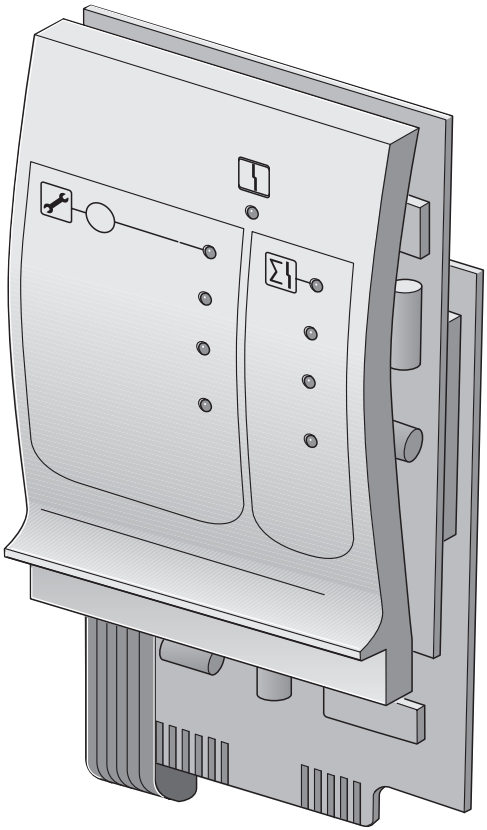
Service instructions

FM 448 function module
Fault reporting module



Buderus

Publishing information

These service instructions contain important information for the safe and intended operation of your heating system with the Logamatic 4000 controls.

Read these serving instructions thoroughly before start-up. All work which involves opening the controls must be carried out by a trained technician. There are no user-servicable parts inside this controls.

Disconnect the heating system and controls from the main power by shutting off the emergency shutoff switch or by disengaging the heating system circuit breaker and lock to prevent from accidental reconnection.

Have malfunctions repaired immediately by a trained technician.

WARNING!

WARNING: Hot water can scald. A thermostatic or tempering valve is strongly recommended on the DHW for anti scald protection.

This product has been tested and is certified for both the U.S. and Canadian markets, to the applicable U.S. and Canadian standards.

It is the installer's responsibility to ensure that the heating system and all of its components meet all applicable local and national codes.

The right to make technical changes is reserved.

Illustrations, function steps and specifications may vary slightly as a result o continuous development.

Updating documentation

If you have any suggestions for improvement or if you have discovered any errors, please contact us.

Contents

1 Safety

1.1 Correct use

The Logamatic 4000 controls are only for controlling heating systems in apartment buildings, residential buildings and other buildings.

1.2 Please observe these notes

- Only use the controls for the purposes for which they are intended and only use if they are in perfect working order.
- Read the service manual carefully before starting work on the control.

WARNING!

DANGER TO LIFE

from electric shock.

- Make sure that all electrical work is carried out by a licensed contractor.
- Before opening the control: disconnect electrical power completely and lock to prevent accidental reconnection.

CAUTION!

SYSTEM DAMAGE

from freezing.
The heating system can freeze up in cold weather if it is shut down.

- Protect a disabled heating system from freezing by draining the boiler and water pipes at the lowest point.

NOTICE

Make sure that a circuit-breaker for disconnecting all poles from the mains is present. If there is no circuit-breaker, you will need to install one.

NOTICE

Only use original Buderus spare parts. Losses caused by the use of parts not supplied by Buderus are excluded from the Buderus warranty.

1.3 Important instructions for commissioning

- Before switching on the control check that the manual switches on the control and the function modules are set to "AUT".
- A setup log is included in the operating instructions for information of the system operator. Record the settings made during initial setup and the layout of the heating circuits in the setup log.

1.4 Cleaning control

- Clean the control with a damp cloth only.

1.5 Disposal

- Dispose of the controller packaging in an environmentally responsible manner.
- Dispose of a discarded control in an environmentally responsible manner through an approved organization. The lithium battery on the CM431 module must be removed from the control and disposed of separately.

2 FM 448 function module

The FM 448 function module can be installed in the controls of the Logamatic 4000 control system.

The main function of the FM 448 function module is to output a fault message via a relay with a potential-free contact. It is activated when errors or faults occur anywhere in the installation.

The following functions are available:

– Group fault output with option for connection of acoustic alarm or alarm system – output, potential-free contact

– Remote display of heat consumption via a heat meter – input

– Push buttons for resetting service and alarm messages.

