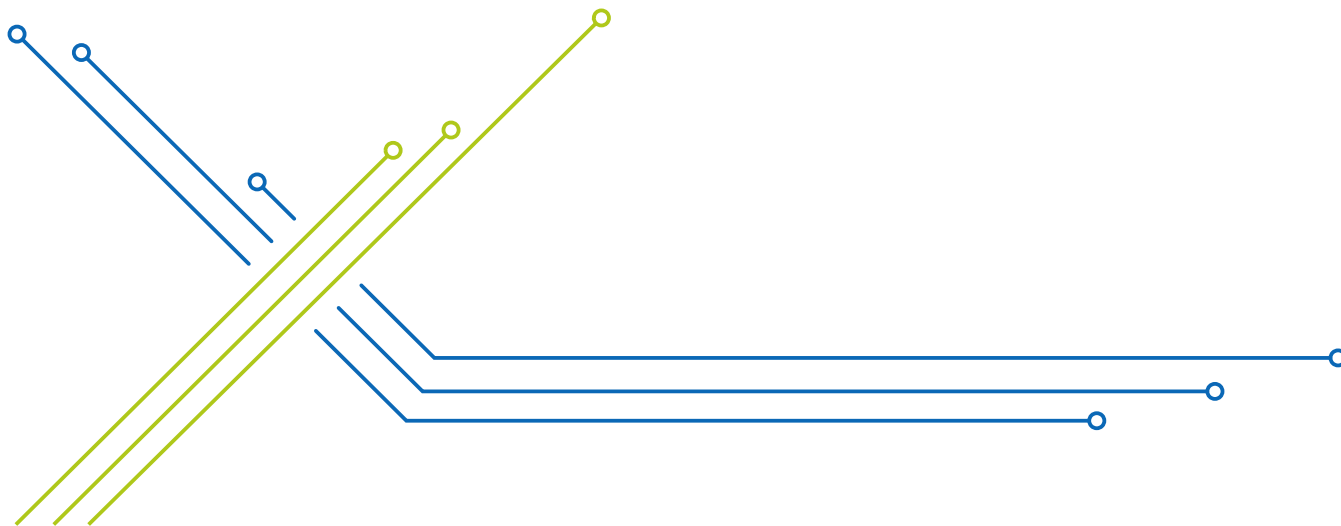


TSY 032

Trainings System Extension HMI 7"

INSTRUCTION MANUAL

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Trainings System Extension HMI 7"

TSY 032

The TSY 032 training system is an application assembly that is used for training. The TSY 032 is the extension for the basic application TSY 021. The application consists of a 7 inch multi-touch panel, which is integrated in a device rack. The Ethernet interface serves for the data exchange between the TSY 032 and the basic module TSY 021.

Additionally the application has a low voltage connection cable for supplying the application. It is simply connected to the basic module TSY 021 and so needs no own desktop power supply.

Additionally a RJ45 network cable for establishing an online connection is part of the application.



The following system components are integrated in the TSY 032:

- 1x Low Volt Connection Cable (cable length: 2.5 m)
- 1x RJ45 to Tyco Mini I/O cable 1 m
- 1x multi-touch panel ET 0710

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1 Technical Data

1.1 Performance Data

Processor	EDGE3-Technology
Processor cores	4 ¹⁾
Internal program and data memory (RAM)	2-Gbyte (DDR4)
Internal remnant data memory	128-kByte FRAM
Internal storage device	8-Gbyte microSD (16-Gbyte 2:1 formatted ~60k P/E cycles) ²⁾
Optional memory expansion	no
Graphic	integrated in EDGE processor
Interfaces	1x Ethernet (10/100) 1x USB 2.0 Host Type A 1x USB 2.0 Host/Device Type C 1x RS485 1x CAN 1x microSD card holder (SD 3.0)
Internal interface connections and devices	no
Operating components	no
Signal generator	no
Display Resolution	7" IPS color display WSVGA 1024 x 600 pixels
Operating field	Touch screen (multi-touch, projective capacitive)
Status LEDs	yes, 2-color front LED (green/red) Status LEDs (green/yellow)
Real-time clock	yes (battery buffered)
Cooling	passive (fanless)

¹⁾ Attention: When programming on multi-core CPUs (with LASAL), particular focus must be placed on thread security!

