



Temperature Switch

TRS 5-52

EN
English

Original Installation &
Operating Manual

819175-07

Contents

Page

Important notes

Usage for the intended purpose	4
Function	4
Safety notes.....	4
Potentially explosive areas	5

Technical data

TRS 5-52.....	6 – 7
Product package.....	7
Example of name plate/identification	8

Installation

Installation in the door of the control cabinet.....	9
Dimensions of the TRS 5-52	10
Key	10
Installation in a control cabinet	10

In the control cabinet: Wiring the temperature switch

Wiring diagram for temperature switch TRS 5-52	11
Key	11
Supply voltage connection	12
Connecting the output contacts.....	12
Connecting temperature sensors	12
Connecting the actual value output	12
Tools.....	12

In the system: Wiring temperature sensors

Connecting temperature sensors	13
Wiring diagram for temperature sensors	13

Factory settings

Factory settings	13
------------------------	----

Operating the temperature switch

Meaning of codes on the 7-segment display	14
Setting parameters	15

Bringing into service

Setting switchpoints and the actual value output	16
--	----

Operation, alarm and testing

Password protection	16
Indicators	17
Checking the function of the MIN/MAX output contacts	17

Troubleshooting

Indications, diagnosis and remedies	18
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Further information

Action against high-frequency interference	19
Replacing/taking the equipment out of service	19
Disposal	19

Declaration of Conformity

Directives and Standards	20
--------------------------------	----

Important notes

Usage for the intended purpose

The TRS 5-52 temperature switch is used in combination with the TRG 5-6.. temperature sensors as a limit switch, e.g. in steam boilers and hot water installations. The temperature switch indicates when a MIN and MAX temperature has been reached.

The TRS 5-52 temperature switch can be combined in a circuit with the TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68 temperature sensors.

Function

A EN 60751-compliant Pt100 platinum resistance thermometer is used as a temperature sensor for the TRS 5-52 temperature switch. It is connected in a three-wire configuration.

The temperature switch processes the variations in resistance in the temperature sensor, which vary depending on the temperature and, in normal operation, shows these variations on the 7-segment LED display.

The MIN or MAX temperature switchpoints can be adjusted as long as they remain within the measuring range. If the MIN or MAX temperature is reached, the MIN or MAX output contact switches and the MIN or MAX LED lights up.

Faults or malfunctions in the temperature sensor, the electrical connection or the settings are indicated on the 7-segment LED display and the MIN and MAX alarm is triggered.

If faults occur in the TRS 5-52 temperature switch, only the MIN and MAX alarm is triggered and the system is restarted.

Parameters can be changed or the MIN/MAX alarm simulated by operating the rotary knob.

The equipment is available with a 4-20 mA actual value output for external temperature indication.

Safety note

The equipment performs a safety function and may only be installed, wired and brought into service by qualified and competent staff.

Retrofitting and maintenance work may only be performed by authorised staff who have achieved a recognised level of competence through specific training.



Danger

The terminal strips of the equipment are live during operation.

There is a risk of serious injury due to electric shock!

Always **cut off power to the equipment before working on the terminal strips (installation, removal, connecting cables).**



Attention

The name plate indicates the technical features of the equipment. Do not bring into service or operate any equipment that does not bear its own specific name plate.

Important notes continued

Potentially explosive areas

The equipment must **not** be used in potentially explosive atmospheres.



Note

TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68 temperature sensors are simple items of electrical equipment as specified in EN 60079-11 section 5.7. The equipment may be used in potentially explosive atmospheres only in combination with approved Zener barriers. Suitable for use in Ex zones 1 and 2 (1999/92/EC). The equipment does not have Ex classification.

Technical data

TRS 5-52

Supply voltage

24 VDC $\pm$ 20%

Fuse

external 0.5A (semi-delay)

Power consumption

4 W

Connecting the temperature sensor

1 input for TRG 5-63, TRG 5-64, TRG 5-65, TRG 5-66, TRG 5-67 and TRG 5-68 temperature sensors, (Pt100 platinum resistance thermometer to EN 60751), 3-pole with shield.

