

Instructions for use

MICS Process 2

Carantec & Carnac

Réf. constructeur : Tech/JF/981746.en

Réf. GPAO : 33502008201 ind5

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1. Introduction

This new version to MICS PROCESS 2 is essentially on next evolutions:

- * The creation to a additional module include 12 digitals input and 4 output with relay. This module allow to adapt better the material configuration for the need.
- * The leave of absence to two residents languages.
- * The leave of absence to the bases configurations allow to adapt simply a existing generating set for its new utilization. This new functionality is particularly interesting in the lessor's case.
- * The possibly to record different measure on the variable time. This recordings cause a complementary help to a diagnostic and concern generating set.

The MICS PROCESS 2 preserve with improve the functionality to the last version:

- * The base version look after the command control to generating set
- * The CARANTEC card append, the speed and the tension regulation, the synchronizations functions and active and reactive powers repartition, the protections and electrical measures.
- * The CARNAC card complete the system with the fast electrical protection function such that a mini impedance, vector jump, dF/dT , max. to I...
- * The CAN bus utilization, for the dialogue with certain system to motor control, put at disposition for a user a rich information driving tool
- * Put in memory 300 events
- * Acknowledged to analogue values $-10v/+10v$ or $-20mA/+20mA$.
- * Acknowledged to temperature accept directly the plummet pt100 or torque k.
- * In the base there are two series connections integrated. An optional card allow to append four others.
- * Marking CE.

2. Description of the components

2.1 Basic rack

This unit contains the following:

- * CPU board and
- * The optional communication board
- * Carantec board.
- * Carnac board

Reference 2 slots: P 109 000

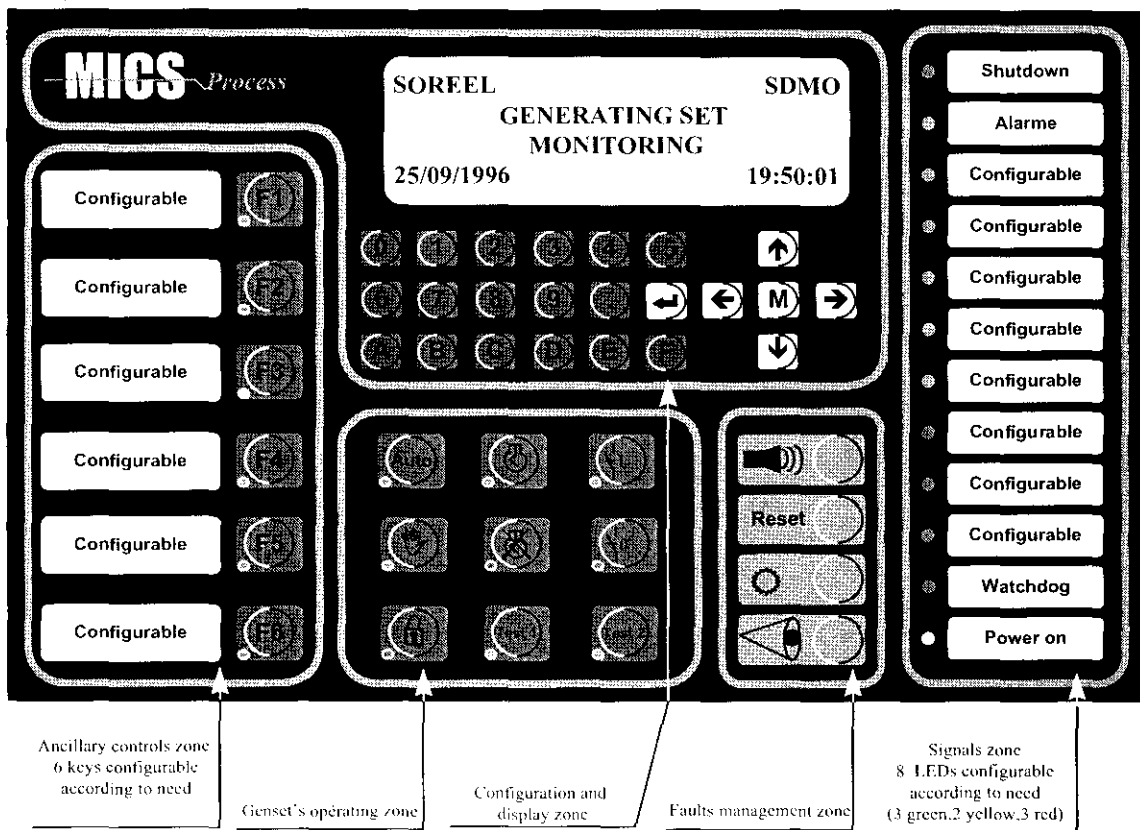
Reference 3 slots: P146 000

2.1.1 Mechanical characteristics

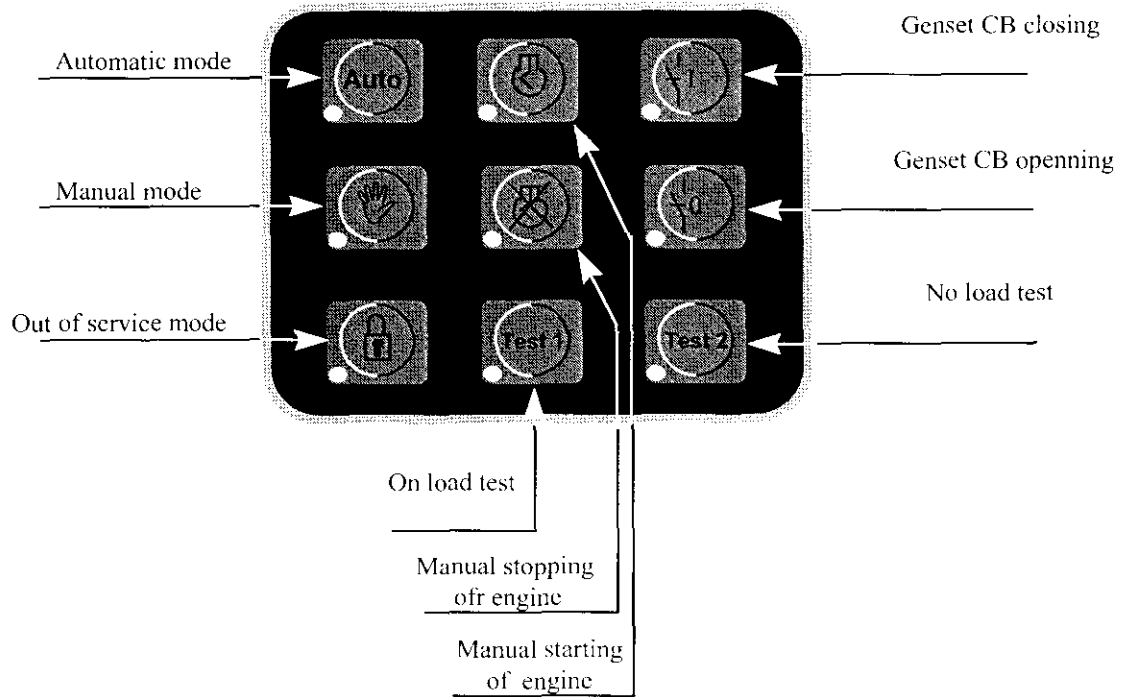
Overall dimensions: 342 mm x 226 mm x 103 mm

Flush-mounted in a recess (210 mm x 187 mm) using 6 x 3 mm dia. screws.

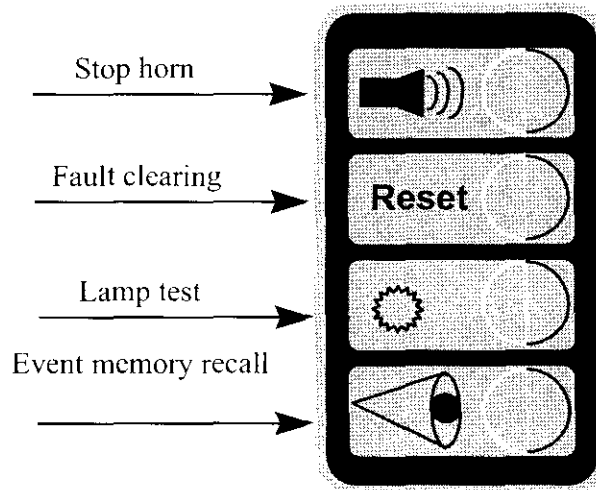
2.1.2 Keyboard



2.1.2.1 Genset control area



2.1.2.2 Fault management area



2.1.3 Central processing unit (CPU) board

The following functions are on this board:

2.1.3.1 Power supply

24 Vdc -25% +15% power supply from the starter battery.

A transient voltage drop to 6 V for 0.5 second is tolerated. Consumption: 300 mA at 24 V (Keyboard + CPU board + com. board).

2.1.3.2 Speed detection

The speed measurement input accepts either the alternator voltage or the pick-up signal.

Input rated voltage: 400 V. (Permissible overvoltage: 600 V)

Frequency range: the three switches SW3 closed 0 to 75 Hz (Alternator voltage)

the three switches SW3 open 500 Hz to 75 KHz (Pick-up)

A 0.1 mA analogue output is available for a tachometer supply.

2.1.3.3 Processor

The board is designed around the Motorola 68340 25 MHz 32-bit micro-controller.

256 kilobytes of SRAM.

512 kilobytes of flash memory.

A real-time clock.

2.1.3.4 Two CAN bus controllers

Communication between the main board and the various modules is provided via a CAN type digital interface.

The ISO standard describes this bus as being "a serial communication protocol which efficiently supports the distribution of commands in real time with a high level of security. Its favourite domains cover generally networking applications with a high rate, high transmission reliability and low-cost wiring concept."

A simple shielded pair enables the installation's components to be connected to each other.

Each CAN bus can control 16 modules.

Each module must be addressed using the DIP switches provided for this purpose.

The table below indicates the combinations to be made.

	0				1				2				3			
ON								X				X			X	X
OFF	X	X	X	X	X	X	X		X	X		X	X	X		
	4				5				6				7			
ON		X				X		X		X	X			X	X	X
OFF	X		X	X	X		X		X			X	X			
	8				9				A				B			
ON	X				X			X	X		X		X		X	X
OFF		X	X	X		X	X			X		X		X		
	C				D				E				F			
ON	X	X			X	X		X	X	X	X		X	X	X	X
OFF			X	X			X					X				

The digital input modules can only be addressed from 0 to 7, the output modules from 8 to F.

2.1.3.5 An RS 232 C serial interface

2.1.3.6 An RS 485 (2- or 4-wire) serial interface

2.1.4 Communication board

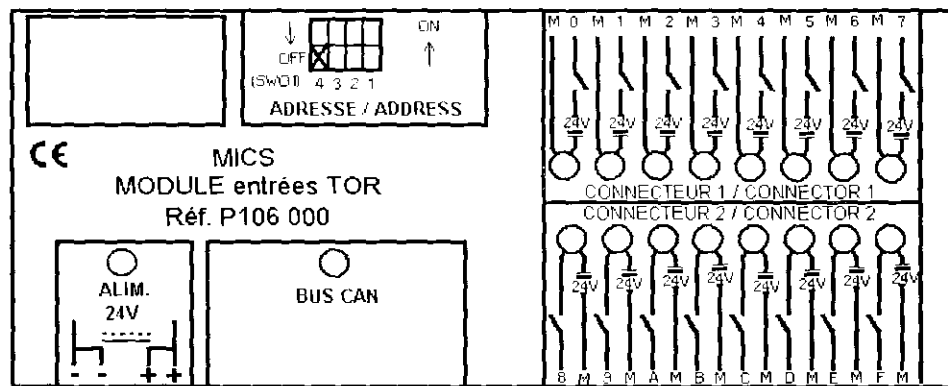
This optional board is housed in the basic unit.

It makes it possible to have a CAN bus and 4 additional RS 485 ports.

2.1.5 Connections

	Qty	Soecel references
Power supply	1	WE1 152 646
Can	1 per bus	PHO 1 841 912 + MCMMDM15M + 2 x MCMMJS
Speed input	1	PHO 176 6990
Analogue output	1	WE1 152 656
Watchdog output	1	WE1 159 736
RS 232 C	1	MCMSDB25PTS + MCMMDM25M + 2 x MCMMJS
RS 485	1	MCMSDB9PTSN + MCMMDM9M + 2 x MCMMJS

2.2 Digital inputs



Reference P 106 000 16 inputs per module

2.2.1 Mechanical characteristics

Dimensions: 148 x 62 x 29. Fixed by 2 clips on DIN rail.

2.2.2 Electrical characteristics

Unit power supply 24 V dc -25% +15%.

It tolerates a voltage drop to 6 V for 0.5 second.

A LED indicates that it is "on".

Two terminals of each polarity facilitate wiring.

Module's consumption (inputs open) => 100 mA at 24 V

(inputs closed) => 230 mA at 24 V

Logic level 0 => voltage at PCB input < 0.6 V

1 => voltage at PCB input > 4 V

A LED indicates the state of each channel.

2.2.3 CAN bus

The CAN connector permits the connection of two cables.

If the unit is at the end of the bus, the free terminals must be terminated with a 120 Ω resistor.

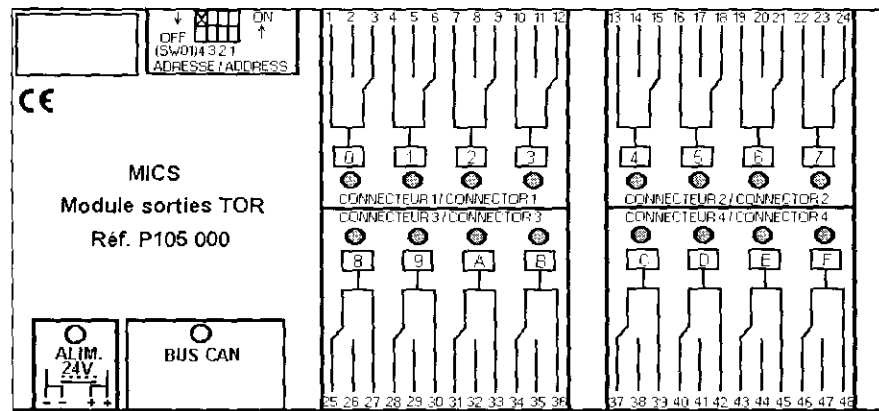
A LED indicates the CAN bus activity.

The digital input modules can be addressed from 0 to 7.

2.2.4 Connections

	Qty	SOREEL references
Power supply	1	WEI 152 666
Can	1	PHO 1 841 912 + MCMMDM15M + 2 x MCMMJ5
Inputs	2	WEI 159 750

2.3 Digital outputs



Reference P 105 000 16 outputs per module

2.3.1 Mechanical characteristics

Dimensions: 222 x 106 x 33. Fixed by 2 clips on DIN rail.

2.3.2 Electrical characteristics

- Unit's power supply 24 V dc -25% +15%.
It tolerates a voltage drop to 6 V for 0.5 of a second.
A warning LED indicates that it is "on".
Two terminals of each polarity facilitate wiring.
 - Module consumption (relay at rest) => 40 mA at 24 V
(relay live) => 460 mA at 24 V
 - Characteristics to the output contact 8A under 250V CA on ohmic load
8A under 24V CC on ohmic load
1A under 48V CC on ohmic load
- A LED indicates the state of each channel.

2.3.3 CAN bus

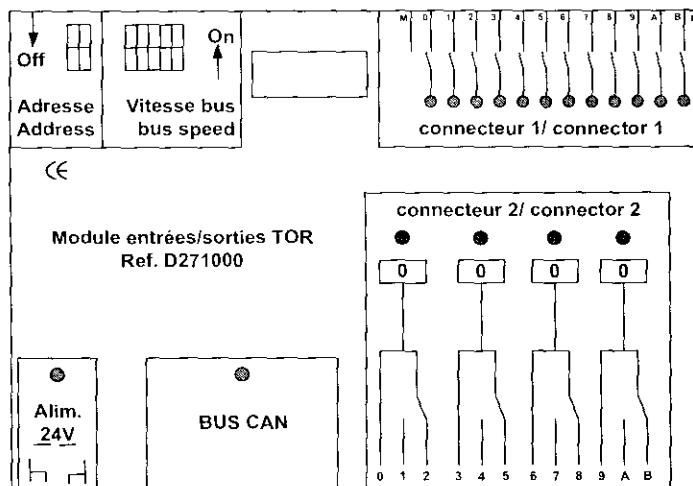
- The CAN bus connector permits the connection of two cables.
- If the unit is at the end of the bus, the free terminals must be terminated with a 120 Ω resistor.
- LED indicates the CAN bus activity.
- The digital output modules can be addressed from 8 to F.

2.3.4 Connections

Screw-type connectors make all connections.

	Qty	Soreel references
Power supply	1	WE1 152 666
Can	1	PHO 1 841 912 + MCMMDM15M + 2 x MCMMJS
Outputs	4	WE1 152746

2.4 Module 12 Digital input, 4 output with relay



Reference D271000 12 inputs, 4 outputs by module

2.4.1 Mechanical characteristics.

Dimensions: 151 x 106 x 33.
Fixation by 2 clips on rail DIN

2.4.2 Electrical characteristics.

Sheet feed 24V CC -25% +15%.
It tolerate a tension drop to 6 V during 0.5 second.
A light indicate its present.
Two terminal on each polarity make easier the wiring.
The module consumption : 100 mA.
The inputs characteristic is identical to the inputs module
The outputs characteristic is identical to the outputs module

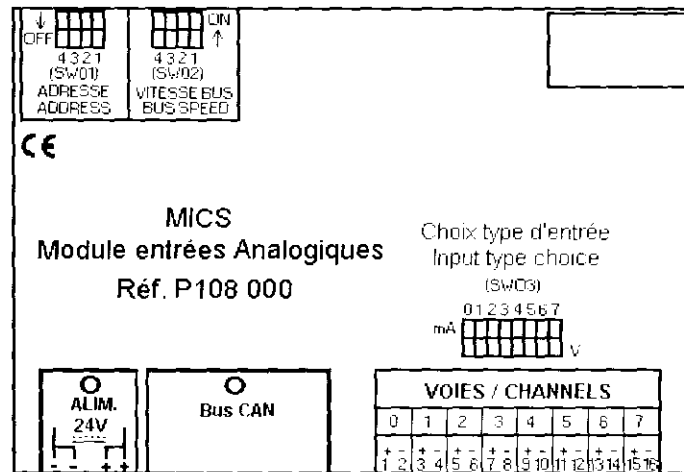
2.4.3 Bus CAN.

The connector CAN allow to adjusting two cables.
If the box are in extremity to the bus, a resistor to 120 Ω must be connected in a plug.
A light indicate the activity to the CAN bus.
The ETEMP modules can have the 0 to F address

2.4.4 Connexions.

	Qté	References SOREEL
Alimentation	1	WE1 152 666
Can	1	
input	1	

2.5 Analogue inputs



Reference P 108 000 8 channels per module

2.5.1 Mechanical characteristics

Dimensions: 151 x 106 x 33.

Fixed by 2 clips on DIN rail.

2.5.2 Electrical characteristics

Unit's power supply 24 V dc -25% +15%.

It tolerates a voltage drop to 6 V for 0.5 of a second.

A LED indicates that it is "on".

Two terminals of each polarity facilitate wiring.

Module consumption: 100 mA.

Input impedance of an analogue channel: 500 Ω

2.5.3 Measurements

Each channel permits the acquisition of analogue data sourced by ± 20 mA / ± 10 V converter outputs.

The choice of the input type is made through a switch (SW03) independent of each channel.

The table below gives the error as a function of the input measured value.

Voltage	Value		100 mV	1 V	5 V	10 V
	Error		31 mV	36 mV	58 mV	86 mV
Current	Value	1 μ A	200 μ A	1 mA	10 mA	20 mA
	Error	0,17 μ A	63 μ A	76 μ A	116 μ A	362 μ A

2.5.4 CAN bus

The CAN bus connector permits the connection of two cables.

If the unit is at the end of the bus, the free terminals must be terminated with a 120 Ω resistor.

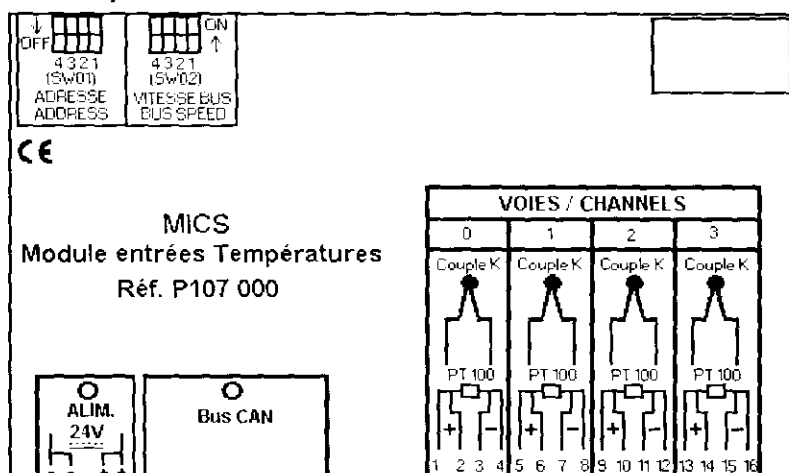
A led indicates the CAN bus activity.

The analogue inputs modules can be addressed from 0 to F.

2.5.5 Connections

	Qty	Soreel references
Power supply	1	WE1 152 666
Can	1	PHO 1 841 912 + MCMMDM15M + 2 x MCMMJ5
Inputs	1	WE1 159 750

2.6 Temperature inputs



Reference P 107 000 4 channels per module

2.6.1 Mechanical characteristics

Dimensions: 151 x 106 x 33.
Fixed by 2 clips on DIN rail.

2.6.2 Electrical characteristics

Unit's power supply 24 V dc -25% +15%.
It tolerates a voltage drop to 6 V for 0.5 of a second.
A LED indicates that it is "on".
Two terminals of each polarity facilitate wiring.
Module consumption: 100 mA

2.6.3 Measurements

The inputs accept 3- or 4-wire platinum resistive thermometers or K-type thermocouples.
Two kinds of sensors can be mixed on the same module. The type is selected by the software at the time of system configuration.
The table below gives the error values.

Type of sensor	Temperature range	Accuracy
Pt resistive thermometer	0 to 200°C	+/-0.08°C +/-0.1%
K-type thermocouple	200 to 1000°C	+/-3 °C +/-0.06%

2.6.4 CAN bus

The CAN connector permits the connection of two cables.
If the unit is at the end of the bus, the free terminals must be terminated with a 120 Ω resistor.
A LED indicates the CAN bus activity.
The temperature inputs modules can be addressed from 0 to F.

2.6.5 Connections

	Qty	Soreel references
Power supply	1	WE1 152 666
Can	1	PHO J 841 912 + MCMMDM15M + 2 x MCMMJ5
Inputs	1	WE1 159 750

2.7 Technical characteristics of the products

All this modules are conformed to the following characteristics

2.7.1 Temperature

Storage -25°C to +80°C
Operation -25°C to +80°C

2.7.2 Protective treatment

Relative humidity 100% and 40°C without dripping water
Relative humidity 95% and 45°C without dripping water
Relative humidity 70% and 50°C without dripping water
Relative humidity 50% and 60°C without dripping water

2.7.3 Altitude

1500 m

2.7.4 EMC

Conforming to NF EN 50081-2
Conforming to NF EN 50082-2
CE marking

3. Ergonomics

3.1 Display

In standby mode, the display is as follows:

SOREEL	SDMO
GENERATING SET	
MONITORING	
15/03/02	11:12:13

From the standby screen, there are 4 display modes:

- * Operating signals.
- * Fault signals.
- * Memory reading.
- * Setting mode.

3.1.1 Operating signals

This mode corresponds to the presence of set operation request conditions, absence of mains voltage, EDF tariff period signals, etc.

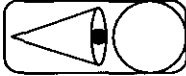
In this mode, when the set is operating, the speed and frequency are displayed.



3.1.2 Fault signals

This mode corresponds to the presence of an uncleared fault. The screen indicates the nature of the anomaly (see paragraph 07).

This display mode has priority over the operating display mode.

3.1.3 Memory reading

To go to this mode, press the  key.

Use the  and  keys to scroll through the list of the 300 stored events.

To exit this mode, press  or , or do not touch the keyboard for a while.

3.1.4 Setting mode

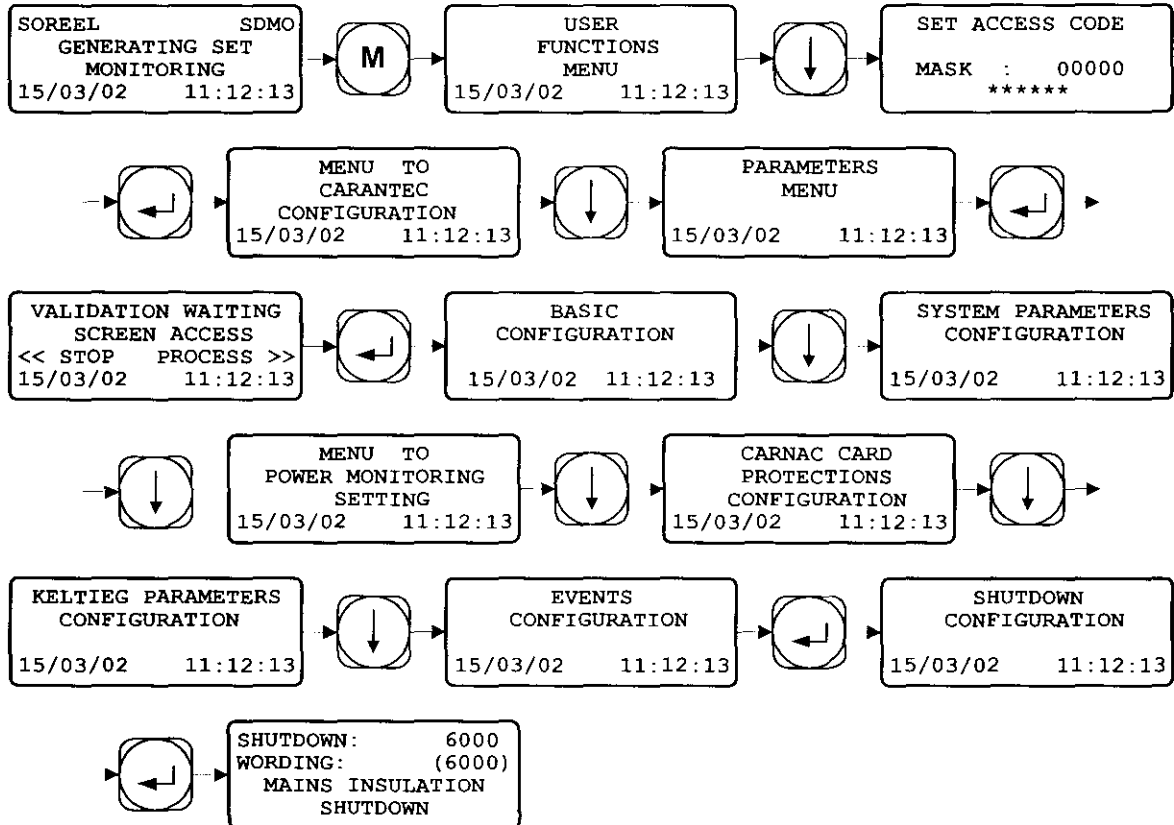
This mode is activated by one of the operations described in the following paragraphs.

3.2 Using the keys

This chapter describes how to move around the menus and change the settings.

3.2.1 To reach a sub-menu

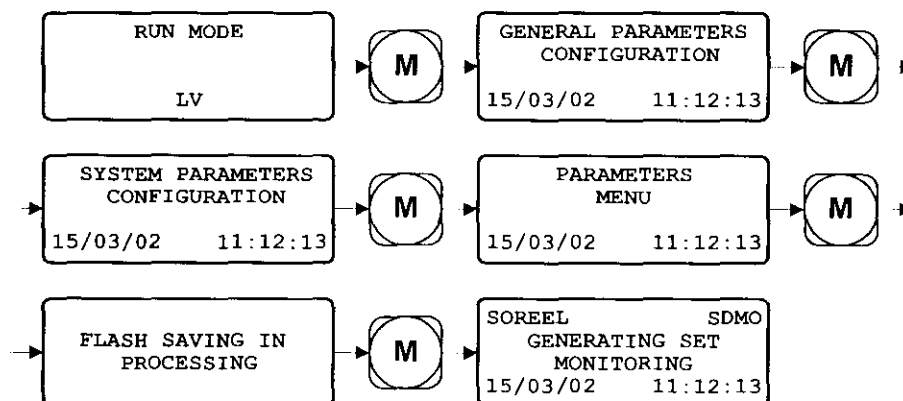
Example: to reach the beginning of the shutdown list, from the standby screen :



Note: The access code is only requested if there is no dongle on the RS 232 port. The code is entered using the alphanumeric keys. The screen bind to Carnac and Keltieg appear if the corresponding options are selected.

3.2.2 To return to the standby screen

Example: To return to the standby screen, from the "run mode" sub-menu.

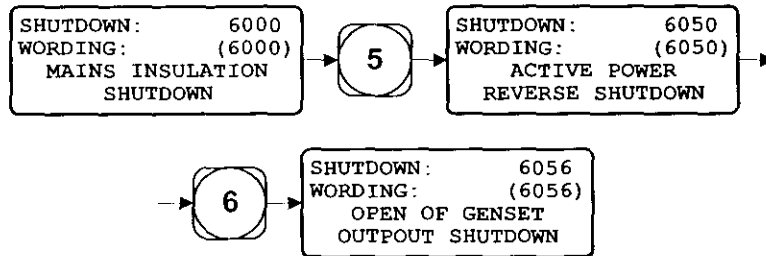


Note: The "flash- saving" menu appears only when a parameter has been modified.



3.2.3 To reach a sub-menu in a numbered list

When the sub-menus correspond to a list of numbered variables, you can move through the list as above using the UP and DOWN keys or by entering the address.

Example: To reach fault 6056, from the first screen of the shutdown list :

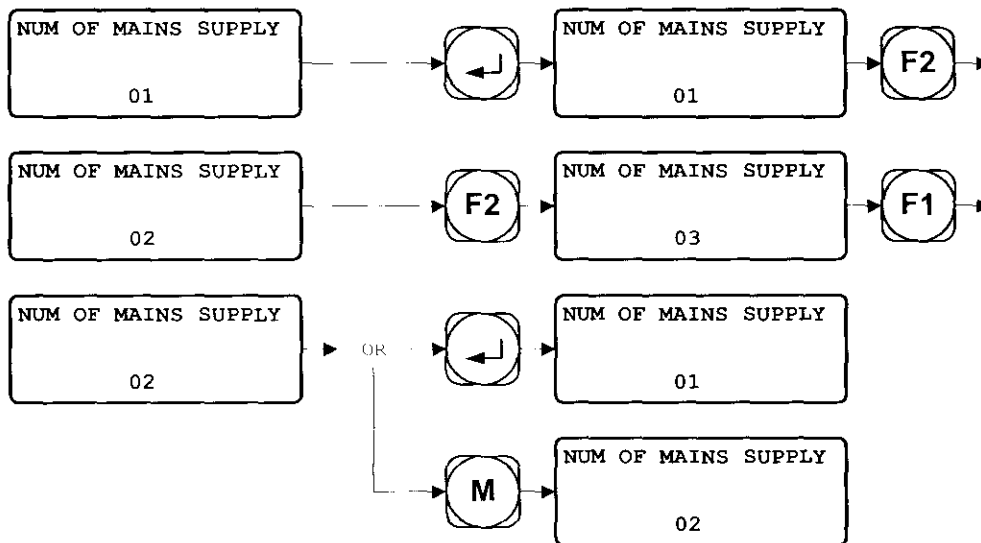




As each key is entered, the cursor moves to the left.

It can also be positioned using the  and  arrows.

