

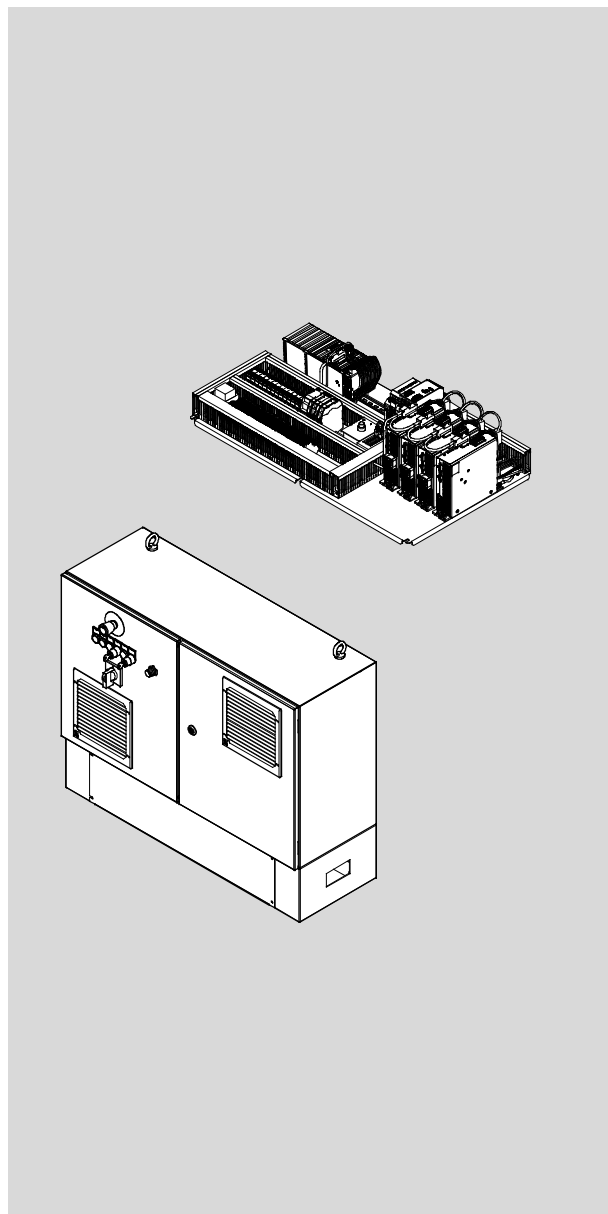
Control system

CMCA-...-B...

FESTO

Description

Electrical
Installation



8036667
1405NH
[8036661]

Translation of the original instructions

GDCP-CMCA-B-INST-EN

Codesys® is a registered trademark of its respective trademark holder in certain countries.

Identification of hazards and instructions on how to prevent them:



Warning

Hazards that can cause death or serious injuries.



Caution

Hazards that can cause minor injuries or serious material damage.

Other symbols:



Note

Material damage or loss of function.



Recommendations, tips, references to other documentation.



Essential or useful accessories.



Information on environmentally sound usage.

Text designations:

- Activities that may be carried out in any order.
- 1. Activities that should be carried out in the order stated.
- General lists.

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1 Safety and requirements for product use

1.1 Safety

1.1.1 General safety information



Warning

Danger of electric shock even if power switch is shut off.

The control system is only completely voltage-free if all supply lines have been switched voltage-free.

- Switch off all supply lines (also external voltage) prior to assembly, installation and/or maintenance work and secure them from being restarted accidentally.
- Switch the voltages back on only after completion of work.



Note

Damage to the product from incorrect handling.

- Never pull or plug in the plug connectors and interfaces when powered.
- Observe the handling specifications for electrostatically sensitive devices.



1.1.2 Intended use

The control system CMCA-...-B... is intended to operate a kinematics system in the environment of a machine or automated system.

- Use system only as follows:
 - in perfect technical condition
 - in original status, without unauthorised modifications
 - within the limits of the product defined through the technical data (→ A.1 Technical data)
 - in an industrial environment

The safety circuit of the control solution CMCA-...-B... is only one part of the safety concept for a machine, whereby the safety concept must be based on a risk assessment of the entire machine to be performed by the machine manufacturer.



Note

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

1.1.3 Foreseeable misuse

- The safety circuit of the control system CMCA-...-B... is changed in its function.
- With the control system CMCA-...-B..., safety functions are implemented that are not described in this documentation.
- A sufficient risk assessment has not been performed for the machine.
- There is no safety concept for the machine available.
- The safety circuit is not appropriate for the application.
- No verification and no validation of the switch in the machine have been performed.

1.2 Requirements for product use

- Provide this documentation to the following persons:
 - design engineer
 - assembler
 - commissioner of the machine or system
- Comply with the specifications of the documentation. Follow all accompanying documentation and the documentation of any associated accessories.
- Take the following into consideration for the destination:
 - applicable legal regulations
 - regulations and standards
 - regulations of the testing organizations and insurers
 - national specifications

For correct and safe use:

- Observe all warnings and notes.
- Comply with all load limits of the product and the connected components (→ A.1 Technical data).

1.2.1 Qualification of specialized personnel

- The product should only be installed by specialized personnel with corresponding qualifications.

The following knowledge is required:

- installation and operation of electrical control systems
- applicable regulations for operating safety-engineering systems
- applicable regulations for accident protection and operational reliability
- documentation and mode of operation of the product

1.2.2 Range of application and certifications

Standards and test values that the product complies with and fulfills (→ A.1 Technical data).

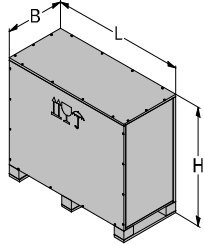
Certificates and declaration of conformity (→ www.festo.com/sp).

2 Transport and storage

2.1 Transport

The control system is delivered on a pallet and is protected with a cover made of plates. The mounting plate design is also screwed to the pallet.

2.1.1 Dimensions and weights

CMCA-...-B...		C-	CC-	CS-	
Dimensions	[mm]				
H		565	868	1018	
L		1010	1140	1140	
B		640	510	510	
Maximum weight ¹⁾	[kg]				
Control system		43	81	91	
Overall weight		87	127	144	

1) Dependent on the design and accessories

Tab. 2.1



Note

- For transport, observe the marking on the upper side on the transport box.

