Web Panels with TFT Display

User manual

PHOENIX CONTACT
INSPIRING INNOVATIONS

User manual

Web Panels with TFT Display

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This user manual is valid for:

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WP 4101W/P US 01	1094818
WP 4156W/P US 01	1104387
WP 4185W/P US 01	1104395
WP 4070-WXPS	1148693
WP 4070-WVRS	1148694
WP 4101-WXPS	1148687
WP 4120-WXPS	1148689
WP 4156-WHPS	1148691
WP 4185-WHPS	1148690

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1 Important Notes

1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.

This symbol indicates hazards that could lead to personal injury.

There are three signal words indicating the severity of a potential injury.

DANGER
Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury.

WARNING
Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.

CAUTION
Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.

This symbol together with the **NOTE** signal word alerts the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

Here you will find additional information or detailed sources of information.

1.2 Safety Notes

- Read this manual carefully before using the operating device. Keep this manual in a place where it is always accessible to all users.
- Proper transportation, handling and storage, placement and installation of this product are prerequisites for its subsequent flawless and safe operation.
- This user manual contains the most important information for the safe operation of the device.
- The user manual, in particular the safety notes, must be observed by all personnel working with the device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

1.3 Security in the network

NOTE: Risk of unauthorized network access
Connecting devices to a network via Ethernet always entails the risk of unauthorized access to the network.
Therefore, please check your application for any option of deactivating active communication channels . Setting passwords to prevent third parties from accessing the controller without authorization and modifying the system.
Because of the controller's communication interfaces, we advise against using the controller in safety-critical applications without additional security appliances.
Please take additional protective measures according to the IT security requirements and the standards applicable to your application (for instance virtual networks (VPN) for remote maintenance access, firewalls, etc.) for protection against unauthorized network access.
On first request, you shall release Phoenix Contact and the companies associated with Phoenix Contact GmbH & Co. KG, Flachsmarktstraße 8, 32825 Blomberg in accordance with §§ 15 ff. AktG or German Stock Corporation Act (hereinafter collectively referred to as "Phoenix Contact") from all third-party claims that are made due to improper use.
For the protection of networks for remote maintenance via VPN, Phoenix Contact offers the mGuard product series security appliances which you can find described in the latest Phoenix Contact catalog (phoenixcontact.net/products).
Additional measures for protection from unauthorized network access can be found in the AH EN INDUSTRIAL SECURITY application note. The application note can be downloaded at phoenixcontact.net/products.

1.4 Intended Use

- The device is designed for use in the industry.
- The device is state-of-the art and has been built to the latest standard safety requirements. However, dangerous situations or damage to the machine itself or other property can arise from the use of this device.
- The device fulfills the requirements of the EMC directives and harmonized European standards. Any modifications to the system can influence the EMC behavior.

NOTICE: Radio Interference
Operation of this device may cause radio interference in residential areas.

1.5 Target Group

The use of products described in this manual is oriented exclusively to:

– Qualified electricians or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.
– Qualified application programmers and software engineers. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

1.6 Licensing information on open source software

The operating device works with a Linux operating system. License information for the individual Linux packages can be found in the web-based management of the operating device.

1.7 Retrieving the source code

This product contains software components which are licensed by the rights holder as free software or Open-source software under the GNU General Public License, version 2. You may retrieve the source code for these software components from Phoenix Contact using an appropriate storage medium (CD or DVD-ROM), by contacting After Sales Service at the address below. This must be carried out no more than three years after delivery of the product. A processing charge of 50 euros will be required in this case.

PHOENIX CONTACT GmbH & Co. KG
After Sales Service
Flachsmarktstraße 8
32825 Blomberg
GERMANY

Subject: Source code WP 4XXXX

2 Installation and Commissioning

2.1 Unpacking the Device

Unpack all parts carefully and check the contents for any visible damage in transit. Also check whether the shipment matches the specifications on your delivery note.

If you notice damages in transit or discrepancies, please contact us immediately.

2.2 Mounting the Device

NOTICE: Damage
When installing the device, leave a gap of at least 30 mm (1.181") around the device to ensure sufficient air circulation.

NOTICE: Damage
When the operating device is installed horizontally, please note that additional sources of heat beneath the operating device may result in heat accumulation.
Make sure to allow sufficient heat dissipation!
Please observe the permissible temperature range specified in the technical data when operating the device.

NOTICE: Damage
In order to ensure the degree of protection specified in the technical data, observe the following points:

- A tolerance of ±0.5 mm is maintained for the mounting cutout.
- The seal lies flat against the mounting surface.
- The number of mounting brackets, given in the technical data, is used.
- The material of the mounting surface is sufficiently stable to ensure permanently secure attachment of the operating device.
- The mounting surface and the operating device may not become deformed due to the effects of the mounting clamps or through the operation of the device.
- The threaded pins of the mounting brackets are tightened uniformly to a maximum torque of 1 Nm.

The device can be easily and quickly mounted from the rear of the device. A panel thickness of 1 mm to 6 mm (0.039" to 0.236") is permitted for proper mounting.

1. Cut the mounting cutout in the housing for the device size to be installed.
2. Push the device through the mounting cutout from the front.

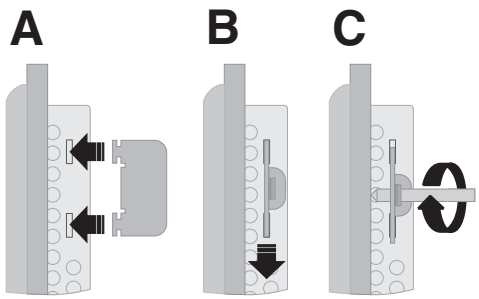

Figure 2-1 Mounting the device using a mounting bracket

3. Fix the mounting brackets in the recesses provided (A).
4. Pull the mounting brackets down until the snap into place (B).
5. Secure the device using the threaded pins (C).

2.2.1 Front Panel Dimensions

2.2.1.1 7" Display (resistive)

