

CONFIGURATION HANDBOOK

IPL36



IPL36L



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Device Presentation

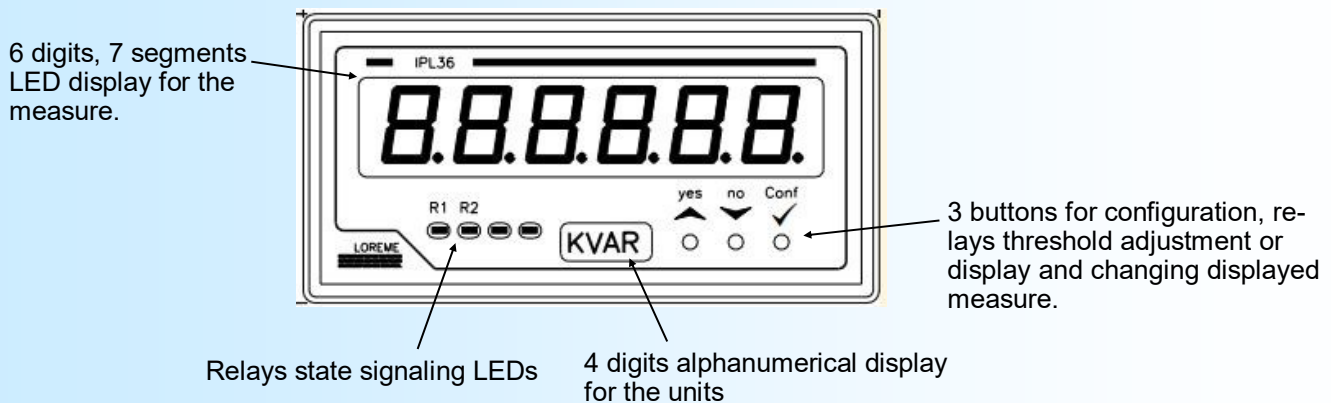
The IPL36 is a TRMS wattmeter and IPL36L is a TRMS volt-ammeter, frequency meter. They have a 6 digits display and allow the measurement, monitoring and retransmission of electrical parameters. Implementation is quick by simply programming via the front face.

Devices have several options:

- IPL36(L) : Standard current input base version.
- IPL36(L)-Hall : Hall sensor current input base version.
- IPL36(L)..R1 : + 1 relay.
- IPL36(L)..R2 : + 2 relays.
- IPL36(L)..S : + 1 analog output.
- IPL36(L)..CMTCP : + Ethernet Modbus TCP/SNMP link.
- IPL36(L)..CM : + RTU Modbus link.

/S, /CM and /CMTCP options are not combinable.

The technical data sheets are downloadable at: http://www.loreme.fr/fichtech/IPL36_eng.pdf
http://www.loreme.fr/fichtech/IPL36L_eng.pdf



- ▲ Displayed measure change or <yes> button or incrementing button.
- ▼ Access to relays threshold setup or <no> button or decrementing button.
- ✓ Access to device configuration or value validation.

OPERATING MODE

1) Visualization

At power on, the device displays briefly its actual revision number. It's a message of the form "r.- x.y", where 'x' is the hardware revision and 'y' the software revision. Then it displays the currently selected measurement (V, A,).

2) Displayed measure changing

By pressing the ▲ (yes) button, it is possible to change the type of measurement displayed.

The device can thus display:

- The voltage measurement ("V" unit).
- The current measurement ("A" unit).
- The frequency measurement of the voltage inputs only ("Hz" unit).
- The active power measurement ("W" unit) (only IPL36(-Hall)).
- The reactive power measurement ("VAR" unit) (only IPL36(-Hall)).
- The apparent power measurement ("VA" unit) (only IPL36(-Hall)).
- The power factor measurement ("COS" unit) (only IPL36(-Hall)).
- The active energy counter ("kWh" unit) (only IPL36(-Hall)).
- The max voltage measurement if the function is activated ("Vmax" unit) (cf special functions).
- The max current measurement if the function is activated ("Amax" unit) (cf special functions).

Remark:

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

Configuration via the front face

3) Energy counter reset

When the energy counter is displayed, it can be reset by pressing simultaneously the ▲ & ▼ keys. 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-bit 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 '✓' button. It is possible to lock the access in the "Special Function" rubric. If access is locked then the message " NOT ALLOWED! " is displayed.

4.1) Language configuration

LANGUAGE 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.

ENGLISH? Push ▲ (yes) to choose the English language. Push ▼ (no) to go to the next choice.

FRENCH? Push ▲ (yes) to choose the French language.

4.2) Inputs configuration

The device comes standard with two voltage inputs (high and low) and two internal current input (internal and external shunt) on the standard version or with one current input and a +/- 15 V power supply for the **-Hall** version. Default calibers of the inputs are:

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

The inputs configuration rubric permits to select the measured voltage input, the measured current input, the sensitivity of the external shunt current input and the measurement response time (integration time for measurement TRMS 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 measure value. For example with a filter of 1 s, the ripple is 0.6% of the TRMS 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 high voltage input or the ▼ (no) button to go to the next choice.

