LOREME

CONFIGURATION HANDBOOK
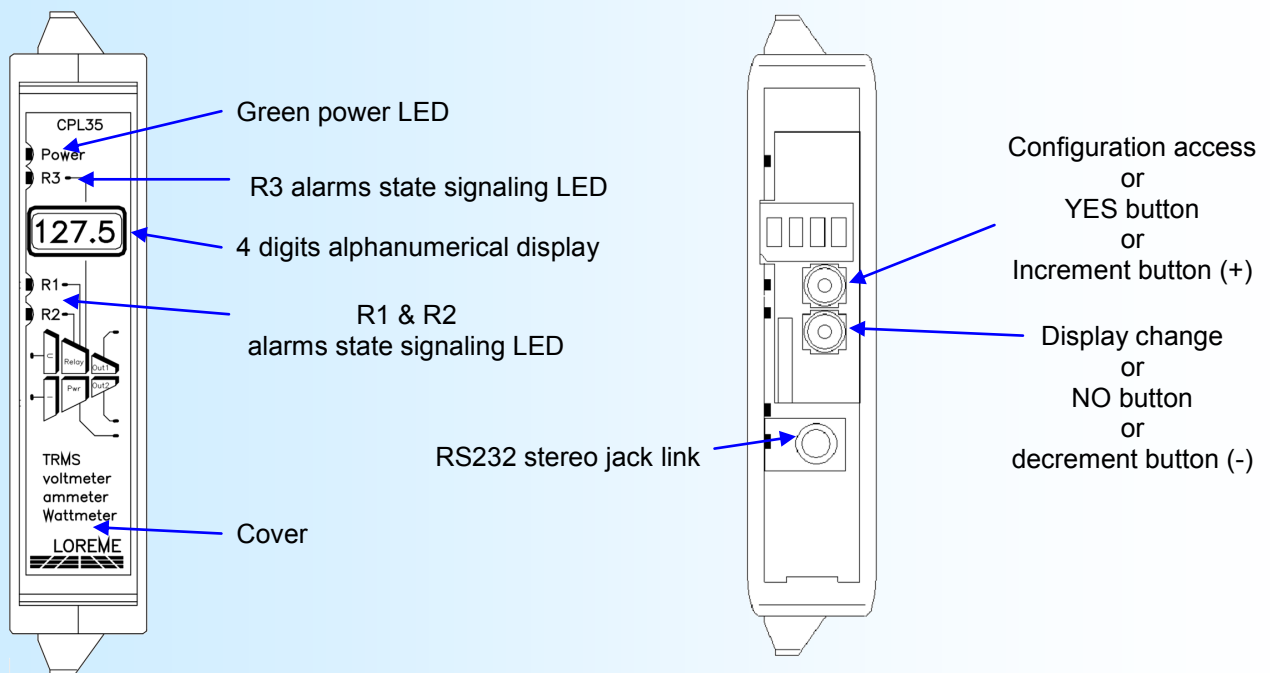
CPL35
CPL35L

Table of contents

Device Presentation

The CPL35 and CPL35L are TRMS (AC+DC) converters for measuring, monitoring and retransmission of electrical parameters. Implementation is fast by simple front face configuration. The various output options allow a wide range of application: measurement, protection, control.

Devices have several options:
- CPL35(L)   : standard base version with one analog output (no energy count).
- CPL35(L)-Rogo   : Rogowski sensor input base version with one analog output.
- CPL35(L)-Hall   : Hall sensor input base version with one analog output.
- CPL35../R1   : + 1 relay.
- CPL35../R2   : + 2 relays.
- CPL35../R3   : + 3 relays.
- CPL35../S2   : 2 analog outputs.
- CPL35../CMTCP   : Modbus TCP Ethernet link (special version with no analog output and energy count).

The technical data sheets are downloadable here: http://www.loreme.fr/fichtech/CPL35_eng.pdf
http://www.loreme.fr/fichtech/CPL35L_eng.pdf

Green power LED

R3 alarms state signaling LED

4 digits alphanumerical display

R1 & R2
alarms state signaling LED

RS232 stereo jack link

Cover

Configuration access
or
YES button
or
Increment button (+)

Display change
or
NO button
or
decrement button (-)

1) Visualization

At power on, the device displays a Hard-Soft revision number (rh-s) during 1 s and then the last selected measurement.

2) Display change

Normally, the device displays the value of the currently selected measurement. Pressing the bottom button toggles the display to the unit for 2 seconds. The units shown are:
- **V** for voltage measurement.
- **A or mA** for current measurement.
- **Hz** for frequency measurement on voltage inputs 600V and 150V only.
- **Vpic** for peak voltage measurement   (only on standard CPL35L).
- **Apic** for peak current measurement   (only on standard CPL35L).
- **W** for the active power measurement   (only on CPL35).
- **VAR** for the reactive power measurement   (only on CPL35).
- **VA** for the apparent power measurement   (only on CPL35).
- **COS** for power factor measurement   (only on CPL35).
- **kWh** for the active energy counter   (only on CPL35/CMTCP).

During the display of the unit, the operator can change measurement by re pressing the bottom button as many times as necessary. The unit changes after each press. The device automatically returns to the measurement display mode after 2 seconds.

Note: *The type of measurement displayed remains active even when the device is powered off.*

3) Reset of memorized alarms or energy counter

If the energy counter is not displayed, simultaneous pressing both buttons provides a alarms reset if the hold function is enabled and whether the alarm condition no longer exists.

When the energy counter is displayed, it can be reset by pressing simultaneously both buttons. This function can be forbidden in the "**Special Functions**" rubric in terminal mode. In this rubric, the counter can also be initialized to a starting value. The counter is in 32 bits format, and has a resolution of 0.01 kWh. The maximum count value before overflow is **42.94967295 GWh**. The counter is also stored in non-volatile memory every 15 minutes and the last saved value is recalled at every Power on.

4) CONFIGURATION

To access the configuration, push the top button. It is possible to lock the access in the "SPECIAL FUNCTIONS" rubric. If access is locked then the message "NOT ALLOWED!" is displayed.

Note about value setting:
Use the (+)/(-) buttons to increase or decrease the value. The value is automatically validated after 4 seconds if no button is pressed.

4.1) Language configuration

LANGUAGE CONFIGURATION?   This message scrolls on the display. Push the **YES** button to access to the rubric.
   FRENCH? or ENGLISH?   **YES** button to choose French language, **NO** button to select the next choice.

