

CONFIGURATION HANDBOOK

CML106



LOREME 12, rue des Potiers d'Étain Actipole BORNÝ - B.P. 35014 - 57071 METZ CEDEX 3
Phone 03.87.76.32.51

Contact : Commercial@Loreme.fr - Technique@Loreme.fr
Download manual at : www.loreme.fr

DEVICE PRESENTATION	p3
FRONT FACE USAGE	p4
Visualization	p4
Configuration	p4
1) Protected configuration access	p5
2) Language setting	p5
3) Input setting	p5
3.1) Setting of the display range	p5
4) Communication	p6
5) Special function	p6
5.1) RTD linearization	p6
6) End of setting	p6
CONFIGURATION ACCESS PROTECTION	p7
1) Activating the « Password » function	p7
RS232 LINK SETTING.....	p8
PC under WINDOWS	p8
TERMINAL MODE	p9
Visualization	p9
Configuration	p9
1) Method	p9
1.1) Menu selection	p9
1.2) Parameter selection	p9
1.3) Value acquisition.....	p10
2) Configuration items	p10
OFFSET	p12
FIRMWARE UPDATE	p13
EMC CONSIDERATION.....	p14
THE MODBUS/TCP COMMUNICATION	p15
1) Feature	p15
2) DATA descriptions	p15
3) Table of DATA	p16
3-1) Table of measure in floating format	p16
3-2) Table of measure in integer format	p17
WEB SERVER	p18
WIRING	p19

Device Presentation

The CML106 is a measurement unit design for demanding applications in terms of precision and functional safety. The fully isolation of this device ensures total independence of each measurement channel. A 2 lines LCD display is use to display the measure and for the configuration of the device.

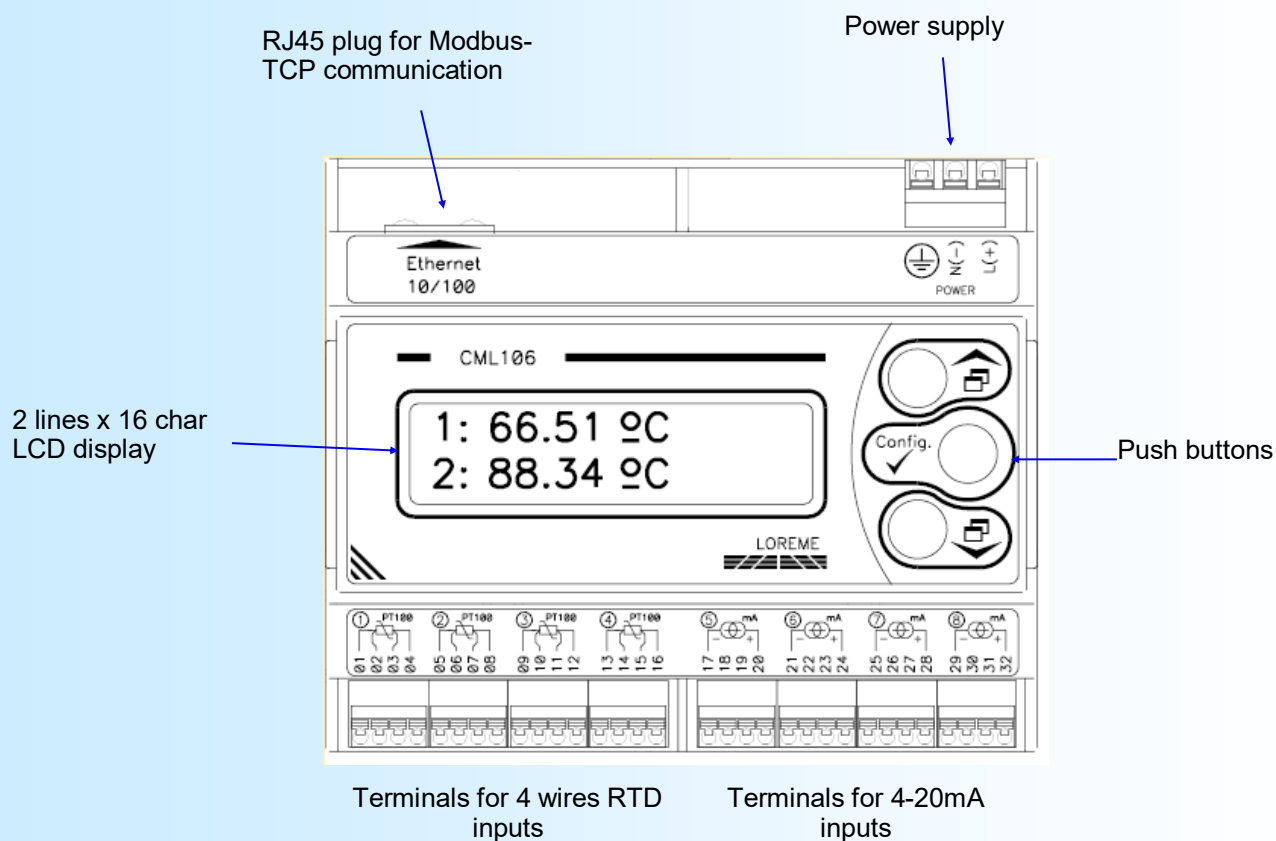
A few models exists:

CML106/CMTCP : 4 x RTD inputs, 4 x 4-20mA inputs, Ethernet MODBUS-TCP communication.

CML106/CMTCP-20ppm : "low drift" version.

The technical data sheet is downloadable here: http://www.loreme.fr/fichtech/CML106_eng.pdf

USER INTERFACE



Functions of push buttons:

- ▲ Change of measure page, answer <YES>, increase the display value.
- ▼ Change of measure page, answer <NO>, decrease the display value.
- ➡ Access to configuration mode, validate the display value.

Front face usage

Visualization

The CML100 display the measure of 2 channels. The 'Display ▼' and 'Display ▲' buttons allows to scroll the display of measurement channels.

Display of measurements:

Display when "sensor breaking" default

```
01: 10.25°C
02: 85.62°C
```

```
01: Err
02: Err
```

Button ▼

Button ▲

```
03: 95.22°C
04: 82.34°C
```

```
05: 4.255mA
06: 12.522mA
```

The 'Err' message indicate a sensor breaking error.

The 'DEFAULT M' indicate a malfunction of input measure circuit of CML100.

The 'OFF' indicate that the channel is not scanning.

Remark:

At the power on, the following message can be displaying:

```
COMM. DEFAULT
XPORT MODULE
```

This message indicate a default of the internal Ethernet component.

Configuration

The CML106 is fully configurable with the front face. A press on the 'Config' button access to the configuration mode: A temporary message is display to show the device version (Revision Hard and Soft).

```
CONFIGURATION
Rev x.x
```

Note:

The device exits the configuration mode after 90sec of non activity. In this case, no configuration changes are made. It is only at the end of configuration ("ok" message) that the configuration parameters are stored.

1) Protected configuration access

If the « Password » function is activated, entering a code is necessary to access the configuration.

```
PASSWORD?
----
```

'Display ▲' et 'Display ▼' buttons to change the character.

(only alphanumeric characters are accepted: '0' to '9' and 'A' to 'Z').

The 'Config' button validate the character.

A message 'Error !!' is displayed if the password is wrong. The device return to measure mode.

2) Language setting

LANGUAGE? The buttons '▲' and '▼' change the selection.
<FR> ENG The '**Config**' button validate the choice.

- <FR> : French message.
- <ENG> : English message.

3) Input setting

INPUT CONF.? Press the button ▲ (Yes) to access to the input parameters.
(Y-N) Press the button ▼ (No) to skip this menu.

CHANNEL (1 . . 8) At first, select the indices of wanted channel.
1 Use the buttons ▲ and ▼. the button '**Config**' validate the choice.

SCANNING Choose if the channel is scanning or not. Use ▲ and ▼ to select the response
<YES> NO use the button '**Config**' to validate the choice.

3.1) Setting of the display range (only for the channels 5 to 8)

The display range interprets the input signal into a physical quantity, which makes it easier to read information.

Ex: Input 4-20 mA / Range 0-1000 kg
→ input = 12 mA, Display = 500 kg.

The parameters of display range are :

- The number of decimal displayed,
- The unit,
- The low scale,
- The high scale

The number of decimal is for the number of digits whose displayed behind the decimal point. The limit is 3.

The unit of the display range is only use to interpret the physical measure. the limit is up to 4 characters.

DISPLAY RANGE? Press the button ▲ (Yes) to access to the setting
(Y-N) Press the button ▼ (No) to skip this menu.

