

CONFIGURATION HANDBOOK

INL35



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Download manual at : www.loreme.fr

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Device Presentation

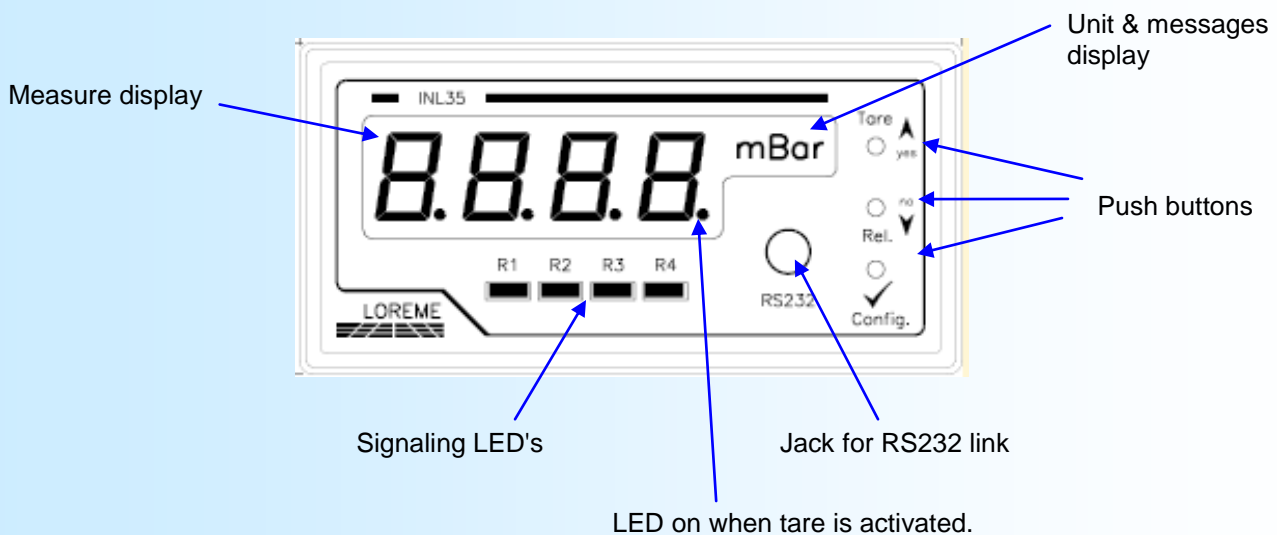
The INL35 is a universal panel indicator for analog process and temperature inputs. It is configurable in a clear language and allows to display a physical unit.

It is necessary to make de difference between the different models:

INL35:	Universal input, more than 10 types.
INL35/S:	1 configurable isolated output.
INL35/R1:	1 relay.
INL35/R2:	2 relays.
INL35/R3:	3 relays.
INL35/R4:	4 relays.
INL35/CM:	RS485 MODBUS link
INL35/CP:	RS485 PROFIBUS link
INL35/CMTCP:	Ethernet MODBUS TCP link

The technical data sheet is downloadable at: http://www.loreme.fr/fichtech/INL35_eng.pdf

USING INTERFACE



The device front panel is composed of:

- a 4 digits display - 10 000 pts to visualise the measure,
- a 4 digits alphanumerical display for unit & messages.
- 4 signalling LED's:
 - R1 Alarm 1,
 - R2 Alarm 2,
 - R3 Alarm 3,
 - R4 Alarm 4,
- a 3.5 mm jack plug for the RS232 terminal link,
- 3 push buttons:

- / **Tare** Access to the tare function or <Yes> button or incrementing button.
- / **Rel.** Access to alarm threshold setup or <No> button or decrementing button.
- / **Config.** Access to device configuration or value validation.

1) Visualization

At the power on, the device display the measure value and the unit. In case of default (sensor breaking, internal default), the following message can be visible:

Err	Brk.	Display for sensor breaking (Tc, PT100, mA inputs).
Err	Meas	Display if internal measure circuit is faulty.
Err	Temp	Display if cold junction temperature sensor is faulty.
Hi	mV	Display if measure is greater than 1% of high scale display range.
Lo	mV	Display if measure is lower than 1% of low scale display range.

2) Tare/Zero function

Press the push button **▲ <Tare>** to access to the tare function if it is not inhibited. A message « **TARE Y/N?** » is display. The **▲ <yes>** button activate the measure tare and the **<no>** button reset the tare value.

Notes:

- The tare value is saved in a non volatile memory. It remains active even after a power off.
- The function can be inhibited by configuration.

3) Alarms threshold setting

The user can change the threshold value if:

- The threshold detection is activated.
- The setting is authorized by the configuration.

Setting procedure:

- The relay choice is made by pressing the button **▼ < Rel.>**, the message '**ADJUST THRESHOLD x?**' is displayed and the Rx LED is blinking. With the button **▲ <yes>** the user access to the setting and with the button **▼ <no>** the user goes to the next relay or back to the measure mode if it was the last relay. After pressing the **▲ <yes>** button, the threshold value is displayed and the Rx LED blink.
- If the threshold setting is authorized, the user can adjust the value with the buttons **▲** and **▼**, otherwise the threshold is only displayed. The setting speed depends on the time the buttons are kept pressed.
- A press on **<✓ Config.>** button save the new value.
- If no action are made in a 30 seconds delay, the device goes back to measure mode without saving the modifications.

4) Front face configuration

The device is fully configurable with the front face buttons. This feature may be secured by using a password. It is possible to modify the language, the input type, the display range, the display filter, the output, the relay parameters, the communication, the calculation function, modify the front face access, the password and inhibit the Tare function.

The configurable parameters are:

- For language: French or English.
- For input: The input type, the low and high scales.
- For the display range: The unit, the number of decimal, the low and high scales.
- For the display filter: The response time for the display.
- For the output: The output type, low and high scales, the response time, the limitation.
- For the relays: The type of detection (threshold, breaking/watchdog), the type of alarm, the threshold, the hysteresis, the type of security, the delays, the front face setting lock.
- For communication: The device address, baud rate and parity for « /CM » option.
The device address, baud rate for « /CP » option.
The IP address, the mask and the gateway for « /CMTCP » option.
- For calculation functions: The square root function.
- For the front face access: Free access or protected by password.
- For the Tare function: Inhibit or not the function.

