CONFIGURATION HANDBOOK

INL35L

LOREME 12, rue des Potiers d'Etain Actipole BORNY - B.P. 35014 - 57071 METZ CEDEX 3
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Download manual at : www.loreme.fr

REV0.3 - 30/03/16

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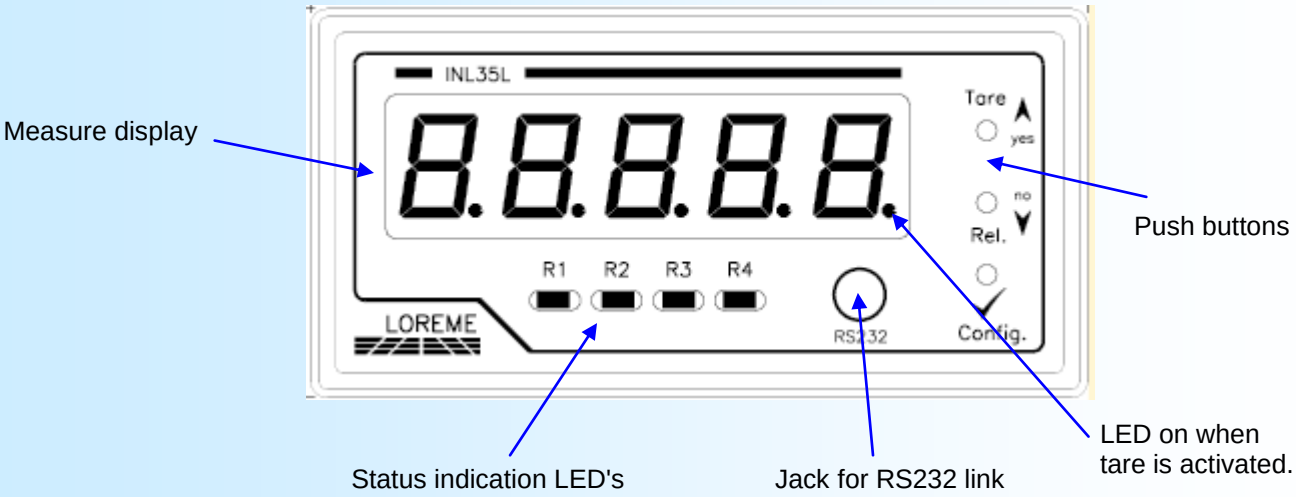
Device Presentation

The INL35L is a universal panel indicator for analog process inputs. It is configurable in a clear language (without manual) and allows to display the physical unit.
It is necessary to make de difference between the different models:

INL35L: Process input, mV, strain gauge, mA, V, frequency, Duty cycle.
INL35L/S: 1 configurable isolated output.
INL35L/R1: 1 relay.
INL35L/R2: 2 relays.
INL35L/R3: 3 relays.
INL35L/R4: 4 relays.
INL35L/CM: RS485 MODBUS link
INL35L/CP: RS485 PROFIBUS link
INL35L/CMTCP: Ethernet MODBUS TCP link

The technical data sheet is downloadable at: http://www.loreme.fr/fichtech/INL35L_eng.pdf

USING INTERFACE



The device front panel is composed of:
- a 5 digits display - 10 000 pts to visualise the measure,
- 4 LED for status indication:
  - 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) Tare/Zero function
Press the push button **<Tare>** to access to the tare function. The message « **tArE** » is displayed instead of measure.
The button <**yes**> activate the function, the button <**no**> deactivate the function.
If no buttons are pressed after 30sec, the device comme back to the measure mode without modification.

Note:
The value of tare is stored in not volatile memory. It remains active even after a power off.

2) Alarm threshold setting

Access of threshold setting with push buttons depend of alarm configuration. The alarm should be active (see threshold alarm configuration.

Setting procedure:

- The choice of relay is made with the button ⮟ **(Rel.)**, the message '**rEL x'** is display and the LED Rx is on. With the button ⮝ **(yes)** the user access to setting, with the button ⮟ **(no)** the user skip to following relay or return to measure mode. After press the button ⮝ **(yes)**, the threshold value is displayed and the LED Rx blink.
- If the modification is allowed, the value can be adjust with the buttons ⮝ and ⮟ , if not the value is just displayed. The speed of setting depend on press duration.
- Press the button ✓ to store this new value.

