



Manual for connection and operation of

GIR 2000 Pt

as of version 2.3



GREISINGER electronic GmbH

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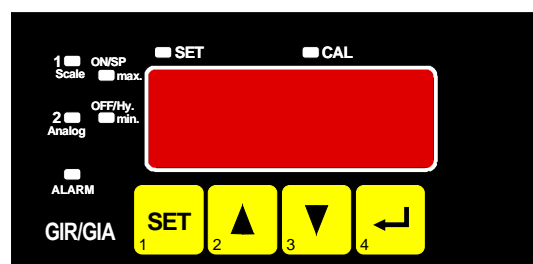
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1. Introduction

The GIR 2000 Pt is a microprocessor controlled displaying device.

The devices supports one input for the connection of:

- RTD (Pt100, 3-wire)



The device features additional one switching output, which can be configured as 2-point-controller or min./max. alarm.

The state of the switching outputs (relays) is displayed with the LED "1".

An upcoming alarm condition is displayed by LEDs "alarm", "max" and "min".

When leaving our factory the GIR 2000 Pt has been subjected to various inspection tests and is completely calibrated.

Before the GIR 2000 Pt can be used, it has to be configured for the customer's application.

Hint: By calling a configuration menu (configuration of the output function, offset- and slope-adjustment) the measurement and regulation of the device will be deactivated.

By leaving the menu the device will be reinitialised and the measuring/regulation will be started again.

2. Safety regulations

This device was designed and tested considering the safety regulations for electronic measuring devices.

Faultless operation and reliability in operation of the measuring device can only be assured if the General Safety Measures and the devices specific safety regulations mentioned in this users manual are considered.

1. Faultless operation and reliability in operation of the measuring device can only be assured if the device is used within the climatic conditions specified in the chapter "Specifications"
2. Always disconnect the device from its supply before opening it. Take care that nobody can touch any of the unit's contacts after installing the device.
3. Standard regulations for operation and safety for electrical, light and heavy current equipment have to be observed, with particular attention paid to the national safety regulations (e.g. VDE 0100).
4. When connecting the device to other devices (e.g. the PC) the interconnection has to be designed most thoroughly, as internal connections in third-party devices (e.g. connection of ground with protective earth) may lead to undesired voltage potentials.
5. The device must be switched off and must be marked against using again, in case of obvious malfunctions of the device which are e.g.:
 - visible damage.
 - no prescribed working of the device.
 - storing the device under inappropriate conditions for longer time.

When not sure, the device should be sent to the manufacturer for repairing or servicing.



ATTENTION: When running electric devices, parts of them will always be electrically live. Unless the warnings are observed serious personal injuries or damage to property may result. Skilled personnel only should be allowed to work with this device. For trouble-free and safe operation of the device please ensure professional transport, storage, installation and connection as well as proper operation and maintenance.

SKILLED PERSONNEL

Are persons familiar with installation, connection, commissioning and operation of the product and have professional qualification relating to their job.

For example:

- Training and instruction or qualifications to switch on or off, isolate, ground and mark electric circuits and devices or systems.
- Training or instruction according to the state.
- First-aid training.



ATTENTION:

Do NOT use this product as safety or emergency stopping device, or in any other application where failure of the product could result in personal injury or material damage.

Failure to comply with these instructions could result in death or serious injury and material damage.

3. Electric Connection

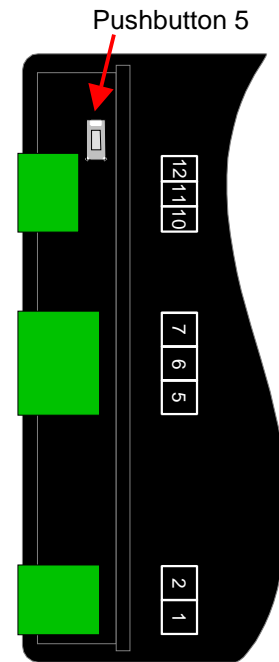
Wiring and commissioning of the device must be carried out by skilled personnel only.

In case of wrong wiring the device may be destroyed. We can not assume any warranty in case of wrong wiring of the device.

