CONFIGURATION HANDBOOK

94000

94000L

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Device Presentation

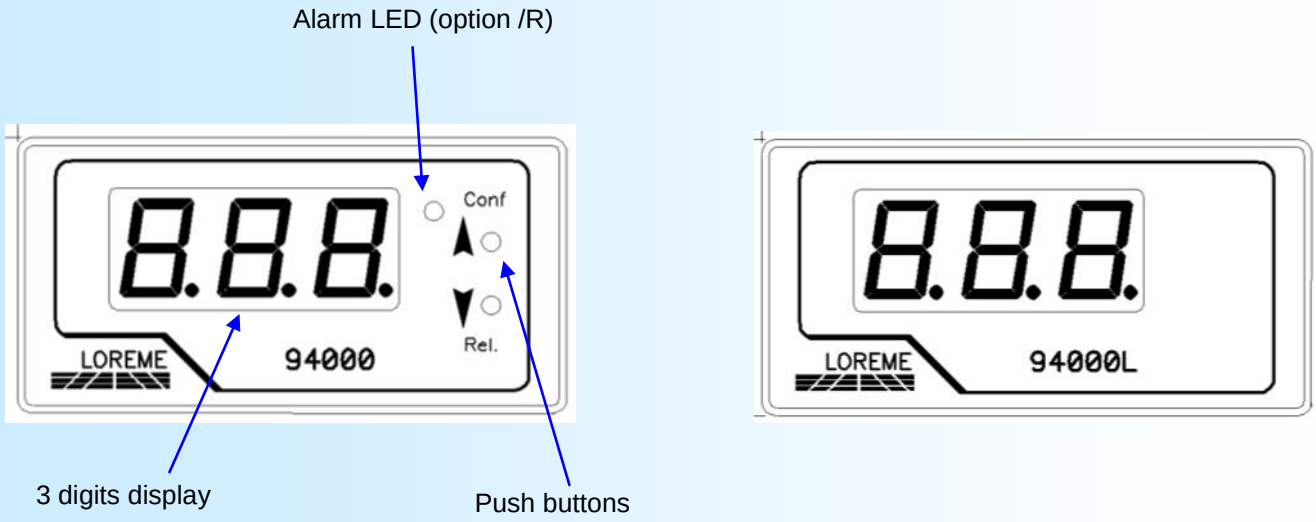
The 94000 is a digital indicator designed for low-cost or small size applications, the relay option allows a thermostat or safety relay usage. The analogical output allows a copy of measure information (only on temperature input model).

94000: temperature input (°C) or process input (voltage, current), with accessible front panel setting.
94000L: temperature input (°C) or process input (voltage, current), without accessible front panel setting, (setting accessibility by tacking off the front panel).

94000/R: temperature input (°C) or process input (voltage, current), with 1 alarm relay.
94000/S: temperature input only, with one 4/20mA analogical output.
94000/CM: temperature input only, with Modbus RTU RS485 link.
/R, /S, /CM options are not combinable.

The datasheet can be downloaded at: http://www.loreme.fr/fichtech/94000_eng.pdf

USER INTERFACE



The device front panel is composed of:
- 1 three digits display - 1000 pts for the measure reading.
- 1 alarm LED (option /R).
- 2 push buttons.

Push buttons functionality:

- ▲ **/ Conf.** Configuration access or <YES> button or button to increase value.
- ▼ <NO> button or button to decrease value.

Visualization

Process input model:
This indicator model is able to display a measure ranging from -99 to 999, function of the display range setting. An over-flow will be indicated by the message "**Hi** " and an underflow by displaying the message "**Lo** ". If the 4-20 mA current input is selected, then the message "**Err**" will signal a break in the current loop (I < 2.4 mA).

Temperature input model:
This model allows the display of the temperature in a range from -99 ° C to 650 ° C. An overflow will be indicated by the message "**Hi**" and an underflow by displaying the message "**Lo**". A sensor breaking is indicated with the message "**Err**" and a failure of the measuring circuit with "**- - -**".

Configuration

1) Process input model

The unit is fully configurable via the front face push buttons. The input and the display range can be configured by this way. Access to the configuration is made by pressing the button ⮝ **/ Conf.**

1.1) Input configuration

The message "**InP**" is displayed and the user can change the type of input by pressing the ⮝ (Yes) button, or skip to the next rubric by pressing the ⮟ (No) button. In case of Yes, the device displays the actual input type, witch can be:

- The 0-10 V voltage input with the display "**010**".
- The 0-20 mA current input with the display "**020**".
- The 4-20 mA current input with the display "**420** ".

Pressing the <Yes> button validates the input type, pressing the <No> button selects the next input type.

