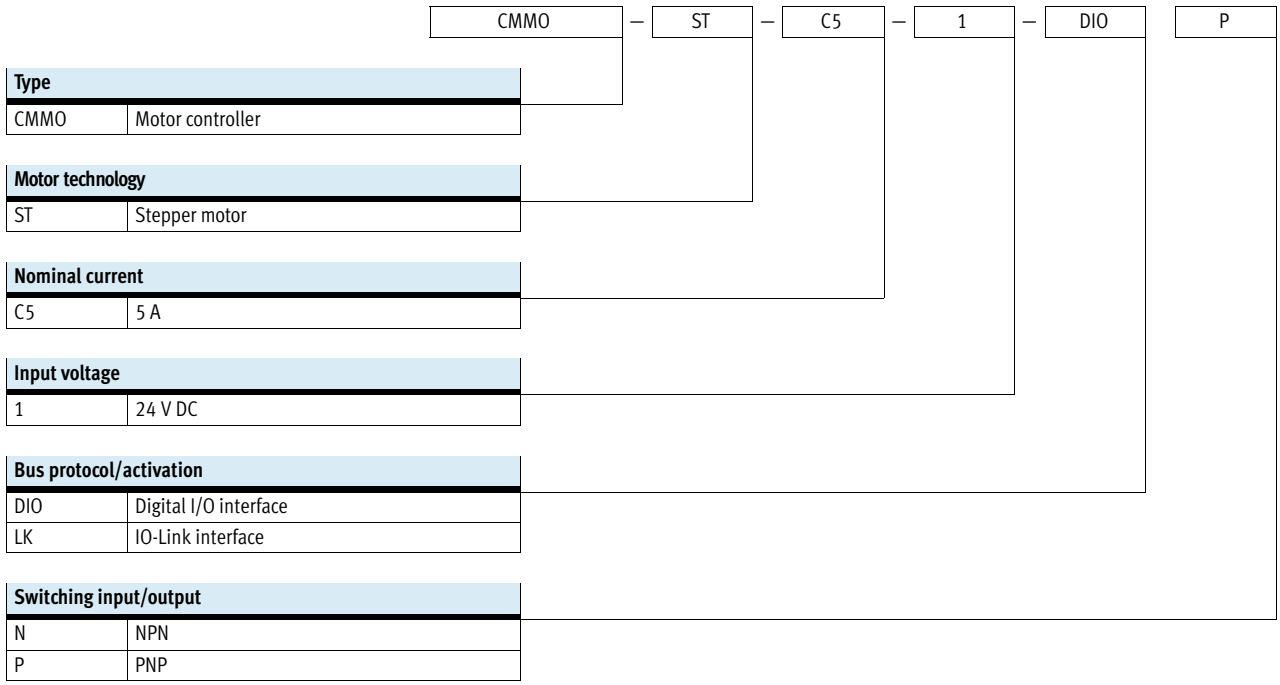
- Reference positions can be either edited or taught in
- Flexible adaptation to installation conditions
- Settings are displayed clearly

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

New
IO-Link

Motor controllers CMMO-ST

Technical data

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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 x 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 ➔ User documentation.
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^2t 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 ➔ User documentation.
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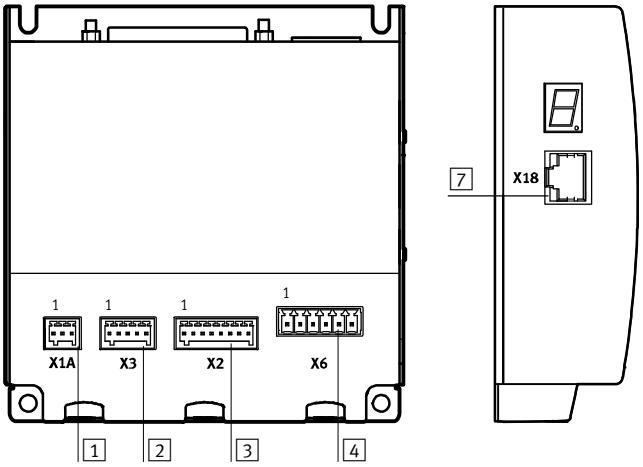
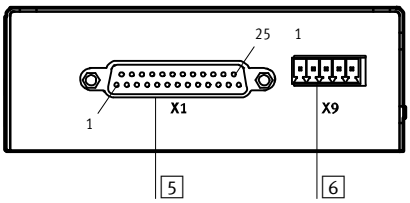
Motor controllers CMMO-ST

