

Motor controllers CMMP-AS, for servo motors

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Motor controllers CMMP-AS, for servo motors

Key features

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Performance characteristics		
Compactness - Extremely small dimensions - Full integration of all components for the controller and power section, including USB interface, Ethernet and CANopen interface - Integrated brake chopper		Motion control - Evaluation of digital absolute encoder (EnDat/HIPERFACE) in single-turn or multi-turn versions - Can be operated as a torque, speed or position controller - Integrated position control - Time-optimised (trapezoidal) or jerk-free (S-shaped) positioning
Fieldbus interfaces       		Input / Output - Freely programmable I/Os - High-resolution 16-bit analogue input - Jog/Teach mode - Simple connection to a higher-order controller via I/O or fieldbus - Synchronous operation - Master/slave mode - Additional I/Os with the plug-in card CAMC-D-8E8A → Page 18
Integrated safety functions - Depending on the variant or plug-in card, the motor controller supports the following 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)		Integrated sequence control - Automatic sequence of position sets without a higher-order controller - Linear and cyclical position sequences - Adjustable delay times - Branches and wait positions - Overlapping restart possible during the movement
		Interpolating multi-axis movement With a suitable controller, the CMMP-AS can perform path movements with interpolation via CANopen or EtherCAT. To do this, the controller specifies setpoint position values in a fixed time pattern. In between, the servo position controller independently interpolates the data values between two data points.

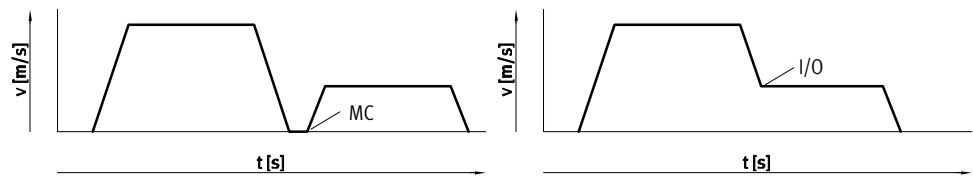
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Key features

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



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 synchronised with the position of a master axis so that overlapping, time-optimised motion sequences can be easily defined. To be able to use the cam disc function, you will need the Festo Configuration Tool (FCT) and also the curve editor → Page 21

Features:

- High system flexibility. 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.
- Each cam disc is coupled with four digital trip cams.
- Each cam disc can be offset by a certain amount from the master axis.

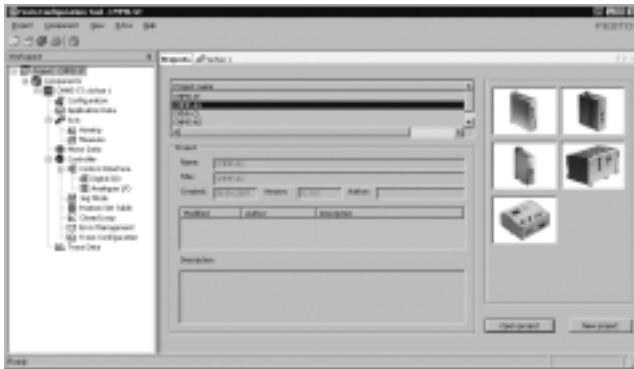
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FCT software – Festo Configuration Tool

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 types of equipment
- 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

