PROGRAMMABLE NETWORK

ANALYZER

IPL50
IPL50/S
IPL50/C
IPL50/A

CONFIGURATION HANDBOOK

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DIALOGUE - TERMINAL MODE

Numeric devices can converse with all terminal emulation mode systems. As the dialogue and configuration part are in device's memory, no software or specific interface are necessary for their configuration.
Two terminal emulation mode systems are presented: the PSION and the PC. Differents procedures are enumerated below.

1) PSION serie 2:
First of all manipulation, plug in "COMMS LINK" on the PSION. To start up the PSION, push on the **"ON"** key.
The PSION displays this menu: **RECH SAUV AGENDA**
CALC PROG EFFACE

Push on the **"C"** key until the menu **"COMMS"**, and validate with **"EXE"**.
The PSION displays this menu: **TRANSMIT RECEIVE**
SETUP TERM AUTO

Push on the **"T"** key until the menu **"TERM"**, and validate with **"EXE"** to obtain a empty screen. The PSION is now in terminal mode and you can link the PSION to the device, by plugging in the RS 232. The measure is displayed, to configurate, push on the **"C"** key.

2) PSION Workabout:
To start up the PSION push on the **"ON"** key.
At the presentation, push on the **"MENU"** key. Select **"SYSTEME SCREEN"** mode and validate by **"ENTER"**.

Icons display: **DATA CALC SHEET PROGRAM COMMS**

Select icon **"COMMS"** and validate by **"ENTER"**, on display, a cursor flashing. The **PSION** is in terminal mode. Plug in "RS232" on PC. The measure is displayed and, to configure, push **"C"** on keyboard.

To quit terminal mode and switch off PSION, push on **"OFF"** key. When you re-start the **PSION** in terminal mode, it start automaticaly and directely in terminal mode without re-start configuration.

3) PC with DOS:

The terminal emulation mode software with DOS **"IBM®-PC KERMIT-MS V2.26"** is available at simple request. After the PC has booted, type **"a: K"** then press **"ENTER"**. The PC is in terminal mode and uses COM port 1.
If you want to use the second serial communication port (COM2), type:

"A:KERMIT" and **"ENTER"** to launch the program,
"SET PORT 2" and **"ENTER"** to select **COM2**,
"SET BAUD 9600" and **"ENTER"** to select speed,
"CONNECT" and **"ENTER"**, to enter in the terminal mode.

The PC is now emulating a terminal and may be connected to the device by plugging in the RS 232 link cable.
Measure is now displayed and configuration's acces allowed by a press on **"C"** key.

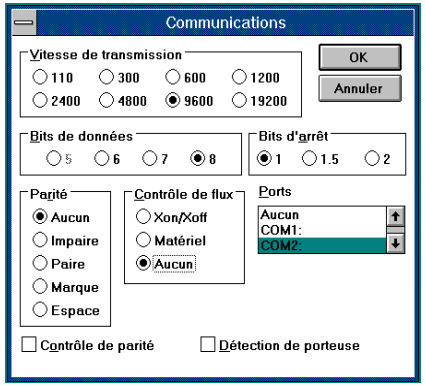
To quit kermit, press **"CTRL-$"** then press the key **"C"**.
When the message KERMIT-MS appears, type **"QUIT"** to return to MS-DOS commands.

4) PC with WINDOWS 3.11:

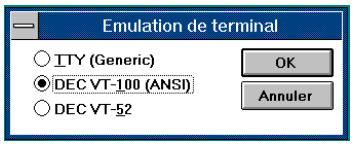
Start **WINDOWS** and in "**ACCESSOIRES**" group, double-click on 

icon wich get access to terminal mode.

In "**PARAMETRES**" menubar, click on "**COMMUNICATION**" sub-menu. We access to the following windows. Configure communication parameters, 9600 bauds, no parity, 8 data bits, 1 stop bit, no flow control and validate.



Begin terminal emulation by click on "**PARAMETRES**", then on "**EMULATION TERMINAL**". the following board is displayed.

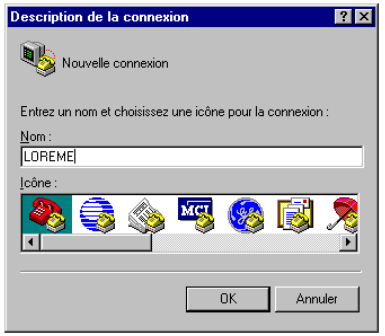


Choose terminal mode **DEC-VT-100(ANSI)** and validate. The PC is in terminal mode, connect it to device by plugging the RS232 link cable. Measure is now displayed and to access at configuration, press on **"C"** key.

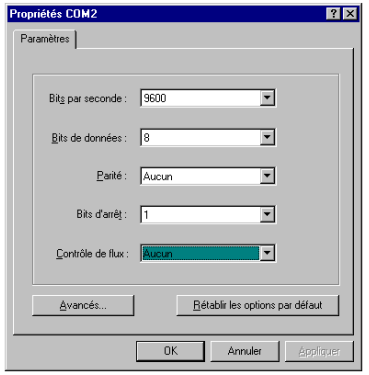
5) PC with WINDOWS 95/98:

To start up terminal program:
1 - Clique on button **"START"**,
2 - Tick off **"PROGRAMS"**, **"ACCESSOIRES"**, and **"HYPER TERMINAL"**,
3 - Click twice on 

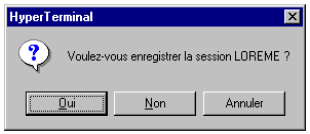
The following window is displayed. Enter a name for a new connection and validate, the hereunder window will appear



Choose a communication port and validate. The belowing windows is displayed



Configure communication parameters, 9600 bauds, no parity, 8 data bits, 1 stop bit, no flow control and validate. The PC is in terminal mode, connect to device by plugging in the RS232 link cable. Measure is now displayed and to access at the configuration, press on **"C"** key .