– Level limit sensor (e.g. level of heating oil tank) – input

– Option for connection of a higher-level third-party control system for heat demand – input

– Option for connection of a third-party controller (e.g. for ventilation) for heat requirement – output

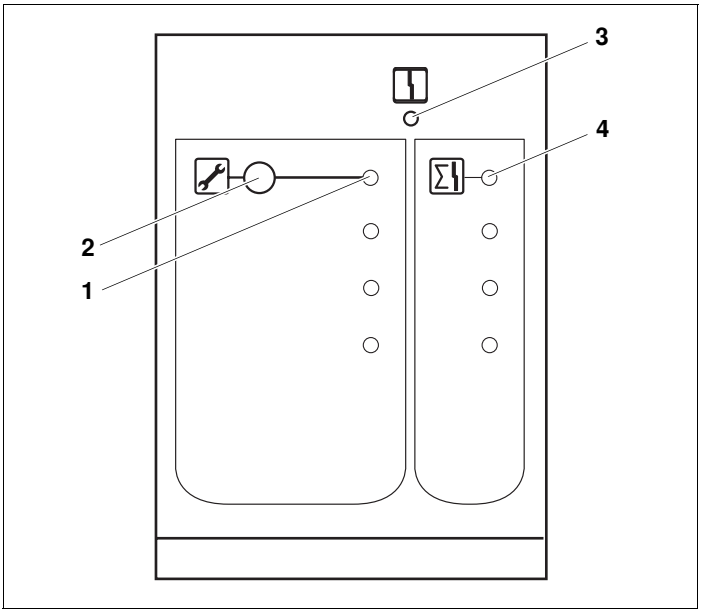


Fig. 1 Front panel of FM 448 function module

Item 1: *"Service/Alarm Reset" LED (red) – service function active*

Item 2: *Button for activating/deactivating "Service/Alarm Reset"; suppression of alarm forwarding*

Item 3: *"Module Fault" LED (red) – general module fault*

Item 4: *"Group Fault" LED (red) – a group fault is pending*

NOTICE

Only one FM 448 function module can be installed per control. Installation of a second module will result in an error message.

NOTICE

Never install a FM 447 and a FM 448 function module together in a 4311 or 4312 control.

If both function modules are installed, an error message will be shown in the display of the MEC 2 programming unit.

2.1 Inputs and outputs, connections

The low-voltage terminals and 120 V connections are on the back top of the FM 448 function module.

The connectors are marked in color and coded.

Name	Description	Connection
AS	General group fault (potential-free)	12 V or 120 V
Mains	Power supply	120 V

Tab. 1 120 V and 12 V terminals

Name	Description	Connection
ZW	Heat meter	5 V
GFS	Level sensor	5 V
U⇓	Input for installation reference value	0–10 V
U⇑	Output for installation reference value	0–10 V or 0–20 mA

Tab. 2 Low-voltage terminals

2.2 Examples of installation in Logamatic 43xx controls

The FM 448 function module can be installed in any free slot in the 4000 series controls (e.g. slot 1-4 in Logamatic 43xx).

43xx
1, 2, 3, 4

Tab. 3 Possible slot assignments

NOTICE

For example, in the illustrations the installation position on the far right has been selected.

