

UM-X

Field display for continuous level sensors



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1 Features of the UM-X measurement analysis system

The UM-X measurement analysis system is a standalone display for continuous filling level sensors. It is powered directly by the mains voltage and provides the power supply for the filling level sensor at the same time. The filling level can be displayed as analogue and digital on the graphic display.

The UM-X measurement analysis system also provides five potential-free change over contacts. The switching points of the five relays are adjusted via the display using 4 buttons and the statuses of the relays can be checked using the display.

The UM-X measurement analysis system

- can be used for all filling level sensors with a 4-20 mA interface.
- can be supplied with ATEX approval (intrinsically safe electric circuit).
- can be supplied as approved overfill prevention.
- shows the filling level as digital and analogue display.
- has five potential-free change over contacts as binary outputs.
- provides simple, menu-driven operation using a graphical display.
- is installed in splash-proof case.

There are 4 equipment versions of the UM-X measurement analysis system:

UM-S

Standard version: Measurement analysis with 5 relay outputs and connection of a continuous filling level sensor and an external acknowledgement button.

UM-O

Measurement analysis with 5 relay outputs and connection of a continuous filling level sensor and an external acknowledgement button.

Also approved in accordance with German law as overfill prevention.

UM-Ex

Measurement analysis with 5 relay outputs and connection of a continuous filling level sensor and an external acknowledgement button.

Also approved for the connection of an explosion protected sensor (intrinsically safe sensor circuit).

UM-O Ex

Measurement analysis with 5 relay outputs and connection of a continuous filling level sensor and an external acknowledgement button.

Also approved in accordance with German law as overfill prevention and for the connection of an explosion protected sensor (intrinsically safe sensor circuit).

2 Safety instructions

The UM-X measurement analysis system is used as a standalone filling level display for continuous filling level sensors. Please only use the system for this purpose. The manufacturer accepts no liability for any damage resulting from other uses!

The UM-X measurement analysis system has been developed, manufactured and inspected in accordance with state-of-the-art technology and with recognised technical safety rules and regulations. Nevertheless, hazards may arise from its use. Therefore, please observe the following safety instructions:

- Do not make any changes, add anything to or rebuild the system without obtaining the manufacturer's permission first.
- All installation and maintenance work, with the exception of the function test, must only be carried out when the power supply is disconnected.
- The measuring transducer must be installed outside a potentially explosive zone.
- Installation, operation, and maintenance of the UM-X measurement analysis system must only be performed by competent personnel. Specialised knowledge must be obtained by undergoing regular training.
- Operators, setting up and maintenance personnel must observe all the applicable safety regulations. This also applies to the local safety and accident prevention regulations not mentioned in these operating instructions.

The safety instructions in this manual are identified as follows:



If you do not observe these safety instructions, there is a risk of an accident or the measurement analysis system can be damaged.



Useful information that will guarantee proper function of the system or facilitate your work.

2.1 Password



You need a password for some menu items in order to be able to launch the items or make changes.



The password will be provided on an accompanying sheet and must only be used by instructed persons.

3 Design and operation

3.1 Rating plate

Among other things, the rating plate contains information about the version of your measurement analysis system:

- Device type UM-S, UM-O, UM-Ex or UM-O Ex.
- Approval mark.

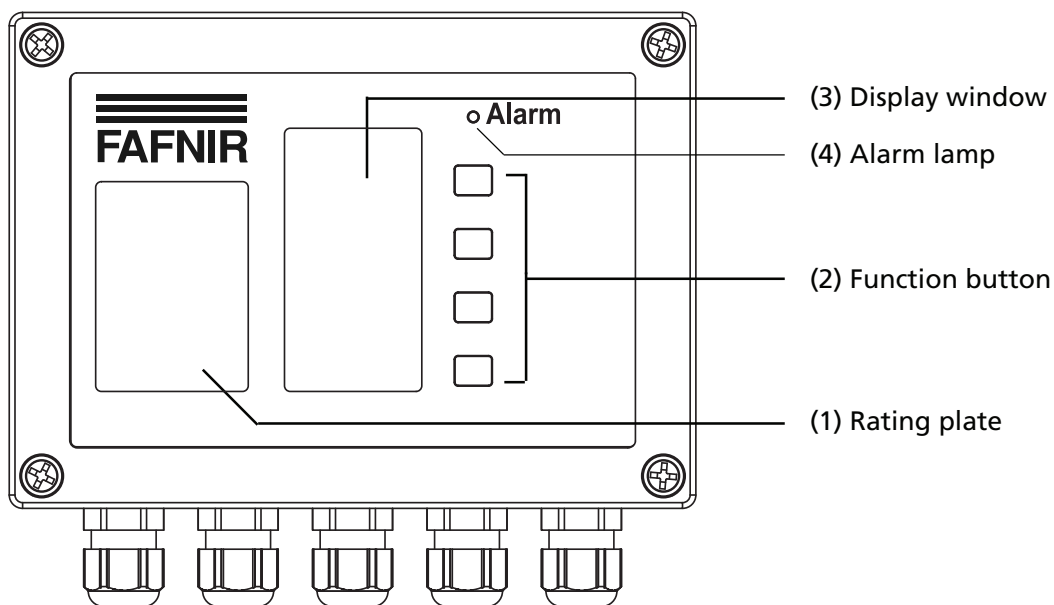


Fig. 1: Layout of the UM-X measurement analysis system, view from above

3.2 Function buttons

You navigate through the menu structure shown on the display and change parameters in the settings menus using the four function buttons.

The functions of the buttons are shown in the function button field of the display and change partially in the individual menus (see Chapter 6 "Operation" Section 6.1, "Layout of the display").

3.3 Display window

The display is used for showing the filling level information and for setting the parameters for the measurement analysis.

3.4 Alarm lamp

The measuring transducer is equipped with a red "Alarm" light emitting diode (LED) for displaying alarms and system faults.

The red LED signals the exceeding or dropping below the alarm thresholds set using the software and the occurrence of faults (see the "Alarms" Chapter).

