TRS 5-7

GB

Installation Instructions 810718-00

Temperature Switch TRS 5-7

Content

Page

Wiring Diagram

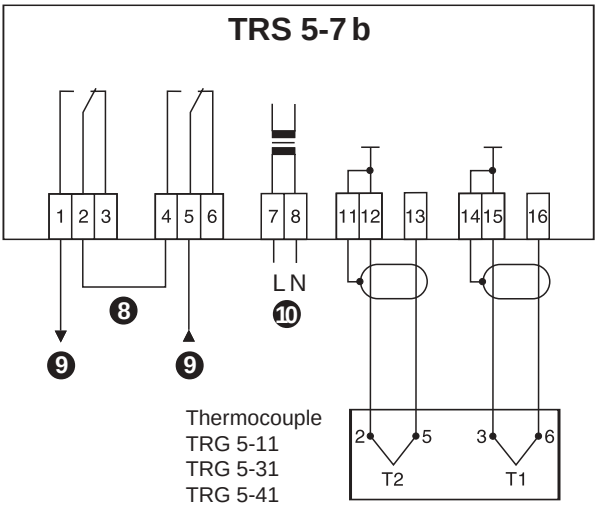


Fig. 1

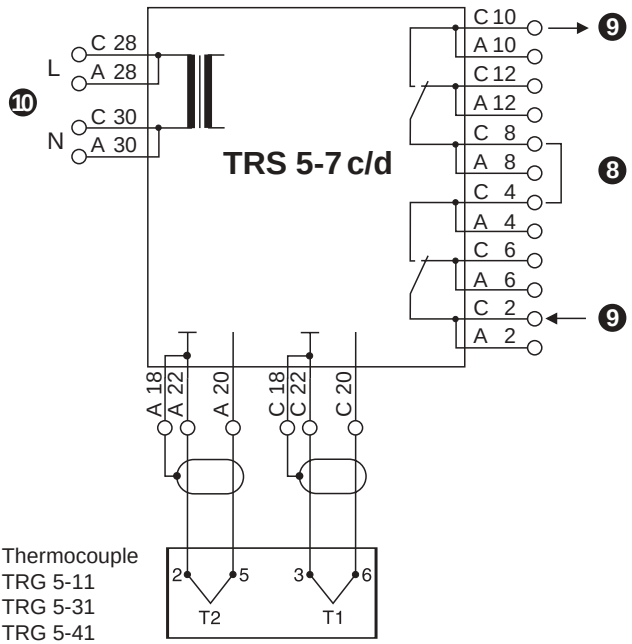


Fig. 2

Parts Drawings

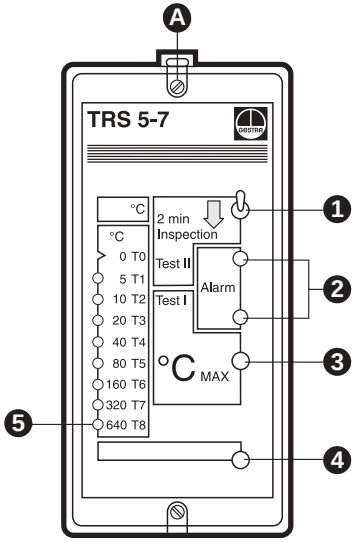
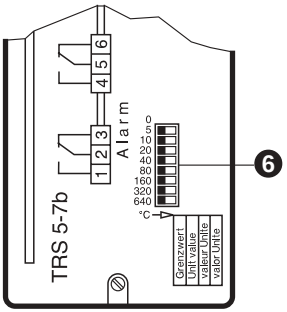


