



**Motor controllers CMMP-AS, for servo motors**



# Motor controllers CMMP-AS, for servo motors

Key features

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Performance characteristics	
<b>Compactness</b> <ul style="list-style-type: none"> <li>Extremely small dimensions</li> <li>Full integration of all components for the controller and power section, including USB interface, Ethernet and CANopen interface</li> <li>Integrated brake chopper</li> </ul>	<ul style="list-style-type: none"> <li>Integrated EMC filters</li> <li>Automatic actuation for a holding brake</li> <li>Compliance with the current CE and EN standards without additional external measures (→ 6)</li> </ul>
<b>Motion control</b> <ul style="list-style-type: none"> <li>Evaluation of digital absolute encoder (EnDat/HIPERFACE) in single-turn or multi-turn versions</li> <li>Can be operated as a torque, speed or position controller</li> <li>Integrated position control</li> <li>Time-optimised (trapezoidal) or jerk-free (S-shaped) positioning</li> <li>Absolute and relative movements</li> <li>Point-to-point positioning with and without motion path smoothing</li> <li>Position synchronisation</li> <li>Electronic gear unit</li> <li>255 position sets</li> <li>Wide range of homing methods</li> </ul>	
<b>Fieldbus interfaces</b> 	
<b>Input/output</b> <ul style="list-style-type: none"> <li>Freely programmable I/Os</li> <li>High-resolution 16-bit analogue input</li> <li>Jog/teach mode</li> <li>Simple connection to a higher-order controller via I/O or fieldbus</li> <li>Synchronous operation</li> <li>Master/slave mode</li> <li>Additional I/Os with the plug-in card CAMC-D-8E8A → 20</li> </ul>	<b>Integrated sequence control</b> <ul style="list-style-type: none"> <li>Automatic sequence of position sets without a higher-order controller</li> <li>Linear and cyclical position sequences</li> <li>Adjustable delay times</li> <li>Branches and wait positions</li> <li>Overlapping restart possible during the movement</li> </ul>
<b>Integrated safety functions</b> <ul style="list-style-type: none"> <li>Depending on the variant or plug-in card, the motor controller supports the following safety functions: <ul style="list-style-type: none"> <li>– Safe torque off (STO)</li> <li>– Safe stop 1 (SS1)</li> <li>– Safe brake control (SBC)</li> <li>– Safe operating stop (SOS)</li> <li>– Safe stop 2 (SS2)</li> <li>– Safely limited speed (SLS)</li> <li>– Safe speed range (SSR)</li> <li>– Safe speed monitor (SSM)</li> </ul> </li> </ul>	<b>Interpolating multi-axis movement</b> <ul style="list-style-type: none"> <li>With a suitable controller, the CMMP-AS can perform path movements with interpolation via CANopen or EtherCAT. The controller specifies setpoint position values in a fixed time slot pattern to this end. In between, the servo position controller independently interpolates the data values between two data points.</li> </ul>

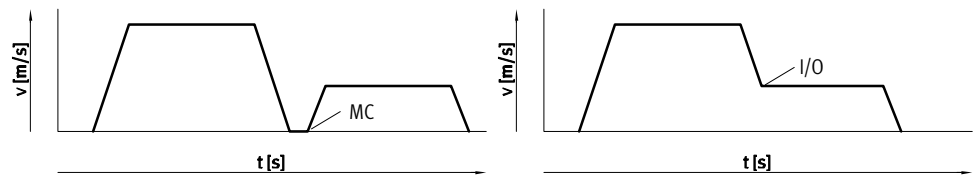
PROFIBUS®, PROFINET®, DeviceNet®, CANopen®, EtherCAT®, EtherNet/IP® is a registered trademark of its respective trademark holder in certain countries.

# Motor controllers CMMP-AS, for servo motors

Key features

## Travel program

- Linking of any number of position sets into a travel program
- Step enabling conditions for the travel program possible via digital inputs, for example  
MC – motion complete  
I/O – digital inputs



## Library for EPLAN

→ [www.festo.de/eplan](http://www.festo.de/eplan)



EPLAN macros for fast and reliable planning of electrical projects in combination with motor controllers,

motors and cables. This enables a high level of planning reliability, standardisation of

documentation, no need to create symbols, graphics and master data.

## Cam disc functionality

The “electronic cam disc” application type creates optimised motion profiles that generate less vibration and lower acceleration forces at the machine. In addition, the movement of the motor is always synchronous in position with a master axis, which enables easy definition of overlapping, time-optimised motion sequences. To be able to use the cam disc function, you will need the Festo Configuration Tool (FCT) and also the curve editor → 23

Key features:

- High flexibility of the system. The mechanics do not need to be modified if the requirements for the curve shapes change.
- User-friendly motion plan editor. All limits for position, speed and acceleration are immediately displayed in the editor.
- Up to 16 cam discs with a total of up to 2048 data points can be managed. The data points can be randomly distributed along the cam discs.
- There are four digital trip cams coupled with each cam disc.
- Each cam disc can be offset by a certain amount from the master axis.

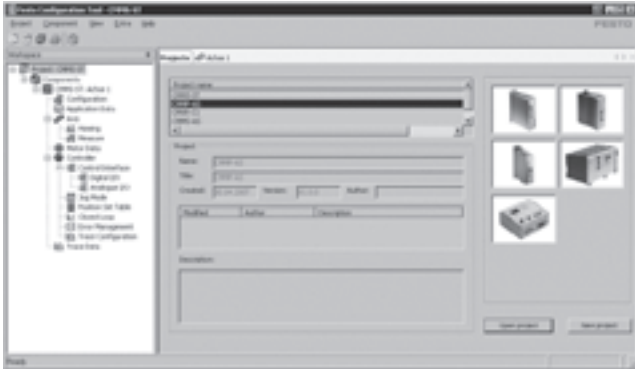
# Motor controllers CMMP-AS, for servo motors

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 operating mode for all drives
- Work offline at your desk or online at the machine

## FHPP – Festo Handling and Positioning Profile

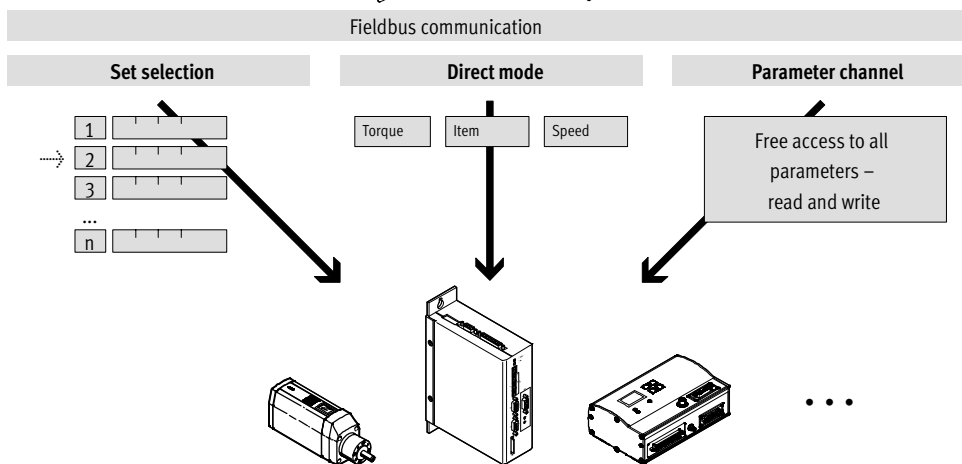
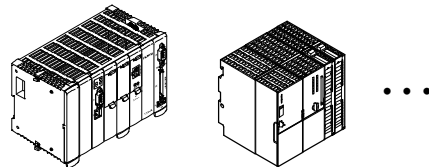
Optimised data profile

Festo has developed an optimised data profile, the "Festo Handling and Positioning Profile (FHPP)", which is especially tailored to handling and positioning applications.