3.5 Buzzer

The buzzer is used for the acoustic alarm signal. The alarm tone is interrupted as soon as the acknowledgement button has been pressed, the reason for the alarm has been cancelled or the fault has been rectified. The buzzer volume cannot be adjusted.

4 Installation



Installation must only be performed by competent personnel observing all the applicable safety regulations. This also applies to any local safety regulations and accident prevention regulations not mentioned in these operating instructions.

4.1 Assembly and connections

The UM-X measurement analysis system is intended for wall mounting. It can only be mounted and connected while it is open:

- Undo the four cover screws.
- Carefully remove the cover. It is still connected to the printed circuit board with two ribbon cables.
- Unplug the connectors in order to be able to completely remove the cover.
- Now you can mount the measurement analysis system.



The measurement analysis system must be installed outside the potentially explosive area. Sensors for the potentially explosive atmosphere can be connected to the UM-Ex and UM-O Ex devices.

- Connect the cables for the auxiliary power and the filling level sensor to the measurement analysis system after it has been mounted. An external acknowledgement button and external control units can optionally be connected.

See Section 4.2 "Pin assignment" in this Chapter.

Close the measurement analysis system again after mounting and connection of all electrical cables.

- First, plug the wide ribbon cable back into its holder which has reverse polarity protection.
- Now, connect the narrow ribbon cable back to the membrane keypad. Pay particular attention here to the correct seating of the socket as this does not have reverse polarity protection.
- Close the measurement analysis system using the four cover screws.

4.2 Pin assignment



Wiring work must only be performed when the equipment is disconnected from the power supply. The special VDE regulations and the local installation regulations must be observed.



In doing so observe the maximum values for operating parameters indicated on the wiring diagram.

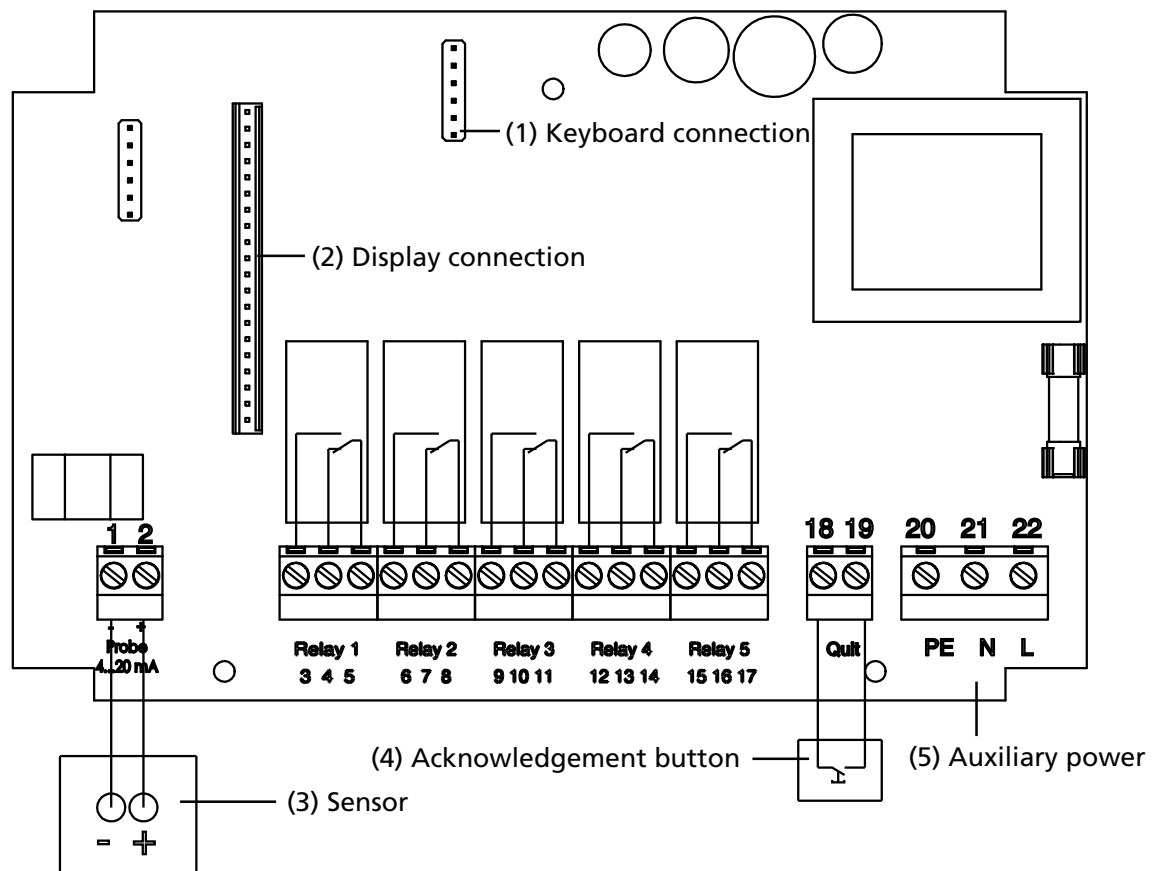


Fig. 2: Measurement analyser UM-X: Pin assignment

Sensor connection

The sensor is connected to the terminals 1 (-) and 2 (+).

Output circuits

The relays K1 to K5 (terminals 3 to 17) are used for limit monitoring. There are 5 potential-free change-over contacts available here.



Special features of the UM-O and UM-O Ex equipment versions:

- *Overflow prevention relay cannot be acknowledged:
Relay K1 (terminals 3, 4 and 5)*
- *Overflow prevention relay can be acknowledged:
Relay K2 (terminals 6, 7 and 8).*

Auxiliary power

The auxiliary power is connected to the terminals PE, N and L of the printed circuit board. For the 24 V DC version, + must be connected to L and - to N.

External acknowledgement button

It is possible to use an external acknowledgement button (potential-free normally open contact). This is connected to the Quit terminals (18 and 19).



