RDM 3.0

User manual – technical documentation

A53 V0 9 0020 A

Technical documentation history

Date	Version	Comment
September 2015	A	Initial edition

Content

1. Presentation

RDM 3.0 is a color touch screen remote display module that supplements GENSYS 2.0 CORE, to control a single generating sets power in a power plant.

Connected to a GENSYS 2.0 or GENSYS 2.0 LT, RDM 3.0 module can be used as an additional remote display.

Information displayed:

- Synoptic of the installation
- Power plant overview
- Generator and mains/bus electrical measures :
  - Phase-phase voltage (3 phases RMS)
  - Phase-neutral voltage (3 phases RMS)
  - Current (3 phases RMS)
  - Frequency
  - Active power (3 phases + total)
  - Reactive power(3 phases + total)
  - Power factor (3 phases+ total)
  - Active energy (kWh)
  - Reactive energy (kVARh)
- Engine measures: oil pressure, water temperature, engine speed, hours run meter, spare analog inputs, J1939 measures.
- Synchronization conditions
- GENSYS inputs/outputs (ON/OFF)
- Active timers
- Maintenance cycle monitoring
- Alarms & faults and events
- Information screen

2. Installation

 **Warning**	**The GENSYS firmware version must be at least v4.66a5 to ensure the proper functioning of the HMI.**

2.1 Environment

Operating temperature: 0° to +55°C

Storage temperature: -25° to +65°C

Humidity: to 95%, no condensation

2.2 Transport

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. During transport, your device should therefore be protected from excessive mechanical stress.

 **Warning**	**Danger of damage to the unit :** If the device is transported in cold weather or is exposed to extreme variations in temperature, make sure that moisture (condensation) does not form on or inside the device.

2.3 Unpacking

- Make sure the package contains the RDM 3.0 with the alimentation connector plugged.
- Keep the package in case of return.
- Ensure that there are no visible defects on the device

2.4 Preparation

 **Note**	**Circulation of air :** When the unit is installed in an enclosure, adequate space for ventilation must be provided. The clearance above and below the housing must be at least 5 cm in order to ensure adequate ventilation of RDM 3.0.

- Control cabinet cutting : 247.5x298mm (9.74x11.73 inch)
- Position RDM 3.0 in such a way that reflections on the screen are avoided as much as possible
- Use the position of the screen as a guide for the correct installation height; it should be optimally visible for the user at all times
- The panel PC should not be exposed to direct sunlight
- When the unit is in its mounting position, the ventilation openings must not be obstructed.

 **Warning**	**Control cabinet cutting :** The cutting dimensions must be respected. A torsion of the screen can cause a malfunction of the device **Avoid extreme environment :** Extreme environmental conditions should be avoided as much as possible. Protect RDM 3.0 from dust, moisture and heat. The ventilation slots of the device must not be covered.

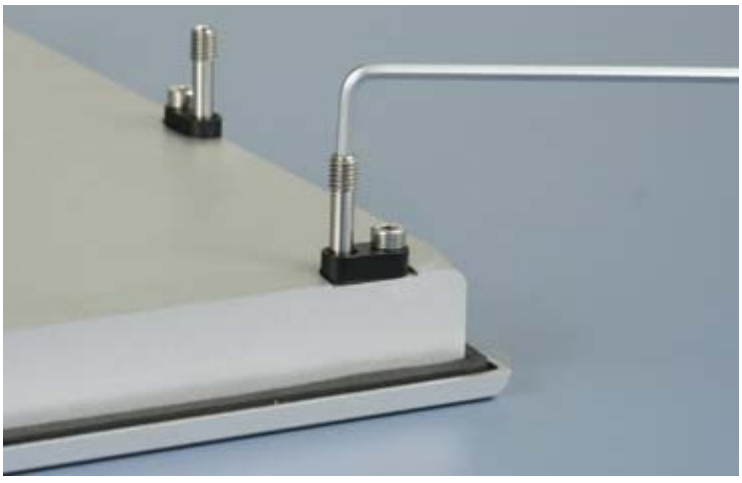
 **Danger**	**Risk of explosion!** RDM 3.0 must not be used where there is a risk of explosion.

2.5 Installation in the control cabinet

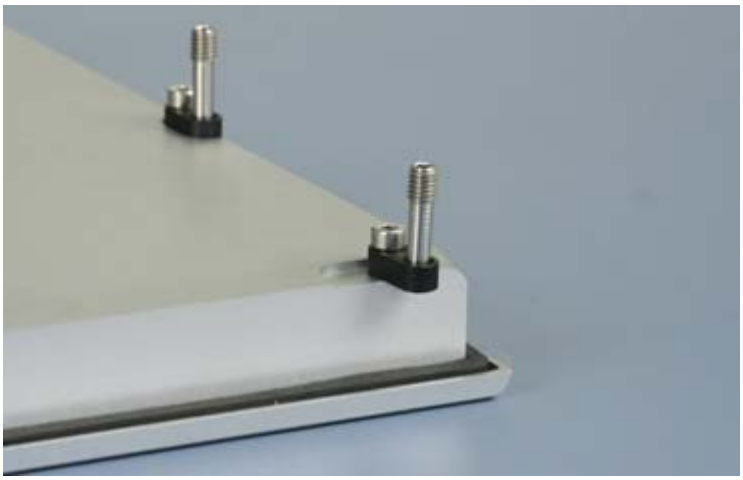
RDM 3.0 is installed in the cabinet wall with clamping levers. The wall thickness must be between 1 mm and 5 mm.

1. Insert the RDM 3.0 into the cutout.

2. Release the clamping levers with a 3.0 mm Allen key.



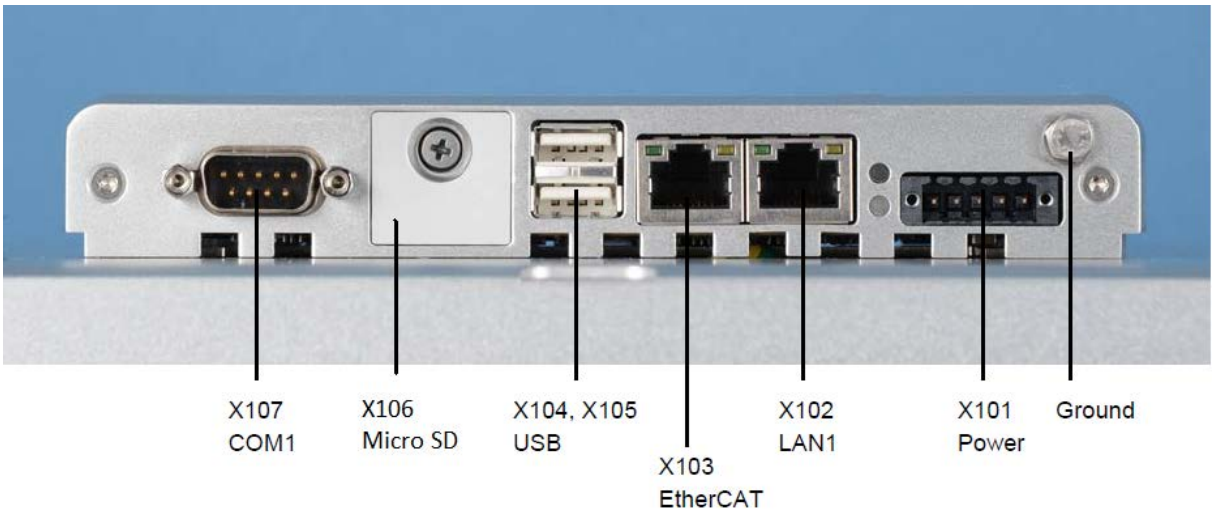
3. Turn the clamping levers to the side through 90°.



4. Retighten the screws.

2.6 RDM 3.0 connections

The connectors are located at the rear side of the housing.



There are several connectors:

- Power supply connector (X101)
- Ethernet connection (X102)
- EtherCAT connection (X103)
- Two USB outputs (X104, X105)
- Micro-SD card slot (X106)
- Serial interface RS232 COM1 (X107)

To establish a connection between RDM 3.0 and GENSYS please follow the steps bellow:

1- Disconnect RDM 3.0 power supply
2- Connect RDM 3.0 to GENSYS with an Ethernet cable (straight or crossed). You can make a direct connection or you can use a switch
3- Make sure that connections between wires and connectors are correctly secured
4- Reconnect RDM 3.0 power supply

Attention	**Don't forget to establish a low-impedance connection from the earthing point on the RDM 3.0 and from the GND pin of the power supply connector to the central earthing point on the control cabinel wall in which the device is installed.** **Earthing connections dissipate interference from external power supply cables, signal cables or cables to peripheral equipment.**

