

CONFIGURATION HANDBOOK

INL35SSI



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Device Presentation

The INL35ssi is a 6 digits display meter for use with ssi absolute encoder. It allows to read and transform the data of an absolute encoder (mono or multi turn) in a analog output signal. The INL35ssi can works in master or slave mode.

Master mode: The device drives the clock signal and reads the position data every 10ms. After treatment, the information is displayed and sent to the analog output and to the relays.

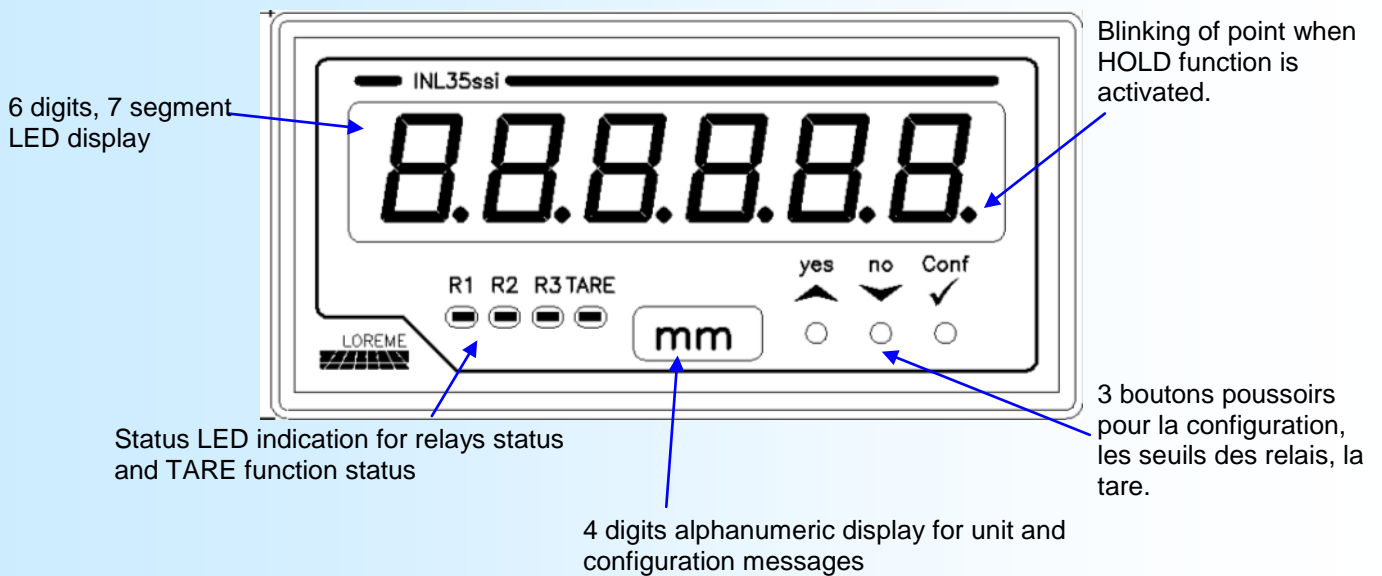
Slave mode: The device is in "listening mode" on ssi link. It synchronizes with the clock signal generated by the remote master to intercept data of encoder. The device can treated only one ssi telegram every 10ms, even if the remote master transmits more in this time.

Devices have several options:

- INL35ssi:** base version.
 - INL35ssi/R1:** + 1 relay.
 - INL35ssi/R2** + 2 relays.
 - INL35ssi/R3** + 3 relays.
 - INL35ssi/S:** + analog output.
 - INL35ssi/CMTCP** + Ethernet link Modbus TCP.
- The option /R3, /S, /CMTCP are not cumulative*

The datasheet can be downloaded at : http://www.loreme.fr/fichtech/INL35ssi_eng.pdf

USER INTERFACE



Push button functions:

- ▲ <YES> / increase value / Access to Tare function.
- ▼ <NO> / decrease value / Access to alarm threshold setting.
- ✓ Confirm value / Access to device configuration.

