Operating Instructions

MICRO PANEL

XVH300 5.7"; MH2 5.7"

Document M001506-04
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<thead>
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<th>Manufacturer</th>
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<tbody>
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</table>

**Original instructions**
The German version of this document is the original instructions.

**Translation of the original instructions**
All non-German editions of this document are translations of the original instructions.

**Editor**
Monika Jahn

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Subject to modifications.
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1. General

1.1 Purpose of these Operating Instructions

These Operating Instructions contain the information required for the correct and safe use of the MICRO PANELs XVH300 5.7"; MH2 5.7". The Operating Instructions are part of the devices and must therefore be kept nearby.

These Operating Instructions describe all aspects of the devices: transport, installation, commissioning, operation, maintenance, storage and disposal.

The operating system and the application software are not described.

Please send any comments, recommendations or suggestions relating to these Operating Instructions to info@microinnovation.com.

1.2 Additional documentation

The following documents may be helpful in the use of the device in addition to these Operating Instructions. These can be downloaded from our home page (www.microinnovation.com/en, «DOWNLOADS» section).

[1] M000174
System Description Windows CE
(operation of the Windows CE operating system on a MICRO PANEL)

System Description Networks in Brief
(information on networks in general and on the integration of PCs and MICRO PANELs in networks)
2. Device description

2.1 Device names

XVH300 5.7"; MH2 5.7" are two different names of equivalent products.

2.2 Function

MICRO PANELs XVH300 5.7"; MH2 5.7" are used as HMI devices.

2.3 Intended use

MICRO PANELs XVH300 5.7"; MH2 5.7" are primarily used in machine and system building as well as in building services management systems. They are designed exclusively for the visualization and operation of machines, systems and buildings. Any other use must be agreed beforehand with the manufacturer.

2.4 Device versions

MICRO PANELs XVH300 5.7"; MH2 5.7" are available in the following versions:

<table>
<thead>
<tr>
<th>Version with Fieldbus</th>
<th>XVH300 type</th>
<th>MH2 type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive touch</td>
<td>XVH-330-57BAS</td>
<td>MH2-330-57BAS</td>
</tr>
<tr>
<td>CAN interface</td>
<td>XVH-330-57CAN</td>
<td>MH2-330-57CAN</td>
</tr>
<tr>
<td>Profibus interface</td>
<td>XVH-330-57MPI</td>
<td>MH2-330-57MPI</td>
</tr>
<tr>
<td>Infra-red touch</td>
<td>XVH-340-57BAS</td>
<td>MH2-340-57BAS</td>
</tr>
<tr>
<td>without fieldbus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN interface</td>
<td>XVH-340-57CAN</td>
<td>MH2-340-57CAN</td>
</tr>
<tr>
<td>Profibus interface</td>
<td>XVH-340-57MPI</td>
<td>MH2-340-57MPI</td>
</tr>
<tr>
<td>Infra-red touch</td>
<td>XVH-342-57SKS</td>
<td></td>
</tr>
<tr>
<td>Suconet K and RS232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Sucom A) interface</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tab. 1 Device versions
2. Device description

MICRO PANEL XVH300 5.7”; MH2 5.7”

Fig. 1 XVH300, MH2 with resistive touch

Fig. 2 XVH300, MH2 with infra-red touch

Fig. 3 SKS device (XVH-342-57SKS)
2.5 Scope of delivery

The accessories supplied with the MICRO PANELs XVH300 5.7"; MH2 5.7" depend on the device version.

2.5.1 Scope of delivery for devices with resistive touch

<table>
<thead>
<tr>
<th>Qty</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MICRO PANEL: X VH-330-57BAS or MH2-330-57BAS</td>
</tr>
<tr>
<td></td>
<td>XVH-330-57CAN or MH2-330-57CAN</td>
</tr>
<tr>
<td></td>
<td>XVH-330-57MPI or MH2-330-57MPI</td>
</tr>
<tr>
<td>1</td>
<td>Set of retaining brackets (4 retaining brackets with threaded pin)</td>
</tr>
<tr>
<td>1</td>
<td>Sealing strip for mounting the device</td>
</tr>
<tr>
<td>1</td>
<td>Power supply connector</td>
</tr>
<tr>
<td>1</td>
<td>CF slot cover (fitted)</td>
</tr>
<tr>
<td>1</td>
<td>Touch pen</td>
</tr>
</tbody>
</table>

Tab. 2 Scope of delivery for devices with resistive touch

2.5.2 Scope of delivery for devices with infra-red touch

<table>
<thead>
<tr>
<th>Qty</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MICRO PANEL: X VH-340-57BAS or MH2-340-57BAS</td>
</tr>
<tr>
<td></td>
<td>XVH-340-57CAN or MH2-340-57CAN</td>
</tr>
<tr>
<td></td>
<td>XVH-340-57MPI or MH2-340-57MPI</td>
</tr>
<tr>
<td></td>
<td>XVH-342-57SKS</td>
</tr>
<tr>
<td>1</td>
<td>Set of retaining brackets (4 retaining brackets with threaded pin)</td>
</tr>
<tr>
<td>1</td>
<td>Sealing strip for mounting the device</td>
</tr>
<tr>
<td>1</td>
<td>Power supply connector</td>
</tr>
<tr>
<td>1</td>
<td>CF slot cover (fitted)</td>
</tr>
</tbody>
</table>

Tab. 3 Scope of delivery for devices with infra-red touch

2.6 Accessories

Different accessories are available.

Order the accessories required from your supplier. Required accessories for:
- Mounting with increased protection class:
  See Chapter 9.6 IP protection classes, 59.
- Use in a potentially explosive atmosphere:
  See Chapter 9.7 Approvals and declarations, 60.
2. Device description

MICRO PANEL XVH300 5.7"; MH2 5.7"

2.7 Designation

Nameplate
A nameplate is fixed on the rear of the device in order to identify it. The nameplate contains the following information:
- Manufacturer address
- Type designation
- Power supply required
- Article no.
- Serial no.
- Time of manufacturing (week/year)
- Approval marks
- Arrangement of interfaces and operating elements
- Permissible mounting options (top edge «Top»)

Support
To ensure fast and optimum support always provide the support personnel with the following information on the nameplate:
- Article no.
- Serial no.
3. Safety regulations

3.1 General

Hazards may still occur even though the device meets the current state of the art and complies with all recognized safety requirements.

The device must only be installed and commissioned in perfect technical condition and in compliance with these Operating Instructions.

Read this chapter, before working with the device. This contains important information for your personal safety. This chapter must be read and understood by all persons working with this device.

3.2 Meaning of symbols

The following symbols are used in these Operating Instructions according to the hazard level described:

**DANGER**

- **Signal word DANGER**
  - Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

- **Signal word WARNING**
  - Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

- **Signal word CAUTION**
  - Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or in material damage.

Indicates important information not related to safety.

The danger symbol used and the text indicate the actual danger and the related preventative measures.
3. Safety regulations

3.3 Mandatory requirements, personnel

3.3.1 Work safety

All applicable work safety regulations (in-house and national) must be observed.

3.3.2 Qualification of personnel

It must be ensured that only suitably qualified persons work with the device. These persons must be informed of all hazards and risks associated with the device.

