Installation and Operating instruction

C9900-M900 and C9900-M998

IP65-EtherCAT Push-button extension

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BECKHOFF

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1 Foreword

1.1 Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning the components.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.
We reserve the right to revise and change the documentation at any time and without prior announcement.
No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents:
EP1590927, EP1789857, DE102004044764, DE102007017835
with corresponding applications or registrations in various other countries.

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1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

⚠ DANGER

Serious risk of injury!

Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.

⚠ WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

⚠ CAUTION

Personal injuries!

Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTE

Damage to the environment or devices

Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.

Tip or pointer

This symbol indicates information that contributes to better understanding.

2 Transport and unpacking

2.1 Transport

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. During transport the device must therefore be protected from mechanical stress. Therefore, please use the original packaging.

NOTE	
	**Risk of damage to the device** If the device is transported in cold weather or is exposed to extreme variations in temperature, make sure that moisture (condensation) does not form on or inside the device.

2.2 Unpacking

Proceed as follows to unpack the unit:

1. Remove packaging.
2. Do not discard the original packaging. Keep it for future relocation.
3. Check the delivery for completeness by comparing it with your order.
4. Please keep the associated paperwork. It contains important information for handling the unit.
5. Check the contents for visible shipping damage.

If you notice any shipping damage or inconsistencies between the contents and your order, you should notify Beckhoff Service.

3 Product description

3.1 Product overview

The C9900-Mxxx IP65 EtherCAT button modules are decentralized button input modules designed for individual installation on the machine.

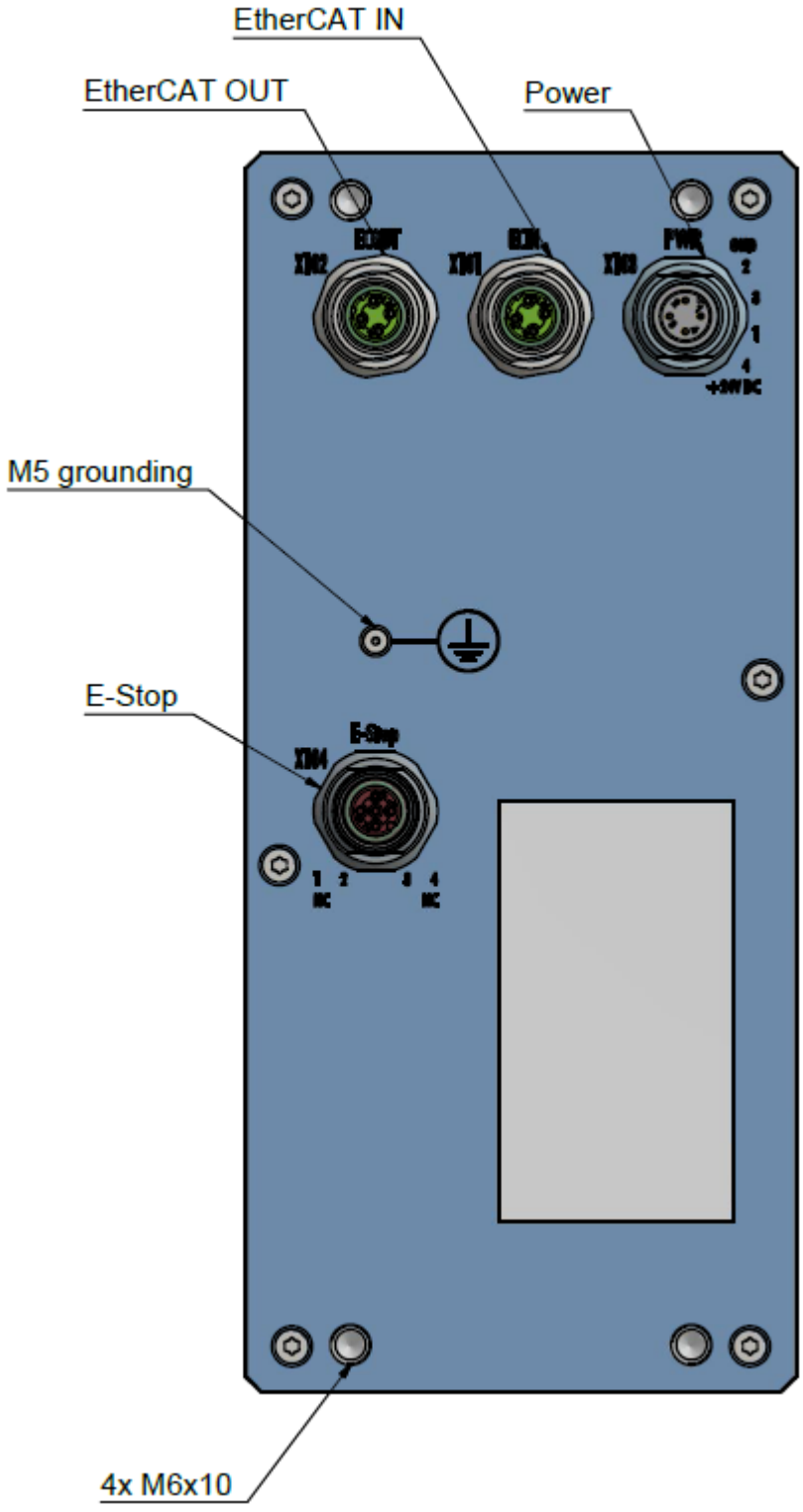
The modules, which are implemented in IP65, are characterized by the fact that actions or status displays are visible directly on the module. Each light ring (C9900-M900) of the keys can thus be activated in the colors red, green, blue and white, as a result of which the operator can immediately read off feedback messages that are indicated, for example, by a change of color or by flashing.