4.1) Method

For each rubric, a message is scrolling on the unit display. The ▲(yes) button allows to access to the rubric or to validated the choice. The ▼(no) button allows to skip the rubric and access to the next choice. In case of value setting, the ▲ button permits to increase the value and the ▼ button to decrease it. During the setting, the relay 1 LED is blinking. All parameters are limited except the display range. To save the value, press the ✓(Config) button.

Note: *If no action are made during 30 seconds, the device come back to measure mode without saving any changes.*

4.2) Configuration details

The access to the configuration mode is made by pressing the ✓(Config) button. A temporary message is displayed. This message shows the device version « REVx.y », where x is the Hardware version and y is the software version.

4.2.1) Inhibited access

If front face access is locked by using a password, a message is displayed and the device wait for the entering of the 4 digits code (the message "PsWd" is displayed on the unit display and the thousand digit is selected).

Note: *If the password is activated, the default value is 1234.*

ENTER PASSWORD

This message scrolls on the unit display.

- PsWd

Use the ▲ or ▼ button to enter the password.

1- PsWd

and ✓ button to validate it.

12- PsWd

123- PsWd

1235 PsWd

WRONG CODE!

The password is not correct! the device return to measure mode.

4.2.2) Language configuration

LANGUAGE CONFIGURATION?

Press the ▲ button to access to the menu. Press the ▼ button to skip.

ENGLISH?

Language choice.

FRENCH?

4.2.3) Input configuration

INPUT CONFIGURATION?

Access to the input configuration (type and scales).

The actual configured input type is showed at first.

THERMOCOUPLE?

Configuration for thermocouple (Tc K is the actual input).

Choose the type of thermocouple with the ▲ button. use the ▼ button to skip.

Tc: K?

Tc: R?

Tc: S?

Tc: T?

Tc: N?

Tc: W3?

Tc: W5?

Tc: B?

Tc: E?

Tc: J?

VOLTAGE (mV)?

STRAIN GAUGE?

CURRENT?

VOLTAGE (V)?

RESISTANCE?

4 wires connection.

FREQUENCY?

DUTY CYCLE?

PT100 3 WIRES?

PT100 4 WIRES?

LOW SCALE? Setting of low scale for the selected input type.
0 °C Set this value with ▲ , ▼ button and validate it with ✓ button.

HIGH SCALE? Setting of high scale for the selected input type.
600.0 °C

4.2.4) Display range
DISPLAY RANGE?

UNIT? Setting of message for displaying unit.

Predefined units into the device:

V, mV, mA, A, Ohm, S, uS, %, °C, °F, °K, s, min, Hz, rpm, kg, g, N, t, t/h, Pa, kPa, hPa, MPa, mBar, Bar, kJ, mm, cm, m, m/s, m³, m³/h, L, L/s, L/h, mol, pH.

NUMBRE OF DECIMAL? Setting the number of decimals displayed.
2 Set the value (0, 1, 2 or 3).

LOW SCALE? Setting the low scale.
0 rpm (value not limited).

HIGH SCALE? Setting the high scale.
50.00 rpm (value not limited).

4.2.5) Display filter
DISPLAY FILTER?

1.0 s Set the value (0 to 60s).

4.2.6) Analogical output (/S option)
OUTPUT CONFIGURATION?

CURRENT? Choice of output type.
VOLTAGE?

LOW SCALE? Setting the output low scale.
4.00 mA

HIGH SCALE? Setting the output high scale.
20.00 mA

SECURITY VALUE? Setting the security value.
22.00 mA

RESPONSE TIME? Setting the output response.
0 s

LIMITED OUTPUT? Activate the limitation with ▲ or deactivate it with ▼ .

4.2.7) Alarms relays (if option /R1 to /R4)

RELAY CONFIGURATION?

RELAY 1?	Access to the relay #1 parameters (/R1 option).
WATCHDOG/BREAK DETECTION?	Activate the function with ▲ or deactivate the function with ▼ .
THRESHOLD DETECTION?	Activate the function with ▲ or deactivate the function with ▼ .
LOW THERSHOLD?	Select the type of threshold detection.
HIGH THERSHOLD?	
THERSHOLD?	Setting of threshold value.
0 rpm	
HYSTERESIS?	Setting of hysteresis value (percent of display range).
1.0 %	
FRONT FACE THRESHOLD ADJUST?	Front face access.
YES?	Setting by front face button is allowed.
NO?	Setting is forbidden. Only viewing is possible.
POSITIVE SECURITY?	Choice of security type.
NEGATIVE SECURITY?	
ACTIVATION DELAY?	Setting of activation delay (0 to 14400 s).
1.0 s	
DEACTIVATION DELAY?	Setting of deactivation delay (0 to 14400 s).
1.0 s	
RELAY #2?	Access to relay #2 parameters (for /R2 option).
same as relay #1	
RELAY #3?	Access to relay #3 parameters (for /R3 option).
same as relay #1	
RELAY #4?	Access to relay #4 parameters (for /R4 option).
same as relay #1	

4.2.8) Communication (/CM or /CP or /CMTCP option)

CONFIG COMMUNICATION?

Access to the communication parameters.

Menus with option /CM or /CP:

MODBUS	Show protocol for /CM option.
PROFIBUS	Show protocol for /CP option.
ADDRESS?	Setting of bus address (1 up to 255 for Modbus, 0 up to 126 for Profibus).
1	
BAUDRATE?	Choice of baud rate for Modbus (in kbauds).
38.4 kbds	
19.2 kbds	
9.6 kbds	
4.8 kbds	
2.4 kbds	
1.2 kbds	

or
continued on next page.

1500 kbds	Choice of baud rate for Profibus (in kbauds).
500 kbds	
187.5 kbds	
93.75 kbds	
19.2 kbds	
9.6 kbds	
PARITY?	Setting of parity for Modbus.
NONE?	
EVEN?	
ODD?	
<u>Menus with /CMTCP option:</u>	
IP ADDRESS?	Access to the IP parameters.
192 IP 1	Setting of first field of IP address.
168 IP 2	
0 IP 3	
253 IP 4	
IP MASK?	Access to the mask IP.
255 IP 1	
255 IP 2	
255 IP 3	
0 IP 4	
GATEWAY?	Access to the gateway parameters.
0 IP 1	
0 IP 2	
0 IP 3	
0 IP 4	
4.2.9) <u>Calculation functions</u>	
CALCULATION FUNCTIONS?	
SQUARE ROOT?	Activation (▲) or deactivation (▼) of square root function.
4.2.10) <u>Front face access</u>	
FRONT PANEL ACCESS CONFIG?	
FREE ACCESS	Choice of front access (free or by password).
PASSWORD ACCESS	
- PsWd	Enter of new 4 digits password.
0- PsWd	Use the buttons ▲ or ▼ to modify the digit and ✓ to validate it.
4.2.11) <u>Tare function</u>	
TARE CONFIG?	
TARE INHIBITION?	Inhibit (▲) or allows (▼) the tare function.
4.2.12) <u>End of configuration</u>	
OK !	End of configuration. The changes have been saved successfully.

