

- 1 LEDs for operating and error displays
- 2 Pushbuttons for functional test, reset and adjusting the set values (recessed and sealable)
- 3 TFT display
- 4 Pushbuttons for operation and reset
- 5 Bus interface for KFM field bus adapter
- 6 USB service interface

1
2



3
4
5
6

type test approved:

- | | |
|-------------------------|--|
| STB / STW 1255 S | ref. DIN EN 14597 |
| SIL2 | ref. IEC 61508 |
| CE 0045* | ref. rule 2014/68/EU * in preparation |

General:

Safety temperature limiter (STB) or monitor (STW) in two-channel and self-monitoring design in accordance with the requirements for extended safety (DIN EN 14597, SIL 2).

A switch-off, i.e. interruption of the safety circuit, occurs when the set limit value is exceeded or undercut as well as in case of errors in the measuring input or device. Unlocking is only possible manually and only after the fault has been eliminated (STB) or automatically (STW). Operating principle according to DIN EN 60730 Types 2B, 2H, 2K, 2P and 2V (only STB).

Depending on the version, PT100, stand. signal (4-20mA) or thermocouple are available as meas. inputs.

A potential-free safety-related additional contact is used for parallel output of the switching status.

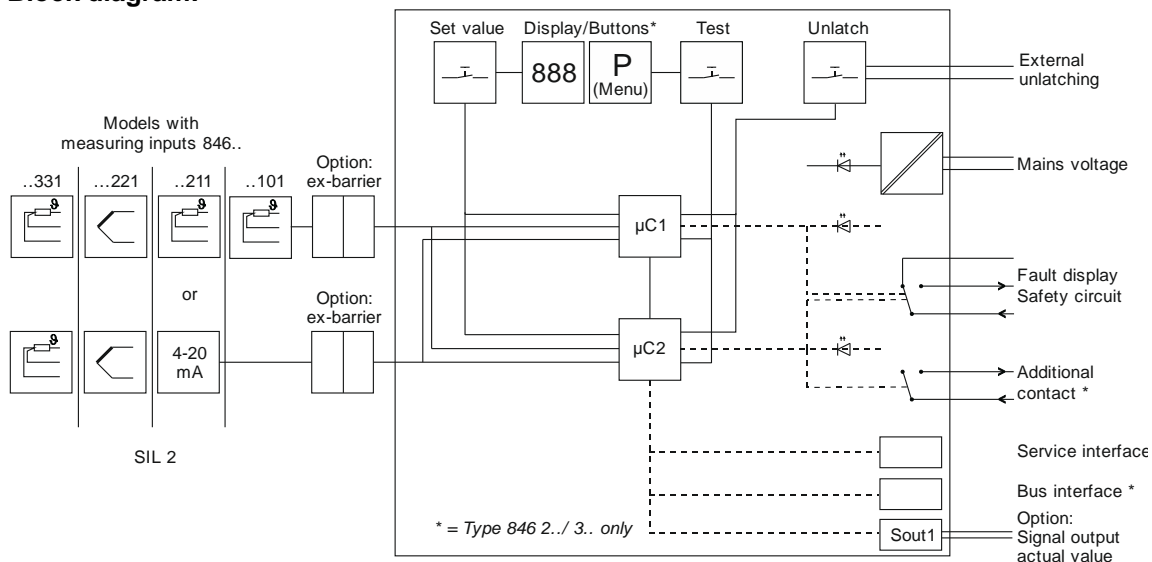
The ix industrial bus interface allows the connection of KFM adapter modules, e.g. 99spne (Profinet), which allows the actual value, limit value and status of the device to be read out. When the bus interface is plugged in, safety operation is possible without any changes.

The service interface is used exclusively for parameterising the STB, e.g. during commissioning. Safety operation is not possible when the USB plug is plugged in.