The short-stroke keys of the **C9900-M900** are located behind an embossed front laminate and can be labeled in the factory. Mounting the push-in strips - C9900-M900 [▶ 19]

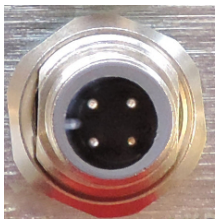
The illuminated push-buttons on the **C9900-M998** module are equipped with exchangeable bezels and can thus easily be labeled with labels. Mounting labels C9900-M998 [▶ 19].

On the rear side all connections are implemented as easily accessible M12 screw connections and can be connected to other EtherCAT devices at distances of up to 100 m using pre-assembled cables. Each module has four M6 threaded holes in the rear panel for mounting. A mounting plate C9900-M340 is optionally available. Options [▶ 13]

3.2 Connections



3.2.1 Power supply



Power is supplied to the button module via the 4-pin M12 socket. The protection class of the round connector is equivalent to the IP67 standard.

Pin	Signal	Pin	Signal
1	+24 V DC	3	GND
2	GND	4	24V DC

3.2.2 EtherCAT IN/OUT

The EtherCAT connection is established via the 4-pin M12 socket. The protection class of the round connector is equivalent to the IP67 standard.

Pin	Color	Pin	Color
1	Yellow	3	orange
2	white	4	Blue

3.2.3 Emergency stop connection

The emergency stop in the push-button extension is connected via the 5-pin connector.

Pin assignment (emergency stop)	Description
1	NC 1
2	NC 1
3	NC 2
4	NC 2

3.3 Connection cable

3.3.1 Power cable with 90° 4-pin round connector

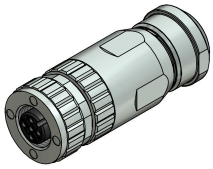
Accessories	Description
C9900-K741	Power cable for Control Panel, drag-chain suitable, with 90° 4-pin round connector, 10 m, consisting of: - Power cable 2 x 0.75 mm² conforming to UL, cores color-coded - Side A: Round connector 4-pin socket, angled 90° - Side B: not used
C9900-K748	Power cable for Control Panel, drag-chain suitable, with 90° 4-pin round connector, 20 m, consisting of: - Power cable 2 x 0.75 mm² conforming to UL, cores color-coded - Side A: Round connector 4-pin socket, angled 90° - Side B: not used

3.3.2 Power cable with 4-pin round connector

Accessories	Description
C9900-K742	Power cable for Control Panel, drag-chain suitable, with 4-pin round connector, 5 m, consisting of: - Power cable 2 x 0.75 mm² conforming to UL, cores color-coded - Side A: Round 4-pin socket - Side B: not used
C9900-K743	Power cable for Control Panel, drag-chain suitable, with 4-pin round connector, 10 m, consisting of: - Power cable 2 x 0.75 mm² conforming to UL, cores color-coded - Side A: Round 4-pin socket - Side B: not used
C9900-K744	Power cable for Control Panel, drag-chain suitable, with 4-pin round connector, 20 m, consisting of: - Power cable 2 x 0.75 mm² conforming to UL, cores color-coded - Side A: Round 4-pin socket - Side B: not used

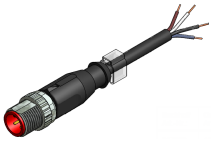
3.3.3 Power supply plug

Accessories	Description
C9900-P916	Power supply plug for Industrial PC, round connector IP65 with strain relief for the external supply cable



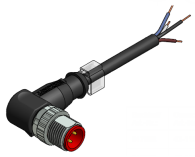
3.3.4 Sensor cable (for emergency stop)

Accessories	Description
ZK2000-6100-0020	Sensor cable, M12 plug, straight, pin, 4-pin, A-coded open end 2 m
ZK2000-6100-0050	Sensor cable, M12 plug, straight, pin, 4-pin, A-coded open end 5 m
ZK2000-6100-0100	Sensor cable, M12 plug, straight, pin, 4-pin, A-coded open end 10 m
ZK2000-6100-0150	Sensor cable, M12 plug, straight, pin, 4-pin, A-coded open end 15 m



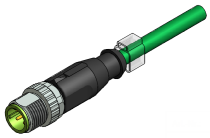
3.3.5 Sensor cable 90° (for emergency stop)

Accessories	Description
ZK2000-6300-0020	Sensor cable, M12, angled 90°, pin, 4-pin, A-coded, open end 2 m
ZK2000-6300-0050	Sensor cable, M12, angled 90°, pin, 4-pin, A-coded, open end 5 m
ZK2000-6300-0100	Sensor cable, M12, angled 90°, pin, 4-pin, A-coded, open end 10 m



3.3.6 M12 EtherCAT cable for (highly) flexible applications

Accessories	Description
ZK1090-6xxx-xxxx	"See Beckhoff I/O price list"



3.4 Accessories

3.4.1 Torque wrench

Accessories	Description
ZB8800	Torque wrench for M8 cables
ZB8800-0001	M12 ratchet attachment
ZB8800-0002	M8 ratchet attachment

3.5 Options

Options	Description
C9900-M340 	Stainless steel mounting plate 90° for EtherCAT button module C9900-M900 or C9900-M998. Offers the option of mounting an EtherCAT button module C9900-M900 or C9900-M998 at an angle of 90°. Four 6.5 mm through holes with a spacing of 40 x 150 mm for mounting.