150V? Push the ▲ (yes) button to choose the low voltage input or the ▼ (no) button to go to the previous choice.

The following CURRENT INPUT choice menu is only visible on a standard IPL36(L).

CURRENT INPUT? Push the ▲ (yes) button to access to the current input selection.

5.0A? Push the ▲ (yes) button to choose the 5A internal shunt current input.

200.0mV? Push the ▲ (yes) button to choose the external shunt current input.

MEASURE RESPONSE TIME? Push the ▲ (yes) button to access to the response time configuration.
(0.01 s to 60 s, default value is 1 s). Use the ▲ / ▼ buttons to increase or decrease the value and the ✓ button to validate the value.

4.3) Network configuration

The wiring options on the network are:

- Alternative or Continuous.
- Single-phase or balanced three phases with neutral for a alternative network.

It is also necessary to configure:

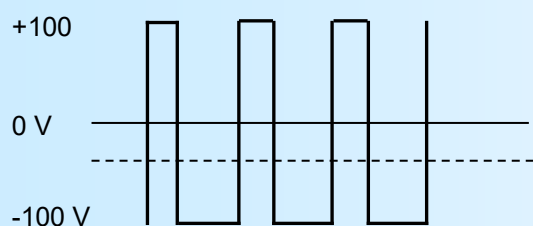
- The Potential Transformer ratio (PT ratio).
- The Current Transformer ratio (CT ratio) or external current shunt sensibility or the Hall sensor current caliber on a **Hall** version.

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 AC 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.
<i>The single phase/three phases rubric is only accessible on a IPL36 in AC mode.</i>	
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 or the ▼ (no) button to select the previous choice.
PT RATIO?	Push the ▲ (yes) button to access the PT ration setting (0.001 to 10^6) or the ▼ (no) button to go to the next rubric.
CT RATIO?	Push the ▲ (yes) button to access the CT ration setting (0.001 to 10^6) in internal shunt
or	current input configuration.
SHUNT SENSIBILITY?	or to access to the shunt sensibility setting (0.001 A/ mV to 10^6 A/mV) in external shunt current input configuration.
<i>or on a IPL36(L)-Hall</i>	
CURRENT CALIBER?	Access to the Hall sensor current caliber setting (1 to 65500 A).

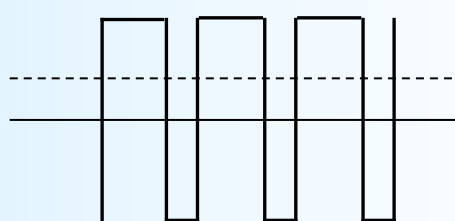
Notes:

- At factory output a IPL36(L)-Hall is configured in DC (continuous) mode.
- In CONTINUOUS mode, the device calculate the average value of the signal with the response time set in previous page. For an AC signal the average value is 0.

Signal with an average value < 0.



Signal with an average value > 0.



4.4) Relays configuration

This rubric is only visible if the device is equipped with 1 or 2 relays (options /R1 or /R2).

Each relay has two operating modes:

- Threshold detection (alarm) or,
- Energy metering (IPL36(-Hall) only).

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 DETECTION?	Push the ▲ (yes) button to activate the detection, ▼ (no) to deactivate it.
MEASURE:	Choice of monitored measure.
VOLTAGE?	Push the ▲ (yes) button to choose the displayed measurement. 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 setting.
HYSTERESIS?	Push the ▲ (yes) button to access the hysteresis setting.
RELAY CLOSED IN ALARM? RELAY CLOSED OUT OF ALARM?	Choose the type of security.
ACTIVATION DELAY?	Push the ▲ (yes) button to access the activation delay setting.
DEACTIVATION DELAY?	Push the ▲ (yes) button to access the deactivation delay setting.

or

ENERGY COUNT?	Push the ▲ (yes) button to activate the energy count, ▼ (no) to deactivate it.
PULSE WEIGHT?	Push the ▲ (yes) button to access the counting pulse weight parameter (0.01 kWh minimum).
RELAY 2? <i>same as relay 1.</i>	Push the ▲ (yes) button to access to the relay 2 configuration (only with option /R2).

4.5) Output configuration

This rubric is only visible if the unit is equipped with an analogical output (/S option).

OUTPUT CONFIG?	Push the ▲ (yes) button to access to the rubric.
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.
MEASURE: VOLTAGE?	Choice of monitored measure. Push the ▲ (yes) button to choose the displayed type. Push the ▼ (no) button to display the next 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.
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.

See the configuration by terminal for more details about the output parameters.

4.6) Communication configuration

This rubric is only visible if the unit is equipped with the /CMTCP or /CM option.

