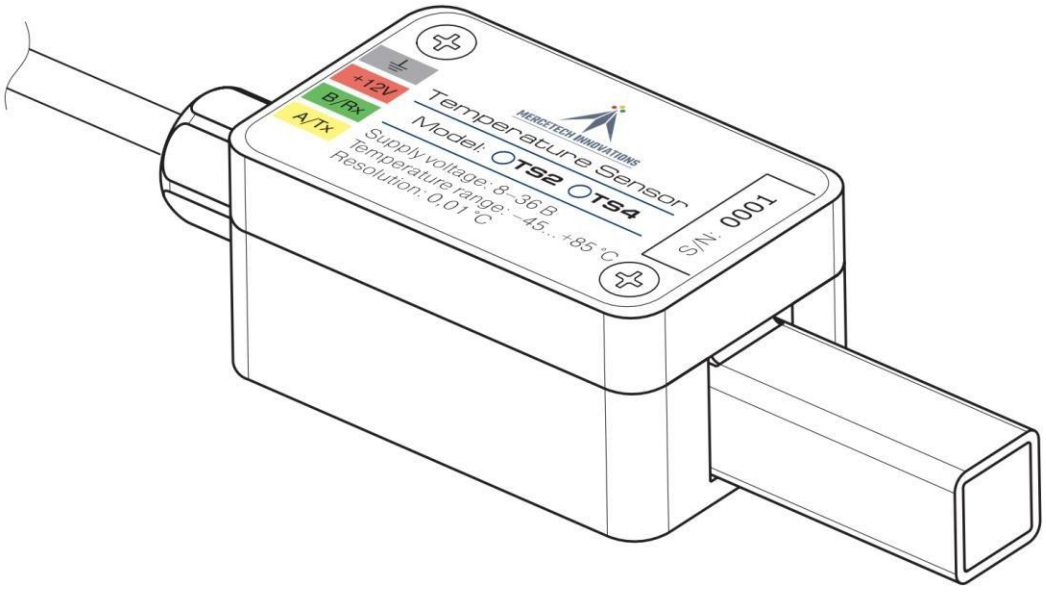
Mercetech Innovations Private Limited

ISO
9001: 2015



Temperature Sensor
TS2

Passport and User Manual

TS.000-M-EN PS+UM

v. 240606

GENERAL INSTRUCTIONS

The passport should be kept in the archive. When filling in data in passport, pencils, washable inks or erasers must not be used.

PURPOSE AND PRINCIPLE OF OPERATION

Temperature sensor (hereinafter – Sensor) is purposed for environment temperature measurement and subsequent transfer of data and Sensor ID number to the reader device (hereinafter – GPS tracker). This allows executing a real-time remote supervision of temperature conditions in enclosed volume (e.g. in cooling machine).

Data transfer from the Sensor to the GPS tracker is performed by a wireline connection through RS-232 interface.

TECHNICAL SPECIFICATION

Parameter or characteristic name	**Value**	**Note**
Temperature measurement range, ˚C	– 45 … + 85	
Resolution threshold, ˚C	0,01 / 1	For 16/8-bit data presentation
Temperature measurement error, ˚C, max	0,5	10 minutes after switching-on
Degree of protection	IP67	
Mode of operation	Continuous	
Serial port exchange rate, bps	2400, 4800, 9600, 19200, 38400, 57600, 115200	Configurable via software, default value – 19200
Power supply voltage, operational range, V	from +8 to +36	Nominal value
Current consumption, mA, max	15	
Acceptable exposure of impulse voltage through power circuits, V	+ 160, 1 sec. -1000, long	
Dimensions (without cable), mm, max	120 x 40 x 30	
Cable length, m	10	Length can be changed when ordering

DELIVERY SET

Name	Q-ty	Note
TS2 sensor	1	
Cable with fuse	1	
SI 0,1 A fuse	2	
Self-drilling screw	2	Ø 3,9 x 16 mm
Heat shrink tube	1	Ø4/Ø2, L=20мм
Passport and user manual	1	
Software	1	Delivered optionally

SENSOR INSTALLATION AND CONNECTION

SAFETY MEASURES

The responsibility for the implementation of security measures lies with the technical staff involved in the installation of the Sensor, as well as the employees responsible for the equipment at the working site.