3.2.4 To select a choice from a list

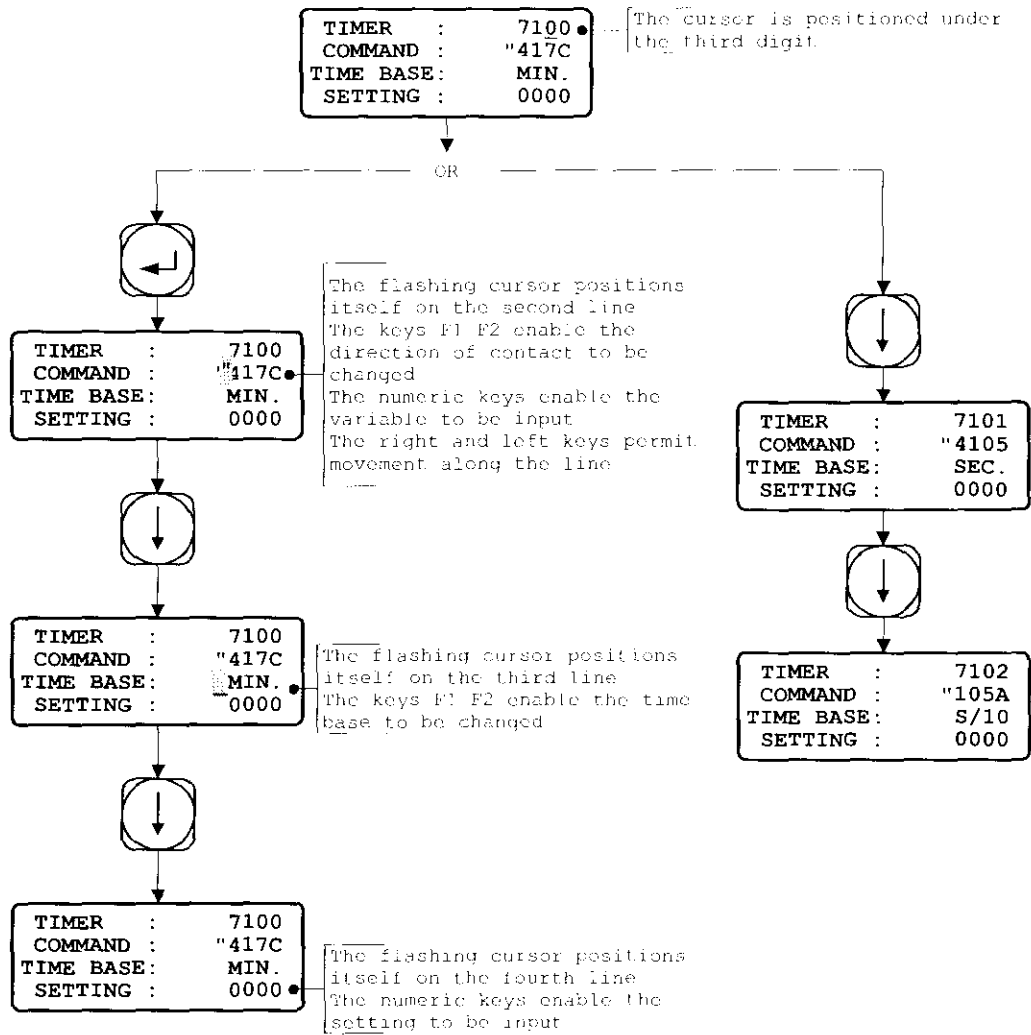
This type of operation is indicated by the presence of the flashing cursor to the left of the line on which the options are displayed.



After modification, press  to confirm the new choice. Press  to retain the previous setting.

3.2.5 To enter a value

Example: to modify the duration of a time-delay.



The alphanumeric keypad enables values to be entered. F3 and F4 are used as shift keys to give the letters from G to Z. The table below gives the equivalences. Press once to activate the function key, press a second time to deactivate it.

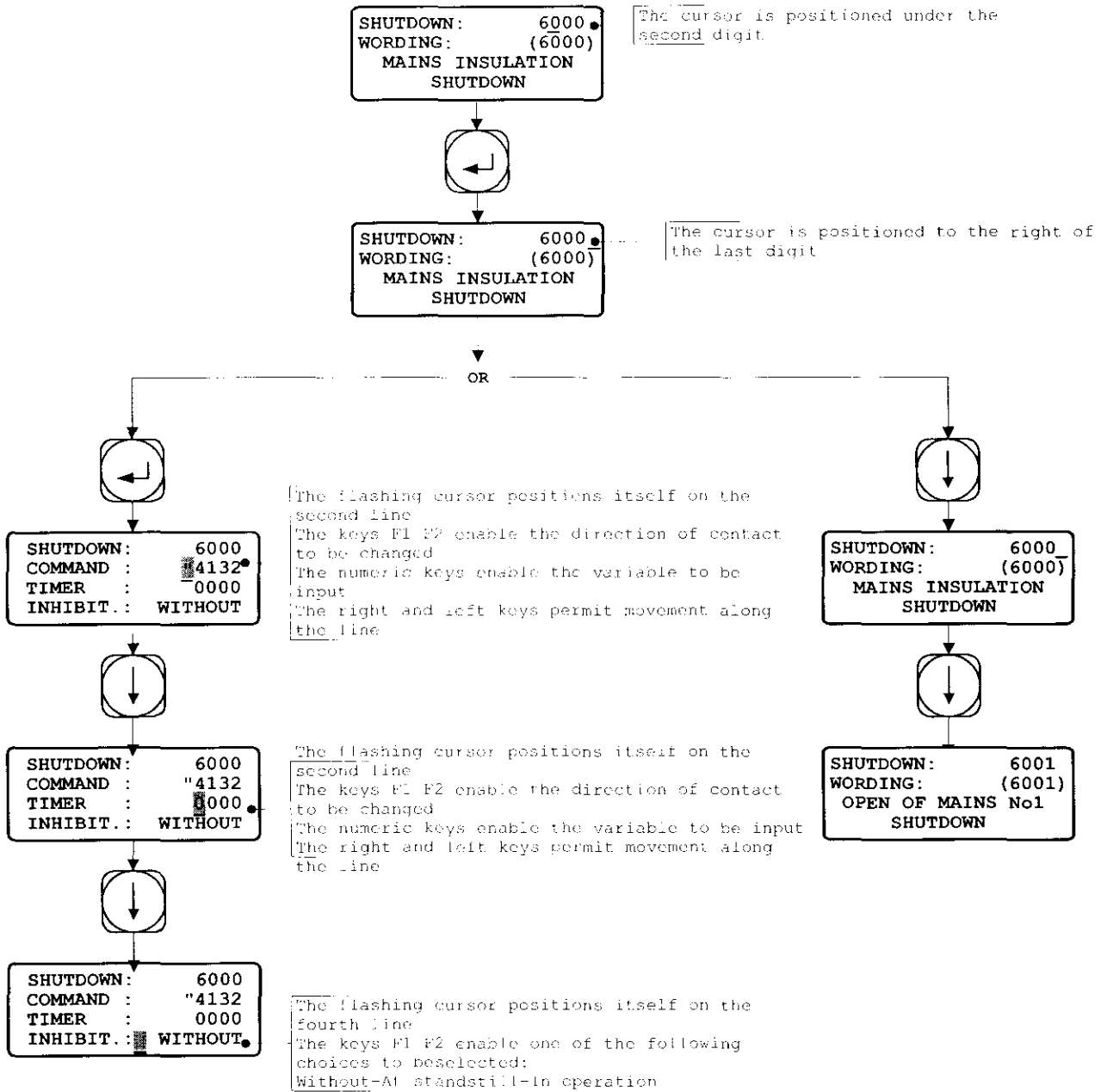
When F3 or F4 are active, the associated LED is ON.

	0	1	2	3	4	5	6	7	8	9
F3	G	H	I	J	K	L	M	N	O	P
F4	Q	R	S	T	U	V	W	X	Y	Z

To delete a character, use F6.

3.2.6 To set the alarms

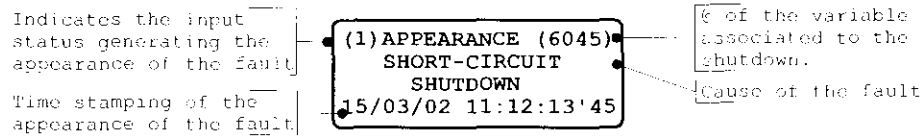
The settings of each alarms is presented on one of three screens.
 Navigating within these screens is done as described below.



The settings on each line can be modified as previously described.

3.3 Management of fault signalling

The message gives the following indications on the causes for malfunction



Each fault is signalled by a LED.

Pressing the reset key only applies to the fault displayed.

Acting on the variable 4047 resets all faults.

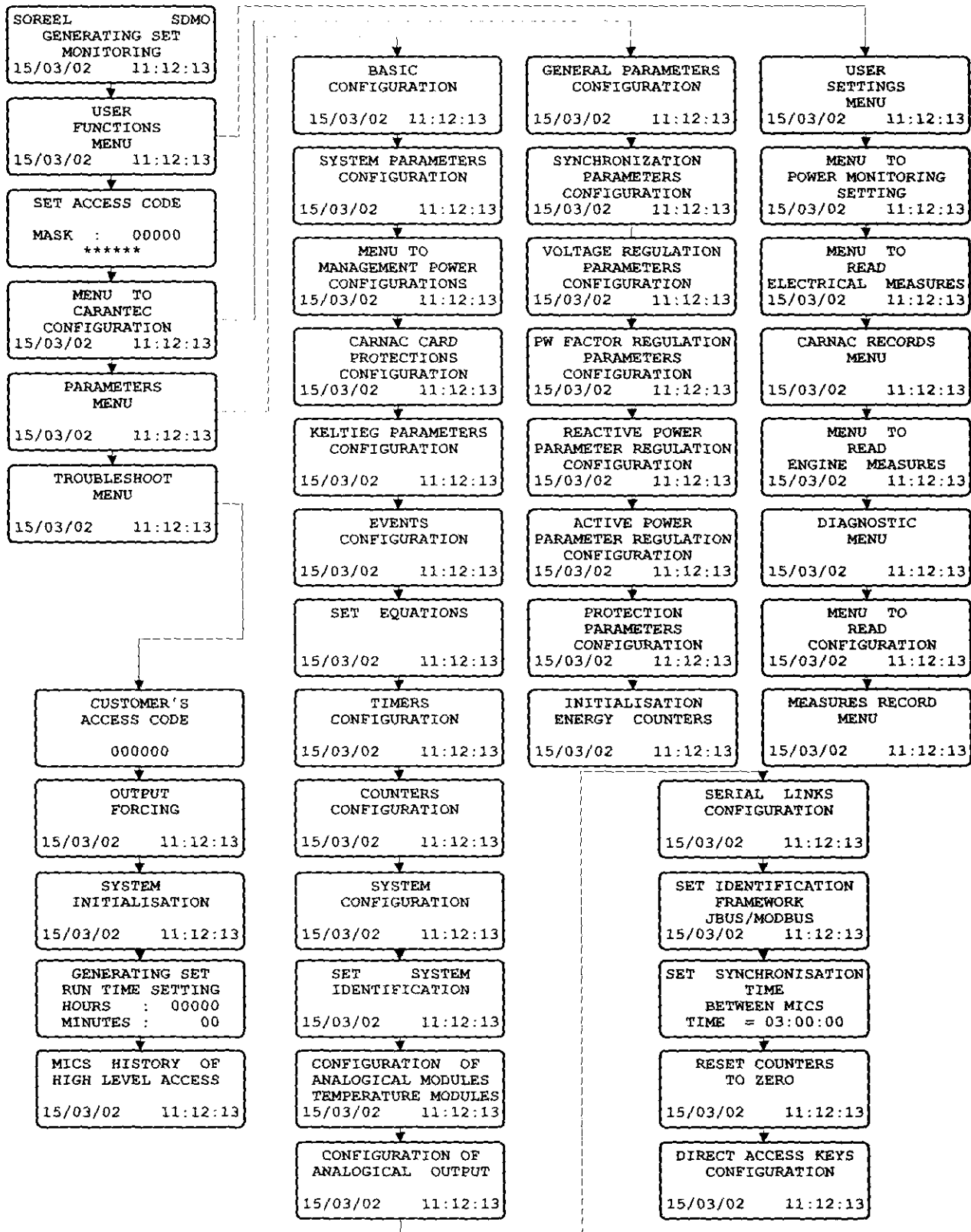
Depending on how they have been programmed, certain faults force the "out of service" mode.

Action	Display		Leds		
			Off	Flashing	Fixed
Appearance of a short circuit	(1) APPEARANCE (6045) SHORT-CIRCUIT SHUTDOWN 15/03/02 11:12:13'45	Active			
	(1) APPEARANCE (6045) SHORT-CIRCUIT SHUTDOWN 15/03/02 11:12:13'45	Inactive			
Reset	(1) APPEARANCE (6045) SHORT-CIRCUIT SHUTDOWN 15/03/02 11:12:13'45	Inactive			
Eliminate the cause of the fault	(0) APPEARANCE (6045) SHORT-CIRCUIT SHUTDOWN 15/03/02 11:12:13'45	Inactive			
	SOREEL SDMO GENERATING SET MONITORING 15/03/02 11:12:13	Inactive			

On exiting from another display mode, if a fault has not been cleared, the display returns as a priority.

4. Description of the software

4.1 Architecture



4.2 Accessibility

Access to the user function menu is not coded.

Access to the other menus is coded and is done in two ways:

By fitting a dongle on the CPU RS 232 port.

Depending on the authorisation defined by the dongle, the operator has access to one or more encoded levels.

By entering an alphanumeric code in the entry screen.

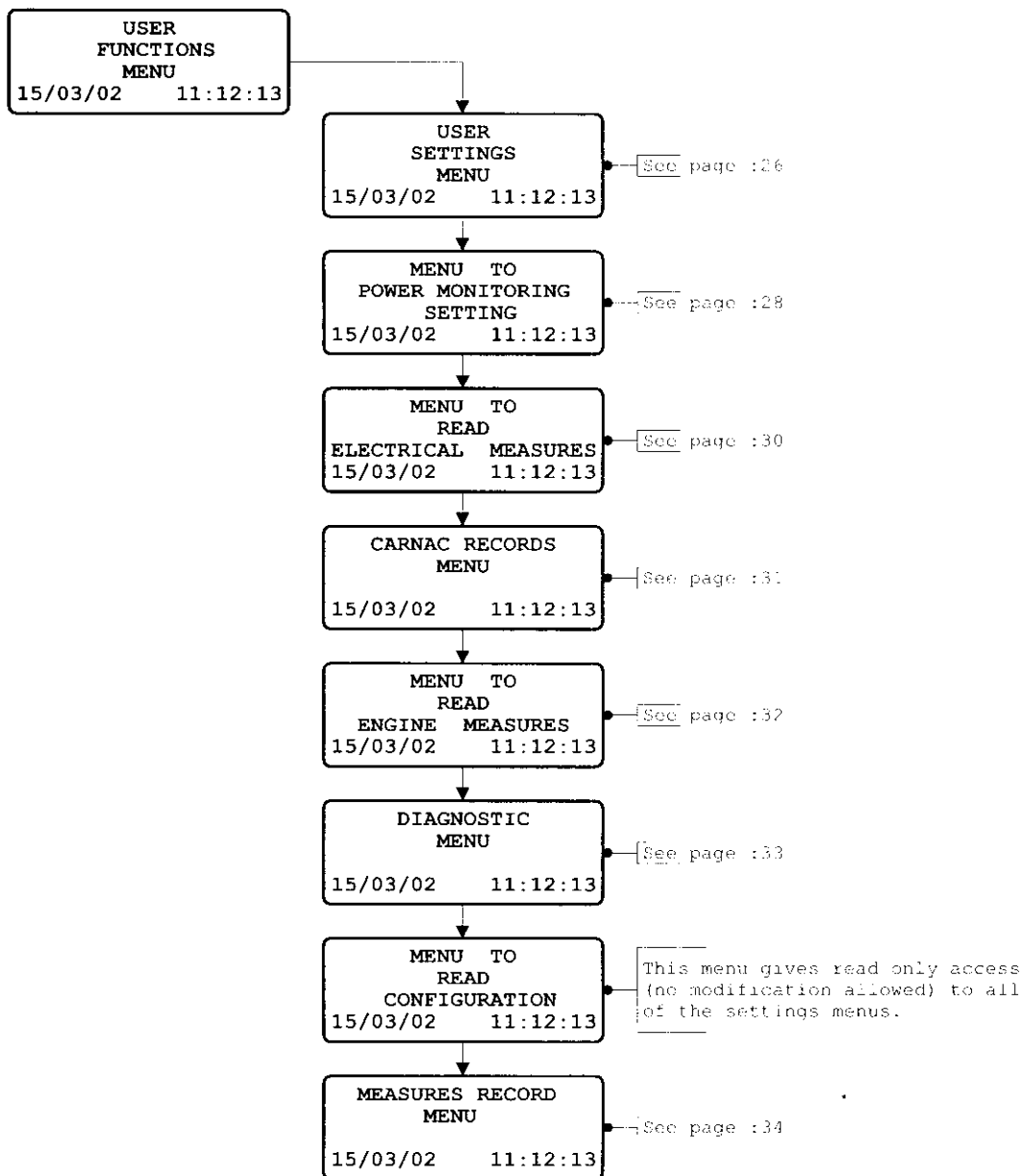
This code, available from SDMO technical support team (SAT) in Brest, is valid for 24 hours.

N.B. MTU engine-linked menus are available from version 2 if a CAN bus is assigned to the MDEC dialogue.

Carantec-linked menus are available from version 3 if a Carantec board is installed.

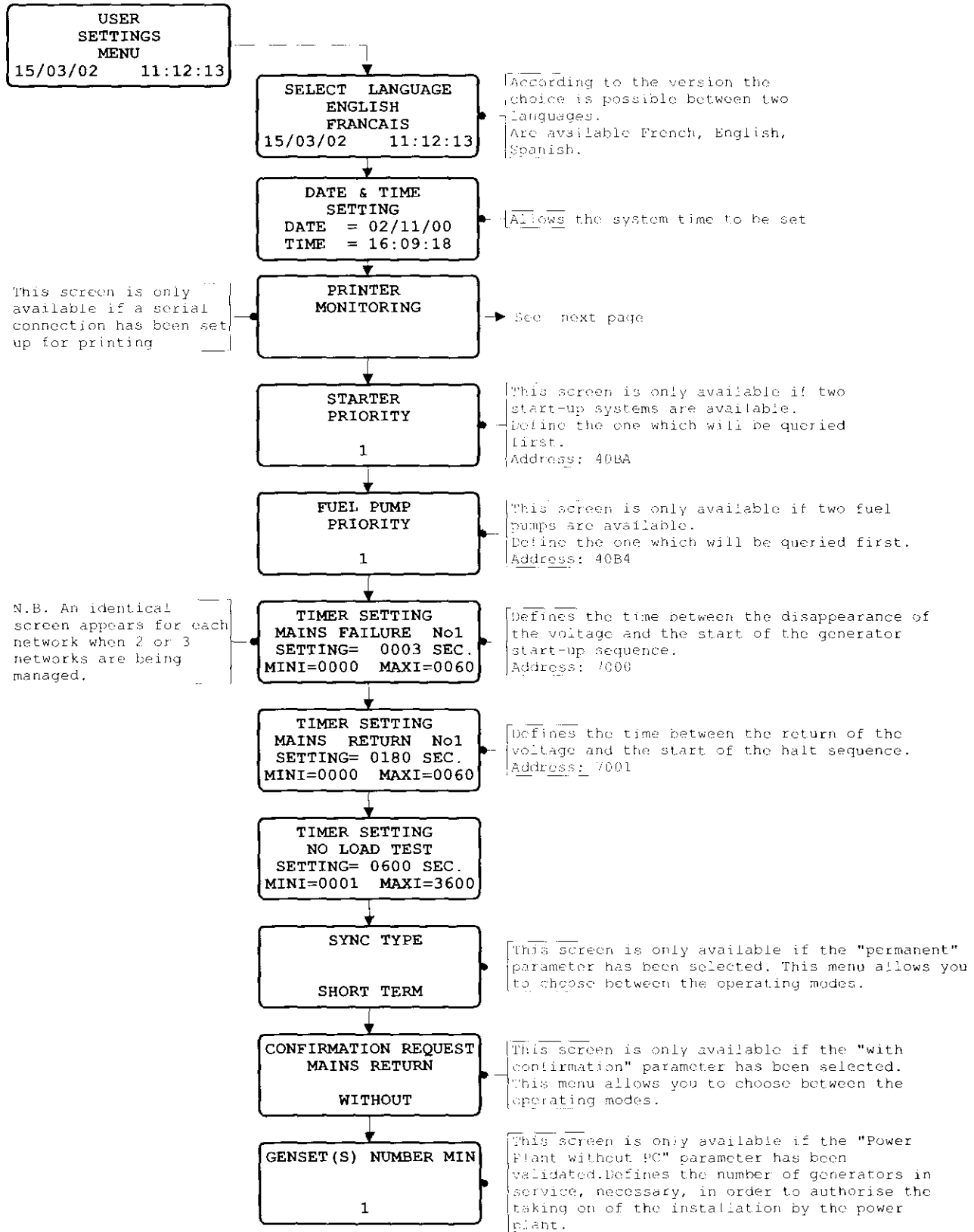
Carnac linked menus are available from version 4 if a Carnac board is installed.

4.3 User functions menus

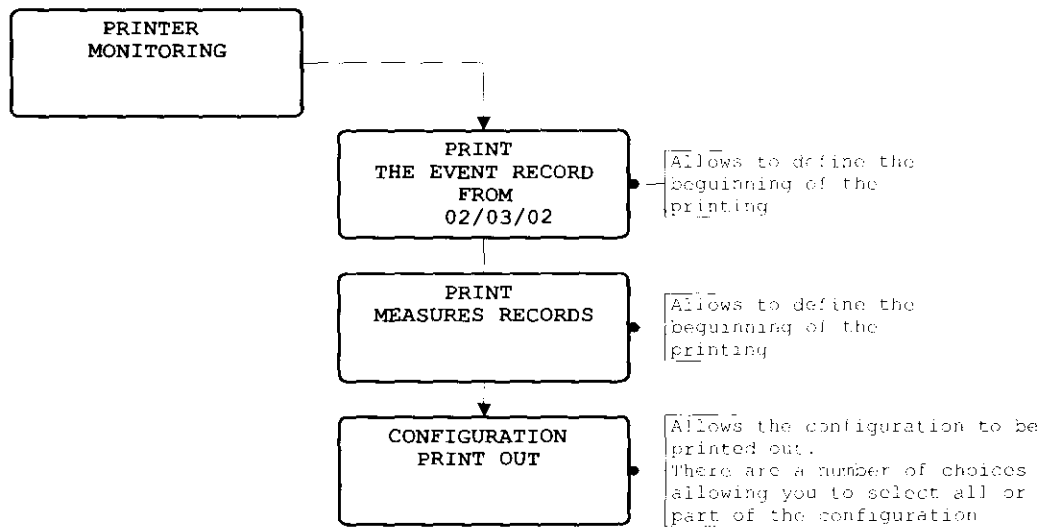


4.3.1 User setting menus

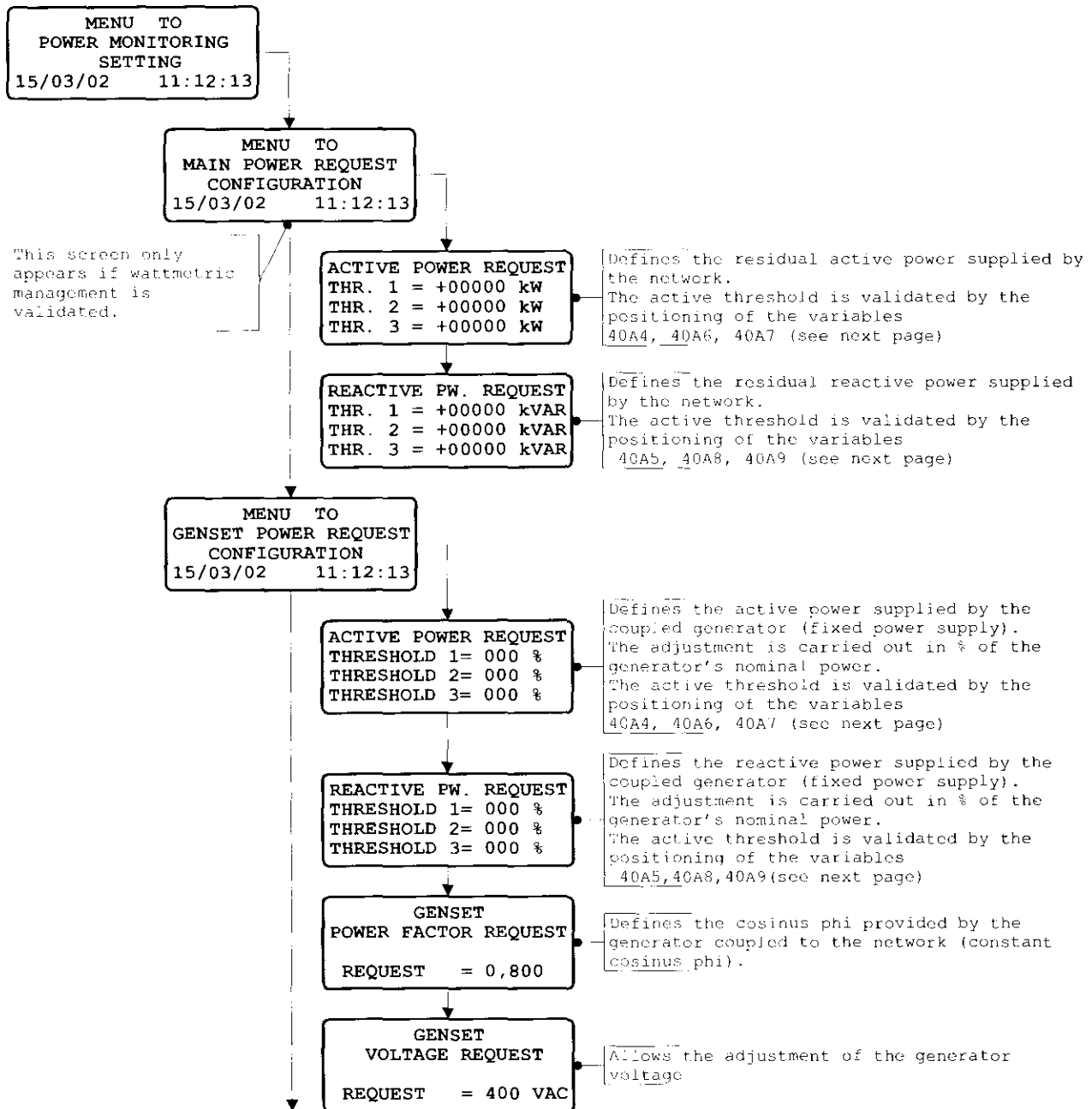
4.3.1.1 Organisation



4.3.1.2 Printer monitoring



4.3.2 Power management settings menu



MENU TO
THRESH. ACTIVE POWER
CONFIGURATION
15/03/02 11:12:13

SETTING
THRESH. ACTIVE POWER
No 1
%

Allows you to generate thresholds linked to the active power supplied by the power plant. The variables 4260 to 4267 are associated with these thresholds. Adjustment is possible between 0 and 120%.

MENU TO
WATT. MANAGEMENT
CONFIGURATIONS
15/03/02 11:12:13

This screen only appears if wattmetric management is validated.

SELECT
GENSET PRIORITY
01

Allows you to set the order in which the generator will be queried according to the evolution of the power required by the installation.

THRESHOLD BALLAST
70 %

When wattmetric management is in service, in a power plant without a common part, defines the value for which the generator will be started up. The adjustment is carried out in % of the sum of the nominal power of the generators which have been started up.

THRESHOLD LIFT OFF
30 %

When wattmetric management is in service, in a power plant without a common part, defines the value for which the generator will be shut down. The adjustment is carried out in % of the sum of the nominal power of the generators which have been started up.

TIMER SETTING
THRESHOLD BALLAST
SETTING= 0010 SEC.
MINI=0000 MAXI=0240

Period between the appearance of the threshold defined in the screen above and the request for the start-up of the generator. Avoids the starting up of the generator on the appearance of a spike.

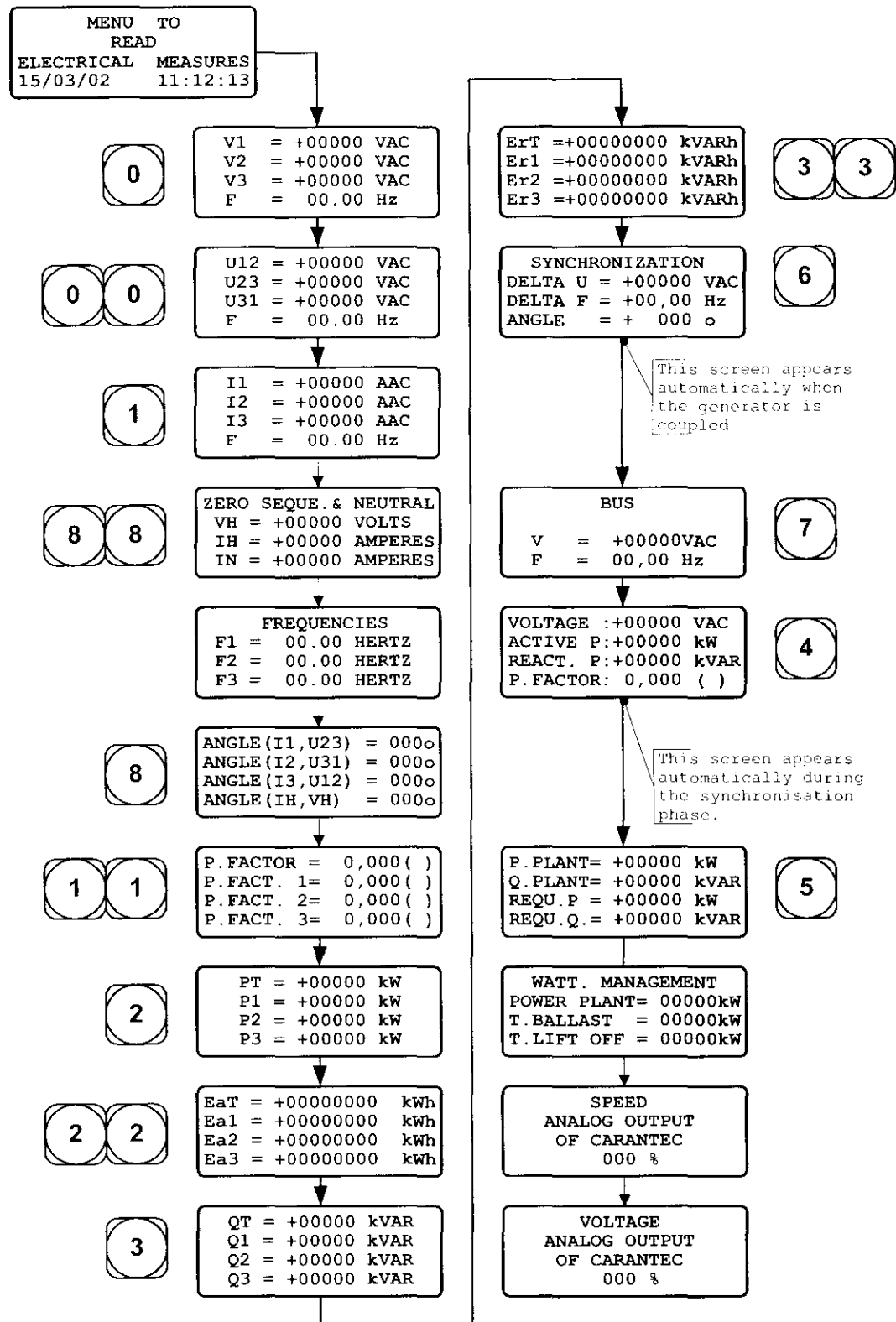
TIMER SETTING
THRESHOLD LIFT OFF
SETTING= 0010 SEC.
MINI=0000 MAXI=0240

Period between the appearance of the threshold defined in the screen above and the request for the shutting down of the generator. Avoids the shutting down of the generator on the appearance of a temporary drop in load.

Variables	Active power			Reactive power		
	40A4	40A6	40A7	40A5	40A8	40A9
genset setting by analogue input	0	0	0	0	0	0
genset setting by threshold 1	0	0	1	0	0	1
genset setting by threshold 1	0	1	0	0	1	0
genset setting by threshold 1	0	1	1	0	1	1
genset setting by threshold 1	1	0	0	1	0	0
genset setting by threshold 1	1	0	1	1	0	1
genset setting by threshold 1	1	1	0	1	1	0
Not used	1	1	1	1	1	1

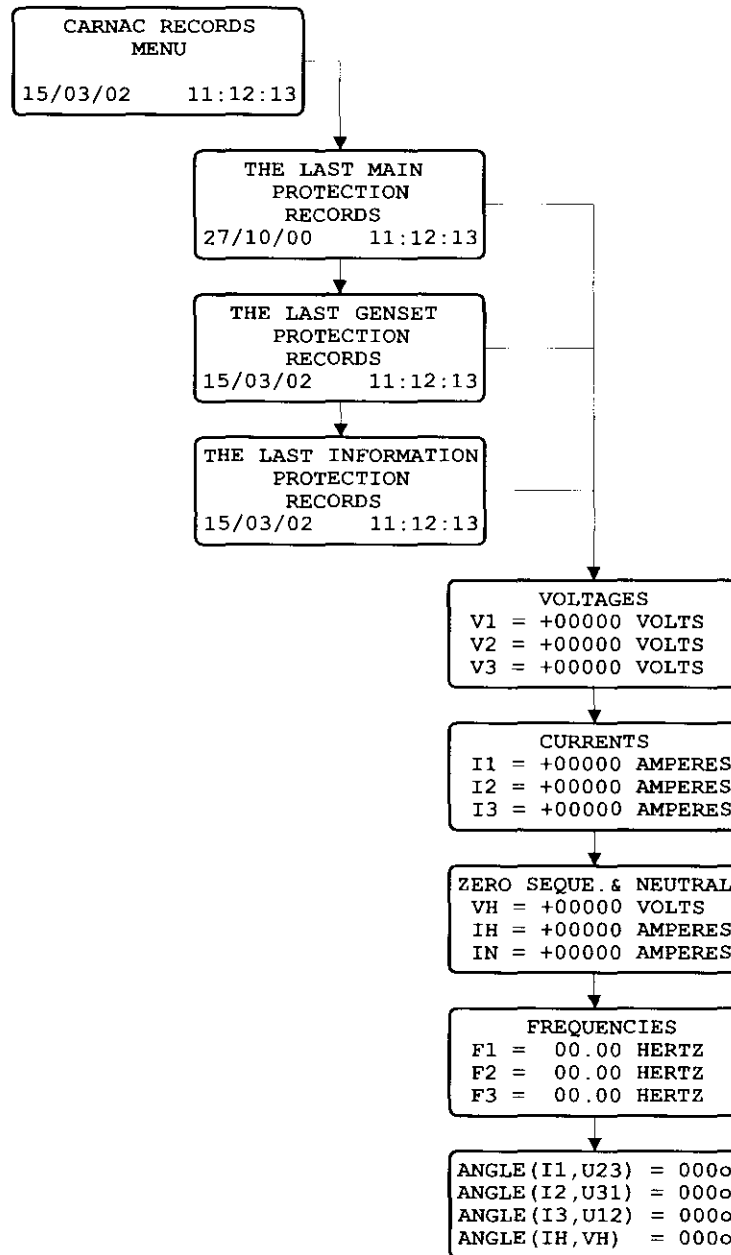
4.3.3 Electrical measurement menu

These menus are only available when the CARANTEC board is installed in the unit.
 Direct access to the screen is possible by pressing the alphanumeric keys.
 The measurement accuracy is 0.5% of full scale for values measured, 1% of full scale for calculated values.