Front face configuration

1) Visualization

At the power on, the version of the INL35ssi is display during 1 second. It's a message type "**r- x.y**". Where "x" represent the hardware version and "y" the software version.

Display of default:

- display of messages "**Err Co**" or "**Err Ma**" with "**ssi**" instead of unit
-> the device don't receive data from encoder or don't receive clock from master.
- "D-C!" instead of unit:
-> The lines DATA and/or CLOCK still in low level (short circuit or reversal sense)
- "Hi" or "Lo"
-> The value overflow the display capability.

2) Tare function

The tare function may be activated with the front face buttons or by the digital inputs.

Front face:

After a press on ▲, a message is display : "**Tare O/N ?**".

- Press on ▲ to activate the function. A new message is display : "**Activate Tare?**" . Press on ▲ to take the new Tare or ▼ to reset the value. The tare is store in not volatile memory and remains active after a power off.

Digital input: (see the digital input configuration chapter).

A pulse on the digital input leads the actual encoder reading is taken as the tare. The minimal pulse duration is 20ms. The signal polarity is configurable. For deactivate the function, use the front face button (see above)

When the tare function is activated, the LED 'TARE' is lit on.

3) "ZERO POSITION" function

This function allows to shift the zero of encoder out of the working zone. This function may be initiate with the front face buttons or by the digital inputs. Only push button can be use to reset the parameter value.

Front face:

After a press on ▲, a message is display : "**Tare O/N ?**". Press on ▼ to access to "zero position" parameter

- A press on ▲ to access, when the message "**Activate Zero?**" is display, press on ▲ to take the encoder position or press ▼ to reset the parameter value.

Digital input: (see the digital input configuration chapter).

A pulse on the digital input leads the actual encoder reading is taken as the tare. The minimal pulse duration is 20ms. The signal polarity is configurable.

3-1) Difference between "Tare" and "zero position":

Just after taken the Tare, the display is set to 0. If the encoder arrive to mechanical overflow, the display become very big.

The "zero position" function is equivalent to do a mechanical zero of encoder. In this case, if the encoder arrive to mechanical overflow, the panel meter calculate the corresponding value with taking account of the programmed resolution parameter. And so display a continuous value.

4) HOLD function

The HOLD function is driven only with digital inputs. A signal presence in this input activate the HOLD function: encoder readings are ignored, the display, output are frozen in their actual state. The HOLD function still activate as long as the HOLD signal is present.

When the HOLD function is activated, the decimal point of unit display blink.

5) Alarms thresholds setting

The access to the setup/display of threshold with the buttons is function of alarms configuration. Threshold detection must be enabled.

- The choice of the relay to be setting is made with the ▼ button. The message '**rEL x**' is display and the Rx led is lit. Access to the setting with the ▲ button. Skip with the ▼ button. After pressing the ▲ button, the threshold value is display and le Rx led blinking.
- If the setting is allowed, the threshold can be modify with buttons. If not, the value is display only.
- confirm the new value with the button '✓ conf.' to store the parameter.
- If no action are made within 30 seconds, the device save the actual value of threshold and return to measure mode.

6) Front face configuration

Press the '✓ conf.' button to access to the configuration.
 The ▲ button is for access to the menu, validate the proposal.
 The ▼ button is for skip the menu, don't validate the proposal.

For a numerical value, increase with ▲ button and decrease with ▼ button. Use the button '✓ conf.' to confirm and store value parameter.