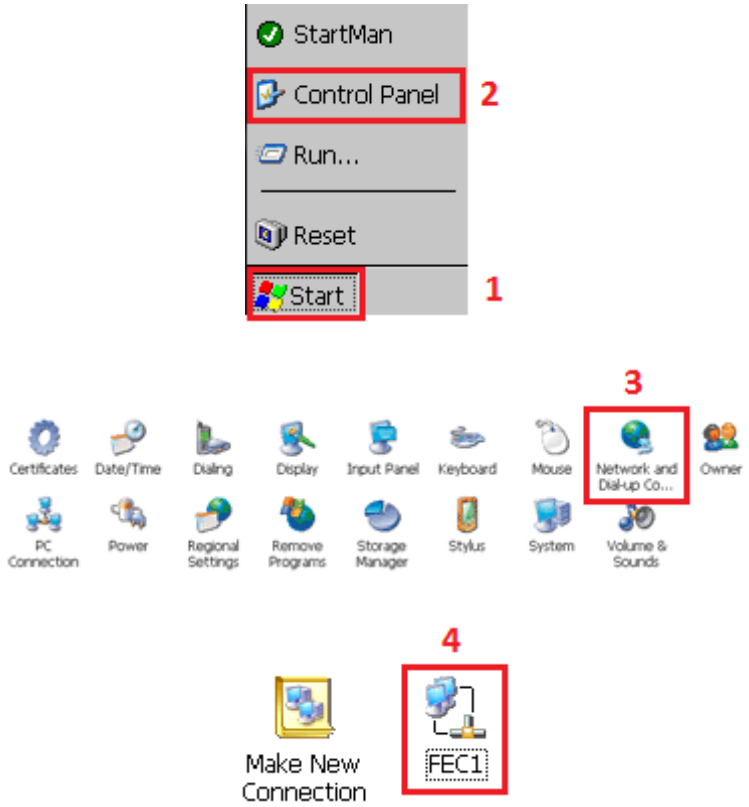
3. Communication

Once RDM 3.0 and GENSYS are connected through Ethernet, you must establish the communication between the two devices. For that, you must know your GENSYS IP address (192.168.11.1 by default).

On the RDM 3.0:

Firstly, leave the application pressing the EXIT button of the “System” screen (refer to **6.11 System**)

Go in « Start/Control Panel /Network and Dial-up Connections/FEC1»

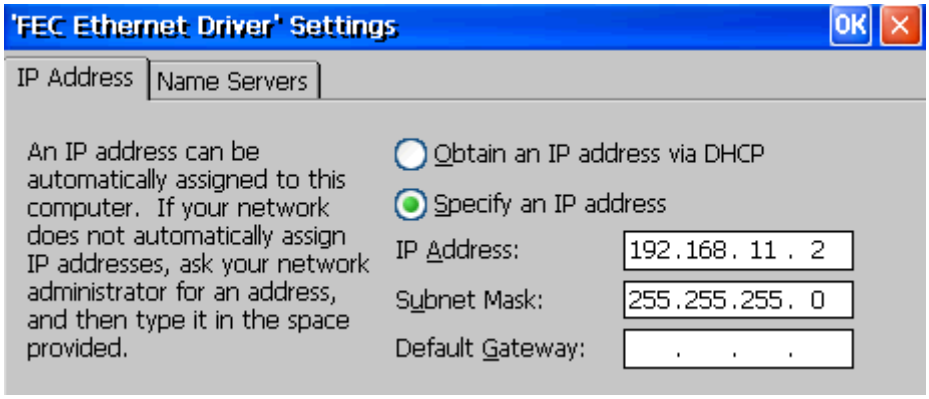


In the window displayed below, key the RDM 3.0 IP address.

The address range of the RDM 3.0 and the GENSYS must be the same: For example for the GENSYS default IP address (192.168.11.1), give RDM 3.0 an IP address that matches the following pattern: 192.168.11.XX (with XX included between 0 and 255). Ensure that the chosen IP address is different from the GENSYS IP address or any other devices connected to the Ethernet network.

In that case we chose 192.168.11.2

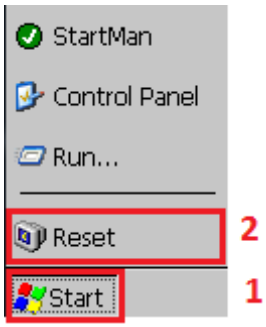
Subnet mask is 255.255.255.0



Push OK.

Note: If all devices are connected to a network with DHCP server, you can select the option "Obtain an IP address via DHCP". This option will automatically give RDM 3.0 an IP address compatible with the network.

Once the IP address is configured, press "Start" and then "Reset" to reset the RDM 3.0 and start the application.



To finalize the communication, you must configure in the application the IP address of the GENSYS you want to communicate with (refer to **6.11 System**).

4. Animated symbols

The application contains several animated symbols

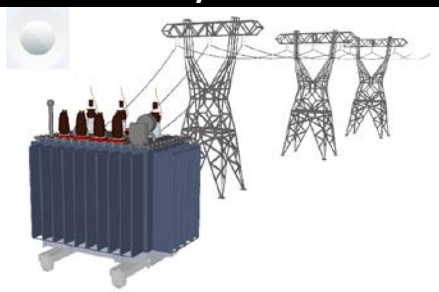
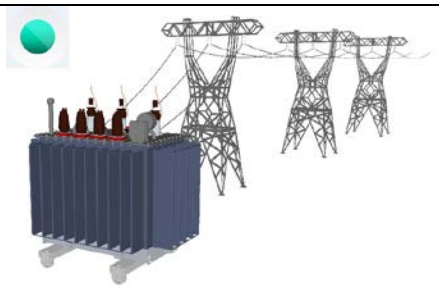
4.1 Generator

Symbol	Description
	Generator is idle
	Generator is running

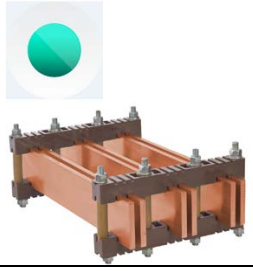
4.2 Load

Symbol	Description
	Load isn't supplied
	Load is supplied

4.3 Mains

Symbol	Description
	Mains is missing
	Mains is present

4.4 Bus bar

Symbol	Description
	Bus bar isn't supplied
	Bus bar is supplied

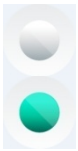
4.5 Breakers

Symbol	Description
	Breaker is open
	Breaker is closed

4.6 Connections

Symbol	Description
	Currentless wire
	Live wire

4.7 Logical indicators

Symbol	Description
	This symbol show the state of a Boolean variable: Grey = OFF Green= ON
	Grey: manual mode not selected Orange: manual mode selected
	Grey: automatic mode not selected Blue: automatic mode selected
	Grey: test mode not selected Orange: test mode selected

5. Navigation bar and header

5.1 Navigation bar

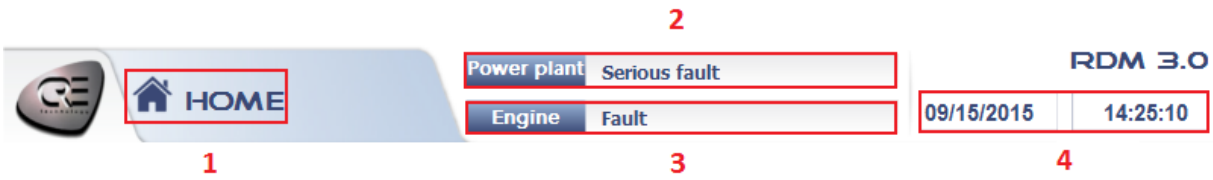
RDM 3.0 contains a navigation bar allowing you to navigate between the different screens of the application.

Symbol	Description
Home	Home screen
Power plant	Power plant overview (for several generators)
Generator	Generator electrical measures
Mains	Mains electrical measures (1 generator + 1 Mains)
Bus	Bus bar electrical measures (multi-generator plant)
Engine	Engine measures (water temperature, oil pressure…)
Synchro	Synchronization information
I/O	Inputs/outpus states
Tempo	Generator active temporisation
Maintenance	Maintenance cycle

Symbol	Description
	Events screen
	Evolution curves of the selected data
	RDM 3.0 settings
	Information and modification by parameter number
	Blinking when a fault appears. Press button to display Fault screen
	Blinking when an alarm appears. Press button to display Alarm screen

5.2 Header

The header is present in all screens of the application. This one gives users the following information:



1. Screen currently displayed
2. Plant state
3. Engine state
4. Date and time (synchronized with GENSYS time)

6. Screens description

6.1 Home

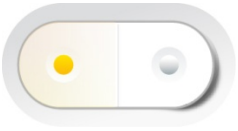
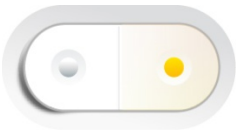
When you launch the application, a loading screen is displayed during the parameters initialization.

