Thermostat regulator for heating cables and ribbons.

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CONFIGURATION HANDBOOK

THL105

Table of contents

Device Presentation

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The THL105 is a compact field mount thermostat for regulating heating cables and ribbons, allowing control of resistive load up to 3.5 kilowatts. The digital regulation allows to combine precision and ease of use.
Temperature and setpoint are displayed on a large LCD display.

Technical specifications can be downloaded at: http://www.loreme.fr/fichtech/THL105_eng.pdf

USER INTERFACE

LCD display
2 lines / 16 characters

Buttons

Terminals for PT100
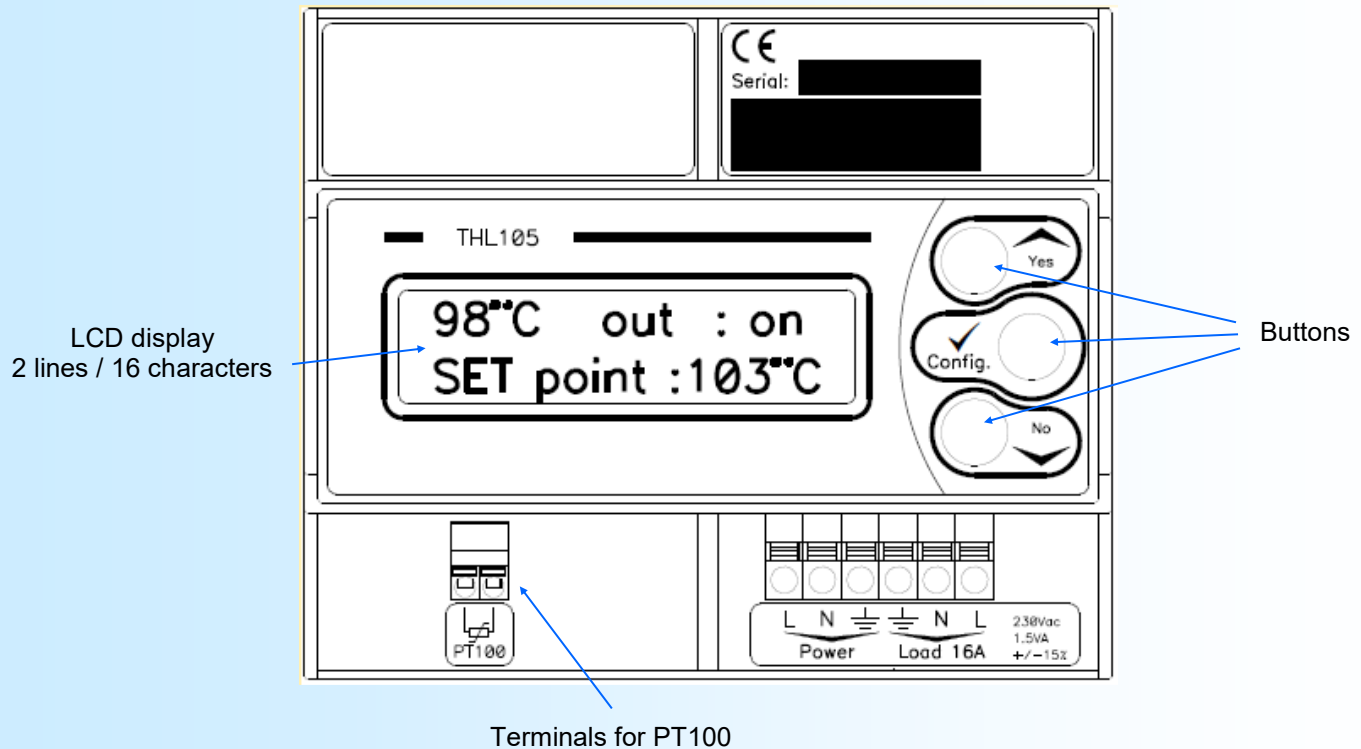
Visualization

```
160°C  out: off      Temperature and output relay state.
SET point:140°C      Setpoint.
```

Note: The display blinking when the temperature measurement is breaking.

The push buttons allow a direct adjustment of the setpoint. The ⋏ button allows you to increment the setpoint and the ⋎ button to decrement it. The setpoint is incremented or decremented in steps of 1 °C at the beginning. Holding pressed the ⋏ or ⋎ button for more than 4 s will increment or decrement the setpoint in 10 °C steps.

Configuration

An advanced configuration is accessible via the 'Config' button. The user can thus configure the hysteresis and delay parameters of the regulation.

The regulation works as follows:
- The load is energized when the temperature drops below the setpoint and after the configured delay time.
- The load is no longer supplied when the temperature goes above the threshold plus the hysteresis.