- If no action are made during 30sec, the device return to measure mode without change.

3) Front face configuration

The button ✓is used to access to configuration. This configuration is a simplified version of the configuration that is done with a RS232 terminal.

The button ⮝ (yes) confirm the proposal displayed. The button ⮟ (no) display the next proposal.

When the LED 'R1' blink quickly, an action on button (yes) or (no) is expected (30sec duration).

When the LED 'R1' blink slowly, a number value input is expected (60sec duration). Use the buttons ⮝ and ⮟ to change the value and confirm with ✓ .

At the beginning of configuration, the version number of device is displayed

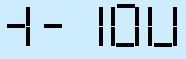
 and  (Hard and Soft version)

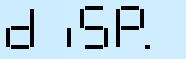
 "**input**" : input configuration.
⮝ (yes) to access to parameter. ⮟ (no) to skip

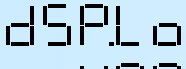
 "**4-20mA**". The first message displayed is the active setting.

 "**0-20mA**". ⮝ (yes) to confirm. ⮟ (no) to display next proposal.

 "**0-10V**"

 "**+/- 10V**"

 "**display**" : Display configuration
⮝ (yes) to access to parameter. ⮟ (no) to skip.

 "**display Low**" : Setting of low range value
⮝ (yes) to access to setting. ⮟ (no) to skip
 Modify the value with ⮟ and ⮝ . confirm with ✓ .

 "**display High**" : Setting of high range value
⮝ (yes) to access to setting. ⮟ (no) to skip
 Modify the value with ⮟ and ⮝ . confirm with ✓ .

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OutP. "**Output**" : Output configuration (if option **/S**)
▲ (yes) to access parameter. ▼ (no) to skip.

4.20mA "**4-20mA output**". The first message displayed is the active setting.

0.20mA "**0-20mA output**". ▲ (yes) to confirm. ▼ (no) to skip.

0. 10U "**0-10V output**"

rEL. 1 "**relais 1**" : Relay #1 configuration (if option **/Rx**)
▲ (yes) to access parameter. ▼ (no) to skip.

rPt. y "**breaking sensor Yes"** : Active the breaking sensor detection.
▲ (yes) to confirm. ▼ (no) to skip

rPt. n "**breaking sensor no"** : Deactivate the breaking sensor detection.
▲ (yes) to confirm. ▼ (no) to skip

AL. y "**Alarm Yes"** : Active the threshold detection.
▲ (yes) to confirm. ▼ (no) to skip

AL. n "**Alarm no"** : Deactivate the threshold detection.
▲ (yes) to confirm. ▼ (no) to skip

AL. Lo "**Low alarm"** : Low threshold detection.
▲ (yes) to confirm. ▼ (no) to skip

AL. H "**High alarm"** : High threshold detection.
▲ (yes) to confirm. ▼ (no) to skip

thrES. "**threshold**" : Setting of threshold value
▲ (yes) to access to the setting. ▼ (no) to skip
1340 Change with ▼ and ▲ . confirm the new value with ✓ .

Conn. "**Com.** " : Communication parameters (if option **/CM** or **/CP** or **/CMTCP**)
▲ (yes) to access to parameters. ▼ (no) to skip.

Adr "**Address**" : Setting of device address
▲ (yes) to access to the setting. ▼ (no) to skip
5 Change with ▼ and ▲ . confirm the new value with ✓ .

bAUd "**Baudrate"** : baud rate configuration.
▲ (yes) to access. ▼ (no) to skip

1500 "**1500 Kbds**". The first parameter displayed is the active parameter.

19.2 "**19.2 Kbds**". ▲ (yes) to confirm. ▼ (no) to display the next proposal.

Note: for the option **/CM**, the baud rate is 38.4k, 19.2k, 9.6k, 4.8k, 2.4k, 1.2kbds. For the option **/CP**, the baud rate is 1500k, 500k, 187.5k, 93.75k, 19.2k, 9.6kbs.