1. Transport the pallet with the control system to the mounting/storage location.
2. Set the pallet down on a fixed and flat base at the mounting/storage location.

2.2 Storage conditions

- For safe later use, the following storage conditions must be complied with.

Storage conditions		
Storage temperature	[°C]	–20 ... +60
Relative air humidity	[%]	10 ... 95 (non-condensing)
Max. storage time		60 months
Requirements of storage location		dry, solid and flat base

Tab. 2.2

2.3 Unpacking



Note

Damage to the product from incorrect dismounting of the transport packaging.

- Use the correct tool to loosen the screws.
- Do not let packaging parts fall onto the control system.
- Observe product weight.(→ 2.1.1 Dimensions and weights).
- Keep the packaging for later use or dispose of it in accordance with the notes (→ 7.3 Disposal).

2.3.1 Mounting plate

Remove transport packaging

1. Loosen and remove the lower cover screws.
2. Pull cover off upwards.

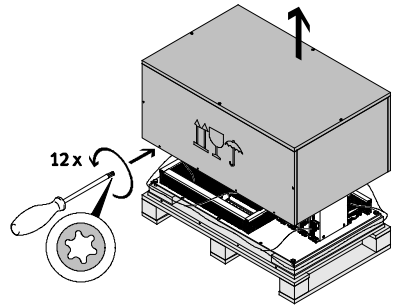


Fig. 2.1

Remove the packaging foil

3. Cut the plastic sheet parallel to the contour of the product with an appropriate tool. When cutting, make sure that you do not damage or scratch the components of the control system.
4. Pull the plastic sheet upward and away. Carefully remove the bag with drying agent and dispose of it in accordance with the instructions (→ 7.3 Disposal).

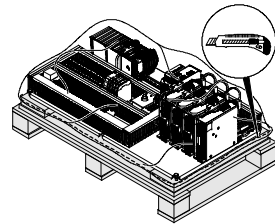


Fig. 2.2

Loosen mounting plate

5. Loosen and remove the screws with which the mounting plate is screwed to the pallet.
6. With two people, lift the control system off the pallet and bring it to the installation site.

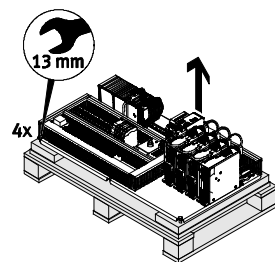


Fig. 2.3

2.3.2 Control cabinet



Warning

Danger of injury/damage due to falling loads.

The device to lift the control cabinet out of the transport packaging must be sufficiently dimensioned.

- Observe product weight (→ 2.1.1 Dimensions and weights).

Remove transport packaging

1. Loosen and remove all screws from the cover.
2. Remove transport packaging covers upward.

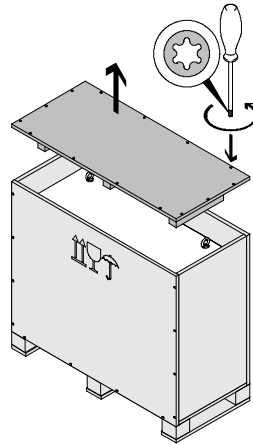


Fig. 2.4

3. Loosen and remove all screws of the side wall near the control cabinet doors.
4. Pull the side wall forward and off.

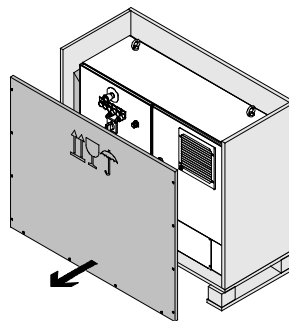


Fig. 2.5

2 Transport and storage

5. Mount an appropriate lifting device to the transport lugs of the control cabinet.

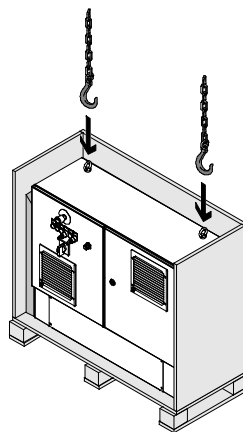


Fig. 2.6

6. Lift the control cabinet out of the transport packaging.

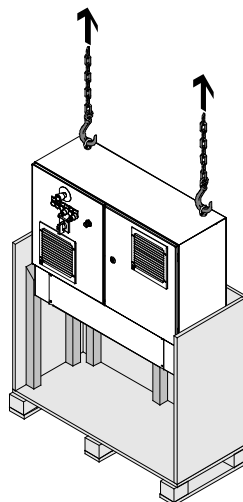


Fig. 2.7

Unpack filter mats



Caution

Fire risk from overheating.

At delivery, the filter mats for control cabinet fans and outlet filters are packed in plastic and placed in the filter cassettes.

Operation of the control system with packaged filter mats results in overheating and related consequential damage.

- Remove the plastic packaging from both filter mats as described subsequently.

1. Pull the covers of the filter housing off to the front.
2. Take out the packaged filter mats.
3. Remove the packaging.

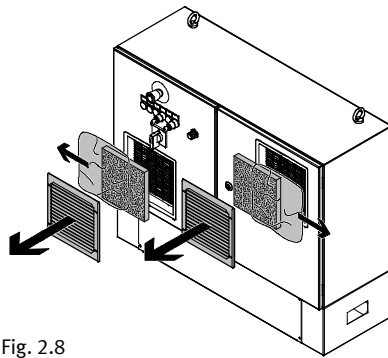


Fig. 2.8

4. Place the unpackaged filter mats in the filter housing.
5. Install covers again.

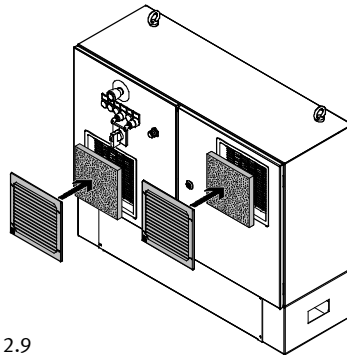


Fig. 2.9

Remove drying agent



The control cabinet includes several bags with drying agent to protect against damage due to moisture.

Before installation of the control system:

- Carefully remove the drying agent from the control cabinet and dispose of it in accordance with the instructions (→ 7.3 Disposal).