6-1) Language of messages

LANGUAGE CONFIGURATION ?	This message scrolls on the unit display. Press on ▲ to access. Press on ▼ to skip this menu.
ENGLISH or FRENCH	Press on ▲ to confirm or on ▼ to display the next proposal

6-2) ssi parameters

SSI CONFIGURATION ?	
MODE	
MASTER or SLAVE	define the operating mode for the device.
CLOCK	
100KHz, 250KHz, 500KHz or 1MHz	define the baud rate of ssi link.
FORMAT	define the data format of ssi telegram.
GRAY or BIN	
SSI FRAME LENGHT	
25bit	define the length of ssi telegram (8 up to 32bits)
LOW BIT	
1	format the ssi frame by keeping the useful bits. (bits suppression)
HIGH BIT	
19	
POSITION ZERO?	Allows to reset or set the parameter value
RAZ value ?	
0	
DIRECTION ?	define the direction of counting. with the "REVERSE", the encoder value is complemented so the counting direction is reversed.
NORMAL or REVERSE	
<i>For the slave mode only:</i>	
TIMEOUT	define the delay before the device detect a default/breaking in ssi link
10.0 s	

Low bit, High bit and ssi length parameters

The parameters Low and High bit used to not consider all bits of the ssi frame.
 The display is on 6 digits, if the encoder resolution is greater than 19bits, the value can overflow the display capacity. To avoid this problem, taking in account of this 19 bits limitation and suppress the unused bits.
 The Low bit parameter specified the first bit that will be taken in account (LSB). The High bit parameter set the last bit (MSB).

Example:

On a ssi frame of 25 bits length, we want to use the first 19 bits. So :
 ssi length frame = 25bits, Low bit = 1 (LSB) and High bit = 19 (MSB). (All bits above the bit 19 will be ignored)
 If we need to keep only the 19 bits MSB: Low bit = 7, High bit = 25. (All bits below bit 7, will be ignored).

6-3) Display parameters

The display value represent the value according to this formula

$$\text{Display} = [\text{Encoder value} - \text{Tare value}] \times M / D + P$$

The 'Encoder value' is the reading value after format with Low and High bit.

DISPLAY CONFIGURATION ?	
Coeff M	Coefficient M: signed value -99999 to 999999. (1.000 default).

Coeff D	Coefficient D: not signed value 0.001 to 999999. (1.000 default).
Coeff P	Coefficient P: signed value -99999 to 999999 (0 default).
NUMBER OF DECIMAL UNIT	define the number of decimals displaying.
DISPLAY FILTER?	Choose the unit in a list of 37 pre-defined unit (For a specific unit, use the RS232 link to configure the unit). allows to average the display value.

6-4) Setting of linearization parameters

In some case, it be useful to have a specific display for the encoder value.
After define the number of linearization point, the device ask for the input point (is the display value without linearization) and the linearized point (is the value that have to be displayed for this input). During calculation, the device define a straight segment between two points of linearization.

LINEARISATION SPECIALE ?

ACTIVE LINEARISATION? Press on ▲ to activate the linearization.
Press on ▼ to deactivate the function.

CONFIGURATION ?

NUMBER OF POINTS? Press on ▲ to setting the linearization points.
Define the number of used points (3 to 26 points).
INPUT POINT ? Type the normally display value ('PE' is display as unit and 01 as first point).
POINT LINEARISE ? Type the value should be displayed for this input point ('PL' is display as unit and 01 as first point).

6-5) Analog output parameters

This rubric is available only for a device with the /S option

OUTPUT CONFIGURATION?

CURRENT define the type of output
VOLTAGE
LOW SCALE define the physical range (4mA, 20mA or 0V, 10V)
HIGH SCALE
DISPLAY for Smin enter the display value according to the output scale.
DISPLAY for Smax (ex: scale output: 4 / 20mA for a display range of 0 / 65536)
Note: The display value are the value after linearization, scaling)
SECURITY VALUE? define the output value when the device is in default/breaking condition.
RESPONSE TIME? allows to apply a filter on the output to smooth the signal.
LIMITED OUTPUT? allows to clamp the output signal to the output scale. Except in breaking condition

6-6) Communication parameters

This rubric is available only for a device with the /CMTCP option

COMMUNICATION?

IP1 type de IP address.
IP2 define the 4 fields of IP address: IP1.IP2.IP3.IP4
IP3
IP4

Note: - The network mask is by default 255.255.255.0. To change this, use the RS232 terminal link.
- When you access to the communication rubric, the device will display a message 'MeMo' on the unit display and a series of 5 signs on the measure display.