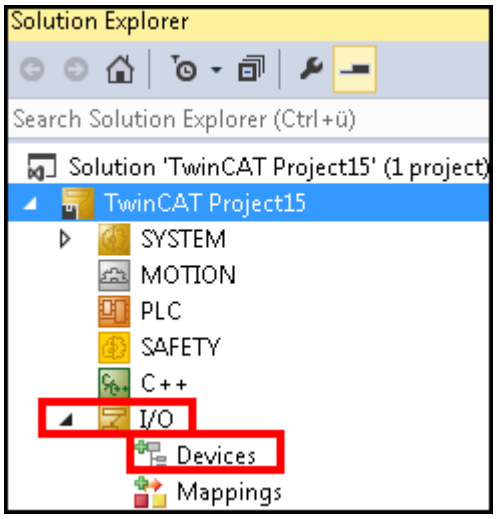
C9900-M998 options	Description
C9900-Z260	Transparent foil for individual labeling - type Rafi FS+, diameter: 22.3 mm - 1 sheet DIN A4, 54 pieces
C9900-Z255	button cap, blue, for individual fitting - type Rafi FS+, diameter: 22.3 mm - 5 pieces
C9900-Z256	button cap, yellow, for individual fitting - type Rafi FS+, diameter: 22.3 mm - 5 pieces
C9900-Z257	button cap, green, for individual fitting - type Rafi FS+, diameter: 22.3 mm - 5 pieces
C9900-Z258	button cap, red, for individual fitting - type Rafi FS+, diameter: 22.3 mm - 5 pieces
C9900-Z259	button cap, clear, for individual fitting - type Rafi FS+, diameter: 22.3 mm - 5 pieces

3.6 TwinCAT System Manager

All button outputs (red, green and blue) must be set to high (1) in order to activate the light ring in white. Before you can use the device it must first be created in the TwinCAT System Manager.

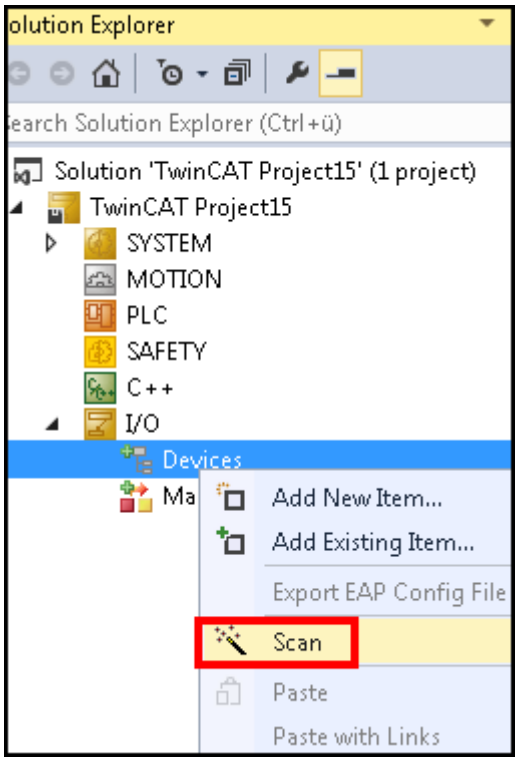
Proceed as follows:

1. Click at the top in the menu on **File > New > Project** and create a new **TwinCAT XAE Project.**



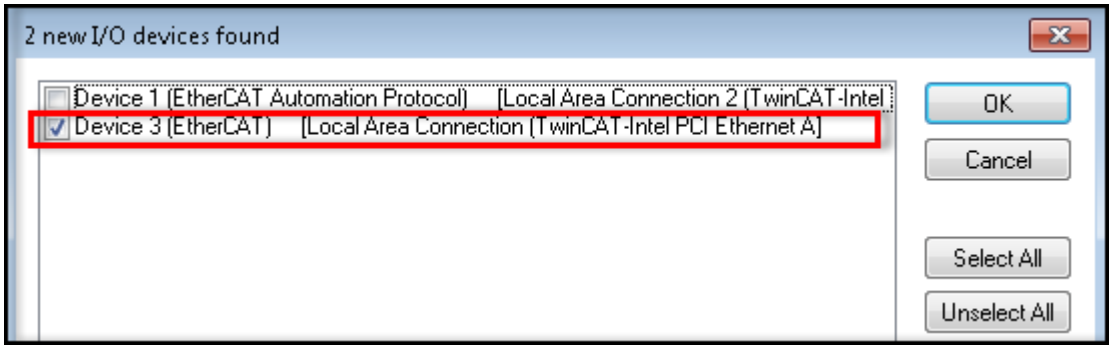
2. In the tree view on the left, click on **I/O** and then right-click on **Device**.

3. In the context menu click on **Scan**.

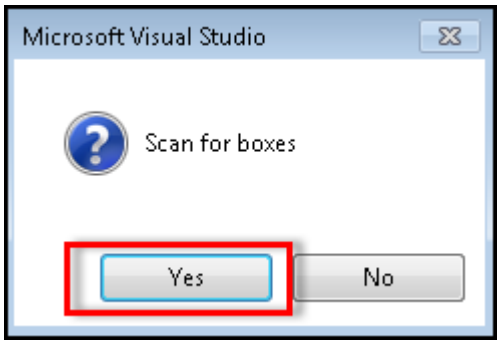


The **New I/O Devices** window appears. All available devices are displayed.