When quitting HyperTerminal will be diplayed the following window. To dialog with all LOREME devices without re-start all the method, click on **"OK"**

To load LOREME session directly:
1 - Click on button **"Start"**.
2 - Tick off **"Programs"**, **"Accessories"**, and **"HyperTerminal"**.
3 - Click twice on the icon 

6) Display on terminal

When switching on, the analyzer is automatically put in operating mode and displays the measures. The user will be able to visualize the measures on two tables, each one including a part of the pieces of information.

The two tables of displayed measures are the following ones:

VOLTAGE	CURRENT
ACTIVE POWER	COSINUS φ
APPARENT POWER	FREQUENCY
REACTIVE POWER	

Pressing any key shifts from a table to another.

It is possible to visualize the two tables simultaneously pressing the key "$" (only on PC). To go back to the normal mode, press "Enter".

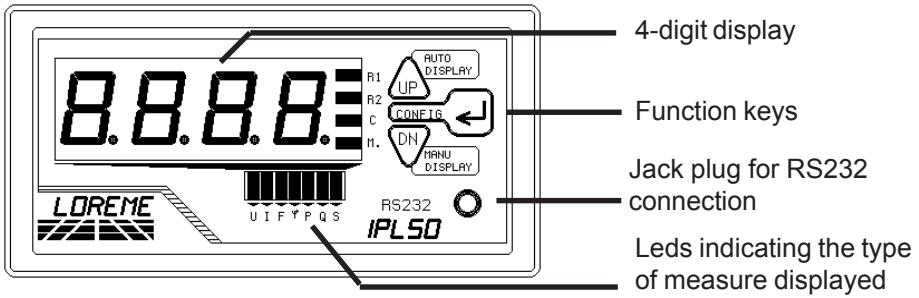
DEVICE PRESENTATION

The purpose of this handbook is to allow to become familiar with the different models of devices:

- IPL50: 2 relays,
- IPL50/S: 2 relays, 2 analogical outputs,
- IPL50/C: 2 relays, RS 485 numerical output,
- IPL50/A: 2 relays with specific alarm configuration.

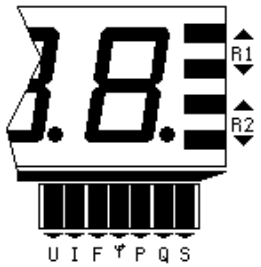
USER INTERFACE

1) IPL 50, IPL 50/S, IPL 50/C:



IPL50, IPL 50/S, IPL50/C

IPL 50/A



1) Operating mode:

The key DN / MANU DISPLAY allows:
- to shift to manual mode if you are in scrolling mode.
- to change displayed measure type in manual mode (U,I,F,φ,P,Q,S).

The key AUTO DISPLAY / UP allows:
- to shift to scrolling mode if you are in manual mode.

The vertical LEDS of the front side let you identifiate displayed measure type:

U : Voltage	I : Current
F : Frequency	φ : Power factor
P : Active power	Q : Reactive power
S : Apparent power	

Four horizontal LEDS give the following information:

- IPL50, 50/S, 50/C:	R1 : Alarm 1	C : Configuration mode
	R2 : Alarm 2	M : Manual mode
- IPL50/A:	▲R1: Alarm 1 high	▲R2: Alarm 2 high
	▼R1: Alarm 1 low	▼R2: Alarm 2 low

For IPL50/A version, a simultaneous press on two keys AUTO DISPLAY / UP and DN / MANU DISPLAY allows to get a reset of alarms memorization if function validated.

2) Configuration mode:

The key CFG allows:
- to shift to the mode adjustment of the alarm thresholds.

The key AUTO DISPLAY / UP allows:
- to increment the value of the alarm threshold.

The key DN / MANU DISPLAY allows:
- to decrement the value of the alarm threshold.

Note:
-IPL50, 50/S, 50/C:
Relay 1 or 2 on which threshold is adjusted is marked out by leds R1 and R2.
-IPL50/A:
Relay 1 or 2 and threshold high or low on which threshold is adjusted is marked out by leds R1, ▼R1, R2 or ▼R2.

CONFIGURATION

The handbook explains in detail differents possibilities of configuration: Network, outputs, relay, communication, special function.
To enter configuration mode, just press **"C"** key.

1) Method:
At the configuration, the user is asked different types of questions.
For each one, several answers are possible.
You will find below the detailed description of each case.

1.1) Menu selection:
exemple: INPUT
Y - N
The user makes a choice by pressing the keys **"Y"** or **"N"**. This choice allows to access the different menus of configuration.

1.2) Parameter selection:
exemple: VOLTAGE or VOLTAGE
(Y - N) YES (Y - N) NO

Previous choice = YES:
- pressing **"Y"** => choice validation = YES,
- pressing **"↵"** => choice validation = YES,
- pressing **"N"** => choice changing = NO.