6-7) Relays parameters

This menu is visible only for device with the relay option (/R1, /R2, /R3)
Choose if the relay works in sense of rotation or works in threshold/breaking detection.

RELAY CONFIGURATION?

RELAY 1?
ALARME ON ROTATION Activate or not the sense of rotation detection.
COUNTING? or COUNTDOWN? define the sense of rotation (counting or down counting).

NEGATIVE SECURITY or POSITIVE SECURITY ACTIVATION DELAY? DEACTIVATION DELAY? <i>End of relay configuration</i>	define the security of relay. define the delay between the alarm detection and the relay action. (value in seconds. pitch of 0.01 s)
BREAK DETECTION?	Activate or not the breaking detection.
THRESHOLD DETECTION?	activate or not the threshold detection.
low THRESHOLD? or high THRESHOLD?	choose the threshold detection (Low or High).
THRESHOLD?	enter the threshold value (in same range as display)
HYSTERESIS ?	enter the hysteresis value (in same range as display).
FRONT FACE THRESHOLD ADJUST	Allow the adjustment of threshold by the front face buttons.
NEGATIVE SECURITY or POSITIVE SECURITY ACTIVATION DELAY? DEACTIVATION DELAY? <i>End of relay configuration</i>	Define the security state for relay. Define the delay between the alarm detection and the relay action (value in second, pitch of 0,01s).
RELAY #2?	Same configuration for the other relays.
RELAY #3?	

in **positive security** the relay is activated in alarm. In **negative security** the relay is activated when no alarm. The **activation delay** is the time delay between the alarm detection and the action on relay. The **deactivation delay** is the time delay between the disappearance of alarm condition and the action on relay.

6-8) Configuration of digital inputs

The device support 3 digital inputs. It is possible to associate a function (Tare, Hold) to a digital input.

LOGICAL INPUT CONFIG? inA LOGICAL SENSE? NORMAL or REVERSE	Define the sens of active input. (NORMAL: the input is activate with a high input level. REVERSE: the input is activate with a low input level). same for the inputs inB, inC.
inB LOGICAL SENSE? inC LOGICAL SENSE?	
TARE FUNCTION? inA INPUT? inB INPUT? inC INPUT?	Assign the TARE function to one of three digital input.
HOLD FUNCTION? inA INPUT? inB INPUT? inC INPUT?	Assign the HOLD function to one of three digital input.
ZERO FUNCTION? inA INPUT? inB INPUT? inC INPUT?	Assign the "Zero position" function to one of three digital input.

Note: *It is not possible to assign more than one function to an input. For ex : If the tare function is assigned to an input, automatically the hold function is deactivate for this input.*

OK! End of configuration. Changes are stored.

Note: *If no action on buttons within 90 sec, the device return to measure mode. For changes are effective, go to 'OK!' message.*

RS232 link configuration

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

1) Visualization

The INL35ssi can be configured using the RS232 link on the front of the device.

This requires a USB/Jack or DB9/jack adapter cable, depending on connectors available on the PC, and have a ASCII emulation program like 'Hyperterminal ' or else.

Note: For RS232 cable installation, see the "RS232 Configuration" page.

Once the INL35ssi is connected to PC, it send following informations:

B:13319	display of the encoder value reading (all bits),
C:13319	encoder value after bit formatting (with bit Low, bit High) and tare,
G:327.2 mm	corresponding value in display range (after linearization)
S:7.25 mA	value of analog output. If present.

To access to the configuration, press the "C" key on PC keyboard.

The device display: CONFIGURATION REV x.y	temporary display of device version.
---	--------------------------------------

Many message can be display:

- Message of menu: RELAY CONFIGURATION (Y-N)	Press the "Y" (Yes) to enter in this menu. Press the "N" (Non) to skip and go to next menu.
- Message for choosing: MASTER (Y-N)YES	The actual choice is display. Press "N" to change. The device will display another choice.
- Numerical enter: RESPONSE TIME 1.0 s	The current value is display. Enter the new value and validate it with ENTER For no change, just press the ENTER key. In case of error when entering new value, press the "←" (backspace) to cancel the modification.

