

BECKHOFF New Automation Technology

Manual | EN

C9900-G05x

Compact push-button extension



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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.

The following instructions and explanations must be followed during installation and commissioning of the components. The qualified personnel must ensure that the application of the described products meets all safety requirements, including all applicable laws, specifications, regulations and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development. For that reason the documentation is not in every case checked for consistency with performance data, standards or other characteristics. In the event that it contains technical or editorial errors, we retain the right to make alterations at any time and without warning. 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. All illustrations shown are only examples. The configurations depicted may deviate from the standard.

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Delivery conditions

In addition, the general delivery conditions of the company Beckhoff Automation GmbH & Co. KG apply.

2 For your safety

The signal panel and its meanings are explained in the chapter on safety. They contain fundamental safety instructions that are essential for the avoidance of personal injuries and damage to property.

Exclusion of liability

Liability on the part of Beckhoff Automation GmbH & Co. KG is excluded in the following cases:

- Failure to comply with this documentation
- Improper use
- Use of untrained personnel
- Use of unauthorized spare parts

2.1 Description of safety symbols

The following safety symbols are used in these operating instructions. In order to avoid personal injuries and damage to property, read and follow the safety and warning notices.

Warning of personal injuries:

⚠ DANGER
Disregarding the safety notice will lead to death or serious injuries.

⚠ WARNING
Disregarding the safety notice may lead to death or serious injuries.

⚠ CAUTION
Disregarding the safety notice may lead to minor injuries.

Warning of damage to property:

NOTICE
Disregarding the notice may lead to damage to property.

2.2 Intended use

Control panels and panel PCs with a compact push button extension enable the user-specific arrangement of electromechanical illuminated push buttons directly on the operating unit. It enables precise adaptation of the control panel to the machine control requirements. In many cases a machine operator control panel is no longer required, since all functions are integrated in the control panel.

The specified limits for technical data must be adhered to.

The push button extension can be used within the documented operating conditions.

Improper use

Do not use the push button extension outside the documented operating conditions.

2.3 Fundamental safety instructions

The following safety instructions must be followed when handling the compact push-button extensions.

Application conditions

- Do not use the push-button extensions in extreme environmental conditions. Protect the components against dust, moisture and heat.
- Never use the push-button extensions in potentially explosive atmospheres.
- Never carry out any work on the push-button extensions when they are live. Always switch off the supply voltage for the device before mounting it, replacing device components or rectifying malfunctions.
- Never connect the push-button extension during a thunderstorm. There is a risk of electric shock.
- Ensure that the device has a protective and functional earth connection.

Damage to property, loss of data and impairment of functions

- Only make the documented modifications to the hardware and software configurations. Unauthorized modifications of these configurations can limit the function or lead to damage to property and loss of data.
- Ensure that only technical personnel trained in control and automation engineering operate the push-button extensions. Use by unauthorized persons can lead to damage to property and loss of data.
- Protect the power supply cable with a fuse with a max. rating of 16 A. The functionality may be impaired if the fuse rating is too high.
- If it should catch fire, extinguish the push-button extension with powder or nitrogen.

2.4 Operator's obligation to exercise diligence

The operator must ensure that

- the products are used only for their intended purpose (see chapter 2.2 [Intended use \[► 6\]](#)).
- the products are only operated in sound condition and in working order.
- the products are operated only by suitably qualified and authorized personnel.
- the personnel is instructed regularly about relevant occupational safety and environmental protection aspects, and is familiar with the operating instructions and in particular the safety instructions contained herein.
- the operating instructions are in good condition and complete, and always available for reference at the location where the products are used.

2.5 Notes on information security

The products of Beckhoff Automation GmbH & Co. KG (Beckhoff), insofar as they can be accessed online, are equipped with security functions that support the secure operation of plants, systems, machines and networks. Despite the security functions, the creation, implementation and constant updating of a holistic security concept for the operation are necessary to protect the respective plant, system, machine and networks against cyber threats. The products sold by Beckhoff are only part of the overall security concept. The customer is responsible for preventing unauthorized access by third parties to its equipment, systems, machines and networks. The latter should be connected to the corporate network or the Internet only if appropriate protective measures have been set up.

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3 Product overview



Fig. 1: C9900-G05x Compact push button extension

With the C9900-G05x compact push button extensions, the central functions of a machine or plant such as emergency stop, start, stop and reset can be controlled with electromagnetic push buttons.

The push button extensions are fitted below the touch screen ex factory and are tailored to the CP39xx-00x0 multi-touch Control Panel and the multi-touch panel PCs CP37xx-1600-00x0 and CP32xx-1600-00x0. There is a choice of four different display sizes in 16:9 Format (see chapter 3.1 [C9900-G05x ordering options](#) [[▶ 10](#)]).

The control of the switching contacts and LEDs of the push button extensions differs between the various versions as follows:

- C9900-G050, C9900-G052, C9900-G054 and C9900-G056: for each push button, one switching contact and the LED are controlled via USB. The second switching contact and the 24 V supply voltage are supplied and controlled via a 19-pin round connector.
- C9900-G051, C9900-G053, C9900-G055 and C9900-G057: all switching contacts and LEDs are wired via the 19-pin round connector. The push buttons can be operated with a maximum supply voltage of 35 V and a maximum switching capacity of 250 mW.
- C9900-G05x: the built-in emergency stop is wired potential-free to the 19-pin round connector with two break contacts.

The C9900-G050 - C9900-G053 options for 15.6-inch and 18.5-inch displays are equipped with three push buttons (green, red and blue). The compact push button extensions C9900-G054 - C9900-G057 for 21.5-inch and 24-inch displays are delivered with four push buttons (green, red, blue and white). If other colors or additional labels are desired on the push buttons, they can be ordered for retrofitting (see chapter 3.9.2 [Push-button caps and inscription labels](#) [[▶ 25](#)]).

3.1 C9900-G05x ordering options

Table 1: USB/ directly-wired versions

Ordering option	Description
C9900-G050	<p>Compact push button extension for CP3216-1600, CP3716-1600 or CP3916 with horizontal 15.6-inch display</p> <p>Push button extension at the bottom, connection via USB (factory) and 19-pin round connector (customer)</p> <p>3 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop is wired potential-free to the 19-pin round connector with two break contacts. The red illuminated push button is wired potential-free to the 19-pin round connector with one break contact, while the green and blue illuminated push buttons are each wired to it with one make contact.</p> <p>In addition, all push buttons with a make contact are queried via USB.</p> <p>All LEDs of the illuminated push buttons are controlled only via USB.</p>
C9900-G052	<p>Compact push button extension for CP3218-1600, CP3718-1600 or CP3918 with horizontal 18.5-inch display</p> <p>Push button extension at the bottom, connection via USB (factory) and 19-pin round connector (customer)</p> <p>3 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop is wired potential-free to the 19-pin round connector with two break contacts. The red illuminated push button is wired potential-free to the 19-pin round connector with one break contact, while the green and blue illuminated push buttons are each wired to it with one make contact.</p> <p>In addition, all push buttons with a make contact are queried via USB.</p> <p>All LEDs of the illuminated push buttons are controlled only via USB</p>
C9900-G054	<p>Compact push button extension for CP3221-1600, CP3721-1600 or CP3921 with horizontal 21.5-inch display</p> <p>Push button extension at the bottom, connection via USB (factory) and 19-pin round connector (customer)</p> <p>4 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop is wired potential-free to the 19-pin round connector with two break contacts. The red illuminated push button is wired potential-free to the 19-pin round connector with one break contact, while the green, blue and white illuminated push buttons are each wired to it with one make contact.</p> <p>In addition, all push buttons with a make contact are queried via USB.</p> <p>All LEDs of the illuminated push buttons are controlled only via USB.</p>
C9900-G056	<p>Compact push button extension for CP3224-1600, CP3724-1600 or CP3924 with horizontal 24-inch display</p> <p>Push button extension at the bottom, connection via USB (factory) and 19-pin round connector (customer)</p> <p>4 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p>

	<p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop is wired potential-free to the 19-pin round connector with two break contacts. The red illuminated push button is wired potential-free to the 19-pin round connector with one break contact, while the green, blue and white illuminated push buttons are each wired to it with one make contact.</p> <p>In addition, all push buttons with a make contact are queried via USB.</p> <p>All LEDs of the illuminated push buttons are controlled only via USB.</p>
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The installation of mechanical extensions under the compact push button extension is not possible.