4.2) Inputs configuration

The device comes in standard with two voltage inputs (high and low) and three current inputs (2 internals and 1 for external shunt) on the standard version and one more current input and a +/- 15 V power supply for the **Hall** version or with only one current input for the **Rogo** version (not available with CMTCP option). Default calibers of the inputs are:

- 600 V for the high voltage input,
- 150 V for low voltage input,
- 1 A for the internal shunt current input 1,
- 5 A for the internal shunt current input 2,
- 200 mV (200 A) for the external shunt current input (default configured shunt sensibility is 1 A/mV),
- 4000 mV for the Hall sensor current input (default configured current caliber is 100 Adc).
- 200 mV (2000 A for 100 mV/kA) for the Rogowski sensor current input.

The inputs configuration rubric permits to select the measured voltage input, the measured current input (standard version only) and the measurement response time (integration time for TRMS measurement value calculation). This parameter is configurable from 0.01 s to 60 s (1 s by default). It should be noted that the amplitude of the ripple on the calculated TRMS measurement is inversely proportional to this value. A fast response time implies a strong ripple on the TRMS measurement value. For example, with a filter of 1 s, the ripple is 0.6% of the measured value.

INPUTS CONFIG?   This message scrolls on the display. Push the **YES** button to access to the rubric.
   Push the **NO** button to go to the next rubric.

 VOLTAGE INPUT?   Push the **YES** button to access to the voltage input selection.

  600V?   Push the **YES** button to choose the 600V voltage input or the **NO** button to select the next choice.

  150V?   Push the **YES** button to choose the 150V voltage input or the **NO** button to select the previous choice.

 CURRENT INPUT?   Push the **YES** button to access to the current input selection (only standard & Hall).
 1A?   Push the **YES** button to choose the 1 A internal shunt current input.
 5A?   Push the **YES** button to choose the 5 A internal shunt current input.
 200mV?   Push the **YES** button to choose the external shunt current input.
  HALL CURRENT INPUT? Push the **YES** button to choose the Hall current input (only -Hall version).

 MEASURE RESPONSE TIME?   Push the **YES** button to access to the response time setting (0.01 s to 60 s).

4.3) Network configuration

The network configuration possibilities are:
- Alternative or Continuous (only on CPL35(L) or CPL35(L)-Hall),
- Single-phase or balanced three phases with or without neutral for a alternative network (only visible on a CPL35).
- Two-phases without neutral for a alternative network.

It is also necessary to configure:
- The Potential Transformer ratio.
- The Current Transformer ratio or the external current shunt sensibility or the current measurement unit and the Hall sensor current caliber, or for the **Rogo** version, the Rogowski sensor sensibility.
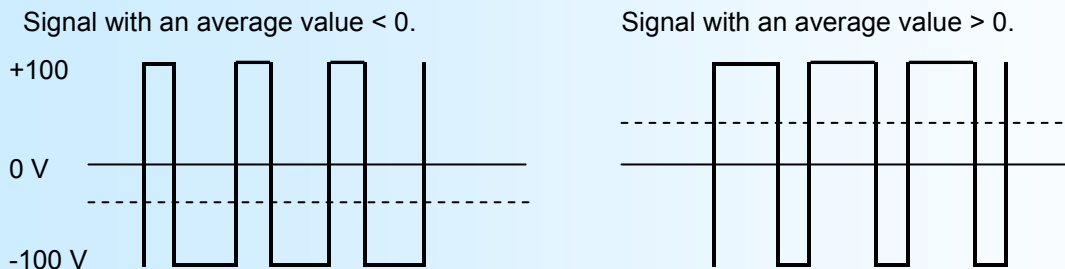
NETWORK CONFIG?	Push the **YES** button to access to the rubric. Push the **NO** button to go to the next rubric.
ALTERNATIVE?	Push the **YES** button to choose TRMS (AC+DC) measure mode or the **NO** button to select the next choice.
CONTINUOUS?	Push the **YES** button to choose the DC measure mode or the **NO** button to select the previous choice.

Notes:
- Per default, the **Hall** version is configured in CONTINUOUS mode at factory output.
- In CONTINUOUS mode, the device calculate the average value of the signal with the response time set previously. For an AC signal the average value is 0.

Signal with an average value < 0.   Signal with an average value > 0.

+100

0 V

-100 V

These 2 rubrics are only accessible on a CPL35 and if the ALTERNATIVE mode was previously selected

SINGLE PHASE?	Push the **YES** button to choose the single phase mode or the **NO** button to select the next choice.
THREE PHASES?	Push the **YES** button to choose the three phases mode with or without neutral. In this mode the power measurements are multiply by 3.
PT RATIO?	Push the **YES** button to access the PT ration setting (0.001 to 1 M) or the **NO** button to go to the next rubric.
CT RATIO? *or*	Push the **YES** button to access the CT ration setting (0.001 to 1 M) in internal shunt current input configuration.
SHUNT SENSIBILITY?	Access to the shunt sensibility setting (0.001 A/ mV to 1 MA/mV) if the external shunt current input is selected.
or CURRENT(A)? CURRENT(mA)?	Choice of the Hall current measurement unit (according to the sensor caliber) in Hall current input configuration.
HALL CALIBER?	Access to the Hall sensor caliber setting (1 to 65500 A or mA).
or on a CPL35(L)-Rogo ROGO SENSIBILITY?	Access to the Rogowski sensor sensibility setting (10.00 to 1000 mV/kA).

4.4) Relays configuration
This rubric is only visible if the device is equipped with 1, 2 or 3 relays (option /R1 or /R2 or /R3).

RELAYS CONFIG?	Push the **YES** button to access to the rubric.
RELAY 1?	Push the **YES** button to access to the relay 1 configuration.
THRESHOLD ALARM?N	The threshold alarm is disabled. **"?N"** is displayed. **NO** confirms the deactivation of the alarm. **YES** activates the threshold alarm (**"?Y"** will be displayed next time).
WINDOW ALARM?N	**YES** to activate the window alarm, **NO** to deactivate it.
ENERGY COUNT?N	**YES** to activate energy counting, **NO** to deactivate it (only on CPL35/CMTCP).

If the energy count is activated
PULSE WEIGHT?   Push the **YES** button to access to the counting pulse weight setting (0.01 to 60 kWh).

If the threshold alarm is activated

MEASURE:	Choice of monitored measure type.
VOLTAGE?	Push the **YES** button to choose the displayed type. Push the **NO** button to display the next type.
HIGH THRESHOLD? LOW THRESHOLD?	Choose the type of detection (High or Low).
THRESHOLD?	Push the **YES** button to access the threshold value setting.
RELAY CLOSED IN ALARM? RELAY CLOSED OUT OF ALARM?	Choose the type of security.
ALARM HOLD?N	**YES** to activate the hold function, **NO** to deactivate it.
ACTIVATION DELAY?	Push the **YES** button to access the activation delay setting.
DEACTIVATION DELAY?	Push the **YES** button to access the deactivation delay setting. Absent if the alarm hold function is enabled.