2) Configuration menus

2-1) Language of messages

This rubric is for define the language of messages. French or English

2-2) ssi parameters

This rubric is for setting the SSi parameters (see page 4, chapter 4-2).

2-3) Display parameters

This rubric is for setting the display range (see page 5, chapter 4-3).

UNIT (Y-N)	type the 'Y' key to modify unit
UNIT moB	Display of actual unit. Type the 4 characters for the new unit and confirm with "ENTER" Just press the "ENTER" key for no change.

2-4) Linearization parameters

This rubric is for define the points of linearization (see page 5, chapter 4-4).

2-5) Analog output parameters

This rubric is for define the output parameters (see page 6, chapter 4-5).

2-6) Communication parameters

This rubric is for setting the IP address and the network mask

COMMUNICATION
(Y-N)

Type on 'Y' key to access parameters

IP ADDRESS
192.168.0.253

Type directly the new address separate by point confirm with ENTER

IP MASK
255.255.255.0

type the network mask

2-7) Relays parameters

This rubric is for define the relays parameters (see page 6, chapter 4-7).

2-8) Digital inputs configuration

This rubric is for define the function associated with digital inputs (see page 7, chapter 4-8).

2-9) Special functions

SPECIAL FUNCTIONS
(Y-N)

Type 'Y' to access to parameters.

FRONT FACE LOCKED
(Y-N)NO

If the answer is YES, it is not possible to access configuration by the front face. The threshold adjustment still available.

End of configuration

SAVING...
* * * * *

If configuration change, the message is display followed by 5 start symbols

OK!

Message to indicate the saving of new parameters.

Note: *If no action, the device go back to measure mode after 2 minutes delays without tacking account of new parameters.*

MODBUS TCP communication

1) Characteristics

Link:	Ethernet 10/ 100 base T
Default IP address:	192.168.0.253
Port:	502
Protocol:	Modbus TCP
Connector:	RJ45
Reading request:	Function code 03,04
Writing request:	Not supported
Data type:	Displayed value, output value, encoder value, device state
Data format:	Display value and output are in IEEE 32bits float format, encoder value in 32bits integer, device state is on 16bits integer.

Note:

The INL35ssi allows up to 4 simultaneous Modbus TCP connection.

2) Data description

2.1) Data available

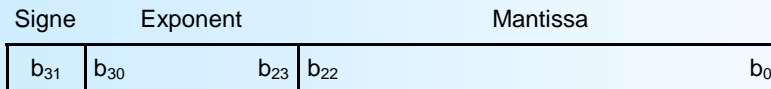
All data are available for reading request. The data are in several formats:

- 2 words (4 bytes) for float 32bits IEEE format,
- 2 words (4 bytes) for 32bits integer format,
- 1 word (2 bytes) for device status.

2.3) Data format

- Data in IEEE 32 bits float format (measure and output).

Data send MSB first.



- Data in unsigned 32bits integer (encoder reading).

Data send MSB first.

- Data in 16bits format (device status).

Data send MSB first.

2.4) Detail of the device status

<u>Status</u>	<u>Remark</u>
bit0 = 1	Default with master!. The device operating as a slave ssi. No detection of clock frame from master.
bit1 = 1	Encoder Default!. The device don't receive the data frame from encoder.
bit4	Alarm status for relay #1 (if present).
bit5	Alarm status for relay #2 (if present).
bit6	Alarm status for relay #3 (if present).

Status = 65535 (0xFFFF hexa).

=> Measure Default: There is a communication problem between the Ethernet part and the measure part.
(The Ethernet part is not receive data for at least 4 sec).

Note:

In case of Measure Default, all registers are set to 65535 (0xFFFF hexa).

