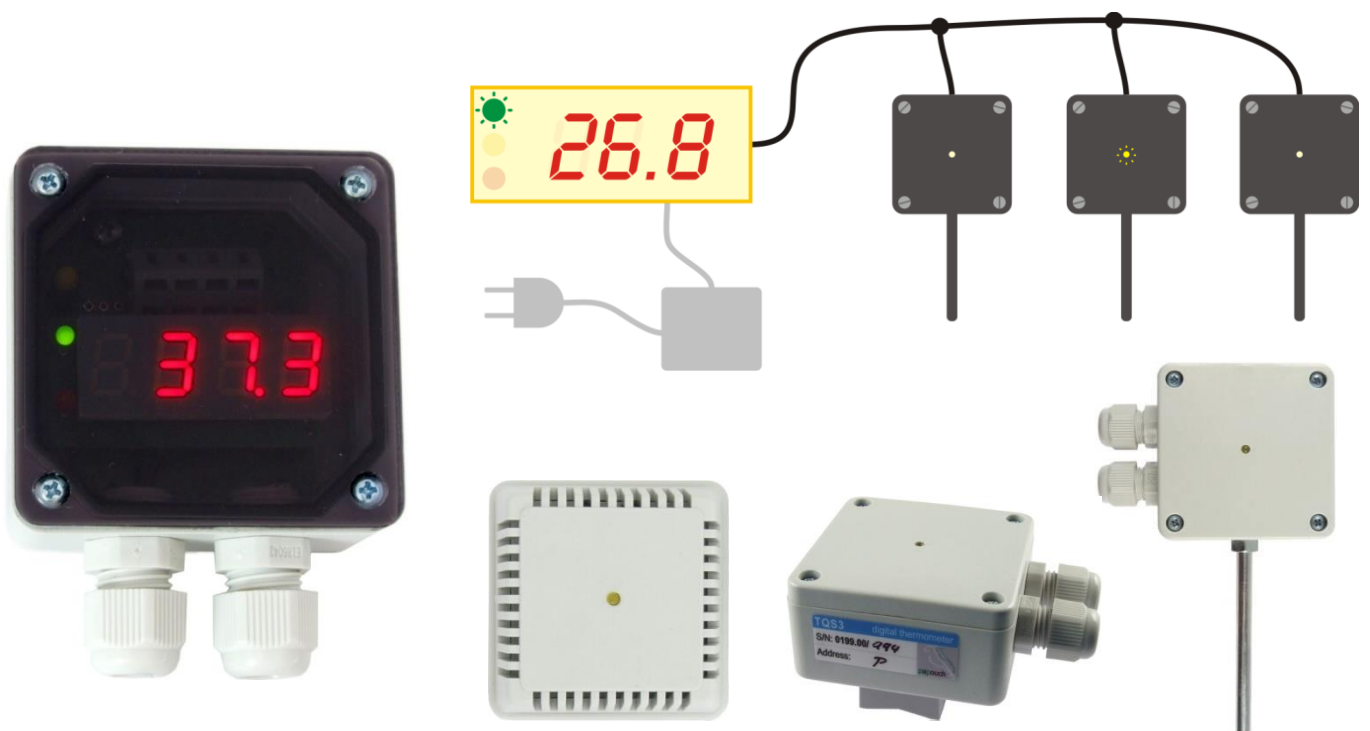# Industrial thermometer

TDS

Displaying temperatures from 3 sensors

for a distance of up to 1,200 metres

7-Segment LED display

TDS

Datasheet

Created: 2/27/2008

Last update: 4/24/2014 2:23 PM

Number of pages: 12

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CONTENT

DESCRIPTION

The TDS Thermometer can display temperatures measured by one to three sensors connected by means of a common cable which can be up to 1,200 metres long. The temperatures measured via TQS3 sensors range from –55 °C to +125 °C.
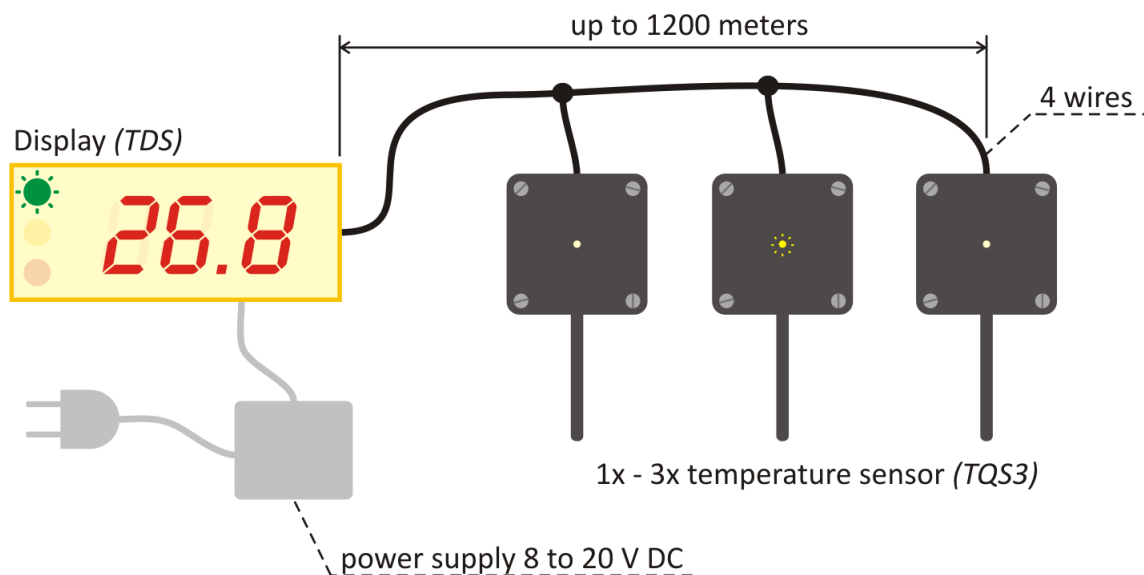

fig. 1 – TDS thermometer connected to three temperature sensors

The TDS display is connected with the sensors by means of a single 4-wire cable. The sensors and the display are fed from one power supply.

The temperature is shown on a single 7-segment illuminated display featuring 10-mm-high characters. In case more temperature sensors are connected, the temperatures alternate on the display every three seconds. The currently displayed temperature is identified by three indicators next to the displayed number.