1.2) Decimal point configuration

The user can, with this parameter, set the number of digits displayed after the decimal point.
The message "**dP**" is displayed and the user can access the configuration parameter by pressing the ⮝ (Yes) button, or skip to the next rubric by pressing the ⮟ (No) button. In case of <Yes>, the unit displays the actual setting.
The settings are:

- No decimal with displaying "**dP0**"
- One decimal with displaying "**dP.1**"
- Two decimals with displaying "**d.P2**"

Pressing the button ⮝ <Yes> validate the displayed choice, pressing the ⮟ <No> button selects the next choice.

1.3) Display range configuration

The range interpret the input signal in a other physical unit, thus making the reading of the measured information easier.

Ex: Input 4-20 mA / Range 0-999 kg
➔ Input = 12 mA, indication = 500 kg

The message "**dSP**" is displayed. Press the ⮝ <Yes> button to access to the low and high scales adjustment, the ⮟ <No> button skips to the next rubric. The message "**Lo**" is displayed for configuring the low scale and the message "**Hi**" for the high scale. Access to Adjustment is made by pressing the ⮝ <Yes> button. The current value of the scale is displayed and the ⮝ , ⮟ buttons permits to increment/decrement it. The display flashes during the setting. The settled value is validated automatically after 4 seconds if no button is pressed.

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1.4) Alarm relay configuration (/R option)

The message "**rEL**" is displayed and the user can access the alarm threshold and detection type configuration by pressing the ⮝ <Yes> button, or exit setup by pressing the ⮟ <No> button. In case of a <Yes> answer, see below (§2.1) for the configuration procedure.

Note:
The hysteresis value is fixed to 0.5 % of the display range.

At the end of configuration, the parameters are saved in internal memory. They are operational as soon as the device returns to measurement mode.

Note:
If there is no action on buttons for a delay greater than 10 seconds, the device automatically returns to measurement mode without saving the new configuration.

2) Temperature input model

For this model, the push buttons are used to configure the alarm relay (/R option), the analogue output (/S option), or the communication (/CM option). Access to the configuration is done by pressing the button ⮝ **/ Conf.**

2.1) Alarm relay configuration (/R option)

2.1.1) Threshold setting

The current value of the threshold is displayed and the ⮝ , ⮟ buttons are used to increase/decrease it. The display flashes during the setting. The settled value is validated automatically after 4 seconds if no button is pressed.

2.1.2) Type of alarm detection

The user can, with this parameter, set the direction of the detection. It works as follows:

- High alarm : .alarm is activated when measure goes above threshold,
  .alarm is removed when measure goes below threshold minus hysteresis.

- Low alarm : .alarm is activated when measure goes below threshold,
  .alarm is removed when measure goes above threshold plus hysteresis.

The configuration possibilities are :
- High alarm with "**AHi**" message display,
- Low alarm with "**ALo**" message display

Pressing the button <Yes> validate the displayed choice, pressing the <No> button selects the next choice.

Note: *The hysteresis value is fixed to 1°C.*

2.2) Output configuration (/S option)

The user can setting the measure scale (°C) low and high corresponding to the output scale low (4mA) and high (20mA). By default the measure scale is 0 / 600°C for 4 / 20 mA output.

2.2.1) Measure low scale setting

The "**iLo**" message is display and the user can access to the low range setting with the ⮝ (Yes) button, or go to the next rubric with the ⮟ (No) button. The device display the range value and the ⮝ , ⮟ buttons allow to increase / decrease it. The display flashes during the setting. The settled value is validated automatically after 4 seconds if no button is pressed.

2.2.2) Measure high scale setting

The "**iHi**" message is display and the user can access to high range setting with the ⮝ (Yes) button, or go to the next rubric with the ⮟ (No) button. The device display the range value and the ⮝ , ⮟ buttons allow to increase / decrease it. The display flashes during the setting. The settled value is validated automatically after 4 seconds if no button is pressed.

2.3) Modbus communication (/CM option)

This unit provide a RS485 link for the Modbus RTU communication. At configuration access, the message "r0.0" is displayed temporarily. This message show's the Hard and Soft version of the unit.
The user can set the slave address and choose the baud rate (9600 bauds or 19200 bauds).
The Modbus slave only support reading request's (function code 03 and 04). The format is fixed to 8 bits data, 1 stop bit, no parity. The response delay to a reading request is < 50ms.

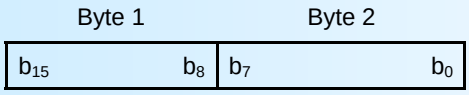
2.3.1) Data available

Two data formats are available:

- measure value x 10 in 16bits signed integer.
- measure value in 32bits IEEE floating point format.