Table 2: Directly wired versions

Ordering option	Description
C9900-G051	<p>Compact push button extension for CP3216-1600, CP3716-1600 or CP3916 with horizontal 15.6-inch display</p> <p>Push button extension at the bottom, connection via 19-pin round connector (customer)</p> <p>3 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop and the red illuminated push button are each wired potential-free to the 19-pin round connector with two break contacts. The green illuminated push button is wired to the 19-pin round connector with two make contacts, while the blue illuminated push button is wired to it with one make contact.</p> <p>All indicator lamps are also wired to the 19-pin round connector.</p>
C9900-G053	<p>Compact push button extension for CP3218-1600, CP3718-1600 or CP3918 with horizontal 18.5-inch display</p> <p>Push button extension at the bottom, connection via 19-pin round connector (customer)</p> <p>3 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop and the red illuminated push button are each wired potential-free to the 19-pin round connector with two break contacts. The green illuminated push button is wired to the 19-pin round connector with two make contacts, while the blue illuminated push button is wired to it with one make contact.</p> <p>All indicator lamps are also wired to the 19-pin round connector.</p>
C9900-G055	<p>Compact push button extension for CP3221-1600, CP3721-1600 or CP3921 with horizontal 21.5-inch display</p> <p>Push button extension at the bottom, connection via 19-pin round connector (customer)</p> <p>4 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop and the red illuminated push button are each wired potential-free to the 19-pin round connector with two break contacts. The green illuminated push button is wired to the 19-pin round connector with two make contacts, while the blue and white illuminated push buttons are each wired to it with one make contact.</p> <p>All indicator lamps are also wired to the 19-pin round connector.</p>

C9900-G057	<p>Compact push button extension for CP3224-1600, CP3724-1600 or CP3924 with horizontal 24-inch display Push button extension at the bottom, connection via 19-pin round connector (customer)</p> <p>4 illuminated push buttons, type RAFI RAFIX 22FS+, round, 30 mm</p> <p>1 emergency stop, type RAFI RAFIX 22FS+</p> <p>Labels for the push button caps for individual labeling of each push button can be ordered as accessories</p> <p>The emergency stop and the red illuminated push button are each wired potential-free to the 19-pin round connector with two break contacts. The green illuminated push button is wired to the 19-pin round connector with two make contacts, while the blue and white illuminated push buttons are each wired to it with one make contact.</p> <p>All indicator lamps are also wired to the 19-pin round connector.</p>
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The installation of mechanical extensions under the compact push button extension is not possible.

3.2 Interface description

The following interface is provided for controlling the push-button extension:

- Signal and power supply (XS01)

Signal and power supply (XS01)

The C9900-G05x push-button extensions are supplied with a nominal input voltage of 24 V, which may actually lie between 20.4 and 28.8 V. The power supply is connected to pin 19 of the 19-pin round connector (XS01). GND is on pin 6.

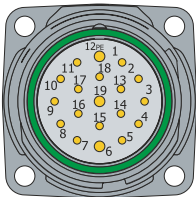


Fig. 2: C9900-G05x Signal and Power Supply

Table 3: C9900-G050 and C9900-G052 pin assignment

Pin	Signal	Pin	Signal
1	Emergency stop S1 input break contact 1	11	S4 output make contact
2	Emergency stop S1 output break contact 1	12	PE
3	Emergency stop S1 input break contact 2	13	reserve
4	Emergency stop S1 output break contact 2	14	reserve
5	S2 input make contact	15	reserve
6	GND	16	reserve
7	S2 output make contact	17	reserve
8	S3 input break contact	18	reserve
9	S3 output break contact	19	+ 24 V
10	S4 input make contact		

Table 4: C9900-G054 and C9900-G056 pin assignment

Pin	Signal	Pin	Signal
1	Emergency stop S1 input break contact 1	11	S4 output make contact

Pin	Signal	Pin	Signal
2	Emergency stop S1 output break contact 1	12	PE
3	Emergency stop S1 input break contact 2	13	S5 input make contact
4	Emergency stop S1 output break contact 2	14	S5 output make contact
5	S2 input make contact	15	reserve
6	GND	16	reserve
7	S2 output make contact	17	reserve
8	S3 input break contact	18	reserve
9	S3 output break contact	19	+ 24 V
10	S4 input make contact		

Table 5: C9900-G051 and C9900-G053 pin assignment

Pin	Signal	Pin	Signal
1	Emergency stop S1 input break contact 1	11	S3 input break contact 2
2	Emergency stop S1 output break contact 1	12	PE
3	Emergency stop S1 input break contact 2	13	S3 output break contact 2
4	Emergency stop output break contact 2	14	S3 LED
5	S2 output make contact 1	15	S4 output make contact 1
6	GND	16	S4 LED
7	S2 output make contact 2	17	reserve
8	S2 LED	18	reserve
9	S3 input break contact 1	19	+ 24 V
10	S3 output break contact 1		

Table 6: C9900-G055 and C9900-G057 pin assignment

Pin	Signal	Pin	Signal
1	Emergency stop S1 input break contact 1	11	S3 input break contact 2
2	Emergency stop S1 output break contact 1	12	PE
3	Emergency stop S1 input break contact 2	13	S3 output break contact 2
4	Emergency stop output break contact 2	14	S3 LED
5	S2 output make contact 1	15	S4 output make contact 1
6	GND	16	S4 LED
7	S2 output make contact 2	17	S5 output make contact 1
8	S2 LED	18	S5 LED
9	S3 input break contact 1	19	+ 24 V
10	S3 output break contact 1		

3.3 Description of the boards

The boards used and their connectors are described and explained below. The C9900-G05x push button extensions are wired ex factory to a 19-pin round connector. Named plug designations (CONxxx) can be found in the individual circuit diagrams.

NOTICE

Switching voltage too high

An excessively high switching voltage can lead to damage to property.

- Supply the push buttons with a maximum of 35 V and a maximum switching capacity per push button of 250 mW.

Emergency stop board for C9900-G050, C9900-G052, C9900-G054 and C9900-G056

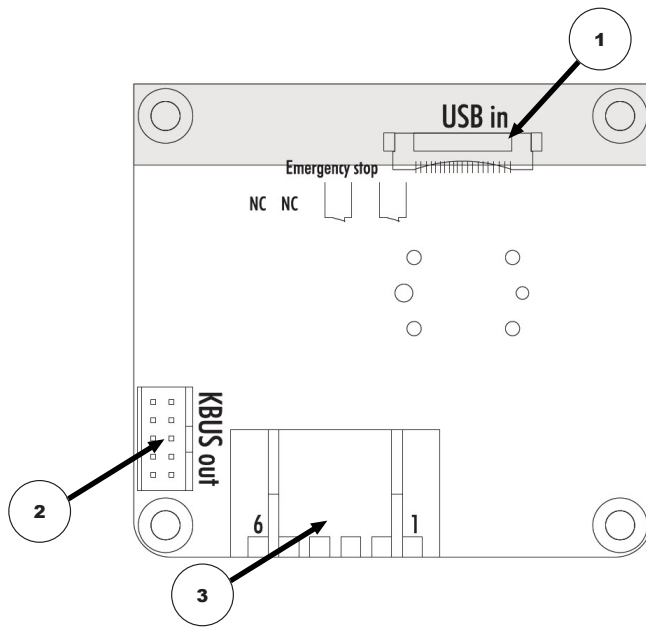


Fig. 3: A918 emergency stop board

The emergency stop board has a USB-to-KBUS coupler to control the inputs and outputs of the push buttons. The "USB IN" 1, CON500, is supplied from the control panel, the "KBUS OUT" 2, CON400 connects the other push button boards. There is also a normally open contact on the KBUS which operates on a pulse basis and does not establish a permanent contact.