The FHPP data profile permits the actuation of Festo motor controllers, using a fieldbus interface, via standardised control and status bytes.

The following are defined, among others:

- Operating modes
- I/O data structure
- Parameter objects
- Sequence control



## Motor controllers CMMP-AS, for servo motors

Product range overview and type codes

Type	CMMP-AS-...-M0	CMMP-AS-...-M3	CMMP-AS-C20-11A-P3
<b>Fieldbus interface</b>			
Integrated in the controller			
CANopen	■	■	■
Modbus/TCP	■	■	-
Optional via plug-in card			
PROFIBUS DP	-	■	■
DeviceNet	-	■	■
EtherCAT	-	■	■
EtherNet/IP	-	■	-
PROFINET RT	-	■	-
<b>Safety functions</b>			
Integrated in the controller	■	-	■
Optional via plug-in card	-	■	-

### Type codes

		CMMP	AS	C5	11A	P3	M3
<b>Type</b>							
CMMP	Motor controller, premium						
<b>Motor technology</b>							
AS	AC synchronous						
<b>Nominal current</b>							
C2	2.5 A						
C5	5 A						
C10	10 A						
C15	15 A						
C20	20 A						
<b>Input voltage</b>							
3A	100 ... 230 V AC						
11A	3x 230 ... 480 V AC						
<b>Number of phases</b>							
-	1-phase						
P3	3-phase						
<b>Number of slots</b>							
M0	No slot						
-	With 2 slots						
M3	With 3 slots						

## Motor controllers CMMP-AS, for servo motors

Technical data

Fieldbus interfaces

**CANopen**

**DeviceNet**

**DeviceNet**

**EtherCAT**

**Modbus**

**PROFIBUS DP**

**EtherNet/IP**

**UL US LISTEC**



General technical data						
CMMP-AS-	C2-3A-...	C5-3A-...	C5-11A-P3-...	C10-11A-P3-...	C15-11A-P3-...	C20-11A-P3
Type of mounting	Screwed onto connecting plate					
Display	7-segment display					
Parameterisation interface	USB, Ethernet					RS232
Active PFC	Yes	-				
DIL switches	Firmware download/fieldbus settings <sup>1)</sup> /CAN terminating resistor					-
SD card slot	Memory card → 21					-
Encoder interface input	Resolver Incremental encoder with analogue or digital tracking signals Absolute encoder with EnDat V2.1 serial/V2.2 Absolute encoder with HIPERFACE Additional input for synchronous/cam disc operation					
Encoder interface output	Actual value feedback via encoder signals in speed control mode Setpoint specification for downstream slave drive Resolution up to 16384 ppr					
Braking resistor, integrated	[Ω]	60	68		47	
Pulse power of braking resistor	[kVA]	2.8	8.5		12	
Braking resistor, external	[Ω]	≥ 50	≥ 40		30 ≤ R ≤ 100	
Impedance of setpoint input	[kΩ]	20				
Number of analogue outputs	2					
Operating range of analogue outputs	[V]	±10				
Resolution of analogue outputs	9 bits					
Characteristics of analogue outputs	Short-circuit proof					
Number of analogue inputs	3					
Operating range of analogue inputs	[V]	±10				
Characteristics of analogue inputs	1x differential, resolution 16 bit 2x single-ended, resolution 10 bit Configurable for speed setpoint value/torque setpoint value/position setpoint value					
Mains filter	Integrated				External <sup>2)</sup>	Integrated
Max. motor cable length <sup>3)</sup>	[m]	25	-		25	
Product weight	[g]	2100	2200	3800	3450	8000

1) Not in combination with CMMP-AS-...-M0

2) The mains filter is mandatory for compliance with the CE and EN standards → 23

3) Without external mains filter

Function blocks for PLC programming							
Programming software	Controller manufacturer	Interfaces					
		CANopen	PROFIBUS DP	DeviceNet	EtherCAT	EtherNet/IP	PROFINET RT
CODESYS	Festo	■	■	■	■	■	■
TwinCAT	Beckhoff	■	■	■	■	■	■
	Other manufacturers	■	■	■	■	■	■
RSLogix5000	Rockwell Automation	-	-	■	-	■	-
Step 7/TIA Portal	Siemens	-	■	-	-	-	■

# Motor controllers CMMP-AS, for servo motors

Technical data

Technical data – Fieldbus interface										
Interfaces	I/O	Additional I/O <sup>1)</sup>	CANopen	Modbus/TCP	PROFIBUS DP	DeviceNet	EtherCAT	EtherNet/IP	PROFINET RT	
Number of digital logic outputs	5	8	5							
Characteristics of digital logic outputs	Freely configurable									
Number of digital logic inputs	10	8	10							
Characteristics of logic inputs	Freely configurable									
Process coupling	16 (127) position sets <sup>2)</sup>	255 position sets	250 position sets							
Communication profile	–	–	DS301, FHPP+ DS301, DSP402	FHPP+	DP-V0/FHPP+	FHPP+	DS301, FHPP+ CoE: DS301, DSP402	FHPP+	FHPP+	
Max. fieldbus transmission rate [Mbps]	–	–	1	100	12	0.5	100	100	100	
Interface										
CMMP-AS-...-M0	Integrated	■	–	■	■	–	–	–	–	–
CMMP-AS-...-M3	Integrated	■	–	■	■	–	–	–	–	–
	Optional <sup>3)</sup>	–	■	–	–	■	■	■	■	■
CMMP-AS-C20-11A-P3	Integrated	■	–	■	–	–	–	–	–	–
	Optional <sup>3)</sup>	–	–	–	–	■	■	■	–	–

- 1) With the plug-in card CAMC-D8E8A → 20
- 2) Can be expanded with configurable logic inputs up to max. 127 position sets
- 3) Plug-in cards can be ordered separately → 20

Electrical data								
CMMP-AS-		C2-3A-...	C5-3A-...	C5-11A-P3-...	C10-11A-P3-...	C15-11A-P3-...	C20-11A-P3	
Output data								
Output voltage range	[V AC]	3x 0 ... 270			3x 0 ... 360			
Nominal current	[A <sub>eff</sub> ]	2.5	5	5	10	15	20	
Peak current	[A <sub>eff</sub> ]	5	10	10	20	30	41.5	
Max. peak current duration	[s]	5					2	
	[A <sub>eff</sub> ]	10	20	20	40	45	–	
	[s]	0.5					1	–
Max. DC link voltage	[V DC]	320/380 <sup>1)</sup>			560			
Output frequency	[Hz]	0 ... 1000						
Load supply								
Nominal voltage phases		1			3			
Input voltage range	[V AC]	100 ... 230 ±10%			3x 230 ... 480 ±10%			
Max. nominal input current	[A]	3	6	5.5	11	13	20	
Nominal power	[VA]	500	1000	3000	6000	9000	12,000	
Peak power	[VA]	1000	2000	6000	12,000	18,000	25,000	
Mains frequency	[Hz]	50 ... 60						
Logic supply								
Nominal voltage	[V DC]	24 ±20%						
Nominal current	[A]	0.55/2.05 <sup>2)</sup>	0.65/2.15 <sup>2)</sup>	1/3.5 <sup>2)</sup>				
Max. current of digital logic outputs	[mA]	100						

