

CZAKI THERMO-PRODUCT

ul. 19 Kwietnia 58
05-090 Raszyn-Rybie
tel. (22) 7202302
fax. (22) 7202305
www.czaki.pl
handlowy@czaki.pl



Multichannel temperature logger

WRT-9

User's guide on hardware installation
and software configuration

1. Introduction

WRT-9 is a flexible temperature logger for temperature measurement at nine points. The logger includes a microprocessor-based temperature meter EMT-200 and multi-channel switch PMP-201/232.

The main advantages of WRT-9 are following:

- temperature values at nine points are displayed simultaneously,
- temperatures are plotted in a graph,
- the meter EMT-200 and the switch PMP-201/232 are connected with serial interface RS-232 so that the measurement is online,
- measured values can be stored in files and browsed offline,
- the data stored in files can be easily accessed by commonly-used computer programs (for instance Excel),
- nine separate alarms can be set,
- plots can be printed out directly.

2. First-time launch of application

When the computer program is launched the first time, only the number of channels should be set (that is the number of sensors connected to the switch PMP-201/232). By default the logger measures temperature at 3 points and displays temperature of the first sensor in the graph.

3. Main window of application

The main window of the computer program contains

- values of temperatures measured in all channels,
- some control buttons,
- sampling interval field,
- graph showing temperature data.

3.1. Frame *Temperature [°C]*

In the frame there are nine boxes containing temperatures of installed sensors. Additionally for each channel an alarm can be set in order to



indicate that the temperature exceeds an user-defined range (the parameters of alarms will be described in chapter 4.4). If the temperature passes the upper threshold, the box color changes to red. In the case of the temperature fall under the lower limit, the box color becomes blue. In the both cases the channel activates the alarm. Then message *Alarm!!!* appears and the output relay 1 switches on in the meter EMT-200.

3.2 Control button

The button *Connect* detects and opens a serial port which is connected to the meter EMT-200 and the switch PMP-201/232. If the connection is established properly, the temperature value appears and the switch PMP-201/232 sets to the channel 1. The button name changes to *Measure*. If the meter is unavailable, there appears message *Device not responding*. In this case the following actions should be carried out:

- check wiring,
- check if the meter EMT-200 displays reasonable value,

- check if the serial port connected to the meter is not used by Windows or any running application,
- check address and baud-rate of the meter (see chapter 5),
- check address of the switch (see chapter 5).

The control button actually named *Measure* starts recording of measured temperatures. During the measurement some options cannot be modified especially in the menu *Settings*. The button name changes to *Suspend*.

The control button *Suspend* stops recording of temperatures. The button name changes to *Resume*.

The control button *Resume* activates the suspended measurement and recording.

3.3. Graph

The measured temperatures are plotted in the graph. The user can select which channels are displayed and in what colors. These functions are carried out by controls placed on the right-hand side of the main window.

The vertical axis (i.e. temperature values) may be scaled automatically or manually by the user. The horizontal axis corresponding to time can be scaled in the following two ways:

- all measured samples are displayed or
- the plot is floating.

In the first case, the time range of the plot increases while new measurements are stored. In the second case, the time range is defined by the user, and always the last measurements are displayed. The user can select the way in which the graph is plotted in the menu *Settings*.

3.4. Timing parameters

The parameter *Sampling interval* tells how frequently the temperatures are measured. The next parameter *Changing ch. delay* is useful when inter-channel cross-talks occur (due to the internal capacitance of the meter EMT-200). This parameter should be larger, when using thermocouple sensors for measurement of very different temperatures.

All above-mentioned parameters can be saved in window *Settings*, that will be described in chapter 4.

3.5. Main menu

3.5.1 Menu item *File*

3.5.1.1 Menu item *Open*

This item opens an existing data file. The data is directly displayed in the graph. When the user begins measurement, the new data is appended to the end of the file.

3.5.1.2 Menu item *Save as*

This item closes the actual data file and creates a new data file with user-defined name. New measurements are recorded to the new data file.

3.5.1.3 Menu item *Print*

This item prints the graph with its legend on the default printer. Only these channels are printed out that are actually displayed in the graph.

3.5.1.6. Menu item "Printer Settings"

This item configures advanced settings of the printer, that are unavailable at the menu item "Print".

3.5.1.7. Menu item "Finish"

This item stops measurements and closes the computer program.

3.5.2. Menu item "Settings"

This item will be described below in Chapter 4.

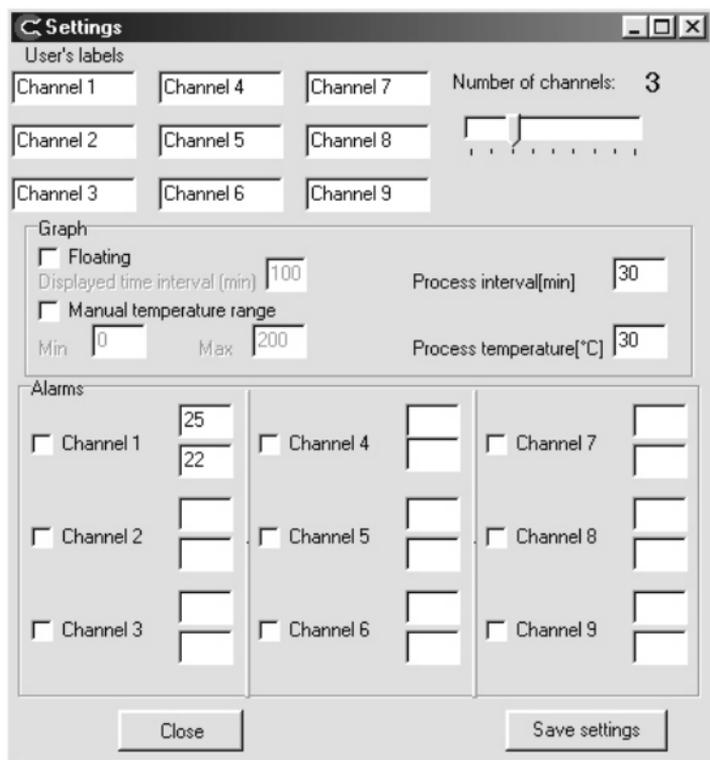
3.5.3 Menu item "Help"

This item displays information about the manufacturer of this equipment and software.