NBR DECIMAL Setting the decimals.
1 Use buttons ▲ and ▼ to change the value (0 to 3).
Use the button '**Config**' to validate the value.

UNITS Unit configuration. (enter the four characters)
m/s Change the character value with ▲ and ▼.
The button '**Config**' validate the character and select the next.

LOW SCALE ▲ or ▼ to increase or decrease the value.
0m/s '**Config**' to validate the value.

HIGH SCALE ▲ or ▼ to increase or decrease the value.
2200.0m/s '**Config**' to validate the value.

4) Communication (option /CMTCP)

COMMUNICATION?
(Y-N) Un appui sur le bouton ▲ (Oui) permet d'accéder aux paramètres de communication.
Un appui sur le bouton ▼ (Non) permet de passer à la section suivante.

IP ADDRESS On modifie les champs d'adresse avec les boutons ▲ et ▼.
192.168.000.253 On passe au champ suivant avec le bouton '**Config**'.

IP MASK On modifie les champs d'adresse avec les boutons ▲ et ▼.
255.255.255.000 On passe au champ suivant avec le bouton '**Config**'.

Note:

En sortie d'usine le CML106 est à l'adresse 192.168.0.253 avec le masque à 255.255.255.0.

5) Special functions

In the special functions, the user can access to the RTD linearization parameters.

5.1) RTD linearization

The linearization function is use to adapt the RTD linearization curve of the RTD inputs.
This function is calculate with a 2nd order equation:

$t^{\circ}\text{C} = [-A + \text{SQUARE ROOT}(A^2 - 4 \cdot B \cdot (1 - R_t/100))] / 2 \cdot B$, with R_t = sensor resistance and
A, B, two configurable coefficients.

Default values



Standard	A Coefficient	B Coefficient
European	3,9083E-03	-5,775E-07
American	3,9848E-03	-5.870E-07
Industrial US	3.9692E-03	-5,8495E-07

PT100 LIN CONF.? Press the ▲ (Yes) to access linearization parameters.
(Y-N)

A COEFFICIENT Use ▲ or ▼ to change the coefficient value.
3.90775E-03 Use '**Config**' to validate to choice.

B COEFFICIENT
-5.7750E-07

6) End of setting. storage of parameters

MEMORIZING . . This message is display only if the user has change parameters in the
***** "COMMUNICATION" menu.

OK This message indicates the end of configuration and that parameters was correctly saved in memory.

Configuration access protection

It is possible to forbid the access to the configuration's device. When the "Password" function is activated, the user must enter a 4 characters code to access in configuration mode.

1) Activating the function

When the device operate in measure mode, pressing simultaneously on '▲' and '▼' buttons for at least 5 seconds, the following message is displayed:

PASSWORD?	The buttons '▲' and '▼' change the selection.
YES <NO >	The 'Config' button validate the choice.

- <NO> : deactivating the "Password" function. Access to configuration mode is free.

- <YES> : activating the function.

PASSWORD?	Enter a new code:
----	'Display ▲' et 'Display ▼' buttons to change the character.
	(only alphanumeric characters are accepted: '0' to '9' and 'A' to 'Z').
	The 'Config' button validate the character.

Note: When activating the function by answering YES, a new code is automatically requested.

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/download/ rubric accessories

- 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).

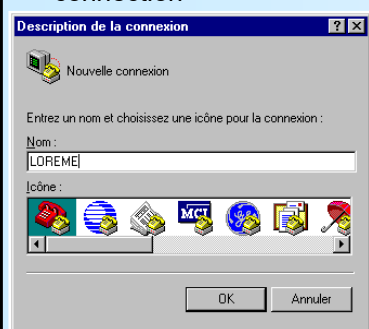
1 The terminal emulation software for PC « HyperTerminal » is resident in windows up to XP version. For later versions, it is downloadable on : **www.loreme.fr in download part** (www.loreme.fr/download/)

=> Run the downloaded software to install it.