COMMUNICATION CONFIG? Push the ▲ (yes) button to access to the rubric.

4.6.1) CMTCP option

IP ADDRESS? IP1, IP2, IP3, IP4	Push the ▲ (yes) button to access to the rubric. Use the ▲ / ▼ buttons to increase/decrease the value and the ✓ button to validate it. The address is decomposed as follow: IP1.IP2.IP3.IP4 The output factory IP address is: 192.168.0.253
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IP MASK? IP1, IP2, IP3, IP4	Push the ▲ (yes) button to access to the rubric. Use the ▲ / ▼ buttons to increase/decrease the value and the ✓ button to validate it. 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 and the ✓ button to validate it. 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 the message 'MeMo' on the unit display and a series of five lines on the measurement display.

4.6.2) CM option

ADDRESS?	Push the ▲ (yes) button to access to the rubric. Use the ▲ / ▼ buttons to increase/decrease the value and the ✓ button to validate it. The output factory address is: 1
BAUD RATE?	Push the ▲ (yes) button to access to the rubric. Use the ▲ / ▼ buttons to increase/decrease the value and the ✓ button to validate it. The value available are : 38.4 kbps, 19.2 kbps, 9.6 kbps, 4.8 kbps, 2.4 kbps, 1.2 kbps The output factory baud rate is: 38.4 kbps
PARITY?	Push the ▲ (yes) button to access to the rubric.
NONE?	Push the ▲ button to validate the parity none choice. Push ▼ to display the next choice.
EVEN?	Choose of parity even.
ODD?	Choose of parity odd.

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/N)?	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 display 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?	
POWER UNIT?	Push the ▲ (yes) button to access the power unit display mode setting.
AUTO(Y/N)?	Pressing ▲ (yes) selects the automatic power unit mode (kMG unit prefix is automatic). Pressing ▼ (no) selects the fixed mode. kW, kVA, kVAR with 2 decimals are displayed for the power measurements.

4.8) Special functions

SPECIAL FUNCTION?	Push the ▲ (yes) button to access to the rubric.
MAX VOLTAGE?	▲ (yes) to activate, ▼ (no) to deactivate the max voltage holding function.
MAX CURRENT?	▲ (yes) to activate, ▼ (no) to deactivate the max current holding function

HOLDING TIME? Use the ▲ / ▼ buttons to increase/decrease the value and the ✓ button to validate it.
The max value holding time is adjustable from 0.1 s to 60 s (factory default value is 5 s).

4.9) End of configuration

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

Remark:

If, during the configuration process, no buttons are pressed for more than 60 s, the device returns to measure mode without saving the new configuration.

5) Setting or displaying the relays threshold

If the threshold detection is activated, pushing the ▼ button accesses to the threshold setting or displaying. By default the setting is allowed, but it is possible to lock it through the relay configuration by terminal mode.

The message 'THRESHOLD Rx?' (x = 1 or 2) scrolls on the display and the Rx led is on. Push the ▲ (yes) button to access to the setting or the ▼ (no) button to go to the next threshold or to return to measure mode if it was relay 2.

If the setting is allowed, the ▲ / ▼ buttons permits to increase/decrease the threshold and the ✓ button to save it.

Note:

If during the setting, no buttons are pressed for more than 60 s, the device return automatically to measure mode without taking into account the new settled threshold.

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).

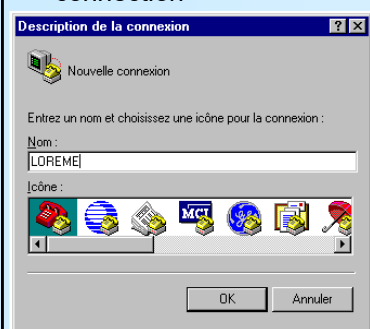
1 The terminal emulation software for PC « HyperTerminal » is resident in windows up to XP version. For later versions, it is downloadable on : **www.loreme.fr in download part** (www.loreme.fr/download/)

=> Run the downloaded software to install it.

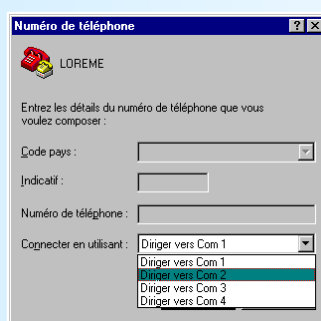
2 Start a "hyper Terminal" connection :

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

3 Enter name for the new connection

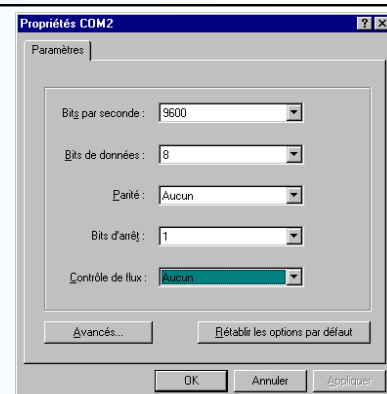


4 Choose the communication port related to the adapter.



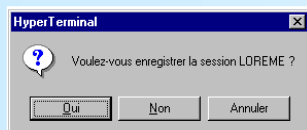
5

- 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

1) Visualization

The IPL36 or IPL36L can be configured using the RS232 link on the rear 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.