The following persons must be suitably qualified according to the work to be completed:

- **Installation:**
  - Automation specialists
- **General operation:**
  - Operating personnel instructed in the application
- **Maintenance and service:**
  - Persons suitably qualified for the work to be completed
- **Storage:**
  - Persons without special knowledge
- **Transport:**
  - Persons with a specialist knowledge of transport (in particular how to prevent damage in transit)
- **Disposal:**
  - Persons with a specialist knowledge of proper disposal (also about the proper disposal of harmful substances)

3.3.3 Operating Instructions

It must be ensured that any person working with the device in any phase of its lifespan has read and understood the relevant sections of the Operating Instructions.

**WARNING**

Incomplete copy of these Operating Instructions

Working with individual pages of these Operating Instructions may cause damage to property or personnel by failure to observe safety-related information.

► Always work with the complete document.

3.3.4 Installation, maintenance and disposal

It must be ensured that the device is properly connected, mounted, maintained and disposed of in compliance with all relevant standards and safety regulations.

3.3.5 Prohibited use

The implementation of safety functions (relating to the protection of personnel and machinery) using the device is prohibited.
3.3.6 Requirements for proper operation

The following points must be observed so that the device meets the contractual requirements:
- Only qualified personnel may work with the device.
- These persons must have read the Operating Instructions and must observe the requirements described.
- The ambient conditions stated must be observed. See Chapter 9.9 Ambient conditions, § 61.
- The maintenance work must be carried out correctly.

No liability is accepted for damage, consequential damage and accidents caused by the following:
- Failure to observe work safety regulations
- Failure or malfunction of the device
- Improper handling or use
- Failure to observe the Operating Instructions
- Conversions, modifications and repairs to the device

Repairs, see Chapter 7.3.1, § 50.
3.4 Device related hazards

**DANGER**

Explosion hazard
Death, serious injury or material damage may occur if an electrical plug connection is removed in a potentially explosive atmosphere during operation.

- Only use the device in the following environments:
  - Environments not subject to explosion hazards
  - Potentially explosive atmosphere, Zone 22 (according to ATEX 94/9/EC)
- Only operate the device in potentially explosive atmospheres if it is correctly mounted.
- Switch off the device before removing the plug connections

**WARNING**

Live parts in the device
When the device is opened, there is a risk of electric shock if live parts are touched.

- The device must not be opened.

**WARNING**

Potential equalization currents
Large equalization currents between the protective ground systems of different devices may cause operational malfunctions due to signal interference and may even cause fires.

- If necessary, a potential equalization conductor should be installed parallel to the cable. This should have a cross-section that is a multiple of the cable shield.

**CAUTION**

Sensitive resistive touch surface
Damage to the resistive touch due to the use of pointed or sharp objects.

- Only activate the resistive touch with your finger or a touch pen.
- When wearing gloves, ensure that these are clean. They must not be covered with abrasive dust or sharp particles.
CAUTION

Electrostatic discharge
Electrostatic discharge may damage or destroy electronic components.

- Avoid contact with components (such as connector pins) that are susceptible to electrostatic discharge.
- Discharge (by touching a grounded metal object) any static charge accumulated in your body before touching the device.

CAUTION

Data loss
During a write operation, the CF card may lose data or may be destroyed if it is removed or if there is a power failure.

- Always secure CF cards with the CF slot cover.
- Avoid write operations to CF cards. Reasons:
  - The number of write cycles possible on CF cards is limited.
  - A power failure during write operations will most likely lead to loss of data.
- Only remove the CF card when the device is in a de-energized state.
- Before switching off, ensure that no software write operations to the CF card are in progress («CF ACT» LED must not be lit).

CAUTION

Device condensation
If the device is or was exposed to climatic changes (temperature fluctuation, air humidity) moisture can form on or in the device (device condensation). In this case, there is a risk of short-circuit.

- The device must not be switched on when device condensation is present.
- If condensation is present on the device, or if it was exposed to temperature fluctuations, it must be allowed to adjust to room temperature (do not expose the device to the direct heat of heating devices) prior to commissioning.

CAUTION

Cleaning the device
Damage to the device due to the use of pointed or sharp objects or by liquids.

- Do not use any pointed or sharp objects (e.g. knife) for cleaning.
- Do not use any aggressive or abrasive cleaning agent or solvent.
- Avoid any liquid entering the device (risk of short-circuit).
3. Safety regulations
4. Operating and indication elements

4.1 Operating and indication elements on the front

The device has the following operating and indication elements on the front:

<table>
<thead>
<tr>
<th>Element</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Touch sensor&lt;br&gt;Detection of the actuation of the operating elements shown on the display.&lt;br&gt;- Resistive touch: These devices are operated by touching the operating elements with your finger or with a touch pen.&lt;br&gt;- Infra-red touch: These devices are operated by interrupting the infra-red light matrix with your finger or a suitable object (min. ø 7 mm). It is not necessary to touch the infra-red touch protective panel.</td>
</tr>
<tr>
<td>B</td>
<td>Display&lt;br&gt;Display operating and indication elements.</td>
</tr>
</tbody>
</table>

Fig. 4 Operating and indication elements on the front (figure shows device with infra-red touch)
4. Operating and indication elements

4.2 Operating elements on the service side

The device has the following operating elements on the service side:

<table>
<thead>
<tr>
<th>Element</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A CF slot cover</td>
<td>Fastening the CF card in the CF slot.</td>
</tr>
<tr>
<td>B CF slot 0</td>
<td>Slot for CF card with operating system and normally with PLC and visualization projects.</td>
</tr>
<tr>
<td>C Ejector button</td>
<td>Ejecting the CF card.</td>
</tr>
<tr>
<td>D Control button</td>
<td>Function depends on the software used.</td>
</tr>
</tbody>
</table>

Tab. 5 Operating elements on the service side
4.3 Indication elements on the service side

The device has the following indication elements on the service side:

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A CF ACT</td>
<td>Lit if the CF card is accessed.</td>
</tr>
<tr>
<td>B CAN ACT</td>
<td>Lit if data is transferred via the CAN interface.</td>
</tr>
<tr>
<td></td>
<td>or PROFIBUS ACT (green) Lit if data is transferred via the Profibus interface.</td>
</tr>
<tr>
<td>C TOUCH</td>
<td>Dark during boot up.</td>
</tr>
<tr>
<td></td>
<td>Lit when the touch sensor is ready.</td>
</tr>
<tr>
<td></td>
<td>Flashes when actuating the touch sensor.</td>
</tr>
<tr>
<td>D TOUCH ERROR</td>
<td>Lit during boot up.</td>
</tr>
<tr>
<td></td>
<td>Dark when the touch sensor is ready.</td>
</tr>
<tr>
<td></td>
<td>Lit in the event of errors.</td>
</tr>
<tr>
<td></td>
<td>Flashes if the infra-red frame is contaminated and has to be cleaned</td>
</tr>
<tr>
<td></td>
<td>(cleaning the infra-red touch, → Chapter 7.2.3, 49).</td>
</tr>
<tr>
<td></td>
<td>Flashes if the resistive touch is incorrectly calibrated (touch calibra-</td>
</tr>
<tr>
<td></td>
<td>tion, → Document «M000174»).</td>
</tr>
<tr>
<td>E SUPPLY</td>
<td>Lit if all internal system voltages are present.</td>
</tr>
<tr>
<td></td>
<td>OK (green)</td>
</tr>
</tbody>
</table>

