Alarm Annunciator, Indicator Panel

CONFIGURATION HANDBOOK

AFL100

REV 2.3 29/06/23

Table of content

LOREME

RS232 link setting

LOREME

The device can be configured or updated in terminal mode via an RS232 link. The terminal emulation software for PC « hyperterminal » is resident in windows up to XP version. For later versions, it is downloadable on :
(http://www.loreme.fr/HyperTerm/htpe63.exe)

The different procedures for the terminal setting are detailed below.

PC with WINDOWS:
Step for running terminal program:

1 - Click on **"START"** button
Up to XP version
- Tick off **"Programs \ Accessories \ Communication \ Hyper Terminal"**
- Click on **"Hypertrm.exe"**
Later versions
- Tick off **"All programs \ HyperTerminal Private Edition"**
- Click on **"HyperTerminal Private Edition"**

2 Enter name for the new connection
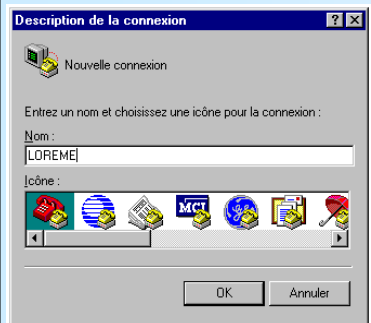
3 Choose a communication port
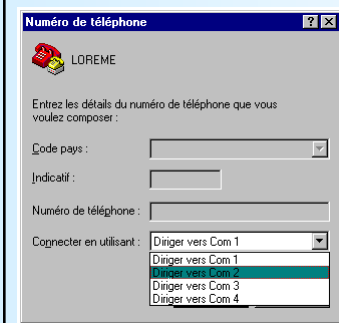
4 Choose:
- 9600 bauds
- 8 DATA bits
- no parity
- 1 stop bit
- **XON/XOFF**

5 Le PC is now in terminal mode, connect to device by plugging the RS232 link cable. The measure is now displayed. To access configuration, press 'C' key.

6 When leaving Hyper terminal, the following window will appear. By accepting the recording of the session, terminal mode will be able to start again without using this procedure.
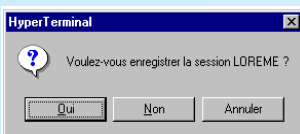
Thus, the shortcut LOREME.ht will permit to communicate with all LOREME devices.

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.

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 driver,
- Plug the adapter on USB port,
- Start and configure the **HyperTerminal** as described above.

Note :
The use of the adapter on another USB port don't generates a new communication port .

FIRMWARE update

To access to the firmware update function, power on the device. The following character is send to the terminal:

>   <——————————— The device sends this character then it waits the « F » key during 0.5 s.

If the user has pressed the « F » key in the allowed time, the following message is displayed in the Hyperterminal windows:

FIRMWARE LOADER Rev2
READY TO TRANSFER...

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

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

FIRMWARE LOADER Rev2
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.

Device presentation

LOREME

Description:

AFL100 is a treatment panel of technical defaults. Intended to replace the lamps on the switchboard in industrial plant. It integrates all the functions necessary to local or remote signalling: memorization, blinking, acknowledge and alarm. Directly embedded, it can be mounted on a rack, on a console . Different options allows a fully adaptation: number of input, relay Output...

Models specifications: AFL 100/8: 8 logical input.
AFL 100/16: 16 logical input.
Option : /S: 1 output contact by channel input.
/CM: modbus communication.
/CMTCP: modbus TCP communication.

Visual alarms

Push button

RS232 link
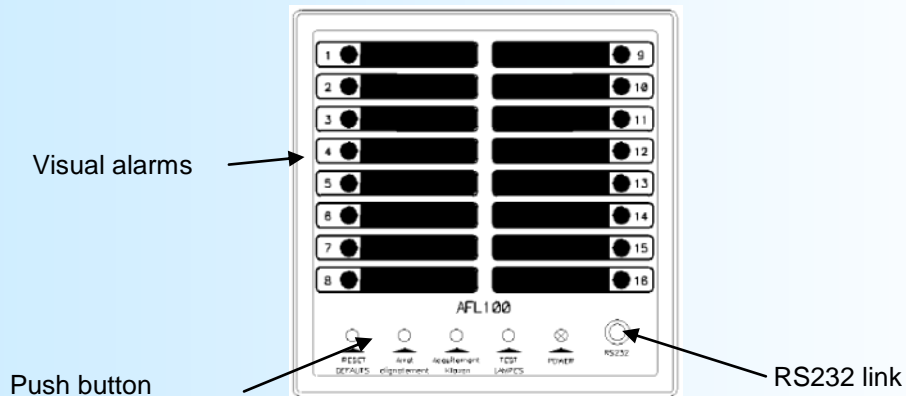
The AFL100 has 4 push buttons in front face. This buttons can be remote by using the contact input provide in back side.
- « HORN ACKNOWLEDGE » button : Shut off the Horn.
- « LAMP RESET » button : change the Led blinking to continuous illumination.
- « DEFAULT RESET » button : shut off Led and the relays
- « LAMP TEST » button : All the Led are on as long as the button is press.