²⁾ The internal storage medium is formatted in the specified ratio to increase its lifespan. Changing the format to the full storage medium size is not permitted and will result in a significant reduction in lifespan.

1.2 Electrical Requirements

Supply voltage	+24 V DC $\pm 20\%$ (SELV/PELV) UL: NEC Class 2	
Protection class	III	
Current consumption of power supply (+24 V)	typically 320 mA (with no external devices connected)	maximum 530 mA (with external devices connected)
Inrush current without current-limiting supply	60,5 A for max. 41 μ s	
Inrush current with 24 V/10 A fixed voltage supply	1 A for max. 100 ms	

INFORMATION



The supply input terminal of panel shall be protected by or connected to:

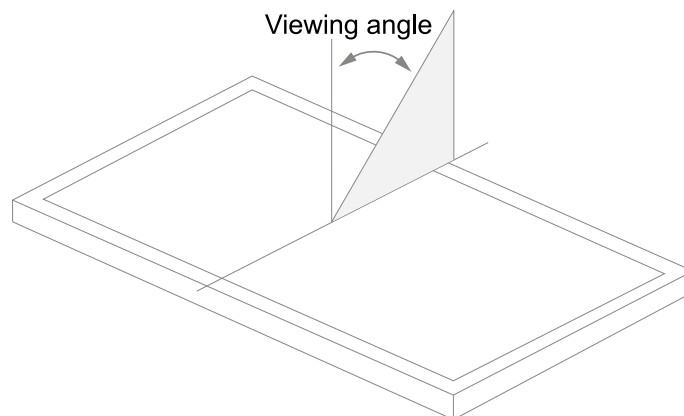
1. Listed fuse (UL 248-14) meeting the requirements of Limited Energy Circuit (table 18) of UL/CSA 61010-1 3rd ed. Cl. 9.4 or
2. The devices are intended to be supplied from an isolated Limited Energy Source per UL 61010-1, 3rd ed. cl. 9.4 or Limited Power Source per UL 60950-1 or Class 2 per NEC.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.3 Display

Type	7" IPS color display
Resolution	WSVGA 1024 x 600 pixels
Color depth	24-Bit RGB
LCD mode	normally black ¹⁾
LCD Polarizer	transmissive ²⁾
Pixel size	0.1506 x 0.1432 mm
Active range	154.21 x 85.92 mm
Backlighting	LED, adjustable
Contrast ratio	typically 800:1
Brightness	typically 350 cd/m ²
Angle CR ≥ 10	left, right, top, bottom typically 85° ³⁾
Life span	By compliance with the ambient conditions, the brightness of the display sinks after 30,000 operating hours to 50 % of the original brightness.

Due to the manufacturing process, individual pixel errors cannot be excluded to 100 % and therefore do not constitute a reduction in quality.



¹⁾ If there is no display data, the display remains black when the backlighting is on.

²⁾ Display technology, with which display backlighting is used.

³⁾ The viewing angle is measured from the normal to the display surface.

1.4 Control Unit

Operating field	Touch screen (multi-touch, projective capacitive)
Maximum number of fingers	5
The operation with thin gloves	yes
SIGMATEK Touch pen (passive)	yes
Handwriting recognition	no
Ball of the thumb recognition	no
Water spray recognition ¹⁾	no
Water detection ²⁾	no
Cleaning	see chapter Cleaning and Disinfecting the Touch Screen