- 1) Without PFC/with PFC
- 2) Max. current with brake and I/Os

## Motor controllers CMMP-AS, for servo motors

Technical data

Safety functions to EN 61800-5-2				
Motor controller	CMMP-AS-...-M0	CMMP-AS-...-M3		CMMP-AS-C20-11A-P3
With plug-in card	-	CAMC-G-S1 → 16	CAMC-G-S3 → 17	-
Safe torque off (STO)	■	■	■	■
Safe stop 1 (SS1)	-	-	■	-
Safe brake control (SBC)	■	■	■	■
Safe operating stop (SOS)	-	-	■	-
Safe stop 2 (SS2)	-	-	■	-
Safely limited speed (SLS)	-	-	■	-
Safe speed range (SSR)	-	-	■	-
Safe speed monitor (SSM)	-	-	■	-

Safety characteristics		
CMMP-AS-	C2/C5/C10-...-M0	C20-11A-P3
Safety function to EN 61800-5-2	Safe torque off (STO)	
Performance Level (PL) to EN ISO 13849-1	Category 4, Performance Level e	Category 3, Performance Level d
Safety integrity level (SIL) to EN 61800-5-2, EN 62061, EN 61508	SIL 3	SIL 2
Certificate issuing authority	TÜV 01/205/5262.01/14	DGUV MFS 10027
Proof test interval	20a	-
Diagnostic coverage [%]	97	-
Safe failure fraction (SFF) [%]	99.2	-
Hardware fault tolerance	1	-
CE marking (see declaration of conformity)	To EU EMC Directive <sup>1)</sup>	
	To EU Machinery Directive	

- 1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://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 – Connection to the integrated safety module with CMMP-AS-...-M0		
Control port STO-A/STO-B		
Nominal voltage	[V DC]	24 (related to 0V-A/B)
Operating range	[V]	19.2 ... 28.8
Nominal current	[mA]	20 (typical; max. 30)
Starting current	[mA]	450 (typical, duration approx. 2 ms; max. 600 at 28.8 V)
Maximum positive test impulse length at 0 signal	[ms]	0.3 (related to nominal voltage 24 V and intervals > 2 s between impulses)
Maximum allowable time for test pulse at 24 V signal	[ms]	< 2 ... 6
Properties	Galvanically isolated	
Monitoring contact C1, C2		
Nominal voltage	[V DC]	24
Max. voltage	[V DC]	< 30 (overvoltage-resistant up to 60 V)
Nominal current	[mA]	< 200 (not short-circuit proof)
Version	Potential-free signal contact	
Switching logic	Contact closes at STO	



## Motor controllers CMMP-AS, for servo motors

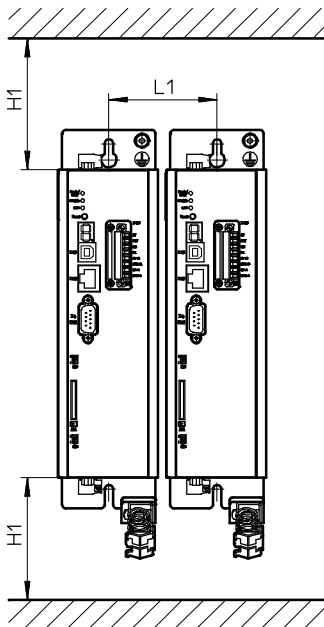
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Technical data

Operating and environmental conditions		C2-3A-...	C5-3A-...	C5-11A-P3-...	C10-11A-P3-...	C15-11A-P3-...	C20-11A-P3
CMMP-AS-							
Digital logic outputs		Galvanically isolated					
Logic inputs		Galvanically isolated					
Degree of protection		IP20					
with plug on X6 and X9		IP10					
Protective function		I <sup>2</sup> t monitoring					
		Intermediate circuit over/undervoltage					
		Output stage short circuit					
		Standstill monitoring					
		Temperature monitoring					
Ambient temperature	[°C]	0 ... +40					
Storage temperature	[°C]	-25 ... +70					
Relative air humidity	[%]	0 ... 90 (non-condensing)					
CE marking (see declaration of conformity)		To EU Low Voltage Directive					
		To EU EMC Directive <sup>1)</sup>					
		To EC Machinery Directive					
Certification		c UL us listed (OL)					-
		RCM mark					C-Tick
Note on materials		Contains paint-wetting impairment substances					
		RoHS compliant					

- 1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://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.

### Installation clearance for motor controller



Type	H1 <sup>1)</sup>	L1
CMMP-AS-C2-3A-...	100	71
CMMP-AS-C5-3A-...		
CMMP-AS-C5-11A-P3-...	100	85
CMMP-AS-C10-11A-P3-...		
CMMP-AS-C15-11A-P3-...		
CMMP-AS-C20-11A-P3	100	95

- 1) An installation clearance of 150 mm is recommended for optimum wiring of the motor or encoder cable on the underside of the motor controller

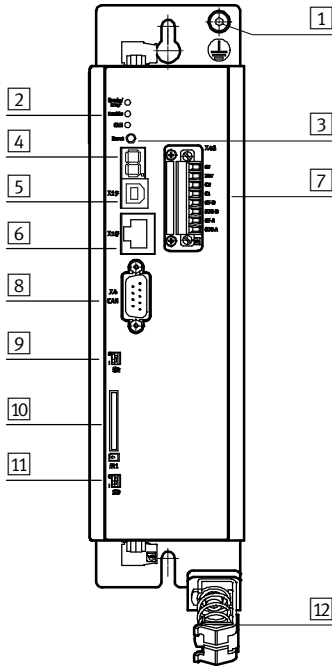
## Motor controllers CMMP-AS, for servo motors

Technical data

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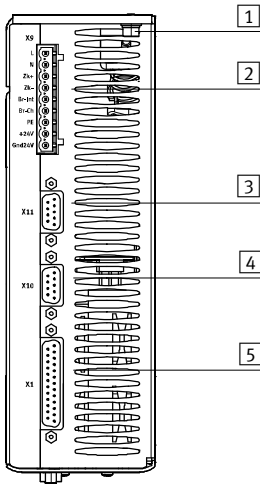
### View of motor controller

CMMP-AS-...-M0



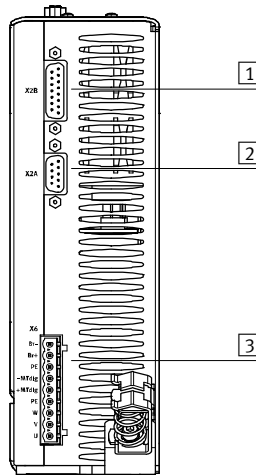
- 1 PE connection
- 2 LEDs
- 3 Reset button
- 4 7-segment display
- 5 X19 USB interface
- 6 X18 Ethernet interface
- 7 X40 Digital I/O interface for controlling the STO function
- 8 X4 CANopen interface
- 9 Activation of CANopen terminating resistor
- 10 SD/MMC card slot
- 11 Activation of firmware download
- 12 Screened connection

### From above



- 1 PE connection
- 2 X9 Power supply
- 3 X11 Incremental encoder interface (output)
- 4 X10 Incremental encoder interface (input)
- 5 X1 I/O interface

