

# **ETT 1544**

## **Build-in Touch Terminal**

### **Operating Manual**

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### **Translation from German**

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## Build-in Touch Terminal

## ETT 1544

The ETT 1544 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 15.6" 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.



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# 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](http://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 041
- TP 1561
- HW IP Address Settings

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

## 1.3 Contents of Delivery

ETT 1544

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 recommandations importantes sur le produit, la manipulation ou sections pertinentes 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.

## 2.4 Software/Training

The application is created with the software LASAL CLASS 2 and LASAL SCREEN Editor.

Training for the LASAL development environment, with which the product can be configured, is provided. Information on our training schedule can be found on our website.

## 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



---

#### EU Declaration of Conformity

The product ETT 1544 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”.

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# 4 Technical Data

## 4.1 Performance Data

|                                        |                                                                                                         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| Processor                              | Intel® Celeron® J4005                                                                                   |
| Processor cores                        | 2 <sup>1)</sup>                                                                                         |
| Processor clock                        | 2.0-2.7 GHz                                                                                             |
| Internal cache                         | 4 Mbytes                                                                                                |
| Internal program and data memory (RAM) | 4-Gbyte DDR4 (SODIMM)                                                                                   |
| Graphics                               | Intel® UHD Graphics 600                                                                                 |
| Hard drive                             | 128-Gbyte SATA M.2 SSD                                                                                  |
| Interfaces                             | 4x USB 2.0 (Type A)<br>1x DisplayPort output V1.2a (max. 1920 x 1200 px at 60 Hz)<br>2x Ethernet (Gbit) |
| Internal interfaces                    | 1x Panel Interface Connector                                                                            |
| Signal generator                       | no                                                                                                      |
| Display                                | 15.6" TFT color display                                                                                 |
| Resolution                             | WXGA 1366 x 768 pixels                                                                                  |
| Operating panel                        | touch screen (projective capacitive)                                                                    |
| Status LEDs                            | 1x red, 1x green                                                                                        |
| Real-time clock                        | yes                                                                                                     |
| Cooling                                | passive (fanless)                                                                                       |

<sup>1)</sup> Attention: When programming (with LASAL) on multicore CPUs, particular focus must be placed on thread security!

## 4.2 Electrical Requirements

|                                                    |                                                                                   |                                                      |
|----------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------|
| Supply voltage                                     | +18-30 V DC (SELV/PELV), typically +24 V DC<br>UL: Class 2 or LVLC <sup>(1)</sup> |                                                      |
| Current consumption of (+24 V) power supply        | typically 1100 mA<br>(without externally connected devices)                       | maximum 1600 mA<br>(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 3.7 A (for 6 µs, load-dependent)                                          |                                                      |

<sup>(1)</sup> 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           | 15.6" TN color display                                                                                                                         |
| Resolution     | WXGA 1366 x 768 pixels                                                                                                                         |
| Color depth    | 24-bit RGB                                                                                                                                     |
| LCD mode       | normally white <sup>1)</sup>                                                                                                                   |
| LCD Polarizer  | transmissive <sup>2)</sup>                                                                                                                     |
| Pixel size     | 0.252 x 0.252 mm                                                                                                                               |
| Active surface | 344.23 x 193.54 mm                                                                                                                             |
| Backlighting   | LED                                                                                                                                            |
| Contrast ratio | typically 500:1                                                                                                                                |
| Brightness     | typically 300 cd/m²                                                                                                                            |
| Angle CR ≥ 10  | All directions typically 80° <sup>3)</sup>                                                                                                     |
| 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 |

- <sup>1)</sup> If there is no display data, the display is white (LED backlight on)
- <sup>2)</sup> Display technology, with which display backlighting is used.
- <sup>3)</sup> The viewing angle is measured from the normal to the display surface.

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.                 |

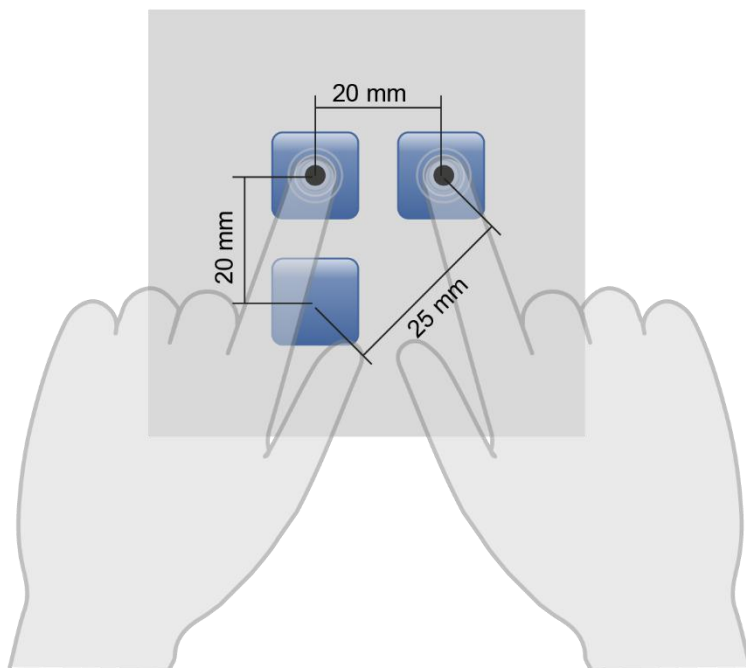


A projective capacitive touch screen is built into the panel, with which 10-finger input, Zoom and gesture functions can be implemented. Data can be input using fingers, a project capacitive touch pen as well as with thin gloves. The device must always be grounded to ensure stable function of the touch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