Previous choice = NO:
- pressing **"N"** => choice validation = NO,
- pressing **"↵"** => choice validation = NO,
- pressing **"Y"** => choice changing = YES.

Choice is made by pressing **"Y"** or **"N"** keys, and validation is made by pressing corresponding key to displayed answer (**"Y"** for YES and **"N"** for NO) or **"↵"** (PC)/**"EXE"** (PSION). Pressing key **"↵ / EXE"** without modification allows to validate the previous answer.

1.3) Value acquisition:
exemple: LOW SCALE
4 mA

Two cases are possible:
- validation without modification, just press **"↵ / EXE"**,
- value modification on keyboard (simultaneous display), followed by validation with **"↵ / EXE"**.

Note:
- It is possible, when a mistake is made during a value acquisition, before validating it, to go back by pressing "DEL" key (only on PSION), which re-displays the message without taking notice of the wrong value.
- In configuration mode, if there is no action, device goes back in operating mode after a two minutes delay without taking notice of modifications made before.
- In configuration mode, if you want to shift to measure mode without taking notice of the modifications made before, you just have to press "ESC" (PC) or "SHIFT + DEL" (PSION) key.

2) Network:
The possibilities of wiring on the network are:
- in direct current,
- in alternating current:
  - monophase,
  - three-phase balanced without neutral,
  - three-phase balanced with neutral,

It is also necessary to configure:
- the PT ratio, potential transformer,
- the CT ratio, current transformer.

3) Analogical outputs:
The output configuration is composed of 2 rubrics:
- output assignement:
  - measured value, voltage, current, frequency, cos φ, active power, reactive power, apparent power,
  - low and high measure scale.

- output parameters:
  - output type, current or voltage,
  - low and high output scale,
  - numerical filtering,

    The **numerical filter** allows to smooth an analogical output, the measure of which would be disrupted, fluctuating or exposed to interferences.

4) Relay:
Each relay can be configured in two different ways:
- alarm,
- energy counting.

4.1) Alarm:
The relay configuration in alarm is composed of 2 rubrics:

- alarm assignement:
  - measured value, voltage, current, frequency, cos φ, active power, reactive power, apparent power.

- alarm parameters:
  - detection type, high or low threshold,
  - threshold,
  - hysteresis.

Detection type works in this way:
- **High threshold:**
  .alarm is active when measure is beyond threshold,
  .alarm is inactive when measure is below threshold less hysteresis.
- **Low threshold:**
  .alarm is active when measure is below threshold,
  .alarm is inactive when measure is beyond threshold more hysteresis.

4.2) Specific alarm:
It is possible to get an extension of alarm parameters on **IPL50/A** version.
Alarm configuration:
- alarm type, low, high, external or internal window,
- thresholds, hysteresis,
- alarm memorization,
- relay security, positive or negative,
- alarm temporization,
- alarm condition.

- **High alarm:**
  Alarm is activated when measure goes beyond threshold, it is deactivated when measure goes under threshold minus hysteresis.

- **Low alarm:**
  Alarm is activated when measure goes under threshold, it is deactivated when measure goes beyond threshold plus hysteresis.

- **Internal window alarm:**
  Alarm is activated when measure is between low and high threshold, It is deactivated when measure goes under low threshold minus hysteresis or beyond high threshold plus hysteresis.

- **External window alarm:**
  Alarm is activated when measure goes under low threshold or beyond high threshold, It is deactivated when measure is between low thresold plus hysteresis and high threshold minus hysteresis.

- Memorization:
This function allows to keep the alarm activated, even though the measure comes back out of the alarm; this will last until the alarm is deactivated by a reset on the front side.

- Security:
This function allows to choose between the excitation or the de-excitation of the relays when the alarm is activated.
In positive security, relay is excited when alarm is active and de-excited when alarm is inactive.
In negative security, relay is de-excited when alarm is active and excited when alarm is inactive.

- Temporization:
This function allows to set a delay in seconds at the activation/ deactivation of alarms.

- **Condition:**
This function allows to specify a condition of alarm validation so as to avoid it engages in very precise cases. Condition measure type can be different from the one of alarm. Its functioning is identical to low and high thresholds.

4.3) Energy counting:
The configuration of the relay in counting is composed of 2 rubrics:
- counting assignement:
  - measured value, active power, reactive power.
- counting parameters:
  - impulse load value, KW.H or Kvar.H.

5) RS485 numerical output (IPL 50/C):
Communication configuration is composed of 3 rubrics:

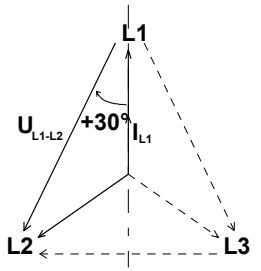
- device **address** in communication network, 1 to 255,
- **speed,** 600, 1200, 2400, 4800, 9600, 19200 or 38400 bauds,
- **parity**, even, odd, without.

6) Special function:
This function activates or deactivates **press-buttons** that allow to change displayed value, manual or scrolling.

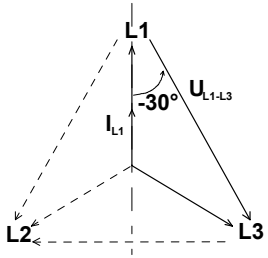
DETERMINATION OF THE PHASE ANGLE
Function reserved for experienced users.

