



Temperature Switch

# TRS 5-52

EN  
English

Original Installation Instructions  
**819175-04**

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## Important Notes

### Usage for the intended purpose

The temperature switch TRS 5-52 is used in conjunction with temperature sensors TRG 5-6.. as max.-min. limit switch, for instance in steam boilers and (pressurised) hot-water plants. The temperature switch detects and indicates a MIN and a MAX temperature.

The temperature switch TRS 5-52 is designed for use in conjunction with temperature sensors TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68.

### Function

A platinum resistance thermometer Pt 100 to EN 60751 is used as temperature sensor for the temperature switch TRS 5-52. A three-wire configuration is used for the electrical connection.

The temperature switch processes the temperature-dependent changes in resistance of the temperature sensor and during normal operation the seven-segment LED display shows the actual value.

The switchpoints for MIN and MAX temperature can be variably adjusted within the measuring range. When the MIN or MAX temperature is reached, the MIN or MAX output contact is switched over and MIN or MAX LED is illuminated.

Any error or malfunction that occurs in the temperature sensor, the electrical connection or the settings is indicated by the seven-segment LED display and will trigger a MIN and MAX alarm.

If an error occurs in the temperature switch TRS 5-52, only the MIN and MAX alarm is raised and the system is restarted.

Parameter settings can be changed or a MIN/MAX alarm be simulated by operating the rotary button.

For external temperature indication the equipment is optionally available with an actual-value output 4 - 20 mA.

### Safety note

The equipment fulfils a safety function and must only be installed, wired and commissioned by qualified and competent staff.

Retrofitting and maintenance work must only be performed by qualified staff who - through adequate training - have achieved a recognised level of competence.



#### Danger

The terminal strips of the equipment are live during operation.

This presents the danger of electric shock!

Always **cut off power supply** to the equipment before mounting, removing or connecting the terminal strips!



#### Attention

The name plate specifies the technical features of the equipment. Note that any piece of equipment without its specific name plate must neither be commissioned nor operated.

## Directives and Standards

### DIN EN 14597

The temperature switch TRS 5-52 in conjunction with temperature sensor TRG 5-.. is type-approved to DIN EN 14597. DIN EN 14597 describes and specifies - among other things - the requirements made on tests of temperature monitors.

### LV (Low Voltage) Directive and EMC (Electromagnetic Compatibility)

The equipment meets the requirements of the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

### ATEX (Atmosphère Explosible)

According to the European Directive 94/9/EC the equipment must **not** be used in explosion risk areas.



#### Note

The temperature sensors TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68 are simple items of electrical equipment as defined in EN 60079-11 section 5.7. According to the European Directive 94/9/EC the equipment must be equipped with approved Zener barriers if used in potentially explosive areas. Applicable in Ex zones 1, 2 (1999/92/EC).  
The equipment does not bear an Ex marking.

### UL / cUL (CSA) Approval

The equipment meets the requirements of the Directives: UL 508 and CSA C22.2 No. 14-13, Standards for Industrial Control Equipment. File E243189.

### Note on the Declaration of Conformity / Declaration by the Manufacturer **CE**

For details on the conformity of our equipment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.  
The current Declaration of Conformity / Declaration of Manufacturer are available in the Internet under [www.gestra.com/documents](http://www.gestra.com/documents) or can be requested from us.

## Technical data

### TRS 5-52

#### Supply voltage

24 VDC  $\pm$  20 %

#### Fuse

external 0.5 A (semi-delay)

#### Power consumption

4 VA

#### Wiring temperature sensor

1 input for temperature sensor TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68, (platinum resistance thermometer Pt 100 to EN 60751), with 3 poles and screen.

#### Outputs:

2 volt-free change-over contacts, 8 A 250 V AC / 30 V DC  $\cos \varphi = 1$ .  
(MIN/MAX alarm, switchpoint adjustable).

Provide inductive loads with RC combinations according to manufacturer's specification to ensure interference suppression.

1 analogue output 4-20 mA, max. load 500 ohm, e. g. for actual-value indication (optional).

#### Measuring range

0 °C up to 600 °C

#### Switching hysteresis

Switchpoint MAX temperature:  $-5$  K, factory set.

Switchpoint MIN temperature:  $+5$  K, factory set.