Outputs:

2 volt-free relay contacts, 6 A 250 V AC / 30 V DC $\cos \varphi = 1$.

(MIN/MAX alarm, adjustable switchpoint).

Inductive loads must have interference suppression (RC combination) as per the manufacturer's specification.

1 analogue output 4-20 mA, max. output load 500 ohms, e.g. for actual value indication.

Measuring range

0 °C to 600 °C

Switching hysteresis

MAX temperature switchpoint: -5 K, fixed.

MIN temperature switchpoint: $+5$ K, fixed.

Displays and controls

1 rotary knob with integrated pushbutton for testing the MIN/MAX alarm and setting the parameters,

1 four-digit seven-segment LED display, green

2 red LEDs for MIN/MAX alarm

Housing

Housing material base of black polycarbonate; front of grey polycarbonate

Conductor size: 1 x 4.0 mm² solid per wire, or

1 x 2.5 mm² per stranded wire with sleeve to DIN 46228, or

2 x 1.5 mm² per stranded wire with sleeve to DIN 46228 (min. $\varnothing$ 0.1 mm)

Terminal strips can be removed separately

Housing attachment: Mounting clip on support rail TH 35, EN 60715

Electrical safety

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

IP rating

Housing: IP 40 to EN 60529

Terminal strip: IP 20 to EN 60529

Panel adapter: IP 65 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

in operation –10 ... 55 °C

Transport temperature

–20 ... +80 °C (<100 hours), only switch on after a defrosting period of 24 hours.

Storage temperature

–20 ... +70 °C, only switch on after a defrosting period of 24 hours.

Relative humidity

Max. 95%, non-condensing

Product package

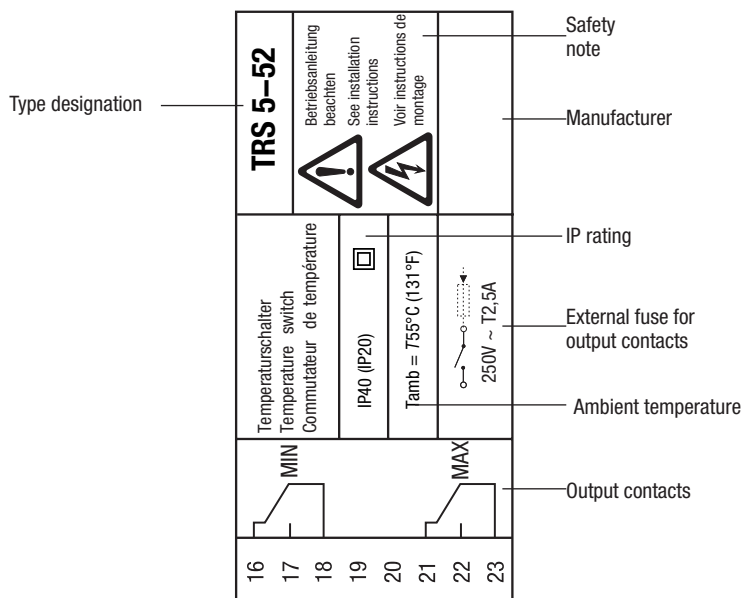
TRS 5-52

1 temperature switch TRS 5-52

1 Installation & Operating Manual

Example of name plate/identification

Name plate, top



Name plate, bottom

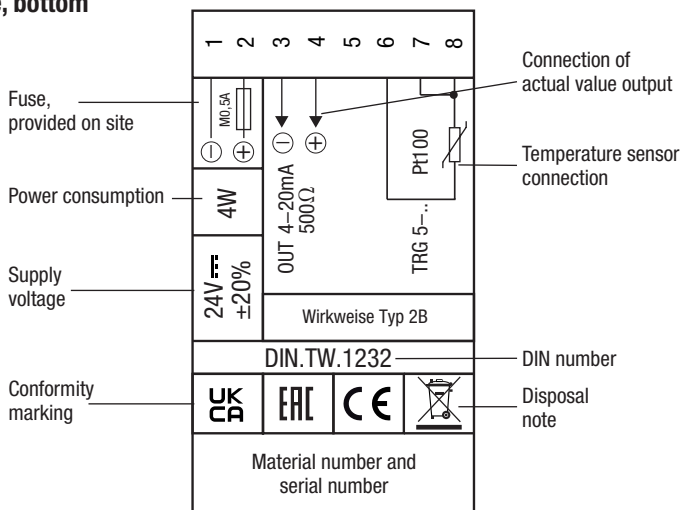


Fig. 1

Installation

Installation in the door of the control cabinet

The small panel adapter with rotary knob, stock code 441553, enables the switch to be installed in the door of a control cabinet.

