SIGMATEK

ETT 2154-W

Build-in Touch Terminal

Operating Manual

Date of creation: 20.11.2020 | Version date: 04.11.2024 | Article number: 01-230-2154-WE

Publisher: SIGMATEK GmbH & Co KG
A-5112 Lamprechtshausen
Tel.: +43/6274/4321
Fax: +43/6274/4321-18
Email: office@sigmatek.at
WWW.SIGMATEK-AUTOMATION.COM

Copyright © 2020
SIGMATEK GmbH & Co KG

Translation from German

All rights reserved. No part of this work may be reproduced, edited using an electronic system, duplicated or distributed in any form (print, photocopy, microfilm or in any other process) without express permission.

We reserve the right to make changes in the content without notice. SIGMATEK GmbH & Co KG is not responsible for technical or printing errors in this handbook and assumes no responsibility for damages that occur through its use.

Build-in Touch Terminal ETT 2154-W

The ETT 2154-W is an intelligent panel for visualizing, operating and monitoring automated processes.

A capacitive touch screen serves as the input medium for process data and parameters. The output is shown on a 21.5" TFT color display.

Via the high-performance processor, complex HTML5 applications can be displayed without problems.

The available interfaces can be used to exchange process data or configure the multi-touch terminal. An M.2 SSD serves as the storage medium for the operating system, application and application data.

Contents

1 Introduction 5

1.1 Target Group/Purpose of this Operating Manual 5

1.2 Important Reference Documentation 5

1.3 Contents of Delivery 5

2 Basic Safety Guidelines 6

2.1 Symbols Used 6

2.2 Disclaimer 8

2.3 General Safety Guidelines 9

3 Norms and Guidelines 10

3.1 Guidelines 10

3.1.1 EU Declaration of Conformity 10

4 Technical Data 11

4.1 Performance Data 11

4.2 Electrical Requirements 12

4.3 Display 13

4.4 Control Unit 13

4.5 Minimum Distance between Operating Elements for Multi-touch Applications 14

4.6 Environmental Conditions 15

4.7 Miscellaneous 15

5 Mechanical Dimensions 16

6 Interfaces 17

6.1 Connections Bottom 17

6.1.1 X1: Supply (4-pin Phoenix RM 3.5) 17

6.2 Left Side Connectors 18

6.2.1 X2: DisplayPort Output V1.2a 18

6.2.2 X3, X4: Ethernet 1, 2 10/100/1000 (RJ45) 19

6.2.3 X5-X8: USB 2.0 (Type A) 19

6.3 Applicable Connectors 19

7 Display 20

7.1 Status LEDs Front 20

8 Transport/Storage 21

9 Assembly/Installation 22

9.1 Check Contents of Delivery 22

9.2 Installation 22

9.3 Restricted Space Around Rear Trimming 23

9.4 Required Cutout for Mounting the Terminal 24

9.5 Mounting Position 25

10 Wiring 26

10.1 Ground 26

10.2 Shielding 27

10.3 ESD Protection 27

10.4 USB Interface Connections 27

11 Display “Burn-In” Effect 28

12 Buffer Battery 29

12.1 Exchanging the Battery 30

13 Maintenance 31

13.1 Cleaning the Touch Screen 31

13.2 Service 32

13.2.1 Calibrating the Touch Screen 32

13.3 Repair 32

14 Modularity 33

14.1 Removing the PIM from the Touch Panel 34

14.2 Mounting the PIM onto the Touch Panel 35

15 Disposal 36

16 Accessories 37

16.1 Battery 37

1 Introduction

1.1 Target Group/Purpose of this Operating Manual

This operating manual contains all information required to operate this product.

This operating manual is intended for:

- Project planners
- Technicians
- Commissioning engineers
- Machine operators
- Maintenance/test technicians

General knowledge of automation technology is required.

Further help and training information, as well as the appropriate accessories can be found on our website www.sigmatek-automation.com.

Our support team is also happily available to answer your questions.
Please see our website for our hotline number and business hours.

1.2 Important Reference Documentation

- PIM 051-W
- TP 2161

This and additional documents can be downloaded from our website or obtained through SIGMATEK Support.

1.3 Contents of Delivery

ETT 2154-W
14x angle bracket
1x 4-pin Phoenix connector plug

2 Basic Safety Guidelines

2.1 Symbols Used

The following symbols are used in the operator documentation for warning and danger messages, as well as informational notes:

DANGER

Danger indicates that death or serious injury **will occur**, if the specified measures are not taken.

⇨ To avoid death or serious injuries, observe the all guidelines.

Danger indique une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

⇨ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

WARNING

Warning indicates that death or serious injury **can** occur, if the specified measures are not taken.

⇨ To avoid death or serious injuries, observe the all guidelines.

Avertissement d'une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

⇨ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION

Caution indicates that moderate to slight injury **can** occur, if the specified measures are not taken.

⇨ To avoid moderate to slight injuries, observe the all guidelines.

Attention indique une situation dangereuse qui, faute de prendre les mesures adéquates, **peut** entraîner des blessures assez graves ou légères.

⇨ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

INFORMATION

Provides important information on the product, handling or relevant sections of the documentation, which require attention.