3.1. Terminal assignment

12	Input: Pt100
11	Input: Pt100
10	Input: Pt100
7	Relay, break contact, * ¹
6	Relay, make contact, * ¹
5	Relay, input, * ¹
2	Supply voltage 230V _{AC} , * ¹
1	Supply voltage 230V _{AC} , * ¹

*¹ = or the corresponding designation on the label on the housing



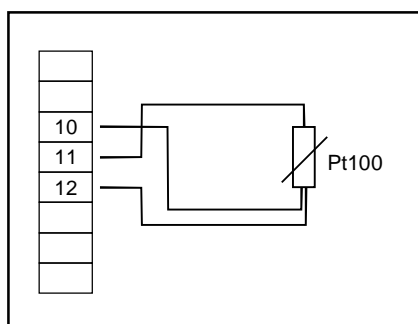
3.2. Connection data

	between terminals	typical		limitations		notes
		min.	max.	min.	max.	
Supply voltage	1 and 2	207 V _{AC}	244 V _{AC}	0 V _{AC}	253 V _{AC}	or corresponding designation on the type plate
Relay (change-over contact)	5, 6 and 7				253 V _{AC} 10A ohmic load	or corresponding designation on the type plate
Input Pt100 (3-wire)	10 - 12			0 Ω	∞ Ω	active signal not allowed

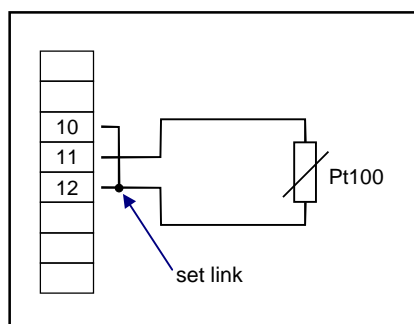
These limits must not be exceeded (not even for a short time) !

3.3. Connecting a Pt100-temperature probe

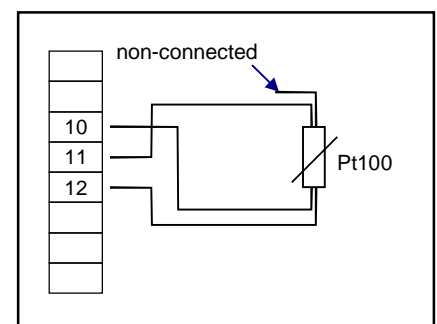
Please take care not to exceed the limitations of the inputs when connecting the device as this may lead to destruction of the device.



Pt100-RTD probe (3-wire)



Pt100-RTD probe (2-wire)



Pt100-RTD probe (4-wire)

3.4. Connecting switching output

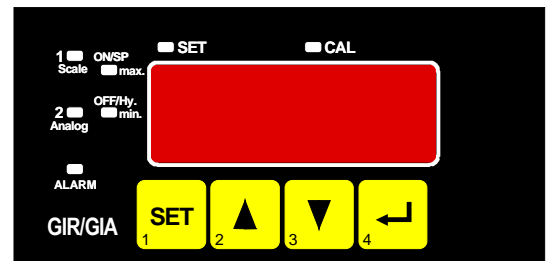
The device features one switching output (relays) by default.

Please take care that you must not exceed the limits of the voltage and of the maximum current of the switching outputs (not even for a short period of time). Please take extreme care when switching inductive loads (like coils or relays, etc.). Because of their high voltage peaks, protective measures (e.g. RC-element) to limit these peaks have to be taken.

Note: In case of configuring one output as an alarm output, the output will be active in idle state (no alarm present). The output relay opens when an alarm condition occurred.

4. Input-configuration: select filter value

- Turn the device on and wait until it completed its built-in segment test.
- At the same time press the **pushbutton** on the rear side (button 5) and **button 2** for >2 seconds.
The device displays "**FiLt**" (Filter = digital filter).
- Use **button 2** or **button 3** for setting the desired filter value [in sec.].
Selectable values: off, 0.01 ... 2.00 sec.



Explanation: this digital filter is a digital replica of a low pass filter.

Note: If the digital filter is "off" the internal mains hum suppression of the GIR2002 is deactivated. This adjustment is ideal for fastest response to even small changes of the signal, but the display and the analog output gets more turbulent. Therefore the filter should be set to at least 0.01 for 'ordinary' application

A filter value of at least 0.1 is recommended for the input signal 0-50mV.

- Press **button 1** to validate your value, the display shows "**FiLt**" again.
- When pressing **button 1** again, the display shows always "**FiLt**" again.

Now you have finished the input configuration.

- Press now **button 4** to exit the input configuration menu.

5. Configuration of the output functions

General description and notes to the operating of the menu

By means of **button 1** you can go to the next parameter.

Additionally a given changing in the parameter setting can be confirmed by this button and the new value will be saved. Afterwards it will be changed to the parameter view again.