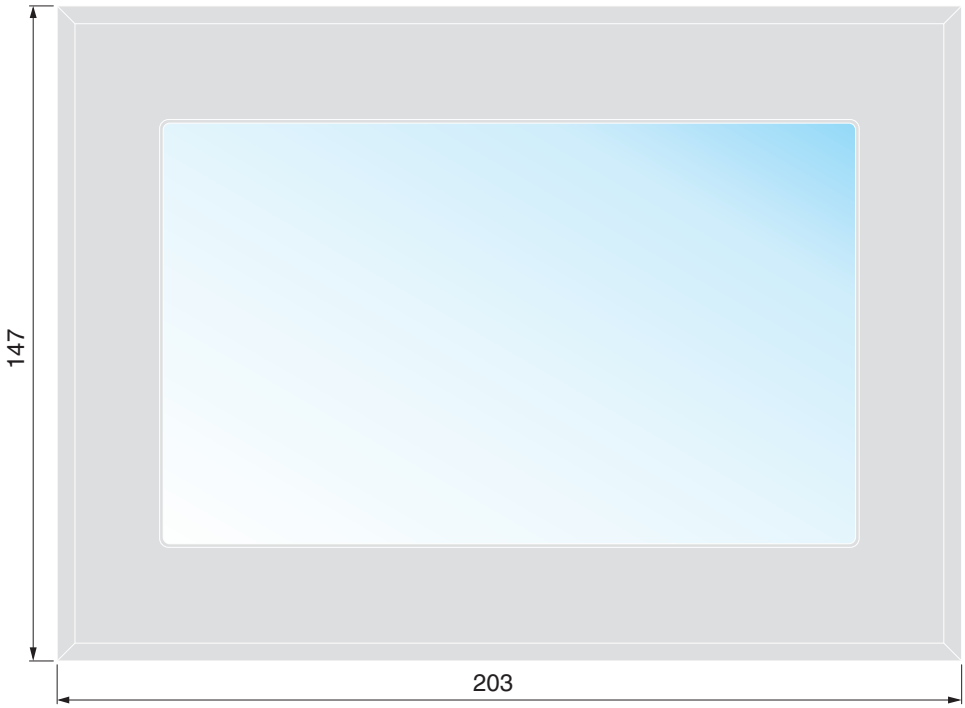

Figure 2-2 Front panel (dimensions in mm)

2.2.1.2 7" Display (PCAP)

Figure 2-3 Front panel (dimensions in mm)

2.2.1.3 10.1" Display (PCAP)

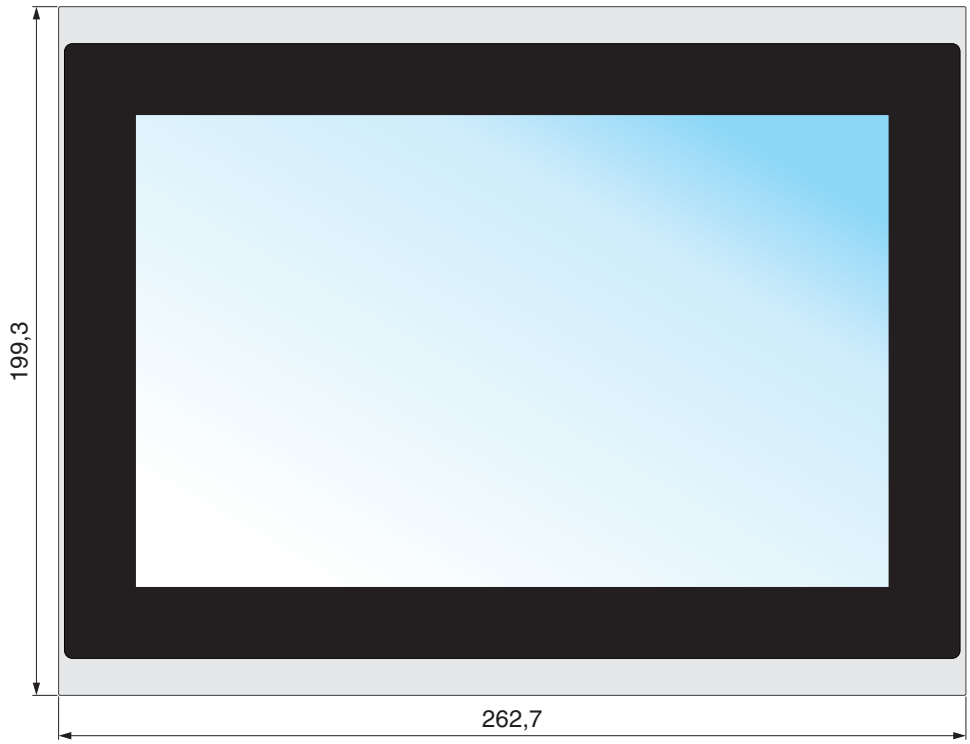

Figure 2-4 Front panel (dimensions in mm)

2.2.1.4 12.1" Display (PCAP)

Figure 2-5 Front panel (dimensions in mm)

2.2.1.5 15.6" Display (PCAP)

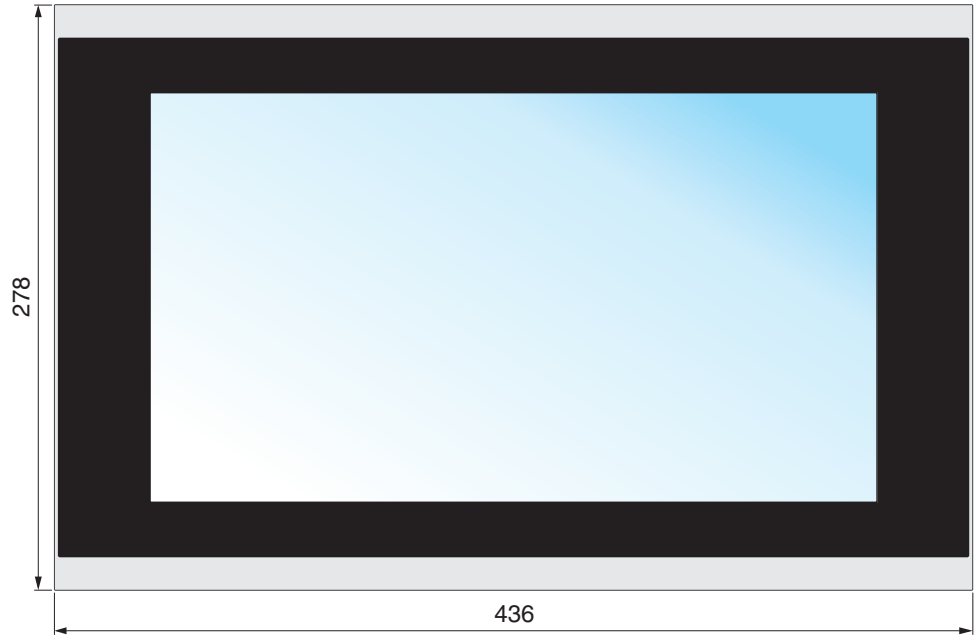

Figure 2-6 Front panel (dimensions in mm)

2.2.1.6 18.5" Display (PCAP)

Figure 2-7 Front panel (dimensions in mm)

2.2.2 Mounting Cutout

2.2.2.1 7" Display (resistive)

