

THERMOMETER TMR6000



GELEC

INDUSTRIAL ELECTRONICS

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PRECAUTIONS!

There are no serviceable parts inside the **TMR6000** unit. Not to be opened by any unauthorized person. All repairs to the device must be carried out by the manufacturer or a qualified service engineer.

Improper handling may result in serious personal injury and considerable material damage. All connection and maintenance work must be carried out by qualified personnel.



RISK OF ELECTRIC SHOCK!

Use the correct voltage. The TMR6000 is designed for use with specific voltage only. Connection to a different voltage may cause fire, electric shock or other damage.

Always cut the power off before connecting or disconnecting the unit.

Do not touch the plug and the connectors with wet hands.

Disconnect the TMR6000 before cleaning it, to avoid the risk of electric shock.

Attempting to use a malfunctioning TMR6000 can be dangerous.

Do not block the ventilation slots on the cabinet of the TMR6000.

Keep liquids away from the TMR6000.

Spillage into the cabinet may result to fire, electric shock, or equipment damage. If a small object or liquid falls/spills into the TMR6000 cabinet, unplug the unit immediately. Have the unit checked by a qualified service engineer before using it again.

Place the TMR6000 in an appropriate location. Do not install in a dusty, humid or vibrating environment. Do not place it near heater, or air conditioner. Away from air steam, extremely high or low temperature and humidity.

Always follow the instructions given by the manufacturer and use the TMR6000 in accordance to its specifications.

I. MANUFACTURER'S WARRANTY, GENERAL TERMS AND CONDITIONS

Thank you for purchasing our product.

Our products have been manufactured with the latest technology, the highest quality components and have gone through rigorous quality control tests at the factory, before shipment. Make sure that the part number and type indicated in the identification label and pack correspond to the part number or type of your order. After receiving, inspect the unit to ensure that no damage have been caused during transportation.

GELEC and GELEC's authorized distributors warrant to the original purchaser that the product shall be free from defect in material and/or workmanship. The warranty period begins on the purchase date (proof of purchase by invoice or delivery note) and is valid for one (1) year.

In the event of malfunction during the warranty period attributable directly to faulty material and/or faulty construction and functional defects, GELEC and authorized distributors will, at their option, either repair or replace the faulty product with the same or similar model.

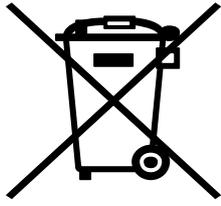
GELEC and authorized distributors shall have no obligation under this warranty, however, in the following cases:

- ▶ Any defect caused by freight damage, accident, disaster, faulty maintenance or improper handling.
- ▶ Any defect caused by modification, alteration, abuse, misuse or incorrect installation.
- ▶ Any defect of the product caused by improper repair by third party other than GELEC and GELEC's authorized distributors.
- ▶ Any incompatibility of the products with subsequent technical innovations or regulations.
- ▶ Any defect of the product caused by external equipment.
- ▶ Any defect of the product on which the original manufacturer's labeling has been altered or removed.
- ▶ Any damage on external/connected equipment, or by extension on every part of the whole application, caused by a possible improper device operation.

In case of complaint please contact our company or send the unit un-dismantled to your local dealer. Any necessary replacement parts and necessary repair work are totally covered free of charge.

All products are designed and produced by the manufacturer GELEC & Co. LP to be in compliance with the EU norms applying to them. GELEC is not responsible for direct or indirect damages or malfunction caused by improper use or installation of the TMR6000.

2. DISPOSAL OF OLD ELECTRICAL & ELECTRONIC EQUIPMENT



This symbol, found on your product, indicates that this should not be treated as household waste when you wish to dispose it.

It should be handed over to an applicable collection point for the recycling of electrical and electronic equipment.

By ensuring this product is disposed of correctly, you will prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product.

The recycling of materials will help to preserve natural resources.

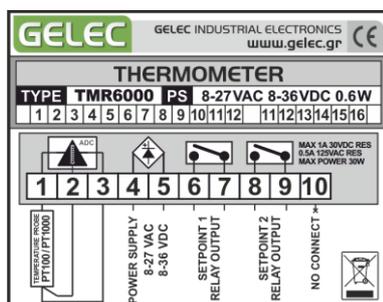
3. THERMOMETER TMR6000

This operator's manual explains the functions and operation of the **TMR6000**. It also gives some troubleshooting tips as well as general precautions to be taken when operating the unit. In order to ensure the best performance and effective use of the TMR6000, we recommend that you read the information in this manual carefully and follow the instructions contained.

This manual is a complete guide to the TMR6000 with information on unit maintenance, unit installation and instructions on how to operate it. Do not touch any part of the TMR6000 the manual does not cover. Keep the manual for immediate reference. It should help in solving any operational questions you may have.

No part of this manual may be quoted, reproduced, stored in a retrieval system, transmitted, transcribed or translated into any other language in any form or by any means, electronic, mechanical, or otherwise, without prior written permission of **“Gelec & Co. LP”**.

Although every effort has been made to ensure that this manual provides up to date information, please note that the contents in this manual and the unit specifications are subject to change without notice.