2.4 Check the scope of delivery

1. After unpacking, check whether the product corresponds to the version you ordered.
2. Check accompanying user manual of the individual components for completeness.

Documentation	No.
Electrical installation control system CMCA-...-B...	1
Circuit diagram, control system CMCA-...-B...	1
Multi-axis controller CMXR-C1/CMXR-C2	1
Motor controller + CD-ROM	1
I/O module CECX-D-8E8A-NP-2	1
Power supply CACN	1
Subcon cable interface	1
Ethernet switch SFNB	1
Controller PNOZ S7 + supplement	1
Controller PNOZmulti Mini + DVD	1
Buffer module	1 (for characteristic S2)
Terminals with filter 1, 21108-2EN-04	1

Tab. 2.3

Only for control cabinet version:

3. Check accompanying accessories for completion.

Accessories	No.
Key for key switch	2 each
Key for control cabinet doors	1
Inscription labels for control elements, German	6

Tab. 2.4

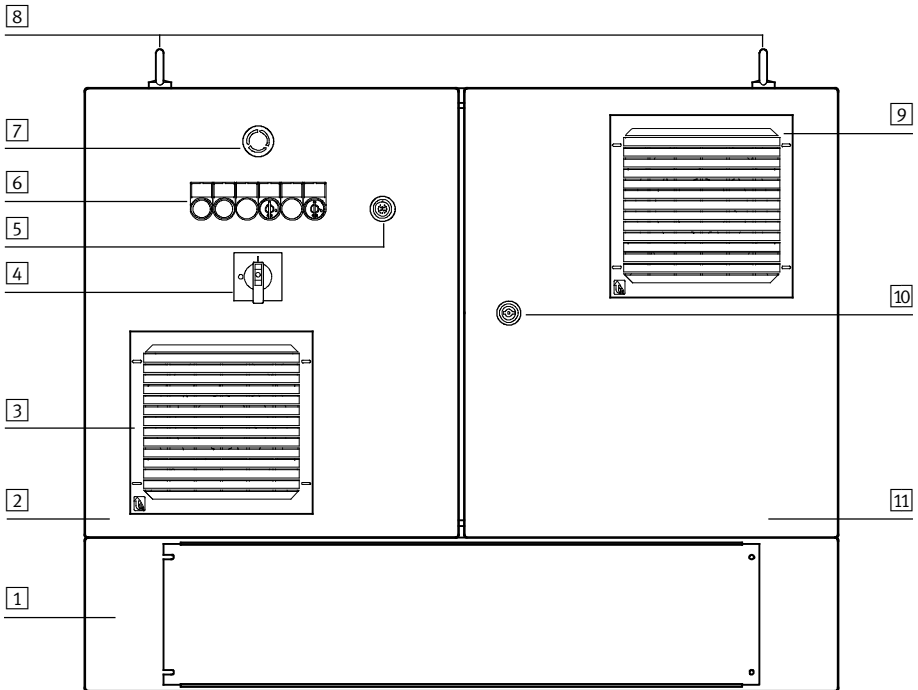
3 Overview

3.1 Function and application

The control system CMCA-....-B... serves to control and monitor a connected kinematics system with several axes. Each axis of the kinematics system is controlled by a motor controller. The higher-order multi-axis controller coordinates the movements of the individual axes through the corresponding motor controller.

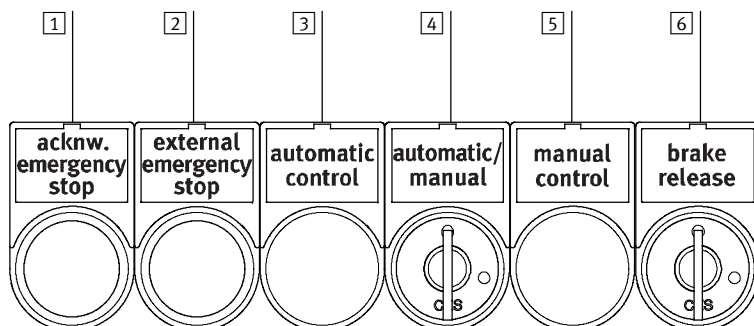
3.2 Design

3.2.1 External control elements and connections



- | | |
|--|--|
| 1 Base (option) | 6 Control and signal elements (→ Fig. 3.2) |
| 2 Control cabinet door, left | 7 Emergency stop switch (S1) |
| 3 Control cabinet fan cover | 8 Transport lugs |
| 4 Power switch | 9 Outlet filter cover |
| 5 Connection for operator unit CDSA or enabling button CACS-Z... | 10 Control cabinet doors interlock |
| | 11 Control cabinet door right |

Fig. 3.1



- 1** Illuminated push-button (S20/P20) “acknowledge emergency stop”: confirms unlocking of the emergency stop circuit
- 2** Indicator light (P21) “external emergency stop”: external emergency stop triggered
- 3** Indicator light (P4) “automatic control”: automatic operation active
- 4** Key switch (S2) “automatic/manual”: Switches between automatic and manual override
The switch is only active when the “local” operating mode has been selected by means of link plugs (→ Tab. 4.18). In case of “external” operating mode, the switch is without effect.
- 5** Indicator light (P5) “manual control”: manual override active
- 6** Key actuator (S3) “brake release”: releases the motor brakes
Only possible in manual override and in combination with one of the enabling buttons on the operator unit CDSA or the enabling button CACS-Z-....

Fig. 3.2



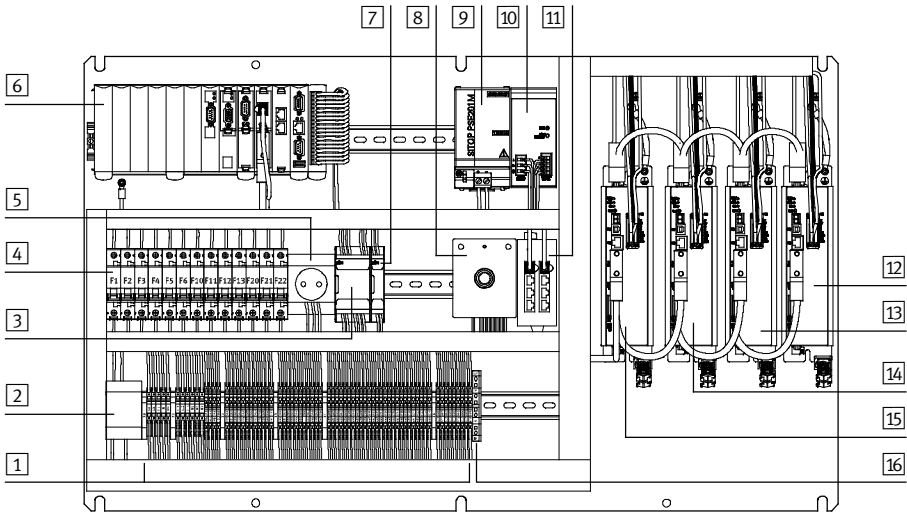
Note

The labels for marking the control elements in German as well are included in the control cabinet.