Fig. 3



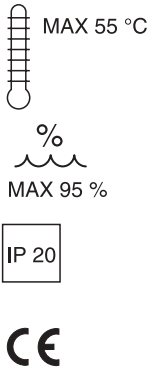


Fig. 4

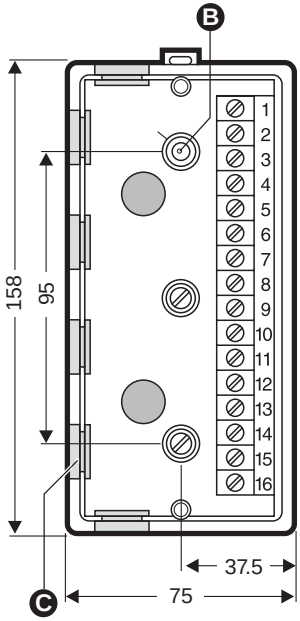


Fig. 5

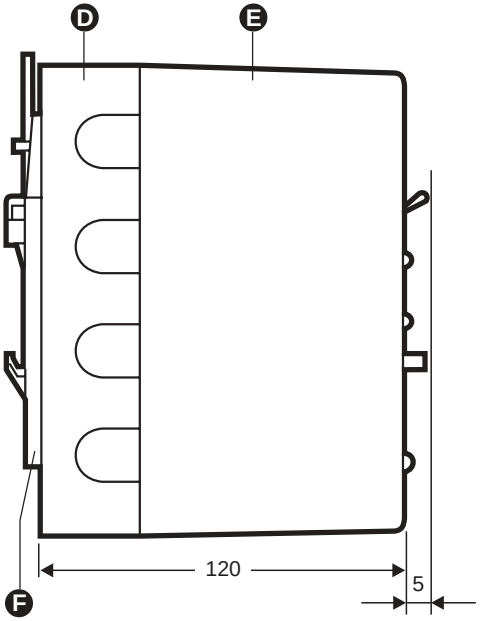


Fig. 6

Parts Drawings

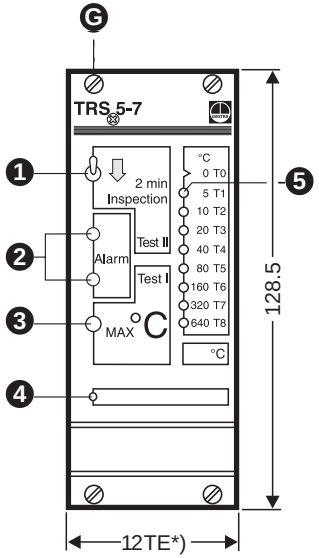
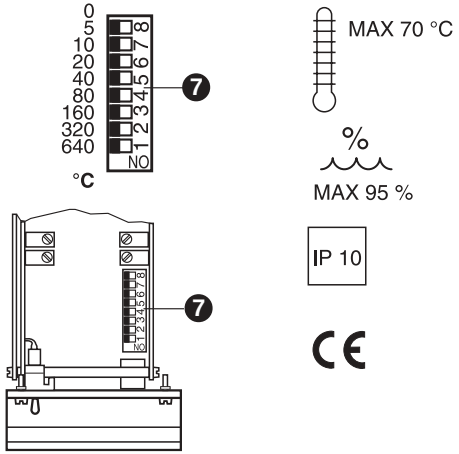


Fig. 7



*) TE = division units (1 TE = 5.08 mm)

Fig. 8

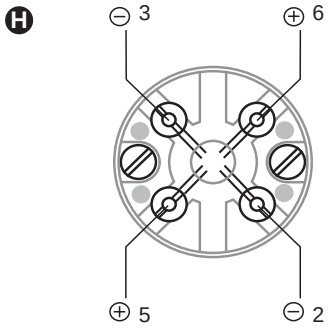


Fig. 9

Key

Ⓐ Cover screw

Ⓑ Hole for wall mounting

Ⓒ Cable entry

Ⓓ Base

Ⓔ Cover

Ⓕ Mounting clip

Ⓖ Fixing screws for 19" slide-in unit

Ⓗ Thermocouple TRG 5-11, TRG 5-31, TRG 5-41

❶ Toggle switch “Test 2/Inspection”

❷ LED “Alarm”

❸ Button “Test 1”

❹ LED “Operation”

❺ LED “Temperature value”

❻ Code switch for TRS 5-7b

❼ Code switch for TRS 5-7 c/d (19" version)

❽ External wire link

❾ Burner-protection circuit

❿ Mains

Important Notes

Usage for the intended purpose

The temperature switch TRS 5-7 is a safety equipment for plants requiring official approval and must only be used in conjunction with thermocouples TRG 5-11, TRG 5-31 and TRG 5-41 for signalling temperature limits.

Safety Note

The equipment must only be installed by qualified staff.

Qualified staff are those persons who – through adequate training in electrical engineering, the use and application of safety equipment in accordance with regulations concerning electrical safety systems, and first aid & accident prevention – have achieved a recognised level of competence appropriate to the installation and commissioning of this device.

Danger

The terminal strips of the TRS 5-7 b and TRS 5-7 c/d are live during operation. This presents the danger of electric shock. Cut off power supply before installing or removing the cover.