Fournit des recommendations importantes sur le produit, la manipulation ou sections relevantes de la documentation, qui nécessitent prêter une attention particulière.

Danger for ESD-sensitive components.

Les signes de danger pour les composants sensibles aux décharges électrostatiques.

2.2 Disclaimer

The contents of this operating manual were prepared with the greatest care. However, deviations cannot be ruled out. This operating manual is regularly checked and required corrections are included in the subsequent versions. The machine manufacturer is responsible for the proper assembly, as well as device configuration. The machine operator is responsible for safe handling, as well as proper operation.

The current operating manual can be found on our website. If necessary, contact our support.

Subject to technical changes, which improve the performance of the devices. The following operating manual is purely a product description. It does not guarantee properties under the warranty.

Please thoroughly read the corresponding documentation and this operating manual before handling a product.

SIGMATEK GmbH & Co KG is not liable for damages caused through non-compliance with these instructions or applicable regulations.

2.3 General Safety Guidelines

The Safety Guidelines in the other sections of this operating manual must be observed. These instructions are visually emphasized by symbols.

According to EU Guidelines, the operating instructions are a component of a product.

This operating manual must therefore be accessible in the vicinity of the machine since it contains important instructions.

This operating manual should be included in the sale, rental or transfer of the product, or its online availability indicated.

Maintain this operating manual in readable condition and keep it accessible for reference.

Regarding the requirements for Safety and health connected to the use of machines, the manufacturer must perform a risk assessment in accordance with machine guidelines 2006/42/EG before introducing a machine to the market.

Before commissioning this product, check that conformance with the provisions of the 2006/42/EG guidelines is correct. As long as the machine with which the with the product should be used does not comply with the guideline, operating this product is prohibited.

Operate the unit with devices and accessories approved by SIGMATEK only.

CAUTION

Handle the device with care and do not drop or let fall.

Prevent foreign bodies and fluids from entering the device.

The device must not be opened, otherwise it could be damaged!

The module complies with EN 61131-2.

In combination with a machine, the machine builder must comply with EN 60204-1 standards.

For your own safety and that of others, compliance with the environmental conditions is essential.

The control cabinet must be connected to ground correctly.

To perform maintenance or repairs, disconnect the system from the power supply.

3 Norms and Guidelines

3.1 Guidelines

The product was constructed in compliance with the following European Union guidelines and tested for conformity.

3.1.1 EU Declaration of Conformity

CE

EU Declaration of Conformity

The product ETT 2154-W conforms to the following European guidelines:

- **2014/35/EU** Low-voltage guideline
- **2014/30/EU** “Electromagnetic Compatibility” (EMC guideline)
- **2011/65/EU** “Restricted use of certain hazardous substances in electrical and electronic equipment” (RoHS Guideline)

The EU Conformity Declarations are provided on the SIGMATEK website. See: Products/downloads or use the search function and keyword “EU Declaration of Conformity”.

4 Technical Data

4.1 Performance Data

Processor	Intel® Celeron® J5005
Processor cores	4
Processor clock	1.5-2.8 GHz
Internal cache	4 Mbytes
Internal program and data memory (RAM)	4-Gbyte DDR4 (SODIMM)
Graphics	Intel® UHD Graphics 605
Hard drive	64-Gbyte SATA M.2 SSD
Interfaces	4x USB 2.0 (Type A) 1x DisplayPort output V1.2a (max. 1920 x 1200 px at 60 Hz) 2x Ethernet (Gbit)
Default IP address Intel Ethernet (X3) Realtek Ethernet (X4)	 automatic (DHCP) automatic (DHCP)
Internal interfaces	1x Panel Interface Connector
Signal generator	no
Display Resolution	21.5“ TFT color display Full HD 1920 x 1080 pixels
Operating panel	touch screen (projective capacitive)
Status LEDs	1x red, 1x green
Real-time clock	yes
Cooling	passive (fanless)

4.2 Electrical Requirements

Supply voltage	+24 V DC ±20 % (SELV/PELV) UL Class 2 or LVLC[1]	
Current consumption of (+24 V) power supply	typically 1650 mA (without externally connected devices)	maximum 2150 mA (with external devices connected)
Inrush current with 24 V/10 A fixed voltage supply	maximum 2.2 A (for 1.8 ms, load-dependent)	
Inrush current without current-limiting supply	maximum 3.5 A (for 6 µs, load-dependent)	

[1] For USA and Canada:

The supply must be limited to:
a) max. 5 A at voltages from 0-20 V DC, or
b) 100 W at voltages from 20-60 V DC.

The limiting component (e.g. transformer, power supply or fuse) must be certified by an NRTL (Nationally Recognized Testing Laboratory).