1) Function of detection:
1-1) « ALARM » function:
The appearance of a defect in the input leads, after delays, the flashing of the corresponding Led and an action on horn and synthesis relays. This state will remain active even if the fault disappears (alarm memory). The detection of the first defect is visualized by a fast blinking of the led (several channels may generate the first defect if they appear in the same time), the following defect by a slow blinking.
The defaults acknowledge is made in several step :
- Action on « HORN ACKNOWLEDGE » : The klaxon relay is shut off,
- Action on « LAMP RESET » : The flashing led become fixed. The appearance of a new defect will be indicated by a fast blinking.
- Action on « DEFAULT RESET » : Led and synthesis relay are off if the default have disappeared. If default still present, the led are lit continuously.

1-2) « SIGNALLING » function:
In this configuration, there is no alarm memory. The Led show the state of the input. The input delays still be activated.

2) Configurable input parameters:
2-1) Inhibit:
When an input is inhibited, it is no longer taken into account by the AFL100.

2-2) Time delays:
This delays is the time between the appearance of the defect on input and its consideration by the AFL100. (the limits are 0 to 300 seconds. 0.1s is the default value)

2-3) Inactive state:
This parameter define the input state when no defects are present.
- NORMAL: The input is inactive if the voltage is < 3V.
- REVERSE: The input is inactive if the voltage is > 3V.

3) Configurable parameters of HORN and SYNTHESIS relays:
3-1) HORN relay:
Three action type may be use :
- CONTINUOUS : The relay is ON and stay ON.
- INTERMITTENT with relay ON 1 second and OFF 1second
- INTERMITTENT with relay ON 1 second and OFF 2seconds

The SECURITY parameter define if the relay is normally open or normally close.

3-2) SYNTHESIS relay:
Only the SECURITY parameter can be modified. This parameter define the state of relay in idle state.

4) Configurable parameters of output contact:
The AFL100 device with /S option provide output contact. This output have three operating mode:

4-1) « ALARM MEMORY » mode:
The output relay is activated when the input defect appears (after input delay). It is deactivated after an action on the "Default Reset" button and if the default disappears.

4-2) « INPUT » mode:
The output relay is activated when the input defect appears (after input delay). It is deactivated if the defect disappears.

4-3) « SIGNAL » mode:
The output relay follow the front face led.

5) Configuration:
The AFL100 provide a RS232 link for the local communication. If the user connects a cable from the AFL100 to a PC with a terminal emulation program (such as HyperTerminal), he can access to viewing and configuring the device.

5-1) Viewing:
The device automatically detects the connection of terminal. Once detected, the page is displayed after 3-4 seconds. Pressing **"R"** to force the display of this page:

```
   CHANNEL STATE INHIB. FUNCT.  DELAY SENSE
 1> 1  -      0             ALARM   0.1s NORMAL
 2> 2  -      0             ALARM   0.1s NORMAL
 3> 3  -      0      INH
 4> 4  -      0             ALARM   0.1s NORMAL
 5> 5  -      0             ALARM   0.1s NORMAL
 6> 6  -      0             ALARM   0.1s NORMAL
 7> 7  -      0             ALARM   0.1s NORMAL
 8> 8  -      0             ALARM   0.1s NORMAL
 9> 9  -      0             ALARM   0.1s NORMAL
10>10  -      1             SIGNAL  0.1s REVERSE
11>11  -      0             ALARM   0.1s NORMAL
12>12  -      0             ALARM   0.1s NORMAL
13>13  -      0             ALARM   0.1s NORMAL
14>14  -      0             ALARM   0.1s NORMAL
15>15  -      0             ALARM   0.1s NORMAL
16>16  -      0             ALARM   0.1s NORMAL


           STATE    SENSE        MODE
17> HORN      0   NORMALLY OPEN   CONTINUOUS
18> SYNTHESIS 0   NORMALLY OPEN

 <R>EFRESH DISPLAY    <C>OMMON CONFIGURATION   CHOICE(1-18)
```

> *Note:*
> *This page shows the state and configuration of the input and relays.*
> *This page is not automatically refresh, the user should press the « R » key.*
>
> ***Attention !:*** *When the AFL100 send the data of viewing page to the terminal, inputs are no longer monitored.*

LOREME

5.2) Method:
In configuration, different types of questions are asked. For each of them, several answers are possible. Here is their description:

5.2.1) Menu selection:
Example: INPUT   The choice is done by typing **"Y"** or **"N"** keys.
          Y - N   This choice allows access to different configuration menus.

5.2.2) Parameter selection:
Example: INHIBITION   or   INHIBITION
          (Y-N) TES   (Y-N) NO

Previous choice = YES: - type **"Y"** or **"Enter"**   =>   validate the choice = YES,
                        - type **"N"**   =>   change, choice = NO.
Previous choice = NO: - type **"N"** or **"Enter"**   =>   validate the choice = NO,
                        - type **"Y"**   =>   change, choice = YES.

Choices and validation are made by typing **"Y"** or **"N"** keys, validation are made by typing **"Enter"**.

5.2.3) Value acquisition:
Example: TIME DELAY   Two possibilities:
          0.1 s   - The validation without modification by typing **"Enter"**,
                          - The modification with simultaneous display followed by validation with **"Enter"** key.