CAUTION! MAINS VOLTAGE!

5 Commissioning

The measurement analysis system is supplied with factory settings (default) and must be adapted to the local conditions.



Detailed information about configuration of the measurement analysis system can be found in Chapter 6 "Operation".



The values for the factory settings are listed in Chapter 9 "Menu structure with factory settings".

Proceed as follows for commissioning the system:

1. Install the UM-X measurement analysis system in its designated place and install the filling level sensor in the tank.
2. Connect at least the auxiliary power and the sensor.
3. Pay attention during assembly that the ribbon cables from the display and from the membrane keypad are plugged in correctly before closing the measurement analysis system.
4. Now switch on the auxiliary power.
5. Adjust the 4 mA point (bottom) and the 20 mA point (top, tank height) on the filling level sensor.
6. Now go to the measurement analysis menu. Select the item "Height" and set the tank height.
7. If the 4 mA point is not at the height of the tank bottom, set the correct height in the "Offset" menu.

8. If the 20 mA point does not correspond to the tank height,
- fill your tank as full as possible (the 20 mA point must be above the tank height!),
 - measure the level with a dipstick
 - and enter the value in the "Span - Change" menu item.



The 20 mA point must not be less than tank height.

For the UM-O and UM-O Ex equipment versions (overflow prevention), the 20 mA point must correspond to the height of the tank.

9. Now you can set the relay switching points.



It can happen that a switching point is less than 4 mA or more than 20mA by changing the offset or the span factor. If this happens, the relays do not switch as desired and malfunctions can occur.

Check the current values in the menu items "Relays -> K1...K5 -> S-P On and S-P Off". If the current values are outside the desired range, "< 4.00 mA" or "> 20.00 mA" will be displayed under the milliamper unit.

6 Operation

The "Information" display is shown for 5 seconds after switching on the measurement analysis system. The display changes automatically afterwards to the "bar graph" filling level display.

An overview of the menu structure and the factory default values in tabular form can be found in Chapter 9 "Menu structure with factory settings".



Fig. 3:
The "Information" display is shown for 5 seconds after switching on the measurement analysis system

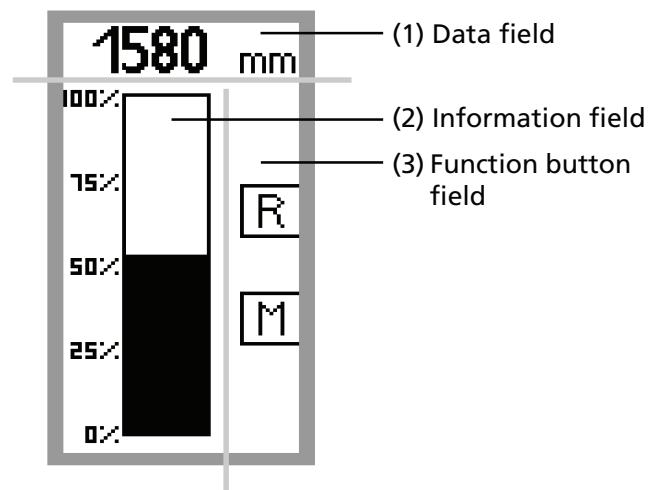


Fig. 4:
Layout of the display "Bar graph" display

6.1 Layout of the display

The display is divided into 3 areas (see Fig. 4):

Data field (1)

The current filling level is displayed digitally on the top line.

Information field (2)

The information field has three functions:

- Display of information.
- Navigation using selection menus:
You navigate through the menu structure using the buttons.
- Changing parameters in settings menus:
You make the changes using the buttons.

Function button field (3)

The right-hand column of the display is used as the function button field. The functions of the adjacent buttons are displayed here. The functions are matched to the respective menu options.

6.2 Bar graph display (analogue filling level display)

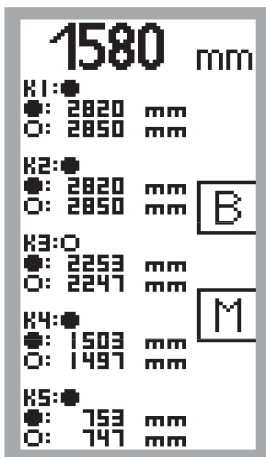
The column graphically represents the filling level. The scaling is made in percent and cannot be changed. The filling level is also displayed digitally in the data field.

You have two navigation options in the bar graph view:

Symbol [R] - displays the status of all relays.

Symbol [M] - goes to the main menu.

6.3 Relay status display



The "relay status" display gives an overview of the current status of all relays:

- a solid dot stands for the status "On Relay".
- an empty dot stands for the status "Off Relay".

At the same time, you have an overview of the relay switching points which you set in the menu items "S-P On" and "S-P Off".

The symbol

[B] - goes to the bar graph.

[M] - goes to the main menu.

Fig. 5:
"Relay status"
display

6.4 Main menu

The main menu is invoked from the "bar graph" or "relay status" displays with the button next to the symbol [M].

You can select the following menu items:

- Relays - Selection menu for configuration of the relays.
- Unit - Setting the unit.
- Height - Setting the tank height.
- Offset - Setting the distance from the tank bottom to the 4 mA point of the filling level sensor.
- Span - Selection menu for adjusting sensors, e.g. pressure sensors.
- Test - Selection menu for manual control of the relays.
- Reset - Selection menu, reset all values to the factory settings.
- Information - Display of the device information

If you are in a selection or settings menu and do not make any entries for 3 minutes, the display automatically returns to the last display - bar graph or relay status. Parameter changes which have not been confirmed are discarded.

6.4.1 Navigation

There are four functions available for scrolling in the various menu items, for invoking the selected menu item and for saving changed parameters.

Cursor UP [↑] and DOWN [↓]

The cursor is moved through the displayed selection menu using the UP and DOWN functions. You select a menu item in this way.

