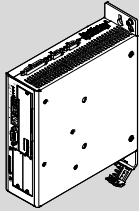


# Motor controller

## CMMP-AS-...-M3



**FESTO**


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Brief description

8156652  
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Translation of the original instructions


Motor controller CMMP-AS-...-M3 ..... English

 For all available product documentation → [www.festo.com/sp](http://www.festo.com/sp)

### 1 Safety and requirements for product use

#### 1.1 Safety

##### Safety instructions for commissioning, repair and decommissioning

**Warning**

Danger of electric shock.

- If modules or cover plates are not mounted on slots Ext1 ... Ext3.
- If cables are not mounted at plugs [X6] and [X9].
- If live connecting cables are disconnected.

Contact with live parts can result in serious injury or even death.


Only operate the product when it is mounted and once all of the protective measures have been initiated.

All PE cables must be connected before commissioning for reasons of safety. The mains PE connection is connected to the PE connection points (rear of device and [X9] of the ). Make sure that the earth connections between devices and the mounting plate are of sufficiently large dimensions in order to be able to discharge HF interference.

Before touching live parts during maintenance, repair and cleaning work and during prolonged service interruptions:

1. Switch off power to the electrical equipment and secure it against being switched on again.
2. After switching it off, wait at least 5 minutes of discharge time and check that it is free from voltage before accessing the controller.


→ The safety functions do not provide protection from electric shock but only from dangerous movements!

**Note**

Danger caused by unexpected movement of the motor or the axis.

- Make sure the movement does not endanger any personnel.
- Conduct a risk assessment in accordance with the Machinery Directive.
- Plan the safety system for the entire machine based on this risk assessment, taking into account all integrated components. This also includes the electric drives.
- Bypassing of safety equipment is impermissible.

### Protection by low voltage (PELV) against electric shock

**Warning**

- Use only power sources which guarantee reliable electrical isolation of the operating voltage in accordance with IEC/EN 60204-1. Consider also the general requirements for PELV circuits in accordance with IEC/EN 60204-1.
- Use only power sources which guarantee reliable electrical isolation of the operating voltage as per IEC/EN 60204-1.

Protection against electric shock (protection against direct and indirect contact) is guaranteed in accordance with IEC/EN 60204-1 by using PELV circuits (electrical equipment of machines, general requirements).


#### Designated use

The CMMP-AS-...-M3 is used ...

- in control cabinets to supply AC servo motors and regulate their torque (current), speed and position.

The CMMP-AS-...-M3 is intended for installation in machines or automation systems and is to be used as follows:

- in perfect technical condition,
- in original status without unauthorised modifications,
- within the product's limits as defined by the technical data (→ chapter 8),
- in an industrial environment.

**Note**

In the event of damage caused by unauthorised manipulation or use other than that intended, the guarantee is invalidated and the manufacturer is not liable for damages.

#### 1.2 Safety conditions

- Make this documentation available to the design engineer and installer or person responsible for commissioning the machine or system in which this product will be used.
- Ensure compliance with specifications in the documentation at all times. Also take into account the documentation for the other components and modules.
- Take into account the legal regulations applicable to the destination, as well as:
  - regulations and standards,
  - regulations of the testing organisations and insurers,
  - national regulations.

#### Technical requirements

General conditions for the correct and safe use of the product, which must be observed at all times:

- Comply with the connection and environmental conditions of the product (→ chapter 8) and all connected components.

The product can only be operated in accordance with the relevant safety guidelines if the limit values and/or load limits are observed.
- Observe the warnings and instructions in this documentation.

#### Qualification of trained personnel (requirements for personnel)

The product may only be commissioned by a qualified electrical engineer who is familiar with:

- the installation and operation of electrical control systems,
- the applicable regulations for operating safety-engineered systems,
- the applicable regulations for accident protection and occupational safety, and
- the product documentation.