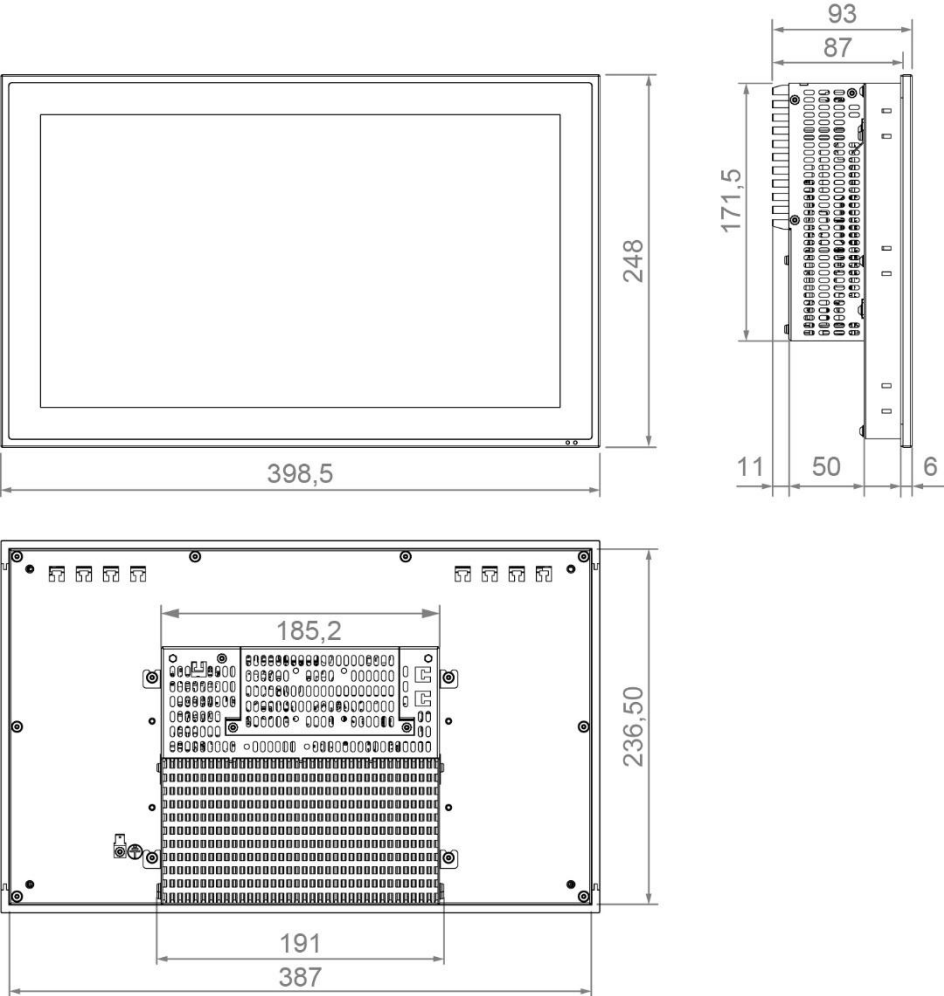
|                                       |                                                                                                                |                                                                                                                                      |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 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<br>> 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<br>Transition frequency: 8.42454 Hz<br>acceleration: 1 g<br>duration: 10 cycles<br>cycle: 1 octave/minute |
| Shock resistance                      | EN 60068-2-27                                                                                                  | 15 g (147.15 m/s <sup>2</sup> )                                                                                                      |
| Protection type                       | EN 60529<br>protected through the housing                                                                      | front: IP65 <sup>1)</sup><br>cover IP20 <sup>1)</sup>                                                                                |

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

## 4.7 Miscellaneous

|                         |                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------|
| Article number          | 01-230-1544                                                                                                 |
| Hardware version        | 1.x-2.x                                                                                                     |
| Operating system        | Gecko                                                                                                       |
| Default IP address      |                                                                                                             |
| Intel Ethernet (X3)     | automatic (DHCP)                                                                                            |
| Realtek Ethernet (X4)   | automatic (DHCP)                                                                                            |
| Default browser address | 10.10.150.1                                                                                                 |
| Approvals               | CE;<br><br>the ETT 1544 consists of a TP 1561 (cULus (E247993)) and<br>a PIM 041 (designed according to UL) |

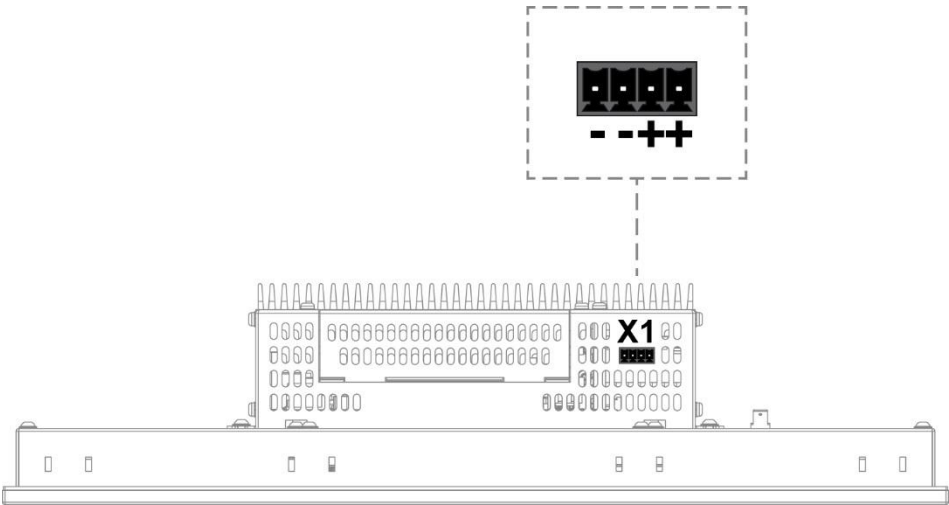
5 Mechanical Dimensions



|            |                                                                                                                                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Dimensions | 398.5 x 248 x 93 mm (W x H x D)                                                                                                   |
| Material   | front plate: 1.8 mm glass (touch screen) in black anodized aluminum frame<br>housing: sheet steel<br>heat sink: anodized aluminum |
| Weight     | 4.2 kg                                                                                                                            |

