Operating Instructions
Overfill Prevention System SOP300

For reliable and secure tank overfill prevention

Endress+Hauser
People for Process Automation

Change history

Product version	Operating Instructions	Changes	Comments
1.00.XX	BA01787S/04/EN/01.17	Initial version	–
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1 About this document

1.1 Document function

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

1.2 Symbols used

1.2.1 Safety symbols

Symbol	Meaning
DANGER	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
CAUTION	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE	**NOTE!** This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Symbols for certain types of information

Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
1., 2., 3...	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.2.3 Electrical symbols

Symbol	Meaning	Symbol	Meaning
⎓	Direct current	~	Alternating current
⎓ ~	Direct current and alternating current	⏚	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
⏚	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.	⏚	**Equipotential connection** A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.

1.3 Text emphasis

Emphasis	Meaning	Example
Bold	Keys, buttons, program icons, tabs, menus, commands	**Start → Programs → Endress+Hauser** In the **File** menu, select the **Print** option.
Angle brackets	Variables	<DVD drive>

1.4 Acronyms used

Acronyms	Meaning
AC	Alternating Current
AOPS	Automated Overfill Prevention System
CPU	Central Processing Unit
DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
H	High-Limit (upper warning limit)
HH	HighHigh-Limit (upper alarm limit)
HMI	Human Machine Interface (e.g. operating panel)
L	Low-Limit (lower warning limit)
LL	LowLow-Limit (lower alarm limit)
NC	Normally Closed
NO	Normally Open
OPS	Overfill Prevention System
MOPS	Manual Overfill Prevention System
PLC	Programmable Logic Controller
UPS	Uninterruptible Power Supply
VNC	Virtual Network Computing (software for the transmission of the screen content)
WAN	Wide Area Network (possible communication channel for remote maintenance modem)
3G	Wireless data transmission standard (possible communication channel for remote maintenance modem)
I/O	Inputs/Outputs

1.5 Valid versions

Component	Version
Software	V1.00.xx
Hardware platform	V1.00.xx

1.6 Documentation

Overfill Prevention System SOP300
- Brief Operating Instructions KA01345S/04/EN
- Electrical wiring diagram
- On DVD:
  - Technical Information TI01358S/04/EN
  - Documentation for internal components

1.7 Registered trademarks

All brand and product names are trademarks or registered trademarks of the respective companies and organizations.

2 Basic safety instructions

2.1 Requirements for personnel

The personnel for installation, commissioning, diagnostics and maintenance must meet the following requirements:

- Trained, qualified specialists: must have a relevant qualification for this specific role and task and have been trained by Endress+Hauser. Experts at the Endress+Hauser service organization.
- Personnel must be authorized by the plant owner/operator.
- Personnel must be familiar with regional and national regulations.
- Before starting work: personnel must read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- Personnel must follow instructions and comply with general policies.

Operating personnel must meet the following requirements:

- Personnel are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- Personnel follow the instructions in this manual.

2.2 Designated use

The Overfill Prevention System has been designed as a safety function for the monitoring of critical levels (HH, H, L, LL) in tanks. It is also possible to monitor leaks in tanks and tank pipes in the tank basin. Appropriate sensors must be used for monitoring.

For more information on "sensors", see the Technical Information → 10

Any other use is considered to be non-designated use. Designated use entails compliance with the operating and maintenance requirements specified by the manufacturer. The Overfill Prevention System must be installed in a safe environment (not in hazardous areas or Ex zones). We recommend that you install the Overfill Prevention System in a dry, air-conditioned room.

Dangers

It is the responsibility of the owner/operator to assess any dangers for the systems. These dangers must be assessed by the owner/operator and the measures resulting from the assessment must be implemented. While the Overfill Prevention System can form part of such a measure, responsibility for the entire safety function always rests with the owner/operator, particularly the taking of suitable measures if the Overfill Prevention System signals an alarm. We also specifically state that relevant measures must also be assessed from a process engineering perspective.

Incorrect use

Non-designated use can compromise safety. The manufacturer is not liable for damage caused by improper or non-designated use.

2.3 Occupational safety

Personnel must meet the following conditions when working on and with the system:

- Wear the required personal protective equipment according to regional/national regulations.
- When welding, do not ground the welding unit via the system.
- If hands are wet, wear gloves on account of the higher risk of electric shock.

2.4 Operational safety

Operate the system only if it is in proper technical condition, free from errors and faults.

The operator is responsible for the interference-free operation of the system.

2.4.1 Modifications to the system

Unauthorized modifications to the system are not permitted and can lead to unforeseeable dangers:

- If, despite this, modifications are required, consult with Endress+Hauser.

2.4.2 Repairs

To ensure continued operational safety and reliability:

- Only carry out repairs that are specifically approved by the manufacturer.
- Repairs must only be performed by certified Endress+Hauser specialists.
- Observe federal/national regulations pertaining to the repair of an electrical device.
- Use original spare parts and accessories from Endress+Hauser only.

2.5 Product safety

This device is designed in accordance with industry practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. It meets general safety standards and legal requirements. It also complies with the EC directives listed in the product-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

2.6 IT security

We only provide a warranty if the system is installed and used as described in the Operating Instructions. The system is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the system and system data transfer must be implemented by the operators themselves.

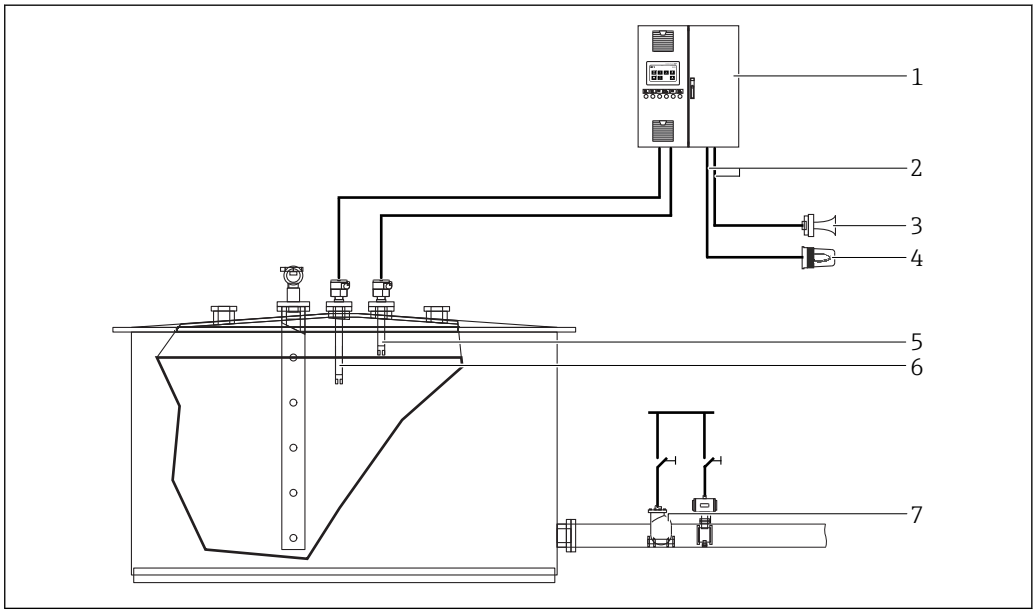
The operator is responsible for data backup.

3 Product description

3.1 Product design

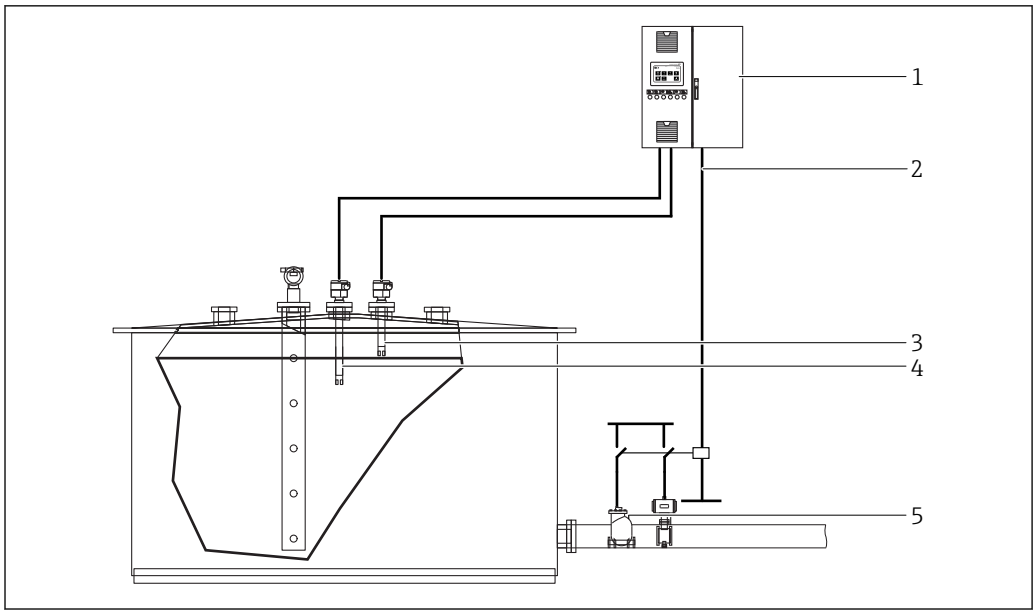
This solution package offers a reliable solution to monitor the level of fluids in tanks (H and HH as overfill prevention, L and LL to prevent the system from running dry), and to detect leaks in the tank basin. This product is primarily designed for the oil & gas, chemical, primaries and metal industries but can also be used in other industries. The system measures the level using sensors and transmitters and, in the event of an alarm, switches safety relays or activates alarm signalization devices in the field. Thanks to the flexible system configuration, a wide range of tank configurations can be monitored in a single system. A maximum of five different states can be detected per tank (HH, H, L, LL and leaks). A safety relay can be assigned to each of these alarm and warning states and responses that correspond to these states can be initiated automatically. Similarly, in the event of an alarm condition in the system overall, a collective relay can be switched or corresponding field signalization can be enabled. Depending on the configuration, the system can be used as either an automatic tank monitoring system (a floating changeover switch switches in the event of an alarm/warning) or as a manual tank monitoring system (strobe and/or siren is activated in the event of an alarm).

The actuator connected to the floating contacts is not part of this product. Such actuators are plant-specific and are therefore the responsibility of the plant owner/ operator.



1 *Overview of Manual Overfill Prevention System (MOPS), example*

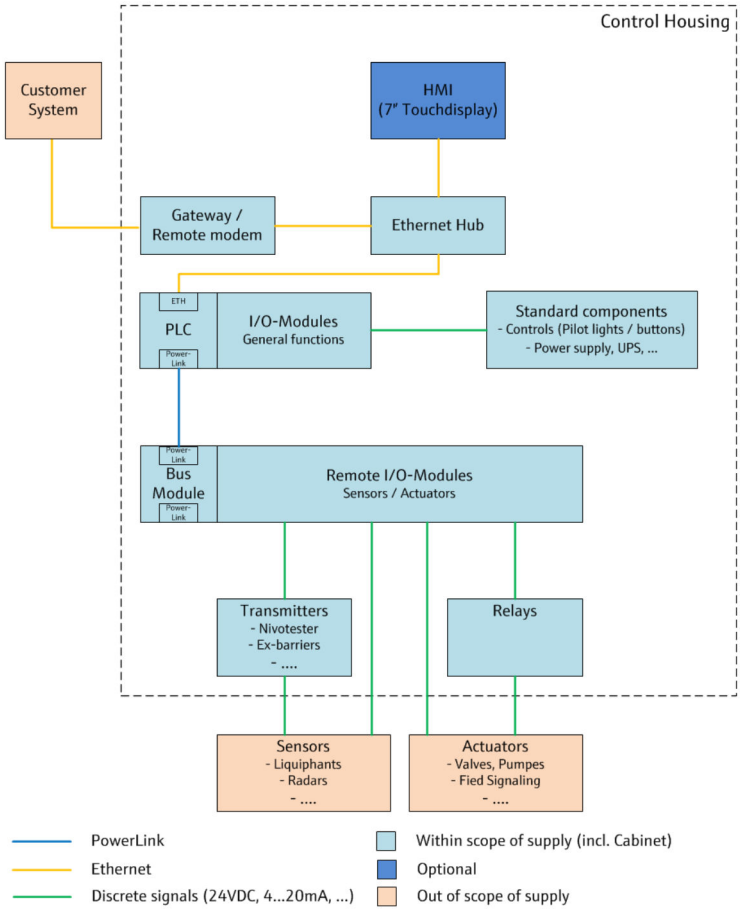
1 *Control cabinet of Overfill Prevention System*
2 *Safety relay output*
3 *Field signalization siren*
4 *Field signalization strobe*
5 *Sensor for High-High alarm*
6 *Sensor for High warning*
7 *Actuator to be disabled manually*



2 *Overview of Automatic Overfill Prevention System (AOPS), example*

1 *Control cabinet of Overfill Prevention System*
2 *Safety relay output*
3 *Sensor for High-High alarm*
4 *Sensor for High warning*
5 *Automatically disabled actuator*

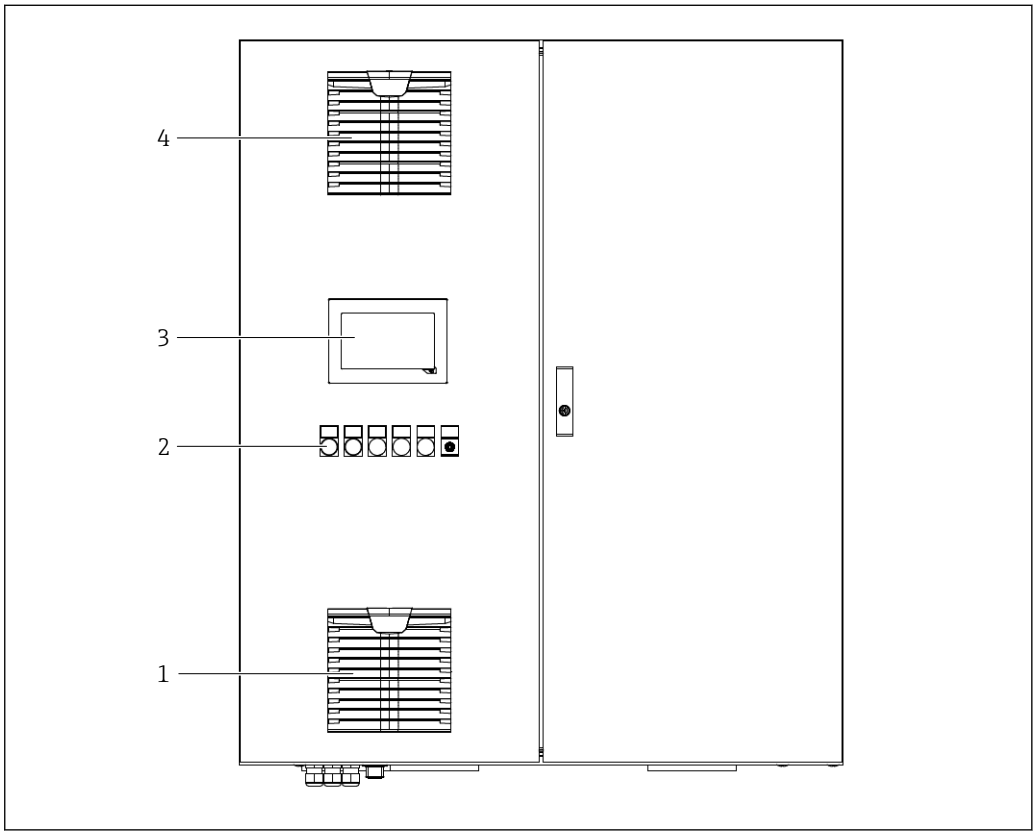
3.1.1 System overview



3 *System overview with integrated operating elements (standard)*

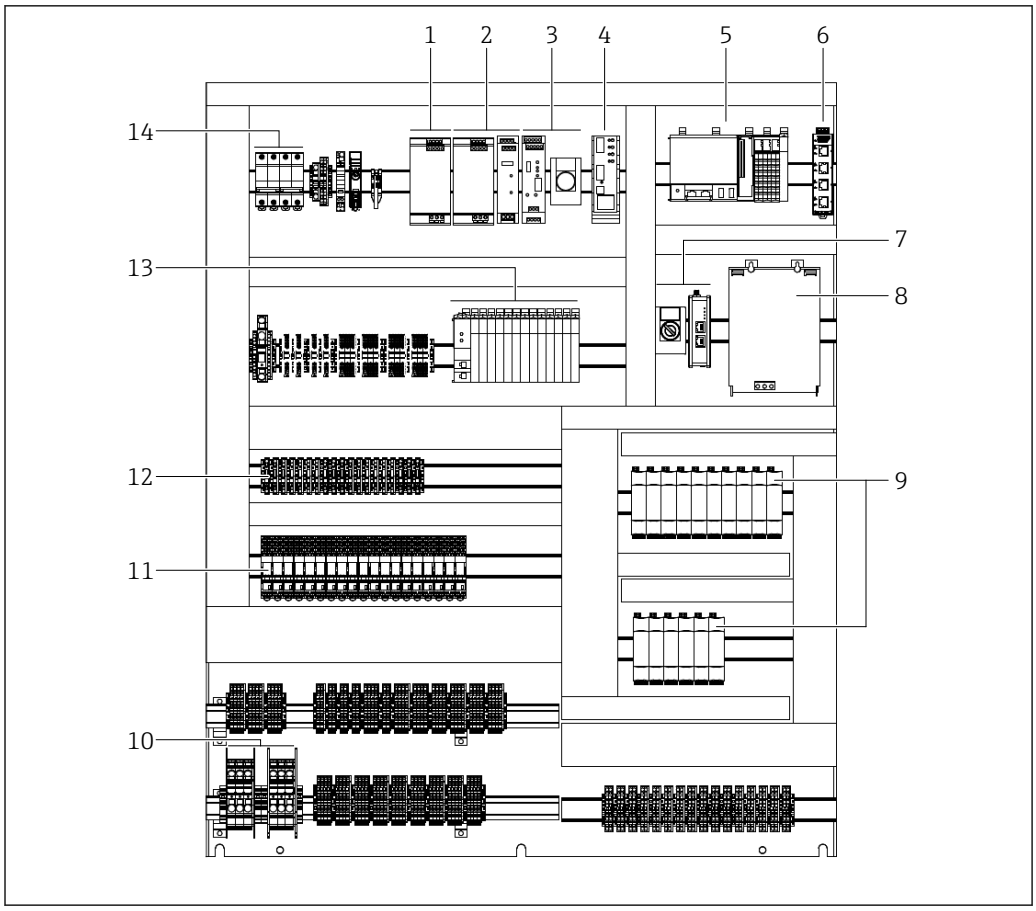
You can also optionally order the operating panel as a remote housing (380 mm x 380 mm x 210 mm). A maximum distance of 100 m is possible between the control cabinet and operating panel.

The following elements are integrated into the remote housing:
- 7" touch display as the HMI (optional)
- Built-in door elements → 38



4 *Example of control cabinet, exterior view (wall cabinet 1000 mm x 1200 mm x 300 mm)*

1 Filter fan
2 Built-in door elements → 38
3 7" touch display (optional)
4 Air filter



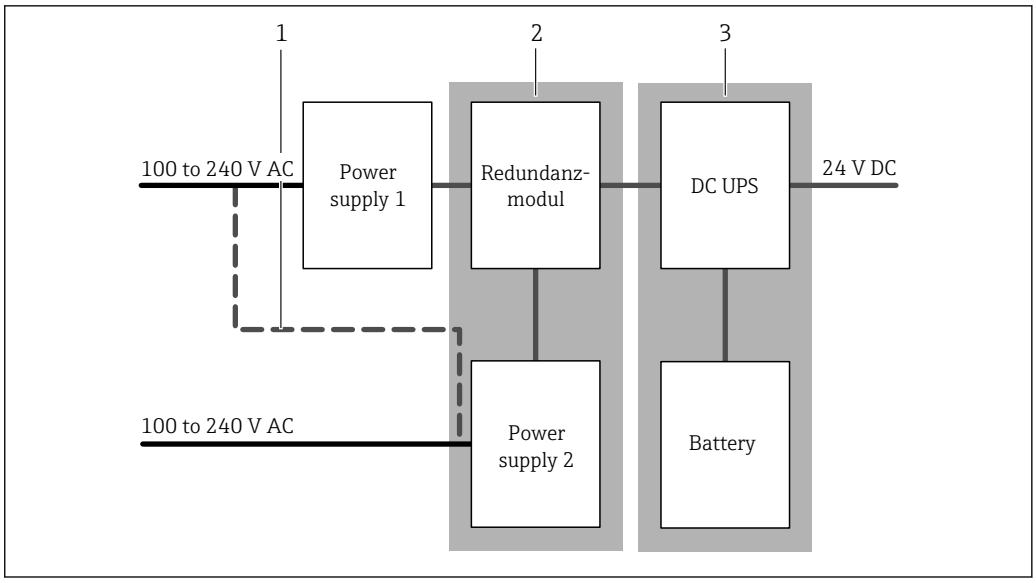
5 *Example of control cabinet, interior view (wall cabinet 1000 mm x 1200 mm x 300 mm)*

1 *Power supply*
2 *Redundant power supply including redundant module (optional)*
3 *Optional UPS including button to deactivate the battery if no supply voltage is applied*
4 *Electronic fuse*
5 *Controller*
6 *Network switch*
7 *Remote modem / gateway (SiteManager)*
8 *Battery for optional UPS*
9 *Nivotester*
10 *Power terminals for mains connection*
11 *Safety relay*
12 *Fuse terminals*
13 *Remote I/Os*
14 *Power supply circuit breakers*

The arrangement varies depending on the configuration.

3.1.2 Power supply

The electricity supply consists of at least one power supply system that converts the supply voltage from 100 to 240 V_{AC}, 45 to 65 Hz to 24 V_{DC}. As an option, a second (redundant) power supply system can be used to increase plant availability. To ensure that power is supplied to the system for a certain amount of time in the event of a power failure, the use of an uninterruptible power supply (UPS) is also an option. The use of a UPS is urgently recommended in applications where an alarm is signaled via an alarm siren and/or strobe as these components need a supply of power for fault signalization. Otherwise, there is no fault signalization if the power fails. The length of time power is supplied via the UPS depends on the power requirements of the system and on the capacity of the battery.



6 *Power supply*

1 *Bridge provided by the customer onsite if two separate mains connections are not available in a redundant power supply system*
2 *Option – redundant power supply, order code "040", version "2" or "4"*
3 *Option – uninterruptible power supply (UPS), order code "630"*

Mains connection

System connection to the electricity mains: 100 to 240 V_{AC} / 45 to 65 Hz

If you have a redundant power supply system but do not have two separate electricity mains connections, you can bridge the mains connection available in the control cabinet.

Power monitoring

The system provides a DC power supply which powers all the system components, including the field devices.

The system monitors the power supply and issues a corresponding warning if the mains voltage fails.

Uninterruptible power supply (optional)

The system provides an uninterruptible DC power supply (UPS) which powers the device for a certain length of time if the AC mains voltage fails. A UPS should always be used in manual monitoring systems as a supply of power is needed to signal an alarm (activation of field signalization).

7 *Battery for the UPS*

You must insert the battery fuse during commissioning. Once the battery is fully charged the "Uninterruptible power supply: Battery charging" warning message disappears.

If the mains power to the UPS system is interrupted for an extended period, we recommend that you disconnect the power supply from the UPS (from the battery) by pressing the red "UPS off" button in the control cabinet. This prevents the battery from discharging.

3.1.3 Input signals

The input signals depend on the configuration.

A wide variety of sensors can be used as input signals in the Overfill Prevention System to detect a limit violation. These sensors can also be combined as required, depending on the conditions in the tanks. Only one signal can be used per limit violation (HH, H, L, LL or Leak).