RS232 link setting

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

Visualization

When switching on, the device is automatically put in measure mode.

2 information's are available on screen:

10.00 mV	Input measure value
11.99 mA	Output result value

Configuration

This manual resume in detail the different configuration possibilities: Languages, input, display range, output (/S), relays 1, 2, 3, 4 (/Rx), communication (/CM, /CP, /CMTCP), special functions, tag.

To access the configuration mode, type the "C" key. the message 'CONF' is displayed on the unit display.

1) Method

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

1.1) Menu selection

Example: INPUT (Y-N)	The choice is done by typing "Y" or "N" keys. This choice allows access to different configuration menus.
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1.2) Parameter selection

Example: VOLTAGE mV or (Y-N)YES	VOLTAGE mV (Y-N)NO
------------------------------------	-----------------------

Previous choice = YES:	- type "Y" or "Enter"	=> validation, choice = YES,
	- type "N"	=> change and validation, choice = NO.

Previous choice = NO:	- type "N" or "Enter"	=> validation, choice = NO,
	- type "Y"	=> change and validation, choice = YES.

1.3) Value acquisition

Example: LOW SCALE 4 mA

Two possibilities:

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

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.

2) Language

The language possibilities are: - French
- English

3) Input

The input possibilities are:

- Voltage (mV, mV differential, V)
- Current (mA)
- Resistance (Ohm), 4 wires connection.
- Frequency (Hz)
- Thermocouple (°C) internal or external compensation, linearized or not.
- Pt 100 (°C) 3 wires, linearized or not.
- Pt 100 (°C) 4 wires, linearized or not

with for each input type, the choice of low scale, high scale and display range.

Configuration

Particularities:

- Thermocouple:

Choice of thermocouple type, B, E, J, K, R, S, T, N, W3, W5 (another on request).

Choice of compensation type, internal or external: Choose **internal compensation** when thermocouple is extended up to device with a compensation cable. Choose **external compensation** when thermocouple is not extended up to device with a compensation cable, but up to a compensation box where temperature will be known and stabilized. This is the value of temperature that will be typed as the external compensation value (except thermocouple type B).

- Potentiometer:

Configure voltage input (V): - low scale: 0 V
 - high scale: 5 V

Move potentiometer at the start and at the end of range, notice each value.

Change voltage input (V): - low scale = start range value,
 - high scale = end range value.

See wiring diagram for potentiometer wiring.

- Sensor power supply:

To supply a loop powered converter and measure the loop current, it's necessary to configure the device in 4-20 mA current input. See wiring diagram for sensor power supply and current input wiring.

4) Display range

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

Ex: Input 4-20 mA / Display range 0-1000 kg
 => Input = 12 mA, displayed value = 500 kg

To configure the display range, it is necessary to configure:

- The unit.
- The low scale.
- The high scale.
- The number of decimal.

The **unit** of the display range is useful to interpret the real size . It is limited to 4 characters. This characters are type on terminal keyboard and display on screen. The <Enter> key valid unit. If unit is configured via the front panel, the user can choose one from a list of 37 predefined units.

The **number of decimal** correspond to the number of digit displayed behind the decimal point (0, 1, 2 or 3).

5) Display filter

The **display filter** parameters allows to reduce display instability when measured value is disturbed. It is adjustable from 1 to 60 s.

6) Analogue output

The device can, by the /S option, provide an analogue output, insulated and configurable.

Analogue output configuration is presented through 2 rubrics:

- Output type: - current output (mA),
 - voltage output (V).

And for each output type, the low and high scale.

- Output parameters: - security value,
 - limitation,
 - response time.

The **security value** allows to set the output on a known state when there is a sensor breaking or a measure range overflow. This value will be transferred to output.

The **limitation** allows to bound the output signal swing to the configured output scales for all input signal values. Only security value goes beyond this function.

The **response time** is adjustable from 0 to 60 s.

Configuration

7) Relays

The device can, by /R1, /R2, /R3 or /R4 option, provide respectively 1, 2, 3 or 4 independently configurable alarm relays.

Relays configuration is presented through 2 rubrics:

- Detection type (The two detections types can be activated simultaneously):
 - breaking detection/watchdog function,
 - threshold detection.

The **breaking/watchdog detection** activates alarm on sensor breaking, on internal failure or on measure range overflow.

The **threshold detection** activates alarm on threshold overstepping. It is necessary to choose threshold type, high or low, threshold and hysteresis value.

The **threshold detection** works in this manner:

- **high threshold** detection: .alarm is activated when measure goes above threshold,
.alarm is removed when measure goes below threshold minus hysteresis.
- **low threshold** detection: .alarm is activated when measure goes below threshold,
.alarm is removed when measure goes above threshold plus hysteresis.

Remark: *The hysteresis value is relative to the display range scale and can be configured between 0 % and 99 %.*

Relay parameter:

- authorization of threshold adjustment by the front panel, security, delay.

When alarm is used in threshold detection, the **Front face threshold adjustment** is authorized by default.

This possibility can be deactivated if the adjustment must be inaccessible in front face, only the visualization is then possible.

Each relay can be set in **positive security** or **negative security**. This function allows to choose between the activation or the de-activation of the relay when alarm is activated:

- in **positive security**, relay is switched when alarm is active, "works" contact is closed on alarm, opened out of alarm, "back" contact is opened on alarm, closed out of alarm.
- in **negative security**, relay is switched when alarm is inactive, "works" contact is opened on alarm, closed out of alarm, "back" contact is closed on alarm, opened out of alarm.

The **delay value**, configurable from 0 to 14400 s (4 hour), set the time above which alarm changes its state after event appearance and disappearance. The device provide for each relay a configurable delay when alarm is activated and when alarm is removed.