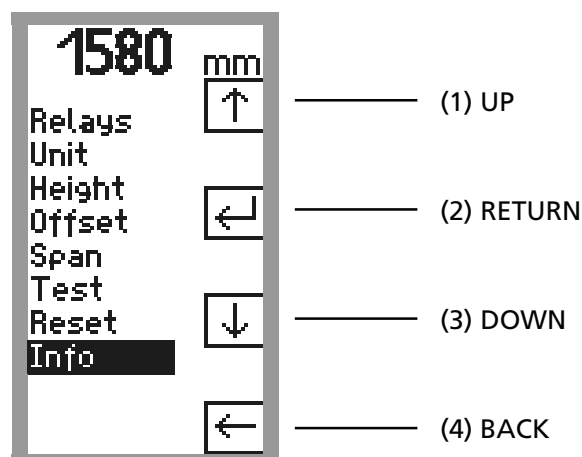


Fig. 6: Main menu and navigation functions



RETURN [↵]

The symbol RETURN has two functions:

- "Select" in the selection menu

You confirm your selection with RETURN in the menu selection and invoke the next selection menu or a settings menu.

- "Confirm, save and return" in the settings menu

If you have changed parameters in a settings menu, you confirm and save your entries using RETURN. After saving, the menu selection one level higher is automatically shown on the display.

BACK [←]

The symbol BACK has two functions:

- "Back without selecting" in the selection menu

Using BACK, you return one level higher in the menu selection.

- "Back without saving" in the settings menu

If you have changed parameters in a settings menu, you can exit from the menu item without saving the new settings using BACK.

6.5 Relays selection menu

The "Relays" menu item opens a selection menu where you can select a relay (K1 to K5) using the UP [↑] and DOWN [↓] functions. Confirm your selection with RETURN [↵].



The relays K1 and K2 can only be selected and configured together for the UM-O and UM-O Ex (overflow prevention) equipment versions.

6.5.1 K1 to K5 selection menu

A submenu with the setting options opens for the selected relay.

- S-P On - Switching Point On
- S-P Off - Switching Point Off
- On Delay
- Off Delay
- Alarm - Configuration of the alarm

Select a menu item with the UP [↑] and DOWN [↓] keys and confirm your selection with RETURN [↵].

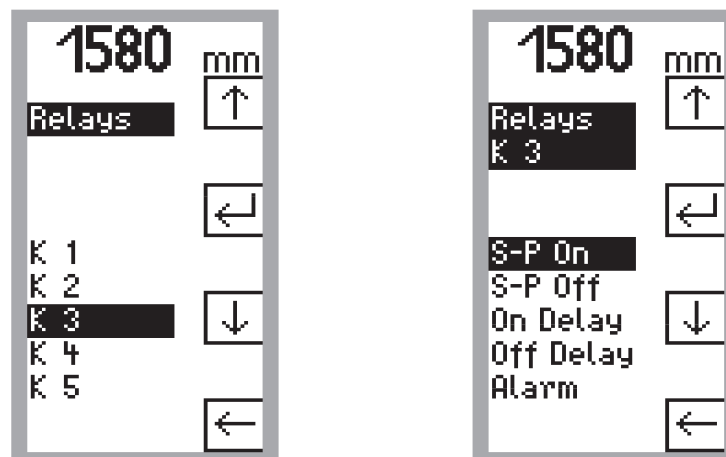
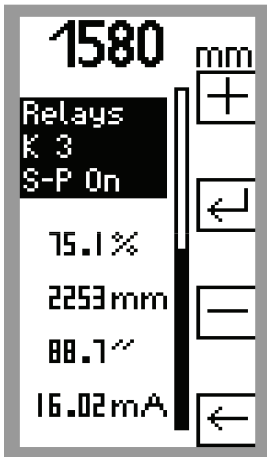


Fig. 7: Menu guidance: Selecting relays

6.5.2 Settings menu S-P On (switching-on point)



The "S-P On" (Switching Point On) menu shows you the value at which the relay is activated.

The switching-on point is specified in percent in steps of 0.1 percent. The millimetre, inch and milliampere units are calculated and displayed for information and control.

Using the functions

[+] PLUS and

[-] MINUS

you specify the switching-on point. Confirm your selection with RETURN [↵] .

Fig. 8:
"S-P On" display



The current value must not be less than 4 mA and must not be more than 20 mA so that malfunctions do not occur.

The following information applies only to relays K1 and K2:



For the UM-O and UM-O Ex equipment versions (overflow prevention), you need a password for changing the switching-on point.

The range of values for these versions is between 0.1 and 98.9 percent. The switching-on point (S-P On) is always less than the switching point Off (S-P Off) and can never exceed this.

6.5.3 Settings menu S-P Off (switching-off point)

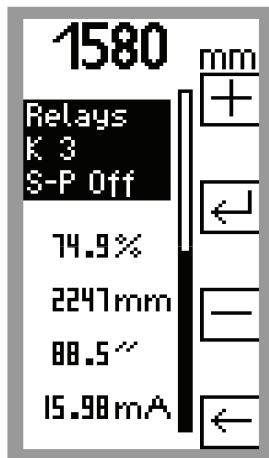


Fig. 9:
"S-P Off" display

The "S-P Off" (Switching Point Off) menu shows you the value at which the relay is deactivated.

The switching-off point is specified in percent in steps of 0.1 percent. The range of values is 0.1 to 99.9 percent. The millimetre, inch and milliampere units are calculated and displayed for information.

Using the functions

[+] PLUS and

[-] MINUS

you specify the switching-off point. Confirm your selection with RETURN [↵].



The current value must not be less than 4 mA and must not be more than 20 mA so that malfunctions do not occur.

The following information applies only to relays K1 and K2:



For the UM-O and UM-O Ex equipment versions (overflow prevention), you need a password for changing the switching-off point.

The range of values for these versions is between 0.1 and 99.0 percent. The switching-off point (S-P Off) is always higher than the switching-on point (S-P On) and can never be lower than this.