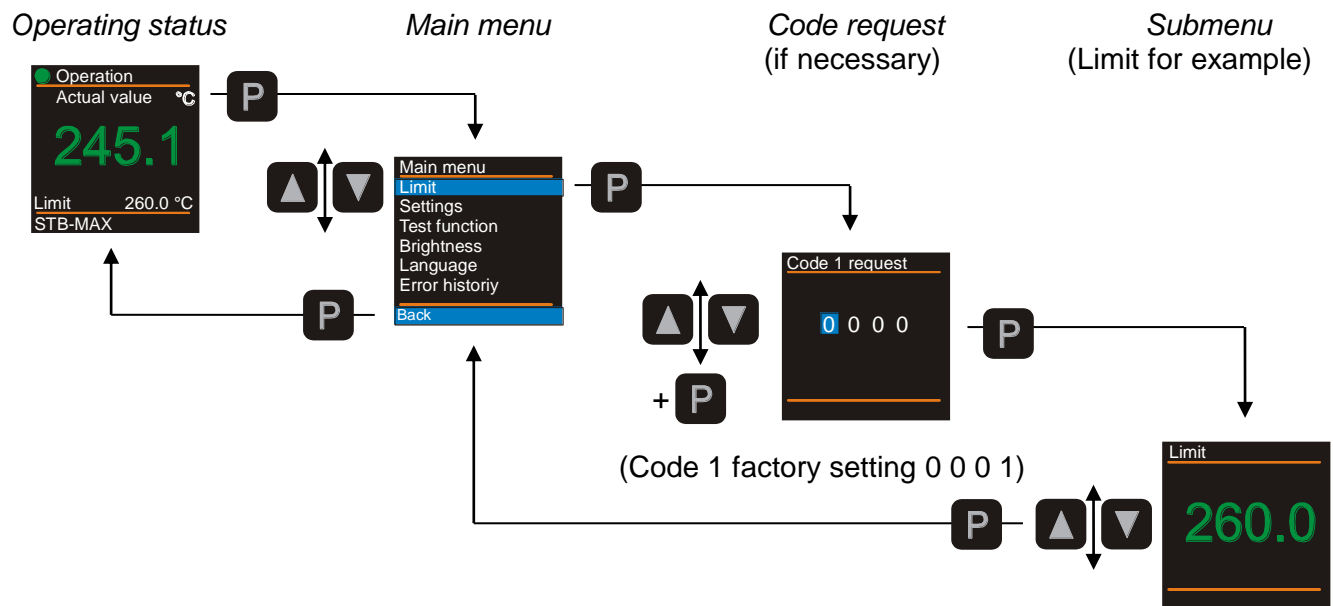
Models:

- | | |
|---------|--|
| 846 100 | Basic version STW, input Pt100 without TFT display |
| 846 101 | Basic version STB, input Pt100 without TFT display |
| 846 211 | Basic version (STB/STW), input Pt100 / 4-20mA with TFT display |
| 846 221 | Version (STB/STW) with input 2 x thermocouple |
| 846 331 | Version (STB/STW) with input 2 x Pt100, SIL 3 |
| Suffix | without: 100-250 V AC, 8 = 24V DC |

Block diagram:

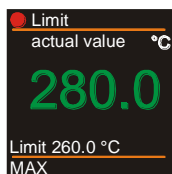


Operating scheme (type 8462.. only)



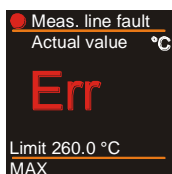
Note concerning the comfort- operation: The next parameter respectively the next submenu is marked blue after confirming an entry, limit is marked blue after the return from the submenu "Settings" to the main menu.

Short overview status messages (type 8462.. only)



Limit

Limit over- or below exceeded (error history recording)
→ Safety circuit interrupted



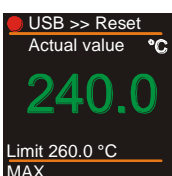
Measuring line fault

Error measuring input (error history recording)
→ Safety circuit interrupted



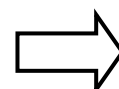
USB active

Setup- Interface connected,
no operation is possible
→ Safety circuit interrupted



USB → Reset

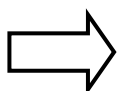
Setup- Interface disconnected,
Reset required
→ Safety circuit interrupted



All status messages
see page 6

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Reference!
This symbol refers to further information in other sections, chapters or other manuals.

Intended use

The device is intended, in accordance to the technical data, for monitoring thermal processes in industrial environments.