8) Communication

The following rubrics are only displayed on a /CM or /CP or /CMTCP device.

8.1) MODBUS TCP (/CMTCP)

The communication parameters are : The network IP address, mask and gateway.

At factory output, the gateway is set to 0.0.0.0 and is therefore inactive.

8.2) MODBUS (/CM)

The modbus setting is presented through 3 rubrics:

- device **address** on the network (1 to 255),
- **baud rate** (1200, 2400, 4800, 9600, 19200, 38400 bauds),
- **parity** (even, odd, none).

The measure data can be read on several formats:

- 32 bits IEEE floating point.
- 16 bits unsigned integer (% of input range).
- 32 bits signed integer (value x 100).

8.3) PROFIBUS (/CP)

The profibus setting is presented through 2 rubrics:

- device **address** on the network (0 to 126),
- **baudrate** (9600, 19200, 93.75 k, 187.5 k, 0.5 M, 1.5 Mbauds).

The data exchange is the measure in 32 bits IEEE floating point format.

For more information, consult the manual part of the specific use of communication in Modbus or Profibus protocols.

9) Tag

The tag allows to easily identify the converter. It can be made of up to 10 alphanumerical characters. The user only have to enter the tag on the keyboard and validate it with the <ENTER> key. The tag will now be displayed on each configuration access. If a character cannot be displaying, it is replaced by '-'.

10) Special functions

The device disposes of some special functions to adapt its operation mode.

The rubric « **FRONT FACE ACCESS?** » allows or secure access to configuration by the front panel buttons. The user can choose between "FREE ACCESS" or "ACCESS PASSWORD". he can then set the 4 digits password.

The rubric « **TARE INHIBITION?** » permits to inhibit the "Tare" function.

The rubric « **CALCULATION FUNCTIONS ?** » groups the scare root function and the special linearization. The **square root** function executes a square root on the input range percentage. The result is reported on analogical output and displayed.

The **special linearization** function allows you to customize a response curve by the configuration of corresponding points between the measured input signal and the range configured display. When this function is chosen, it is directly activated, but linearization points are not modified. To modify linearization points, it is necessary to validate by YES the configuration question.

When **special linearization** is enabled, the device uses linearization curve corresponding to configured points. To personalize a response curve, it's necessary to set for each curve point the input value and the corresponding display range value (maximum 26 points including input points 0 % and 100 %). So, for each measured point, the device will make correspondence to the linearized display range value.

11) End of the configuration

OK! This message indicates that all the parameters have been successfully saved.

12) Listing of configuration messages

CONFIGURATION

REV1.5

TAG: -----

LANGUAGE?

(Y-N)

ENGLISH?

(Y-N) NO

FRENCH?

(Y-N) NO

INPUT CONFIGURATION?

(Y-N)

VOLTAGE (mV)

(Y-N) NO

STRAIN GAUGE

(Y-N) NO

CURRENT

(Y-N) NO

VOLTAGE (V)

(Y-N) NO

RESISTANCE

(Y-N) NO

4 wires connection.

FREQUENCY

(Y-N) NO

DUTY CYCLE

(Y-N) NO

PT100 3 WIRES

(Y-N) NO

PT100 4 WIRES

(Y-N) NO

THERMOCOUPLE?

(Y-N)

THERMOCOUPLE: K

(Y-N) YES

choice: R, S, T, N, W3, W5, B, E, J

LOW SCALE

-200.0 °C

HIGH SCALE

1000.0 °C

OVERFLOW

message in case of value greater than scale limits.

Messages for Tc or PT100 input:

INTERNAL COMPENSATION
(Y-N) YES

EXTERNAL COMPENSATION
(Y-N) YES

COMPENSATION VALUE
0 °C



If Tc input

SENSOR LINEARIZATION
(Y-N) YES

RANGE-DISPLAY?
(Y-N)

UNIT
mV

LOW SCALE
0 mV

HIGH SCALE
600.0 mV

NUMBER OF DECIMAL
1

DISPLAY FILTER?
(Y-N)

DISPLAY FILTER
1.0 s

OUTPUT CONFIGURATION?
(Y-N)

With the /S option:

CURRENT
(Y-N) NO

VOLATEG
(Y-N) YES

NEED STRAP!

Alert message for output wiring (see page 22).

LOW SCALE
2.00 V

HIGH SCALE
10.00 V

SECURITY VALUE
11.00 V

RESPONSE TIME
0 s

LIMITED OUTPUT
(Y-N) NO

RELAY CONFIGURATION?
(Y-N)

Messages with /R1 option:

RELAIS #1
(Y-N)

WATCHDOG/BREAK DETECTION
(Y-N) YES

THRESHOLD DETECTION
(Y-N) YES

LOW THRESHOLD
(Y-N) NO

HIGH THRESHOLD
(Y-N) YES

THRESHOLD
50.0 mV

HYSTERESIS
0.5 %

FRONT FACE THRESHOLD ADJUST
(Y-N) YES

POSITIVE SECURITY
(Y-N) NO

NEGATIVE SECURITY
(Y-N) YES

ACTIVATION DELAY
0 s

DEACTIVATION DELAY
0 s

same as above for relays 2,3,4.

COMMUNICATION?
(Y-N)

Messages with /CMTCP option:

IP ADDRESS
192.168.000.253

IP MASK
255.255.255.000

GATEWAY
000.000.000.000

Message with /CM or /CP options:

<i>/CM option</i>	<i>/CP option</i>
MODBUS	PROFIBUS
ADDRESS	ADDRESS
1	1
BAUDRATE	BAUDRATE
*1 38.4 Kbds	*1 1500 Kbds
2 19.2 Kbds	2 500 Kbds
3 9.6 Kbds	3 187.5 Kbds
4 4.8 Kbds	4 93.75 Kbds
5 2.4 Kbds	5 19.2 Kbds
6 1.2 Kbds	6 9.6 Kbds
YOUR CHOICE: 1	YOUR CHOICE: 1
PARITY	
*1 NONE	
2 EVEN	
3 ODD	
YOUR CHOICE: 1	

TAG CONFIGURATION?
(Y-N)

TAG:
----- enter up to 10 characters for tag.

SPECIAL FUNCTIONS?
(Y-N)

FRONT PANEL ACCESS CONFIGURATION
(Y-N)

FREE ACCESS
(Y-N) NO

PASSWORD ACCESS
(Y-N) YES

PASSWORD
0000 enter the 4 digits password.