Home screen

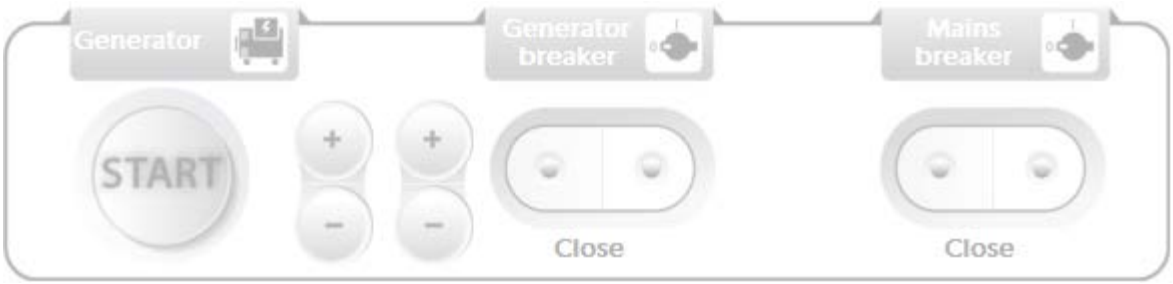
This screen displays main information:

- Battery voltage and engine speed
- Generator phase-phase voltage U31, frequency, active and reactive power
- Mains phase-phase voltage U31, frequency, active and reactive power

On the left, there are the three GENSYS modes with, in manual mode, the possibility to command the plant:

Button	Description
	Start the generator's engine. Visible when the generator is idle.
	Stop the generator's engine. Visible when the generator is running.
	Increase the engine speed (F)/the alternator voltage (U).
	Decrease the engine speed (F)/the alternator voltage (U).
	Close the generator/Mains breaker. Visible when the breaker is open.
	Open the generator/Mains breaker. Visible when the breaker is closed.

In "AUTO" and "TEST" mode, buttons described above are disabled.



An animated synoptic is displayed to inform the user about the plant state (refer to 4 **Animated symbols**).

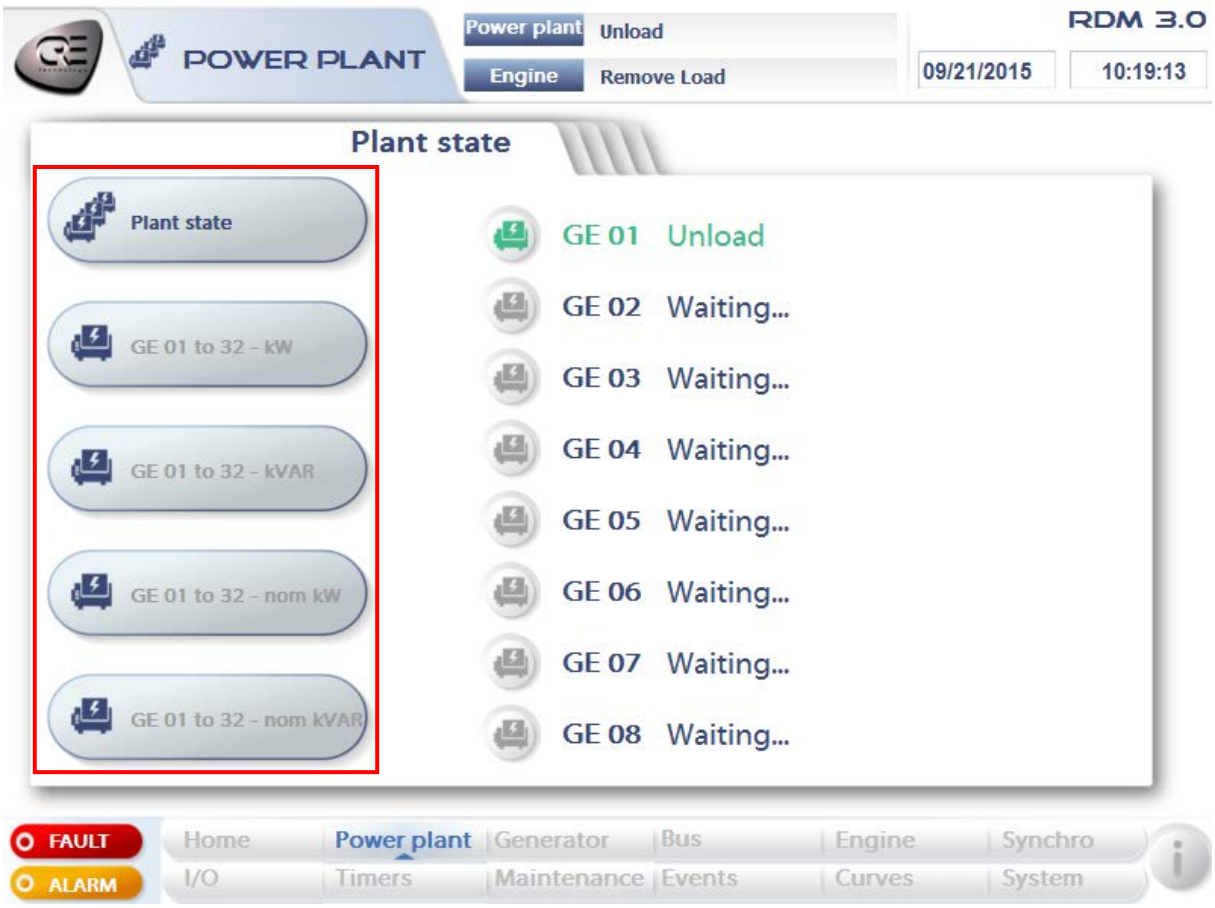
There are two possible synoptics according to the GENSYS configuration:

This one is displayed for a "One generator and one mains" configuration (parameter "Quantity of GENSYS"= 1 in the GENSYS)

This one is displayed for a "Several generators" configuration (parameter "Quantity of GENSYS">1 in the GENSYS)

6.2 Power plant

This screen is only available when there are several GENSYS (parameter "Quantity GENSYS">1 in the GENSYS connected)



Power plant overview screen

This screen consists of several screens with the same structure and described in the table below.

You can navigate between them thanks to the buttons located on the left side of the screen.

Screen	Description
Plant states (4 screens)	Status of the generators constituting the power plant
GE 01 to 32 – kW (2 screens)	Active power production (In % of the nominal active power) of each generator constituting the power plant
GE 01 to 32 - kVAR (2 screens)	Reactive power production (In % of the nominal reactive power) of each generator constituting the power plant
GE 01 to 32 – kW - Nom (2 screens)	Nominal active power of each generator constituting the power plant
GE 01 to 32 – kVAR - Nom (2 screens)	Nominal Reactive power of each generator constituting the power plant

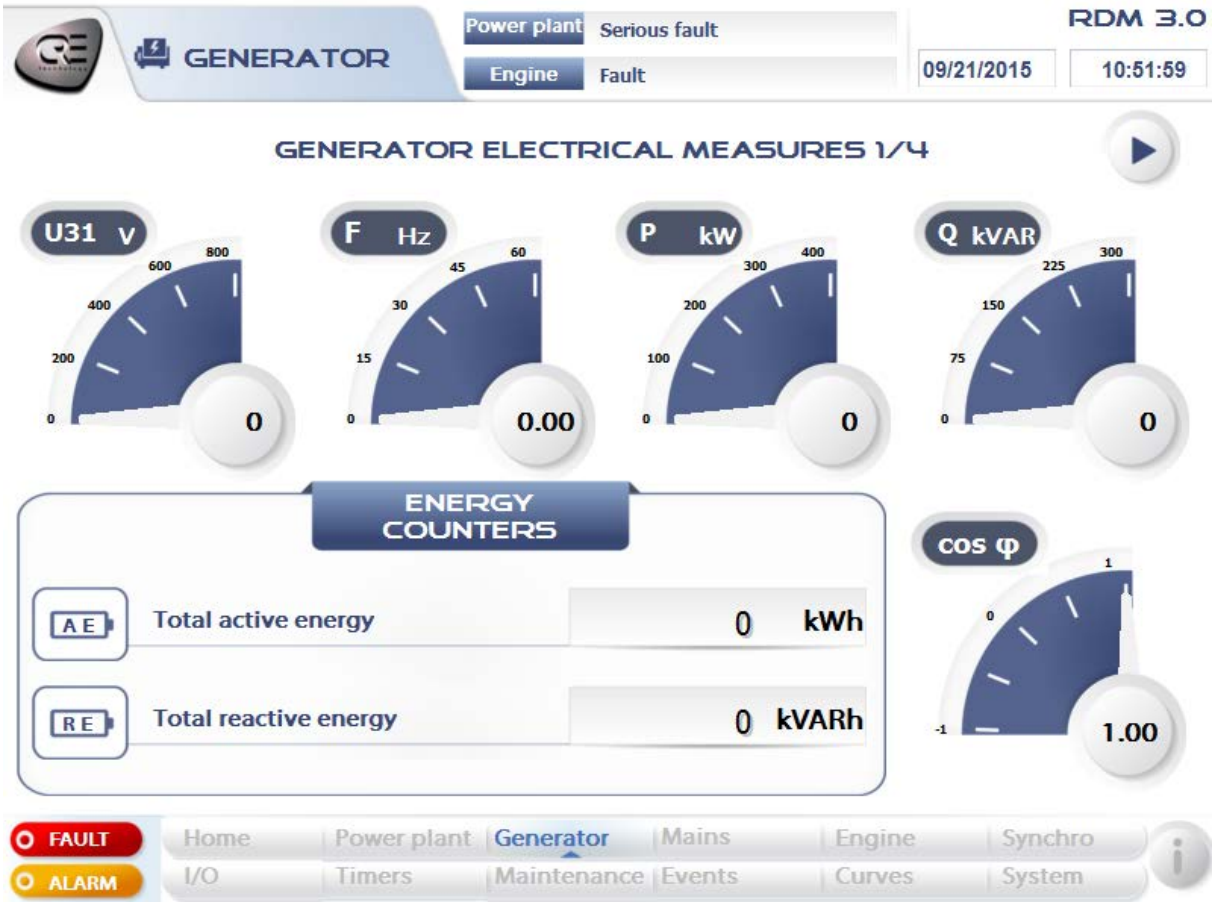
Each screen consists of several sub screens allowing the display of the information above for a maximum of 32 generators (8 generators by sub screen for "Plant states" screen and 16 generators by sub screen for the others).