2.2.1 FM 448 in the Logamatic 43xx control

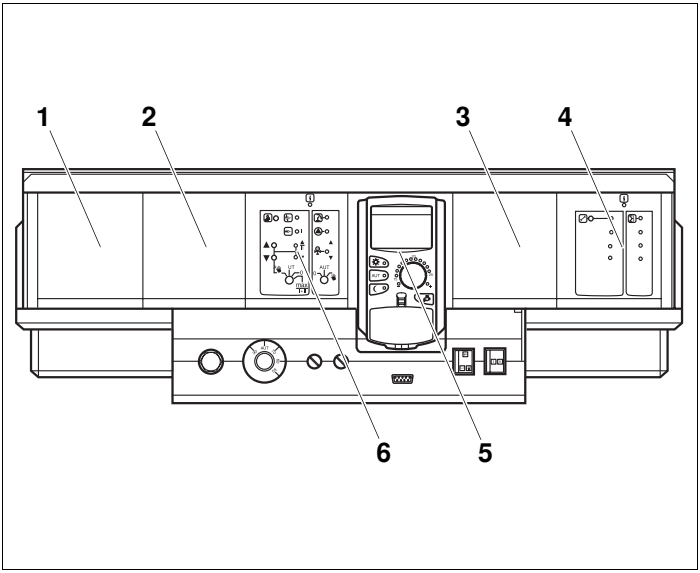


Fig. 2 FM 448 function module, e.g. in the Logamatic 4311 control

Item 1: *Slot 1 for additional module*

Item 2: *Slot 2 for additional module*

Item 3: *Slot 3 for additional module*

Item 4: *Slot 4 with FM 448 function module*

Item 5: *Slot B behind the MEC 2 programming unit*

Item 6: *Slot A for ZM 432 central module (standard model)*

NOTICE

Slot B (Fig. 2, **Item 5**) is behind the MEC 2 programming unit and contains the controller and power module (CM, NM).

3 Functions of the FM 448

The following sections explain how to use the various functions and how to set the MEC 2.

3.1 Integrating the FM 448 function module in the control

Calling up the service level

The operation of the MEC 2 programming unit is explained in detail in the service instructions for the specific Logamatic 43xx control. A brief overview of the operation of the MEC 2 is given here.

The MEC 2 has two control levels (1st level with the cover closed and 2nd level with the cover open) and a service level (can be entered using a key code). The service level has various main menus through which submenus for making settings on the controls can be accessed.

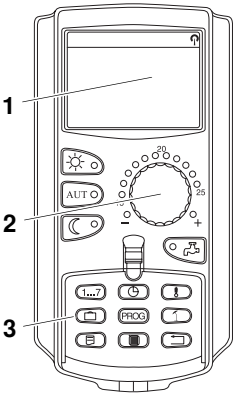


Fig. 3 MEC 2 controller

Item 1: *Display*
Item 2: *Dial*
Item 3: *Function keys*

To enter the service level press this key combination (key code) until "SERVICE LEVEL – general data" is displayed.

Integrating FM 448 function module at MEC 2 level

After installation of the 448 function module (see installation manual), it is typically automatically detected by your control.

NOTICE

If it is not automatically detected, it follow below instructions to manually register it with the MEC 2 programming unit.

Integrating FM 448 function module at MEC 2 level manually

Calling up service level.

Rotate dial until "SERVICE LEVEL – module selection" appears in the display.

SERVICE LEVEL

Module selection

Press "Display" to open the main "MODULE SELECTION" menu.

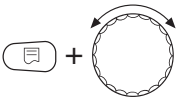
MODULE SELECTION
Slot A

Boiler module
ZM 432

"MODULE SELECTION – slot A" is shown in the display.

Rotate dial to the slot in which the FM 448 function module is installed.

For example, the function module is installed in slot 3.



Press and hold "Display" (the text in the bottom line starts to flash) and rotate dial until the FM 448 function module is shown in the display.

Release the "Display" key.

Press "Back".

MODULE SELECTION
Slot 3

Fault reporting module
FM 448

The FM 448 function module is installed in slot 3.

Press "Back" twice or close the cover to return to level 1.

3.2 Recording heat consumption

In the basic version of the Logamatic 43xx control software, the heat consumption of the system can be calculated based on the burner output (for more information see the service instructions for the controls). Alternatively the optional heat meter can be used to to more accurately collect the heat consumption.

NOTICE

If the FM 448 function module is installed, heat consumption can only be calculated from the burner setting or using data from the heat meter. Selection of one function cancels the other function.

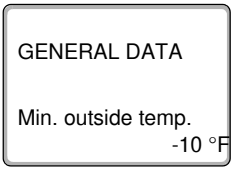
3.2.1 Adjusting heat consumption recording "by pulses"

If a heat meter is installed, the heat consumption should be displayed in the MEC 2 programming unit using the specified input. The FM 448 function module has a pulse counter input, which must be enabled in the MEC 2 programming unit.

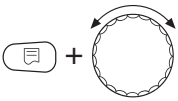
Calling up service level.

Press "Display" button to open the main "GEN. DATA" menu.

The display shows "GENERAL DATA – min. outside temp."



Turn the dial until "Heat consumption – no display" appears.



Press and hold the "Display" button and rotate the dial until "by pulses" appears.

NOTICE

The "by pulses" display is only shown if the FM 448 function module is installed.

Release "Display" at the "by pulses" setting.

The function is selected and the control has imported the setting.

NOTICE

Enable the meter input "by pulses" in the MEC 2 programming unit if a heat meter is integrated and connected in the system.