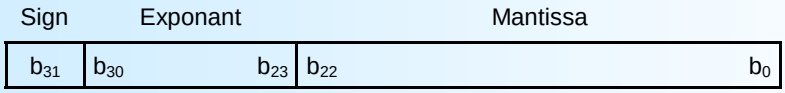
2.3.1.1) 16 bits signed integer format

The value can be read at the register address 00. The value is sent MSB first.



2.3.1.2) 32 bits IEEE floating point format

The value can be read at the register addresses 01 and 02. The value is sent MSB first.



2.3.2) Slave address configuration

The "**Adr**" message is display and the user can access to address setting with the ⮝ (Yes) button, or go to the next rubric with the ⮟ (No) button. The device display the actual address value and the ⮝ , ⮟ buttons allow to increase / decrease it. The display flashes during the setting. The settled value is validated automatically after 4 seconds if no button is pressed.

2.3.3) Baud rate configuration

The "**bdr**" message is display and the user can access to baud rate parameter with the ⮝ (Yes) button, or go to the next rubric with the ⮟ (No) button. The device display the actual choice "**9.6**" or "**19.2**". The ⮝ , ⮟ buttons allow to choose between this two propositions.

At the end of configuration, the "**End**" message is displayed and the device goes back to measure mode.

Note:

If there is no action on the buttons for a delay greater than 10 seconds, the device automatically returns to measure mode without saving the new configuration.

EMC Considerations

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

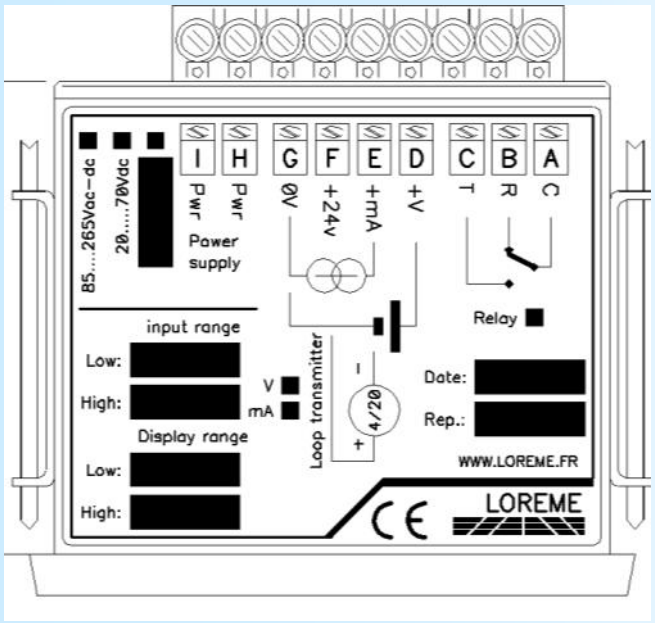
- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power 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.

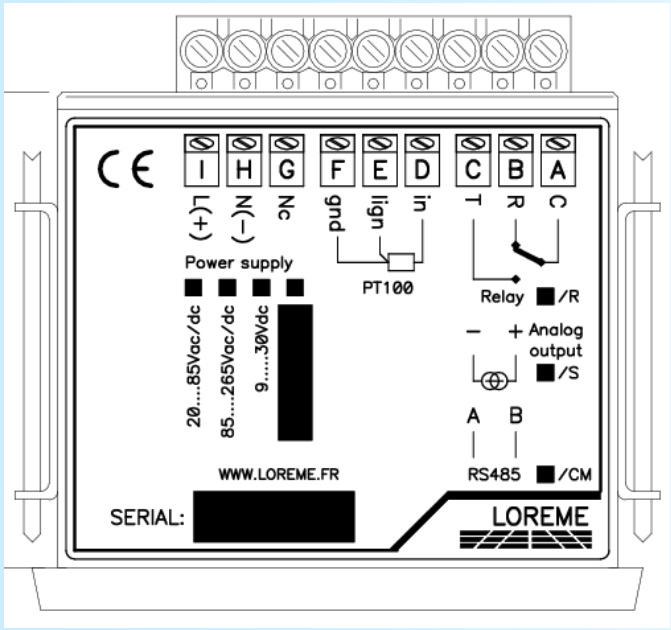
Wirings

PROCESS MODEL WIRINGS



Power supply:	terminals I and H.
Voltage input:	terminal D (+), terminal G (-).
Current input:	terminal E (+), terminal G (-).
sensor supply output:	terminal F (+), terminal E (-).
Relay (/R):	terminal B (NC), terminal C (NO), terminal A (common).

TEMPERATURE MODEL WIRINGS



Power supply:	terminals I and H.
3 wires PT100 input:	terminal D (+), terminal E (line), terminal F (ground).
Relay (/R):	terminal B (NC), terminal C (NO), terminal A (common).
Analogue output (/S):	terminal B (+), terminal C (-).
RS485 (/CM):	terminal B (B), terminal C (A).

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