Input signal: FTL325P-#1E1 point level switch

A Liquiphant FTL5x/FTL7x (with FEL57 electronic insert) is used for this input signal to detect a limit value. The limit violation is evaluated by a Nivotester (FTL325P-#1E1) incorporated in the control cabinet

The Nivotester FTL325P-#1E1 is included in the delivery of the Overfill Prevention System.

8 *Nivotester FTL325P*

If this type of input is used, you can perform an automated proof test on the system periodically. Here, the function of the limit detection system is checked intermittently.

In the case of tanks located in hazardous areas, the signals sent by the Liquiphant devices to the Nivotester are considered Ex-i signals (intrinsically safe signals). This depends on the Liquiphant devices used.

Input signal: point level switch 1x floating contact (NEx/Ex(d))

Any sensor that provides a floating contact in the event of a limit violation (HH, H, L, LL or Leak) can be used for this input signal. The contact can either open or close when a limit is breached. This is specified during system configuration.

We recommend the use of a sensor with a floating contact that is open in the event of an error (limit violation and power failure). This ensures the correct signal response in the event of a wire breakage.

Input signal: point level switch 2x floating contact (NEx/Ex(d))

Any sensor that provides a floating contact in the event of a limit violation (HH, H, L, LL or Leak) can be used for this input signal. In addition, this sensor also makes a second floating contact available that signals a sensor error. The contact can either open or close in the event of an error. This is specified during system configuration.

We recommend the use of a sensor with a floating contact that is open in the event of an error (limit violation and power failure). This ensures the correct signal response in the event of a wire breakage.

Input signal: continuous level: (4-20mA HART; NEx/Ex(d))

A sensor that provides a continuous 4 to 20 mA signal depending on the level can be used with this input signal. Sensors with HART-compatible signals can also be used here. It is possible to access these devices via the Overfill Prevention System with HART signals. In addition, both two-wire and four-wire sensors can be connected to this signal.

It is possible to detect and signal all four limit violations (HH, H, L, LL) with the 4 to 20 mA input signal. An arrangement that combines the "digital" input signals mentioned above is also possible (e.g. 4 to 20 mA signal for H and L and one FTL325P for HH and one FTL325P for LL).

3.1.4 Output signals

The output signals depend on the configuration.

A wide variety of output signals can be used as a response to limit violation or system alarms in the Overfill Prevention System.

Output signal: alarm relay (changeover contact)

An alarm relay that switches in the event of a limit violation can be used for each function (HH, H, L, LL and Leak). For safety reasons, the relay is activated during normal operation so that it is deactivated and therefore assumes the safe state in the event of an alarm, a power failure or a wire breakage. It is also possible to use such a relay as a collective relay alarm. This relay is deactivated as soon as the system status changes to ERROR and is reactivated if the status of the system is OK or WARNING. The relays are used to respond automatically to an event and therefore a valve or a pump connected to the relay can be switched off automatically for safety reasons. The system checks whether the relays are working correctly each time a relay is activated or deactivated, and a message is generated in the event of an error.

A changeover contact is provided by the safety relay. If a valve or pump is to be closed/switched off automatically, the normally open (NO) must always be used, however. This ensures that the relay adopts the safe state in the event of a power failure or wire breakage and that the connected valve is closed or the connected pump is switched off.

9 *Safety relay*

Output signal: alarm siren with activation feedback

An alarm siren, which is activated when the system status is ERROR, is used for alarm signalization in the field. Acknowledging the alarm by pressing the door button (acknowledge alarm with user logged into the system (at least Operator Level access)) switches off the alarm siren. The alarm siren is activated again as soon as a new alarm occurs. Each time the alarm siren is activated, an acoustic sensor inside the alarm siren checks that the siren is functioning correctly.

10 *Alarm siren*

Output signal: alarm strobe with activation feedback

An alarm strobe, which is activated when the system status is ERROR, is used for alarm signalization on the field. Acknowledging the alarm by pressing the door button (acknowledge alarm with user logged into the system (at least Operator Level access))

switches off the alarm strobe. The alarm strobe is activated again as soon as a new alarm occurs. Each time the alarm strobe is activated, an optical sensor inside the alarm strobe checks that the strobe is functioning correctly.

11 *Alarm strobe*

3.1.5 Temperature monitoring

To ensure that the internal components, and specifically the UPS battery, have a long service life, the temperature in the control cabinet is measured and monitored by a Pt1000 sensor. If an upper limit (default value 40 °C) is exceeded or a lower limit (default value 5 °C) is undershot, a message is displayed to this effect.

12 *Pt1000 temperature sensor*

13 *Thermostat for the cabinet fan*

There is a thermostat for the cabinet fan in the control cabinet. You must set the thermostat to a suitable value. This is usually 25 to 35 °C depending on the ambient temperature. If the message "Temperature in control cabinet: Too high" appears often, set the thermostat to 25 °C. If the message is not displayed and the fan is in continuous operation, set the thermostat to 35 °C.

3.1.6 Interfaces (optional)

Modbus TCP interface

The system has an optional Modbus TCP interface. All the alarms and warnings can be communicated via this interface.

A description of the Modbus TCP interface is provided on the DVD supplied.

3.1.7 Remote maintenance modem / gateway

A SiteManager can be used as a reliable remote maintenance solution or as a gateway between the Overfill Prevention System and the customer's system. Endress+Hauser staff can access the system for remote maintenance via a secure VPN connection with a WAN or 3G. The SIM card is not included in the delivery. External access via the SiteManager can be prevented using a key switch (located directly beside the SiteManager in the control cabinet). The use of the SiteManager as a gateway enables access from the customer's system to the Overfill Prevention System (e.g. VNC access) or the transfer of data from the Overfill Prevention System to the customer's system (e.g. Modbus TCP data → 22).

If the customer-specific IP address was defined for the gateway (UPLINK port) when the system was ordered, this IP address is configured in the SiteManager before delivery. Otherwise the UPLINK port is configured as a DHCP connection.

14 Remote maintenance modem / gateway

3.2 Key system features

- Scalable from 1 to max. 128 tanks per system (maximum 128 functions)
- For automated and manually operated systems
- Detection of HH, H, L and LL Levels
- Detection of leaks in tank basin
- Integrated automated proof testing
- Optional UPS for autonomous operation for 20 minutes
- Detailed warnings and alarms
- Independent signalization for warnings and alarms
- Integrated remote maintenance modem / gateway

3.3 Scaling

Feature	Definition	Comment
Number of tanks	1 to 128	
Number of tank areas	1 to 8	Maximum 64 tanks per area
Number of input signals	Maximum 128	HH, H, L, LL and Leak e.g. 128 x HH or 32x HH, H, L and LL
Number of output signals	Maximum 128	Maximum 1 relay per input function (HH, H, L, LL and Leak), and 1x collective alarm function as a relay, strobe and siren

Feature	Definition	Comment
7" touch display	1 per system	Optional As local display
SiteManager	1 per system	Can be used for remote maintenance or as a gateway

3.4 Customer benefits

- Fully independent solution as per API2350 for maximum trust and reliability.
- Safe investment as the solution is modular, scalable and extensible.
- Integrated automated proof testing shortens the time required for commissioning and maintenance.
- Detailed warnings and alarms help users to make quick decisions and take immediate action.
- Seamless integration into monitoring systems for remote monitoring via standard interfaces such as Modbus/TCP.
- Reduced engineering and commissioning time and lower maintenance costs.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

- Check the packaging for visible damage arising from transportation.
- To avoid damage, remove the packaging with care.
- Retain all the accompanying documents → 10.

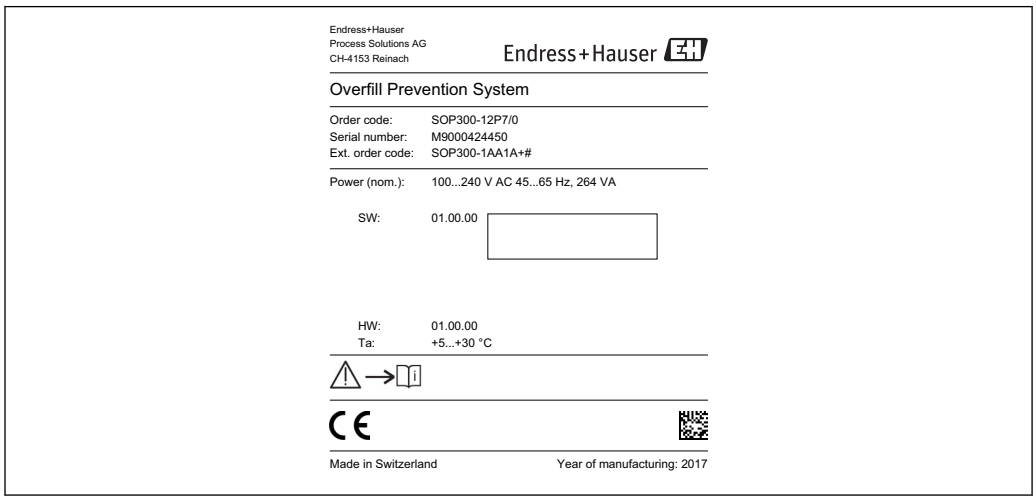
The system may not be put into operation if the contents are found to be damaged beforehand. Contact your Endress+Hauser Sales Center if this happens. Return the device to Endress+Hauser in the original packaging where possible.

4.2 Product identification

The system can be identified by the nameplate, which is fitted on every control cabinet.

4.2.1 Endress+Hauser products

You can identify the components in the following ways:
- Enter the serial number indicated on the nameplate in W@M Device Viewer (www.endress.com → About us → W@M Life Cycle Management → Operations → The right device information always at hand (find spare part) → Access device-specific information → Enter serial number): all the information relating to the system/device is then displayed.
- Enter the serial number indicated on the nameplate into the Endress+Hauser Operations App or scan the 2D matrix code (QR code) on the nameplate with the Endress+Hauser Operations App: all the information relating to the measuring device is then displayed.



4.3 Storage and transport

- The control cabinet is packed in such a way that it is fully protected against shock when in storage and during transportation. The original packaging offers the best protection.
- The permitted storage temperature is 0 to 40 °C (32 to 104 °F).
- When transporting the control cabinet protect it from direct sunshine to avoid excessively high surface temperatures
- Store the control cabinet, also packaged, in a dry place
- Transport the control cabinet to its final destination in the transportation box in which it was delivered

5 Installation

5.1 Installation conditions

DANGER

Non-designated installation: control cabinet and/or field signalization system are installed in a hazardous area!

If the device is not installed as designated, this can cause an explosion.

- ▶ Install the control cabinet and field signalization system in non-hazardous areas only.

CAUTION

Noise from alarm siren (105 dB up to one meter)!

The alarm siren can cause temporary hearing impairment and stress.

- ▶ Only install alarm siren outdoors.

CAUTION

Leaking battery fluid!

Leaking battery fluid can cause skin lesions and poisoning.

- ▶ Avoid contact with leaking battery fluid.
- ▶ Do not inhale battery fluid vapors.
- ▶ Replace faulty batteries immediately.

5.1.1 Control cabinet

The following conditions must be met:

- Dry and air-conditioned indoor area
- Non-hazardous area
- Ambient temperature: 5 to 30 °C
- Humidity: maximum 85 %

5.1.2 Field signalization (cables and components)

The following conditions must be met:

- Non-hazardous area
- Ambient temperature: –25 to 55 °C
- Humidity: maximum 90%
- The strobe light and alarm siren must be protected from direct sunlight

5.1.3 Sensors

Please see the sensor documentation for sensor installation conditions.

5.2 Mounting the control cabinet

CAUTION

Loose wires!

Loose wires can cause people to trip, slip or fall.

- ▶ Always lay cables into and out of the control cabinet correctly, e.g. in cable ducts.

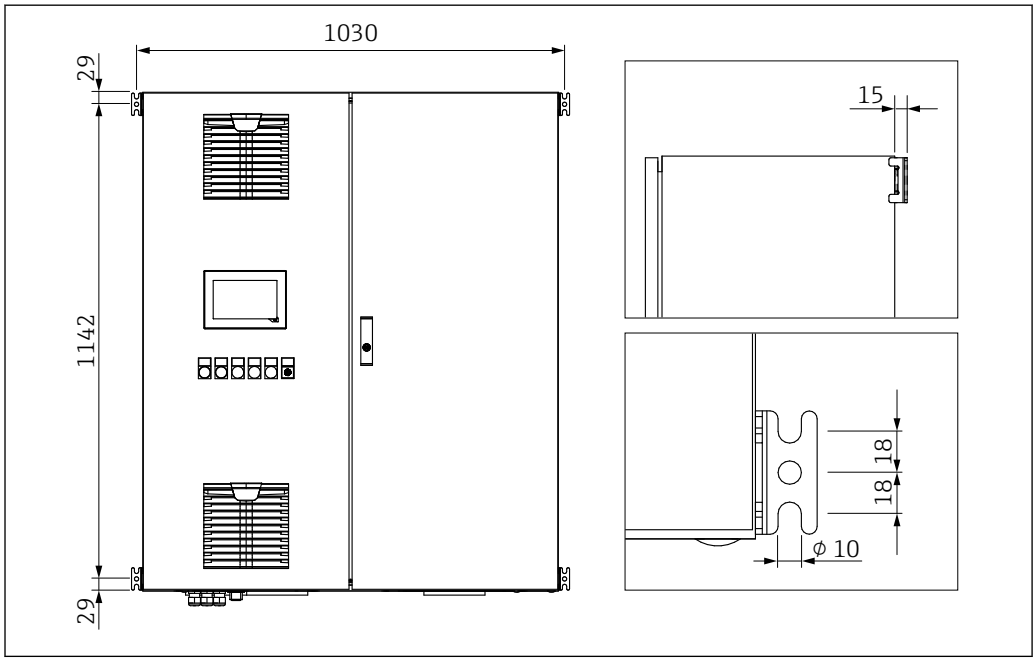
The cable entries are located on the bottom of all control cabinets.

5.2.1 Control cabinet for wall mounting

⚠ WARNING

The control cabinet can fall down if it is not installed correctly!
Danger of crushing!

- ▶ Mount the control cabinet on a stable wall using all the cabinet holders.
- ▶ The wall must be designed to hold the weight of the cabinet.
- ▶ The securing screws must be designed to hold the weight of the cabinet.
- ▶ Ensure that all the securing screws are securely tightened.
- ▶ Observe the mounting instructions and technical aids.



15 *Example: control cabinet for wall mounting*

Cabinets for wall mounting are supplied with holders.

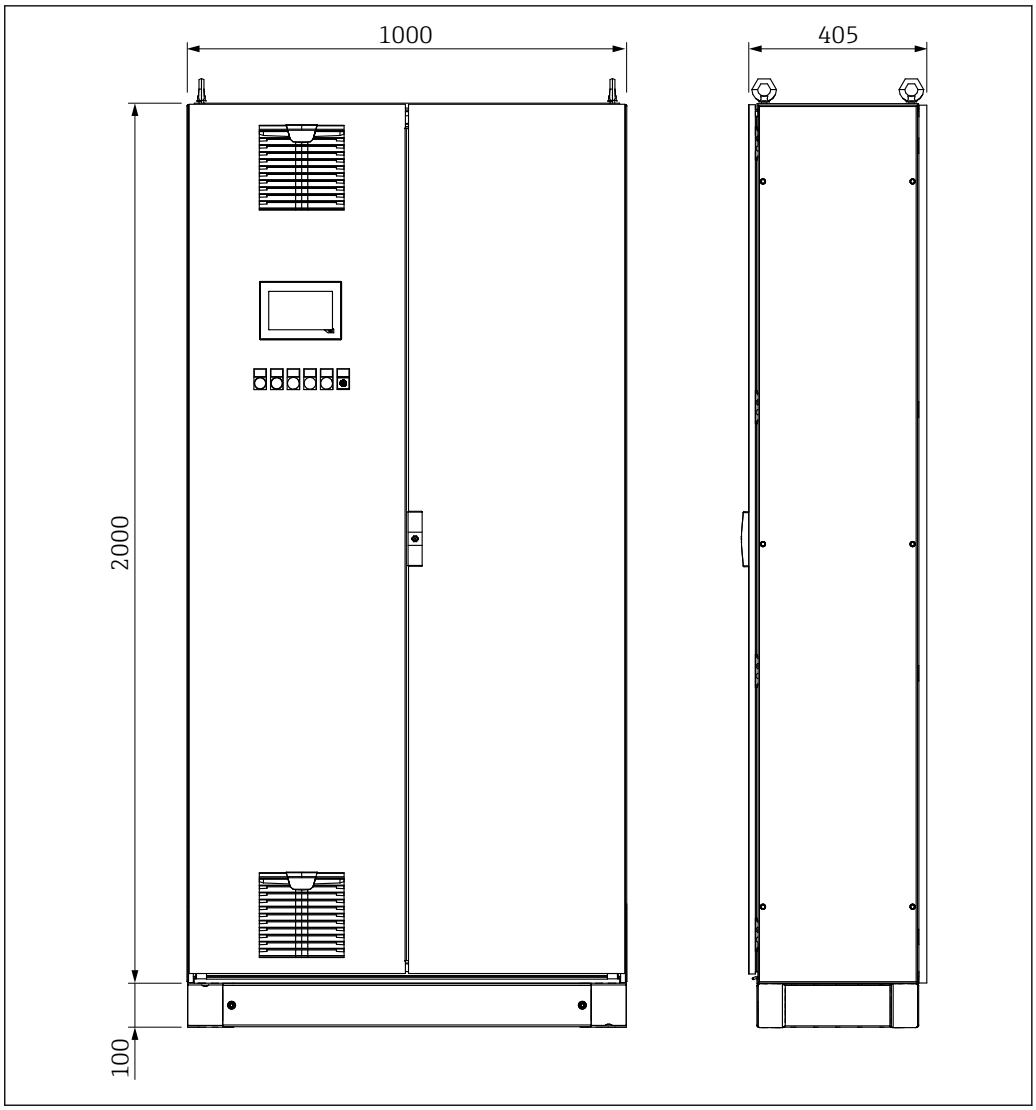
- ▶ Mount the control cabinet on a stable wall using the cabinet holders.

5.2.2 Cabinet for free-standing installation

⚠ WARNING

The control cabinet can topple over if it is not installed correctly!
Danger of crushing!

- ▶ Screw the control cabinet to the floor.
- ▶ The floor must be even.
- ▶ The floor must be designed to hold the weight of the cabinet.
- ▶ The securing screws must be designed for the cabinet.
- ▶ Observe the mounting instructions and technical aids.



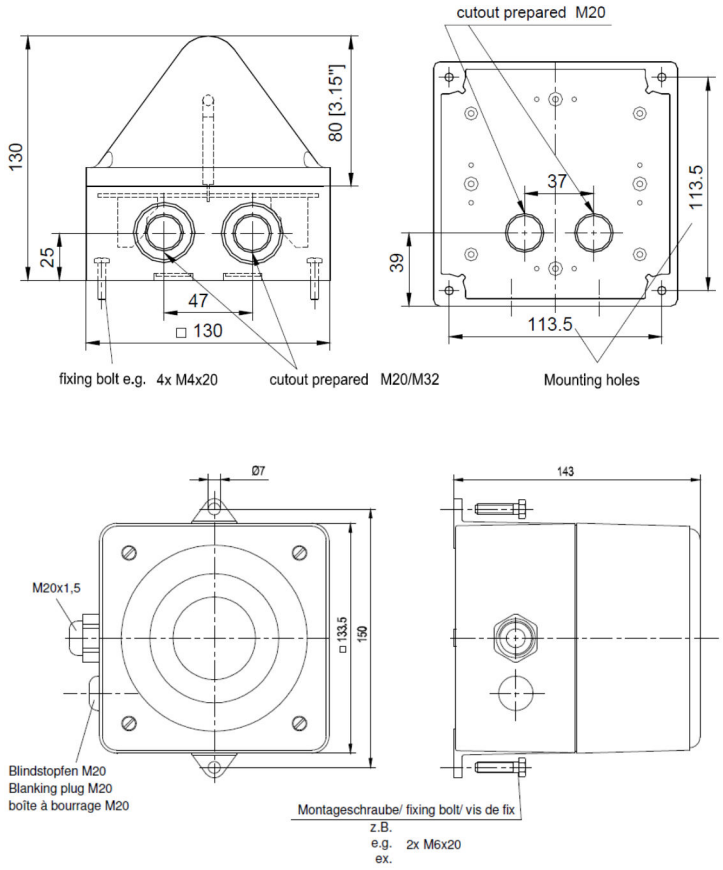
16 *Example: free-standing cabinet*

Free-standing cabinets are supplied with a 100 mm base.

- ▶ Screw the control cabinet onto a secure and even floor.

5.3 Mounting the field signalization system

The strobe light and siren must be mounted on a stable and even apparatus using the dimensioned drawings provided below. If possible, the devices should be mounted with the cable glands pointing downwards.



5.4 Post-installation check

Are the mounted components undamaged (visual inspection)?	❑
Do all the components meet the required specifications? For example: ▪ Ambient temperature ▪ Humidity ▪ Explosion protection	❑
Is the correct orientation selected?	❑
Are the measuring point identification and labeling correct (visual inspection)?	❑
Is the device adequately protected from precipitation and direct sunlight?	❑
Are the securing screws tightened securely?	❑

6 Electrical connection

6.1 Connection conditions

DANGER

Electrical voltage!
Severe or life-threatening injuries!
- Electrical work may only be performed by electrical technicians.
- The electrical connection must be performed when the device is de-energized. Make sure the device is de-energized.
- Connect the protective ground.

DANGER

Risk of electric shock from faulty cables and components!
Faulty cables and components can cause an electric shock and life-threatening injuries.
- Check cables and components regularly.
- Avoid moisture on the cabinet interior.

CAUTION

Leaking battery fluid!
Leaking battery fluid can cause skin lesions and poisoning.
- Avoid contact with leaking battery fluid.
- Do not inhale battery fluid vapors.
- Replace faulty batteries immediately.

NOTICE

Unsuitable cable types!
High temperatures can put a strain on cables.
- Use cables that suit the temperature range. The cables must be suitable for temperatures of 5 °C (9 °F) above the ambient temperature.

NOTICE

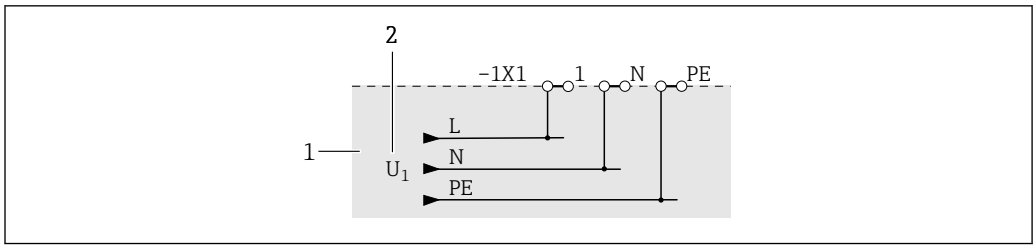
Electrical overloading, incorrect supply voltage and incorrect wiring!
Possible malfunction or destruction of the system.
- Before commissioning the device, check that the supply voltage matches the information on the nameplate.
- Install an overload protection element for the power cable. Observe the nominal current in accordance with the wiring diagram.
- Establish the connection as per the wiring diagram.

6.2 Connecting the system

6.2.1 Supply voltage electrical connection

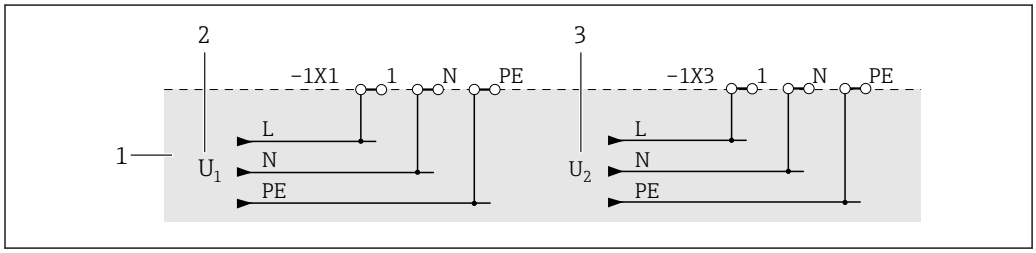
The supply voltage must meet the following requirements:
- L / N / PE
- 100 to 240 V AC
- 45 to 65 Hz
- Wire cross-section: min. 2.5 mm^2, observe country-specific standards

If the control cabinet of the Overfill Prevention System is fitted with an optional, redundant power supply, the supply voltage can be redundant. If a redundant supply voltage is not available, you can bridge the existing supply voltage in the control cabinet → 16.