INFORMATION



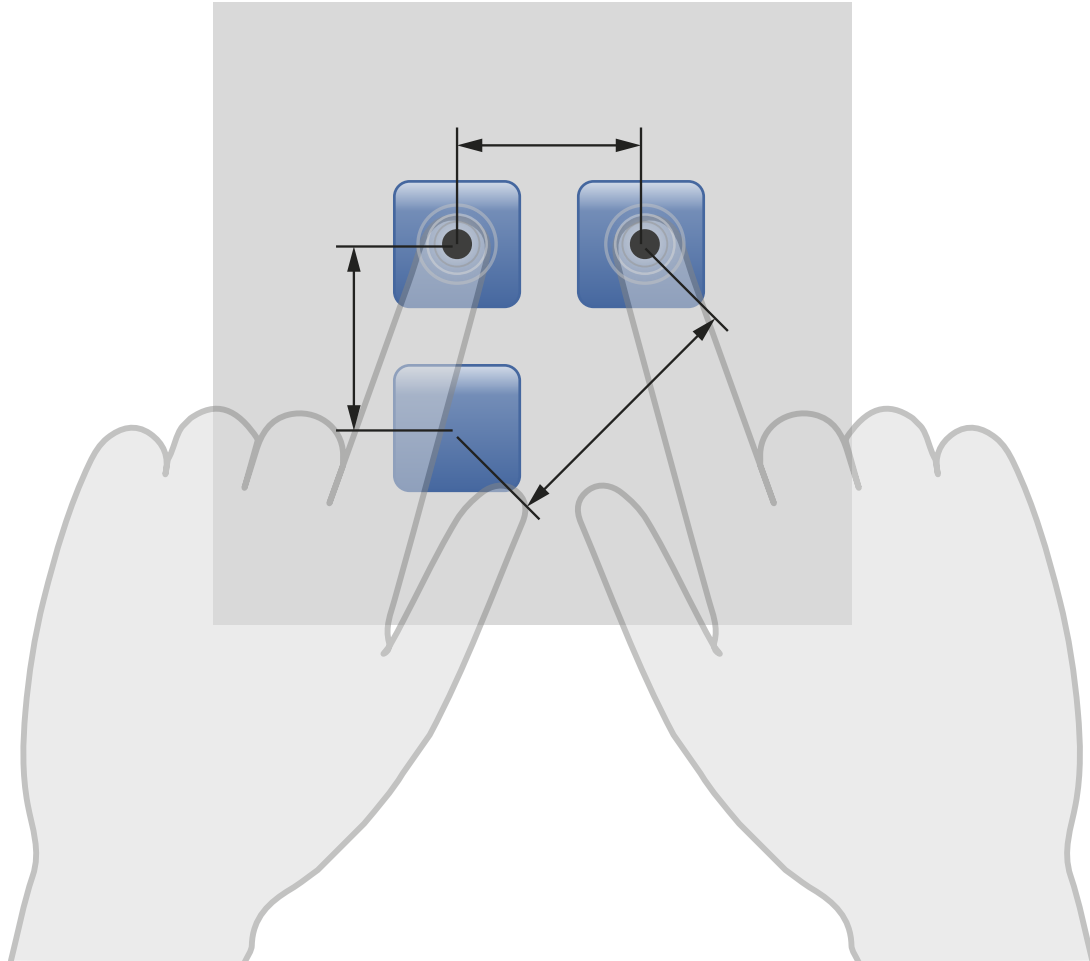
The device must always be grounded or with cable-connected devices, the mass must be connected correctly to ensure stable function of the touch screen. The touch function may still have to be individually adapted to the respective environmental conditions.

¹⁾ Detects individual water droplets on the touch screen and remains operable.

²⁾ Detects a large amount of water on the touch screen and deactivates it.

1.5 Minimum Distance between Operating Elements for Multi-touch Applications

To guarantee smooth operation with multi-touch applications, buttons and control elements that should be operated at the same time must have a realistic minimum clearance.



INFORMATION



The size of the buttons and operating elements directly affect the operability of the application. Small operating elements should therefore be avoided.

