Threshold relay for resistive level sensor
Resistive level probe Type : SNL

LOREME

CONFIGURATION HANDBOOK

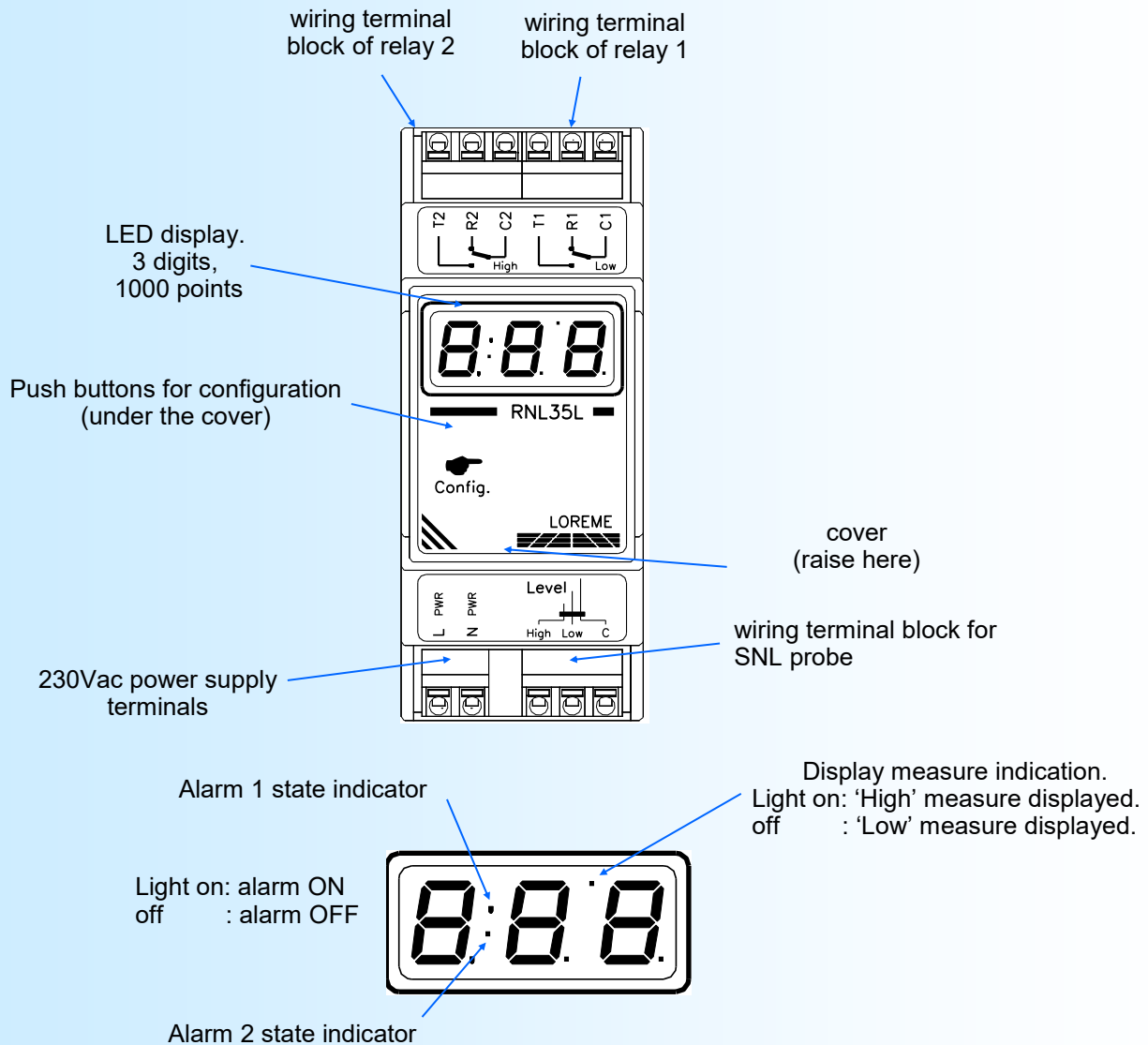# RNL35L

REV 0.0 - 07/10/13

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Device Presentation

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The RNL35L is a threshold relay for level detection. It works with a resistive level probe with 1 or 2 levels (SNL probe). The RNL35L measures the resistance between the common and the 'Low' inputs for the first level and between the common and the 'High' inputs for the second level. These measurements are then compared to thresholds, to activate or not the alarm relays.

The resistance measurement is on the 0 - 100 kOhms range. The alarms parameters are:
- Threshold (0 to 100 kOhms),
- Hysteresis in kOhms,
- Delay (0.1 s to 60 s). This delay is the time between the alarm detection and the action on relay.
- The alarm type (low threshold or high threshold),
- The relay security (positive or negative security).