3) Table of measure

Register address (Hexadecimal)	Designation	
00 (\$0000)	Device status	Mot 1
01 (\$0001)	Display value	Mot 1
	<i>(32bits float)</i>	Mot 2
03 (\$0003)	Output value	Mot 1
	<i>(32b float)</i>	Mot 2
05 (\$0005)	Device status (copy)	Mot 1
06 (\$0006)	Direct Encoder value	Mot 1
	<i>(32b unsigned integer)</i>	Mot 2

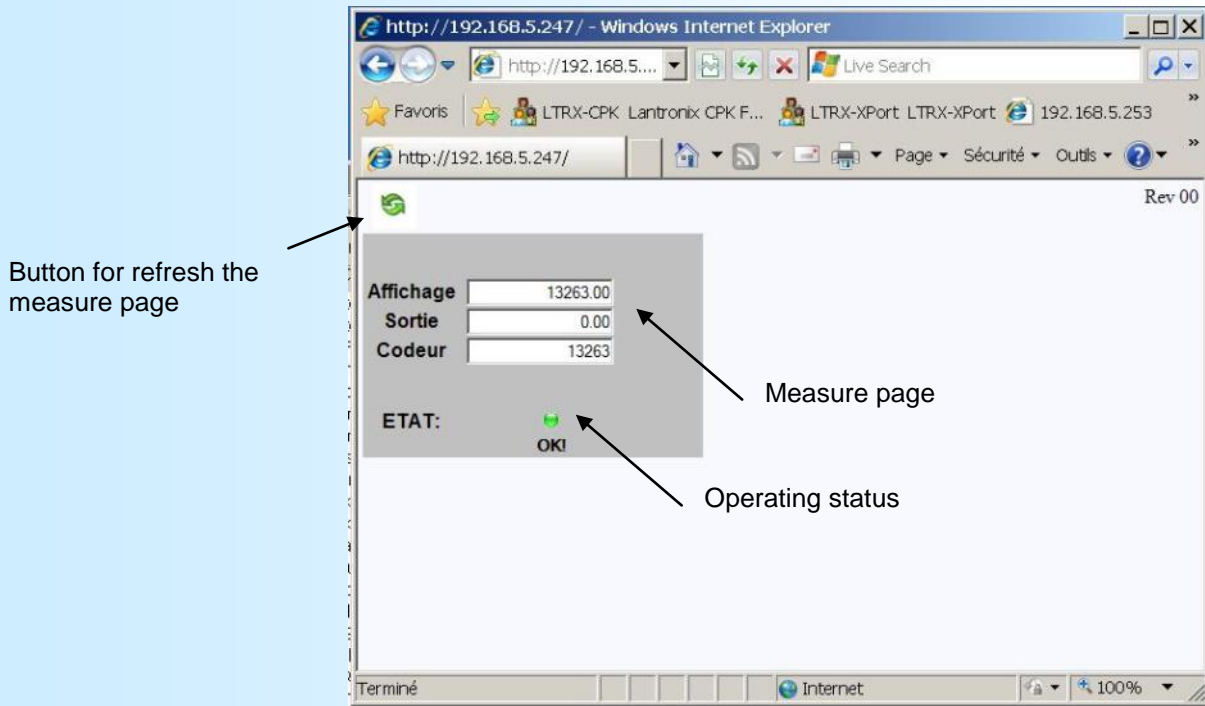
4) Response time

The response time is the delay between the request transfer and answer receive by the Modbus TCP master. The INL35ssi has a response time <10ms.

WEB server

WEB page overview


This page consist of a banner containing a icon and a page showing the measurements of the device.



Button for refresh the measure page

Measure page

Operating status

Click on icon  To refresh measure and state.

The operating status is normally in green, it become red with default (internal, encoder, master ...).

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 the firmware load mode and is waiting for the firmware file. This file is provide by LOREME and contain the firmware code in Intel HEX format.

Select the « Transfer », « Send a text file ... » in the Hyperterminal menu.
Select the directory and open the file. The Hyperterminal program begins to send the file to the device.