1.6 Input

Input	Multi-touch screen (PCAP)
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1.7 Environmental Conditions

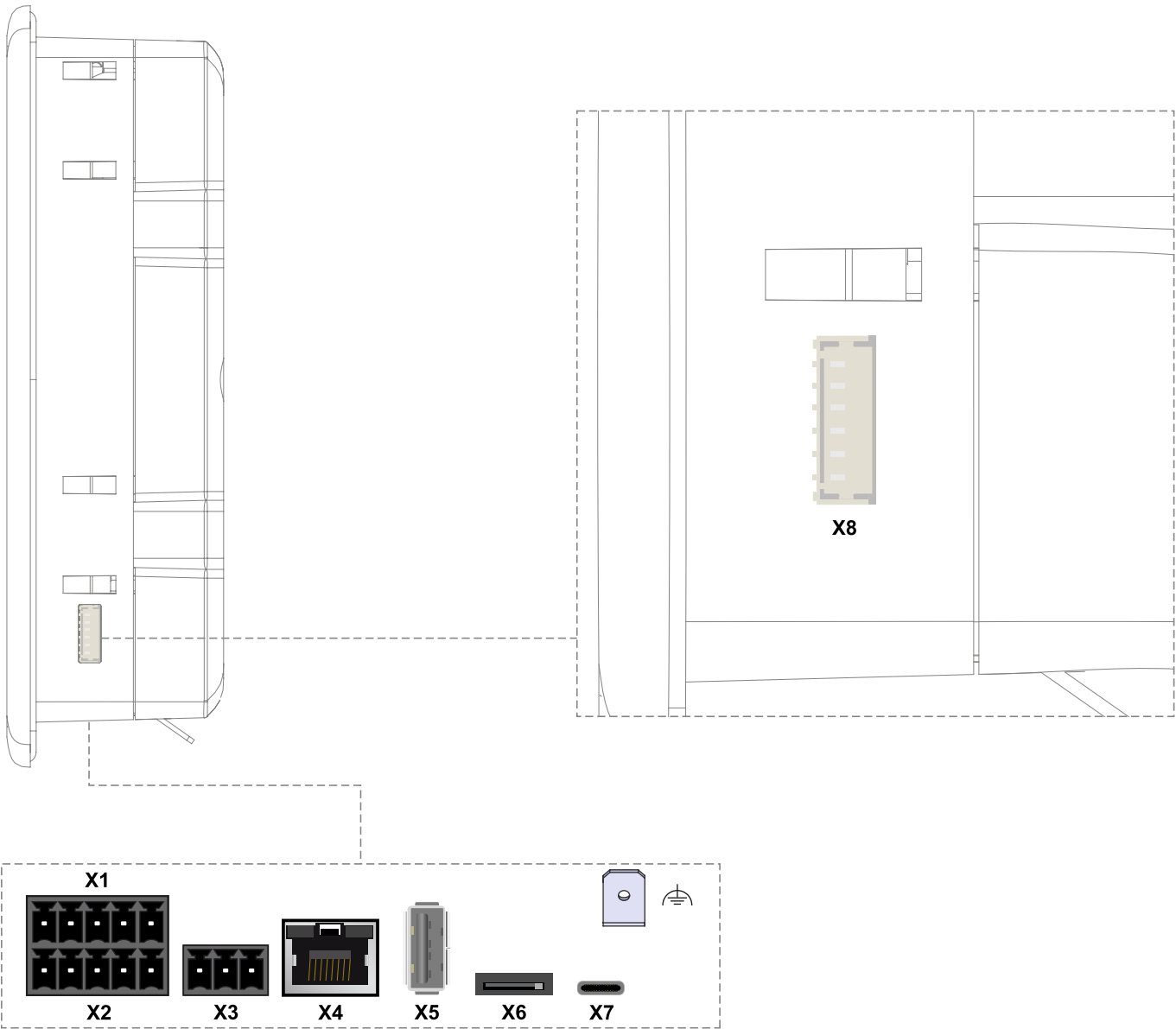
Storage temperature	-30 ... +70 °C	
Environmental temperature	0 ... +50 °C	
Humidity	10-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
Noise emissions	≤ 70 dB	
EMC resistance	EN 61000-6-2 (industrial area)	
EMC noise generation	EN 61000-6-4 (industrial area) EN 61000-6-3 (household area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g (147.15 m/s ²)
Protection type	EN 60529	front: IP65 cover: IP20 (not evaluated by UL)
Enclosure rating	Type 1	UL/CSA 61010-1