FHPP – Festo Handling and Positioning Profile

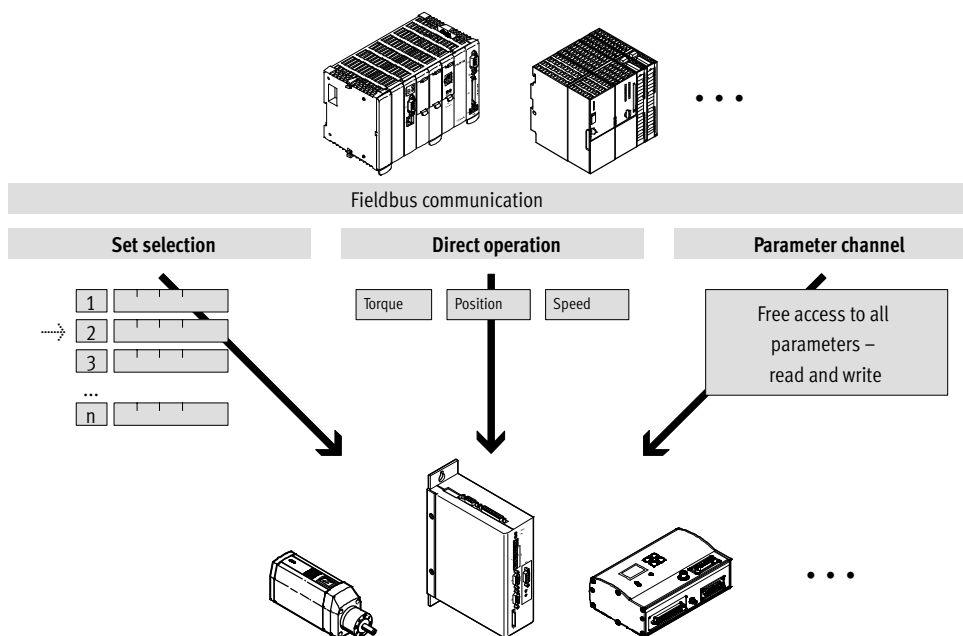
Optimised data profile

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

With the FHPP data profile, Festo motor controllers can be actuated 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



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Product range overview and type codes

Type	CMMP-AS-...-M0	CMMP-AS-...-M3
Bus protocols		
Integrated in the controller		
CANopen	■	■
Modbus®/TCP	■	■
Optional via plug-in card		
PROFIBUS DP	–	■
DeviceNet®	–	■
EtherCAT	–	■
EtherNet/IP	–	■
PROFINET RT	–	■
Safety functions		
Integrated in the controller	■	–
Optional via plug-in card	–	■

Type codes

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

Motor controllers CMMP-AS, for servo motors

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Technical data

Bus protocols

CANopen

PROFIBUS DP

DeviceNet

EtherCAT

Modbus

PROFINET

EtherNet/IP

UL US LISTED



General technical data					
CMMP-AS-	C2-3A-...	C5-3A-...	C5-11A-P3-...	C10-11A-P3-...	C15-11A-P3-...
Type of mounting	Screwed onto connecting plate				
Display	7-segment display				
Parameterisation interface	USB, Ethernet				
Active PFC	Yes		–		
DIP switches	Firmware download/fieldbus settings ¹⁾ /CAN terminating resistor				
SD card slot	Memory card ➔ Page 19				
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	
Pulse power of braking resistor	[kVA]	2.8		8.5	
Braking resistor, external	[Ω]	≥ 50		≥ 40	
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 ²⁾
Max. motor cable length ³⁾	[m]	25			–
Product weight	[g]	2100	2200	3800	3450

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

2) The mains filter is mandatory for compliance with the CE and EN standards → Page 21

3) Without external mains filter

Function elements 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 – Bus protocols/control										
Interfaces	I/O	Additional I/O ¹⁾	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 interfacing	16 (127) position sets ²⁾	255 position sets	250 position sets							
Communication profile	–	–	DS301, FHPP+ DS301, DSP402	FHPP+	DP-V0 / FHPP+	FHPP+	DS301, FHPP+ CoE: DS301, DSP402	FHPP+	FHPP+	FHPP+
Max. fieldbus transmission rate [Mbit/s]	–	–	1	100	12	0.5	100	100	100	
Interface										
CMMP-AS-...-M0	Integrated	■	–	■	■	–	–	–	–	–
CMMP-AS-...-M3	Integrated	■	–	■	■	–	–	–	–	–
	Optional ³⁾	–	■	–	–	■	■	■	■	■

1) With the plug-in card CAMC-D8E8A → Page 18

2) Can be expanded with configurable logic inputs up to max. 127 position sets

3) Plug-in cards can be ordered separately → Page 18

Electrical data						
CMMP-AS-		C2-3A-...	C5-3A-...	C5-11A-P3-...	C10-11A-P3-...	C15-11A-P3-...
Output data						
Output voltage range	[V AC]	3x 0 ... 270		3x 0 ... 360		
Nominal current	[A _{eff}]	2.5	5	5	10	15
Peak current at max. peak current duration	[A _{eff}]	5	10	10	20	30
	[s]	5				
	[A _{eff}]	10	20	20	40	45
	[s]	0.5				
Max. DC link voltage	[V DC]	320/380 ¹⁾		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
Nominal power	[VA]	500	1000	3000	6000	9000
Peak power	[VA]	1000	2000	6000	12000	18000
Mains frequency	[Hz]	50 ... 60				
Logic supply						
Nominal voltage	[V DC]	24 ±20%				
Nominal current	[A]	0.55/2.05 ²⁾	0.65/2.15 ²⁾	1/3.5 ²⁾		
Max. current of digital logic outputs	[mA]	100				