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

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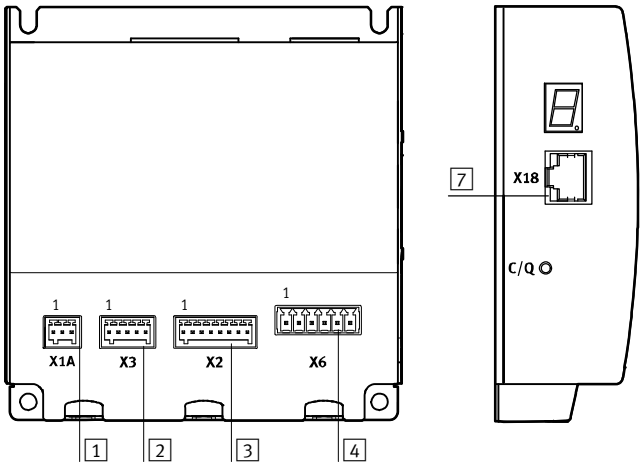
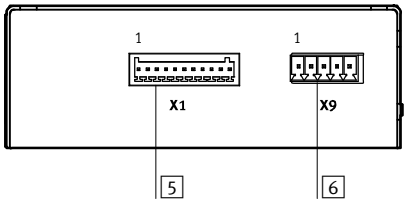
Pin allocation for CMMO-ST-...-LK





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

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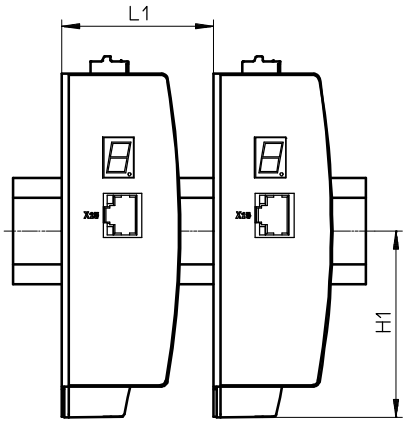
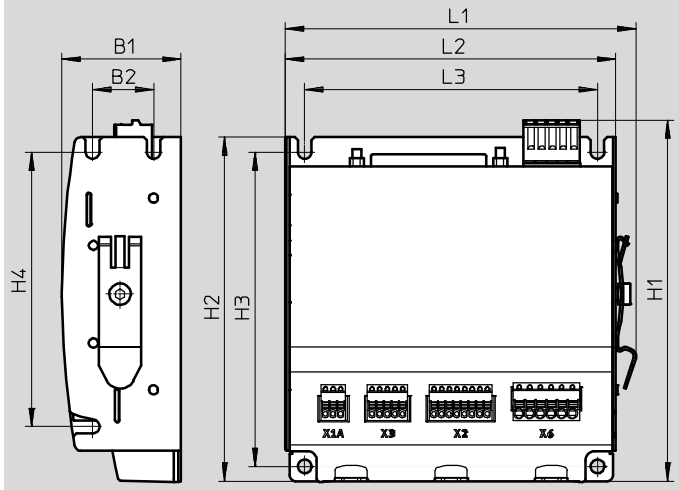
Minimum distance between two motor controllers



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

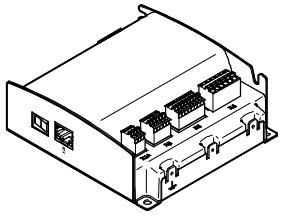
Dimensions

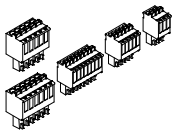
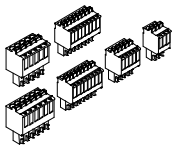
Download CAD data ➔ **www.festo.com**



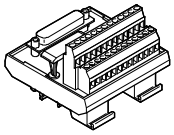
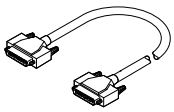
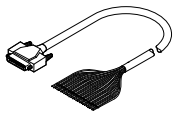
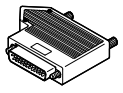
Type	B1	B2	H1	H2	H3	H4	L1	L2	L3
CMMO-ST-...	39	20	118.7	113.1	103.1	90	115	108.8	96

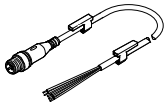
Ordering data

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**

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-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]

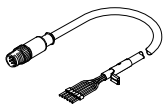
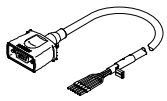
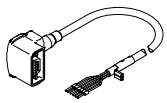
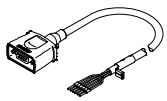
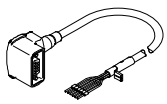
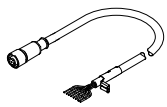
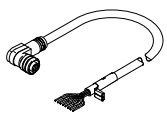
1) Plug connectors are included in the scope of delivery of the motor controller.

Ordering data – Connection options from I/O interface to controller				
	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				
	– 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.

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-M12G8-E-1.5-Q5-LE6**
			2.5	**1449601**	**NEBM-M12G8-E-2.5-Q5-LE6**
			5.0	**1449602**	**NEBM-M12G8-E-5-Q5-LE6**
			7.0	**1449603**	**NEBM-M12G8-E-7-Q5-LE6**
			10.0	**1449604**	**NEBM-M12G8-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.