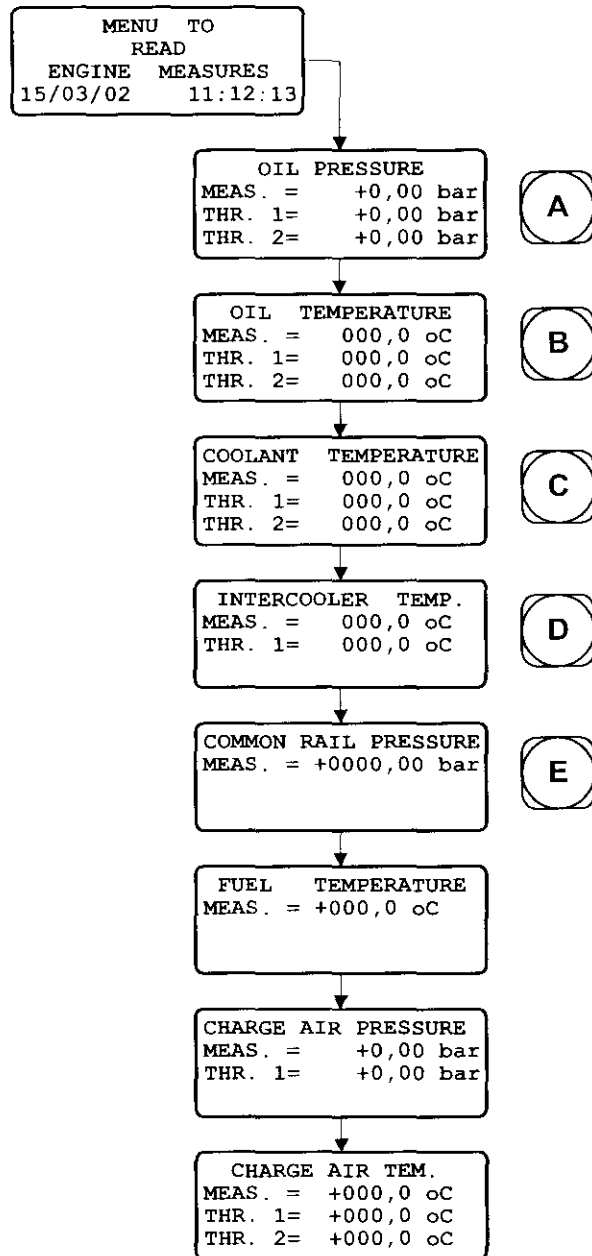
4.3.4 CARNAC records menu

This function is only available if the board is installed.
These records contain the last values measured before a fault occurs.
These menus only appear from version 4 software.



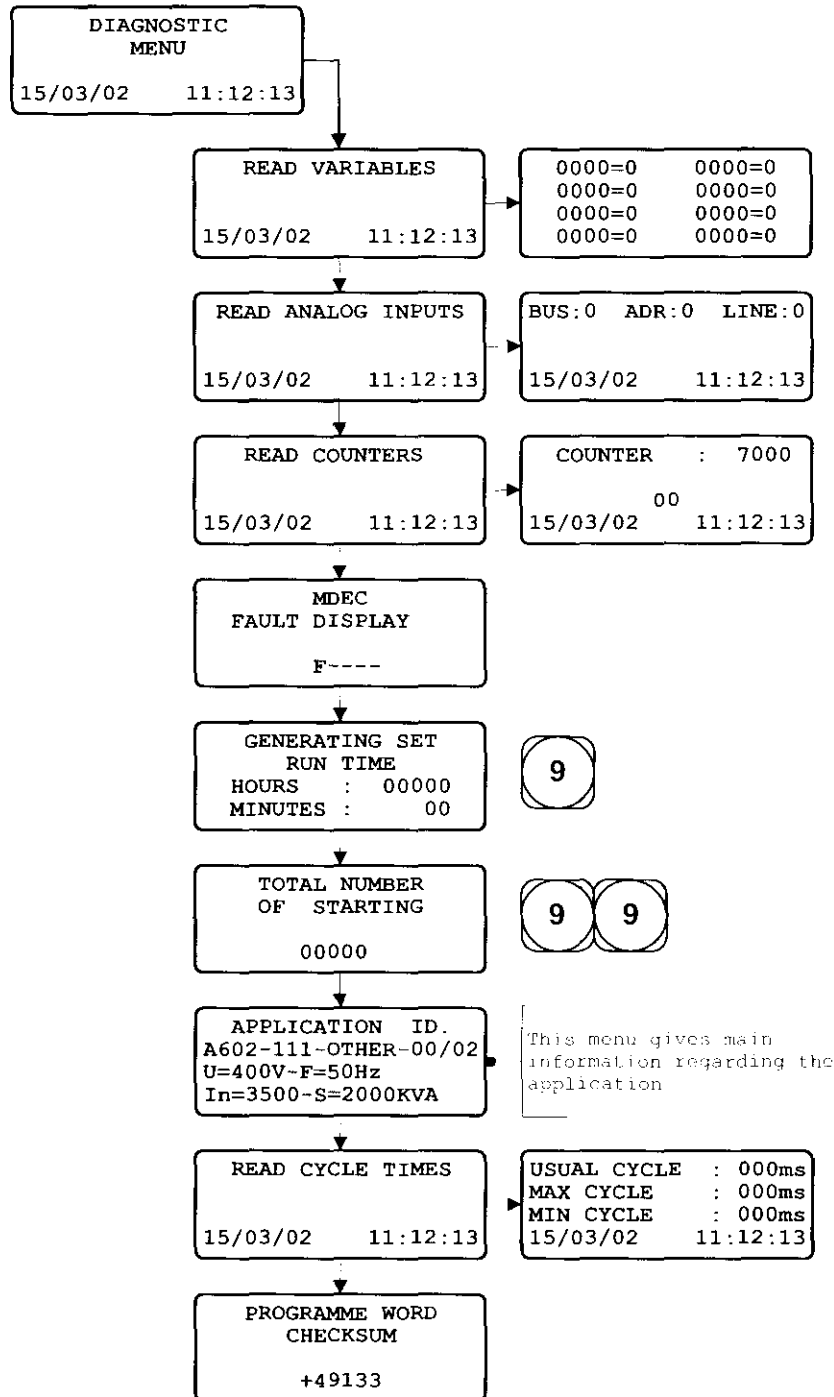
4.3.5 Engine measurement menus

These menus are only available from version 2.0 software. They only appear when one of the CAN bus modules is used in communication with an MTU engine MDEC regulator. They enable the current readings measured by the MDEC (MEASUREMENT=) and the setting values of the associated thresholds (if any) to be displayed.



4.3.6 Diagnostic menus


This section describes a series of genset operating help functionalities. The chart below shows the sequence.



4.3.6.1 Reading the variables


This menu is used to view the state of one or more variables. Enter the number of the variable(s) to be viewed, then press "ENTER". The variable state (0 or 1) is displayed in the resulting screen. The variables are not refreshed while being displayed. The variables are not deleted on exiting the menu.

4.3.6.2 Reading the analogue inputs

Press  to display the screen below

```
BUS:0  ADR:0  LINE:0
15/03/02  11:12:13
```

The keys F1 F2 enable the existing addresses to be scrolled
The right left keys enable the cursor to be moved along the line

Press  again to display the current value of the channel selected.

4.3.6.3 Reading the counters

Enter the number of the counter whose current value you wish to know.

4.3.6.4 Reading the run time

Indicates the engine's operating time.
This counter cannot be reset.

4.3.6.5 Reading the cycle times

This menu gives information on the MICS cycle time.

4.3.6.6 Total number of starting

This menu indicates how many times the engine has started.

4.3.6.7 Application ID.

When using a standard configuration, this screen shows which type is used.

4.3.7 Configuration reading menu

This menu gives read-only access to all the information contained in the set parameter section.

4.3.8 The measures archiving

This functionality is available when a CARANTEC card is install in a box and/or a connection with a motor MTU to be declare.

It allow to record the medium, the max, the min, for four electrical and/or mechanical values at a certain frequency. The sampling on the period to do each 100 mS.

The measures archiving are choose in the next list:

- * Tensions U12, U23, U31, V1, V2, V3.
- * Currents I1, I2, I3.
- * Cos Phi 1, Cos Phi 2, Cos Phi 3, Cos Phi T.
- * Powers P1, P2, P3, PT, Q1, Q2, Q3, QT.
- * Water temperatures HT, water BT, fuel,
- * Oil, fuel pressure.

The archiving frequency is adjustable between 10 and 999 seconds

The quantity to the save measures is function to the frequency and the number record value.

The approximate duration archiving calculate by a expression:

$$\text{Durée (secondes)} = \frac{65535}{(\text{Nb valeurs} \times 6) + 6} \times \text{Intervalle (secondes)}$$

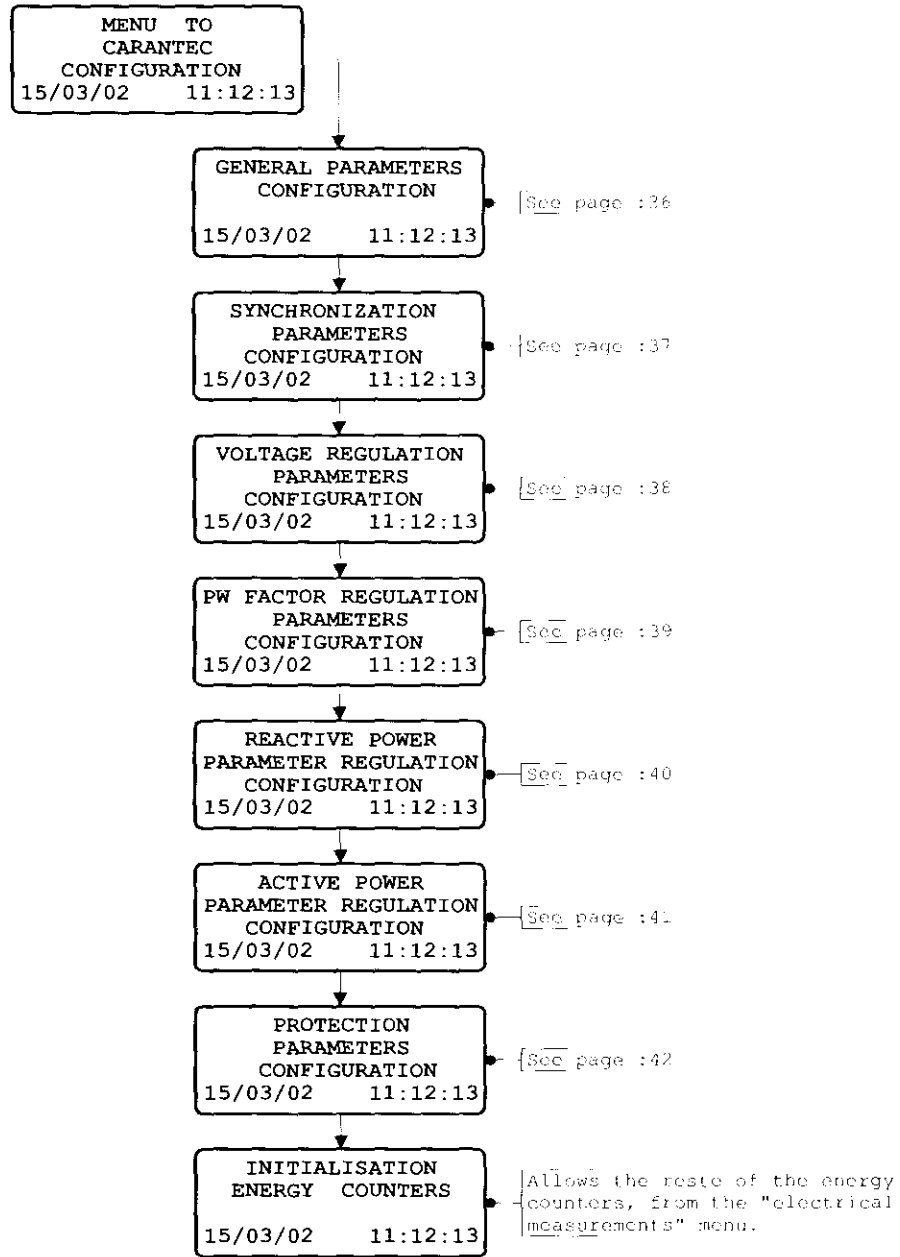
Like this the recording to four sizes each the 60 seconds authorize a duration to 131040 seconds that is to say 1 day 12 hours 24 minutes.

This recordings are recoverable by a series connection either on print or on PC.

This function is active by 46E3

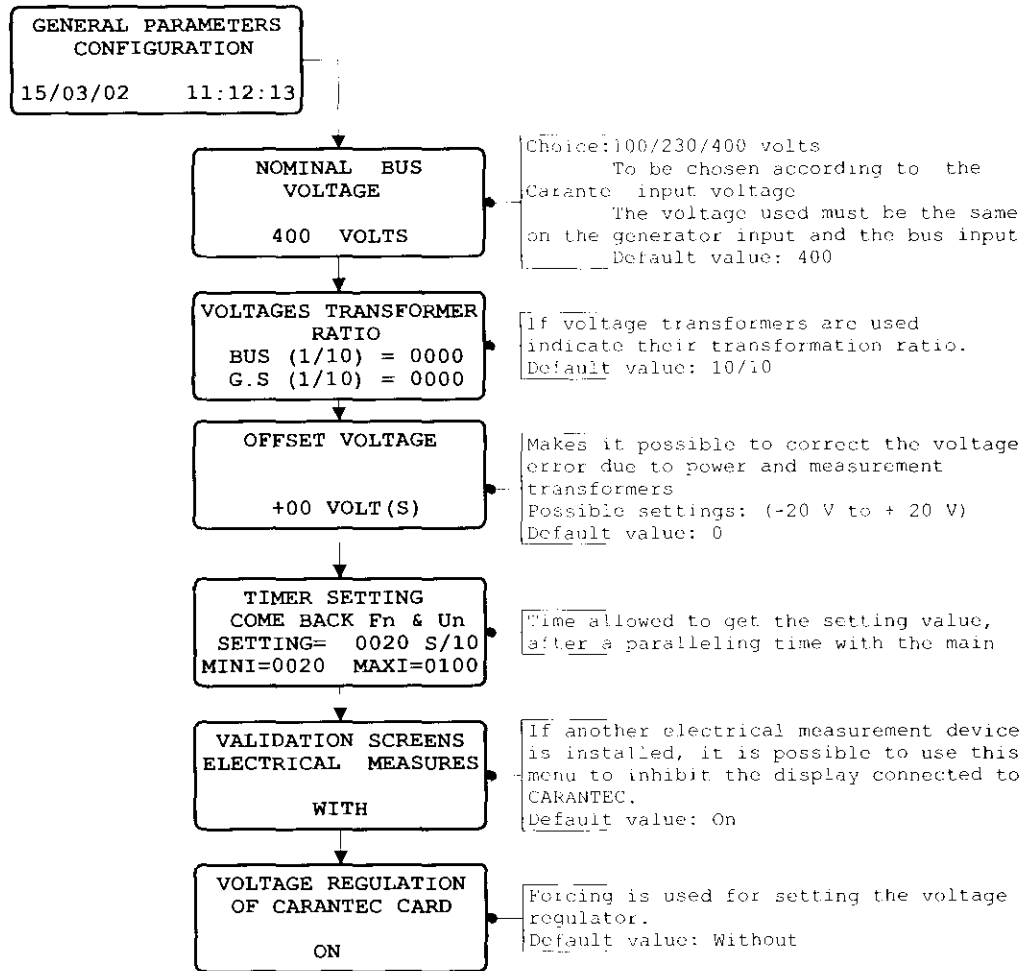
4.4 CARANTEC board configuration menu.

The CARANTEC board settings can be made from a number of screens organised as shown below:

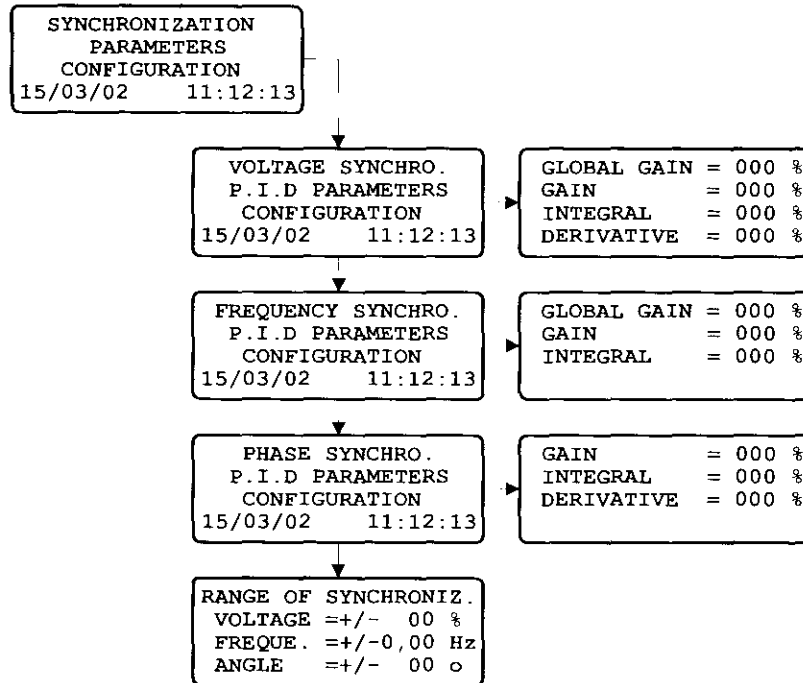


These menus are only accessible when a CARANTEC board is declared in the configuration of optional cards.

4.4.1 Configuration of general parameters



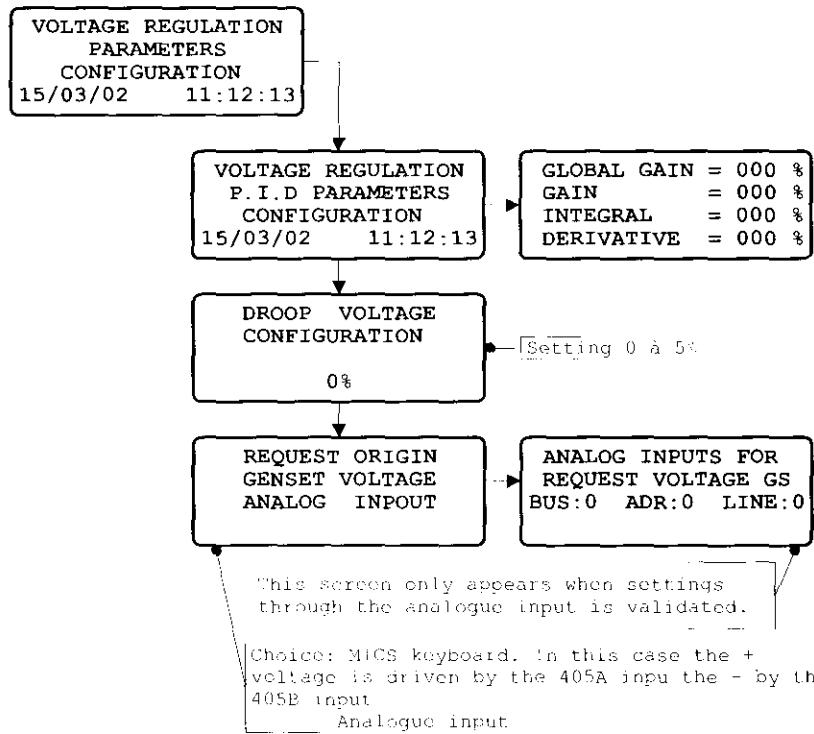
4.4.2 Configuration of synchronisation parameters



Settings of PIDs				
Settings	Limits of settings	Default values		
		Voltage synchro	Frequency synchro	Phase Synchro
Overall gain	0 to 100%	20%	20%	
Gain	0 to 100%	20%	20%	30%
Integral	0 to 100%	30%	10%	20%
Derivative	0 to 100%	0%		0%

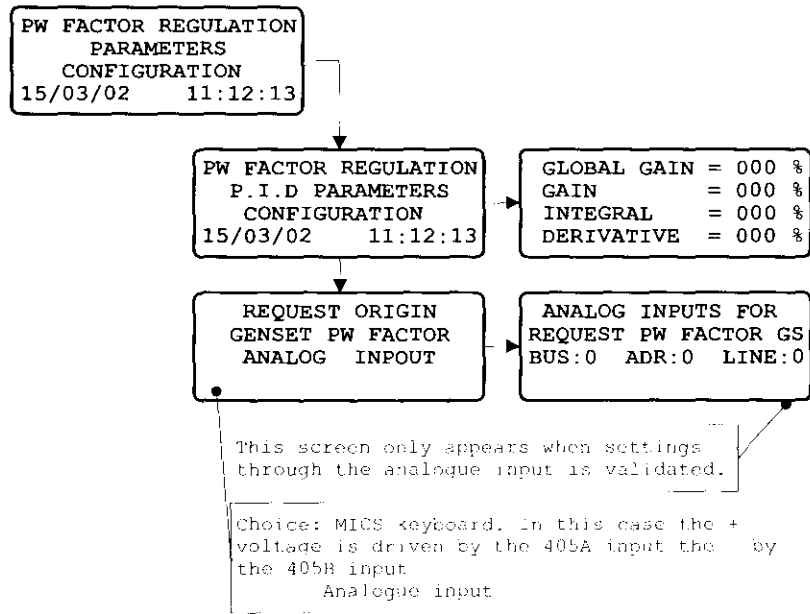
Synchronisation range		
Settings	Limits of settings	Default values
Voltage	0 to 15%	3%
Frequency	0.1 to 0.25 Hz	0.15 Hz
Angle	+/- 2 to 20°	5°

4.4.3 Configuration of voltage regulation parameters



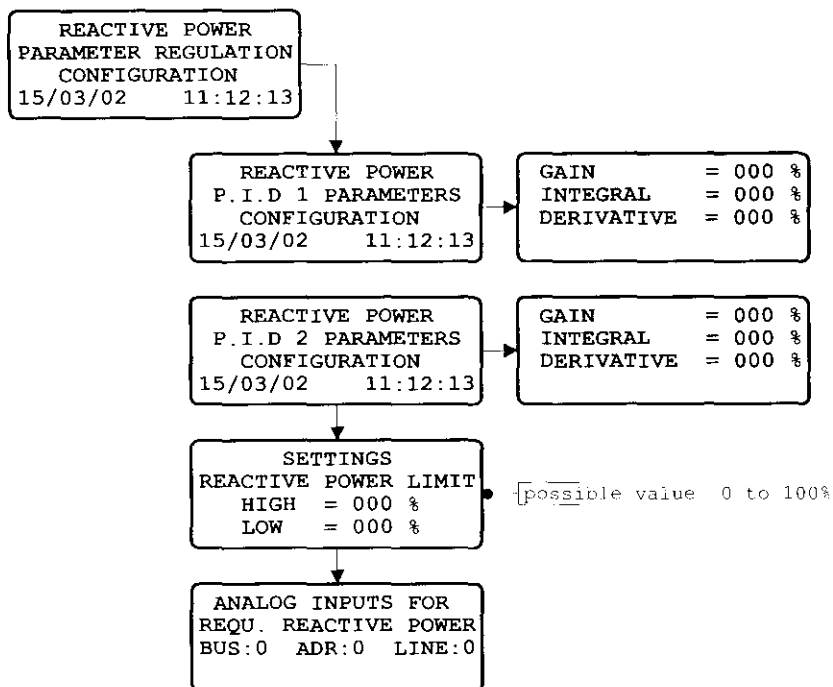
Voltage PID		
Settings	Limits of settings	Default values
Overall gain	0 to 100%	50%
Gain	0 to 100%	30%
Integral	0 to 100%	20%
Derivative	0 to 100%	0%

4.4.4 Configuration of power factor regulation parameters



Power factor PID		
Settings	Limits of settings	Default values
Overall gain	0 to 100%	30%
Gain	0 to 100%	10%
Integral	0 to 100%	10%
Derivative	0 to 100%	0%

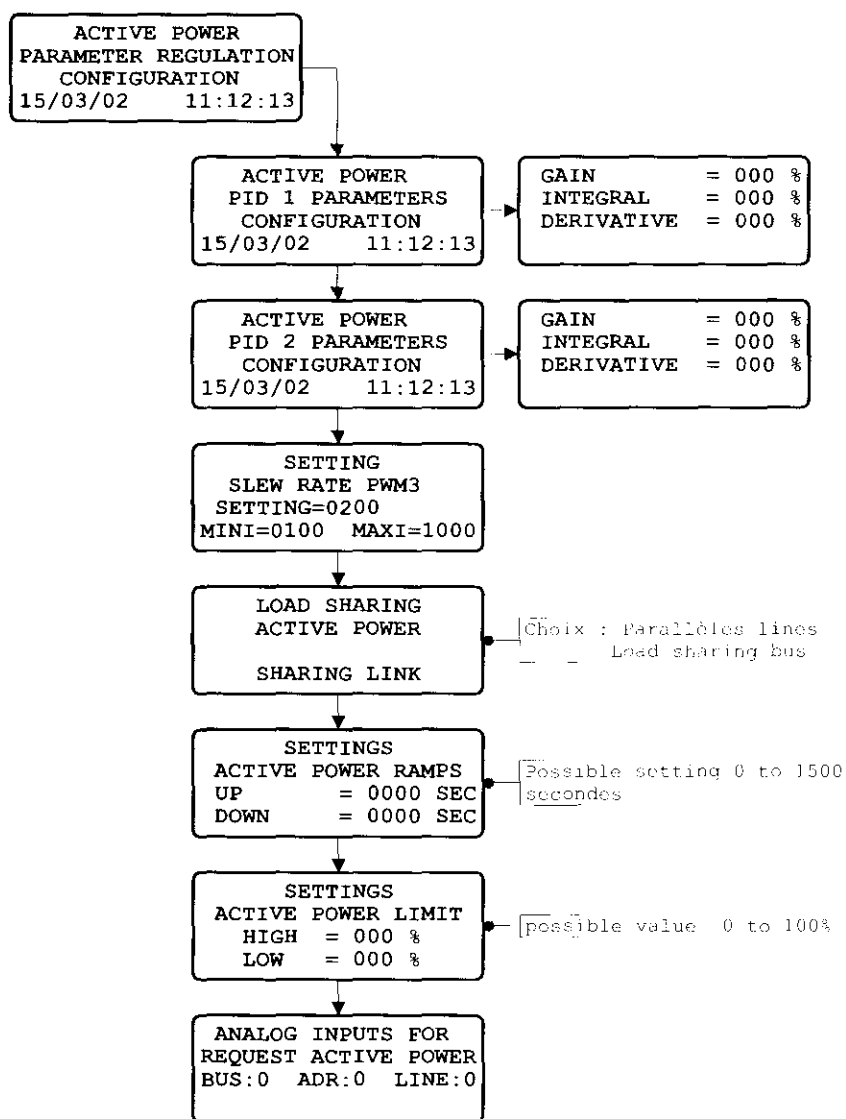
4.4.5 Configuration of reactive power regulation parameters



Reactive power PID 1		
Settings	Limits of settings	Default values
Overall gain	0 to 100%	10%
Gain	0 to 100%	15%
Integral	0 to 100%	2%
Derivative	0 to 100%	0%

Reactive power PID 2		
Settings	Limits of settings	Default values
Overall gain	0 to 100%	20%
Gain	0 to 100%	15%
Integral	0 to 100%	0%
Derivative	0 to 100%	0%

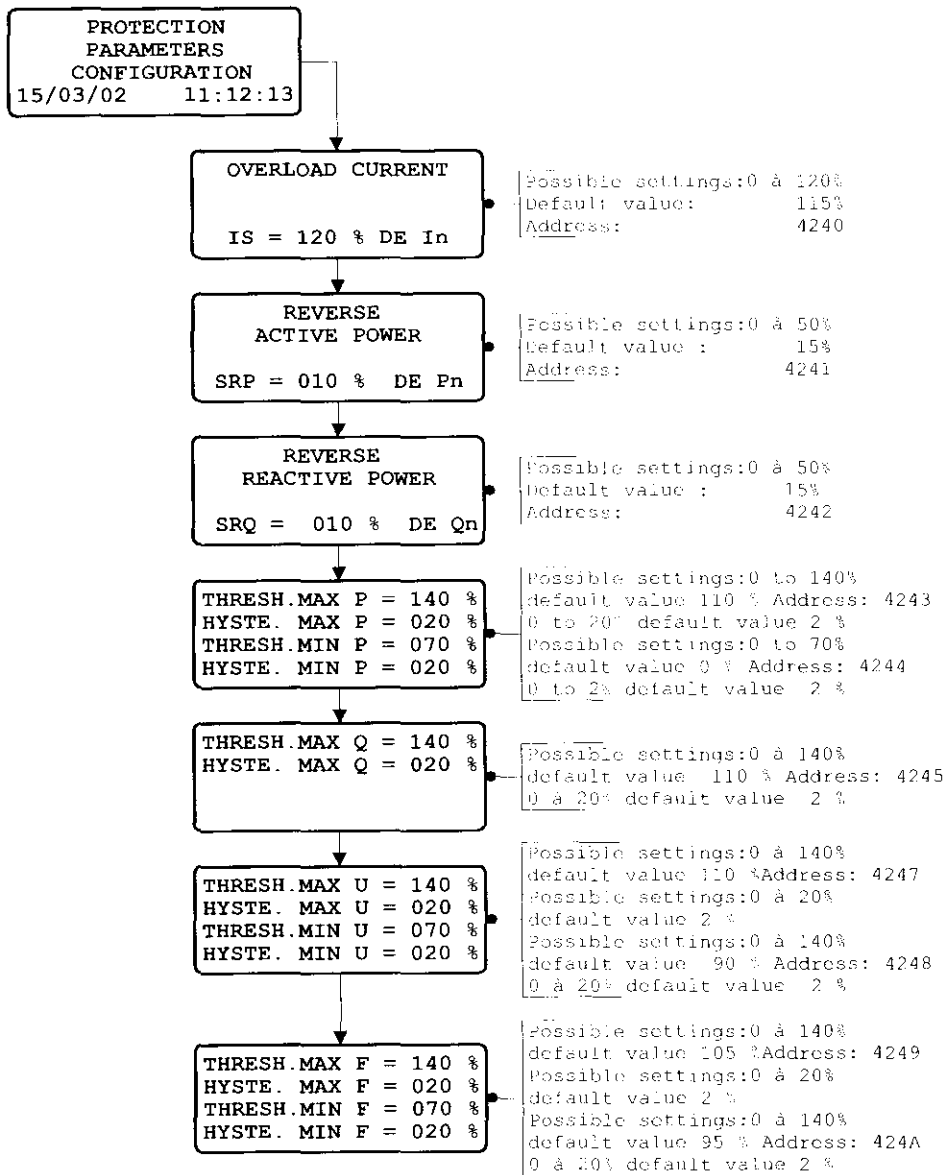
4.4.6 Configuration of active power parameters



Active power PID 1		
Settings	Limits of settings	Default values
Gain	0 to 100%	60%
Integral	0 to 100%	30%
Derivative	0 to 100%	0%

Active power PID 2		
Settings	Limits of settings	Default values
Gain	0 to 100%	60%
Integral	0 to 100%	30%
Derivative	0 to 100%	0%

4.4.7 Configuration of protections parameters

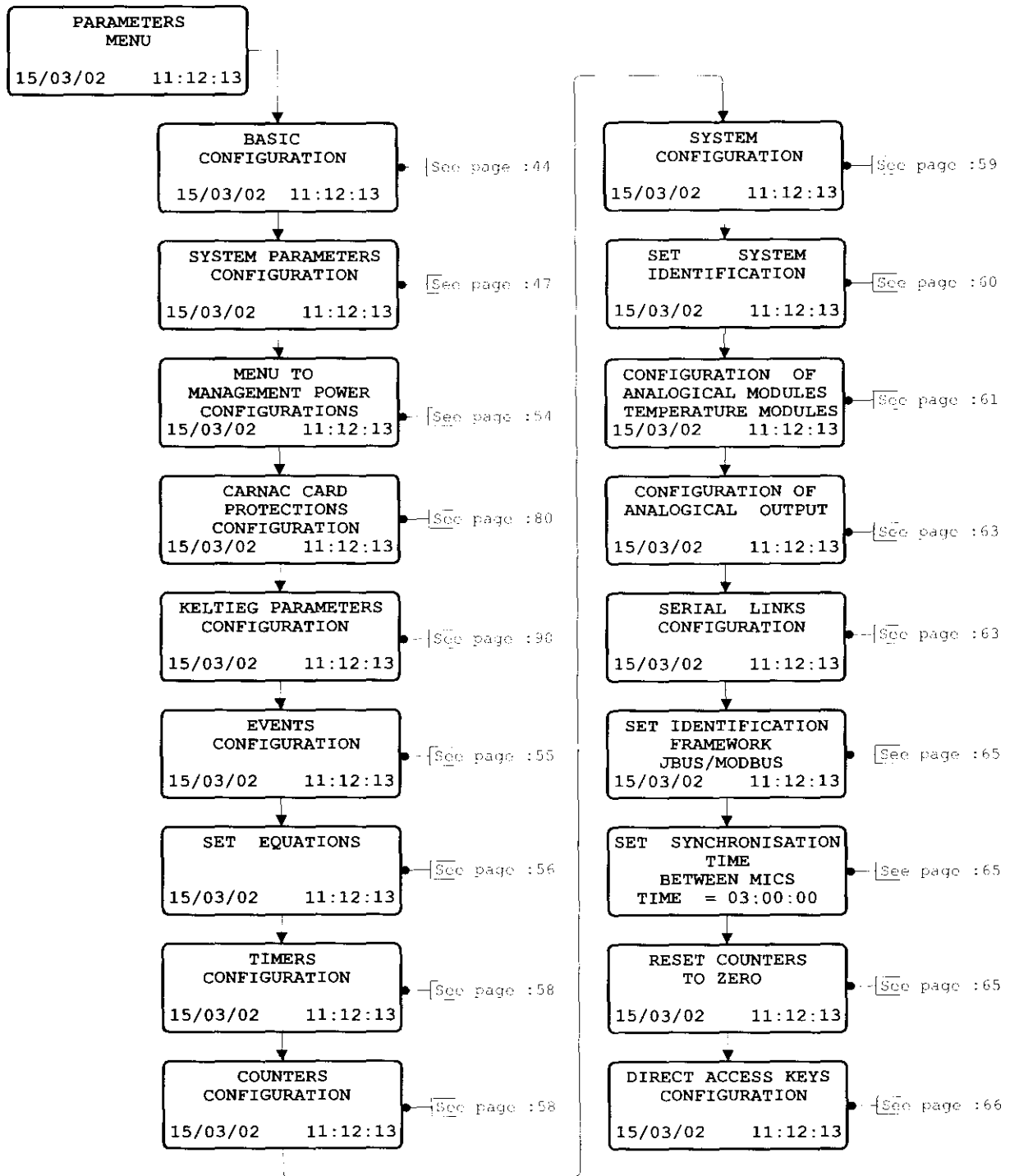


4.4.8 Initialisation of energy counters

This menu is used to reset the counters on the “electrical measurements” menu.