6.5.4 Settings menu On Delay

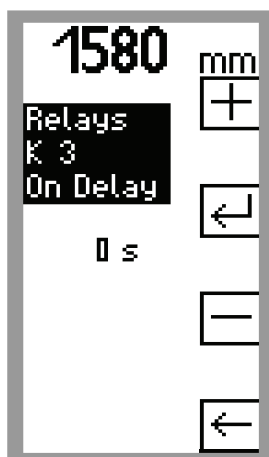


Fig. 10:
"On Delay" display

You define the 'On Delay' of a relay in the "On Delay" settings menu.

The delay time can be between 0 and 255 seconds and is specified in 1-second steps.

Using the functions

[+] PLUS and

[-] MINUS,

you enter the value. Confirm your selection with RETURN [↵].

6.5.5 Settings menu Off Delay

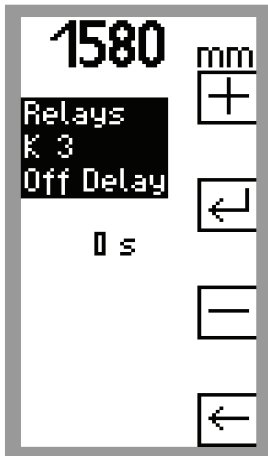


Fig. 11:
"Off Delay" display

You define the 'Off Delay' of a relay in the "Off Delay" settings menu.

The delay time can be between 0 and 255 seconds and is specified in 1-second steps.

Using the functions

[+] PLUS and

[-] MINUS,

you enter the value. Confirm your selection with RETURN [↵].



For the UM-O and UM-O Ex equipment versions (overflow prevention), the Off Delay is always 0 seconds and cannot be changed.

6.5.6 Settings menu Alarm

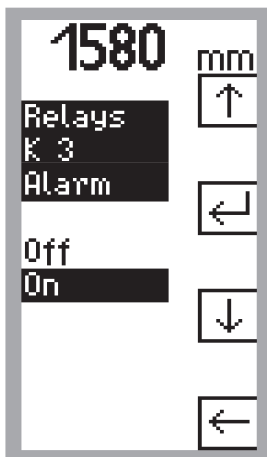


Fig. 12:
"Alarm" display

In the "Alarm" settings menu you set the relay alarm with the functions

[↑] UP and

[↓] DOWN

to the values

Off - for OFF or

On - for ON.

Confirm your selection with RETURN [↵].

See also Chapter 7 "Alarms".



For the UM-O and UM-O Ex equipment versions (overflow prevention), the alarm for K1/K2 is always set and cannot be changed to "Off".

6.6 Settings menu Unit

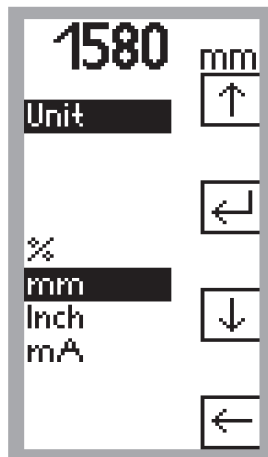


Fig. 13:
"Unit" display

When the "Unit" settings menu is invoked, the cursor is automatically placed on the currently set unit. You navigate through the units with the UP [↑] and DOWN [↓] keys

% - Percent.

mm - Millimetres

Inch - Inches (unit information on the display with "" ").

mA - Milliampères.

Confirm your selection with RETURN [↵] .

The values in the data field and the values in the "relay status" display are shown in the selected unit.

6.7 Settings menu Height

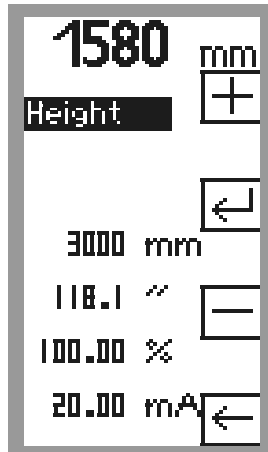


Fig. 14:
"Height" display

You enter the tank height in the "Height" settings menu.

The height can be up to 25,000 mm and is specified in steps of 1 millimetre. The inch, percentage and milliampere units are calculated and displayed for information.

Using the functions

[+] PLUS and

[-] MINUS,

you enter the value. Confirm your selection with RETURN [↵] .



You need a password to change the tank height for the UM-O and UM-O Ex equipment versions (overflow prevention).

The 20 mA point of the filling level sensor must be set to the tank height. If this is not possible, an adjustment can be made using the "Span" menu item.

6.8 Settings menu Offset (zero point offset)



The distance from the tank bottom to the 4 mA point is designated as "Offset".

The distance is specified in 1 millimetre steps. The inch, percentage and milliampere units are calculated and displayed for information.

Input the distance using

[+] PLUS and

[-] MINUS

and confirm your selection with RETURN [↵].

Fig. 15:
"Offset" display



It can happen that a switching point is less than 4 mA or more than 20 mA by changing the offset. If this happens, the relays do not switch as desired and malfunctions can occur.



Check the current values in the menu items "Relays -> K1...K5 -> S-P On and S-P Off". They must not be less than 4 mA and not more than 20 mA.

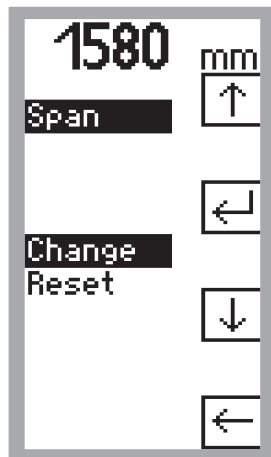
Example:

The tank height is set to 3,000 mm and the offset is set to 300 mm – corresponds to 10%. As the relay switching points are set in percent, these points can also be less than 10% and thus be less than 4 mA.



You need a password to change the tank height for the UM-O and UM-O Ex equipment versions (overflow prevention).

6.9 Selection menu Span (Adjustment)



If you use a sensor for the filling level measurement where the 20 mA point does not match the tank height (e.g. pressure sensors), make a sensor adjustment in the "Span" menu. You see a submenu with the two options

- Change and
- Reset.