#### Indicators and adjustors

1 rotary button with integrated test button for MIN/MAX alarm and parameter settings,

1 four-digit seven-segment LED indication, green

2 red LEDs for MIN/MAX alarm

#### Housing

Housing material: base: polycarbonate, black; front: polycarbonate, grey

Conductor size: 1 x 4.0 mm<sup>2</sup> solid, per wire, or

1 x 2.5 mm<sup>2</sup> per stranded wire with sleeve to DIN 46228 or

2 x 1.5 mm<sup>2</sup> per stranded wire with sleeve to DIN 46228 (min.  $\varnothing$  0.1 mm)

Terminal strips can be detached

Fixing of housing: Mounting clip on supporting rail TH 35, EN 60715

#### Electrical safety

Pollution degree 2 for installation in control cabinet with protection IP 54, completely insulated

#### Protection

Housing: IP 40 to EN 60529

Terminal strip: IP 20 to EN 60529

#### Weight

approx. 0.2 kg

## Technical Data - continued -

### TRS 5-52 - continued -

#### Ambient temperature

when system is switched on: 0 ° .... 55 °C,  
during operation: -10 ... 55 °C

#### Transport temperature

-20 ... +80 °C (<100 hours), defrosting time of the de-energized equipment before it can be put into operation: 24 hours.

#### Storage temperature

-20 ... +70 °C, defrosting time of the de-energized equipment before it can be put into operation: 24 hours.

#### Relative humidity

max. 95 %, no moisture condensation

#### Approvals:

Type approval

DIN EN 14597:

Requirements made on temperature monitors,

DIN Registration number DIN TW 1232 (see name plate)

UL /cUL (CSA) Approval

Approval UL 508 and CSA C22.2 No. 14-13, Standards for Industrial Control Equipment. File E243189.

### Scope of supply

#### TRS 5-52

1 Temperature switch TRS 5-52

1 Installation & operating manual

## In control cabinet: Mounting temperature switch

### Dimensions TRS 5-52

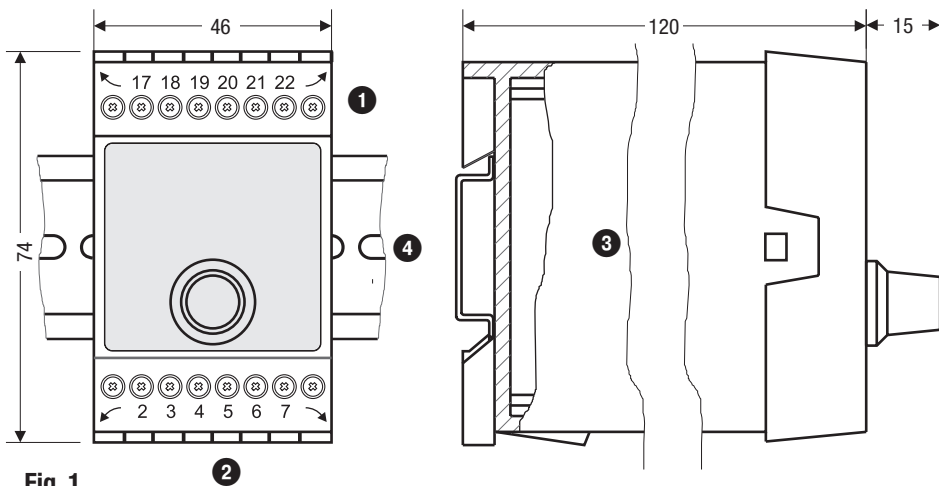


Fig. 1

### Key

- 1 Upper terminal strip
- 2 Lower terminal strip
- 3 Body
- 4 Supporting rail type TH 35, EN 60715