INHIBIT TARE?
(Y-N) NO

CALCULATION FUNCTIONS?
(Y-N)

SQUARE ROOT
(Y-N) NO

continued on next page.

SPECIAL LINEARIZATION
(Y-N) YES

CONFIGURATION
(O-N)

NUMBER OF POINTS
6 Pts

INPUT POINT 01
0 mA

LINEARIZED POINT 01
0 rpm

INPUT POINT 02
2 mA

LINEARIZED POINT 02
50 rpm
etc....

OK End of configuration. The parameters have been saved successfully.

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:

100.5 °C	measure value with offset,
OFFSET 10	offset function, offset value.

- use keys "+" and "-" to adjust offset, measure is directly modified.
- type on **Enter** to save offset.

When device is not supplied or in configuration mode, offset stay 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 control mode, when there is no action on keys during 20 s, the device leaves the mode and discard the actual offset value.

Attention, if the device is configured in frequency or duty cycle measurement, the offset is not active.

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 Rev3
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 Rev3
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 operation of the device.

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 centimetres 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

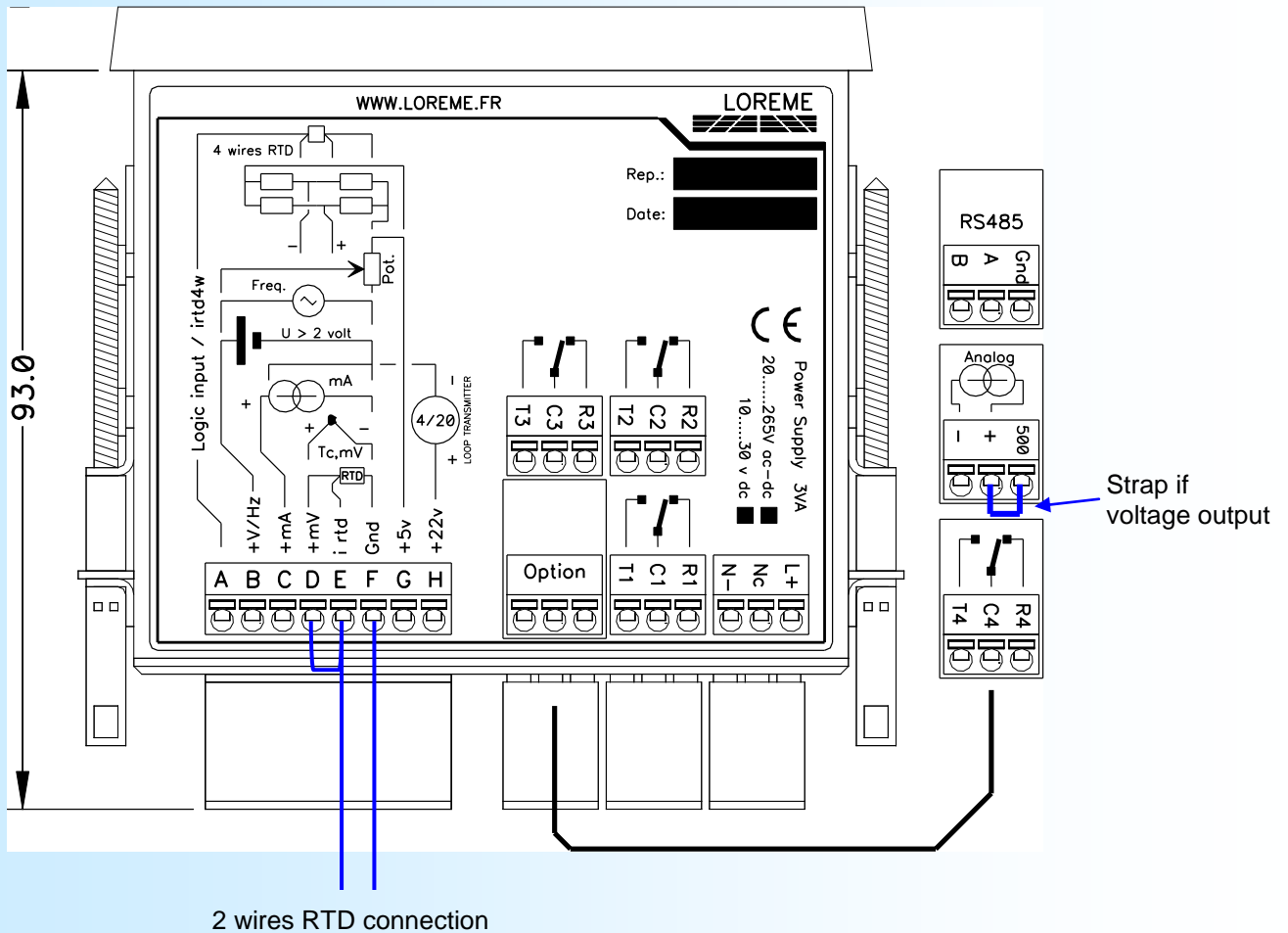
- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power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

WIRING DIAGRAM



mV, Tc input:	D (+), F (-)	Potentiometer input:	G(+Vcc), B (+), F (-)
V / Hz input:	B (+), F (-)	Strain gauge input:	power: G (+Vcc), F (-)
mA input:	C (+), F (-)		measure: E (+), D (-)

current loop power supply: terminal H (+), terminal C (-)

