

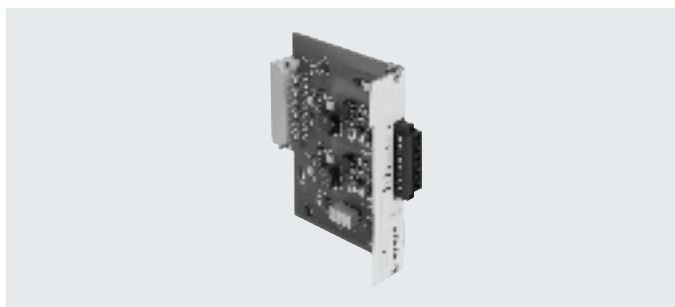
Accessories

Safety module CAMC-G-S1

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

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

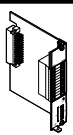
- Safe torque off (STO)



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	German Technical Control Board (TÜV) 01/205/5165.02/19
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 conformity) ¹⁾	To EU EMC Directive
	To EU Machinery Directive
UKCA marking (see declaration of conformity) ¹⁾	To UK instructions for EMC
	To UK instructions for machines

1) More information www.festo.com/catalogue/camc → Support/Downloads

Technical data	
Control input 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)
Max. positive test pulse length with logic 0 [ms]	0.3 (related to nominal voltage 24 V and intervals > 2 s between pulses)
Max. allowable time for test pulses at 24 V signal [ms]	< 2 ... 6
Key features	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)
Design	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"> • 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 plugs are included in the scope of delivery. To reorder plug NEKM → page 20 	★ 1501330	CAMC-G-S1



Accessories

Safety module CAMC-G-S3

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

The safety module serves as an extension 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	Up to category 4, Performance Level e
Safety Integrity Level (SIL) to EN 61800-5-2, EN 62061, EN 61508	SIL 3
Certificate issuing authority	German Technical Control Board (TÜV) 01/205/5165.02/19
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 conformity) ¹⁾	To EU EMC Directive
	To EU Machinery Directive
UKCA marking (see declaration of conformity) ¹⁾	To UK instructions for EMC
	To UK instructions for machines

1) More information www.festo.com/catalogue/camc → Support/Downloads

Accessories

Technical data		
General		
Parameterisation	Using SafetyTool, integrated into the FCT plug-in 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
Key features	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
Key features	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
Key features	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)
Design	Potential-free signal contact	
Key features	Suitable for the diagnostics of safety functions Function can be configured	

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 (801412 0/2010-12-21) → 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

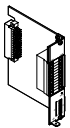
First encoder	Second encoder	Achievable safety level		Note
Resolver	Other encoder	SIL 3	Cat. 3/PL d; Cat. 3/PL e	–
Resolver	Incremental encoder	SIL 3	Cat. 4/PL e	–
Resolver	None	SIL 2	Cat. 3/PL d	Please see the note below
SIN/COS incremental encoder	None	SIL 3	Cat. 3/PL d	Requires SIL classification 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 check 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 on diagnostic coverage as well as the restrictions on the achievable accuracy of standstill and speed monitoring 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: <ul style="list-style-type: none"> • 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 plugs are included in the scope of delivery. To reorder plug NEKM → page 20 	★ 1501331	CAMC-G-S3

Festo core product range



Generally ready for dispatch from the factory within 24 hours
Generally ready for dispatch from the factory within 5 days

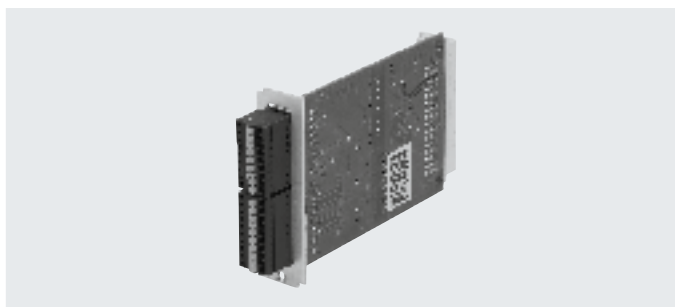
Accessories

Interface CAMC-D-8E8A

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

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

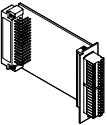
Up to two interfaces are supported simultaneously.