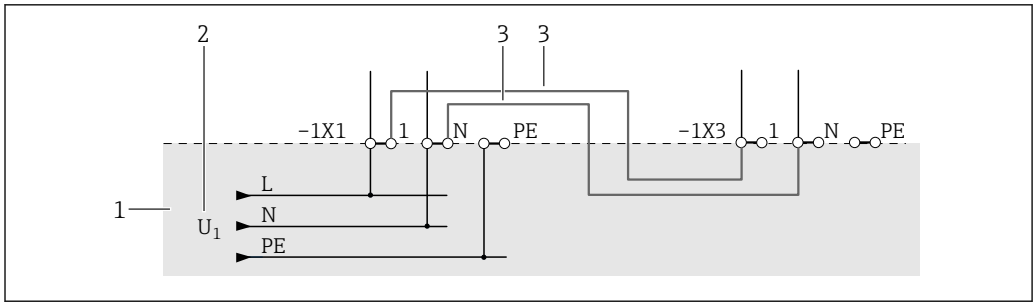
17 Supply voltage connection without a redundant power supply in the control cabinet SOP300

1 Customer's side
2 Supply voltage U_1



18 Supply voltage connection with a redundant power supply in the control cabinet SOP300 – with a redundant supply voltage

1 Customer's side
2 Supply voltage U_1
3 Supply voltage U_2



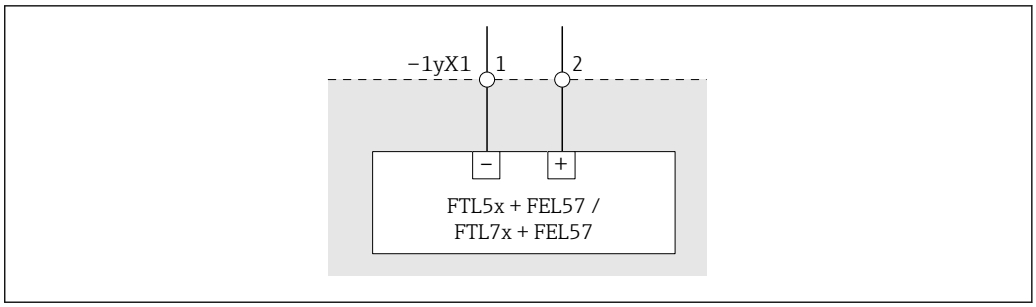
19 Supply voltage connection with a redundant power supply in the control cabinet SOP300 – without a redundant supply voltage

1 Customer's side
2 Supply voltage U_1
3 Bridge at least 2.5 mm², provided by the customer onsite

6.2.2 Electrical connection of the input signals

Input signal: Nivotester FTL325P-#1E1

Connectable point level switches:
- Liquiphant M FTL50 (H), FTL51 (H) and FTL51C with FEL57 electronic insert
- Liquiphant S FTL70 and FTL71 with FEL57 electronic insert

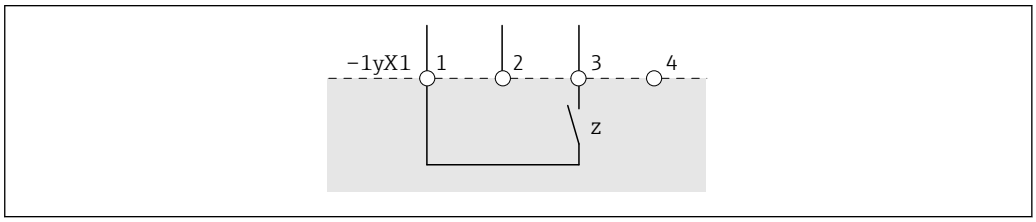


20 *Connection example Liquiphant FTL5x / FTL7x with FEL57 electronic insert*

y 1 = HH, 2 = H, 3 = L, 4 = LL

Input signal: point level switch

Connectable point level switches:
Every sensor that activates a floating contact (NEx/Ex(d)) if a point level is exceeded or undershot

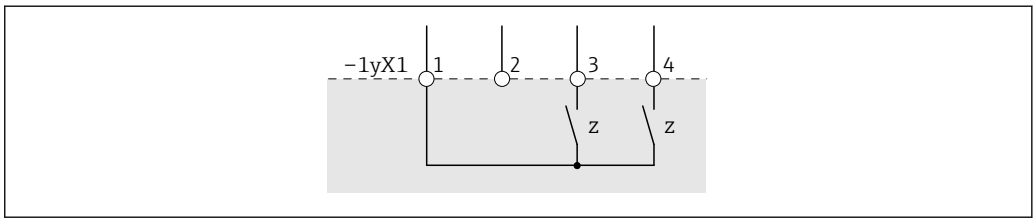


21 *Connection example for point level switches*

y 1 = HH, 2 = H, 3 = L, 4 = LL, 5 = Leak
z NC or NO contact, depending on the sensor
1 24 V DC
2 0 V DC
3 Point level "OK" or "Not OK" with 24 V DC signal, depends on sensor, point level "OK" is recommended as a wire break is reliably detected and the relay adopts a safe state
4 NA

Input signal: point level switch with device error

Connectable point level switches:
Every sensor that has two floating contacts (NEx/Ex(d)). One contact is used for point level detection and the second contact for the device error.

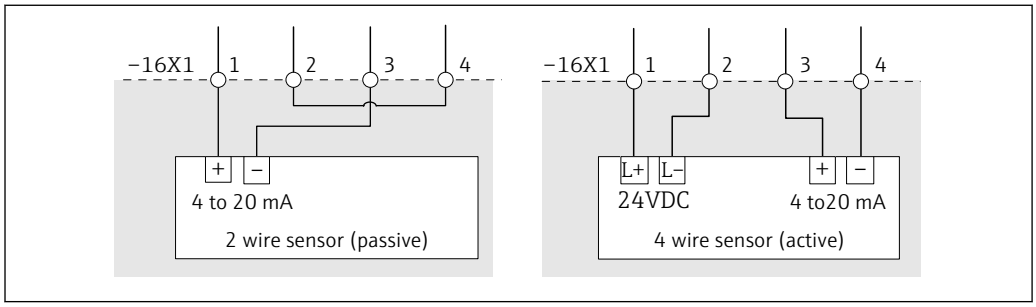


22 *Connection example of point level switch with device error*

y 1 = HH, 2 = H, 3 = L, 4 = LL, 5 = Leak
z NC or NO contact, depending on the sensor
1 24 V DC
2 0 V DC
3 Point level "OK" or "Not OK" with 24 V DC signal, depends on sensor, point level "OK" is recommended as a wire break is reliably detected and the relay adopts a safe state
4 "Device error" or "No device error" with 24 V DC signal, depends on sensor, "No device error" is recommended as a wire break is reliably detected and the relay adopts a safe state

Input signal: continuous level

The sensor must meet the following requirements:
- Output signal: 4 to 20 mA for 0 % to 100 % level
- NEx/Ex(d)
- 2-wire sensors (passive) or 4-wire sensors (active)



23 Left: connection example for 2-wire sensor with 4 to 20 mA signal, right: connection example for 4-wire sensor with 4 to 20 mA signal

1 24 V DC
2 0 V DC
3 4 to 20 mA signal (+)
4 4 to 20 mA signal (–)

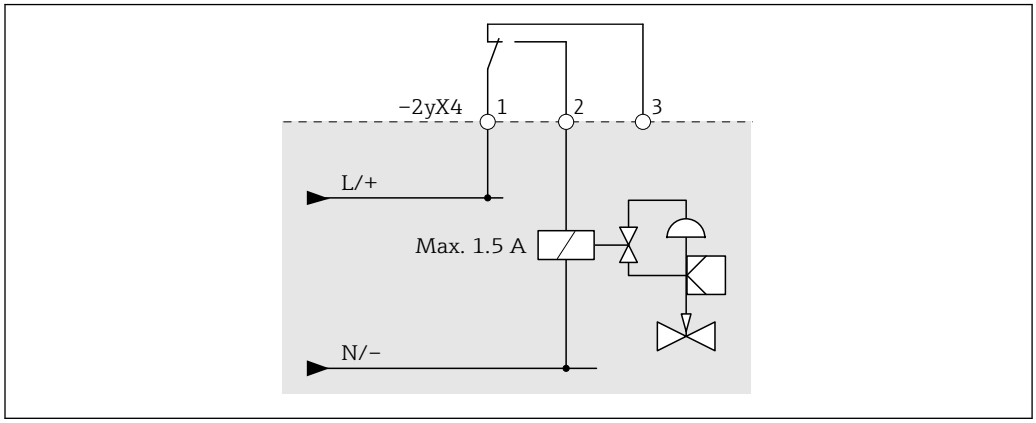
6.2.3 Electrical connection of the output signals

Output signal: alarm relay (changeover contact)

Function relay

Actuators can be connected via the floating changeover contact. The functions per tank that are assigned a relay depends on the order configuration. Possible functions are: HH, H, L, LL and Leak.

The actuators are not included in the scope of supply.

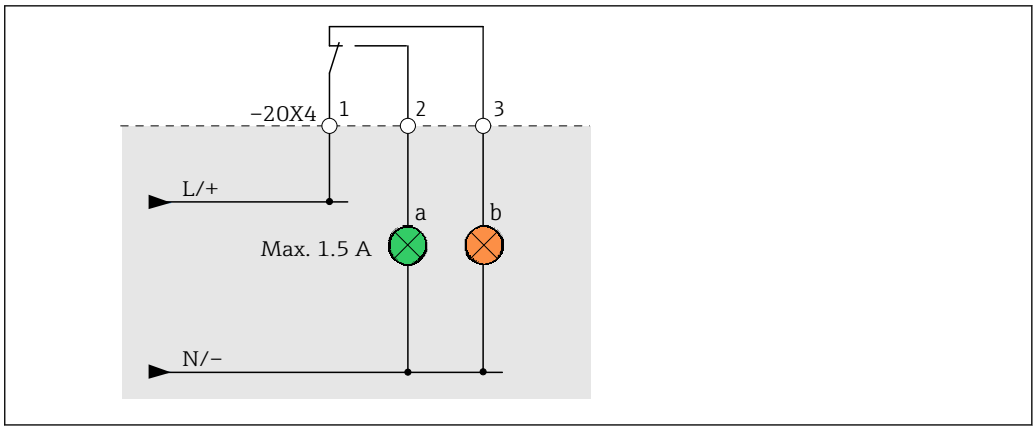


24 Connection example for valve control, valve closed without current; alarm relay activated in the "Good" state, change-over contact (1) and NO contact (2) closed

y 1 = HH, 2 = H, 3 = L, 4 = LL, 5 = Leak
1 Changeover contact
2 NO contact
3 NC contact

System alarm relay

You can signalize the system status or relay it to another system via the existing floating changeover contact.



25 *Connection example for signalization of the system status; system alarm relay activated in the "Good" state, change-over contact (1) and NO contact (2) closed*

a System status is "Good": OK or WARNING
b System status is ERROR
1 Changeover contact
2 NO contact
3 NC contact

Output signal: alarm siren with activation feedback

Please refer to the separate wiring diagram for the electrical connection.

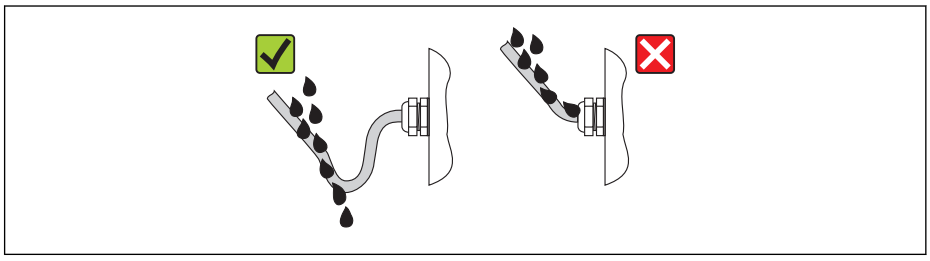
Output signal: alarm strobe with activation feedback

Please refer to the separate wiring diagram for the electrical connection.

6.3 Ensuring the degree of protection

- The cabinet is only approved for indoor use (IP54)
- The field signalization system meets all the requirements of IP66/67 protection
- Please refer to the relevant documentation for the degree of protection of the sensors and actuators

1. Ensure that the housing seals are clean and mounted correctly. Dry, clean or replace the seals if necessary.
2. Tighten all housing screws and screw covers.
3. Tighten cable glands.
4. Ensure that moisture cannot penetrate the cable entry by laying the cable in such a way that it forms a U shape in front of the cable entry (**water trap**).



5. Seal off any unused cable entries using dummy plugs.

6.4 Post-connection check

Are the system, devices and cables undamaged (visual check)?	❑
Do the cables comply with the requirements ?	❑
Do the cables have adequate strain relief?	❑
Are all cable glands installed, securely tightened and leak-tight? Cable run with water trap?	❑
Does the supply voltage match the specifications on the nameplate?	❑
Is the terminal assignment correct?	❑
Are all housing covers installed and securely tightened?	❑
Are all unused cable entries sealed with a dummy plug?	❑
Are the cables of the field signalization system routed separately?	❑

7 Operation options

The device is generally operated using the optional touch display integrated in the door of the control cabinet. If the touch display was not ordered, it is possible to connect to the system via a VNC client and operate the system via this client.

There is also a button for acknowledging alarms and an illuminated pushbutton to reset components, such as the alarm output relay and electronic device protective switches, to an operational state. The light of the illuminated pushbutton flashes to alert the user to the fact that a reset is necessary. There are built-in signal lamps in the cabinet door which signalize the state of the system (green: system status OK, orange: system status WARNING, red: system status ERROR).

Safety-oriented field signalization units, such as strobes and sirens, are also optionally available for order. Furthermore, users also have the option of making data available to a higher-level system (e.g. Modbus TCP).

8 Commissioning

8.1 Function check

Before commissioning the Overfill Prevention System:
Make sure that the post-installation and post-connection checks have been performed:
– "Post-installation" checklist, **Section 5.3** → 🖹 28
– "Post-connection" checklist, **Section 6.2** → 🖹 34

8.2 Switching on the Overfill Prevention System

Prerequisites:
- The system has been installed correctly.
- The electrical connection has been established correctly.

8.2.1 Switching on the Overfill Prevention System with an optional UPS

⚠ DANGER

Damaged battery connection cable!
Risk of fatal injury from electric shock.
▶ When closing the front cover for the battery, do not pinch or damage the insulation of the battery connection cable.

In the case of a non-redundant power supply

1. Insert the fuse of the UPS battery → 🖹 36. See wiring diagram "+PS1-14G3".
2. Switch on the circuit breaker. See wiring diagram "+PS1-11F1".

In the case of a redundant power supply

1. Insert the fuse of the UPS battery → 🖹 36. See wiring diagram "+PS1-14G3".
2. Switch on the first circuit breaker. See wiring diagram "+PS1-11F1".
3. Switch on the second circuit breaker. See wiring diagram "+PS1-12F1".

Inserting the fuse of the UPS battery (+PS1-14G3)

1. Press the two locking lugs at the top of the battery housing simultaneously and swivel the front cover down.
2. Insert the fuse into the fuse holder.
3. Close the front cover. The locking lugs must snap into the attachment on the housing top.

8.2.2 Switching on the Overfill Prevention System without an optional UPS

In the case of a non-redundant power supply

▶ Switch on the circuit breaker. See wiring diagram "+PS1-11F1".

In the case of a redundant power supply

1. Switch on the first circuit breaker. See wiring diagram "+PS1-11F1".
2. Switch on the second circuit breaker. See wiring diagram "+PS1-12F1".

8.3 Configuring the Overfill Prevention System

1. Log an operator onto the system. The operator must at least have the "Operator" access level.
2. Acknowledge all the alarms and warnings via the **Acknowledge** built-in door button.
3. Reset the safety relays via the **Reset** built-in door button.
4. Assign a password for all users → 78.
5. Set the correct local time → 64.
6. Set the desired proof-test interval → 69.
7. Perform an automated proof-test → 48.
8. Perform a signaling proof-test → 53.

8.4 Configuring sensors

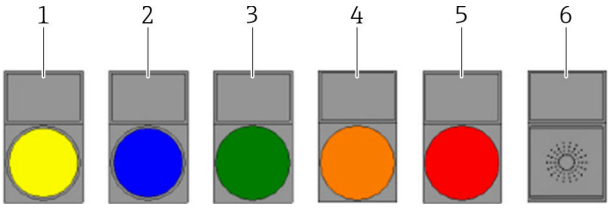
- Configure the sensors as described in the relevant sensor documentation.

8.5 Performing the functional test

- Perform suitable tests to guarantee the safety function.

9 Operation

9.1 Built-in door elements



26 *Built-in door elements*

1 *Yellow "Acknowledge" push button*
2 *Blue "Reset" illuminated push button*
3 *Green "System ok" signal lamp*
4 *Orange "Warning" signal lamp*
5 *Red "Alarm" signal lamp*
6 *"Alarm/Warning" buzzer*

9.1.1 "Acknowledge" push button

All active alarms and warnings are acknowledged in one go with the **Acknowledge** push button. Once the warnings and alarms have been acknowledged and the system has returned to a normal operating state, the alarms and warnings are automatically deleted from the list. Pressing the button also switches off the acoustic signal (buzzer in control cabinet door) and the field signalization (alarm strobe and alarm siren).

Field signalization is only switched off if a user is logged on with at least "Operator"-level access.

The system detects whether the acknowledge signal is permanently active, such as in the event of a button short-circuit, and issues a warning to this effect.

9.1.2 "Reset" illuminated push button

Once an alarm has been acknowledged and the alarm event is deleted from the system, corresponding hardware components (alarm output relay, electronic device protection switch) must be reset, where necessary, via the **Reset** button.

The system detects whether the reset signal is permanently active, such as in the event of a button short-circuit, and issues a warning to this effect.

9.1.3 "System ok" signal lamp

If the "System OK" signal lamp is continuously lit green, this indicates that the system status is normal and no alarms or warnings are active.

9.1.4 "Warning" signal lamp

If a warning is active, the signal lamp flashes orange. Once the warning has been acknowledged via the touch display or door button, the signal lamp is lit continuously. The signal lamp flashes again as soon as a new warning occurs.

9.1.5 "Alarm" signal lamp

If an alarm is active, the signal lamp flashes red. Once the alarm has been acknowledged via the touch display or door button, the signal lamp is lit continuously. The signal lamp flashes again as soon as a new alarm occurs.

9.1.6 "Alarm/Warning" buzzer

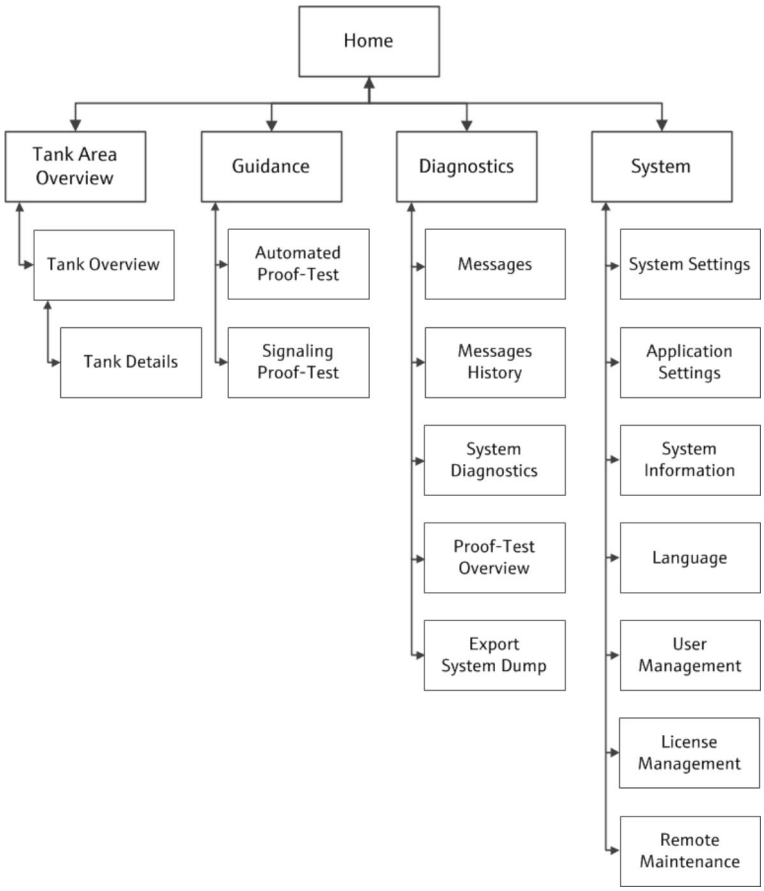
The buzzer sounds when an alarm or a warning is active. The buzzer switches off once the alarm or warning has been acknowledged via the touch display or door button. The buzzer sounds again when a new alarm or warning is active.

9.2 Visualization (HMI)

9.2.1 Touch display

A 7" touch display is optionally integrated in the cabinet door as an operating terminal.

9.2.2 HMI navigation



27 *HMI home screen, first and second level*

The graphic illustrates how the user navigates between the individual screens. Depending on the user group, certain screens are not available and are therefore grayed out.

Additional functions are available as a shortcut on the "Home" screen:

Messages	Home\Diagnostic\Messages
Automated Proof-Test	Home\Diagnostic\Automated Proof-Test
Login/Logout	Home\System\User Management\Login / Logout

9.2.3 User administration

Access authorization for device operation can be organized in the user administration system. Certain functions are only available to users with a higher user access level. Passwords do not expire.

User access levels and default users

User level	User name	Password
View	**Anonymous**	-
Operator	**Operator**	operator [1]
Maintenance	**Maintenance**	maintenance [1]
Expert	**Expert**	++++++++++

1) password on delivery

The "Expert" user level is only available to Endress+Hauser staff.

The "Anonymous" user is logged in automatically when the system starts up.

If one of the other users logs out, the "Home" screen is displayed and the "Anonymous" user is automatically logged on again.

Log in/log out

Users log in and out via the "Login / Logout" dialog box.

- Tap **Home → System → User Management → Login/Logout**.
  - The "Login/Logout" dialog box opens.

Access authorization

The following table lists the specific access authorization for each user level.

Screens (main pages)	View	Operator	Maintenance	Expert
All pages except "Automated Proof-Test" and "Signaling Proof-Test"	☑	☑	☑	☑
Automated Proof-Test	☒	☑	☑	☑
Signaling Proof-Test	☒	☑	☑	☑
Operation				
Log in / log out	☑ [1]	☑	☑	☑
Export system dump	☑	☑	☑	☑
Acknowledge messages	☒	☑	☑	☑
Run "Automated-Proof-Test" and "Signaling Proof-Test" wizards	☒	☑	☑	☑
Save proof test log files	☒	☑	☑	☑
Operation of remote maintenance modem	☒	☑	☑	☑
Administration				
Restart system	☒	☑	☑	☑
Change password [2]	☒	☒	☑	☑
Change date and time	☒	☒	☑	☑
Change language	☒	☒	☑	☑
Load application configuration	☒	☒	☑	☑
Settings				

Screens (main pages)	View	Operator	Maintenance	Expert
Tank settings (basic settings)	☒	☒	☑	☑
Range settings (basic settings)	☒	☒	☑	☑
Application settings (basic settings)	☒	☒	☑	☑
IP configuration	☒	☒	☒	☑
Display settings	☒	☒	☑	☑
Time for automatic log-out	☒	☒	☑	☑
Tank settings (advanced)	☒	☒	☒	☑
Application settings (advanced)	☒	☒	☒	☑
Electronic nameplate settings	☒	☒	☒	☑
General settings	☒	☒	☒	☑

1) The "Anonymous" user is logged off automatically once a user logs off.
2) Only up to own level.