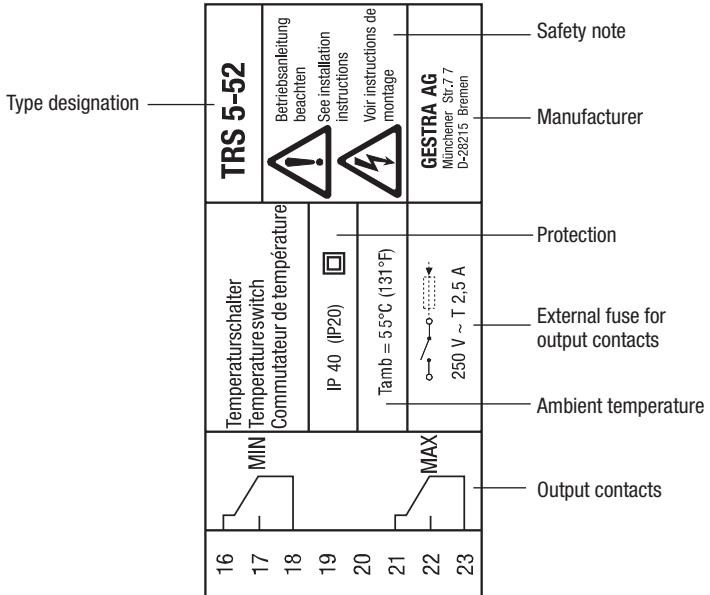
### Installation in control cabinet

The temperature switch TRS 5-52 is clipped onto the support rail type TH 35, EN 60715 in the control cabinet. Fig. 1 4

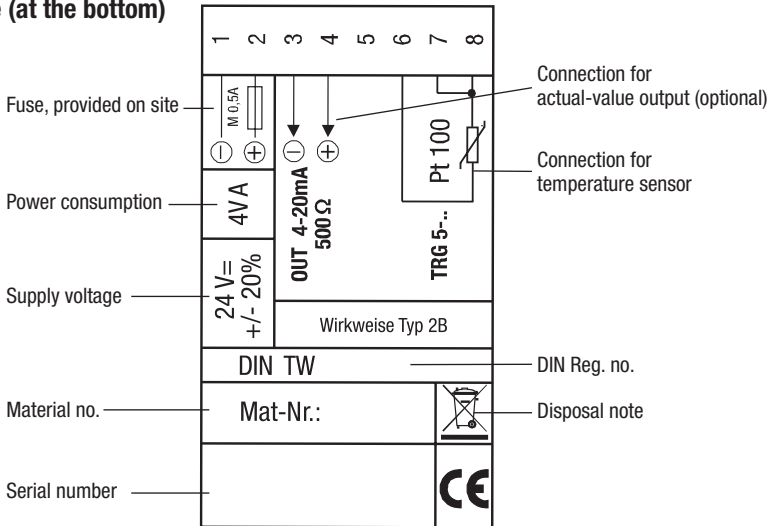


**Name plate / marking**

**Name plate (on top)**



**Name plate (at the bottom)**



**Fig. 2**

## In control cabinet: Wiring temperature switch

### Wiring diagram for temperature switch TRS 5-52

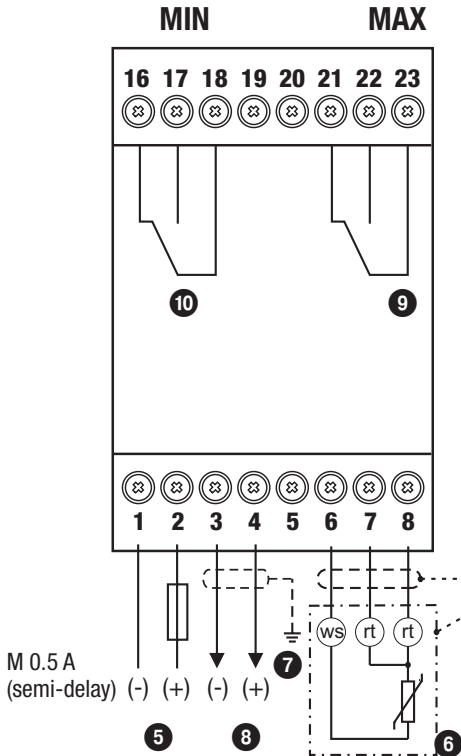


Fig. 3

#### Key

- 5 Connection of supply voltage **24 V DC** with fuse 0.5 A (semi-delay) provided on site
- 6 Temperature sensor TRG 5-... , screen provided by cable gland terminal ws = white, terminals rt = red
- 7 Central earthing point (CEP) in control cabinet
- 8 Actual value output 4-20 mA (optional)
- 9 MAX output contact
- 10 MIN output contact

## In control cabinet: Wiring temperature switch - continued -

### Connecting supply voltage

The equipment is supplied with 24 V DC and fused with an external slow-blow fuse 0.5 A. Please use a safety power supply unit with safe electrical isolation.

The power supply unit must be electrically isolated from dangerous contact voltages and must meet at least the requirements on double or reinforced isolation according to one of the following standards: DIN EN 50178, DIN EN 61010-1, DIN EN 60730-1 or DIN EN 60950.

### Connecting output contacts

Wire the upper terminal strip **1** (terminals 16-23) according to the desired switching functions. Provide an external slow-blow fuse 2.5 A for the output contacts.