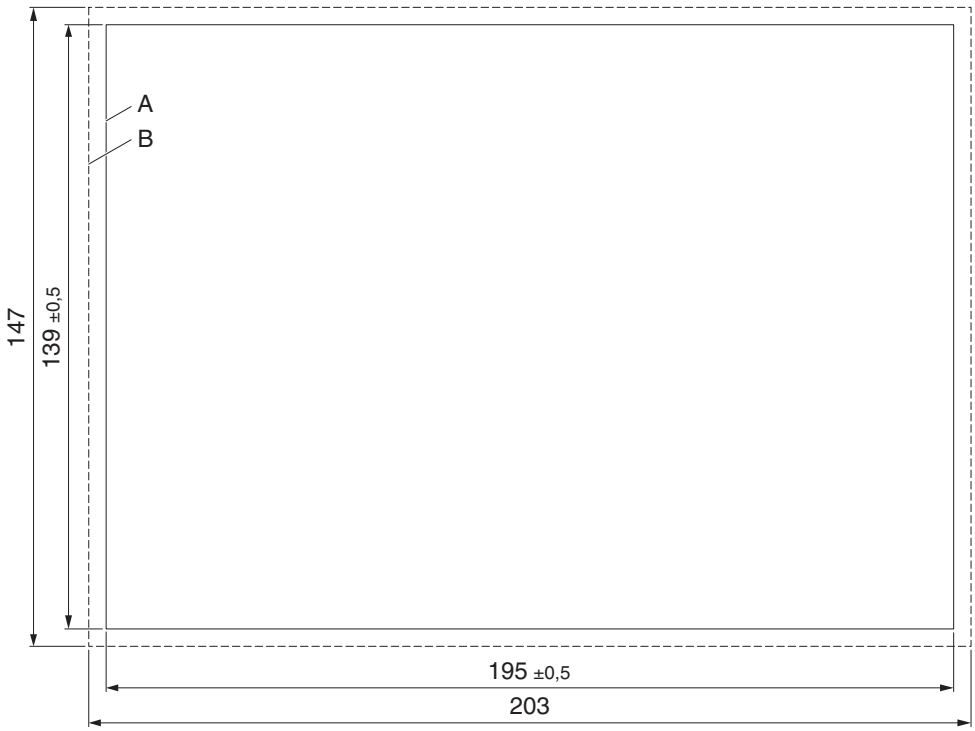

Figure 2-8 Mounting cutout (dimensions in mm)

A Mounting Cutout
B Front Panel

2.2.2.2 7" Display (PCAP)

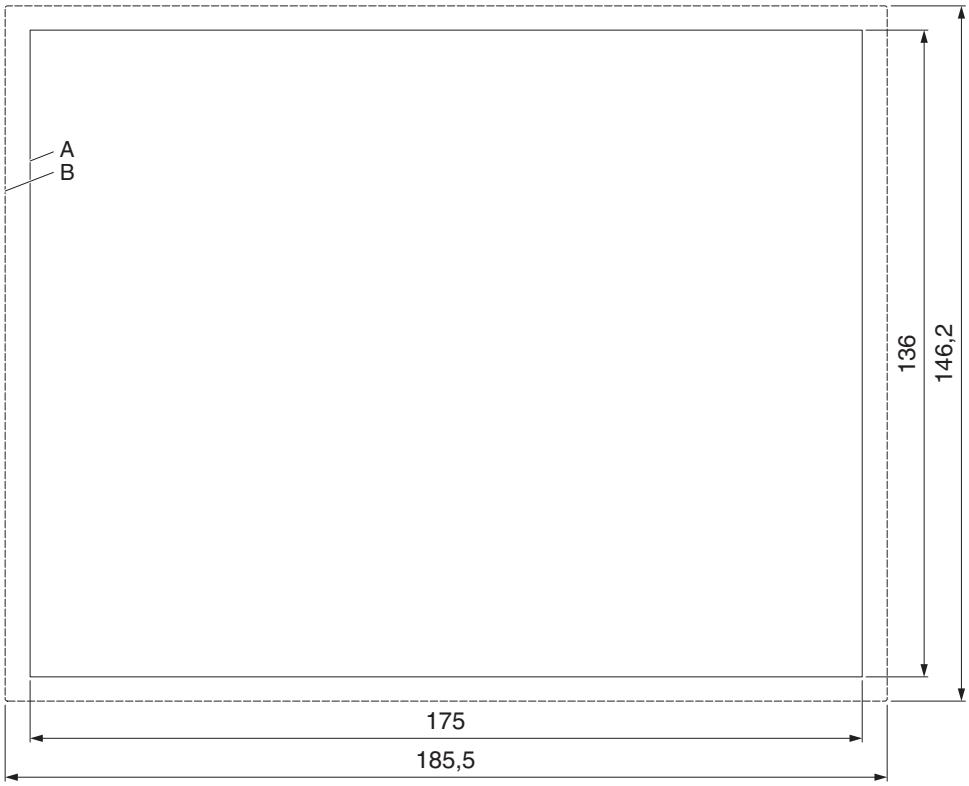

Figure 2-9 Mounting cutout (dimensions in mm)

A Mounting Cutout
B Front Panel

2.2.2.3 10.1" Display (PCAP)

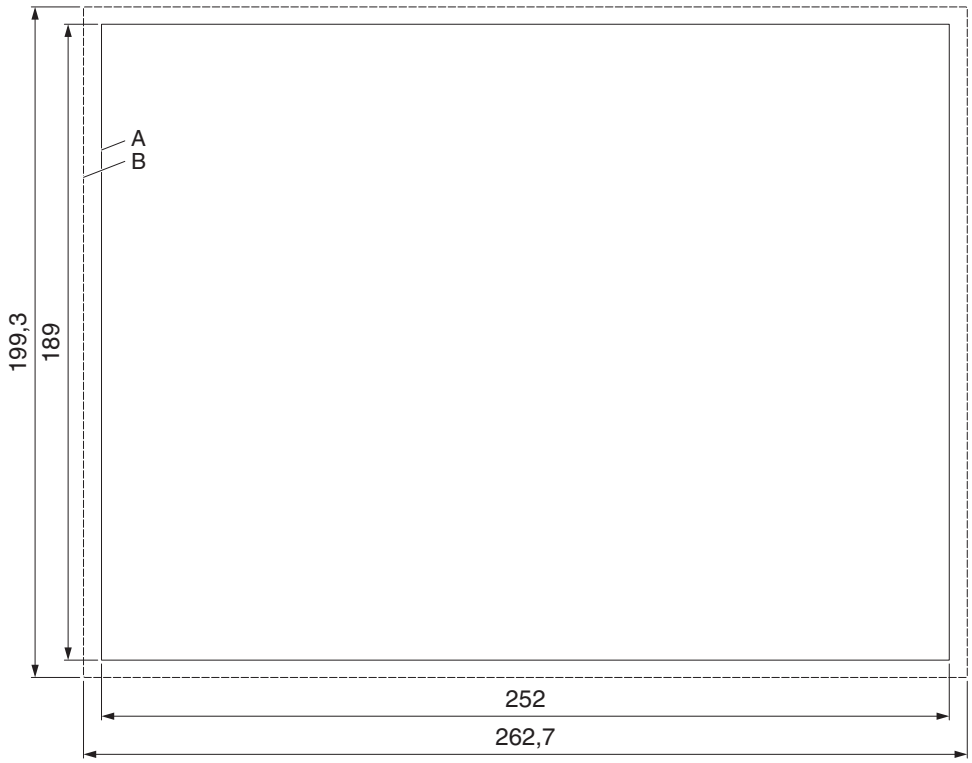

Figure 2-10 Mounting cutout (dimensions in mm)

A Mounting Cutout
B Front Panel

2.2.2.4 12.1" Display (PCAP)