By means of **button 2** or **button 3** you can go from the parameter view to the parameter setting and adjust its value there.

Hint: The buttons 2 and 3 are featured with a 'roll-function'. When pressing the button once the value will be raised (button 2) by one or lowered (button 3) by one. When holding the button pressed for longer than 1 sec. the value starts counting up or down, the counting speed will be raised after a short period of time.

The device also features a 'overflow-function', when reaching the upper limit of the range, the device switches to the lower limit, vice versa.

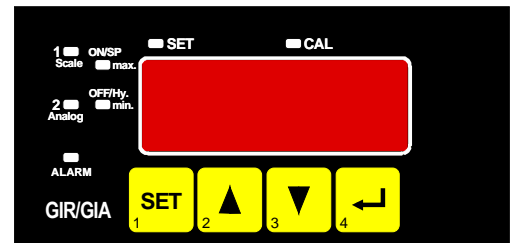
By means of **button 4** a given changing will be cancelled in the parameter setting. The changing will be discarded and the former parameter value will be preserved.

In the parameter view button 4 closes the menu.

Please note: If you don't press any button for more than 10 sec. in the parameter setting, the adjustment will be cancelled, the changing discarded and it will be changed to the parameter view. If you don't press any button for more than 60 sec. in the menu, the menu will be automatically closed.

5.1. Selection of the output function

- Turn the device on and wait until it completed its built-in segment test.
- At the same time press the **pushbutton on the rear side** (button 5) and **button 1** for >2 seconds. The device displays "**outP**" ('output').
- Use **button 2** or **button 3** to select the output function. According your selection the outlets will be allocated as the following table shows:



Description	To select as output	Output 1 (change-over contact)	See chapter
No output, device is used as display unit	no	off	--
2-point-controller	2P	Switching function 1	5.2
Min-/Max-alarm	AL.F1	Min-/Max-alarm, inverse	5.3

- Press **button 1** to validate the selected output function. The display shows "**outP**" again.

Note: Alarm inverse means, that the output will be active when there is no alarm!

Hint: The settings for the switching and alarm points can be made later in an extra menu (see chapter 5)

5.2. 2-point-controller

This chapter describes how to configure the device as a 2-point-controller and how to adjust the switching values. This instruction demands that you selected "**2P**" as your desired output function like it is explained in chapter 5.1.

- Press **button 1**. The device will be displaying "**1.on**" (turn-on-point of switching function 1).
- Use **button 2** or **button 3** to set the desired value, the device's switching function 1 should be turning on.
- Press **button 1** to validate your selection. The display shows "**1.on**" again.

- Press **button 1** again, the device will be displaying “**1.off**”. (turn-off-point of switching function 1)
- Use **button 2** or **button 3** to set the desired value, the device’s switching function 1 should be turning off.
- Press **button 1** to validate your selection. The display shows “**1.off**” again.
- Press **button 1** again, the device will be displaying “**1.dEL**”(delay of switching function 1).
- Use **button 2** or **button 3** to set the desired value [in sec] for the switching-delay of switching function 1.
- Press **button 1** to validate the selection. The display shows “**1.dEL**” again.
- When pressing **button 1** again, the device will display “**1.Err**” (preferred state of switching function 1).
- Use **button 2** or **button 3** to set the desired initial state in case of an error.

Display	Preferred state of the output	Note
off	Inactive in case of an error	
on	Active in case of an error	

- Press **button 1** to validate the selection. The display shows “**1.Err**” again.
- When pressing **button 1** again, the display shows “**outP**” ('output') again.

Now you have finished the output configuration.

- Press now **button 4** to exit the output configuration menu.

5.3. Minimum/maximum-alarm

This chapter describes how to adjust the device’s alarm boundaries for min-/max-alarm-monitoring. This instruction demands that you selected “**AL.F1**” as your desired output function like it is explained in chapter 5.1.

Please note that the alarm-outputs are inverted! This means, that the output will be active when there is no alarm!

- When pressing **button 1**, the device will be displaying “**AL.Hi**”. (maximum alarm-value)
- Use **button 2** or **button 3** to set the desired value, the device should turn on its maximum-alarm.
- Press **button 1** to validate your selection. The display shows “**AL.Hi**” again.
- When pressing **button 1** again, the device will be displaying “**AL.Lo**”. (minimum alarm-value)
- Use **button 2** or **button 3** to set the desired value, the device should turn on its minimum-alarm
- Press **button 1** to validate your selection. The display shows “**AL.Lo**” again.
- When pressing **button 1** again, the device will be displaying “**A.dEL**”. (delay of the alarm-function)
- Use **button 2** or **button 3** to set the desired delay of the alarm-function.