Requirements of fire safety regulations, requirements of occupational health and safety rules, other requirements of regulatory documents in force within the consumer territory must be observed.

MECHANICAL MOUNTING OF SENSOR

Sensor can be mounted on a vertical or horizontal surface with zip-ties or self-drilling screws, which are included in the delivery kit.

In the latter case, it is necessary to remove the upper lid of the Sensor, which is fixed by two screws. Then you need to fix the Sensor to the base with self-drilling screws through the concealed screw holes in the Sensor body. Then you put back the upper lid of the Sensor.

SENSOR ELECTRICAL CONNECTION

Sensor must be connected to the GPS tracker and power source according to the cable-marking table below:

Wire color	Purpose
Brown (red)	+ 9…+36 V
Black	GND
Yellow	TXD
Blue (green)	RXD

ATTENTION! Fuse (included in the delivery kit) must be installed between the positive power supply terminal (battery) and Brown (red) "+" Sensor wire.

Fuse must be installed outside the temperature measuring zone!

SENSOR CONFIGURATION

Temperature sensor is configured using the "TRM1_Install" software package (hereinafter – software), supplied optionally.

To install it on the personal computer (hereinafter – PC), software should be copied into the required directory. Additionally, PC should have RS-232 port. If PC don't have such port, USB/RS-232 converters should be used.

Before the software use it is necessary to connect Sensor to the corresponding port (polarity of interface and power supply conduits must be strictly respected) and to ensure the Sensor power supply from the external power source (power source parameters – according to the Sensor technical specification).

Software has an adaptive user interface. Depending on model or/and firmware version, software interface can change (only options for the current model and firmware version are displayed).

After starting the software, it is necessary to select the port number, baud rate and device address in the "Port settings" field (figure 1). Default Sensor setting are 19200 bps for baud rate and device address – 1.

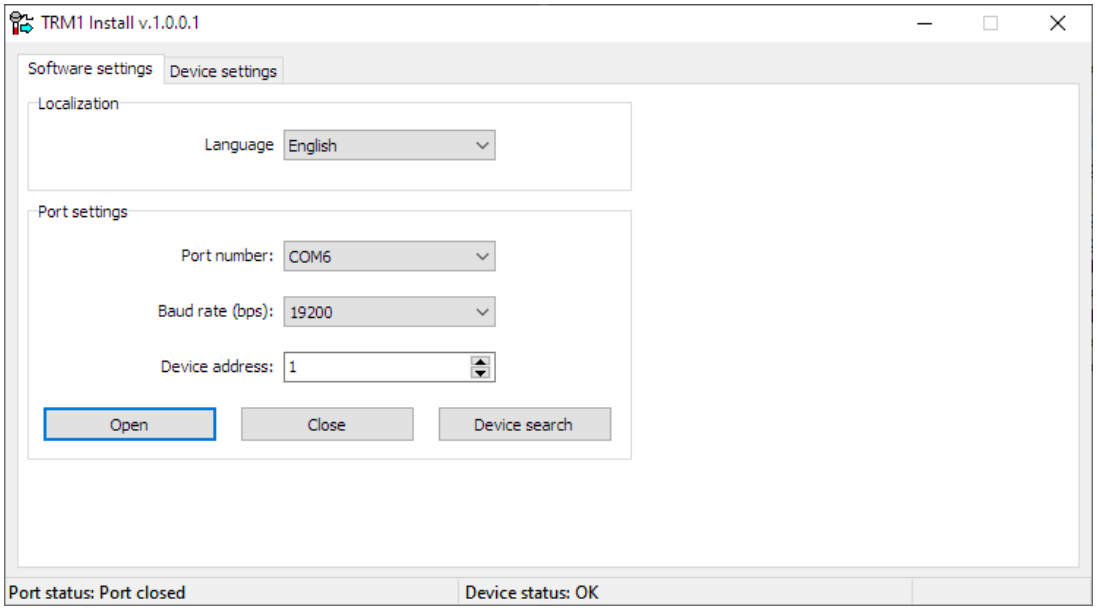


Figure 1 – "Software settings" tab

Press "Open" button to start working.