PAr it. "**Parité**" : Parity setting.
▲ (yes) to access. ▼ (no) to skip

Odd "**Odd**". The first parameter displayed is the active parameter.

EUEn "**Even**". ▲ (yes) to confirm. ▼ (no) to skip.

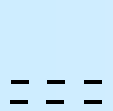
nonE "**none**"

"**Address field IP1**" : Setting of IP address (if option **/CMTCP**)
▲ (yes) to access. ▼ (no) to skip
Change with ▼ and ▲ . Confirm with ✓ .

"**Address field IP2**"

"**Address field IP3**"

"**Address field IP4**"



(the default IP address is *192.168.0.253*)

Display of 5 symbols "-" after any change in IP address

The display of message "**End..**" indicate that new parameters are store in device memory.

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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)

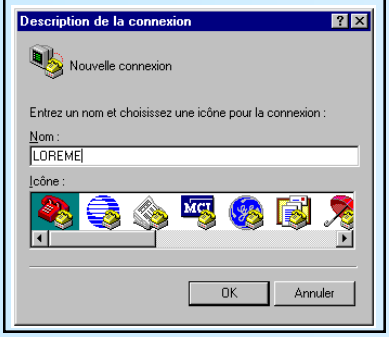
=> Run the downloaded software to install it.

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"**

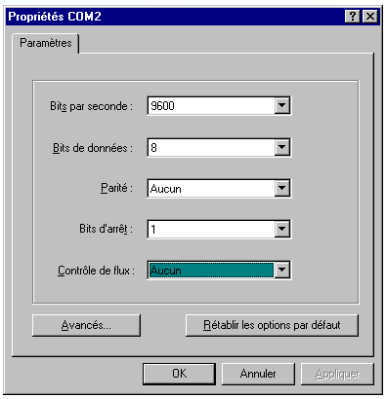
Or if the software was downloaded
- Go to **"All programs \ HyperTerminal Private Edition"**
- Click on **"HyperTerminal Private Edition"**

3 Enter name for the new connection



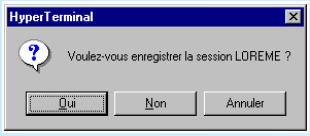
4 Choose the communication port related to the adapter.

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 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.

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, strain gauge, V), and high voltage,
- Current (mA)
- Frequency (Hz)
- Duty cycle (%)

With for each type of input, the setting of low and high range and the sampling rate.

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Configuration

The **sampling** parameter is use to setting the resolution and the acquisition time for the measure.
2 choice :

- Fast : 60 samples/sec with 14 bits resolution
- Slow: 15 samples/sec with 16 bits resolution

Special case:
- 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 **number of decimal** correspond to the number of digit displayed behind the decimal point (0, 1, 2, 3 or 4).

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.

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8) Communication

The following rubrics are only displayed with option **/CM** or **/CP** or **/CMTCP** .

8.1) MODBUS TCP (/CMTCP)

The communication parameters are :

- the network IP address (192.168.0.253 by default),
- the network mask (255.255.255.0 by default),
- the gateway (0.0.0.0 by default).

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).

8.2) 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 **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.

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.

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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.