4.3 Display

Type	21.5” TN color display
Resolution	FullHD 1920 x 1080 pixels
Color depth	24-bit RGB
LCD mode	normally black (1)
LCD Polarizer	transmissive (2)
Pixel size	0.248 x 0.248 mm
Active surface	476.64 x 268.11
Backlighting	LED
Contrast ratio	typically 5000:1
Brightness	typically 300 cd/m²
Angle CR ≥ 10	left, right, top, bottom typically 89°
Life span	by compliance with the ambient conditions, the brightness of the display sinks after 50,000 operating hours to 50 % of the original brightness

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

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

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

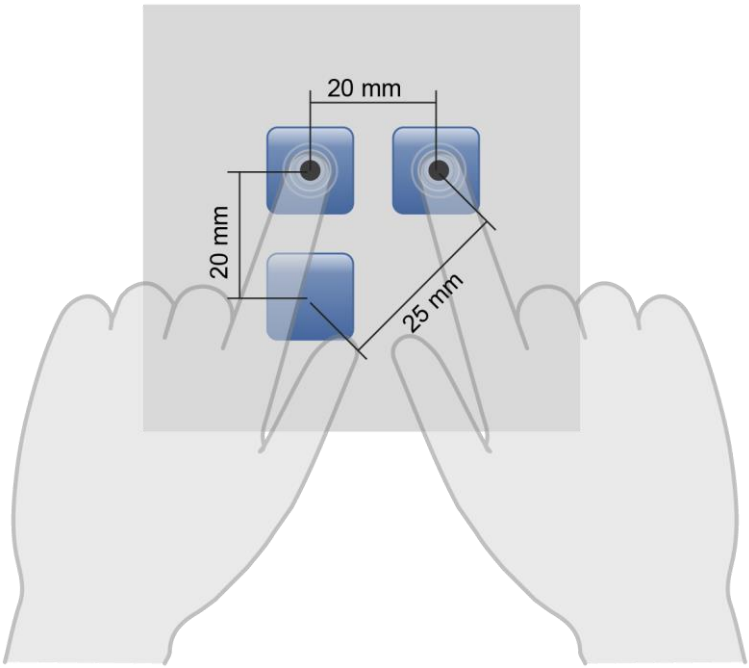
4.4 Control Unit

Touch panel	projective capacitive touch panel
Cleaning	see chapter 13.1.

A projective capacitive touch screen is built into the panel, with which 10-finger input, Zoom and gesture functions can be implemented. Data can be input using fingers, a project capacitive touch pen as well as with thin gloves. The device must always be grounded to ensure stable function of the touch screen. The touch function may still have to be individually adapted to the respective environmental conditions.

4.5 Minimum Distance between Operating Elements for Multi-touch Applications

To guarantee smooth operation with multitouch applications, buttons and control elements that should be operated at the same time must have the minimum clearance shown below (depending on the estimated touch point).



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

4.6 Environmental Conditions

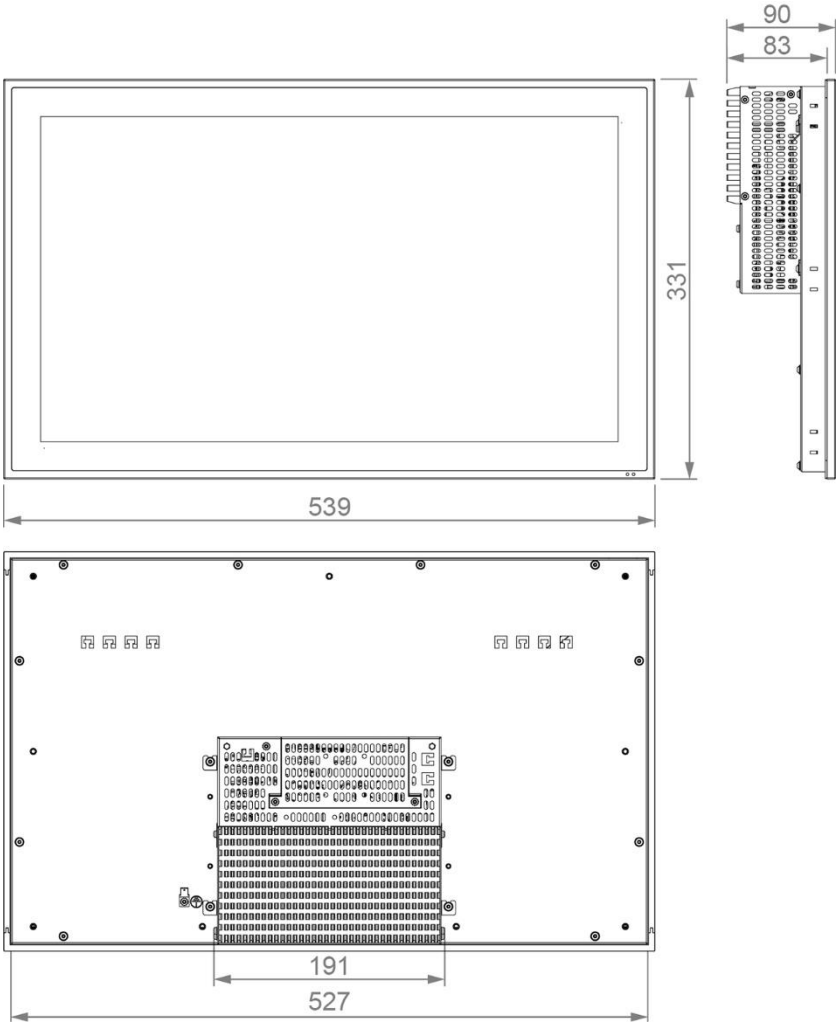
Storage temperature	-10 ... +70 °C	
Environmental temperature	0 ... +50 °C	
Humidity	10-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m with derating of the maximum environment temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
EMC resistance	in accordance with EN 61000-6-2 (industrial area)	
EMC noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	5-200 Hz: amplitude 3.5 mm Transition frequency: 8.42454 Hz acceleration: 1 g duration: 10 cycles cycle: 1 octave/minute
Shock resistance	EN 60068-2-27	15 g (147.15 m/s²)
Protection type	EN 60529 protected through the housing	front: IP65 (1) cover IP20 (1)