Used only for a balanced triphase network without neutral.This function allows a wiring adaptation. Phase angle acquisition between voltage and current allows to use any voltage phase with any current phase.

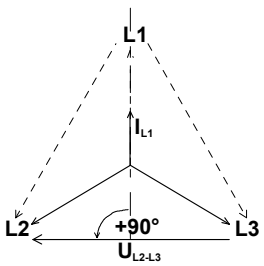
To determine the initial angle, you must:
- be in measure mode,
- type **"PHAS"**, function access code, after each code, a beep is emit,
- the message **"INITIAL ANGLE"** followed by initial angle value appears,
- enter the new value of angle,
- then press **"ENTER"** to memorize angle, message **"OK !"** appears.



With I1, L1 and L2,
+30° initial angle



With I1, L1 and L3,
-30° initial angle



With I1, L2 and L3,
+90° initial angle

VALUE TO ENTER AT THE QUESTION : INITIAL ANGLE

	I1	I2	I3
With L1 and L2	**+30°**	**-30°**	**+90°**
With L1 and L3	**-30°**	**+90°**	**+30°**
With L2 and L3	**+90°**	**+30°**	**-30°**

EMC CONSIDERATION

1) Introduction:

In order to satisfy its policy as regards EMC, based on the Community directive 89/336/CE, the LOREME company takes into account the standards relative to this directive from the very start of the conception of each product.
As the devices are devised to work in industrial environments, the various tests are carried out in the sight of the EN 50081-2 and EN 50082-2 standards, in order to make out a statement of conformity.
As the devices lie in certain typical configurations during the tests, it is not possible to secure the outcomes in any possible configuration.
To ensure the best functioning possible of each device, it would be judicious to comply with several recommendations of use.

2) Recommendations of use:

2.1) General remarks:

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

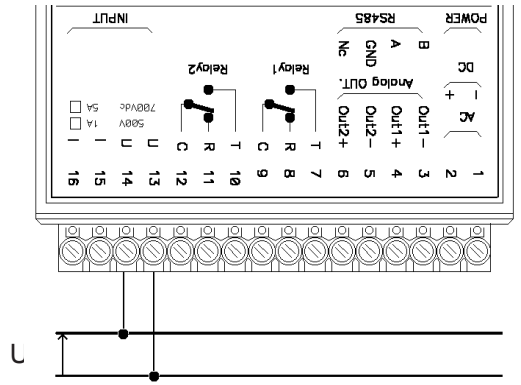
2.2) Power supply:

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

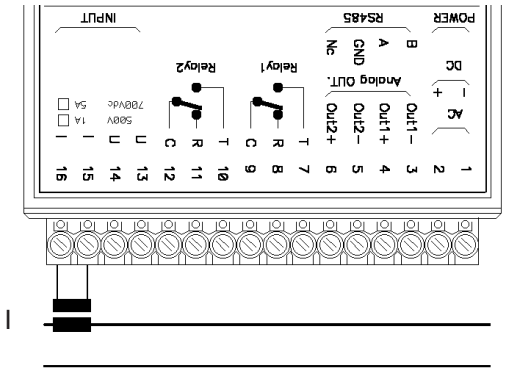
2.3) Inputs / Outputs:

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

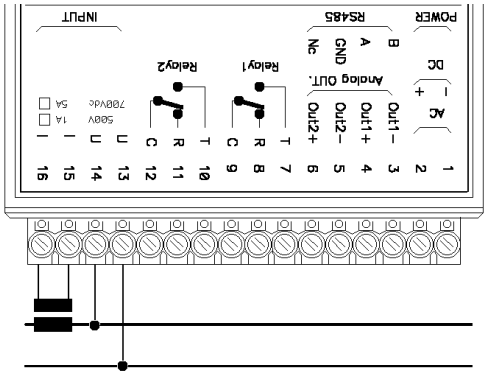
DIAGRAMS OF CONNECTION



Measure of voltage or frequency on voltage signal

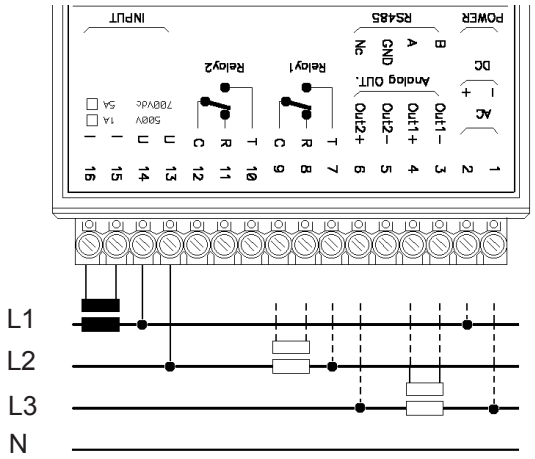


Measure of current or frequency on current signal



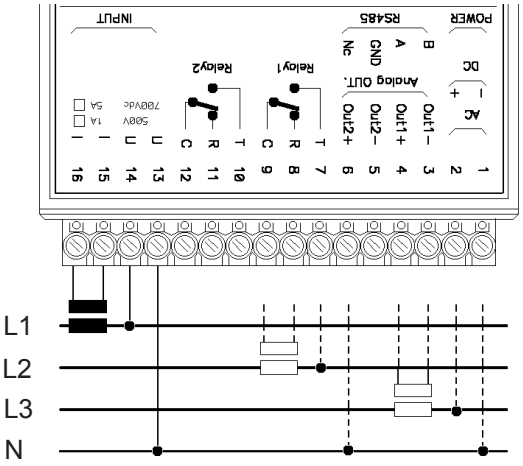
Monophase

DIAGRAMS OF CONNECTION



Three-phase balanced without neutral

Using of initial angle for wiring adaptation



Three-phase balanced with neutral

RS485 COMMUNICATION MODBUS

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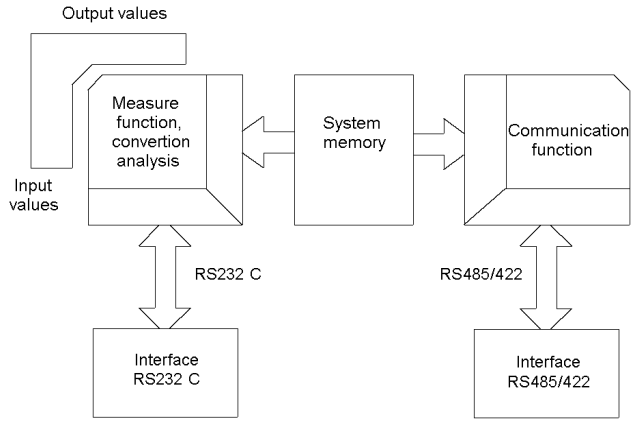
1) Internal structure:

1.1) Presentation:

The device is divided in two cells. Each cell has a specific function which keeping a continuous exchange of pieces of information with the second cell. The first cell is in charge of the measure, analysis and conversion function. The second cell is in charge of the communication function. The information exchange is continuous and automatic.



1.2) Measure function:

The measure cell runs the acquisition of the different signals and calculates all the values with regards to the configuration of the device.
It also runs all the output functions (analogical, alarm, meter, RS 232). All measured or calculated parameters are stored in the system memory and are constantly refreshed.

1.3) Communication function:

The communication cell runs the RS485 communication interface in the MODBUS/JBUS protocol. It analyzes the requests of the main station and answers if the device is addressed. It draws all these datas from the system memory that can be continuously accessed.

1.4) System memory:

Each cell can continuously access the system memory. The latter has a dual access, which allows a reading/writing of the data without any possible internal conflicts.

2) Communication:

The type of used protocol is MODBUS/JBUS in RTU mode. The communication has neither header nor delimitator of frame. The detection of the frame start is made by a silence whose time is at least equal to the transmission of 3.5 bytes. It implies that a frame received can be processed only after a time equal to the silence given before. The time of this silence is directly linked to the speed of transmission of the system:

Ex: Speed 9600 bauds - no parity (10 bits/byte)
Silence = (3.5 x 10) / 9600 = 3.64 ms

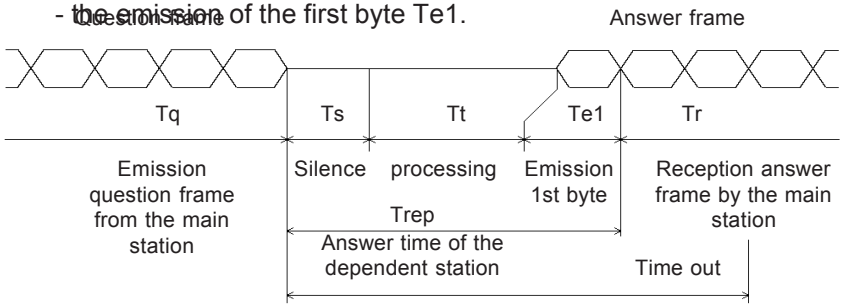
The device starts to process the frame 3.64 ms after receiving the last byte.

Note: The time separating two bytes from a same frame must be inferior to a silence. If the user does not comply with this condition, the second byte will be considered as the first one of a new frame.

The interval of time separating the end of reception of the last byte of the question frame and the end of emission of the first byte of the answer frame (detection of frame of the main station) constitutes the answer time of the device.

This answer time Trep includes:

- the silence (time of 3.5 bytes) Ts,
- the processing of the frame Tt,
- the emission of the first byte Te1.



The time beyond which the device does not answer is called **Time out**. It depends on the transmission parameters (speed, format) and the type of the function asked (reading, writing). This time must be defined by the user and must be superior to the answer time of the device.

A complete cycle of communication includes :

- the transmission of the question frame Tq
- the answer time of the device Trep
- the transmission of the answer frame Tr

Three reasons might cause a **time out**:

- wrong transmission data at the time of the question frame
- wrong configuration of the **time out** on the main station
- dependent station out-of-order.