When switching off inductive loads, voltage spikes are produced that may impair the operation of control and measuring systems. Connected inductive loads must be provided with suppressors such as RC combinations as specified by the manufacturer.

### Connecting temperature sensor

To connect the equipment use screened multi-core control cable with a min. conductor size 0.5 mm<sup>2</sup>, e. g. LiYCY 3 x 0.5 mm<sup>2</sup>, max. length: 100 m.

Wire terminal strip in accordance with the wiring diagram. **Fig. 3**

Note that **only** the cable gland of the temperature sensor provides the screen.

Make sure that connecting cables leading to the equipment are segregated and run separately from power cables.

### Connection for actual-value output (optional)

To connect the equipment use screened multi-core control cable with a min. conductor size 0.5 mm<sup>2</sup>, e. g. LiYCY 2 x 0.5 mm<sup>2</sup>, max. length: 100 m.

Please observe the max. load of 500 ohm.

Wire terminal strip in accordance with the wiring diagram. **Fig. 3**

Connect the screen **only once** to the central earthing point (CEP) in the control cabinet.

Make sure that connecting cables are segregated and run separately from power cables.

Any item of equipment that you want to connect to the terminals for the actual-value output 4 - 20 mA must be certified to have at least double or reinforced isolation according to DIN EN 50178 or DIN EN 61010-1 or DIN EN 60730-1 or DIN EN 60950 (safe electrical isolation) between the current loop and live parts of the equipment that are not supplied with safety extra-low voltage (SELV).



#### Attention

- Do not use unused terminals as support point terminals.

### Tools

- Screwdriver size 3.5 x 100 mm, completely insulated according to VDE 0680-1.

## In the plant: Wiring temperature sensor

### Connecting temperature sensor

The temperature switch TRS 5-52 is designed for use in conjunction with temperature sensors TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68.

To connect the equipment use screened multi-core control cable with a min. conductor size 0.5 mm<sup>2</sup>, e. g. LiYCY 3 x 0.5 mm<sup>2</sup>, max. length: 100 m.

Note that **only** the cable gland of the temperature sensor provides the screen.



#### Attention

- Please follow the instructions given in the installation & operating manual for the TRG 5-6x.
- Make sure that connecting cables leading to the equipment are segregated and run separately from power cables.

### Wiring diagram for temperature sensor

TRG 5-63, TRG 5-65,  
TRG 5-66, TRG 5-67

TRS 5-..

TRG 5-64  
TRG 5-68

TRS 5-..

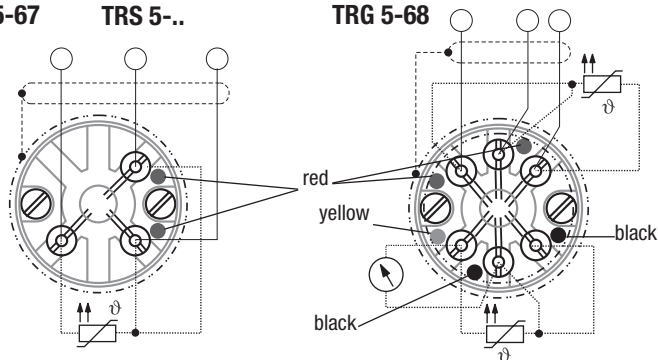


Fig. 4



#### Note

Additional equipment such as indicating devices can be connected to the terminals marked in yellow and black of the TRG 5-64 and TRG 5-68. **Fig. 12**

## Factory settings

### Temperature Switch TRS 5-52

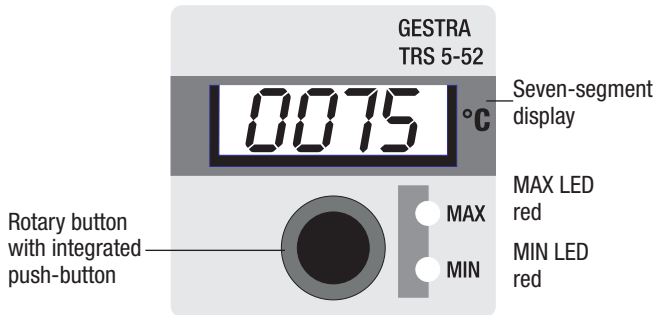
The temperature switch features the following factory set default values:

- MAX switchpoint AL.Hi = 150 °C, reset hysteresis: -5 K (fixed setting)
- MIN switchpoint AL.Lo = 50 °C, reset hysteresis: +5 K (fixed setting)
- Current output Sout 20 mA = 200 °C

**Code switch:** S1, S2, S3, S4 OFF

## Operating temperature switch

### Key to codes on seven-segment display



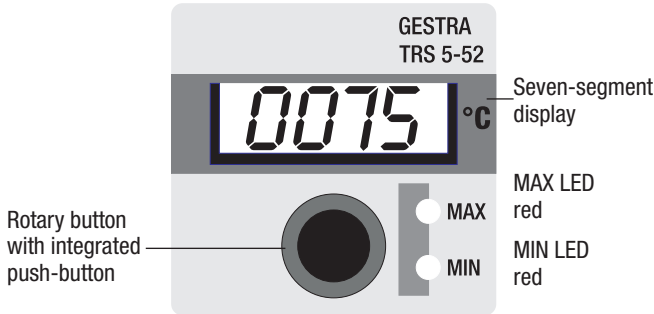
**Fig. 5**

Code	Description	
Indicated when rotary button is turned to the right:		
AL.Hi	Alarm High	MAX switchpoint
AL.Lo	Alarm Low	MIN switchpoint
Sout	Current out	Limit of actual-value output, adjustable between 0 and 600 °C
tESt	Test	Tests output relays

Indicated when in parameterization mode:		
quit	Quit	Input not confirmed
done	Done	Input confirmed

Indicated if malfunctions occur:		
E.005	Error	Temperature sensor defective, measured value too low
E.006	Error	Temperature sensor defective, measured value too high
E.013	Error	MIN switchpoint above MAX switchpoint

## Setting parameters



**Fig. 5**

Start		
Activity	Display	Function
Switch on supply voltage. Temperature between MIN and MAX.	Seven-segment display shows equipment and software version.	System test, takes approx. 3 sec.
	Seven-segment display shows actual value.	System switches to operating mode.

Setting parameters		
Activity	Seven-segment display	Function
Turn rotary button until the desired parameter is indicated.	Display toggles between parameter and the saved value setting.	For selecting the parameter.
Press and hold down the push-button (of the rotary button)	First digit (10 <u>0</u> ) flashing.	Parameterization mode active. You can change the first digit.
Turn rotary button.	A new value is indicated.	To increase the value turn rotary button to the right, to decrease turn it to the left.
Press push-button. Each time you press the button the system moves to the next digit.	Second or third digit is flashing. (from right to left)	The second or third digit can be changed by turning the rotary button. To increase the value turn rotary button to the right, to decrease turn it to the left.
<i>If no further operation is performed:</i>	“quit” is indicated for a moment. Then the display toggles between parameter and the old value setting.	The system switches automatically back to parameter and the input is not confirmed.
After the input has been finished: Press and hold down the push-button.	“done” is indicated for a moment. Then the display toggles between parameter and the new value setting.	The input is confirmed and the system switches automatically back to parameter.
Turn rotary button until the next parameter is indicated. Or turn the rotary button until the actual value is shown. If no operation is performed the actual value will be indicated automatically after 30 sec.		

## Commissioning procedure

### Setting switchpoints and actual-value output

<b>Setting MIN/MAX switchpoints</b>	
<b>Activity</b>	<b>Function</b>
Select parameter AL.Lo, set the desired temperature and save the setting.	MIN switchpoint setting between 0 - 600 °C.
Select parameter AL.HI, set the desired temperature and save the setting.	MAX switchpoint setting between 0 - 600 °C.

<b>Setting the upper limit of actual-value output</b>	
Select parameter Sout, set the desired temperature and save the setting.	Setting between 0 - 600 °C.

## Operation, Alarm and Test

### Indicators

Operation		
Activity	Display	Function
Temperature between MIN and MAX.	MIN and MAX LEDs are not illuminated.	MIN output contact 16/18 open, 17/18 closed. MAX output contact 21/23 open, 22/23 closed.

MIN alarm		
Value below switchpoint MIN temperature	MIN LED illuminated red	MIN output contact 16/18 closed, 17/18 open.

MAX alarm		
Switchpoint MAX temperature exceeded	MAX LED illuminated red	Time delay elapsed, MAX output contact 21/23 closed, 22/23 open.