9.2.4 General information

Status bar

The status bar is displayed at the top of the screen.

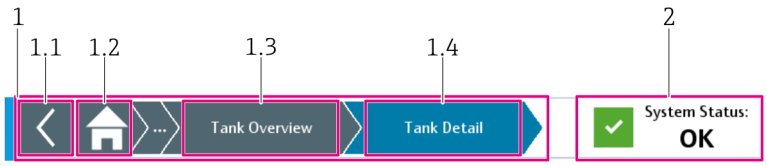
28 Status bar

1 Language
2 Status of remote maintenance modem
3 Current user
4 Date and time

Language	Displays the language currently selected.
Status of remote maintenance modem	Displays the current status of the remote maintenance modem. The following statuses are possible: ▪ SRM : Modem not available, as the modem is not connected, not switched on or is deactivated in the control cabinet via the key switch, for example ▪ SRM : Modem is available ▪ SRM : Modem is available and VPN connection is active
Current user	Displays the current user.
Date and time	Displays the current time and date.

Navigation bar

The navigation bar is displayed at the top of the screen, directly beneath the status bar.



29 *Navigation bar*

1 Navigation (breadcrumb)
1.1 Back to last screen
1.2 Home screen
1.3 Previous screen
1.4 Current screen
2 Status of the overall system

Navigation (breadcrumb)	Navigation between screens. Displays the current screen with a blue background.
Status of the overall system	Displays the current status of the overall system: OK, WARNING and ERROR.

Header in wizards

In the wizards, the header is displayed instead of the navigation bar at the top of the screen.

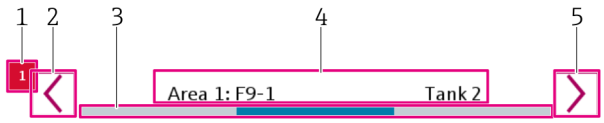
30 *Header in wizards*

1 Step already performed
2 Current step
3 Remaining steps

Step already performed	Dark-gray background and a tick beside the text: indicates the steps that have already been performed.
Current step	Blue background: indicates the step that the wizard is currently performing.
Remaining steps	Light-gray background: indicates the steps that are still to be performed.

Integrated navigation bar

Users navigate within a screen using the integrated navigation bar.



31 *Integrated navigation bar*

1 Message symbol
2 Left
3 Position
4 Description
5 Right

Message symbol	Indicates that there are elements with an active message. In the graphic, the element with the active message is accessed by navigating to the left.
Left	▪ Tap the button: navigate to the left between the elements ▪ Tap the button for longer: quick navigation
Position	The blue part of the line indicates the current position within the entire navigation area.
Description	Brief description of the current elements.
Right	▪ Tap the button: navigation to the right between the elements ▪ Tap the button for longer: quick navigation

Scroll bar

The scroll bar allows you to navigate through the lists and tables. Press and hold the button to scroll quickly.

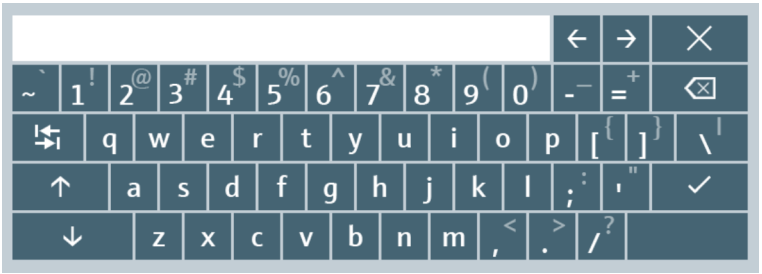
Numeric keypad

Enter numeric values via the touch display. The limit values (min. and max.) for the value to be entered appear at the top of the keypad.

32 *Numeric keypad*

Alphanumeric keypad

Enter a character string via the touch display.



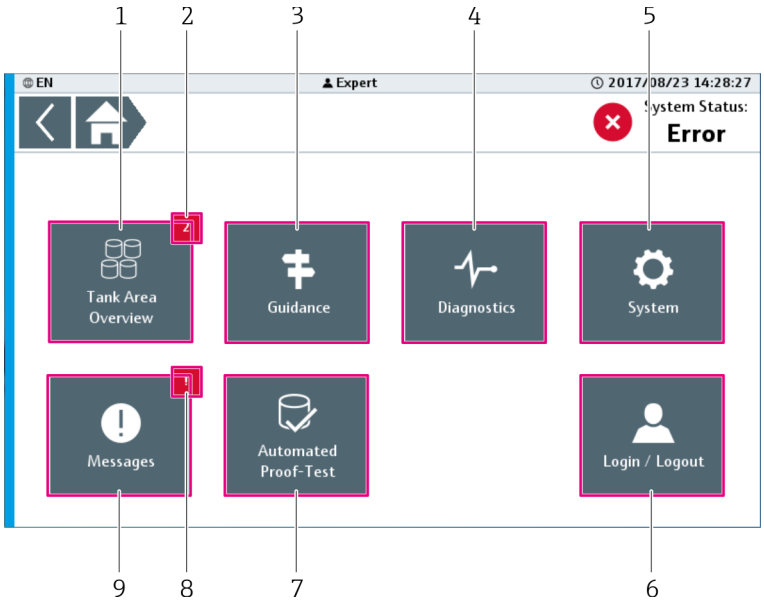
33 *Alphanumeric keypad with lower case letters*

34 *Alphanumeric keypad with upper case letters*

Switching the keypad	Action
Permanently switch keypad from lower case to upper case	Tap caps lock key (↑).
Reset keypad to lower case letters	Tap caps lock key (↑) or shift key (↓).
Temporarily switch keypad from lower case to upper case	Tap shift key (↓).

9.2.5 "Home" screen

The "Home" screen is the default screen that appears after booting the device.



35 *Home screen*

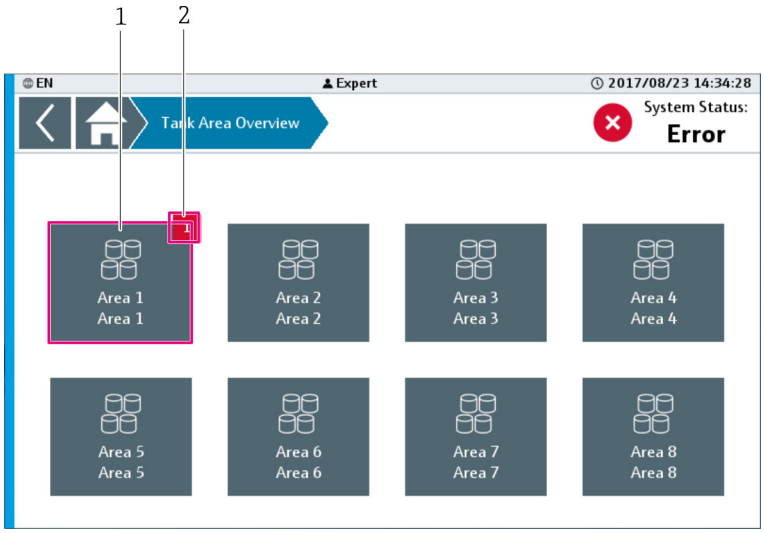
1 *Tank Area Overview* → 🖹 45. *If only one area is available, the "Tank Overview" screen opens*→ 🖹 46
2 *Message (tank system). Displays the number of active messages for the tank system. The symbol does not appear if there are no active messages.*
3 *Guidance* → 🖹 47
4 *Diagnostics*→ 🖹 55
5 *System* → 🖹 63
6 *Login / Logout* → 🖹 77
7 *Automated Proof-Test* → 🖹 48
8 *Notifications (messages)*
9 *Messages* → 🖹 56

Notifications (messages)
- Flashes: there are changes in the "Messages" screen that require input from the user, e.g. acknowledgment of a message.
- Permanently: there is at least one active message in the "Messages" screen. The message has already been acknowledged by the user but the issue causing the message has not yet been resolved.
- Nothing displayed: no messages are pending.

9.2.6 "Tank Area Overview" screen

The "Tank Area Overview" screen shows the current status for all the tank areas available. A maximum of 8 tank areas are possible. If there is only one tank area, this screen is not displayed.

▶ On the "Home" screen, tap **Tank Area Overview**.
↳ The "Tank Area Overview" screen opens.



36 "Tank Area Overview" screen

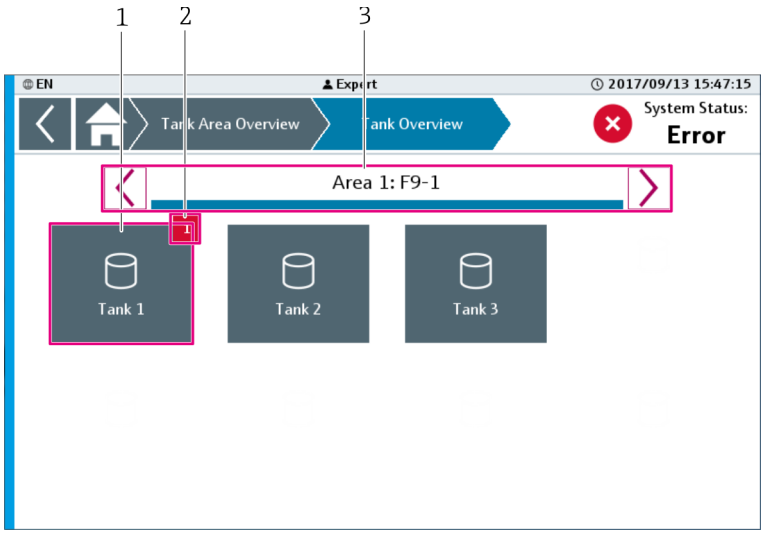
1 Tank area. Opens the "Tank Overview" screen for the selected tank area → 45.
2 Messages (tank area)

Messages (tank area)
- Displays the number of active messages in the corresponding tank area.
- Nothing displayed: no messages are pending.

"Tank Overview" screen

The "Tank Overview" screen shows the current status for the first tanks in the selected area. A maximum of 8 tanks are possible per screen.

▶ On the "Tank Area Overview" screen, tap **Area x**.
↳ The "Tank Overview" screen opens.



37 *Tank Overview screen*

1 *Tank (tank details)* → 46
2 *Messages (tank)*
3 *Navigation bar for navigating between all the tanks available in the selected tank area* → 42

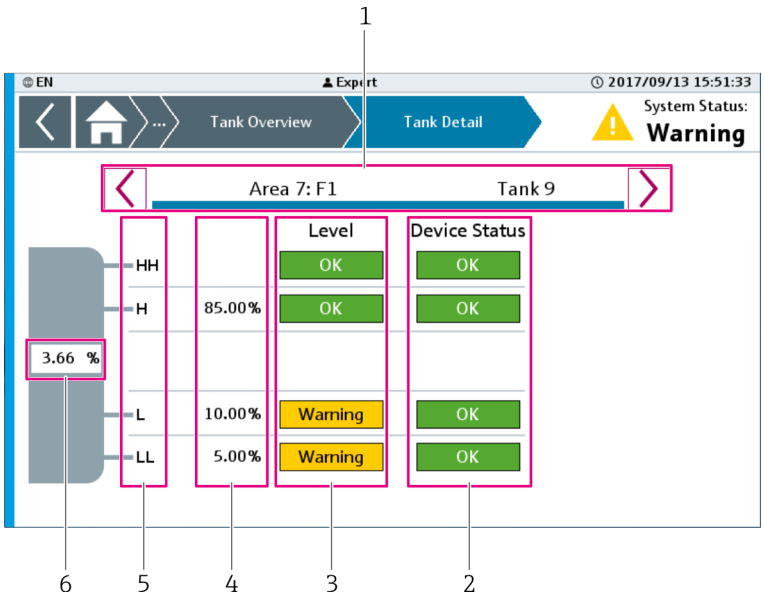
Messages (tank)

- Displays the number of active messages in the corresponding tank.
- Nothing displayed: no messages are pending.

"Tank Details" screen

The "Tank Details" screen contains detailed information on the selected tank, e. g. Name of the tank and available functions.

▶ On the "Tank Overview" screen, tap a tank.
↳ The "Tank Details" screen opens.



38 *"Tank Details" screen*

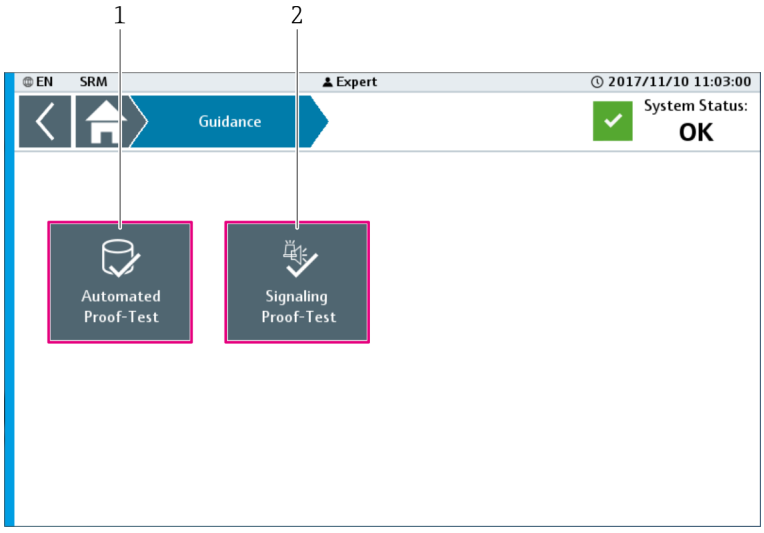
1 *Navigation bar*
2 *Device status*
3 *Level*
4 *Limit values*
5 *Available functions*
6 *Level currently measured*

Navigation bar	Navigate between all the tanks available in the selected tank area. Navigation bar → 42
Device status	Displays the device status, if available, of the device for every function. ▪ Green: OK, the status of the device is OK ▪ Orange: WARNING, the status of the device is not OK – Status of digital signal "Device fault" – > 20 mA: analog signal range exceeded during continuous level measurement – < 3.6 mA: analog signal range undershot during continuous level measurement ▪ Orange: broken wire, the status of the device is not OK < 2 mA: analog signal broken wire detection
Level	Displays the level for the available functions: ▪ Green: OK, the level is OK ▪ Orange: WARNING, the level is not OK The level is defined as a warning. ▪ Red: ERROR, the level is not OK The level is defined as an alarm.
Limit values	Displays the limit values of all the functions that refer to the continuous level, such as H, L and LL in the example.
Available functions	Displays all the available functions for the selected tank, such as HH, H, L and LL in the example.
Level currently measured	Displays the level currently measured as a percentage. The level is only displayed as a percentage if at least one of the functions HH, H, L or LL refer to the continuous level signal.

9.2.7 "Guidance" screen

The "Guidance" screen contains functions that define an interconnected series of functions. These functions enable users to perform fundamental tasks quickly (mainly with guided wizards).

▶ On the "Home" screen, tap **Guidance**.
↳ The "Guidance" screen opens.



39 *"Guidance" screen*

1 *Automated Proof-Test → 48*
2 *Signaling Proof-Test → 53*

"Automated Proof-Test" wizard

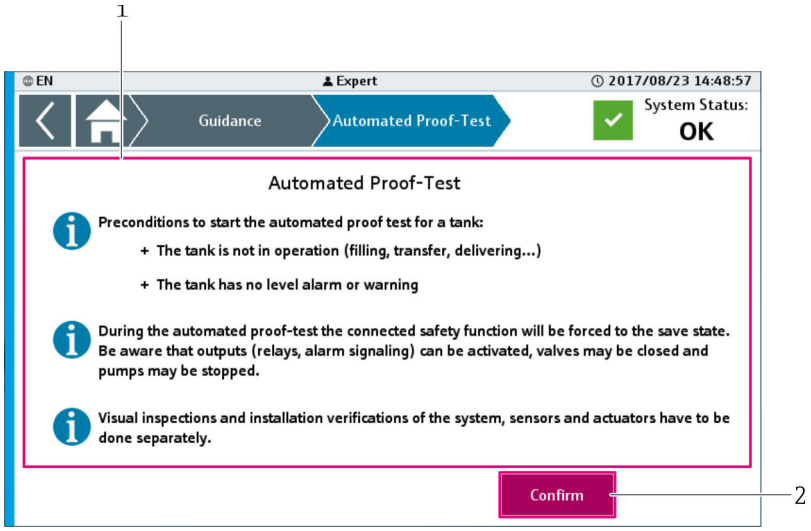
The "Automated Proof-Test" wizard guides the user through the proof test for the selected devices.

The following devices are currently available for proof testing:
- Liquiphant FTL5x with FEL57 electronic insert, connected to Nivotester FTL325P-#1E1
- Liquiphant FTL7x with FEL57 electronic insert, connected to Nivotester FTL325P-#1E1

▶ On the "Guidance" screen, tap **Automated Proof-Test**.
↳ The "Automated Proof-Test" wizard opens.

Automated Proof-Test, step 1

General information is displayed in the first wizard step. Here the user receives information about applicable preconditions, as well as automatic and semi-automatic functions, and any reactions of the functions to the proof test.



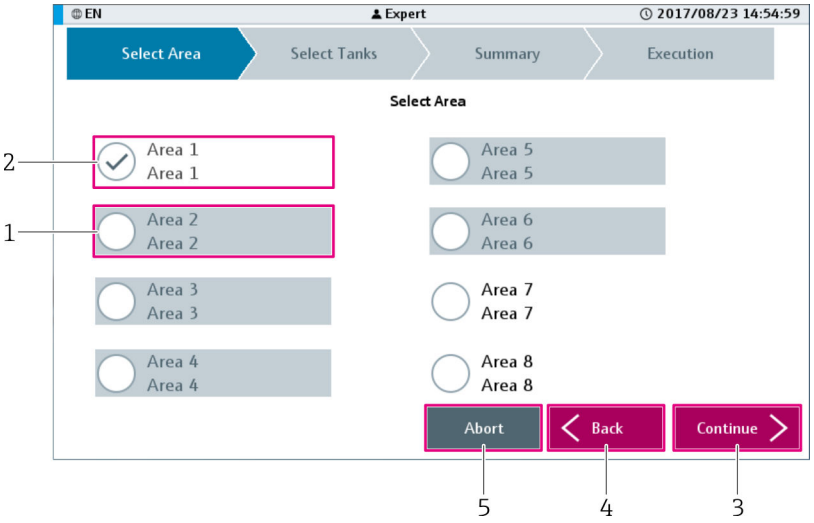
40 *Automated Proof-Test, step 1*

1 Note
2 Confirm

Note	The note contains the following information: ▪ Preconditions that must be met before the proof test can start ▪ Information on potential system reactions during the proof test
Confirm	The operator confirms that he has understood the information. The "Automated Proof-Test" wizard then starts → 48.

Automated Proof-Test, step 2

In this step, select the area for which the proof-test is to be performed. All the available areas are displayed. It is not possible to select areas that do not have devices that can be tested automatically. These areas have a gray background.



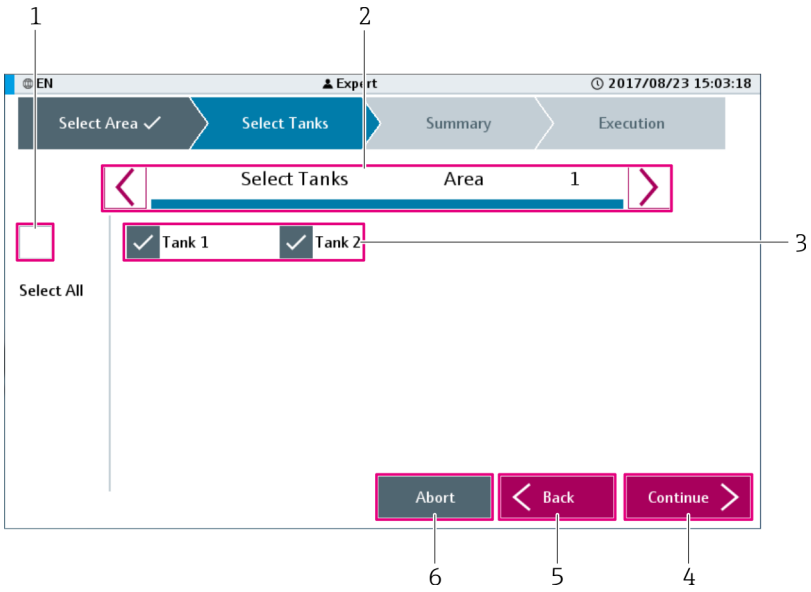
41 *Automated Proof-Test, step 2*

1 *Area, gray background*
2 *Area, white background*
3 *Continue*
4 *Back*
5 *Abort*

Area, gray background	These areas are not available for automatic proof-testing. No devices that can be tested automatically are mounted in this area.
Area, white background	These areas are available for automatic proof-testing. Tap the button to select the area for proof testing. You can only select one area.
Continue	Displays the next wizard step → 49. This button is only active if at least one area is selected.
Back	Displays the previous wizard step → 48.
Abort	Cancels the wizard. No proof tests are performed and no log file is saved.

Automated Proof-Test, step 3

In this step, you select the tanks for the proof test. All the tanks that support an automatic proof test are displayed.



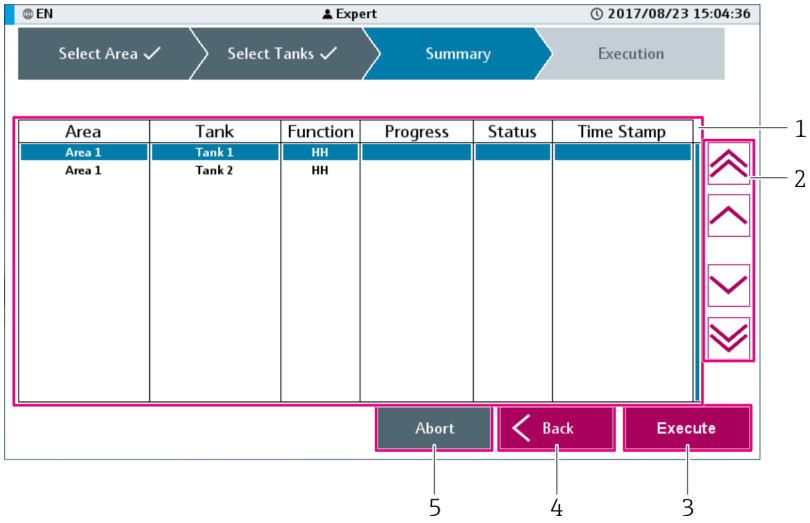
42 *Automated Proof-Test, step 3*

1 *Check box to select all the tanks*
2 *Navigation bar*
3 *Selection of one or more tanks*
4 *Continue*
5 *Back*
6 *Abort*

Select all the tanks in the selected area	Selects all the tanks available in this area in which devices are mounted that can be proof-tested.
Navigation bar	Navigation between all the tanks available in the selected tank area. Navigation bar → 42
Selection of one or more tanks	Select one or more tanks with devices for a proof test.
Continue	Displays the next wizard step → 50. This button is only active if at least one tank has been selected.
Back	Displays the previous wizard step→ 48.
Abort	Cancels the wizard. No proof tests are performed and no log file is saved.

Automated Proof-Test, step 4

This wizard step shows a summary of all the selected tanks and functions that are to be tested.