Do not forget to refer the exact type and version of your TMR6000 whenever you contact the manufacturer, asking for any further information. You can find this information on the identification label inside the unit.

4. GENERAL DESCRIPTION

The TMR6000 is a programmable, dual setpoint temperature controller unit, with two relay outputs and three operating modes (COOLING, HEATING, HEATING/COOLING). It is designed to be used with an external RTD temperature sensor (PT100/PT1000). TMR6000 can be used in numerous industrial or general purpose applications, such as liquid temperature control, fan control, overheating protection/alarm, industrial refrigerators, etc.

The separately configured setpoints and the selected operating mode, allows you to control two different devices. This way, the unit can drive the external equipment in order to cover a wide variety of temperature based application needs.

Several selectable parameters allow customization of the TMR6000 functions to your application. Password protected menus and error indications give the ability to use TMR6000 in a completely secure way. Please advise the TMR6000 documentation to explore all operating capabilities.

FEATURES

- ▶ Fully programmable digital thermometer
- ▶ Three operating modes, *COOLING*, *HEATING*, *HEATING/COOLING*
- ▶ Two independent setpoints
- ▶ External 3-wire RTD temperature sensor input. (PT100/PT1000)
- ▶ Temperature range -50°C to +850°C
- ▶ 1°C / 0.5°C / 0.1°C indication steps
- ▶ Celsius or Fahrenheit temperature indication
- ▶ 4-button Navigation keypad
- ▶ 4-digit 10mm bright red LED 7-seg display easily visible from distance
- ▶ Output status indication LEDs
- ▶ IP64 waterproof front panel
- ▶ 8-36VDC / 8-27VAC power supply, 0.6W
- ▶ Potential free output relays
- ▶ RTD short/open circuit detection
- ▶ Password protected menus

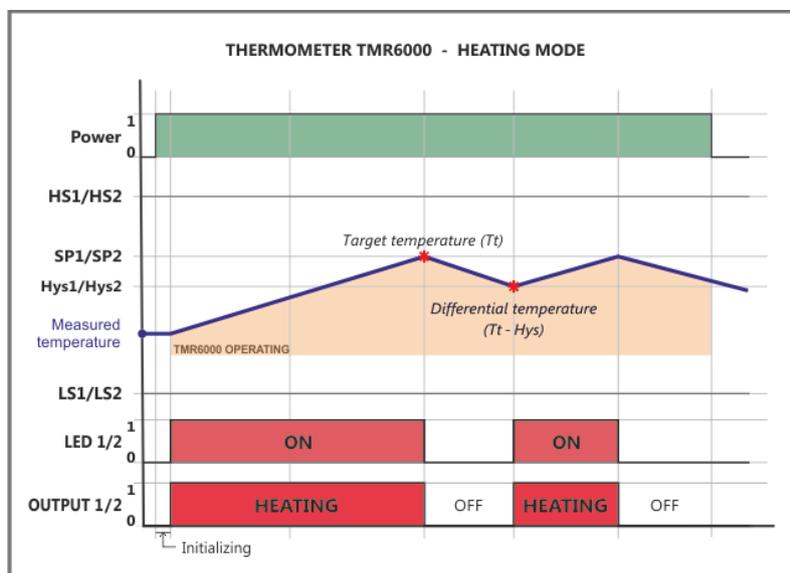
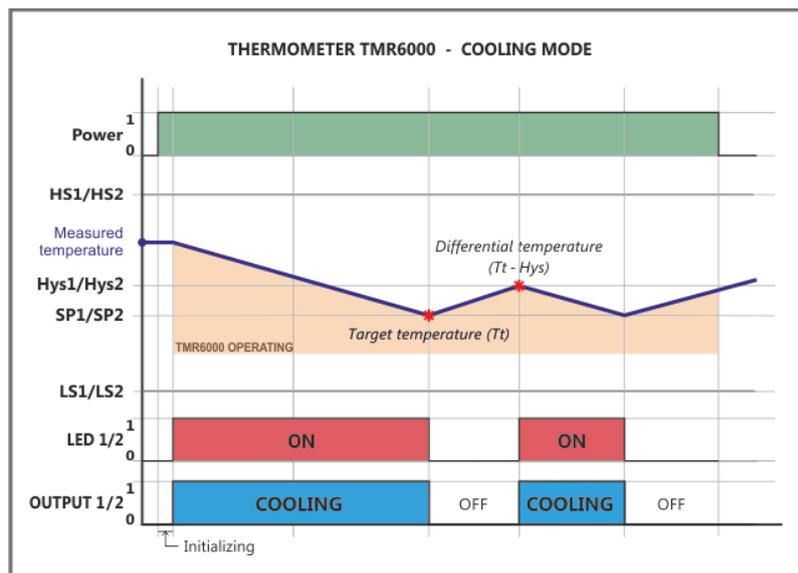
OPERATING MODES

Adjusting the operating mode of each digital output enables the user to configure the overall working mode of the unit. Two programmable operating modes for each digital output are available, *COOLING MODE* and *HEATING MODE*. These operating modes are assigned properly to the relay outputs in order the unit to maintain the temperature in a

desirable temperature range. Assigning to both of the outputs the same working mode sets the overall working mode of the unit to *COOLING* or *HEATING MODE*, while if different working mode is set for each output then the overall working mode of the unit is set to *COOLING/HEATING MODE*.