Once the device is connected to the PC, it displays the following measurements page every 3 seconds.

IPL36 measurements page:

```
VOLTAGE      : 230 V
CURRENT      : 1.13 A
FREQUENCY    : 50.1 Hz
ACTIVE P.    : 260 W
REACTIVE P.  : 22 VAR
APPARENT P.  : 259 VA
POWER FACTOR : 0.99
ACTIVE E.    : 0.05 kWh
MAX VOLTAGE  : OFF
MAX CURRENT  : OFF
```

IPL36L measurements page:

```
VOLTAGE      : 230 V
CURRENT      : 1.13 A
FREQUENCY    : 50.1 Hz
MAX VOLTAGE  : OFF
MAX CURRENT  : OFF
```

Note:

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 handbook explains in detail the different configurations possibilities: Language, input, network, relays, analog output, communication, special functions. To enter configuration mode, just press the "C" key. The message 'Conf' is displayed in front.

2.1) Method

during the configuration, 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.
- If you want go back to measure mode without taking notice of modifications made before, just press the escape key.
- 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.

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 with standard device).
- Measure response time.

2.4) Network

The wiring options on the network are:

- Alternative: single-phase or balanced three phases with neutral.
- Continuous.

It is also necessary to configure:

- The Potential Transformer ratio,

and on a standard device:

- The Current Transformer ratio (1A/5A input) or external current shunt sensibility (200mV input).

or on a **-Hall** device:

- The Hall sensor current caliber.

2.5) Relays

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

Each relay has two operating modes:

- Threshold detection (alarm) or,
- Energy metering (IPL36(-Hall) only).

The **threshold detection** rubric, allows to activate or deactivate the alarm on threshold overrun.

Threshold detection parameters are:

- Monitored value: voltage, current, frequency, max voltage, max current on a IPL36 and IPL36L.
plus: active power, reactive power, apparent power, power factor, on a IPL36.
- Type of detection: high or low threshold.
- Threshold and hysteresis value.
- Front face adjustment possibility.
- Security.
- Activation and deactivation delays.

If the alarm detection is activated it works in this manner:

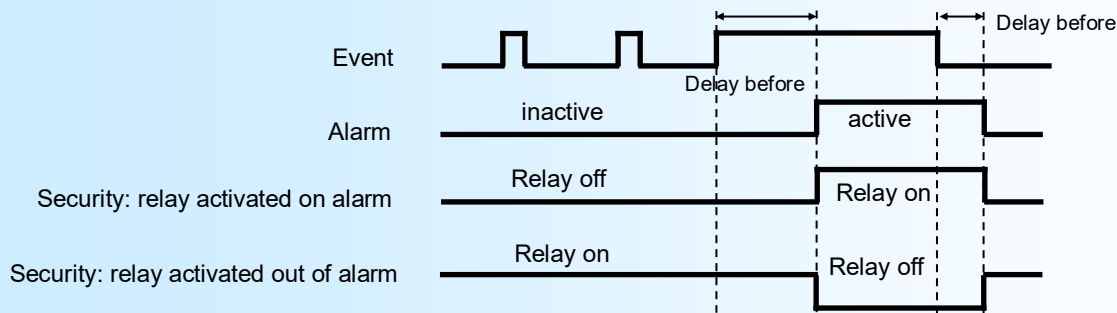
- **high threshold** detection: .alarm is activated when measure goes above threshold,
.alarm is removed when measure goes below threshold minus hysteresis.
- **low threshold** detection: .alarm is activated when measure goes below threshold,
.alarm is removed when measure goes above threshold plus hysteresis.

The **Front face threshold adjustment** is authorized by default.

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

The **security** function allows to choose between the activation or the de-activation of the relay when alarm is activated.

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.



The **energy count** rubric allows you to activate or deactivate the use of the relay for energy metering. For this mode, 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

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

Output parameters:

- Current output (mA).
- Voltage output (V) with strap connected (see wiring).
- Low and high output scales.
- Monitored value: voltage, current, frequency, max voltage, max current on a IPL36 or IPL36L plus: active power, reactive power, apparent power, power factor, on a IPL36.
- Low and high input measure scales.
- Limitation.
- Response time.

The **limitation** allows to bound the output signal swing to the configured output scales for any input signal swing overflow.

The **response time** allows to smooth the TRMS measure ripple transmitted on the analogical output signal. It is adjustable from 0 to 60 s.