## 6 Interfaces

### 6.1 Connections Bottom



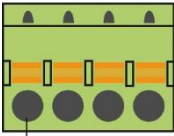
Symbol Image ETT 1544

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



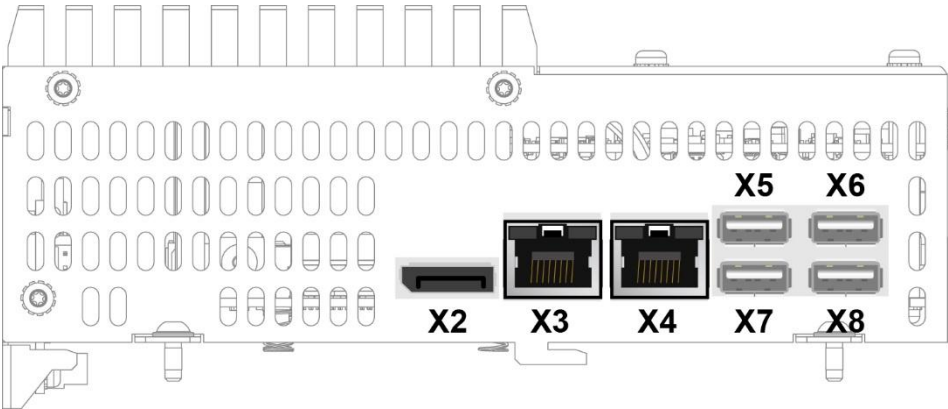
1

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



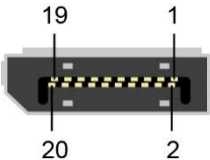
1

6.2 Left Side Connectors



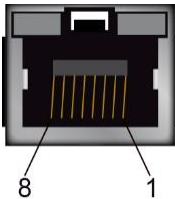
Symbol Image ETT 1544

6.2.1 X2: DisplayPort Output V1.2a



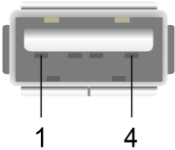
| Pin | Function   |
|-----|------------|
| 1   | Lane 0 (p) |
| 2   | GND        |
| 3   | Lane 0 (n) |
| 4   | Lane 1 (p) |
| 5   | GND        |
| 6   | Lane 1 (n) |
| 7   | Lane 2 (p) |
| 8   | GND        |
| 9   | Lane 2 (n) |
| 10  | Lane 3 (p) |
| 11  | GND        |
| 12  | Lane 3 (n) |
| 13  | 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, $I_{out,max} = 500\text{ mA}$ |
| 2   | D-                                  |
| 3   | D+                                  |
| 4   | GND                                 |



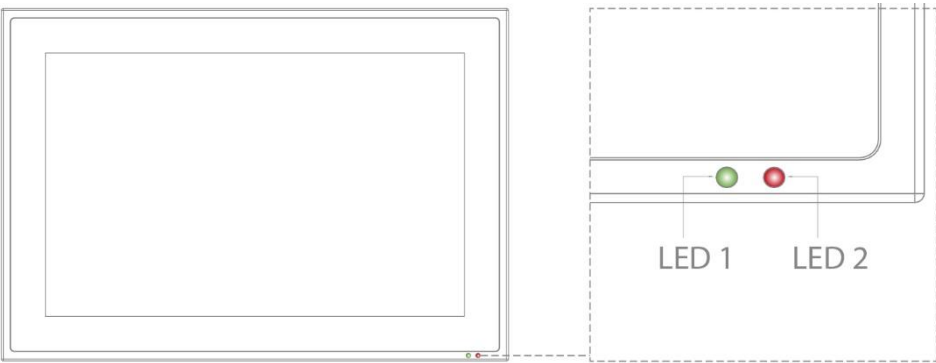
It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. It is also possible that these devices will not be detected at the USB port or function correctly. Therefore, it is recommended that every USB stick be tested before 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 by 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 1.3 Contents 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

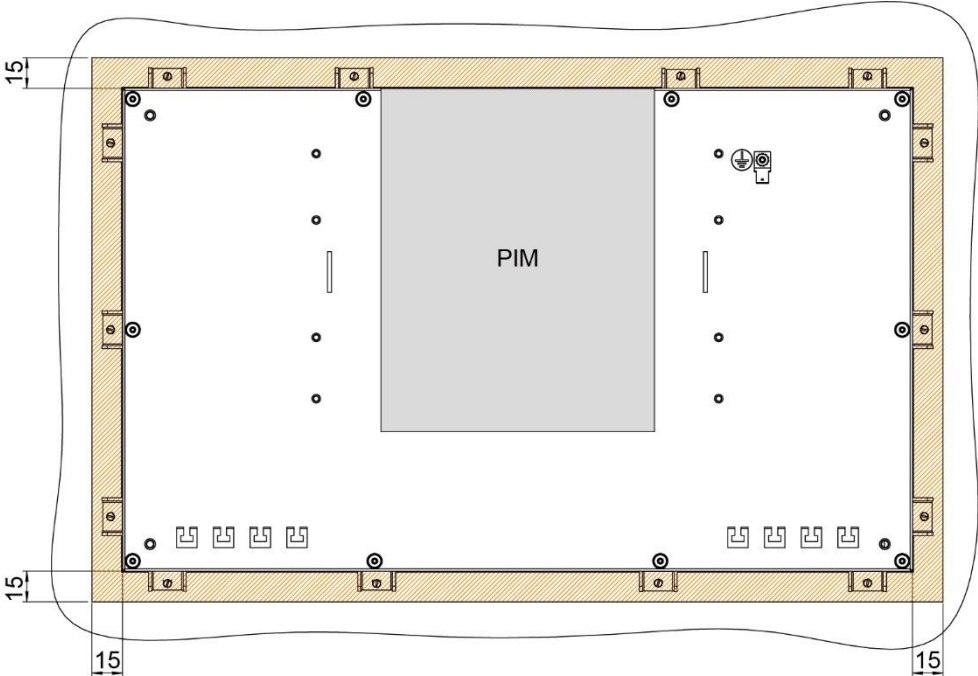
The following instructions must be followed when installing the terminal:

- 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 30 Watts. To ensure the necessary air circulation for cooling, the mounting instructions must be followed!

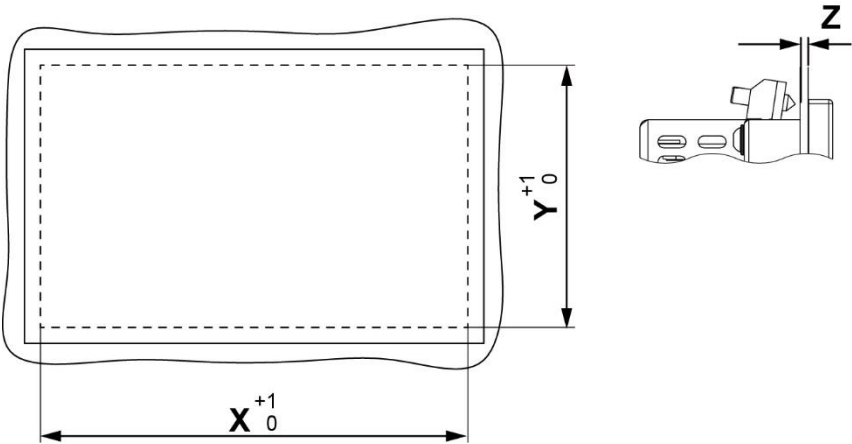
### 9.3 Restricted Space Around Rear Trimming



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.