If the window alarm is activated

MEASURE:	Choice of monitored measure type.
VOLTAGE?	Push the **YES** button to choose the displayed type. Push the **NO** button to display the next type.
LOW THRESHOLD?	Push the **YES** button to access the low threshold value setting.
HIGH THRESHOLD?	Push the **YES** button to access the high threshold value setting.
RELAY CLOSED IN THE WINDOW? RELAY CLOSED OUT OF WINDOW?	Choose the functioning mode.
ACTIVATION DELAY?	Push the **YES** button to access the activation delay setting.
DEACTIVATION DELAY?	Push the **YES** button to access the deactivation delay setting.

RELAY 2? *same as relay 1*	Push the **YES** button to access to the relay 2 configuration (only with /R2 option).
RELAY 3? *same as relay 1*	Push the **YES** button to access to the relay 3 configuration (only with /R3 option).

LOREME

4.5) Output configuration

OUTPUTS CONFIG?	Push the **YES** button to access to the rubric.
OUTPUT 1?	Push the **YES** button to access to the output 1 configuration.
CURRENT? VOLTAGE?	Choose the output type, current or voltage.
OUTPUT 0%?	Push the **YES** button to access the output low scale setting.
OUTPUT 100%?	Push the **YES** button to access the output high scale setting.
RESPONSE TIME?	Push the **YES** button to access the output response time setting (0 to 60 s).
LIMITATION?	Push the **YES** button to activate the output limitation, Push the **NO** button to deactivate the output limitation.
MEASURE: VOLTAGE?	Choice of monitored measure. Push the **YES** button to choose the displayed type. Push the **NO** button to display the next measurement type.
MEASURE 0%?	Push the **YES** button to access the measure low scale setting.
MEASURE 100%?	Push the **YES** button to access the measure high scale setting.
OUTPUT 2? *Same as output 1.*	Push the **YES** button to access to the output 2 configuration (only with /S2 option).

The default factory parameters are:
For output 1: output scale = 4/20 mA, input scale = 0/600 V, response time = 0 s, no limitation.
For output 2: output scale = 4/20 mA, input scale = 0/5 A (standard) or 0/2000 A (Rogo) or 0/100 Adc (Hall), response time = 0 s, no limitation. See the *"Analogical outputs"* paragraph (terminal mode) for more details about the output parameters.

4.6) Communication configuration

This section is only visible on a device with the /CMTCP option.

COMMUNICATION CONFIG?   Push the **YES** button to access to the rubric.

IP ADDRESS? IP1, IP2, IP3, IP4	Push the **YES** button to access to the rubric. Use the +/- buttons to increase/decrease the value. The address is decomposed as follow: IP1.IP2.IP3.IP4 The output factory IP address is: 192.168.0.253.
IP MASK? IP1, IP2, IP3, IP4	Push the **YES** button to access to the rubric. Use the +/- buttons to increase/decrease the value. The address is decomposed as follow: IP1.IP2.IP3.IP4 The output factory mask is: 255.255.255.0
GATEWAY? IP1, IP2, IP3, IP4	Push the **YES** button to access to the rubric. Use the +/- buttons to increase/decrease the value. The Gateway address is decomposed as follow: IP1.IP2.IP3.IP4 At factory output, the gateway is inactive and equal to: 0.0.0.0

Note:

When you access the communication rubric, the device will display at the end of configuration a series of stars as an indication of the communication parameters memorizing process. If an error occurs during this process, the message "COMM. DEFAULT" will be displayed.

4.7) Display configuration

This section allows you to customize the display of measurements on front.

DISPLAY CONFIG?   Push the **YES** button to access to the rubric.

  DISPLAY FILTER?   Push the **YES** button to access the display filter setting (0 to 60 s).
                       Allows filtering of the displayed value to smooth fluctuations of the measurement.

  DECIMAL POINT?   Push the **YES** button to access the decimal point mode setting.

    AUTO?Y   Pressing **YES** selects the automatic decimal point display mode.
                      Pressing **NO** selects the fixed mode.

  NUMBER OF DECIMAL FOR: Choosing the number of decimals (0, 1 or 2) for each measure in fixed mode.
  VOLTAGE?   Push the **YES** button to access the number of decimals displayed for the voltage measure.
  CURRENT?   And so on for all the other measurements.
  FREQUENCY?
  ACTIVE P.?
  REACTIVE P.?
  APPARENT P.?
  POWER FACTOR?

4.8) Peak voltage & current hold time configuration

SPECIAL FUNCTIONS? Push the **YES** button to access to the rubric.

  HOLD TIME
  PEAK VOLTAGE?   Peak voltage hold time setting access (0.01 s to 60 s).

  HOLD TIME
  PEAK CURRENT?   Peak current hold time setting access (0.01 s to 60 s).

4.9) End of configuration

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

Note:
If, during the configuration process, no buttons are pressed for more than 90 s, the device returns to measure mode without saving the new configured parameters.

LOREME

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
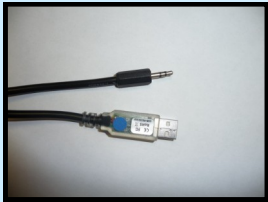
- download driver at www.loreme.fr:
> http://www.loreme.fr/aff_produits.asp?rubid=53&langue=fr

- 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 measures are 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 session whereas this one is connected, it is necessary to disconnect it, modify the parameters and then to reconnect it.

LOREME

Terminal mode

1) Visualization

The CPL35 or CPL35L can be connected to a terminal with the RS232 link on the front of the device.
This requires a USB/Jack adapter cable, and have a ASCII emulation program like 'HyperTerminal ' or else installed on the PC.

Once the device is connected to the PC, it displays the following measurements page every 5 seconds.

CPL35 measurements page:

VOLTAGE:	200 V
CURRENT:	2.55 A
FREQUENCY:	50.01 Hz
ACTIVE P.:	260 W
REACTIVE P.:	22 Var
APPARENT P.:	260 VA
COSINUS PHI:	0.999
ACTIVE E.:	0.78 kWh (only CPL35/CMTCP)
OUTPUT 1:	9.33 mA
OUTPUT 2:	12.16 mA

CPL35L measurements page:

VOLTAGE:	89.2 V
CURRENT:	2.55 A
FREQUENCY:	50.01 Hz
OUTPUT 1:	6.27 mA
OUTPUT 2:	12.16 mA

Remark:

In terminal mode the metrological performance of the device are degraded. It is therefore preferable to limit the time of use in this mode.

2) Configuration

The device can also be configured by the terminal link.
To enter configuration mode, just press the **"C"** key. The message '**CONF**' is displayed in front.

2.1) 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.

2.1.1) Menu selection

example: INPUTS CONFIGURATION   The user makes a choice by pressing the keys **"Y"** or **"N"**.
        (Y-N)

2.1.2) Parameter selection

example: VOLTAGE   or   VOLTAGE
        (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.