### From underneath



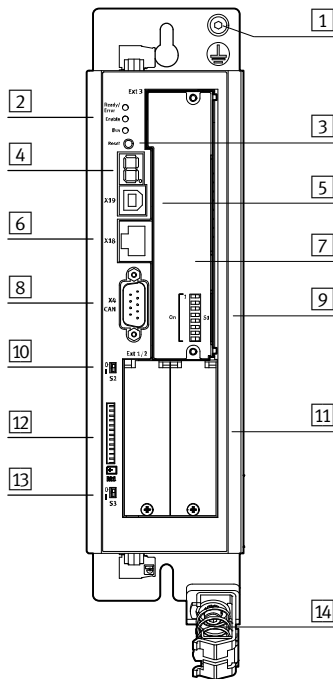
- 1 X2B Encoder connection
- 2 X2A Resolver connection
- 3 X6 Motor connection

# Motor controllers CMMP-AS, for servo motors


Technical data

## View of motor controller

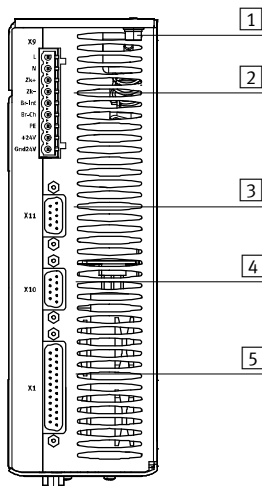
CMMP-AS-...-M3



- 1 PE connection
- 2 LEDs
- 3 Reset button
- 4 7-segment display
- 5 X19 USB interface
- 6 X18 Ethernet interface
- 7 Slot for switch or safety module
- 8 X4 CANopen interface
- 9 Fieldbus settings
- 10 Activation of CANopen terminating resistor
- 11 Slots for extension modules
- 12 SD/MMC card slot
- 13 Activation of firmware download
- 14 Screened connection

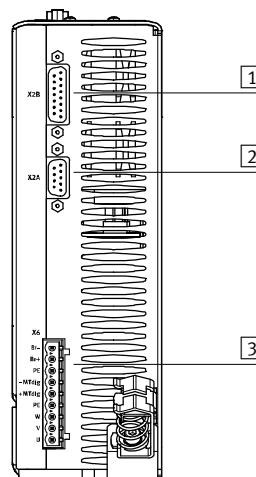
 **Note**  
A plug-in card must be inserted in slot 7 in order to operate the motor controller.  
Possible plug-in cards:  
CAMC-DS-M1 → 21  
CAMC-G-S1 → 16  
CAMC-G-S3 → 17

## From above



- 1 PE connection
- 2 X9 Power supply
- 3 X11 Incremental encoder interface (output)
- 4 X10 Incremental encoder interface (input)
- 5 X1 I/O interface

## From underneath



- 1 X2B Encoder connection
- 2 X2A Resolver connection
- 3 X6 Motor connection

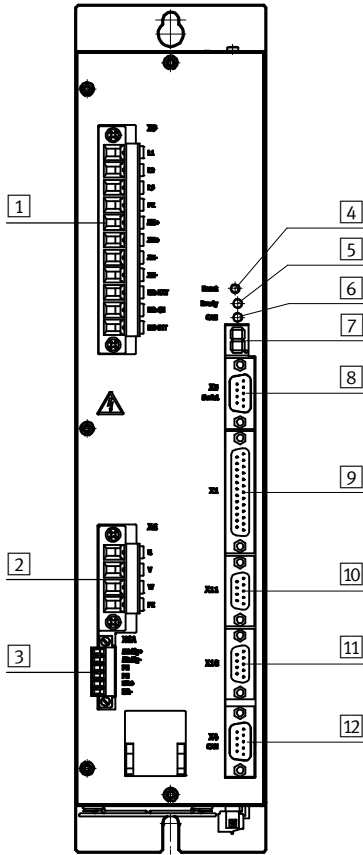
## Motor controllers CMMP-AS, for servo motors

Technical data

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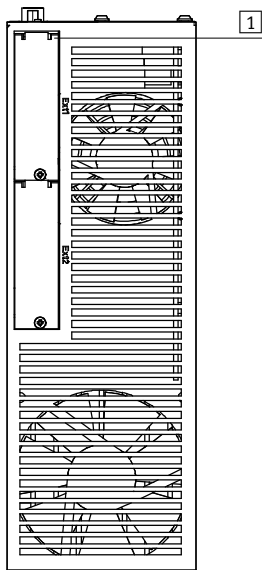
### View of motor controller

CMMP-AS-C20-11A-P3



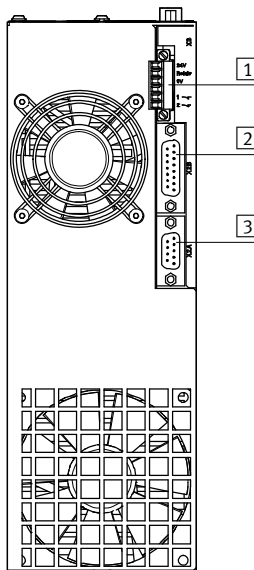
- 1 X9 Power supply
- 2 X6 Motor connection
- 3 X6A Motor connection
- 4 Reset button
- 5 Ready/bus LED
- 6 Bus switched on
- 7 7-segment display
- 8 X5 Interface: RS232
- 9 X1 I/O interface
- 10 X11 Incremental encoder interface (output)
- 11 X10 Incremental encoder interface (input)
- 12 X4 Interface: CAN bus

### From above



- 1 Technology module slots

### From underneath



- 1 X3 Control connection for relay driver supply
- 2 X2B Encoder connection
- 3 X2A Resolver connection

## Motor controllers CMMP-AS, for servo motors

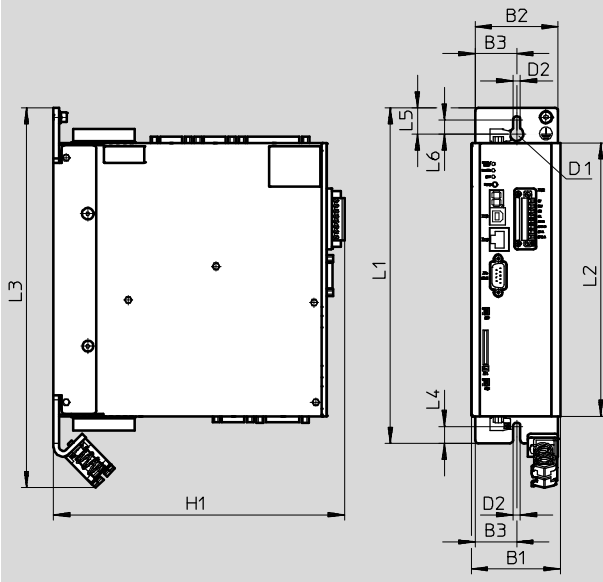
Technical data

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### Dimensions

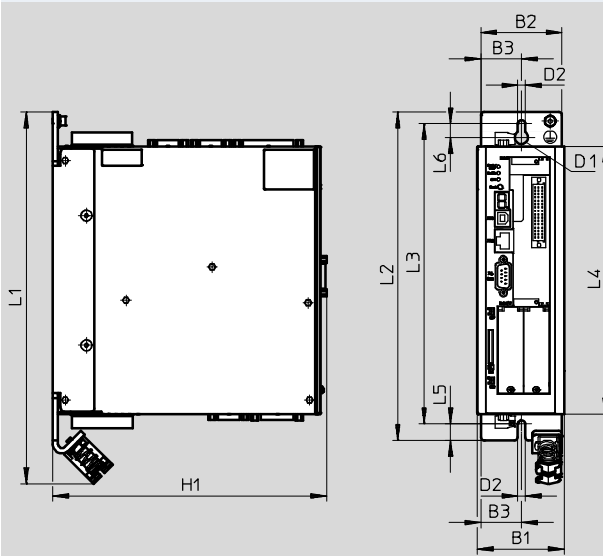
Download CAD data → [www.festo.com](http://www.festo.com)