Remarks: It is possible, when a mistake is made during a value acquisition, before validating it, to go back by pressing on "<—" (backspace) key. This re-displays the message and discard the new value. In configuration mode, if no action are made, device goes back in operating mode without taking notice of the modifications made before. if the user want to leave configuration mode and go back to measure mode, just press **"ESC"** .

5.3) Individual configuration of inputs:
To access the configuration of a channel, type the channel number and confirm by « ENTER »:
« 1 » to « 8 » for the first eight channel, « 9 » to « 16 » for the eight next channel.

Configuration menu:

CONFIGURATION Vx.y   temporary display of hard and soft device version.

LOGICAL INPUT 01   Display the input index.

LANGUAGE
(Y-N)   -> type 'Y' to change the message language.

INHIBITION
(Y-N)NO   -> The input is no longer account when it is inhibit.

FUNCTION
(Y-N)   -> type 'Y' to access parameters
    SIGNALLING
    (Y-N)NO   -> choice between two operating mode. « Signalling » or « Alarm »
    ALARM
    (Y-N)YES

TIME DELAY
(Y-N)
    TIME DELAY
    0.1 s   -> Setup the input delay value. (0 to 300sec.)

INACTIVE STATE
(Y-N)   -> Setup the inactive state of inputs. « Normal » or « Reverse »

```
    NORMAL
    (Y-N)NO
    REVERSE
    (Y-N)YES
```

```
OUTPUT CONTACT FUNCTION
(Y-N)                             -> define the operating mode.
    OUTPUT CONTACT= INPUT
    (Y-N)NO
    OUTPUT CONTACT= SIGNALLING
    (Y-N)NO
    OUTPUT CONTACT= ALARM MEMORY
    (Y-N)YES
```

```
OK                        -> end of configuration. The change are store in memory.
```

5.4) Common configuration:
The user can modify the configuration for all input channel by press the « C » key.

```
CONFIGURATION Vx.y        temporary display of hard and soft device version.
```

```
LANGUAGE
(Y-N)                     -> type on 'Y' to change the message language.
```

```
COMMON INPUT
(Y-N)                     -> type on 'Y' to access to inputs parameters. (see « Individual configuration of inputs »
                             section.)
```

5.5) Communication configuration:
Available only with the AFL100 /CM or /CMTCP option.
To access to the communication setup, go to « common configuration » menu.

```
COMMUNICATION
(Y-N)                     -> type 'Y' to access to the parameters.
```

/CM option:
```
    MODBUS                -> show the used protocol : Modbus RTU

    ADDRESS
    1                     -> type the slave address.

    SPEED
    1 38.4 Kbds
    2 19.2 Kbds
  * 3 9.6 Kbds
    4 4.8 Kbds
    5 2.4 Kbds
    6 1.2 Kbds

    YOUR CHOICE: 3        -> choose the baudrate. The ' * ' symbol show the initial choice.

    PARITY
  * 1 NONE
    2 EVEN
    3 ODD
    YOUR CHOICE: 1        -> Choose the parity bit format.
```

/CM option:

```
     PROFIBUS                    -> show the used protocol : PROFIBUS

     ADDRESS
     1                           -> type the slave address : from 1 to 125

     SPEED
  *  1 1500 Kbds
     2 500 Kbds
     3 187.5 Kbds
     4 93.7 Kbds
     5 19.2 Kbds
     6 9.6 Kbds

     YOUR CHOICE: 1              -> choose the baudrate. The ' * ' symbol show the initial choice.
```

/CMTCP option:

```
     MODBUS TCP                  -> show the used protocol: Modbus TCP

     IP ADDRESS
     192.168.0.253               -> type the IP address.

     IP MASK
     255.255.255.0               -> type the network mask.

     GATEWAY
     0.0.0.0                     -> type the gateway address if exist.
```

5.6) Configuration of specials functions
To access to this setup, go to « common configuration » menu.

```
SPECIAL FUNCTION
(Y-N)                           -> répondre 'O' pour accéder aux paramètres.

     ACTIVATE RELAY WITH LAMP TEST
     (Y-N)NO                         -> Choose 'Yes' for output contact are activated in the same time as the front face led
                                        during the action on the "Lamp Test" button.
                                     -> Chose 'No' for only the front face led are activated during the action on "Lamp Test".

     SAVING...
     *****                           -> five characters '*' to show the good saving of TCP communication parameters.
                                        (if there are modified).
     OK                              -> Indication of parameters saving.
```

5.7) Configuration of HORN and SYNTHESYS relays:
To access to the configuration, type « 17 » and « ENTER » for the Horn relay and « 18 » for the Synthesis relay.

```
     CONFIGURATION Vx.y

     SETUP KLAXON

     CONTINU                    -> Choose the relay operation (continuous or intermittent).
     (Y N)NO
     ON:1s/OFF:1s
     (Y N)NO
     ON:1s/OFF:2s
     (Y N)NO

     SECURITY:                  -> Choose the idle state of relay.
```

```
NORMALLY OPEN
(Y N)NO
NORMALLY CLOSED
(Y N)NO

OK

SETUP SYNTHESIS
```

SECURITY: -> Choose the idle state of relay.

```
NORMALLY OPEN
(Y N)NO
NORMALLY CLOSED
(Y N)NO
OK
```

6) Functional test:

This part is useful if the user want to test the input, led and output. To access to this test type "**CTRL+T**" (control key and T key simultaneously).