4. Select the devices you want to use and confirm the selection with **OK**.

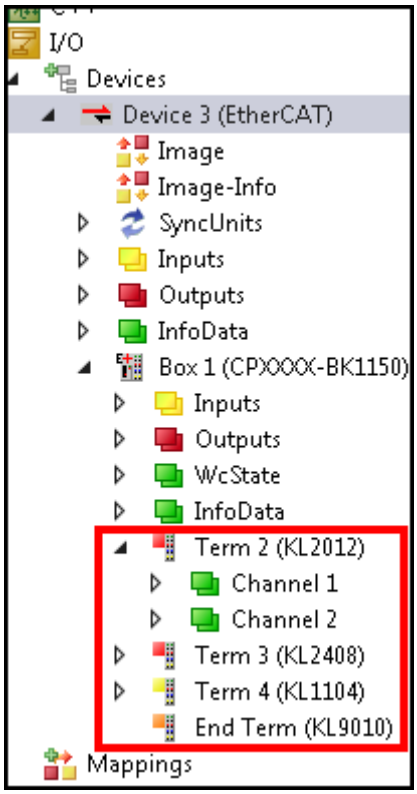
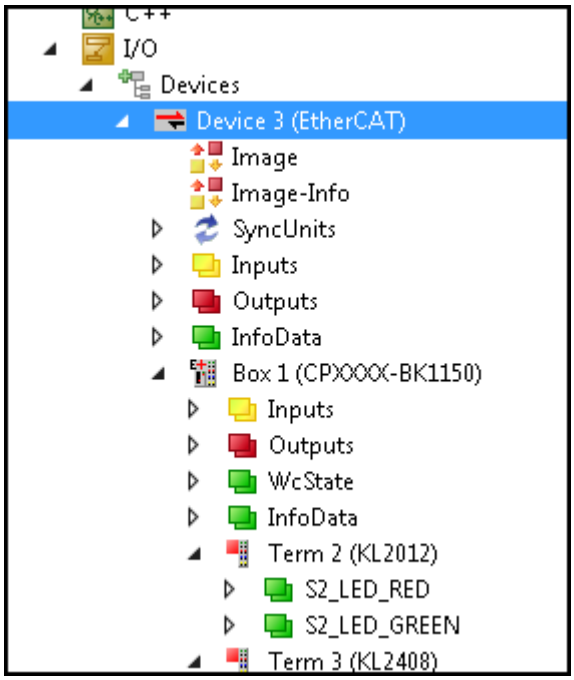