CMMP-AS-C2/C5-3A-M0, CMMP-AS-C5/C10-11A-P3-M0



Type	B1	B2	B3	D1 ∅	D2 ∅	H1	L1	L2	L3	L4	L5	L6
CMMP-AS-C2-3A-M0	66	61	30.7	10	5.5	215	248	202	281	12.5	19.5	10.5
CMMP-AS-C5-3A-M0												
CMMP-AS-C5-11A-P3-M0	79	75	37.5	10	5.5	255	297	252	330	12.5	19.8	10.5
CMMP-AS-C10-11A-P3-M0												

CMMP-AS-C2/C5-3A-M3, CMMP-AS-C5/C10/-C15-11A-P3-M3



Type	B1	B2	B3	D1 ∅	D2 ∅	H1	L1	L2	L3	L4	L5	L6
CMMP-AS-C2-3A-M3	66	61	30.7	10	5.5	207	281	248	227	202	12.5	10.5
CMMP-AS-C5-3A-M3												
CMMP-AS-C5-11A-P3-M3	79	75	37.5	10	5.5	247	330	297	276	252	12.5	10.5
CMMP-AS-C10-11A-P3-M3												
CMMP-AS-C15-11A-P3-M3												

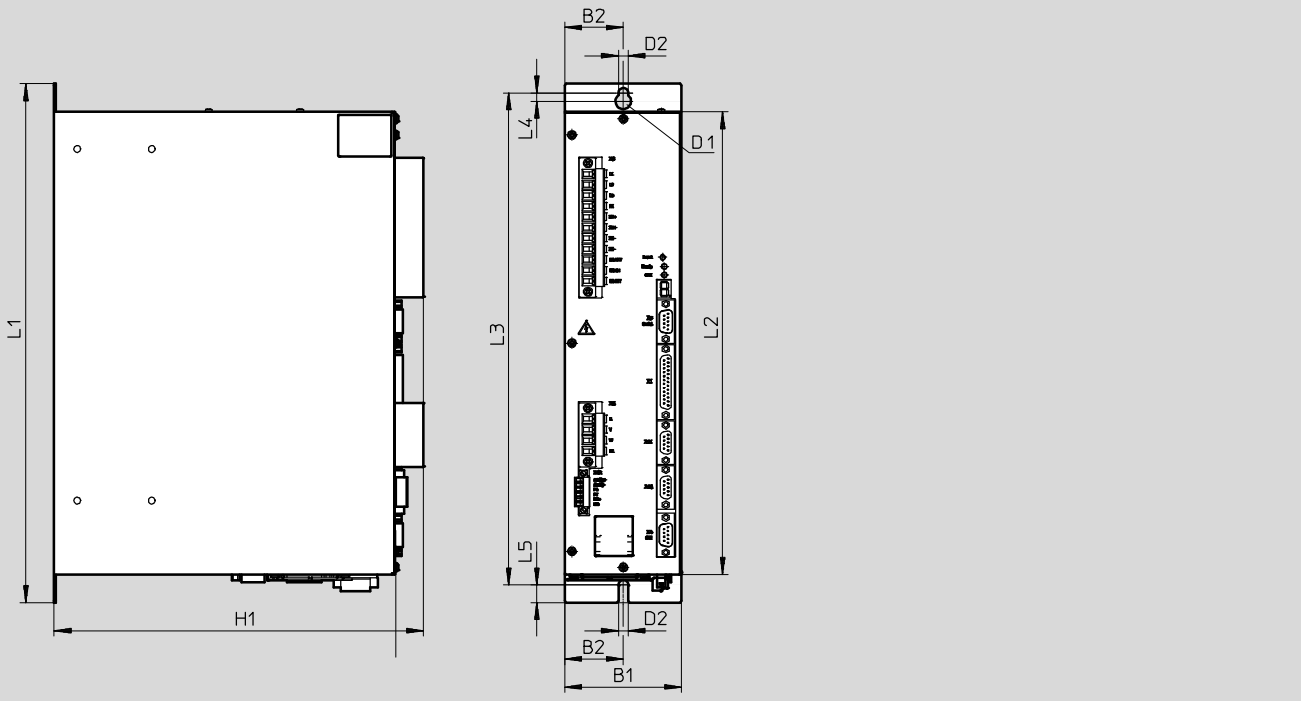
## Motor controllers CMMP-AS, for servo motors

Technical data

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)

CMMP-AS-C20-11A-P3

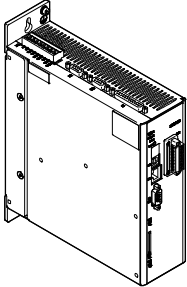
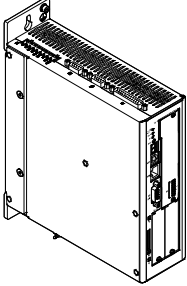
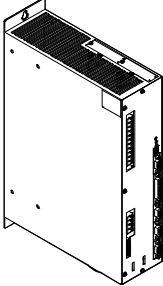


Type	B1	B2	D1 Ø	D2 Ø	H1	L1	L2	L3	L4	L5
CMMP-AS-C20-11A-P3	83	41.5	11	7	263	369	329	350	6	12.5

## Motor controllers CMMP-AS, for servo motors

**FESTO**

Technical data

Ordering data		Part No.	Type
<b>CMMP-AS-...-M0 – Without slot</b>			
	The plug assortment NEKM (→ 22) is included in the scope of delivery of the motor controller.	<b>1622901</b>	<b>CMMP-AS-C2-3A-M0</b>
		<b>1622902</b>	<b>CMMP-AS-C5-3A-M0</b>
		<b>1622903</b>	<b>CMMP-AS-C5-11A-P3-M0</b>
		<b>1622904</b>	<b>CMMP-AS-C10-11A-P3-M0</b>
<b>CMMP-AS-...-M3 – With 3 slots</b>			
	<ul style="list-style-type: none"> <li>• A plug-in card in slot <span style="border: 1px solid black; padding: 0 2px;">7</span> (→ 11) is mandatory for operation. Possible plug-in cards:                             <ul style="list-style-type: none"> <li>– CAMC-DS-M1 → 21</li> <li>– CAMC-G-S1 → 16</li> <li>– CAMC-G-S3 → 17</li> </ul> </li> <li>• For the CMMP-AS-C15..., the mains filter is mandatory for compliance with the CE and EN standards (→ 23)</li> <li>• The plug assortment NEKM (→ 22) is included in the scope of delivery of the motor controller.</li> </ul>	<b>1501325</b>	<b>CMMP-AS-C2-3A-M3</b>
		<b>1501326</b>	<b>CMMP-AS-C5-3A-M3</b>
		<b>1501327</b>	<b>CMMP-AS-C5-11A-P3-M3</b>
		<b>1501328</b>	<b>CMMP-AS-C10-11A-P3-M3</b>
		<b>3215473</b>	<b>CMMP-AS-C15-11A-P3-M3</b>
<b>CMMP-AS-... – With 2 slots</b>			
	The plug assortment NEKM (→ 22) is included in the scope of delivery of the motor controller.	<b>1366842</b>	<b>CMMP-AS-C20-11A-P3</b>

## Motor controllers CMMP-AS, for servo motors

Accessories

**FESTO**

### Safety module CAMC-G-S1

Only for motor controller:  
CMMP-AS-...-M3

The safety module serves as an expansion to achieve the safety function:

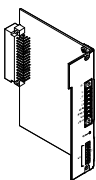
- Safe torque off (STO)



Safety characteristics	
Safety function to EN 61800-5-2	Safe torque off (STO)
Performance Level (PL) to EN ISO 13849-1	Category 4, Performance Level e
Safety integrity level (SIL) to EN 61800-5-2, EN 62061, EN 61508	SIL 3
Certificate issuing authority	TÜV 01/205/5165.01/14
Proof test interval	20a
PFH	$1.27 \times 10^{-10}$
Diagnostic coverage [%]	97
Safe failure fraction (SFF) [%]	99.2
Hardware fault tolerance	1
CE marking (see declaration of conformity)	To EU EMC Directive <sup>1)</sup> To EU Machinery Directive

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://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		
Control port STO-A/STO/B		
Nominal voltage [V DC]		24 (related to 0V-A/B)
Operating range [V]		19.2 ... 28.8
Nominal current [mA]		20 (typical; max. 30)
Maximum positive test impulse length at 0 signal [ms]		0.3 (related to nominal voltage 24 V and intervals > 2 s between impulses)
Maximum allowable time for test pulse at 24 V signal [ms]		< 2 ... 6
Properties		Galvanically isolated
Monitoring contact C1, C2		
Nominal voltage [V DC]		24
Max. voltage [V DC]		< 30 (overvoltage-resistant up to 60 V)
Nominal current [mA]		< 200 (not short-circuit proof)
Version		Potential-free signal contact
Switching logic		Contact closes at STO

Ordering data – Plug-in card			
	Description	Part No.	Type
	Safety module: <ul style="list-style-type: none"> <li>• One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot <b>7</b> (→ 11) in order to operate the motor controller</li> <li>• The plug connectors are included in the scope of delivery. To reorder plug connector NEKM → 22</li> </ul>	<b>1501330</b>	<b>CAMC-G-S1</b>



## Motor controllers CMMP-AS, for servo motors

**FESTO**

Accessories

### Safety module CAMC-G-S3

Only for motor controller:  
CMMP-AS-...-M3

The safety module serves as an expansion to achieve the safety functions:

- Safe torque off (STO)
- Safe stop 1 (SS1)
- Safe brake control (SBC)
- Safe operating stop (SOS)
- Safe stop 2 (SS2)
- Safely limited speed (SLS)
- Safe speed range (SSR)
- Safe speed monitor (SSM)



Safety characteristics	
Safety function to EN 61800-5-2	Safe torque off (STO)
	Safe stop 1 (SS1)
	Safe brake control (SBC)
	Safe operating stop (SOS)
	Safe stop 2 (SS2)
	Safely limited speed (SLS)
	Safe speed range (SSR)
	Safe speed monitor (SSM)
Performance Level (PL) to EN ISO 13849-1	Category 4, Performance Level e
Safety integrity level (SIL) to EN 61800-5-2, EN 62061, EN 61508	SIL 3
Certificate issuing authority	TÜV 01/205/5165.01/14
Proof test interval	20a
PFH	$9.5 \times 10^{-9}$
Diagnostic coverage [%]	97.5
Safe failure fraction (SFF) [%]	99.5
Hardware fault tolerance	1
CE marking (see declaration of conformity)	To EU EMC Directive <sup>1)</sup>
	To EU Machinery Directive

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://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.

## Motor controllers CMMP-AS, for servo motors

Accessories

Technical data		
General information		
Parameterisation	Using SafetyTool, integrated into the FCT plugin for CMMP-AS-...	
Digital safe inputs DIN 40A/B to DIN 43A/B		
Specification	IEC 61131-2, type 3	
Number of 2-channel inputs	4	
Nominal voltage	[V DC]	24
Operating range	[V]	-3 ... 30
Nominal current	[mA]	15
Max. nominal current	[mA]	200
Properties	Suitable for emergency-stop switchgear, protective door circuit, light curtain, enabling button, two-hand operator unit; Inputs switching equivalently/antivalently; Test pulses can be configured; Function can be configured	
Digital safe inputs DIN 44 to DIN 49		
Specification	IEC 61131-2, type 3	
Number of 1-channel inputs	6	
Nominal voltage	[V DC]	24
Operating range	[V DC]	-3 ... 30
Nominal current	[mA]	15
Max. nominal current	[mA]	200
Properties	Suitable for start button, brake feedback, mode selector, error acknowledgement, restart blocking; Test pulses can be configured; Function can be configured	
Safe outputs DOUT 40A/B to 42A/B		
Number of 2-channel outputs	3	
Output	High-side switch with pull-down	
Nominal voltage	[V DC]	24
Operating range	[V DC]	18 ... 30
Permissible output current	[mA]	< 50
Properties	Semiconductor outputs: parameterisable PNP (positive switching) Outputs switching equivalently/antivalently Test pulses can be configured Function can be configured	
Monitoring contact C1, C2		
Nominal voltage	[V DC]	24
Max. voltage	[V DC]	< 30 (overvoltage-resistant up to 60 V)
Nominal current	[mA]	< 200 (not short-circuit proof)
Version	Potential-free signal contact	
Properties	Suitable for diagnosing safety functions Function can be configured	

## Motor controllers CMMP-AS, for servo motors

Accessories

### Supported position encoders

- Resolver via X2A
- SIN/COS incremental encoder
- SICK Hiperface shaft encoder (only process data channel)
- Heidenhain ENDAT encoder
- Incremental encoder with digital A/B signals
- BISS position sensors for linear motors
- Incremental encoder with digital A/B signals

The manufacturers of SIL-certified shaft encoders publish guidelines for the use of these shaft encoders in safety applications.

The safety module CAMC-G-S3 takes the following manufacturer specifications into account when evaluating the encoder signals:

- Implementation Manual HIPERFACE® Safety dated 21.12.2010 (8014120/2010-12-21) → [www.sick.com](http://www.sick.com)
- Specification of the E/E/PES safety requirements for EnDat-Master dated 19.10.2009 (D533095-04-G-01) → [www.heidenhain.de](http://www.heidenhain.de) (in preparation)

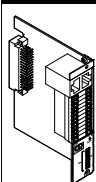
### Permissible combinations of position encoders

First encoder	Second encoder	Achievable safety level		Note
Resolver	Other encoder	SIL 3	Cat. 3/PL d; Cat. 3/PL e	–
Resolver	Incremental encoder	SIL 3	Cat. 4/PL e	–
Resolver	None	SIL 2	Cat. 3/PL d	Please see the note below
SIN/COS incremental encoder	None	SIL 3	Cat. 3/PL d	Requires SIL classification of the encoder
SIN/COS incremental encoder	Incremental encoder	SIL 3	Cat. 4/PL e	Please see the note below
Hiperface incremental encoder	Incremental encoder	SIL 3	Cat. 3/PL e	Please see the note below
Hiperface incremental encoder	None	SIL 2 or 3	Cat. 3/PL d; Cat. 4/PL e	Requires SIL classification of the encoder
ENDAT encoder	Incremental encoder	SIL 3	Cat. 4/PL e	Setting, encoder: "Other encoder" Please see the note below
ENDAT encoder	None	SIL 2	Cat. 3/PL d	In preparation Requires SIL classification of the encoder
Other encoder	Incremental encoder	SIL 2	Cat. 3/PL d	–

### Note

- Please assess whether your selected position encoder is sufficiently accurate to fulfil the monitoring task, in particular the SOS safety function.
- In applications with only one shaft encoder/position encoder, it must have the SIL classification required in accordance with the risk assessment. In most cases, the classification requires additional requirements or fault exclusions in the mechanical system. Please check carefully that these requirements are fulfilled in your application and that the appropriate fault exclusions can be performed.
- In applications with only one shaft encoder/position encoder with analogue signal interface (resolver, SIN-/COS, Hiperface etc.), the restrictions regarding diagnostic cover and limitations as to the accuracy of rest and speed monitoring that can be achieved must be taken into account.
- When using two functional encoders without SIL classification, the suitability of the encoder combination for use in safe systems up to SIL3 must be proven separately (for example, the following are required: diversity of the encoder systems with regard to CCF, MTTFd, etc., suitability of the encoders for the operating and ambient conditions, EMC, etc.).