There is also a hysteresis value set for each output, in order to avoid rapid relay changes when the temperature reaches the selected setpoints.

Advise the following diagrams and the detailed parameter descriptions to comprehend the unit behavior during temperature changes.



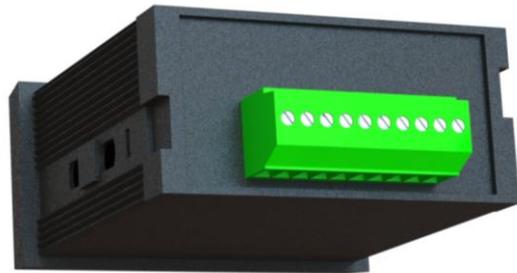
5. CONTROL UNIT TMR6000

The TMR6000 is a complete unit with built-in electronic board and electric connection terminals, with a black colour, panel mounting enclosure according to DIN 43700, with plastic fastening elements on each side, IP64 waterproof front panel and it can be easily installed at the front of any electrical control panel.

It is designed to support PT100 and PT1000 sensor types, depending on your application needs and its precision requirements.



Front panel



Rear view

DISPLAY

High brightness and contrast four digit display, with 7-SEG. LED digits (10mm), will normally indicate temperatures from -50 to +850°C (-58 to 1562°F), depending on the input probe. Decimal values are only displayed at temperatures below 999.9. Above that temperature the display turns automatically into degree mode. Plus symbol (+) is never displayed. All alphanumeric information and menus are toggle-case (abbreviations or initials). Two LEDs located at the left of the display inform you about the output relay status.

KEYPAD

The TMR6000 has four (4) buttons at the front panel. On occasion, these buttons have three operations.

- ✓ You can navigate through the menus and set values in the various functions.
- ✓ When combining them, you can enter to main menu lists such as parameters, calibration etc.
- ✓ You can have access to display information about software version, errors etc.

If no key is pressed within 30 seconds, the display returns to the normal temperature indication mode without storing any new value that may have been set.

ENTER BUTTON

The *ENTER* button is used to enter in menus, values and save the changes.

When in normal temperature indication:

- Press and hold for at least 3 seconds to enter in *USER MENU*.

Inside the menus:

- Press once to see the value.
- Press once to confirm any new value (otherwise it will not be saved).
- Press once to go to the next step.

ESCAPE BUTTON

The *ESCAPE* button is used to exit from menus and values without saving any change.

Inside the menus:

- Press once to exit from a value without saving.
- Press once to exit from menu list to normal temperature indication.

UP BUTTON

The *UP* button is used to navigate through menus and increase the values.

When in normal temperature indication:

- Press once to see the software version.

Inside the menus:

- Press once to move to the next item of the menu list.
- Press to increase the selected value. When holding down, the changing rate accelerates.

DOWN BUTTON

The *DOWN* button is used to navigate through menus and decrease the values.

When in normal temperature indication:

- Press once to see the cause of the error and alarm.

Inside the menus:

- Press once to move to the previous item of the menu list.
- Press to decrease the selected value. When holding down, the changing rate accelerates.

SETPOINT 1 / RELAY STATUS (COOLING)

Indication LED for the Setpoint1 and the K1 output relay status. It depends on the selected Setpoint1 value and the output mode parameter “**HC1**” (heating/cooling). The LED lights when the normal open relay contact is enabled (closed), and the heating/cooling process is on duty.

SETPOINT 2 / RELAY STATUS (HEATING) ,

Indication LED for the Setpoint2 and the K2 output relay status. It depends on the selected Setpoint2 value and the output mode parameter “**HC2**” (heating/cooling). The LED lights when the normal open relay contact is enabled (closed), and the heating/cooling process is on duty.

6. MAIN FEATURES

RELAY OUTPUT

The digital outputs of the TMR6000 are potential free (voltage free common) DPDT relay contacts and they are normally open when not operating. As long as the target temperature is not reached, the relay remains active. When the target temperature is reached, the relay deactivates. Advise the connection diagram and take care not to exceed the contact range electric characteristics.

The *COOLING* and *HEATING* outputs (Setpoint1 and Setpoint2) are disengaged during parameter editing and error existence, as a protective method to avoid faulty temperature control process. The two *LEDs* at the front of the TMR6000 indicate the status of these outputs.

Any wrong configuration at the connection wiring of the output relays may cause fire, malfunction or permanent damage to the unit.

RESOLUTION

TMR6000 measures the temperature value in the maximum possible resolution. When changing the “**tind**” parameter, you can select the way the device displays this value, with one decimal number, or by half degree, or by degree. If the “tind” parameter is set to display integer values, then all parameter settings, setpoint and any similar value are converted automatically to the nearest integer number.

EXTERNAL SENSOR INPUT

TMR6000 has an input for an external PT100 / PT1000 sensor connection for measurement and control directly in an external system.