The two normally closed contacts of the emergency stop are wired to the 19-pin round connector via connection strip 3, CON402. The assignment of the connection strip is listed in the table below.

Table 7: Connection strip assignment - A918 emergency stop board

Connection strip	Terminal point	Description
3	1	Input normally closed contact 1
	2	Output normally closed contact 1
	3	Input normally closed contact 2
	4	Output normally closed contact 2
	5	Not used
	6	Not used

3-button board for the C9900-G050 and C9900-G052 (red, green and blue push buttons)

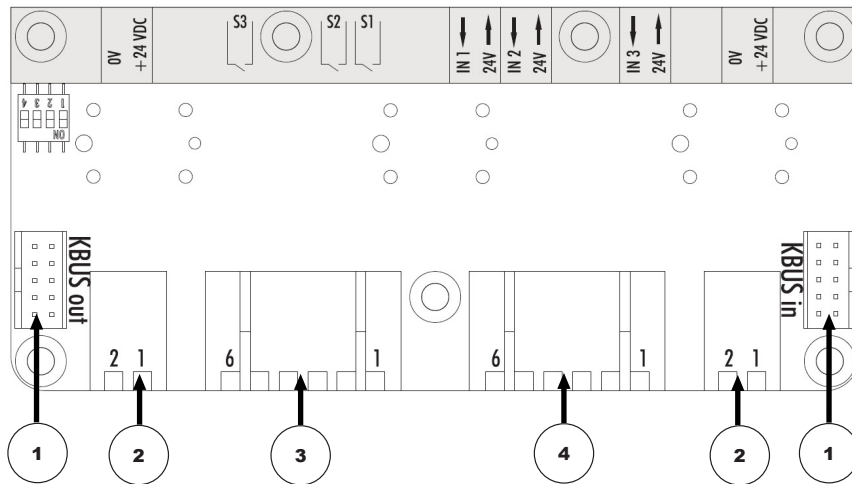


Fig. 4: A919 3-push button board

The 3-push button board has two K-bus interfaces 1, CON400 & CON401. "KBUS IN" connects the board to the USB to KBUS coupler and transmits one normally open contact and the LED for each button. A jumper must be set as a terminating resistor on "KBUS OUT". The external connection strips 2, CON600 & CON601, are used to supply power to the indicator lamps.

The second contact of each push button is wired to the 19-pin round connector via connection strip 3, CON603.

Three digital inputs are available on connection strip 4, CON602, which can be assigned ex factory.

Table 8: Assignment of connection strip - A919 3-push button board

Connection strip	Terminal point	Description
2	1	24 V DC
	2	0 V
3	1	Input normally open contact 1
	2	Output normally open contact 1
	3	Input normally open contact 2
	4	Output normally open contact 2
	5	Input normally open contact 3
	6	Output normally open contact 3
4	1	24 V output
	2	Digital input 1
	3	24 V output
	4	Digital input 2
	5	24 V output
	6	Digital input 3

4-push button board for the C9900-G054 and C9900-G056 (red, green, blue and white push buttons)

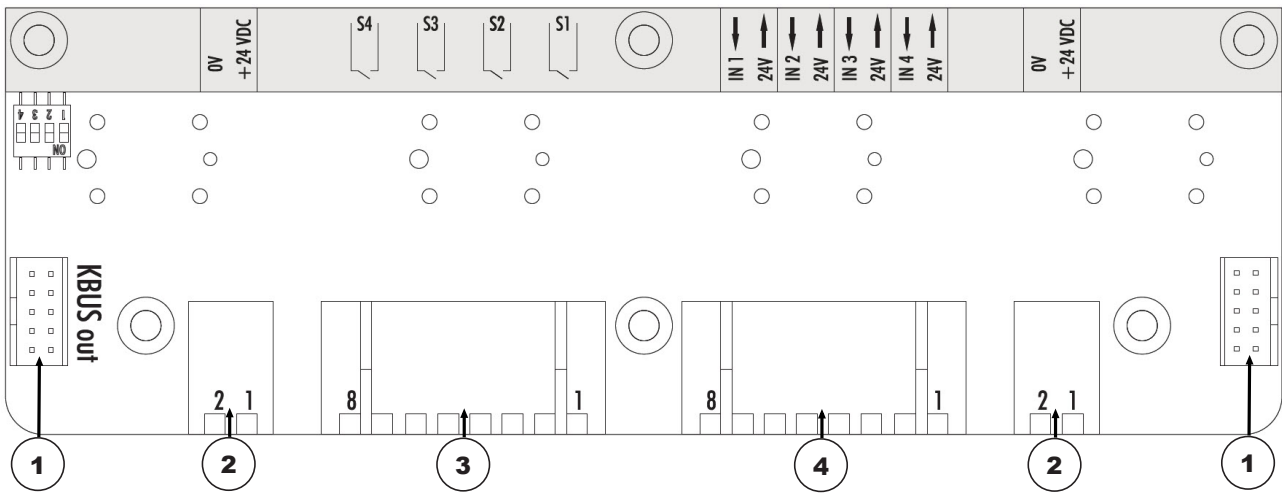


Fig. 5: A920 4-push button board

The 4-push button board has two K-bus interfaces 1, CON400 & CON401. "KBUS IN" connects the board to the USB to KBUS coupler and transmits one normally open contact and the LED for each button. A jumper must be set as a terminating resistor on "KBUS OUT". The external connection strips 2, CON600 & CON601, are used to supply power to the indicator lamps.

The second contact of each push button is wired to the 19-pin round connector via connection strip 3, CON603.

Four digital inputs are available on connection strip 4, CON602, which can be assigned ex factory.

Table 9: Assignment of connection strip - A920 4-push button board

Connection strip	Terminal point	Description
2	1	24 V DC
	2	0 V
3	1	Input normally open contact 1
	2	Output normally open contact 1
	3	Input normally open contact 2
	4	Output normally open contact 2
	5	Input normally open contact 3
	6	Output normally open contact 3
	7	Input normally open contact 4
	8	Output normally open contact 4
4	1	24 V output
	2	Digital input 1
	3	24 V output
	4	Digital input 2
	5	24 V output
	6	Digital input 3
	7	24 V output
	8	Digital input 4

Emergency stop board for C9900-G051, C9900-G053, C9900-G055 and C9900-G057

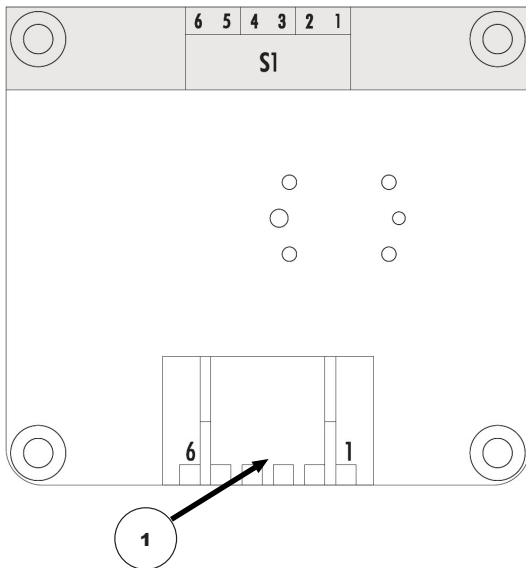


Fig. 6: A971 emergency stop board

The emergency stop board has a connection strip 1, CON402, via which two normally closed contacts of the emergency stop are connected to the 19-pin round connector. In addition, there is a normally open contact on the connection strip. This operates on a pulse basis and does not establish a permanent contact. The assignment of the connection strip is listed in the table below.