The advantage of this is that the status is visible and alarms can be tested without opening the control cabinet door. When installed, the adapter has a rating of IP65. Please refer to the panel adapter Installation & Operating Manual 850625-xx for further information.



Fig. 2

In the control cabinet: Installing the temperature switch

Dimensions of TRS 5-52

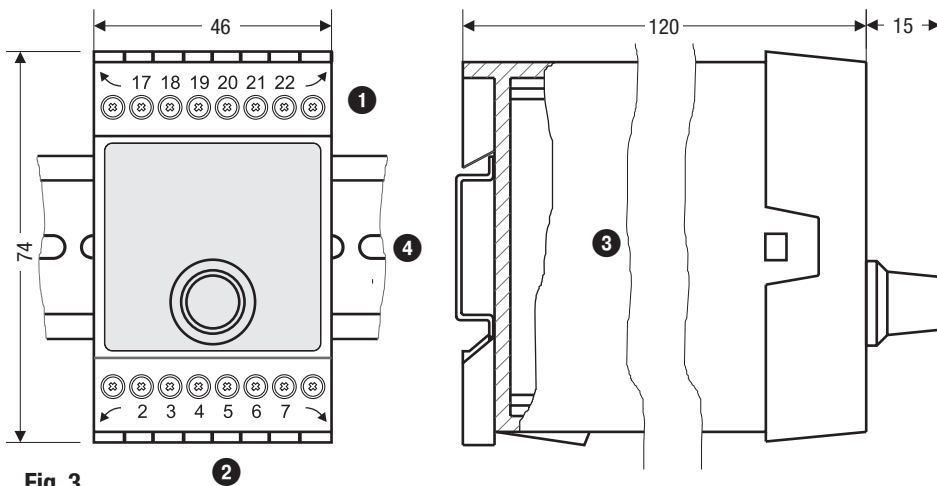


Fig. 3

Key

- | | |
|------------------------|--------------------------------|
| 1 Upper terminal strip | 3 Housing |
| 2 Lower terminal strip | 4 Support rail TH 35, EN 60715 |

Installation in a control cabinet

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

Fig. 3 4

In the control cabinet: Wiring the temperature switch

Wiring diagram for temperature switch TRS 5-52



Key

- 5 Supply voltage connection 24 V DC with 0.5A semi-delay fuse provided on site
- 6 Temperature sensor TRG 5-6.., shielding via cable gland
Terminal wh = white, terminals rd = red
- 7 Central earthing point (CEP) in control cabinet
- 8 Actual value output 4-20 mA
- 9 MAX output contact
- 10 MIN output contact

In the control cabinet: Wiring the temperature switch continued

Supply voltage connection

The equipment is supplied with 24 V DC and has an external 0.5A semi-delay fuse. Please use a safety power supply unit with reliable electrical isolation.

This power supply unit must provide a level of isolation from dangerous contact voltages that at least meets the requirements for double or reinforced insulation in accordance with one of the following standards: EN 61010-1, EN 60730-1, EN 60950-1 or EN 62368-1.

Connection of output contacts

Wire the upper terminal strip **①** (terminals 16-23) in line with the desired switching functions.

Provide an external 2.5A slow-blow fuse for the output contacts.

Switching off inductive loads produces surges that can have a major adverse effect on the operation of open and closed-loop control systems. Connected inductive loads must therefore have interference suppression (RC combination) as per the manufacturer's specifications.

Connecting the temperature sensor

To connect the equipment, please use a shielded, multi-core control cable with a minimum conductor size of 0.5 mm², e.g. LiYCY 3 x 0.5 mm², maximum length 100 m.