Resistance input,

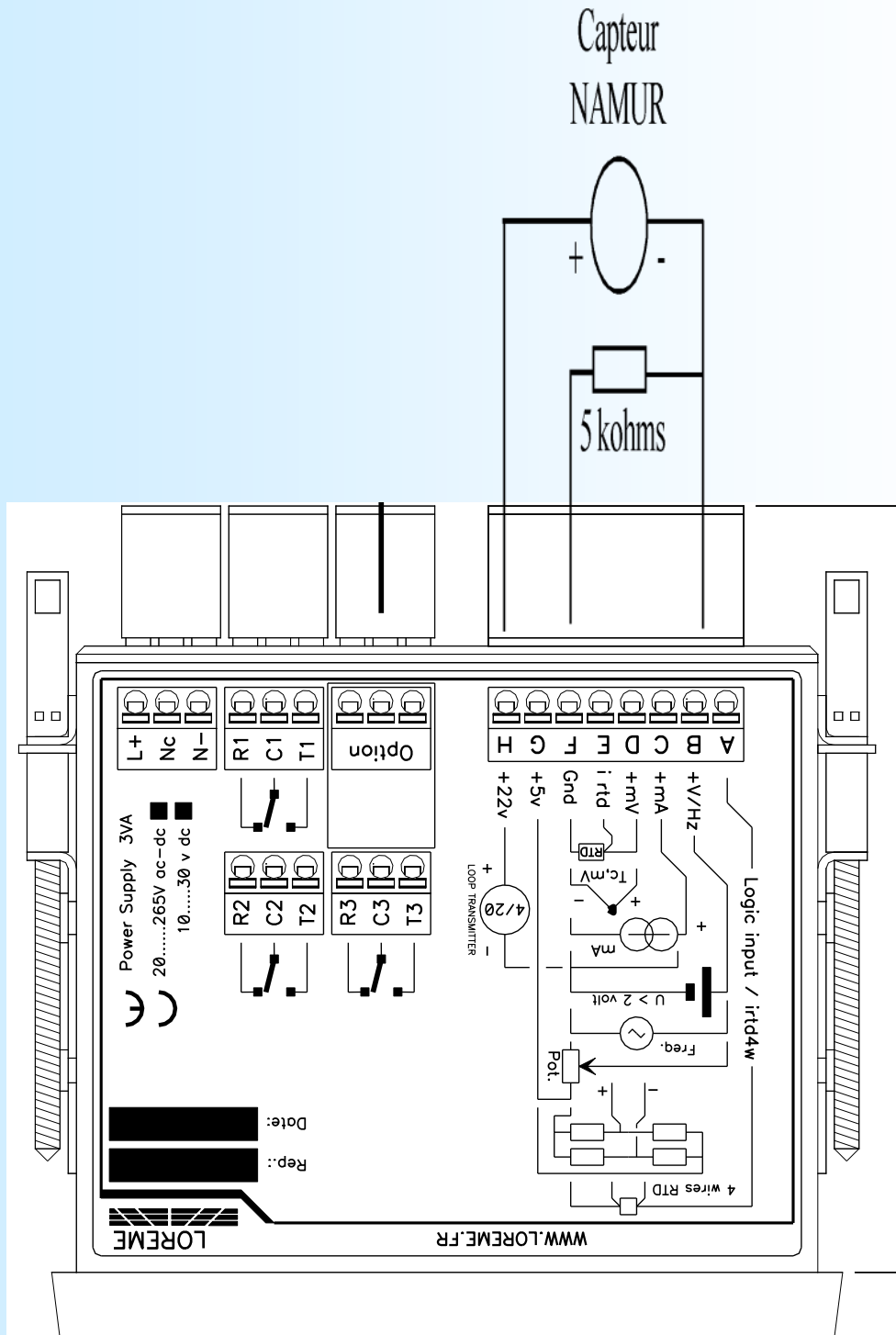
2 wires RTD:	D+E (+), F (-)
3 wires RTD:	D (+), F (-), E (line)
4 wires RTD:	A (line +), D (+), F (-), E (line -)

Current output:	terminal analog+ (+), analog- (-)
Voltage output:	terminal analog+ (+), analog- (-), strap between terminals « analog+ » and « 500 ».

Relay 1:	R1 (closed), T1 (open), C1 (common)
Relay 2:	R2 (closed), T2 (open), C2 (common)
Relay 3:	R3 (closed), T3 (open), C3 (common)
Relay 4:	R4 (closed), T4 (open), C4 (common)

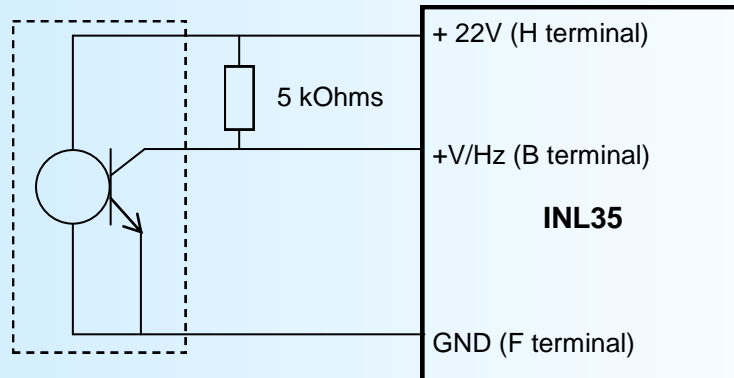
Power supply: terminals L+, N-.

NAMUR sensor wiring

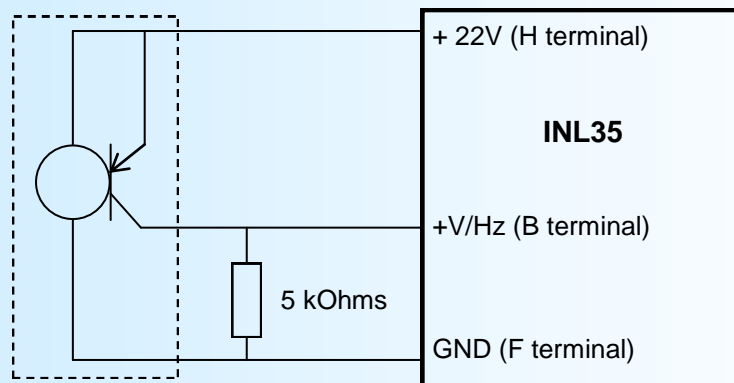


3 wires (NPN, PNP) sensor wiring

1) NPN type sensor



2) PNP type sensor



RS485 MODBUS communication

1) Features

Protocol:	MODBUS RTU
Link:	RS485
Baud rate:	1200 bauds to 38400 bauds
Parity:	even, odd, none
Address:	1 to 255
Connector:	unpluggable 2 wires
Reading operation:	Code function 03, 04
Writing operation:	Not allowed
Data type:	State and threshold value of alarm AL1, AL2, measure value
Data format:	- State of alarm in binary 16b, - Measure in 16b unsigned integer, 32b floating number, 32b reversed signed integer.

Note : The address, the baud rate and the parity must be configure by the RS232 link or by the buttons in front panel.

2) Communication data

2.1) Data type

All measures are accessible in reading mode. It is possible to read the measure of one channel, several channels (consecutives), or all channels, alarm statements of one channel, several channels (consecutives), or all channels.