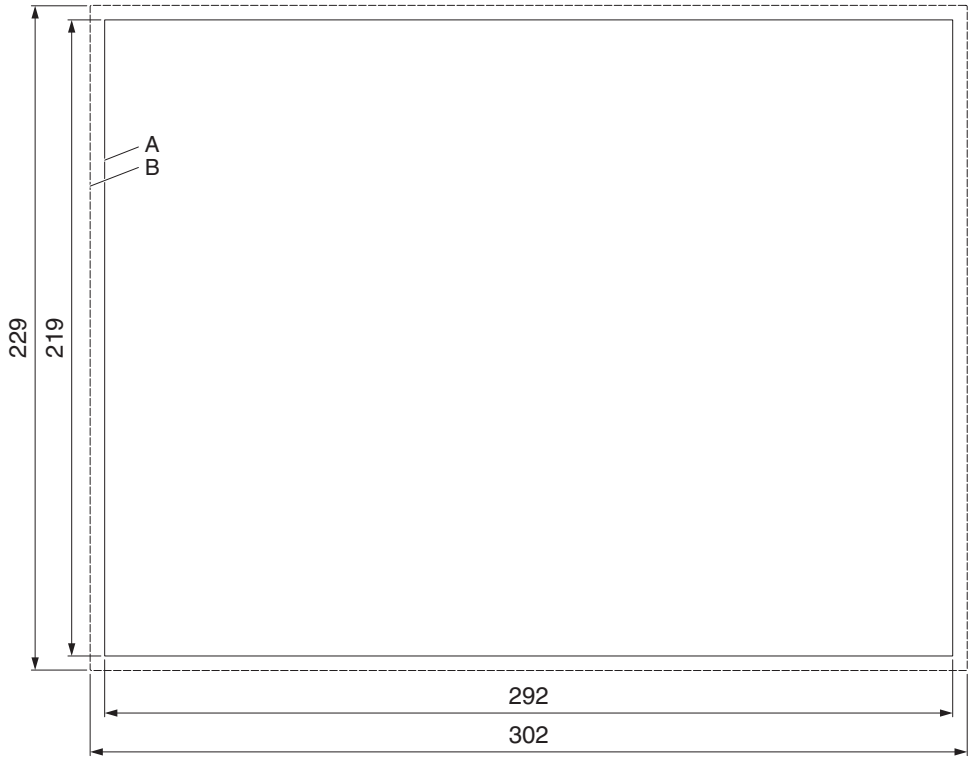

Figure 2-11 Mounting cutout (dimensions in mm)

A Mounting Cutout
B Front Panel

2.2.2.5 15.6" Display (PCAP)

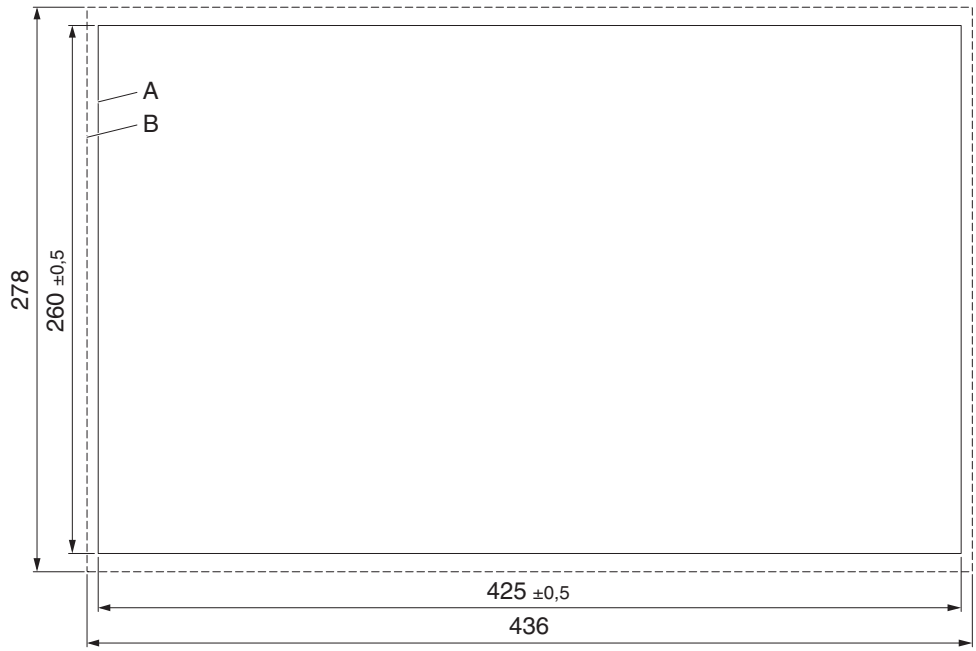

Figure 2-12 Mounting cutout (dimensions in mm)

A Mounting Cutout
B Front Panel

2.2.2.6 18.5" Display (PCAP)

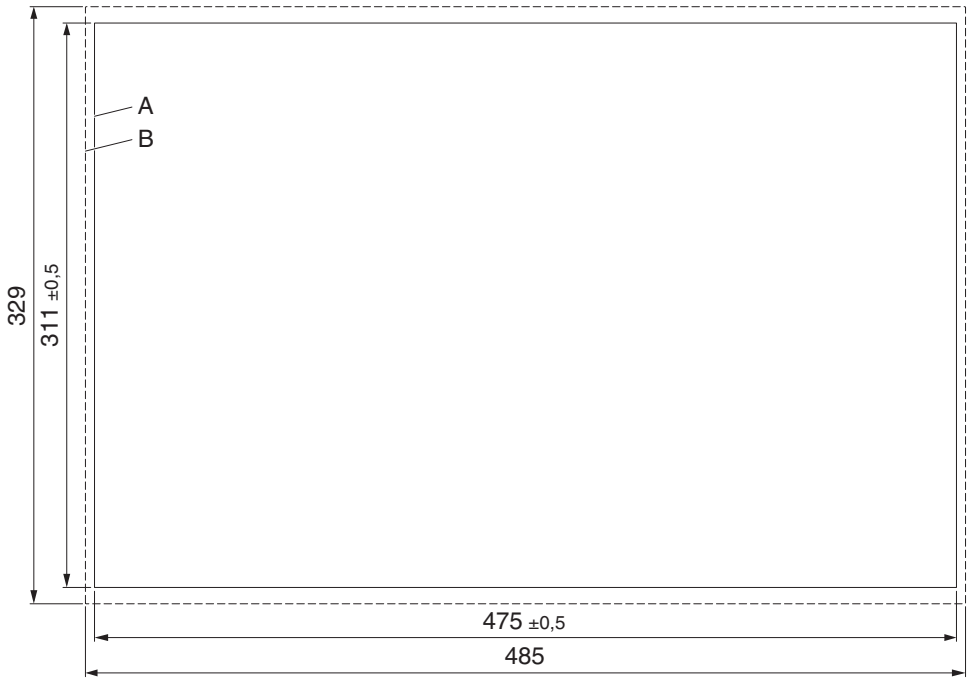

Figure 2-13 Mounting cutout (dimensions in mm)

A Mounting Cutout
B Front Panel

2.2.3 Side View, Mounting Depth

2.2.3.1 7" Display (resistive)