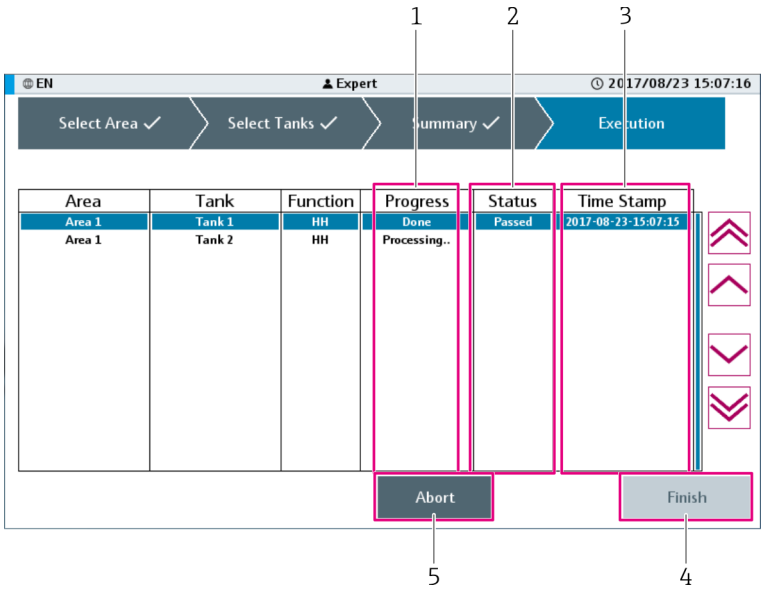
43 *Automated Proof-Test, step 4*

1 *Selected tanks*
2 *Scroll bar*
3 *Execute*
4 *Back*
5 *Abort*

Selected tanks	All the selected tanks are listed in the table with the corresponding area and the available functions.
Scroll bar	Use these buttons to scroll through the functions to be tested→ 43.
Execute	Starts the proof test. The next wizard step is displayed → 51. The test sequences of the devices to be tested are started 5 seconds apart.
Back	Displays the previous wizard step → 49.
Abort	Cancels the wizard. No proof tests are performed and no log file is saved.

Automated Proof-Test, step 5

In this step, the automatic proof test is performed for the selected tanks.



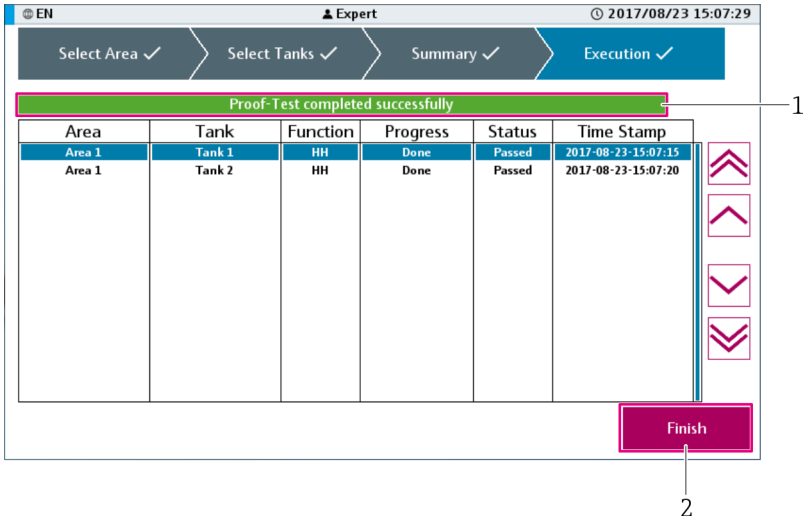
44 *Automated Proof-Test, step 5*

1 *Progress*
2 *Status*
3 *Time stamp*
4 *Finish*
5 *Abort*

Progress	The "Progress" column indicates the progress of the proof test for every function. Possible states: ▪ Blank: not yet started ▪ Processing: proof test is running ▪ Done: proof test is completed ▪ Aborted: proof test canceled by user
Status	The "Status" column indicates the result of the proof test for every function. Possible states: ▪ Blank: not yet finished ▪ Passed: function has passed the proof test ▪ Failed: function has failed the proof test ▪ Aborted: proof test canceled by user
Time stamp	The "Time stamp" column displays the current time stamp when a certain function is completed.
Finish	This button is disabled during the proof test. At least one function has the "Processing" status.
Abort	Cancels the wizard. All the tests that are already completed (progress is "Done") are saved in the log file with the status "Passed" or "Failed". All remaining tests not indicated as "Done" are saved in the log file with the status "Aborted".

Automated Proof-Test, step 6

In the sixth wizard step, you complete the proof test.



45 *Automated Proof-Test, step 6*

1 *Information about the proof test*
2 *Finish*

Information about the proof test	Possible messages: ▪ Proof-Test completed successfully (green background): all tests were successful. All the results of the proof test were successfully written to the log file. ▪ Proof-Test completed with warnings (orange background): at least one test was unsuccessful (failed). All the results of the proof test were successfully written to the log file. ▪ Proof-Test done. Saving data failed. Contact Service. (blue background): the results of the proof test were not successfully written to the log file.
Finish	The button is active if the proof test is completed for all the selected devices. Tap the button to exit the proof test wizard and to close the current screen.

"Signaling Proof-Test" wizard

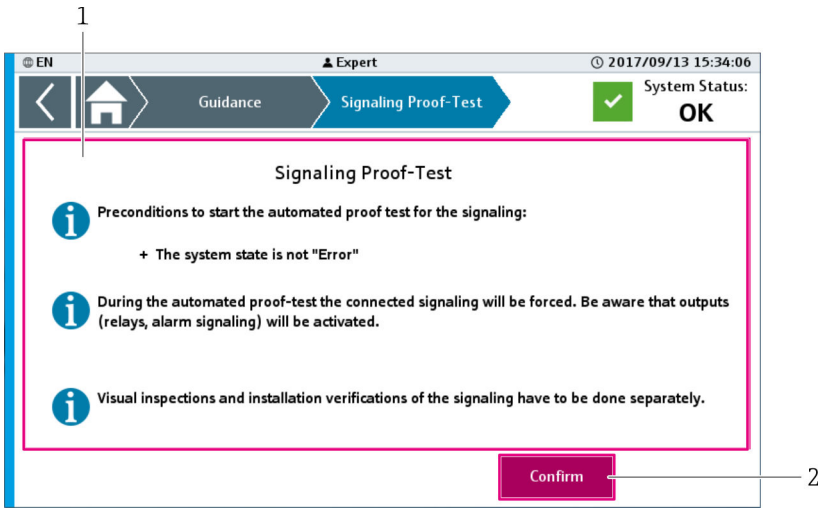
The "Signaling Proof-Test" wizard guides the user through the proof test for any signaling devices. The devices that are available depends on the configuration.

The following devices are currently available for proof testing:
- Alarm siren with activation feedback
- Alarm strobe with activation feedback
- System alarm relay

▶ On the "Guidance" screen, tap **Signaling Proof-Test**.
↳ The "Signaling Proof-Test" wizard opens.

Signaling Proof-Test, step 1

This wizard step displays general information. Here the user receives information about applicable preconditions, as well as any automatic and semi-automatic functions, and any reactions of the functions to the signalling proof test.



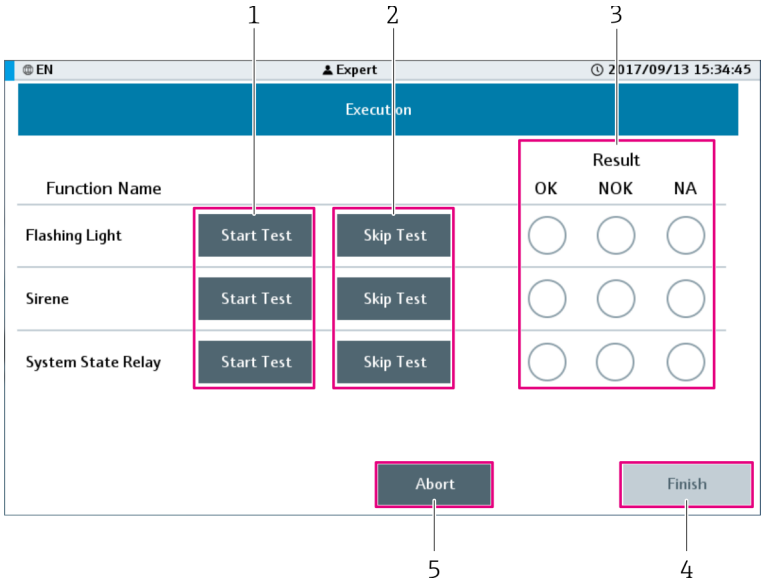
46 *Signaling Proof-Test, step 1*

1 *Note*
2 *Confirm*

Note	Preconditions that must be met before the proof test can start, as well as information for the user about potential reactions of the system during the proof test.
Confirm	The operator confirms that he has understood the information. The "Signaling Proof-Test" wizard then starts.

Signaling Proof-Test, step 2

In this step, the proof test is performed or skipped for the available devices. Devices that are not available in this configuration have a gray background and cannot be tested.



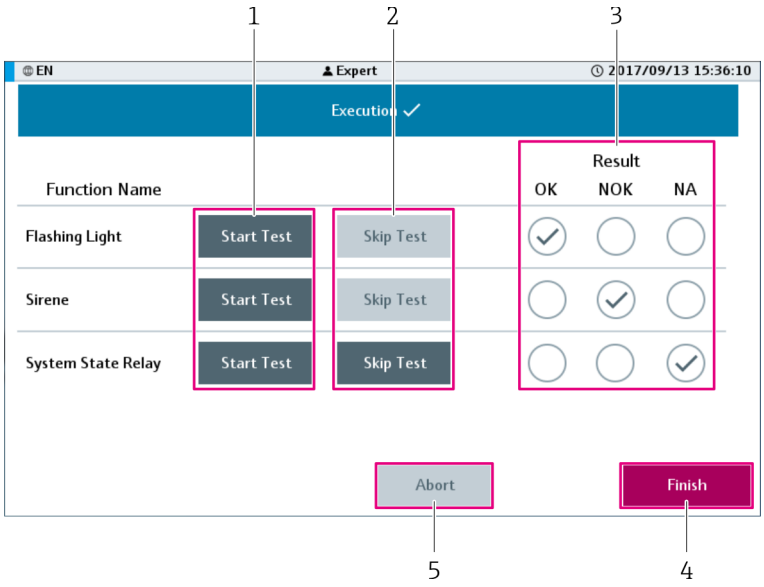
47 *Signaling Proof-Test, step 2*

1 *Start Test*
2 *Skip Test*
3 *Result*
4 *Finish*
5 *Abort*

Start Test	Starts the proof test for the relevant device. A device that has already been tested can be tested again, but you cannot skip the test any more.
Skip Test	Skips the proof test for the relevant device. No test is performed.
Result	See the next proof test step.
Finish	The button is disabled if the proof tests are not completed.
Abort	Cancels the wizard. No proof tests are performed and no log file is saved.

Signaling Proof-Test, step 3

The proof test is completed in this wizard step.



48 *Signaling Proof-Test, step 3*

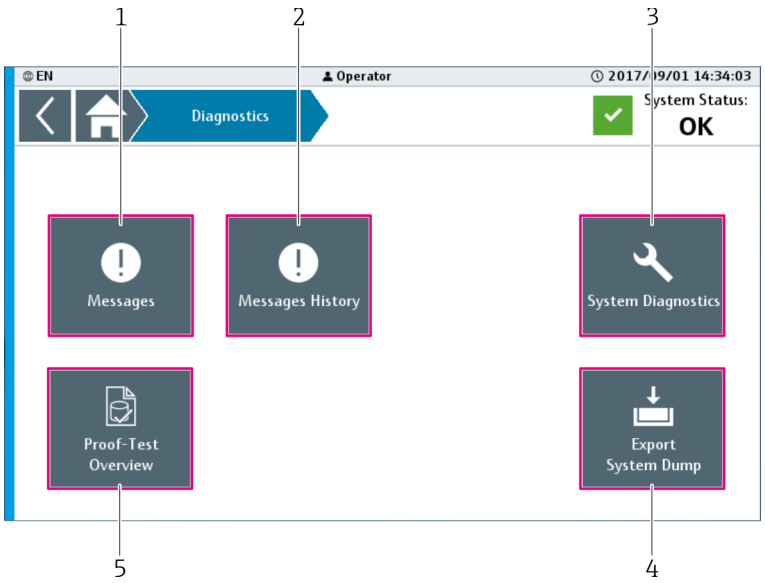
1 *Start Test*
2 *Skip Test*
3 *Result*
4 *Finish*
5 *Abort*

Start Test	See previous proof test step 2.
Skip Test	See previous proof test step 2.
Result	On completion of the proof test, the appropriate field is marked: ▪ OK: test completed successfully ▪ NOK: test was failed ▪ NA: test was skipped A proof test is completed if the test is completed or was skipped.
Finish	The button is active if the proof test is completed (performed or skipped) for all the available devices. Tap the button to exit the proof test wizard and to close the current screen.
Abort	The button is deactivated once all the tests have been completed for the available devices.

9.2.8 "Diagnostics" screen

The "Diagnostics" screen contains functions for a detailed diagnosis of the system.

▶ On the "Home" screen, tap **Diagnostics**.
↳ The "Diagnostics" screen opens.



49 *"Diagnostics" screen*

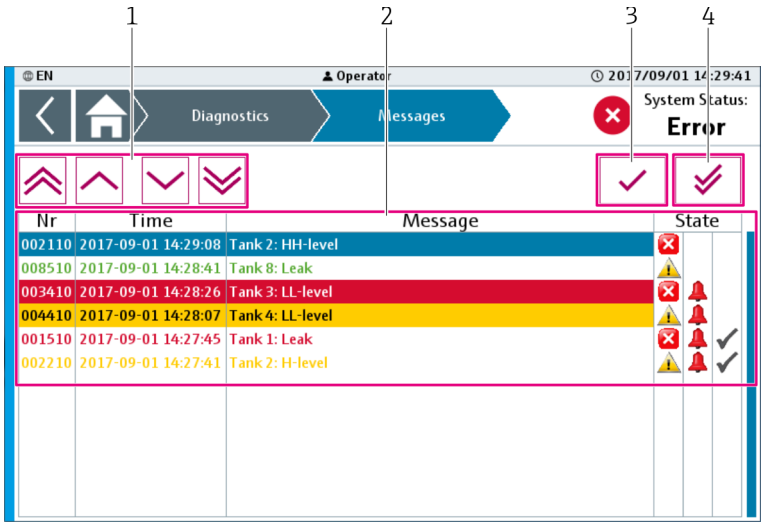
1 *Messages* → 56
2 *Messages History* → 57
3 *System Diagnostics* → 58
4 *Export System Dump* → 61
5 *Proof-Test Overview* → 58

"Messages" screen

The current system messages are listed on the "Messages" screen.

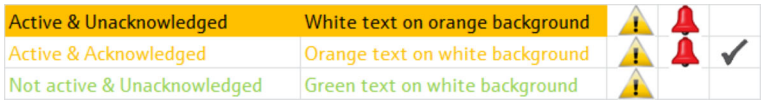
▶ On the "Diagnostics" screen, tap **Messages**.
↳ The "Messages" screen opens.

You can also open the "Messages" screen by tapping the "System Status" field. The "System Status" field is located on the top right of the navigation bar.



50 *"Messages" screen*

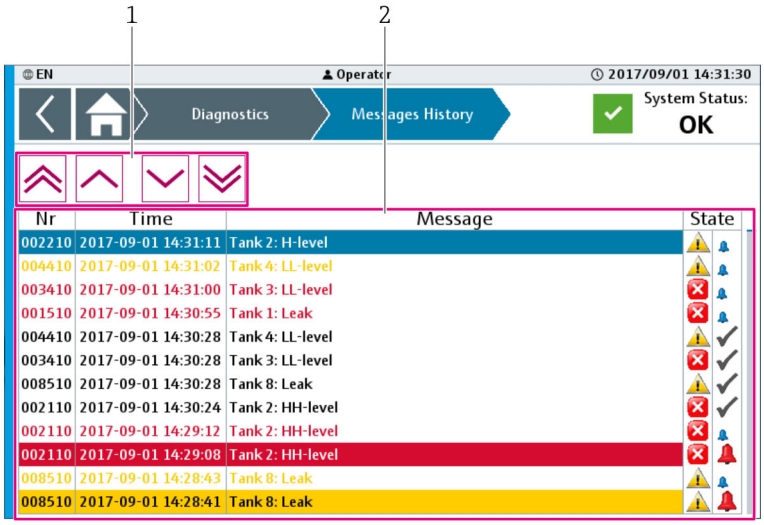
1 *Scroll bar*
2 *Current active messages*
3 *Acknowledge a message*
4 *Acknowledge all messages*

Scroll bar	Use these buttons to scroll through the messages. → 🖹 43
Current active messages	Displays the messages that are currently active. 🖼 51 *Possible alarm states*  🖼 52 *Possible warning states* The selected line is highlighted in blue.
Acknowledge a message	Acknowledges the selected message.
Acknowledge all messages	Acknowledges all the messages.

"Messages History" screen

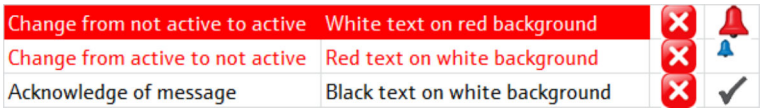
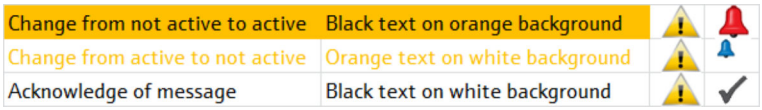
A history of the messages that are saved in the system is listed on the "Messages History" screen.

- ▶ On the "Diagnostics" screen, tap **Messages History**.
  - ↳ The "Messages History" screen opens.



🖼 53 *Messages History screen*

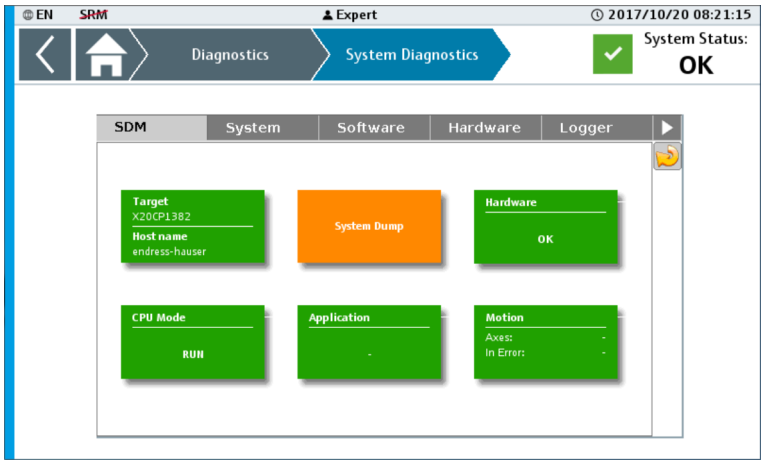
1 *Scroll bar*
2 *Historical messages*

Scroll bar	Use these buttons to scroll through the functions to be tested. → 🖹 43
Historical messages	Displays the historical messages.  🖼 54 *Possible historical information on the alarm states*  🖼 55 *Possible historical information on the warning states* The selected line is highlighted in blue.

"System Diagnostics" screen

The "System Diagnostics" screen contains the system diagnostics manager of the controller .

▶ On the "Diagnostics" screen, tap **System Diagnostics**.
↳ The "System Diagnostics" screen opens.



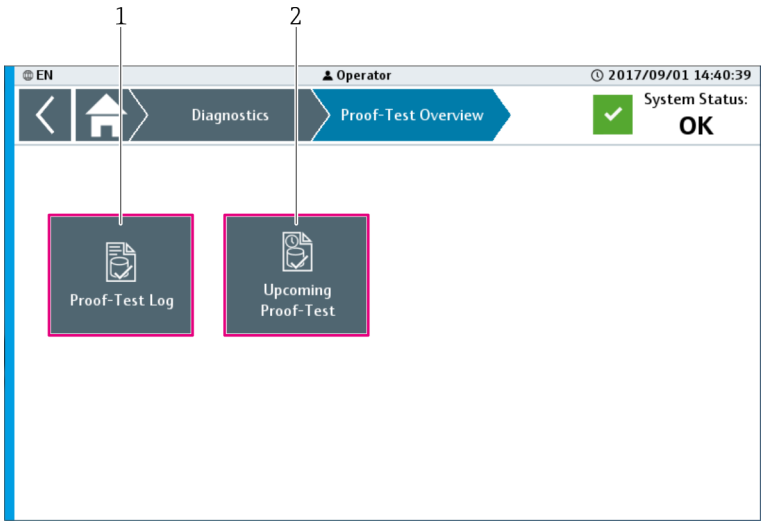
🖼 56 *"System Diagnostics" screen*

The screen shows detailed diagnostics information for the controller.

"Proof-Test Overview" screen

The "Proof-Test Overview" screen contains functions that affect the proof tests, such as log files or a list of pending proof tests.

▶ On the "Diagnostics" screen, tap **Proof-Test Overview**.
↳ The "Proof-Test Overview" screen opens.



57 *"Proof-Test Overview" screen*

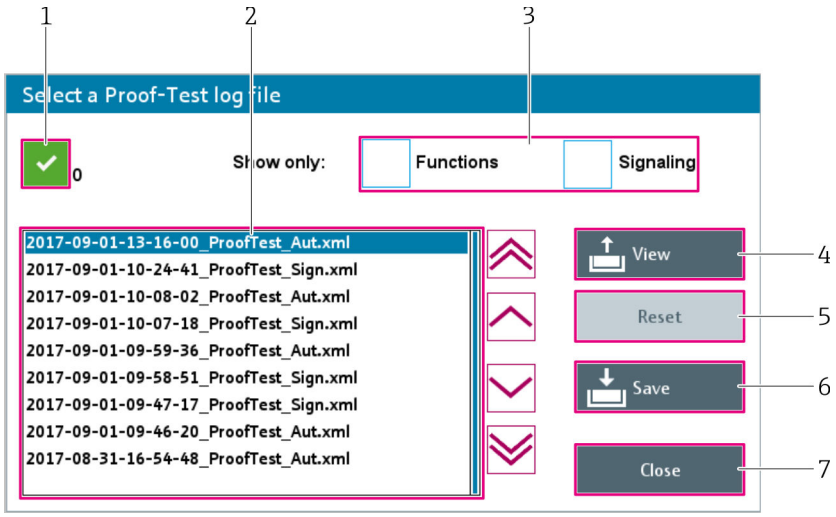
1 *Proof-Test Log → 60*
2 *Upcoming Proof-Test → 61*

"Select a Proof-Test Log File" dialog box

In the "Select a Proof-Test Log File" dialog box, select the log file that should be displayed or saved.

▶ On the "Proof-Test Overview" screen, tap **Proof Test Log**.
↳ The "Select a Proof-Test Log File" dialog box opens.

You can also access the "Select a Proof-Test Log File" dialog box via the "Proof-Test Log" screen. On the "Proof-Test Log" screen, tap **Select Log File**.