Tab. 6 Indication elements on the service side
4.4 Operating and indication elements on the connector side of SKS devices

![Diagram of SKS devices](image)

The SKS devices (XVH-342-57SKS) also have the following operating and indication elements on the connector side:

<table>
<thead>
<tr>
<th>Element</th>
<th>Function</th>
</tr>
</thead>
</table>
| A LED «COM PORT ERROR» (red) | Lit if the last data transfer to the PLC could not be correctly executed.  
- The LED does not go out until the next correct data transfer to the PLC is completed.  
- This LED should **never** be lit in normal operation. |
| B LED «COM PORT ACT» (green) | Lit during an active data transfer between the device and the PLC.  
- This LED should flash **momentarily (approx. 50 ms)** in normal operation. |
| C Switch «LINE TERM. COM PORT» | Switch on termination resistors of the RS485 interface (towards connector = switched on).  
- The first and last stations in the network must have their termination resistors switched on.  
- These always have to be switched on with point-to-point connections (only two stations). |

Tab. 7 Operating and indication elements on the connector side of SKS devices
5. Installation

5.1 Safety regulations

Read the Chapter 3. Safety regulations, 11, before installing and commissioning the device. These contain important information for your personal safety.

5.1.1 Qualification of personnel

The device must only be installed and commissioned by automation specialists.
5.2 Requirements for the place of installation

- Approvals:
  The device must only be used in locations that are approved for the device. See the markings on
  the nameplate and Chapter 9. Technical data, 55.

- Power supply:
  The power supply must comply with the requirements stated in Chapter 9.5.1 Power supply, 59.

5.2.1 Requirements for the mounting position

The device is designed for mounting in control cabinets, control panels or control desks. It can be
mounted horizontally or vertically. The following requirements must be fulfilled when selecting a suitable
mounting position:

- The display should not be exposed to direct sunlight (the UV component of sunlight reduces the
  lifespan of the device and disturbs the infra-red touch sensor).

- If possible, the operating elements on the service side of the device and the cable connections
  should also still be accessible after the device has been mounted.

- The ambient conditions stated must be observed. See Chapter 9.9 Ambient conditions, 61.

- Sufficient ventilation (cooling) must be ensured by means of:
  - Clearance of at least 3 cm to the ventilation slots
  - Clearance of at least 15 cm from heat radiating components such as heavily loaded trans-
    formers
  - The expected temperatures should be within the permissible range. See Chapter 9.9 Ambient
    conditions, 61.

- Properties of the mounting surfaces:
  - Material thickness at the mounting cutout 2…5 mm
  - Flatness \( \leq 0.5 \) mm
    (this requirement must also be fulfilled when the device is mounted!)
  - Surface roughness \( R_z \leq 120 \)
5.3 Cable preparation

The cables for wiring the device are not supplied with it.

**WARNING**

**Potential equalization currents**

Large equalization currents between the protective ground systems of different devices may cause operational malfunctions due to signal interference and may even cause fires.

▶ If necessary, a potential equalization conductor should be installed parallel to the cable. This should have a cross-section that is a multiple of the cable shield.

**CAUTION**

**Operational malfunctions**

Use of unsuitable or improperly prepared cables, as well as incorrect wiring will mean that neither the values stated in the technical data nor the electromagnetic compatibility (EMC) can be ensured.

▶ Only use cables prepared by specialists.
▶ The cables used must be prepared according to the interface description in these Operating Instructions.
▶ The wiring instructions for the relevant interface must be observed when wiring the device.
▶ Any generally applicable regulations and standards must be fulfilled.
5. Installation

5.3.1 Overview of interfaces

Connector side:

The fitting of the connector cover on the connector side depends on the device version concerned. See nameplate and Chapter 2.4 Device versions, p. 7.

![Fig. 9 Interfaces on the connector side of the BAS, CAN and MPI devices (figure shows CAN device)](image)

![Fig. 10 Interfaces on the connector side of the SKS devices](image)

Service side:

![Fig. 11 Interfaces on the service side of the BAS, CAN and MPI devices (figure shows service side of BAS, CAN and MPI devices)](image)
<table>
<thead>
<tr>
<th>Interface</th>
<th>Interface description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Ethernet</td>
<td>→ Chapter 5.3.4, p. 29</td>
</tr>
<tr>
<td>B No interface (BAS devices)</td>
<td></td>
</tr>
<tr>
<td>CAN (CAN devices)</td>
<td>→ Chapter 5.3.5, p. 30</td>
</tr>
<tr>
<td>Profibus (MPI devices)</td>
<td>→ Chapter 5.3.6, p. 32</td>
</tr>
<tr>
<td>C System Portt (SKS devices)</td>
<td>→ Chapter 5.3.8, p. 36</td>
</tr>
<tr>
<td>D Com Port (SKS devices)</td>
<td>→ Chapter 5.3.7, p. 35</td>
</tr>
<tr>
<td>E Power supply</td>
<td>→ Chapter 5.3.3, p. 28</td>
</tr>
<tr>
<td>F DIAG</td>
<td>Only for service tasks</td>
</tr>
<tr>
<td>G USB Device</td>
<td>→ Chapter 5.3.9, p. 37</td>
</tr>
</tbody>
</table>

Tab. 8 Overview of interfaces
5. Installation

5.3.2 Preparation of cables with D-Sub connector

The preparation of bus cables is an essential factor in ensuring reliable operation and electromagnetic compatibility (EMC).

Wiring requirements

- The cables must be shielded.
- The cable shield must be made from a copper braid.
- The cable shield must make a low impedance connection with the connector casing over a large contact area. This is achieved by:
  - Use of metal or metallized connector casings with a cable clamp for strain relief.
  - The cable clamp must be screwed securely to the connector.

Connecting the cable shield

1. Strip the cable end so that approx. 3 cm of the shield braid is exposed.
2. Fold back the shield braid over the cable shield.
3. Fit approx. 3 cm of heat shrinkable tubing over the folded back end of the shield braid or use a rubber grommet.
   - 5…8 mm of the shield braid must be exposed at the cable end.
   - The folded back shield braid end must be covered by the heat shrinkable tubing or by the rubber grommet.
4. Fit the D-Sub connector to the cable end:
   - The exposed metal shield braid must be clamped to the connector casing with the cable clamp.
The EMC values stated in the technical data (immunity and emission) can only be guaranteed by observing the prescribed cable preparation!
5.3.3 Power supply

The device is provided with an internal fuse cut-out and is protected against polarity reversal. The GND terminal is connected to both the housing and the 0 V terminal. The device power supply is not electrically isolated.

The device requires a 24 VDC power supply from an AC/DC converter with safe isolation (e.g. SELV). For other power supply requirements see Chapter 9.5.1 Power supply, 59.

- SELV (safety extra low voltage):
  Circuit in which no dangerous voltage is present, even in the event of a single fault.

Fig. 14 Power supply interface

Wiring

- Phoenix Contact MSTB 2.5/3-ST-5.08 connector, Phoenix order no. 1757022 is always supplied with the device.