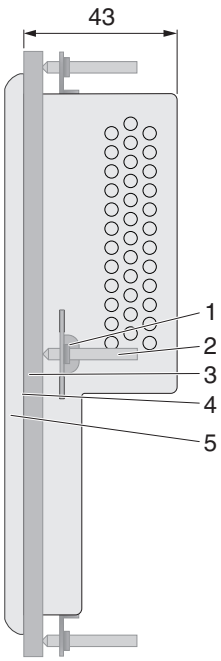

Figure 2-14 Side view, mounting depth (dimensions in mm)

1 Mounting Bracket
2 Threaded Pin
3 Mounting Surface Thickness 1 mm to 6 mm
4 Circumferential Seal
5 Front Panel

2.2.3.2 7" Display (PCAP)

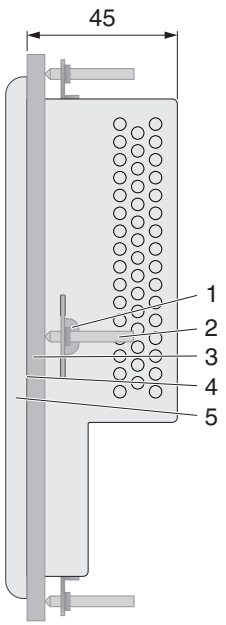

Figure 2-15 Side view, mounting depth (dimensions in mm)

1 Mounting Bracket
2 Threaded Pin
3 Mounting Surface Thickness 1 mm to 6 mm
4 Circumferential Seal
5 Front Panel

2.2.3.3 10.1" Display (PCAP)

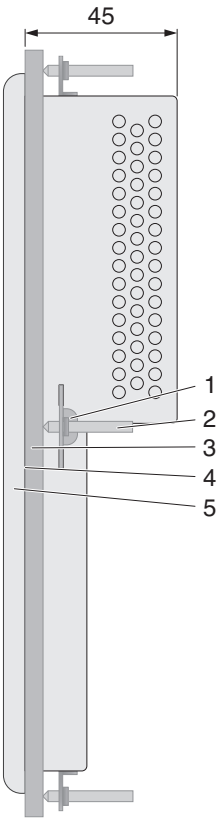

Figure 2-16 Side view, mounting depth (dimensions in mm)

1 Mounting Bracket
2 Threaded Pin
3 Mounting Surface Thickness 1 mm to 6 mm
4 Circumferential Seal
5 Front Panel

2.2.3.4 12.1" Display (PCAP)

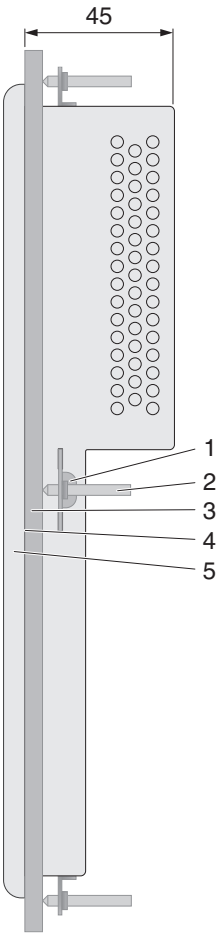

Figure 2-17 Side view, mounting depth (dimensions in mm)

1 Mounting Bracket
2 Threaded Pin
3 Mounting Surface Thickness 1 mm to 6 mm
4 Circumferential Seal
5 Front Panel

2.2.3.5 15.6" Display (PCAP)

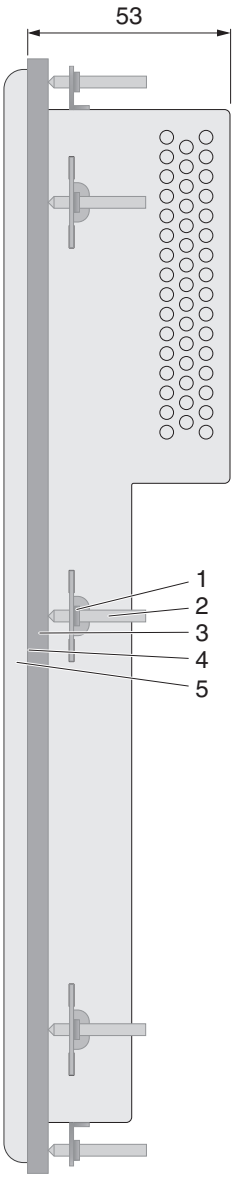

Figure 2-18 Side view, mounting depth (dimensions in mm)

1 Mounting Bracket
2 Threaded Pin
3 Mounting Surface Thickness 1 mm to 6 mm
4 Circumferential Seal
5 Front Panel

2.2.3.6 18.5" Display (PCAP)

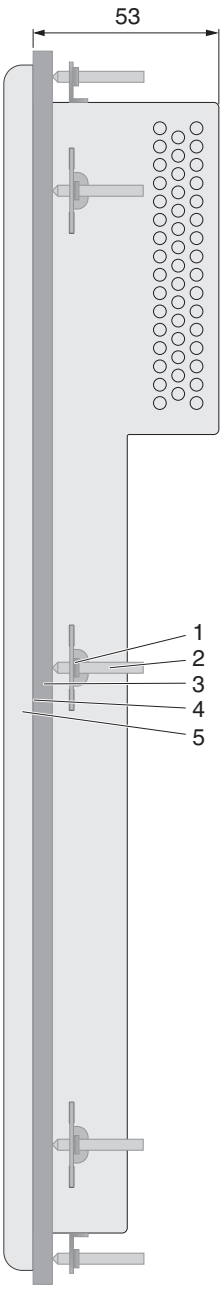

Figure 2-19 Side view, mounting depth (dimensions in mm)

1 Mounting Bracket
2 Threaded Pin
3 Mounting Surface Thickness 1 mm to 6 mm
4 Circumferential Seal
5 Front Panel

2.3 Connecting the Device

2.3.1 Supply Voltage

The supply voltage is supplied via pin strip X1. A suitable socket strip is supplied.

Refer to the technical data for the permissible supply voltage of the operating device.

NOTICE: Damage
The operating device has to be supplied by a power source, which meets the requirements for SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1.

NOTICE: Damage
For UL 61010, an 4 A (or smaller) fuse, either standard or electronic, or circuit breaker must be installed between the 24 V DC external power supply and the operating device. The fuse / circuit breaker must be rated at 30 V DC and be a UL listed component.

The device has reverse polarity protection. In case of wrong polarity, the device will not operate.

Connector in the operating device: 3 pin pin strip

Table 2-1 Pin assignment supply voltage

Pin	Designation	Function
1	⏚	Functional earth ground (FE)
2	0 V	Supply voltage 0 V (GND)
3	⎓ 24 V	Supply voltage ⎓ 24 V

DANGER: Hazardous voltages
Hazardous voltages can exist inside electrical installations that can pose a danger to humans. Coming in contact with live parts may result in electric shock!