58 *"Select a Proof-Test Log File" dialog box*

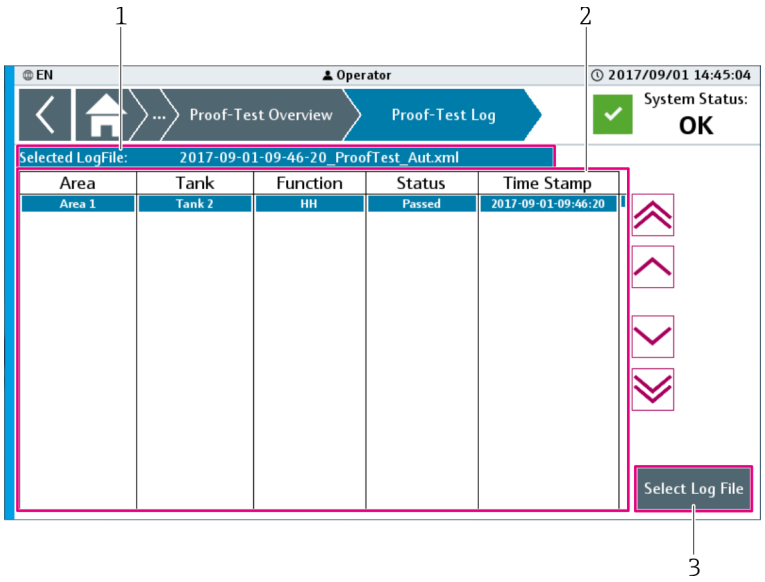
1 *Status for load file / refresh list*
2 *List of log files*
3 *"Functions (Automated Proof-Test)" or "Signaling (Signaling Proof-Test)" check box to filter the display*
4 *View*
5 *Reset*
6 *Save*
7 *Close*

Status for load file / refresh list	Displays the status of the following actions: ▪ Load the selected file ▪ Refresh the list of log files
List of log files	Lists the proof tests that have been performed. The tests that are displayed depend on the filter that is currently active. This list is sorted chronologically, with the most recent log file at the top of the list.
Check box to filter the display (functions / signaling)	Tap the check box to filter the list of log files by function proof tests or signal proof tests. The list is refreshed each time the check box is selected/deselected. If the check box is not selected, no filter is active.
View	Loads the information for the selected test file. As soon as the information is loaded, the dialog box closes and the information of the selected log file is displayed on the "Proof Test Log" screen.
Reset	This button is active if the system failed to load a file or if the list of log files was not refreshed. Tap the button to reset the corresponding function.
Save	Saves the selected test file as an XML file to the root directory of the connected USB device. Plug the USB device into a free USB port of the controller in the control cabinet. The controller is marked as "+PLC1-10A1" in the wiring diagram. Once the data have been saved successfully, the "File transfer is completed" pop-up window appears. If no USB device is connected to the controller, the "No USB device is available" pop-up window appears.
Close	Closes the dialog box. The information on the "Proof-Test Log" screen does not change.

"Proof-Test Log" screen

The "Proof-Test Log" screen shows the results of previous proof tests.

▶ In the "Select a Proof-Test Log File" dialog box, tap **View**.
↳ The "Proof-Test Log" screen opens.



59 *"Proof-Test Log" screen*

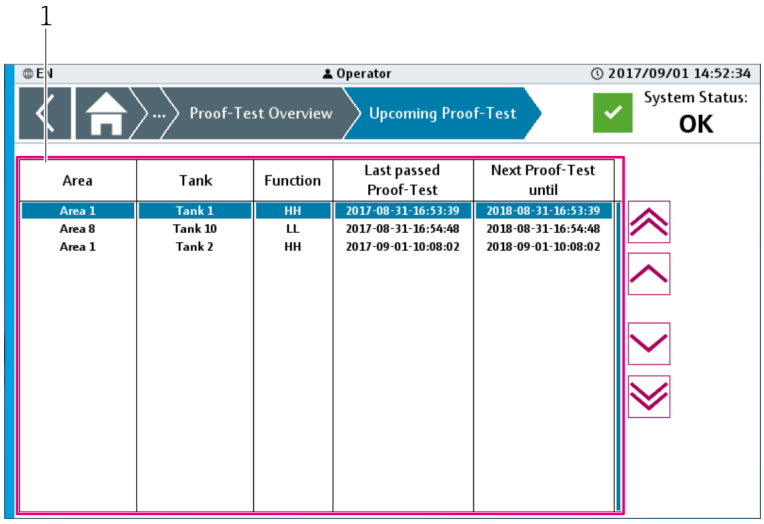
1 *Selected Log File*
2 *List of proof tests*
3 *Select Log File*

Selected Log File	Displays the file name of the selected proof test.
List of the proof tests	This list contains all the functions that were tested during the selected proof test, as well as the status of the tests ("Passed", "Failed" or "Aborted") and the time stamp for the proof test.
Select Log File	Opens the "Select a Proof-Test Log File" → 58 dialog box.

"Upcoming Proof-Test" screen

The "Upcoming Proof-Test" screen lists all the functions that can be tested.

- On the "Proof-Test Overview" screen, tap **Upcoming Proof-Test**.
  - The "Upcoming Proof-Test" screen opens.



60 *"Upcoming Proof-Test" screen*

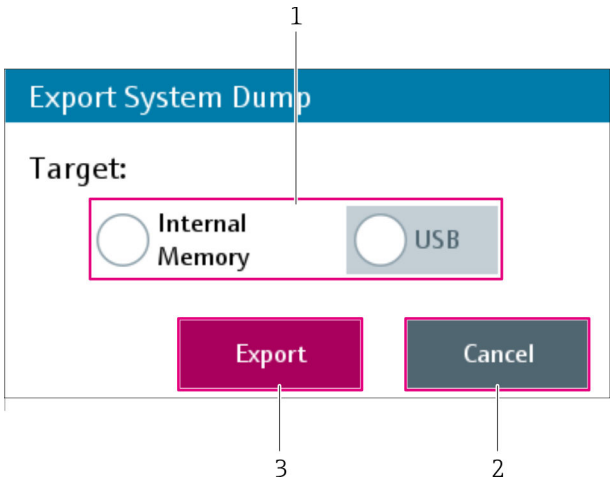
1 *List of upcoming proof tests*

List of all the upcoming proof tests	This list contains all the functions that can be tested, together with the date and time of the last successful test and the time and date by which the next test should be performed at the very latest. The list is sorted by date/time, and the function that should be tested next is at the top of the list. Use the scroll bar to navigate within the list. The "Next Proof-Test until" date is calculated from the date of the "Last passed Proof-Test" plus the value in the "Proof-Test period time" parameter→ 69.

"Export System Dump" dialog box

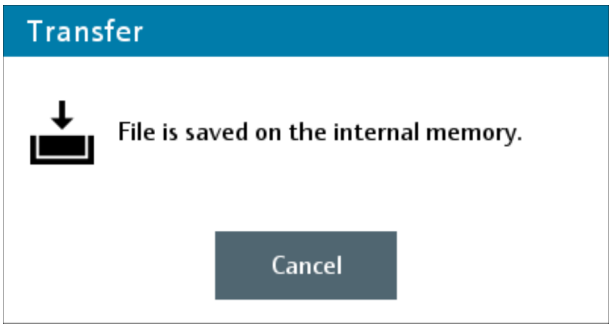
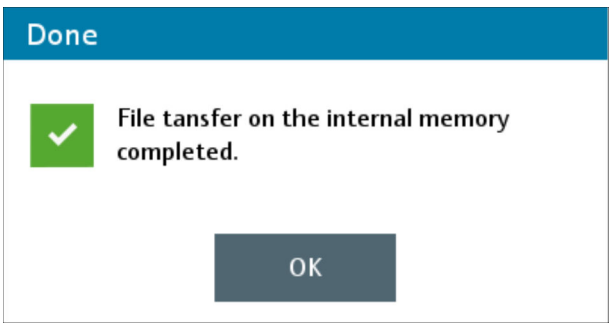
Use the "Export System Dump" dialog box to save the system information to a data storage medium. In this way, you have access to system information for later analysis, for example.

- On the "Diagnostics" screen, tap **Export System Dump**.
  - The "Export System Dump" dialog box opens.



61 *"Export System Dump" dialog box*

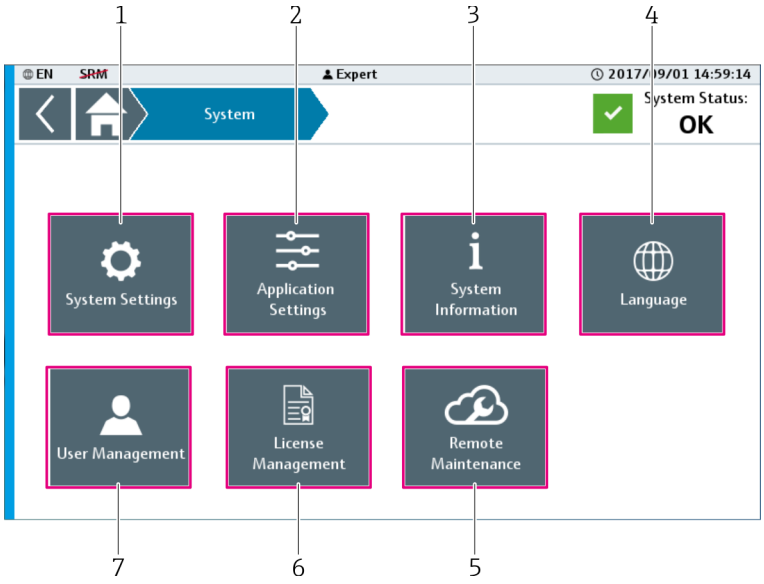
1 Target
2 Cancel
3 Export

Target	Select the desired target device. Grayed out elements are not available (not plugged in).
Cancel	Closes the dialog box. No data are saved.
Export	Saves the system dump file "YYYY_MM_DD_hh_mm_ss_SysDump.tar.gz" to the root directory of the connected USB device (target = USB) or to the folder "C:\customer\SystemDump\" (target = internal memory). The "Transfer" dialog box appears during this save routine:  "Cancel" closes the dialog box. The file is not saved. Once the file has been saved to the selected data storage device, the "Done" dialog box appears:  "OK" closes the dialog box.

9.2.9 "System" screen

The "System" screen contains general functions for the system.

- On the "Home" screen, tap **System**.
  - The "System" screen opens.



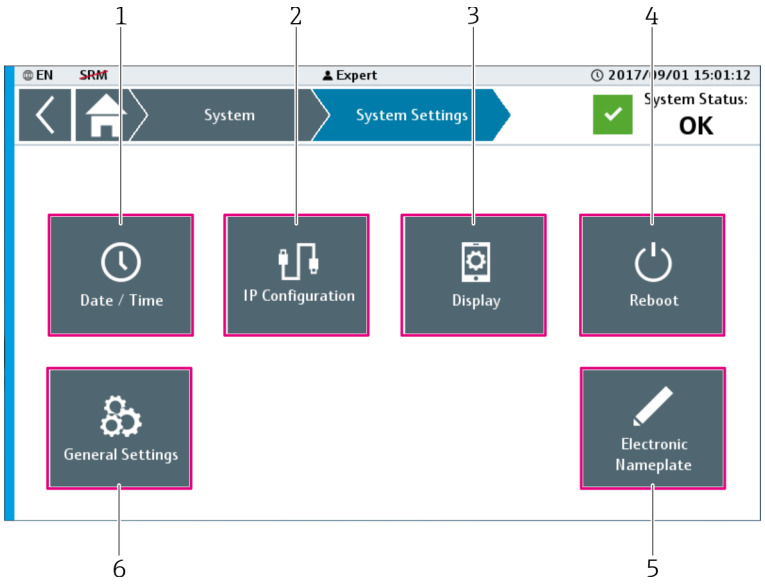
62 *"System" screen*

1 *System Settings* → 63
2 *Application Settings* → 69
3 *System Information* → 75
4 *Language*→ 76
5 *Remote Maintenance* → 80
6 *License Management*→ 79
7 *User Management* → 76

"System Settings" screen

The "System Settings" screen contains general system functions for the current system.

- On the "System" screen, tap **System Settings**.
  - The "System Settings" screen opens.



63 *"System Settings" screen*

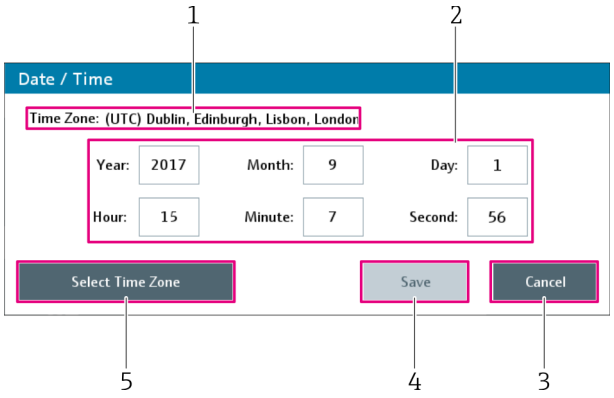
1 *Date/Time* → 64
2 *IP Configuration* → 65
3 *Display*→ 66
4 *Reboot* → 67
5 *Electronic Nameplate* → 68
6 *General Settings*→ 67

The " IP Configuration", "Electronic Nameplate" and "General Settings" dialog boxes can only be accessed by Endress+Hauser staff.

"Date/Time" dialog box

You can change the date and time of the system in the "Date/Time" dialog box.

- On the "System Settings" screen, tap **Date/Time**.
  - The "Date/Time" dialog box opens.



64 *"Date/Time" dialog box*

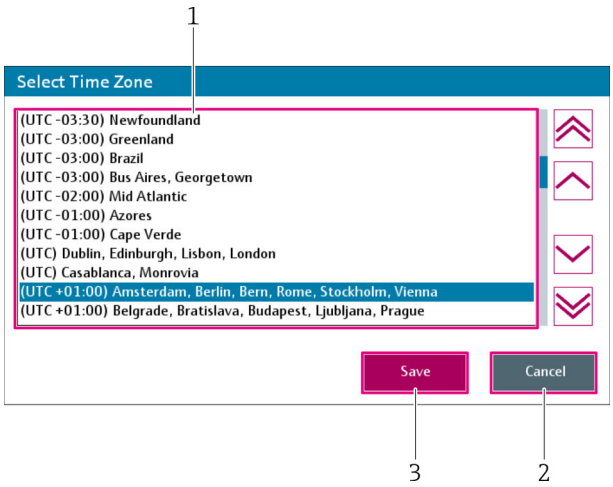
1 *Time Zone*
2 *Current Date/Time*
3 *Cancel*
4 *Save*
5 *Select Time Zone*

Time Zone	Displays the time zone currently selected.
Current Date/Time	Displays the current system date and time. Tapping one of these buttons calls up the numeric keypad. Use the keypad to change the value of the field (date and/or time).
Cancel	Closes the dialog box. Changes are not saved.
Save	Closes the dialog box. The changes for the system date and system time are saved. The "Save" button is only enabled if at least one value has been changed.
Select Time Zone	Opens the "Select Time Zone" dialog box → 65.

"Select Time Zone" dialog box

You can change the time zone of the system in the "Select Time Zone" dialog box.

- In the "Date/Time" dialog box, tap **Select Time Zone**.
  - The "Select Time Zone" dialog box opens.



65 *"Select Time Zone" dialog box*

1 Time zone list
2 Cancel
3 Save

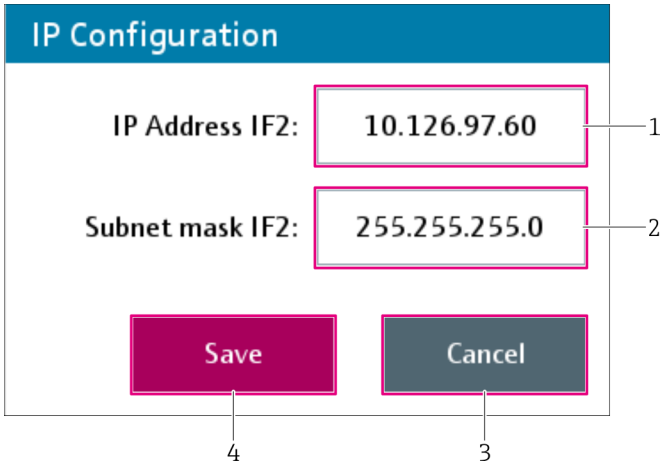
Time zone list	Use the scroll bar to select the desired time zone. The time zone currently selected is highlighted in blue.
Cancel	Closes the dialog box. Changes are not saved.
Save	Closes the dialog box. The changes for the time zone are saved. The system zone is adapted to the time zone.

"IP Configuration" dialog box

The "IP Configuration" dialog box can only be accessed by Endress+Hauser staff.

The "IP Configuration" dialog box is used to change the IP address.

- On the "System Settings" screen, tap **IP Configuration**.
  - The "IP Configuration" dialog box opens.



66 *"IP Configuration" dialog box*

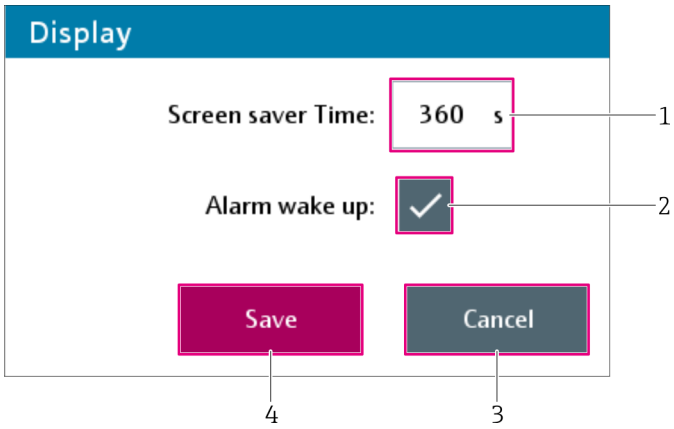
1 *IP Address IF2*
2 *Subnet Mask IF2*
3 *Cancel*
4 *Save*

IP Address IF2	Displays the specific keypad. Use the keypad to enter the new IP address for the Ethernet interface IF2 (CPU).
Subnet Mask IF2	Displays the specific keypad. Use the keypad to enter the new Subnet Mask for the Ethernet interface IF2 (CPU).
Cancel	Closes the dialog box. Changes are not saved.
Save	Saves the changes to the IP configuration and closes the dialog box. Changes to the IP configuration can cause the system to no longer work correctly.

"Display" dialog box

You can change the settings of the touch display in the "Display" dialog box.

- On the "System Settings" screen, tap **Display**.
  - The "Display" dialog box opens.



67 *"Display" dialog box*

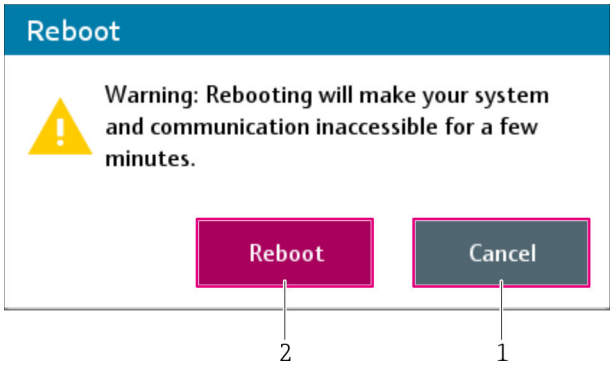
1 *Screen saver Time*
2 *Alarm wake up*
3 *Cancel*
4 *Save*

Screen saver Time	Displays the numeric keypad. Use the keypad to set the time for the screensaver. Input range: 0 to 65 535 s; 0 = screensaver deactivated The screensaver switches on if the set time has elapsed without an action being performed on the touch display.
Alarm wake up	Activates or deactivates the alarm function. If the alarm function is active and an alarm occurs while the screensaver is active, a flashing alarm symbol appears. This is shown over the entire display.
Cancel	Closes the dialog box. Changes are not saved.
Save	Saves the modified settings and closes the dialog box.

"Reboot" dialog box

The "Reboot" dialog box notifies the user of the consequences of rebooting the system and requires the user to confirm the system reboot.

- ▶ On the "System Settings" screen, tap **Reboot**.
  - ↳ The "Reboot" dialog box opens.



68 *"Reboot" dialog box*

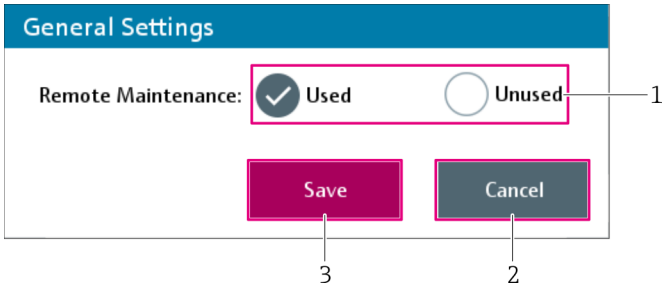
1 Cancel
2 Reboot

Cancel	Closes the dialog box. The system is not rebooted.
Reboot	The system is rebooted.

"General Settings" dialog box

The "General Settings" dialog box can only be accessed by Endress+Hauser staff.

- ▶ On the "System Settings" screen, tap **General Settings**.
  - ↳ The "General Settings" dialog box opens.



69 *"General Settings" dialog box*

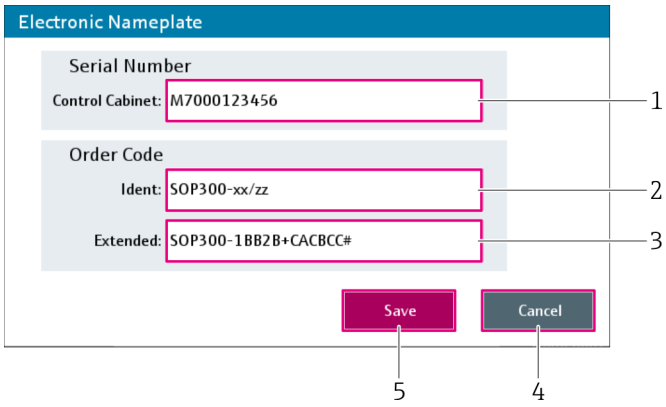
1 *Remote Maintenance*
2 *Cancel*
3 *Save*

Remote Maintenance	Tap the "Used" or "Unused" button to activate or deactivate the "Remote Maintenance" option. If the "Unused" button is selected, the "Remote Maintenance" button is deactivated on the "System" screen.
Cancel	Closes the dialog box. The changes are not saved.
Save	Saves the modified settings and closes the dialog box.

"Electronic Nameplate" dialog box

The "Electronic Nameplate" dialog box can only be accessed by Endress+Hauser staff.

▶ On the "System Settings" screen, tap **Electronic Nameplate**.
↳ The "Electronic Nameplate" dialog box opens.



70 *"Electronic Nameplate" dialog box*

1 *Serial Number – Control Cabinet*
2 *Order Code – Ident*
3 *Order Code – Extended*
4 *Cancel*
5 *Save*

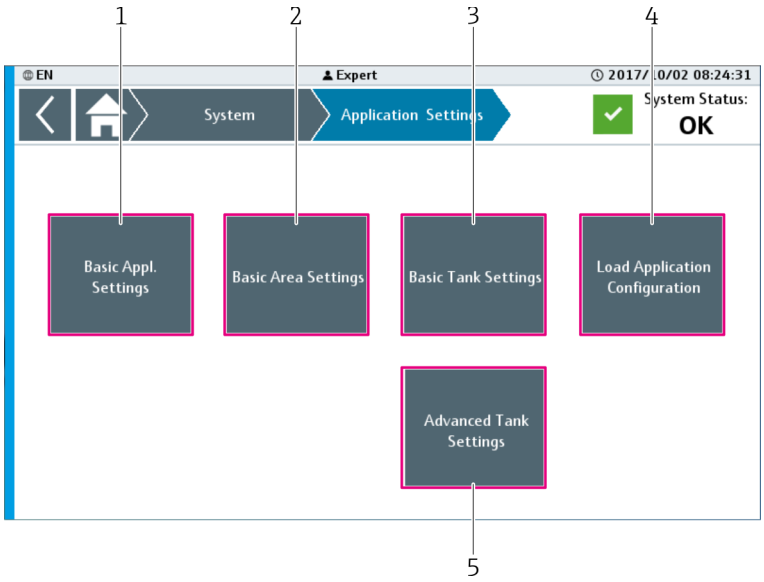
Serial Number – Control Cabinet	Displays the alphanumeric keypad. Use the keypad to edit the serial number of the system (max. 20 characters).
Order Code – Ident	Displays the alphanumeric keypad. Use the keypad to edit the order code of the system (max. 40 characters).
Order Code –Extended	Displays the alphanumeric keypad. Use the keypad to edit the extended order code of the system (max. 20 characters).

Cancel	Closes the dialog box. Changes are not saved.
Save	Saves the changes and closes the dialog box.