2.7) Setting of communication parameters

2.7.1) MODBUS TCP (option /CMTCP)

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

2.7.2) MODBUS (option /CM)

The parameters are : Slave address, baud rate and parity.

- **address** : Modbus slave address (1 to 255),
- **Baud rate** (1200, 2400, 4800, 9600, 19200, 38400 bauds),
- **parity** (Even, Odd, None).

The measure data are available with different format:

- 32 bits IEEE floating point number.
- 32 bits signed integer, measure x 100.

2.8) Display

This rubric permits to personalize the measurements display on the front.

The display parameters are:

- Display filter.
- Decimal point display mode.
- Power units 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)? (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 number of decimal for the fixed mode for each measure. VOLTAGE 1 etc.....	Enter the number of decimals to display for the voltage measurement.
POWER UNITS? (Y-N)	Press the 'Y' key to access decimal point mode configuration.
AUTO(Y/N)? (Y-N)YES	Press 'Y' key to choose the automatic power units display mode or 'N' to choose the fixed mode in kW, kVAR, kVA with 2 decimals.

2.9) Special function

This section allows you to lock the front face configuration access.

SPECIAL FUNCTION? (Y-N)	Press 'Y' to access the special function configuration.
FRONT FACE CONFIG. LOCK? (Y-N)NO	Press 'Y' to lock the front face configuration access.
MAX VOLTAGE (Y-N)NO	Press 'Y' to activate de the max voltage maintaining function.
MAX CURRENT (Y-N)YES	Press 'Y' to activate de the max current maintaining function.
HOLDING TIME 5.0 s	Enter the max value holding time (this is the time before the next refreshment).
FRONT FACE ENERGY RESET ACCESS (Y-N)YES	Press 'N' to forbid the reset of the energy counter via the front face.
PRESET ENERGY? 0 kWh	Energy counter preset. Only on a IPL36(-Hall). Enter a value and press Enter.

2.10) End of the configuration

SAVING..... *****	This message will be displayed on a /CMTCP device if the communication configuration has changed, followed by 5 stars.
OK!	This message indicates that all the parameters have been successfully saved.

RS485 MODBUS communication

1) Feature

Protocol:	MODBUS RTU
Link:	RS485
Baud rate:	1200 to 38400 bauds
Address:	1 to 255
Reading request:	Function codes 03, 04
Type of data:	Electrical measurement, status of alarms.
data format:	Measure in 32 bits IEEE floating point format and 32 bits signed or unsigned integer format.
response time:	The delay for a reading request is less than 40ms.

2) Data

2.1) Available data

All measures are accessible in reading mode. Data's are available in different formats:

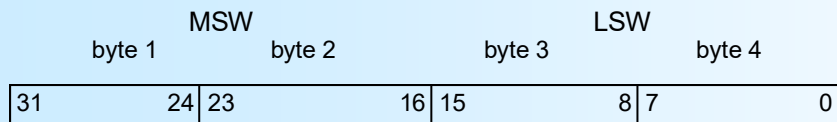
- 2 words, 4 bytes, for measures in the 32 bits IEEE floating point format.
- 2 words, 4 bytes, for measures in the 32 bits integer format.
- 1 word, 2 bytes, for the alarms state.

2.2) Format of data

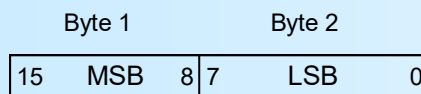
- Data in 32 bits IEEE floating point format
- Data send Most Significant Byte first (word 1: exponent + mantissa MSB, word 2: mantissa)



- Data in 32 bits integer signed or not.
- Data send MSB first. 4 bytes or 2 words long.



- Data in 16 bits integer format for status of alarm R1 (bit0) and R2 (bit1).
- Data send MSB first.



3) Exception frame

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

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

Error code	Details
\$01	Function code not allowed. Only the function code 03 or 04 are used by the IPL36(L). (register reading function).
\$02	Data address not allowed.
\$04	Slave busy. The internal communication slot is not in connection with the measure part.

4) **Measure tables**

4.1) **Floating point format data**

The register address are the same as the table for MODBUS-TCP communication. The measure are in floating point format number except for the alarm status register (16 bits).

4.2) **Integer format data**

The register address are the same as the table for MODBUS-TCP. 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 Hall sensor) or the external shunt sensibility.

Note:

On a IPL36(L)-Hall, the CT ratio parameter is always equal to one.

4.3) **Table of additional data**

This data are available only with the IPL36(L) in /CM version

Two data are available on address \$301 and \$404.

The data at address \$301 is the measure voltage in 32bits signed integer format.

The data at address \$404 is the decimal point position.