You can navigate between these sub screens using the buttons  and  .

The number of generators displayed matches the quantity of GENSYS configured in the GENSYS connected to the RDM 3.0.

Information related to the connected GENSYS is displayed in green.

6.3 Generator/Mains/Bus



Generator electrical measures 1/4 screen

The "Generator" and "Mains" screens structure is identical. They consist of 4 sub screens which include the electrical measures described in the table below.

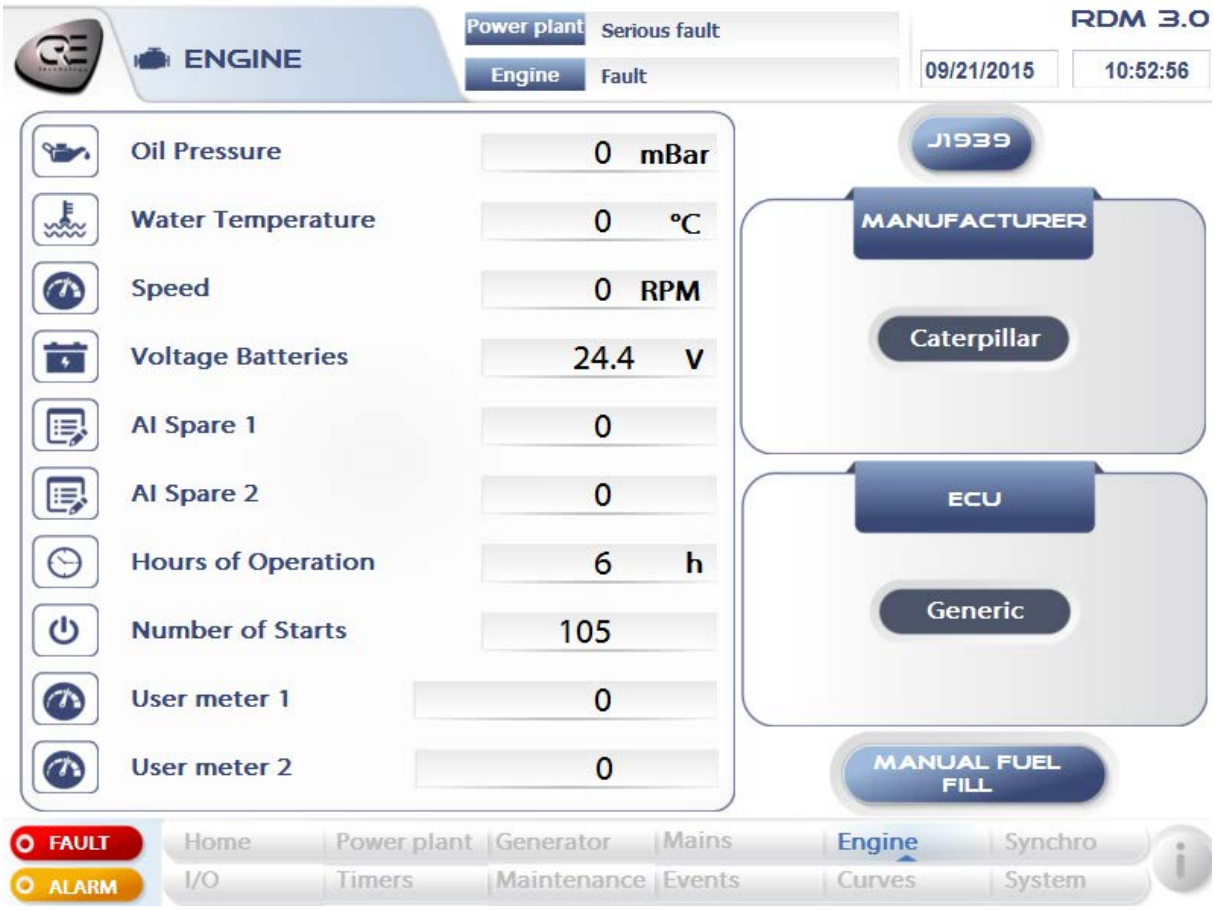
You can navigate between these sub screens using the buttons and .

Screen	Displayed measures
Screen 1/4	• Phase-phase voltage U31 (V) • Frequency (Hz) • Total active power (kW) • Total reactive power (kVAR) • Total power factor • Total active energy (kWh) • Total reactive energy (kVARh)
Screen 2/4	• Phase-neutral voltage V1 (V) • Phase-neutral voltage V2 (V) • Phase-neutral voltage V3 (V) • Phase-phase voltage U12 (V) • Phase-phase voltage U23 (V) • Phase-phase voltage U31 (V)
Screen 3/4	• Active power P1 (kW) • Active power P2 (kW) • Active power P3 (kW) • Reactive power Q1 (kVAR) • Reactive power Q2 (kVAR) • Reactive power Q3 (kVAR)
Screen 4/4	• Current I1 (A) • Current I2 (A) • Current I3 (A) • Power factor cos(ϕ1) • Power factor cos(ϕ2) • Power factor cos(ϕ3)

The "Bus" screen consists of a single screen that contains the following electrical measures

- Phase-neutral voltage V1 (V)
- Phase-neutral voltage V2 (V)
- Phase-neutral voltage V3 (V)
- Phase-phase voltage U12 (V)
- Phase-phase voltage U23 (V)
- Phase-phase voltage U31 (V)
- Frequency (Hz)

6.4 Engine



Engine screen

This screen displays engine measures.

The "J1939" button and the ECU are only displayed when a manufacturer has been configured in the GENSYS.

The "J1939" button gives access to the J1939 measures display.

Measures are allocated between 7 sub screens. You can navigate between these sub screens using the buttons  and  .

6.5 Synchro

Synchronization screen

This screen displays the information needed to synchronize the generator with the mains or with the bus bar.

The user can see the synchronization conditions:

- Difference of volt between mains/bus and generator
- Difference of frequency between mains/bus and generator
- Difference of phase between mains/bus and generator
- Phase sequence

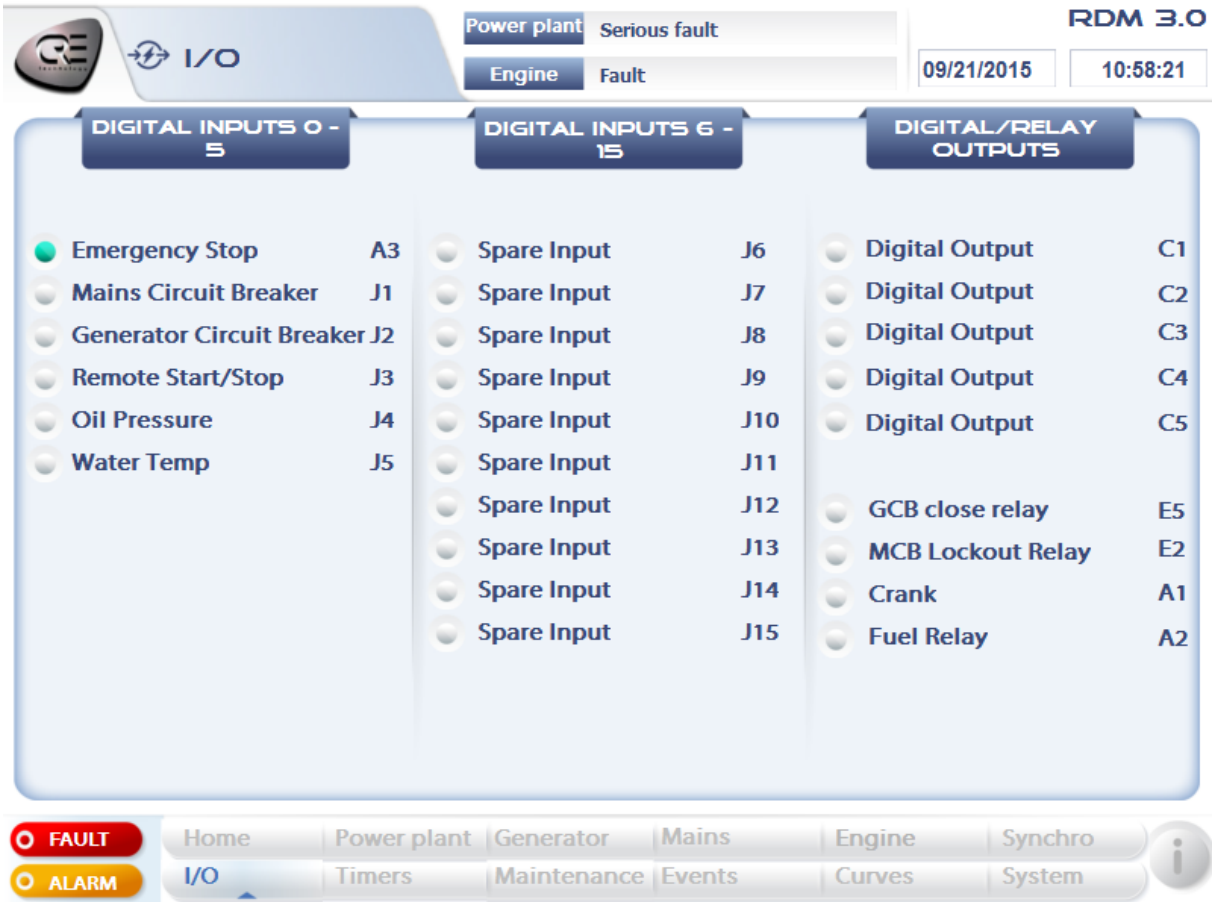
The conditions states are represented by LEDs: green if the condition is true, red if the condition is false.