Data are available in different format:

- 2 words, 4 bytes, for the 32 bits IEEE floating point format,
- 1 word, 2 bytes, for the measure in 16 bits integer format. The value is in percent of the input scale,
- 2 words, 4 bytes, for the 32 bits integer format,
- 1 word, 2 bytes, 16 bits integer format, for the alarms statement.

=> Consult the enclosed tables for detail of data.

2.2) Exception frame

If the slave receive an corrupted frame (CRC16 or parity), it doesn't answer.
If it is a frame error (data address, function, value), the slave send an exception frame.
The exception frame is a 5 bytes frame long.

Details of the exception frame:

Function code: The function code of the exception frame is identical to the question frame, but this MSB bit is set to 1
Error code: The error code indicate the reason of the exception frame

Error code	Details
\$01	Function code not allowed. Only the function code \$03 or \$04 are used by the INL35 (register reading function).
\$02	Data address not allowed
\$04	Slave busy. The internal communication slot is not in connection with the measure part.

2.3) Data format

- Data in 32 bits IEEE floating point format
Data are transmitted Most Significant Byte first, 4 bytes or 2 words long.
\$FFFFFFFF = sensor braking.



- Data in 16 bits integer format.

Data are transmitted most significant byte first, 2 bytes or 1 word long.

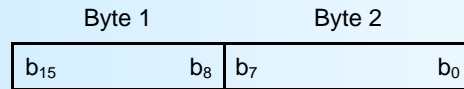
The 16 bits unsigned integer values correspond to the percentage of the input measure scale.

\$0000 ou \$FFFF = sensor breaking.

\$0001 = Low overstepping of input scale,

\$FFFE = High overstepping of input scale.

\$0002 à \$FFFD = Percentage of input scale.



Example:

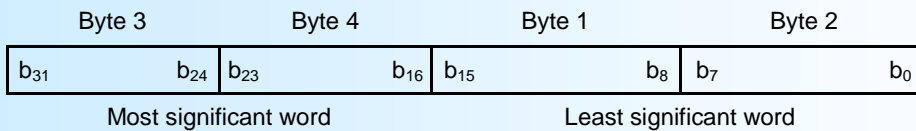
- input PT100 (scale: -200 /800°C), 16 bits measure = 37442 => $(((37442 - 2)/65531) * (800+200)) - 200 = 371,3^{\circ}\text{C}$

- input Tc K (scale: -200 /1350°C), 16 bits measure = 20900 => $(((20900 - 2)/65531) * (1350+200)) - 200 = 294,3^{\circ}\text{C}$

- Data in 32bits reversed signed integer format.

Data are transmitted **Least significant word** first, 4 bytes or 2 words long.

The 32 bits signed integer value correspond to the measure x 100.



3) Tables of measure

Address in decimal (Hexadecimal)	Designation	
0000 (\$0000)	Measure in 16bits integer format	Word 1
4096 (\$1000)	Measure in IEE 32bits floating format	Word 1
4097 (\$1001)		Word 2
8192 (\$2000)	Alarms status	Word 1
8448 (\$2100)	R1 alarm threshold value	Word 1
8449 (\$2101)		Word 2
8450 (\$2102)	R2 alarm threshold value	Word 1
8451 (\$2103)		Word 2
12288 (\$3000)	Measure in 16bits integer format	Word 1
40960 (\$A000)	Measure in 32bits signed integer	Word 1
40961 (\$A001)		Word 2

percentage of the input measure scale

Msb: R1, Lsb: R2

32bits float number

32bits float number

percentage of the input measure scale

correspond to measure x 100

MODBUS TCP communication

1) Features

Protocol:	MODBUS TCP
Link:	Ethernet
Speed:	10/100 base T
Default IP address:	192.168.0.253
Connector:	RJ45
Reading operation:	Function codes 03, 04
Writing operation:	Not allowed

2) Data description

The available data are the same as MODBUS communication.

3) Response time

It is the delay between a read request send by the master and the response frame send by the INL35/CMTCP.

The INL35 device answer in less of 30 ms to a read of 4 registers.

4) Use with more than one Modbus TCP master

The INL35/CMTCP supports to be access by masters with different IP address. However, the network load have to be less then 30 requests /second. A too high network load could lead to communication errors.

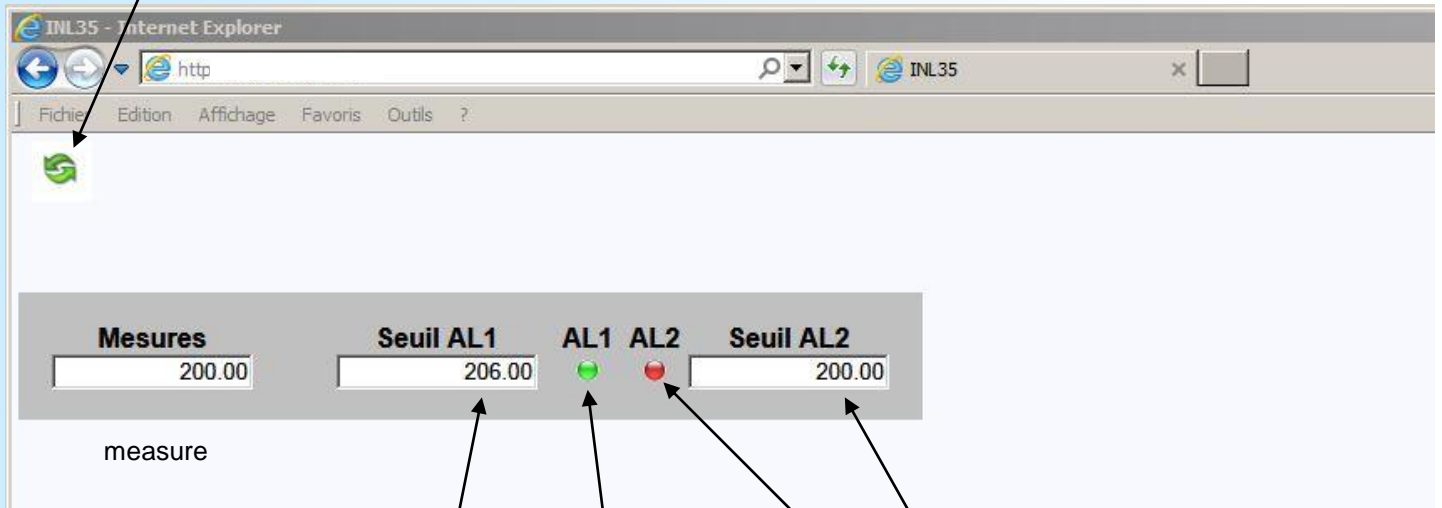
WEB server

WEB page presentation

The device integrates a web server to view the measure and the alarms threshold & state.
The web page consist of a page of the different values and an icon to refresh the web page.