This input is a classic 3-wire temperature reading application. Connect the first wire directly to the end of the sensor and the other two wires together to the other end of the temperature sensor. This connection configuration has the advantage of equalizing the sensor cable resistance that varies between the different lengths of it. (See connection diagram)

Ensure that you have proper cable insulation. Short circuit and loose connection results in poor temperature measurement, malfunction or unit damage. If there is a suspicion of electrical interference in the input wiring cables, the use of shielded cable is strongly recommended.

The temperature range for RTD sensor (depending on type) is the following:

- **RTD** sensor type **PT100** and **PT1000** temperature range* :

-50°C to +850°C / -58°F to +1562°F

(*) No decimal number above 999,9 degrees.

ERROR DETECTION

Several conditions may result in Error situation during a working cycle or installation of the TMR6000. In this case, four (4) bars appear on the display. The specific cause of the error can be retrieved by pressing and holding the *DOWN* button. Below are the possible error codes.

- E01** Probe wiring fault. Short-circuit between probe ends. The TMR6000 is not able to proceed in temperature measurements.
- E02** Sensor Probe fault. Open circuit between probe ends or damaged sensor. The TMR6000 is not able to proceed in temperature measurements.

CALIBRATION

The TMR6000 is calibrated by the manufacturer. This is a complicated procedure that can't be done without special laboratory equipment.

Sometimes, wiring and connections may cause a slight difference between the displayed and the real temperature value. The parameter "**AdJS**" gives the ability to correct small variations to the value as an offset.

CELSIUS TO FAHRENHEIT STANDARD

The TMR6000 is running at both Celsius and Fahrenheit temperature measurement standards. According to your regional settings, select through parameter **C-F** the appropriate temperature standard.

When changing from one standard to the other, all values (parameter limits, setpoints etc) are automatically converted to the selected one, without editing any of them. Have the TMR6000 checked for decimal values only.

PASSWORD

It is your own secret password you set to enter the user menu, edit parameters and calibrate the temperature input (only by manufacturer). You can set this number at **Cod1** and **Cod2** parameters. After this procedure, you will have to enter it whenever **PAS1** or **PAS2** are requested by the unit, (e.g. when you are going to change a value in a menu). Otherwise, you will be able to enter and read the values, but you cannot change them.

If 0 (zero) number is set at parameters *Cod1/Cod2*, no password is required to enter the corresponding menu and the *PAS-* prompt does not appear at all.

You are not able to read or change any password if you do not enter the correct existing one. There isn't a default way to reset the passwords and it differs from a software version to another. However, it is possible to clear your passwords (Cod1 and Cod2), with a simple procedure. Send us the exact type (found at the label of the unit) and the software version (retrieved by pressing *UP* button) of your device, for further instructions.

If you forget your password contact us to give you instructions on how to unlock the TMR6000.

7. USER MENU & TEMPERATURE SETPOINTS

To enter the menu press and hold for 3 seconds the *ENTER* button.

Through this menu the user can edit the temperature setpoints. It can be either protected with the *PAS1* password, or can have free entry (unprotected). If no key is pressed within 30 seconds, the display returns to normal temperature indication mode.

- EDITING SETPOINTS -

In order to edit the setpoints follow the below procedure.

- 1) Press and hold the *ENTER* button for 3 seconds.
If a password has been set for entering the user menu, the *PAS1* request will appear. Press *ENTER* to proceed to password* selection with *UP* / *DOWN* buttons.
Press *ENTER* to set the selected password and proceed to Step 2.
 - 2) **SP-1.** Press *ENTER* to select the temperature Setpoint1 (cooling), using the *UP* and *DOWN* buttons. Press *ENTER* to save this value and proceed to Step3.
 - 3) **SP-2.** Press *ENTER* to select the temperature Setpoint2 (heating), using the *UP* and *DOWN* buttons. Press *ENTER* to save this value and proceed to Step4.
 - 4) The user menu is working circularly. After Step3 it returns to Step2 (SP-1), skipping the *PAS1* that is already stored. Press *ESCAPE* to exit the user menu and return to normal indication mode.
- (*) If a password is not required to enter the user menu, the menu starts with to Step2. If you don't have the correct password, you will be able to enter and read the values, but you cannot change them.

8. PARAMETER MENU DESCRIPTION

The *PARAMETER MENU* is used only from the unit installer or an engineer who is familiar with the TMR6000 features. It has different access level than the user menu and any interference by the user is not recommended.

To enter this menu press and hold for 3 seconds *ESCAPE* and *DOWN* buttons.

To understand each parameter meaning, advise the below descriptions and the quick parameter guide.

PAS2 - PASSWORD FOR EDITING PARAMETERS

It is your own secret password, which is been set at *Cod2* parameter for editing use. The number you set at *Cod2* parameter, is the number you have to set at *PAS2* when asked, if you want to change the value of any parameter in the parameter menu. Otherwise, you are able to enter and read the parameter values but you are not able to change them. If you forget your password contact us to get instructions on how to unlock the TMR6000.

tind - TEMPERATURE INDICATION METHOD

It is the way the thermometer indicates the measured value of the temperature, independently of the way of "reading" the sensor (it is only the preferred display/menu scrolling method). The first way is indication without a decimal number. The degree changes at the midpoint of the previous and the next temperature degree. The second way is also similar by giving a decimal number at the temperature degree midpoint. So the indicated temperature changes every 0,5 degree. The third way and the most accurate of all, includes a standard decimal number giving indication at 0,1 degree. When the temperature exceeds the capability of the 4-digit display (999.9) no decimal number is appeared.

tiPP - TEMPERATURE INPUT RTD PROBE SELECTION

Selection for the input probe type, when external sensor is being used. Set PT100 or PT1000 according to the type of the sensor you use. The TMR6000 version supports only RTD sensor types. Selecting wrong type of sensor will lead to faulty measurements and under circumstances to equipment damage.