GENERAL DATA

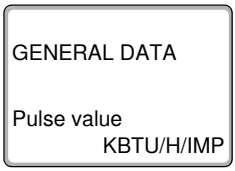
Heat consumption
by pulses

The display shows "GENERAL DATA – heat consumption by pulses."

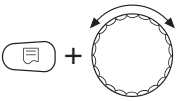
Compensating pulse value

Now compensate the pulses of the heat meter with the settings in the MEC 2.

Rotate dial one click to the right.



The display shows "GENERAL DATA – pulse value."



Press and hold the "Display" button and rotate dial.

Set the pulse value.

Release "Display" at the desired setting.

The display stops flashing. The input is accepted.

Press "Back" twice or close the cover to return to level 1.

NOTICE

The pulse setting in the control must always match the pulse setting of the heat meter.
If this is not the case, there will be errors in the calculation.

3.2.2 Checking heat consumption

Open the cover of the MEC 2 programming unit.

Rotate the dial until the display shows the various heat consumption values.

You can check the daily, weekly and annual heat consumption.

Daily consumption
Current
500 BTU

Weekly consumption
Current
2430 BTU

Annual consumption
Current
354 kBTU

Display of heat consumption recording		
Daily consumption	**Weekly consumption**	**Annual consumption**
Current	Current	Current
Yesterday	1 week ago	1 year ago
Day before yesterday	2 weeks ago	2 years ago
Record period		
from 0.00 to 0.00	from Monday to Sunday	from 01.01.XX to 31.12.XX

Tab. 4 Avaible heat consumption displays

NOTICE

Changes to the date and time affect the consumption and may result in loss of data.

NOTICE

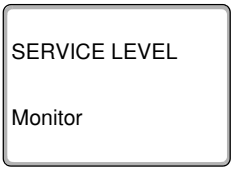
The heat consumption of the heating system is shown in kBTU and above 10,000 BTU in MBTU.

3.2.3 Checking total heat consumption

In addition to the heat consumption displays on the 2nd level, you can also read the total heat amount since the start of counting in the "Monitor" menu.

Calling up service level.

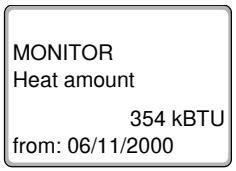
Rotate dial until "SERVICE LEVEL – Monitor" appears in the display.



Press "Display" button to open the main "MONITOR" menu.

Rotate dial until "MONITOR – heat amount" appears in the display.

Press "Display".



The display now shows the "MONITOR – heat amount" screen.

The heat consumption and the date of installation of the heat consumption recording are displayed.

Press "Back" twice or close the cover to return to level 1.

3.2.4 Restarting heat consumption metering

If you want to restart the heat consumption metering, a reset is required.

Calling up service level.

Rotate dial until "SERVICE LEVEL – Reset" appears in the display.

Press "Display" button to open the "RESET – Settings" submenu.

Rotate dial until "RESET – consumption values" appears in the display.

Press the "Display" button until "SERVICE LEVEL – Reset" appears in the display again.

The blocks in the last line disappear in succession. The reset occurs when all blocks have disappeared. If the button is released while a block is still visible the reset is canceled. After the reset the display automatically returns to the next higher level.

The heat amount metering is restarted.

Press "Back" twice or close the cover to return to level 1.

3.3 Group fault

The FM 448 function module always reports group faults that occur in the control or the control system (e.g. faulty sensor, burner fault,...).

All faults in the installation are shown regardless of where the FM 448 function module is installed (slot or control).

NOTICE

If the control or the function module is in manual mode, it will only be displayed at the MEC 2 programming unit but not as a group fault.

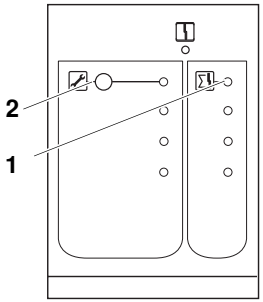


Fig. 4 Front panel of FM 448 function module

Item 1: *"Group Fault" LED*

Item 2: *"Service/Alarm Reset" button*

If a current group fault has occurred in the control or the control system, the "Group Fault" LED (Fig. 4, **Item 1**) in the FM 448 function module lights.

3.4 Service/alarm reset

If a fault occurs ("Service" LED Fig. 5, **Item 1** shows the fault) and is reported by the connected alarming device (e.g. horn or warning light), the alarm device can be silenced by pressing a button (Fig. 5, **Item 2**).