3.2.2 Internal components and connections



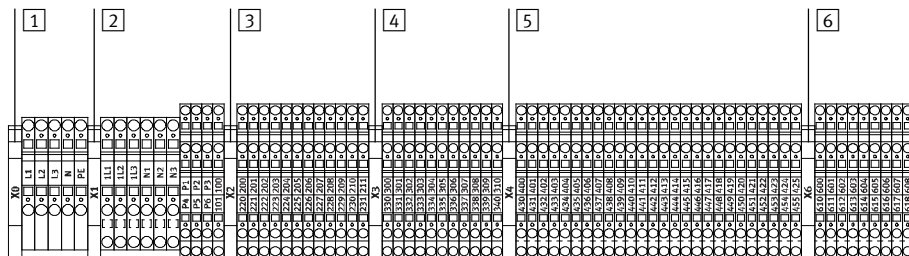
The design can deviate from the illustration, depending on the version.



- 1 Terminal strips X0 ... X6
- 2 Monitoring module for mains failure detection (only for characteristic S2)
- 3 Controller, safety control circuit PNOZ S7
- 4 Circuit breakers F1 ... F22
- 5 Protective contact socket type F (230 V AC, max. 6 A) for PC
- 6 Multi-axis controller
- 7 Controller, safety control circuit extension PNOZmulti
- 8 Connection for operator unit CDSA or enabling button CACS-Z...
(with control cabinet design on the left door)
- 9 Buffer module 24 V DC (only for characteristic S2)
- 10 Power supply unit 24 V DC
- 11 Ethernet switch
- 12 Motor controller for axis 4 (only for characteristic B3, B5, B8)
- 13 Motor controller for axis 3 (only for characteristic B2, B3, B4, B5, B7, B8)
- 14 Motor controller for axis 2
- 15 Motor controller for axis 1
- 16 Terminals with filter

Fig. 3.3

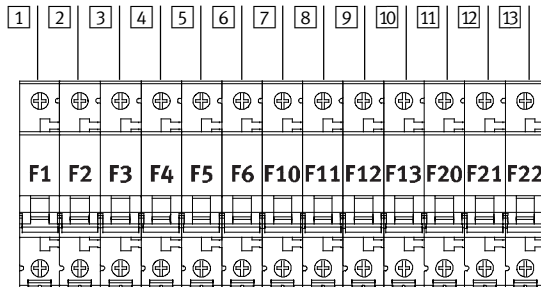
3.2.3 Terminal strips



- 1 X0: Feed upstream of power switch
- 2 X1: Feed downstream of power switch
- 3 X2: Control circuit 24 V DC
- 4 X3: Emergency stop
- 5 X4: External emergency stop
- 6 X6: Control and signal elements

Fig. 3.4

3.2.4 Circuit breakers



- 1** F1 (B16 A):
power supply 230 V AC, power supply unit 24 V DC
- 2** F2 (B16 A):
power supply 230 V AC, load circuit motor controller axis 1
(three-phase for characteristics A6, A7 and A8)
- 3** F3 (B16 A):
power supply 230 V AC, load circuit motor controller axis 2
(three-phase for characteristics A6, A7 and A8)
- 4** F4 (B16 A):
power supply 230 V AC, load circuit motor controller axis 3
(only for characteristics B2, B3, B4, B5, B7, B8)
- 5** F5 (B16 A):
power supply 230 V AC, load circuit motor controller axis 4
(only for characteristics B3, B5, B8)
- 6** F6 (B6 A):
power supply 230 V AC, plug socket
- 7** F10 (B2 A):
power supply 230 V AC, control cabinet fan
- 8** F11 (B2 A):
power supply 230 V AC, control cabinet lighting
- 9** F12 (B4 A):
external emergency stop
- 10** F13 (B4 A):
external emergency stop
- 11** F20 (B6 A):
power supply 24 V DC
- 12** F21 (B4 A):
power supply 24 V DC
- 13** F22 (B2 A):
power supply 24 V DC

Fig. 3.5

4 Mounting and installation

4.1 Mounting



Warning
Danger of injury/damage risk due to falling loads.

If incorrectly mounted, the control system can become loose and fall.

- Observe the product weight in selection of the mounting surface and mounting material (→ A.1 Technical data).

4.1.1 Mounting plate

The control system on the mounting plate must be mounted to the 6 mounting points on a vertical and sufficiently stable surface.

Mounting points

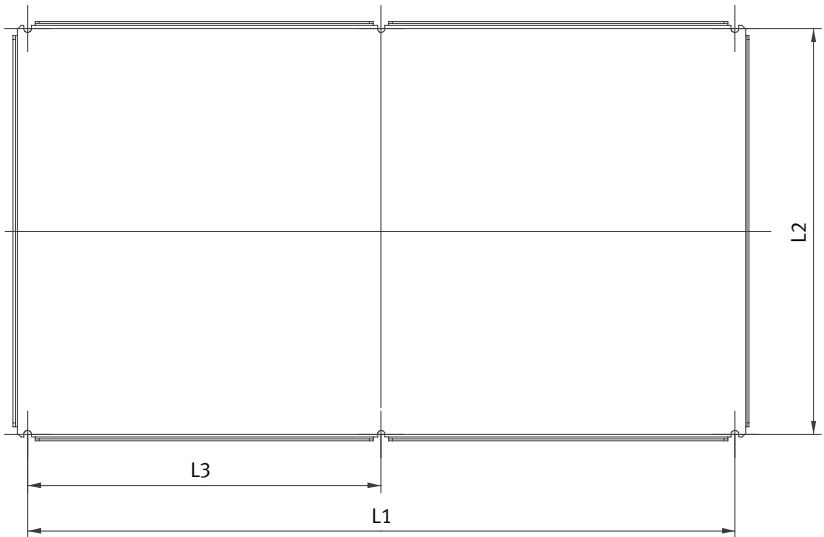


Fig. 4.1

Dimensions [mm]	
L1	925
L2	518
L3	462.5

Tab. 4.1

4.1.2
Control cabinet without base

The control system with its own control cabinet must be mounted as follows:

- upright on a sufficiently strong wall bracket
- upright on horizontal cross braces in a frame with sufficient bearing capacity
- with a free space below the control cabinet of at least 200 mm for the cable throughfeed



Note

A wall bracket is not included in the scope of delivery.