Any other use or usage beyond this scope is not considered as intended.

The device is constructed in accordance to the current standards and directives and complies with safety regulations.

Nevertheless, improper use can result in danger to life or property damages.

In order to avoid risks, the device must be used for the intended use in a proper safety condition and in compliance with the delivered technical documentation. Application- related dangers can occur also if the device is appropriate or intended used caused for example by missing safety devices or wrong adjustments.

Personnel qualification

This document includes all information necessary for the intended use of the device described therein.

It has been written exclusively for technically qualified personnel who have been specially trained with expertise in automation technology. Understanding these informations and the technically correct implementation of the delivered documentation are required for safe installation, commissioning as well as for safety during operation. Work on the device and the electrical wiring must only be carried out to the extent described by qualified personell.

Installation

Before installation: Inspect the device for any visible signs of damage caused during transport.

Check power supply according to name plate.

Fasten the housing in the mounting slots on the standard rail.

Electrical safety

- All electrical lines of the device must be disconnected during installation/dismantling, service- and repair work.
- Load circuits must be fused for the maximum load (see technical data).
- The device is not suitable for installation in areas with an explosion hazard.
- In addition to a faulty installation, also incorrectly or wrong set parameter values on the device (for example: device function) could affect the correct monitoring process. The corresponding safety regulations must be observed.
- The operator must be electrostatic discharged (for example by touching a grounded metal object) before plugging or pulling of the connecting cables.
- During commissioning, the delivery defaults of the device can be different from the designated application. The plant constructor is generally responsible for commissioning.
- Live parts (terminals, screws, etc.) are to protect against unintentional contact, for example by an appropriate control cabinet installation.

Electrical wiring

- Terminal blocks on the upper and lower surface; connect up the controller following the wiring diagram on the device.
- For connecting power supply phase wire and neutral wire must not be transposed.
- Wire cross section max. 1,5 mm². Maximum 0,75 mm² are permitted for the 5- pole terminal blocks when using ferrules with plastic sleeves. Stripping length 10mm.
- Lay input-, output and supply cabling physically separated and not parallel to one another.
- Use shielded and twisted cables for the measuring-, control- and interface circuits to avoid interferences; Ground the shield properly. Do not lay close to components or cables through which current is flowing. The length of the cable must be max. 30m.
- Do not loop through ground wires, but connect to a common grounding point in the control cabinet; furthermore, a professional potential equalization must be noted and the lines must be kept as short as possible.
- The DIN VDE 0100 "construction of low-voltage systems" respectively the appropriate country specific regulations (for example on basis of IEC 60364) must be followed for the wiring material, the installation and the electrical wiring.

Putting into operation

Switch on the mains supply. Digital displays and indicator lamps, if present, light up after a few seconds depending on the limit value setting. The signal output is available after approx. 5 seconds. Set the desired limit value. Check other settings.

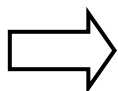
Maintenance

All electronic devices in the product range of the manufacturer are virtually maintenance-free. Provided that the device is correctly installed and put into operation and is protected against mechanical damage and inadmissible operating conditions, it should give years of trouble-free service. In case of faults repair work by the customer should be restricted to the externally accessible leads, connections and components the customer is expressly permitted to deal with himself (bridge circuits, fuses).

All further work, especially on internal components will terminate warranty, makes subsequent inspection and fault repair more difficult and can cause considerable damage to the circuitry.

For repair mark the leads and remove the terminal blocks.

In case of remittance please give precise details of the fault to reduce time and cost of repair.



see chapter status messages on page 6

Displays:

After switching on the mains voltage, the "Status" LED (Type 8461...) or the operating status indicator lights up on the TFT display (Type 8462/3...).

If the actual value is below the limit value and no triggering has occurred before, both relays switch on and the safety circuit on the output side is closed. Depending on the version, this is indicated by the LEDs K1 and K2 (Type 8461...) or the green LED symbol with the indication "Operation" on the display (Type 8462/3...).