Table 10: Connection strip assignment - A971 emergency stop board

Connection strip	Terminal strip	Description
1	1	Input normally closed contact 1
	2	Output normally closed contact 1
	3	Input normally closed contact 2
	4	Output normally closed contact 2
	5	Input normally open contact 1
	6	Output normally open contact 1

3-push button board for C9900-G051 and C9900-G053

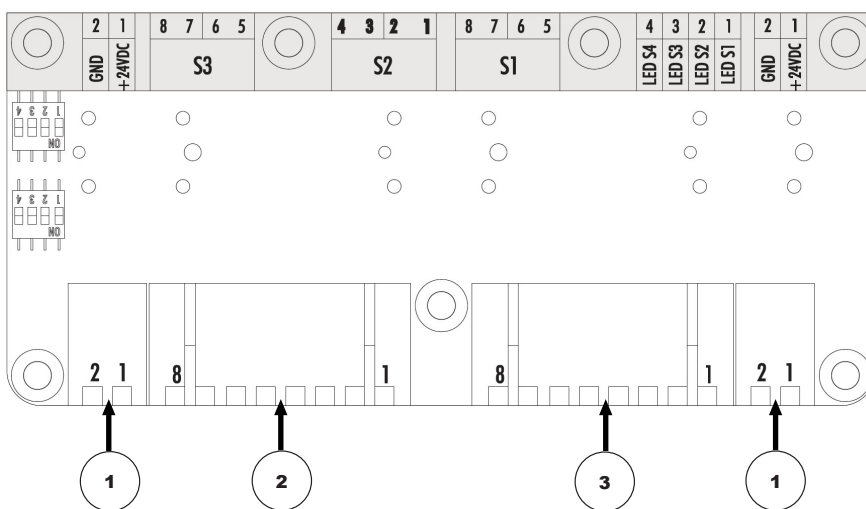


Fig. 7: A972 3-push button board

The 3-push button board has two external connection strips 1, CON600 & CON601, which are used for the power supply to the board. LEDs 1-3 and the push button S1 are wired via connection strip 3, CON602. Connection strip 2, CON603, is used for the wiring of the push buttons S2 and S3.

Table 11: Assignment of connection strip - A972 3-push button board

Connection strip	Terminal point	Description
1	1	24 V DC
	2	0 V
2	1	Input normally closed contact 2.1
	2	Output normally closed contact 2.1
	3	Output normally closed contact 2.2
	4	Input normally closed contact 2.2
	5	Input normally open contact 3.1
	6	Output normally open contact 3.1
	7	Output normally open contact 3.2
	8	Input normally open contact 3.2
3	1	LED 1
	2	LED 2
	3	LED 3
	4	Not used
	5	Input normally open contact 1.1
	6	Output normally open contact 1.1
	7	Output normally open contact 1.2
	8	Input normally open contact 1.2

4-push button board for C9900-G055 and C9900-G057

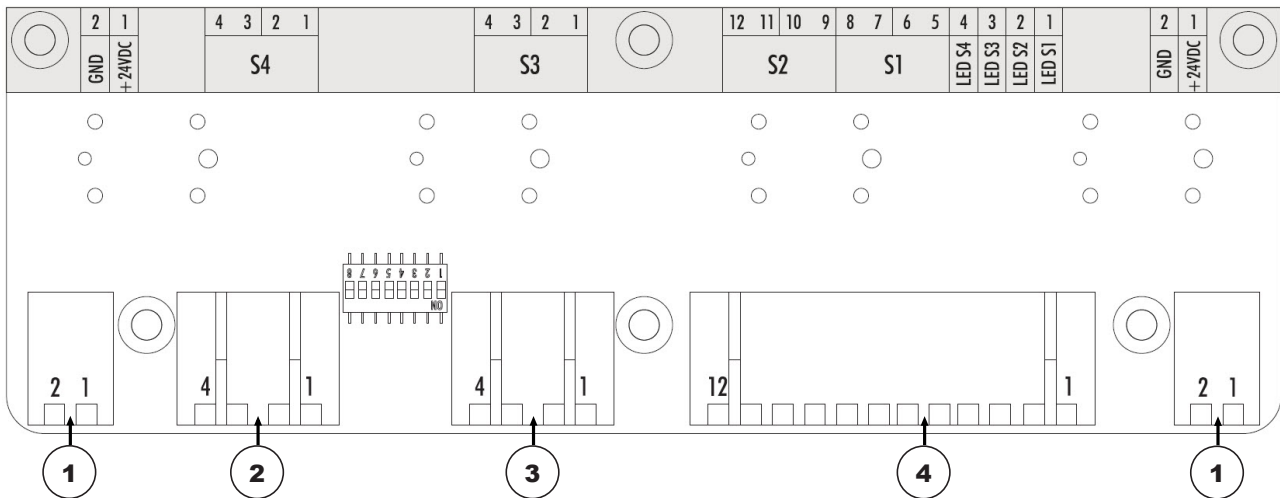


Fig. 8: A973 4-push button board

The 4-push button board has two external connection strips 1, CON600 & CON601, which are used for the power supply to the board. LEDs 1-4 and the push buttons S1 and S2 are wired via connection strip 4, CON602.

Connection strip 2, CON603, is used for the wiring of the push button S3. Connection strip 2, CON604, is used for the wiring of the push button S4.

Table 12: Assignment of connection strip - A973 4-push button board

Connection strip	Terminal point	Description
1	1	24 V DC
	2	0 V
2	1	Input normally open contact 4.1
	2	Output normally open contact 4.1
	3	Output normally open contact 4.2

Connection strip	Terminal point	Description
	4	Input normally open contact 4.2
3	1	Input normally open contact 3.1
	2	Output normally open contact 3.1
	3	Output normally open contact 3.2
	4	Input normally open contact 3.2
4	1	LED 1
	2	LED 2
	3	LED 3
	4	LED 4
	5	Input normally open contact 1.1
	6	Output normally open contact 1.1
	7	Output normally open contact 1.2
	8	Input normally open contact 1.2
	9	Input normally closed contact 2.1
	10	Output normally closed contact 2.1
	11	Output normally closed contact 2.2
	12	Input normally closed contact 2.2

3.4 Board combination

An emergency stop board is always used in each setup. In addition, the 3 or 4-button boards are combined depending on the option number. All **K-Bus** combinations are listed in the following table.

Option number	Number of buttons	Emergency stop board	3-button board	4-button board
C9900-G050	3	Yes	Yes	-
C9900-G052	3	Yes	Yes	-
C9900-G054	4	Yes	-	Yes
C9900-G056	4	Yes	-	Yes

In addition, all **directly wired** combinations are listed in the following table.

Option number	Number of buttons	Emergency stop board	3-button board	4-button board
C9900-G051	3	Yes	Yes	-
C9900-G053	3	Yes	Yes	-
C9900-G055	4	Yes	-	Yes
C9900-G057	4	yes	-	Yes