A temporary message appears at the beginning, indicating the version of the device (Rev Hard.Soft).

```
CONFIGURATION
Rev:0.1
```

1) Hysteresis (dead band) configuration

```
HYSTERESIS?        Press the ⋀ or ⋁ button to increment or decrement the hysteresis value (1 °C steps).
  2˚C              Press the 'Config' button to validate the setting (0 to 50 °C).
```

2) Delay configuration

```
RETARD?            Press the ⋀ or ⋁ button to increment or decrement the delay value (0.1 s steps).
  0s               Press the 'Config' button to validate the setting (0 to 300 s).
```

3) End of configuration

The new parameters are saved in non volatile memory and the message **'OK'** is displayed briefly, indicating that the parameters have been successfully saved. Then, device returns to measure mode.

Note:

If the waiting time for action on the buttons exceeds 90 seconds then the device automatically returns to measurement mode without saving the new settings.

RS232 link setting

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The device can be configured or updated in terminal mode via an RS232 link.

Step 1: Driver installation for USB / RS232 adapter

- download driver at www.loreme.fr:
   http://www.loreme.fr/aff_produits.asp?rubid=53&langue=fr

- Click on executable file to install the driver,
- Plug the cable on a USB port, Windows install a new serial communication port **COMx** (x >= 4).

Note :
The use of the cable on another USB port don't generates a new communication port. Use of another adapter generates another communication port number (COMx) and requires the reconfiguration of the HyperTerminal.

Step 2: Setting of terminal emulation software (PC with windows).

1 The terminal emulation software for PC « HyperTerminal » is resident in windows up to XP version. For later versions, it is downloadable on : **www.loreme.fr in download part** (http://www.loreme.fr/HyperTerm/htpe63.exe)

=> Run the downloaded software to install it.

2 Start a "hyper Terminal" connection :
- Click on **"START"** button
Up to XP version
- Go to **"Programs \ Accessories \ Communication \ Hyper Terminal"**
- Click on **"Hypertrm.exe"**
Or if the software was downloaded
- Go to **"All programs \ HyperTerminal Private Edition"**
- Click on **"HyperTerminal Private Edition"**

3 Enter name for the new connection

4 Choose the communication port related to the adapter.

5

Choose:
- 9600 bauds
- 8 DATA bits
- no parity
- 1 stop bit
- **XON/XOFF**

6 The PC is now in terminal mode, connect it to the device by plugging the RS232 cable. The measure is now displayed on the terminal. To access configuration, press 'C' key.

7 When leaving Hyper terminal, the following window will appear. By saving, the terminal session will start with the same configuration.

Thus, the shortcut LOREME.ht will permit to communicate with all LOREME devices.

Note: to modify the parameters of terminal mode whereas this one is already started, it is necessary, after having carried out the modifications, to close the terminal and to open it again so that the modifications are effective.

Terminal mode

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Visualization

In measure mode 2 information's are displayed on screen every 2 seconds:

138.5 ohms	Measured resistance.
100.0 °C	Measured temperature.

Configuration

This manual resume in detail the different configuration possibilities.
To access the configuration mode, type the "**C**" key.
On the front face the following message is displayed:

```
CONF PAR RS232          RS232 CONF.
EN COURS...             IN PROGRESS
```

1) Method

In configuration, different types of questions are asked. For each of them, several answers are possible. Here is their description:

1.1) Value acquisition

Example: SEUIL?
            80 °C

Two possibilities:
- The validation without modification by typing "**Enter**",
- The modification with simultaneous display followed by validation with "Enter" key.

2) Configurable parameters

Remarks:
- It is possible, when a mistake is made during a value acquisition, before validating it, to go back by pressing on backspace key. This re-displays the message without taking notice of the mistake.
- In configuration mode, if there is no action on a key during 2 minutes, device goes back in measure mode without taking notice of the modifications made before.
- In configuration mode, if you want go back to measure mode without taking notice of modifications made before, just press the escape key.

The following parameters can be configured:

- The threshold (setpoint).
- The hysteresis.
- The delay.

2.1) Configuration messages

```
CONFIGURATION
REV:0.1
```

```
SEUIL?                  Threshold setting (-50 °C to 250 °C).
80 °C
```

```
HYSTERESIS?             Hysteresis setting (0 °C to 50 °C).
2 °C
```

```
RETARD?                 Relay activation delay setting (0 s to 300 s).
0.5 s
```

OFFSET

Sometimes, it may be interesting to modify the measure by a simple terminal keyboard intervention. It can be used in many situations as sensor aging, an input refinement as a result of magnifying effect...

To shift the measure, it is necessary:
- To be in measure mode,
- type on "**+**" or "**-**" to access the function,
- on terminal display become:

138.5 Ohms	
100.5 °C	Temperature value with offset,
OFFSET 0.5	offset function, temperature offset value.

- Use keys "**+**" and "**-**" to adjust offset, the temperature is directly modified.
- Type on "**Enter**" to save the new offset.

When the device is powered off and on, the offset stays active. To reset offset, it is necessary to enter in "OFFSET" mode, put the value to zero by "+" and "-" keys, then validate by <ENTER>.
In offset mode, when there is no action on a key during 120 s, the device leaves automatically the mode and discard the new adjusted offset value and keeps the old offset value.

FIRMWARE update

To access to the firmware update function, you must first open an HyperTerminal session on a PC, connect the device to the PC with the RS232 link cable and then power on the device.