Select a menu item with the UP [↑] and DOWN [↓] keys and confirm your selection with RETURN [↵] .

Fig. 16:
"Span" display



You need a password to change the tank height for the UM-O and UM-O Ex equipment versions (overflow prevention).

6.9.1 Settings menu Change

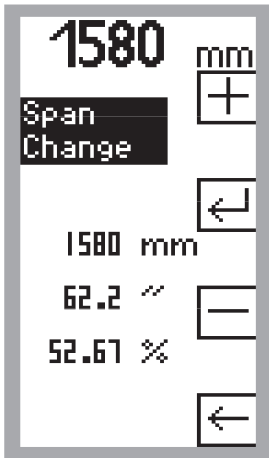


Fig. 17:
"Change" display

The "Change" settings menu displays the set filling level in millimetres, inches and as a percentage. Input the previously measured filling level using the

[+] PLUS and
[-] MINUS
keys.

The filling level is specified in 1 millimetre steps. The inch, percentage and milliampere units are calculated and displayed for information.

The adjustment can only be made during operation. The tank must be filled and the correct tank height must have been entered so that the deviations remain small. Detailed instructions can be found in Chapter 5 "Commissioning".



It can happen that a switching point is less than 4 mA or more than 20 mA by changing the span factor. If this happens, the relays do not switch as desired and malfunctions can occur.



Check the current values in the menu items "Relays -> K1...K5 -> S-P On and S-P Off". They must not be less than 4 mA and not more than 20 mA.

6.9.2 Settings menu Reset

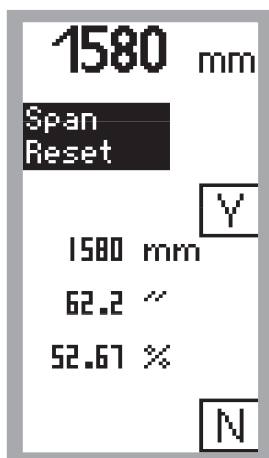


Fig. 18:
"Reset" display

With "Reset", you reset the correction factor for the sensor adjustment back to the delivered condition. Select the symbol

[Y] - for "Yes, reset" and
[N] - for "No, do not reset".

6.10 Selection menu Test

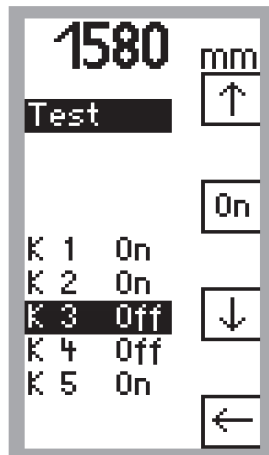


Fig. 19:
"Test" display

You receive an overview of the five relays K1 to K5 in the "Test" menu item. The "On" or "Off" status displayed next to each relay, shows whether it is activated (On) or not (Off).

Selecting relays

You select a relay using the UP [↑] and DOWN [↓] functions.

Switching relays on or off

Depending on the test status of a relay, one of the following symbols is displayed between the UP [↑] and DOWN [↓] symbols:

[On] - for "On Relay" or

[Off] - for "Off Relay",

A manually switched relay switches to the current operating status as soon as you select a different relay or after quitting the "Test" menu item.

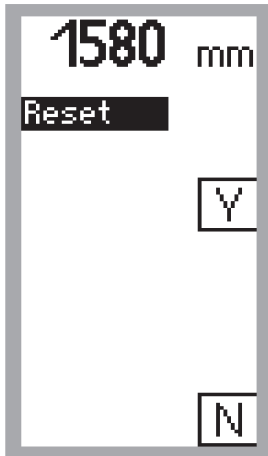


Exceptions:

For the UM-O and UM-O Ex equipment versions (overflow prevention), a test for the relay K1 or K2 cannot be performed if K1 is deactivated (relay alarm).

In the case of an error (see Chapter 7 "Alarms" Section 2 "Error"), all relays drop out automatically. A test cannot be performed again until the error has been rectified.

6.11 Selection menu Reset



With "Reset", you reset all values to the factory settings. Select the function

[Y] - for "Yes, reset" and

[N] - for "No, do not reset".



You need a password in order to be able to invoke this menu item!

Fig. 20:
"Reset" display

6.12 Information display



Under this menu item, you obtain information about

- the equipment version,
- contact data of the manufacturer, FAFNIR, and the
- measurement analysis software version.

You return to the main menu by pressing one of the four buttons.

Fig. 21:
"Information"
display

7 Alarms

7.1 Relay alarm

A relay alarm is violation of an upper or lower limit specified by you. If a relay is deactivated and the alarm for this relay has been set, an alarm is triggered.

During an alarm, the LED flashes at regular intervals (1 second on, 1 second off) and the buzzer sounds. The symbol [Q] appears on the display next to the bottom button. You acknowledge the alarm here.

If you acknowledge the alarm, the buzzer switches off and the LED lights permanently. The [Q] symbol is now displayed in reverse video. The LED stops lighting and the reverse video [Q] symbol is no longer displayed until after the reason for the alarm has been eliminated.

7.2 Error

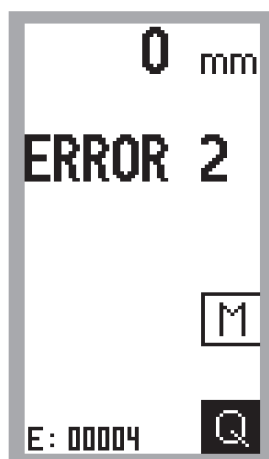


Fig. 22:
"Error" display, error
code 2: Interruption

In the case of an error, the LED flashes periodically (0.1 seconds on, 0.9 seconds off), the buzzer sounds and the error code is shown on the display.

All relays are automatically deactivated in the event of an error and the [Q] symbol is visible next to the bottom button. You acknowledge the alarm here.

The buzzer stops after the acknowledgement, but the LED continues to flash until the error has been rectified.