The difference of frequency and volt are measured and displayed as graduated ruler.

At the bottom of the screen, we find the same synoptic as in the home screen allowing the user to have an overview of the plant during the synchronization. We also find the following buttons:

- +F/-F to correct the difference of frequency
- +U/-U to correct de difference of volt
- Close/Open Generator/Mains breaker to command the breakers during a manual synchronization.

6.6 Inputs/Outputs



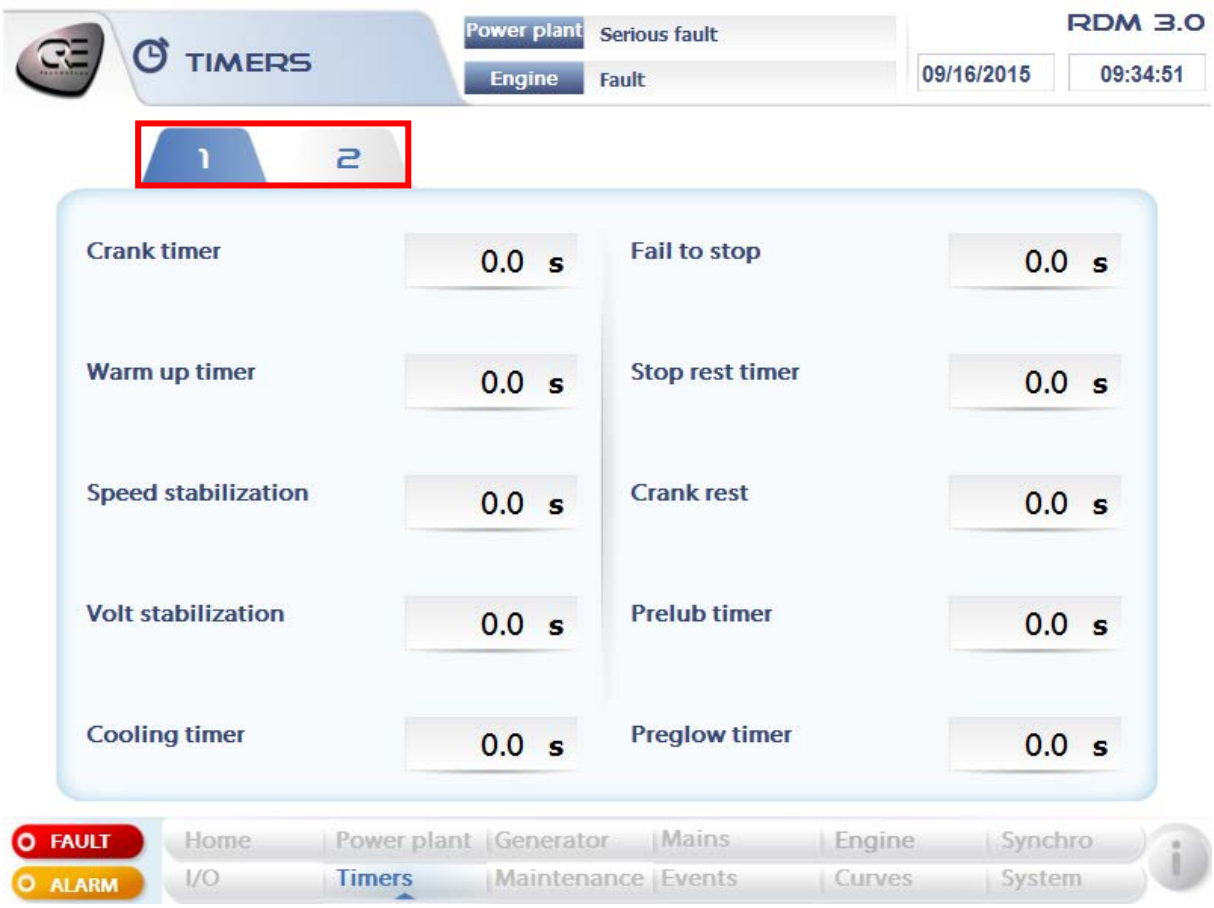
Inputs/Outputs screen

This screen displays the states of GENSYS inputs/outputs.

The state of each input/output is represented with a LED: green for the active state and grey for the inactive state.

The labels of digital inputs J4 to J15, digital outputs C1 to C5 and relay outputs A1 to A2 are configurable through the "Labels configuration" screen (refer to **6.11 System**).

6.7 Timers



Timers screen

This screen displays GENSYS active timers which are divided between two sub screens. To navigate between the sub screens, use the tabs at the top of the screen (boxed in red).

6.8 Maintenance

Maintenance cycle monitoring screen

This screen displays the maintenance cycles configured in the GENSYS.

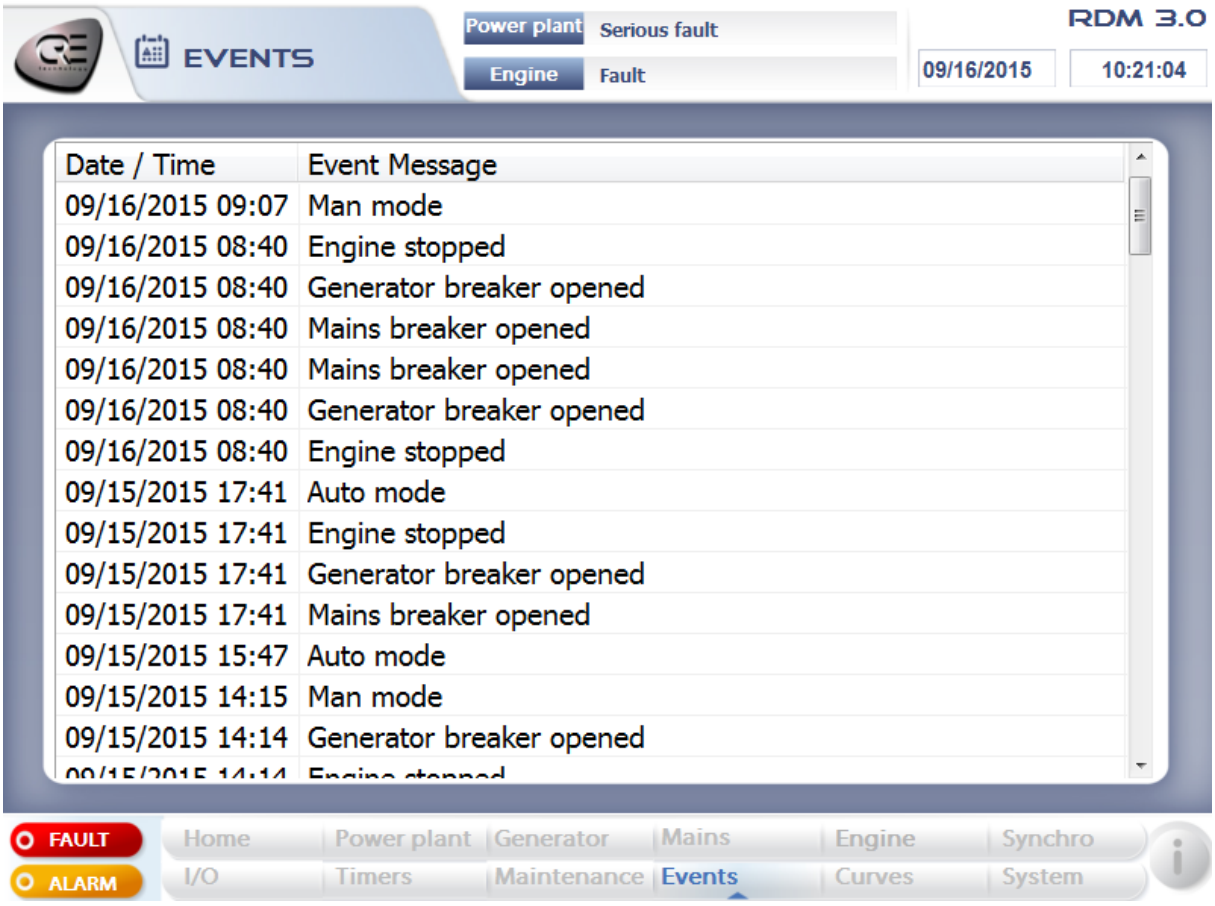
On the left there are the hourly cycles and on the right there are daily cycles.

If a cycle is disabled, the state "OFF" is displayed next to it.

You can reset each meter using the RESET button.