(1) IP housing protection type was tested for Europe and is not part of a UL-certification for the device

4.7 Miscellaneous

Article number	01-230-2154-W
Hardware version	1.x
Operating system	Windows 10 IOT
Approvals	CE; ETT 2154-W consists of a TP 2161 ($_{c}UL_{US}$ (E247993)) and a PIM 051-W (designed according to UL)

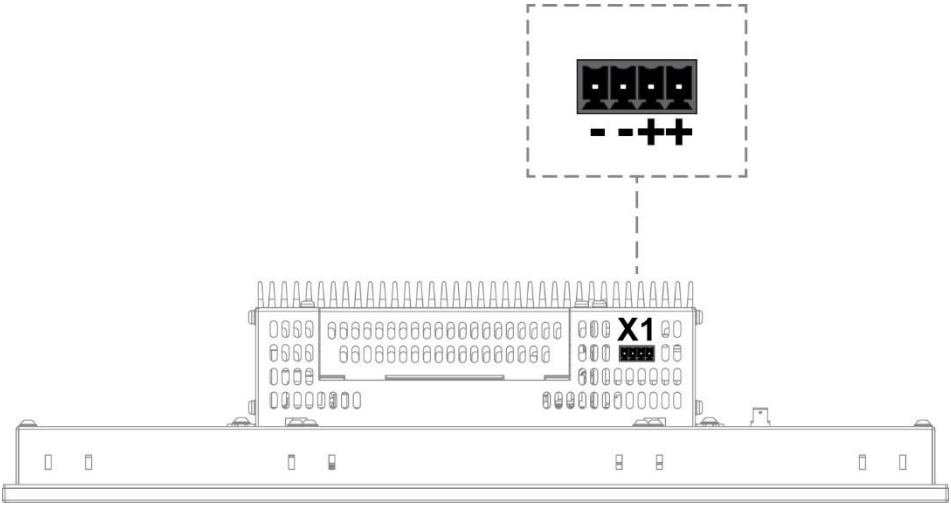
5 Mechanical Dimensions



Dimensions	539 x 331 x 90 mm (W x H x D)
Material	front plate: 2.8 mm glass (touch screen) in black anodized aluminum frame housing: sheet steel heat sink: anodized aluminum
Weight	6.5 kg

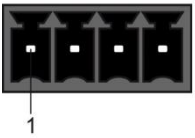
6 Interfaces

6.1 Connections Bottom

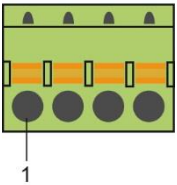


Symbol Image ETT 1544

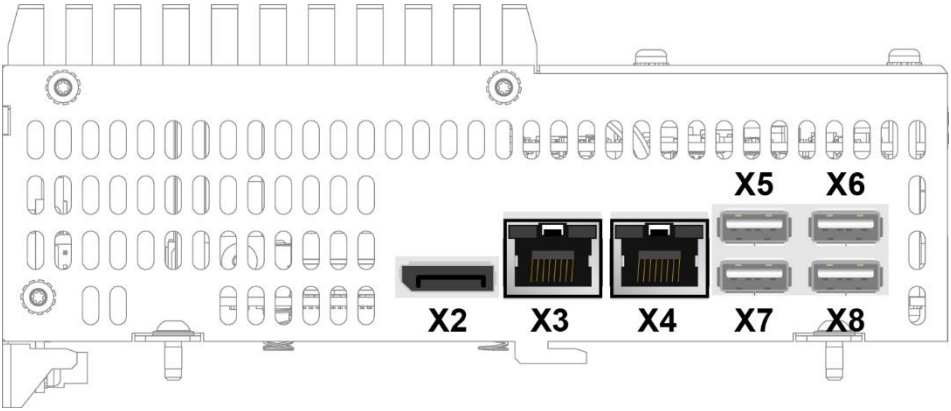
6.1.1 X1: Supply (4-pin Phoenix RM 3.5)



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

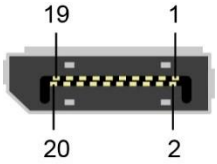


6.2 Left Side Connectors



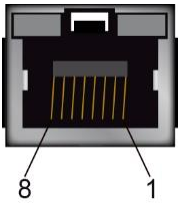
Symbol Image ETT 1544

6.2.1 X2: DisplayPort Output V1.2a



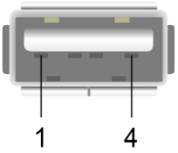
Pin	Function
1	Lane 0 (p)
2	GND
3	Lane 0 (n)
4	Lane 1 (p)
5	GND
6	Lane 1 (n)
7	Lane 2 (p)
8	GND
9	Lane 2 (n)
10	Lane 3 (p)
11	GND
12	Lane 3 (n)
13	Config1
14	Config2
15	AUX CH (p)
16	GND
17	AUX CH (n)
18	Hot Plug
19	Return
20	DP_VCC_3V3