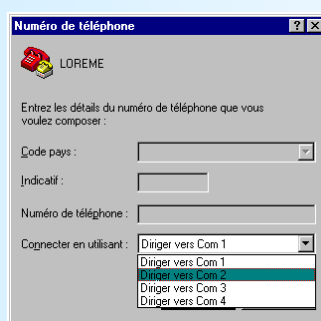
2 Start a "hyper Terminal" connection :

- Click on **"START"** button
- Go to **"All programs \ HyperTerminal Private Edition"**
- Click on **"HyperTerminal Private Edition"**

3 Enter name for the new connection

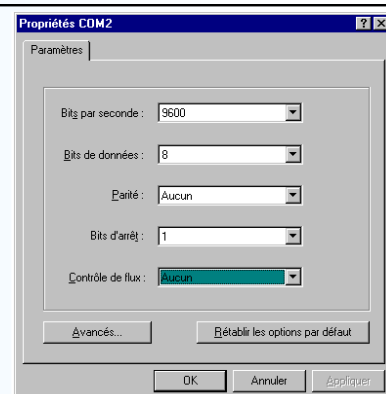


4 Choose the communication port related to the adapter.



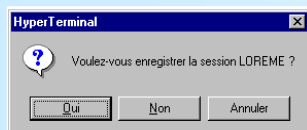
5

- 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

At the power on, the device is automatically in measure mode.

If a terminal is connected, a message is displaying every 5 seconds.

CONFIGURATION	V01	13.25 °C	PT100	0/200 °C
Touche <C>	V02	95.97 °C	PT100	0/200 °C
	V03	Err	PT100	0/200 °C
	V04	94.75 °C	PT100	0/200 °C
	V05	4.562 mA	4/20mA	4.000/20.000 mA
	V06	12.002 mA	4/20mA	4.000/20.000 mA
	V07	6.012 mA	4/20mA	4.000/20.000 mA
	V08	Err	4/20mA	4.000/20.000 mA

Channel number	Measure or error message	Input type	Scale input (°C) or Display range
-------------------	-----------------------------	------------	--------------------------------------

Instead of measurement or in addition with it, different messages can be displayed:

The 'Err' message is for a "sensor breaking".

The 'DEFAULT M' indicate a internal measure default.

The 'OFF' indicate that the channel is not scanning.

Configuration

To access to the configuration mode, just press "C" key. The following message is displayed on LCD display.

```
CONF BY RS232
IN PROGRESS...
```

and on the terminal, a temporally message is display:

```
CONFIGURATION
REV X.Y          Show the Hard revision (X) and the revision of internal firmware (Y)
```

1) Method

At the configuration time, different types of questions are displayed. For each one, several answers are possible. You will find below the detailed description of each case.

1.1) Menu selection

Example: LANGUAGE The user makes a choice by pressing the keys "Y" or "N".
Y - N

1.2) Parameters selection

Example: FRENCH or FRENCH
(Y-N) YES (Y-N) NO

Previous choice = YES: - pressing "Y" or "Enter" => choice validation = YES.
- pressing "N" => choice changing = NO.
Previous choice = NO: - pressing "N" or "Enter" => choice validation = NO.
- pressing "Y" => choice changing = YES.

1.3) Value acquisition

Example: LOW SCALE
4 mA

There are two possibilities:

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

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 message can be displayed in French or English.

3) Input

This page is displayed when access to input configuration:

```
CHANNEL?      V01 PT100      0/200 °C
1....8        V02 PT100      0/200 °C
<ENTER>       V03 PT100      0/200 °C
->            V04 PT100      0/200 °C
              V05 4/20mA     4.000/20.000 mA
              V06 4/20mA     4.000/20.000 mA
              V07 4/20mA     4.000/20.000 mA
              V08 OFF
```

LEAVE
Press <L>

To modify the parameters of a channel, type the number and press <Enter>.
The key <L> is use to exit the input configuration.

For each channel, it is possible to activate or deactivate the scanning and set the display range (decimal number, unit, scales) for the 4/20mA inputs.

4) Communication

This rubric is available only for device with /CMTCP option.
Parameters are : IP address and IP mask

IP ADDRESS Setting of IP address
192.168.000.253 type the field of address.

IP MASK
255.255.255.000

5) Special function

In this rubric, the user can access to linearization of RTD inputs.

The function **Linearization PT100**, allows to adapt the linearization curve of PT100 input.
This function is calculated with a 2nd order equation:

$t^{\circ}\text{C} = [-A + \text{SQUARE ROOT}(A^2 - 4 \cdot B \cdot (1 - R_t/100))] / 2 \cdot B$,
with R_t = sensor resistance and A, B, two modifiable coefficients (see table on next page).