INL35/CMTCP WEB page:

Click to refresh the page



alarm1 threshold & state:
Green: No alarm
Red: Alarm ON

alarm 2 state & threshold:
Green: No alarm
Red: Alarm ON

RS485 PROFIBUS communication

1) Features

This device meet the PROFIBUS specification EN 50710 volume 2.
 Supported baud rate: 9.6 k, 19.2 k, 93.75 k, 187.5 k, 0.5 M, 1.5 Mbauds.
 Type of transmission: RS485, 8bits data, 1 stop, even parity.
 Connector: unpluggable 2 wires.

2) Implementation

The network address and the baud rate should be configured in the device. All communication information's are in the GSD file provide with the device (or may be download from www.loreme.fr).

This information's are in 3 parts:

- Information about the functionality of the device,
- data configuration,
- list of alarms and parameters.

2.1) Explanation of input/output data

A data exchange frame has 105 byte long:

- 96 bytes for the measure in 32bits IEEE floating point number.
- 3 bytes for the alarm 1 status (1bit by channel, set to 1 if alarm activated).
- 3 bytes for the alarm 2 status (1bit by channel, set to 1 if alarm activated).
- 3 bytes for the input status (1bit by channel, set to 1 if input is breaking).

2.2) Explanation of diagnostic data

There are 6 byte of standard diagnostic data and 2 byte for device specific data.

2.3) Data exchange information

Remark: Only the channel 1 is use by the INL35 and the alarms 1 and 2 are always 0.

							Total		
b7	b6	b5	b4	b3	b2	b1	b0	word	byte
Channel 1			byte 1		word 1			1	1
			byte 2						2
			byte 3		word 2			2	3
			byte 4						4
Channel 2			byte 1		word 1			3	5
			byte 2						6
			byte 3		word 2			4	7
			byte 4						8
Channel 3			byte 1		word 1			5	9
			byte 2						10
			byte 3		word 2			6	11
			byte 4						12
Channel 4			byte 1		word 1			7	13
			byte 2						14
			byte 3		word 2			8	15
			byte 4						16

		Words	bytes		
AL1	Channel 24	byte 3	word 2	48	95
		byte 4			96
Status	Channel1 to 8	byte 1			97
	Channel 9 to 16	byte 2			98
AL2	Channel 17to 24	byte 3			99
	Channel 1 to 8	byte 1			100
Status	Channel 9 to 16	byte 2			101
	Channel 17 to 24	byte 3			102
Sensor	Channel 1 to 8	byte 1			103
	Channel 9 to 16	byte 2			104
Status	Channel17 to 24	byte 3			105

2.4) Alarms and input Status byte

When a bit is set to 1, the corresponding channel is in alarm or input breaking.

	b7	b6	b5	b4	b3	b2	b1	b0	bit
State of channel 1 to 8	8	7	6	5	4	3	2	1	byte 1
State of channel 9 to 16	16	15	14	13	12	11	10	9	byte 2
State of channel 17 to 24	24	23	22	21	20	19	18	17	byte 3

2.5) Device specific diagnostic data

byte 1 à 6 : standard bytes

0	0	0	0	0	0	1	0	byte 7: header byte 8: diagnostic bit0: measure default
0	0	0	0	0	0	0	0/1	
b7	b6	b5	b4	b3	b2	b1	b0	

The 'Measure Default' appears when the communication slot don't receive data from the measure part within a 3s delay. (It's the case if the user enter the device in configuration mode by RS232 link or front panel).

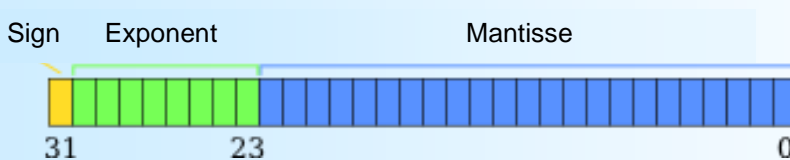
In this case ALL data exchanged are set to 0 !!

2.6) Data format for measure value (only channel 1)

- Date in IEEE 32 bits floating point number.

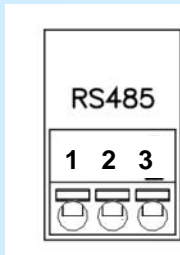
Data are transmitted Most significant byte first, 4 bytes long.

\$FFFFFFFF = sensor breaking.

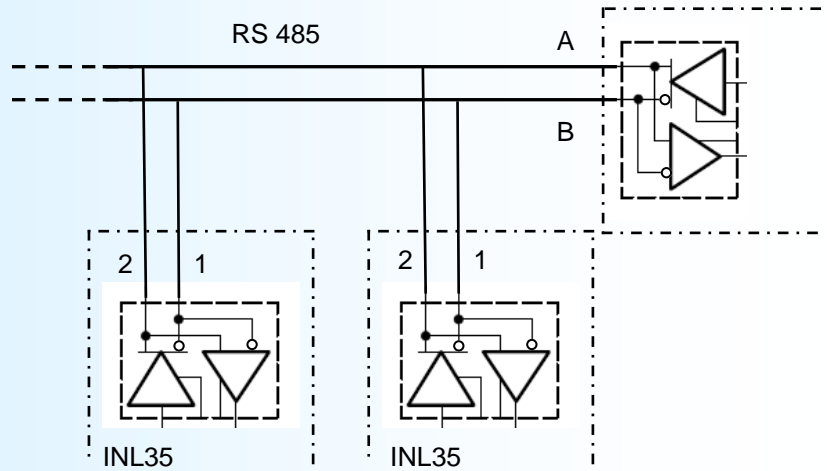


Connection to the communication network

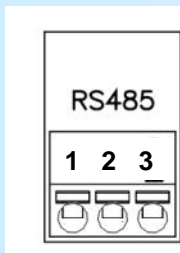
1) Connection to a MODBUS network



The terminal (3) is not connected



2) Connection to a PROFIBUS network



The terminal (3) is not connected