If baud rate parameters and device address are unknown, "Device search" button can be used. When "Device search" button is pressed, software sends a request with a broadcast address to the port.

Attention! "Device search" option is not recommended if several Sensors are connected to the network.

Port status is indicated in the lower part of the window.

- **Port closed** – means that COM port is closed; press "Open" or "Device search" button to start working with device;
- **Port open** – means that COM port is open and operates properly;
- **Open error** – means that COM port is opening with error; also, error message will be displayed. In this case, it is necessary to check if port is blocked with other application programs and diagnose port operability on the software and hardware levels.

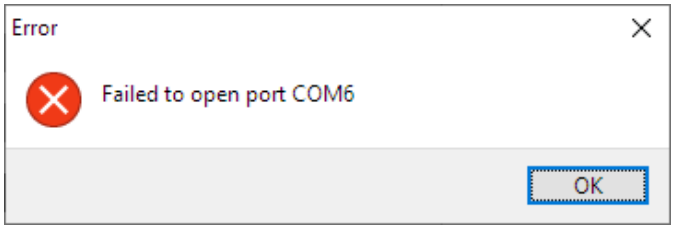


Figure 2 – Port opening error

Device status is also indicated in the lower part of the window:

OK – if the Sensor responds correctly.

Device is not responding – Sensor is not responding to the software request.

Software will proceed to the "Device settings" tab if the program settings and Sensor connection are correct (Figure 3).

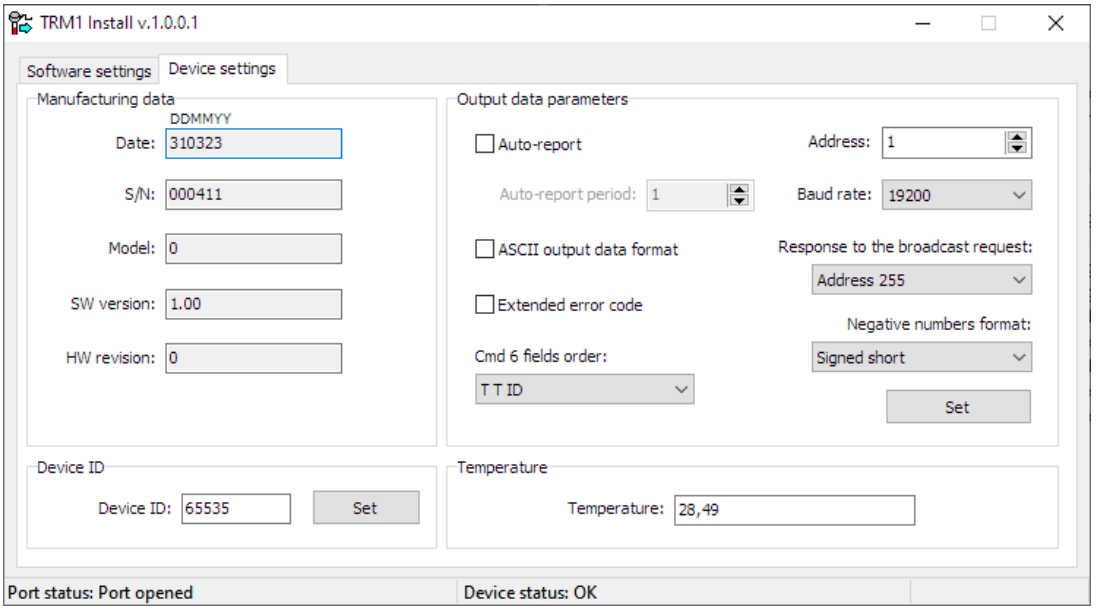


Figure 3 – «Device settings» tab

"Device settings" tab allows you to view production data and configure output data parameters and device ID. Reading of manufacturing data, output data parameters and device ID is performed automatically when opening the tab. To set parameters, it is necessary to press the "Set" button.