### Ordering data – Plug-in card

	Description	Part No.	Type
	<p>Safety module:</p> <ul style="list-style-type: none"> <li>• One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot <b>7</b> (→ 11) in order to operate the motor controller</li> <li>• The plug connectors are included in the scope of delivery. To reorder plug connector NEKM → 22</li> </ul>	<b>1501331</b>	<b>CAMC-G-S3</b>

## Motor controllers CMMP-AS, for servo motors

Accessories

**FESTO**

### Interface CAMC-D-8E8A

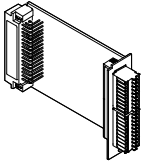
Only for motor controller:  
CMMP-AS-...-M3

The interface is used to extend the digital I/Os.

Up to two interfaces are supported simultaneously.

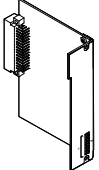


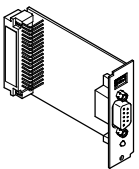
Technical data		
General information		
Max. connection cross section	[mm <sup>2</sup> ]	0.5
Electrical connection		Screw terminal
		Straight plug
Digital inputs		
Number		8
Nominal voltage	[V DC]	24
Voltage range	[V]	-30 ... +30 (protected against reverse polarity and short circuit proof)
Nominal value for True	[V]	8
Nominal value for False	[V]	2
Input impedance	[kΩ]	4.7
Digital outputs		
Number		8
Nominal voltage	[V DC]	24
Voltage range	[V]	+18 ... +30 (protected against reverse polarity and short circuit, protection in the event of thermal overload)
Output current	[mA]	100
Short circuit, overcurrent protection	[mA]	500

Ordering data – Plug-in card			
	Description	Part No.	Type
	Interface: for additional I/Os (The plug connectors are included in the scope of delivery. To reorder plug connector NEKM → 22)	<b>567855</b>	<b>CAMC-D-8E8A</b>

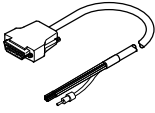
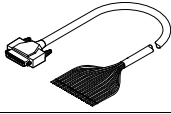
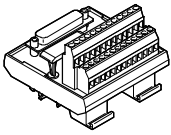
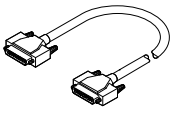
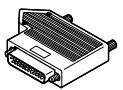
## Motor controllers CMMP-AS, for servo motors

Accessories

Ordering data – Plug-in card			
	Description	Part No.	Type
	Switch module: <ul style="list-style-type: none"> <li>One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot <b>7</b> (→ 11) in order to operate the motor controller CMMP-AS-...-M3</li> </ul>	<b>1501329</b>	<b>CAMC-DS-M1</b>

Ordering data – Plug-in cards for fieldbus interface			
	Description	Part No.	Type
	For PROFIBUS DP	<b>547450</b>	<b>CAMC-PB</b>
	For PROFINET RT	<b>1911916</b>	<b>CAMC-F-PN</b>
	For DeviceNet	<b>547451</b>	<b>CAMC-DN</b>
	For EtherCAT	<b>567856</b>	<b>CAMC-EC</b>
	For EtherNet/IP	<b>1911917</b>	<b>CAMC-F-EP</b>

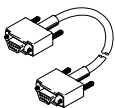
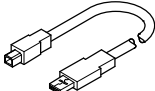
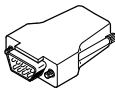
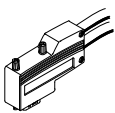

Ordering data – Memory card			
	Description	Part No.	Type
	Memory card, for data backup and firmware download	<b>1436343</b>	<b>CAMC-M-S-F10-V1</b>

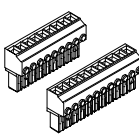
Ordering data – Connection options from I/O interface to controller				
	Description	Cable length [m]	Part No.	Type
<b>Control cable</b>				
	<ul style="list-style-type: none"> <li>For I/O interface to any controller</li> <li>Recommended for analogue signals since the cable is shielded</li> </ul>	2.5	<b>552254</b>	<b>NEBC-S1G25-K-2.5-N-LE26</b>
	<ul style="list-style-type: none"> <li>For I/O interface to any controller</li> <li>Cannot be used if the incremental encoder interface (X10 plug) is in use</li> </ul>	3.2	<b>8001373</b>	<b>NEBC-S1G25-K-3.2-N-LE25</b>
<b>Connection block</b>				
	Ensures simple and clear wiring. The connection to the motor controller is established via the connecting cable NEBC-S1G25-K-....	–	<b>8001371</b>	<b>NEFC-S1G25-C2W25-S7</b>
<b>Connecting cable</b>				
	<ul style="list-style-type: none"> <li>Connects the motor controller to the connection block</li> <li>Cannot be used if the incremental encoder interface (input) is in use</li> </ul>	1.0	<b>8001374</b>	<b>NEBC-S1G25-K-1.0-N-S1G25</b>
		2.0	<b>8001375</b>	<b>NEBC-S1G25-K-2.0-N-S1G25</b>
		5.0	<b>8001376</b>	<b>NEBC-S1G25-K-5.0-N-S1G25</b>
<b>Plug connector</b>				
	<ul style="list-style-type: none"> <li>25-pin Sub-D plug connector. Each wire can be individually assembled using screw terminals</li> <li>Cannot be used if the incremental encoder interface (input) is in use</li> </ul>	–	<b>8001372</b>	<b>NEFC-S1G25-C2W25-S6</b>

## Motor controllers CMMP-AS, for servo motors

Accessories

**FESTO**

Ordering data – Cables and plugs				
	Description	Cable length [m]	Part No.	Type
<b>Programming cable</b>				
	For CMMP-AS-C20-11A-P3	1.5	<b>160786</b>	<b>PS1-ZK11-NULLMODEM-1,5M</b>
	For CMMP-AS-...-M0, CMMP-AS-...-M3	1.8	<b>1501332</b>	<b>NEBC-U1G4-K-1.8-N-U2G4</b>
<b>Encoder plug</b>				
	For incremental encoder interface	–	<b>564264</b>	<b>NECC-A-S-S1G9-C2M</b>
<b>Plug connector</b>				
	For PROFIBUS interface	–	<b>533780</b>	<b>FBS-SUB-9-WS-PB-K</b>
	For CANopen interface	–	<b>533783</b>	<b>FBS-SUB-9-WS-CO-K</b>
	For DeviceNet interface	–	<b>525635</b>	<b>FBSD-KL-2X5POL</b>