1) Without PFC/with PFC

2) Max. current with brake and I/Os

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Technical data

Safety functions to EN 61800-5-2			
Motor controller	CMMP-AS-		
	C2/C5/C10-...-M0	C2/C5/C10/C15-...-M3	
With plug-in card	–	CAMC-G-S1 → Page 14	CAMC-G-S3 → Page 15
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 data	
CMMP-AS-	C2/C5/C10-...-M0
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 01/205/5262.01/14
Proof test interval	20a
Diagnostic coverage [%]	97
Safe failure fraction (SFF) [%]	99.2
Hardware fault tolerance	1
CE marking (see declaration of atmosphere)	To EU EMC Directive ¹⁾ To EC Machinery Directive

- 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 – 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		Electrically 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

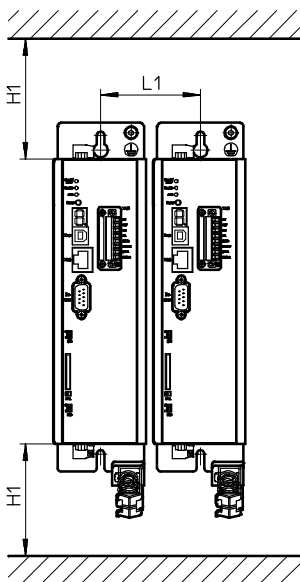
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Technical data

Operating and environmental conditions					
CMMP-AS-	C2-3A-...	C5-3A-...	C5-11A-P3-...	C10-11A-P3-...	C15-11A-P3-...
Digital logic outputs	Electrically isolated				
Logic inputs	Electrically isolated				
Degree of protection					
With plug connector at X6 and X9	IP20				
Without plug connector at X6 and X9	IP10				
Protective function	I ² 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 humidity [%]	0 ... 90 (non-condensing)				
CE marking (see declaration of conformity)	To EU Low Voltage Directive				
	To EU EMC Directive ¹⁾				
	To EC Machinery Directive				
Certification	c UL us listed (OL)				
	RCM				
Note on materials	Contains paint-wetting impairment substances				
	RoHS compliant				

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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 ¹⁾	L1
CMMP-AS-C2-3A-...	100	71
CMMP-AS-C5-3A-...		
CMMP-AS-C5-11A-P3-...		
CMMP-AS-C10-11A-P3-...	100	85
CMMP-AS-C15-11A-P3-...		

- 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

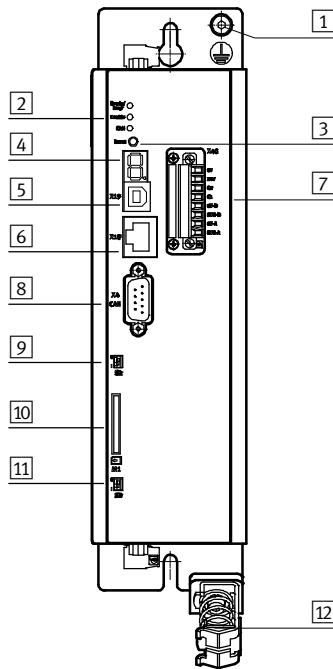
Motor controllers CMMP-AS, for servo motors

Technical data

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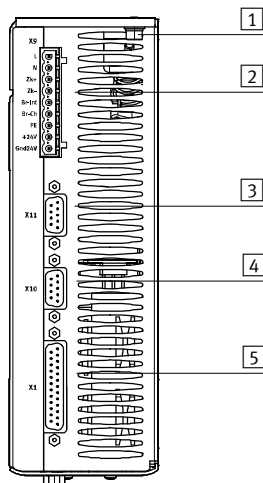
View of motor controller

CMMP-AS-...-M0



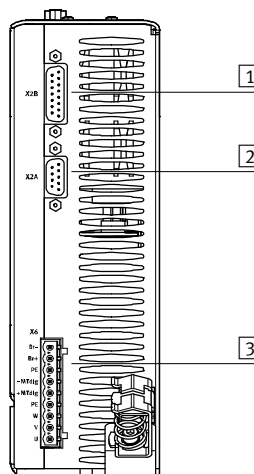
- 1 PE connection
- 2 LEDs
- 3 Reset button
- 4 7-segment display
- 5 X19 USB interface
- 6 X18 Ethernet interface
- 7 X40 digital I/O interface for controlling the STO function
- 8 X4 CANopen interface
- 9 Activation of CANopen terminating resistor
- 10 SD/MMC card slot
- 11 Activation of firmware download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