4.5 Set parameter menus

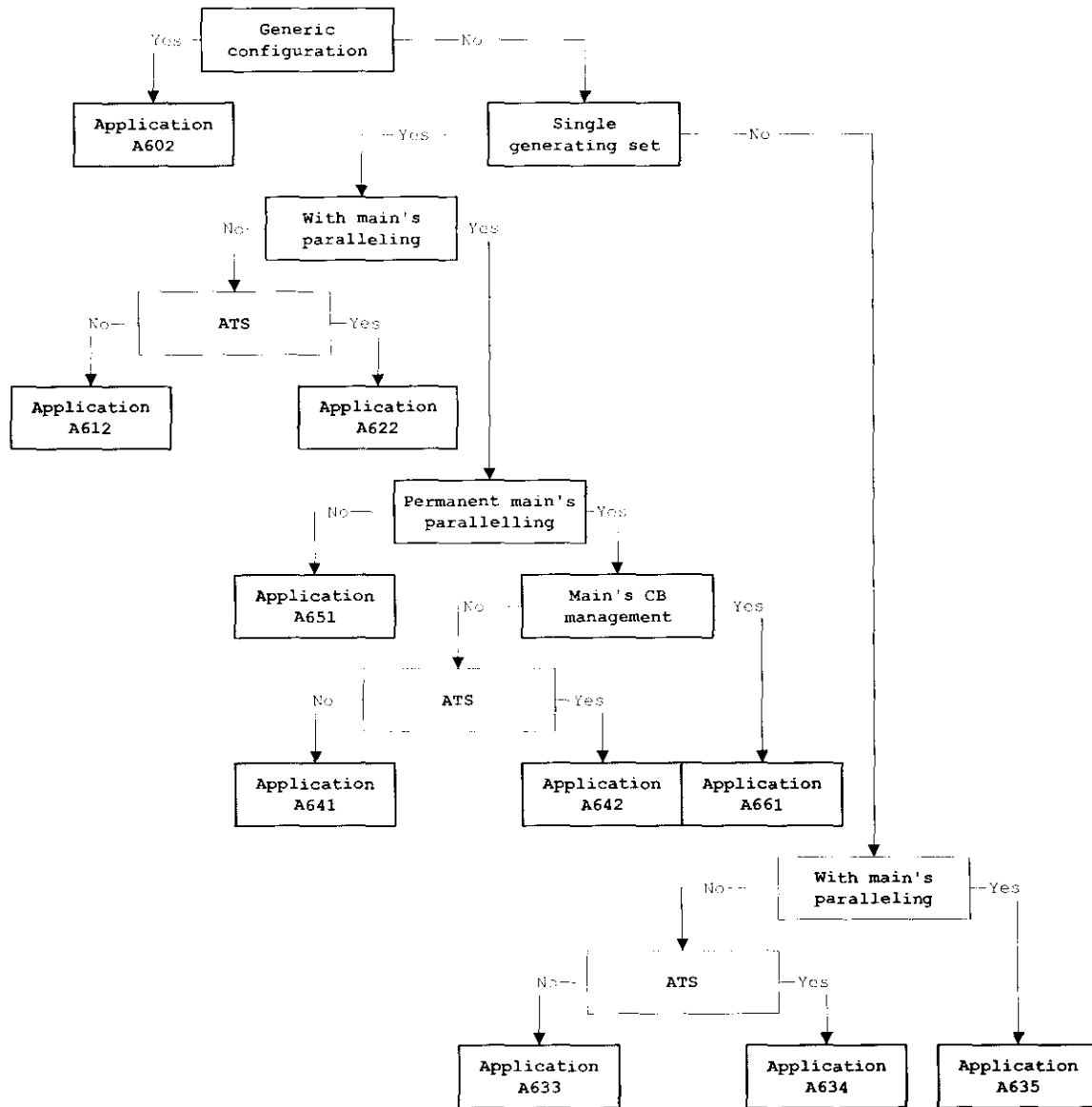
This menus split to next manner



4.5.1 Basic configurations

This menu allow to adapt simply the MICS Process for generating set characteristic which it is join.

It give equally the choice among ten select running types depending the next diagram



BASIC CONFIGURATION
15/03/02 11:12:13

INSTALLATION CHARACTERISTIC CONFIGURATION
15/03/02 11:12:13

TYPE OF ENGINE
MTU 2000/4000

Choice: No listed
MTU 2000/4000

MODE SELECTION
A612

Choice: A602; A612; A622;
A633; A634; A635; A641;
A642; A651; A661

MATERIAL CONFIGURAT.
SLOT No 2 : CARNAC
ETOR OPTION. : NO
ACB MANUAL : NO

To be selected according to the hardware installed on the MICS

NUMBER OF GENSETS IN THE POWER PLANT
01

LOAD SHARING ACTIVE POWER SHARING LINK

This screen only appear when the number of GS>1
Choice : Parallel lines
Load sharing bus

SLAVE NUMBER NUMERICAL LOAD SHARING BUS
00

This screen only appear when the number of genset > 1
Choice : Parallel lines
Load sharing bus

See next page

ELECTRIC
CHARACTERISTIC
CONFIGURATION
15/03/02 11:12:13

CURRENTS TRANSFORMER
(1/10)
CARANTEC = 7000
CARNAC = 7000

Indicate the transformation ratio of the TCs used.
Default value: 7000

U CARNAC=U CARANTEC

YES

CARNAC
NOMINAL VOLTAGE
Vn = 4000 (1/10)V

This screen is only available if the voltage of Carnac is different of this of Carantec

NOMINAL VOLTAGES
BASE = 400 VAC
Un 2 = 000 VAC
Un 3 = 000 VAC

Allow to define the voltage that can be selected by the input

NOMINAL VOLTAGES
Un 4 = 000 VAC
Un 5 = 000 VAC
Un 6 = 000 VAC

Allow to define the voltage that can be selected by the input.

NOMINAL FREQUENCY

50 Hz

Choice: 50/60 Hz
Default Value: 50 Hz

NOMINAL POWERS
AT 50 HZ
ACTIVE = 1600 KW
REACTIVE = 1200 KVAR

Alternator characteristics

NOMINAL POWERS
AT 60 HZ
ACTIVE = 1600 KW
REACTIVE = 1200 KVAR

Alternator characteristics

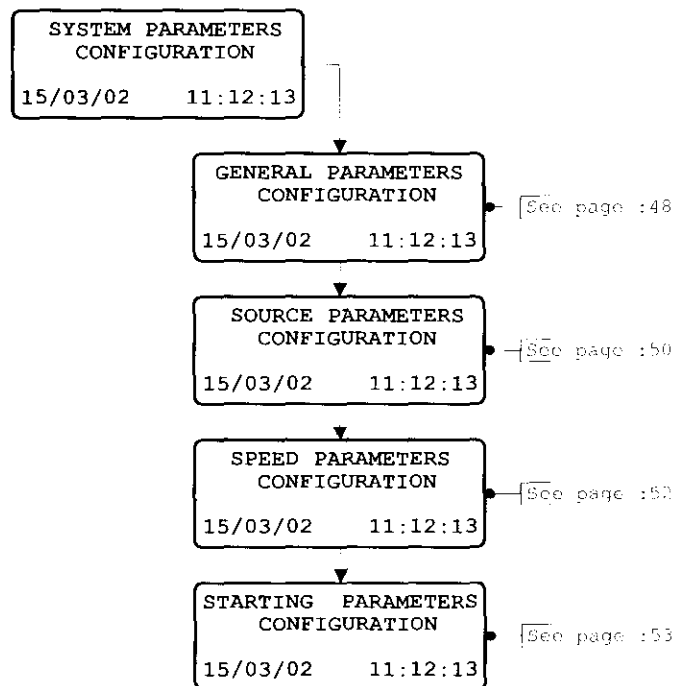
NOMINAL POWER

APPARENT = 2000KVA

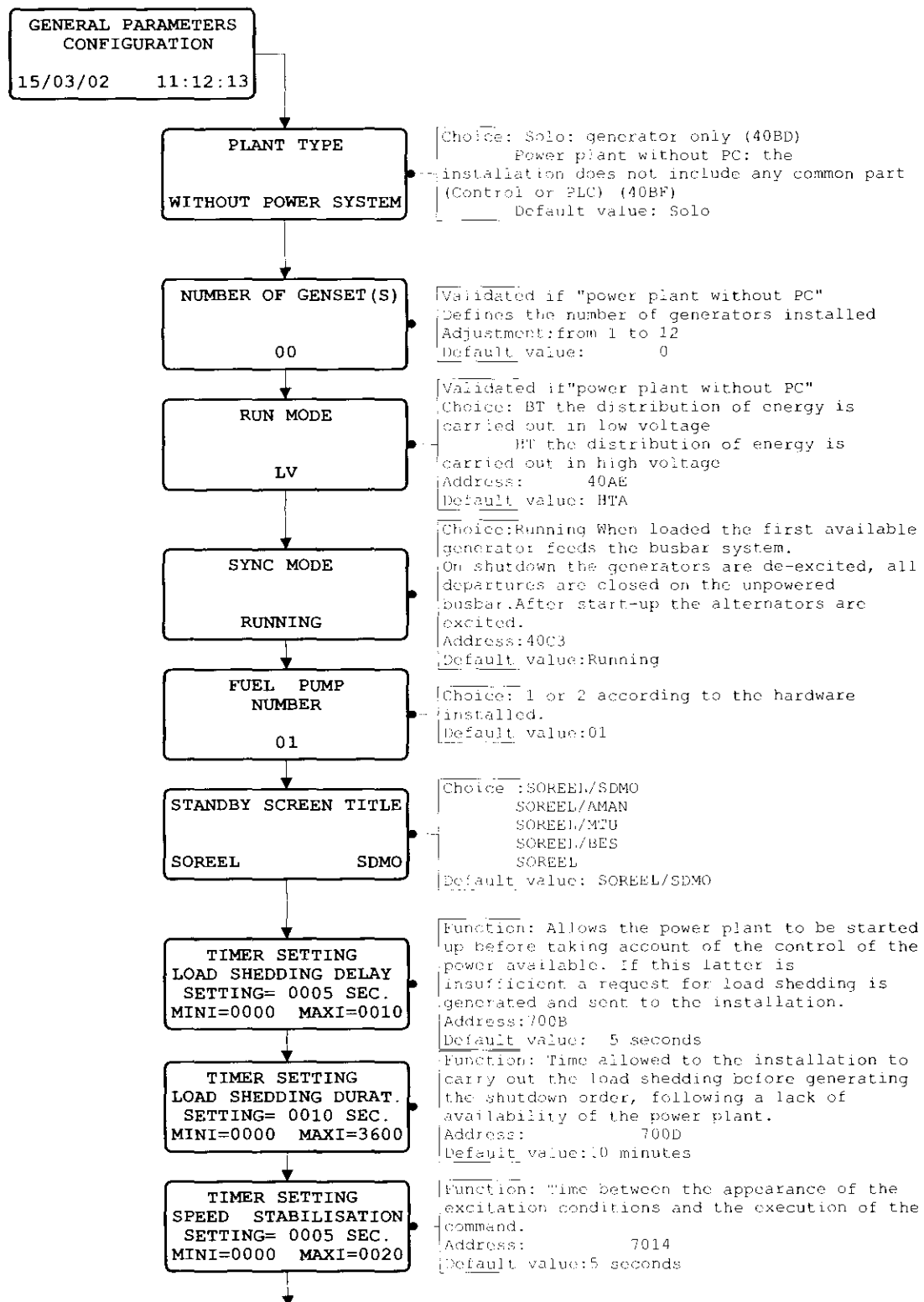
Alternator characteristics

Voltage	Control
Un 1	46F1
Un 2	46F2
Un 3	46F3
Un 4	46F4
Un 5	46F5
Un 6	46F6

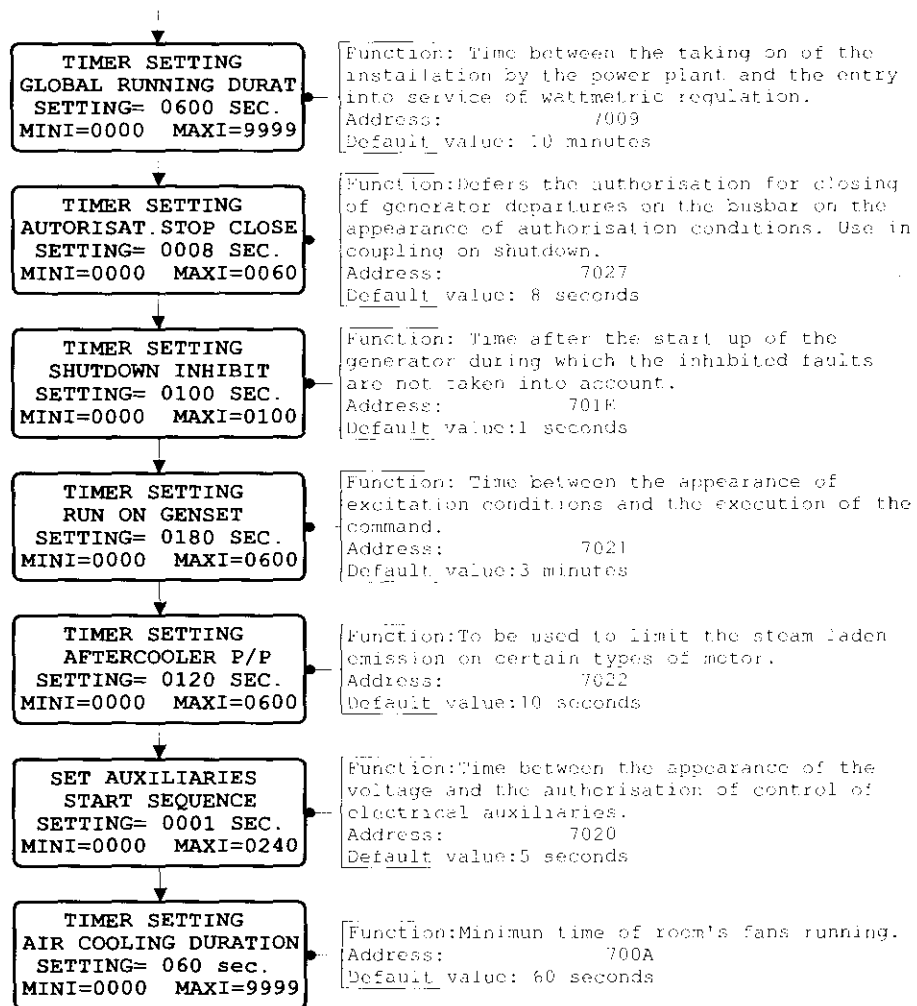
4.5.2 Configuration of system parameters



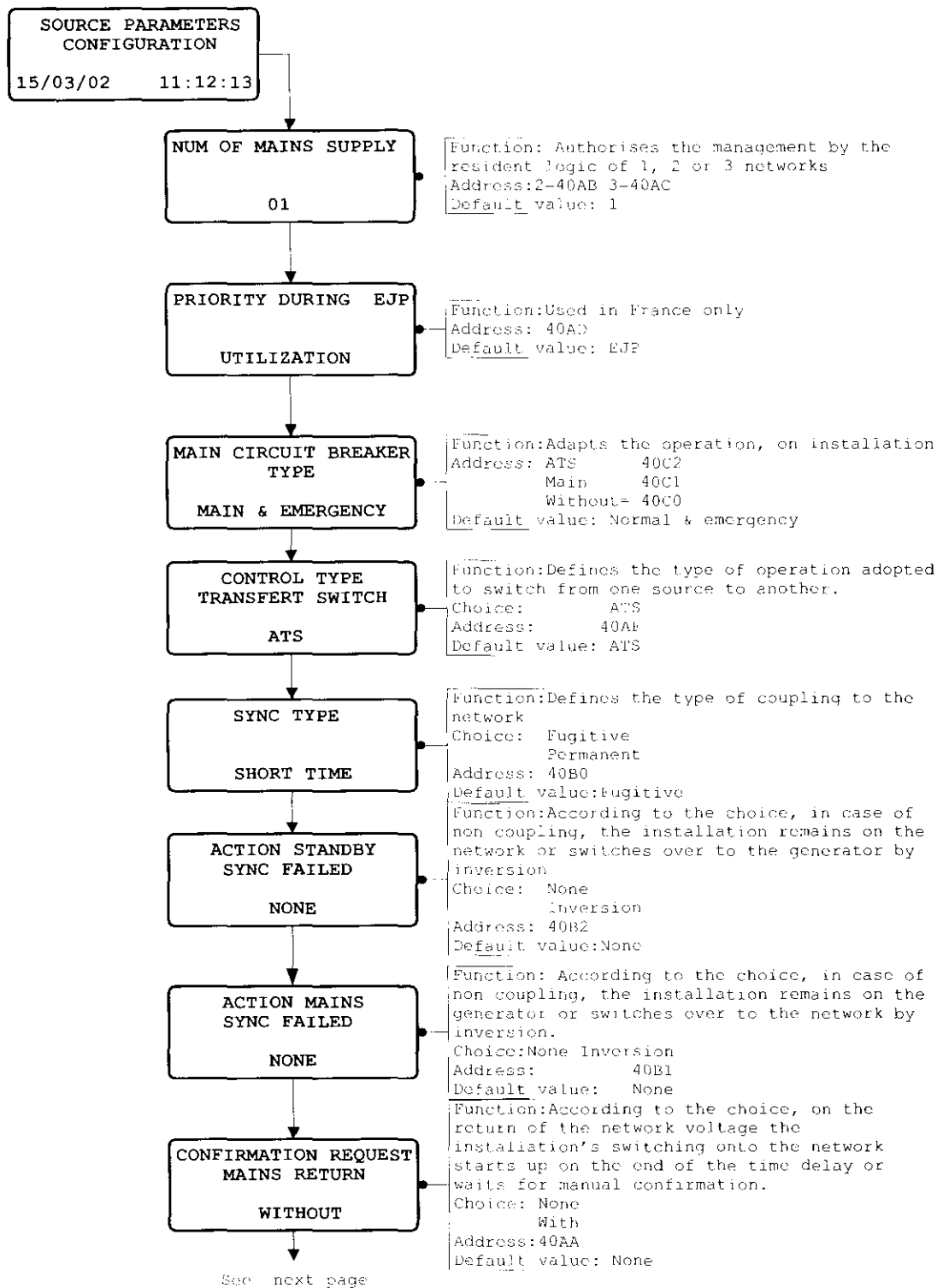
4.5.2.1 Configuration of general parameters



Note: In Running mode, the first available set supplies the bus bar and the others synchronise. At standstill, the alternators are de-excited and all the genset CBs are closed on the unpowered bus bar. When all the engines reach their rated speed, the alternators are excited.

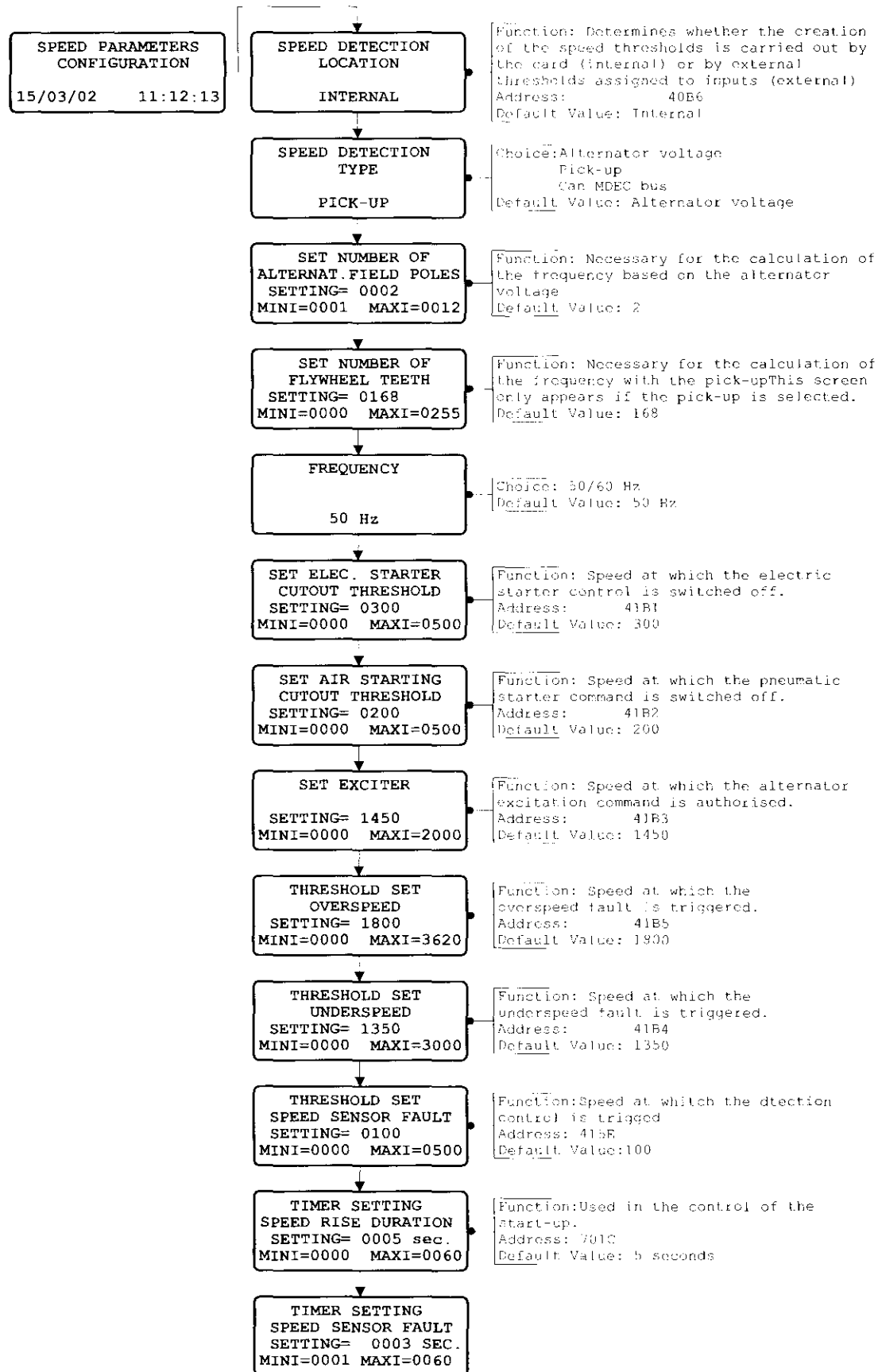


4.5.2.2 Configuration of source parameters

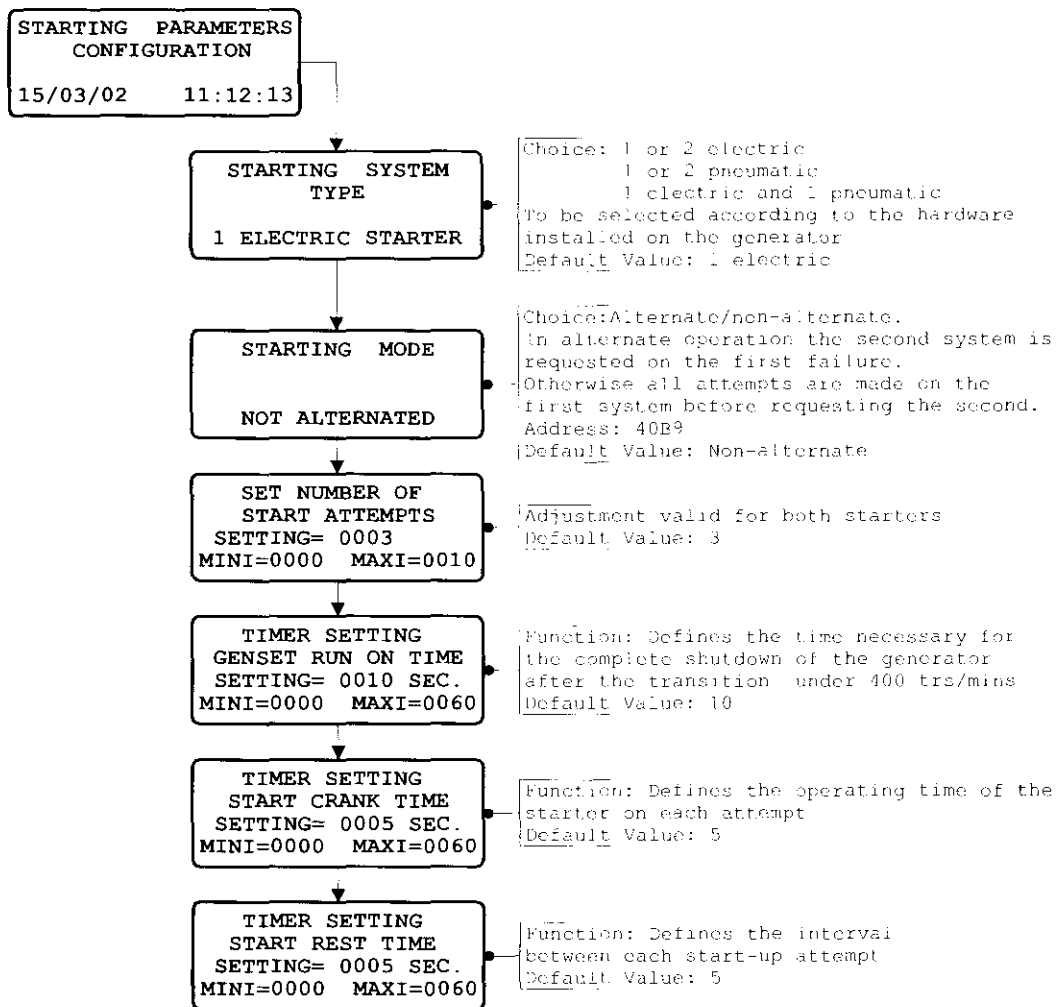


<p>TIMER SETTING PREAVIS EJP (FRANCE) SETTING= 1200 SEC. MINI=0000 MAXI=3600</p>	<p>Function: Defers the taking into account of the EJP prior warning information. Address: 7006 Default value: 20 minutes</p>
<p>TIMER SETTING TOP EJP (FRANCE) SETTING= 0600 SEC. MINI=0000 MAXI=3600</p>	<p>Function: Defers the taking into account of the loss of the EJP top. Address: 7007 Default value: 10 minutes</p>
<p>TIMER SETTING SYNC INHIBITION SETTING= 0010 SEC. MINI=0000 MAXI=0060</p>	<p>Function: Defers the putting back into service of the synchronisation request following a decoupling caused by a network fault (Min-impedance, etc.). This screen only appears if coupled operation is selected. Address: 700E Default value: 10 seconds</p>
<p>TIMER SETTING START SYNC CHAIN SETTING= 0005 SEC. MINI=0001 MAXI=0060</p>	<p>Function: Defers the putting into service of the synchronisation on the appearance of authorisation conditions. This screen only appears if coupled operation is selected. Address: 7016 Default value: 5 seconds</p>
<p>TIMER SETTING SYNC TIME SETTING= 0060 SEC. MINI=0000 MAXI=3600</p>	<p>Function: Defines the time allocated for the carrying out of the coupling. If the coupling is not carried out in this time the non coupling fault is activated. This screen only appears if coupled operation is selected. Address: 7017 Default value: 1 minutes</p>
<p>TIMER SETTING LOAD TRANSFER (TEMP) SETTING= 0010 SEC. MINI=0000 MAXI=0240</p>	<p>Function: Defines the coupling duration, network in fugitive coupling. This screen only appears if coupled operation is selected. Address: 7019 Default value: 10 seconds</p>
<p>TIMER SETTING LOAD TRANSF. (PERM.) SETTING= 1200 sec; MINI=0001 MAXI=9999</p>	<p>Function: Defines the time allocated to the load transfer from the power plant to the network prior to emergency opening. Valid only in permanent coupling. This screen only appears if coupled operation is selected. Address: 7018 Default value: 1200 seconds</p>
<p>TIMER SETTING ATS CHANGEOVER SETTING= 0010 sec; MINI=0000 MAXI=0100</p>	<p>Function: Provides a complete opening time for the inverter prior to the shutdown authorisation from one of the devices. The adjustment is common to the three tempos. Address: 700F, 7010, 7011 Default value: 10 seconds/10</p>
<p>TIMER SETTING DELAY TO TRANSFER SETTING= 0001 SEC. MINI=0000 MAXI=0020</p>	<p>Function: Defers the authorisation for taking over on the appearance of the voltage. Address: 701F Default value: 10 seconds</p>
<p>TIMER SETTING EXCITER TIME SETTING= 0005 SEC. MINI=0000 MAXI=0060</p>	<p>Function: Sets the time for the lead genset to parallel. Address: 412E Default value: 5 seconds</p>

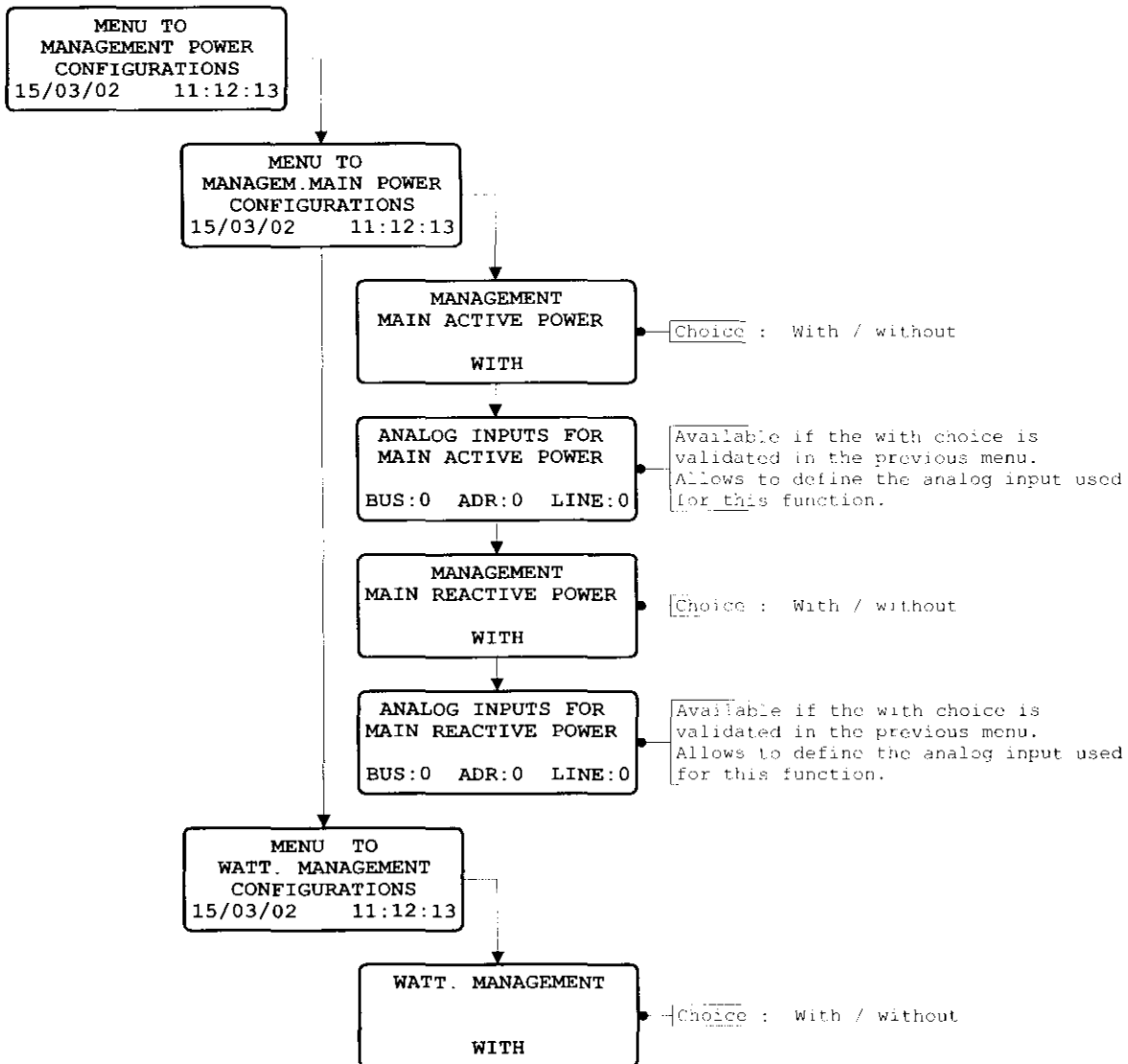
4.5.2.3 Configuration of speed parameters



4.5.2.4 Configuration of starting parameters



4.5.3 Configuration of power management



4.5.4 Configuration of the events

This part contains two sections:

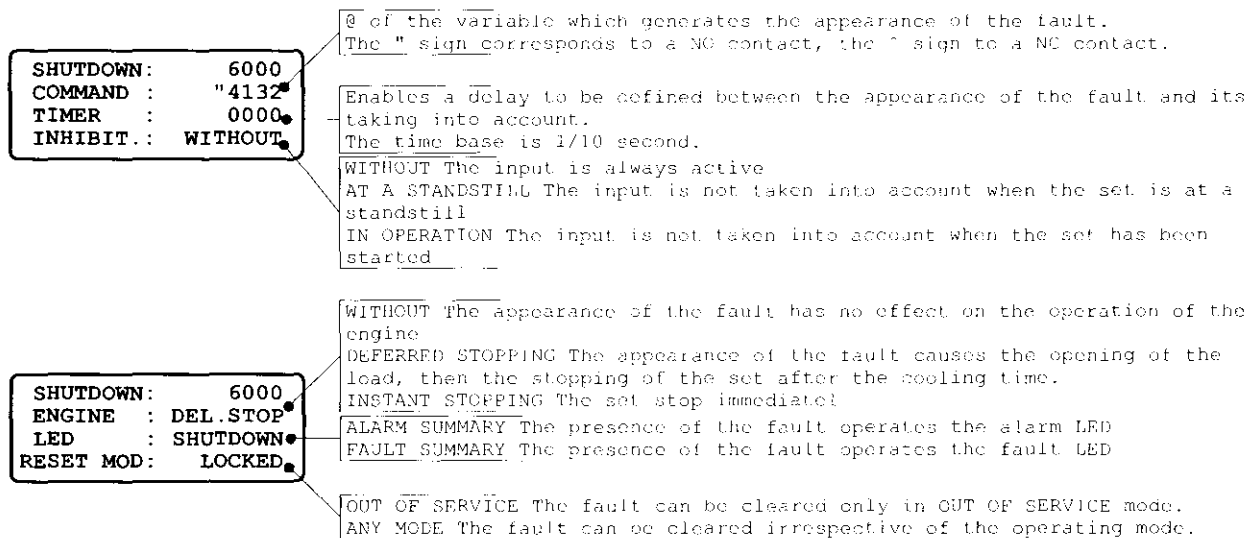
- * Configuration of alarms and faults
- * Configuration of the status

4.5.4.1 Configuration of alarms and faults

This section describes the library of alarms and faults managed by the MICS.