C-F - CELSIUS or FAHRENHEIT STANDARD

Temperature standard selection function. Set CELSIUS or FAHRENHEIT according to the regional standard you use. Changing from one standard to the other, all values (parameter limits, setpoints etc) are automatically converted to the selected one without editing any of them.

HC-1 - *HEATING* or *COOLING MODE* for OUTPUT 1 (SETPOINT 1)

Relay working function "make on rise" or "make on fall", for *Output1*. We set HEAT (fall) when we want the relay to act every time the temperature falls below the *Setpoint1* value, or COOL (rise) when we want the relay to act every time the temperature rises above the *Setpoint1* value.

LS-1 - LOW LIMIT for SETPOINT 1 (OUTPUT 1)

Limit for the lowest possible *Setpoint1* value set by the user. This value cannot be higher than the HIGH LIMIT of this setpoint.

HS-1 - HIGH LIMIT for SETPOINT 1 (OUTPUT 1)

Limit for the highest possible *Setpoint1* value set by the user. This value cannot be lower than the LOW LIMIT of this setpoint.

HyS1 - HYSTERESIS for SETPOINT 1 (OUTPUT 1)

Relay contact switching hysteresis make on rise/fall according to HC-1 (set in temperature degree). The relay will not change its status until the readout temperature overcomes the hysteresis value.

E.g the *Setpoint1* is on cooling mode, set at 20°C with 1°C hysteresis and ambient temperature is 25°C. The relay will activate the cooling unit until the ambient temperature gets below 20°C, but it will not start again until the ambient temperature reaches 21°C. With this feature you can avoid the rapid relay changes near the temperature setpoints.

HC-2 - *HEATING* or *COOLING MODE* for OUTPUT 2 (SETPOINT 2)

Relay working function "make on rise" or "make on fall", for *Output2*. We set HEAT (fall) when we want the relay to act every time the temperature falls below the *Setpoint2* value, or COOL (rise) when we want the relay to act every time the temperature rises above the *Setpoint2* value.

LS-2 - LOW LIMIT for SETPOINT 2 (OUTPUT 2)

Limit for the lowest possible *Setpoint2* value set by the user. This value cannot be higher than the HIGH LIMIT of this setpoint.

HS-2 - HIGH LIMIT for SETPOINT 2 (OUTPUT 2)

Limit for the highest possible *Setpoint2* value set by the user. This value cannot be lower than the LOW LIMIT of this setpoint.

HyS2 - HYSTERESIS for SETPOINT 2 (OUTPUT 2)

Relay contact switching hysteresis make on rise/fall according to HC-2 (set in temperature degree). The relay will not change its status until the readout temperature overcomes the hysteresis value.

E.g the *Setpoint2* is on heating mode, set at 15°C with 1°C hysteresis and ambient temperature is 10°C. The relay will activate the heating unit until the ambient temperature gets above 15°C, but it will not start again until the ambient temperature reaches 14°C. With this feature you can avoid the rapid relay changes near the temperature setpoints.

odEL - OUTPUT DELAY TIME

It is a time delay (absolute value in seconds), common for both of the output relays, which comes right after the moment the relay status changes. The relay will not change its status again within this time, irrespective of temperature, but right after the delay time expiration. This is a safe guard function in cases that heating or cooling control is abnormal.

AdJS - ADJUST

Adjust the read-out value when another thermometer is working as a main temperature indicator so the two instruments show the same temperature. Set temperature above or below the measured one in absolute temperature degree including decimal numbers.

E.g. The TMR6000 with the incorporated sensor is installed in a large room and its close ambient temperature is different from the rest room (near the heater). You can adjust this offset in order to make the temperature control more representative regarding the average room temperature.

Cod2 - CODE to EDIT PARAMETERS

It is your own secret password set for editing parameter use. You can set this number at *Cod2* parameter. After this procedure, you will have to enter it when *PAS2* is requested by the unit (entering parameter menu), if you are going to change a parameter value in the parameter menu. If 0 (zero) number is set at parameter *Cod2*, no password required to enter parameter's menu and the *PAS2* request does not appear at all. If you forget your own secret number contact us to give you instructions on how to unlock the TMR6000.

Cod1 - CODE to ENTER USER MENU

It is your own secret password you set to edit the user menu (setpoints). You can set this number at *Cod1* parameter. After this procedure, you will have to enter it when *PAS1* is requested by the unit (entering user menu), if you are going to change a setpoint in the user menu. Otherwise, you will be able to enter and read the values, but you cannot change them. If 0 (zero) number is set at parameter *Cod1*, no password required to enter user menu and the *PAS1* request does not appear at all.