3) Implementation:

3.1) Parametrizing:

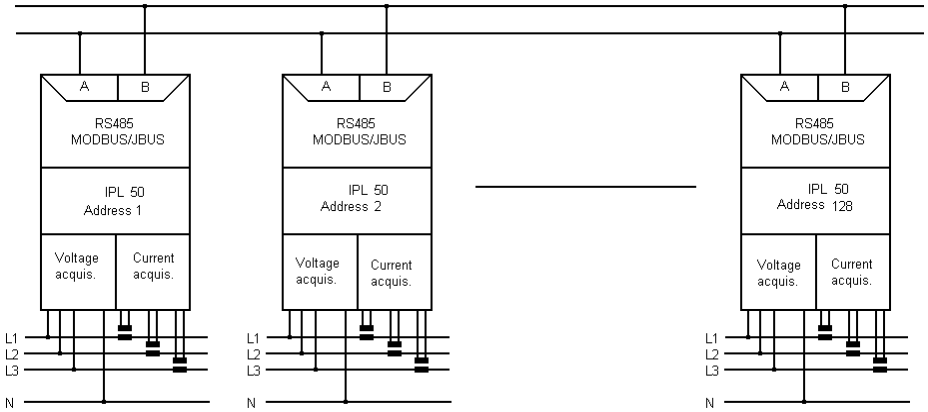
Before starting up the RS485 MODBUS/JBUS communication, make sure that:

- the speed of transmission is identical between the dependent stations (LOREME devices) and the main station.
- the parity is identical between the dependent stations LOREME devices and the main station.
- the addresses are correctly distributed among the dependent stations (LOREME devices), no identical addresses for two dependent stations.
- the TIME OUT is correctly adjusted on the main station.

All the parameters of speed, parity and address must be configured on the devices with the RS232 link.

The possibilities of configuration of the devices are the following ones:

- address: from 1 to 255
- speed 600, 1200, 2400, 4800, 9600, 19200, 38400 bauds
- parity: even, odd, without.



The RS485 interface used allows to connect 128 dependent stations on the same network. For better operating conditions (noise immunity), the network will have to be made up of a twisted pair.

4) Communication times:

4.1) Procedure:

Analysis of the times of communication for parameters of data transmission and for particular cases.

Parameters of transmission:

- speed: 9600 bauds.
- format: 1 start bit, 8 data bits without parity, 1 stop bit.

Explored cases:

- reading of all the measures of the network at the floating format

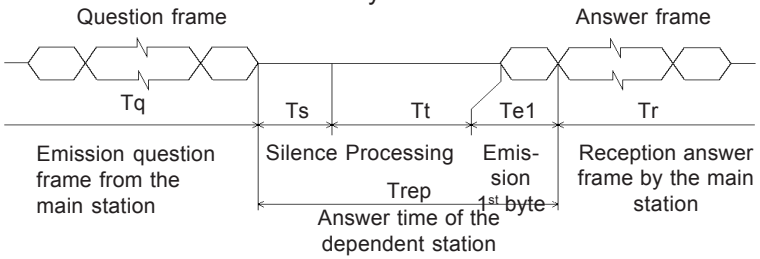
4.2) Measures reading :

Reading of 14 words (28 bytes) of the address $4000 to $400D

- Voltage
- Current
- Frequency
- Active power
- Reactive power
- Apparent power
- Cosinus phi

(value made of 2 words, 4 bytes)

Length of frame:
- question: 8 bytes
- answer: 33 bytes



Calculation of the times:

- Question frame	Tq = (8 x 10) / 9600 = 8.33 ms
- Silence	Ts = (3.5 x 10) / 9600 = 3.64 ms
- Processing	Tt = 45 ms
- Emission 1st byte	Te1 = (1 x 10) / 9600 = 1.04 ms
- Answer time	Trep = Ts + Tt + Te1 = 49.68 ms
- Answer frame	Tr = [(33 - 1) x 10] / 9600 = 33.33 ms
- Complete cycle	Tcyc = Tq + Trep + Tr = 91,34 ms

Processing time Tt is fixed. It depends neither on the speed nor on the format of transmission. Consequently, for new parameters of transmission, all the times are going to change but not Tt.

To set TIME OUT of the system, you just have to calculate answer time Trep of dependent station according to parameters of communication.

For a complete reading of measures, cycle time of system is about 92 ms.

5) Frames structure :

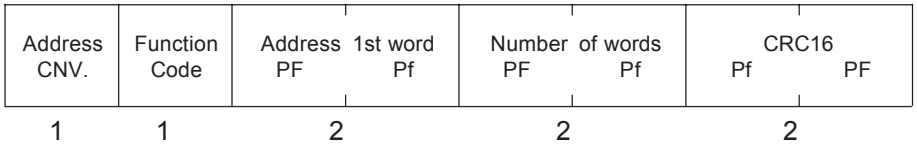
5.1) Words reading :

Function code used: $03 or $04

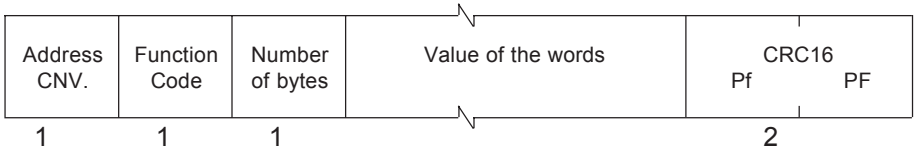
Reading of measures of the network:

- data at the 32-bit floating format	address $4000 to $400D
- data at the 16-bit integer format	address $5000 to $5008
- data at the 32-bit integer format	address $6000 to $600D

Question: length of frame 8 bytes.