When a variable associated with an alarm or fault is activated, a corresponding time-stamped message is recorded into the event memory and printed (if a printer is in service), and the associated functionalities are carried out.

Three screens are used to set these functionalities.



The third screen displays the wording of the fault and enables editing.

Alarms 6000 to 601D are fixed and cannot be changed.

Version 2.0 software onwards, faults and alarms from 6080 appear (associated with the MTU engine).

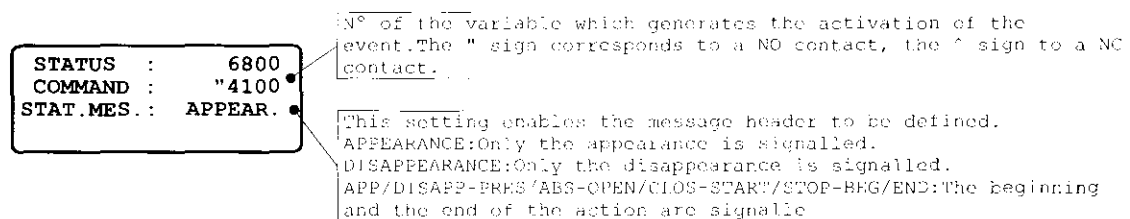
4.5.4.2 Configuration of status

This section describes the control library relating to status.

When a variable associated with a status is activated, a corresponding time-stamped message is recorded into the event memory and is printed (if a printer is available).

The first part of the message indicates the nature of the change (opening/closing, appearance, beginning/end, etc.), the second the nature of the control.

A first screen permits the allocation of the operating variable and header.



A second screen is used to enter text.

4.5.5 Entering the equations

Three sub-menus are associated with this menu:
Input variables wiring equations
Additional logics
Physical outputs wiring equations

4.5.5.1 Input variables wiring equations

System information is stored in the installation, the wiring addresses are not fixed to preserve flexibility.
Changes are made in this menu.
Only the first line can be altered.

4.5.5.2 Additional logic

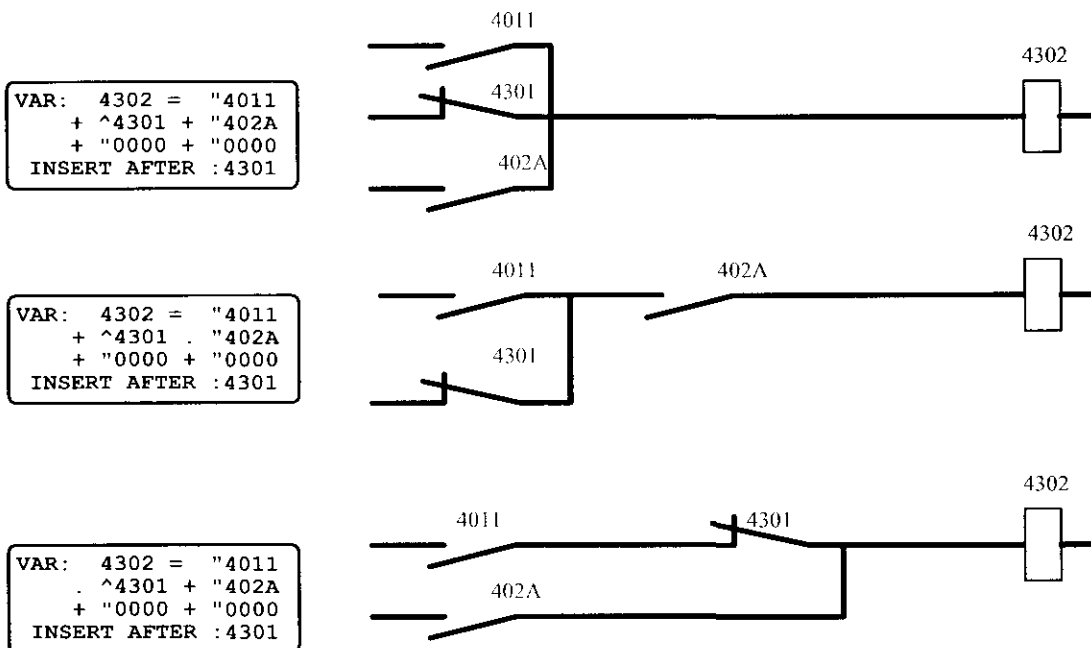
This enables additional functions to be used.
Each screen is used to write of an equation with five operands with a level of parenthesis.
Five hundred equations are available.
Four symbols are used:

- " for a normally open contact
- ^ for a normally closed contact
- + for the OR function
- for the AND function.

The system reads and runs the functions in the order in which the equation is written.
The content of the parenthesis is resolved before combinations with the function preceding it.
See the examples below.

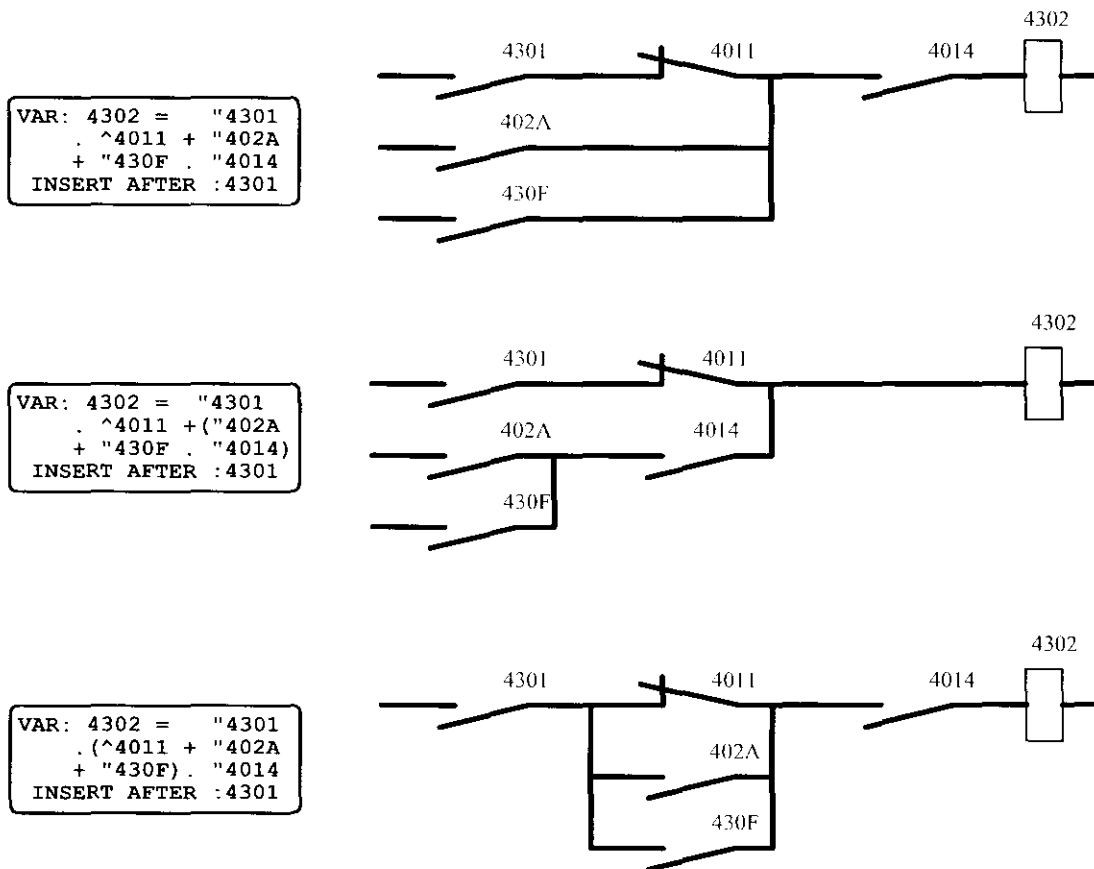
4.5.5.2.1 Equation with three variables

In the following examples, only the function sign changes



4.5.5.2.2 Equation with five variables

The following examples show the effect of the parentheses



When a new equation is written it is positioned after the existing equations. This may increase the run time. Indeed, the system reads and updates the variables in the order in which they are written. So, three cycles will be needed in order to resolve the group of following equations when the variable 1180 changes status:

```
4301="4302
4302=4303
4303="1180
```

In the first cycle 4303 is updated, 4301 and 4302 do not change status.

In the second cycle 4302 is updated, 4301 does not change status.

In the third cycle 4301 is updated.

If these equations are written in order

```
4303="1180
4302=4303
4301="4302
```

a single cycle is sufficient.

The "insert after" function is used to move an equation to any place on the existing line. The equation is put after the address indicated on the screen.

4.5.5.3 Physical outputs wiring equations

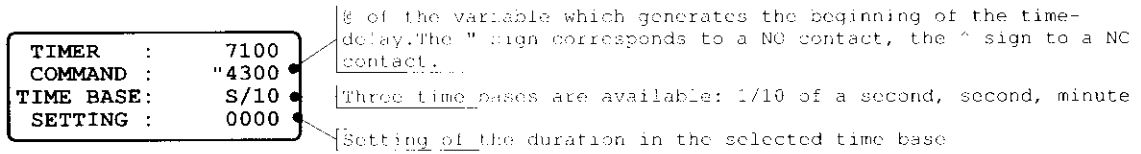
This menu is used to create the link between the commands produced by the logic and the wiring on the output modules.

This menu shows the addresses of all the output modules declared on the CAN bus.

The screen displays four variables. Only the first line can be altered.

4.5.6 Configuration of the time-delays

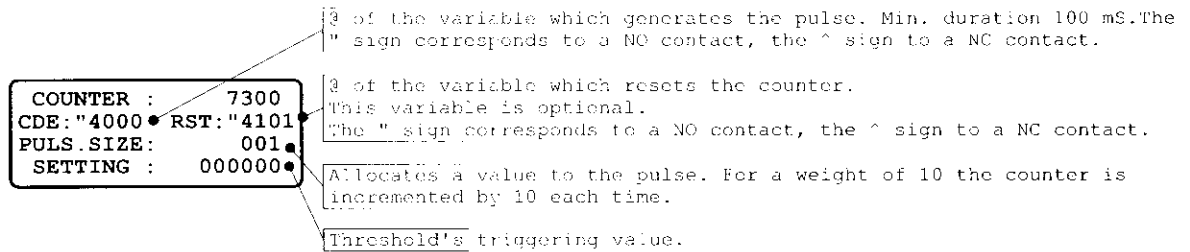
In addition to the equations, 50 time-delays are available.
 These time-delays are used to set the time after a variable is triggered.
 The possible settings are as follows



4.5.7 Configuration of the counters

Fifty counters are available. They are used to add the pulses supplied by an input.
 The current value of these counters is accessible in the diagnostics menu.
 A threshold can be allocated to them.
 The counter can be reset via

- * The "counter reset" menu
- * When it reaches 99999.
- * A variable



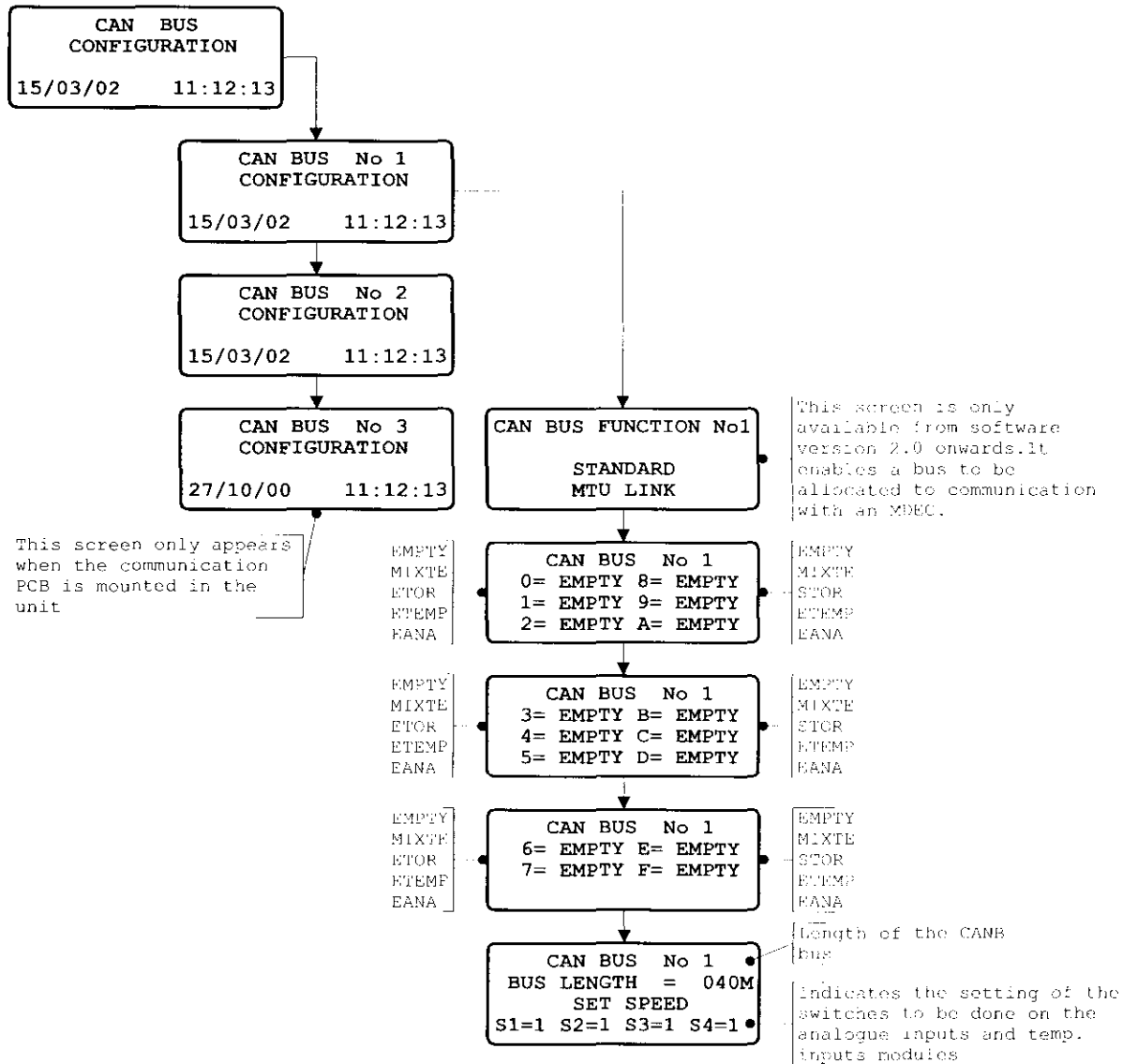
4.5.8 Configuration of the system

This section contains the menus used to declare the physical resources installed for each application.

4.5.8.1 Configuration of the optional boards

Is used to identify Enables the type of optional boards PCB installed in the basic unit.

4.5.8.2 Configuration of the CAN buses

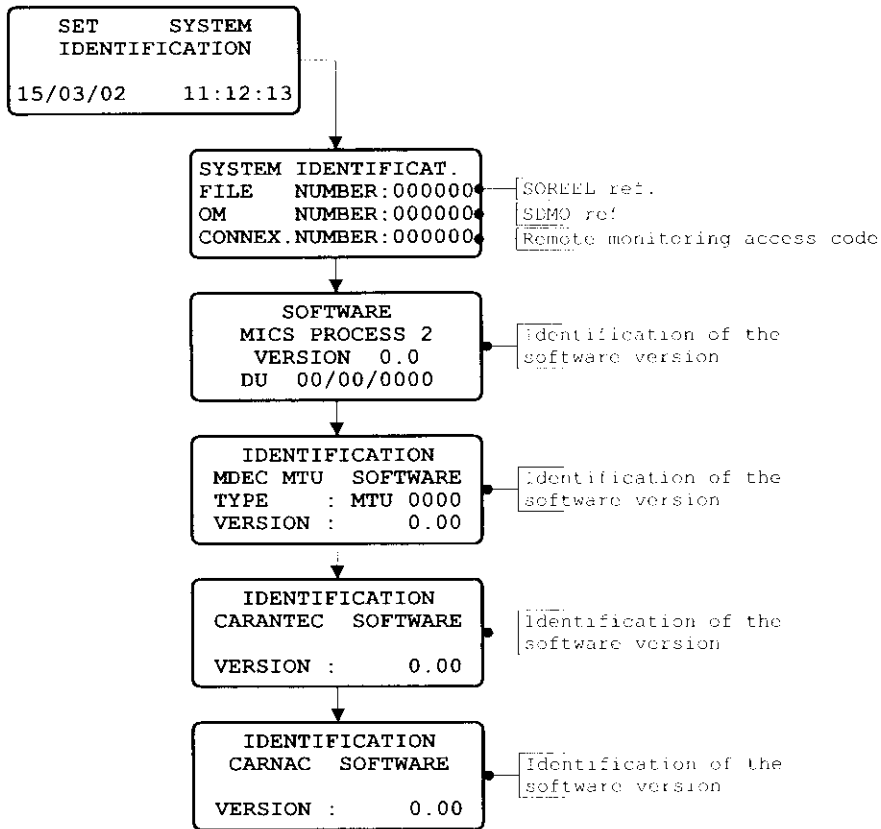


The digital inputs must be addressed from 0 to 7 and the digital outputs from 8 to F. The default baud rate of the CAN bus is 125 kbits/s. The maximum theoretical length for this rate is 40 m. For greater lengths, the baud rate must be reduced. Displaying the length of the bus does this setting. The base and the digital input and output modules automatically adapt their rate to suit this new speed, the screen gives the positioning to be produced on the switches of the analogue and temp. input modules.

Each bus rate is independent of the other buses.

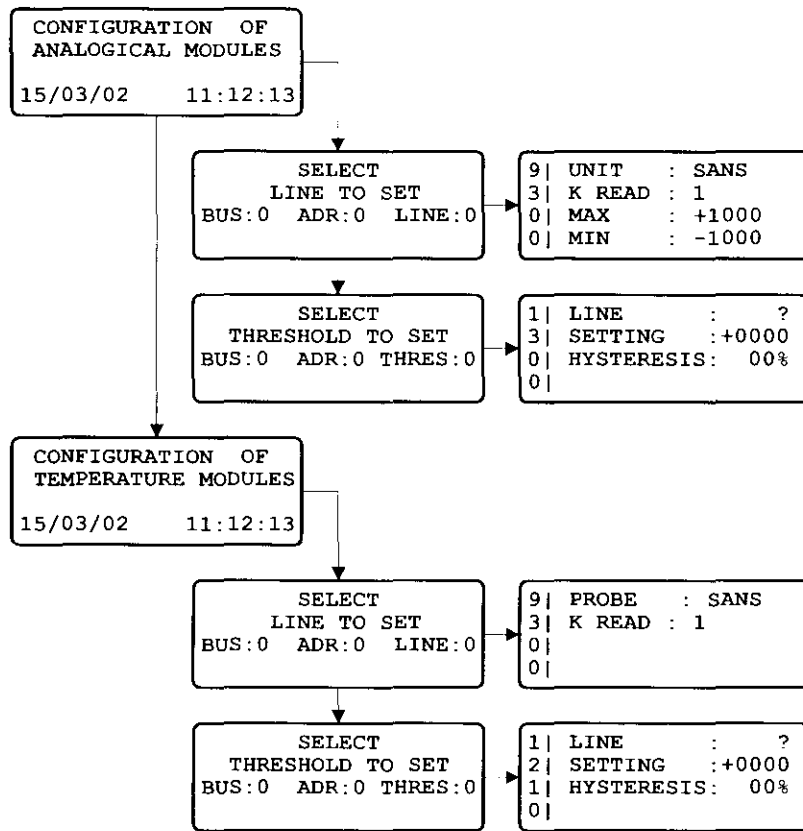
IMPORTANT: If the baud rate is reduced too much, exceeding a time-out can trigger a «watchdog» fault.

4.5.9 Setting of system identification



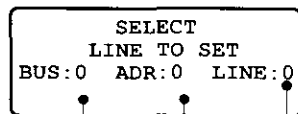
4.5.10 Configuration of the analogue acquisitions

The architecture of this section is as follows:



4.5.10.1 Configuration of the analogue channels/lines

4.5.10.1.1 Selection of the line

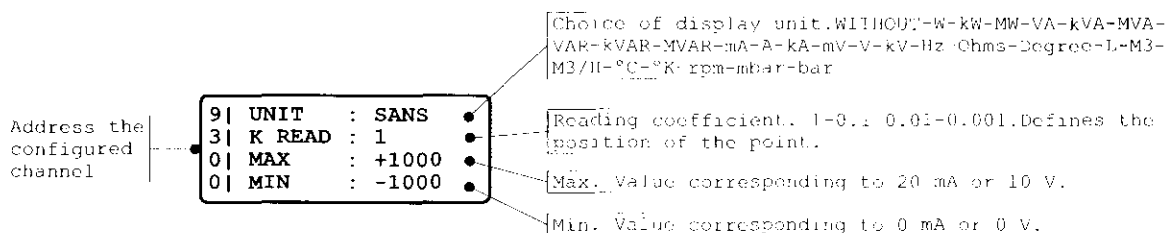


N° of the channel for which parameters are to be set.
0 to 7 or 0 to 3 according to the type of module.

Address of the module on the bus.
Only the addresses of analogue inputs or temp. inputs modules appear.

Enables the CAN bus on which the module is installed to be selected.
Only the CAN buses on which analogue inputs or temp. inputs modules have been declared are accessible.

4.5.10.1.2 Scaling of an analogue inputs line



Example 1: For an 800 kW 0-20 mA output power converter, do the following settings

- * Unit = kW
- * Reading K = 0.1
- * Max = +08000 (800/K)
- * Min = -00000

The display of the current value shall be as follows: 0800.0 kW

Example 2: For a 24 V 0-20 mA output voltage converter, do the following settings

- * Unit = V
- * Reading K = 0.01
- * Max = +02400 (24/K)
- * Min = -00000

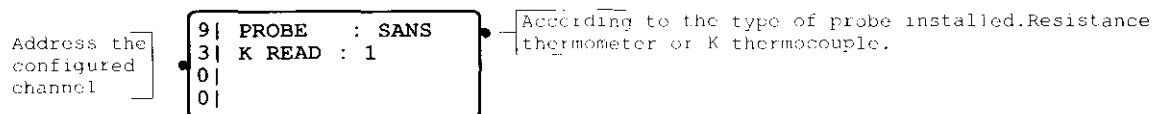
The display of the current value shall be as follows: 024.00 V

The use of a 4-20 mA input is possible by doing the scaling as follows

Converter 0-5000 A for 4-20 mA i.e. 312.5 A per mA (5000/16)

- * Unit = A
- * Reading K = 1
- * Max = +05000 (5000/K)
- * Min = -01250 (312.5 x 4)

4.5.10.1.3 Configuration of a temp. inputs line



The scaling is done depending on the choice of probe.

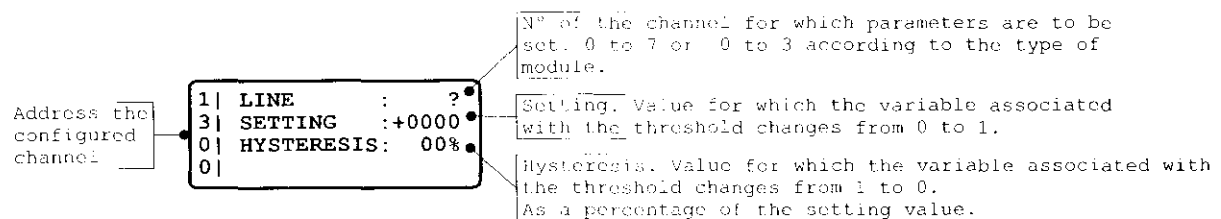
4.5.10.2 Configuration of a threshold

Each analogue module manages sixteen thresholds. Thresholds can be allocated to any measurement channel. The following menus permit this configuration.

4.5.10.2.1 Selection of the threshold

The threshold selection principle is the same as the channel selection principle (§ 4.4.8.1.1).

4.5.10.2.2 Setting of the thresholds

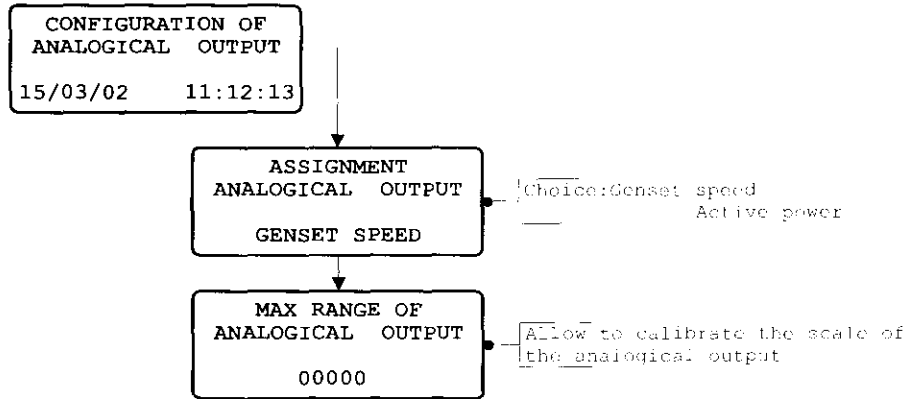


Example: Using the data in example 1 in 4.4.8.1.2 one wishes to generate a threshold whose contact closes at 400 kW and opens at 380 kW. The configuration will be as follows

- * LINE = 9301
- * SETTING = +0400
- * HYSTERESIS = 05%

4.5.11 The analogical output configuration

This menu allow to assign a analogical output either a speed reading or a power reading



4.5.12 Configuration of the serial interfaces

There is one menu per serial interface. The menu for RS485 N°2 to 5 only appear if the optional communication board is installed in the MICS.

The RS 232 and RS 485 N° 1 are mounted on the CPU board, the RS 485 Nos 2 to 5 are mounted on the optional communication board.

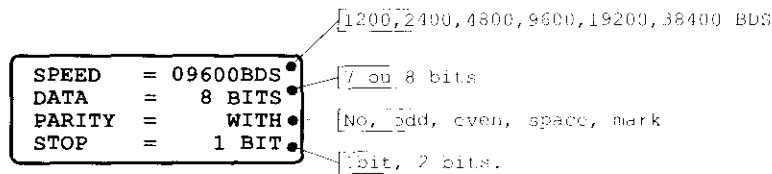
The RS 232 serial interface manages the RX, TX, DSR, DTR, RTS, CTR, DCD, RI signals.

The basic board RS 485 serial interface manages the RX+, RX-, TX+, TX-, DP+, DP- signals.

This interface can be used with two or four wires.

The communication board RS 485 serial interfaces only manage the TX+, TX- signals.

4.5.12.1 Format setting of the frame transmitted



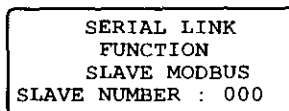
4.5.12.2 Functions

4.5.12.2.1 Printing

Allocates the interface to a printer.

4.5.12.2.2 Slave modbus

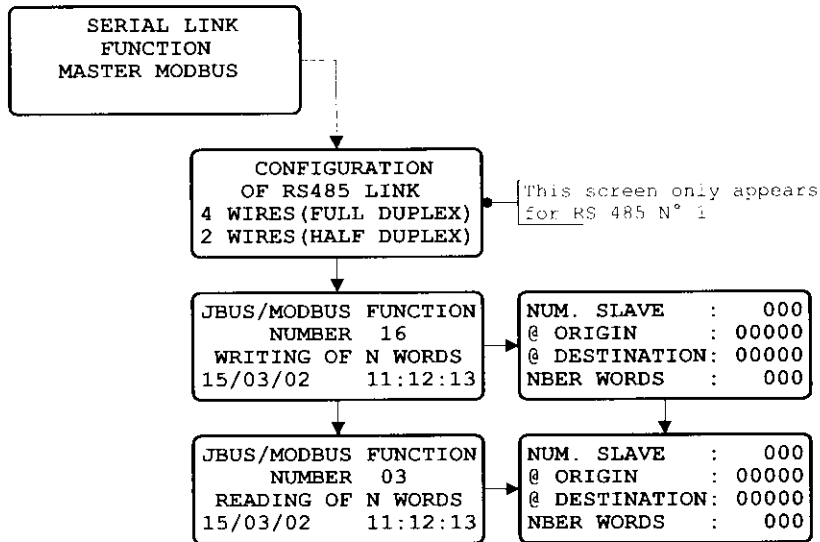
This function is used when the MICS communicates with a master (BMS system).