"Application Settings" screen

The "Application Settings" screen contains functions to adjust the application.

- On the "System" screen, tap **Application Settings**.
  - The "Application Settings" screen opens.



71 *"Application Settings" screen*

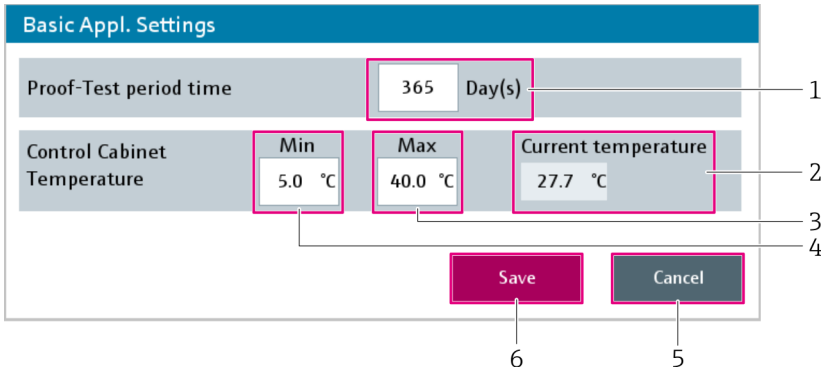
1 *Basic Application Settings → 63*
2 *Basic Area Settings → 70*
3 *Basic Tank Settings → 71*
4 *Load Application Configuration → 73*
5 *Advanced Tank Settings → 74*

The "Advanced Tank Settings" dialog box can only be accessed by Endress+Hauser staff.

"Basic Application Settings" dialog box

Use the "Basic Application Settings" dialog box to change the general settings for the application.

- On the "Application Settings" screen, tap **Basic Application Settings**.
  - The "Basic Application Settings" dialog box opens.



72 *"Basic Application Settings" dialog box*

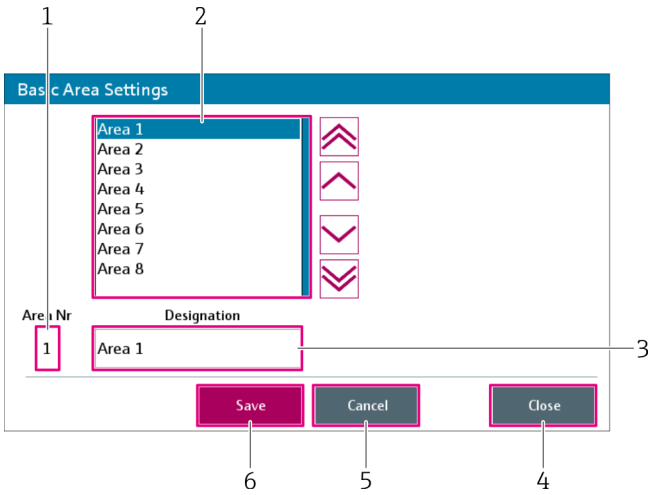
1 *Proof-Test period time*
2 *Control cabinet temperature – Current temperature*
2 *Control cabinet temperature – Max*
3 *Control cabinet temperature – Min*
5 *Cancel*
6 *Save*

Proof-Test period time	Displays the numeric keypad. Use the keypad to enter the proof test period. Input range: 0 to 10 000 Day(s) This parameter is used to define how long a successful proof test remains valid. This means that the date when the next test is due corresponds to the date of the last successful proof test plus the number of days specified in this parameter. The parameter is used for all proof tests A change to the parameter does not affect the validity dates that have already been computed. The change only applies to future successful proof tests.
Control cabinet temperature – Current temperature	Displays the temperature currently measured inside the control cabinet.
Control cabinet temperature – Max	Displays the numeric keypad. Use the keypad to enter the upper limit value for the control cabinet temperature. A control cabinet temperature above this value causes a corresponding message to be displayed. Input range: 15.0 to 50.0 °C
Control cabinet temperature – Min	Displays the numeric keypad. Use the keypad to enter the lower limit value for the control cabinet temperature. A control cabinet temperature below this value causes a corresponding message to be displayed. Input range: 5.0 to 15.0 °C
Cancel	Closes the dialog box. Changes are not saved.
Save	Saves the changes to the basic application settings and closes the dialog box.

"Basic Area Settings" dialog box

Use the "Basic Area Settings" dialog box to change the names of the areas used in this application.

▶ On the "Application Settings" screen, tap **Basic Area Settings**.
↳ The "Basic Area Settings" dialog box opens.



73 *"Basic Area Settings" dialog box*

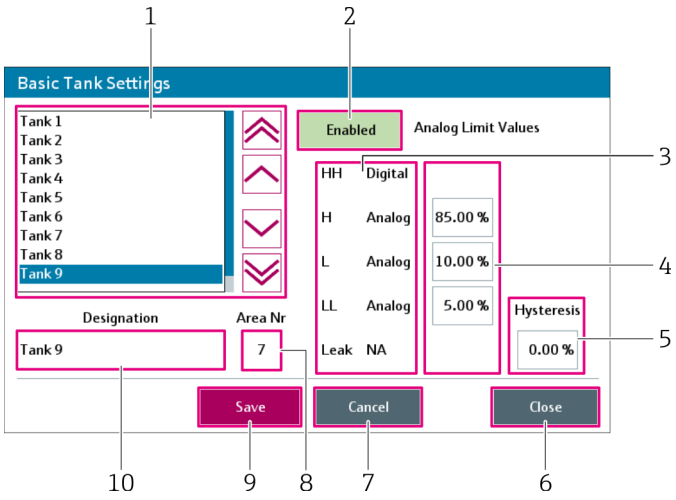
1 *Area Number*
2 *Choice of Area*
3 *Designation*
4 *Close*
5 *Cancel*
6 *Save*

Area Number	Displays the number of the selected area. This number cannot be changed.
Choice of Area	Use the scroll bar to select the desired area. The selected area is highlighted in blue.
Designation	Displays the alphanumeric keypad. Use the keypad to change the area name. Input range: 1 to 15 characters)
Close	Closes the dialog box. Changes are not saved.
Cancel	Undoes changes to the selected area.
Save	Saves the modified settings and closes the dialog box.

"Basic Tank Settings" dialog box

Use the "Basic Tank Settings" dialog box to change the tank-specific basic settings of the individual tanks present in the system. These are the designation, associated area, tank enabled/disabled and the limit values (if continuous level measurement is used).

▶ On the "Application Settings" screen, tap **Basic Tank Settings**.
↳ The "Basic Tank Settings" dialog box opens.



74 *"Basic Tank Settings" dialog box*

1 *Tank Selection*
2 *Enabled / Disabled*
3 *Tank Configuration*
4 *Analog Limit Values*
5 *Hysteresis*
6 *Close*
7 *Cancel*
8 *Area Number*
9 *Save*
10 *Designation*

Tank Selection	Use the scroll bar to select the desired tank. The selected tank is highlighted in blue. If you have made a change but have not yet saved or rejected this change, it is not possible to select another tank.
Enabled / Disabled	Tap this button to change the status between "Enabled" and "Disabled". If a tank is disabled, all the messages are suppressed. The function-specific alarm relays are disabled for a tank that is disabled. This means that a connected actuator, such as a pump or a valve, is switched off or closed.
Tank Configuration	This area displays the configuration of the selected tank. The corresponding function type is displayed for every HH, H, L, LL and Leak function. The following function types are possible: ▪ Digital: the function is available for this tank. A digital signal is used. ▪ Analog: the function is available for this tank. An analog signal is used. ▪ NA: the function is **not** available for this tank.
Analog Limit Values	This area is shown if the tank has continuous level measurement (tank configuration for "Analog" function type). At least one function that refers to the continuous level signal must be configured so that the corresponding field or fields are displayed. Use the numeric keypad to change the limit values. Input range: 0.0 to 100.0 % If the current value exceeds the limit value (HH and / or H) or drops below the limit value (LL and / or L), a message is displayed and the function-specific alarm relay is disabled.

Hysteresis	If at least one analog limit value is available, the hysteresis function is also available. Displays the numeric keypad. Use the keypad to change the hysteresis. Input range: 0.0 to 100.0 % The hysteresis applies for all the analog limit values. If the level currently measured exceeds the H limit value, for instance, the system displays a message. For the message to disappear, the level must be below the H-limit value minus the hysteresis. Example: ▪ H-limit value = 90 %, hysteresis = 1 % ▪ A level of over 90 % generates a message. ▪ For the message to disappear, the level must drop below 89 % (H-limit value – hysteresis). The hysteresis must be added for L and LL limit values.
Close	Closes the dialog box. The changes are not saved. This button is blocked if you have made a change but have not yet saved or rejected this change.
Cancel	Changes to the selected tank are not saved. The tank is reset to its saved settings.
Area Number	Displays the numeric keypad. Use the numeric keypad to change the number for the area this tank belongs to.
Save	Saves the change to the selected tank.
Designation	Displays the alphanumeric keypad. Use the keypad to change the area name (1 to 15 characters).

"Load Application Configuration" dialog box

NOTICE

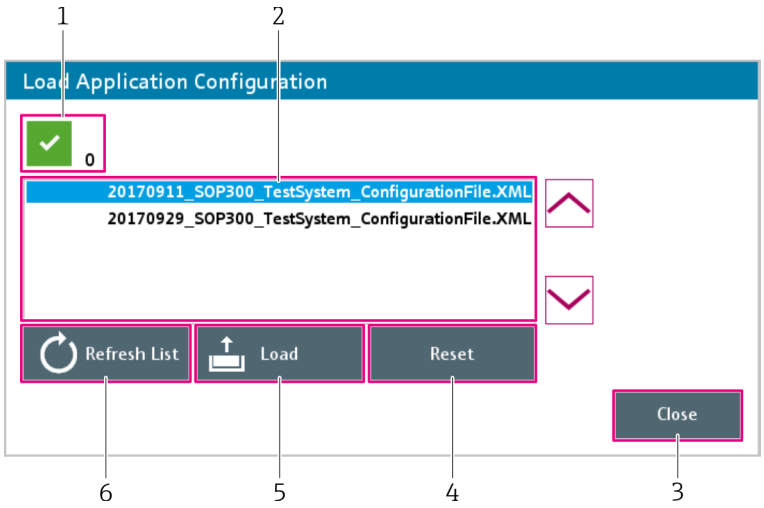
Unsuitable configuration file may cause application malfunction!

A configuration file must match the installed hardware. If an unsuitable configuration file is used this can cause an application malfunction.

- ▶ Always consult with Endress+Hauser before you load a new configuration file.
- ▶ Only have experienced users load a new configuration file.

You can load the application configuration via the "Load Application Configuration" dialog box. This makes it possible to reset the application configuration to the as-delivered state, for instance.

- ▶ On the "Application Settings" screen, tap **Load Application Configuration**.
  - ↳ The "Load Application Settings" dialog box opens.



75 *"Load Application Configuration" dialog box*

1 *"Load" or "Refresh List" status*
2 *List of configuration files*
3 *Close*
4 *Reset*
5 *Load*
6 *Refresh List*

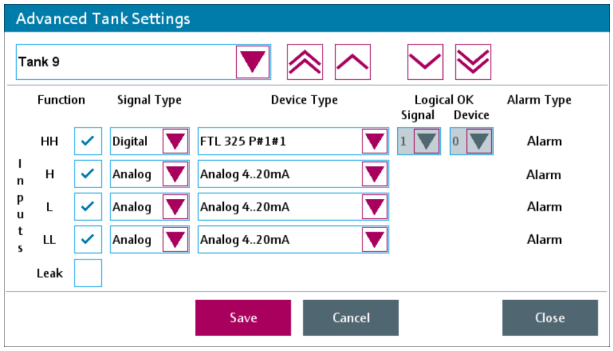
"Load" or "Refresh List" status	Displays the status of the following actions: ▪ Load the selected file ▪ Refresh the list of configuration files
List of configuration files	Use the scroll bar to select the desired configuration file. The selected configuration file is highlighted in blue.
Close	Close the "Load Application Configuration" dialog box . The button is disabled while a configuration file is being loaded.
Reset	Resets one of the following actions: ▪ Unsuccessful loading of the configuration file ▪ Refresh the list
Load	Loads the selected configuration.
Refresh List	Refreshes the list of configuration files.

"Advanced Tank Settings" dialog box

The "Advanced Tank Settings" dialog box can only be accessed by Endress+Hauser staff.

Use the "Advanced Tank Settings" dialog box to change the tank configuration of the individual tanks present in the system. The tank configuration comprises functions, function types, device types and instrument logic.

▶ On the "Application Settings" screen, tap **Advanced Tank Settings**.
↳ The "Advanced Tank Settings" dialog box opens.



76 *"Advanced Tank Settings" dialog box*

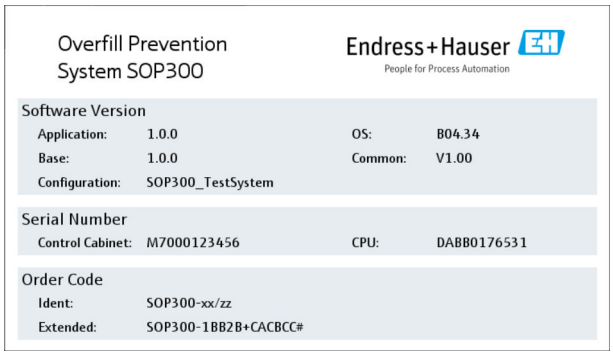
The tanks are configured in the "Advanced Tank Settings" dialog box. The available functions are enabled or disabled. It is also possible to select the "Digital" or "Analog" signal type. The device type is selected depending on the signal type. In the case of digital signals, it is necessary to define the significance of the signal input (0 or 1) for the level and also for the device status, if available. Furthermore, the "Alarm" or "Warning" alarm type is displayed for every function.

Changes to the configuration may only be implemented by Endress+Hauser staff and only following consultation with the manufacturer. Configuration changes may cause errors in the system as changes always involve the hardware (I/O of the controller).

"System Information" pop-up window

The "System Information" pop-up window displays the relevant system information.

- On the "System" screen, tap **System Information**.
  - The "System Information" pop-up window opens.



77 *"System Information" pop-up window*

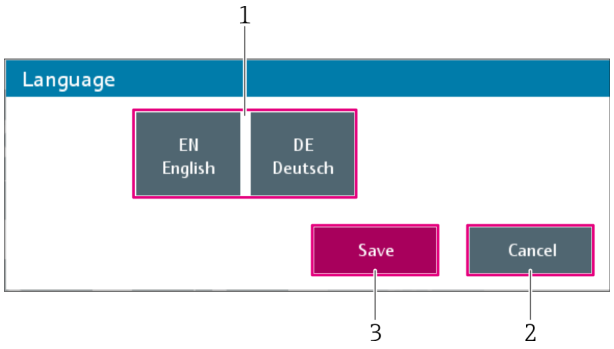
The "System Information" pop-up window displays the following data:
- Software Version – Application
- Software Version – Operating System
- Software Version – Base
- Software Version – Common
- Software Version – Configuration
- Serial Number – Control Cabinet → 68
- Serial Number – CPU
- Order Code – Ident → 68
- Order Code – Extended → 68

Tap the display to close the "System Information" pop-up window.

"Language" dialog box

You can change the language setting for visualization in the "Language" dialog box.

▶ On the "System" screen, tap **Language**.
↳ The "Language" dialog box opens.



78 *"Language" dialog box*

1 Language selection
2 Cancel
3 Save

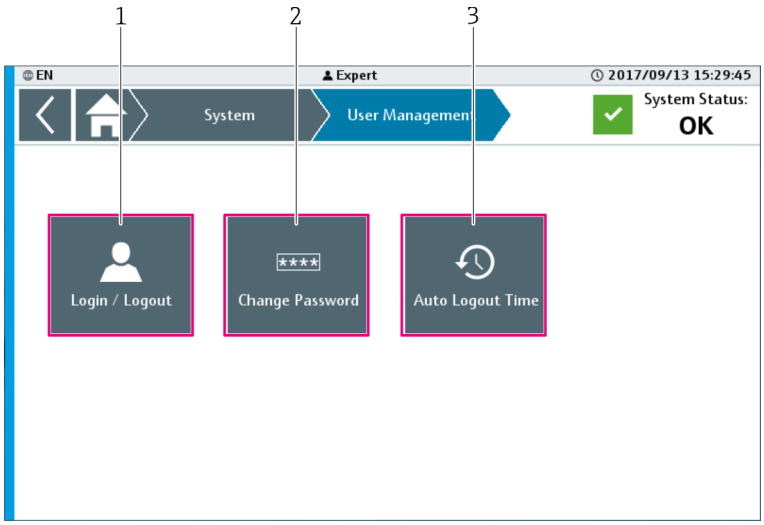
Language selection	Select the language.
Cancel	Closes the dialog box. The selected language is not saved.
Save	Saves the selected language as the operating language and closes the dialog box.

The language selected for visualization does not affect the language setting for data that have already been saved, such as the message history.

"User Management" screen

The "User Management" screen contains functions that concern user administration → 40.

▶ On the "System" screen, tap **User Management**.
↳ The "User Management" screen opens.



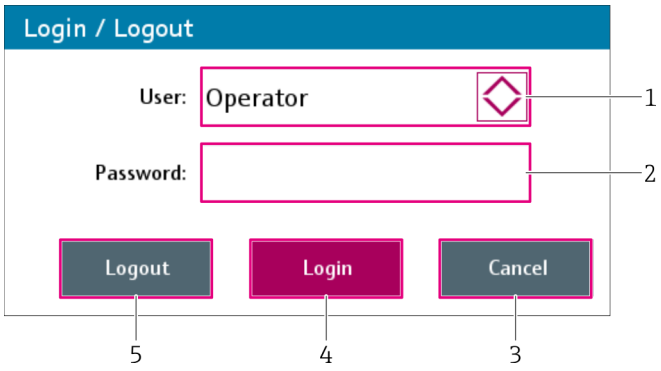
79 *"User Management" screen*

1 *Login / Logout* → 77
2 *Change Password* → 78
3 *Auto Logout Time* → 78

"Login / Logout" dialog box

The user logs into or out of the system in the "Login / Logout" dialog box.

▶ On the "User Management" or "Home" screen, tap **Login / Logout**.
↳ The "Login/Logout" dialog box opens.



80 *"Login / Logout" dialog box*

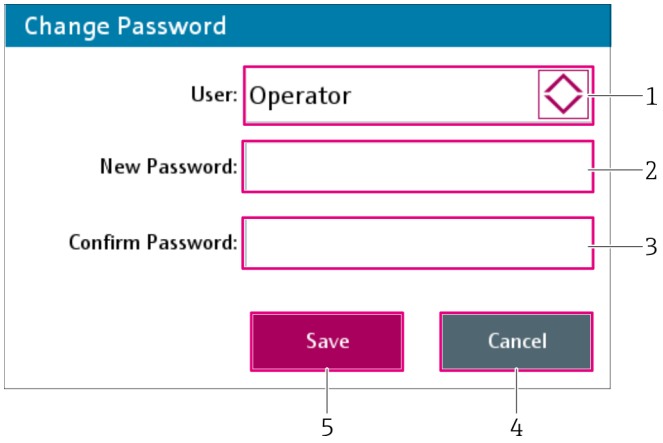
1 *User*
2 *Password*
3 *Cancel*
4 *Login*
5 *Logout*

User	Opens the list of users. Select the user.
Password	Displays the alphanumeric keypad. Use the keypad to enter the password for the selected user.
Cancel	Closes the dialog box. The user currently logged in remains logged into the system.
Login	The selected user is logged in and the "Login / Logout" dialog box is closed. If you enter an incorrect password for the selected user, the user is not logged in and the message "Password incorrect" is displayed.
Logout	The user currently logged in is logged out. The user "Anonymous" is logged in and the "Login / Logout" dialog box is closed.

"Change Password" dialog box

You can change the password for a user in the "Change Password" dialog box.

► On the "User Management" or "Home" screen, tap **Change Password**.
↳ The "Change Password" dialog box opens.



81 *"Change Password" dialog box*

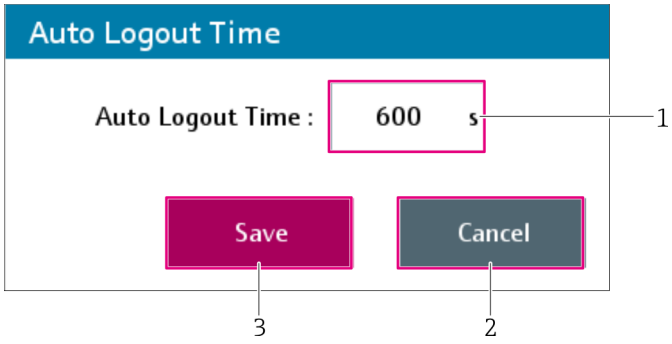
1 *User*
2 *New Password*
3 *Confirm Password*
4 *Cancel*
5 *Save*

User	Opens the list of users. Select the user whose password you wish to change. You can only change the password up to your own user access level. You cannot change the password for the users "Anonymous" and "Expert".
New Password	Displays the alphanumeric keypad. Use the keypad to enter the new password for the selected user. (Min. 2 characters, max. 20)
Confirm Password	Displays the alphanumeric keypad. Use the keypad to enter the new password once again.
Cancel	Closes the dialog box. The password is not saved.
Save	Saves the new password for the selected user and closes the dialog box. A message appears if the entries in the "Confirm Password" and "New Password" fields do not match or if the password is too short. You must enter the passwords again.

"Auto Logout Time" dialog box

You can change the time for automatic logout in the "Auto Logout Time" dialog box.

► On the "User Management" screen, tap **Auto Logout Time**.
↳ The "Auto Logout Time" dialog box opens.



82 *"Auto Logout Time" dialog box*

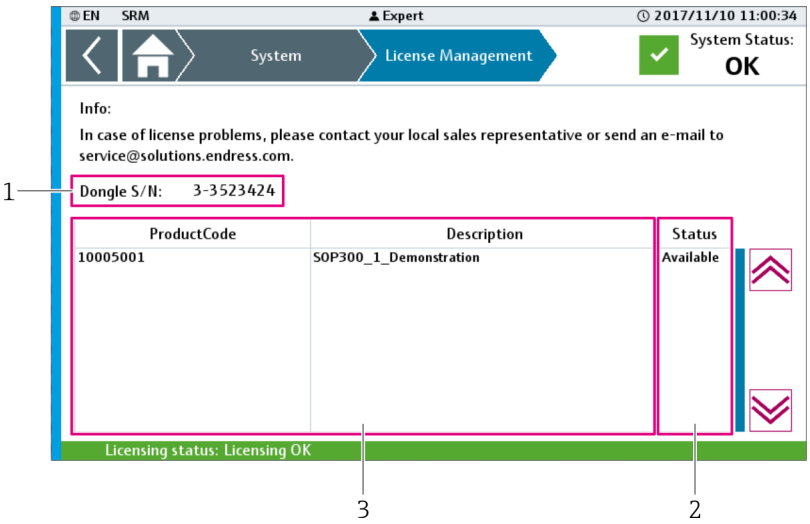
1 *Auto Logout Time*
2 *Cancel*
3 *Save*

Auto Logout Time	Displays the numeric keypad. Use the keypad to change the time for automatic logout. Input range: 0 to 65 535 s; 0 = automatic logout is disabled
Cancel	Closes the dialog box. The time for automatic logout is not saved.
Save	Saves the modified time for automatic logout and closes the dialog box.

"License Management" screen

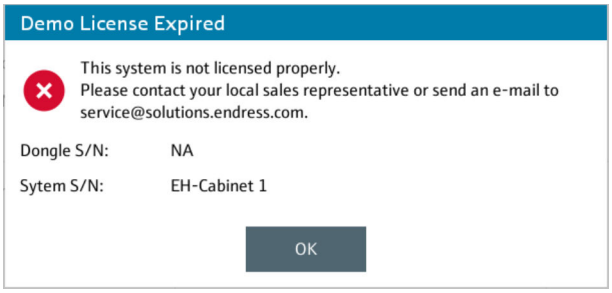
The "License Management" screen contains functions and information on the licensing of the Overfill Prevention System.