Register address in decimal (Hexadecimal)	Designation	Total Words
769 (\$301)	Voltage (V) Word 1	1
	32 bits signed integer Word 2	2
1028 (\$404)	Decimal point position Word 1	1
	2 => display with 2 decimal 3 => display with 1 decimal 4 => display with 0 decimal	

Example :

The reading of "Voltage" data on \$301 give : 1283

The reading of data on \$404 give : 3

The real voltage value is : 128,3 V

MODBUS TCP Communication

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 IPL36../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.

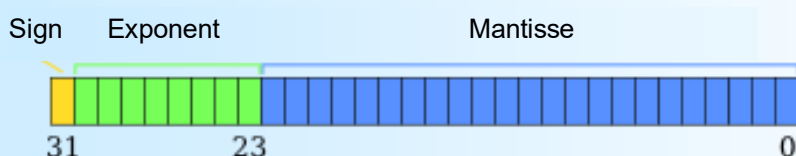
Data's are available in different formats:

- 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

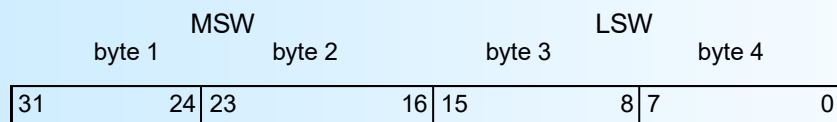
- Data in 32 bits IEEE floating point format

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



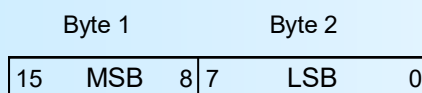
- Data in 32 bits signed or unsigned integer format.

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



- Alarm data in 16 bits integer (0 to 15), bit 0 for R1 and bit 1 for R2.

Data are transmitted Most significant byte first.



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).

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)	Word 1	13
4109 (\$100D)	Frequency	Word 1	14
		Word 2	15

Remark:

For an IPL36L, 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.

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)	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

Remark:

For an IPL36L, the Powers and Power Factor measures are at \$FFFFFFFF hexadecimal and the energy counter stays equal to \$00000000.

WEB server (/CMTCP option)

Click to refresh measures Tab for SNMP parameters Tab for password configuration. version number

Tension:	224.04 V
Courant:	0.00 A
Fréquence:	50.00 Hz
Cos phi:	0.00

WEB page overview

1) "Measure" tab

Display all measurements of an IPL36 or IPL36L

IPL36

Tension:	224.04 V
Courant:	0.00 A
Fréquence:	50.00 Hz
Cos_phi:	0.00
Puissance active (P):	0.00 W
Puissance réactive (Q):	0.00 VAR
Puissance apparente (S):	0.00 VA
Energie active:	0.00 KWh
Rapport de Tension:	1.00
Rapport de Courant:	1.00
Sensibilité shunt externe:	--- A/mV

IPL36L (There are no energy, power, power factor measurements)

Tension:	123.98 V
Courant:	0.00 A
Fréquence:	50.00 Hz
Cos_phi:	---
Puissance active (P):	--- W
Puissance réactive (Q):	--- VAR
Puissance apparente (S):	--- VA
Energie active:	0.00 KWh
Rapport de Tension:	1.00
Rapport de Courant:	1.00
Sensibilité shunt externe:	--- A/mV

2) "SNMP" tab

Download the MIB file,.

Set-up the community names (these names are "public" and "private" by default).

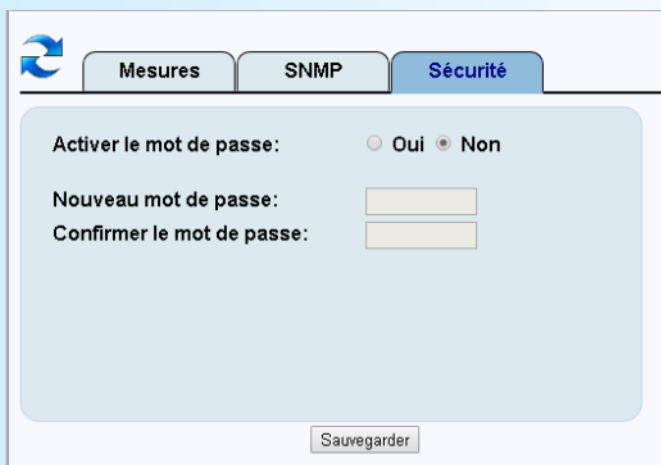
Read Community :

Write Community :