#### Areas of application and approval by authorities

Standards and test values which the product must comply with and fulfil can be found under “Technical data” (→ chapter 8). The product-relevant EU directives can be found in the declaration of conformity → [www.festo.com/sp](http://www.festo.com/sp)

2 Product overview

2.1 Product identification, versions

→ This documentation refers to the following versions:  
– Motor controller CMMP-AS-...-M3, from Rev 01

2.2 Documentation

→ You can find the complete documentation for the CMMP-AS-...-M3 motor controller in PDF format on the CD-ROM accompanying the motor controller or at  
→ [www.festo.com/sp](http://www.festo.com/sp):

User documentation for the motor controller CMMP-AS-...-M3	
Name, type	Contents
Hardware description, GDCP-CMMP-M3-HW-...	Assembly and installation for all variants/power classes (1-phase, 3-phase), pin allocations, error messages, maintenance.
Function descriptions, GDCP-CMMP-M3-FW-...	Instructions for commissioning with FCT + functional description (firmware). Overview of FHPP, fieldbus, safety technology.
FHPP description, GDCP-CMMP-M3-C-HP-...	Control and parametrisation of the motor controller via the Festo profile FHPP with the following fieldbuses: CANopen, PROFIBUS, DeviceNet, EtherCAT.
CiA 402 (DS 402) description, GDCP-CMMP-M3-C-CO-...	Control and parametrisation of the motor controller via the CiA 402 (DS402) device profile with the following fieldbuses: CANopen and EtherCAT.
CAM editor description, P.BE-CMMP-CAM-SW-...	Cam disc functionality (CAM) of the motor controller.
Safety module description, GDCP-CAMC-G-S1-...	Functional safety technology for the motor controller with safety function STO.
Safety module description, GDCP-CAMC-G-S13...	Functional safety technology for the motor controller with safety functions STO, SS1, SS2, SOS, SBC, SLS, SSR, SSM.
Help for FCT plug-in CMMP-AS	Interface and functions of the CMMP-AS plug-in for the Festo Configuration Tool → <a href="http://www.festo.com/sp">www.festo.com/sp</a>

2.3 Device view

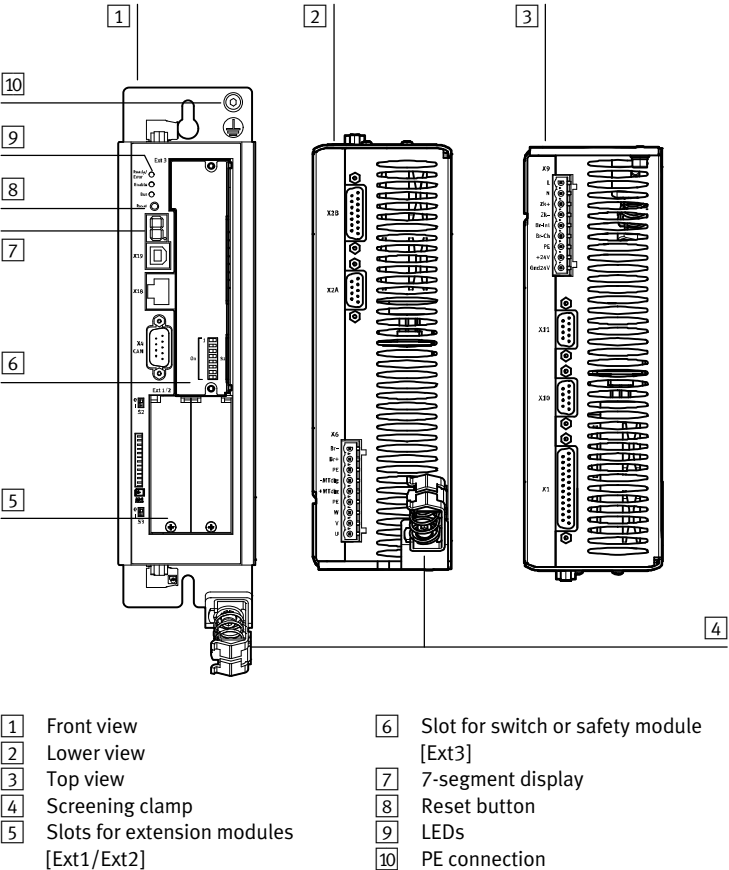


Fig. 1 Motor controller CMMP-AS-...-M3 (example CMMP-AS-...-C2-3A-M3)

3 Mechanical installation

3.1 Important instructions

→ Note

Proceed carefully with mounting. During mounting and subsequent operation of the drive, make sure that that no metal shavings, metal dust or mounting parts (screws, nuts, pieces of wire) fall into the motor controller.