After internal test, the AFL100 display « BUZZER ». Press « ENTER » to activate and stop the buzzer.

- Test of the input channel. Press « Y »

LOGICAL INPUT	1 2 3 4 5 6 7 8		
	R R R R R R R R	"R" : Input inactive	"A": input activated.

If the user activated an input, he can see the state change.
Type « ENTER » for the next step.

LOGICAL INPUT	9 10 11 12 13 14 15 16		
	R R R R R R R R	"R" : Input inactive	"A": input activated.

Test of the LED and output contact
(Type « ENTER » for the next step.)

LED CHANNEL 1	normally only the LED 1 is illuminate.
CONTACT CHANNEL 1	The output relay 1 should be activated.
...	
LED CHANNEL 16	normally only the LED 16 is illuminate.
CONTACT CHANNEL 16	The output relay 16 should be activated.

Test of the horn and synthesis relays

HORN RELAY OFF	The relay is not activated, the contact is open.
HORN RELAY ON	The relay is activated, the contact is close.
SYNTHESIS RELAY OFF	The relay is not activated, the contact is open.
SYNTHESIS RELAY ON	The relay is activated, the contact is close.

Test of push buttons (front face and remote)

PB: LAMP TEST	Wait an action in the « LAMP TEST » button
REMOTE PB: LAMP TEST	Wait the input contact « LAMP TEST » is closed.
PB: HORN ACK.	Wait an action in the « HORN ACK. » button
REMOTE PB: HORN ACK.	Wait the input contact « HORN ACK. » is closed.
PB: LAMP RESET.	Wait an action in the « LAMP RESET » button
REMOTE PB: LAMP RESET.	Wait the input contact « LAMP RESET » is closed.
PB: DEFAULT RESET	Wait an action in the « DEFAULT RESET » button
REMOTE PB: DEFAULT RESET	Wait the input contact « DEFAULT RESET » is closed.
OK	End of test

NOTE : The test can be different following options on AFL100 device.