2.1.3) 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**".

Notes:

- 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.

Configuration

2.2) Language
The language possibilities are:
- French
- English

2.3) Input
The input configuration is made of:
- Voltage input choice.
- Current input choice (only CPL35(L) standard or Hall).
- Measure response time.

2.4) Network
The configurable parameters are:
- Alternative TRMS (AC+DC) or continuous (DC) (only on standard and Hall version).
- Single-phase or three-phase (only on CPL35).
The three-phase mode corresponds to a balanced three-phase wiring with or without neutral. In this mode the CPL35 multiplies the power measurements by three.

It is also necessary to configure:
- The Potential Transformer ratio,
And on a standard or Hall version:
- The Current Transformer ratio (1A or 5A input) or external current shunt sensibility (200mV input) or the current measurement unit (A or mA) and the Hall sensor caliber (Hall input).
Or on a Rogo version:
- The Rogowski sensor sensibility in mV/kA (100 mV/kA per default).

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

Relay parameters are:
- Choice of function: No function, threshold alarm, window alarm, energy count.
.
   For the threshold alarm:
- Monitored value:
   - RMS voltage, peak voltage, RMS current, peak current, frequency on a CPL35L.
   - RMS voltage, RMS current, frequency, active, reactive, apparent power, power factor, on a CPL35(/CMTCP).
- Type of detection: high or low threshold.
- Threshold and hysteresis value.
- Security.
- Hold function.
- Activation and deactivation delays.

   For the window alarm:
- Monitored value: same as for the threshold alarm
- Low threshold value.
- High threshold value.
- Functioning mode.
- Relay activation and deactivation delays.

   For the energy count (only CPL35/CMTCP)
- Counting pulse weight.

The threshold alarm 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.

The **security** function allows to choose between the activation or the de-activation of the relay when alarm is activated (see chronograms on next page).

The **Hold** function keeps the alarm activated, even if the measure comes off alarm, and this until it has been disabled by a reset on the front.

The **activation and deactivation** delays, configurable from 0 to 600 s set the time above which alarm changes its state after event appearance and disappearance (see chronograms on next page).
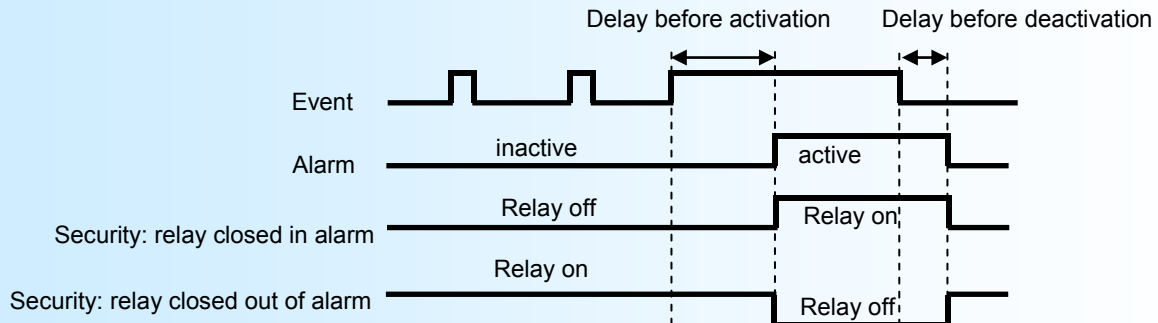
The window alarm works in this manner:

In the "RELAY CLOSED IN THE WINDOW" mode
- The relay is activated when the measure >= to the low threshold and <= to the high threshold.
- The relay is deactivated when the measure is < than the low threshold or > than the high threshold.

In the "RELAY CLOSED OUT OF WINDOW" mode
- The relay is deactivated when the measure >= to the low threshold and <= to the high threshold.
- The relay is activated when the measure is < than the low threshold or > than the high threshold.

If the relay is used for energy count, the only parameter to be configured is the counting pulse weight. In this mode, at each count pulse, the relay is switched on for 150 ms.

2.6) Analogical output
In standard the device provides one analogical output, insulated and configurable. It can by /S2 option be equipped with a second insulated output. The two outputs are configurable independently of each other. They can also be used as a bipolar +/- 10V output (see "special functions" next page).

Configurable output parameters:
- Type of output: Current output (mA) or Voltage output (V) with strap connected.
- Low and high output scales.
- Response time.
- Limitation.
- Monitored value:
   - RMS voltage, peak voltage, RMS current, peak current, frequency on a CPL35L.
   - RMS voltage, RMS current, frequency, active, reactive, apparent power, power factor, on a CPL35(/CMTCP).
- Low and high input measure scales.

The **limitation** allows to bound the output signal swing to the configured output scales for all input signal values.

The **response time** allows a smoothing of the output. It is configurable from 0 to 60 s (set to 0 s at the factory).

2.7) Communication parameters (/CMTCP option)
This rubric permits to configure the Ethernet link parameters.
The parameters are : IP address, IP mask and gateway address.

2.8) Display
This rubric permits to personalize the measurements display on the front.
The display parameters are:
   - Display filter.
   - Decimal point display mode.

DISPLAY CONFIGURATION?
(Y-N)   Press the 'Y' key to access display configuration.

DISPLAY FILTER?
1 s   Enter the filter value (0 to 60 s).

DECIMAL POINT?
(Y-N)   Press the 'Y' key to access decimal point mode configuration.

  AUTO?
  (Y-N)YES   Press 'Y' key to choose the automatic decimal point display mode or 'N' to choose the fixed mode.

  NUMBER OF DECIMAL FOR: configure the number of decimal for the fixed mode for each measure.
  VOLTAGE
  1   Enter the number of decimals to display for the voltage measurements.
  etc.......

2.9) Special functions

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

The **front face configuration lock** allows the user to lock the configuration procedure accessible via the front face.

The **bipolar output** allows to use the 2 unipolar outputs as one +/-10 V bipolar output. It is necessary to reconfigure output parameters after activation of the bipolar output.

SPECIAL FUNCTIONS?   Press 'Y' to access the special function configuration.
(Y-N)

  FRONT FACE CONFIG. LOCK?
  (Y-N)NO   Press 'Y' to lock the front face configuration access.

  HOLD TIME   Only present on a CPL35L.
  PEAK VOLTAGE
  1.00 s   Enter the peak voltage hold time value (0.01 to 60 s).

  HOLD TIME   Only present on a CPL35L.
  PEAK CURRENT
  1.00 s   Enter the peak current hold time value (0.01 to 60 s).

  BIPOLAR OUTPUT?   Only present on a CPL35(L)/S2.
  (Y-N)NO   Press 'Y' to activate the bipolar +/-10 V output.