Wire the terminal strip as shown in the wiring diagram. **Fig. 4**

The shield is applied **only** to the temperature sensor via the cable gland.

Route the connecting cables to the equipment separately from power lines.

Connecting the actual value output

For connection, please use a shielded, multi-core control cable with a minimum conductor size of 0.5 mm², e.g. LiYCY 2 x 0.5 mm², maximum length 100 m.

Please note the maximum output load of 500 ohms.

Wire the terminal strip as shown in the wiring diagram. **Fig. 4**

Connect the shield **just once** to the central earthing point (CEP) in the control cabinet.

Route connecting cables separately from power cables.

Any item of equipment that you wish to connect to the terminals for the 4-20 mA actual value output must be certified to have at least double or reinforced insulation to EN 61010-1, EN 60730-1, EN 60950-1 or EN 62368-1 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 terminals.

Tools

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

Operating the temperature switch

Meaning of codes on the 7-segment display

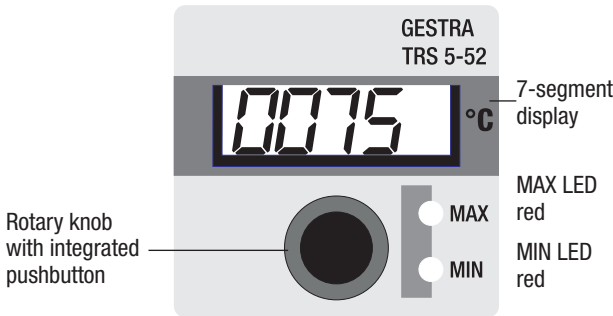
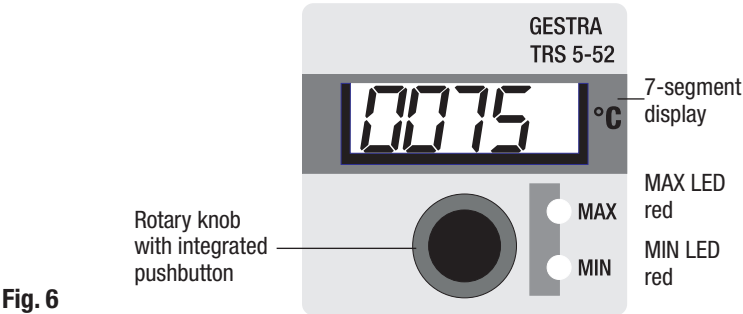


Fig. 6

Code	Meaning	
Appears when rotary knob is turned clockwise:		
AL.Hi	Alarm High	MAX switchpoint
AL.Lo	Alarm Low	MIN switchpoint
Sout	Current out	Upper limit of actual value output, adjustable between 0 and 600 °C
tESt	Test	Output relays are tested
PW	Password	on = password protection is enabled oFF = password protection is disabled
	Factory setting	1902 (cannot be changed)
Appears in parameterization mode		
quit	Quit	Input is not confirmed
done	Done	Input is confirmed
Appears in the event of malfunctions		
E.005	Error	Temperature sensor defective, reading too low
E.006	Error	Temperature sensor defective, reading too high
E.013	Error	MIN switchpoint higher than MAX switchpoint

Setting parameters



Starting		
Action	Indication	Function
Switch on the supply voltage. Temperature between MIN and MAX.	7-segment display shows software and equipment version	System test, takes approx. 3 sec.
	7-segment display shows actual value	System switches to operating mode

Setting parameters		
Action	7-segment display	Function
Turn the rotary knob until the desired parameter is shown	Display toggles between the parameter and the saved value.	The parameter is selected
Press and hold the pushbutton (on rotary knob)	First digit (100) flashes.	Parameterization mode active. First digit can be changed.
Turn the rotary knob	A new value is displayed.	Turning clockwise increases the value, turning anti-clockwise reduces the value.
Briefly press the pushbutton. The number increases with each press.	2nd or 3rd digit flashes. (from right to left)	2nd or 3rd digit can be changed using the rotary knob. Turning clockwise increases the value, turning anti-clockwise reduces the value.
<i>If you do not take any further action:</i>	quit is briefly displayed. After this, the display toggles between the parameter and the old value.	The parameter is automatically shown once more and your entry is not confirmed.
When your entries are complete: press and hold the pushbutton	done is displayed. After this, the display toggles between the parameter and the new value.	Your entry is confirmed and the parameter is automatically shown once more.
Turn the rotary knob until the next parameter is shown. Or turn the rotary knob until the actual value is displayed. Or after 30s, the actual value is displayed automatically.		