If the process value exceeds the limit value*, both relays drop out and the LEDs K1 and K2 go out (Type 8461..) or the LED symbol "Limit value" (Type 8462/3..) lights up red. The safety circuit is interrupted. The optional additional contact drops out. The status remains unchanged even if the actual value subsequently falls below the limit value again or the mains voltage is interrupted. In the safety temperature monitor function, the device is automatically reset to the operating state when the temperature falls below the limit value. The safety temperature limiter can only be reset to the operating state after the internal or the externally connected reset button has been pressed and the actual value is lower than the limit value (minus the hysteresis).

*= Example MAX- function

Status messages:

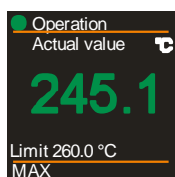
Type 8461.. (version without TFT- display)

| Status-LED | meaning |
|--------------|--|
| Off | For example, without power supply voltage, fuse defective |
| Green | Proper operation |
| Red | Error measuring input |
| Red flashing | Internal error. No further operation possible. Remit device for repair |

Type 8462/3.. (version with TFT- display):

| Status-LED | text display | meaning | error history |
|------------|--------------------|---|---------------|
| Green | „Operation“ | Proper operation | |
| Red | „Limit“ | Limit over- or below exceeded | recording |
| Red | „test active“ | Test function still active | |
| Red | „Meas. Line fault“ | Error measuring input | recording |
| Red | „USB active“ | Setup- Interface connected, no operation is possible | |
| Red | „USB → Reset“ | Setup- Interface disconnected, Reset required | |
| Red | „Internal error“ | Internal error. No further operation is possible. Remit device for repair | recording |

Operating status:



Analogue values (type 8462/3.. only): Actual value (size 8mm) and limit (size 3mm) are displayed. A dedicated unit for each value can be configured if desired. The actual value- descriptive text is changeable by means of the PKS PC software. The status of the relays is shown at the upper- left side of the display by the colour of a circle icon and a plain text message. The device function is displayed at the bottom on the left side in plain text. If existing, the name is displayed at the bottom on the right side.

Setpoint value setting:

For reasons of safety the set value should be adjusted on the Type 845 220 to a value 2K below the desired trigger value to allow for possible component tolerances. As an alternative, the determined trigger value can be noted on the safety label!

Whenever the set value is adjusted, the function of the device is to be checked by simulating a corresponding temperature at the sensor input!

Type 8462/3.. (version with TFT- display):

Briefly press the **P** - button (do not hold)

The main menu is displayed, the sub menu "Limit" is marked blue.

Briefly press the **P** - button (do not hold)

Code 1 request, the first of four digits is marked blue and can be changed using the **▼** (lower)...**▲** (higher) buttons, press the **P** -button *briefly* to continue.

(Code 1 factory setting: 0 0 0 1)

The limit can now be *changed* using the **▼** (lower)...**▲** (higher) buttons.

Where appropriate, longer pressing causes faster changing.

A limit change is effective *immediately*, without any further operational steps.

return to main menu:

Briefly press the **P** - button (do not hold)

return to operating mode: by marking "back" and pressing the **P** -button *briefly*,
no automatic switchback!

Type 8461.. (version without TFT- display):

Some appropriate means (a resistor decade box or similar simulator) is used to simulate the desired trigger temperature at the sensor input. This is entered as a new limit by pressing the "SET" button.

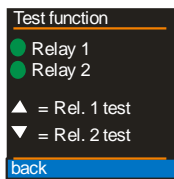
Note: Tolerance figures related to the components must be considered in relation to the set value range when using this version.

In accordance with DIN EN 14597, the set value must be secured against accidental or unauthorised modification. For this purpose, a safety label is applied over the "Set" button to seal it. In the case of devices of Type 845210 the set value must be recorded on the safety label.

Function check:

In accordance with DIN EN 14597 the safety temperature limiter must be subjected to a function check once a year.

To do this on type 8461.., the test- buttons are pressed in sequence, holding them down for about 3 seconds each: Pressing the first test button makes it possible to check that the associated relay releases, the corresponding LED goes out, the electrical safety circuit is interrupted and the external fault signal lamp lights up. The device must return to the normal condition by pressing the reset button. Both LEDs light up again, and the electrical safety circuit is closed. The second channel is then to be tested in the same way.