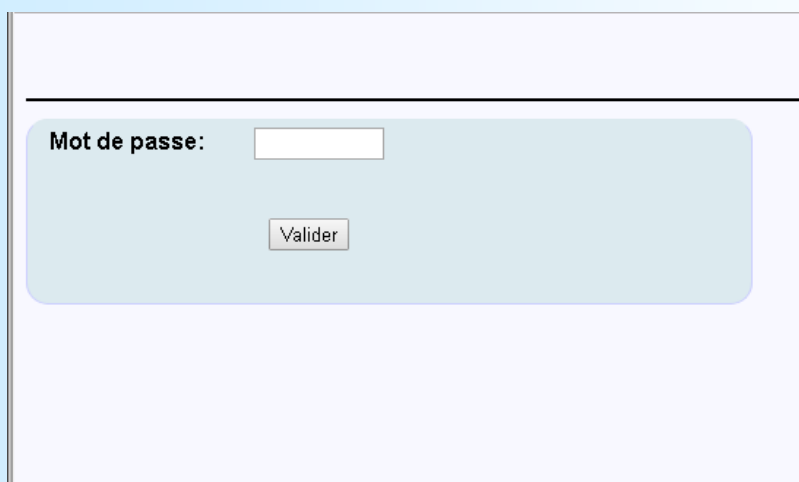
[Télécharger le fichier MIB](#) click droit et "Enregistrer sous..."

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 IPL36 and IPL36L support SNMP V1 protocol for measurements reading. Measures are available in 32 bits integer format (refer to the page 18, section 4.2, 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/UE** & **2014/35/UE**, 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 UE 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.

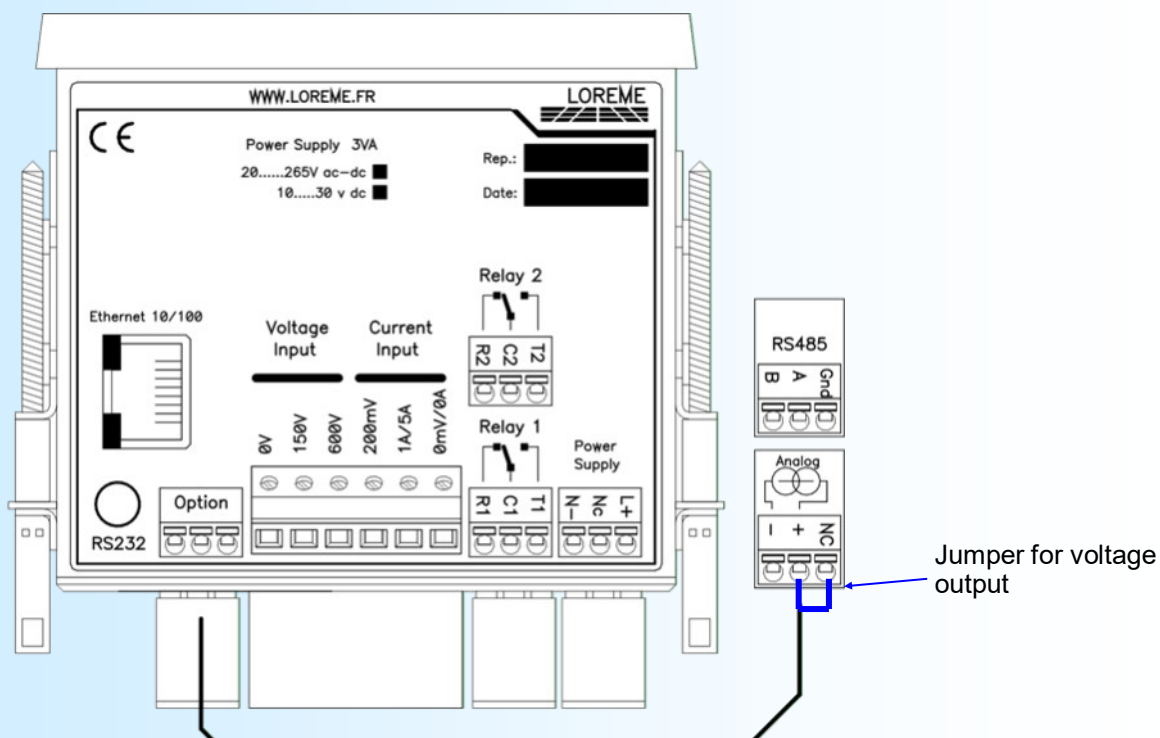
2.2) Power supply

- 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.

IPL36(L) standard Wiring



Power supply
(20 to 265Vac/dc):

terminals L+, N-.

Relay 1:
Relay 2:

terminals common (C1), rest (R1), work (T1)
terminals common (C2), rest (R2), work (T2)

(/S option)

Analogical output mA:
Analogical output V:

terminals analog+ (+), analog- (-), no jumper.
terminals analog+ (+), analog- (-), need jumper between terminals analog+ & 500.