3.5 Circuit diagram - C9900-G050 and C9900-G052

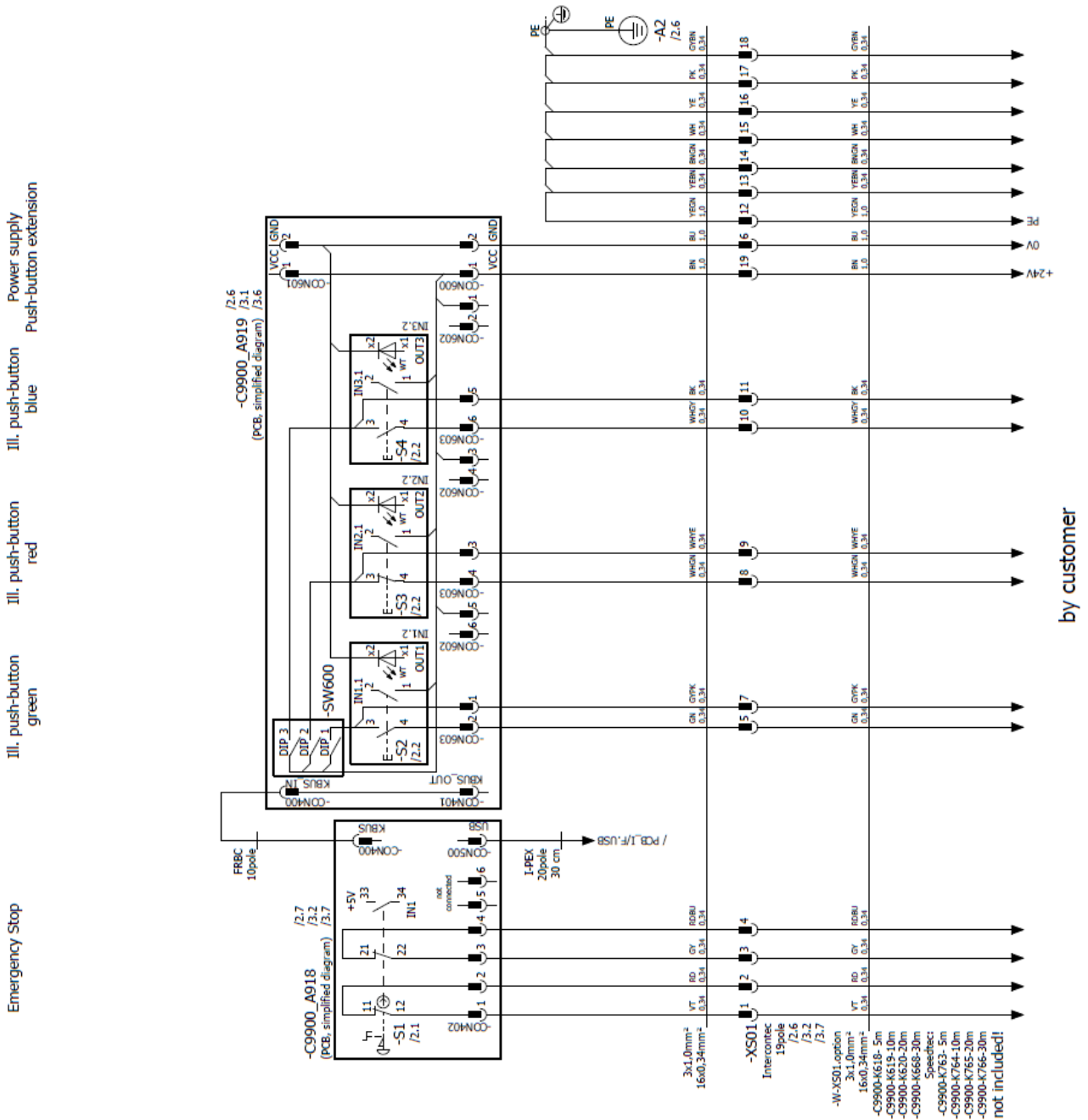


Fig. 9: Circuit diagram - C9900-G050 and C9900-G052

3.6 Circuit diagram - C9900-G054 and C9900-G056

Emergency Stop
 III. push-button green
 III. push-button red
 III. push-button blue
 III. push-button transparent
 Power supply
 Push-button extension

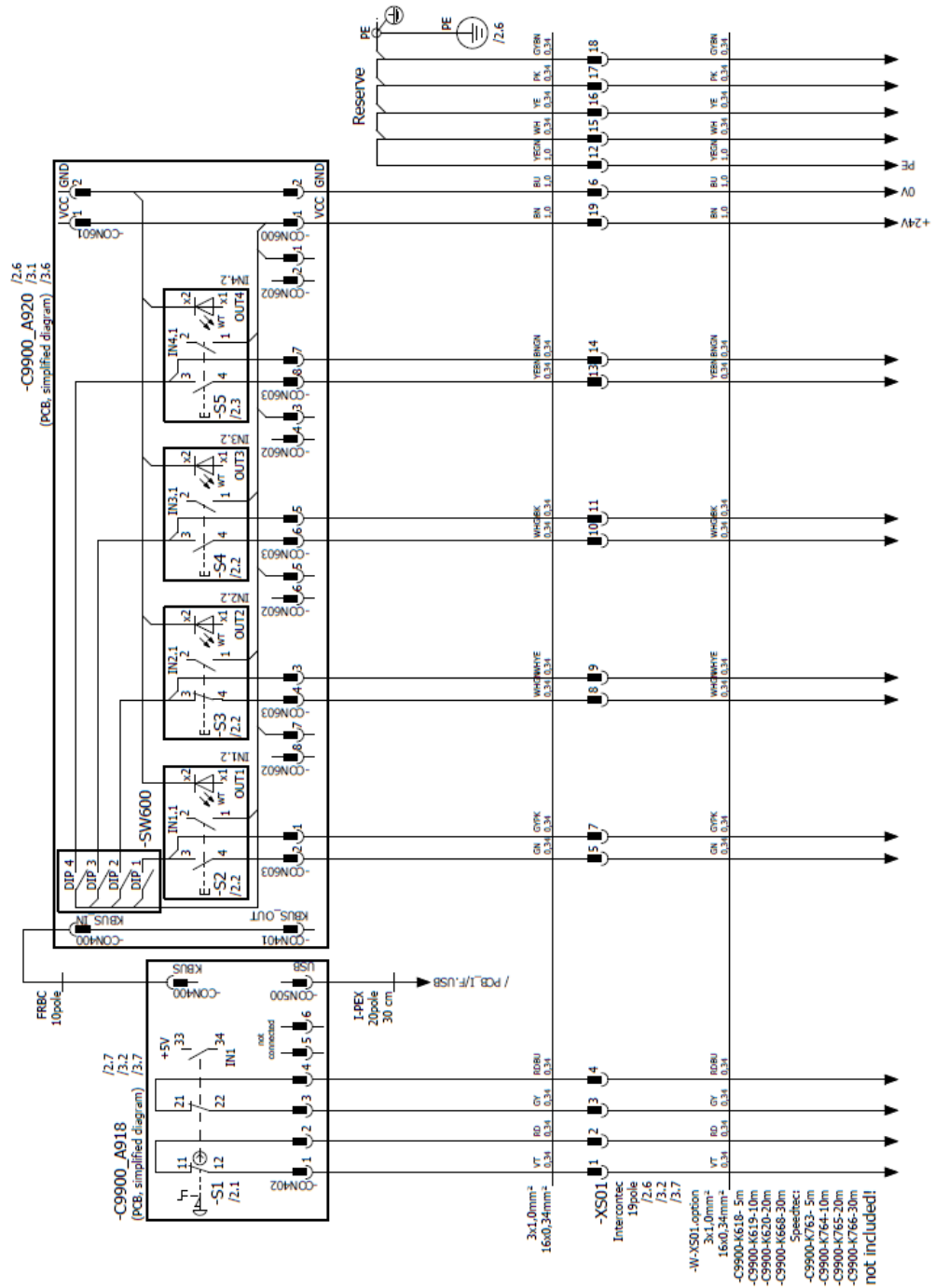
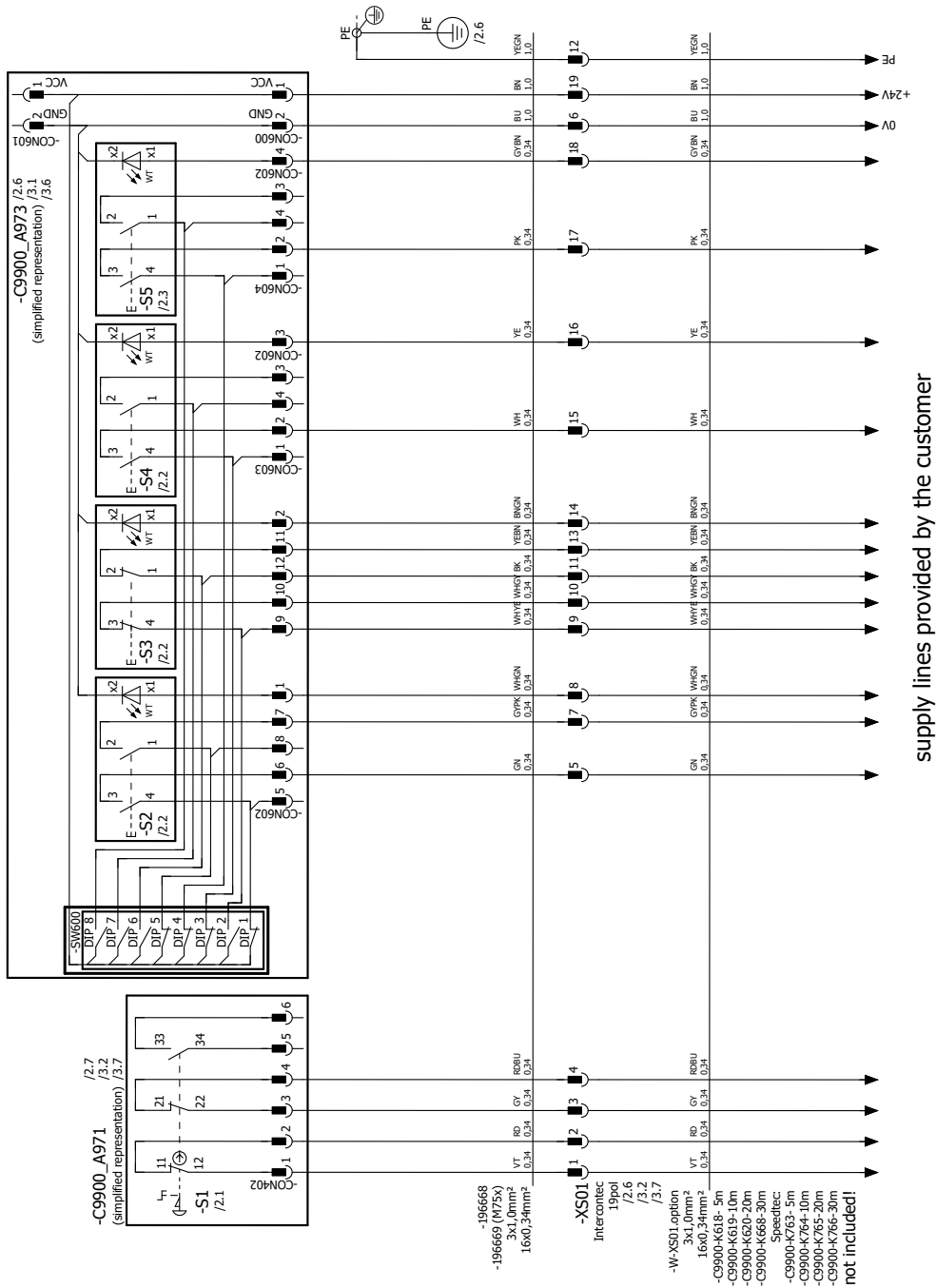