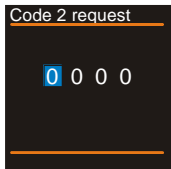
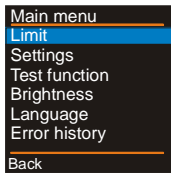
On type 8462/3.. the function check takes place in the main menu by selecting the sub menu "test function".

For this purpose the arrow up-/ arrow down buttons are pressed in sequence: Pressing the arrow up- button makes it possible to check that the associated relay releases, the corresponding LED goes out, the electrical safety circuit is interrupted and the external fault signal lamp lights up. The device must return to the normal condition by pressing the reset button. Both LEDs light up again, and the electrical safety circuit is closed. Accordingly, the second channel is then to be tested.

The annual function check specified by DIN EN 14597 is only carried out correctly if the two buttons are pressed independently one after the other, respectively after completion of the test function.

After the expiration of 10 years the systems are not sufficient to meet the requirements in accordance to their SIL- certification.

Main menu



Access from the operating status

Call up: *briefly* press the **P** -button (do not hold)

The requested sub menu is marked blue using the **▼...▲** buttons, press the **P** -button *briefly* to continue.

return to operating mode: **only** with marking "Back" and entering **P** - button *briefly*, **no** automatic switching back!

Code 2 request before sub menu (if existing), the first of four digits is marked blue and can be changed using the **▼** (lower)...**▲** (higher) buttons, press the **P** -button *briefly* to continue. (Code 2 factory setting: 0 0 0 1)

Sub menus in detail: (existence depends on version and type):

return to main menu / sub menu (depends on menu): with marking "Back" and entering **P** - button *briefly*, alternative when accepting parameter – value using the **P** -button *briefly*.
Note: no automatic switching back!

The parameter- values can be *changed* with the **▼** (lower / previous) and **▲** (higher / next) -*buttons*.
Where appropriate, longer pressing causes faster changing.

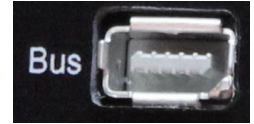
| | | <i>Factory setting.</i> |
|--------------------------|---|-------------------------|
| Limit | Adjustment limit safety temperature limiter | 0 |
| Settings: | | |
| Measuring input | Input type measuring input: (RTD/ 4-20mA/ thermo. J/ thermo. K) | RTD /th.K |
| Start input range | (only) voltage / current input: start of display range | # |
| End input range | (only) voltage / current input: end of display range | # |
| Decimal point | Number of decimal places | 1 |
| Start out. range | (only) information signal output: start of range | # |
| End out range | (only) information signal output: end of range | # |
| Unit | Switching the display unit (°C / °F), only temp. measurement inputs | °C |
| Device function | Functions: limiter / monitor - maximum / minimum (STW MIN / STW MAX / STB MIN / STB MAX) | STB MAX |
| Hysteresis | Setting the switching difference | 8 |
| History delete | Delete history: (YES/NO) | NO |
| Change code 1/2 | Change code 1 / 2: (0...9999) | 0001 / 0001 |
| Test function | see page 7 function test | |
| Brightness | Brightness adjustment Display: (0...100) | 50 |
| Language | Language selection (Deutsch/German, English) | Deutsch |
| Error history | Display of recorded messages with time stamp | |
| Desc.- text | Designation text for actual value display, (actual value) additionally a variable text *, input via PKS | Istwert |
| Name | e.g. marking of equipment, variable text, input via PKS | - |
| Date/Clock | Setting the date and time # = corresponds to range | |

Interfaces

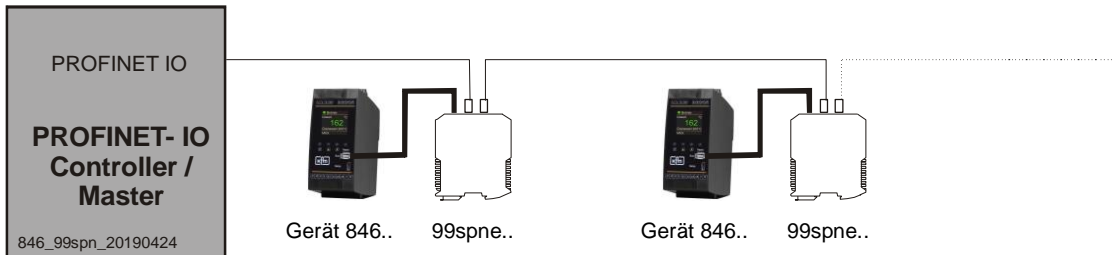
Bus

The bus interface ix industrial enables the connection of KFM adapter modules, e.g. 99spne (Profinet), whereby actual value, limit value and status of the device can be read out.