Fig. 15 Phoenix Contact MSTB 2.5/3-ST-5.08 connector (view from the wiring side)

<table>
<thead>
<tr>
<th>Connection</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24 VDC</td>
<td>+24 VDC power supply</td>
</tr>
<tr>
<td>GND</td>
<td>Functional ground connected to housing (does not have to be connected)</td>
</tr>
<tr>
<td>0 V</td>
<td>0 V power supply (connected to GND)</td>
</tr>
</tbody>
</table>

Tab. 9 Assignment of connector

- The following must be observed when the connector wiring is prepared:

Preparation the wiring of the connector

<table>
<thead>
<tr>
<th>Terminal type</th>
<th>Pluggable screw terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section</td>
<td>min. 0.75 mm² / max. 2.5 mm² (lead or wire)</td>
</tr>
<tr>
<td>Stripping length</td>
<td>7 mm</td>
</tr>
</tbody>
</table>

Tab. 10 Preparing the wiring of the connector
5.3.4 Ethernet

Fig. 16 Ethernet interface (RJ45 socket)

<table>
<thead>
<tr>
<th>LED</th>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT (yellow)</td>
<td>flashes</td>
<td>Ethernet is active (data traffic)</td>
</tr>
<tr>
<td>LINK (green)</td>
<td>lit</td>
<td>Active network is connected and detected</td>
</tr>
</tbody>
</table>

Tab. 11 Control LEDs of the Ethernet interface

---

Cable

- Use shielded twisted pair cable (STP) for networking:
  - For device to device connection: crossover cable
  - For connecting to the hub/switch: 1:1 patch cable
- Maximum cable length: 100 m.

Ethernet interface in accordance with EIA/TIA 568 TSB-36.

---

CAUTION

Forces acting on the Ethernet interface

Communication can be disturbed and the connection mechanics damaged if the Ethernet interface is exposed to severe vibration or the RJ45 plug connection is pulled.

- Protect the RJ45 connection from severe vibration.
- Protect the RJ45 connection from pulling on the socket.
5.3.5 CAN

The CAN interface is electrically isolated.

![Fig. 17 CAN interface (9-pin, D-Sub, male, UNC)](image)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>2</td>
<td>CAN-L</td>
<td>Bus line (dominant low)</td>
</tr>
<tr>
<td>3</td>
<td>CAN-GND</td>
<td>CAN Ground</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>Optional CAN Ground</td>
</tr>
<tr>
<td>7</td>
<td>CAN-H</td>
<td>Bus line (dominant high)</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>nc</td>
</tr>
</tbody>
</table>

Tab. 12 Pin assignment of CAN interface in accordance with CiA

- Pin 3 (CAN-GND) and 6 (GND) are connected internally in the device.
- nc: Pins 1, 4, 5, 8 and 9 must not be connected!
- The CAN bus drivers are fed internally with power.
- No power supply for third-party devices is implemented on the CAN connector.

Wiring

- Shielded cables must be used.

### Cable specifications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated surge impedance</td>
<td>120 Ω</td>
</tr>
<tr>
<td>Permissible surge impedance</td>
<td>108…132 Ω</td>
</tr>
<tr>
<td>Capacitance per unit length</td>
<td>&lt; 60 pF/m</td>
</tr>
<tr>
<td>Core cross-section / max. cable length</td>
<td>≥ 0.25 mm² / 100 m</td>
</tr>
<tr>
<td></td>
<td>≥ 0.34 mm² / 250 m</td>
</tr>
<tr>
<td></td>
<td>≥ 0.75 mm² / 500 m</td>
</tr>
</tbody>
</table>

Tab. 13 Cable specifications
The maximum baud rate depends on the cable length:

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Max. baud rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 m</td>
<td>1000 Kbit/s</td>
</tr>
<tr>
<td>50 m</td>
<td>800 Kbit/s</td>
</tr>
<tr>
<td>100 m</td>
<td>500 Kbit/s</td>
</tr>
<tr>
<td>250 m</td>
<td>250 Kbit/s</td>
</tr>
<tr>
<td>500 m</td>
<td>125 Kbit/s</td>
</tr>
<tr>
<td>500 m</td>
<td>100 Kbit/s</td>
</tr>
<tr>
<td>1000 m</td>
<td>50 Kbit/s</td>
</tr>
<tr>
<td>2500 m</td>
<td>20 Kbit/s</td>
</tr>
<tr>
<td>5000 m</td>
<td>10 Kbit/s</td>
</tr>
</tbody>
</table>

Tab. 14 Relationship of cable length / baud rate

- The use of repeaters is recommended with cables over 1000 m in length. Repeaters can also be used to implement electrical isolation. Refer to the documentation of the repeater manufacturer for further information.
- Observe the recommendations of the CiA (CAN in Automation).
- When preparing the cables, ensure that there is a low-resistance connection between the cable shield and the connector casing (→ Chapter 5.3.2, ¶ 26).

**CAN bus topology**

- A bus segment can connect up to 32 bus stations.
- Several bus segments can be linked via repeaters (bidirectional amplifiers). Refer to the documentation of the repeater manufacturer for further information.
- A bus segment must be provided with cable termination (120 Ω) at both ends. These terminations must be connected in the connector, directly between pin 2 and 7.

- The bus segment must be terminated at both ends.
- No more than two terminations must be provided on each bus segment.
- Transmission faults can occur if operation is carried out without the correct termination.

![Termination](Fig. 18 Termination)
5.3.6 Profibus

The Profibus interface is electrically isolated.

![Fig. 19 Profibus interface (9-pin, D-Sub, female, UNC)]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>EIA RS 485 line B</td>
</tr>
<tr>
<td>4</td>
<td>RTSAS</td>
<td>Output for controlling a repeater</td>
</tr>
<tr>
<td>5</td>
<td>M5EXT</td>
<td>Output of reference ground for external termination</td>
</tr>
<tr>
<td>6</td>
<td>P5EXT</td>
<td>5V output for external termination</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>8</td>
<td>A</td>
<td>EIA RS 485 line A</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>nc</td>
</tr>
</tbody>
</table>

Tab. 15 Pin assignment of the Profibus interface

Pin 6 (5 V) must not be used as a power supply for external devices.

Wiring

- Shielded twisted pair cables, cable type A (in accordance with Profibus standard EN50170) must be used.

<table>
<thead>
<tr>
<th>Cable specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated surge impedance</td>
</tr>
<tr>
<td>Permissible surge impedance</td>
</tr>
<tr>
<td>Capacitance per unit length</td>
</tr>
<tr>
<td>Loop resistance</td>
</tr>
<tr>
<td>Core cross-section</td>
</tr>
</tbody>
</table>

Tab. 16 Cable specifications
The maximum baud rate depends on the cable length:

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Max. baud rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200 m</td>
<td>≤ 93.75 Kbit/s</td>
</tr>
<tr>
<td>1000 m</td>
<td>187.5 Kbit/s</td>
</tr>
<tr>
<td>400 m</td>
<td>500 Kbit/s</td>
</tr>
<tr>
<td>200 m</td>
<td>1500 Kbit/s</td>
</tr>
</tbody>
</table>

Tab. 17 Relationship of cable length / baud rate (for cables compliant with cable type A of the Profibus standard EN5017)

When preparing the cables, ensure that there is a low-resistance connection between the cable shield and the connector casing (→ Chapter 5.3.2, § 26).

Profibus topology

- A bus segment can connect up to 32 bus stations.
- Several bus segments can be linked via repeaters (bidirectional amplifiers). Refer to the documentation of the repeater manufacturer for further information.