5. Confirm the request with **Yes**, in order to look for boxes.

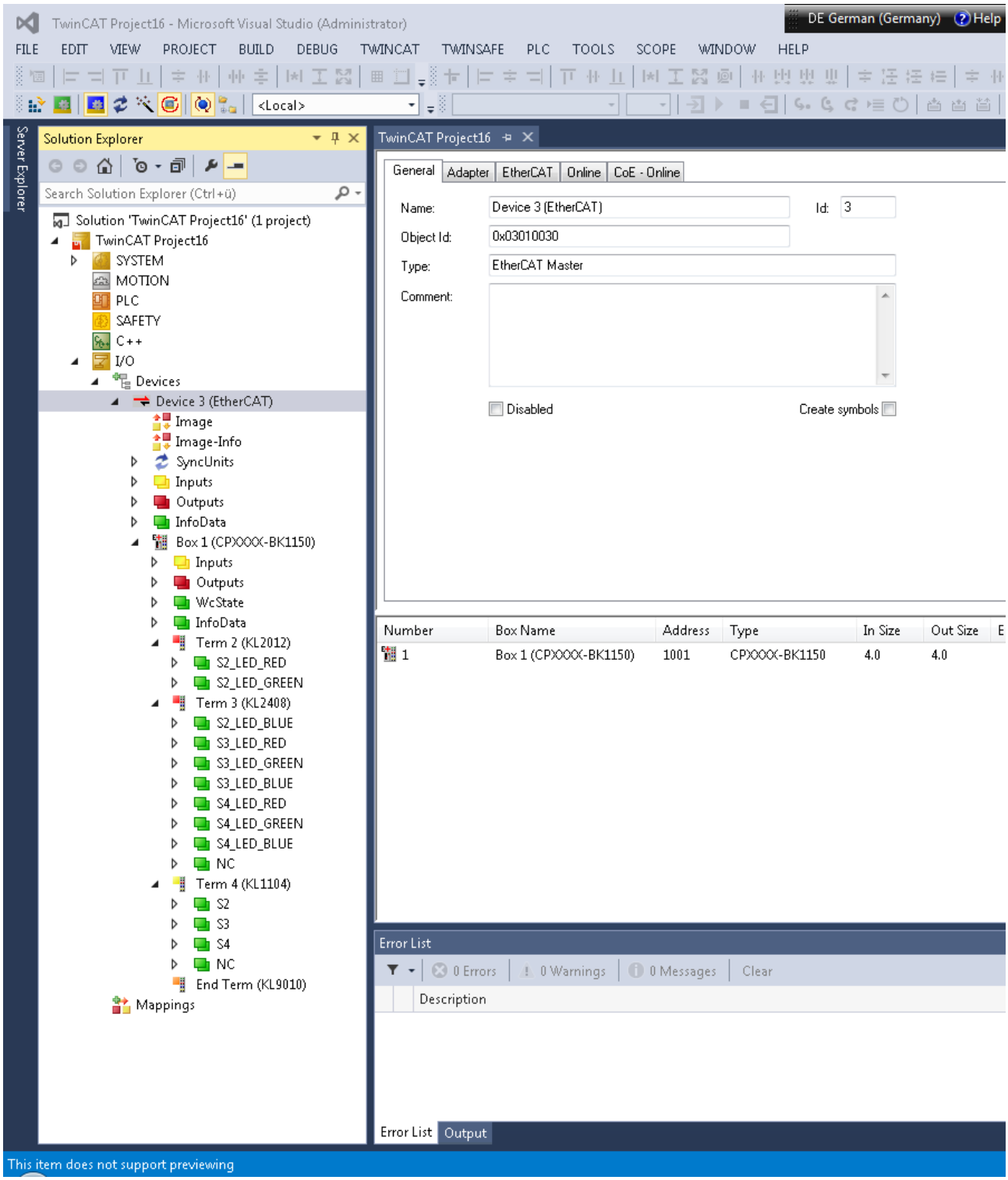


6. Confirm the request whether to enable **FreeRun** with **Yes**.

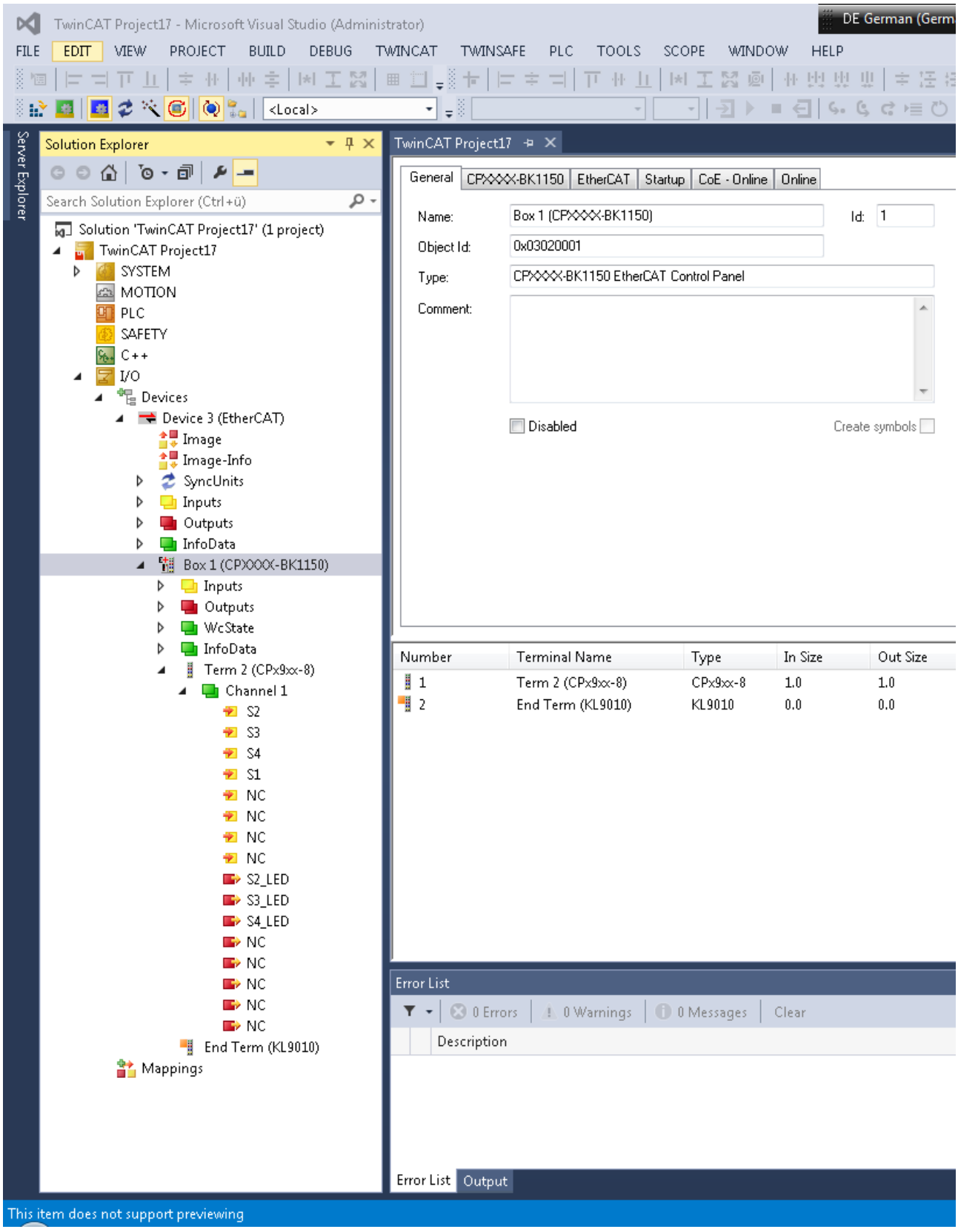
⇨ The device is inserted as a box in the tree view and displayed with the respective inputs and outputs (e.g. Term 2 to 5). Label the inputs and outputs (Term 2 to 5) as follows.