Note

Screws and mounting accessories are not included in the scope of delivery.

- Observe the product weight in selection of the mounting surface and mounting material (→ A.1 Technical data).

Mounting points, control cabinet bottom for mounting on wall bracket

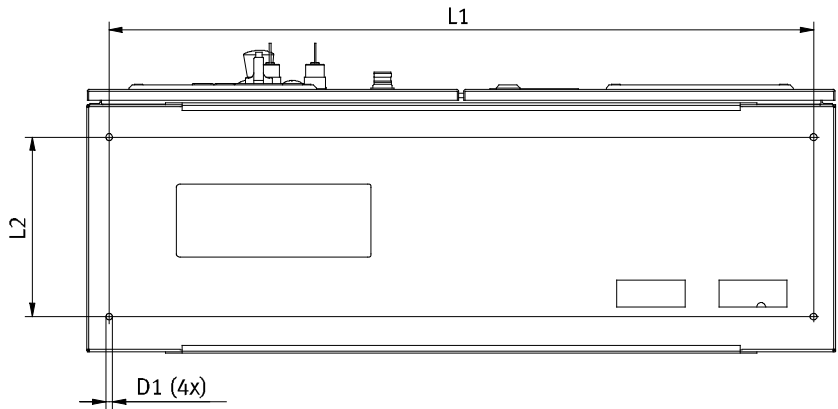


Fig. 4.2

Dimensions [mm]	
L1	940
L2	239.4
D1	Ø 9

Tab. 4.2

4.1.3 Control cabinet with base

The control system with its own control cabinet and base must be mounted as follows:

- fastened with 4 screws through the 4 drill holes in the base on a sufficiently stable foundation



Note

Screws and mounting accessories are not included in the scope of delivery.

- Observe the product weight in selection of the mounting surface and mounting material (→ A.1 Technical data).

Mounting points

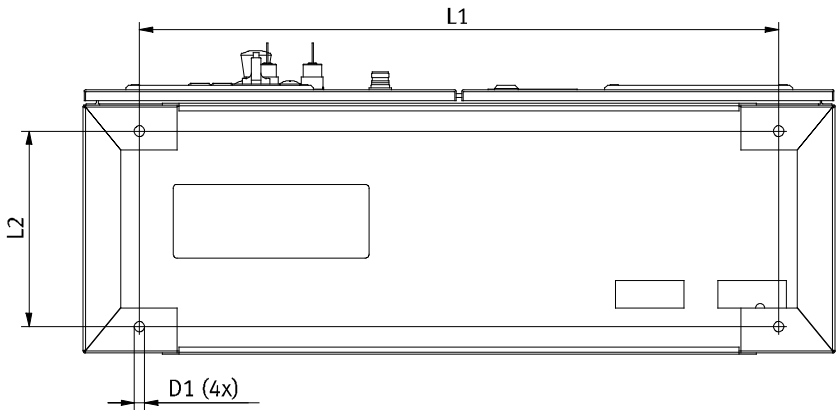


Fig. 4.3

Dimensions [mm]	
L1	850
L2	260
D1	Ø 14

Tab. 4.3

4.2 Electrical installation

4.2.1 Safety instructions



Warning

Danger of electric shock from voltage sources.

- Connect control system directly to the mains switch. Do not use a plug.
- Mount strain relief for supply voltage connecting cables and for motor cables.

The control system is only completely voltage-free if all supply lines have been switched voltage-free.

Before carrying out mounting, installation and/or maintenance work:

- Switch off supply voltage and safeguard against being switched on again unintentionally.
- Switch off external voltage and safeguard against being switched on again unintentionally.
- After the supply voltage is switched off, wait at least one minute. Start work on plugs and interfaces only when the residual voltage has fallen below 60 V.
- Use a protective conductor with a cross section $\geq 10 \text{ mm}^2$ (copper) or $\geq 16 \text{ mm}^2$ (aluminium).
- Only use power sources which guarantee reliable electrical isolation of the operating voltage in accordance with EN 60204-1.
- Connect all PE protective conductors before commissioning.
- Observe the regulations of EN 50178 and EN 60204-1 for protective earthing in installation.
- Switch the voltages back on only after completion of work.



Note

The mains voltage must be protected at the mains with a maximum of 20 A (slow-blow).



Warning

Danger of injury/damage due to ineffective emergency stop.

A not-connected operator unit in reach of the user can result in ineffective use of the emergency stop switch.

- Keep a not-connected operator unit outside the reach of the user.



Caution

An active emergency stop only has an effect on the electric drives. Any pneumatic components that may be on hand are not affected.

- If necessary, plan corresponding safety equipment for the pneumatic components of the system. For control, use the connection for external emergency stop circuits (→ 4.2.6 External emergency stop circuits).



Note

The description of the electric installation in this chapter requires completely mounted and installed kinematics (→ mechanical installation description).

For operation of the control system, the following measures must be taken:

- Use screened motor connection cables (→ motor controller description).
- The high leakage current can cause problems if a fault current protective device is used.



Note

Damage to the product from incorrect handling.

- Never pull or plug in the plug connectors and interfaces when powered.



ESD (electrostatic discharge) can cause damage to the device or other system parts at plug connectors that are not used.

- Observe the handling specifications for electrostatically sensitive devices.



Note

Unplugging the connection cover or a connected device triggers an emergency stop.

- Put the system at rest before the connection cover or a connected device is plugged in or unplugged.

Either a device must be connected or the connection cover mounted. Otherwise, the emergency stop circuit is opened (emergency stop active).