The maximum cable length can be increased by using repeaters. Refer to the documentation of the repeater manufacturer for further information.

- Bus terminal connector
  Only use bus terminal connectors that are specified for use in the Profibus network. They hold both bus cables on a bus station and ensure a low impedance connection of the cable shield to the shield reference potential of the bus station.
  These bus terminal connectors contain the Profibus cable termination that can be switched on as required.

- A bus segment must be provided with cable termination at both ends. The termination is passive and is fed from the bus station. It ensures a defined idle signal on the bus when no bus station is transmitting.
  These bus terminations should be implemented externally in the connector casing according to the Profibus standard (they can also be implemented with the bus terminating connector described above).

Fig. 20 Termination
The bus segment must be terminated at both ends.
- No more than two terminations must be provided on each bus segment.
- At least one of the two terminations must be fed by the bus station.
- Transmission faults can occur if operation is carried out without the correct termination on the Profibus network.
5.3.7 Com Port (RS485)

The Com Port is implemented as a standard RS485 interface. This interface is electrically isolated. The GND pin is directly connected to the housing potential.

![Fig. 21 RS485 interface (9-pin, D-Sub, female, UNC)]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>EIA RS 485 line A</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Reference ground</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>7</td>
<td>B</td>
<td>EIA RS 485 line B</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>nc</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>nc</td>
</tr>
</tbody>
</table>

Tab. 18 Pin assignment of the RS485 interface

⚠️ nc: Pins 1, 2, 4, 6, 8 and 9 must not be connected!
5.3.8 System Port (RS232)

The System Port is implemented as a standard RS232 interface. This interface is not electrically isolated. The GND pin is directly connected to the housing potential.

![RS232 interface diagram](image)

### Pin Assignment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>Data Carrier Detected</td>
</tr>
<tr>
<td>2</td>
<td>RxD</td>
<td>Receive Data</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>Transmit Data</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>Data Terminal Ready</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
<td>Data Set Ready</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>Request to Send</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>Clear to Send</td>
</tr>
<tr>
<td>9</td>
<td>RI</td>
<td>Ring Indicator</td>
</tr>
</tbody>
</table>

Tab. 19 Pin assignment of the RS232 interface

### Wiring

- Shielded cables must be used.
- The maximum baud rate depends on the cable length:

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Max. baud rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 m</td>
<td>9600 Bit/s</td>
</tr>
<tr>
<td>15 m</td>
<td>19200 Bit/s</td>
</tr>
<tr>
<td>10 m</td>
<td>38400 Bit/s</td>
</tr>
<tr>
<td>5 m</td>
<td>57600 Bit/s</td>
</tr>
<tr>
<td>2.5 m</td>
<td>115200 Bit/s</td>
</tr>
</tbody>
</table>

Tab. 20 Relationship of cable length / baud rate

When preparing the cables, ensure that there is a low-resistance connection between the cable shield and the connector casing (→ Chapter 5.3.2, § 26).
5.3.9 **USB Device**

The USB Device interface supports USB 1.1.

![USB Device interface (USB Device, type B)](efesotomasyon.com - Klockner Moeller - inverter)

**Cable**
- Only use shielded USB standard cable.
- Maximum cable length: 5 m.
5.4 Mounting

**CAUTION**

**Operational malfunctions**

Use of unsuitable or improperly prepared cables, as well as incorrect wiring will mean that neither the values stated in the technical data nor the electromagnetic compatibility (EMC) can be ensured.

- Only use cables prepared by specialists.
- The cables used must be prepared according to the interface description in these Operating Instructions.
- The wiring instructions for the relevant interface must be observed when wiring the device.
- Any generally applicable regulations and standards must be fulfilled.

**CAUTION**

**Device condensation**

If the device is or was exposed to climatic changes (temperature fluctuation, air humidity) moisture can form on or in the device (device condensation). In this case, there is a risk of short-circuit.

- The device must not be switched on when device condensation is present.
- If condensation is present on the device, or if it was exposed to temperature fluctuations, it must be allowed to adjust to room temperature (do not expose the device to the direct heat of heating devices) prior to commissioning.

1. Check the device for damage in transit.

2. Mount the device in the control cabinet, control panel or the control desk. See Chapter 5.4.1 Mounting the device, 39.

3. Connect the device as required.
   - Follow the instructions on wiring the relevant interface. See Chapter 5.3 Cable preparation, 23.

**The device must only be installed and commissioned in perfect technical condition and in compliance with these Operating Instructions.**

- The device is not provided with an On/Off switch. If the power supply is not provided with a switch, the device will start up (boot) as soon as it is connected to the power supply.
5.4.1 Mounting the device

An additional set of retaining brackets is required for mounting in accordance with IP65 and for use in potentially explosive atmospheres. Please contact your supplier.

1. Select the mounting position of the device as described in Chapter 5.2.1 Requirements for the mounting position, 22.

2. Prepare a mounting cutout for the device at the selected position:
   - Mounting cutout 198 × 142 mm (± 1 mm)
   - Material thickness at the mounting cutout 2…5 mm

![Diagram of Mounting Cutout]

Fig. 24 Mounting cutout for 5.7" devices

3. Insert the sealing strip supplied in the groove (A) on the rear of the device front plate and cut it so that the join is tight.
   - Groove for sealing strip, see Fig. 25, 40.

**CAUTION**

Poor sealing

Poor sealing resulting from the twisting of the sealing strip or due to a gap between the ends of the sealing strip.

- The join of the sealing strip must be positioned on the bottom of the device.
- Do not twist the sealing strip when it is inserted.
- Cut the sealing strip to a suitable length so that the join is tight.
4. Fit the device from the front into the mounting cutout.
5. Clip on the retaining brackets in the recesses provided for them on the device as shown below and fix the device by tightening the threaded pins.

**CAUTION**

- **Mechanical damage to the device**
  - Tightening the threaded pins too tightly may damage the device.
  - ▶ Tighten threaded pins with a max. tightening torque of 0.2 Nm.

- The positions of the retaining brackets depend on the mounting requirements.
### Standard mounting:
- **Top and bottom of the device:**
  - Fit one retaining bracket each at the left and right fixing position

![Fig. 26 Devices with four retaining brackets (do not meet IP65 requirements)](image)

- **Devices which must be mounted in accordance with IP65 or used in potentially explosive atmospheres:**
  - **Top and bottom of the device:**
    - One retaining bracket at each of the fixing positions (left, right and in the center)
  - **Left and right on the device:**
    - One retaining bracket each at the central fixing position

![Fig. 27 Devices with eight retaining brackets (meet IP65 requirements)](image)
6. Operation

6.1 Safety regulations

Read the Chapter 3. Safety regulations, 11, before working with the device. These contain important information for your personal safety.

CAUTION

Sensitive resistive touch surface
Damage to the resistive touch due to the use of pointed or sharp objects.
- Only activate the resistive touch with your finger or a touch pen.
- When wearing gloves, ensure that these are clean. They must not be covered with abrasive dust or sharp particles.

CAUTION

Device condensation
If the device is or was exposed to climatic changes (temperature fluctuation, air humidity) moisture can form on or in the device (device condensation). In this case, there is a risk of short-circuit.
- The device must not be switched on when device condensation is present.
- If condensation is present on the device, or if it was exposed to temperature fluctuations, it must be allowed to adjust to room temperature (do not expose the device to the direct heat of heating devices) prior to commissioning.