Fig. 10: Circuit diagram - C9900-G054 and C9900-G056

3.8 Circuit diagram - C9900-G055 and C9900-G057



supply lines provided by the customer

Fig. 12: Circuit diagram - C9900-G055 and C9900-G057

3.9 Accessories

Optionally, pre-assembled signal and power supply cables are available. The respective signal and power supply cables can be ordered in four different lengths. Compatible accessories can be found in chapter 3.9.1 Signal and power supply - 19-pin round connector [► 24].

3.9.1 Signal and power supply - 19-pin round connector

Table 13: Signal and power supply cables

Accessories	Description
C9900-K618	Signal and power supply cable for push-button extension, drag-chain suitable, length 5 m, 3 x 1 mm ² + 16 x 0.34 mm ² , pre-assembled, M23 socket IP65, screwable, 19-core, second end open
C9900-K619	Signal and power supply cable for push-button extension, drag-chain suitable, length 10 m, 3 x 1 mm ² + 16 x 0.34 mm ² , pre-assembled, M23 socket IP65, screwable, 19-core, second end open
C9900-K620	Signal and power supply cable for push-button extension, drag-chain suitable, length 20 m, 3 x 1 mm ² + 16 x 0.34 mm ² , pre-assembled, M23 socket IP65, screwable, 19-core, second end open
C9900-K668	Signal and power supply cable for push-button extension, drag-chain suitable, length 30 m, 3 x 1 mm ² + 16 x 0.34 mm ² , pre-assembled, M23 socket IP65, screwable, 19-core, second end open



Fig. 13: 19-pin round connector

Table 14: Pin assignment - 19-pin round connector

Pin	Color	Cross-section	Signal	Pin	Color	Cross-section	Signal	
1	Violet	0.34 mm ²	GND	11	Black	0.34 mm ²	+ 24 V	
2	Red	0.34 mm ²		12	Green/yellow	1.0 mm ²		PE
3	Grey	0.34 mm ²		13	Yellow/brown	0.34 mm ²		
4	Red/blue	0.34 mm ²		14	Brown/green	0.34 mm ²		
5	Green	0.34 mm ²		15	White	0.34 mm ²		
6	Blue	1.0 mm ²		16	Pink	0.34 mm ²		
7	Gray/pink	0.34 mm ²		17	Yellow	0.34 mm ²		
8	White/green	0.34 mm ²		18	Gray/brown	0.34 mm ²		
9	White/yellow	0.34 mm ²		19	Brown	1.0 mm ²		
10	White/gray	0.34 mm ²						

3.9.2 Push-button caps and inscription labels

Table 15: Optional push-button caps and inscription labels

Options	Description
C9900-Z255	Blue push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z256	Yellow push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z257	Green push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z258	Red push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z259	Clear push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z290	Orange push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z495	Black push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z496	Gray push-button cap for individual assembly of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 5 pieces
C9900-Z260	Transparent film for the individual labeling of a C9900-G0xx- push-button extension, make: Rafi, series FS+, diameter: 22.3 mm, 1 sheet A4, 54 pieces

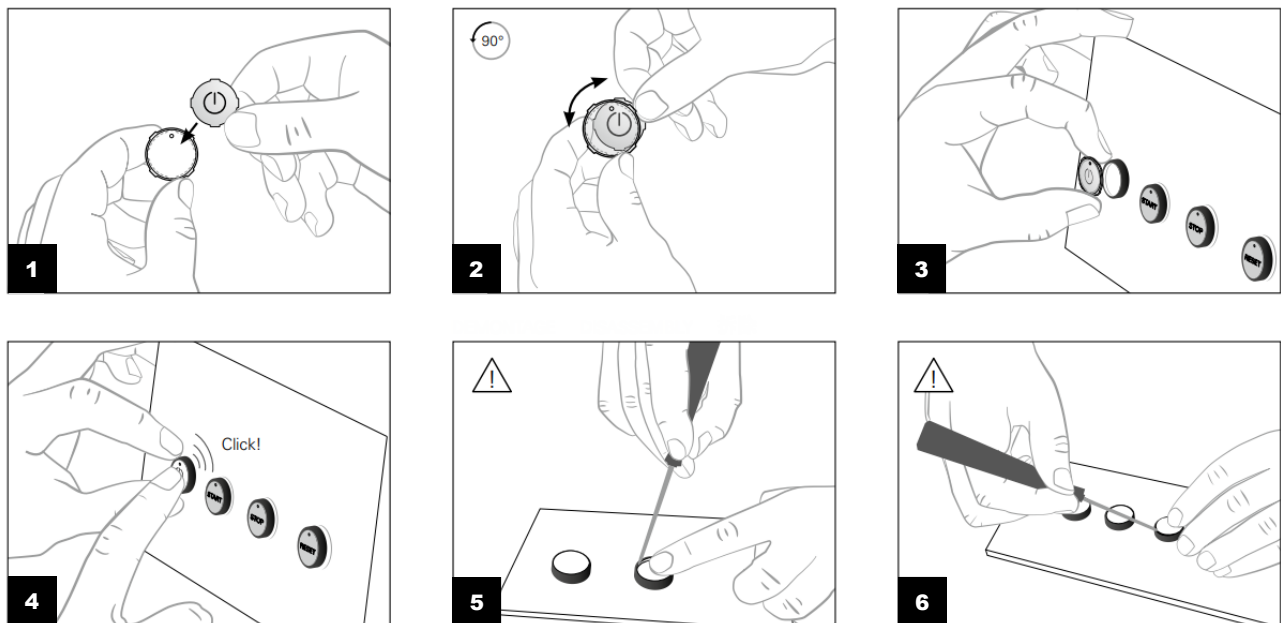


Fig. 14: Assembly of RAFI labels and push-button caps

If you wish to change the push-button caps or to add customer-specific inscription labels, the disassembly and assembly of the respective components is shown in Fig. 14.