4.2.2
Design of the double-stack terminals

The double-stack terminals of the terminal strips X2 ... X6 and the right part of X1 have the following design.

Connection number with the identification on top

The terminals on top correspond to the terminal numbers, also attached somewhat further on top (here 610 ... 618).

Both connections of a terminal are bridged internally.

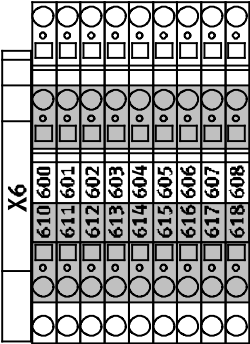


Fig. 4.4

Connection number with the identification underneath

The terminals below correspond to the terminal numbers, also attached somewhat further underneath (here 600 ... 608).

Both connections of a terminal are bridged internally.

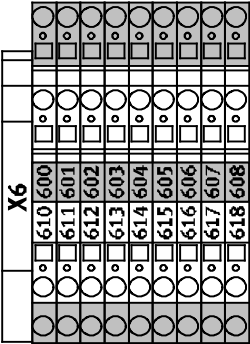


Fig. 4.5

4.2.3 Supply voltage



Note

In the design with a control cabinet, guide the supply lines of the supply voltage through the left one of the two cut-outs on the bottom of the control cabinet.

- Guide the supply line of the supply voltage (230/400 V AC / 3-phase, 50 ... 60 Hz) in the cable duct to the terminal strip X0.
- Connect the conductors to the lower clamping contacts of the terminals.

Terminal strip	Terminal	Description
X0	L1	External conductor L1 (phase 1)
	L2	External conductor L2 (phase 2)
	L3	External conductor L3 (phase 3)
	N	Neutral conductor
	PE	Protective earth conductor (connected to the mounting plate)

Tab. 4.4

4.2.4 Power switch (mounting plate design)



Caution

Danger of damage to the motor controller.

Switching on one or more phases before switching on the neutral conductor can result in damage to the motor controller.

- Use a 4-pin switching power switch with a leading contact at switch-on for the neutral conductor to prevent damage to the motor controllers during switch-on.
- Connect the power switch from above to the terminal strip X0 and from below to the terminal strip X1.

Terminal strip	Terminal	Connections, power switch
X0	L1	L1
	L2	L2
	L3	L3
	N	N
X1	1L1	T1
	1L2	T2
	1L3	T3
	N1	N

Tab. 4.5

4.2.5 Emergency stop switch (mounting plate design)

- Connect switches for triggering the emergency stop function to the terminal strip X3.

Unlock emergency stop switch:

- Actuate “Acknowledge emergency stop” illuminated push-button.

Emergency stop control cabinet door



Note

In the control cabinet version:

- the emergency stop switch is already connected.

In the mounting plate design:

- the installer must connect the corresponding components.

Terminal strip	Terminal	Emergency stop switch (S1)
X3	302	Switch 1, pin 11
	330	Switch 1, pin 12
	303	Switch 2, pin 21
	331	Switch 2, pin 22

Tab. 4.6

Emergency stop extension

Connection options for an additional emergency stop switch.



Note

If not used:

- Bypass terminals (300 with 330 and 301 with 331).

Terminal strip	Terminal	Additional emergency stop switch
X3	300	Switch 1, pin 11
	330	Switch 1, pin 12
	301	Switch 2, pin 21
	331	Switch 2, pin 22

Tab. 4.7

External emergency stop contacts

Connection option for external potential-free contacts for triggering the emergency stop function (e.g. from other control areas of the same complete system).



Note

If not used

- Bypass terminals (304 with 307 and 305 with 337).
- Prevent an automatic restart through a higher-order safety circuit.

Terminal strip	Terminal	Description
X3	304 + 307	External emergency stop, channel 1
	305 + 337	External emergency stop, channel 2

Tab. 4.8

4.2.6 External emergency stop circuits

Connections for signaling an emergency stop to other control areas of the complete system:

- Two potential-free relay contacts are available.
- If an emergency stop is triggered, these relay contacts are opened.



Note

The maximum current on contact is 6 A.

Terminal strip	Terminal	Description
X4	409 + 439	External emergency stop, channel 1 ¹⁾
	410 + 440	External emergency stop, channel 2 ²⁾

1) Protected through fuse F12

2) Protected through fuse F13

Tab. 4.9

4.2.7 Protective door switch

Connections for the contact switches of the safety doors.

The protective door signal can also be generated from another control circuit of the complete system.



Note

If not used:

- Bypass terminals (332 with 308 and 333 with 338).
- Prevent an automatic restart through a higher-order safety circuit.

Terminal strip	Terminal	Description
X3	332 + 308	Protective door switch, channel 1
	333 + 338	Protective door switch, channel 2

Tab. 4.10

4.2.8 Control and signal elements

**Note**

Control cabinet version:

- The components are already connected.

Mounting plate design:

- The installer must connect the corresponding components.

Illuminated button “acknowledge emergency stop” (acknowledge emergency stop) (S20/P20)

Terminal strip	Terminal	Description
X3	306	Connection 13, (S20)
X6	600	Connection 14, (S20)
X2	207	0 V DC, (P20)
X6	601	+24 V DC, (P20)

Tab. 4.11

Indicator light “external emergency stop” (external emergency stop triggered) (P21)

Terminal strip	Terminal	Description
X2	210	0 V DC, (P21)
X6	602	+24 V DC, (P21)

Tab. 4.12

Indicator light “automatic control” (automatic operation active) (P4)

Terminal strip	Terminal	Description
X2	204	0 V DC, (P4)
X6	616	+24 V DC, (P4)

Tab. 4.13

Key switch “automatic/manual” (automatic/manual) local (S2)

Terminal strip	Terminal	Description
X3	337	Pin 11, (S2)
X6	615	Pin 12, (S2)
X3	307	Pin 13, (S2)
X6	612	Pin 14, (S2)

Tab. 4.14

Additional key switch “automatic/manual” external (S21)

Terminal strip	Terminal	Description
X3	340	Pin 11, (S21)
X6	613	Pin 12, (S21)
X3	310	Pin 13, (S21)
X6	610	Pin 14, (S21)

Tab. 4.15

Indicator light “manual control” (manual active) (P5)

Terminal strip	Terminal	Description
X2	206	0 V DC, (P5)
X6	617	+24 V DC, (P5)

Tab. 4.16

Key switch “brake release” (release brake) (S3)

Terminal strip	Terminal	Description
X3	308	Pin 13, (S3)
X6	618	Pin 14, (S3)

Tab. 4.17

4.2.9
Mode selector

By means of jumpers, selection can be made between local and external mode selector.