Term label after activating FreeRun	Term label after processing
	

3.6.1 C9900-M900



3.6.2 C9900-M998



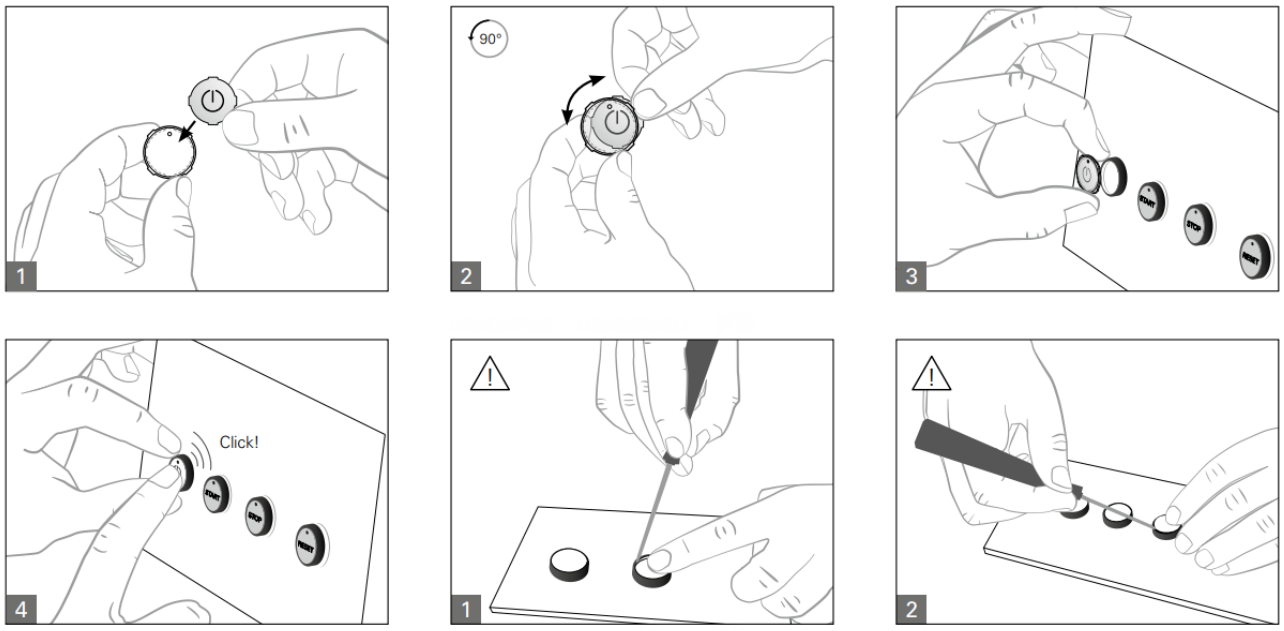
4 Mounting

4.1 Mounting the push-in strips - C9900-M900

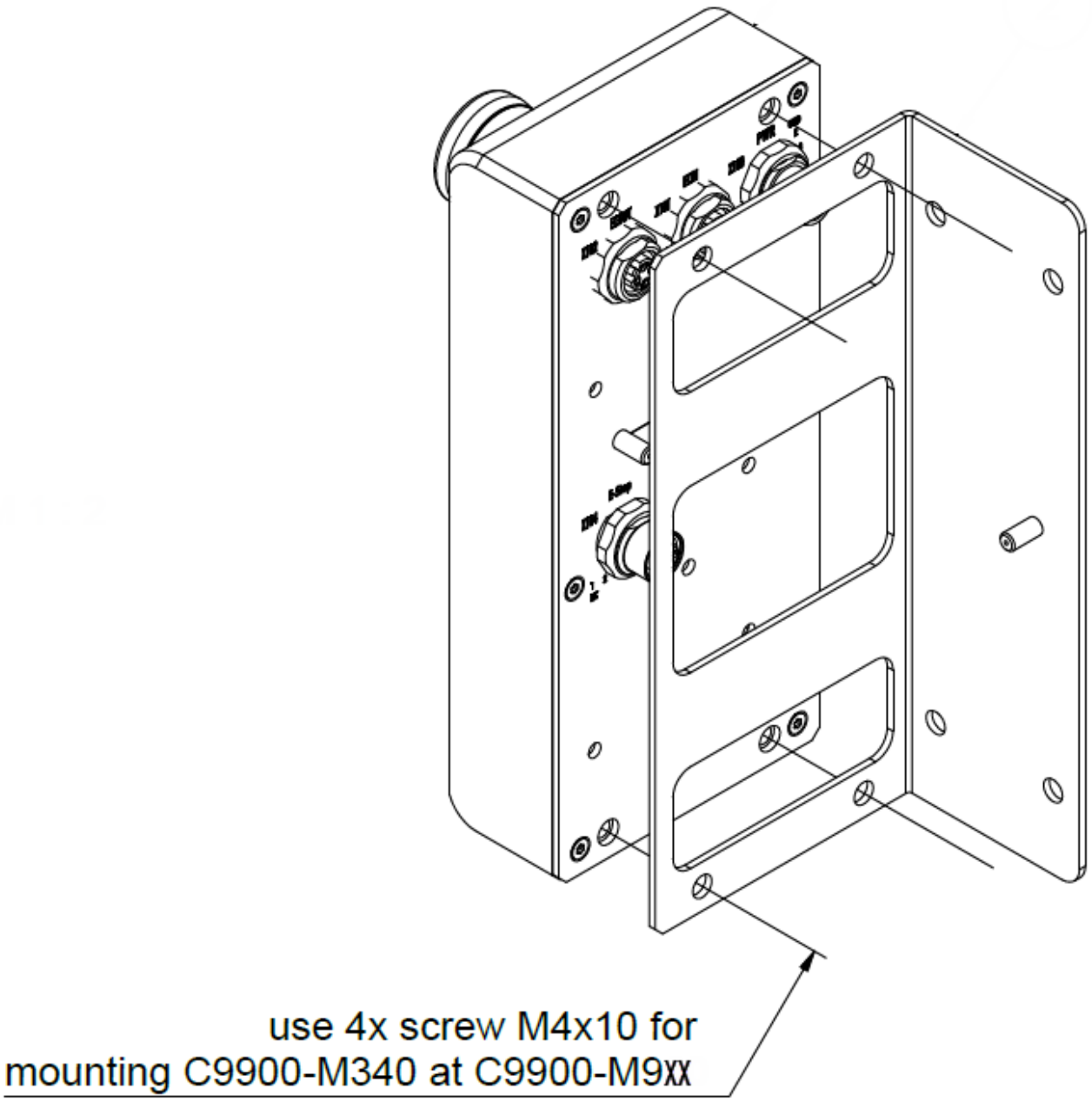
C9900-M900 push-in strips

Customer-specific labeling can be carried out in the factory on request. Subsequent mounting of the push-in strips is not possible.