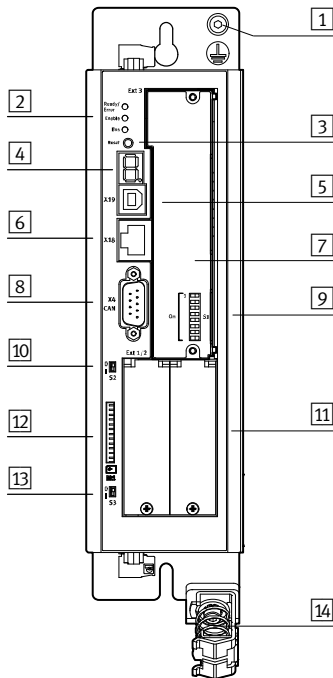
Motor controllers CMMP-AS, for servo motors

Technical data

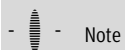
FESTO

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

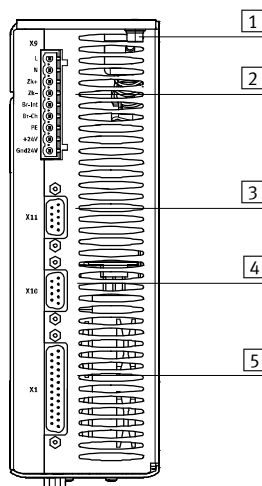


Note

One of the plug-in cards must be inserted in slot [7] in order to operate the motor controller.

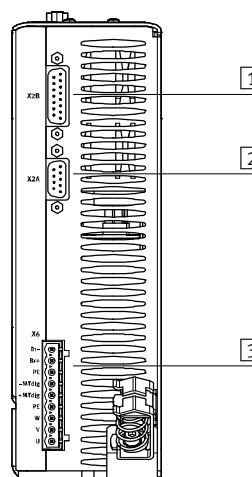
Possible plug-in cards:
CAMC-DS-M1 → Page 19
CAMC-G-S1 → Page 14
CAMC-G-S3 → Page 15

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

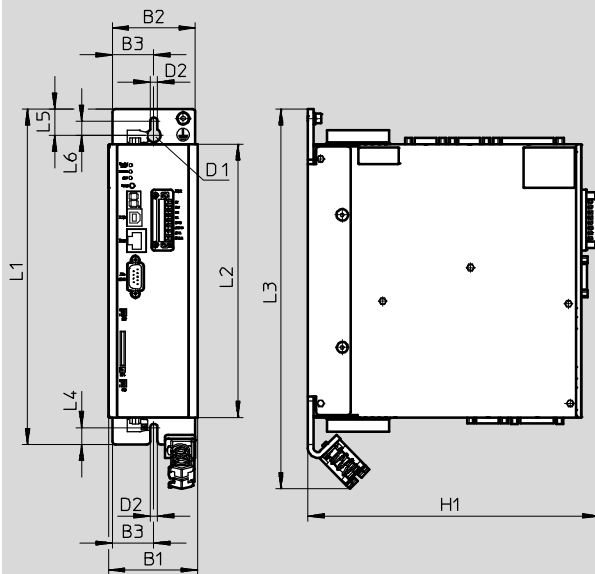
Technical data

FESTO

Dimensions

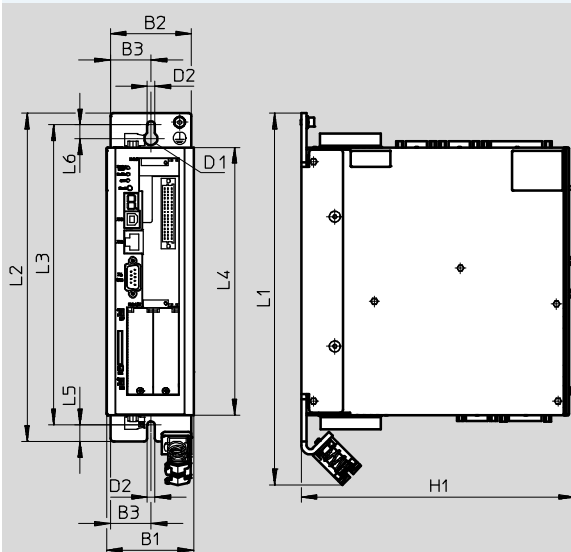
Download CAD data → www.festo.com

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



Type	B1	B2	B3	D1 Ø	D2 Ø	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

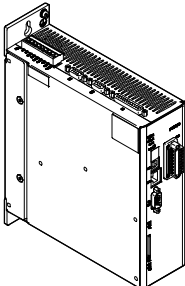
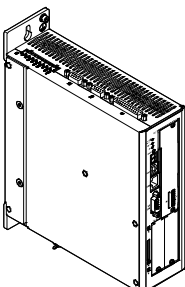