Answer: length of frame 5 bytes + number of read bytes

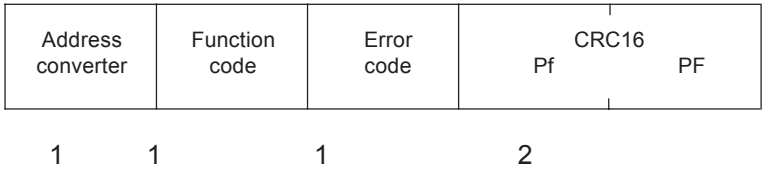


5.2) Exception frame:

When a physical error of transmission of a question frame occurs (CRC16 or parity), the dependent station does not answer.

If an error of frame (data address, function, value) occurs, an answer of exception will be emitted by the dependent station.

Length of frame: 5 bytes.



Features of the exception frame:

- Function code:

The function code of the exception frame is identical to the one of the question frame, but its bit of strong load is set to 1 (logical or with $80)

.- Error code:
The error code establishes the reason of a sending of an exception frame.

Error code	Signification
$01	Function code not used. Only the functions reading of words ($03 or $04) are allowed.
$02	Non-valid data address. Memory access not allowed.

6) Data of communication:

6.1) Accessible data:

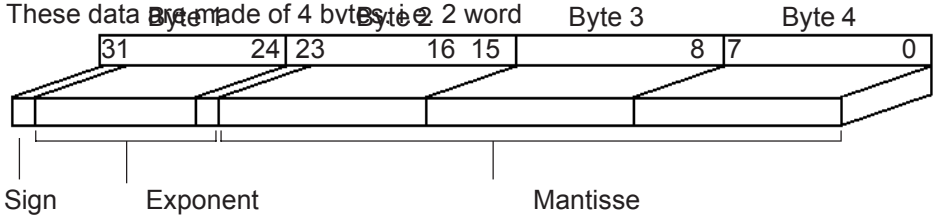
All the measures are accessible in reading mode. Voltage, current, frequency, active power, reactive power, apparent power, cosinus phi, active consumed, generated, reactive inductive, capacitive energy on the phases 1, 2, 3 and the sum of the phases.

The values are:
- on 2 words at the 32-bit IEEE floating format (4 bytes), for voltage, current, frequencie, active, reactive, apparent powers and cos φ.
- on 1 word at the 16-bit integer format (2 bytes) multiplied or not by a coefficient, for voltage, current, frequency, active, reactive,apparent powers, cos φ, PT and CT ratio.
- on 2 words at the 32-bit integer format (4 bytes) multiplied or not by a coefficient, for voltage, current, frequency, active, reactive, apparent powers and cos φ.

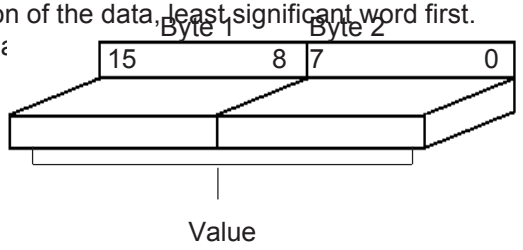
➔ Consult the enclosed tables for the detail of the measures.

6.2) Data format:

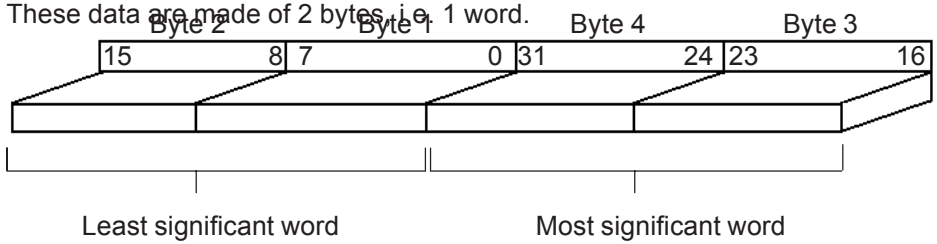
- Data at the 32-bit IEEE floating format.
Transmission of the data, most significant word first.
These data are made of 4 bytes, i.e. 2 word



- Data at the 32-bit integer format.
Transmission of the data, least significant word first.
These data a



- Data at the 16-bit integer formatau format.
Transmission of the data, most significant word first.
These data are made of 2 bytes, i.e. 1 word.



7) Table of data

7.1) 32-bit floating fomat:

Adress words decimal (Hexa)	b7	b6	b5	b4	b3	b2	b1	b0		Total Words	Bytes
16384 ($4000)	Voltage								Byte 1 Word 1	1	1
									Byte 2	2	
16385 ($4001)									Byte 3 Word 2	2	3
									Byte 4	4	
16386 ($4002)	Current								Byte 1 Word 1	3	5
									Byte 2	6	
16387 ($4003)									Byte 3 Word 2	4	7
									Byte 4	8	
16388 ($4004)	Frequency								Byte 1 Word 1	5	9
									Byte 2	10	
16389 ($4005)									Byte 3 Word 2	6	11
									Byte 4	12	
16390 ($4006)	Active Power								Byte 1 Word 1	7	13
									Byte 2	14	
16391 ($4007)									Byte 3 Word 2	8	15
									Byte 4	16	
16392 ($4008)	Reactive Power								Byte 1 Word 1	9	17
									Byte 2	18	
16393 ($4009)									Byte 3 Word 2	10	19
									Byte 4	20	
16394 ($400A)	Apparent Power								Byte 1 Word 1	11	21
									Byte 2	22	
16395 ($400B)									Byte 3 Word 2	12	23
									Byte 4	24	
16396 ($400C)	Cosinus phi								Byte 1 Word 1	13	25
									Byte 2	26	
16397 ($400D)									Byte 3 Word 2	14	27
									Byte 4	28	