**FIRMWARE LOADER 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 (60 s).
- **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 an inoperative device.*

EMC Consideration

1) Introduction

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

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

2) Recommendations of use

2.1) General remarks

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

2.2) Power supply

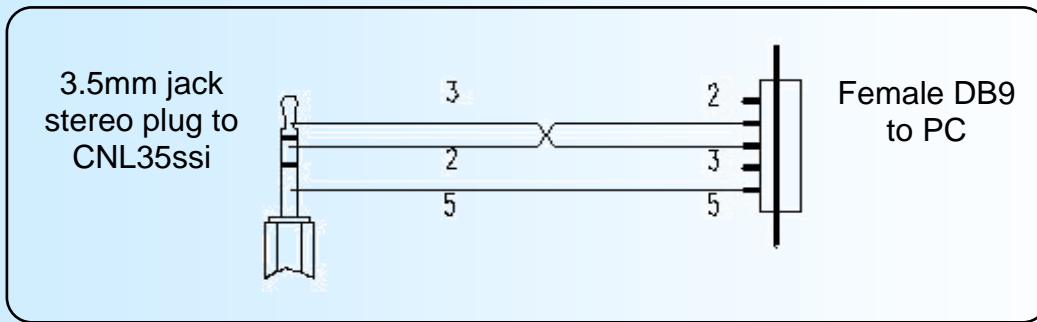
- Comply with the features indicated in the technical sheet (power supply voltage, frequency, allowance of the values, stability, variations ...).
- It is better that the power supply should come from a system with section switches equipped with fuses for the instrumentation element and that the power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

2.3) Inputs / Outputs

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

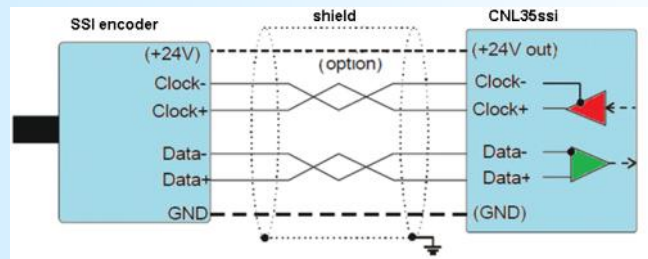
Wirings

terminal - device link

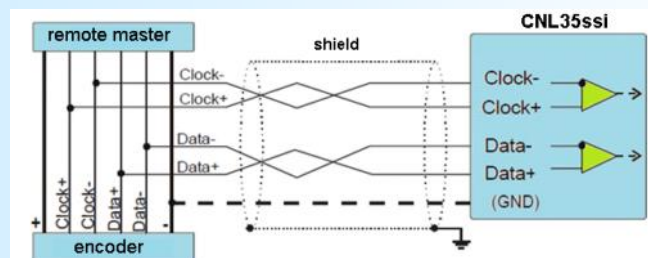


ssi link wiring

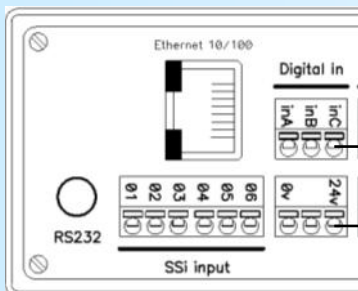
Master mode



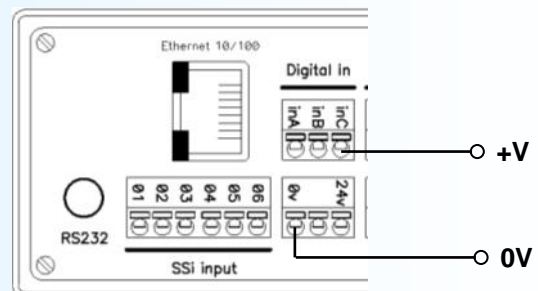
Slave mode



Digital input wiring



Dry contact input



Voltage input

Outlines