NOTICE: Damage
Cables with finely stranded copper conductors with a minimum cross-section of 0.75 mm² (18 AWG) and a maximum cross-section of 2.5 mm² (14 AWG) must be used for the supply voltage.
You must adhere to the following torques at the connector:
Screw connection of terminal blocks: 0.22 Nm (minimal) to 0.25 Nm (maximum)
Screw flange: 0.3 Nm (maximum)

Use the following procedure to connect the device to the supply voltage:

1. Strip approx. 30 mm (1.181") off the outer cable sheath and approx. 5 mm (0.197") off the wires.

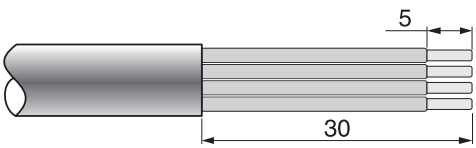

Figure 2-20 Preparing the cable

2. Fit the wires with wire end ferrules and connect the wires to the socket strip.
3. Plug the socket strip onto pin strip X1.
4. Secure the socket strip in place with a screw-type locking to prevent it from slipping out.

2.3.2 Grounding

The grounding is performed with a slip-on sleeve (noiseless ground / functional earth ground).

NOTICE: Damage
A separate copper conductor must always be provided for the grounding. The conductor must have a minimum cross-section of 1.5 mm^2 (16 AWG) and must be kept as short as possible.

1. Strip approx. 5 mm (0.197") off the wires.
2. Fit the stripped wires with a slip-on sleeve.
3. Plug the slip-on sleeve on the flat tab.

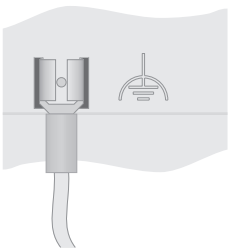

Figure 2-21 Noiseless ground

2.4 Switching On

When switching on the operating system loads. The interface for microSDHC cards is available for applications and other data.

Please also pay attention to the further information in the user manual of your software option at phoenixcontact.net/products.

2.5 Identification

The operating device can be identified using the nameplate on the rear of the device.

Figure 2-22 Nameplate (example)

1 Article Number, Device Type
2 Version Software (at time of delivery)
3 Orderkey
4 MAC Address(es)
5 Voltage and Current
6 Serial Number

2.5.1 Orderkey

The configuration of the operating device can be read from the options in the orderkey on the nameplate.

Table 2-2 Orderkey

Key	Option	Configuration
D31	Display	7" LCD projected capacitive
D36	Display	7" LCD resistive
D35	Display	10,1" LCD projected capacitive
D33	Display	12,1" LCD projected capacitive
D28	Display	15.6" LCD projected capacitive
D29	Display	18.5" LCD projected capacitive

Table 2-2 Orderkey

Key	Option	Configuration
P29	Processor	ARM Cortex-A53, 4x 1.2 GHz
P31	Processor	ARM Cortex-A53, 4x 1.2 GHz TPM
R34	Main memory	1 GB LPDDR3
M76	Master storage	8 GB eMMC Flash
O00	Options	No options

3 Control and Display Elements

3.1 Touchscreen

The device is equipped with a touch screen. You operate the device using this touch screen.

Note the following for devices equipped with a resistive 4-wire touch screen:

NOTICE: Damage
Pointed or sharp objects, such as pens or fingernails, can lead to irreparable damages of the touch screen. Exclusively therefore use the fingertips or the aids indicated in the technical data for the operation.

3.2 Display

DANGER: Toxic
If the display is damaged, avoid touching, swallowing or breathing in the liquids or gases which may leak out!

DANGER: Corrosive
If the display is damaged, avoid touching, swallowing or breathing in the liquids or gases which may leak out!

Pixel failures, which can occur with TFT displays, are due to production and no complaint reason!

The operating device is equipped with different displays (see technical data) depending on variant.

3.3 Status LEDs

Next to the slot for the microSD / microSDHC memory card there are status LEDs.

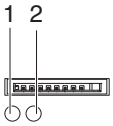

Figure 3-1 Position of the status LEDs

The status LEDs have the following functions:

Table 3-1 Status LEDs

LED	Color	State	Designation	Function
1	Green	Flashing	Heartbeat	The bootloader and the image has been started
		Off		The operating device could not be started properly
2	Green	On	Power	Supply voltage available
		Off		Supply voltage not available

4 Interfaces of the Device

4.1 Standard Interfaces

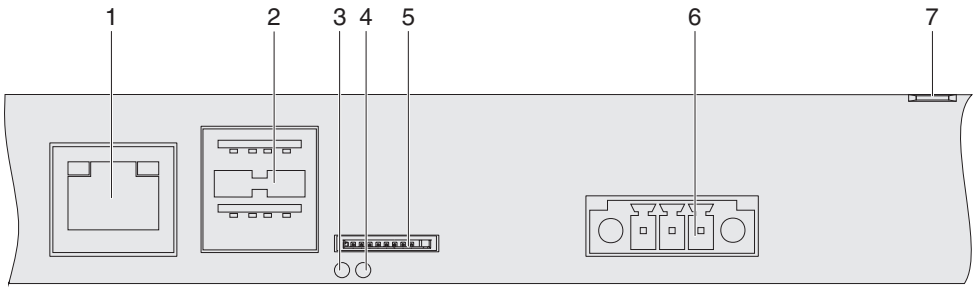

Figure 4-1 Rear view Ethernet

1 Female Connector X5 (Ethernet)
2 Female Connector X9, X10 (USB Host - Type A)
3 Status LED LD1 (Heartbeat)
4 Status LED LD2 (Power)
5 Slot for microSD- / microSDHC Memory Card
6 Connector X1 (Supply Voltage)
7 Flat Push-on Connection for Noiseless Grounding

4.1.1 Ethernet (X5)

A 10/100Base-T Ethernet interface is located at the operating device.

4.1.1.1 Pin Assignment

Connector in the operating device: RJ45 female connector.

Table 4-1 Assignment of the Ethernet interface

Pin	Designation	Function
1	Tx+	Transmitted Data, Positive Polarity
2	Tx-	Transmitted Data, Negative Polarity
3	Rx+	Received Data, Positive Polarity
4	n.c.	Not Connected
5	n.c.	Not Connected
6	Rx-	Received Data, Negative Polarity
7	n.c.	Not Connected
8	n.c.	Not Connected

4.1.1.2 Cable

NOTICE
Use a twisted pair cable of category 5 (CAT 5). The maximum cable length is 100 m (328.084 feet).

See the IEEE 802.3 standard for further information.

4.1.1.3 Diagnostics

Ethernet diagnostics LEDs are located at the operating device.

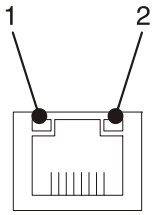

Figure 4-2 Position of the ethernet diagnostics LEDs

Table 4-2 Ethernet diagnostics LEDs

LED	Color	State	Designation	Function
1	Green	On	ACT/LNK	Connected
		Flashing		Sending / receiving ethernet data telegram
2	Yellow	On	SPD 10/100	Operation in 100 MBit/s mode
		Off		Operation in 10 MBit/s mode or disconnected

4.1.2 USB (X9, X10)

Two host interfaces are available on the operating device.

NOTICE:
Using hardware not suitable for industrial use (for example keyboard, mouse, memory card) in industrial environments may decrease safety of operation. This includes hardware intended for home and office use.