Explanatory Notes

Scope of supply

TRS 5-7 b
1 Temperature switch (plug-in unit in plastic case for installation in control cabinets)
1 Installation manual

TRS 5-7 c
1 Temperature switch (19" slide-in unit, front panel acc. to DIN 41494, part 5, 12 TE*)
2 Guide rails
1 Screw-type connector
1 Installation manual

TRS 5-7 d
1 Temperature switch (19" slide-in unit, front panel acc. to DIN 41494, part 5, 12 TE*)
1 Installation manual

*) TE = division units (1 TE = 5.08 mm)

Explanatory Notes – continued –

Description

Self-monitoring temperature switch with periodic self-checking feature to be used in conjunction with thermocouples type **TRG 5-11, TRG 5-31, TRG 5-41.**
The equipment operates as a safety temperature controller, or, in conjunction with an external lock-out in accordance with VDE 0116, as a safety temperature limiter. An alarm is given as soon as the temperature exceeds a preset limit value.
Application in steam boilers and (pressurized) hot-water plants operating without constant supervision (TRD 604) as well as any other kind of heat generating units.

Function

The temperature switch type TRS 5-7 is a two channel unit featuring automatic self-checking in accordance with DIN 3440/VDE 0116 (regulations on protection circuits for firing equipment of furnaces). The two channels are designed to monitor the operation of each other. If one channel fails, an alarm signal is initiated, simultaneously switching the output contacts to shut off the heat supply. The periodic self-checking logic unit checks the two channel circuits for malfunction. The integrity of the thermocouple is continuously monitored by the TRS 5-7. The output relays are not influenced by this internal test.

A manual test push button is also provided. When the push button TEST 1 is pressed, a fault is simulated in the temperature sensor. There is also a toggle switch TEST 2 / INSPECTION for simulating a malfunction in the self-checking unit.

The output contact relays of the temperature switch are of the normally closed type and will therefore signal alarm condition in the event of a mains failure.

The temperature switch can signal the following three operating conditions:

- Normal operation (temperature within permissible range)
- Alarm (limit temperature exceeded)
- Alarm (malfunction in temperature switch or resistance thermometer)

The green LED indicates "POWER ON". The two red LEDs indicate excessive temperature or system malfunction. The failure of one channel (loss of redundancy) is signalled by the lighting-up of one red LED.
The equipment combination TRS 5-7 and TRG 5-... provides fail-safe protection against a first fault, i. e. the system will still continue to provide the safety function even after the occurence of a first fault.

Design

TRS 5-7 b:
Plug-in unit in plastic case for snapping onto the supporting rail TS 35 x 15 to DIN EN 50022 for installation in control cabinets.

TRS 5-7 c:
19" slide-in unit, front panel to DIN 41494, part 5, 12 TE*)

*) TE = division units (1 TE = 5.08 mm)

Explanatory Notes – continued –

Technical Data

Type approval
DIN · STW (STB) · 986 98S

Input
2 connections for one twin-thermocouple (type K):
TRG 5-..., 1 – 170 bar, T_{max} 650 °C – 1000 °C

Output
2 volt-free relay contacts.
Max. contact rating with switching voltages of 24 V, 115 V and 230 V a. c.:
4 A resistive, 0.75 A inductive at cos φ 0.5.
Max. contact rating with a switching voltage of 24 V d. c.: 4 A
Contact material silver, hard-gold plated.

Temperature range
0 – 1000 °C, code switch selectable in steps of 5 °C

Switching hysteresis
–10 °C

Indicators and adjustors
Two LEDs “Alarm”, one LED “Operation”, one push button “Test 1”, one toggle switch “Test 2/Inspection”, eight LEDs and one code switch for temperature limit settings.

Accuracy
Better –19 Kelvin

Supply voltage
230 V +/– 10 %, 50/60 Hz.
Special voltage: 115 V +/– 10 %, 50/60 Hz or 24 V +/– 10 %, 50/60 Hz.

Power consumption
5 VA

Protection
TRS 5-7 b: IP 20 to DIN EN 60529
TRS 5-7 c: IP 10
TRS 5-7 d: IP 10

Max. admissible ambient temperature
TRS 5-7 b: 0 °C to 55 °C
TRS 5-7 c: 0 °C to 70 °C
TRS 5-7 d: 0 °C to 70 °C

Case material
TRS 5-7 b:
Base: ABS plastic, black. Cover: polystyrene, highly shock resistant, stone grey.
Fig. 5, Fig. 6
TRS 5-7 c: Front panel: Aluminium. **Fig. 7**
TRS 5-7 d: Front panel: Aluminium. **Fig. 7**

Weight
TRS 5-7 b: approx. 1.0 kg
TRS 5-7 c: approx. 0.8 kg
TRS 5-7 d: approx. 0.8 kg

Installation

TRS 5-7b

On supporting rail (with mounting clip)

1. Clip temperature switch onto supporting rail.
2. Loosen cover screws Ⓐ and unplug cover Ⓔ from its base Ⓓ.
3. Select cable entry Ⓒ and remove corresponding seal.