1.8 Miscellaneous

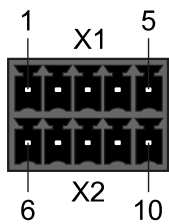
Article number	12-100-032	
Operating system	Salamander	
Default IP address	10.10.150.1	
Printed circuit board coating	no	
Approvals	CE	yes
	UL	designed according to UL
	Functional Safety	no
	UKCA	no

2 Interfaces

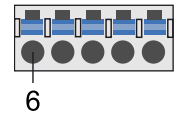
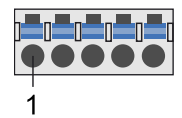
2.1 Rear Connectors



2.1.1 X1: CAN Bus, X2: Supply (2x 5-pin Phoenix RM 3.5)



X1 Pin	Function
1	CAN A (LOW)
2	CAN B (HIGH)
3	CAN A (LOW)
4	CAN B (HIGH)
5	GND
X2 Pin	Function
6	+24 V feed-in
7	+24 V feed-in
8	GND
9	GND
10	GND



INFORMATION



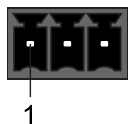
CAN Bus Termination

→ The resistance can be switched on or off via hardware class.

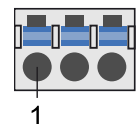
CAN Bus and Supply

→ The power supply and CAN bus are internally connected via connector X8.

2.1.2 X3: RS485 (COM2) (3-pin Phoenix RM 3,5)



Pin	Function
1	RS485 A
2	RS485 B
3	GND



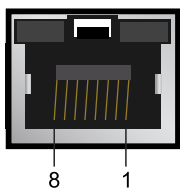
INFORMATION



Termination and spreading resistance

→ The resistors can be enabled or disabled by hardware class.

2.1.3 X4: Ethernet (10/100 Mbit/s) (RJ45)



Pin	Function
1	Tx+
2	Tx-
3	Rx+
4	n.c.
5	n.c.
6	Rx-
7	n.c.
8	n.c.

n.c. = do not use

INFORMATION



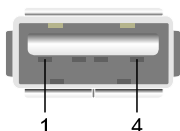
Only for use in LAN, not for connection to telecommunication circuits.

INFORMATION



Problems can arise if a control is connected to an IP network, which contains modules that are not running with a SIGMATEK operating system. With such devices, Ethernet packets could be sent to the control with such a high frequency (i.e. broadcasts), that the high interrupt load could cause a real-time runtime error or runtime error. By configuring the packet filter (Firewall or Router) accordingly however, it is possible to connect a network with SIGMATEK hardware to a third party network without triggering the error mentioned above.

2.1.4 X5: USB 2.0, Host (Type A)



Pin	Function
1	+5 V, $I_{out,max} = 500 \text{ mA}$
2	D-
3	D+
4	GND

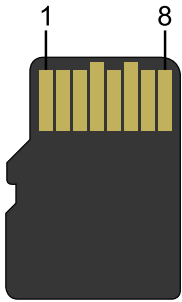
INFORMATION



Short circuit

- In the event of an external short circuit (e.g., defective USB stick), the voltage is switched off via a hardware component. To check whether the short circuit still exists, this component cyclically switches the voltage back on.

2.1.5 X6: microSD



Pin	Function
1	DAT2
2	CD/DAT3
3	CMD
4	+3V3
5	CLK
6	GND
7	DAT0
8	DAT1

INFORMATION

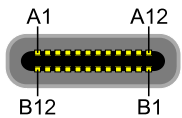


It is recommended that only storage media provided by SIGMATEK be used.

The number of read and write actions have a significant influence on the lifespan of the storage media.

The microSD card is not intended as an exchangeable medium and should therefore be removed from the card holder for maintenance purposed only.

