

Purpose and Application

Self-monitoring temperature switch with periodic self-checking feature to be used in conjunction with twin thermocouples type TRG 5-.... 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, pressurized hot-water plants, as well as any other type of heat generator. The equipment meets the German regulations for use in steam-boiler plants operating without constant supervision (TRD 604).

Design

TRS 5-7b

Plug-in unit in plastic case for installation in control cabinets. The terminals in the case are accessible after loosening two screws and unplugging the unit from its base.

The plug-in units may be clipped onto a 35 mm supporting rail or screwed into position on a mounting panel. Field enclosures for several plug-in units are available on request.

TRS 5-7c

19" slide-in unit, front panel in accordance with DIN 41494. 12 TE (division units); 1 TE = 5.08 mm.

Unit with double row 32 way Euro card connector and two card guides.

TRS 5-7d

19" slide-in spare unit.

Operation

The temperature switch type TRS 5-7 is a two channel unit provided with an automatic periodic self-checking logic unit, in accordance with DIN 57116/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 twin thermocouple is continuously monitored by the TRS 5-7. This is done automatically every 40 seconds by the triggering of a test alarm pulse through the circuit. Unless it finds a fault, this internal test does not interfere with the output contacts of the temperature switch and therefore the plant operation is not interrupted.

In addition, there is a secondary checking device to monitor the operation of the periodic self-checking logic unit. If no test pulse alarm is triggered, the secondary checking device will initiate an alarm signal and switch the output contacts to shut off the heat supply.

A manual test push button is also provided. When the push button "Test I" is pressed, it simulates a fault in the resistance thermometer. There is also a test switch "Test II/Inspection" for checking the function of the self-checking circuitry.

The output contact relays of the temperature switch are of the normally close 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 (fault in temperature switch or twin thermocouple)

A green LED indicates mains supply ON. Exceeding of limit temperature or malfunction of the system are indicated by two red LEDs. The failure of one channel (loss of redundancy) is signalled by the lighting-up of one red LED.

The combination of twin thermocouple TRG 5-... and temperature switch TRS 5-7 provides fail-safe protection against a first fault, i.e. the system will still continue to provide the safety function even after the occurrence of a first fault.

Technical Data

Type-approval No.

DIN.STW (STB).986 93S

Input

Two terminals for each thermocouple type K (NiCr-Ni), type TRG 5-11-..41, PN 1...160, T_{max} 600°C...1100°C

Output

Two volt-free relay contacts.

Max. contact rating with switching voltages of 24 V, 115 V and 240 V a.c.: 4 A resistive, 0.75 A inductive, 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

Switching temperature adjustable in steps of 5 °C within a range of 0 °C to 1200 °C by a code switch.

Switching hysteresis

-10 °C

Indicators and adjustors

Two red LEDs "Alarm"

One green LED "Mains supply on"

One button "Test I"

One test switch "Test II/Inspection"

Eight red LEDs "Set-point indication"

One eight-pole code switch for setting the limit temperature

Mains supply

220/240 V, 50/60 Hz

(please state voltage when ordering)

Special voltage: 115 V ±10%, 50/60 Hz or 24 V ±10%, 50/60 Hz

Protection

Design TRS 5-7b: IP 20 in accordance with DIN 40050

Design TRS 5-7c: IP 10

Permissible ambient temperature

Design TRS 5-7b: 0 °C to 55 °C

Design TRS 5-7c: 0 °C to 70 °C

Case materials

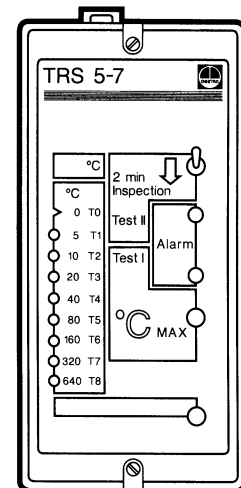
TRS 5-7b

Base: ABS plastic, black

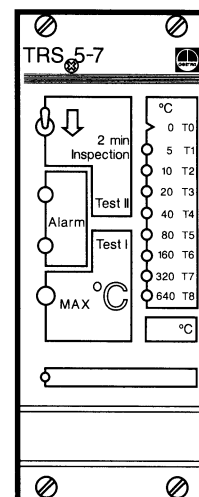
Cover: Polystyrene (highly shock-resistant)

TRS 5-7c/d

Front panel: Aluminium



Temperature switch
TRS 5-7b



Temperature switch
TRS 5-7c

Important Notes

Separate cables required for wiring to each thermocouple: Two-core overall screened compensating cable compatible with the thermocouple type K (NiCr-Ni).

Max. cable length 100 m.

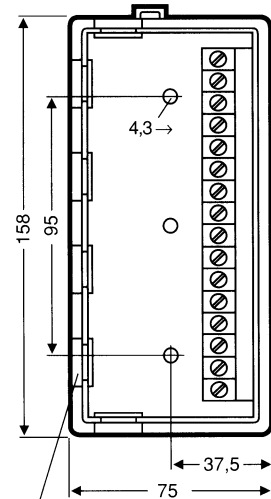
When mounting the twin thermocouple into steam or pressurized hot-water boilers the relevant regulations must be considered.