Default values

Standard	A Coefficient	B Coefficient
European	3,9083E-03	-5,775E-07
American	3,9848E-03	-5.870E-07
Industrial US	3.9692E-03	-5,8495E-07

6) End of setting. storage of parameters

MEMORIZING . .

This message is display only if the user has change parameters in the "COMMUNICATION" menu.

OK

This message indicates the end of configuration and that parameters was correctly saved in memory.

OFFSET

Dans certains cas, il est intéressant de pouvoir modifier la mesure par simple action au clavier. Cette fonction peut trouver son utilité dans divers cas tels un vieillissement du capteur, un affinement de l'entrée lors d'un effet loupe... Cette fonction est réalisée individuellement sur chaque voie.

Pour décaler une voie de mesure, il faut:

- être en mode mesure,
- taper sur "+" ou "-" donnant accès à la fonction,
- la visualisation sur terminal devient:

OFFSET VOIE 01: 10
15.24 °C

N° voie, valeur offset (point CNA).
valeur mesurée avec offset.

- taper sur "\$" pour changer le numéro de la voie (N° + 1).
- utiliser les touches "+" et "-" pour régler l'offset de la voie sélectionnée, la mesure tient immédiatement compte du changement,
- taper sur "Entrée" pour mémoriser les offsets de toutes les voies.

Notes:

- Lorsque l'appareil est hors tension ou en configuration, les offsets restent actifs.
- Pour annuler l'offset d'une voie, il faut appeler la fonction **"OFFSET"**, se positionner sur la voie en question en utilisant la touche "\$", remettre sa valeur à zéro par les touches "+" et "-", puis valider par **"Entrée"**.
- Si, en mode réglage d'offset, aucun appui n'est fait sur les touches "+", "-", "\$" ou **"Entrée"** pendant un temps de 2 minutes, l'appareil abandonne automatiquement ce mode de fonctionnement sans tenir compte du réglage effectué.

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 Rev2.1 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 Rev2.1 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 sheet (direction of assembly, spacing between the devices, ...).
- Comply with the recommendations of use indicated in the technical sheet (temperature range, protection index).
- Avoid dust and excessive humidity, corrosive gas, considerable sources of heat.
- Avoid disturbed environments and disruptive phenomena or elements.
- If possible, group together the instrumentation devices in a zone separated from the power and relay circuits.
- Avoid the direct proximity with considerable power distance switches, contactors, relays, thyristor power groups, ...
- Do not get closer within fifty centimeters of a device with a transmitter (walkie-talkie) of a power of 5 W, because the latter can create a field with an intensity higher than 10 V/M for a distance fewer than 50 cm.

2.2) Power supply

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

2.3) Inputs / Outputs

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

MODBUS TCP communication

1) feature

Firmware revision: 08
 Protocol: MODBUS TCP
 Link: Ethernet 10/ 100 base T
 IP address by default: 192.168.0.253
 Port: 502
 Connector: RJ45
 Read request: Function code 03,04
 Write request: Not supported
 Type of data: Inputs measure
 data format: Measure values in IEEE 32 bits floating format or 32 bits integer.

Using of multi master link

The CML106/CMTCP supports being queried by multiple masters with different IP address (up to 6). However, care be taken that the average network load does not exceed 30 requests per second. too heavy network load could cause communication errors (no response to masters request, ...).

2) Data description

2.1) Data available

All measures are reachable in reading mode. Data are available in different formats:

- 2 words or 4 bytes for measure in IEEE 32bits floating format,
- 2 words or 4 bytes for measure in 32bits signed integer format

Refer to table in next page.

2.2) Data format

- Data in 32 bits IEEE floating point format (measures)

Data are transmitted Most Significant Byte first, 4 bytes or 2 words long.

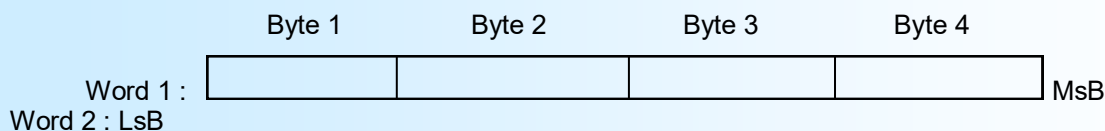
\$FFFFFFFF = sensor braking.



- Data in 32bits integer format .

Data are send Most Significant Byte first, 4 bytes or 2 words long.

The value is the measurement multiplied by 100.