3.9.3 Mating connector 19-pin round connector

Table 16: Optional mating connector to 19-pin round connector

Options	Description
C9900-Z431	Signal round connector 16 + 3 P-part socket, with crimp contacts

4 Commissioning

In order to use the device, you must first commission it. In the first step, this includes transporting and unpacking the components. This is followed by the mounting of the device on the mounting arm adapter, the connection of the cables and the power supply and finally switching on the push-button extension.

4.1 Transport and unpacking

The specified storage conditions must be adhered to (see chapter 8 [Technical data \[▶ 33\]](#)).

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. Therefore, protect the push-button extension against high mechanical stress. Use the original packaging for shipping.

NOTICE

Risk of damage to the compact push-button extension

When transporting in cold weather or when the push-button extension is exposed to extreme temperature fluctuations, make sure that no moisture (condensation) collects on and in the push-button extension.

Unpacking

Proceed as follows to unpack the unit:

1. Remove packaging.
2. Keep the packaging for possible future transport.
3. Check your delivery for completeness by comparing it with your order.
4. Be sure to keep the documents supplied with the device. They contain important information about how to use your device.
5. Check the contents for visible shipping damage.
6. In case of discrepancies between the package contents and the order, or in case of transport damage, please inform Beckhoff Service (see chapter 9.1 [Service and support \[▶ 35\]](#)).

4.2 Commissioning in the TwinCAT System Manager

In the case of the push button extensions C9900-G050, C9900-G052, C9900-G054 and C9900-G056, one make contact and the LED of each illuminated push button are transmitted via USB to the control/ visualization PC.

The steps required to connect the push button extension in the TwinCAT System Manager are explained below.

Proceed as follows:

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

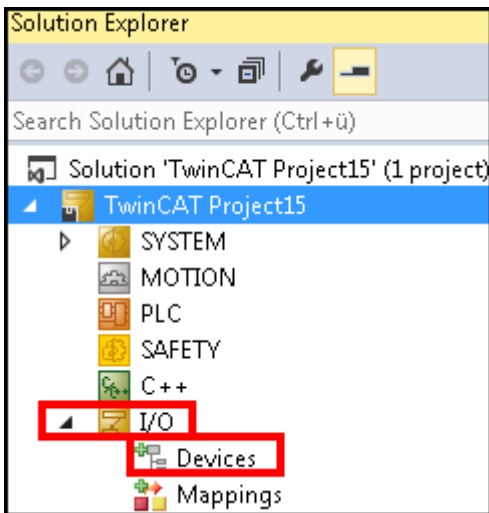


Fig. 15: TwinCAT_XAE project

1. Click **I/O** on the left in the tree view, and then right-click **Device**.
2. In the context menu click **Scan**.

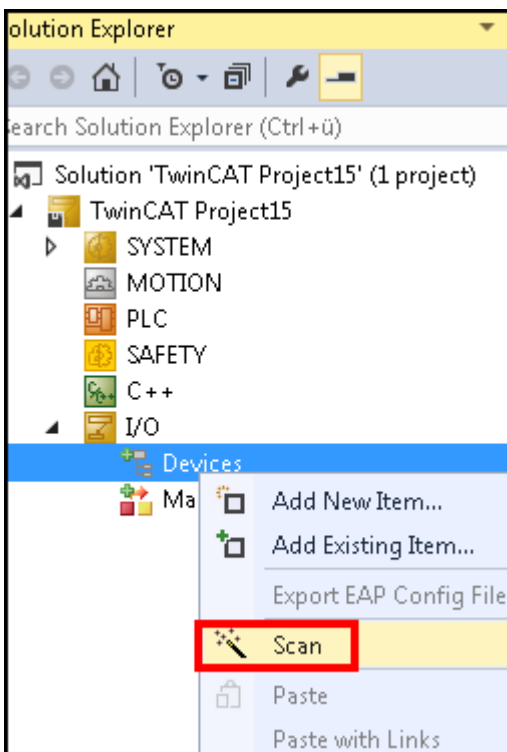


Fig. 16: TwinCAT_device scan

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

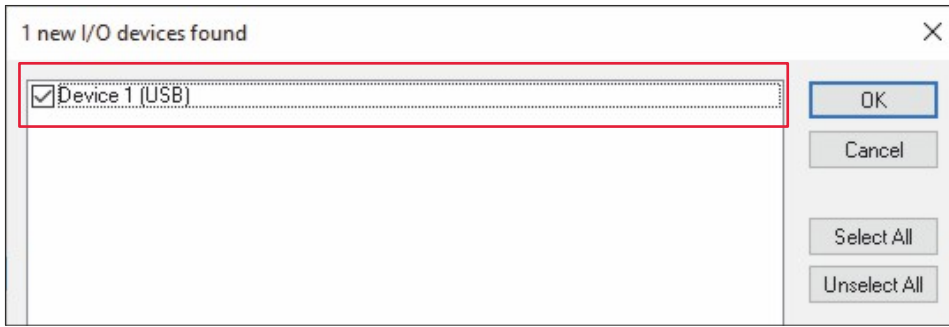


Fig. 17: TwinCAT_device select

4. Confirm the request with **Yes**, in order to scan for boxes.

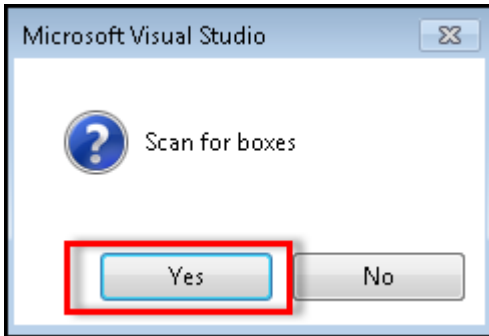


Fig. 18: TwinCAT_scan boxes

5. 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).
6. **Right-click** the term to convert it to a compatible type. This adapts the display of the inputs/outputs to the inputs/outputs that are actually present.