Manufacturing data:

Date – Sensor release date;
S/N – Sensor serial number;
Model – Sensor model;
SW version – Firmware version;
HW revision – Sensor board revision.

Output data parameters:

Auto-report – Auto-report data output ON/OFF;
Auto-report period – Auto-report data output interval in seconds (available only if Auto-report data output is ON);
ASCII output data format – ASCII output data format ON/OFF (to initiate it is necessary to press the "Set" button and reboot Sensor by power reset);
Extended error code – Error code output mode in return code;
Address – Sensor network address;
Baud rate – Baud rate speed;
Command 6 fields order – Changes fields' sequence, which Sensor outputs by command 6. Possible values:
T ID T – Temperature Identifier Temperature;
T T ID – Temperature Temperature Identifier;

Response to the broadcast request – Changes the Sensor behavior when responding to a broadcast request. Possible values:

Own address – Reply with the address specified in the “Address” field;

Address 255 – Reply with broadcast address 255;

Negative numbers format – Changes presentation format of the negative temperature. Possible values:

Signed short – Standard negative number;

15-th bit – Uppermost bit sign;

Device ID – Sensor identifier, integer number in range 0-65535;

Temperature – Current Sensor temperature.

UPDATING SENSOR FIRMWARE, SAVING AND RESTORING CONFIGURATION DATA

To update the firmware, as well as save to a file and restore configuration and calibration data from a file, use the loader program “RCS_AppLoader”, supplied optionally.

It is necessary to perform the following actions:

- Connect the Sensor to the RS-232 port, **do not turn on the Sensor power**;
- Run the “RCS_AppLoader” program:

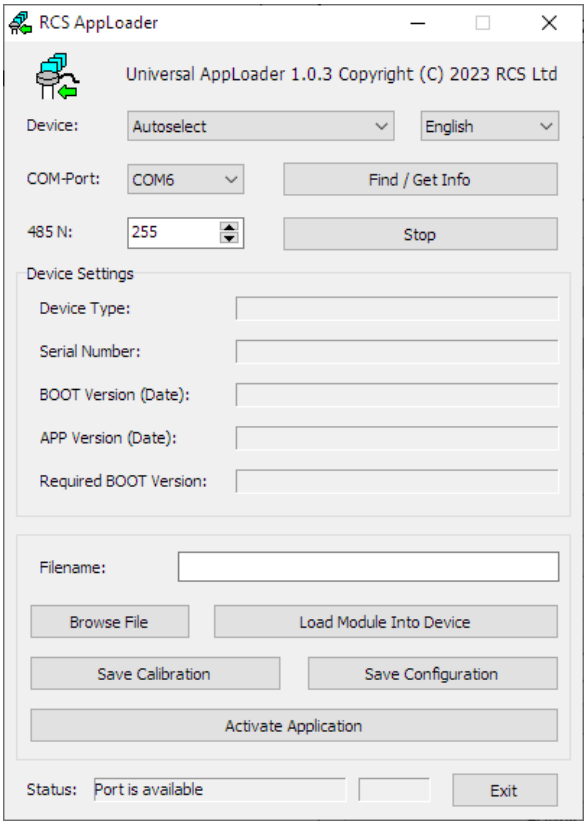


Figure 4

- Select the COM-port. If there are several devices connected to the network, it is necessary to enter the exact device address in “485 N” field.
- Press the “Find / Get Info” button in “RCS_AppLoader” program;

- **Turn on the Sensor power** (if the Sensor was turned on – turn it off, then turn on the power). After about 1 second, the technological parameters will be read from the Sensor, after which the “Find / Get Info” button will become active again;