► On the "System" screen, tap **License Management**.
↳ The "License Management" screen opens.



83 *"License Management" screen*

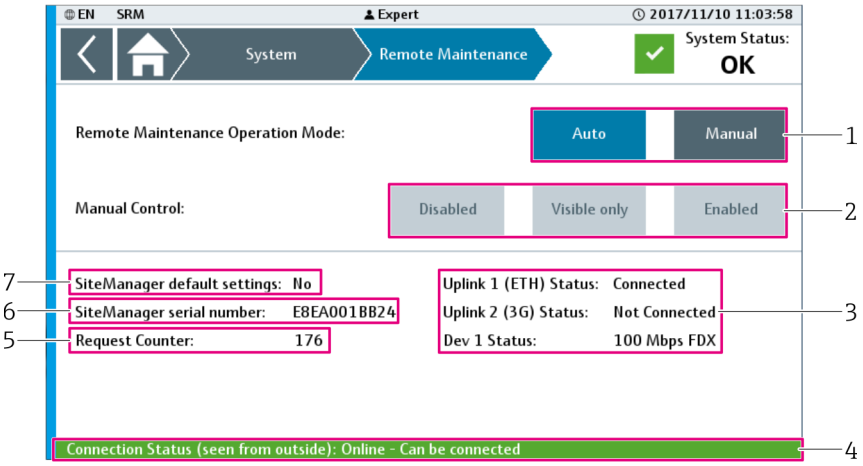
1 *License dongle serial number*
2 *License status*
3 *List of licenses*

License dongle serial number	If a license dongle is plugged into a USB port of the controller, the serial number of the license dongle is displayed. If a license dongle is not plugged into the USB port, "NA" appears on the screen. The controller is marked as "+PLC1-10A1" in the wiring diagram.
License status	The licensing status is indicated on this line. The following statuses are possible: ▪ "Licensing OK" with a green background: the necessary Endress+Hauser license is available and OK. ▪ "Demo license active xx days remaining" with an orange background: the necessary Endress+Hauser license was not found. The demo license has not yet expired, xx days remain. The warning "License: Demo time running" is active. ▪ "Demo license expired" with a red background: the necessary Endress+Hauser license was not found. The demo license has expired. The "Demo License Expired" pop-up window appears periodically on the screen. The alarm "License: Demo time expired" is active. 
List of licenses	Lists all the necessary licenses along with the product code, description and status. If a valid license is not found, no license description appears. The following statuses are possible: ▪ Missing: the necessary license is not on the dongle. ▪ Available: the necessary license is on the dongle.

"Remote Maintenance" screen

The "Remote Maintenance" screen contains functions and information on the use of the remote maintenance connection (VPN connection).

► On the "System" screen, tap **Remote Maintenance**.
↳ The "Remote Maintenance" screen opens.



84 *"Remote Maintenance" screen*

1 *Remote Maintenance Operation Mode*
2 *Manual Control*
3 *SiteManager Status*
4 *Connection Status*
5 *Request Counter*
6 *SiteManager serial number*
7 *SiteManager default settings*

Remote Maintenance Operation Mode	Tap the "Auto" or "Manual" button to switch the SiteManager to the corresponding mode. ▪ Auto (blue background): the automatic mode is active. A VPN connection to the SiteManager can be established with a LinkManager. The "Manual Control" functions are not available. ▪ Manual (blue background): the manual mode is active. The "Manual Control" functions are available.
Manual Control	If the SiteManager is in manual mode and connected, the SiteManager is controlled manually. The following options are possible. The selected option is highlighted in blue. ▪ Disabled: the SiteManager is disabled for all connections. In this mode, it is not possible to establish a connection to the SiteManager from outside. ▪ Visible only: the SiteManager is displayed on the GateManager, but a connection to the SiteManager is not established. In this mode, it is not possible to establish a connection to the SiteManager from outside. ▪ Enabled: it is possible to access the SiteManager from outside via a LinkManager. Manual control and the establishment of a connection via a LinkManager is only possible if the SiteManager is connected to the CPU and the key switch in the control cabinet is set to the "Remote Maintenance on" position.
SiteManager Status	Displays the status of the various ports. The following statuses are possible for the UPLINK port (Ethernet (1) and 3 G (2)): ▪ Not connected ▪ Connected (not used) ▪ Connected The following statuses are possible for the DEV 1-port: ▪ Not Connected ▪ 10 Mbps HDX ▪ 10 Mbps FDX ▪ 100 Mbps HDX ▪ 100 Mbps FDX ▪ 1000 Mbps FDX

Connection Status	Displays the current status of the SiteManager from outside (LinkManager). The following statuses are possible: ▪ Offline (red background): not possible to connect to the system from outside ▪ Online – Visible only (no data exchange) (green background): SiteManager is visible from outside, but it is not possible to connect to the system ▪ Online – can be connected (green background): possible to connect to the system from outside ▪ Online – connected (yellow background): an outside connection to the system is active
Request Counter	This value increases when the SiteManager is connected with the CPU and has booted. "0" is displayed if no connection is established to the SiteManager.
SiteManager serial number	Once the SiteManager is connected to the CPU and has booted, the serial number is displayed here. "00000000000" is displayed if no connection is established to the SiteManager.
SiteManager default settings	Once the SiteManager is connected to the CPU and has booted, this field displays the configuration of the SiteManager. ▪ Yes: the configuration of the SiteManager matches the configuration of the SiteManager in the CPU (default setting). ▪ No: the configuration of the SiteManager does **not** match the configuration of the SiteManager in the CPU. The configuration was modified manually at the SiteManager after it was transmitted by the CPU.

10 Diagnostics and troubleshooting

10.1 General troubleshooting

Displaying and acknowledgment: → 38.

10.2 Overview of diagnostic information

Message number	Message	Message type	Diagnostics	Cause	Corrective action	Reference wiring diagram
010	License: Demo time running	Warning	System is running in the demo mode	No USB license dongle plugged into CPU.	Plug valid USB license dongle into USB port of CPU.	
011	License: Demo time expired	Alarm	System demo time has expired	USB license dongle is plugged into CPU, but the license is not valid (see 010).	Contact Endress+Hauser for a replacement license.	
015	Remote maintenance: VPN connection active	Warning		A VPN connection to the SiteManager is active.	End VPN connection or disable "Remote maintenance".	
020	Internal Data Memory: Free space low	Warning		Free space available on controller < 20 %		
101	Power supply 1: Fault	Warning	"DC OK" LED for power supply 1 is off	Circuit breaker 1 is off.	Switch on circuit breaker 1.	=CCy+PSy-11G1 [1) 2)] =CCy+PSy-11F1 [1) 2)]
			"DC OK" LED for power supply 1 is flashing	Voltage supply 1 not OK.	Check input voltage to power supply 1. If the input voltage does not match the specification (nameplate), make appropriate voltage available.	
				Overload mode	Check consumer for short-circuit or electrical overloading.	
102	Power supply 2: Fault	Warning	"DC OK" LED at power supply 2 is off	Circuit breaker 2 is off.	Switch on circuit breaker 2.	=CCy+PSy-11G1 [1) 2)] =CCy+PSy-11F1 [1) 2)]
			"DC OK" LED at power supply 2 is flashing	Voltage supply 2 not OK.	Check input voltage to power supply 2. If the input voltage does not match the specification (nameplate), make appropriate voltage available.	
				Overload mode	Check consumer for short-circuit or electrical overloading.	
103	Power supply redundancy module: Fault	Warning	"I<IN" LED is lit and "Redundancy OK" LED is lit.	No load distribution because power supply not adjusted.	Adjust power supply voltage so that the ">OK<" bar graph is lit green.	=CCy+PSy-13G1 [1) 2)]
			"I<IN" LED flashing and "Redundancy OK" LED flashing.	No redundancy because I>In.	Check load current.	

Message number	Message	Message type	Diagnostics	Cause	Corrective action	Reference wiring diagram
			"I<IN" LED is lit, "Redundancy OK" LED is flashing and ">OK<" bargraph is flashing red.	No redundancy as no power is supplied to an input.	Check input IN1/IN2 and its connections.	
			All LEDs off.	No power to the device.	Check the power supply (see message numbers 101 and 102).	
				Short-circuit at the output of the redundancy module.	Check the output side for a short-circuit.	
			"Redundancy OK" LED is flashing and ">OK<" bargraph is lit red.		The device must be checked at the factory.	
111	Uninterruptible power supply: Fault	Warning	Green LED off, red and yellow LED lit.	Battery operation and battery almost empty (< 10 %)	Check the power supply (see message numbers 101,102 and 103).	=CCy+PSy-14G1 [1) 2)]
			Green and red LED lit and yellow LED off.	Mains operation and battery problem (bottom bargraph LED flashes red).	Battery not connected, battery has reached end of remaining service life, or incorrect battery type connected.	
112	Uninterruptible power supply: Battery mode	Warning	Green and red LED off, yellow LED lit.	Battery operation, bargraph shows current state of charge.	Check the power supply (see message numbers 101,102 and 103).	=CCy+PSy-14G1 [1) 2)]
113	Uninterruptible power supply: Battery charging	Warning	Green LED lit, red and yellow LED off and not all bargraph LEDs lit.	Mains operation and battery is charging.	Wait until the battery is fully charged.	=CCy+PSy-14G1 [1) 2)]
131	Circuit breaker 24 V_{DC}: Tripped	Warning	"DC OK" LED lit green and at least one channel LED flashing red.	The corresponding channel was overloaded.	Check components connected to the channel and then switch channel back on via relevant LED button or the **Reset** button on the control panel door.	=CCy+PSy-20F1 [1) 2)]
			"DC OK" LED lit yellow.	Voltage exceeded temporarily.	Check the power supply (see message numbers 101,102 and 103).	
			"DC OK" LED flashing yellow.	Power supply back to normal range after being temporarily under range.	Acknowledge by pressing the LED button or the **Reset** button on the control panel door.	
			"DC OK" LED lit red.	Permitted voltage range exceeded.	Check the power supply (see message numbers 101,102 and 103).	
			"DC OK" LED flashing red.	Power supply back to normal range after being over range.	Acknowledge by pressing the LED button or the **Reset** button on the control panel door.	
132	Circuit breaker 24 V_{DC}: Prewarning (I > 80 %)	Warning	"DC OK" LED lit green and at least one channel LED lit yellow.	Channel load > 80 % of configured rated current.	Check components connected to the channel or the configuration of the corresponding channel.	=CCy+PSy-20F1 [1) 2)]
201	Temperature in control cabinet: Too high	Warning	The temperature in the control cabinet has	Filter fan not working or not working correctly.	Check the function of the filter fan.	=CCy+PSy/5 [1) 2)]

Message number	Message	Message type	Diagnostics	Cause	Corrective action	Reference wiring diagram
			exceeded the configured "High" limit value (default value: 40 °C).	Ambient temperature too high.	Adjust ambient conditions.	
202	Temperature in control cabinet: Too low	Warning	The temperature in the control cabinet has dropped below the configured "Low" limit value (default value: 5 °C).	Filter fan not working or not working correctly.	Check the function of the filter fan.	=CCy+PSy/5 [1) 2)]
				Ambient temperature too low	Adjust ambient conditions.	
203	Temperature in control cabinet: Broken wire	Warning		Pt1000 temperature sensor not connected or not correctly connected to input module.	Connect Pt1000 temperature sensor correctly.	=CCy+PSy-15R7
				Pt1000 temperature sensor faulty.	Check Pt1000 temperature sensor and replace if necessary.	
221	Reset push button: Short circuit	Warning		Press button for longer than 5 seconds.	Release button.	=CCy +OPy-11SH3 [1) 3)] =OPy+OPy-11SH3 [3)]
				Short-circuit on door button contact.	Check function and wiring of the button.	
222	Acknowledge push button: Short circuit	Warning		Press button for longer than 5 seconds.	Release button.	=CCy+OPy-11S2 [1) 3)] =OPy+OPy-11S2 [3)]
				Short-circuit on door button contact.	Check function and wiring of the button.	
223	Reset push button: Reset required	Warning		A component must be reset manually.	Press the **Reset** button.	
301	Remote IO Bus: Fault	Alarm	To locate the affected bus module, see the "System Diagnostics" display → 🖹 55.	Bus node has no power supply.	Check the applied voltage at the bus module.	=CCy+IOy-111 [1) 4)]
				No communication with the bus node.	Check Powerlink cable connection between the CPU and tank remote IO.	=CCy+IOy-111 [1) 4)] =CCy+PLC1-11 [1)]
				Bus module is defective.	Replace bus module.	=CCy+IOy-11A0 [1) 4)]
311	Remote IO Module: Fault	Alarm	To locate the affected IO module, see the "System Diagnostics" display → 🖹 55.	IO module not installed correctly.	Check installation of the IO module and correct if necessary.	Depends on the affected IO module
				IO module not available.	Install the IO module.	Depends on the affected IO module
				IO module is defective.	Replace the IO module.	Depends on the affected IO module
601	System alarm flashing light: Fault	Alarm		Safety relay for the strobe light is defective.	Check relay and replace if necessary.	=CCy+SYSy-22K1
				Strobe light is defective.	Check strobe light and replace if necessary.	=CCy+SYSy-22H4
				Incorrectly wired.	Check wiring and correct if necessary.	=CCy+SYSy/22
611	System alarm flashing light: Power supply: Fault	Alarm		Glass fuse in power supply to strobe defective.	Replace fuse.	=CCy+SYSy-22F4

Message number	Message	Message type	Diagnostics	Cause	Corrective action	Reference wiring diagram
				Power supply not ok.	Check the power supply (see message numbers 101,102 and 103).	
602	System alarm siren: Fault	Alarm		Safety relay for the siren is defective.	Check relay and replace if necessary.	=CCy+SYSy-23K1
				Siren is defective.	Check siren and replace if necessary.	=CCy+SYSy-23H4
				Incorrectly wired.	Check wiring and correct if necessary.	=CCy+SYSy/23
612	System alarm siren: Power supply: Fault	Alarm		Glass fuse in power supply to siren defective.	Replace fuse.	=CCy+SYSy-23F4
				Power supply not ok.	Check the power supply (see message numbers 101,102 and 103).	
603	System alarm relay: Fault	Warning		Safety relay defective.	Check relay and replace if necessary.	=CCy+SYSy-21K1
				Incorrectly wired.	Check wiring and correct if necessary.	=CCy+SYSy/21
701	Proof test: Validity time expired	Warning		Validity time of at least one function has expired.	Perform proof test for the corresponding function.	
702	Proof test: Running	Information		Automatic proof test is active.	Wait until automatic proof test is finished.	
704	System alarm flashing light: Proof test failed	Warning	Strobe light active during proof test.	Strobe light is defective.	Check strobe light and replace if necessary.	=CCy+SYSy-22H4
				Strobe light signaling relay wired incorrectly.	Check wiring and correct if necessary.	=CCy+SYSy/22
			Strobe light not responding during proof test.	Strobe light is defective.	Check strobe light and replace if necessary.	=CCy+SYSy-22H4
				Strobe light wired incorrectly.	Check wiring and correct if necessary.	=CCy+SYSy/22
705	System alarm siren: Proof test failed	Warning	Siren active during proof test.	Siren is defective.	Check siren and replace if necessary.	=CCy+SYSy-23H4
				Siren signaling relay wired incorrectly.	Check wiring and correct if necessary.	=CCy+SYSy/23
			Siren not responding during proof test.	Siren is defective.	Check siren and replace if necessary.	=CCy+SYSy-23H4
				Siren wired incorrectly.	Check wiring and correct if necessary.	=CCy+SYSy/23
706	System alarm relay: Proof test failed	Warning		Safety relay defective.	Check safety relay and replace if necessary.	=CCy+SYSy-21K1
				Safety relay wired incorrectly.	Check wiring and correct if necessary.	=CCy+SYSy/21
xxx001 [5]	Tank xxx [5]: Proof test failed	Warning		At least one function in this tank failed the proof test.	Check components and then perform proof test again.	
xxx002 [5]	Tank xxx [5]: Continuous level: Broken wire	Warning		Faulty sensor.	Check sensor and replace if necessary.	=CCy+TKxxx
				Wiring failure.	Check wiring and correct if necessary.	

Message number	Message	Message type	Diagnostics	Cause	Corrective action	Reference wiring diagram
				IO module is defective.	Check the IO module. See message number 311 in this table.	Depends on the affected IO module
xxx110 [5]	Tank xxx [5]: HH-level	Alarm/ Warning [6]		Level in this tank too high.	Drain product until product drops below limit level	=CCy+TKxxx/11 [5]
				Faulty sensor.	Check sensor and replace if necessary	
				Incorrectly wired.	Check wiring and correct if necessary	
xxx120 [5]	Tank xxx [5]: HH-level device: Fault	Warning		Faulty sensor.	Check sensor and replace if necessary.	=CCy+TKxxx/11 [5]
xxx130 [5]	Tank xxx [5]: HH-level relay: Fault	Alarm		Safety relay defective.	Check relay and replace if necessary.	=CCy+TKxxx/21 [5]
				Incorrectly wired.	Check wiring and correct if necessary.	
xxx210 [5]	Tank xxx [5]: H-level	Alarm/ Warning [6]		Level in this tank too high.	Drain product until product drops below limit level	=CCy+TKxxx/12 [5]
				Faulty sensor.	Check sensor and replace if necessary	
				Incorrectly wired.	Check wiring and correct if necessary	
xxx220 [5]	Tank xxx [5]: H-level device: Fault	Warning		Faulty sensor.	Check sensor and replace if necessary.	=CCy+TKxxx/12 [5]
xxx230 [5]	Tank xxx [5]: H-level relay: Fault	Alarm		Safety relay defective.	Check relay and replace if necessary.	=CCy+TKxxx/22 [5]
				Incorrectly wired.	Check wiring and correct if necessary.	
xxx310 [5]	Tank xxx [5]: L-level	Alarm/ Warning [6]		Level in this tank too low.	Fill tank until product exceeds limit level.	=CCy+TKxxx/13 [5]
				Faulty sensor.	Check sensor and replace if necessary.	
				Incorrectly wired.	Check wiring and correct if necessary.	
xxx320 [5]	Tank xxx [5]: L-level device: Fault	Warning		Faulty sensor.	Check sensor and replace if necessary.	=CCy+TKxxx/13 [5]
xxx330 [5]	Tank xxx [5]: L-level relay: Fault	Alarm		Safety relay defective.	Check relay and replace if necessary.	=CCy+TKxxx/23 [5]
				Incorrectly wired.	Check wiring and correct if necessary.	
xxx410	Tank xxx [5]: LL-level	Alarm/ Warning [6]		Level in this tank too low.	Fill tank until product exceeds limit level.	=CCy+TKxxx/14 [5]
				Faulty sensor.	Check sensor and replace if necessary.	
				Incorrectly wired.	Check wiring and correct if necessary.	
xxx420 [5]	Tank xxx [5]: LL-level device: Fault	Warning		Faulty sensor.	Check sensor and replace if necessary.	=CCy+TKxxx/14 [5]
xxx430 [5]	Tank xxx [5]: LL-level relay: Fault	Alarm		Safety relay defective.	Check relay and replace if necessary.	=CCy+TKxxx/24 [5]
				Incorrectly wired.	Check wiring and correct if necessary.	

Message number	Message	Message type	Diagnostics	Cause	Corrective action	Reference wiring diagram
xxx510 [5]	Tank xxx [5]: Leak	Alarm/ Warning [6]		Leak detected.	Fix leak and pump out leaked product properly.	=CCy+TKxxx/15 [5]
				Faulty sensor.	Check sensor and replace if necessary.	
				Incorrectly wired.	Check wiring and correct if necessary.	
xxx520 [5]	Tank xxx [5]: Leak device: Fault	Warning		Faulty sensor.	Check sensor and replace if necessary.	=CCy+TKxxx/15 [5]
xxx530 [5]	Tank xxx [5]: Leak relay: Fault	Alarm		Safety relay defective.	Check relay and replace if necessary.	=CCy+TKxxx/25 [5]
				Incorrectly wired.	Check wiring and correct if necessary.	

1) CCy corresponds to the relevant control cabinet (e.g. CC1 = control cabinet 1)
2) PSy corresponds to the relevant power supply unit (e.g. PS1 = power supply of control cabinet 1)
3) OPy corresponds to the relevant operating panel (e.g. OP1 = operating panel 1)
4) IOy corresponds to the relevant remote IO node (e.g. IO1 = remote IO node 1)
5) xxx corresponds to the specific tank number
6) Depending on the system configuration

10.3 Firmware

Version	Description	Comments
1.00.xx	First version	–
As of 1.00.01	Bug fix version	–

11 Maintenance

DANGER

Risk of electric shock from faulty cables and components!
Faulty cables and components can cause an electric shock and life-threatening injuries.
- ▶ Check cables and components regularly.

CAUTION

Faulty power supply, battery and/or components!
Risk of burns from touching faulty parts such as power supply, battery and components.
- ▶ Check power supply, battery and components regularly.

In addition to regular automated proof-tests, visual inspections of the components must also be performed regularly. Endress+Hauser also offers its customers Maintenance Agreements or Service Level Agreements for this. For more information, see the next section.

11.1 Endress+Hauser services

Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service, system tests or device tests. Your Endress+Hauser Sales Center can provide detailed information on the services.

12 Repairs

12.1 General notes

DANGER

Electrical voltage!

Severe or life-threatening injuries!

- ▶ Electrical work may only be performed by electrical technicians.
- ▶ The electrical connection must be performed when the device is de-energized. Make sure the device is de-energized.
- ▶ Connect the protective ground.

DANGER

Risk of electric shock from faulty cables and components!

Faulty cables and components can cause an electric shock and life-threatening injuries.

- ▶ Check cables and components regularly.
- ▶ Avoid moisture on the cabinet interior.

DANGER

Damaged battery connection cable!

Risk of fatal injury from electric shock.

- ▶ When closing the front cover for the battery, do not pinch or damage the insulation of the battery connection cable.

CAUTION

Leaking battery fluid!

Leaking battery fluid can cause skin lesions and poisoning.

- ▶ Avoid contact with leaking battery fluid.
- ▶ Do not inhale battery fluid vapors.
- ▶ Replace faulty batteries immediately.

- Observe the following:
- Standard components can be replaced with identical components.
- Only use original spare parts.
- Observe local and national laws and regulations.
- Document all repairs and enter them in the W@M Lifecycle Management database.
- Repairs may only be performed by Endress+Hauser staff or by individuals authorized and trained by Endress+Hauser.
- Check the function after repair. Repeat the proof tests.

Device repairs must always be carried out by Endress+Hauser only. Safety functions cannot be guaranteed if repairs are carried out by another party.

In the event of failure of a SIL-labeled Endress+Hauser device, which has been operated in a protective system, the **Declaration of Hazardous Material and Decontamination** with the corresponding note **Used as SIL device in protective system** must be enclosed when the defective device is returned.

We recommend you conclude a Service Level Agreement. For more information, please contact your Endress+Hauser Sales Center.

12.2 Spare parts

Please contact your Endress+Hauser Sales Center at: www.addresses.endress.com

12.3 Endress+Hauser services

Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service, system tests or device tests. Your Endress+Hauser Sales Center can provide detailed information on the services.

12.4 Disposal

⚠ WARNING

Danger to persons and environment from fluids that are hazardous to health.
Make sure that the measuring device and all cavities are free from fluid residue that is harmful to health or the environment.

- ▶ Observe valid federal/national regulations.
- ▶ Ensure proper separation and reuse of the system components.

13 Technical data

For detailed information on the "technical data": see the Technical Information → 10

www.addresses.endress.com

For more Endress+Hauser product please visit: www.ainstru.com
Mail: Sales@ainstru.com

Endress+Hauser
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