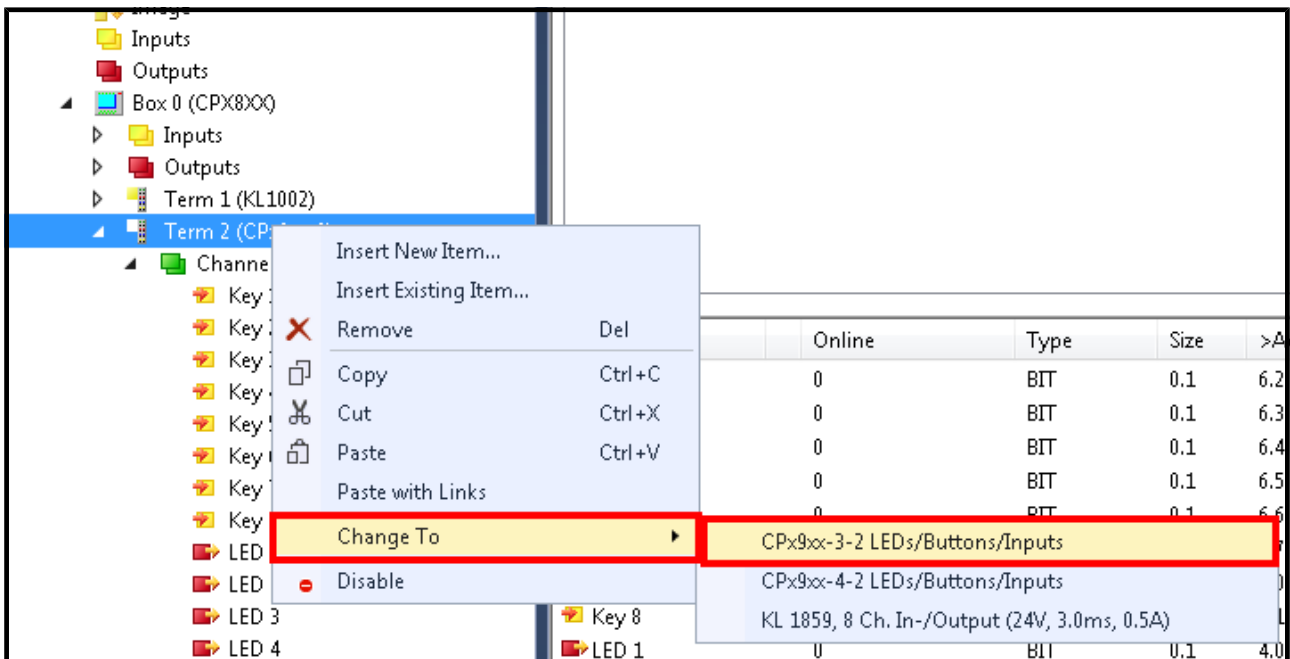


Fig. 19: TwinCAT_Select compatible types

Table 17: List of compatible types

Found terminal	Compatible type	Hardware
KL1002	CPx9xx e-stop	Emergency stop board

Found terminal	Compatible type	Hardware
CPx9xx-8	CPx9xx-3-2	Three-button board
CPx9xx-8	CPx9xx-4-2	Four-button board

Please refer to the table [Board combination \[► 19\]](#) regarding the hardware present in your device.

5 Decommissioning

NOTICE

Damage to property due to power supply

A connected power supply can cause damage during disassembly.

- Disconnect the power supply from the device before commencing with the disassembly.

As part of the decommissioning of the push button extension, you must first disconnect the power supply and cables. Following that, you can dismantle the components from the push button extension.

Disconnecting the power supply and cables

⚠ CAUTION

Risk of electric shock

Connecting the push button extension during a thunderstorm can lead to electric shocks.

- Never plug-in or unplug the cables of the push button extension during a thunderstorm.

Before dismantling the components from the push button extension, you must follow these steps:

1. Shut down the control panel or panel PC.
2. Disconnect the push button extension and the connected devices from the power supply (see below).
3. Disconnect the cables between the push button extension and the connected devices (see below).

Disconnecting the power supply

To disconnect the power supply, proceed as follows:

1. Disconnect the push button extension and the connected devices from your external 24 V power supply.
2. Unplug the power supply cable from the 19-pin round connector on the panel.
3. Dismount the power supply cable.

Disconnecting cables

Make a note of the wiring configuration, if you wish to restore it with another device.

The cables on the connected devices and the push button extension must be disconnected.

6 Maintenance

⚠ CAUTION

Risk of electric shock

Working on the push-button extension when live can lead to electric shock.

- Turn off the supply voltage before cleaning the device or replacing device components.

Maintenance measures increase the efficiency of the device by ensuring long-term functionality.

Repair

Only the manufacturer may repair the device. If a repair should be necessary, contact Beckhoff Service (see chapter 9.1 [Service and support](#) [▶ 35]).

Cleaning

NOTICE

Unsuitable cleaning agents

The use of unsuitable cleaning agents can damage the device.

- Clean the device only as specified.

The following cleaning agents and materials are unsuitable for use with the device:

- corrosive cleaning agents
- thinners
- scouring agents
- hard objects

Clean only the housing of the device. Use a soft, moist cleaning cloth for this.

7 Troubleshooting

Table 18: Troubleshooting

Fault	Cause	Measures
Push-button extension doesn't work	No supply of power via the 19-pin round connector	Check the cable for the power supply
	Other cause	Call Beckhoff Service
USB devices not found (TwinCAT System Manager)	No USB connection	Check the cables Check the transmitter box
	Other cause	Beckhoff Service

8 Technical data

Table 19: Characteristics of the respective push button extensions

Properties	Description	
Order identifier	C9900-G050, C9900-G051, C9900-G052, C9900-G053, C9900-G054, C9900-G055, C9900-G056, C9900-G057	
Operating temperature	CP32xx-1600-00x0	0...45°C
	CP37xx-1600-0020	0...45°C
	CP39xx-0000	0...55°C
	CP39xx-0010	0...50°C
Shock resistance (sinusoidal vibration)	EN 60068-2-6:	10 to 58 Hz: 0.035 mm
		58 to 500 Hz: 0.5 G (~ 5 m/s ²)
Shock resistance (shock)	EN 60068-2-27:	5 G (~50 m/s ²), duration: 30 ms
Protection rating	IP65	
Supply voltage	24 V _{DC} (20.4 – 28.8 V _{DC})	
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	
EMC interference immunity	conforms to EN 61000-6-2	
EMC interference emission	conforms to EN 61000-6-4	
Permissible relative air humidity	Maximum 95%, no condensation	
Certifications	CE, UL	
Max. cable length	30 m	

Table 20: Characteristic values emergency stop and push buttons

Properties	Description	
Min. operating current AC/DC	1 mA	
Max. operating current AC/DC	100 mA	
Switching capacity max.	250 mW	
Protection rating	IP65	
Emergency stop type	1.30.273.512/0030 Rafi 22FS+	
	The emergency stop is reset by rotating.	
	Lifetime	50,000 cycles
	B10 value	65,000 cycles
Switching element (emergency stop)	1.20.126.414/0000 Rafi FS	
	Lifetime	1 million cycles at 10 mA / 24 V DC
	B10 value	65,000 cycles
Illuminated push button type	9.30.270.027/1500 Rafi 22FS+	Green
	9.30.270.027/1300 Rafi 22FS+	Red
	9.30.270.027/1600 Rafi 22FS+	Blue
	9.30.270.027/1000 Rafi 22FS+	Clear
	Lifetime	1,000,000 cycles
	B10 value	1,300,000 cycles
Switching element (buttons)	1.20.126.003/9000	
	1.20.126.005/9000	
	1.20.126.004/9000	

Properties	Description	
	Lifetime	1,000,000 cycles
	B10 value	1,300,000 cycles

9 Appendix

9.1 Service and support

Beckhoff and their partners around the world offer comprehensive service and support, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Beckhoff Service

The Beckhoff Service Centre supports you in all matters of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

Hotline: + 49 (0) 5246/963-460

Fax: + 49 (0) 5246/963-479

E-mail: service@beckhoff.com

If servicing is required, please quote the serial number of your Industrial PC, which can be found on the name plate.

Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- World-wide support
- design, programming and commissioning of complex automation systems
- extensive training program for Beckhoff system components

Hotline: + 49 (0) 5246/963-157

Fax: + 49 (0) 5246/963-9157

E-mail: support@beckhoff.com

Headquarters

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany

Phone: + 49 (0) 5246/963-0

Fax: + 49 (0) 5246/963-198

E-mail: info@beckhoff.de

The addresses of the worldwide Beckhoff branches and agencies can be found on our website at <http://www.beckhoff.com/>.

You will also find further documentation for Beckhoff components there.

9.2 Approvals

The Industrial PC is CE and EAC-certified.

FCC approvals for the United States of America

FCC: Federal Communications Commission Radio Frequency Interference Statement

This device was tested and complies with the limits for a digital device of class A, according part 15 of the FCC regulations. These limits are designed to provide adequate protection against adverse interference, if the device is used in a commercial environment. This device generates, uses and may emit radio frequency energy and may cause adverse interference with radio communications, if it is not installed and used in accordance with the operating instructions. If this device is used in a residential area it is likely to cause adverse interference, in which case the user must take appropriate countermeasures in order to eliminate the interference at his own expense.

FCC approvals for Canada

FCC: Canadian Notice

This device does not exceed the class A limits for radiation, as specified by the Radio Interference Regulations of the Canadian Department of Communications.

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More Information:
www.beckhoff.com/c9900-g05x

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 5246 9630
info@beckhoff.com
www.beckhoff.com