### Note

The actual value is shown on the seven-segment display

### Checking functions of MIN / MAX output contacts

Testing MIN alarm and MAX alarm		
Activity	Display	Function
<b>During operation: Temperature between MIN and MAX</b> Select parameter "Test". Press and hold down push-button.	MAX LED flashes for 3 sec.	
	MAX LED is illuminated red for 3 sec.	MAX output contact 21/23 closed, 22/23 open.
	MIN and MAX LEDs not illuminated for 1 sec.	MAX output contact 21/23 open, 22/23 closed. MIN output contact 16/18 open, 17/18 closed.
	MIN LED flashes for 3 sec.	
	MIN LED is illuminated red for 3 sec.	MIN output contact 16/18 closed, 17/18 open.
Test finished, release push-button. Equipment returns to operating mode.	Note: If you continue to hold down the push-button, a new test is started. You can abort the test any moment by releasing the push-button.	
Replace the temperature switch if the test does not finish successfully.		



## Troubleshooting

### Indication, diagnosis and remedy



#### Attention

Before carrying out the fault diagnosis please check:

**Supply voltage:**

Is the equipment supplied with the mains voltage specified on the name plate?

**Wiring:**

Is the wiring in accordance with the wiring diagram?

Faults indicated by the seven-segment display		
Error code	Error	Remedy
E.005	Temperature sensor defective, measured value too low	Check the temperature sensor for correct readings. If any deviations occur replace the measuring insert with a new one. Check the sensor lines (short circuit, interruption?).
E.006	Temperature sensor defective, measured value too high	Check the temperature sensor for correct readings. If any deviations occur replace the measuring insert with a new one. Check the sensor lines (short circuit, interruption?).
E.013	MIN switchpoint above MAX switchpoint	Re-adjust the switchpoints.
<b>In the event of a malfunction a MIN and MAX alarm will be triggered.</b>		



#### Attention

- For further troubleshooting please follow the instructions given in the installation & operating manual for the TRG 5-6...



#### Note

If a malfunction occurs in the temperature switch, MIN and MAX alarms will be triggered and the equipment is restarted.

Should this happen over and over again, replace the equipment with a new one.

## Further Notes

### Action against high frequency interference

High-frequency interference can be caused by out-of-phase switching operations. Should sporadic failures or malfunctions occur take the following remedial actions in order to suppress interference:

- Provide inductive loads with RC combinations according to manufacturer's specification to ensure interference suppression.
- Make sure that connecting cables leading to the equipment are segregated and run separately from power cables.
- Increase the distance to sources of interference.
- Check the screen connection of the temperature sensors.
- HF interference suppression by means of hinged-shell ferrite rings.



### Danger

The upper terminal strip of the equipment is live during operation.

This presents the danger of electric shock!

Always **cut off power supply** to the equipment before mounting, removing or connecting the terminal strips!

### Decommissioning / replacing the equipment

- Switch off supply voltage and **cut off power supply** to the equipment.
- Remove the lower and upper terminal strips. **Fig. 6**
  - Insert a screwdriver to the right and left of the arrow markings between the terminal strip and the front frame.
  - Unlock terminal strip on the left and right side. For this purpose move screwdriver in direction of the arrow.
  - Remove the terminal strips.
- Release the white fixing slide at the bottom of the equipment and take the equipment off the supporting rail.

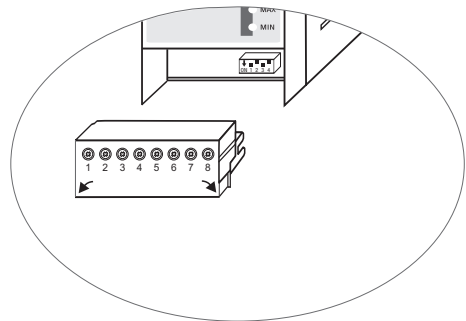
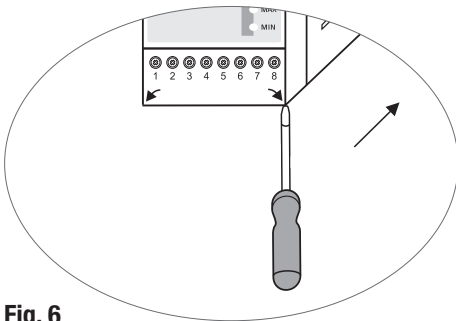


Fig. 6

### Disposal

For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

## For your Notes

If faults occur that are not listed above or cannot be corrected, please contact our service centre or authorized agency in your country.



Agencies all over the world: [www.gestra.de](http://www.gestra.de)

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