The device is not accepted as fault-free until the error has been rectified and no other errors occur for 10 seconds. The error code "ERROR 0" is displayed in the meantime.

Afterwards, the display returns to the bar graph or relay status display – depending on which display you had invoked last.

7.2.1 Meaning of the error codes

These errors can occur:

ERROR 1: Residual current from the filling level sensor (3.6 mA or 21.5 mA).

ERROR 2: Interruption in the sensor circuit, e.g. cable break.

ERROR 3: Short-circuit in the sensor circuit.

ERROR 4: Internal device error.

ERROR 0: Status between error resolution and 10 seconds without errors.

8 Technical data

| | |
|--|--|
| Ambient temperature | 0 °C ... +50 °C |
| Protection class | IP64 |
| Dimensions | 180 mm × 130 mm × 52 mm |
| Auxiliary power | 230 V _{AC} ; 50 – 60 Hz; ±10 %; 7.5 VA; or 24 V _{AC} ; 50 – 60 Hz; ±10 %; 7.5 VA; or 24 V _{DC} ; ±20 %; 4.7 W |
| Sensor circuit | 4 to 20 mA |
| Voltage | U ₀ ≤ 28.4 V |
| Current | I ₀ ≤ 32 mA |
| Output | Five relays, each with a potential-free, change-over contact |
| Alternating voltage | U _{eff} ≤ 250 V; I _{eff} ≤ 5 A; P _{eff} ≤ 500 VA; cos φ ≥ 0.7 |
| Direct voltage | U ≤ 250 V; I ≤ 0.25 A; P ≤ 50 W |
| External acknowledgement button | Potential-free normally open contact connected to mains voltage |

9 Menu structure with the factory settings

| Start displays | Main menu | Level 2 | Level 3 | Possible values | Factory setting |
|--------------------------------|-----------|---|---|--|---------------------------------------|
| Bar graph view Relay status | | | | | |
| | Relays | K1 | S-P On S-P Off On Delay Off Delay Alarm | 0,1 ... 99.9 % 0.1 ... 99.9 % 0 ... 255 s 0 ... 255 s On / Off | 94.0 % 95.0 % 0 s 0 s On |
| | | K2 | S-P On S-P Off On Delay Off Delay Alarm | 0.1 ... 99.9 % 0.1 ... 99.9 % 0 ... 255 s 0 ... 255 s On / Off | 94.0 % 95.0 % 0 s 0 s Off |
| | | K1/K2 K1/K2 are switched together for UM-O and UM-O Ex | | | |
| | | | S-P On {Password} < S-P Off | 0.1 ... 98.9 % & {Password} < S-P Off | 94.0 % |
| | | | S-P Off {Password} > S-P On | 0.2 ... 99.0 % & {Password} > S-P On | 95.0 % |
| | | | On Delay Off Delay Alarm | 0 ... 255 s 0 s On | 0 s 0 s On |
| | | K3 | S-P On S-P Off On Delay Off Delay Alarm | 0.1 ... 99.9 % 0.1 ... 99.9 % 0 ... 255 s 0 ... 255 s On / Off | 75.1 % 74.9 % 0 s 0 s Off |
| | | K4 | S-P On S-P Off On Delay Off Delay Alarm | 0.1 ... 99.9 % 0.1 ... 99.9 % 0 ... 255 s 0 ... 255 s On / Off | 50.1 % 49.9 % 0 s 0 s Off |
| | | K5 | S-P On S-P Off On Delay Off Delay Alarm | 0.1 ... 99.9 % 0,1 ... 99,9 % 0 ... 255 s 0 ... 255 s On / Off | 25.1 % 24,9 % 0 s 0 s Off |



| Start displays | Main menu | Level 2 | Level 3 | Possible values | Factory setting |
|----------------|---|-----------------------------|---------|---|--|
| | Unit | | | % mm Inch mA | <i>Default: mm</i> |
| | Height | | | 1 ... 25,000 mm 0 ... 984.3 " 100.00 % | <i>3,000 mm 118.1 " 100.00 %</i> |
| | A password is needed for UM-O and UM-O Ex. | | | | |
| | Offset | | | 0 ... {Height mm} mm 0 ... {Height " } " 0 ... 100,00 % | <i>0 mm 0,0 " 0,00 %</i> |
| | A password is needed for UM-O and UM-O Ex. | | | | |
| | Span | Change | | 0 ... {Height mm} mm 0 ... {Height " } " 0 ... 100.00 % | <i>1</i> |
| | | Reset | | Yes / No | |
| | A password is needed for UM-O and UM-O Ex. | | | | |
| | Test | for each relay K1 ... K5 | | On / Off | |
| | Reset | | | Yes / No | |
| | A password is needed for all UM-X versions. | | | | |
| | Information | | | | |

Appendix

1 EC-declaration of conformity

EG – Konformitätserklärung EC – Declaration of Conformity

In Übereinstimmung mit EN 45 014; 1998 - *In accordance with EN 45 014; 1998*

**FAFNIR GmbH
Bahrenfelder Str. 19
D 22765 Hamburg**

erklärt in eigener Verantwortlichkeit, daß das Produkt
declare under sole responsibility that the product

Messauswertung

Field Display

UM-X

in Übereinstimmung mit nachfolgenden Richtlinien:
in accordance with the following directives:

EMV-Richtlinie; *EMC Directive 89/336/EWG/EEC*
Ex-Richtlinie; *Ex Directive 94/9/EG/EC*

nach folgenden Vorschriften (Normen) entwickelt und gefertigt wurden:
has been designed and manufactured to the following specifications:

| | |
|---------------------------------|----------------------|
| EN 50 0111, Kl. B; 1998 +A1 +A2 | EN 61 000-4-4, 2005 |
| EN 50 14; 1997 +A1+A2 | EN 61 000-4-5; 2001 |
| EN 50 020; 2002 | EN 61 000-4-6; 2001 |
| EN 61 000-4-2; 2001 | EN 61 000-4-11; 2005 |
| EN 61 000-4-3; 2003 | |