Type	B1	B2	B3	D1 Ø	D2 Ø	H1	L1	L2	L3	L4	L5	L6
CMMP-AS-C2-3A-M3	66	61	30.7	10	5.5	207	281	248	227	202	12.5	10.5
CMMP-AS-C5-3A-M3												
CMMP-AS-C5-11A-P3-M3	79	75	37.5	10	5.5	247	330	297	276	252	12.5	10.5
CMMP-AS-C10-11A-P3-M3												
CMMP-AS-C15-11A-P3-M3												

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Technical data

Ordering data		Part No.	Type
Description			
CMMP-AS-...-M0 – Without slot			
	The plug assortment NEKM (➔ Page 20) is included in the scope of delivery of the motor controller.	1622901	CMMP-AS-C2-3A-M0
		1622902	CMMP-AS-C5-3A-M0
		1622903	CMMP-AS-C5-11A-P3-M0
		1622904	CMMP-AS-C10-11A-P3-M0
CMMP-AS-...-M3 – With 3 slots			
	• One of the plug-in cards must be inserted in slot 7 (➔ Page 11) in order to operate the motor controller. Possible plug-in cards: – CAMC-DS-M1 ➔ Page 19 – CAMC-G-S1 ➔ Page 14 – CAMC-G-S3 ➔ Page 15 • For the CMMP-AS-C15..., the mains filter is mandatory for compliance with the CE and EN standards (➔ Page 21) • The plug assortment NEKM (➔ Page 20) is included in the scope of delivery of the motor controller.	1501325	CMMP-AS-C2-3A-M3
		1501326	CMMP-AS-C5-3A-M3
		1501327	CMMP-AS-C5-11A-P3-M3
		1501328	CMMP-AS-C10-11A-P3-M3
		3215473	CMMP-AS-C15-11A-P3-M3

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Accessories

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Safety module CAMC-G-S1

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

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

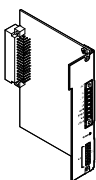
- Safe torque off (STO)



Safety data	
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	1.27×10^{-10}
Diagnostic coverage [%]	97
Safe failure fraction (SFF) [%]	99.2
Hardware fault tolerance	1
CE marking (see declaration of atmosphere)	To EU EMC Directive ¹⁾
	To EC Machinery Directive

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		
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		Electrically 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: • One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot 7 (→ Page 11) in order to operate the motor controller. • The plug connectors are included in the scope of delivery. To reorder plug connector NEKM → Page 20	1501330	CAMC-G-S1

Motor controllers CMMP-AS, for servo motors

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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 data	
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	9.5×10^{-9}
Diagnostic coverage [%]	97.5
Safe failure fraction (SFF) [%]	99.5
Hardware fault tolerance	1
CE marking (see declaration of atmosphere)	To EU EMC Directive ¹⁾
	To EC Machinery Directive

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 CMMP-AS, for servo motors

FESTO

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
Digital 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

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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 their use 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
- Specification of the E/E/PES safety requirements for EnDat-Master dated 19.10.2009 (D533095-04-G-01) → www.heidenhain.de (in preparation)

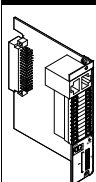
Permissible combinations of position encoders

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	Encoder setting: "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 evaluation. 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 standstill 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
	Safety module: • One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot 7 (→ Page 11) in order to operate the motor controller. • The plug connectors are included in the scope of delivery. To reorder plug connector NEKM → Page 20	1501331	CAMC-G-S3

Motor controllers CMMP-AS, for servo motors

Accessories

FESTO

Interface CAMC-D-8E8A

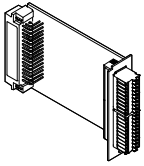
Only for motor controller:
CMMP-AS-...-M3

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

Up to two interfaces are supported simultaneously.