Cycle labels are modifiable through the "Labels configuration" screen (refer to **6.11 System**)

6.9 Events



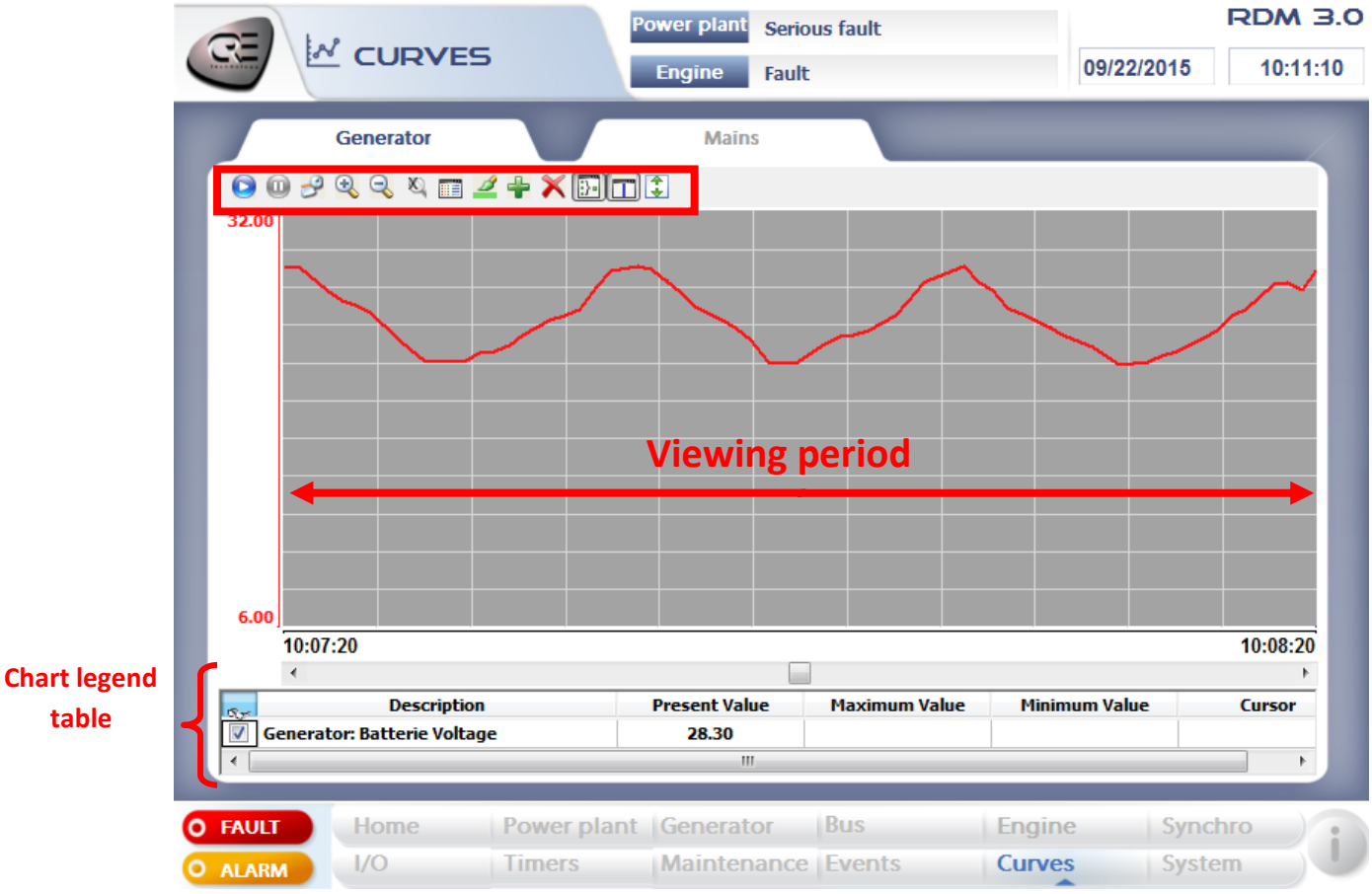
Events screen

This screen displays a time stamped history of the last 100 events of the power plant. The following events are listed:

- Man mode
- Test mode
- Auto mode
- Starting engine
- Engine stopped
- Generator breaker opened
- Generator breaker opened
- Mains breaker closed
- Mains breaker opened

6.10 Curves

In this screen, you can display several measures over time as curves.



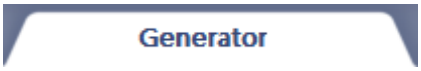
Curves screen

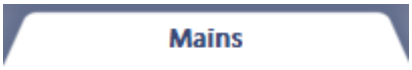
On the top there is a tool bar that offers the following functionalities:

Button	Description
	Start the display of the curves in real time
	Pause the display of curves
	Viewing period settings
	Zoom or unzoom to display the curves on a greater/lower period
	Cancel the active zoom. If no zoom is active, button is greyed

Button	Description
	Add/Remove columns in the chart legend table
	Curves properties: type, color, thickness…
	Add a new measure to display
	Remove a measure displayed
	Add/Remove a cursor on the curves
	« Auto Scale »: automatic adjustment of the graphic scale.

Two tabs are displayed above the graph:

- A 

tab allowing you to display generator measures
- A 

tab allowing you to display mains measures.

Note:

You can display several measures on the graph and then the scale will be split. To display only one curve, hide the others thanks to the column  *located in the chart legend table.*

6.11 System

System screen

In this screen you can exit the application thanks to the 

button (only accessible in “User2” level).

Note: You must use this button only if you have to change RDM 3.0 IP address. ***Warning****, a change of internal RDM 3.0’s settings can involve a dysfunction of the application.*

This screen displays the application settings that the user can configure.

- **Languages:**

The application is available in English and French.

Note: Other languages can be available on request.

- **GENSYS IP address and Modbus port**

Note: You don't change GENSYS IP address, you just define the address of the device you want to communicate with.

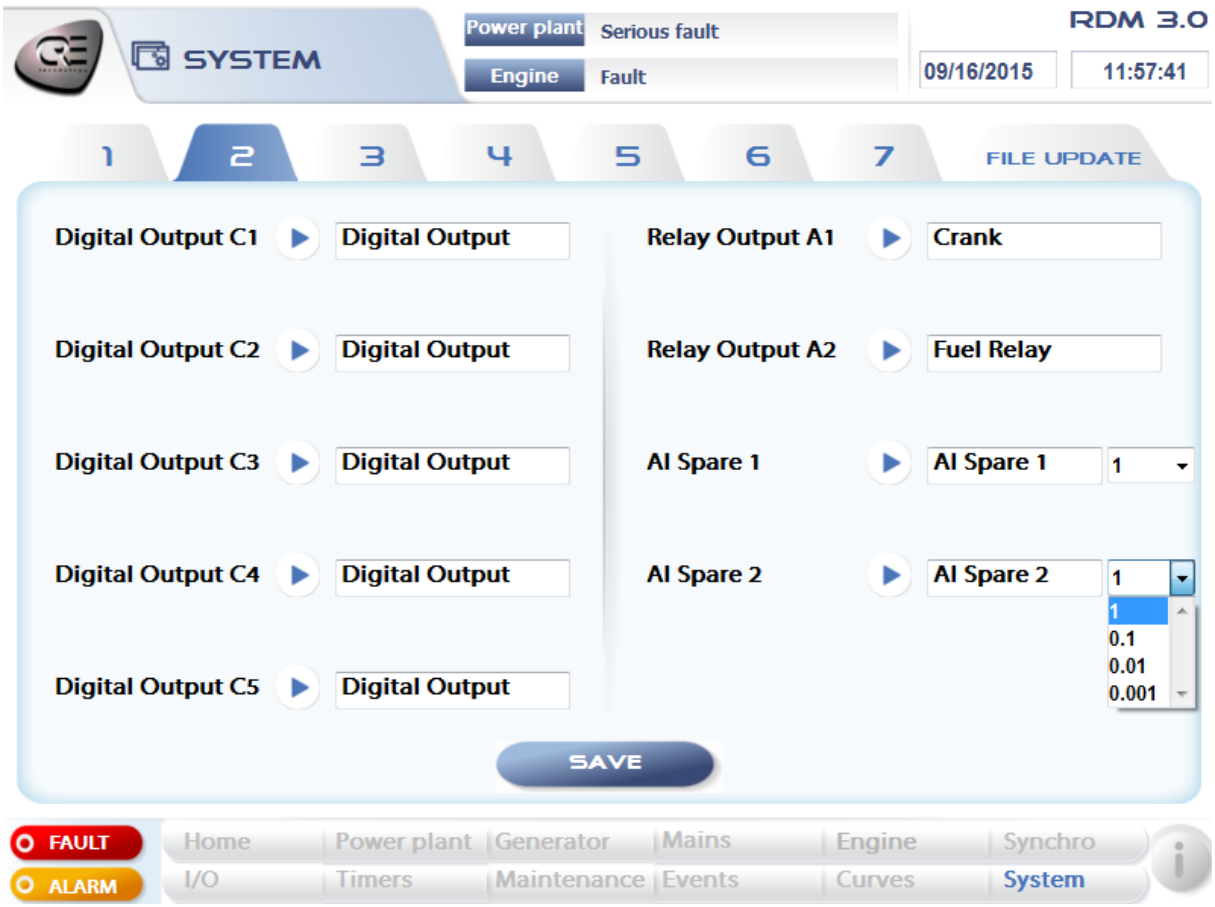
- **Users**

There are two user levels:

- ⇨ User1 (password: 1): This user can access to the display part and the command part (start/stop engine, open/close breaker, change mode…) of the application.
  However he is not enabled to exit the application, to change GENSYS IP address and Modbus port, to configure application's labels, to make a modification by parameter number in the "Information" screen (refer to **6.12 Information**).
- ⇨ User2 (password: 2): This user can access to all the functionalities of the application.