The screen is used to assign an ID No to the bus.

4.5.12.2.3 Master modbus

Just one master modbus is available per MICS.



4.5.12.2.4 Commander Process link

The screen is used to assign an ID No to the bus.

This function is used in power plant mode when a printer is installed on the Commander. It allows the events on the Commander to be grouped prior to printing.

4.5.12.2.5 Download MICS (Only for the RS 232)

This function allows

- the transfer of the MICS configuration to a PC
- the uploading of the configuration from a PC to the MICS.

4.5.12.2.6 Distribution link (except RS 232)

This function is used for the dialogue between MICS associated to the Carantec board.

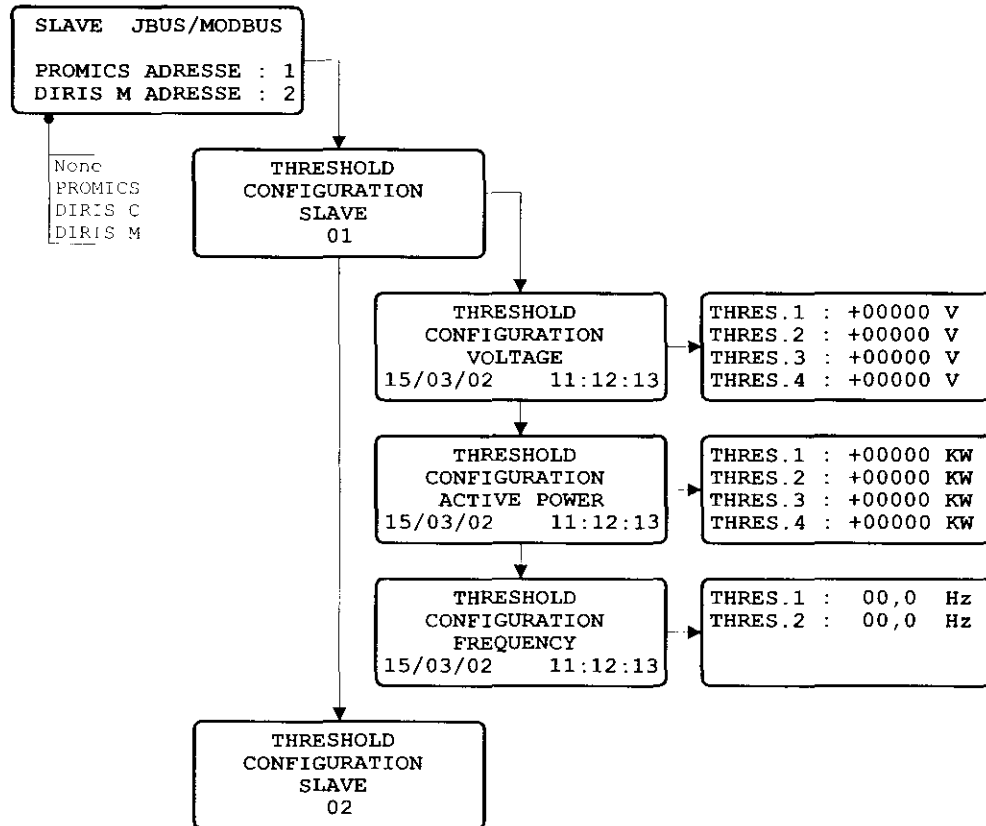
The screen is used to assign an ID No to the bus.

4.5.12.2.7 Remote control

This function is only available on RS 485 No 1. It is used to connect a modem.

4.5.12.2.8 Promics/Diris Communication

This function is used to make certain information created by the device to which the MICS is connected available to MICS.



4.5.12.2.9 Keltieg

It is used to communicate with Keltieg module.

4.5.13 Entry of the JBUS/MODBUS identification frame

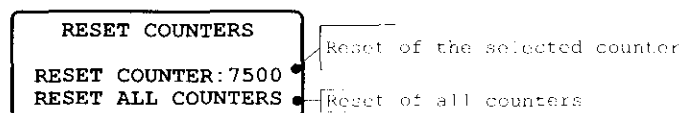
This menu is used to adapt a special identification frame of the system on the network.

4.5.14 Entry of the synchronising time

This menu is used to define the time displayed on receipt of the synchronising signal.

4.5.15 Reset of counters

This menu is used to reset the counters.



4.5.16 Direct access keys configuration

DIRECT ACCESS KEYS
CONFIGURATION
15/03/02 11:12:13

STO : NOT ALLOCATED
DTO : NOT ALLOCATED
ST1 : NOT ALLOCATED
DT1 : NOT ALLOCATED

This menu allow to configure the screen called by the keys.
STO corresponds to the screen called by a single pulse
DTO corresponds to the screen called by a double pulse
The number is this of the key.

4.6 Breakdown repair menus

These menus are accessible only to users of a level 2 protection key.

4.6.1 Customer access code

Certain customers arrange to a important generating set park, would like arrange to a code which allow a second level access.

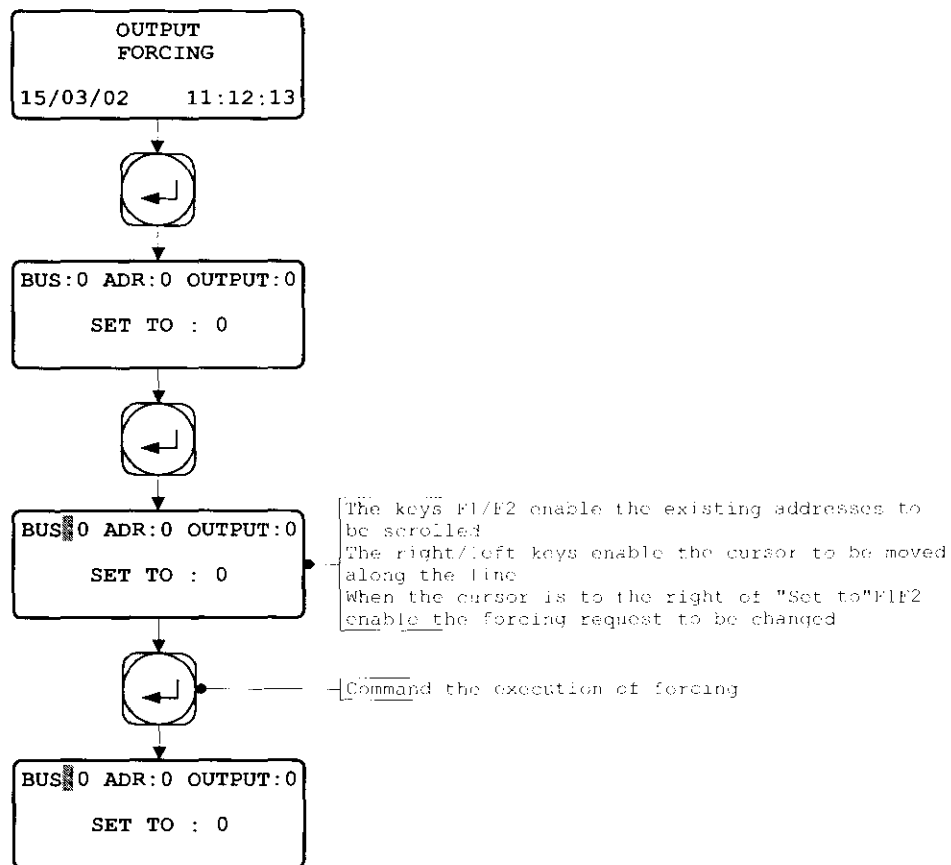
This menu allow to capture this code. It is common for every generating set by customer, and different for each customer.

The management to this code is look after by the SAT SDMO.

4.6.2 Forcing the outputs

This menu is used to force the state of an output to 0 to 1.

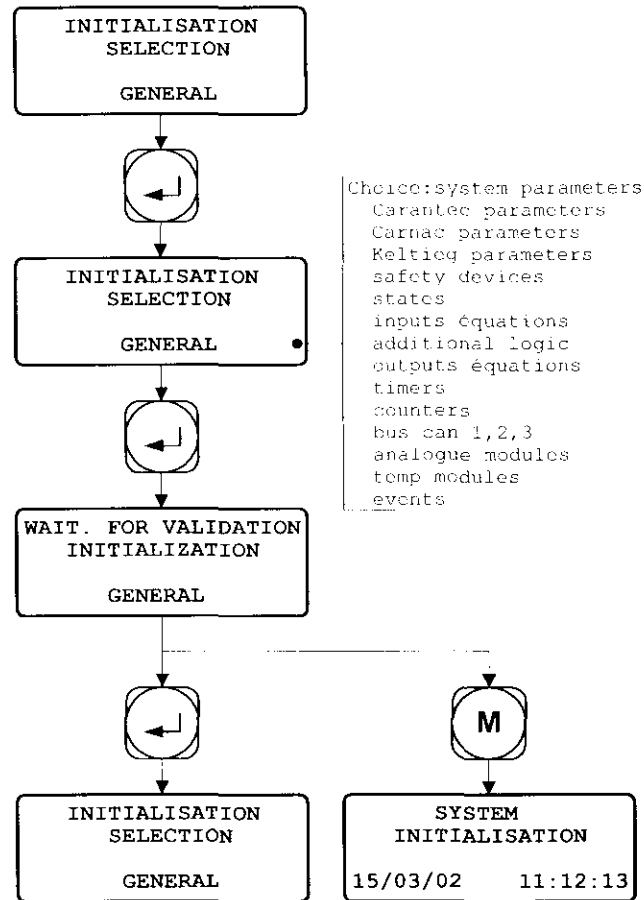
It must be used taking all the necessary precautions in the light of the devices being forced.



Exiting the menu suppresses all the forcing.

4.6.3 Initialization of system

These menus enable the selected heading to be reset to their default settings.

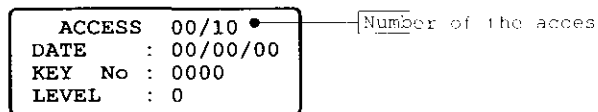


4.6.4 Running time adjustment

This menu allow during the MICS replacement for capture the running time before realize by the generating set.

4.6.5 History of accesses

This menu tells you the last ten accesses to the coded menus.



5. CARANTEC

5.1 Presentation

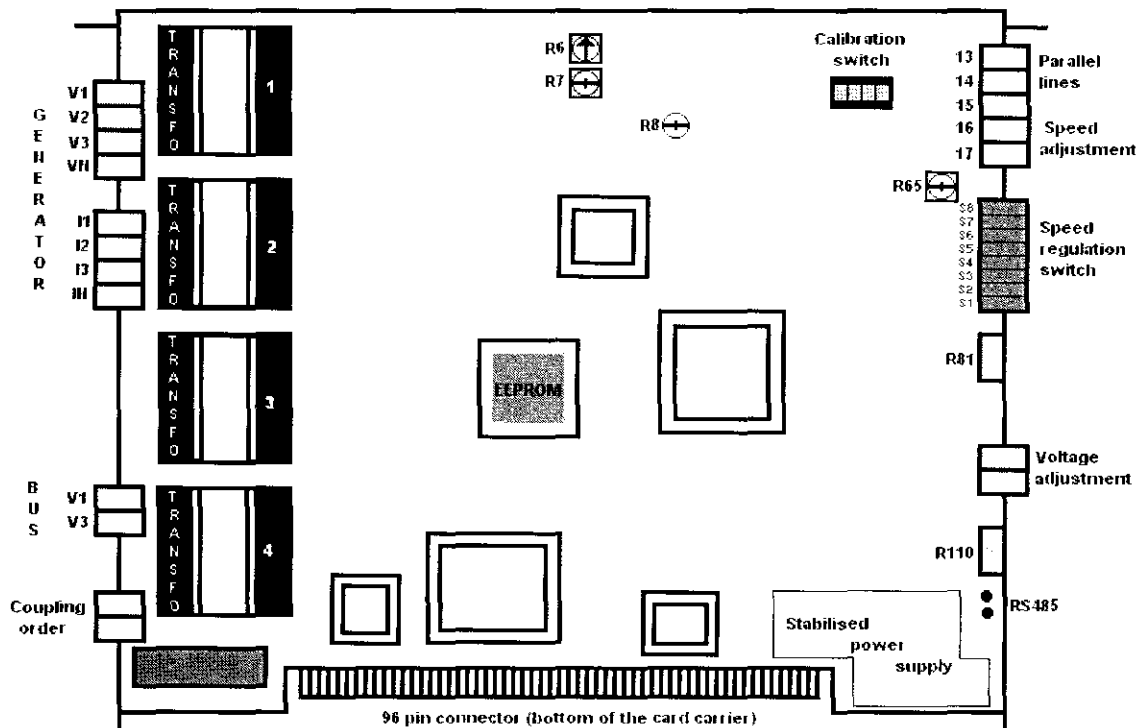
CARANTEC (CARte ANalogique des TECHniques de Couplage) is an analogue board designed for paralleling purposes. It completes and reinforces the Process performances.

This board, which is fitted with its own microprocessor, provides the following functions:

- * Speed regulation
- * Voltage regulation
- * Synchronisation
- * Paralleling
- * Distribution of active and reactive loads
- * Setting of active and reactive powers
- * Electrical protection
- * Electrical measurements (Sec page 30)

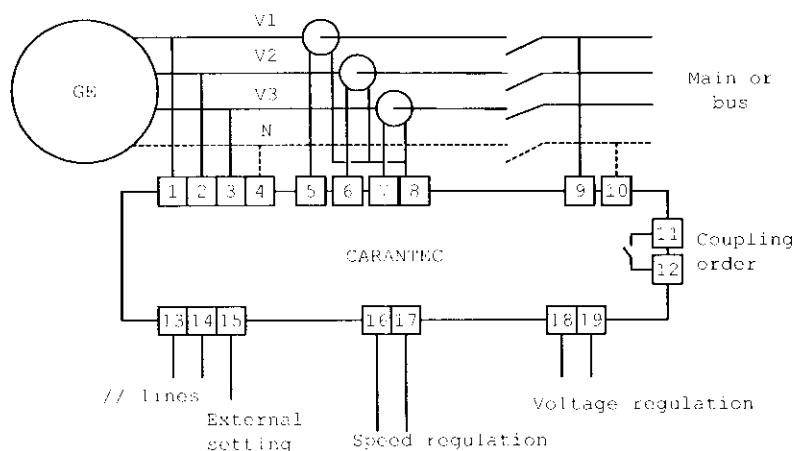
The keyboard and the MICS display provide the man/machine interface.(See chapter 4.4)

IF A CARANTEC BOARD IS DECLARED IN THE OPTIONAL BOARD CONFIGURATION MENU, IT MUST BE PHYSICALLY INSTALLED IN THE UNIT. IF IT IS ABSENT, THE MICROCONTROLLER WILL "CRASH" AND A WATCHDOG FAULT WILL APPEAR.



REAR VIEW OF THE MICS

5.1.1 Connections



5.1.2 Electrical characteristics

- Genset AC voltage inputs: 400V nominal between phases.
- Temporary maximum voltage: 600V
- Bus AC voltage inputs: 270V between phase – neutral
- Current inputs: 5A. Maximum over current 6A.
- AC Power supply, by the MICS.
- Output to speed regulator adjustable from 0 to 10V
- Output to voltage regulator adjustable from 0 to +/- 1,3V
- Paralleling relay contact 8A under 250V

5.1.3 CARANTEC settings

5.1.3.1 Output settings to the speed regulator

The DIPswitches S1 and S2 located on the right side of the board define whether a reference signal coming from the speed regulator is connected to terminal 17. Otherwise the reference is generated internally.

	External reference	Internal reference
S1	ON	OFF
S2	OFF	ON

The switches S7 and S8 located on the right side of the board define the direction of the correction sent to the speed regulator.

	Increase in voltage terminal 16 = Increase in speed	Decrease in voltage terminal 16 = Increase in speed
S7	ON	OFF
S8	OFF	ON

Switches S3 to S6 located on the right hand side of the board carry out the correction range sent to the speed regulator. The setting within the range is made by potentiometer 65.

- The weight of each switch is as follows:
- S3 = 20
 - S4 = 5
 - S5 = 9
 - S6 = 100

The correction calculation is carried out using the following formula:

$$G = 1 + 200 * (1/S3+1/S4+1/S5+1/S6) * R65$$

The value of R65 is equal to 0 at the anticlockwise stop

Examples:

S3	S4	S5	S6	G
ON	OFF	OFF	OFF	$1 + 200 * 1/20 * R65$ G varies from 1 to 11
OFF	ON	OFF	OFF	$1 + 200 * 1/5 * R65$ G varies from 1 to 41
OFF	OFF	ON	OFF	$1 + 200 * 1/9 * R65$ G varies from 1 to 23
OFF	OFF	OFF	ON	$1 + 200 * 1/100 * R65$ G varies from 1 to 3
ON	ON	ON	ON	$1 + 200 * (1/2 + 1/5 + 1/9 + 1/100) * R65$ G varies from 1 to 78

The adjustment of the output signal is carried out by R81 potentiometer

R6 potentiometer is used to adjust the "load pulse" (anticipation of the load impact)

5.1.3.2 Setting the speed droop.

This is done by potentiometer R7

R7 at the anticlockwise stop: droop = 3Hz

R7 at the clockwise stop: droop = 0Hz

5.1.3.3 Setting the output to the voltage regulator

The setting is carried out by potentiometer R110

5.2 Summary of operating principles

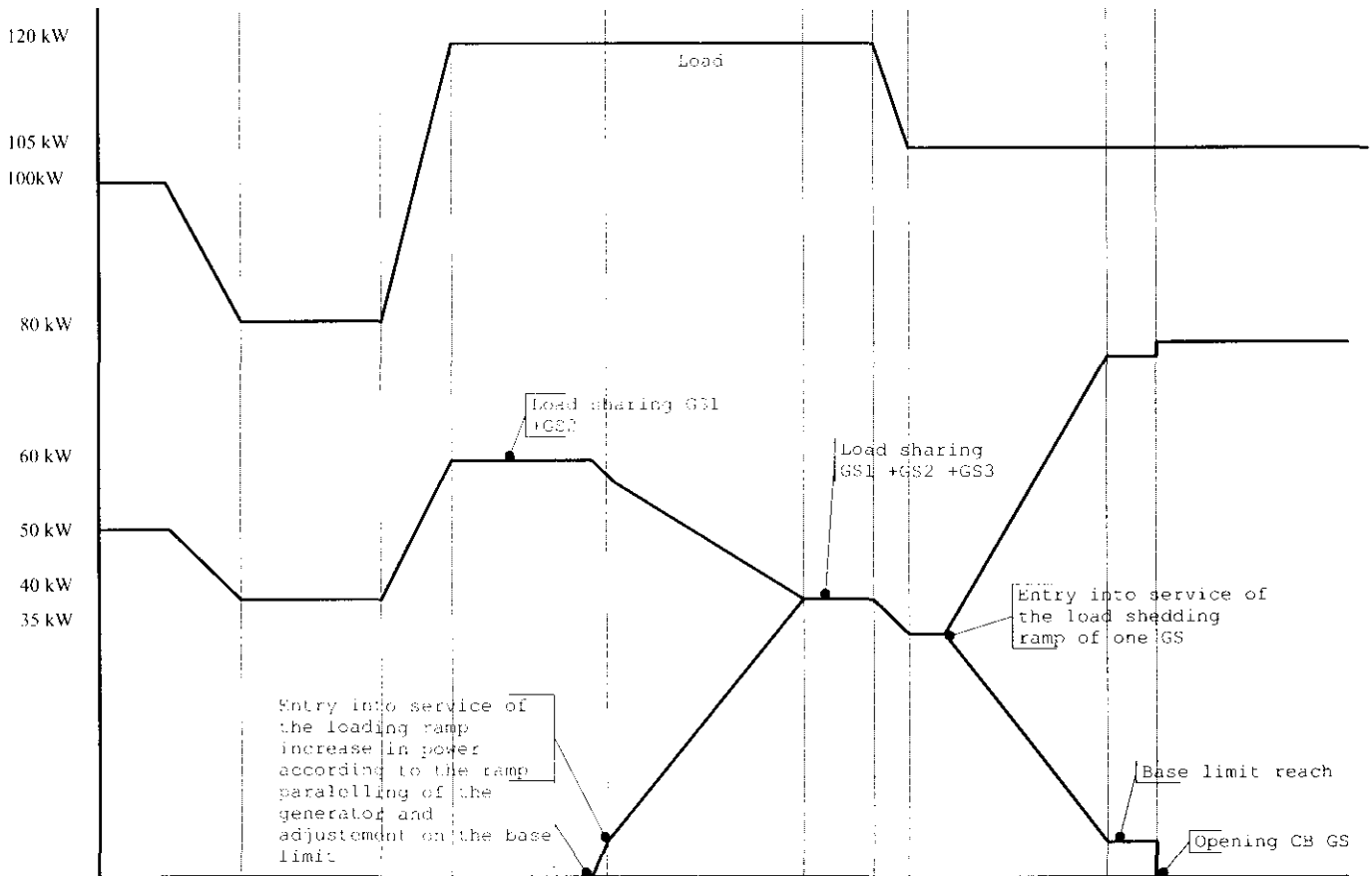
To ensure that a generating set works properly, its speed and voltage must be checked. The speed regulator (EFC, GAC, etc) acts on the engine injection pump and the voltage regulator acts on the alternator excitation. When the generator is operating independently, this regulation is sufficient.

To synchronise a generator to another source, it is necessary to check that the frequency (speed), the voltage and the synchronism of the two sources are the same.

When genset is paralleled with one or more other gensets, it is necessary to provide a regulation, which can distribute the power supplied by each genset pro rata of its nominal power.

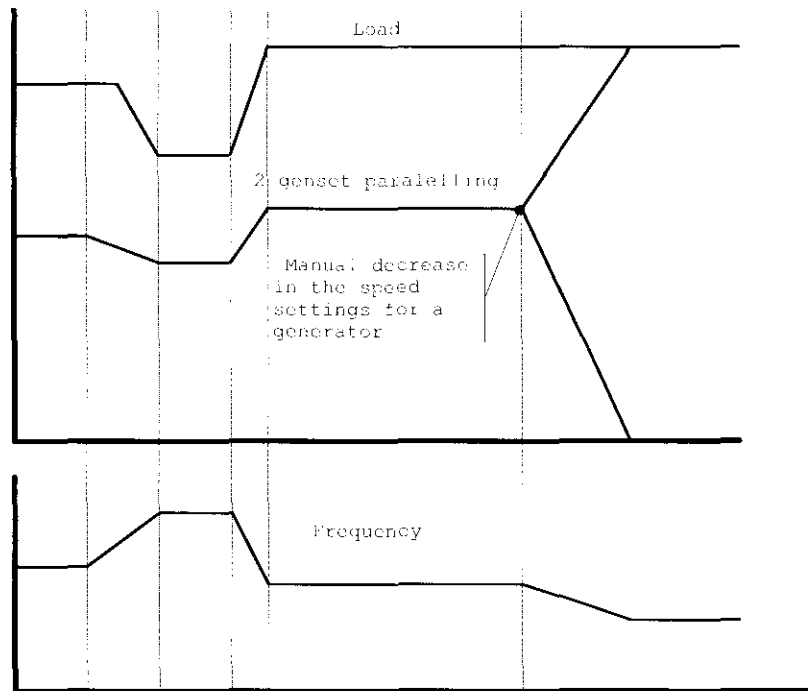
The loading and load shedding of the genset can be carried out gradually using ramps. These are only available in certain regulation modes.

The diagram below illustrates this type of operation.



The power distribution can be carried out either in isochronous mode (distribution through the parallel lines or the distribution bus), the frequency is independent of the load, or in droop mode, the frequency drops as the load increases. This latter operation is always used in manual mode.

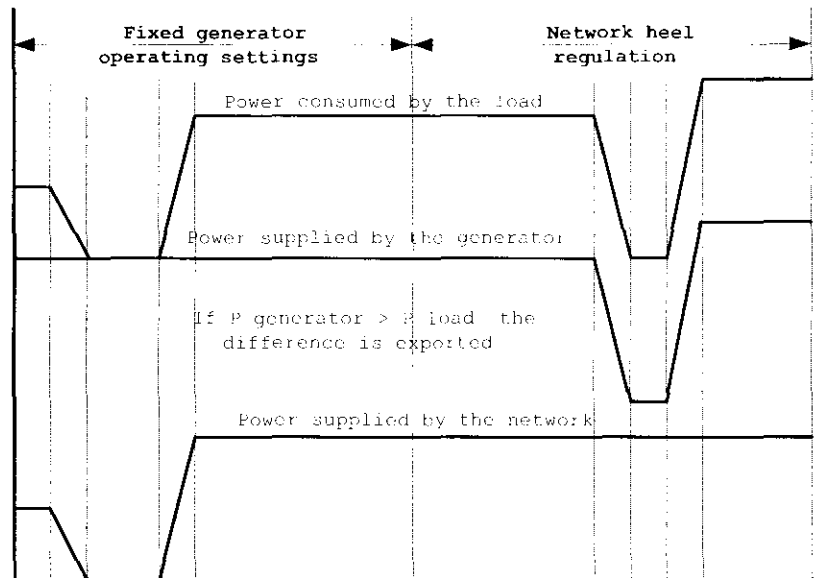
The diagram below illustrates the operation with droop



When the genset is paralleled with a mains supply, two operating modes may be provided:

- ⇒ The genset delivers a fixed power, the mains provides the rest (setting).
- ⇒ The mains delivers a constant power, the generator provides the rest (regulation of a network power threshold).

This requires the analysis of the mains power.

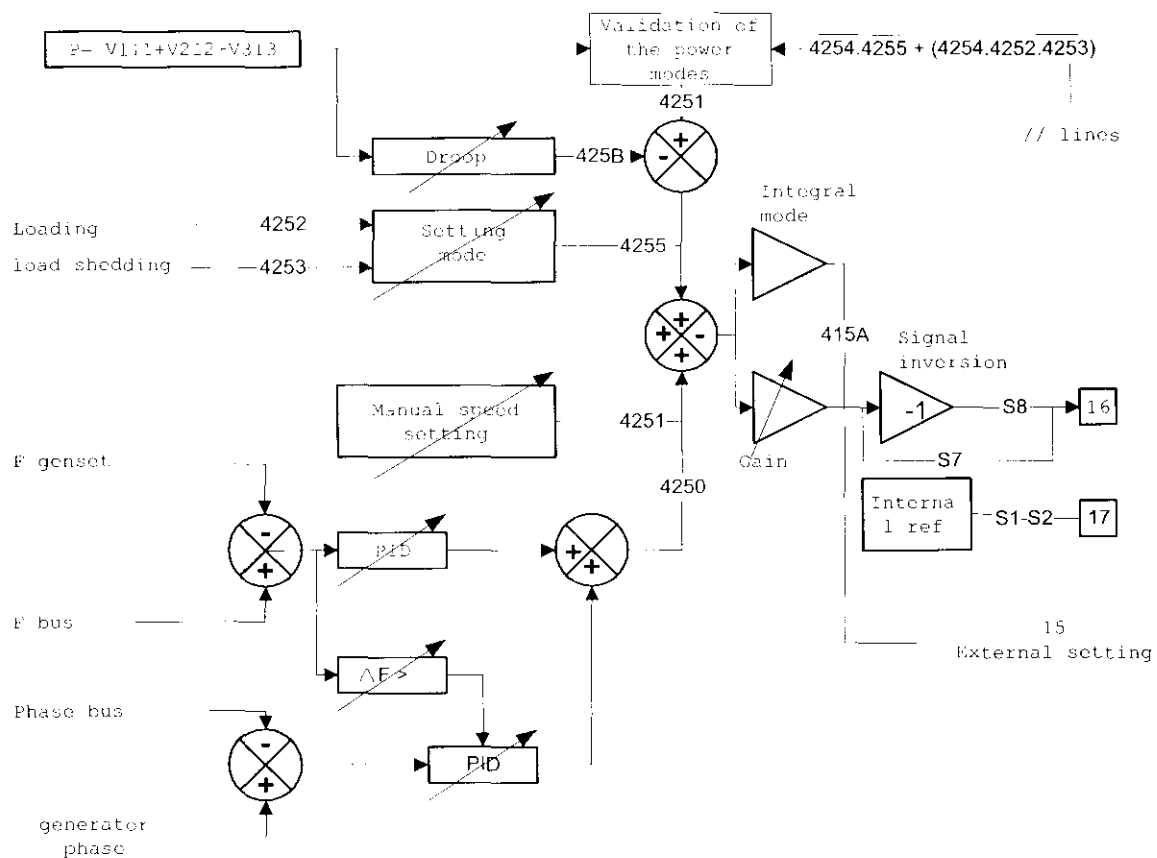


In all of these operating modes, the active power supplied by the genset is adjusted by modifying the speed regulator set point and the reactive power is adjusted by modifying the voltage regulator set point.

According to the current sequence, Carantec analyses the speed, voltage and powers parameters and supplies a correction signal to the regulator involved.

5.3 Speed regulation

The diagram below shows the regulation principle



5.3.1 Mode without correction

Carantec has no action on the speed regulator.

This operation is active when no other function is selected.

This must be the case when the generator is at a standstill or running without load.

5.3.2 Synchronisation

The aim of this function is to carry out the synchronisation of the genset in terms of frequency, and phase with the reference bus voltage.

In manual mode, the operator adjusts the speed by acting on the +/- speed controls.

In auto mode, Carantec sets the speed.

When these conditions are present, the paralleling relay authorises the closing of the circuit breaker.

A power plant can be paralleled with the mains supply in two ways:

- * Using a GCR and parallel lines. The gensets remain in distribution mode.
- * Switching the master genset from bus voltage to mains voltage and starting the synchronisation mode on this genset. The other gensets remain in distribution mode.

This mode is validated by variable 4250.

During this phase the integral mode must never be active.

5.3.3 Active power management

Carantec allows two types of active power management

- Distribution of the power required between the gensets, pro rata of their nominal power by the dialogue on the parallel lines.
- Adjustment of the power according to a set point supplied by the MICS.
 - In this case, the set point can be fixed, the power supplied is constant, or variable allowing a distribution between the gensets and/or a power management of the mains supply.
 - In this case the parallel lines are not connected. The dialogue between the MICS is provided by the serial connection on the distribution bus.

5.3.3.1 Power modes

When the genset is paralleled, variable 4251 "Load mode" is activated. This variable authorises the entry into service of one of the following operating modes.

5.3.3.1.1 "ILS" mode

This mode is operational on validation of the variable 4251 as long as no other regulation mode has been validated.

This operation requires the presence of the parallel lines.

It is used to parallel a power plant via a GCR or "GPRIII" or when the generators are paralleled without load.

5.3.3.1.2 Power plant mode

This mode is used when the genset associated to a power plant runs loaded or when the power supplied by the power plant is controlled by a GPRIII or GCR.

In this operating mode, Carantec provides, by means of the parallel lines, a distribution of the active power supplied by each of the gensets, pro rata of their nominal power.

This operation requires the presence of the parallel lines.

This operating mode is driven by variable 4254.

5.3.3.1.3 Setting mode

In this mode, the MICS gives Carantec a setpoint.

This operating mode is driven by variable 4255.

Three types of regulation can be selected:

- * Distribution (islanded power plant started by 4268)

In this mode, the parallel lines are not required as the exchanges between MICS are carried out via the RS 485 serial connection assigned to the distribution bus. The set point given to Carantec is calculated according to the following formula:

$$\text{Setpoint} = \frac{\Sigma P \text{ supplied}}{\Sigma P \text{ nominal of the sets in auto mode}} \times P \text{ nominal of genset .}$$

- * With this type of calculation, gensets of different outputs can be used.
During this phase, the integral mode must not be active.
- * Fixed set point (system 1, started by 426A).
Used when the generator is paralleled with the mains supply or is associated to a power plant and must produce a constant active power.
- * Peak lopping (system 2, started by 4269).
Used when the mains supply a fixed or zero power and the genset(s) provide(s) the remainder of the requirement.

5.3.3.1.4 Operation of the ramps

When the Carantec power plant mode or setting mode is validated, the genset, after paralleling with the bus bar system, settles at the lower power limit. The validation of the loading ramp authorises the rise in power up to the adjustment value (parallel lines in power plant mode, setting in setting mode). Once this value has been reached, the ramp is inhibited as long as the load shedding ramp has not been brought into service.

At the end of the sequence the load shedding ramp is controlled, the power is reduced until it reaches the lower limit value.

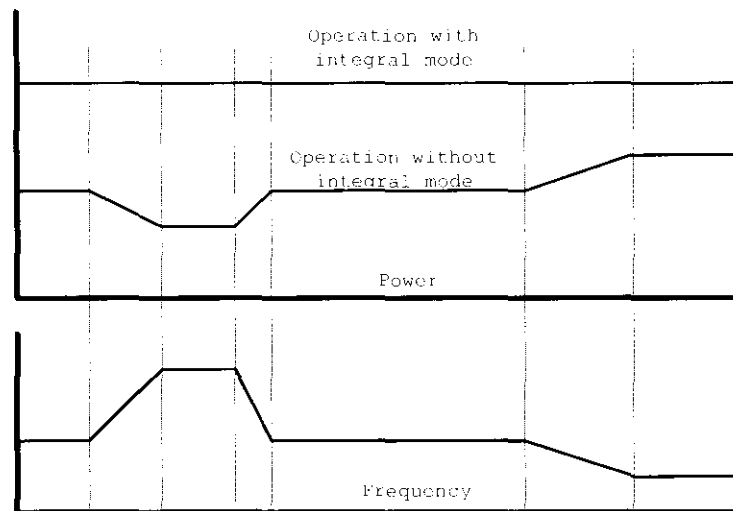
The duration of the ramp is set to transfer the entire nominal power. This means that the transfer of 50% of the power, with a ramp set to 10s will be carried out in 5s.