Note: The unit of the value to be set is in [sec.]. The device will turn on the alarm after the minimum or the maximum alarm value was active for the delay-time you have set.

- Press **button 1** to validate the delay time. The display shows “**A.dEL**” again.
- When pressing **button 1** again, the display shows “**outP**” ('output') again.

Now you have finished the output configuration.

- Press now **button 4** to exit the output configuration menu.

6. Switching points and alarm-boundaries

Remark: The difference between this menu and the output configuration menu is that only in the output configuration menu it is possible to select the output function and to adjust the delay and the preferred state of switching functions.

General description and notes to the operating of the menu

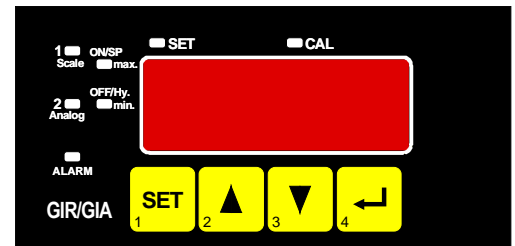
By means of **button 1** you can go to the next parameter.
Additionally a given changing in the parameter setting can be confirmed by this button and the new value will be saved. Afterwards it will be changed to the parameter view again.

By means of **button 2** or **button 3** you can go from the parameter view to the parameter setting and adjust its value there.

Hint: The buttons 2 and 3 are featured with a 'roll-function'. When pressing the button once the value will be raised (button 2) by one or lowered (button 3) by one. When holding the button pressed for longer than 1 sec. the value starts counting up or down, the counting speed will be raised after a short period of time.
The device also features a 'overflow-function', when reaching the upper limit of the range, the device switches to the lower limit, vice versa.

By means of **button 4** a given changing will be cancelled in the parameter setting. The changing will be discarded and the former parameter value will be preserved.
In the parameter view button 4 closes the menu.

Please note: If you don't press any button for more than 10 sec. in the parameter setting, the adjustment will be cancelled, the changing discarded and it will be changed to the parameter view. If you don't press any button for more than 60 sec. in the menu, the menu will be automatically closed.



6.1. Menu calling

- When pressing button 1 for >2 seconds the menu to select the switching points and alarm-boundaries will be called.
- Depending on the configuration you have made in the output configuration menu you will get different Display values. Please follow the specific chapter for further information.

Description	Selected as output	Go on in chapter	Note
No output, device is used as displaying device	no	--	Calling of the menu not possible
2-point-controller	2P	6.2	
min-/max-alarm	AL.F1	6.3	

6.2. 2-point-controller

This chapter describes device how to adjust the switching values of the device used as a 2-point-controller. This instruction demands that you selected "2P" as your desired output function like it is explained in chapter 5.1.

- Press **button 1** (if not already done). The device will be displaying "1.on" (turn-on-point of switching function 1).
- Use **button 2** or **button 3** to set the desired value, the device's switching function 1 should be turning on.
- Press **button 1** to validate your selection. The display shows "1.on" again.
- Press **button 1** again, the device will be displaying "1.off". (turn-off-point of switching function 1)
- Use **button 2** or **button 3** to set the desired value, the device's switching function 1 should be turning off.
- Press **button 1** to validate your selection. The display shows "1.off" again.

Example: You want to control the temperature of a heating coil, with a hysteresis of +2°C, to 120°C. Therefore you will have to select the turn-on-point "1.on" to 120°C and the turn-off-point to "122°C". When your heating coil temperature falls below 120°C it will be turned on. When the temperature rises above 122°C the heating coil will be turned off.

Note: Depending on the inertia of your heating coil an overshooting of the temperature may be possible.

- When pressing **button 1** again, the display shows "1.on" again.

Now you have finished the adjustment of the switching points of the device.

- Press now **button 4** to exit the switching point adjustment menu.

6.3. Minimum/maximum-alarm

This chapter describes how to adjust the device's alarm boundaries for min-/max-alarm-monitoring. This instruction demands that you selected "AL.F1" as your desired output function like it is explained in chapter 5.1.