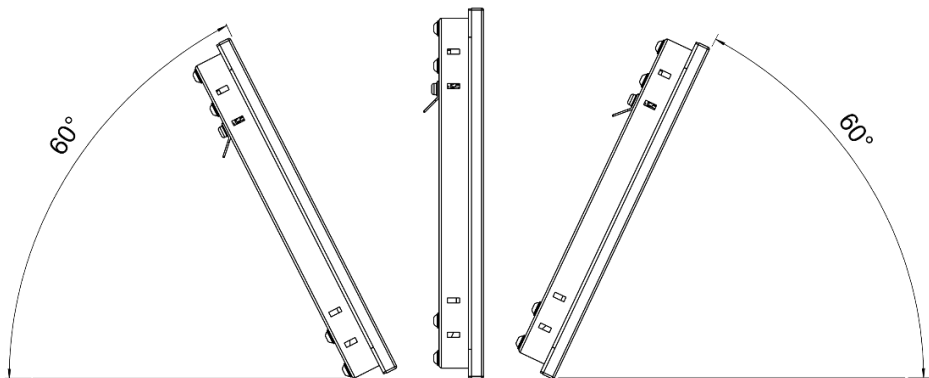
9.4 Required Cutout for Mounting the Terminal



|                                             |          |
|---------------------------------------------|----------|
| Control cabinet cutout width X              | 388 mm   |
| Control cabinet cutout height Y             | 237.5 mm |
| Maximum thickness of control cabinet wall Z | 3 mm     |

## 9.5 Mounting Position

Observe the mounting position of 60-120°.

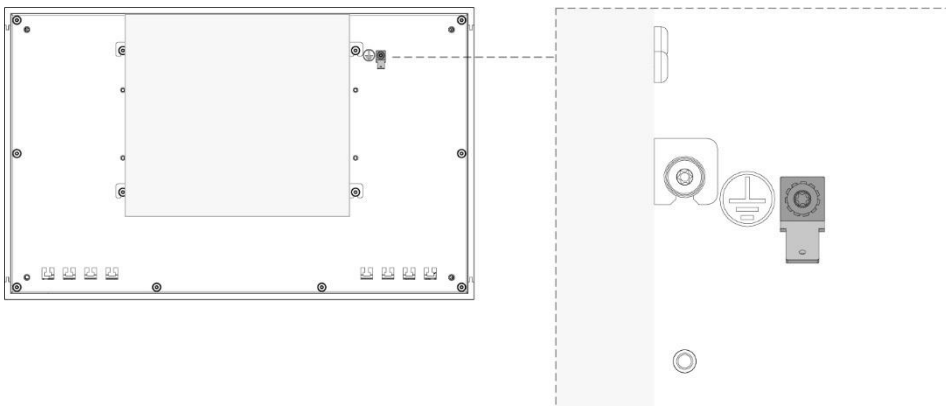


The specified installation distances may be reduced if appropriate measures and technical precautions are taken to dissipate the corresponding waste heat.

## 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 up to 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. |

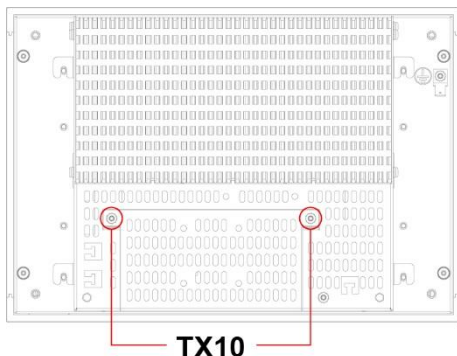
WARNING



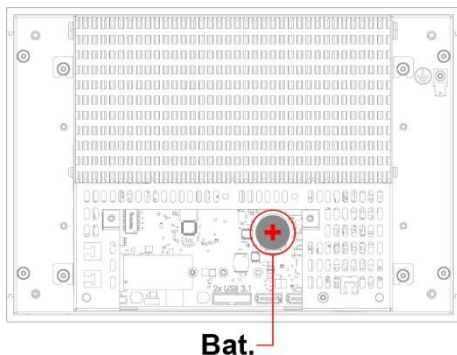
|                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Danger of fire and explosion!</b><br>Slight to serious injuries can occur from incorrect use of the battery.<br>Do not recharge, disassemble or throw batteries into fire!                         |
| <b>Danger d'incendie et d'explosion !</b><br>Des blessures légères à graves peuvent résulter d'une mauvaise utilisation de la batterie.<br>Ne pas recharger, démonter ou jeter les piles dans le feu! |



## 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 2 must be observed.

### 13.1 Cleaning the Touch Screen

#### CAUTION



Before cleaning the touch screen, the ETT must be turned off in order to prevent triggering functions or commands unintentionally!

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.

This can be achieved via the CLI command or the application, if the application engineer has provided the option.

```
calib
```