The next 2 rubrics are only present on a CPL35/CMTCP.
  FRONT FACE ENERGY RESET ACCESS?
  (Y-N)YES   Press 'N' to forbid the reset of the energy counter via the front face.

  ENERGY PRESET   Energy counter preset.
  0 kWh   Enter a value and press Enter.

2.10) End of the configuration

SAVING…..   This message, followed by 5 stars, will be displayed on a /CMTCP device if the
* * * *   communication parameters have changed. If an error occurs during the saving procedure, the message "COMM. DEFAULT" will be displayed.

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

Note:
If no action is performed during the configuration process, the device returns automatically to measurement mode after a wait of two minutes, without taking into account of the modifications made before.

MODBUS TCP Communication

LOREME

1) Features

Link:	Ethernet
Baud rate:	10/ 100 base T
Default IP address:	192.168.0.253
Port:	502
IP protocol:	Modbus TCP
Connector:	RJ45
Reading operation:	Code function 03, 04
Writing operation:	Not allowed
Data type:	Measure value, State of alarms.
Data format:	Measure in IEEE floating point format and 32 bits signed or unsigned integer format. State of alarms in 16 bits format.

2) Multi master environment

The CPL35(L)/CMTCP supports to be access by master with different IP address (6 max). However, care must be taken that the average network load does not become too large. A higher network load can cause communication error due to the traffic. The average response time to a read request is around 50 ms.

3) Data explanation

All measures are accessible in reading mode.
Data's are available in different formats:
- 2 words, 4 bytes, for measures in the 32 bits IEEE floating point format.
- 2 words, 4 bytes, for measures in the 32 bits integer format.
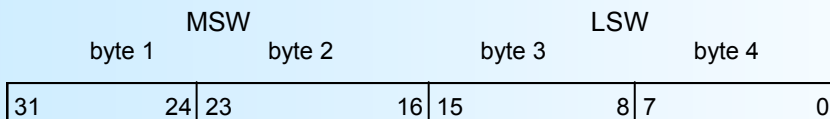- 1 word, 2 bytes, for the alarms state.

3.1) Data format

- Data in 32 bits IEEE floating point format
Data are transmitted Most Significant Byte first, 4 bytes or 2 words long.

Sign	Exponent		Mantisse
31	23		0
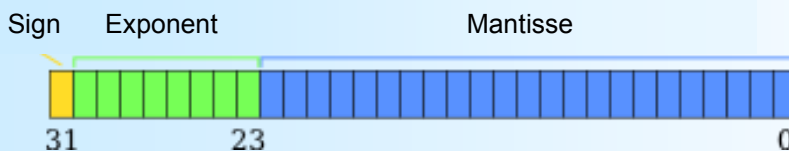
- Data in 32 bits signed or unsigned integer format.
Data are transmitted Most Significant Byte first, 4 bytes or 2 words long.

MSW		LSW	
byte 1	byte 2	byte 3	byte 4
31　　　24	23　　　16	15　　　8	7　　　0

- Alarm data in 16 bits integer (0 to 15), bit 0 for R1, bit 1 for R2 and bit 2 for R3
Data are transmitted Most significant byte first.

Byte 1	Byte 2
15　　MSB　　8	7　　LSB　　0
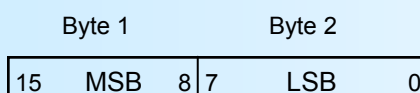
4) Tables of measures

4.1) 32 bits floating format measures

This table lists the measures in 32 bits floating point format and 16 bits register for alarm status (address 4108).
Access with 03 & 04 Modbus function codes.

Register address in decimal (Hexadecimal)	Designation		Total words
4096 ($1000)	Voltage (V)	Word 1	1
		Word 2	2
4098 ($1002)	Current (A)	Word 1	3
		Word 2	4
4100 ($1004)	Active Power (W)	Word 1	5
		Word 2	6
4102 ($1006)	Reactive Power (VAR)	Word 1	7
		Word 2	8
4104 ($1008)	Apparent Power (VA)	Word 1	9
		Word 2	10
4106 ($100A)	Power Factor	Word 1	11
		Word 2	12
4108 ($100C)	Alarms (b0: AL1, b1: AL2, b2: AL3)	Word 1	13
4109 ($100D)	Frequency	Word 1	14
		Word 2	15

Remark:
For a CPL35L/CMTCP, the Powers and Power Factor measures are at $FFFFFFFF hexadecimal.

4.2) 32 bits integer format

This table lists the measures in 32 bits integer format and one 16 bits register for the alarms state (address 18).
The values given in this table represent the direct measurements. That is to say, regardless of the coefficients as the PT ratio, the CT ratio (internal shunt) or the external shunt sensibility.
Access with 03 & 04 Modbus function codes.

4.2.1) Calculation of actual values

The coefficients are at the following addresses:
- PT ratio x100: 12 & 13
- CT ratio x100: 14 & 15
- Sensibility x100: 16 & 17

To find the actual values you must:
- Multiply the voltage value (addresses 00 & 01) by the PT ratio, and divide the result by 10,000.
- Multiply the current value (addresses 02 & 03) by the CT ratio (internal shunt or Hall sensor) or external shunt sensitivity and divide the result by 10,000.
- Multiply the values of powers by the PT ratio and the CT ratio or external shunt sensibility, and divide the result by 10,000.

Register address in decimal (Hexadecimal)	Designation		Total words
0 ($000)	Voltage (Vx100)	Word 1	1
	32b signed integer	Word 2	2
2 ($0002)	Current (Ax100)	Word 1	3
	32b signed integer	Word 2	4
4 ($0004)	Active Power (W)	Word 1	5
	32b signed integer	Word 2	6
6 ($0006)	Reactive Power (VAR)	Word 1	7
	32b unsigned integer	Word 2	8
8 ($0008)	Apparent Power (VA)	Word 1	9
	32b signed integer	Word 2	10
10 ($000A)	Power Factor x100	Word 1	11
	32b signed integer	Word 2	12
12 ($000C)	PT ratio x100	Word 1	13
	32b unsigned integer	Word 2	14
14 ($000E)	CT ratio x100	Word 1	15
	32b unsigned integer	Word 2	16
16 ($0010)	Shunt sensibility (A/mV x100)	Word 1	17
	32b unsigned integer	Word 2	18
18 ($0012)	Alarms (b0: AL1, b1: AL2, b2: AL3)	Word 1	19
19 ($0013)	Frequency (Hz x100)	Word 1	20
	32b unsigned integer	Word 2	21
21 ($0015)	Active energy counter (0.01 kWh)	Word 1	22
	32b unsigned integer	Word 2	23

Note:

For a CPL35L/CMTCP, the Powers and Power Factor measures are at $FFFFFFFF hexadecimal and the energy counter stays at zero.