Bringing into service

Setting switchpoints and the actual value output

Setting the MIN/MAX switchpoints	
Action	Function
Select parameter AL.Lo, enter and save the desired temperature.	MIN switchpoint is set between 0-600 °C
Select parameter AL.Hi, enter and save the desired temperature.	MAX switchpoint is set between 0-600 °C

Setting the limit of the actual value output	
Select parameter Sout, enter and save the desired temperature.	Set between 0-600 °C

Operation, alarm and testing

Password protection

Parameters can be password-protected from software version “S-13” onwards. The default password is 1902 and cannot be changed.

Enabling password protection		
Action	Display	Function
Turn the rotary knob until the entry PW is shown.	The display toggles between the parameter name and the parameter value.	Parameter selected.
Press and hold the pushbutton (on rotary knob).	PASS	Password entry is required.
Release and then press and hold the pushbutton once more.	First digit (0000) flashes.	Enter the password starting with the digit on the right.
Turn the rotary knob clockwise or anti-clockwise to enter the required digit.	000X	The first digit is entered.
Briefly press the pushbutton.	Second digit from the right flashes (000X).	The second digit can be entered.
Repeat the last two steps until the password has been entered in full.	The entered password is displayed (XXXX).	The password is entered in full.
Press and hold the pushbutton.	donE	The correct password was entered. The parameter may be edited.
	FAiL	The wrong password was entered. The parameter is still password-protected.
	quit	Processing time has elapsed. System switches back to the parameter. Password entry is cancelled.
Disabled password protection is re-enabled after 30 minutes without any activity (rotary knob). The password must be entered again. When the equipment is restarted, the parameters are password-protected, if password protection was previously enabled.		



If **password protection** is enabled, you must enter the password before you can change parameters.

Indications

Operation		
Action	Indication	Function
Temperature between MIN and MAX.	MIN and MAX LEDs are not lit	MIN output contacts 16/18 open, 17/18 closed. MAX output contacts 21/23 open, 22/23 closed.

MIN alarm		
Temperature below MIN switchpoint.	MIN LED lights up red	MIN output contacts 16/18 closed, 17/18 open.

MAX alarm		
Temperature above MAX switchpoint.	MAX LED lights up red	Delay time elapsed, MAX output contacts 21/23 closed, 22/23 open.



Note

The actual value is shown on the 7-segment display.

Checking the function of the MIN/MAX output contacts

Testing the MIN alarm and MAX alarm		
Action	Indication	Function
In operating mode: Temperature between MIN and MAX Select Test parameter. Press and hold the pushbutton.	MAX LED flashes for 3 seconds	
	MAX LED lights up red for 3 seconds	MAX output contact 21/23 closed, 22/23 open.
	The MIN and MAX LED do not light up for 1 second	MAX output contact 21/23 open, 22/23 closed. MIN output contact 16/18 open, 17/18 closed.
	MIN LED flashes for 3 seconds	
	MIN LED lights up red for 3 seconds	MIN output contact 16/18 closed, 17/18 open.
Test complete, release pushbutton. Equipment switches to operating mode.	Note: If you continue holding the pushbutton, the test sequence will start again. You can interrupt the test sequence at any time by releasing the pushbutton.	
If the test was failed, replace the temperature switch.		

Troubleshooting

Indications, diagnosis and remedies



Attention

Please check the following before fault diagnosis:

Supply voltage:

Is the temperature switch supplied with the voltage specified on the name plate?

Wiring:

Does the wiring conform to the wiring diagram?