Safety operation is possible when the bus interface is plugged in.



Example Profinet:



READ

Actual value 1
Limit
Status

Receive value 1 from address 5, STB 846..
Receive value 2 from address 5, STB 846..
Status word 2 from address 5, STB 846..

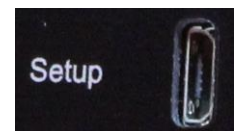
(Parameter 1010)
(Parameter 1030)
(Parameter 1002)

- Bit 1,2: Status relay 1,2
0= relay off; 1= relay on
- Bit 3: Status STB
0= operation; 1= limit value over/underrun
- Bit 4: Status measurement line error
0= Measurement error-free; 1= Error at measuring input

Setup

The service interface- Micro USB is used to parameterise the STB during commissioning using the KFM Software PKS.

Safety operation is not possible when the service interface is plugged in, the STB is switched off and the relays have dropped out.

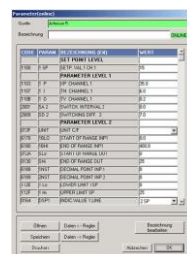


Example:



Software PKS

- Data transfer, processing and Archiving of parameter sets
- Logging
- Marking of operating equipment
- Reading the error history



➔ see sheet 99pks

Characteristic values:

Input / Measuring range:

Pt100 / standard signal, -200..+600 °C / adj.,
thermoelement NiCr-Ni (K) 0..1200 °C,
thermoelement Fe-CuNi (J) 0..900 °C

Set limit value adjustable range:

Pt100 / standard signal, -200..+600 °C / adj.,
thermoelement NiCr-Ni (K) 0..1200 °C,
thermoelement Fe-CuNi (J) 0..900 °C

Note: Observe the sensor's switching point!

Output: 1 relay, max 250 V 2 A,
optional 2nd relay (only normally open contact), 1
continuous output 4...20mA (load<=500Ω) for
actual value

Switching hysteresis:

8461...: 8 K +/- 1K, other val. available on request
8462/3...: adjustable

Interfaces:

Service interface KFM 2.0 micro USB 2.0 type B
Bus interface KFM 2.0 ix Industrial type A

Mains connection: (without protective conductor
connection) 100-250VAC +10% / -15%, 24VDC,
ca. 3 VA

Type of protection acc. EN 60529:

IP 20, for mounting within a housing min. IP 40

Permissible ambient temperature: 0..60 °C,

Storage/transport temperature: -20..+80 °C

Nominal temperature: 20 °C, transport in carton

Climatic resistance: Rel. humidity <= 75 % annual
average without condensation

Electromagnetic compatibility:

According to EN 61326, industrial requirement

Process safety time (PST): 10 seconds

Mounting position: any

housing: mounting on 35 mm standard rail

Acceptable sensors:

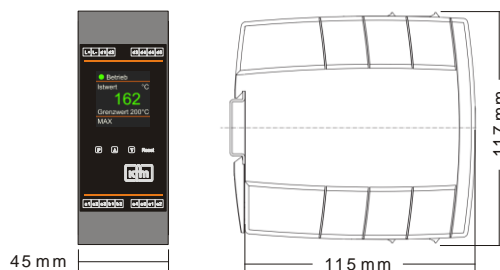
All temperature sensors demonstrably according to DIN EN 14597 are acceptable. Please observe the specifications about type, application range, installation conditions and time constant in the VDTÜV datasheet.

| Type | Operating medium | max. switching point | Protection tube |
|---------|-----------------------|----------------------|-----------------------------------|
| 713 4.. | Liquids | 400 °C | Without immersion sleeve |
| 713 5.. | Air and exhaust fumes | 400 °C | Without immersion sleeve |
| 715.. | Liquids | 400 °C | Only use protection tube supplied |