- Press **button 1** (if not already done). The device will be displaying "AL.Hi". (maximum alarm-value)
- Use **button 2** or **button 3** to set the desired value, the device should turn on its maximum-alarm.
- Press **button 1** to validate your selection. The display shows "AL.Hi" again.
- When pressing **button 1** again, the device will be displaying "AL.Lo". (minimum alarm-value)
- Use **button 2** or **button 3** to set the desired value, the device should turn on its minimum-alarm
- Press **button 1** to validate your selection. The display shows "AL.Lo" again.
- When pressing **button 1** again, the device will be displaying "A.dEL". (delay of the alarm-function)
- Use **button 2** or **button 3** to set the desired delay of the alarm-function.

Note: The unit of the value to be set is in [sec.]. The device will turn on the alarm after the minimum or the maximum alarm value was active for the delay-time you have set.

- Press **button 1** to validate the delay time. The display shows "A.dEL" again.

Example: You want to have a temperature alarm-monitoring of a greenhouse. The alarm should start when the temperature rises above 50°C or falls below 15°C.

Therefore your settings will be 50°C for the maximum alarm-value "AL.Hi" and 15°C for the minimum alarm-value "AL.Lo".

=> The alarm will be starting after the temperature rises above 50°C and stays above 50°C for the entered delay time or after it had been falling below 15°C and stays below 15°C for the entered delay time.

Please note that the alarm-outputs are inverted! This means, that the output will be active when there is no alarm!

- When pressing **button 1** again, the display shows "AL.Hi" again.

Now you have finished the adjustment of the alarm boundaries of the device.

- Press now **button 4** to exit the alarm boundaries configuration menu.

7. Offset- and slope-adjustment

The offset and slope-adjustment function can be used for compensating the tolerance of the used sensor.

General description and notes to the operating of the menu

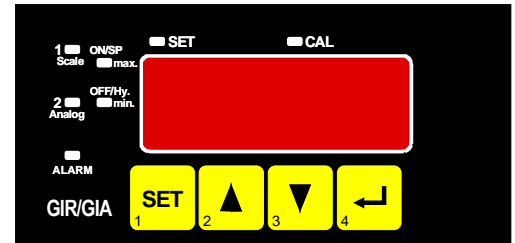
By means of **button 1** you can go to the next parameter. Additionally a given changing in the parameter setting can be confirmed by this button and the new value will be saved. Afterwards it will be changed to the parameter view again.

By means of **button 2** or **button 3** you can go from the parameter view to the parameter setting and adjust its value there.

Hint: The buttons 2 and 3 are featured with a 'roll-function'. When pressing the button once the value will be raised (button 2) by one or lowered (button 3) by one. When holding the button pressed for longer than 1 sec. the value starts counting up or down, the counting speed will be raised after a short period of time. The device also features a 'overflow-function', when reaching the upper limit of the range, the device switches to the lower limit, vice versa.

By means of **button 4** a given changing will be cancelled in the parameter setting. The changing will be discarded and the former parameter value will be preserved. In the parameter view button 4 closes the menu.

Please note: If you don't press any button for more than 10 sec. in the parameter setting, the adjustment will be cancelled, the changing discarded and it will be changed to the parameter view. If you don't press any button for more than 60 sec. in the menu, the menu will be automatically closed.



7.1. Menu calling and adjustment

- Turn on the device and wait after it finished its built-in segment test.
- At the same time press the **pushbutton on the rear side** (button 5) and **button 3** for >2 seconds. The device displays "OFFS" (offset).
- Use **button 2** or **button 3** for setting the desired zero point offset-value.
The value that had been set will be subtracted from the measured value. (see below for further information)
- Press **button 1** to validate your selection. The display shows "OFFS" again.
- When pressing **button 1** again, the device will be displaying "SCAL". (scale = slope)
- Use **button 2** or **button 3** to select the desired slope-adjustment.

The slope adjustment will be entered in %. The displayed value is calculated according to the following formula:

$$\text{Displayed value} = (\text{measured value} - \text{zero point offset}) * (1 + \text{slope adjustment } [\% / 100])$$

Example: The setting is 2.00 => the slope has risen 2.00% => slope = 102%.

When measuring a value of 1000 (without slope-adjustment) the device would display 1020 (with slope adjustment of 102%)

- Press **button 1** to validate the selection of the slope-adjustment. The display shows "SCAL" again.
- When pressing **button 1** again, the display shows "OFFS" again.

Now you have finished the offset- and slope-adjustment.

- Press now **button 4** to exit the offset- and slope-adjustment menu.