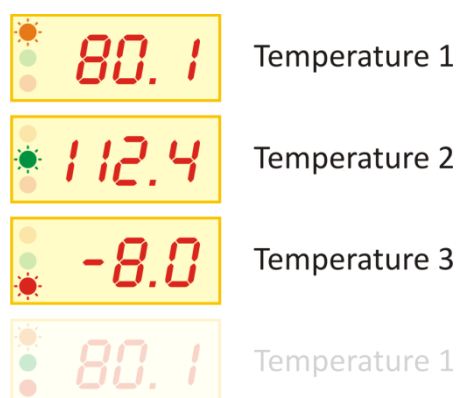

fig. 2 – the way of showing several temperatures on one display. The temperatures alternate automatically on the display every three seconds. Three indicators at the side of the display identify the temperature.

Features

- Industrial thermometer with a cover IP 64
- Almost unlimited distance between the display and sensors (up to 1,200 metres)
- Easy installation, no settings required – just connect it and start measuring
- Various temperature sensor designs: outdoor, indoor, surface sensor to be placed on pipes, with sensor in a pole to be put into a tank, …

CONNECTION AND FUNCTIONING

Interconnecting Wires

The display and temperature sensors are interconnected by means of a single cable with four wires. We recommend using a standard **cable for computer networks** – TP cable. This cable comprises four twisted pairs of wires. One pair should be used for power supply and another one for RxTx+ and RxTx- data conductors.