Terminal strip	Terminal	Terminal	Description
X6	611	612	Mode selection local: → Fig. 4.6 (delivery status)
	614	615	
	611	610	Mode selection external: → Fig. 4.7
	614	613	

Tab. 4.18

Mode selection local (delivery status)

With the local key switch (S2), you can switch between the manual override and automatic operation operating modes.

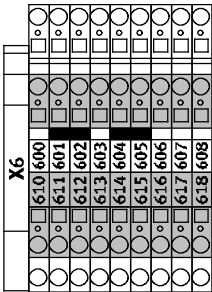


Fig. 4.6

Operating mode selection, external

With the external higher-order controller, you can shift locally between the manual override and automatic operation operating modes.

For external shifting:

- Make two potential-free relay contacts available. → Tab. 4.19

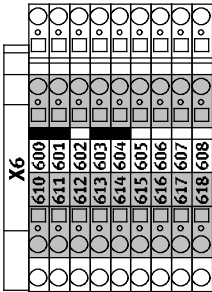


Fig. 4.7

Terminal strip	Terminal	Description
X3	310	Manual override
X6	610	
X3	340	Automatic operation
X6	613	

Tab. 4.19

4.2.10 Kinematic drives

**Note**

In the control cabinet design, the motor and encoder cables are guided through the right one of the two cut-outs on the bottom of the control cabinet.

- Connect the axis drives corresponding to the accompanying motor controller description.

4.2.11 Connect limit switches

Terminal strip	Terminal	Description	Limit switch	Axis	
X4	411	+24 V DC	1	1	
	441	0 V DC			
	416	Signal output			
	412	+24 V DC	2		
	442	0 V DC			
	417	Signal output			
	413	+24 V DC	1	2	
	443	0 V DC			
	418	Signal output			
	414	+24 V DC	2		
	444	0 V DC			
	419	Signal output			
	411	+24 V DC	1	3	
	441	0 V DC			
	446	Signal output			
	412	+24 V DC	2		Only with characteristic B2, B3, B4, B5, B7, B8
	442	0 V DC			
	447	Signal output			
	413	+24 V DC	1	4	
	443	0 V DC			
	448	Signal output			
	414	+24 V DC	2		Only with characteristic B3, B5, B8
	444	0 V DC			
	449	Signal output			

Tab. 4.20

4.2.12 Rod loss detection (only for parallel kinematic system EXPT)

- Connect pressure switch SDE5 for rod loss detection as described subsequently.

Terminal strip	Terminal	Description
X2	208	Power supply 0 V DC
	228	Power supply +24 V DC
	231	Signal from the pressure switch for rod loss detection

Tab. 4.21

- Set and adjust of the rod loss detection (→ commissioning description).

4.2.13 Axis of rotation reference sensor

- Connect the optional axis of rotation reference sensor as described subsequently.

Terminal strip	Terminal	Description
X4	455	Reference sensor signal (at DIN9 motor controller of the last axis)
X2	205	Power supply 0 V DC
	225	Power supply +24 V DC

Tab. 4.22

4.2.14 Camera system

Terminal strip	Terminal	Description
X4	415	Power supply 0 V DC
	445	Power supply +24 V DC
	406	Freely usable
	407	Freely usable
	408	Freely usable
	436	Freely usable
	437	Freely usable

Tab. 4.23

4.2.15 Lighting

- Connect the power supply of an illumination device (230 V AC), e.g. for the camera system, as described below.

Terminal strip	Terminal	Description
X1	101	230 V AC ¹⁾
	N3	0 V AC

1) Protected through fuse F11

Tab. 4.24

4.2.16 Freely usable outputs

The unused outputs of the I/O module CECX-D-8E8A-NP-2 at the CMXR controller can be used for their own extensions. The following connections are available.

Outputs

Terminal strip	Terminal	CECX	Description
X4	401	DOX+1	Output
	431		0 V DC
	402	DOX+4	Output
	432		0 V DC
	403	DOX+5	Output
	433		0 V DC
	404	DOX+6	Output
	434		0 V DC
	405	DOX+7	Output
	435		0 V DC

Tab. 4.25



For detailed information and technical data:

➔ accompanying documentation on the I/O module CECX-D-8E8A-NP-2.

4.2.17 Additional peripheral modules for the multi-axis controller

There is the possibility to install additional peripheral modules. These can be connected to the internal power supply.

Terminal strip	Terminal	Description
X2	201	0 V DC
	221	+24 V DC

Tab. 4.26

For available modules → sales documentation of the multi-axis controller.
Installation instructions accompany the modules.



Note

Additional modules:

- not included in delivery.
- include in the respective machine documentation



If the additional power requirement exceeds the value of 1.5 A:

- Supply external modules externally with 24 V.



Warning

Power supply unit defective. Supply voltage pushes through on the secondary page.
Injury (death) due to electric voltage.

- Use power supply unit with secure electrical disconnection of the operating voltage in accordance with EN 60204-1.
- Observe the requirements for PELV power circuits in accordance with IEC/DIN EN 60204-1.

5 Commissioning



Note

Commissioning should only be carried out by specially trained personnel. The following knowledge is required:

- knowledge of the Festo Configuration Tool (FCT)
- knowledge of robot technology
- Codesys knowledge (only with characteristic C2)
- knowledge of the handling of the Festo components CMMP and CMXR
- knowledge of handling and operation of the kinematics to be operated

Commissioning is described in separate documents.

For support:

- Contact your regional Festo contact person.

For additional information (→ www.festo.com).



Warning

Uncontrolled movement by switching on the power supply or incorrect actuation of the enabling button on the operator unit CDSA or the enabling button CACS-Z-....

Injury due to electric shock, impact, squeezing.

- Before commissioning, take corresponding safeguarding measures, in order to fulfil fundamental safety and health protection requirements.
- Perform commissioning only with knowledge of the related documents.