The protection circuit should be fused with 2.5 A (anti-surge fuse) or in accordance with relevant regulations.

The temperature switch does not have its own lock-out circuit. Lock-out and manual reset facilities are to be provided externally by a secondary circuit (safety chain) in the control cabinet.

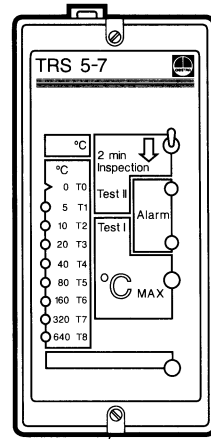
Dimensions

Base with terminals



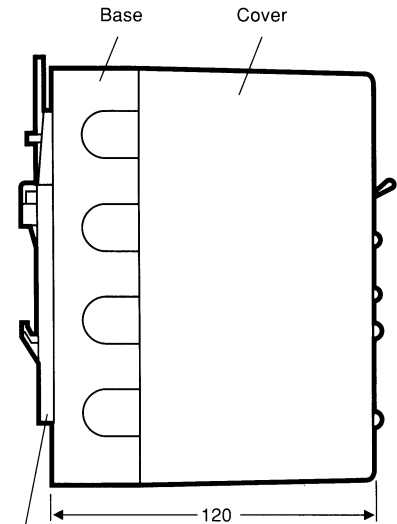
Cable entries

Front view



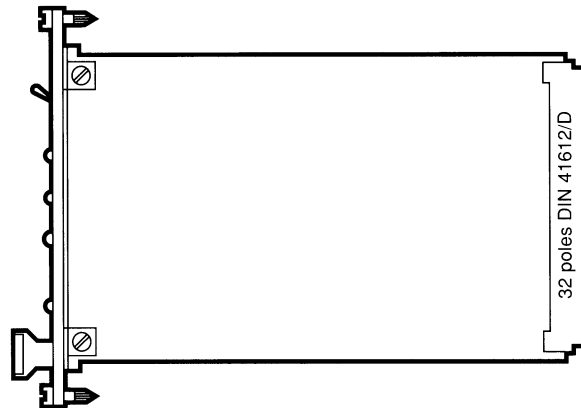
Screws to fasten cover to base

Side view

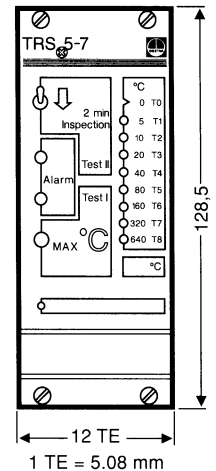


Mounting clip for 35 mm supporting rail

Dimensions of temperature switch type TRS 5-7b



Dimensions of temperature switch type TRS 5-7c/d



Order and Enquiry Specifications

GESTRA temperature switch with periodic self-checking feature in accordance with DIN 3440 and TRD 604:

- Temperature switch type TRS 5-7b, in a plastic case for installation in control cabinets.
- Temperature switch type TRS 5-7c/d, as 19" slide-in unit, 12 TE (divisional unit) 1 TE = 5.08 mm.

Mains supply.....V.....Hz

Associated Equipment

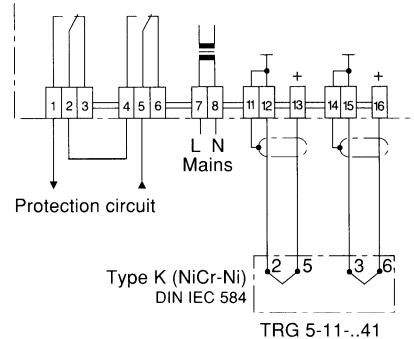
Twin thermocouple type TRG 5-...

Supply in accordance with our general terms of business.

Technical modifications reserved.

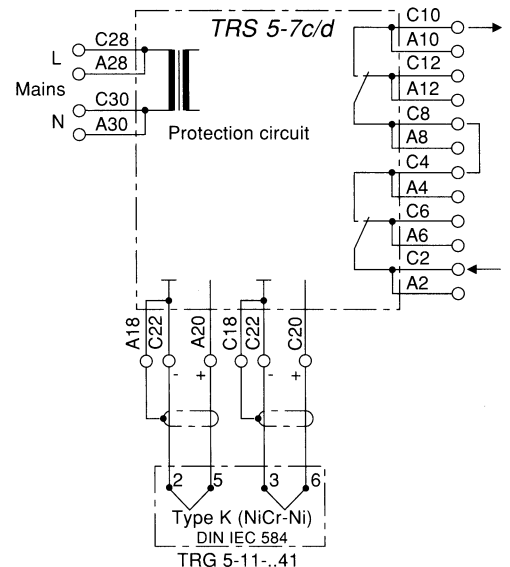
Wiring Diagrams

TRS 5-7b



Illustrated position of contacts: relays deenergized, i.e. adjusted temperature exceeded

Wiring diagram for temperature switch type TRS 5-7b



Wiring diagram for temperature switch type TRS 5-7c/d