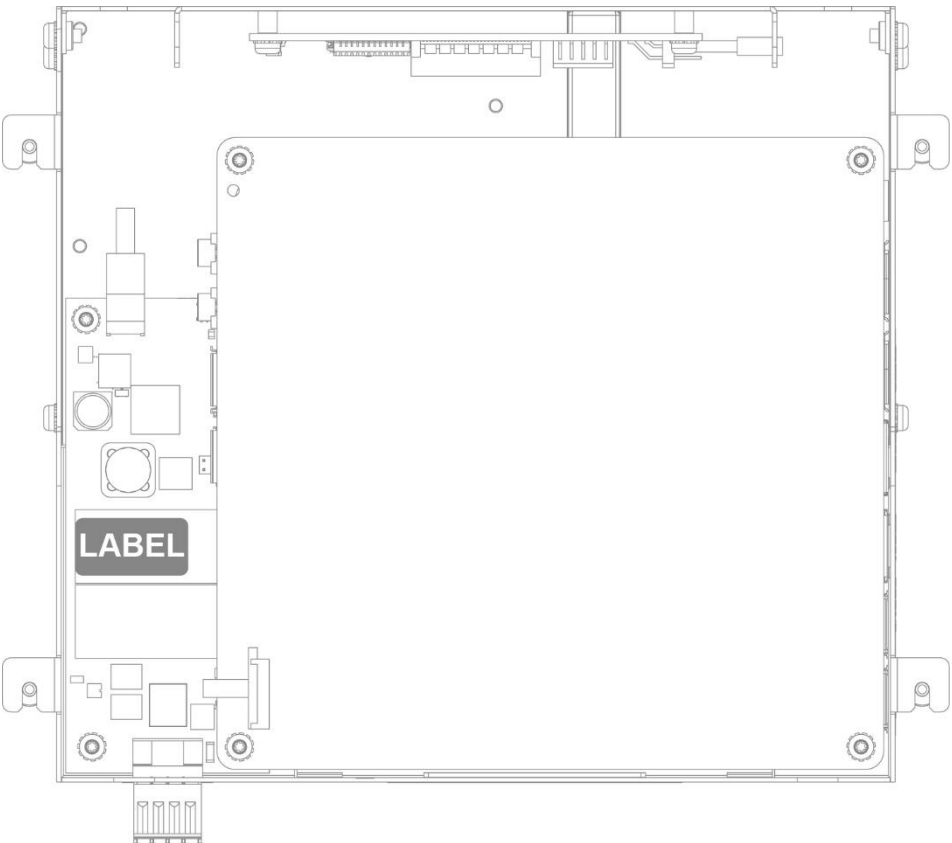
## 13.3 Repair



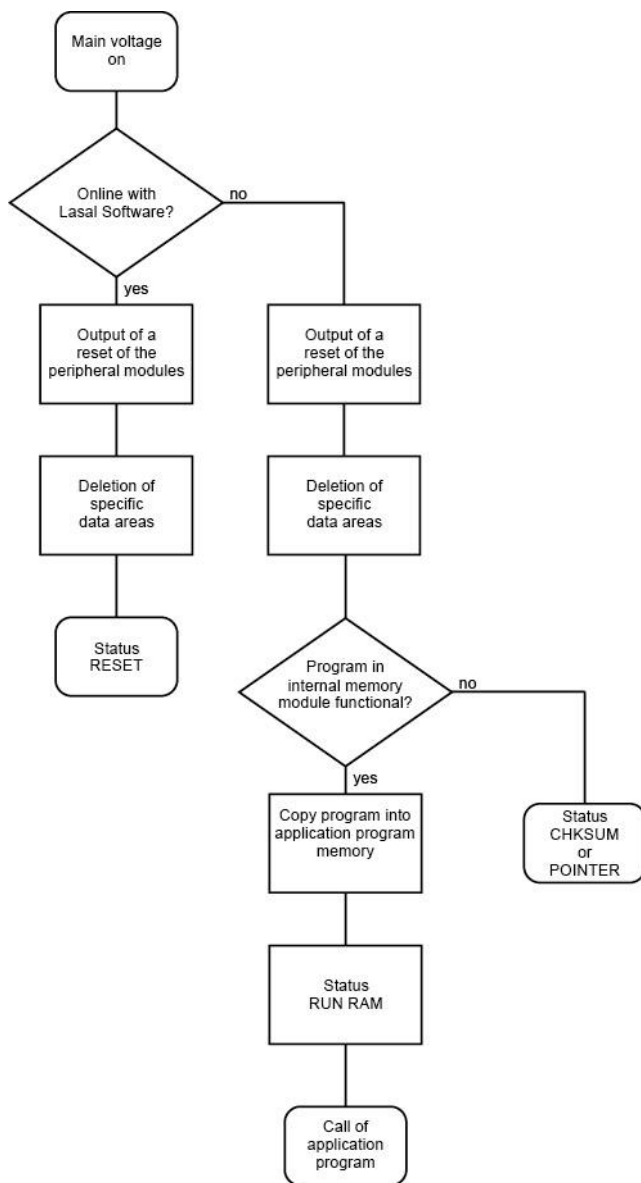
When sent for repair, the panel should be transported in the original packaging if possible. Otherwise packaging should be selected that sufficiently protects the product from external mechanical influences, such as cardboard filled with air cushioning.

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.

**13.4 Position Series Label Sub Device**



## 14 Process Diagram



## 15 Status and Error Messages

Status and error messages are displayed in the LASAL CLASS software status test. POINTER or CHKSUM messages are shown on the screen.