On mounting panel

1. Loosen cover screws Ⓐ and unplug cover Ⓔ from its base Ⓓ.
2. Unscrew mounting clip Ⓕ.
3. Drill the hole Ⓑ marked in the base to 4.3 mm dia.
4. Fasten base with two M4 screws onto mounting panel.

TRS 5-7c

1. Mount plastic card guide rail into 19" magazine.
2. Install screw-type connector.
3. Introduce 19" slide-in unit into magazine and fasten with screws Ⓖ.

TRS 5-7d

1. Mount plastic card guide rail into 19" magazine.
2. Install screw-type connector.
3. Introduce 19" slide-in unit into magazine and fasten with screws Ⓖ.

Tools

- Screwdriver (5.5/100)

Wiring

TRS 5-7b

Use screened two-core supply cable for wiring, 2 x 0.35², type K. Max. cable length 100 m. Each temperature switch requires two cables.
The external wire link ❽ must be installed afterwards.
1. Connect terminal strip according to wiring diagram. **Fig. 1**

TRS 5-7c/d

Use screened two-core supply cable for wiring, 2 x 0.35², type K. Max. cable length 100 m. Each temperature switch requires two cables.
The external wire link ❽ must be installed afterwards.
1. Connect terminal strip according to wiring diagram. **Fig. 2**

Wiring diagram

For wiring diagram see page 2.

Attention

- To protect the switching contacts fuse circuit with T 2.5 A or according to TRD regulations (1.0 A for 72 h operation).
- The screen must not make any other electrical contact.

Note

- Connect screen only to terminal [11] and [14] (TRS 5-7b) or terminal A18 and C18 (TRS 5-7c/d) of the temperature switch.
- The rated voltage is stated on the name plate.
- When switching off inductive loads, voltage spikes are produced that may impair the operation of control and measuring systems. Inductive loads should therefore be provided with commercial arc suppressor RC combinations, e. g. 0.1 µF/100 Ω.

Tool

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680.

Adjust MAX/MIN Temperature Limits

Use the code switch at the rear of the TRS 5-7 to adjust the temperature limits.

Example 1

Requested temperature limit τ_{max} = 750 °C. The 8-pole code switch shows values between “5” and “640”. Use a small screwdriver to set the “10”, “20” and “80” and “640” switches to the right. The sum of the values gives the required temperature limit τ_{max} = 750 °C

Example 2

Requested temperature limit τ_{max} = 420 °C. Use a small screwdriver to set the “20”, “80” and “320” switches to the right. The sum of the values gives the required temperature limit τ_{max} = 420 °C.

Example 3

Requested temperature limit τ_{max} = 146 °C. Use a small screwdriver to set the “5”, “20”, “40” and “80” switches to the right. The sum of the values gives the required temperature limit τ_{max} = 145 °C. An exact adjustment of 146 °C is not possible as temperatures limits can only be adjusted in steps of 5 °C.

Tool

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680.

Commissioning

Check wiring

Check whether the TRS 5-7 has been wired to its associated system components TRG 5-... according to the wiring diagram. **Fig. 1, Fig. 2 and Fig. 9.**

Apply mains voltage

Switch on mains voltage. The green LED ❹ will be illuminated. **Fig. 3, Fig. 7**

Commissioning – continued –

Check functions

TRS 5-7 b, TRS 5-7 c/d

1. When switching on the mains voltage the green LED ❹ should be permanently illuminated. **Fig. 3**
2. Raise temperature in heat generator until the max. permissible temperature limit is exceeded. The two red LEDs ❷ on the temperature switch must light up.
3. After lowering the temperature the two red LEDs ❷ must extinguish.
4. An alarm “limit temperature exceeded” can be simulated by pushing the button TEST 1 ❸ . On pushing the button the two red LEDs must light up.
5. To check the function of the self-checking circuitry of the temperature switch proceed as follows: Set switch TEST 2/INSPECTION ❶ in the direction of the arrow. After a maximum of two minutes the two red LEDs ❷ should signal alarm. The button TEST 1 ❸ must not be operated during this test nor must the adjusted limit temperature be exceeded. After the sucessful testing return switch into its original position. After the response delay the two red LEDs must extinguish.