The loading ramp is driven by the variable 4252, the load shedding ramp by variable 4253.

5.3.3.1.5 Integral mode

This functionality must only be used when the genset is paralleled with the mains supply.

On a disturbed distribution network, it compensates for the variations in power linked to the variations in frequency on the mains supply.

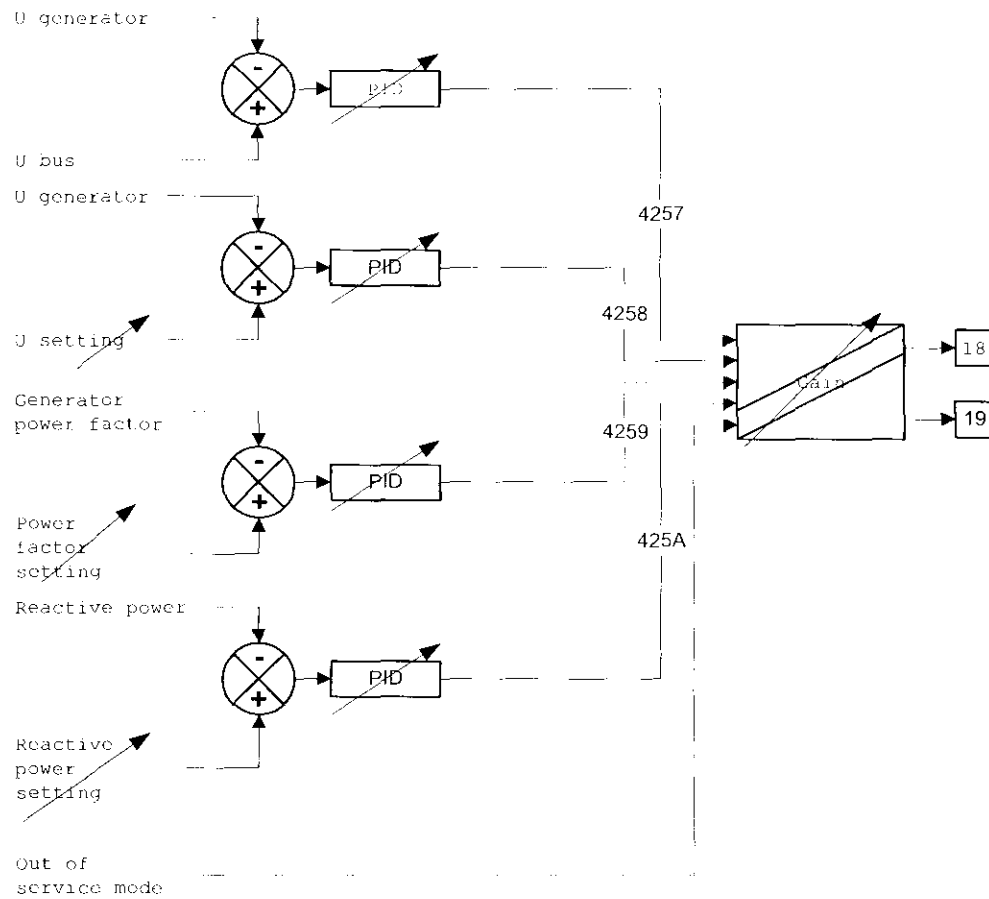


The control variable is 425C.

5.4 Voltage regulation

The voltage regulation on Carantec is used to remove the 3-function regulator and the droop CT.

The diagram below shows the operating principle



5.4.1 Off-line mode

Carantec has no action on the voltage regulator.

This operation is used when:

- The generator is stopped or stopping.

- The generator is in start-up phase and has not reached the excitation speed.

- During commissioning of the genset for the initial setting of the voltage regulator

The function driven by variable 4256

5.4.2 Voltage regulation mode

Carantec provides a PID voltage regulation based on a setting provided by the MICS.

This function is in service when the genset is running on its own, with or without load.

The command variable is 4258.

5.4.3 Voltage equalisation mode.(V=V)

In this mode, Carantec carries out the adjustment of the genset voltage on the bus voltage.
This function is in service during the synchronisation period.
To synchronise a power plant with the mains, only the lead genset is in V=V mode, the others remain in distribution of reactive.
The bringing into service of the function is controlled by variable 4257.

5.4.4 Power factor regulation mode

Carantec regulates the genset power factor based on a setting supplied by the MICS.
This functionality should only be brought into service when the set is paralleled with the mains supply.
The control variable is 4259.

5.4.5 Reactive power regulation mode.

Carantec regulates the reactive power supplied by the genset based on a setting provided by the MICS.
This functionality should only be brought into service when the set is paralleled with the mains supply.
The control variable is 425A.

5.4.6 Reactive power distribution mode.

Carantec provides a reactive power distribution based on a setting supplied by the MICS.

$$\text{Setting} = \frac{\Sigma Q \text{ supplied}}{\Sigma Q \text{ nominal of genset in auto mode}} \times Q \text{ nominal genset}$$

This regulation is used when:

- The gensets are paralleled with one another, with or without load.
- During the synchronisation period if the genset is not the lead set.
- This function is driven by variable 425A.

5.5 Note on the distribution bus

The MICS communicate with each other via one of the RS485 serial interfaces.
This link must be used for the management of the reactive powers.
The exchange concerning the active power can be carried out either by the parallel lines or by the bus.
This multi-master network operates on the token ring principle. In turn, each MICS distributes its own information over the network. The receiving MICS record it. At the end of the distribution, the token is sent to the next slave, which in turn sends its information.
For power plant operations, the logic needs to define the lead genset, which alone controls some common functions.

The selection of this master is carried out by:

- * The first generator started up in auto mode
- * Failing that, the first genset started up in manual mode.

When no genset has been started up, there is no declared master.

The position of the master changes according to the conditions listed below.

The following information are sent over the distribution bus:

- * Number of the lead genset
- * Genset priority
- * Nominal active power
- * Active power supplied
- * Nominal reactive power
- * Reactive power supplied
- * 64 status bits

5.6 Electrical protection

The table gives the parameters monitored and their settings

	Range of settings	Default value	Hysteresis settings	Default hysteresis settings
Overload current	0 to 120% I _n	115%		
Active power return	0 to 50 % P _n	15%		
Reactive power return	0 to 50% Q _n	15%		
Max. active power	0 to 140% P _n	110%	2 to 20%	2%
Min. active power	0 to 140% F _n	0%	2 to 20%	2%
Max. reactive power	0 to 140% Q _n	110%	2 to 20%	2%
Max. voltage	0 to 140% U _n	110%	2 to 20%	2%
Min. voltage	0 to 140% F _n	90%	2 to 20%	2%
Max. frequency	0 to 140% F _n	105%	2 to 20%	2%
Min. frequency	0 to 140% F _n	95%	2 to 20%	2%

6. CARNAC

6.1 Introduction

The CARNAC board completes the MICS system by providing fast-acting electrical protection.

This board, equipped with its own microprocessor, provides the following protections:

- * Short-circuit current (Trip time = 50 ms)
- * Directional over current (Trip time = 50 ms)
- * Low impedance (Trip time = 50 ms)
- * Vector jump (Trip time = 50 ms)
- * dF/dT (Trip time = 70 ms)
- * Zero sequence current (Trip time = 50 ms)
- * Directional of zero sequence current (Trip time = 50 ms)
- * Neutral over current (Trip time = 50 ms)
- * Zero sequence voltage (Trip time = 50 ms)

Three RS485 (2 wire) serial ports and one CAN bus are fitted to the board to replace the communication board. These ports are not connected to CARNAC microprocessor as they are entirely managed by MICS 2 microprocessor via the back plane bus.

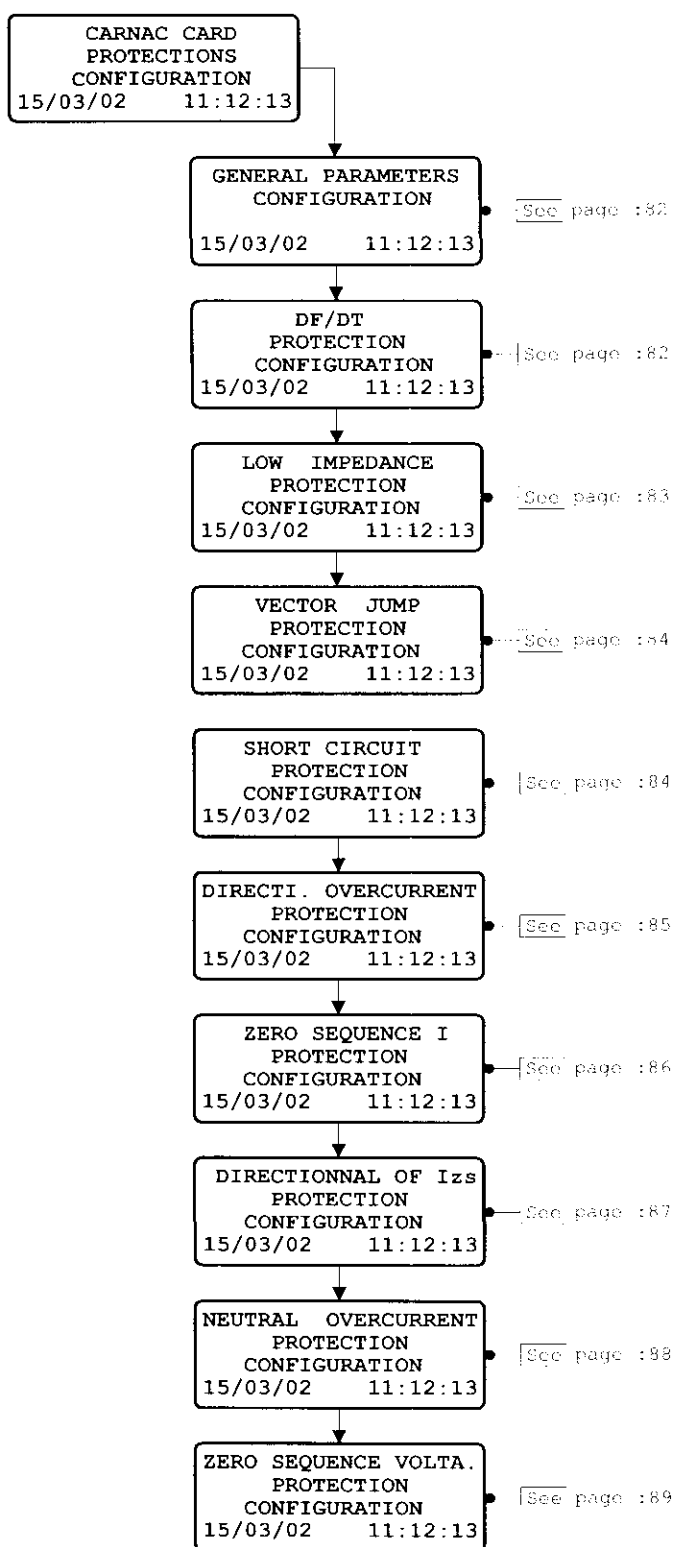
IF A CARNAC BOARD IS DECLARED IN THE OPTIONAL BOARD CONFIGURATION MENU, IT MUST BE PHYSICALLY INSTALLED IN THE UNIT. IF NOT, THE MICROCONTROLLER WILL "CRASH" AND A WATCHDOG FAULT WILL APPEAR.

6.2 Measurements taken

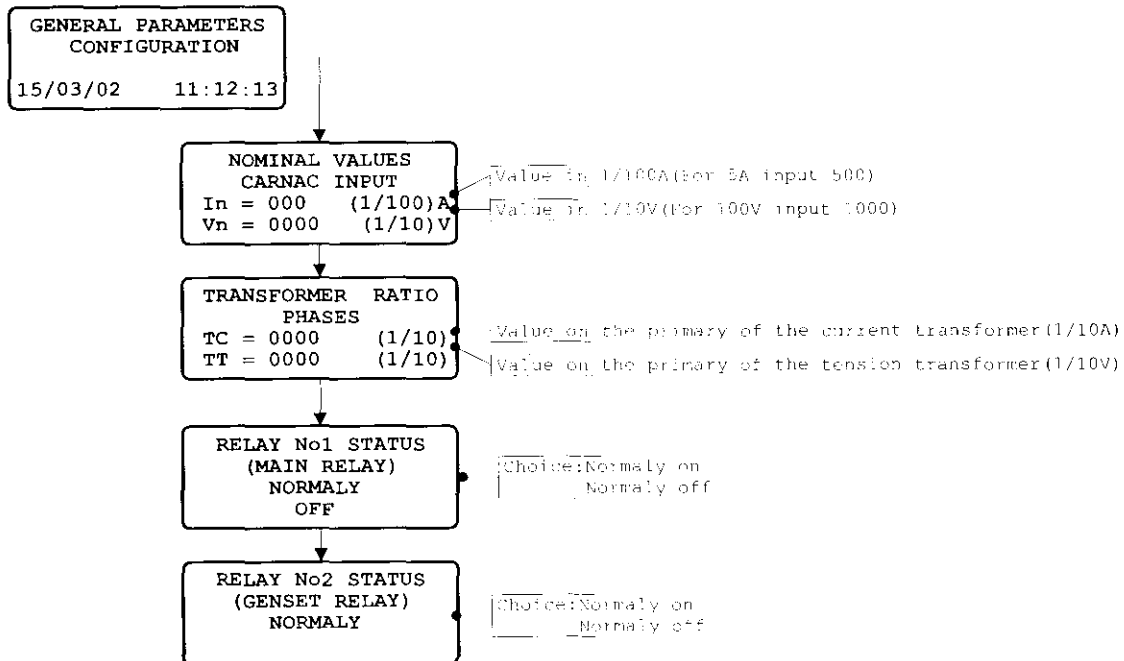
- * The 3 currents I_1, I_2, I_3 ,
- * The neutral current I_N (calculated),
- * The zero sequence current I_H ,
- * The 3 voltages V_1, V_2, V_3 ,
- * The zero sequence voltage V_H
- * The frequency F ,
- * The 3 angles $U/I, \phi_{I1}, \phi_{I2}, \phi_{I3}$, (calculated).

All the electrical measurements are recorded in non-volatile memory each time a new fault occurs. One single record per category (mains supply, genset, information only). The records are kept until the next fault in the same category occurs.

6.3 Organisation



6.4 General parameters

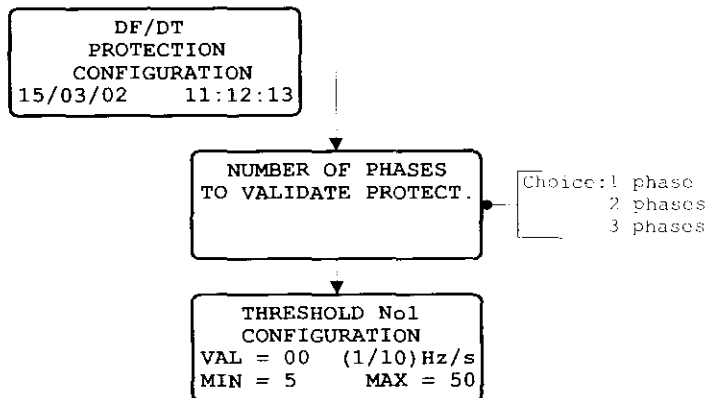


6.5 dF/dT protection

dF/dT is a protection against mains failure. It corresponds to a sudden variation of frequency within a given period of time.

By activating the variables below, the occurrence of a fault can be associated with one of the board relays:

- * 46B0 ⇒ Mains protection,
- * 46B1 ⇒ Genset protection,
- * 46B2 ⇒ Information.

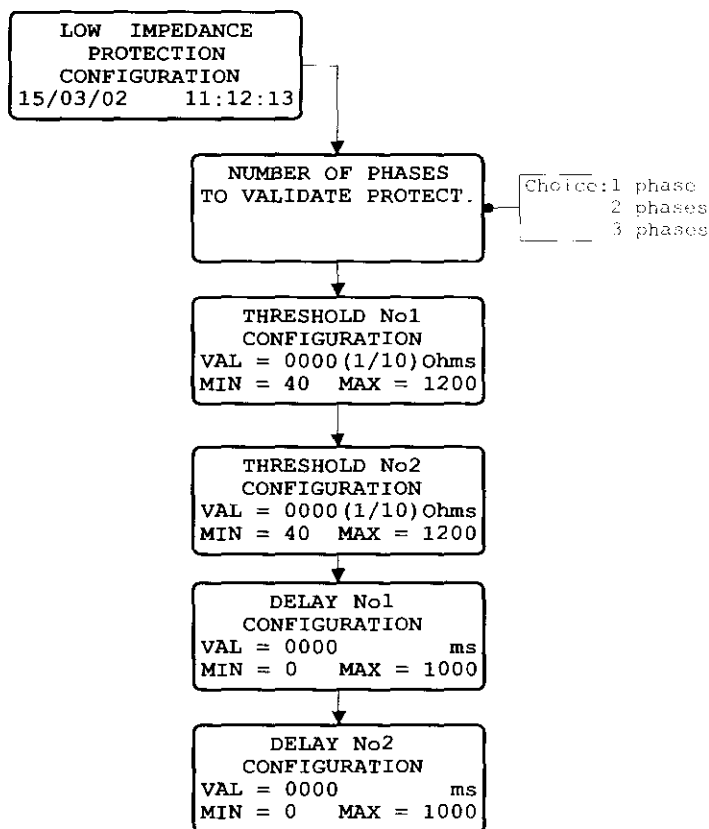
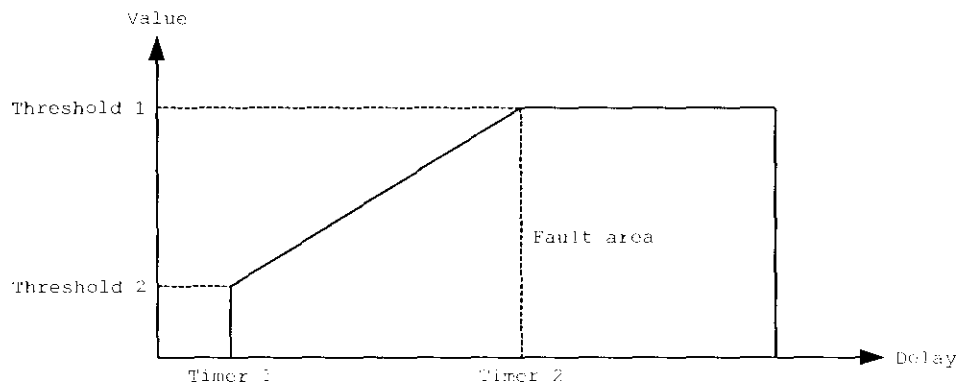


6.6 Low impedance protection

Low impedance is a protection against mains failure, it corresponds with a sudden variation of impedance. The instantaneous impedance measurement is being compared: $Z=V_{rms}/I_{rms}$. By activating the variables below, the occurrence of a fault can be associated with one of the board relays:

- * 46B3 ⇨ Mains protection,
- * 46B4 ⇨ Genset protection,
- * 46B5 ⇨ Information.

The curve is set as shown in the following diagram:

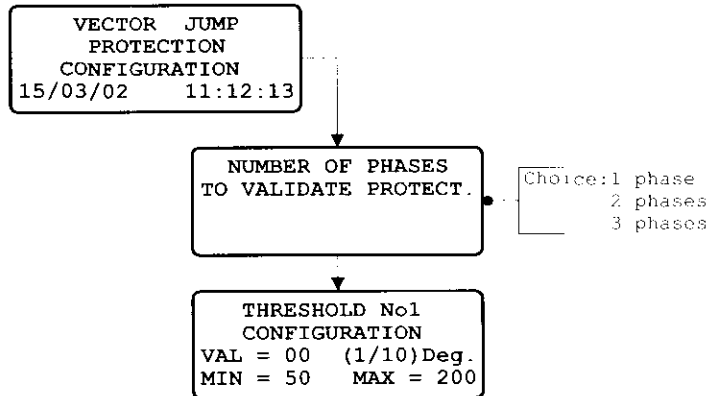


6.7 Vector jump protection

Vector jump is a protection against mains failure, it corresponds with a sinusoidal offset, thus a period variation.

By activating the variables below, the occurrence of a fault can be associated with one of the board relays:

- * 46B6 \Rightarrow Mains protection,
- * 46B7 \Rightarrow Genset protection,
- * 46B8 \Rightarrow Information.

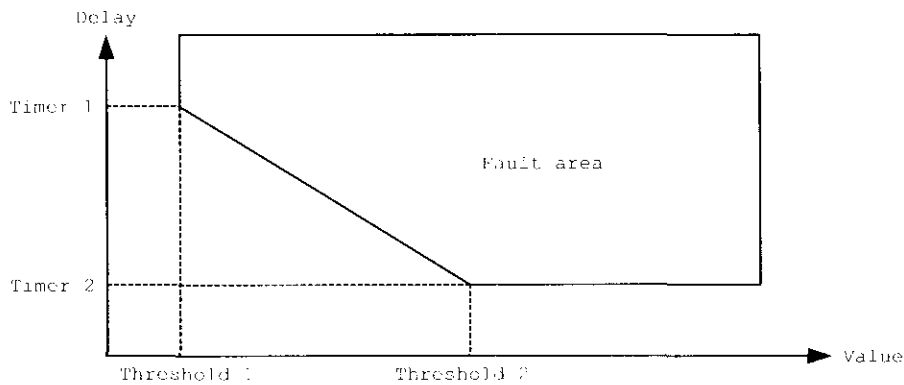


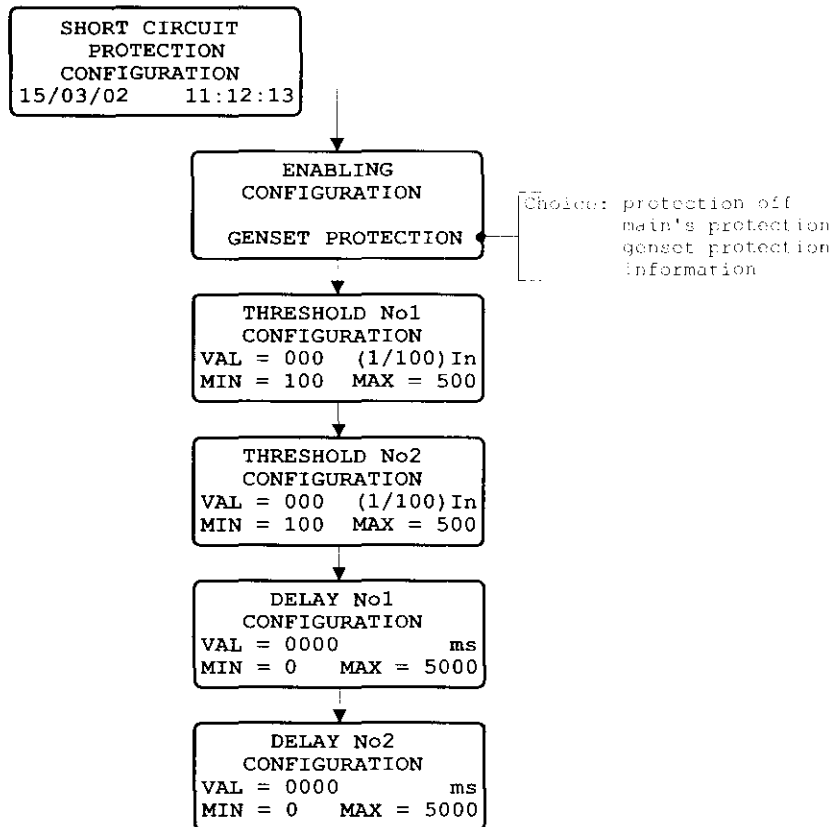
6.8 Short-circuit protection

This protection is available on all three phases.

The current measure input supports a 5 In overload.

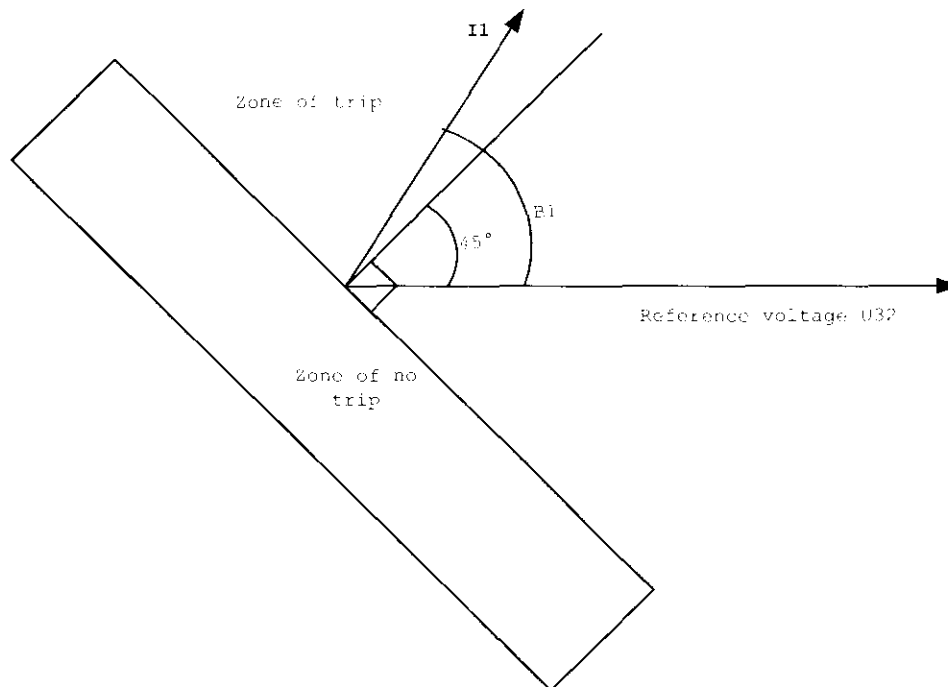
The curve is set as per the following diagram:

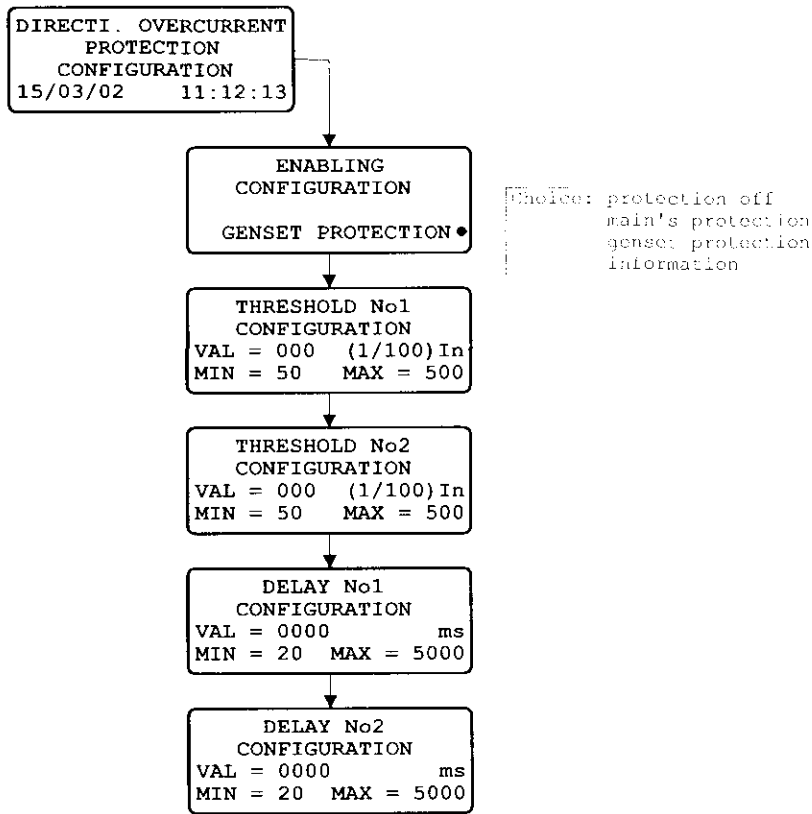




6.9 Directional over current protection.

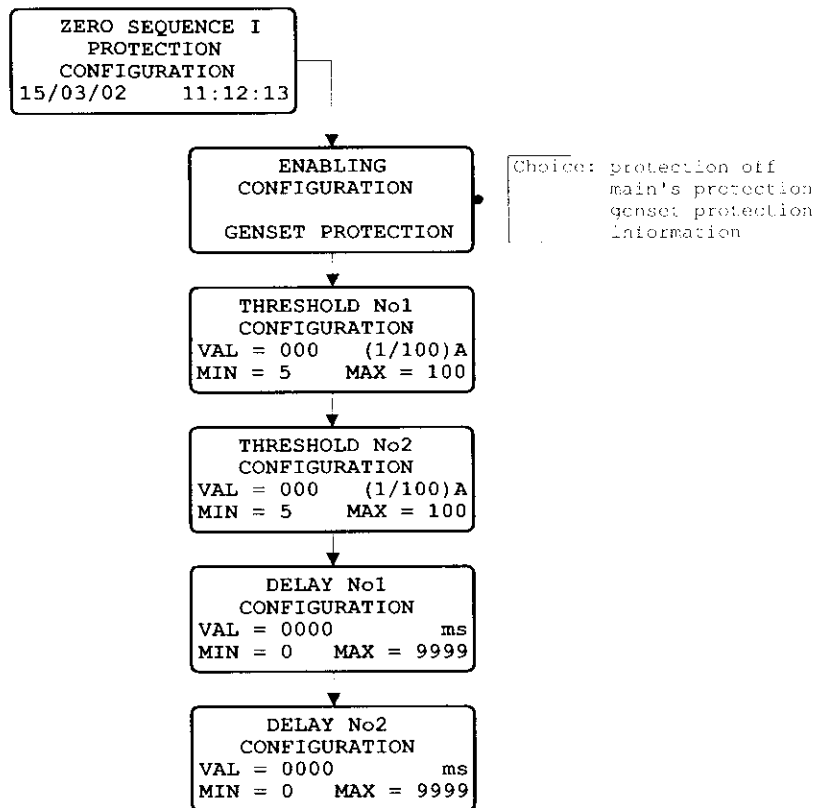
This protection detects the change of current direction (+180°), this corresponds, in practice, with an angle threshold V/I being exceeded. The fault is ignored up to an adjustable current threshold.





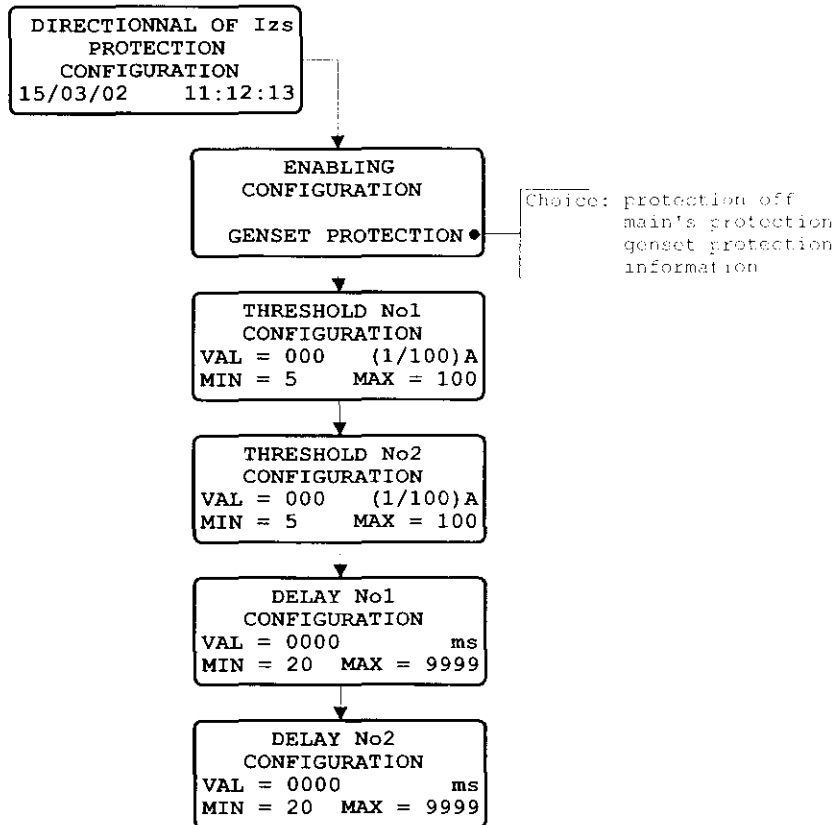
6.10 Zero sequence current protection

This protection is a current trip level on a 0-1 AAC input. The measure is obtained either from a current summation transformer, or from three separate summation-mounted CTs .