Das Produkt entspricht der EG-Baumusterprüfbescheinigung
The above mentioned product is in conformity with EC-Type Examination Certificate

TÜV 07 ATEX 345770

Die Prüfung erfolgte durch die benannte Stelle Nr.: 0044
The inspection was carried out by the notified body No 0044

TÜV NORT Cert GmbH
Am TÜV 1
30519 Hannover
Germany

Hamburg, 20.03.2007

Ort, Datum / Place, Date



Geschäftsführer / Managing Director: S. Kunter

2 EC-type examination certificate

Translation

(1) **EC-Type Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 94/9/EC**

(3) **Certificate Number** TÜV 07 ATEX 345770

(4) for the equipment: Measurement analysis system type UM-... Ex


(5) of the manufacturer: FAFNIR GmbH

(6) Address: Bahrenfelder Str. 19
22765 Hamburg
Germany

Order number: 8000345770

Date of issue: 2007-02-26

- (7) This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (8) The TÜV NORD CERT GmbH, notified body No. 0044 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 07203345770.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 50 014:1997 +A1+A2 **EN 50 020:2002**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-type examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment or protective system must include the following:

 **II (1) G [EEx ia] IIC/IIB**

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, accredited by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the certification body



Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590



(13) **SCHEDULE**

(14) **EC-Type Examination Certificate No. TÜV 07 ATEX 345770**

(15) **Description of equipment**

The measurement analysis system UM-... Ex is used for the supply, display and limit value indication of level sensors equipped with a 4 to 20 mA interface.

The permissible ambient temperature range is 0 °C to +50 °C.

Electrical data

Auxiliary power circuit
(terminals 20, 21 and 22)

U = 230 V AC, ± 10 %, 50...60 Hz, approx. 7.5 VA or
U = 24 V AC, ± 10 %, 50...60 Hz, approx. 7.5 VA or
U = 24 V DC, ± 20 %, approx. 4.7 W
U_m = 253 V

Sensor circuit
(terminals 1 and 2)

in type of protection "intrinsic safety" EEx ia IIC
or EEx ia IIB

Maximum values: U_o = 28.4 V
I_o = 99.5 mA
R = 285 Ω
P_o = 705 mW

Characteristic: linear

C_i negligibly small
L_i negligibly small

The permissible maximum values for the outer inductance (L_o) and capacitance (C_o) must be looked up in the following table:

| | EEx ia IIC | | EEx ia IIB | |
|----------------|------------|--------|------------|--------|
| L _o | 0.68 mH | 0.2 mH | 2 mH | 0.2 mH |
| C _o | 59 nF | 83 nF | 290 nF | 570 nF |

Output circuit
(terminals 3 to 17)

U ≤ 250 V, I ≤ 5 A, P ≤ 500 VA, cos φ ≥ 0.7 or
U ≤ 250 V, I ≤ 0.25 A, P ≤ 50 W

The sensor circuit is safely galvanically separated from the auxiliary power circuit and output circuit up to an apex value of the voltage of 375 V.

(16) Test documents are listed in the test report No. 07203345770.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

Measurement analysis system UM-... Ex

Mode of operation

The UM-... Ex measurement analysis system is used for the power supply, display and limit monitoring of continuous filling level sensors with an interface of 4 to 20 mA. Alarms and faults are signalled visually using a light diode and on an LCD (liquid crystal display) and audibly using an installed buzzer. The audible alarm can be acknowledged using the external acknowledgement button or using the QUIT key on the membrane keypad. The optical alarm remains on until the cause of the alarm has been eliminated. External control units can be connected using potential-free, change-over contacts.

Installation

Connecting the auxiliary power, the filling level sensor, the (optional) acknowledgement button and the (optional) external control units must be carried out in accordance with the wiring diagram. The maximum values for the operating parameters mentioned on the wiring diagram must be observed.


Wiring work must only be performed when the equipment is disconnected from the power supply. The special VDE regulations and the local installation regulations must be observed.

Operating instructions

Before being put into service, all devices must be checked with respect to correct connection and proper operation. The electrical power supply, including the supply of the downstream devices, must be checked.

The general operating instructions for the devices being used must be observed. The measuring transducer is maintenance-free.

Technical data

| | | | | |
|---|--|---|---------------------------|----------|
| Manufacturer | FAFNIR GmbH, Hamburg | | | |
| Type designation | UM-Ex, UM-O Ex | | | |
| Auxiliary power | 230 V _{AC} ; 50 – 60 Hz; ±10 %; 7.5 VA; or 24 V _{AC} ; 50 – 60 Hz; ±10 %; 7.5 VA; or 24 V _{DC} ; ±20 %; 4.7 W | | | |
| Sensor circuit | 4 to 20 mA | | | |
| Voltage | U ₀ ≤28.4 V | | | |
| Current | I ₀ ≤99.5 mA | | | |
| Resistor | R ₀ ≥285 Ω | | | |
| Power input | P ₀ ≤705.0 mW | | | |
| Inductance (outward acting) | L _i negligible | | | |
| capacitance (outward acting) | C _i negligible | | | |
| | IIC | | IIB | |
| Outer inductance | L ₀ ≤0.68 mH | ≤0.2 mH | ≤2.0 mH | ≤0.2 mH |
| Outer capacitance | C ₀ ≤0.059 μF | ≤0.083 μF | ≤0.29 μF | ≤0.57 μF |
| Output | Five relays, each with a potential-free, change-over contact | | | |
| Alternating voltage | U _{eff} ≤250 V; I _{eff} ≤5 A; P _{eff} ≤500 VA; cos φ ≥ 0.7 | | | |
| Direct voltage | U ≤250 V; I ≤0.25 A; P 50 W | | | |
| Ambient temperature | 0 °C ... +50 °C | | | |
| Labelling | | | | |
| EC-type approval certificate number: | TÜV 07 ATEX 345770 | | | |
| according to EC-Directive 94/9: | CE 0044 |  | II (1) G [EEx ia] IIC/IIB | |