5.1 Checks before commissioning

Check	Possible malfunction	Remedy
Circuit breakers	triggered	close
Ethernet cable	unplugged	plug in
CMXR memory card	not completely plugged in	plug in completely
Component	damaged	replace ¹⁾ 2)

1) → www.festo.com/spareparts

2) → 7 Module replacement and repair

Tab. 5.1

6 Operation and diagnostics

6.1 Operation



Note

The instructions for operation must be created by the system manufacturer. The operator must be instructed in handling the system using the description and must have access to it at all times.

6.2 Maintenance and care

6.2.1 Control cabinet fan



Caution

Fire risk from overheating.

Filter mats of the control cabinet fan and the outlet filter:

- Check regularly for contamination (daily in dusty environments).
- Replace if necessary.



Procurement of filter mats → Rüksamen & Herr company.
Type AM 435P (216 x 216 mm, filter class G3)

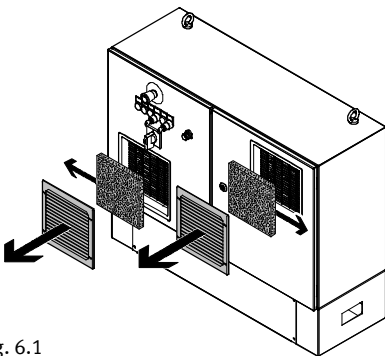


Fig. 6.1

1. Pull the covers of the filter housing off to the front.
2. Replace the dirty filter mats and dispose of them in accordance with the instructions (→ 7.3 Disposal).

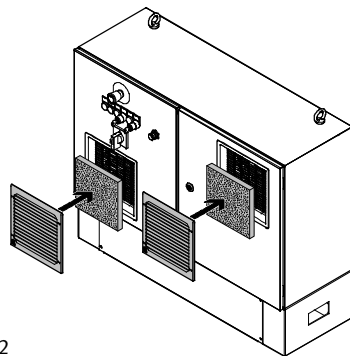


Fig. 6.2

3. Remove the packaging of the new filter mats.
4. Put new filter mats in place
5. Install covers.

7 Module replacement and repair



Caution

Squeezing of body parts and damage to the system.

Unintended switch-on can trigger unexpected movements.

During modification and servicing work:

- Shut down the system safely and secure it from being switched on again unintentionally.

Detached parts could fall or execute unexpected movements.

- Secure the parts against accidental movement or bring them into a safe end position.

7.1 Module replacement



Note

Replacement work may only be performed by professional personnel with the corresponding qualifications and knowledge in handling Festo components.



Note

Replacement of control components (robotics control and/or motor controller) results in loss of parameterisation and thus operating status.

- After replacement of these components, they must be newly parameterised.

7.2 Repair

The control system does not include any repairable components.

- Replace defective components (→ www.festo.com/spareparts).

7.3 Disposal

- Observe notes on dismantling parts (→ 7.1 Module replacement).



The product is RoHS-compliant.

Modules and packaging material:

- Observe regulations for environmentally friendly disposal.

A Technical appendix

A.1 Technical data



Note

For the individual components, the technical data specified in the corresponding accompanying documentation apply.

A.1.1 Safety engineering

Safety reference data CMCA-...-B...-CC-/-CS-1)		
Safety function	SS1	Safe stop 1 in accordance with EN 61800-5-2
Category	4	Classification in accordance with EN ISO 13849-1
Performance level	PL e	in accordance with EN ISO 13849-1
PFH _d value	2.34*10 ⁻⁸ h ⁻¹	

1) If an external EMERGENCY-STOP button is integrated, its safety-engineering characteristic values must be observed.

Tab. A.1

Safety reference data CMCA-...-B...-C-1)2)		
Safety function	SS1	Safe stop 1 in accordance with EN 61800-5-2
Category	4	Classification in accordance with EN ISO 13849-1
Performance level	PL e	in accordance with EN ISO 13849-1
PFH _d value	2.88*10 ⁻⁸ h ⁻¹	

1) If an external EMERGENCY-STOP button is integrated, its safety-engineering characteristic values must be observed.

2) The complete declaration of value must take into account the characteristic values for the EMERGENCY-STOP button.

Tab. A.2

A.1.2 General

Mechanical		CMCA-...-B...-C-	CMCA-...-B...-CC-	CMCA-...-B...-CS-
Width	[mm]	962	1000	1000
Height	[mm]	548	600	800
Depth	[mm]	275 ... 310 ¹⁾	350	350
Maximum weight ¹⁾	[kg]	43	81	91
Note on materials	Includes paint-wetting impairment substances (PWIS) ²⁾			
	RoHS-compliant,			

1) Dependent on the version

2) Paint-wetting impairment substances

Tab. A.3

Approval certificates	CMCA-...-B...-C-	CMCA-...-B...-CC-/-CS-
CE marking (see declaration of conformity) (→ www.festo.com/sp)	–	– EU EMC directive ¹⁾ – EU low voltage directive

1) The device is intended for use in an industrial environment.

Measures for interference suppression may need to be implemented in residential areas.

Tab. A.4

A.1.3 Electrical data

Power supply		
Mains voltage	[V AC]	230/400 / 3-phase
Mains frequency	[Hz]	50 ... 60
Fuse protection on mains side	[A]	max. 20 (slow-blow)

Tab. A.5

A.1.4 Operating and environmental conditions

	CMCA-...-B...-C-	CMCA-...-B...-CC-/-CS-
Ambient temperature	[°C]	+5 ... +40 (outside the housing)
Storage temperature	[°C]	-20 ... +60
Relative air humidity	[%]	10 ... 95 (non-condensing)
Permissible setup altitude above sea level	[m]	≤ 1000 1000 ... 2000 with output reduction of 10 %/1000 m
Cooling	About the ambient atmosphere. If installed in a control cabinet, ventilation must be planned.	About the ambient atmosphere and control cabinet fan.
Degree of protection	IP20	IP54
Relative air humidity	[%]	10 ... 95 (non-condensing)
Degree of contamination in accordance with EN 61800-5-1	2 ¹⁾	2

1) The integrated safety-engineering equipment requires compliance with degree of contamination 2 and thus a protected fitting space. This must be ensured through corresponding measures, e.g. through installation in an appropriate control cabinet.

Tab. A.6

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