6.2.2 X3, X4: Ethernet 1, 2 10/100/1000 (RJ45)



Pin	Function
1	DA+
2	DA-
3	DB+
4	DC+
5	DC-
6	DB-
7	DD+
8	DD-

6.2.3 X5-X8: USB 2.0 (Type A)



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

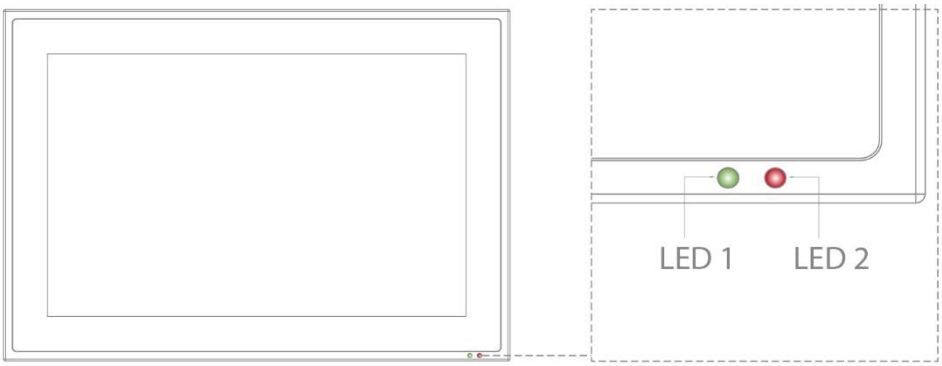
It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. It is also possible that these devices will not be detected at the USB port or function correctly. Therefore, it is recommended that every USB stick be tested before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

6.3 Applicable Connectors

X1: 4-pin Phoenix plug with spring terminal FK-MCP 1.5/ 4-ST-3.5 (included with delivery)
X2: 20-pin DisplayPort connector (not included in delivery)
X3, X4: 8-pin RJ45 (not included in delivery)
X5-X8: USB 4-pin, Type A (downstream connector) (not included with delivery)

7 Display

7.1 Status LEDs Front



LED	LED Status	Definition
1	green	DCOK
2	red	not available

8 Transport/Storage

This device contains sensitive electronics. During transport and storage, high mechanical stress must therefore be avoided.

For storage and transport, the same values for humidity and vibration as for operation must be maintained!

During transport, temperature and humidity fluctuations may occur. Ensure that no moisture condenses within or on the device be letting the device climatize to the room temperature while turned off.

9 Assembly/Installation

9.1 Check Contents of Delivery

Ensure that the contents of the delivery are complete and intact. See chapter 1.3Contents of Delivery for more information.

On receipt and before initial use, check the device for damage. If the device is damaged, contact our customer service and do not install the device in your system.

Damaged components can disrupt or damage the system.

9.2 Installation

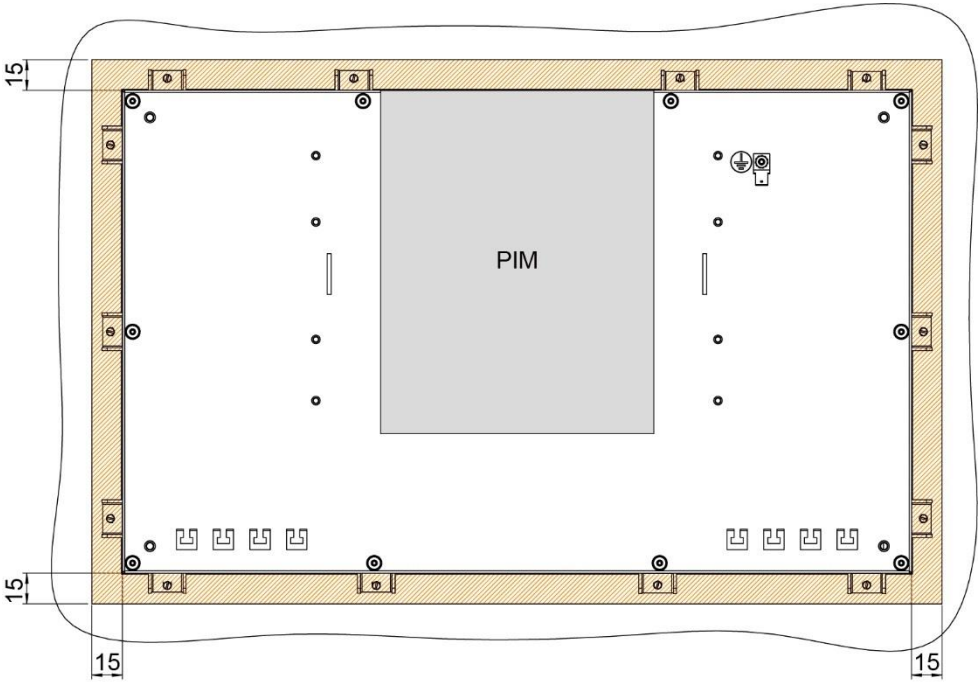
The following instructions must be followed when installing the terminal:

- For installation with the screw terminals provided, it is recommended that the installation panel have a material strength of at least 1 mm and a maximum of 2 mm. The screw-in brackets can be tightened with a maximum torque of 0.2 Nm. For this purpose, a 3x 0.5 flat-tip screwdriver is required.
- To avoid damage to the aluminum frame, it is important to ensure that during installation, the contact surface is clean (free of debris, uneven areas). Unevenness can lead to stress on the glass/aluminum frame or contamination from dust and water.