WEB server *(/CMTCP option)*

Click to refresh measures

Tab for SNMP parameters

Tab for password configuration.

version number

WEB page overview
1) "Measures" tab
Display all measurements of an:

CPL35

CPL35L
(There are no power & power factor measurements and the energy counter stays at 0)

2) "SNMP" tab
Download the MIB file,.
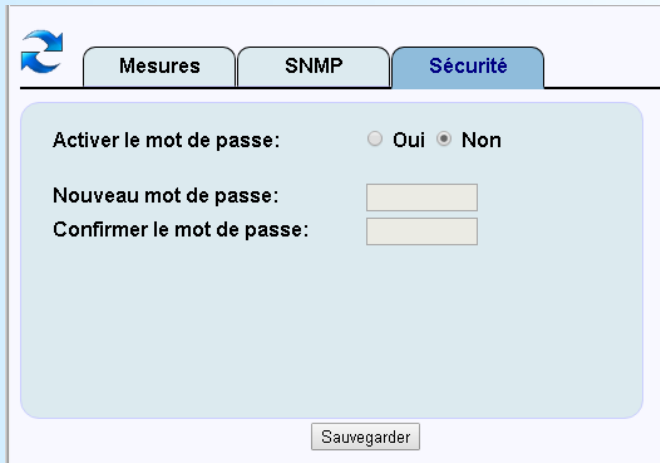Set-up the community names (these names are "public" and "private" by default).

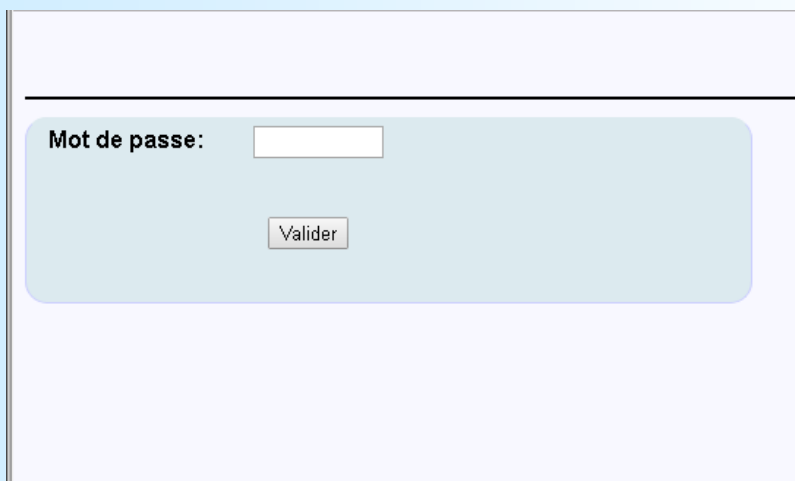### 3) "Security" tab

Limit the web server access with a password. This length of this password is up to 8 characters. This characters can be letters a to z (uppercase and lowercase) and number 0 to 9.

When the password is activated, the web page below is displayed at start up. It is mandatory to enter the correct password to access to the others web pages.
if the web browser is closed and opened, a password is necessary.

SNMP

The CPL35(L)-CMTCP support SNMP V1 protocol for measurements reading. Measures are available in 32 bits integer format (refer to the Modbus table for more details).

The MIB file can be downloaded directly on the Web page of the device.

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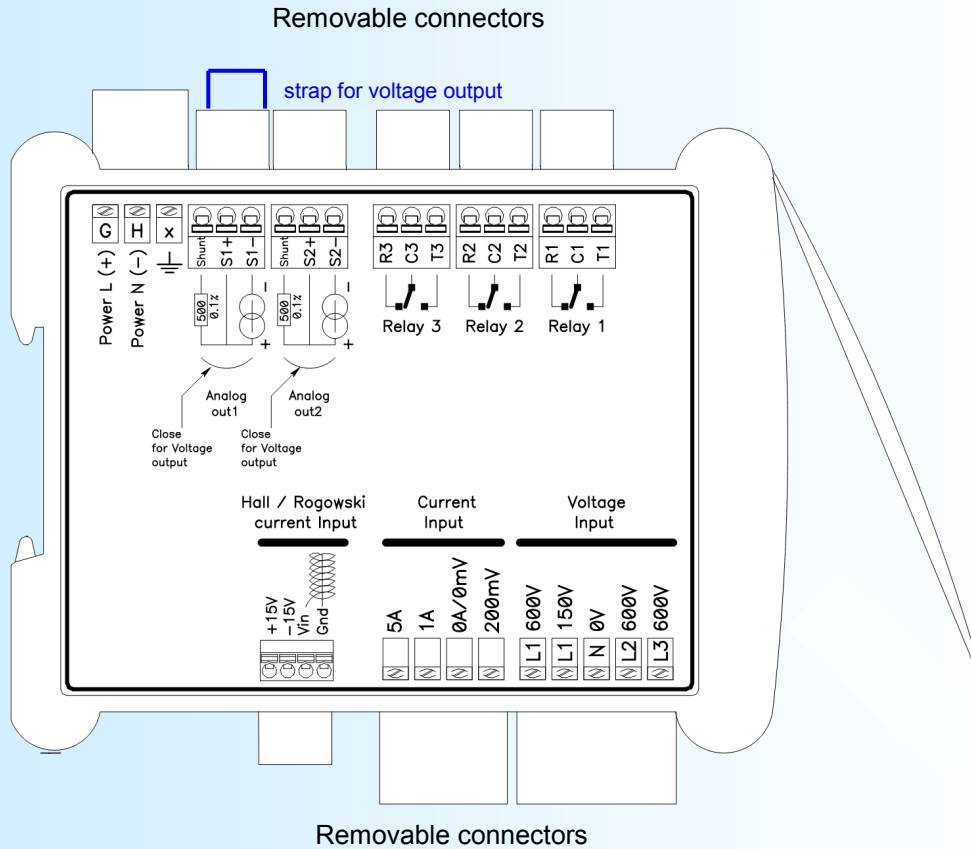
2.2) Power supply

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

2.3) Inputs / Outputs

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

Wirings

Removable connectors

Removable connectors

Power supply:	terminals G, H.
Relay 1:	terminals common (C1), rest (R1), work (T1).
Relay 2:	terminals common (C2), rest (R2), work (T2).
Relay 3:	terminals common (C3), rest (R3), work (T3).
Analogical output 1:	terminals S1+, S1-, Shunt (Internal 500 Ohms shunt for voltage output).
Analogical output 2:	terminals S2+, S2-, Shunt (Internal 500 Ohms shunt for voltage output).
High voltage input:	terminals 600V, 0V.
Low voltage input:	terminals 150V, 0V.

Current inputs:

Standard & Hall version

Internal 1 A shunt:	terminals 1A, 0mV/0A.
Internal 5 A shunt:	terminals 5A, 0mV/0A.
External shunt:	terminals 200mV, 0mV/0A.