Operating Diagrams

1) Fault detection
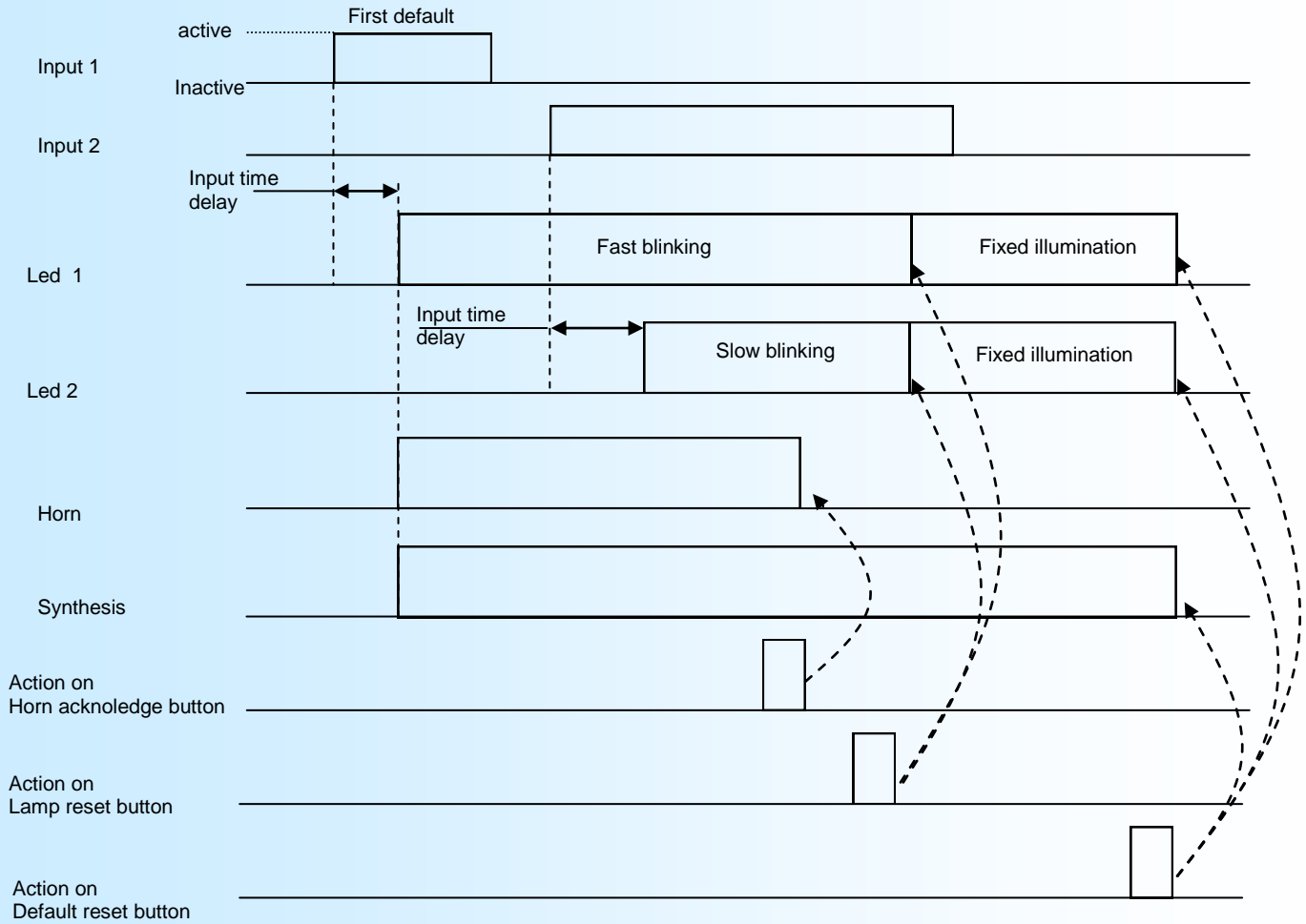
2) Output contact functions
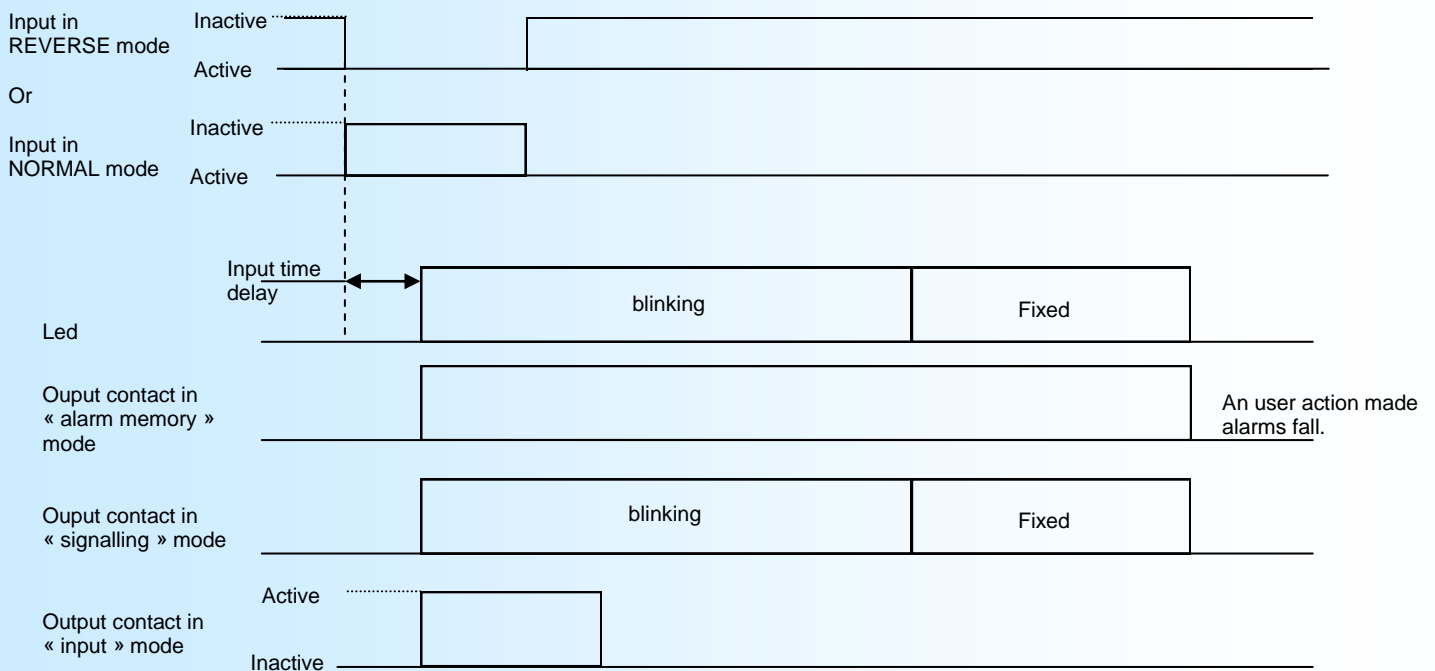
Modbus communication

1) <u>Features:</u>

Protocol:	MODBUS RTU
Link:	RS485
Baudrate:	1200 to 38400 bds
Connector:	4 pts terminal block
Modbus functions:	Read request only: function code 03,04
Data type:	state of inputs, signalling, alarms, output contact, relays.
Data format:	state value in 16bits integer.

2) <u>Communication :</u>

The measure are internally refresh every 50ms. The response time to a read request is about 10ms.

3) <u>Communication data:</u>
3.1) <u>Data type:</u>

The state of an input, alarm, indicator is shown by a bit.
- 1 word or 2 bytes shown 16 inputs, alarms, indicators...

3.2) <u>Data format:</u>

For each word, the bit 0 (LSB) shown the channel 1, the bit 15 (MSB) shown the channel 16.
The words are transmit MSB first.

4) <u>Exception frame:</u>

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

Details of the exception frame:
Byte 1: slave address
Byte 2: Function code: The function code of the exception frame is identical to the request frame with the MSB bit
set to 1.
Byte 3: Error code: The error code indicate the reason of the exception frame
Byte 4-5: control word

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

5) <u>Measure table:</u>

The registers are in address 0000 to 0004. The table below show the mapping of this registers:

Register address (Hexadecimal)	Description
0000 ($0000)	Logical state of inputs. (bit0:input 1..b7:input 8...b15:input 16)
0001 ($0001)	State of front face led. (bit0:led 1..b7:led 8...b15:led 16)
0002 ($0002)	Inputs who have activated alarm. (bit0:input 1..b7:input 8...b15:input 16). this corresponds to the indicator on the front face flashing quickly.
0003 ($0003)	State of output contact. (bit0: rel.1..b7:rel.8...b15:rel.16)
0004 ($0004)	State of relays. (bit0: Horn relay ..bit1: Synthesis relay)

Profibus communication

LOREME

1) **Features:**

This device meet the PROFIBUS specification EN 50710 volume 2.