6.1.1 Qualification of personnel

The device must only be operated by operating personnel instructed for the application concerned.
6.2 Starting the device

1. Insert the CF card with the operating system:

   **CAUTION**

   **Data loss**

   During a write operation, the CF card may lose data or may be destroyed if it is re- moved or if there is a power failure.

   - Always secure CF cards with the CF slot cover.
   - Avoid write operations to CF cards. Reasons:
     - The number of write cycles possible on CF cards is limited.
     - A power failure during write operations will most likely lead to loss of data.
   - Only remove the CF card when the device is in a de-energized state.
   - Before switching off, ensure that no software write operations to the CF card are in progress («CF ACT» LED must not be lit).

   1.1 Remove the CF slot cover (A).

   ![Fig. 28 Service side of the device (CF slot cover fitted)]

   1.2 Insert the CF card into CF slot (B).

   **Do not apply any force (CF cards are protected against reverse insertion).**

   ![Fig. 29 Service side of the device (CF slot cover removed)]

   1.3 Fit the CF slot cover (A).

2. Energize the device.
   - The device will boot.
If the device does not boot up and/or if an error message appears while starting (booting) the device, see Chapter 7.4 Troubleshooting and fault rectification, 51.

Complete the following steps after initial commissioning (→ Document «M000174»):

4.1 Adjust the system settings of the device.
4.2 Install the required application programs.

The lifespan of the backlight can be increased by reducing the brightness (→ Document «M000174»).
6.3 Switching off the device

CAUTION

Data loss

During a write operation, the CF card may lose data or may be destroyed if it is re-
moved or if there is a power failure.

▸ Always secure CF cards with the CF slot cover.
▸ Avoid write operations to CF cards. Reasons:
  - The number of write cycles possible on CF cards is limited.
  - A power failure during write operations will most likely lead to loss of data.
▸ Only remove the CF card when the device is in a de-energized state.
▸ Before switching off, ensure that no software write operations to the CF card are
  in progress («CF ACT» LED must not be lit).

Avoid frequent on/off switching of the device, especially at low temperatures, will reduce the
lifespan of the cold cathode tubes (CCFL) of the backlight.

▸ Avoid frequent on/off switching of the device.
▸ Reduce the brightness of the backlight instead (→ Document «M000174»).

1 De-energize the device.
7. Maintenance and service

7.1 Safety regulations

Read the Chapter 3. Safety regulations, § 11, before working with the device. These contain important information for your personal safety.

7.1.1 Qualification of personnel

The device should only be maintained and serviced by persons with the following qualifications, according to the task required:

- Cleaning:
  - Operating personnel

- Troubleshooting:
  - Persons with the specific knowledge required

- Repairs:
  - See Chapter 7.3.1 Repairs, § 50
7.2 Maintenance

Resistive touch devices are maintenance-free. However, the following work may be necessary:
- Cleaning of the resistive touch if contaminated.
- Recalibration of the resistive touch if it does not respond correctly to touch operation.

The infra-red frame on infra-red touch devices must be cleaned regularly (see Chapter 7.2.3 Cleaning the infra-red touch, page 49). Otherwise these devices are maintenance-free.

7.2.1 Cleaning the resistive touch

CAUTION

Cleaning the device

Damage to the device due to the use of pointed or sharp objects or by liquids.

- Do not use any pointed or sharp objects (e.g. knife) for cleaning.
- Do not use any aggressive or abrasive cleaning agent or solvent.
- Avoid any liquid entering the device (risk of short-circuit).

1. Clean the resistive touch carefully with a clean, damp cloth.
   - With stubborn contamination, spray a little cleaning agent onto the damp cloth first of all.

7.2.2 Recalibrating a resistive touch

The resistive touch is already calibrated when delivered. However, it must be recalibrated if it does not respond correctly to touch operation. Touch calibration, see Document «M000174».
7.2.3 Cleaning the infra-red touch

The infra-red frame must be cleaned regularly.

The infra-red touch needs to be cleaned if the following is indicated:
- On the service side, the «TOUCH ERROR» LED flashes
- On the taskbar of the display, one of the following icons will appear:
  - Contaminated touch sensor
  - Faulty or severely contaminated touch sensor
- A visualization application will show an appropriate warning.

The infra-red channels may be interrupted if the infra-red frame is severely contaminated. In extreme cases, this may mean that the affected zones of the touch sensor cannot be touch activated.

### CAUTION

**Cleaning the device**

Damage to the device due to the use of pointed or sharp objects or by liquids.

- Do not use any pointed or sharp objects (e.g. knife) for cleaning.
- Do not use any aggressive or abrasive cleaning agent or solvent.
- Avoid any liquid entering the device (risk of short-circuit).

1. Clean the infra-red frame and the display with a clean, damp cloth.
   - With stubborn contamination, spray a little cleaning agent onto the damp cloth first of all.

7.2.4 Recalibrating the infra-red touch

Infra-red touch devices do not have to be recalibrated.

7.2.5 Battery

The integrated battery cannot be exchanged. Lifespan, see Chapter 9.4 System, \$$58\$$. 
7. Maintenance and service

7.3 Service

7.3.1 Repairs

Repairs must only be carried out by the manufacturer or from a repair center authorized by the manufacturer.

Contact your local dealer or the technical support of the device manufacturer. Contact address, see Section «Manufacturer», § 2.

Only the original packaging should be used for transporting the device.
## 7.4 Troubleshooting and fault rectification

<table>
<thead>
<tr>
<th>Fault and possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device does not start (boot).</td>
<td></td>
</tr>
<tr>
<td>Power supply interface does not have any power.</td>
<td>Check the power supply cable.</td>
</tr>
<tr>
<td>While the device is starting (booting), the following message appears:</td>
<td></td>
</tr>
<tr>
<td>«No Card in CF slot 0 detected !!!»</td>
<td></td>
</tr>
<tr>
<td>The CF slot 0 does not contain a CF card.</td>
<td>Insert the CF card with the operating system in the CF slot 0.</td>
</tr>
<tr>
<td>CF card in CF slot 0 could not be read (faulty).</td>
<td>Replace CF card.</td>
</tr>
<tr>
<td>«Search Subdirectory … not found»</td>
<td></td>
</tr>
<tr>
<td>The CF card in CF slot 0 does not have an OS (operating system).</td>
<td>If the CF card does not contain an operating system, load one onto a CF card.</td>
</tr>
<tr>
<td></td>
<td>Insert the CF card with the operating system in the CF slot 0.</td>
</tr>
<tr>
<td>«&lt;50&gt; Touch is dirty or defect» (only appears if GALILEO is installed)</td>
<td></td>
</tr>
<tr>
<td>Resistive touch is not correctly calibrated.</td>
<td>Start (boot) the device.</td>
</tr>
<tr>
<td></td>
<td>Calibrate touch (&lt; Document «M000174»&gt;).</td>
</tr>
<tr>
<td>Infra-red frame of the infra-red touch is contaminated.</td>
<td>Clean the infra-red frame (&lt; Chapter 7.2.3, 49&gt;).</td>
</tr>
<tr>
<td>The threaded pins for mounting the device have been tightened too much.</td>
<td>Loosen the threaded pins (observe max. torque, &lt; Chapter 5.4.1, 39).</td>
</tr>
<tr>
<td>Device is faulty.</td>
<td>Send in your device for repair.</td>
</tr>
<tr>
<td>Display remains or becomes dark.</td>
<td></td>
</tr>
<tr>
<td>Backlight is switched off.</td>
<td>Check the function in the visualization software.</td>
</tr>
<tr>
<td>Backlight is faulty.</td>
<td>Send in your device for repair.</td>
</tr>
<tr>
<td>Touch does not react or does not react correctly to touch operation.</td>
<td></td>
</tr>
<tr>
<td>Resistive touch is not correctly calibrated.</td>
<td>Start (boot) the device.</td>
</tr>
<tr>
<td></td>
<td>Calibrate touch (&lt; Document «M000174»&gt;).</td>
</tr>
<tr>
<td>Infra-red frame of the infra-red touch is contaminated.</td>
<td>Clean the infra-red frame (&lt; Chapter 7.2.3, 49&gt;).</td>
</tr>
</tbody>
</table>
## Tab. 21 Troubleshooting and fault rectification