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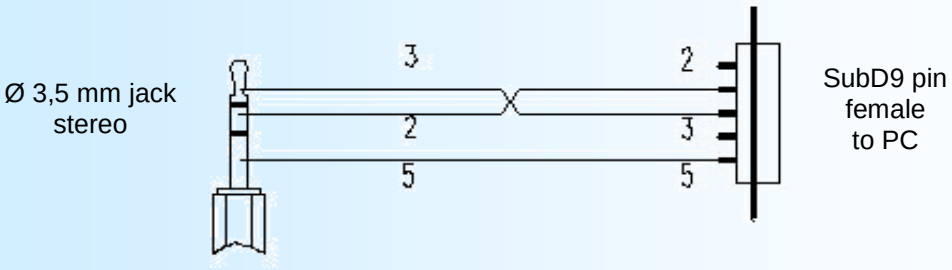
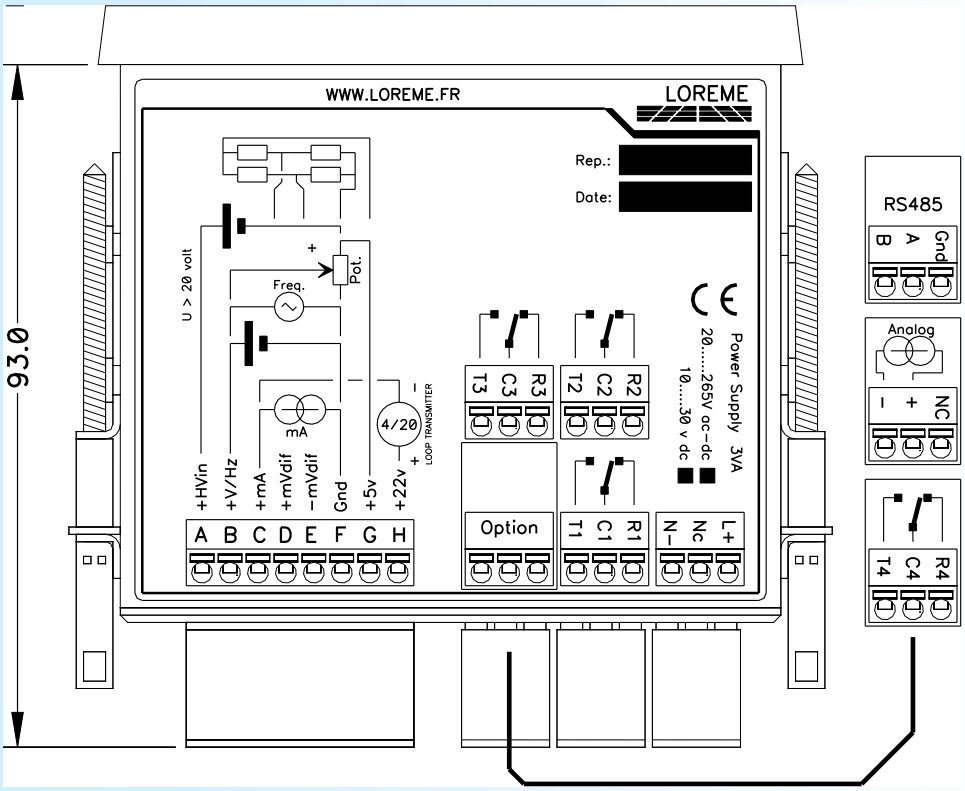
Wirings