Supported baud rate: 9.6 k, 19.2 k, 93.75 k, 187.5 k, 0.5 M, 1.5 Mbauds.
Type of transmission: RS485, 8 bits data, 1 stop, even parity.
Connector: 4 pts terminal block

2) **Implementation :**

The network address and the baud rate should be setting in the device via the RS232 communication link.
All communication information's are in the GSD file available on our site :
http://www.loreme.fr/aff_produits.asp?rubid=135&langue=gb

This information's are in several parts:
- Information about the functionality of the device,
- data configuration,

2.1) **Details of data in cyclic exchange:**

The cyclic exchange data between master and the slave AFL100 is form with 5 input words. No output data.

The data are group like this:
- the first word is for instantaneous state of inputs (bit0 : input 1 … bit15: input 16)
- the second word is for light state (bit0 : light 1 …. bit15: light 16)
- the third word is for inputs who are activated alarm
- the fourth word is the state of output contact
- the fifth word is for the state of horn and synthesis relays (bit0 : horn relay … bit1: synthesis relay)

Modbus TCP communication

LOREME

1) Features:

Protocol: MODBUS RTU
Link: Ethernet
Connector: RJ45
Modbus functions: Read request only: function code 03,04
Data type: state of inputs, signalling, alarms, output contact, relays.
Data format: state value in 16bits integer.

2) Communication :

The measure are internally refresh every 50ms. The response time to a read request is about 10ms.

3) Communication data:

3.1) Data type:

The state of an input, alarm, indicator is shown by a bit.
     - 1 word or 2 bytes shown 16 inputs, alarms, indicators...

3.2) Data format:

For each word, the bit 0 (LSB) shown the channel 1, the bit 15 (MSB) shown the channel 16.
The words are transmit MSB first.

4) Exception frame:

If the communication between the communication card and the measure card is interrupted, the slave return a exception frame to signal to master the measures are inaccessible.
Details of the exception frame:
Byte 1: slave address
Byte 2: Function code: The function code of the exception frame is identical to the request frame with the MSB bit
                  set to 1.
Byte 3: Error code: The error code indicate the reason of the exception frame

     Error code   Details
       $04   Slave busy. The internal communication slot is not in connection with the measure part.

5) Measure table:

The registers are in address 0000 to 0004. The table below show the mapping of this registers:

Register address (Hexadecimal)	Description
0000 ($0000)	Logical state of inputs. (bit0:input 1..b7:input 8...b15:input 16)
0001 ($0001)	State of front face led. (bit0:led 1..b7:led 8...b15:led 16)
0002 ($0002)	Inputs who have activated alarm. (bit0:input 1..b7:input 8...b15:input 16). this corresponds to the indicator on the front face flashing quickly.
0003 ($0003)	State of output contact. (bit0: rel.1..b7:rel.8...b15:rel.16)
0004 ($0004)	State of relays. (bit0: Horn relay ..bit1: Synthesis relay)

WEB server

LOREME

WEB page presentation:

The device integrates a web server to view the measure and the state of inputs, relays,...

Button to refresh the web page.

State of inputs, signal and output relays.

State of Horn and Synthesis relays.

Click on [refresh icon] to refresh the inputs state.

If the communication part does not receive measurement data anymore, the display is:
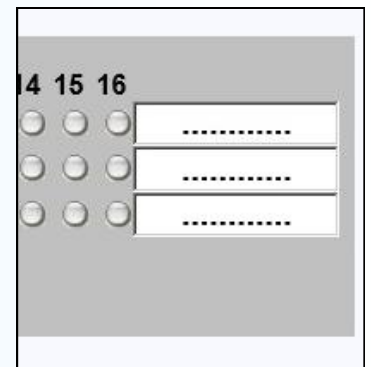
EMC Consideration

LOREME

1) Introduction

In order to satisfy its policy as regards EMC, based on the Community directive 2004/108/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 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.
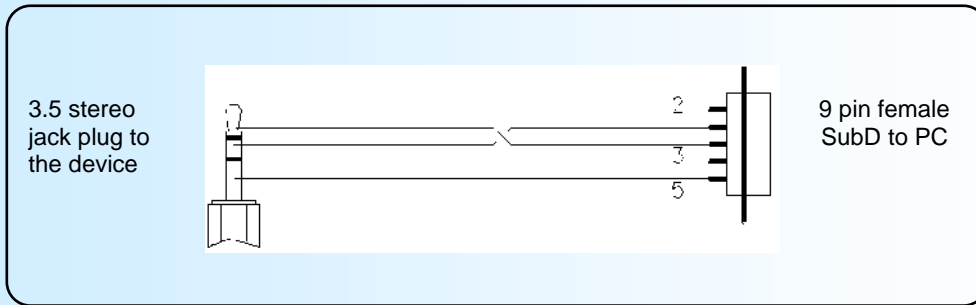
2.2) Power supply