| Number | Message        | Definition                                                                                                                                                                                                                                                 | Cause/solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00     | <b>RUN RAM</b> | The user program is currently running in RAM.<br>The display is not affected.                                                                                                                                                                              | Info                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 01     | <b>RUN ROM</b> | The user program stored in the program memory module was loaded into the RAM and is currently running.<br>The display is not affected.                                                                                                                     | Info                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 02     | <b>RUNTIME</b> | The total time for all cyclic objects exceeds the maximum time; the time can be configured using 2 system variables:<br><ul style="list-style-type: none"> <li>- Runtime: Remaining time</li> <li>- SWRuntime: Preset value for runtime counter</li> </ul> | Optimize the application's cyclic task.<br>Use higher capacity CPU.<br>Configure preset value                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 03     | <b>POINTER</b> | Incorrect program pointers were detected before running the user program                                                                                                                                                                                   | Possible Causes: <ul style="list-style-type: none"> <li>- The program memory module is missing, not programmed or defective.</li> <li>- The program in the user program memory (RAM) is not executable.</li> <li>- The buffer battery has failed.</li> <li>- The user program has overwritten a software error.</li> </ul> Solution: <ul style="list-style-type: none"> <li>- Reprogram the memory module, if the error reoccurs exchange the module.</li> <li>- Exchange the buffering battery</li> <li>- Correct programming error</li> </ul> |
| 04     | <b>CHKSUM</b>  | An invalid checksum was detected before running the user program.                                                                                                                                                                                          | Cause/solution: s. POINTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|    |                       |                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 05 | <b>WATCHDOG</b>       | The program was interrupted via the watchdog logic.                                                                                                                                                                                                                         | <p>Possible Causes:</p> <ul style="list-style-type: none"> <li>- User program interrupts blocked over a longer period of time (STI command forgotten).</li> <li>- Programming error in a hardware interrupt.</li> <li>- INB, OUTB, INW, OUTW instructions used incorrectly.</li> <li>- The processor is defective.</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Correct programming error.</li> <li>- Exchange CPU</li> </ul> |
| 06 | <b>GENERAL ERROR</b>  | <p>General error</p> <p>An error has occurred while stopping the application over the online interface.</p>                                                                                                                                                                 | This error occurs only during the development of the operating system.                                                                                                                                                                                                                                                                                                                                                                                |
| 07 | <b>PROM DEFECT</b>    | An error has occurred while programming the memory module.                                                                                                                                                                                                                  | <p>Causes:</p> <ul style="list-style-type: none"> <li>- The program memory module is defective.</li> <li>- The user program is too large.</li> <li>- The program memory module is missing.</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Exchange the program memory module</li> </ul>                                                                                                                                         |
| 08 | <b>RESET</b>          | <p>The CPU has received the reset signal and is waiting for further instructions.</p> <p>The user program is not processed.</p>                                                                                                                                             | Info                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 09 | <b>WD DEFECT</b>      | <p>The hardware monitoring circuit (watchdog logic) is defective.</p> <p>After power-up, the CPU checks the watchdog logic function. If an error occurs during this test, the CPU deliberately enters an infinite loop from which no further instructions are accepted.</p> | <p>Solution:</p> <ul style="list-style-type: none"> <li>- Exchange CPU</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     |
| 10 | <b>STOP</b>           | The program was stopped by the programming system.                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 11 | <b>PROG BUSY</b>      | Reserved                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 12 | <b>PROGRAM LENGTH</b> | Reserved                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 13 | <b>PROG END</b>       | A memory module was successfully programmed.                                                                                                                                                                                                                                | Info                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 14 | <b>PROG MEMO</b>      | The CPU is currently programming the memory module.                                                                                                                                                                                                                         | Info                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|    |                       |                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                   |
|----|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15 | <b>STOP BRKPT</b>     | The CPU was stopped by a breakpoint in the program.                                                                                                                      | Info                                                                                                                                                                                                                                                                                                                                              |
| 16 | <b>CPU STOP</b>       | The CPU was stopped by the programming software.                                                                                                                         | Info                                                                                                                                                                                                                                                                                                                                              |
| 17 | <b>INT ERROR</b>      | The CPU has triggered a false interrupt and stopped the user program or has encountered an unknown instruction while running the program.                                | <p>Causes:</p> <ul style="list-style-type: none"> <li>- A nonexistent operating system was used.</li> <li>- Stack error (uneven number of PUSH and POP instructions).</li> <li>- The user program was interrupted by a software error.</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Correct programming error.</li> </ul> |
| 18 | <b>SINGLE STEP</b>    | The CPU is in single step mode and is waiting for further instructions.                                                                                                  | Info                                                                                                                                                                                                                                                                                                                                              |
| 19 | <b>READY</b>          | A module or project has been sent to the CPU and it is ready to run the program.                                                                                         | Info                                                                                                                                                                                                                                                                                                                                              |
| 20 | <b>LOAD</b>           | The program is stopped and the CPU is currently receiving a new module or project.                                                                                       | Info                                                                                                                                                                                                                                                                                                                                              |
| 21 | <b>INVALID MODULE</b> | The CPU has received a module that does not belong to the project.                                                                                                       | <p>Solution:</p> <ul style="list-style-type: none"> <li>- Recompile and download the entire project</li> </ul>                                                                                                                                                                                                                                    |
| 22 | <b>MEMORY FULL</b>    | The operating system memory (heap) is too small. No memory could be reserved while calling an internal function or an interface function is called from the application. | <p>Causes:</p> <ul style="list-style-type: none"> <li>- Memory is only allocated but not released.</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Clear memory</li> </ul>                                                                                                                                                   |
| 23 | <b>NOT LINKED</b>     | When starting the CPU, a missing module or a module that does not belong to the project was detected.                                                                    | <p>Solution:</p> <ul style="list-style-type: none"> <li>- Recompile and download the entire project</li> </ul>                                                                                                                                                                                                                                    |
| 24 | <b>DIV BY 0</b>       | A division error has occurred.                                                                                                                                           | <p>Possible Causes:</p> <ul style="list-style-type: none"> <li>- Division by 0.</li> <li>- The result of a division does not fit in the result register.</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Correct programming error.</li> </ul>                                                                               |
| 25 | <b>DIAS ERROR</b>     | While accessing a DIAS module, an error has occurred.                                                                                                                    | Hardware problem                                                                                                                                                                                                                                                                                                                                  |
| 26 | <b>WAIT</b>           | The CPU is busy.                                                                                                                                                         | Info                                                                                                                                                                                                                                                                                                                                              |



|    |                            |                                                                                 |                                                                                                       |
|----|----------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 27 | <b>OP PROG</b>             | The operating system is currently being reprogrammed.                           | Info                                                                                                  |
| 28 | <b>OP INSTALLED</b>        | The operating system has been reinstalled.                                      | Info                                                                                                  |
| 29 | <b>OS TOO LONG</b>         | The operating system cannot be loaded; too little memory.                       | Restart, report error to SIGMATEK.                                                                    |
| 30 | <b>NO OPERATING SYSTEM</b> | Boot loader message.<br>No operating system found in RAM.                       | Restart, report error to SIGMATEK.                                                                    |
| 31 | <b>SEARCH FOR OS</b>       | The boot loader is searching for the operating system in RAM.                   | Restart, report error to SIGMATEK.                                                                    |
| 32 | <b>NO DEVICE</b>           | Reserved                                                                        |                                                                                                       |
| 33 | <b>UNUSED CODE</b>         | Reserved                                                                        |                                                                                                       |
| 34 | <b>MEM ERROR</b>           | The operating system loaded does not match the hardware configuration.          | Solution:<br>- Use the correct operating system version                                               |
| 35 | <b>MAX IO</b>              | Reserved                                                                        |                                                                                                       |
| 36 | <b>MODULE LOAD ERROR</b>   | The LASAL Module or project cannot be loaded.                                   | Solution:<br>- Recompile and download the entire project                                              |
| 37 | <b>BOOTIMAGE FAILURE</b>   | A general error has occurred while loading the operating system.                | Contact SIGMATEK                                                                                      |
| 38 | <b>APPLMEM ERROR</b>       | An error has occurred in the application memory (user heap).                    | Solution:<br>- Correct allocated memory access error                                                  |
| 39 | <b>OFFLINE</b>             | This error does not occur in the control.                                       | This error code is used in the programming system to show that there is no connection to the control. |
| 40 | <b>APPL LOAD</b>           | Reserved                                                                        |                                                                                                       |
| 41 | <b>APPL SAVE</b>           | reserved                                                                        |                                                                                                       |
| 44 | <b>VARAN MANAGER ERROR</b> | An error number was entered in the VARAN manager and stopped the program.       | Solution:<br>- Read LogFile                                                                           |
| 45 | <b>VARAN ERROR</b>         | A required VARAN client was disconnected or a communication error has occurred. | Solution:<br>- Read LogFile<br>- Error Tree                                                           |