4. Window Settings

In order to activate this window, the main menu item *Settings* has to be selected. The options that are collected in this window rarely need to be changed. In the most cases the user configures these settings only once.

This window contains user's labels, the graph settings, the alarms settings and another important parameter: number of channels.



4.1. User's labels

The user can name each channel here in order to facilitate watching the temperatures. Individual labels can shorten the reaction time to any alarm.

4.2. Graph settings

The option *Floating* determines the way in which the plot is displayed. When this option is inactive, all recorded data is shown. In the other case only certain time interval is displayed and the user can set its range (the parameter *Displayed time interval*).

By default the vertical axis, corresponding to temperature is scaled automatically - the option *Manual temperature range* is unchecked. The user can activate this option and set the displayed temperature range.

There is an additional feature that lets the user display markers in the graph. The markers are suitable for dryer monitoring. There are two

parameters related to markers: *Process interval* and *Process temperature*. The switch *Markers ON* placed in the main window switches on or off the markers. When all measured temperatures increases over *Process temperature*, then the first marker appears. The second marker is displayed only, when a time interval equal to *Process length* elapses.

4.3 Parameters of alarms

Operation of alarms was mentioned above in chapter 3.1. All settings related to alarms are collected in the frame *Alarms*. Each channel is equipped with one separate alarm. In order to activate the alarm, its check box should be checked (this box is placed on the left-hand side). After that the lower and upper thresholds should be set (they are on the right-hand side). There are exemplary values of thresholds set in the figure on the previous page. For channel 1, the upper threshold is 25 °C and the lower threshold equals 22 °C.

4.4. Buttons

The button *Save settings* saves all settings, even these which were done in the main window.

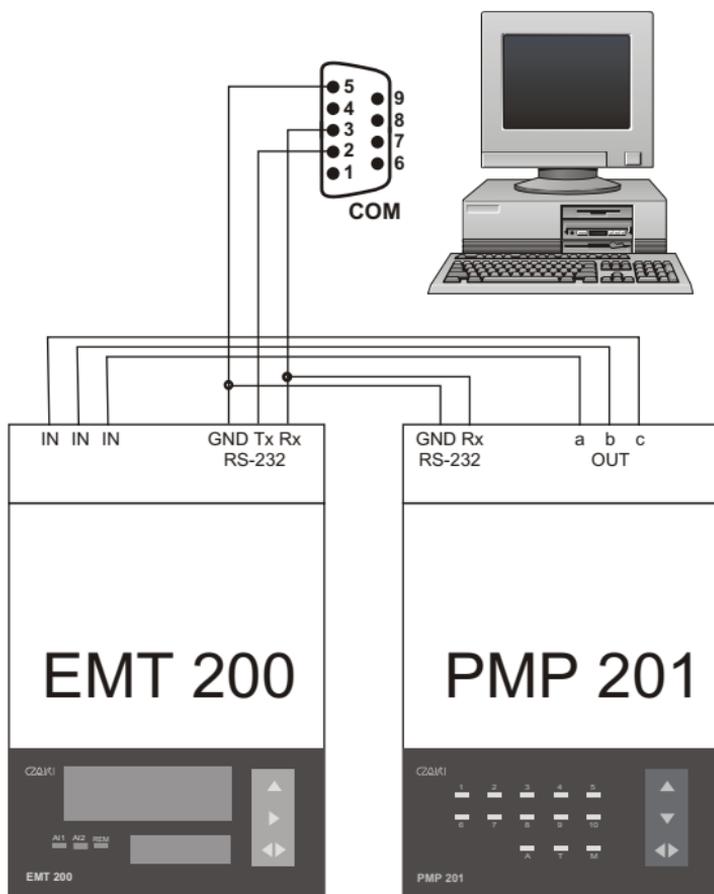
The button *Close* closes the window *Settings*.

5. Serial port wiring

The way of connecting the meter EMT-200 and the switch PMP-201/232 to a serial port of a personal computer is shown in the figure on the next page. The meter EMT-200 is connected to the PC with three wires (that is Rx, Tx and GND), but the switch PMP-201/232 is connected with only two wires (Rx and GND). The output Tx of the switch should be left NOT CONNECTED. The data transmission between the switch and the PC is unidirectional.

The meter and the switch have their addresses, that are important for proper transmission. The address of the meter EMT-200 should equal 01, the address of the switch PMP-201/232 should be 02 and the baud-rate parameter in the meter EMT-200 should equal to 2400. These values are manufacturer's defaults.

The figure on the next page does not show sensor wiring nor power supply wiring (see user's guides for the meter EMT-200 and the switch PMP-201/232).



	Serial number
WRT-9	
EMT-200	
PMP-201/232	