Terminals Connection

On the circuit board bellow is the Wago 236 terminal unit. To connect the conductors, it is necessary to remove the upper cover of the display electronics. (The cover in slipped on only - it can be slipped off easily without using any tools and put it back again after the conductors have been connected.)
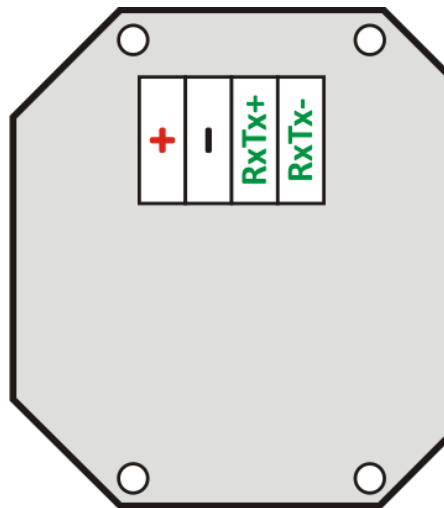

fig. 3 – RS485 connector and power supply

The following signals are to be connected to individual terminals

+ ....power supply positive terminal

− ....power supply negative terminal

RxTx+.......more positive wire of the communication line (RS485)

RxTx−.......more negative wire of the communication line (RS485)

The same four terminals can be found on the display as well as the temperature sensors: +, −, RxTx+ a RxTx−. These **terminal are to be connected 1:1**, i.e. + to +, RxTx+ to RxTx+, etc.

A power supply is to be connected to one of the devices – it can be connected either to the display or to one of the sensors.

Functionality

1) After switching the device on, all the three indicators light up and a display test is carried out – to detect any faulty segments or display errors which could result in improper temperature reading.

2) The display shows the number of the detected temperature sensors as a number between two dashes. For example: `-2-` for two sensors.

fig. 4 – two sensors have been detected

In case no sensors have been detected, number 0 is displayed. If this is the case, please check the connections and switch on the power supply.

3) Now the display starts to show temperatures from the sensors in 3-second intervals. (If only one sensor is connected, one temperature is shown permanently on the display.)
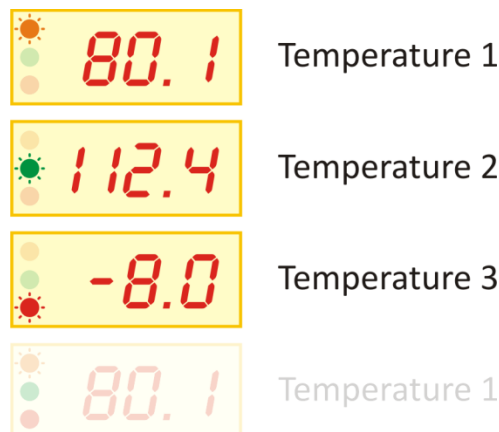

fig. 5 – the way of showing several temperatures on one display. The temperatures alternate automatically on the display every three seconds. Three indicators at the side of the display identify the temperature.

If the communication error occurs during the operation of the device, four dashes are displayed in the time assigned for the given sensor.

Thermometer addressing

The display expects connected thermometers to have addresses "1" through "3". If you order Thermometers with the TDS Thermometer display, we will send you the thermometers set correctly. If however you order those separately, you will have to specify the addresses while ordering.

TECHNICAL PARAMETERS

Display

Measuring interval ....each sensor is measured once every 30 sec [1]

One temperature display interval ....3 sec [1]

Communication line:

Type...RS485

Connector ....Wago 236 terminal

Communication speed ....9600 Bd

Data bits number 8

Parity ....No parity

Stop-bits number 1

Termination:.....................................No, only 22 kΩ resistors defining the idle status

Power supply:

Supply voltage: ....7 to 30 V DC

Consumption: ....typically 30 mA at 12 V

Miscellaneous:

Display type .... seven-segment LED display

Colour... red

Number of digits 4

Digit height.. 10 mm

International protection rating IP64

Wire connection:.. via WAGO 236 terminal unit

Operation temperature................................ -20 °C to +70 °C

Electronics board dimensions:..................... 45 mm x 51 mm x 20 mm

Box dimensions (including sleeves):............ 62 mm x 62 mm (84 mm) x 32,5 mm

Weight: .... 115 g

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[1] This interval can be changed upon request.