4.1.2.1 Cable

For the specification of a suitable cable, please refer to the „Universal Serial Bus Specification“.

NOTICE:
Use industrial-suited USB cables with a length of maximally 2.5 m (8.202 feet).

4.1.3 Memory Card

At the underside of the operating device you can plug in an microSD / microSDHC card.

NOTICE:
Using hardware not suitable for industrial use (for example keyboard, mouse, memory card) in industrial environments may decrease safety of operation. This includes hardware intended for home and office use.

4.1.3.1 Inserting the memory card

When you insert the memory card, make sure the front side (side with contacts is below) of the memory card is visible. Insert the memory card until it snaps into place.

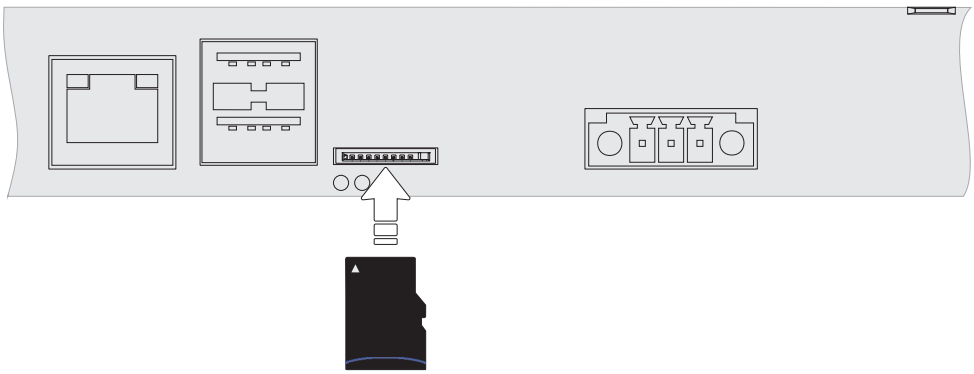

Figure 4-3 Inserting the memory card

4.1.3.2 Ejecting the memory card

To remove, push the memory card into the operating device until it clicks. The memory card bounces when released automatically out of the operating device. Now you can remove the memory card.

5 Maintenance and Servicing

5.1 Front Panel

Use a damp cloth to remove any dirt from the front panel. You also can use Isopropanol for stronger pollutions.

5.2 Fuse

NOTICE: Damage
The semiconductor fuse cannot be replaced!

A semiconductor fuse is used to protect the device. Once the fuse has been tripped, the device must be disconnected from the supply voltage to allow the semiconductor fuse to regenerate. At an ambient temperature of 20 °C (68 °F), the regeneration takes approximately 20 seconds. The higher the ambient temperature, the longer the regeneration takes.

6 Technical Data

6.1 General

Ethernet	
X5 Ethernet	10/100Base-T

USB	
Corresponds to the „Universal serial bus specification Rev. 2.0“	
X9, X10 Host	Min.: 1.5 Mbit/s Max.: 12 Mbit/s Max. output current 100 mA per output

Beeper	
Sound pressure level	At most 85 db at a distance of 10 (3.937“) cm without shielding. The sound pressure level of the mounted operating device is dependent on the shielding at the mounting place.

Central Processing Unit	
Central processing unit	ARM Cortex™-A53
Clock frequency	1,2 GHz quad-core
Other features	Real-time clock (typical deviation is approx. 2 minutes per month)

Real-time Clock
The real-time clock is buffered with a capacitor. The capacitor reaches its maximum capacity after approximately 30 minutes of continuous charging. After a maximum charge, the real-time clock can be buffered approximately 10 days.

Memory	
RAM	1 GByte LPDDR3
Mass storage	8 GByte eMMC
microSD/microSDHC interface	2 GByte / 32 GByte maximum

Connection System
Male connector strip Phoenix MINI-COMBICON, 3 pin (Art.-No. 1847068)
RJ45 male connector
USB male connector type A

Standards and Guidelines	
Interference immunity	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-6-2
Emitted interference	EN 55011 limit value class A EN 55032 limit value class A EN 61000-6-4
Equipment requirements	EN 61131-2
Storage and transportation	EN 61131-2
Power supply	EN 61131-2
Electromagnetic compatibility	2014/30/EU
Degrees of protection	EN 60529
Impact load, shocks	EN 60068-2-27
Sinusoidal vibrations	EN 60068-2-6

NOTICE: Radio Interference
Operation of this device may cause radio interference in residential areas.

6.2 7" Display (resistive)

Touch Screen	
Type	Analog resistive, 4 wire technology
Activation force	15 g (Standard) With R8 HS60 silicon rubber
Durability	No damages or malfunctions after 3 million keystrokes as the following: Keystroke element: R8, HS40 silicon rubber Keystroke load: 150 g Keystroke frequency: 3 Hz

Display	
Size (diagonal) in cm (inch)	17.78 (7)
Type	TFT (color)
Resolution (pixels)	800 x 480
Colors	262144
Viewing angle (left / right / up / down) in °	70 / 70 / 65 / 65
Half-life backlighting	40,000 h
Brightness in cd/m^2	350
Display area (H x W) in mm (Inch)	91.4 x 152.4 (3.598 x 6.0)

Environmental Conditions	
Temperature during operation	0 °C to 50 °C (32 °F to 122 °F) - (with order key option P29 / P31)
Temperature during storage, transport	- 25 °C to + 70 °C (- 13°F to + 158 °F)
Relative air humidity for operation and storage	20 % to 85 %, no condensation
Application area	Degree of pollution 2, overvoltage category II No direct solar radiation

Electrical Data	
Supply voltage	24 V DC (SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.4 A
Connected load	9.6 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	147 x 203 x 5 (5.787 x 7.992 x 0.197)
Seal	Circumferential rubber seal on the rear
Mounting cutout (H x W) in mm (Inch)	139 x 195 (5.7472 x 7.677)
Mounting brackets	6
Mounting depth in mm (Inch)	About 43 mm (1.692)
Degree of protection	Front: IP65 / NEMA Enclosure Type 1 (indoor use only) Rear: IP20
Total weight	About 750 g

Approvals	
CE approval	CE
UL approval	UL / cUL

6.3 7" Display (PCAP)

Touch Screen	
Type	Projected capacitive
Operation	With the finger

Display	
Size (diagonal) in cm (inch)	17.78 (7)
Type	TFT (color)
Resolution (pixels)	1280 x 800
Colors	16.77 million
Viewing angle (left / right / up / down) in °	85 / 85 / 85 / 85
Half-life backlighting	50,000 h
Brightness in cd/m^2	500
Display area (H x W) in mm (Inch)	91.4 x 152.4 (3.598 x 6.0)

Environmental Conditions	
Temperature during operation	0 °C to 50 °C (32 °F to 122 °F) - (with order key option P29 / P31)
Temperature during storage, transport	- 20 °C to + 60 °C (- 4 °F to 140 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 %, no condensation Rear: 20 % to 85 %, no condensation
Application area	Degree of pollution 2, overvoltage category II No direct solar radiation