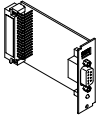
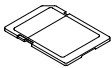
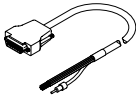
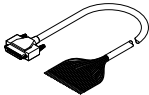
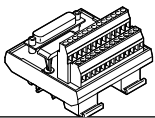
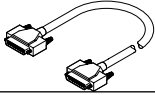

Technical data

General		
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-proof, 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 plugs are included in the scope of delivery. To reorder plug NEKM → page 20)	567855	CAMC-D-8E8A

Accessories

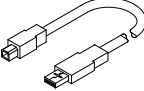



Ordering data – Plug-in card				
	Description	Part no.	Type	
	Switch module: • One of the plug-in cards CAMC-G-S1, CAMC-G-S3 or CAMC-DS-M1 must be inserted in slot [7] (→ page 11) in order to operate the motor controller CMMP-AS-...-M3.	★ 1501329	CAMC-DS-M1	
Ordering data – Plug-in cards for bus protocols				
	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				
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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				
	<ul style="list-style-type: none"> Connects the motor controller to the manifold 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				
	<ul style="list-style-type: none"> 25-pin Sub-D plug. Each single core can be individually assembled using screw terminals. Cannot be used if the incremental encoder interface (input) is in use 	–	★ 8001372	NEFC-S1G25-C2W25-S6

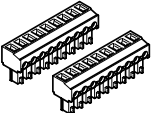

Festo core product range



Generally ready for dispatch from the factory within 24 hours
 Generally ready for dispatch from the factory within 5 days

Accessories

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
Plugs				
	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⁾	

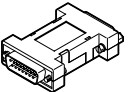
- 1) Plugs are included in the scope of delivery of the motor controller CMMP-AS-...-M0, CMMP-AS-...-M3
- 2) Plugs are included in the scope of delivery of the plug-in card CAMC-D-8E8A
- 3) Plug is included in the scope of delivery of the plug-in card CAMC-G-S1
Plug is included in the scope of delivery of the motor controller CMMP-AS-...-M0
- 4) Plug is included in the scope of delivery of the plug-in card CAMC-G-S3

Ordering data – EMC filter for servo motors EMME-AS

Data sheets → Internet: emme-as

For cable lengths ≥ 10 m, the use of the EMC filter is recommended to reduce EMC interference.

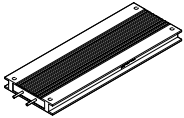
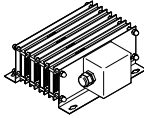
For encoder cables ≥ 10 m, the filter is included in the scope of delivery of the cable.

	Degree of protection	Ambient temperature	Part no.	Type
	IP30 (in mounted state)	–40 ... +80°C	4825847	CAMF-C5-FC

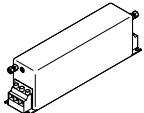
Festo core product range


- ★ Generally ready for dispatch from the factory within 24 hours
- ★ Generally ready for dispatch from the factory within 5 days

Accessories


Ordering data – Braking resistors				Data sheets → 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
	<p>The following descriptions are available on the Festo website:</p> <ul style="list-style-type: none"> • Hardware: mounting and installation of 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 cam editor			
	Description	Part no.	Type
	<p>Software package contains:</p> <ul style="list-style-type: none"> • CD-ROM <ul style="list-style-type: none"> – With user documentation in de, en, es, fr, it, ru, zh – With additional functions for the cam disc functionality <p>The software package is not included in the scope of delivery</p>	570903	GSPF-CAM-MC-ML