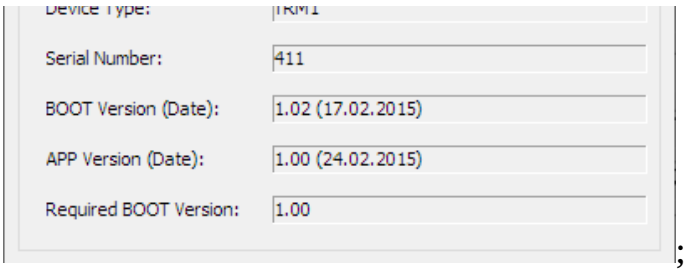


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Figure 5

- Chose the firmware file with “Browse File” button:

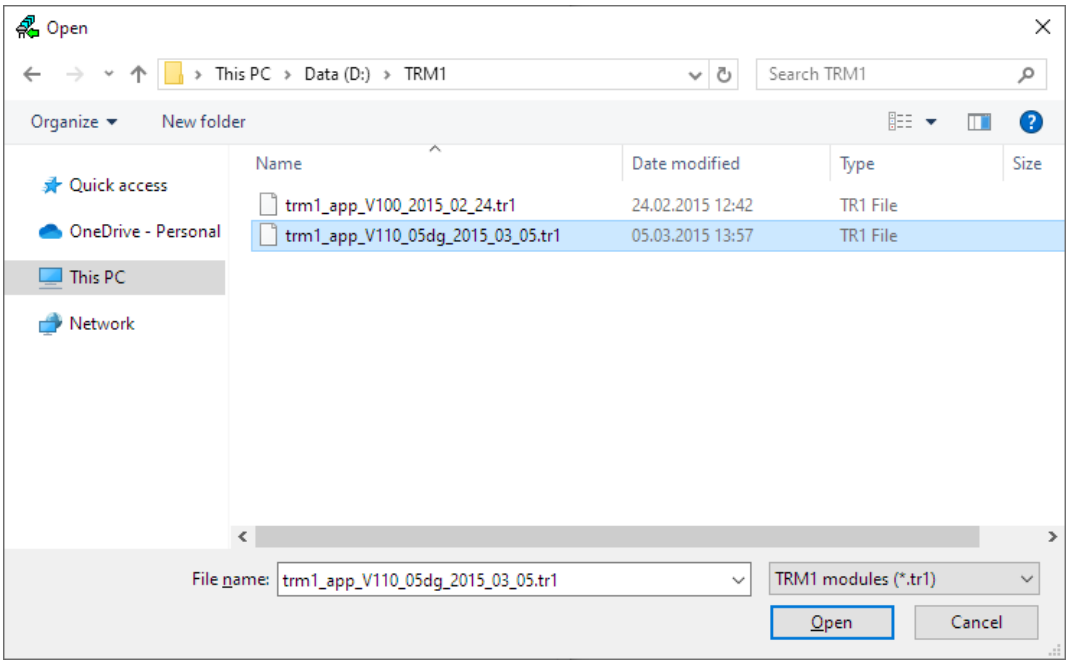
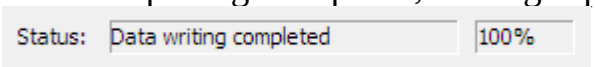


Figure 6

- Upload firmware into the device pressing “Load Module Into Device” button. Uploading process indicates in percent:

- After completing the upload, message appears:



- To save the configuration data into file, press “Save Configuration” button. Chose a folder and input a file name, then press “Save” button:

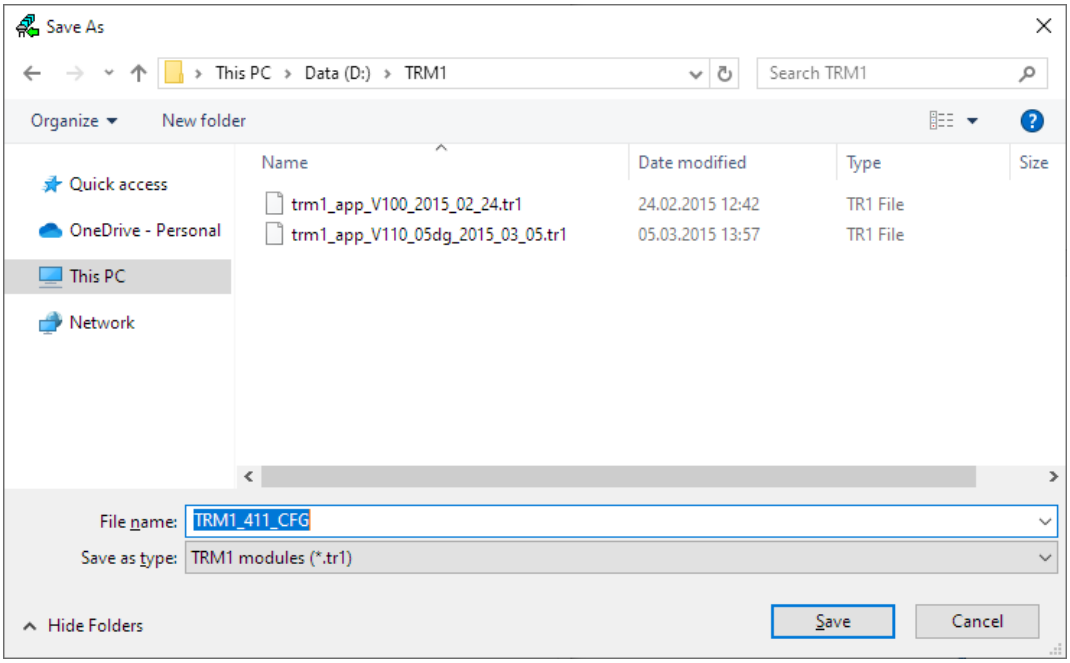


Figure 7

By default, program offers to save file with "TRM1_XXXXX_CFG.TR1" name, where XXXXX is a Sensor serial number.

To save the calibration data it is necessary to press “Save Calibration” button. Program offers to save file with "TRM1_XXXXX_CLB.TR1" name, where XXXXX is a Sensor serial number. Calibration data can be uploaded only into Sensor with a corresponding serial number.

Restoring configuration and calibration data is similar to firmware update, but instead of the firmware file, a configuration or calibration file is selected.

To activate a new firmware press “Activate Application” button or turn off and then turn on the Sensor power supply.

To exit the loader program press “Exit” button or close the program window.

Note

- Availability and port numbers on the PC can be checked here: "Computer\Properties\Device Manager\Ports (COM and LPT)".

CHANGES AND MODIFICATIONS IN NEW SOFTWARE VERSIONS

The firmware version 1.10 (firmware file named "trm1_app_V110_05dg_2015_03_05.tr1") is designed to be compatible with the previous model of the Sensor, which features a cylindrical probe.

Scale resolution of the first field of command 6 (rough temperature value) changed from 1 °C/bit to 0.5 °C/bit. As a result, the range of correct display of the temperature of this field is decreased to ± 63.5 °C.

TERMS OF OPERATION

During Sensor operation, it is forbidden:

- to use Sensor not on purpose;
- connect to the interface of devices, which do not meet requirements of the operational documentation;
- expose to influence of aggressive environments;
- allow pulse voltage exposure through power-supply circuits with values exceeding the limits in Technical Specification table.

TRANSPORTATION AND STORAGE

Transportation of Sensors in the manufacturer's transport packaging is allowed by all types of closed land, sea and air transport (in railway cars, containers, closed cars, holds, sealed compartments of airplanes, etc.).

During transportation and storage, it is necessary to comply with the requirements of the handling signs applied to the group transport packaging.

MANUFACTURER (SUPPLIER) WARRANTY

Warranty period is 12 months from the Sensor sale date. If there is no trading organization stamp with the date of sale in the warranty certificate, warranty period is calculated from the manufacture date of the Sensor.

These warranties are valid only if consumer follow the requirements of the present operational documentation.

In case of violation of these requirements or if there are evidence of high-voltage or aggressive environments, mechanical damage, Sensor body or cable damage, as well as unauthorized construction or firmware modifications, warranty becomes invalid.