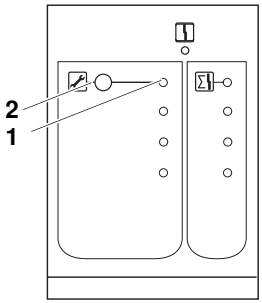


Fig. 5 Front panel of FM 448 function module

Item 1: *"Service/alarm Reset" LED*

Item 2: *"Service/alarm Reset" button*

If the "Service/alarm reset" (Fig. 5, **Item 2**) is pressed, it has the following effect:

– The pending fault message is canceled at the relay output of the module and incoming fault messages are suppressed at the relay output.

– Pending fault message at the relay output of the module, are suppressed at the relay output.

How are fault messages suppressed?

- Press the "Service/alarm reset" button until the "Service/alarm reset" LED lights.

The fault messages are silenced for two hours.

If the "Service/alarm reset" function is active, the "Service/alarm reset" LED (Fig. 5, **Item 1**) in the FM 448 function module lights.

How is the suppression reversed?

- Press the "Service/alarm reset" button again until the "Service/ alarm reset" LED goes out.

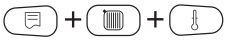
NOTICE

The "Service/alarm reset" function is automatically reset after two hours unless renewed.

3.5 Level sensor

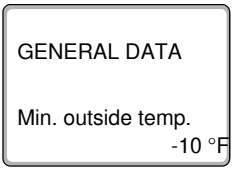
The FM448 module also allows an alarm if a level falls below a limit value. This requires connecting a level sensor.

3.5.1 Activating the level sensor



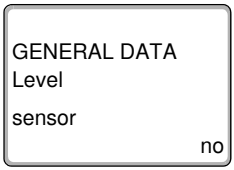
Calling up service level.

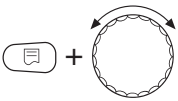
Press the "Display" button to open the "GENERAL DATA" menu.



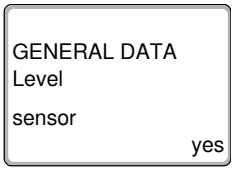
The display shows the "GENERAL DATA – min. outside temp." display.

Rotate dial until "GENERAL DATA – Level sensor" appears in the display.





Press and hold the "Display" button and rotate the dial until "yes" appears.



The level sensor is activated.

Press "Back" twice or close the cover to return to level 1.

3.5.2 Display and correction of fault

In addition to displaying the fault at the 1st level, the last four fault messages of the heating system can also be displayed.

For level alarms there is only one message in the protocol. However, the fault is also displayed by the "Module fault" LED on the FM 448 module.

NOTICE

This level fault message is only displayed on the MEC 2 programming unit if the "level sensor" function has been activated.

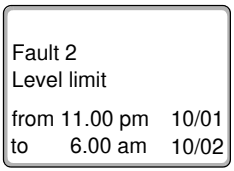
Open the cover of the MEC 2 programming unit.

Calling up service level.

Rotate dial until "SERVICE LEVEL – fault protocol" appears in the display.

Press "Display".

Rotate dial.



If fault messages are recorded, the display shows the source of the fault with the start and end of the fault.

For example, the limit value of the level was violated on October 1st from 11.00 until 6.00 am on October 2nd.

NOTICE

If there are pending and unanswered faults (errors), the bottom line of the display shows an asterisk with date and time.

Troubleshooting

Fault 2
Level limit
from 11.00 pm 10/01
to 6.00 am 10/02

Interpreting the display:

– The level has fallen below the limit value.
  Refill the tank!

– If the level is clearly above the limit, there may be an electrical fault.
  Verify if the float switch or level sensor are operational.

WARNING!

DANGER TO LIFE

from electric shock.

- Before you work on the system:
  Isolate the system from the electrical mains by disconnecting the emergency shutoff switch or heating system circuit breaker.

NOTICE

The level fault remains pending until the limit value is exceeded again or the technical fault is repaired.

3.6 Input and output (0–10 V)

External reference values can be input and output via the U-terminals on the FM 448 function module.

The reference values are always based on the supply of the entire installation.

NOTICE

The input is independent of the specific CAN address of the control.