DEVICE - TERMINAL LINK



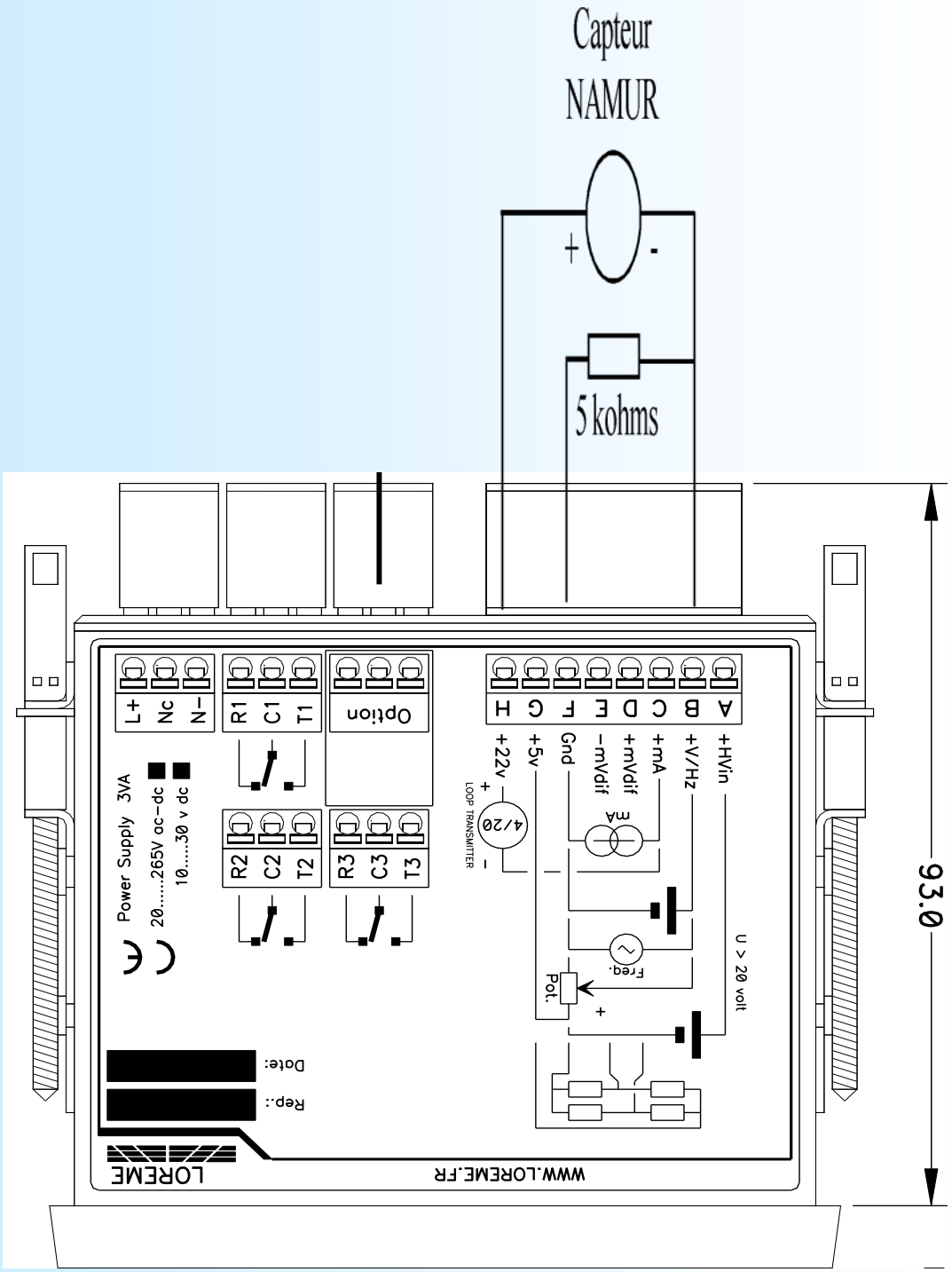
WIRING DIAGRAM



mV input:	D (+), F (-)
V / Frequency input:	B (+), F (-)
High voltage input:	A (+), F (-)
mA input:	C (+), F (-)
Duty cycle input:	B (+), F (-)
Potentiometer input:	G(+5V), B (+), F (-)
Strain gauge input:	G (+5V), F (-): supply D (+), E (-): measure
Sensor supply:	H (+), borne F (-)
Analog output:	Analog+, borne Analog-.
Power supply:	L+, N-.

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)

NAMUR sensor wiring



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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:	3 pins pluggable terminal block
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 INL35L (register reading function).
$02	Data address not allowed
$04	Slave busy. The internal communication slot is not in connection with the measure part.

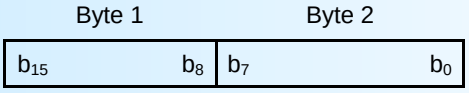
2.3) Data format

- Data in 32 bits IEEE floating point format

Data are transmitted Most Significant Byte first, 4 bytes or 2 words long.
$FFFFFFFF = sensor braking.