Examples for offset- and slope-adjustment:

The device displays the following values (without offset- or slope-adjustment: 2.0°C at 0°C and, 151.7°C at 150°C

Therefore you calculated: zero point: 2.0

slope: $151.7 - 2.0 = 149.7$

deviation: 0.3 (= target-slope - actual-slope = 150.0 - 149.7)

You have to set: offset = 2.0 (= zero point-deviation)

scale = 0.20 (= deviation / actual-slope = 0.3 / 149.7 = 0.0020 = 0.20%)

8. Min-/max-value memory:

The device features a minimum/maximum-value memory. In this memory the highest and lowest measured value is saved.

Calling of the minimum-value	press button 3 shortly	the device will display "Lo" briefly, after that the min-value is displayed for about 2 sec.
Calling of the maximum-value	press button 2 shortly	the device will display "Hi" briefly, after that the max-value is displayed for about 2 sec.
Erasing of the min/max values	press button 2 and 3 for 2 sec.	The device will display "CLr" briefly, after that the min/max-values are set to the current displayed value.

9. Alarm display

If an output function with min-/max-alarm (out = AL.F1) is selected, LEDs will display the min-/max-alarm in case of its appearance.

Min-alarm: LEDs "alarm" and "min" glow

Max-alarm: LEDs "alarm" and "max" glow

If a system-alarm or system-error occurs, it will be handled like a min- and max-alarm. In this case the LEDs "min", "max" and "alarm" will glow. Additionally the error code will be displayed.

10. Error codes

When detecting an operating state which is not permissible, the device will display an error code

The following error codes are defined:

Err.1: Exceeding of the measuring range

Indicates that the valid measuring range of the device has been exceeded.

Possible causes:

- Input signal to high
- Sensor broken

Remedies:

- The error-message will be reset if the input signal is within the limits.
- Check sensor

Err.2: Values below the measuring range

Indicates that the values are below the valid measuring range of the device.

Possible causes:

- Input signal is to low or negative.
- Sensor shorted

Remedies:

- The error-message will be reset if the input signal is within the limits.
- Check sensor

Err.7: System-error

The device features an integrated self-diagnostic-function which checks essential parts of the device permanently. When detecting a failure, error-message Err.7 will be displayed.

Possible causes:

- Valid operating temperature has exceeded or has fallen below the valid temperature range.
- Device defective.

Remedies:

- Stay within valid temperature range.
- Exchange the defective device.

Err.9: Sensor defective

The device features an integrated diagnostic-function for the connected sensor or transmitter. When detecting a failure, error-message Err.9 will be displayed.

Possible causes:

- Sensor broken or shorted

Remedies:

- Check sensor or exchange defective sensor.

11. Specification

Absolute maximum ratings: see chapter 3.2. (Connection data)

Measuring input: Pt100, 3-wire

Measuring range: -50.0 ... + 200.0°C (or -58.0 ... +392.0 °F)

Resolution: 0.1°C or 0.1°F

Accuracy: < 0.3% FS ±1 digit (at nominal temperature)

Temperature drift: < 0.015% FS / K

Max. perm. line resistance: 20 Ohm

Measuring freq.: approx. 4 measures / sec.

Display: approx. 13 mm height, 4-digit red LED-display

Operating: 4 push-buttons

Output: 1 volt-free Relay-output (standard) *or the corresponding designation on the label on the housing*

Output type: change-over contact, breaking capacity: 10A (ohmic load), 250 V_{AC}

Response Time: ≤ 0.5 sec.

Output-functions: 2-point-controller, min-/max-alarm

Switching points: arbitrary

Power supply: 230 V_{AC} , 50/60 Hz (standard) *or the corresponding designation on the label on the housing*

Power consumption: approx. 5 VA

Nominal temp.: 25°C

Operating ambient: -20 to +50°C

Relative humidity: 0 to 80% RH (non condensing)

Storage temp.: -30 to +70°C

Housing:

Dimensions: 48 x 96 mm (front-panel dimensions).

Installation depth: approx. 115 mm (incl. screw-in/plug-in clamps)

Panel Mounting: with brackets

Panel cut-out: 43.0^{+0.5} x 90.5^{+0.5} mm (H x W)

Connection: via screw-in/plug-in clamps
Conductor cross-selection from 0.14 to 1.5 mm²

Protection class: front IP54, with optional mounting seals IP65

EMC: EN61326 +A1 +A2 (appendix A, class B), additional errors: < 1% FS

When connecting long leads adequate measures against voltage surges have to be taken.

12. Disposal notes

This device must not be disposed as 'residual waste'.

To dispose this device, please send it directly to us (adequately stamped). We will dispose it appropriately and environmentally friendly.