4.2 Mounting labels C9900-M998

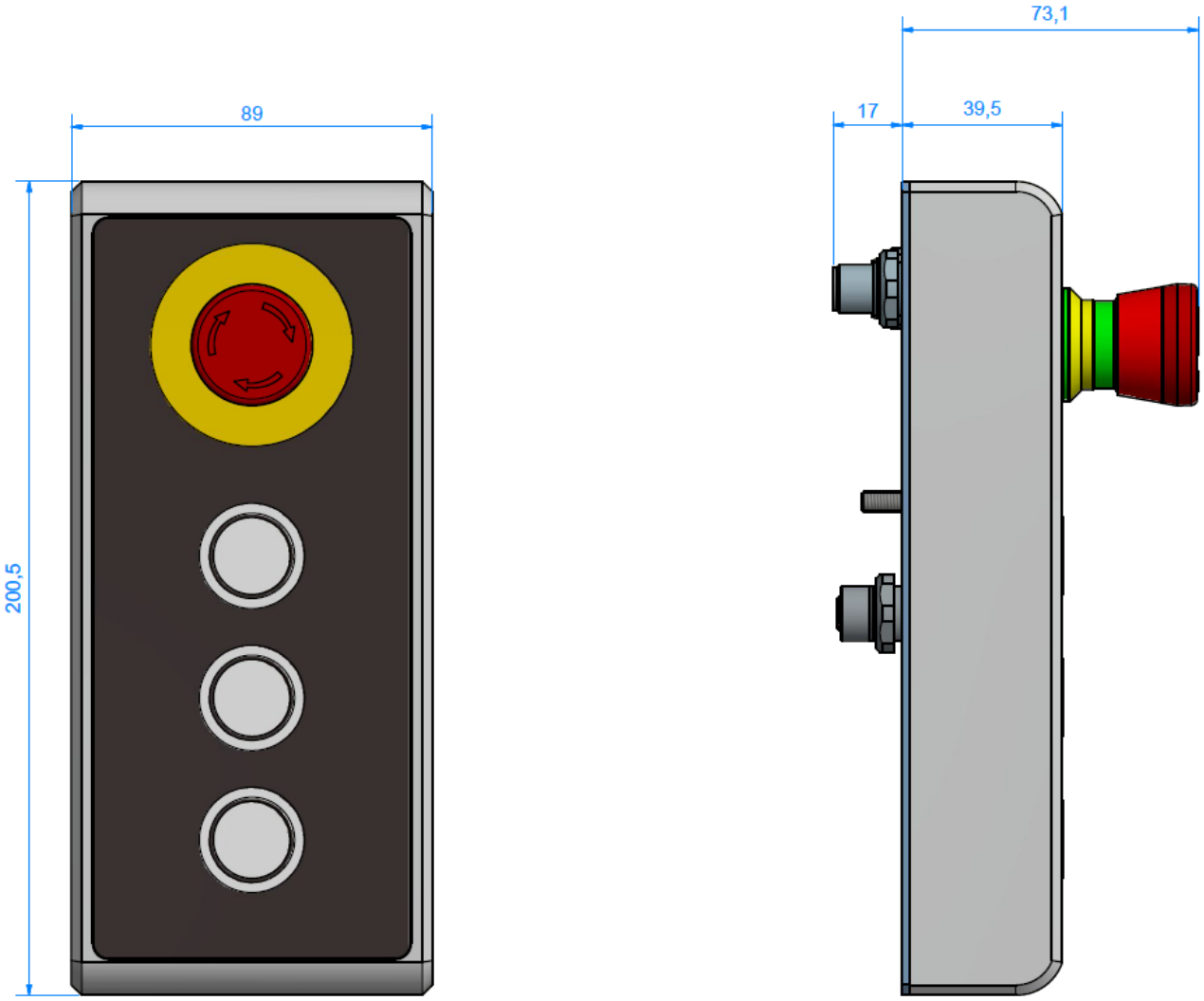


4.3 Assembling the mounting plate

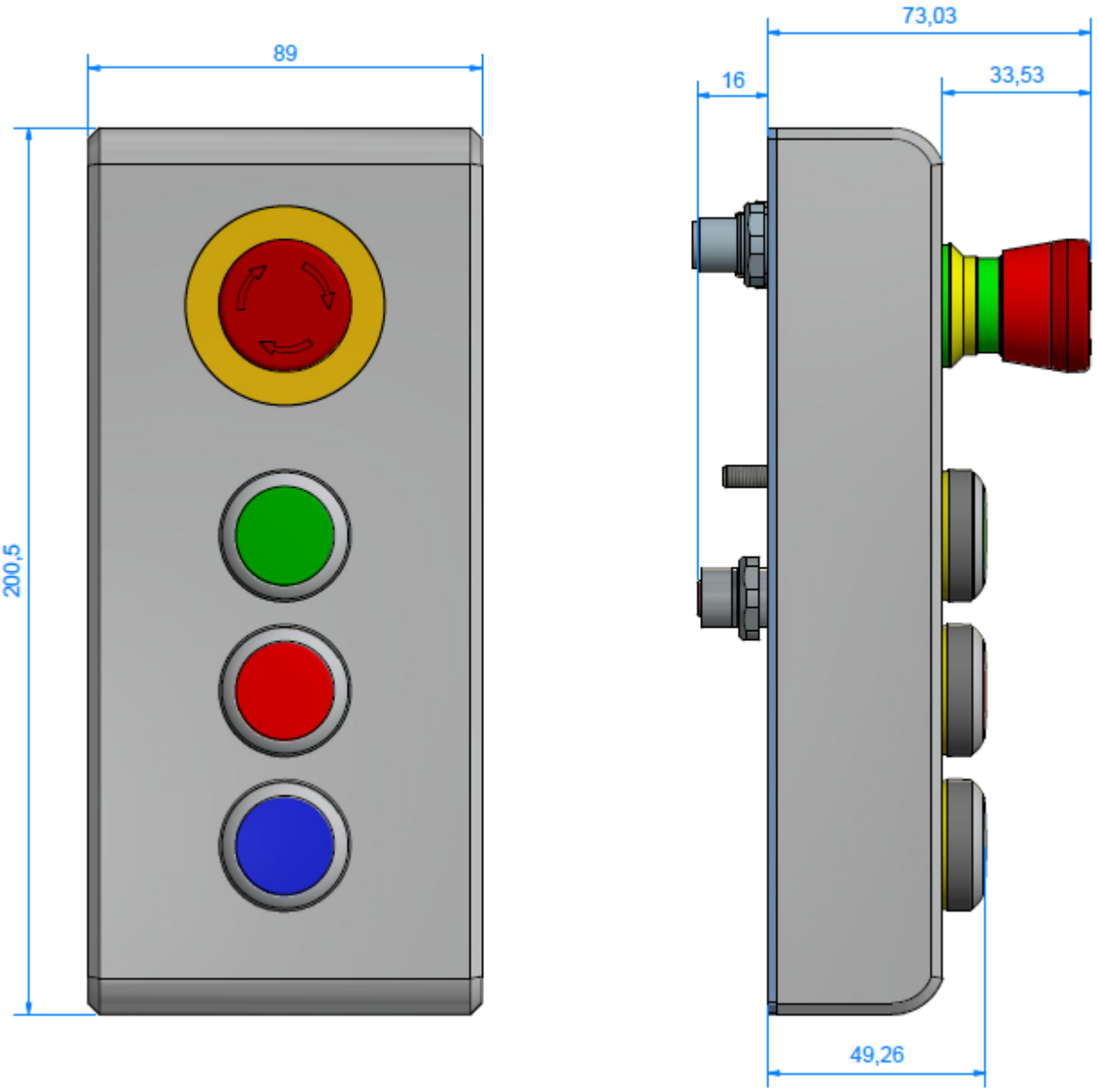


5 Dimensions

5.1 C9900-M900



5.2 C9900-M998



6 Technical data

⚠ DANGER

Risk of explosion!

The button modules must not be used in potentially explosive atmospheres!

Properties	Description		
Dimensions	See chapter Dimensions		
Ordering information	C9900-M900	- 1 x emergency stop (Rafix 22FS+) - 3 x short-stroke keys	
	C9900-M998	- 1 x emergency stop (Rafix 22FS+) - 3x illuminated push-buttons (Rafix 22FS+)	
Interfaces	**M12 socket, 4-pin, D-coded**		
	EtherCAT In		EtherCAT Out
	M12 socket, 4-pin, A-coded		
	Emergency stop (except C9900-M995)		
	M12 plug, 4-pin, A-coded		
	Power supply		
Max. cable length	100 m (100BASE-Tx) for EtherCAT In/ Out		
Data transfer rate	100MBit		
Data transfer medium	Industrial Ethernet cable, shielded, at least CAT.5		
C9900-M900 LED ring lighting of the keys	Red, green, blue, white		
C9900-M998 Colors of the Rafi illuminated push-buttons	Green, red, blue		
Emergency stop type	1.30.273.511/0030 Rafix 22FS+		
	The emergency stop is reset by rotating.		
Switching elements (emergency stop)	1.20.126.414/0000		1 x make contact / 2 x break contact
	Min. operating voltage AC / DC		5 V
	Max. operating voltage AC / DC		35 V
	Min. operating current AC / DC		1 mA
	Max. operating current AC / DC		100 mA
	Switching capacity max.		250 mW
Illuminated push-buttons	Rafi 22FS+		1 x make contact via EtherCAT
Short-stroke keys	Rafi Micon 5		1 x make contact via EtherCAT
Electrical properties	Power supply		24 V DC (-15% / +20%)
	Power consumption		Max. 7.2 W
	Voltage range		20.4- 28.8 VDC
	Current consumption		Max. 300 mA (at rated voltage)
Protection class	IP65		
Weight	C9900-M900		approx.1100 g
	C9900-M998		approx.1150 g
Operating temperature	Operation		0...50°C
	Storage		-20 °C to +60 °C
	Transport		-20 °C to +60 °C
Permissible relative air humidity	95%, no condensation		
Certification	CE		

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