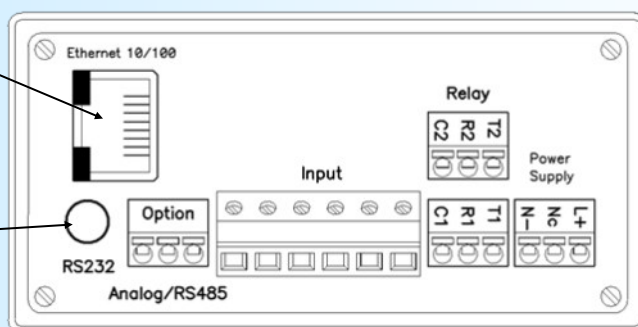
High voltage input:
Low voltage input:

terminals 600 V, 0V
terminals 150 V, 0V

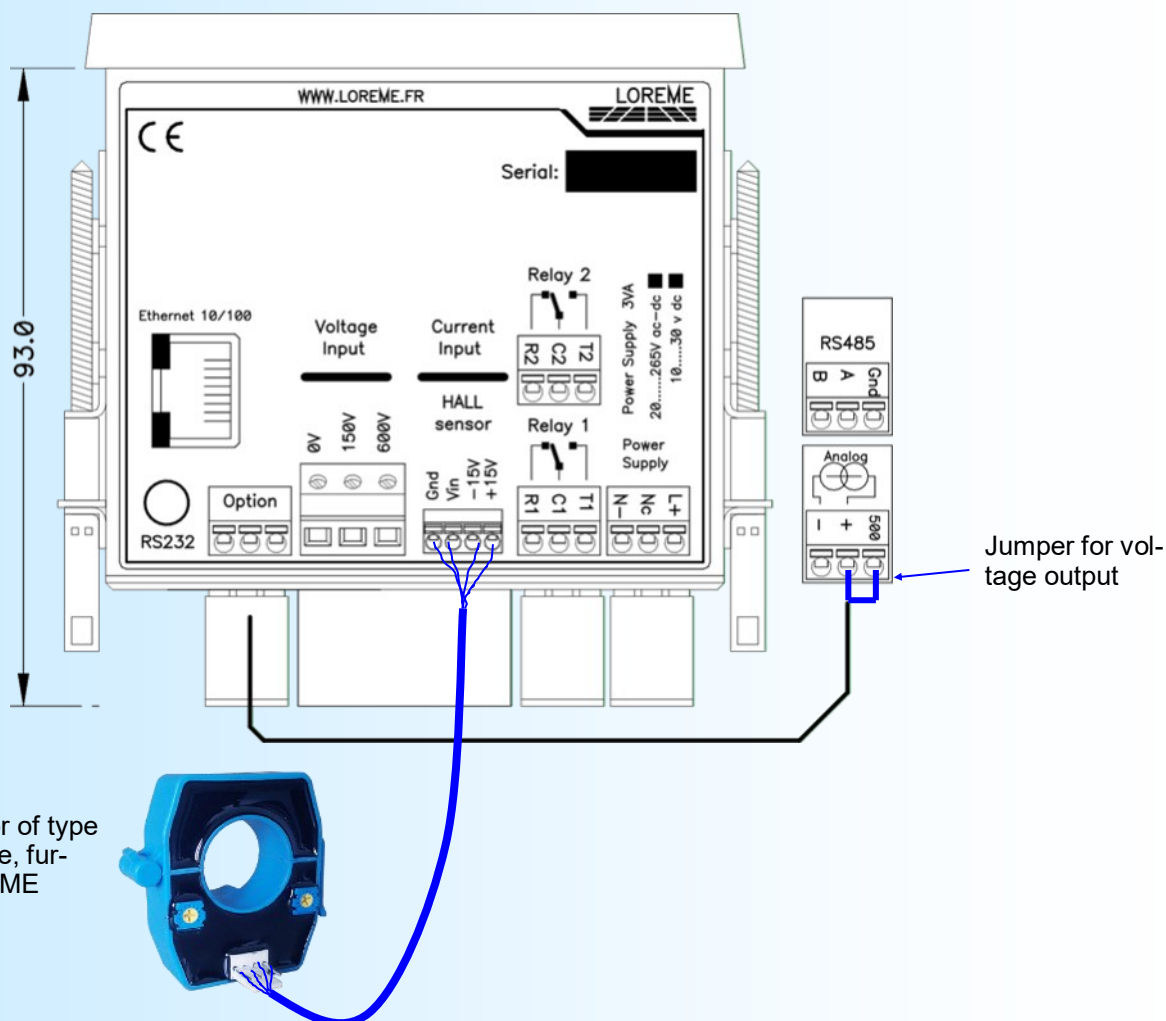
Internal shunt current input:
External shunt current input:

terminals 1A/5A, 0mV/0A
terminals 200 mV, 0mV/0A

Ethernet link if option
IPL36.../CMTCP.
3.5 mm stereo jack for the
RS232 link.



IPL36(L)-Hall Wiring



Power supply
(20 to 265Vac/dc):

terminals L+, N-.

Relay 1:
Relay 2:

terminals common (C1), rest (R1), work (T1)
terminals common (C2), rest (R2), work (T2)

High voltage input:
Low voltage input:

terminals 600 V, 0V
terminals 150 V, 0V

Current input:
(Hall sensor)

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