→ Note

- Only use the motor controller as an installed device for control cabinet assembly.
- The mounting position is vertical with the power supply lines [X9] leading upwards.
- Mount the clip on the mounting plate.
- Mounting clearance: For sufficient ventilation, 100 mm of clearance to other assemblies is required above and below the device.
- A mounting clearance of 150 mm underneath the device is recommended for optimum cabling of the motor and encoder cable!
- The motor controllers are designed in such a way that they can be mounted on a heat-dissipating mounting panel if used as intended and installed correctly. Excessive heating can lead to premature aging and/or damage to the device. If the product is subjected to high thermal stress, a mounting clearance (→ hardware description) is recommended!

3.2 Mounting

→ Always observe the safety instructions when conducting any mounting and installation work → chapter 1.

→ Note

**Improper handling can damage the interface or motor controller.**

- Before mounting and installation work, switch off the supply voltage. Only switch on the supply voltage when the mounting and installation work have been completed.
- Never unplug modules or interfaces from, or plug modules or interfaces into the motor controller when it is energised!
- Observe the handling specifications for electrostatically sensitive devices. Do not touch the printed circuit board or the pins of the terminal strip in the motor controller. Only grasp the interface by the front plate or the edge of the board.

Module in slot Ext3

The CMMP-AS-...-M3 motor controllers are delivered without a module in slot Ext3 and the slot is covered with a transparency.  
→ To operate the motor controller, a suitable module must be mounted in slot Ext3:  
– Switch module CAMC-DS-M1 or  
– Safety module CAMC-G-S...

DIP switch

The status of the DIP switches on the plug-in modules (slot Ext3) can be read when switching on the control voltage or conducting a RESET procedure. Modifications to the switch setting during operation are only recognised by the motor controller during the next switch-on or RESET procedure.  
→ The significance of the DIP switch setting depends on the control interface used  
→ Hardware description.

Interface in slot Ext1/Ext2 (optional)

→ The motor controller can be extended by digital I/Os and/or fieldbus interfaces via interfaces in slots Ext1/Ext2 → Hardware description.

Mounting the motor controller

→ Mounting clips are located at the top and bottom of the CMMP-AS-...-M3 motor controller. These are used to attach the motor controller vertically to a mounting plate. The clips are part of the radiator profile for optimal heat transfer to the mounting plate → Hardware description.  
Please use size M5 screws to attach the CMMP-AS-...-M3 motor controller.

4 Electrical installation

4.1 Connector pin assignments

The CMMP-AS-...-M3 motor controller is connected to the supply voltage, motor, external braking resistor and the holding brake in accordance with ➔ Hardware description.



Note

If the polarity of the operating voltage connections is reversed, or if the operating voltage is too high or the operating voltage and motor connections are reversed, the CMMP-AS-...-M3 motor controller will be damaged.

Overview of connections	
[X1]	I/O communication
[X2A]	Resolver
[X2B]	encoder
[X4]	CAN bus
[X6]	Motor
[X9]	Power supply
[X10]	Increment generator input
[X11]	Increment generator output
[X18]	Ethernet interface <sup>1)</sup>
[X19]	USB interface <sup>1)</sup>

1) Connection of the PC for commissioning.

➔ The cable screening of the motor cable must also be connected to the screening clamp of the motor controller.  
Observe the instructions for safe and EMC-compliant installation ➔ Hardware description.

The main pin allocations can be found as stickers which are included in the scope of delivery.

5 Commissioning

➔ Information for commissioning can be found in the corresponding documentation for the motor controller ➔ section 2.2. The following sections provide a connection overview and an overview for checking the operating status of the product.

Connecting the motor

1. Insert the plug of the motor cable into the corresponding socket on the motor and tighten.
2. Insert the PHOENIX plug into the socket [X6] on the device.
3. Clamp the cable shields to the shield terminals (not suitable as strain-relief).
4. Insert the plug of the encoder cable into the encoder output socket on the motor and tighten.
5. Insert the D-SUB plug into socket [X2A] resolver or [X2B] encoder of the device and secure the locking screws.
6. Check all plug connectors once again.

Connecting the power supply

1. Make sure that the power supply is switched off.
2. Insert the PHOENIX plug into the socket [X9] on the motor controller.
3. Connect the PE cable of the mains supply to the PE earth socket.
4. Connect the 24 V connections using an appropriate power supply unit.
5. Connect the power supply unit.
6. Check all plug connectors once again.