- 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.
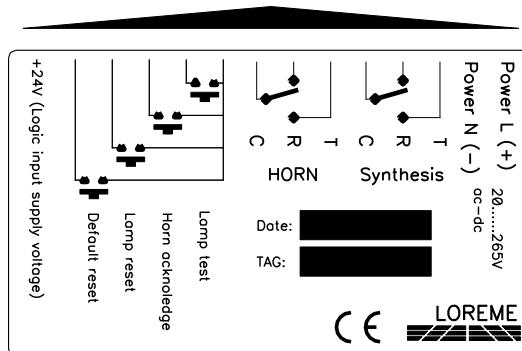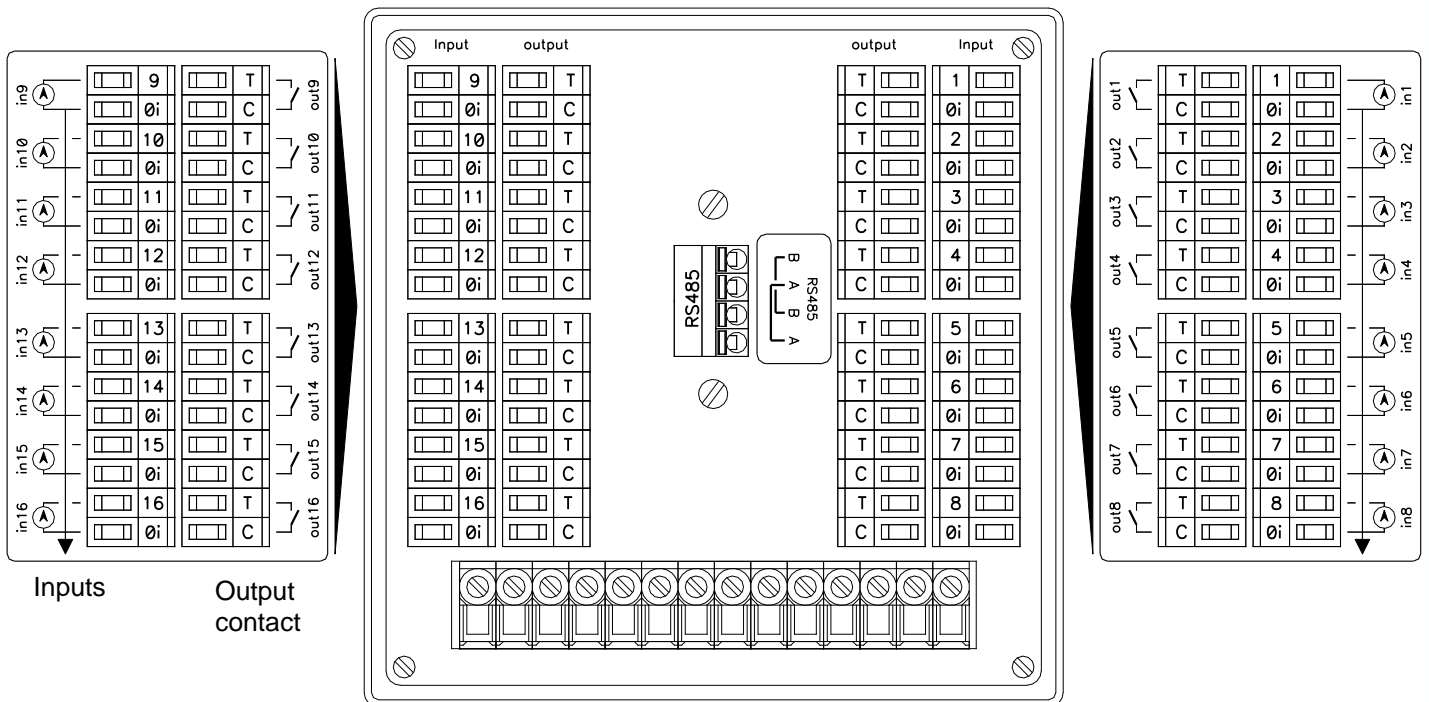
2.3) Inputs / Outputs

- 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.
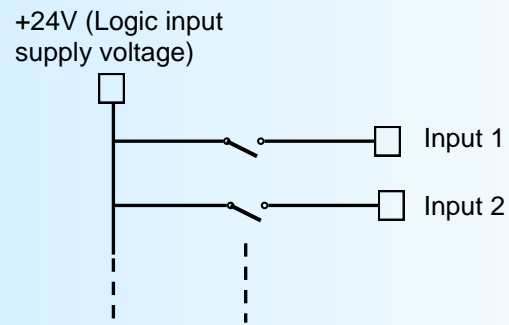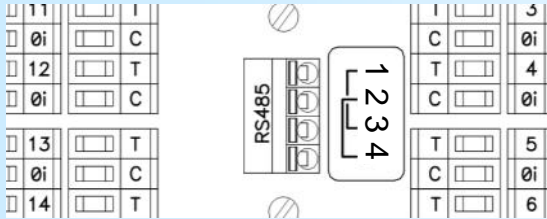
Wiring