You are not able to read or change the *Cod1* password if you do not enter the correct *PAS2* (*Cod2*) password while entering the parameter menu. If you forget any of your passwords contact us to give you instructions on how to unlock the TMR6000.

9. QUICK MENU GUIDE

USER MENU (press ENTER for 3 sec)

PAR	DESCRIPTION	VALUE	EXPLANATION
PAS1	PASSWORD FOR EDITING USER MENU / It is your own secret code asked at Cod1 parameter for editing use.	(Cod1)	NUMBER
SP-1	SETPOINT1 (COOLING) / Set the desirable temperature setpoint for Output1.	LS-1 < SP-1 < HS-1	DEGREES (°C / °F)
SP-2	SETPOINT2 (HEATING) / Set the desirable temperature setpoint for Output2.	LS-2 < SP-2 < HS-2	DEGREES (°C / °F)

PARAMETER MENU (press ESCAPE+DOWN for 3 sec)

PAR	DESCRIPTION	VALUE	EXPLANATION
PAS2	PASSWORD FOR EDITING PARAMETER MENU / It is your own secret code asked at Cod2 parameter for editing use.	(Cod2)	NUMBER
tind	TEMPERATURE INDICATION METHOD / It is the way the thermometer indicates the value of the temperature, with decimal or by half degree.	1	1 °DEGREE
		2	0,5 °DEGREE
		3	0,1 °DEGREE
tiPP	TEMPERATURE INPUT PROBE SELECTION / Selection for the input RTD probe type.	1	PT100
		2	PT1000
C-F	CELSIUS – FAHRENHEIT STANDARD / Temperature function selection standard.	1	CELSIUS
		2	FAHRENHEIT
HC-1	HEATING/COOLING MODE OUTPUT 1 / Relay working function (make on rise or fall), for output 1. Set HEAT (fall) or COOL (rise).	1	HEATING
		2	COOLING
LS-1	LOW SETPOINT 1 LIMIT / Limit for the lowest possible value of Setpoint1. Set preferred min value in °C or °F. (depending on sensor specifications)	-50 – 850	°DEGREE
HS-1	HIGH SETPOINT 1 LIMIT / Limit for the highest possible value of Setpoint1. Set preferred max value in °C or °F. (depending on sensor specifications)	-50 – 850	°DEGREE
HyS1	DIFFERENTIAL SETPOINT OUTPUT 1 / Relay contact switching hysteresis make on rise/fall according to HC-1. Set preferred absolute value in °C or °F.	0 – 30	°DEGREE
HC-2	HEATING/COOLING MODE OUTPUT 2 / Relay working function (make on rise or fall), for output 1. Set HEAT (fall) or COOL (rise).	1	HEATING
		2	COOLING
LS-2	LOW SETPOINT 2 LIMIT / Limit for the lowest possible value of Setpoint2. Set preferred min value in °C or °F. (depending on sensor specifications)	-50 – 850	°DEGREE
HS-2	HIGH SETPOINT 2 LIMIT / Limit for the highest possible value of Setpoint2. Set preferred max value in °C or °F. (depending on sensor specifications)	-50 – 850	°DEGREE
HyS2	DIFFERENTIAL SETPOINT OUTPUT 2 / Relay contact switching hysteresis make on rise/fall according to HC-2. Set preferred absolute value in °C or °F.	0 – 30	°DEGREE
odEL	OUTPUT DELAY OFFSET / Output acting time delay, common for both of the output relays on reaching the setpoint. Set preferred time in sec .	1 – 50	SECONDS
AdJS	CALIBRATION OFFSET / Adjust the read out value. ±10°C - 0,1°C / step	-100 – 100	°DEGREE
Cod2	CODE FOR EDITING PARAMETERS / Password to change any value in the PARAMETER MENU. Zero (0) selection gives free access.	0 – 9999	NUMBER
Cod1	CODE FOR EDITING SETPOINTS / Password to change any value in the SETPOINT menu. Zero (0) selection gives free access.	0-9999	NUMBER

Note than this guide is based on Celsius values. When Fahrenheit standard is selected, the relative values are modified accordingly.

A proper parameter selection is very important for the total operation. These parameters should only be modified by an engineer/installer, familiar with the specific application and device operation. Modifications by unauthorized personnel can damage the device, the connected equipment and by extension the whole application.

IO. ELECTRICAL SECTION

The TMR6000 has a wide power supply range. Supply with either **8-27VAC** or **8-36VDC** regulated, unregulated or stabilized.

Its maximum power consumption is approx. **0.6W** in total operation, when all digits indicate '8888' and both output relays are activated. The connection polarity (+/-) is not crucial, as there is an internal bridge rectifier.

The TMR6000 is designed for use with specific voltage only. Connection to a different voltage may cause fire, electric shock or other damage. There is not an electrical safety fuse in the internal power circuit.

- CONNECTION TERMINALS -

The unit is equipped with a 3,5mm pitch, plug-in connector. Insert and screw only one wire in each terminal in order to be in compliance with VDE norms. Take care to apply the recommended tightening torque.

The wire range should be 28-16AWG (UL) or 0.5-1.5mm² (IEC).