Error codes on the 7-segment display		
Error code	Error	Remedy
E.005	Temperature sensor defective, reading too low	Check whether the temperature sensor is sending the correct readings. In the event of deviations, please replace the sensor unit. Check the sensor lines (short circuit, open circuit?).
E.006	Temperature sensor defective, reading too high	
E.013	MIN switchpoint higher than MAX switchpoint	Reset switchpoints
E.097	Walkthrough application error	Internal error. Replace equipment.
E.098	Walkthrough test error	Internal error. Replace equipment.
E.099	Internal test error	Internal error. Replace equipment.
In the event of a malfunction, the MIN and MAX alarm is triggered.		

All error codes not listed here are available as reserves.



Attention

- For further diagnosis, please refer to the Installation & Operating Manuals for the TRG 5-6..



Note

In the event of a malfunction in the temperature switch, the MIN and MAX alarm is triggered and the equipment restarts.

If the process is continually repeated, the equipment must be replaced.

Further information

Action against high-frequency interference

High-frequency interference can be caused by out-of-phase switching operations. If such interference occurs and results in sporadic failure, we recommend taking the following action to suppress interference:

- Provide inductive loads with RC combinations as per manufacturer's specifications.
- Route the connecting cable to the temperature sensor separately from power lines.
- Increase the distance from sources of interference.
- Check the shield connection on the temperature sensor.
- Suppress HF interference using hinged-shell ferrite rings.



Danger

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

There is a risk of serious injury due to electric shock!

Always **cut off power** to the equipment before working on the terminal strip (installation, removal, connecting cables).

Replacing/taking the equipment out of service

- Switch off the supply voltage and **cut off power to the equipment**.
- Remove the upper and lower terminal strips. **Fig. 7**
 - Insert a screwdriver on the right and left between the terminal strip and the front frame, as shown by the arrows.
 - Release the terminal strip on the right and left sides, by turning the screwdriver in the direction of the arrow.
 - Remove the terminal strips.
- Release the white slider holder on the underside of the housing and remove the equipment from the support rail.

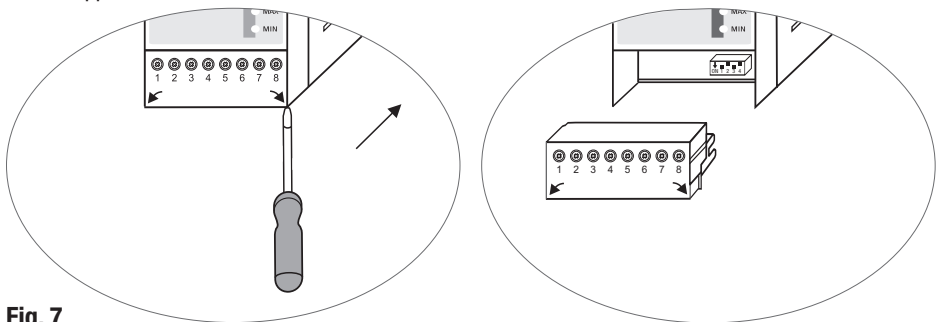


Fig. 7

Disposal

The equipment must be disposed of in accordance with statutory waste disposal regulations.

In the event of malfunctions or faults that cannot be remedied with the aid of this Installation & Operating Manual, please contact our service centre or authorised agent in your country.

Declaration of Conformity Directives and Standards

For more information on the conformity of the equipment as well as applied Directives and Standards please refer to our Declaration of Conformity and associated certificates and/or approvals.

The Declaration of Conformity can be found online at www.gestra.com and associated certificates can be requested from:

GESTRA GmbH

Münchener Straße 77

28215 Bremen

Germany

Telefon +49 421 3503-0

Telefax +49 421 3503-393

E-mail info@de.gestra.com

Web www.gestra.com

Note that Declarations of Conformity and associated certificates lose their validity if equipment is modified without prior consultation with us.



You can find our authorised agents around the world at: **www.gestra.com**

GESTRA GmbH

Münchener Straße 77
28215 Bremen
Germany

Tel. +49 421 3503-0
Fax +49 421 3503-393
E-mail info@de.gestra.com
Website www.gestra.com

UK Importer: GESTRA UK Ltd

Unit 1 Sopwith Park, Royce Close,
West Portway Business Park, Andover,
Hampshire SP10 3TS
United Kingdom