To dissipate the waste heats from the device, the clearance between the heatsink of the PIM and the back wall should be at least 45 mm.

The device's power loss can reach up to 34 Watts. To ensure the necessary air circulation for cooling, the mounting instructions must be followed!

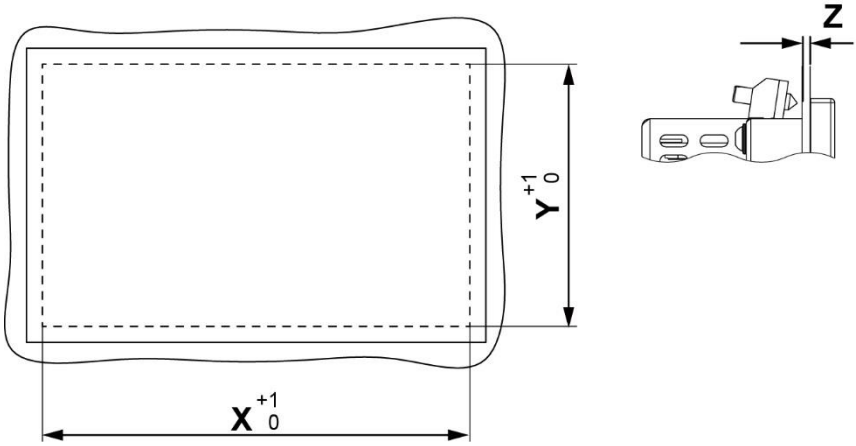
9.3 Restricted Space Around Rear Trimming



Symbol Image ETT 1544

A restricted area of 15 mm around the terminal must be ensured. This is required to mount the terminal onto the machine using the screw terminals provided and when necessary, exchange the module without having to remove the entire device.

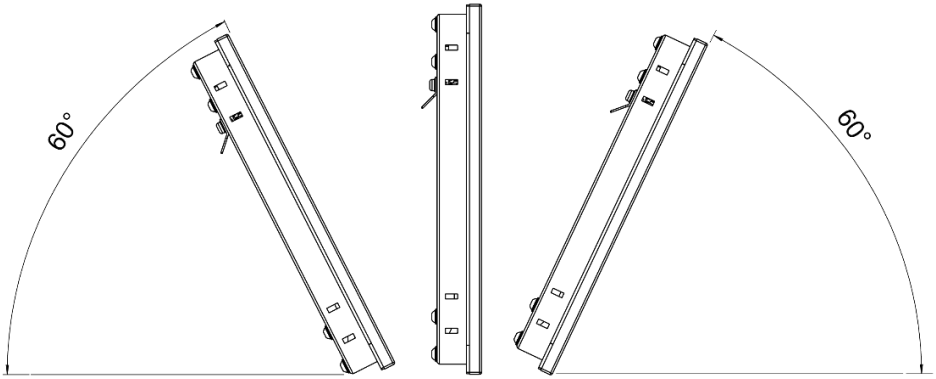
9.4 Required Cutout for Mounting the Terminal



Control cabinet cutout width X	528 mm
Control cabinet cutout height Y	320 mm
Maximum thickness of control cabinet wall Z	3 mm

9.5 Mounting Position

Note the mounting position of 60-120°.

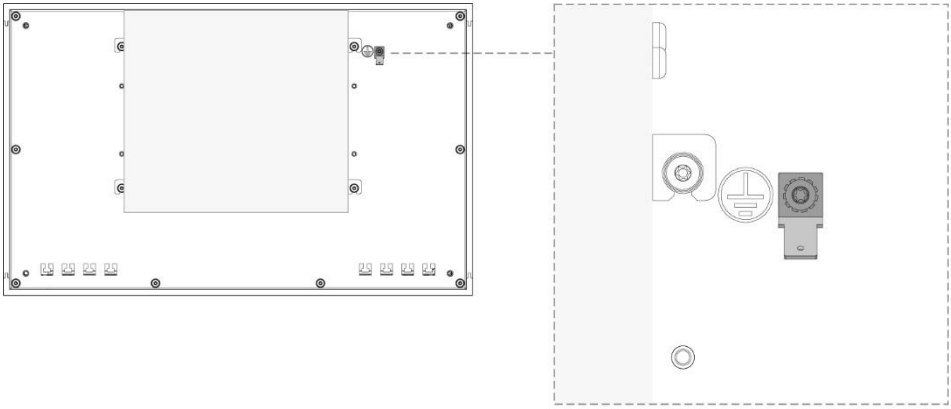


The specified installation distances may be reduced if appropriate measures and technical precautions are taken to dissipate the corresponding power loss.