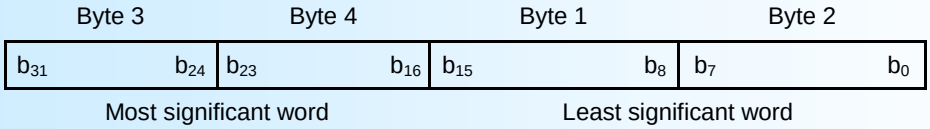
Sign	Exponent		Mantissa	
b_{31}	b_{30}	b_{23}	b_{22}	b_0

- 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°C
- input Tc K (scale: -200 /1350°C), 16 bits measure = 20900 => [((20900 - 2)/65531) * (1350+200)] - 200 = 294,3°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	*percentage of the input measure scale*
4096 ($1000)	Measure in IEE 32bits floating format	Word 1	
4097 ($1001)		Word 2	
8192 ($2000)	Alarms status	Word 1	*Msb: R1, Lsb: R2*
8448 ($2100)	R1 alarm threshold value	Word 1	*32bits float number*
8449 ($2101)		Word 2	
8450 ($2102)	R2 alarm threshold value	Word 1	*32bits float number*
8451 ($2103)		Word 2	
12288 ($3000)	Measure in 16bits integer format	Word 1	*percentage of the input measure scale*
40960 ($A000)	Measure in 32bits signed integer	Word 1	*correspond to measure x 100*
40961 ($A001)		Word 2	

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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 slave.
The INL35L/CMTCP device answer in less of 30 ms to a read of 4 registers.

4) Use with more than one Modbus TCP master

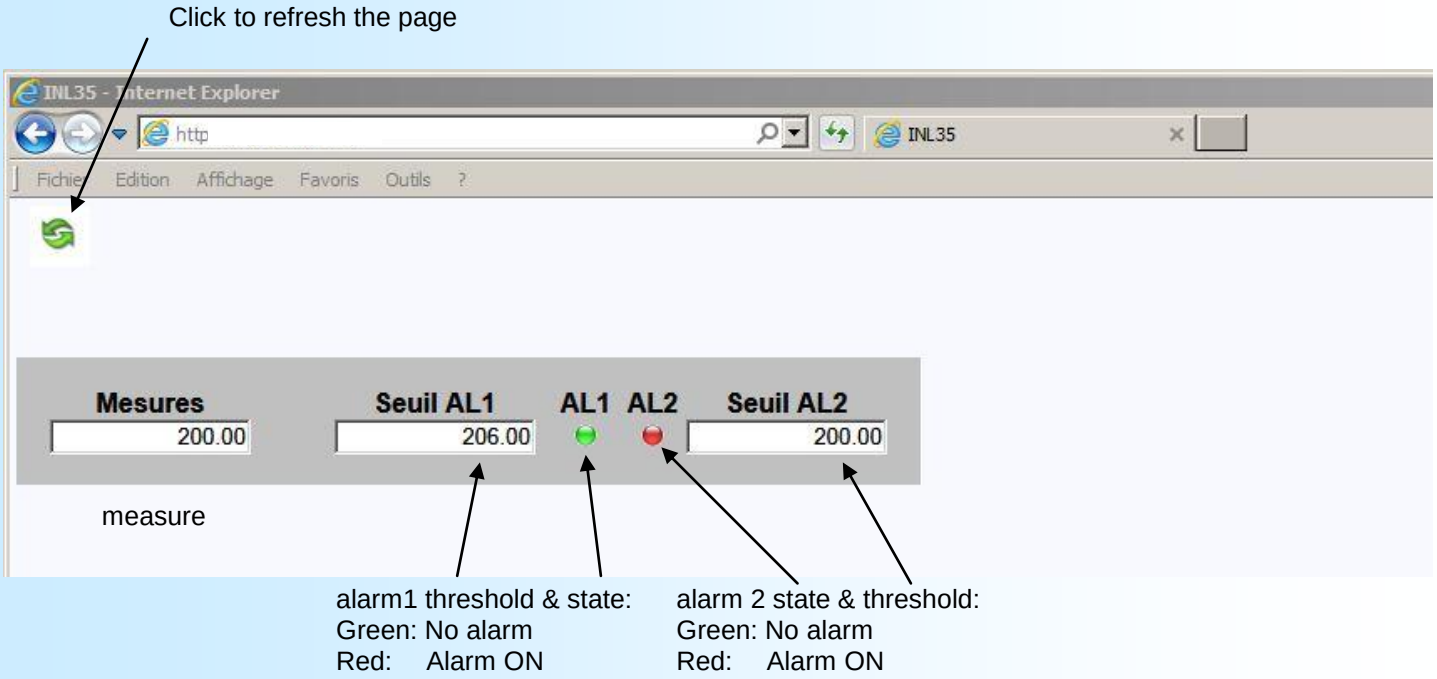
The INL35L/CMTCP supports to be access by masters with different IP address (up to 6 connections).
However, the network load have to be less then 30 requests /second. A too high network load could lead to communication errors.