<table>
<thead>
<tr>
<th>Fault and possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
</table>
| Touch is deactivated.    | - Start (boot) the device.  
|                          | - Activate touch  
|                          | (→ Document «M000174»). |
| LED «TOUCH ERROR» permanently lit and/or the icon  appears in the taskbar. | |
| Incorrect operation of the operating elements on the display. | Remove all objects (also fingers) from the area of the display. |
| Infra-red frame of the infra-red touch is contaminated. | Clean the infra-red frame  
| (→ Chapter 7.2.3, 49). | |
| The threaded pins for mounting the device have been tightened too much. | Loosen the threaded pins (observe max. torque,  
| (→ Chapter 5.4.1, 39). | |
| Device is faulty. | Send in your device for repair. |
8. Storage, transport and disposal

8.1 Safety regulations

Read the Chapter 3. Safety regulations, § 11, before installing and commissioning the device. These contain important information for your personal safety.

8.1.1 Qualification of personnel

The device should only be stored, transported and disposed of by persons with the following qualifications, according to the task required.

- **Storage:** Persons without special knowledge
- **Transport:** Persons with a specialist knowledge of transport (in particular how to prevent damage in transit)
- **Disposal:** Persons with a specialist knowledge of proper disposal (also about the proper disposal of harmful substances)

8.2 Storage

The device should be stored in the original packaging. The ambient conditions must be fulfilled. See Chapter 9.9 Ambient conditions, § 61.

8.3 Transport

Damage to the device must be prevented during transport. The device should therefore only be transported in the original packaging.

The ambient conditions must be fulfilled even when the device is transported. See Chapter 9.9 Ambient conditions, § 61.

1. Check the device on arrival for damage in transit.
8.4 Disposal

DANGER

Explosive and toxic materials

Any improper handling causes a risk of explosion due to the lithium battery soldered in the device and a risk of poisoning due to the mercury content of the cold cathode tubes.

The device must only be disposed of by persons with the required specialist knowledge.

Devices that are no longer used must be properly disposed of in accordance with the applicable national regulations or returned to the manufacturer or sales office.

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Galvanized sheet steel</td>
</tr>
<tr>
<td>Front plate</td>
<td>Aluminum, Peraluman 101 anodized</td>
</tr>
<tr>
<td>Infra-red frame</td>
<td>Polycarbonate (PC)</td>
</tr>
<tr>
<td>Infra-red touch protective panel</td>
<td>Glass</td>
</tr>
<tr>
<td>Resistive touch back panel</td>
<td>Glass with polyester foil</td>
</tr>
<tr>
<td>Cold cathode tubes</td>
<td>Mercury (&lt; 5 mg)</td>
</tr>
<tr>
<td>Battery</td>
<td>Lithium</td>
</tr>
<tr>
<td>Electronic components</td>
<td>Various</td>
</tr>
</tbody>
</table>

Tab. 22 Materials used in the device

<table>
<thead>
<tr>
<th>Packaging</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>External packaging</td>
<td>Cardboard</td>
</tr>
<tr>
<td>Internal packaging</td>
<td>Closed-cell polyethylene foam, CFC-free</td>
</tr>
<tr>
<td>Plastic bag</td>
<td>Polyethylene (PE)</td>
</tr>
</tbody>
</table>

Tab. 23 Materials used in the packaging
9. Technical data

9.1 Dimensions and weights

9.1.1 BAS, CAN and MPI devices

Tab. 24 Dimensions and weights of the BAS, CAN and MPI devices

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>156 mm</td>
</tr>
<tr>
<td>Width</td>
<td>212 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>60 mm</td>
</tr>
<tr>
<td>Thickness of front plate</td>
<td>5 mm</td>
</tr>
<tr>
<td>Mounting depth</td>
<td>55 mm</td>
</tr>
<tr>
<td>Mounting cutout</td>
<td>198 mm × 142 mm (±1 mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 1.7 kg</td>
</tr>
</tbody>
</table>

Fig. 30 Mechanical dimensions of the BAS, CAN and MPI devices
9. Technical data

9.1.2 SKS devices

Fig. 31 Mechanical dimensions of the SKS devices

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>156 mm</td>
</tr>
<tr>
<td>Width</td>
<td>212 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>81 mm</td>
</tr>
<tr>
<td>Thickness of front plate</td>
<td>5 mm</td>
</tr>
<tr>
<td>Mounting depth</td>
<td>76 mm</td>
</tr>
<tr>
<td>Mounting cutout</td>
<td>198 mm x 142 mm (±1 mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 1.9 kg</td>
</tr>
</tbody>
</table>

Tab. 25 Dimensions and weights of the SKS devices
9.2 Display

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>CSTN-LCD (color)</td>
</tr>
<tr>
<td>Resolution (W × H)</td>
<td>QVGA (320 × 240 pixels)</td>
</tr>
<tr>
<td>Visible display area</td>
<td>115 mm × 86 mm (5.7&quot; screen diagonal)</td>
</tr>
<tr>
<td>Color resolution</td>
<td>256 colors</td>
</tr>
<tr>
<td>Contrast ratio</td>
<td>Normally 35:1</td>
</tr>
<tr>
<td>Brightness</td>
<td>Normally 150 cd/m²</td>
</tr>
<tr>
<td>Backlight</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>1× CCFL, dimmable via software</td>
</tr>
<tr>
<td>Lifespan</td>
<td>Normally 50 000 h</td>
</tr>
<tr>
<td>Resistive touch back panel</td>
<td>Touch sensor (absolutely flat, seamless)</td>
</tr>
<tr>
<td>Infra-red touch protective panel</td>
<td>Non-reflective safety glass¹)</td>
</tr>
</tbody>
</table>

Tab. 26 Display

¹) By the end of 2006: non-reflective glass, from 01.01.2007: non-reflective safety glass

9.3 Touch sensor

9.3.1 Devices with resistive touch

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Resistive touch</td>
</tr>
<tr>
<td>Technology</td>
<td>4-wire</td>
</tr>
</tbody>
</table>

Tab. 27 Touch sensor of the devices with resistive touch

9.3.2 Devices with infra-red touch 5.7"

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Infra-red touch</td>
</tr>
<tr>
<td>Resolution</td>
<td>47 × 31 logic channels</td>
</tr>
</tbody>
</table>