10 Wiring

10.1 Ground

The device must be grounded to protective earth (PE) via the blade terminal provided. In addition, ensure that when installing into the control cabinet, a large grounding surface is provided. It is important to establish a low-Ohm connection to ground to ensure error-free function. The ground connection must be made with the maximum wire cross-section and largest (electrical) surface possible. The cable length of the ground connection must also be kept as short as possible.



Symbol Image ETT 1544

10.2 Shielding

For Ethernet, **CAT5e-compliant** cables are recommended. The cable shielding is connected to ground via the RJ45 connector. Noise signals can then be prevented from reaching the electronics and affecting the function.

10.3 ESD Protection

Typically, USB devices (keyboard, mouse etc.) are not equipped with shielded cables. These devices are disrupted by electrostatic discharge and in some instances, no longer function.

Before any device is connected to- or disconnected from the product, the potential with ground must be equalized (by touching the control cabinet or ground terminal). Electrostatic loads (through clothing or shoes) can be thereby dissipated.

10.4 USB Interface Connections

The product has a USB interface. This interface can be used to connect various USB devices (keyboard, mouse, storage media, hubs, etc.). Several USB devices can be connected using a hub, which are then fully functional.

11 Display “Burn-In” Effect

The “Burn-In” effect describes a pattern burned into the display after displaying the same contents over a longer period of time (e.g. a single screen).
This effect is also described mostly as “image sticking”, “memory effect/sticking” or “ghost image”. Here, a distinction is made between a temporary and permanent effect. While the temporary effect fades after the screen has been turned off for some time or when dynamic content is displayed, damage from the permanent effect is irreversible.

This effect can have the following causes:

- Operation without a screen saver
- The same contents displayed over a longer time period (e.g. a single screen)
- Operation at high ambient temperatures
- Operation above specifications

The effect can be avoided/reduced by the following actions:

- Using a screen saver
- Deactivating the display when not in use (e.g. screen display black)
- Continuously changing screen content (e.g. video)

Deactivating the display backlighting only does not prevent Burn-In!

12 Buffer Battery

The exchangeable buffer battery ensures that the clock time and customer-defined BIOS settings are preserved in the absence of a supply voltage. A lithium battery is installed at the manufacturer.

The battery has enough capacity to preserve data in the absence of a supply voltage for approximately 5 years.

If the battery is empty, all BIOS settings and the clock time are reset to the factory defaults and existing SRAM data is deleted.

	COMPANY	DATA
Lithium battery	RENATA	3.0 V/225 mAh

Battery order number: 01-690-028

Use type CR2032 batteries from RENATA only.

Disconnect the device from the supply before changing the battery.

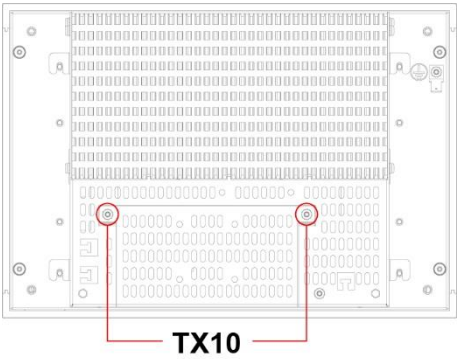
WARNING

Danger of fire and explosion!

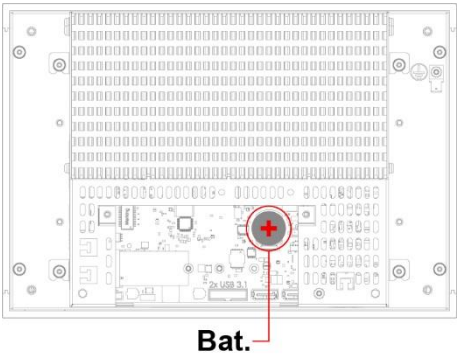
Slight to serious injuries can occur from incorrect use of the battery.

Do not recharge, disassemble or throw batteries into fire!

12.1 Exchanging the Battery



1. Turn off the device supply.
2. Remove the locking screws in the battery cover with a TX10 Torx screwdriver.
3. Remove the battery cover.



4. To remove the battery from the holder press the gold tab of the battery holder away from the battery.
5. Caution! The battery easily spring out of the holder, it is recommended that the tab is fixed in position when pulling it back.
6. Install the new battery with the correct polarity (+ pole facing up). To install, first slide the battery underneath the plastic hooks and then with slight force, press down on the side with the gold tab.
7. Close the battery cover and tighten the locking screws.

13 Maintenance

During maintenance as well as servicing, the safety instructions from chapter 2must be observed.

13.1 Cleaning the Touch Screen

CAUTION

Before cleaning the touch screen, it must be deactivated in order to prevent triggering functions or commands unintentionally; either by turning of the terminal or disabling the touch screen via the application!

The touch screen can only be cleaned with a soft, damp cloth. To dampen the cloth, we recommend a mild cleaning solution such as antistatic foam cleaner. To avoid fluids/cleaning solutions from getting into the housing, the device must not be sprayed directly. To clean, no erosive cleaning solutions, chemicals, abrasive cleansers or hard objects that can scratch or damage the touch screen may be used. The use of steam jets or compressed air is prohibited.