2.1.6 X7: USB 2.0, Host & Device (Type C)



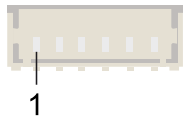
Pin	Function
A1, B1	GND
A2, B2	n.c.
A3, B3	n.c.
A4, B4	VBUS
A5, B5	CC1, CC2
A6, B6	USB2.0 D+
A7, B7	USB2.0 D-
A8, B8	n.c.
A9, B9	VBUS
A10, B10	n.c.
A11, B11	n.c.
A12, B12	GND
+5 V, I _{OUT MAX} = 500 mA	
n.c. = do not use	

INFORMATION



It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. This may cause the device to malfunction. It is also possible that these devices will not be detected at the USB port or function correctly. It is therefore recommended that every USB stick or USB supply be tested before actual use.

2.1.7 X8: CAN, Supply (Molex Picoblade RM1.25)



Pin	Function
1	CAN B (HIGH)
2	CAN A (LOW)
3	GND
4	+24 V feed-in
5	+24 V feed-in
6	FE

INFORMATION

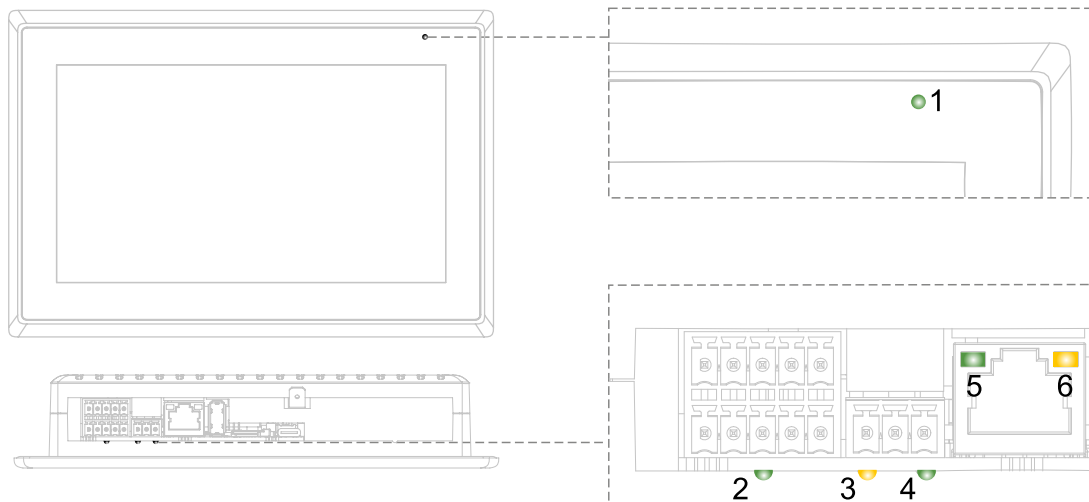


CAN Bus and Supply

- The power supply and CAN bus are internally connected via connector X1 and X2.
- Only for service purposes.