Hall version

Hall sensor input:	terminals Vin, Gnd for the signal.
	terminals +15V & -15V for the sensor power supply.

Rogo version

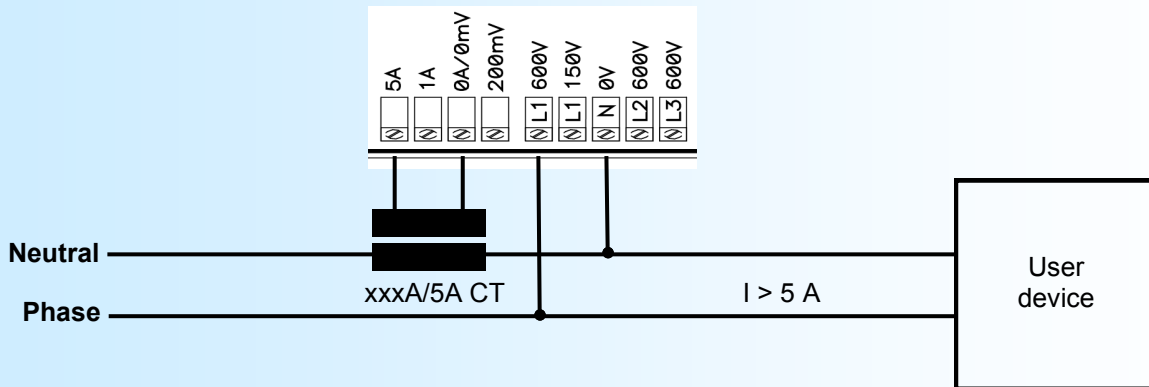|	
Rogowski sensor input:	terminals Vin and Gnd.

LOREME

Wiring examples

For CPL35(L) with measurements on a single phase network
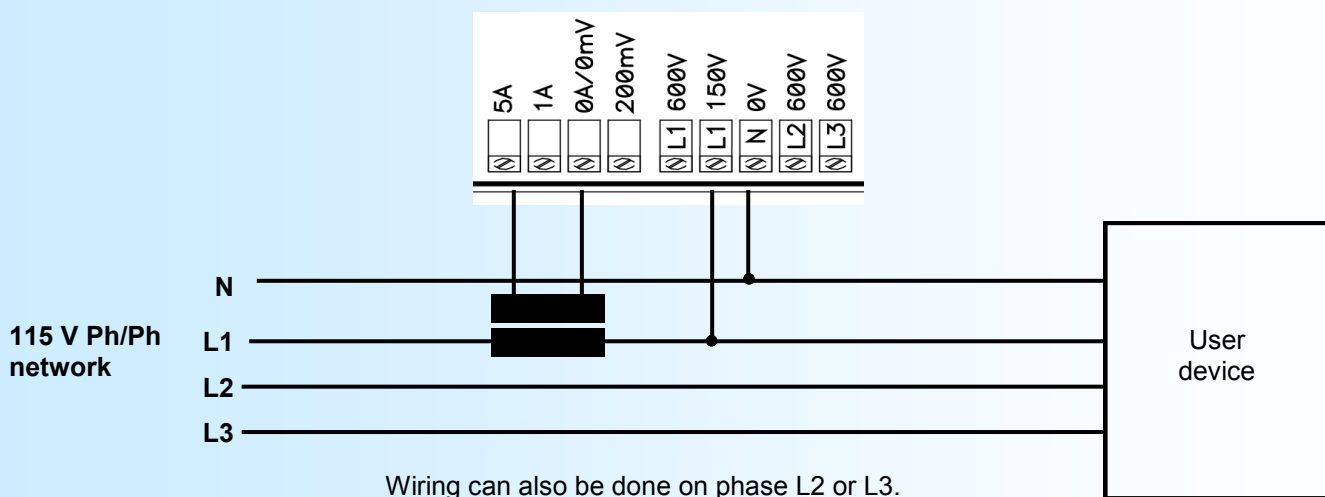
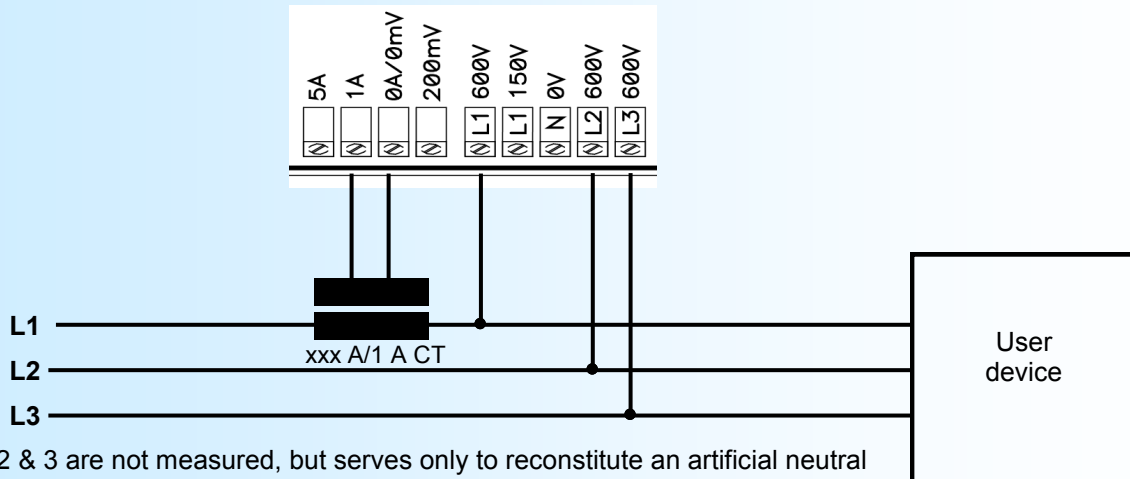1) <u>Current measurement up to 5 A (direct wiring on the internal shunt)</u>
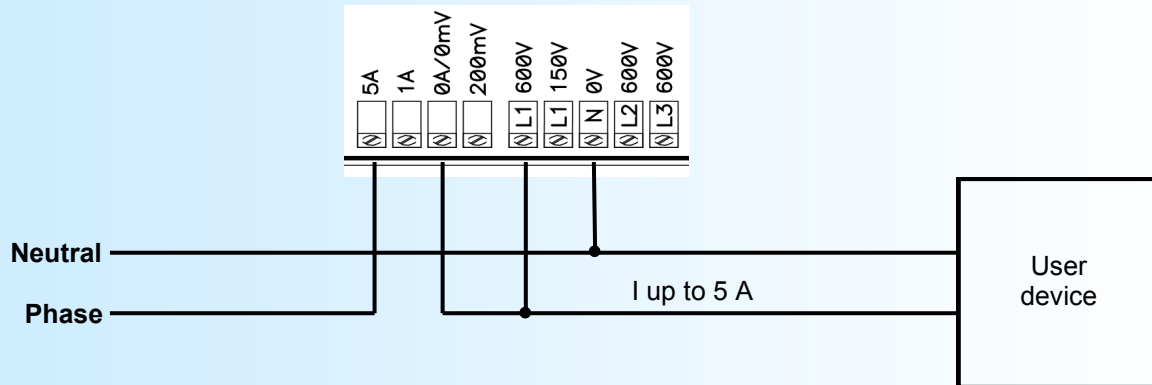
2) <u>Current measurement > 5 A with an external CT</u>