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TERMINAL DEVICE LINK

3.5 stereo jack plug to the device

9 pin female SubD to PC

WIRING

Inputs

Output contact

Remote buttons

Example of wiring "dry contact" input

+24V (Logic input
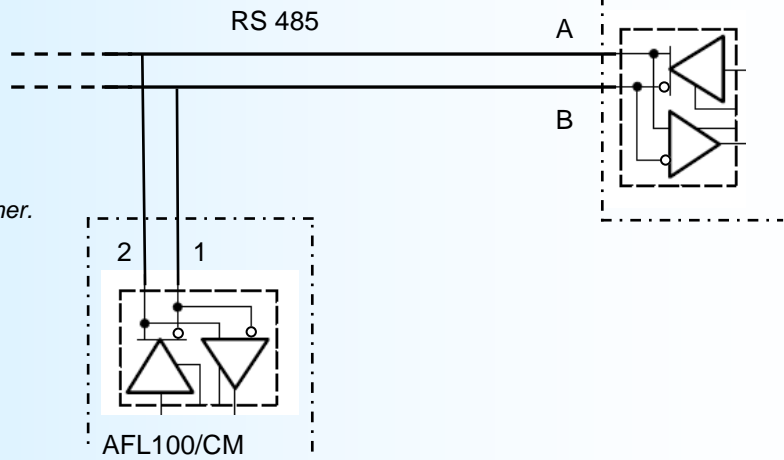supply voltage)

Input 1

Input 2
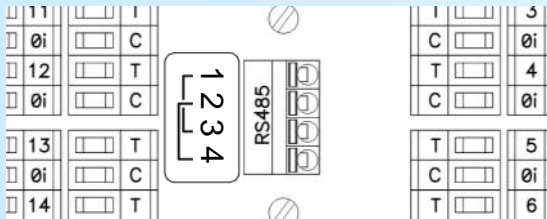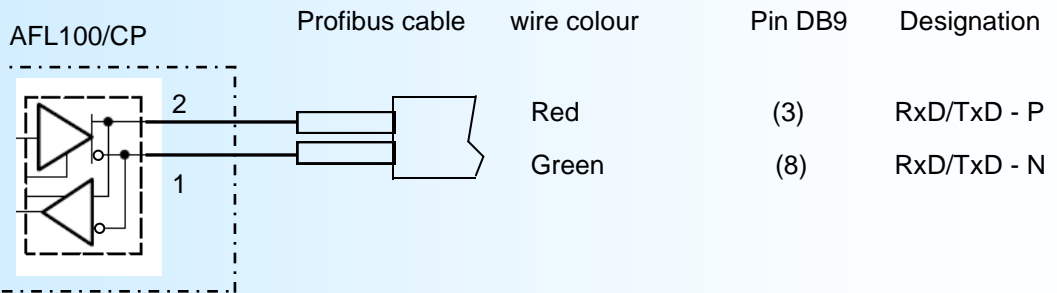
RS485 link wiring for Modbus and Profibus

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Modbus

Note : The terminals 1-2 and 3-4 are linked each other.

Profibus

Note : The terminals 1-2 and 3-4 are linked each other.

AFL100/CP	Profibus cable	wire colour	Pin DB9	Designation
		Red	(3)	RxD/TxD - P
		Green	(8)	RxD/TxD - N

Terminal resistor (not include):
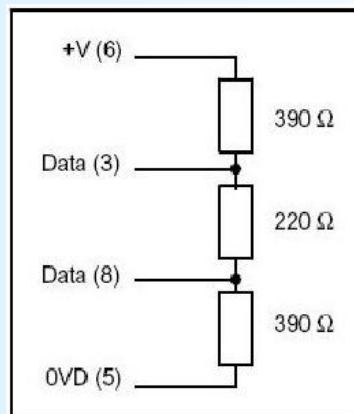
EC DECLARATION OF CONFORMITY

LOREME

With requirements of directive 2004/108/CE "Electromagnetic Compatibility" And requirements of directive 2006/95/CE "LOW VOLTAGE"

We declare under our sole responsibility, that the following product:

> Description: Alarms annunciator
>
> Type: AFL100
>
> Revision number : 2.1   date :   02/15

Complies with the following harmonized generic or specific standards:

GENERIC STANDARDS:	tested	STANDARDS:	
Low Voltage Directive 2006/95/EC.			
	X	EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use
NF EN 61000-6-4 March 2007 Electromagnetic compatibility (EMC) – Part 6-4 : generic standards - Emission standard for industrial environments			
		EN 55011	Radiated emmision and induced emission on alternative current power supply.
NF EN 61000-6-2 January 2006 Electromagnetic compatibility (EMC) – Part 6-2 : generic standards - Immunity for industrial environments			
	X	EN 61000-4-2	**Electrostatic discharges.**
	X	EN 61000-4-4	**Burst.**
	X	EN 61000-4-5	**Surge 1,2/50 (5/20) µs.**
	X	EN 61000-4-8	**Power frequency magnetic field.**
	X	EN 61000-4-11	**Voltage dips and short voltage interruptions.**
	X	EN 61000-4-3	**RF AM electromagnetic field.**
	X	EN 61000-4-6	**Common mode RF AM.**

Metz, the 18/02/2015

Signed on behalf of LOREME, M. Dominique Curulla   Signature:

Year where CE mark was putted on: 2014