Note:

3) Table of DATA

3-1) Table of measure in 32bits floating format

Register address in decimal (in Hexadecimal)	Designation		Total words
4096 (\$1000)	Measure of Channel 1	Word 1	1
	(floating IEEE)	Word 2	2
4098 (\$1002)	Measure of Channel 2	Word 1	3
	(floating IEEE)	Word 2	4
4100 (\$1004)	Measure of Channel 3	Word 1	5
	(floating IEEE)	Word 2	6
4102 (\$1006)	Measure of Channel 4	Word 1	7
	(floating IEEE)	Word 2	8
4104 (\$1008)	Measure of Channel 5	Word 1	9
	(floating IEEE)	Word 2	10
4106 (\$100A)	Measure of Channel 6	Word 1	11
	(floating IEEE)	Word 2	12
4108 (\$100C)	Measure of Channel 7	Word 1	13
	(floating IEEE)	Word 2	14
4110 (\$100E)	Measure of Channel 8	Word 1	15
	(floating IEEE)	Word 2	16

3-2) Table of measures in signed 32bits integer

Register address in decimal (in Hexadecimal)	Designation		Total words
40960 (\$A000)	Channel 1, measure x 100	Word 1	1
		Word 2	2
40962 (\$A002)	Channel 2, measure x 100	Word 1	3
		Word 2	4
40964 (\$A004)	Channel 3, measure x 100	Word 1	5
		Word 2	6
40966 (\$A006)	Channel 4, measure x 100	Word 1	7
		Word 2	8
40968 (\$A008)	Channel 5, measure x 100	Word 1	9
		Word 2	10
40970 (\$A00A)	Channel 6, measure x 100	Word 1	11
		Word 2	12
40972 (\$A00C)	Channel 7, measure x 100	Word 1	13
		Word 2	14
40974 (\$A00E)	Channel 8, measure x 100	Word 1	15
		Word 2	16

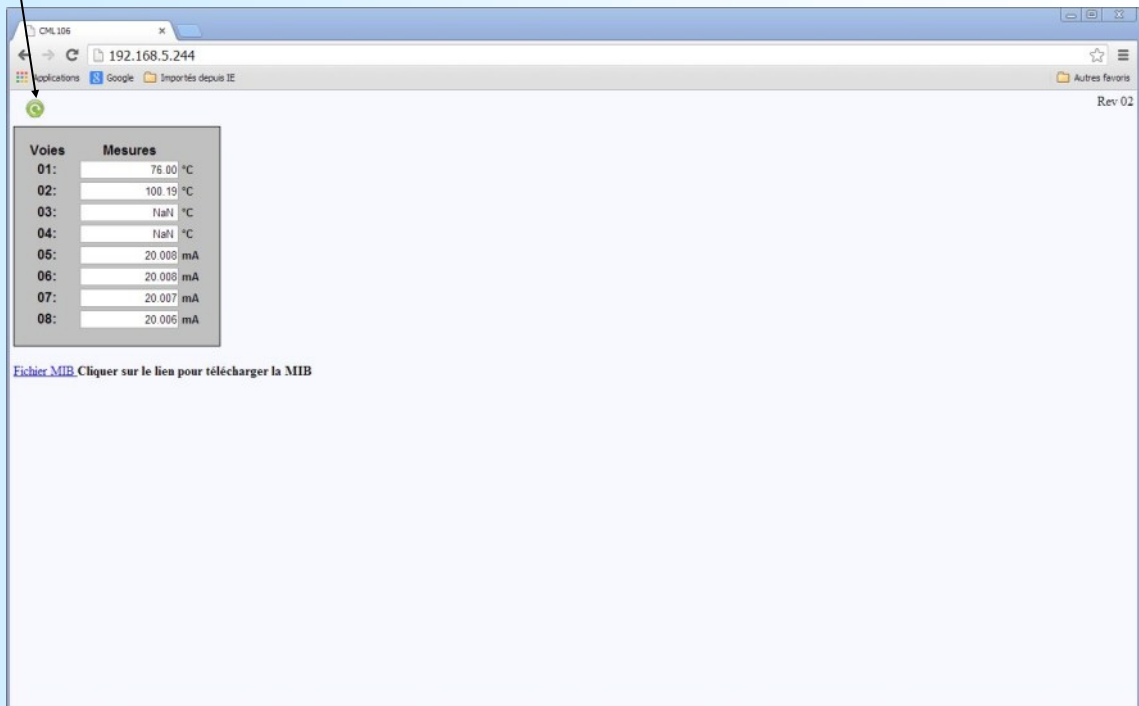
WEB Server

Details of the WEB page

This page consist of a banner showing the status of modules, a page showing the measure values of the selected module and two icons for commands.