Terminals #1 - #2 - #3

Use these terminals to connect the external RTD sensor. Advise the connection diagram and connect the sensor accordingly.

Terminals #4 - #5

Connect the power supply to the terminals #4 and #5. Specific polarity (+/-) is not crucial.

Terminals #6 - #7

Use these terminals to connect the temperature controlling device that you would like to control through SETPOINT1 RELAY OUTPUT1. Advise the connection diagram and connect the external device accordingly.

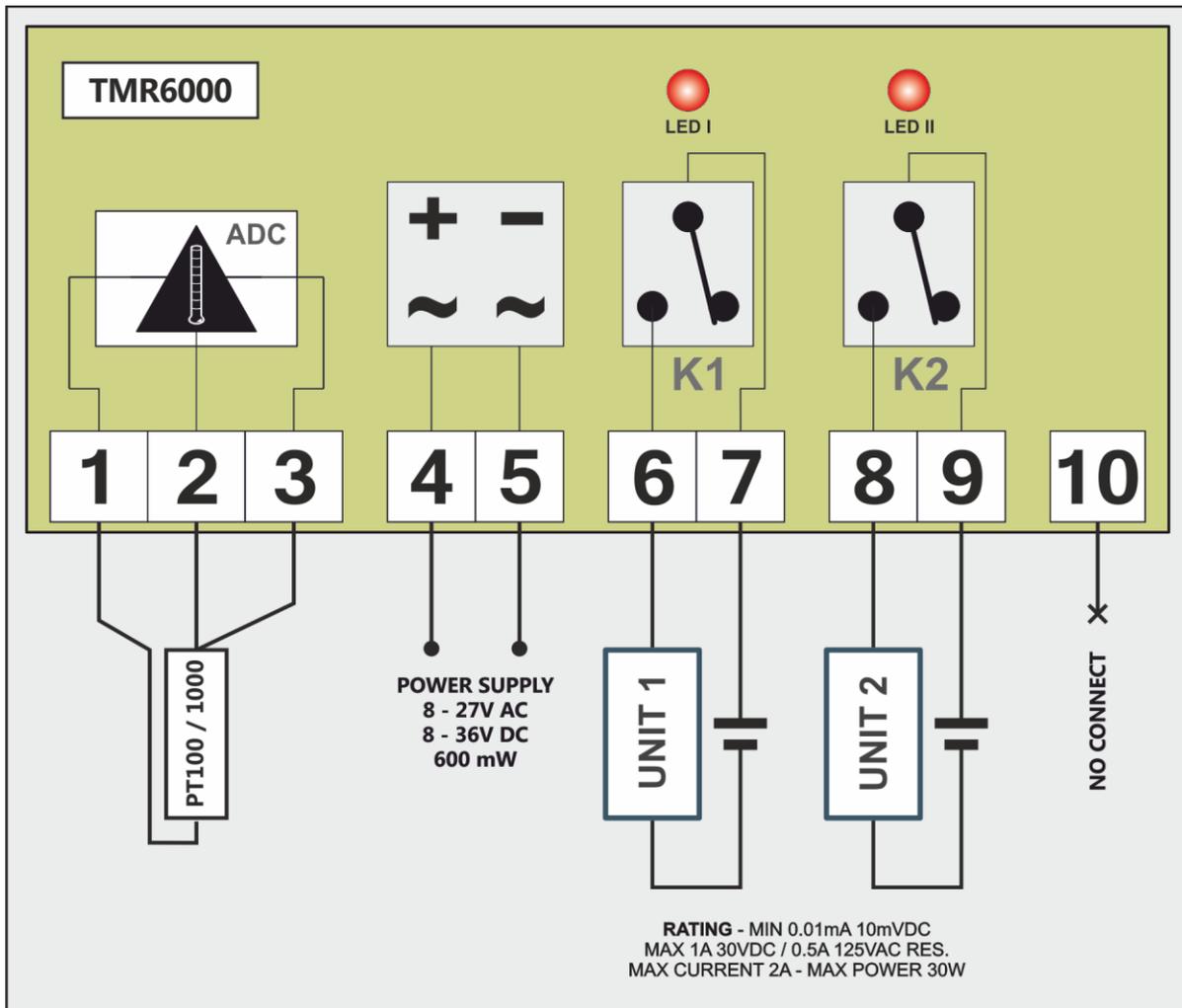
Terminals #8 - #9

Use these terminals to connect the temperature controlling device that you would like to control through SETPOINT2 RELAY OUTPUT2. Advise the connection diagram and connect the external device accordingly.