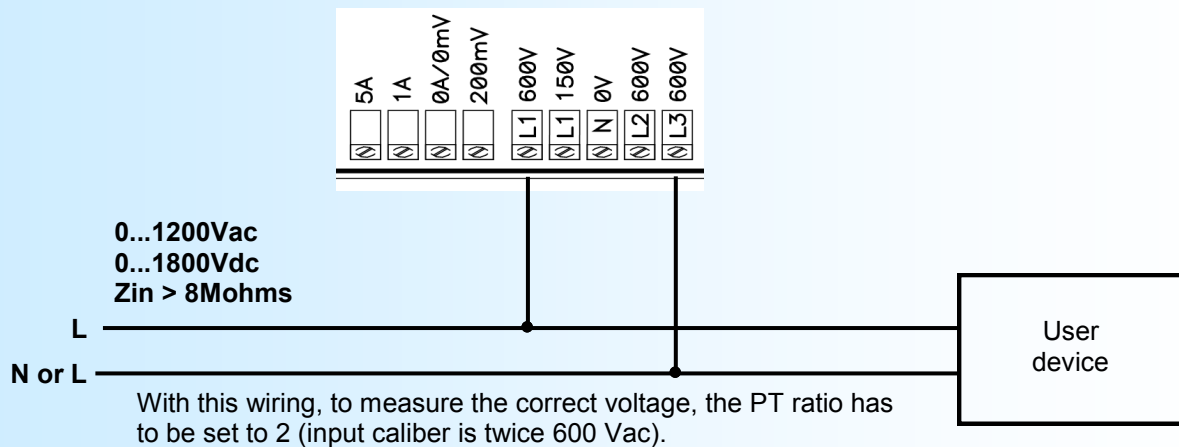**For CPL35 with measurements on a balanced three phases network with neutral**

Wiring can also be done on phase L2 or L3.

For CPL35(L) with measurements on a balanced three phases network without neutral

Terminals: 5A | 1A | 0A/0mV | 200mV | L1 600V | L1 150V | N 0V | L2 600V | L3 600V

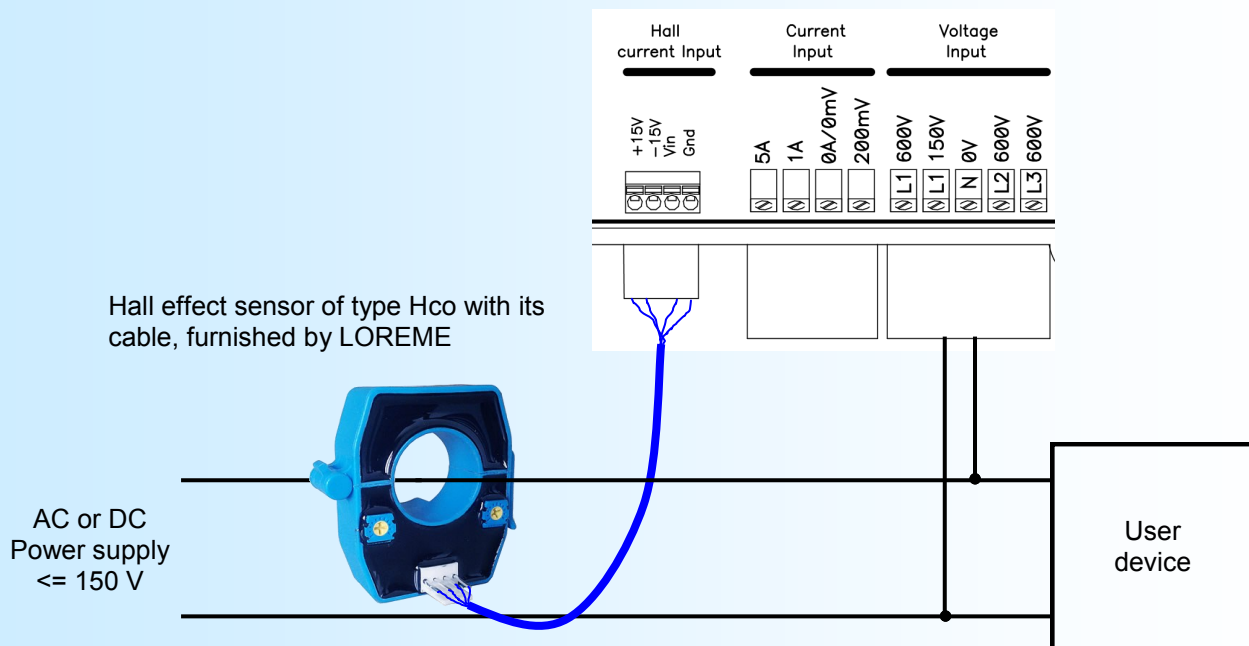xxx A/1 A CT

L1
L2
L3

User device

Phase 2 & 3 are not measured, but serves only to reconstitute an artificial neutral on the 0V(N) connection. So, this connection must be left open.
Since the CPL35(L) is fully insulated, this artificial neutral is compatible with the TT, TN and IT systems.

For a CPL35(L) with high voltage measurement (> 600 Vac)

Terminals: 5A | 1A | 0A/0mV | 200mV | L1 600V | L1 150V | N 0V | L2 600V | L3 600V

0...1200Vac
0...1800Vdc
Zin > 8Mohms

L
N or L

User device

With this wiring, to measure the correct voltage, the PT ratio has to be set to 2 (input caliber is twice 600 Vac).

For a CPL35(L)-Hall with Hall sensor current input

Hall current Input: +15V | −15V | Vin | Gnd
Current Input: 5A | 1A | 0A/0mV | 200mV
Voltage Input: L1 600V | L1 150V | N 0V | L2 600V | L3 600V

Hall effect sensor of type Hco with its cable, furnished by LOREME

AC or DC Power supply <= 150 V

User device

Bipolar output Wirings

+/- 10 V output

ENVIRONMENT

Operating temperature	-20 / 60 °C (75°C peak)
Storage temperature	-40 / 85 °C
Drift (% of full scale)	< 0.03 % / °C
Humidity	85 % not condensed
Vibration in accordance with IEC 60068-2-6	See mechanical test report