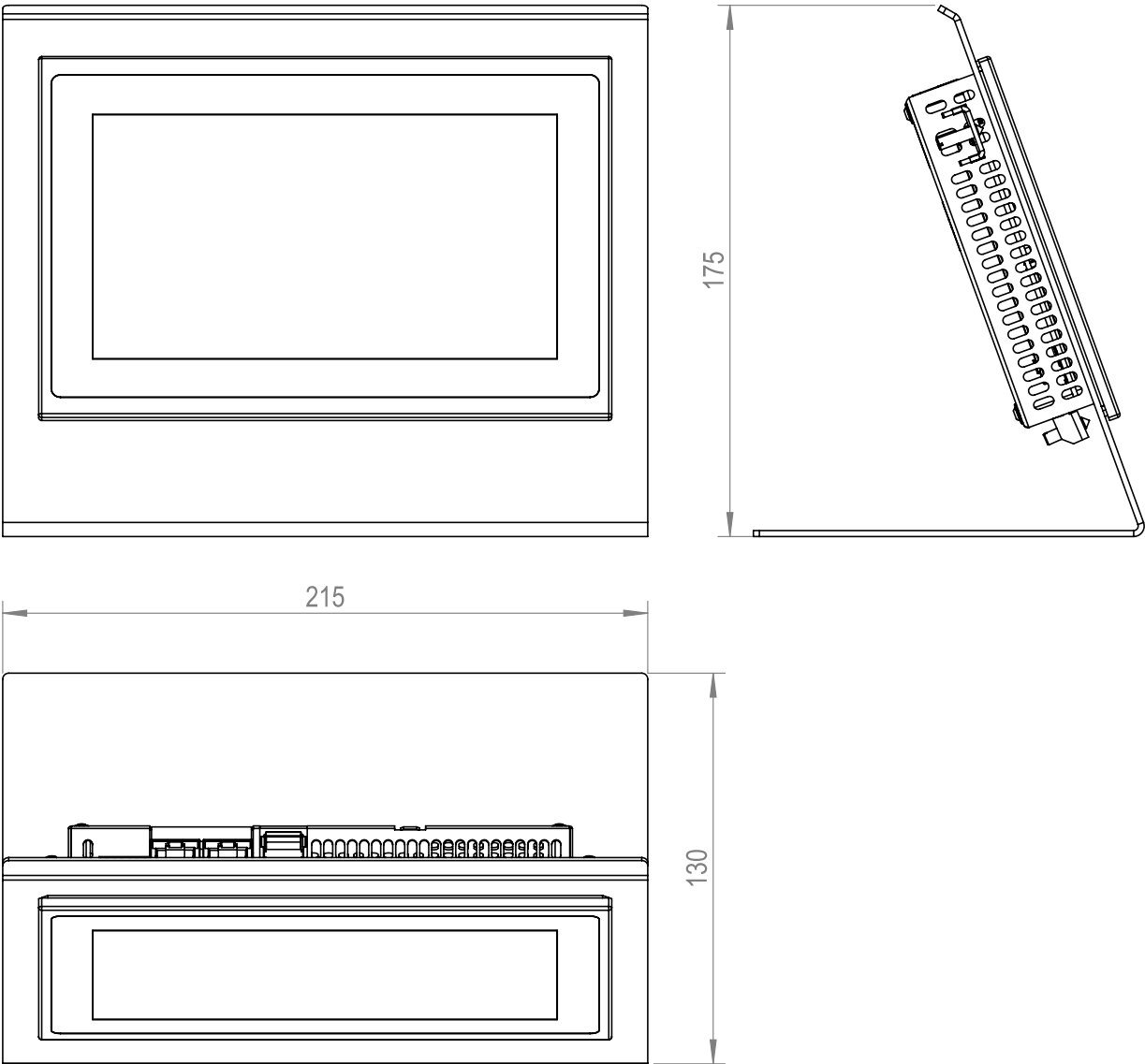
2.2 Status Display LEDs

One multi status LED for diagnostics is located on the front.



LED	Status	Color	Condition	Description
1	DC OK	green	ON	Supply voltage OK
			OFF	Supply voltage NOT OK
			Software-adjustable (On, Blinks, Off)	
1	Error	red	ON	no boot media
			BLINKS	Application RESET
			OFF	Boot medium found / Application RUN
			Software-adjustable (On, Blinks, Off)	
2	Abschluss CAN	green	ON	CAN termination is active.
3	Spreizung RS485	yellow	ON	RS485 spreading is active.
4	Abschluss RS485	green	ON	RS485 termination is active.
5	ETH Activity	green	ON	Link established
			BLINKS	during activity (send & receive)
6	ETH Link/ Speed	yellow	ON	100 Mbit Ethernet connection
			OFF	10 Mbit Ethernet connection no Ethernet connection

3 Mechanical Dimensions



Dimensions	215 x 175 x 130 mm (W x H x D)
Material	Housing: aluminium/steel chromated Color: silver (mount) Front: 2 mm (mount)
Weight	ca. 0.85 kg

Changes Chart

Change date	Affected page(s)	Chapter	Note
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