Annex

Warning

The terminal strips of the TRS 5-7 b / TRS 5-7 c/d are live during operation. This presents the danger of electric shock. Cut off power supply before fixing or removing the cover.

Fault finding list

Fault: The temperature switch signals alarm during normal operation.
Remedy: Check whether the green LED ❹ is illuminated. If not, check power supply.
Remedy: Check whether thermocouple supply cable is damaged.
Remedy: Check whether measured values emitted by thermocouple are correct.

Fault: The testing with push button TEST 2 / INSPECTION ❶ was not successful, i. e. only one or neither of the red LEDs ❷ lit up within two minutes.
Remedy: Replace temperature switch.

If faults occur that are not listed above please contact our subsidiary or agency in your country.

Annex – continued –

CE Declaration of Conformity

We hereby declare that the equipment **TRS 5-7b** and **TRS 5-7c/d** conform to the following Euopean guidelines:

- LVD 73/23/eec version 93/68/eec
- EMC guideline 89/336/eec version 93/68/eec

which are based on the following harmonised standards:

- LV standard EN 50 178
- EMC standard EN 50 081-2, EN 50 082-2

This declaration is no longer valid if modifications are made to the equipment without consultation with us.

Bremen,12th June 2001
GESTRA GmbH

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Lars Bohl
Academically qualified engineer

Key

- **A** Cover screw
- **B** Hole for wall mounting
- **C** Cable entry
- **D** Base
- **E** Cover
- **F** Fixing clip
- **I** Mounting rail TS 35 x 15 to DIN EN 50022

Example of Installation

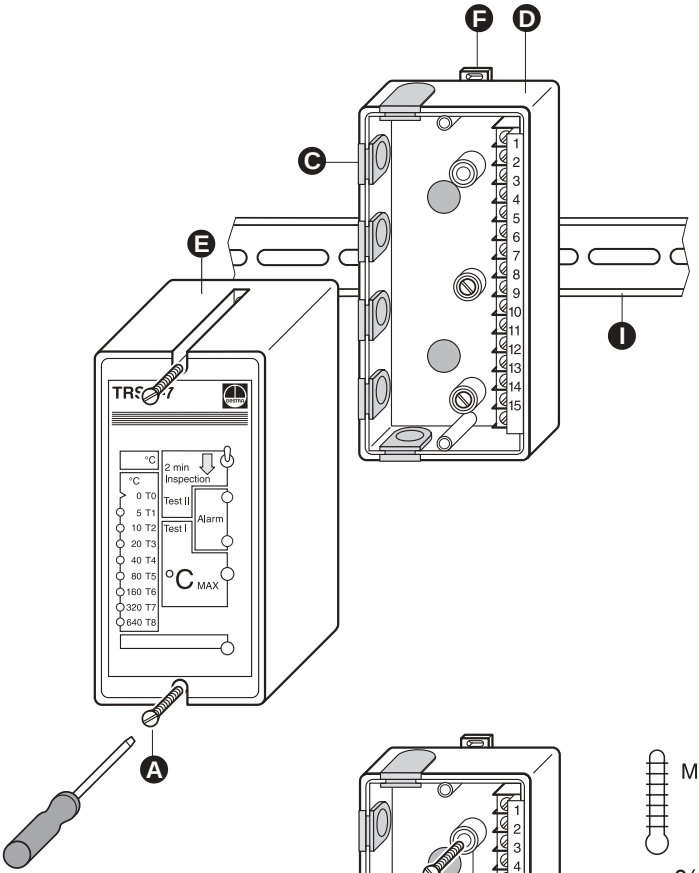

Fig. 11

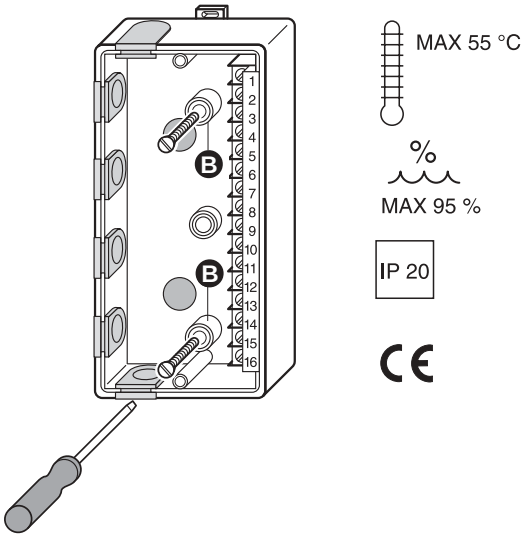

Fig. 12

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