Tab. 28 Touch sensor of the devices with infra-red touch 5.7"
9.4 System

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7”; MH2 5.7”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>RISC, 32-bit, 200 MHz</td>
</tr>
<tr>
<td>Internal memory</td>
<td></td>
</tr>
<tr>
<td>DRAM</td>
<td>64 MByte</td>
</tr>
<tr>
<td>FLASH</td>
<td>Approx. 1.5 MByte available</td>
</tr>
<tr>
<td>External memory</td>
<td></td>
</tr>
<tr>
<td>CF slot</td>
<td>CompactFlash Card Type I/II for operating system, programs and data</td>
</tr>
<tr>
<td>Real-time clock (battery backup)</td>
<td></td>
</tr>
<tr>
<td>Battery type</td>
<td>CR2032 (190 mA/h), maintenance-free (soldered)</td>
</tr>
<tr>
<td>Backup time in de-energized state</td>
<td>Normally 10 years</td>
</tr>
</tbody>
</table>

Tab. 29 System

9.5 Interfaces

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7”; MH2 5.7”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>100Base-TX / 10Base-T</td>
</tr>
<tr>
<td>Interface, depending on the device version:</td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>CAN, electrically isolated</td>
</tr>
<tr>
<td>Profibus</td>
<td>Profibus, electrically isolated, max. 1.5 Mbit/s</td>
</tr>
<tr>
<td>Com Port</td>
<td>RS485 (Sucomet K), electrically isolated</td>
</tr>
<tr>
<td>System Port</td>
<td>RS232 (Sucom A), not electrically isolated</td>
</tr>
<tr>
<td>Power supply</td>
<td>→ Chapter 9.5.1, 59</td>
</tr>
<tr>
<td>DIAG</td>
<td>Only for service tasks</td>
</tr>
<tr>
<td>USB Device</td>
<td>USB 1.1, not electrically isolated</td>
</tr>
</tbody>
</table>

Tab. 30 Interfaces
9.5.1 Power supply

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24 VDC SELV (safety extra low voltage)</td>
</tr>
<tr>
<td>Permissible voltage</td>
<td></td>
</tr>
<tr>
<td>RMS value:</td>
<td>20.4 … 28.8 VDC</td>
</tr>
<tr>
<td>(rated voltage +20 % / -15 %)</td>
<td></td>
</tr>
<tr>
<td>Absolute with ripple:</td>
<td>19.2 … 30.0 VDC</td>
</tr>
<tr>
<td>35 VDC for a period &lt; 100 ms</td>
<td></td>
</tr>
<tr>
<td>Voltage dips</td>
<td></td>
</tr>
<tr>
<td>20 ms from rated voltage (24 VDC)</td>
<td></td>
</tr>
<tr>
<td>2 ms from undervoltage (20.4 VDC)</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td></td>
</tr>
<tr>
<td>BAS, CAN and MPI devices</td>
<td>Max. 16 W (normally 12 W)</td>
</tr>
<tr>
<td>SKS devices</td>
<td>Max. 21 W (normally 17 W)</td>
</tr>
<tr>
<td>Current consumption</td>
<td></td>
</tr>
<tr>
<td>Continuous current</td>
<td></td>
</tr>
<tr>
<td>BAS, CAN and MPI devices</td>
<td>Max. 0.8 A (24 VDC)</td>
</tr>
<tr>
<td>SKS devices</td>
<td>Max. 1.0 A (24 VDC)</td>
</tr>
<tr>
<td>Starting current inrush</td>
<td>2.5 A²s</td>
</tr>
<tr>
<td>Protection against reverse polarity</td>
<td>Yes</td>
</tr>
<tr>
<td>Fuse protection</td>
<td>Yes (fuse cut-out, not accessible)</td>
</tr>
<tr>
<td>Potential isolation</td>
<td>No</td>
</tr>
</tbody>
</table>

Tab. 31 Power supply

9.6 IP protection classes

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>IP65:</td>
</tr>
<tr>
<td>Required accessories for mounting:</td>
<td></td>
</tr>
<tr>
<td>Additional set of retaining brackets (optional)</td>
<td></td>
</tr>
<tr>
<td>Rear</td>
<td>IP20</td>
</tr>
</tbody>
</table>

Tab. 32 Protection classes
### 9.7 Approvals and declarations

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7''; MH2 5.7''</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC</td>
<td>89/336/EC</td>
</tr>
<tr>
<td>Explosion protection</td>
<td>II 3D EEx II T70°C IP5x (ATEX 94/9/EC):</td>
</tr>
<tr>
<td></td>
<td>Zone 22, category 3D:</td>
</tr>
<tr>
<td></td>
<td>- Additional set of retaining brackets (optional)</td>
</tr>
</tbody>
</table>

Tab. 33 Approvals and declarations

### 9.8 Applicable standards and regulations

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7''; MH2 5.7''</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC (in relation to CE)</td>
<td></td>
</tr>
<tr>
<td>EN 61000-6-2</td>
<td>Immunity for industrial areas</td>
</tr>
<tr>
<td>EN 61000-6-3</td>
<td>Emission for residential, commercial and light-industrial environments</td>
</tr>
<tr>
<td>EN 61000-6-4</td>
<td>Emission for industrial environments</td>
</tr>
<tr>
<td>EN 61131-2</td>
<td>Programmable logic controllers, equipment requirements and tests</td>
</tr>
<tr>
<td>Explosion protection (in relation to CE)</td>
<td></td>
</tr>
<tr>
<td>EN 60079-0 (old: EN 50014)</td>
<td>Electrical apparatus for explosive gas atmospheres</td>
</tr>
<tr>
<td>EN 61241-1 (old: EN 50281-1-1)</td>
<td>Electrical apparatus for use in the presence of combustible dust</td>
</tr>
<tr>
<td>EN 13463</td>
<td>Non-electrical equipment for use in explosion hazardous areas</td>
</tr>
<tr>
<td>Safety</td>
<td></td>
</tr>
<tr>
<td>EN 60950</td>
<td>Safety of information technology equipment</td>
</tr>
<tr>
<td>UL 60950</td>
<td></td>
</tr>
<tr>
<td>Product standards</td>
<td></td>
</tr>
<tr>
<td>EN 50178</td>
<td>Electronic equipment for use in power installations</td>
</tr>
<tr>
<td>EN 61131-2</td>
<td>Programmable logic controllers, equipment requirements and tests</td>
</tr>
</tbody>
</table>

Tab. 34 Applicable standards and regulations
9.9 Ambient conditions

<table>
<thead>
<tr>
<th>Property</th>
<th>XVH300 5.7&quot;; MH2 5.7&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>0…50°C</td>
</tr>
<tr>
<td>Storage / Transport</td>
<td>-20…60°C</td>
</tr>
<tr>
<td>Relative air humidity</td>
<td>10…95%, non-condensing</td>
</tr>
<tr>
<td>Vibration</td>
<td>According to IEC68-2-6</td>
</tr>
<tr>
<td>Shock</td>
<td>According to IEC68-2-27</td>
</tr>
<tr>
<td>Fall test</td>
<td>According to IEC68-2-32</td>
</tr>
</tbody>
</table>

Tab. 35 Ambient conditions
9. Technical data

MICRO PANEL XVH300 5.7"; MH2 5.7"