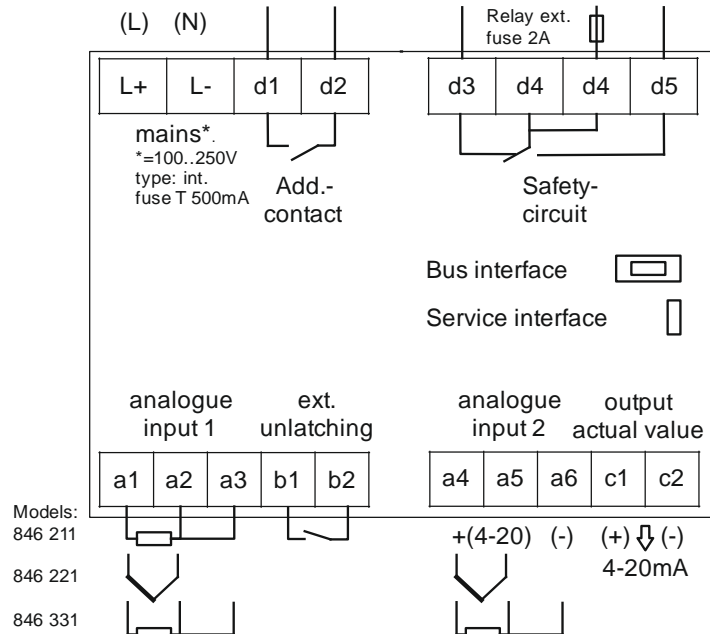
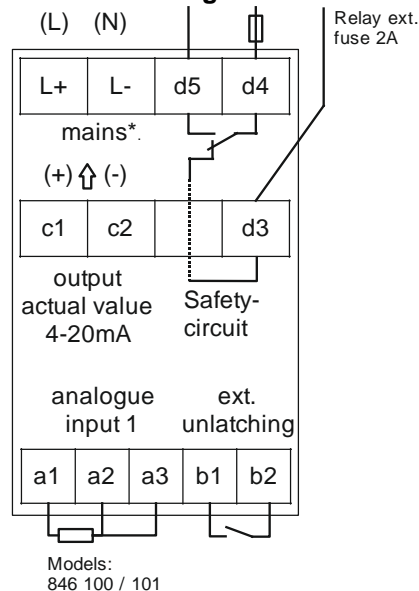
Installation dimensions: 846 1..:



846 2.. /3..



Connection diagram:



Other information according to DIN EN 14597 or DIN EN 60730

| | |
|--|-------------------------------|
| Number of operating cycles (M) for each manual action: | 300 |
| Type of switch-off / interruption for each circuit: | Micro switch-off, single pole |
| PTI value of the insulating materials (board material): | Insulating material group III |
| Type of coating of the printed circuit boards: | None, only protective coating |
| Limitation of operating time: | none |
| Duration of electrical stress on the insulating parts: | Long duration |
| Contamination situation (micro-environment creepage and clearance distance): | 2 |
| Rated surge voltage: | 2500V |
| ELV limit values (measuring input, reset input, 24VDC power-voltage input, signal output): | <=24V DC |
| Glow wire test temperatures: | 850°C / 750°C / 550°C |
| Ball indentation test temperature: | 125°C |
| Min. rate of change of controlled variable (without sensor): | Electronics < 1 sec |
| Number of remote resets: | 1000 cycles |
| The reset function must be evaluated with regard to the end use. | |

Safety-related parameters

| Type | PFDavg | PFH |
|--------------|----------------------|----------------------|
| 846100 / 101 | $5,95 \cdot 10^{-4}$ | $1,36 \cdot 10^{-7}$ |
| 846211 | $2,13 \cdot 10^{-4}$ | $4,86 \cdot 10^{-8}$ |
| 846221 | $2,59 \cdot 10^{-4}$ | $5,91 \cdot 10^{-8}$ |
| 846331 | $2,09 \cdot 10^{-4}$ | $4,78 \cdot 10^{-8}$ |



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