Connect the PC

1. For commissioning you will need the FCT with CMMP-AS plug-in which can be found on the CD-ROM supplied with the motor controller or at ➔ [www.festo.com/sp](http://www.festo.com/sp).  
Installation: Launch “Start.exe”; administrator rights are required for installation of the FCT (see Readme.txt).
2. Connect the PC to the motor controller via USB or Ethernet ➔ Hardware description.

Check readiness for operation

1. Make sure that the controller enable is switched off (controller enable: DIN 5 at [X1]).
2. Switch on the power supplies for all devices. The READY LED on the front of the device should now light up.  
➔ If the READY LED lights up red, it indicates a fault. If an “E” appears in the seven-segment display followed by a sequence of numbers, this is an error message and you must rectify the cause of the error ➔ Hardware description.

If there is no display

1. Switch of the power supply.
2. Wait 5 minutes to allow the intermediate circuit to discharge.
3. Check all connecting cables.
4. Check the functionality of the 24 V power supply.
5. Switch on the supply voltage again.
6. If there is still no display ➔ device is defective

6 Service functions and diagnostic messages

6.1 Operation and display components

The CMMP-AS-...-M3 motor controller has three LEDs on the front and a seven-segment display for indicating the various operating states.

Element	Function	
Seven segment display	Displays the operating mode and an error code should an error occur ➔ 6.2 Seven segment display	
LED1	Lights up green	Ready status
	Lights up red	Error
LED2	Lights up green	Controller enable
LED3	Lights up yellow	CAN bus status display
RESET button	Hardware reset	

6.2 Seven segment display

The display and the meaning of the symbols shown are illustrated in the following table:

Display	Meaning
	The outer segments “rotate” on the display in the speed control operating mode. The display depends on the current actual position or speed.
	The central bar is also active when the controller release is active.
	The CMMP-AS-...-M3 motor controller still needs to be parameterised. (Seven-segment display = “A”)
	Controlled torque mode. (Seven-segment display = “I”)
	“H”: (Only applicable when using a safety module) a safety function is initiated ➔ safety module description.
	“F”: Indicates that firmware is loaded in the flash memory.
	“.”: Boot loader active
	“d”: Indicates that a parameter set is loaded from the SD card into the controller.
P xxx	Positioning (“xxx” stands for the position number) The numbers are shown in succession
PH x	Homing: “x” stands for the respective phase of the homing procedure (0: search phase, 1: creep phase, 2: travel to zero position). The numbers are shown in succession
E xxy	Error message with main index “xx” and subindex “y”
-xxy-	Warning message with main index “xx” and sub-index “y”. Warnings are shown at least twice on the seven-segment display.

6.3 Diagnostic messages

If an error occurs, the CMMP-AS-...-M3 motor controller displays a diagnostic message cyclically in the seven-segment display of the motor controller CMMP-AS-...-M3. The error message consists of an E (for Error), a main index and a subindex, e.g.: E 0 1 0.  
Warnings have the same number as an error message. The difference is that a warning is displayed with a prefixed and suffixed hyphen, e.g.: . - 1 7 0 -.  
The meanings and the measures for the message groups are summarised in the following table. A complete list of all error messages can be found in the ➔ Hardware description.

7 Repair and disposal

➔ Repair of the motor controller is not permissible. If necessary, replace the motor controller.  
➔ Observe the local regulations for environmentally-friendly disposal of electronic modules.

8 Technical data

General				
CMMP-AS-	C2-3A-M3	C5-3A-M3	C5-11A-P3-M3, C10-11A-P3-M3	C15-11A-P3-M3
Dimensions and weight				
Dimensions (HxWxD) <sup>1)</sup>	[mm]	202x66x207	227x66x207	252x79x247
Mounting plate dimensions	[mm]	248x61		297x75
Weight	[kg]	2.1	2.2	3.5
Approvals				
CE marking (see declaration of conformity)	In accordance with EU Low Voltage Directive			
	In accordance with EU EMC Directive			
	In accordance with EU Machinery Directive			