Mounting:

- Without a holder *(standard version)*
- With a wall holder

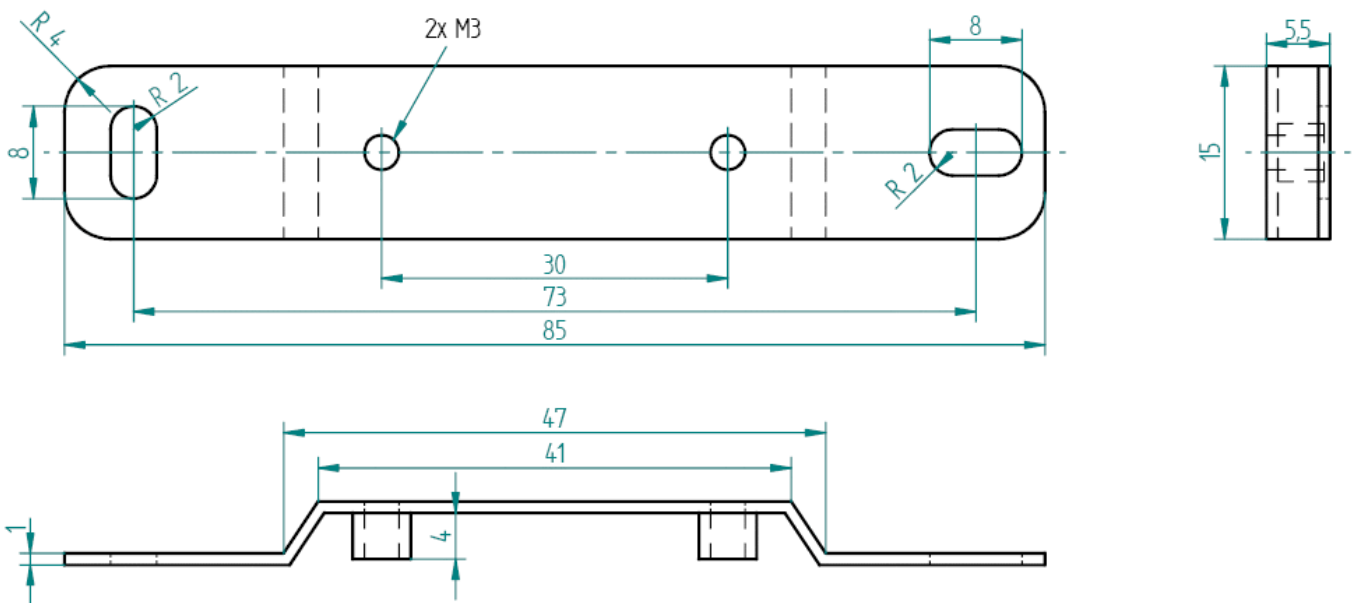*fig. 6 – TDS with a wall holder*

fig. 7 – Wall holder drawing

If you have any other specific requirements concerning the design and functionality of the TDS module, do not hesitate to contact us.

Temperature sensors

Electronics operating temperature.....0 °C to 70 °C

Sensor temperature range.................-55 °C to +125 °C

Resolution...0,1 °C

Accuracy..± 0,5 °C between -10°C and +85°C, otherwise ± 2 °C

Measuring unit DS18B20

Termination......................................No; only 10 kΩ resistances defining the line standby state