- **Labels**

The "Labels configuration" button displays a screen in which you can change some application's labels.



Labels configuration screen

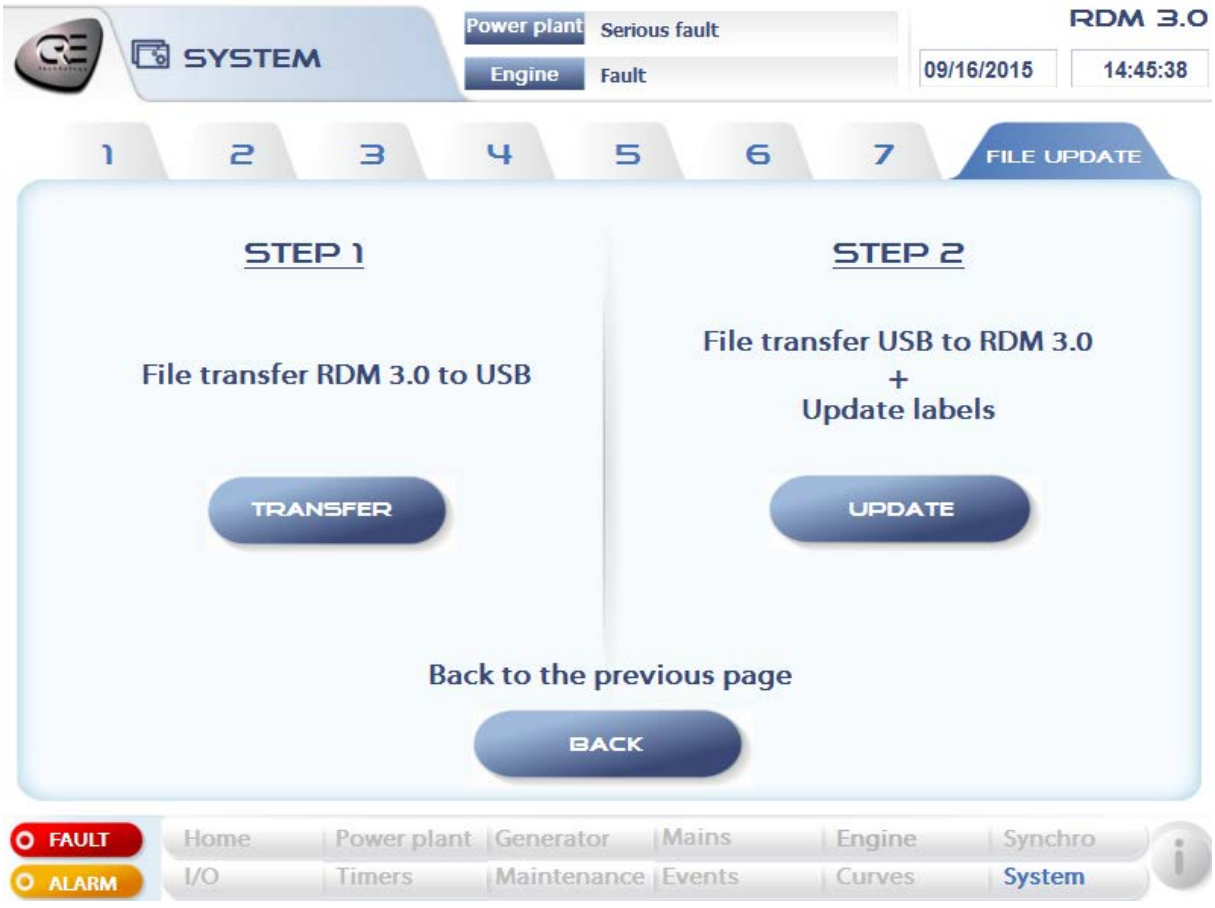
This screen consists of 8 sub screens:

- In the screens 1 to 7 you can change labels one by one.
  For the spare analog inputs and user meters' labels, the user can configure the accuracy of the value displayed.

  Once you have made your modifications, press the SAVE button. The following message is displayed on the screen.

  Note: The save step is important. Without it, the labels won't be saved after leaving the application (resetting the RDM 3.0, power cut…)

- Screen 8, accessed by pushing FILE UPDATE tab, allows the user to update all labels at once thanks to a TXT file.



File update screen

Step 1:

Plug the USB key on the RDM 3.0. Pushing the 

button, a text file named "CfgLabels_EN.txt" is transferred on the USB key.

Note: The generated file is different according to the application language. If the application language is English the file transferred will be called "CfgLabels_EN.txt", if the application language is French the file transferred will be called "CfgLabels_FR.txt".

Remove your USB key from the RDM 3.0, plug it on a computer and then open the text file with the Notepad. Modify the labels you want and save the file.

Note: The file structure and the file name mustn't be changed. Besides, each label mustn't exceed 14 characters (space included) to have correct display.

Step 2:

Once labels have been changed and saved, plug your USB key on the RDM 3.0 and push the 

button to transfer the updated label's file on the RDM 3.0 and then update the application's labels.

Finally, push the 

button to go back to the previous page.

6.12 Information

Information screen

This screen allows the user to display any GENSYS variable. It consists of 5 sub screens including each one 10 variables to display.

To display a variable on a line:

- Press the entry field of the chosen line
- Input the variable number to display

⇨ The labels, the value and the unit of the variable are automatically updated.

Note: 32 bits variables are not displayed correctly in the "Information" screen (ex: Energy meters). These variables are correctly displayed in the dedicated screens.

The "Information" screen provides a function named "Modification by parameter number" which allows the user to modify a GENSYS parameter (variable E1xxx and E4xxx).

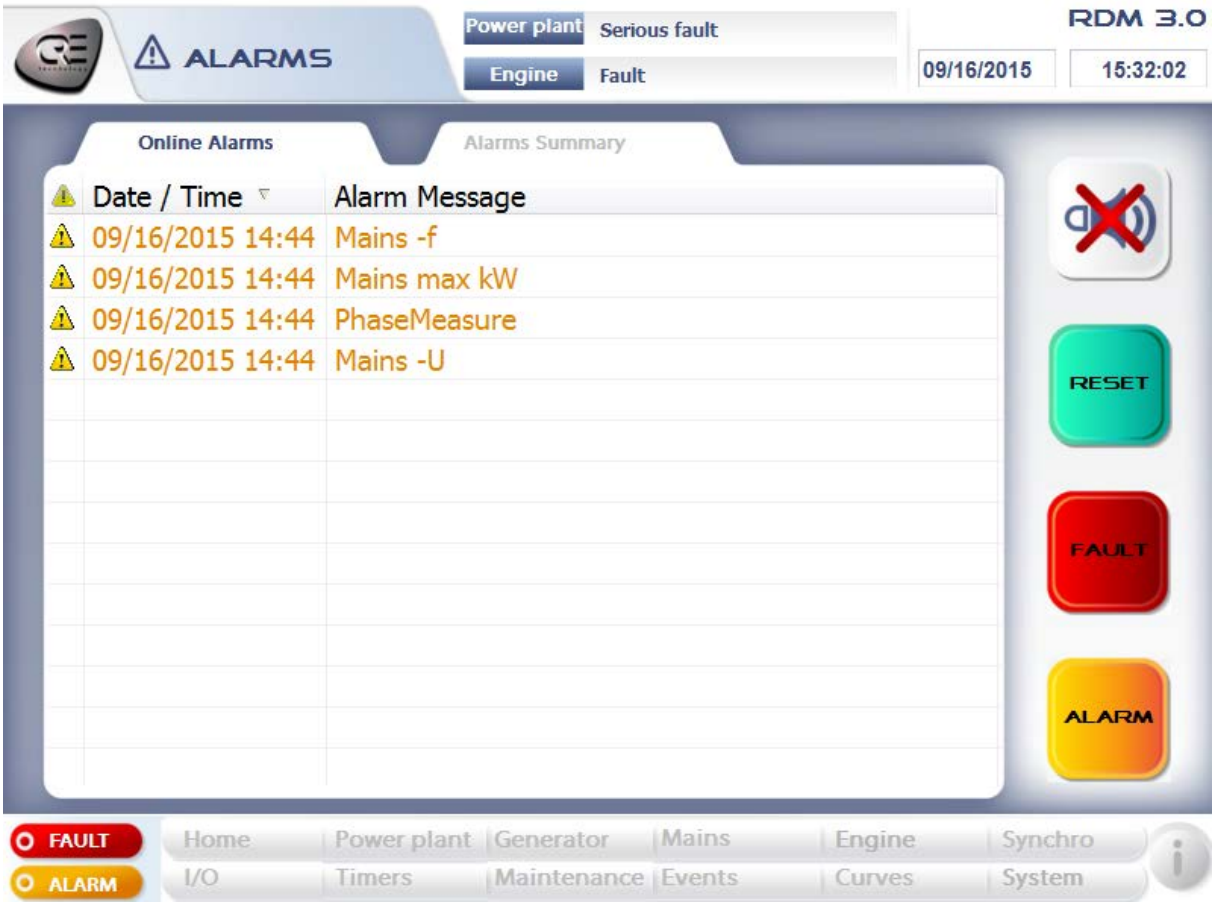
To make the modification:

- Press the entry field below the word "Variable" and input the variable number matching the parameter you want to change.
- Press the entry field below the word "Value" and input the value you want to assign to the parameter.
- Then press the 

button to make the modification.