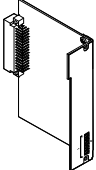
Technical data		
General information		
Max. connection cross section	[mm ²]	0.5
Electrical connection		Screw terminal
		Straight plug
Digital inputs		
Number		8
Nominal voltage	[V DC]	24
Voltage range	[V]	−30 ... +30 (protected against reverse polarity and short circuit proof)
Nominal value for True	[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

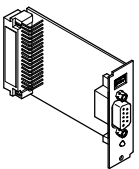
Ordering data – Plug-in card			
	Description	Part No.	Type
	Interface: for additional I/Os (The plug connectors are included in the scope of delivery. To reorder plug connector NEKM → Page 20)	567855	CAMC-D-8E8A

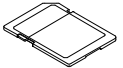
Motor controllers CMMP-AS, for servo motors

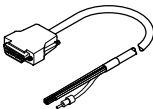
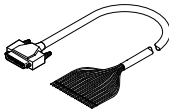
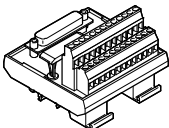
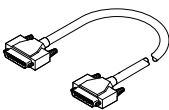
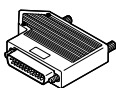
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Accessories

Ordering data – Plug-in card			
	Description	Part No.	Type
	Switch module: • One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot 7 (→ Page 11) in order to operate the motor controller CMMP-AS-...-M3.	1501329	CAMC-DS-M1

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

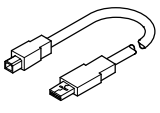
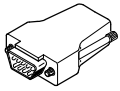
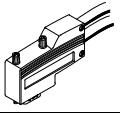
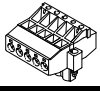
Ordering data – Memory card			
	Description	Part No.	Type
	Memory card, for data backup and firmware download	1436343	CAMC-M-S-F10-V1

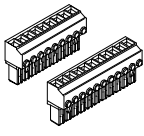
Ordering data – Connection options from I/O interface to the controller				
	Description	Cable length [m]	Part No.	Type
Control cable				
	- For I/O interface to any controller - Recommended for analogue signals since the cable is shielded	2.5	552254	NEBC-S1G25-K-2.5-N-LE26
	- For I/O interface to any controller - Cannot be used if the incremental encoder interface (plug X10) is in use	3.2	8001373	NEBC-S1G25-K-3.2-N-LE25
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. - Cannot be used if the incremental encoder interface (input) is in use	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
Plug connector				
	25-pin Sub-D plug connector. Each wire can be individually assembled using screw terminals - Cannot be used if the incremental encoder interface (input) is in use	–	8001372	NEFC-S1G25-C2W25-S6

Motor controllers CMMP-AS, for servo motors

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Ordering data – Cables and plugs				
	Description	Cable length [m]	Part No.	Type
Programming cable				
	For CMMP-AS-...-M0, CMMP-AS-...-M3	1.8	1501332	NEBC-U1G4-K-1.8-N-U2G4
Encoder plug				
	For incremental encoder interface	–	564264	NECC-A-S-S1G9-C2M
Plug connector				
	For PROFIBUS interface	–	533780	FBS-SUB-9-WS-PB-K
	For CANopen interface	–	533783	FBS-SUB-9-WS-CO-K
	For DeviceNet® interface	–	525635	FBSD-KL-2X5POL

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

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 connector is included in the scope of delivery of the plug-in card CAMC-G-S1

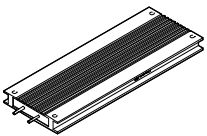
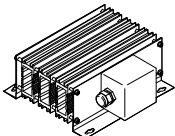
Plug connector is included in the scope of delivery of the motor controller CMMP-AS-...-M0

4) Plug connector is included in the scope of delivery of the plug-in card CAMC-G-S3.

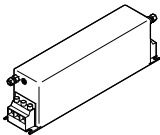
Motor controllers CMMP-AS, for servo motors

FESTO

Accessories

Ordering data – Braking resistors				Technical data → Internet: cacr	
	For type	Resistance value [Ω]	Nominal power [W]	Part No.	Type
CACR-LE2-...					
	CMMP-AS-C2-3A-...	50	200	2882342	CACR-LE2-50-W500¹⁾
	CMMP-AS-C5-3A-...	72	200	1336611	CACR-LE2-72-W500
CACR-KL2-...					
	CMMP-AS-C5-11A-P3-...	67	720	1336617	CACR-KL2-67-W1800
	CMMP-AS-C10-11A-P3-...	40	800	2882343	CACR-KL2-40-W2000¹⁾
	CMMP-AS-C15-11A-P3-...				

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	3947275 CADF-C15-11A-P3

 Note
Regardless of the length of the motor cable, the mains filter is mandatory 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	www.festo.com/net/SupportPortal

Ordering data – Software and documentation for the 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	570903 GSPF-CAM-MC-ML