|    |                               |                                                                                                                                                                                                          |                                                                                                                                                                                                                                                            |
|----|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46 | <b>APPL-LOAD-ERROR</b>        | An error has occurred while loading the application.                                                                                                                                                     | Cause:<br>- Application was deleted.<br><br>Solution:<br>- Reload the application into the control.                                                                                                                                                        |
| 47 | <b>APPL-SAVE-ERROR</b>        | An error has occurred while attempting to save the application.                                                                                                                                          |                                                                                                                                                                                                                                                            |
| 50 | <b>ACCESS-EXCEPTION-ERROR</b> | Read or write access of a restricted memory area. (I.e. writing to the NULL pointer).                                                                                                                    | Solution:<br>- Correct application errors                                                                                                                                                                                                                  |
| 51 | <b>BOUND EXCEEDED</b>         | An exception error has occurred while accessing arrays. The memory area was overwritten by accessing an invalid element.                                                                                 | Solution:<br>- Correct application errors                                                                                                                                                                                                                  |
| 52 | <b>PRIVILEGED INSTRUCTION</b> | An unauthorized instruction for the current CPU level was given. For example, setting the segment register.                                                                                              | Cause:<br>- The application has overwritten the application program code.<br><br>Solution:<br>- Correct application errors                                                                                                                                 |
| 53 | <b>FLOATING POINT ERROR</b>   | An error has occurred during a floating-point operation.                                                                                                                                                 |                                                                                                                                                                                                                                                            |
| 60 | <b>DIAS-RISC-ERROR</b>        | Error from the Intelligent DIAS Master.                                                                                                                                                                  | Restart, report error to SIGMATEK.                                                                                                                                                                                                                         |
| 64 | <b>INTERNAL ERROR</b>         | An internal error has occurred, all applications are stopped.                                                                                                                                            | Restart, report error to SIGMATEK.                                                                                                                                                                                                                         |
| 65 | <b>FILE ERROR</b>             | An error has occurred during a file operation.                                                                                                                                                           |                                                                                                                                                                                                                                                            |
| 66 | <b>DEBUG ASSERTION FAILED</b> | Internal error                                                                                                                                                                                           | Restart, report error to SIGMATEK.                                                                                                                                                                                                                         |
| 67 | <b>REALTIME RUNTIME</b>       | The total duration of all real-time objects exceeds the maximum time; the time cannot be configured.<br><br>2 ms for 386 CPUs<br>1 ms for all other CPUs                                                 | Solution:<br>- Real-time Optimize the application's real-time task (RtWork).<br>- Real-time Reduce the clock time for the real-time task of all objects.<br>- Correct application errors<br>- CPU is overloaded in real-time => use a higher capacity CPU. |
| 68 | <b>BACKGROUND RUNTIME</b>     | The total time for all background objects exceeds the maximum time; the time can be configured using 2 system variables:<br>-BTRuntime: Remaining time<br>-SWBTRuntime: Preset value for runtime counter | Solution:<br>- Optimize the application's background task (background)<br>- Use higher capacity CPU<br>- Set SWBTRuntime correctly                                                                                                                         |

|     |                       |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|-----------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 70  | <b>C-DIAS ERROR</b>   | A connection error with a C-DIAS module has occurred.               | <p>Cause:</p> <ul style="list-style-type: none"> <li>- The cause of the error is documented in the log file</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- This depends on the cause</li> </ul>                                                                                                                                                                             |
| 72  | <b>S-DIAS ERROR</b>   | A connection error with an S-DIAS module has occurred.              | <p>Possible Causes:</p> <ul style="list-style-type: none"> <li>- Real network does not match the project</li> <li>- S-DIAS client is defective</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Analyze log file</li> </ul>                                                                                                                                                   |
| 75  | <b>SRAM ERROR</b>     | An error occurred while initializing, reading or writing SRAM data. | <p>Possible Causes:</p> <ul style="list-style-type: none"> <li>- SRAM configured incorrectly</li> <li>- Battery for powering the internal program memory is empty</li> </ul> <p>Solution:</p> <ul style="list-style-type: none"> <li>- Analyze log file (Event00.log, Event19.log)</li> <li>- Check configuration</li> <li>- Exchange battery for powering the internal program memory</li> </ul> |
| 95  | <b>USER DEFINED 0</b> | User-definable code.                                                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 96  | <b>USER DEFINED 1</b> | User-definable code.                                                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 97  | <b>USER DEFINED 2</b> | User-definable code.                                                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 98  | <b>USER DEFINED 3</b> | User-definable code.                                                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 99  | <b>USER DEFINED 4</b> | User-definable code.                                                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 100 | <b>C_INIT</b>         | Initialization start; the configuration is run.                     |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 101 | <b>C_RUNRAM</b>       | The LASAL project was successfully started from RAM.                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 102 | <b>C_RUNROM</b>       | The LASAL project was successfully started from ROM.                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 103 | <b>C_RUNTIME</b>      |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 104 | <b>C_READY</b>        | The CPU is ready for operation.                                     |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 105 | <b>C_OK</b>           | The CPU is ready for operation.                                     |                                                                                                                                                                                                                                                                                                                                                                                                   |