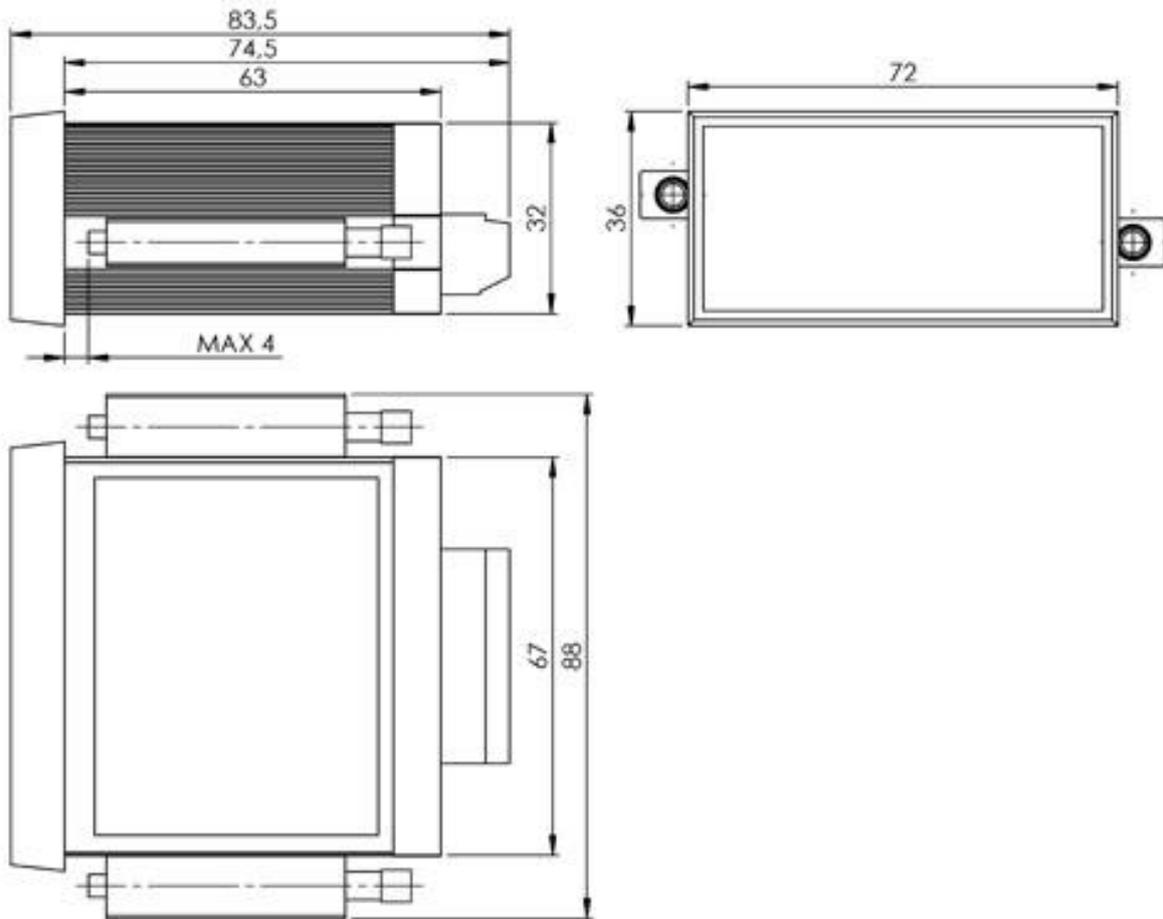
Advise the following diagrams in order to have a proper connection between the unit and your equipment.

!! Always cut the power off before connecting or disconnecting the unit. !!

Connection diagram for TMR6000



II. DIMENSIONS



12. TECHNICAL SPECIFICATIONS

GENERAL DATA	
Unit absolute dimensions (mm)	72 x 72 x 36
Housing area dimensions (mm)	83,5 x 88 x 36
Weight	90 gr.
Enclosure	Self-extinguishing PPO (black)
Mounting	Panel mounting
Degree of protection	IP64 front panel
Features	
Setpoints	2x Independent full range / limited setpoints Heating / Cooling / Differential mode
Resolution	0.1 / 0.5 / 1.0 degree (max 999,9)
Temperature sensor	RTD 3-wire PT100/PT1000 Platinum 385

Temperature standard	Celsius / Fahrenheit
Temperature bandwidth	-50°C ... 850°C (-58°F ... 1562°F)
Input calibration	20-step / Full range, factory pre-calibrated
Display	4-digit 10mm bright red led 7-segment 2 LEDs for output relay status
Keypad	4 buttons (ENTER-ESCAPE-UP-DOWN)
Protective functions	Password protected menus Temperature sensor condition & Wiring error Incorrect polarity protection
Unit operating conditions	
Ambient temperature under bias	-25°C ... 85°C
Storage temperature	-25°C ... 85°C
ELECTRICAL DATA	
Operating voltage (AC values at 50/60 Hz)	8-27 VAC / 8-36 VDC
Power consumption	0.6 W max
Relay contact characteristics	
Digital output	2 DPDT Relays - Potential free
Resistance (initial)	Maximum 50 mΩ at 1A 6 VDC
Rating (resistive)	0.5A 125 VAC or 1A 30 VDC
Max carrying current	2A
Max switching power	62.5 AV, 30 W
Max switching voltage	250 VAC - 220 VDC
Max switching current	2A
Min switching load	0.01 mA 10 mVDC
Contact life	min 1x10 ⁸ operations (mechanical) min 5X10 ⁵ operations (electrical 1 A-30 VDC)
Connector characteristics	
Pitch	3,5 mm
Wire range	28-16AWG (UL) , 0.5-1.5mm ² (IEC)
Tightening torque	0.2Nm (1.7Lb-In.)
STANDARDS	
In conformance with the following standards:	CE

Specifications are subject to change without prior notice.



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