The technical data sheet is downloadable here: http://www.loreme.fr/fichtech/SNL%20-%20RNL35L_eng.pdf

wiring terminal block of relay 2

wiring terminal block of relay 1

LED display. 3 digits, 1000 points

Push buttons for configuration (under the cover)

cover (raise here)

wiring terminal block for SNL probe

230Vac power supply terminals

Alarm 1 state indicator

Display measure indication.
Light on: 'High' measure displayed.
off : 'Low' measure displayed.

Light on: alarm ON
off : alarm OFF

Alarm 2 state indicator

Push buttons functions:

- ▲ (higher button) Access to configuration, <YES> button or increment value button.
- ▼ (lower button) switch the measure display, <NO> button or decrement value button.

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DISPLAYING

The device allows to display on 3 digits, the inputs measures. These measures are the resistance measurement. A value higher than 110 kOhms is indicate by the display of the "**Hi**" message.

A push on the lower button (▼) switches the input measure displayed:

2˙8   the point at the top right show that the measure is for the 'High' input (28 kOhms in this case).

15   Display of the measure of the 'Low' input (15 kOhms in this case).

CONFIGURATION WITH THE BUTTON

The 2 buttons (under the cover) are used for the configuration of alarms parameters. A push on the higher button (▲) allows to enter in the configuration mode.

The device show temporarily the message '**r:0.0**' . It is the Hard and soft version.

1) Relays configuration

The device displays the message '**AL1**' or '**AL2**'. Pressing the ▲ button to access to the relay's configuration parameters. The button ▼ permits to go to the next rubric or leave the configuration mode. In this case, the message '**End**' is displayed and the parameters are stored.

The relays parameters are:
- Threshold,
- Hysteresis,
- Delay,
- Threshold type detection,
- Relay security.

1.1) Threshold configuration

The device displays the message '**thr**'. Pressing button ▲ to access to the adjustment. Pressing button ▼ for skipping the adjustment and continue with the next rubric. In adjustment mode, the actual threshold is displayed and the

▲ , ▼ permits to increment or decrement it. The display is flashing during the adjustment. The value is automatically validated after 4 seconds if no key is pressed.

1.2) Configuration of threshold type detection

The device displays the message '**tYP**'. Pressing button ▲ to access to the adjustment. Pressing button ▼ for skipping the adjustment and continue with the next rubric. The '**Ahi**' is display for a High threshold detection and the '**ALo**' is display for a Low threshold detection. The button ▲ validate the choice and the button ▼ display the next choice.

The high threshold detection:
The alarm is activated when the measure is higher than the alarm threshold. The alarm is deactivated when the measure become lower than threshold minus hysteresis.

The low threshold detection:
The alarm is activated when the measure is lower than the alarm threshold. The alarm is deactivated when the measure become higher than the threshold plus hysteresis.

1.3) Hysteresis configuration

The device displays the message '**db**'. Pressing button ▲ to access to the adjustment. Pressing button ▼ for skipping the adjustment and continue with the next rubric. In adjustment mode, the actual threshold is displayed and the

▲ , ▼ permits to increment or decrement it. The display is flashing during the adjustment. The value is automatically validated after 4 seconds if no key is pressed.

Note:

The hysteresis value corresponds to a resistance in kOhms.

1.4) Delays configuration

The device displays the message '**dLY**'. Pressing button ▲ to access to the adjustment. Pressing button ▼ for skipping the adjustment and continue with the next rubric. In adjustment mode, the actual threshold is displayed and the

▲ , ▼ permits to increment or decrement it. The display is flashing during the adjustment. The value is automatically validated after 4 seconds if no key is pressed..

Note:
This time delay (0.1 s to 60 s) is the time between the alarm detection and the action on the relay. The delay between the disappearance of the alarm and the action on the relay is fixed to about 100 ms.

1.5) Configuration of relay security

The device displays the message '**SCu**'. Pressing button ▲ to access to the adjustment. Pressing button ▼ for skipping the adjustment and continue with the next rubric.

The '**ScP**' is display for positive security and the '**Scn**' is display for a negative security. The button ▲ validate the choice and the button ▼ display the next choice.

The Positive security : The relay is ON when the alarm is ON and OFF when the alarm is OFF.
The Negative security: The relay is ON when there is no alarm and it is OFF when the alarm is ON.

Remark:
If no buttons are pressed during 30 seconds, the device go out of configuration mode without memorizing the new parameters.
The factory setup is:
*   - AL1 & AL2: threshold: 40 kOhms, hyst: 2 kOhms, delay: 0.1 s, detection type: Low, positive security.*

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
<u>Up to XP version</u>
- Go to **"Programs \ Accessories \ Communication \ Hyper Terminal"**
- Click on **"Hypertrm.exe"**
<u>Or if the software was downloaded</u>
- 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 session whereas this one is connected, it is necessary to disconnect it, modify the parameters and then to reconnect it.

TERMINAL MODE

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DISPLAYING

When the device is powered on, it is in measure mode and sends information to the terminal. These information are the resistance measure of the Low & High inputs.

CONFIGURATION

To access to the configuration mode, press the 'C' key on the terminal keyboard. The 'CnF' message is displayed on the device.