Consumption ....typically 2 mA, 3 mA maximum

Lines connection...............................Wago 236 terminal block

Outdoor Design – TQS3 O

International protection rating IP65

Sensor mechanical design.................Metal rod: 6 mm in diameter, 70 mm long

Dimensions.......................................83 (62) mm x 138 (62) mm x 33 mm
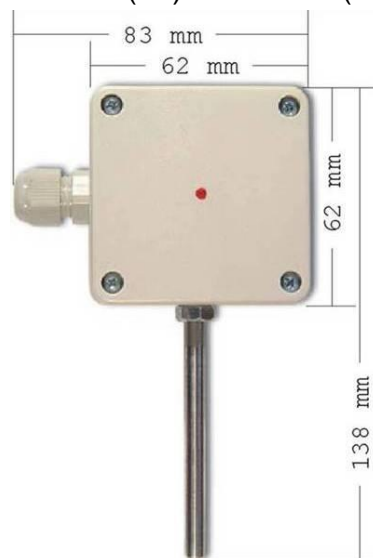
Figure 1 – Outdoor Design

Indoor Design – TQS3 I

International protection rating............ IP20

Sensor mechanical design .... Plastic sensor inside

Dimensions .... 62 mm x 62 mm x 28 mm
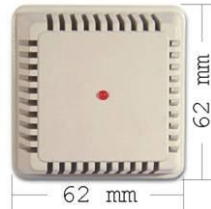
Figure 2 – Indoor Design

Surface Design – TQS3 P

International protection rating............ IP65

Sensor mechanical design .... To be placed on pipes

Dimensions .... 62 mm x 62 mm x 45 mm

A = 11,5 mm
B = 10 mm
C = 9,5 mm
D = 24 mm
E = 48 mm
F = 2,5 mm

Figure 3 – Surface Design   *Figure 4 – Application Part Detail*

Board with Electronics – TQS3 E

Board dimensions .... 35(51) mm x 36 mm x 15 mm

Holes location .... in the corners of 28(44,4) mm x 28 mm rectangle; 3 mm diameter

Sensor mechanical design .... plastic sensor onboard
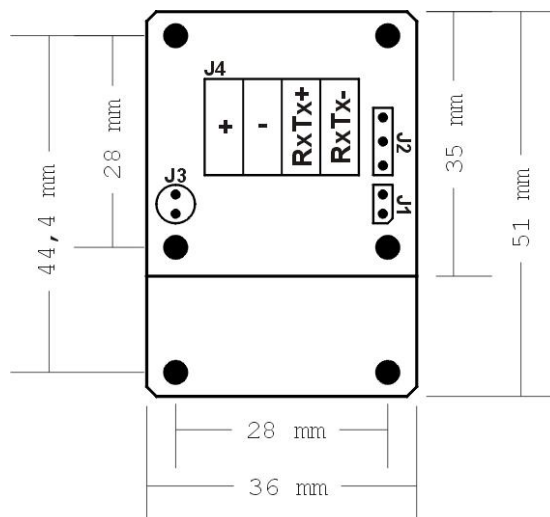
Figure 5 – Board with Electronics Drawing

ORDER INSTRUCTIONS, PRICES

<u>**TDS T**</u> <u>**W**</u> − <u>**TQS3 O**</u> − <u>**TQS3 O**</u> − <u>**TQS3 I**</u>

Main module

Display *(64 €)*

Holder

W – wall mount holder *(+5 €)*

empty – without a holder

Temperature sensor 1:

empty

TQS3 O – outdoor sensor *(+39 €)*

TQS3 I – indoor sensor *(+39 €)*

TQS3 P – surface sensor *(+42 €)*

TQS3 E – bare board with electronics *(+26 €)*

Temperature sensor 2:

empty

TQS3 O – outdoor sensor *(+39 €)*

TQS3 I – indoor sensor *(+39 €)*

TQS3 P – surface sensor *(+42 €)*

TQS3 E – bare board with electronics *(+26 €)*

Temperature sensor 3:

empty

TQS3 O – outdoor sensor *(+39 €)*

TQS3 I – indoor sensor *(+39 €)*

TQS3 P – surface sensor *(+42 €)*

TQS3 E – bare board with electronics *(+26 €)*

Papouch s.r.o.

Data transmission in industry, line and protocol conversions, RS232/485/422/USB/Ethernet/GPRS/ WiFi, measurement modules, intelligent temperature sensors, I/O modules, and custom-made electronic applications.

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