WARNING

If the device is contaminated with toxic or erosive chemicals, it must be carefully cleaned as quickly as possible to prevent personal injury and machine damage!

To ensure the optimal function of the panel, the touch screen should be cleaned in regular intervals!

13.2 Service

This product was constructed for low-maintenance operation.

13.2.1 Calibrating the Touch Screen

The touch screen is calibrated at the factory. You should therefore only recalibrate the touch screen when press-point changes are noticed.

13.3 Repair

When sent for repair, the panel should be transported in the original packaging if possible. Otherwise packaging should be selected that sufficiently protects the product from external mechanical influences, such as cardboard filled with air cushioning.

In the event of a defect/repair, send the panel with a detailed error description to the address listed at the beginning of this document.

14 Modularity

Through its modular construction, the device is prepared for a simple exchange of components. This makes it possible in the future, to adapt the touch panel (TP) or panel interface module (PIM) to actual system requirements.

The device is not Hot-Plug capable and can be damaged when the supply is not disconnected before inserting or removing the PIM.

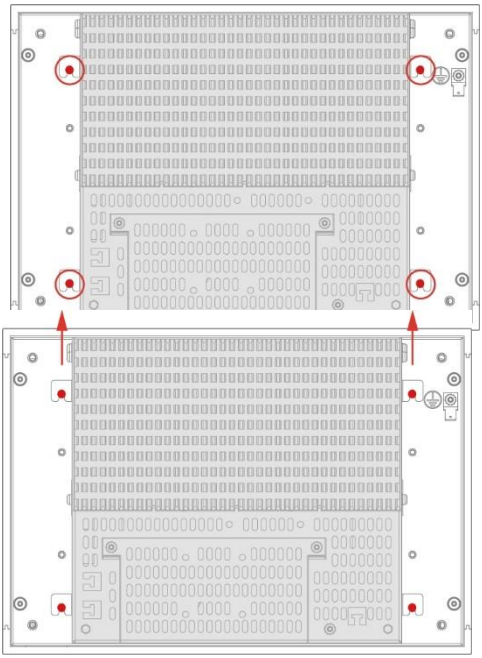
Always disconnect the supply before inserting or removing.

14.1 Removing the PIM from the Touch Panel

This product is a sensitive electronic device. When mounting, as well as dismantling, note that you come into contact with ESD-sensitive areas of the device.

The applicable ESD measures must be taken!

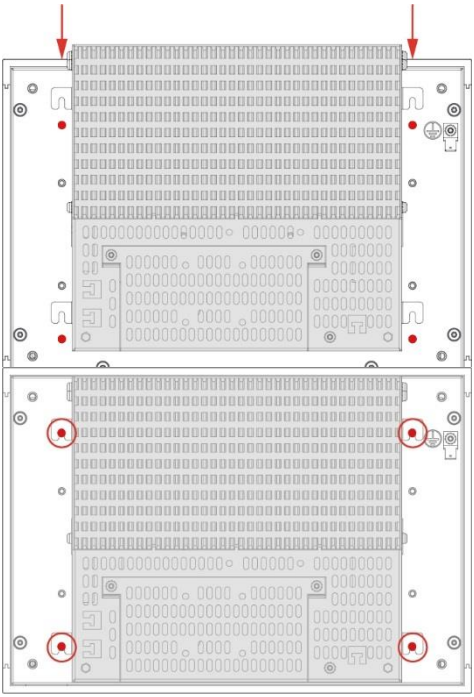
To remove a PIM from a TP, follow the steps below:



1. Ensure that an ESD-compliant working method is followed (ESD armband, ESD clothing).
2. Disconnect the device from the supply.
3. Place the TP flat on its back.
4. Loosen the 4 screws with a TX10 screwdriver
5. Slide the PIM in the direction of the upward as shown.
6. Remove the PIM from the TP.

14.2 Mounting the PIM onto the Touch Panel

To mount the PIM on a TP, follow the steps below:



7. Ensure that an ESD-compliant working method is followed (ESD armband, ESD clothing).
8. Disconnect the device from the supply.
9. Place the TP flat on its back.
10. Place the PIM onto the TP so that the locking clamps of the PIM are securely held in the notches of the TP.
11. Slide the PIM in the direction of the arrows shown.
12. When locking, a “click” can be clearly heard and the thin upper section of the PIM is flush with the housing of the TP.
13. Secure the PIM to the TP using the four screws provided and a TX-10 Torx screwdriver with a torque of 0.7 Nm.

15 Disposal

Should you need to dispose of the device, the national electronic scrap regulation must be observed.

The panel cannot be discarded with domestic waste.

16 Accessories

16.1 Battery

Description	Order Number
Lithium battery RENATA with 20 mm tab (one-sided)	01-690-028

Documentation Changes

Change date	Affected page(s)	Chapter	Note
09.04.2021	11	4.1 Performance Data	Hard drive changed to 64-Gbyte
04.11.2024	29	12 Buffer Battery	Battery data changed