CONFIGURATION	The device show the hard and soft revision.
VER: 0.0	

1) Language configuration

It is possible to choose the language of the configuration messages.

LANGUAGE? (Y-N)	To change the language, press on 'Y' or 'O' keys. For skipping to the next rubric press the 'N' key.
ENGLISH (O-N)YES	Display of the actual choice (English or French). Press the 'Y' or 'O' or 'Enter' to accept this choice. Press the 'N' key to see the next choice.

2) Relay configuration

The 'relay 1' design the relay of input 'Low'. The 'relay 2' is the relay of input 'High'.

RELAY 1 (Y-N)	To modify the parameters press on 'Y' or 'O'. Press the 'N' key to skip this menu.
LOW THRESHOLD? (Y-N)YES	Display of the actual choice (Low or High thershold). Press to 'Y' or 'O' to accept or 'N' to see the next choice.
THRESHOLD 40	Display of the threshold value (in Kohms). Validate with 'Enter' or type the new value with the numerical keys (setting 0 to 100).
HYSTERESIS 2	Display of the hysteresis value (in kohms). Validate with 'Enter' or type the new value with the numerical keys.
ACTIVATION DELAY 0.1s	Display of the delay value. Validate with 'Enter' or type the new value with the numerical keys (setting 0.1 to 60s).
POSITIVE SECURITY (Y-N)YES	Display of the actual choice (Positive or Negative security). Press to 'Y' or 'O' key to accept or 'N' to see the next choice.
OK!	Message send at the end of configuration and after the parameters storage.

Remarks:

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

FIRMWARE update

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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 window:

```
FIRMWARE LOADER Rev2
READY TO TRANSFER...
```

The device is now in file waiting mode. This file is provide by LOREME. The file contain the firmware code in intel HEX format. Select 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 Rev2
READY TO TRANSFER
*********** <——————— The star characters appears to show the progress of the uploading.
```

At the end, the message « **PROGRAMMING OK !** » is displayed 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 operation in 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 data sheet (direction of assembly, spacing between the devices, ...).
- Comply with the recommendations of use indicated in the technical data 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.
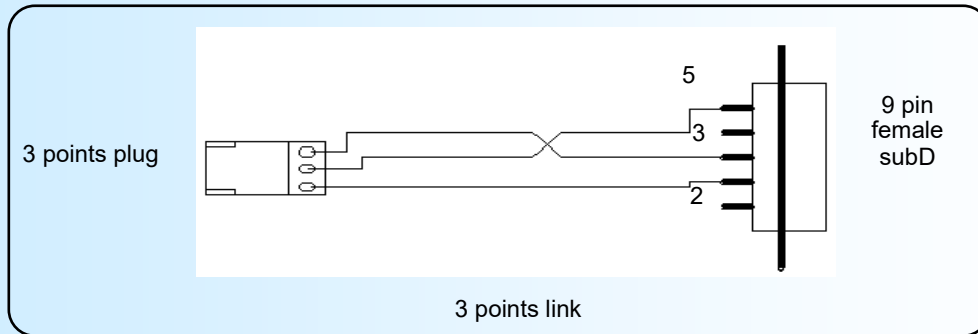
2.2) Power supply

- 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.

Wiring

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DEVICE - TERMINAL LINK

3 points plug

5

3

2

9 pin
female
subD

3 points link

SCHEMAS DE RACCORDEMENT
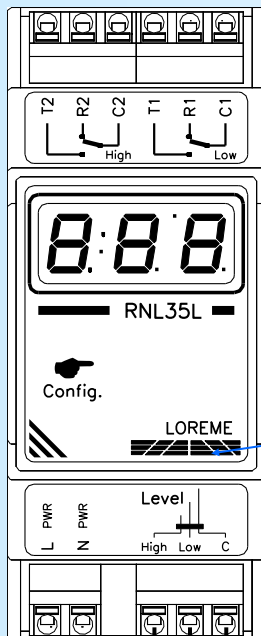
| Terminals T1,R1,C1 | changeover contact of relay 'Low' (AL1) |
| Terminals T2,R2,C2 | changeover contact of relay 'High'(AL2) |

| Terminals L, N: | Power supply 230Vac/50Hz |

Terminal C:	connection to SNL probe, common electrode.
Terminal Low:	connection to SNL probe, Low level electrode.
Terminal High:	connection to SNL probe, High level electrode.

3 terminals connector for the RS232 link (under the cover).

Black

Red

Blue
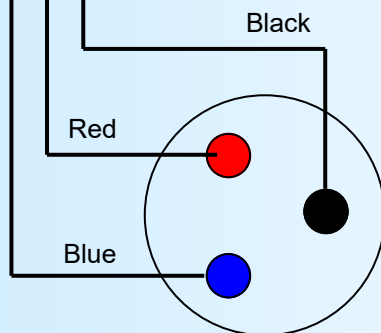
Connections with the SNL probe