The following character is send to the terminal:

>   <——————————— The device sends this character then it waits the « F » key during 0.5 s.

If the user has pressed the « F » key in the allowed time, the following message is displayed in the HyperTerminal windows:

FIRMWARE LOADER Rev0
READY TO TRANSFER...

The device is now in file waiting mode. This file is provide by LOREME. This file contain the firmware code in intel HEX format. Selected the « Transfer », « Send a text file ... » in the HyperTerminal menu.
Select the directory and open the file. The HyperTerminal program begins to send the file to the device.

FIRMWARE LOADER Rev0
READY TO TRANSFER
*********** <——————————— The star characters appears to show the progress of the uploading.

At the end, the message « **PROGRAMMING OK !** » is display if no errors occurs. Otherwise, these following message could be displayed:

- **SERIAL COM ERROR !**   Error during receipt.
- **SERIAL TIMEOUT !**   Waiting time of receipt elapsed.
- **PROGRAMMING FAILED !**   Programming error in the internal flash memory.

Attention:
If an error occurs during the programming process, it is necessary to start again the whole procedure.
A bad programming leads to incorrect or bad operation of the device.

EMC Consideration

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1) Introduction

To meet its policy concerning EMC, based on the Community directives **2014/30/EU** & **2014/35/EU**, the LOREME company takes into account the standards relative to this directives from the very start of the conception of each product.

The set of tests performed on the devices, designed to work in an industrial environment, are made in accordance with **IEC 61000-6-4** and **IEC 61000-6-2** standards in order to establish the EU declaration of conformity. The devices being in certain typical configurations during the tests, it is impossible to guarantee the results in every possible configurations. To ensure optimum operation of each device, it would be judicious to comply with several recommendations of use.

2) Recommendations of use

2.1) General remarks

- Comply with the recommendations of assembly indicated in the technical sheet (direction of assembly, spacing between the devices, ...).
- Comply with the recommendations of use indicated in the technical sheet (temperature range, protection index).
- Avoid dust and excessive humidity, corrosive gas, considerable sources of heat.
- Avoid disturbed environments and disruptive phenomena or elements.
- If possible, group together the instrumentation devices in a zone separated from the power and relay circuits.
- Avoid the direct proximity with considerable power distance switches, contactors, relays, thyristor power groups, ...
- Do not get closer within fifty centimeters of a device with a transmitter (walkie-talkie) of a power of 5 W, because the latter can create a field with an intensity higher than 10 V/M for a distance fewer than 50 cm.
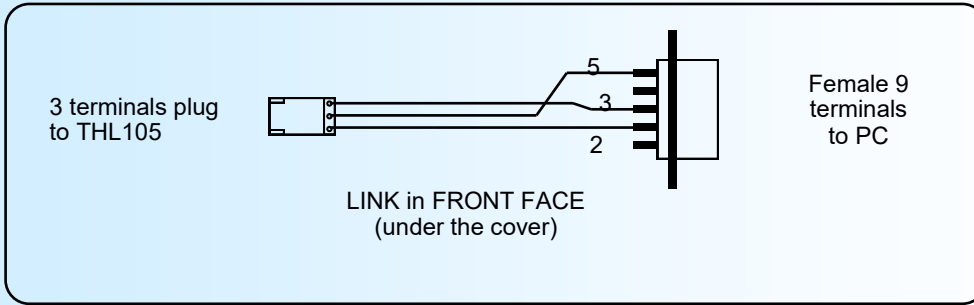
2.2) Power supply

- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power supply line be the most direct possible from the section switch.
- Avoid using this power supply for the control of relays, of contactors, of electrogates, ...
- If the switching of thyristor statical groups, of engines, of speed variator, ... causes strong interferences on the power supply circuit, it would be necessary to put an insulation transformer especially intended for instrumentation linking the screen to earth.
- It is also important that the installation should have a good earth system and it is better that the voltage in relation to the neutral should not exceed 1V, and the resistance be inferior to 6 ohms.
- If the installation is near high frequency generators or installations of arc welding, it is better to put suitable section filters.

2.3) Inputs / Outputs

- In harsh conditions, it is advisable to use sheathed and twisted cables whose ground braid will be linked to the earth at a single point.
- It is advisable to separate the input / output lines from the power supply lines in order to avoid the coupling phenomena.
- It is also advisable to limit the lengths of data cables as much as possible.

Wirings

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E 10

PC - DEVICE LINK

3 terminals plug
to THL105

5
3
2

Female 9
terminals
to PC

LINK in FRONT FACE
(under the cover)

DIAGRAMS OF CONNECTIONS

CE
Serial:

THL105

98°C   out : on
SET point :103°C

Yes

Config.

No

3 terminals
RS232 link
connector
(under the cover)

Cover (lift here)

PT100

L N ⏚ ⏚ N L   230Vac
Power   Load 16A   1.5VA
                       +/−15%

PT100 sensor

Phase Neutral Earth Earth phase Neutral
230 Vac   Load