Note: You can display the parameter to change in the reading part to verify that your modification has been taken into account.

6.13 Alarms/Faults



Alarms and faults monitoring screen

The 

button blinks when an alarm occurs. You can access to the "Alarm" monitoring screen pushing it.

The 

button blinks when a fault occurs. You can access to the "Fault" monitoring screen pushing it.

The structure is the same for the two screens:

The user can navigate between the alarm screen and the fault screen using the 

and 

buttons. The alarm table consists of two tabs:

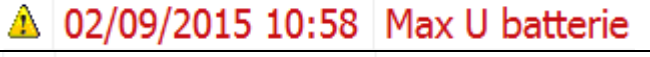
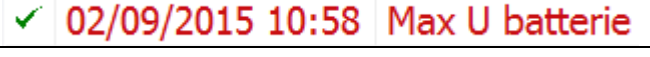
- The "Online alarm" tab that displays alarms in real time.
- The "Alarm Summary" tab that displays the 100 last alarms that occurred.

The structure is the same for the alarm and fault tables.

The user can reset all the alarms and faults using the RESET button.

The user can stop the GENSYS horn using the HORN button.

There are different types of messages displayed in the online alarms/faults table:

Type de message	Description
	The alarm is active and hasn't been acknowledged
	The alarm has been acknowledged but is always active
	The fault is active and hasn't been acknowledged
	The fault has been acknowledged but is always active
	The alarm/fault isn't active anymore. Acknowledge the alarm/fault will make the message disappear

Note: To acknowledge an alarm/a fault, double click on the message.

Note	**Configuration of GENSYS CANopen expansion inputs as alarms/faults:** To ensure a correct display on the RDM 3.0, the polarity configuration of a virtual input must be done by equation while copying "expansion input" toward "virtual input". Example: E2283=E0157; → the virtual input n°1 is normally open. E2283=!E0157; → the virtual input n1 is normally closed.

7. Technical specifications

Power supply

- Power supply: 24 V_{DC} (20,4 to 28,8 V_{DC})
- Power consumed: ~ 16 W

Environment

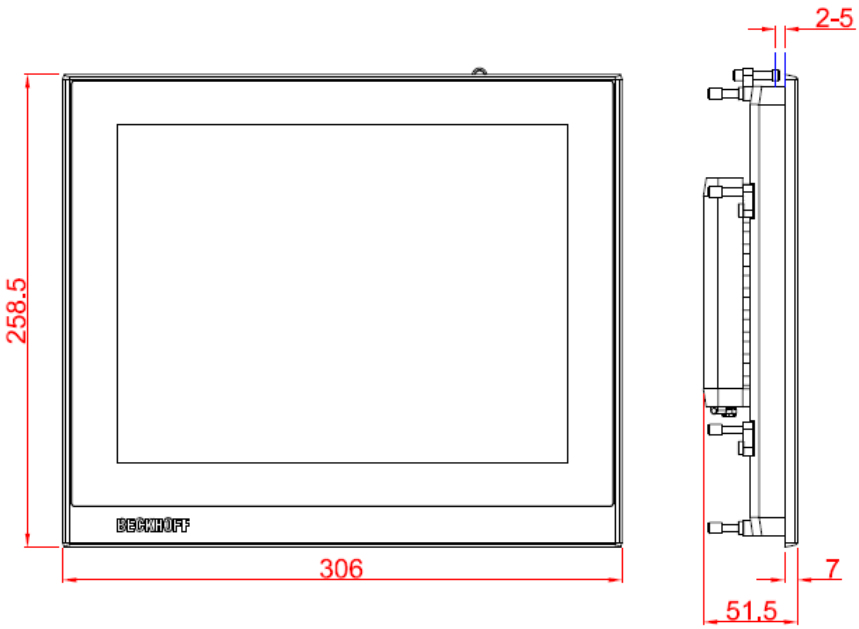
- Operating temperature : 0 to + 55°C
- Storage temperature : -25 to +65°C
- Humidity: to 95%, no condensation
- Front side: protection IP65
- Rear side: protection IP20

Dimensions and weight

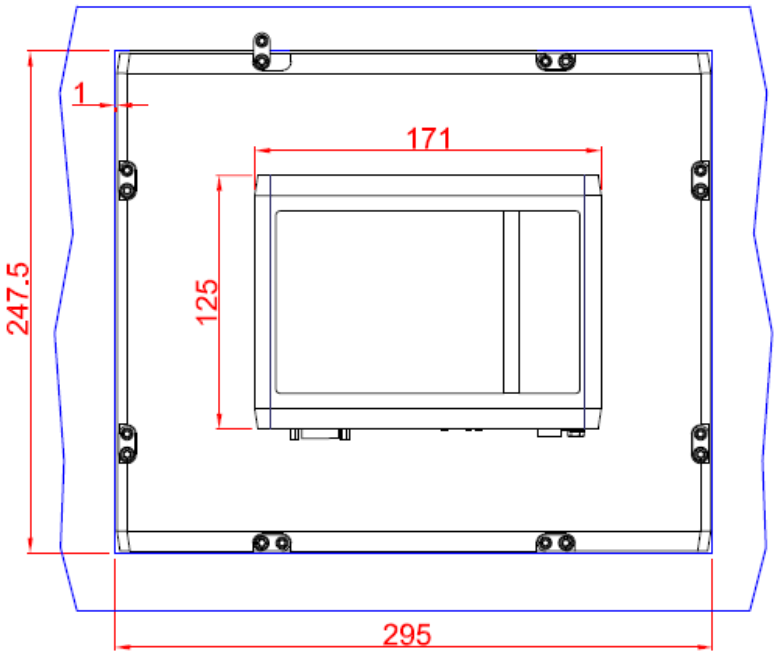
- Dimensions 306x258.5x51.5mm (12.05x10.18x2.03in)
- Cabinet cutout : 247.5x298mm (9.74x11.73in)
- Weight: 3.0 kg (6.61 lbs)

8. Dimensions

dimensions in mm



front view left view



cut out dimensions: 247,5mm x 295mm

rear view

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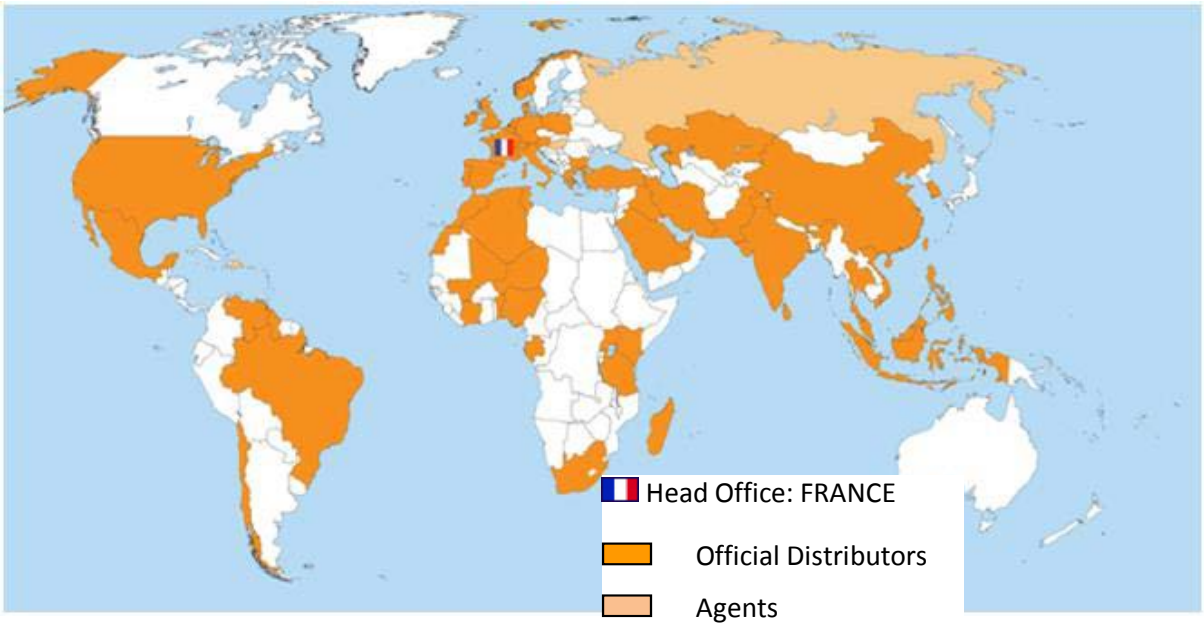
SKYPE: support-cretechnology.com (voice only)

A worldwide coverage:



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