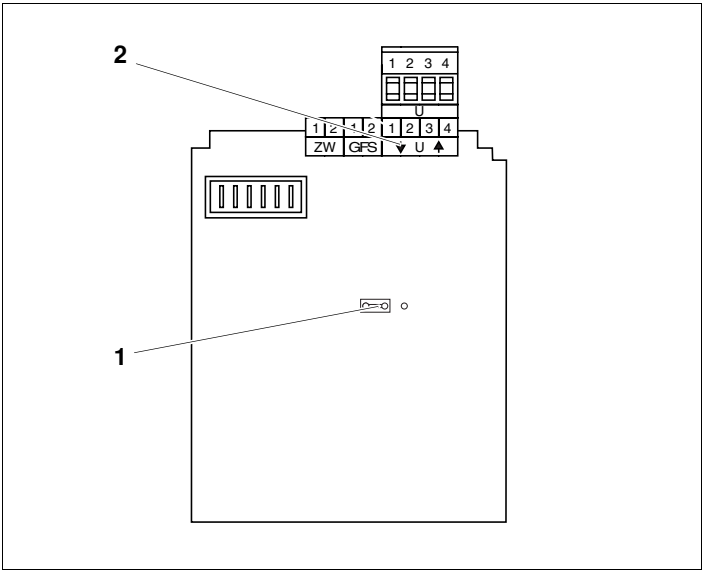


Fig. 6 FM 448 function module, U-terminals 1–4

Item 1: *Jumper plug (Jumper J 1)*

Item 2: *U-terminals*

NOTICE

The jumper factory setting is at 0-10 V.

3.6.1 Jumper plug (Jumper) J 1

The reference value can also be output as a 0-20 mA alarm.

Change the position of jumper plug J 1 (Fig. 6, page 27):

 (0–10 V)

 (0–20 mA)

3.6.2 Input (0–10 V)

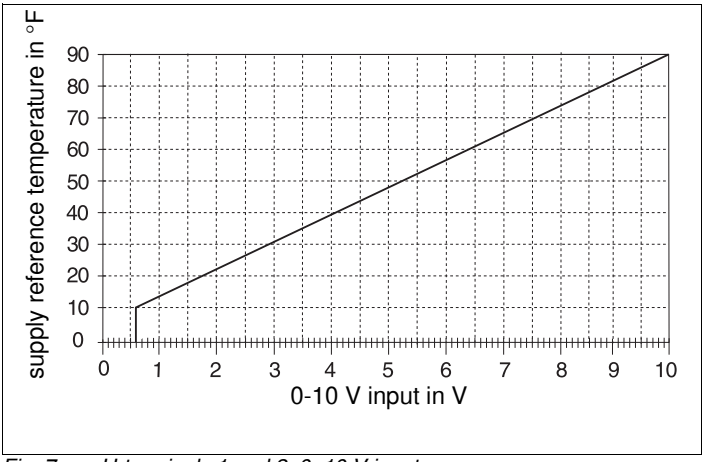


Fig. 7 U-terminals 1 and 2, 0–10 V input

A 0-10 V alarm representing the system supply can be input from an external source through terminals U 1 and U 2 on the FM 448 function module.

The installation supply value represents the minimum setting for the boiler or the installation. Higher reference values (e.g. supplied from heating circuits) that are controlled by additional controls are taken into account as before.

3.6.3 Output (0–10 V or 0–20 mA), U-terminals 3 and 4

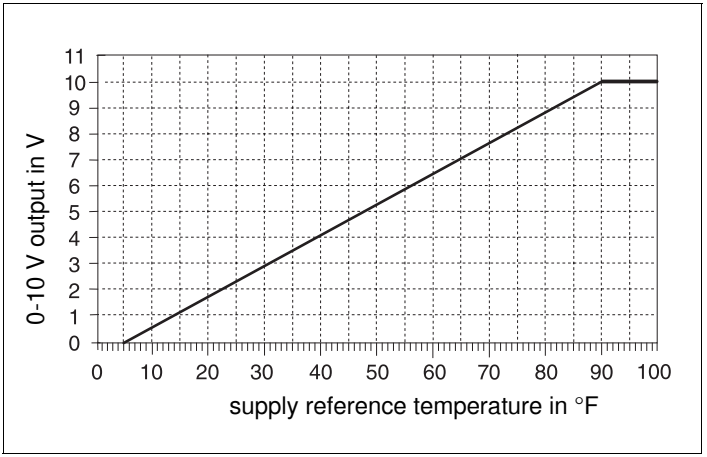


Fig. 8 U-terminals 3 and 4, 0–10 V output

A 0-10 V or 0-20 mA alarm can be output over terminals U 3 and U 4 on the FM 448 function module.

It is the maximum supply temperature of all consumer loops of the installation.

4 Keyword index

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