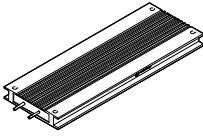
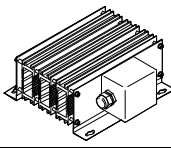
Ordering data – Plug assortment			
	Description	Part No.	Type
	Assortment of plugs for:		
	• Motor controller CMMP-AS-C5/-C10-11A-P3-M0	<b>552256</b>	<b>NEKM-C-3<sup>1)</sup></b>
	• Motor controller CMMP-AS-C5/-C10/-C15-11A-P3-M3		
	• Interface CAMC-D-8E8A	<b>569959</b>	<b>NEKM-C-5<sup>2)</sup></b>
	• Motor controller CMMP-AS-C20-11A-P3	<b>1425453</b>	<b>NEKM-C-6<sup>3)</sup></b>
	• Motor controller CMMP-AS-C2/-C5-3A-M0	<b>1659228</b>	<b>NEKM-C-7<sup>1)</sup></b>
	• Motor controller CMMP-AS-C2/-C5-3A-M3		
• Safety module CAMC-G-S1	<b>1660640</b>	<b>NEKM-C-8<sup>4)</sup></b>	
• Motor controller CMMP-AS-...-M0			
• Safety module CAMC-G-S3	<b>1660937</b>	<b>NEKM-C-9<sup>5)</sup></b>	

- 1) Plug connectors are included in the scope of delivery of the motor controller CMMP-AS-...-M0, CMMP-AS-...-M3
- 2) Plug connectors are included in the scope of delivery of the plug-in card CAMC-D-8E8A
- 3) Plug connectors are included in the scope of delivery of the motor controller CMMP-AS-C20-11A-P3
- 4) Plug connector is included in the scope of delivery of the plug-in card CAMC-G-S1
- 5) Plug connector is included in the scope of delivery of the motor controller CMMP-AS-...-M0
- 6) Plug connector is included in the scope of delivery of the plug-in card CAMC-G-S3

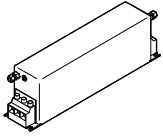
## Motor controllers CMMP-AS, for servo motors


**FESTO**


Accessories


Ordering data – Braking resistors					
	For type	Resistance value [Ω]	Nominal power [W]	Part No.	Type
CACR-LE2-...					
	CMMP-AS-C2-3A-..., CMMP-AS-C5-3A-...	50	500	<b>2882342</b>	<b>CACR-LE2-50-W500<sup>1)</sup></b>
		72	500	<b>1336611</b>	<b>CACR-LE2-72-W500</b>
CACR-KL2-...					
	CMMP-AS-C5-11A-P3-..., CMMP-AS-C10-11A-P3-...	67	1800	<b>1336617</b>	<b>CACR-KL2-67-W1800</b>
		40	2000	<b>2882343</b>	<b>CACR-KL2-40-W2000<sup>1)</sup></b>
	CMMP-AS-C20-11A-P3	33	3600	<b>1336619</b>	<b>CACR-KL2-33-W2400</b>

1) Recommended braking resistor

Ordering data – Mains filter					
	For type	Operating voltage [V]	Input current [A]	Dimensions [mm]	Part No. Type
	CMMP-AS-C15-11A-P3-...	520/300	16	Length: 230 Width: 50 Height: 70	<b>3947275</b> <b>CADF-C15-11A-P3</b>

 **Note**  
Regardless of the length of the motor cable, the mains filter is required for compliance with the CE and EN standards.

Ordering data – Software and documentation		
	Description	→ Internet
	The following descriptions are available on the Festo website: – Hardware: assembly and installation for all variants – Functions: instructions on commissioning with FCT + functional description – FHPP: Control and parameterisation of the motor controller via the FHPP profile – DS402: Control and parameterisation of the motor controller via the device profile CiA 402 (DS402) – CAM editor: cam disc functionality (CAM) of the motor controller – Safety module: functional safety engineering for the motor controller with the safety function STO	<a href="http://www.festo.com/net/SupportPortal">www.festo.com/net/SupportPortal</a>

Ordering data – Software and documentation for curve editor			
	Description	Part No.	Type
	Software package contains: – CD-ROM – With user documentation in de, en, es, fr, it, ru, zh – With additional functions for the cam disc functionality The software package is not included in the scope of delivery	<b>570903</b>	<b>GSPF-CAM-MC-ML</b>

## Product Range and Company Overview

### A Complete Suite and Company Overview

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.



**Custom Automation Components**  
Complete custom engineered solutions



**Custom Control Cabinets**  
Comprehensive engineering support and on-site services



**Complete Systems**  
Shipment, stocking and storage services

### The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.



**Electromechanical**  
Electromechanical actuators, motors, controllers & drivers



**Pneumatics**  
Pneumatic linear and rotary actuators, valves, and air supply



**PLCs and I/O Devices**  
PLC's, operator interfaces, sensors and I/O devices

### Supporting Advanced Automation... As No One Else Can!

Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 16,000 employees in 60 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

### Quality Assurance, ISO 9001 and ISO 14001 Certifications

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.



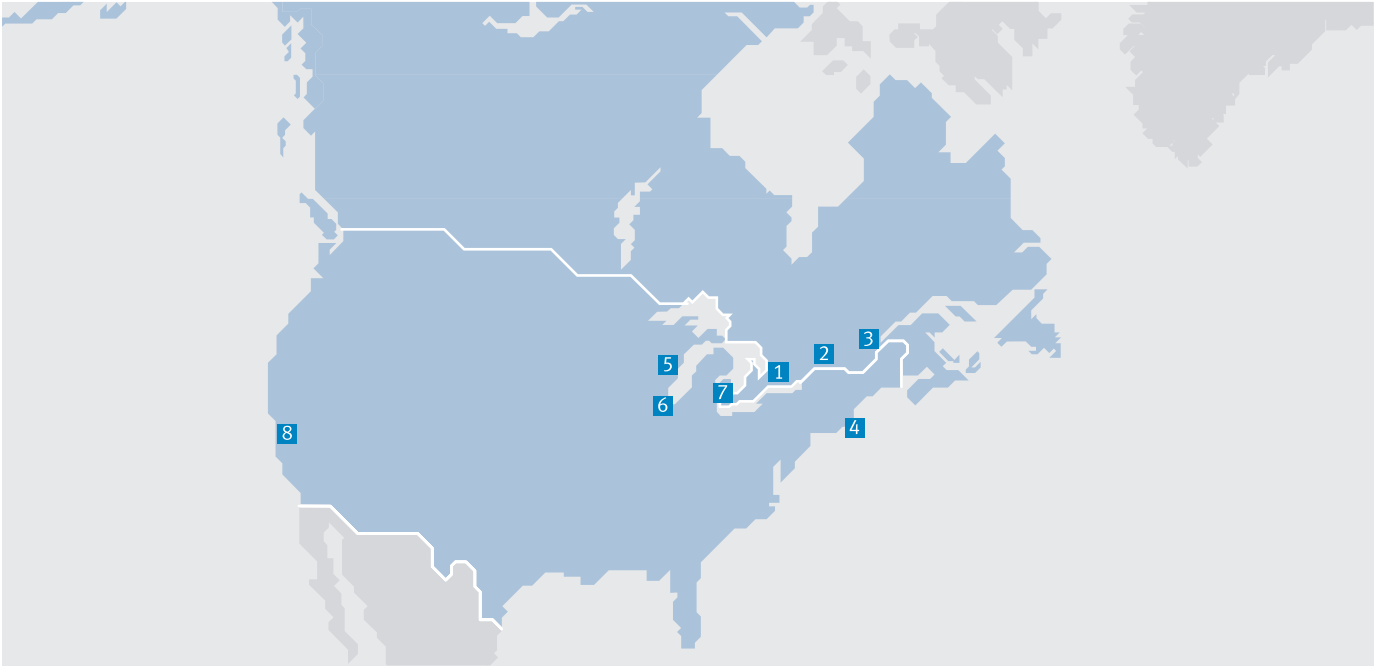
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