|     |                  |                                                                                                 |  |
|-----|------------------|-------------------------------------------------------------------------------------------------|--|
| 106 | C_UNKNOWN_CID    | An unknown object from a stand-alone or embedded object, or an unknown base class was detected. |  |
| 107 | C_UNKNOWN_CONSTR | The operating system class cannot be created; the operating system is probably wrong.           |  |
| 108 | C_UNKNOWN_OBJECT | Indicates an unknown object in an interpreter program; more the one DCC080 object.              |  |
| 109 | C_UNKNOWN_CHNL   | The hardware module number is greater than 60.                                                  |  |
| 110 | C_WRONG_CONNECT  | No connection to the required channels.                                                         |  |
| 111 | C_WRONG_ATTR     | Wrong server attributes.                                                                        |  |
| 112 | C_SYNTAX_ERROR   | Non-specific error. Recompile and download all project sections.                                |  |
| 113 | C_NO_FILE_OPEN   | An attempt was made to open an unknown table.                                                   |  |
| 114 | C_OUTOF_NEAR     | Memory allocation failed                                                                        |  |
| 115 | C_OUT OF_FAR     | Memory allocation failed                                                                        |  |
| 116 | C_INCOMAPTIBLE   | An object with the same name already exists but has a different class.                          |  |
| 117 | C_COMPATIBLE     | An object with the same name and class exists but must be updated.                              |  |
| 224 | LINKING          | The application is currently linking.                                                           |  |
| 225 | LINKING ERROR    | An error has occurred while linking.                                                            |  |
| 226 | LINKING DONE     | Linking is complete.                                                                            |  |
| 230 | OP BURN          | The operating system is currently being burned into the Flash memory.                           |  |
| 231 | OP BURN FAIL     | An error has occurred while burning the operating system.                                       |  |
| 232 | OP INSTALL       | The operating system is currently being installed.                                              |  |
| 240 | USV-WAIT         | The power supply was disconnected; the UPS is active.<br><br>The system is shutdown.            |  |
| 241 | REBOOT           | The operating system is restarted.                                                              |  |
| 242 | LSL SAVE         |                                                                                                 |  |
| 243 | LSL LOAD         |                                                                                                 |  |

|     |                  |                             |  |
|-----|------------------|-----------------------------|--|
| 252 | CONTINUE         |                             |  |
| 253 | PRERUN           | The application is started. |  |
| 254 | PRERESET         | The application is ended.   |  |
| 255 | CONNECTION BREAK |                             |  |

## 16 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.

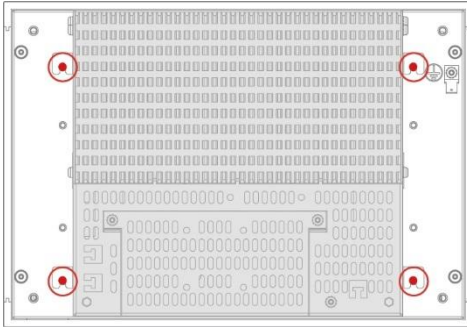
## 16.1 Removing the PIM from the Touch Panel



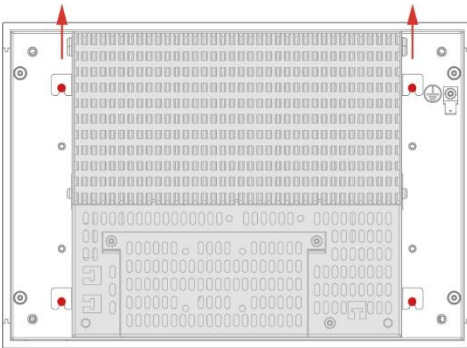
This product is a sensitive electronic device. When mounting, as well as dismantling, note that you come into contact with ESD-sensitive areas of the device.

The applicable ESD measures must be taken!

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



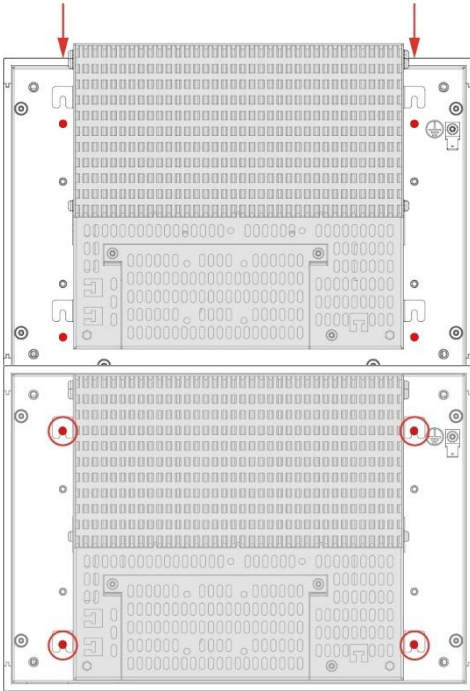
1. Ensure that an ESD-compliant working method is followed (ESD armband, ESD clothing).
2. Disconnect the device from the supply.
3. Place the TP flat on its back.
4. Loosen the 4 screws with a TX10 screwdriver



5. Slide the PIM in the direction of the upward as shown.
6. Remove the PIM from the TP.

## 16.2 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.

## 17 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.





18 Accessories

18.1 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                                                            |
|-------------|------------------|---------------------------------------|-----------------------------------------------------------------|
| 31.01.2020  |                  |                                       | Document editing                                                |
| 12.02.2020  | 10               | 2.4 Software/Training                 | Chapter added                                                   |
|             | 16               | 4.7 Miscellaneous                     | Salamander operating system                                     |
|             | 34               | 14.2.1 Calibrating the Touch Screen   | CLI command                                                     |
| 20.04.2020  | 14               | 4.3 Display                           | Angle CR $\geq 10$ -> Information amended and footnote inserted |
| 20.08.2020  | 35               | 14.4 Position Series Label Sub Device | Chapter added                                                   |
| 27.08.2020  | 37               | 15 Process Diagram                    | Chapter added                                                   |
|             | 38               | 16 Status and Error Messages          | Chapter added                                                   |
| 11.11.2020  | 12               | 4.1 Performance Data                  | Footnote cores (programming) added                              |
|             | 18               | 5 Mechanical Dimensions               | More details                                                    |
| 21.01.2021  | 33               | 13 Setting the IP Addresses           | Chapter removed                                                 |
| 09.04.2021  | 12               | 4.1 Performance Data                  | Hard drive changed to 64-Gbyte                                  |
| 08.11.2021  | 16               | 4.7 Miscellaneous                     | Gecko operating system                                          |
| 04.11.2024  | 30               | 12 Buffer Battery                     | Battery data changed                                            |
| 08.04.2025  | 12               | 4.1 Performance Data                  | RAM up to 4-Gbyte                                               |
| 17.11.2025  | 12               | 4.1 Performance Data                  | Internal storage up to 128-Gbyte                                |