7.2) 16 bit integer format:

Adress words decimal (Hexa)	b7	b6	b5	b4	b3	b2	b1	b0		Total Words	Bytes
20480 ($5000)	Voltage								Byte 1 Word 1	1	1
									Byte 2	2	
20481 ($5001)	Current x 100								Byte 1 Word 1	2	3
									Byte 2	4	
20482 ($5002)	Frequency x 100								Byte 1 Word 1	3	5
									Byte 2	6	
20483 ($5003)	Active Power								Byte 1 Word 1	4	7
									Byte 2	8	
20484 ($5004)	Reactive Power								Byte 1 Word 1	5	9
									Byte 2	10	
20485 ($5005)	Apparent Power								Byte 1 Word 1	6	11
									Byte 2	12	
20486 ($5006)	Cosinus phi x 100								Byte 1 Word 1	7	13
									Byte 2	14	
20487 ($5007)	PT ratio								Byte 1 Word 1	8	15
									Byte 2	16	
20488 ($5008)	CT Ratio								Byte 1 Word 1	9	17
									Byte 2	18	

Supplied values are which one directly mesured by device without taking in consideration TP and TI ratio. To obtain real values, it's necessary to:

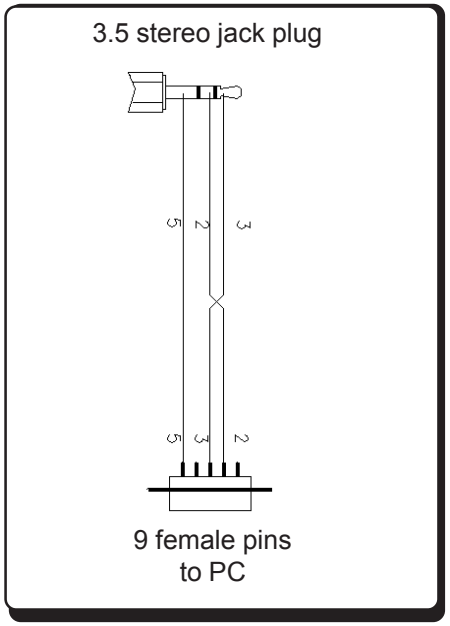
- divide curent, frequency and cos phi values by 100.
- multply voltage, active power, reactive power and apparent power values by TP ratio.
- multply current, active power, reactive power and apparent power values by TI ratio.

So, all obtained values correspond to real electric network values.

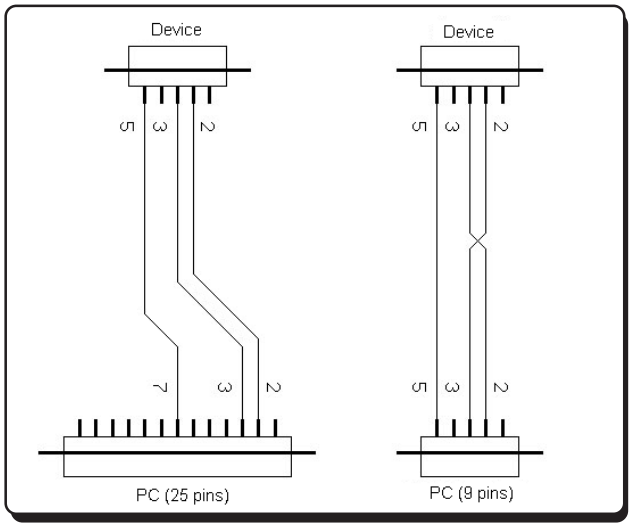
7.3) 32 bit integer format:

Adress words decimal (Hexa)	b7	b6	b5	b4	b3	b2	b1	b0		Total Words	Bytes
24576 ($6000)	Voltage								Byte 1 Word 1	1	1
									Byte 2	2	
24577 ($6001)									Byte 3 Word 2	2	3
									Byte 4	4	
24578 ($6002)	Current								Byte 1 Word 1	3	5
									Byte 2	6	
24579 ($6003)									Byte 3 Word 2	4	7
									Byte 4	8	
24580 ($6004)	Fréquency								Byte 1 Word 1	5	9
	(value x100)								Byte 2	10	
24581 ($6005)									Byte 3 Word 2	6	11
									Byte 4	12	
24582 ($6006)	Active Power								Byte 1 Word 1	7	13
									Byte 2	14	
24583 ($6007)									Byte 3 Word 2	8	15
									Byte 4	16	
24584 ($6008)	Reactive Power								Byte 1 Word 1	9	17
									Byte 2	18	
24585 ($6009)									Byte 3 Word 2	10	19
									Byte 4	20	
24586 ($600A)	Apparent Power								Byte 1 Word 1	11	21
									Byte 2	22	
24587 ($600B)									Byte 3 Word 2	12	23
									Byte 4	24	
24588 ($600C)	Cosinus phi								Byte 1 Word 1	13	25
	(value x100)								Byte 2	26	
24589 ($600D)									Byte 3 Word 2	14	27
									Byte 4	28	

TERMINAL - ANALYZER LINK



STANDARD LINK ON
FRONT SIDE



LINK ON BACK SIDE
IP54 OPTION