1) without plugs, screening screw and screw heads

Operating and environmental conditions				
CMMP-AS-	C2-3A-M3	C5-3A-M3	C5-11A-P3-M3 C10-11A-P3-M3	C15-11A-P3-M3
General				
Permitted installation height above sea level				
at rated output	[m]	1000		
with power reduction <sup>1)</sup>	[m]	1000 ... 2000 (max.)		
Air humidity	[%]	0 ... 90 (non-condensing)		
Protection class	IP20 (with plugged-in plug connectors at X6 and X9)			
	IP10 (without plugged-in plug connectors at X6 and X9)			
Degree of contamination	2			
Transport and storage				
Temperature range	[°C]	-25 ... +70		
Operation				
Operating temperature	[°C]	0 ... +40		
Operating temperature with power reduction 2.5 % per K	[°C]	+40 ... +50		
Shutdown temperature of power unit heat sink	°C	100	80	80 85

1) Above 1000 m above sea level Performance reduction of 1% per 100 m

Power supply [X9]				
CMMP-AS-	C2-3A-M3	C5-3A-M3	C5-11A-P3-M3 C10-11A-P3-M3	C15-11A-P3-M3
Logic supply				
Nominal voltage	[V DC]	24 ±20 %		
Nominal current <sup>1)</sup>	[A]	0.55	0.65	1
Maximum current for holding brake <sup>2)</sup>	[A]	1		2
Load supply				
Number of phases		1		3
Voltage range	[V AC]	100 ... 230 ±10 %		230 ... 480 ±10 %
Mains frequency	[Hz]	50 ... 60		
Alternative DC supply	[V DC]	60 ... 380		60 ... 700

- 1) plus current consumption of a holding brake and I/Os, if present  
2) for higher power requirements ➔ Hardware description

I/O interface [X1]				
Type		Values		Remark
Digital inputs/outputs				
Inputs DIN0 ... DIN9	Input voltage	[V]	24	active high, conforms to EN 61131-2
	Voltage range	[V]	8 ... 30	
Outputs DOUT 0 ... DOUT3	Output voltage	[V]	24	active high, galvanically isolated
	Voltage range <sup>1)</sup>	[V]	8 ... 30	
+24 V	Output voltage	[V]	24	
	Max. output current	[mA]	100	
GND24	Voltage	[V]	0	Reference potential for digital I/Os

1) When used as a digital input (configuration with FCT)

I/O interface [X1]				
Type		Values		Remark
Analogue inputs/outputs				
AIN0 #AIN0	Entry area	[V]	±10 differential	–
	Resolution	Bit	16	
	Time delay	[µs]	< 250	
	max. input voltage	[V]	30	
	R <sub>I</sub>	[kΩ]	30	
AIN1 <sup>1)</sup>	Entry area	[V]	±10 Single-ended	–
	Resolution	Bit	10	
	Time delay	[µs]	< 250	
AIN2 <sup>1)</sup>	Entry area	[V]	±10 Single-ended	–
	Resolution	[bit]	10	
	Time delay	[µs]	< 250	
AMON0, AMON1	Output range	[V]	±10	–
	Resolution	[bit]	9	
	Critical frequency	[kHz]	1	
OGND	Voltage	[V]	0	Reference potential
+VREF	Output range	[V]	0 ... 10	Reference output for setpoint potentiometer

1) This input can also be optionally parameterised as a digital input with an 8 V switching threshold (parametrisation with FCT).

Supported encoders [X2A]/[X2B]		
Encoder type	Protocol	Interface
Resolver	–	[X2A]
Digital encoder	Incremental	[X2B]
Analogue encoder	–	[X2B]
EnDat encoder	EnDat 2.1 (01/21); EnDat 2.2 (22)	[X2B]
HIPERFACE encoder	HIPERFACE	[X2B]
Details ➔ Hardware description		

Motor connection [X6]					
CMMP-AS-	C2-3A-M3 <sup>1)</sup>	C5-3A-M3 <sup>1)</sup>	C5-11A-P3-M3 <sup>2)</sup>	C10-11A-P3-M3 <sup>2)</sup>	C15-11A-P3-M3 <sup>2)</sup>
Voltage	[VAC]	0 ... 270		0 ... 360	
Rated output	[kVA]	0.5	1	3 6	9
Max. power for 5 seconds	[kVA]	1	2	6 12	18

- 1) Data for operation at 1x230 VAC [±10 %], 50 ... 60 Hz  
2) Data for operation at 3x400 VAC [±10 %], 50 Hz

➔ All available technical data ➔ Hardware description.