WEB server

WEB page presentation

The INL35L/CMTCP integrates a web server to view the measure and the alarms threshold & state of relay 1 and 2.
The web page consist of a page of the different values and an icon to refresh the web page.

INL35L/CMTCP WEB page:



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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: 3 terminal block.

2) Implementation

The network address and the baud rate should be configured in the device by RS232. 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 INL35L.

b7 b6 b5 b4 b3 b2 b1 b0			Total word	Total 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
	Channel 24	byte 3	word 2	48	95
		byte 4			96
AL1	Channel1 to 8	byte 1			97
Status	Channel 9 to 16	byte 2			98
	Channel 17to 24	byte 3			99
AL2	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
braking	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

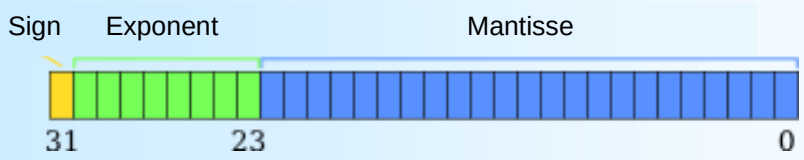
0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0/1
b7	b6	b5	b4	b3	b2	b1	b0

byte 7: header
byte 8: diagnostic
bit0: measure default

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.



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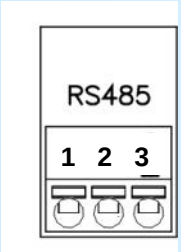
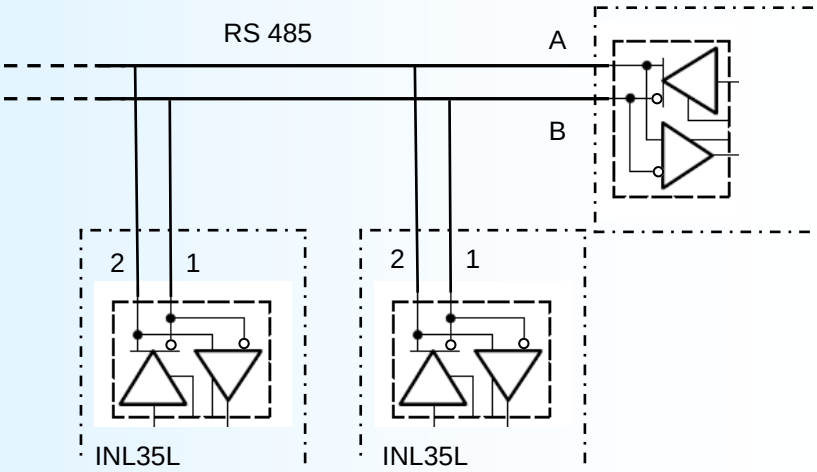
Connection to the communication network

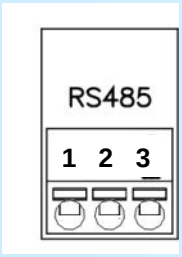
1) Connection to a MODBUS network



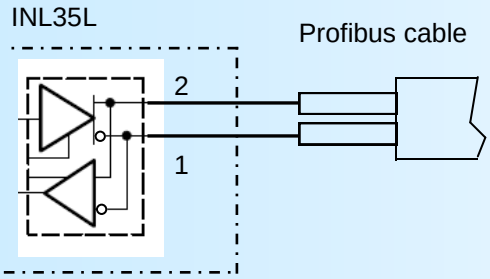
The terminal (3) is not connected



2) Connection to a PROFIBUS network



The terminal (3) is not connected



Profibus cable	wire color	Pin DB9	Designation
	Red	(3)	RxD/TxD - P
	Green	(8)	RxD/TxD - N