Electrical Data	
Supply voltage	24 V DC (SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.4 A
Connected load	9.6 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	146.2 x 185.5 x 6 (5.755 x 7.303 x 0.236)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	136 x 175 (5.354 x 6.889)

Front Panel and Enclosure	
Mounting brackets	6
Mounting depth in mm (Inch)	About 45 (1.771)
Degree of protection	Front: IP65 / NEMA Enclosure Type 4 (indoor use only) Rear: IP20
Total weight	About 760 g

Approvals	
CE approval	CE
UL approval	UL / cUL

6.4 10.1" Display (PCAP)

Touch Screen	
Type	Projected capacitive
Operation	With the finger

Display	
Size (diagonal) in cm (inch)	25.65 (10.1)
Type	TFT (color)
Resolution (pixels)	1280 x 800
Colors	16.77 million
Viewing angle (left / right / up / down) in °	85 / 85 / 85 / 85
Half-life backlighting	50,000 h
Brightness in cd/m^2	850
Display area (H x W) in mm (Inch)	217 x 136 (8.543 x 5.354)

Environmental Conditions	
Temperature during operation	0 °C to 50 °C (32 °F to 122 °F) - (with order key option P29 / P31)
Temperature during storage, transport	- 20 °C to + 60 °C (- 4 °F to 140 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 %, no condensation Rear: 20 % to 85 %, no condensation
Application area	Degree of pollution 2, overvoltage category II No direct solar radiation

Electrical Data	
Supply voltage	24 V DC (SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.6 A
Connected load	14.4 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	199.3 x 262.7 x 6 (7.846 x 10.342 x 0.236)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	189 x 252 (7.44 x 9.921)

Front Panel and Enclosure	
Mounting brackets	6
Mounting depth in mm (Inch)	About 45 (1.771)
Degree of protection	Front: IP65 / NEMA Enclosure Type 4 (indoor use only) Rear: IP20
Total weight	About 1270 g

Approvals	
CE approval	CE
UL approval	UL / cUL

6.5 12.1" Display (PCAP)

Touch Screen	
Type	Projected capacitive
Operation	With the finger

Display	
Size (diagonal) in cm (inch)	30.73 (12.1)
Type	TFT (color)
Resolution (pixels)	1280 x 800
Colors	16.77 million
Viewing angle (left / right / up / down) in °	85 / 85 / 85 / 85
Half-life backlighting	50,000 h
Brightness in cd/m^2	380
Display area (H x W) in mm (Inch)	163.2 x 261.1 (6.425 x 10.28)

Environmental Conditions	
Temperature during operation	0 °C to 50 °C (32 °F to 122 °F) - (with order key option P29 / P31)
Temperature during storage, transport	- 20 °C to + 60 °C (- 4 °F to 140 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 %, no condensation Rear: 20 % to 85 %, no condensation
Application area	Degree of pollution 2, overvoltage category II No direct solar radiation

Electrical Data	
Supply voltage	24 V DC (SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	0.7 A
Connected load	16.8 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	229 x 302 x 6 (9.015 x 11.889 x 0.236)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	219 x 292 (8.622 x 11.496)

Front Panel and Enclosure	
Mounting brackets	8
Mounting depth in mm (Inch)	About 45 (1.771)
Degree of protection	Front: IP65 / NEMA Enclosure Type 4 (indoor use only) Rear: IP20
Total weight	About 1650 g

Approvals	
CE approval	CE
UL approval	UL / cUL

6.6 15.6" Display (PCAP)

Touch Screen	
Type	Projected capacitive
Operation	With the finger

Display	
Size (diagonal) in cm (inch)	39.6 (15.6)
Type	TFT (color)
Resolution (pixels)	1366 x 768
Colors	16.77 million
Viewing angle (left / right / up / down) in °	80 / 80 / 80 / 80
Half-life backlighting	70.000 h
Brightness in cd/m^2	320
Display area (H x W) in mm (Inch)	194 x 344 (7.637 x 13.543)

Environmental Conditions	
Temperature during operation	0 °C to 50 °C (32 °F to 122 °F) - (with order key option P29 / P31)
Temperature during storage, transport	- 25 °C bis + 70 °C (- 13°F to + 158 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 %, no condensation Rear: 20 % to 85 %, no condensation
Application area	Degree of pollution 2, overvoltage category II No direct solar radiation

Electrical Data	
Supply voltage	24 V DC (SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption (typical at 24 V)	1 A
Connected load	24 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	278 x 436 x 6 (10.944 x 17.165 x 0.236)
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	260 x 425 (10.236 x 16.732)

Front Panel and Enclosure	
Mounting brackets	12
Mounting depth in mm (Inch)	About 53 (2.086)
Degree of protection	Front: IP65 / NEMA Enclosure Type 1 (indoor use only) Rear: IP20
Total weight	About 4000 g

Approvals	
CE approval	CE
UL approval	UL / cUL

6.7 18.5" Display (PCAP)

Touch Screen	
Type	Projected capacitive
Operation	With the finger

Display	
Size (diagonal) in cm (inch)	47 (18.5)
Type	TFT (color)
Resolution (pixels)	1366 x 768
Colors	16.77 million
Viewing angle (left / right / up / down) in °	85 / 85 / 80 / 80
Half-life backlighting	50,000 h
Brightness in cd/m^2	240
Display area (H x W) in mm (Inch)	230 x 410 (9.055 x 16.141)

Environmental Conditions	
Temperature during operation	0 °C to 50 °C (32 °F to 122 °F) - (with order key option P29 / P31)
Temperature during storage, transport	- 20 °C to + 60 °C (- 4 °F to 140 °F)
Relative air humidity for operation and storage	Front: 5 % to 95 %, no condensation Rear: 20 % to 85 %, no condensation
Application area	Degree of pollution 2, overvoltage category II No direct solar radiation

Electrical Data	
Supply voltage	24 V DC (SELV / Limited energy circuit in accordance with EN 61010-1 / IEC 61010-1 or Class 2 in accordance with UL 1310 or Limited Power Source (LPS) in accordance with EN 60950-1 / IEC 60950-1)
Residual ripple	10 % maximum
Minimum voltage	18 V
Maximum voltage	30 V
Power consumption, typical at 24 V (standard / field bus)	1.2 A
Connected load (standard / field bus)	28.8 W
Fuse	Semiconductor fuse, self-resetting
Protection against polarity reversal	Integrated

Front Panel and Enclosure	
Enclosure	Steel sheet, galvanized
Front panel material	Aluminium, brushed, anodized natural finish
Front panel (H x W x D) in mm (Inch)	329 x 485 x 8 (12.952 x 19.094 x 0.314)

Front Panel and Enclosure	
Seal	Flat gasket on the rear
Mounting cutout (H x W) in mm (Inch)	311 x 475 (12.244 x 18.7)
Mounting brackets	12
Mounting depth in mm (Inch) - (standard / field bus)	About 53 (2.086)
Degree of protection	Front: IP65 / NEMA Enclosure Type 1 (indoor use only) Rear: IP20
Total weight	About 5500 g

Approvals	
CE approval	CE
UL approval	UL / cUL

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