Icon to refresh measure page

Channel



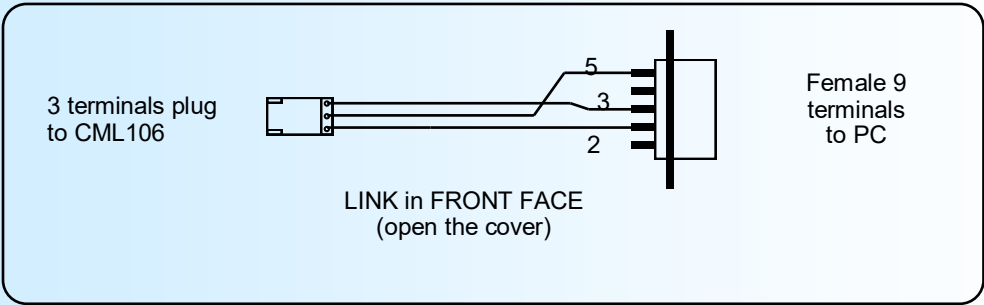
SNMP

The CML106 supports the SNMP V1 protocol for reading measure.

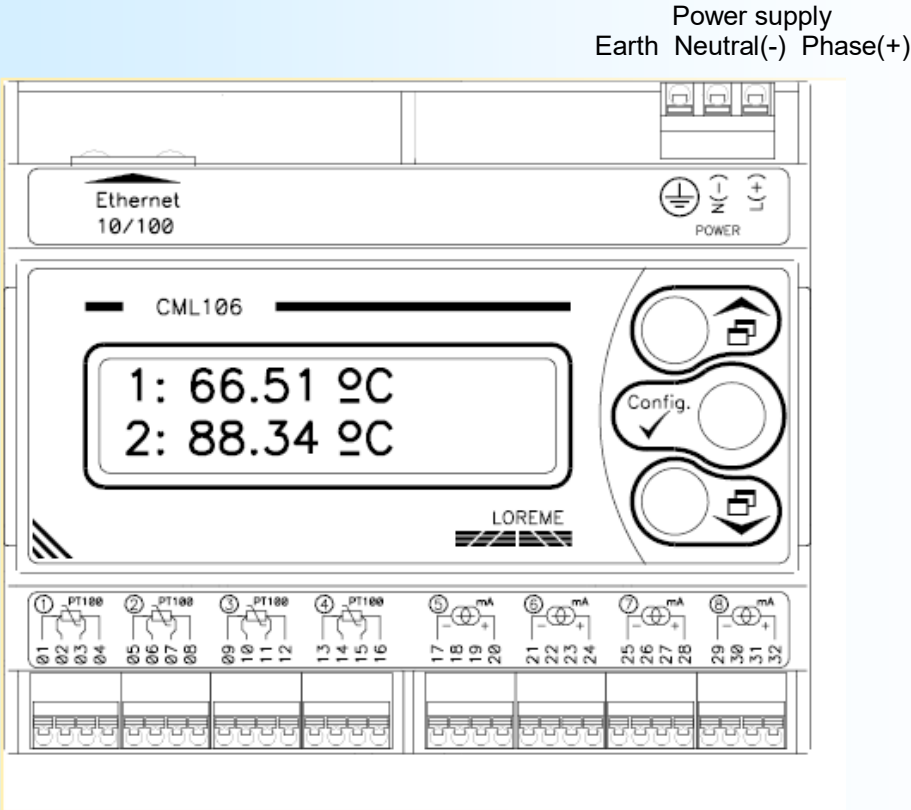
The format of data that are accessible via SNMP is channel measurement x 100 on 32bits integer.

The MIB file can be downloaded directly from the device web page.

PC - DEVICE LINK



DIAGRAMS OF CONNECTIONS



Channel 1: PT100 4 wires

Channel 2: PT100 4 wires

Channel 3: PT100 4 wires

Channel 4: PT100 4 wires

Channel 5: 4-20mA

Channel 6: 4-20mA

Channel 7: 4-20mA

Channel 8: 4-20mA