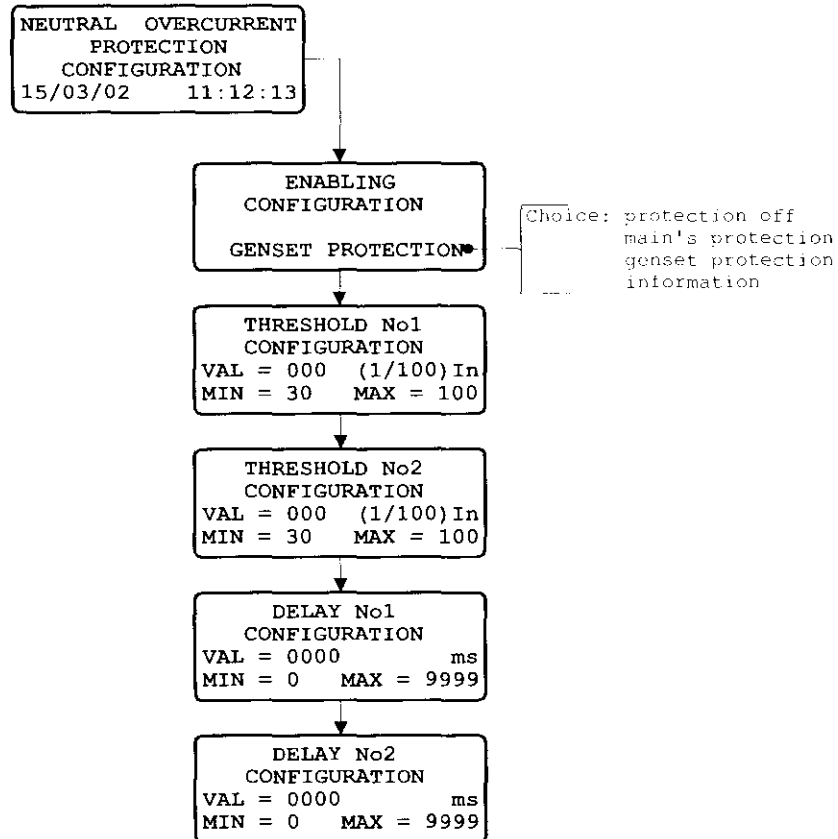
6.11 Directional of zero sequence current protection

This protection detects the change of current direction (+180°), this corresponds, in practice, with an angle threshold U/I being exceeded. The fault is ignored up to an adjustable current threshold.



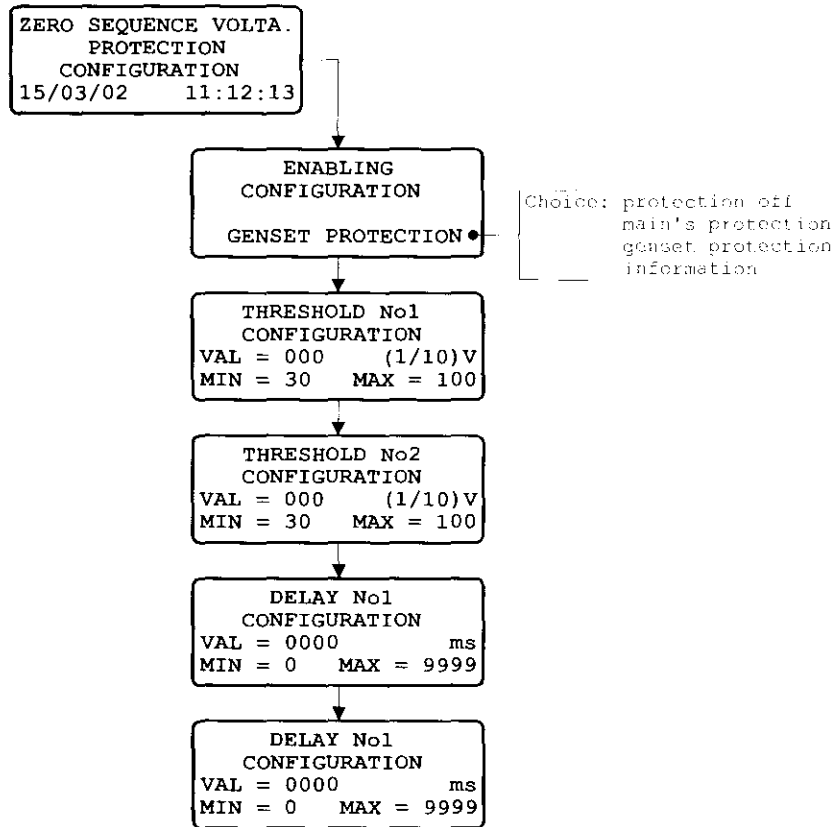
6.12 Neutral overcurrent protection

This protection is used in an unbalanced 4 wire (3 phases + neutral) system.



6.13 Zero sequence voltage protection

Zero sequence voltage is the voltage between the voltage transformers neutral point and earth in a system with an isolated neutral or the vector summation of phase-to-neutral voltage in a system with an earthed neutral.



6.14 Clearing faults

When a fault occurs, the relays on Carnac stay engaged until reset.

Reset is done via variables 46B9 (relay No 1) and 46BA (relay No 2).

This reset is not associated with any built-in logic because several procedures can be used.

6.14.1 Stand alone reset.

First, the fault is removed on Carnac, then on the MICS.

Example:

Use F4 to reset Carnac

- * 4824 = "40FB Led flashes when a fault occurs.
- * 46B9 = "4624 Reset of mains relay (Relay No 1).
- * 46BA = "4624 Reset of genset relay (Relay No 2).

6.14.2 MICS Reset.

Carnac is reset at the same time as the MICS.

- * 46B9 = "463A Reset of mains relay (Relay No 1).
- * 46BA = "463A Reset of genset relay (Relay No 2).

6.15 Summary of the MICS variables associated with Carnac

@	Functionalities
40FB	Carnac faults and alarms summary
46B0	DF/DT in service on main
46B1	DF/DT in service on genset
46B2	DF/DT alarm
46B3	MINI Z in service on genset
46B4	MINI Z in service on genset
46B5	MINI Z alarm
46B6	Vector shift in service on main
46B7	Vector shift in service on genset
46B8	Vector shift alarm
46B9	Reset main protection relay 1
46BA	Reset main protection relay 2
410F	DF/DT fault
4112	Mini-impedance
4117	Vector shift fault
4270	Main faults synthesis
4271	Genset faults synthesis
4272	Information's synthesis
4273	I3 short circuit fault
4274	I2 short circuit fault
4275	I1 short circuit fault
4276	I homopolar fault
4277	Fault Zero Sequence Current
4278	Fault Directional Over current Phase 3
4279	Fault Directional Overcurrent Phase 2
427A	Fault Directional Overcurrent Phase 1
427B	Fault Directional Zero Sequence Current
427C	Fault DF/DT U12
427D	Fault DF/DT U31
427E	Fault DF/DT U23
427 F	Fault Low Impedance U12/I3
4280	Fault Low Impedance U31/I2
4281	Fault Low Impedance U23/I1
4282	Fault Vector Jump U12
4283	Fault Vector Jump U31
4284	Fault Vector Jump U23
4285	Fault Zero Sequence Voltage

7. KELTIEG

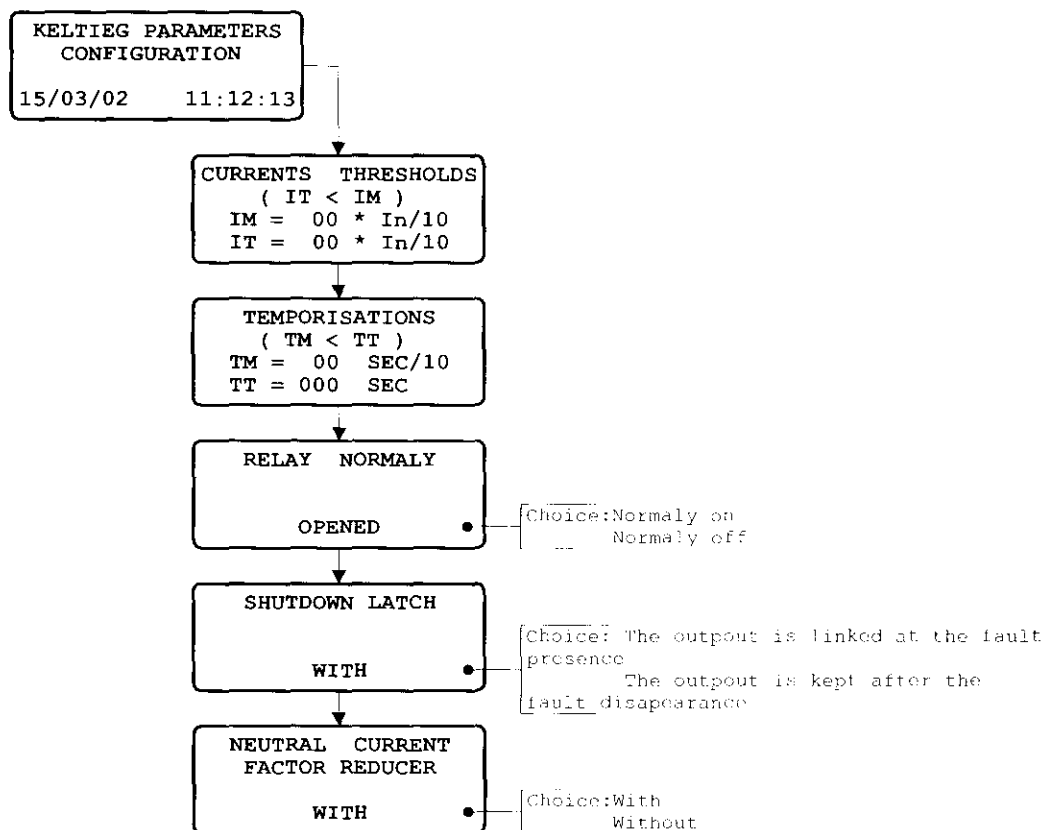
7.1 Introduction

Keltieg is a thermo-magnetic protection module. Settings for this relay can be accessed from the MICS through a serial link.

This chapter shows the various screens used to set it up.

For detailed information on fonctions and commissioning, refer to the appropriate manual.

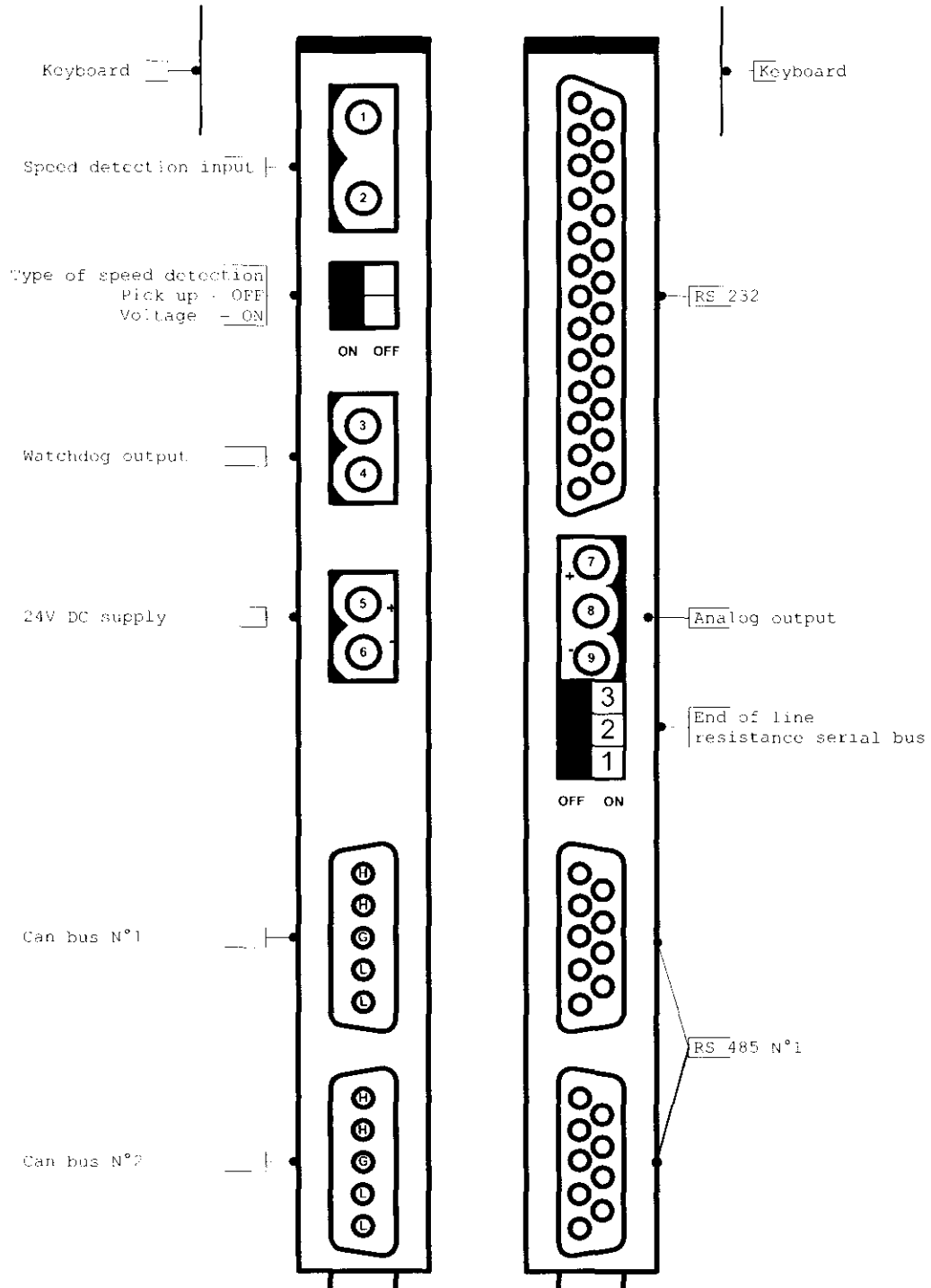
7.2 Configuration



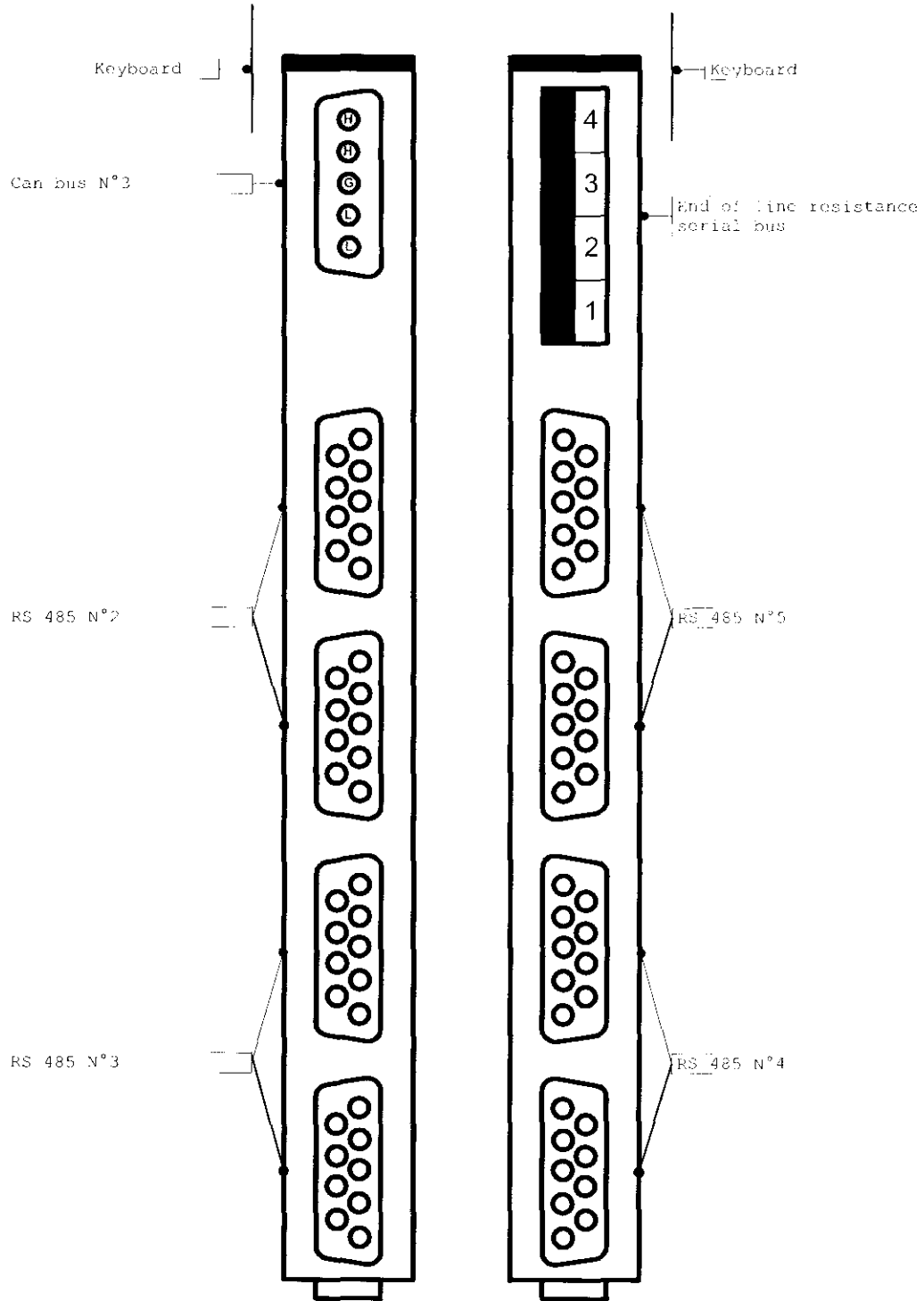
8. Commissioning

8.1 Connections

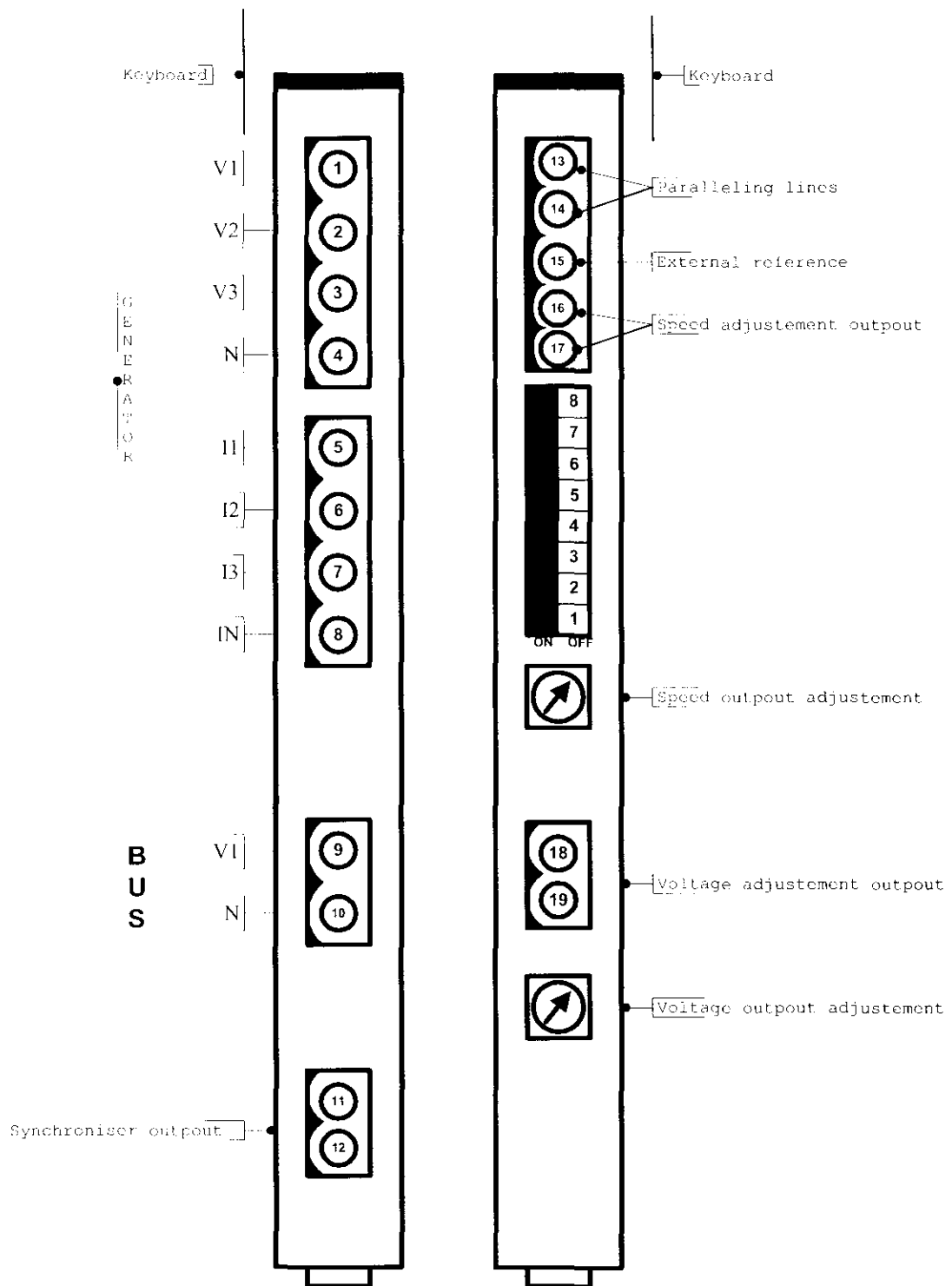
8.1.1 Central Processing Unit board



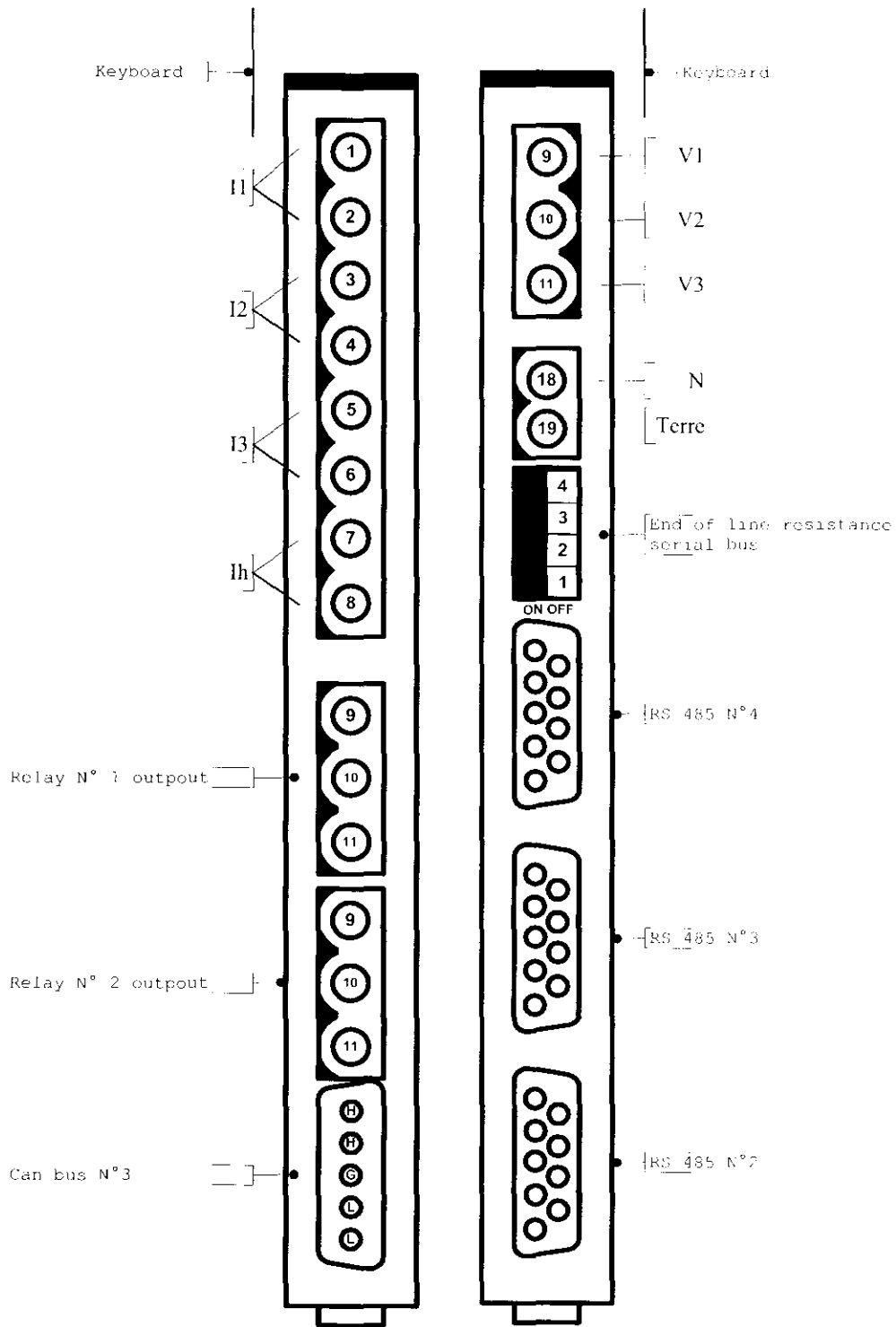
8.1.2 Communication board



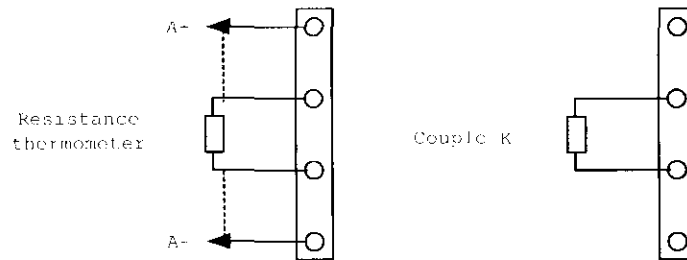
8.1.3 Carantec board



8.1.4 Carnac board



8.1.5 Temperature inputs on the temp-inputs modules



A (+) and A (-) will be connected only for PRTs. If the cable only has two or three wires make the link on the connector.

The link with the thermocouple must be made with a specific cable with the same characteristics as the K-type thermocouple (similarly for any terminals added between the thermocouple and the temp. inputs board).

8.2 Putting the CAN buses into operation

There are two CAN buses in the basic unit.

The implementation of the optional communication board permits the addition of another bus. Each bus can support up to 16 digital/analogue inputs/outputs modules, following certain configuration rules.

8.2.1 Addressing the modules

8.2.1.1 The digital input modules

The digital input modules are limited in hardware to the first eight addresses of a bus (from 0 to 7). This means that in a maximum configuration, the MICS will be able to manage $8 \times 3 \times 16 = 384$ digital inputs.

8.2.1.2 The digital output modules

The digital output modules are limited in hardware to the last eight addresses of a bus (from 8 to F). This means that in a maximum configuration the MICS will be able to manage $8 \times 3 \times 16 = 384$ digital outputs.

8.2.1.3 The analogue & temp-input modules

The temperature and analogue input modules can be placed arbitrarily at any address of a bus (0 to F). Unlike the digital output modules, it is necessary to position the switches SW03 so as to define the baud rate of the CAN bus (see paragraph 4.4.6.2).

8.2.2 Distribution of the modules

With a view to optimising the MICS overall cycle time, it is essential to distribute equally the communication times of each CAN bus. Indeed, the MICS operates on a real time principle, which gives it the possibility of delegating some of its tasks to the drivers which make it up. Thus, for example, the microprocessor gives the order to each of the CAN drivers to carry out a data acquisition and can subsequently devote its time to other tasks until the updating of the entire CAN bus data is complete. Hence, it is easy to note that the refresh time of all the data is the time of the most loaded CAN bus.

The table below gives the length of the frames according to the modules

Action	Maximum number of bits	Number of time units
Digital input module reading	135 bits	1 time unit
Digital output module reading	164 bits	1.21 time units
Analogue input module reading	587 bits	4.35 time units
Temp. input module reading	438 bits	3.24 time units

Example:

The following configuration needs to be produced:

4 digital input modules, 3 digital output modules, 1 analogue input module, 1 temp. Input module

Possible configuration n° 1:

CAN bus n° 1

4 digital input 4 time units

3 digital output 3.63 time units

1 analogue input 4.35 time units

1 temp. Input 3.24 time units

i.e. an overall communication time of: 15.22 time units

Possible configuration n° 2:

CAN bus n° 1

4 digital input 4 time units

3 digital output 3.63 time units

i.e. an overall communication time of: 7.63 time units

CAN bus n° 2

1 analogue input 4.35 time units

1 temp. Input 3.24 time units

i.e. an overall communication time of: 7.59 time units

Through this simple example, one can quickly notice that configuration n° 2 permits a time saving of the order of 50%.

8.2.3 Hardware implementation

The CAN bus is made up of a twisted differential pair (voltage between 0 and 5 volts) carried in a shielded cable. Braid shielding is preferable. The cable's resistance must be around 75Ω for a length of 1000 metres.

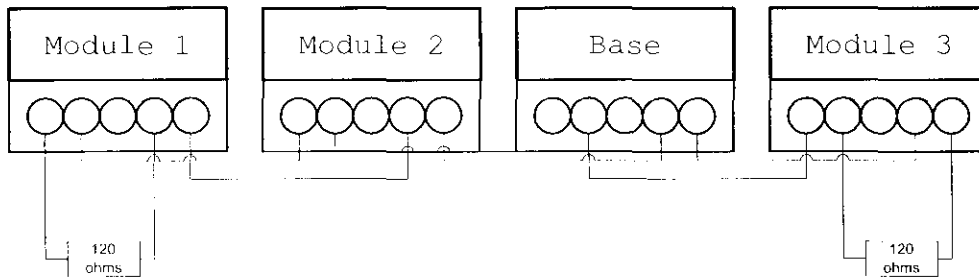
The paralleling of each section of the bus is achieved through the printed circuit of each module, which has the effect of excluding from the network all the modules situated above a non-connected connector.

The connectors connected to the CAN bus are screw-type connectors with earth adjustment, which permits the connection of the shielding (obligatory at all ends).

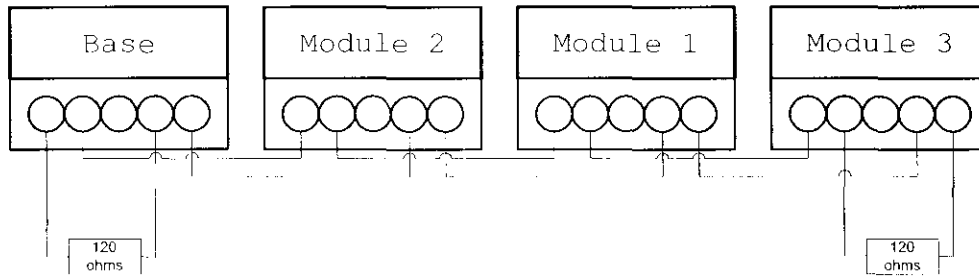
The termination of the CAN bus is done with a 120Ω resistor at each end and this irrespective of the length of the bus. This resistor is connected in the connector.

The hardware order of the modules is independent of the software addressing.

Example n° 1



Example n° 2



8.3 Breakdown repair & error messages

All the operating failures associated with the CAN buses will activate the watchdog so as to protect the installation. After a watchdog fault, the MICS must be powered down to re-initialise the system.

Title	Probable causes
Communication impossible	One or more connectors not connected. No power supply on one or more modules.
Reception of a message with an unknown address	A module of unknown type is present on the bus (Module not supplied by SORFEL.)
Queue full	System error.
Error bus	One or more connectors not connected. No power supply on one or more modules.
OVERRUN	System error.
Reception of a message without request	A module has been connected while the bus was powered. A module has momentarily lost its power supply. A module of unknown type is present on the bus. (Module not supplied by SORFEL)
(Re) connection of a module which is operating	A module has been connected while the bus was powered. A module has momentarily lost its power supply.
No response	One or more connectors not connected. No power supply on one or more modules.
Incorrect response	System error.
Incorrect declaration	A module at one address does not correspond to the declaration

After any modifications to a module's hardware configuration, it is essential to power supply it down so that the new configuration is taken into account.

8.4 Note on the operation of the "watchdog"

It is important to keep a permanent check on the activity of the microprocessor, which runs the system.

To do this an oscillator, which is installed on the board, sends clocked pulses to a pulse counter. The microprocessor regularly zeroes the counter.

If the microprocessor is defective, for a physical or software reason, the counter reaches the threshold, which has been assigned to it and orders the start-up of the "watchdog" relay.

This relay is also controlled by the appearance of a communication fault on the CAN bus controlling the input/output modules.

When the microprocessor is the source of the fault the system is blocked (there is no more keyboard access). If the fault is caused by a problem on the CAN bus, the MICS remains operational and one or more messages relating to the origin of the fault are accessible in the stack.

8.5 The serial interfaces

The rules, which must be applied to the serial interfaces are those applicable, to all communication networks:

Connecting of the shielding to the earth at both ends.

Fitting of end-of-line resistors (120 Ω) at both ends.

8.5.1 Pin configuration of the RS 232 (female sub D25)

Terminals	Signals	I/O	Meaning
2	TX	S	Serial data transmission
3	RX	I	Serial data reception
4	RTS	S	Request to send
5	CTS	I	Ready to send
6	DSR	I	Modem ready
7	GND		Ground
8	DCD	I	Data carrier detection
20	DTR	S	Data terminal ready
22	RI	I	Call indicator

8.5.2 Pin configuration of the RS 485 n° 1 (female sub D9)

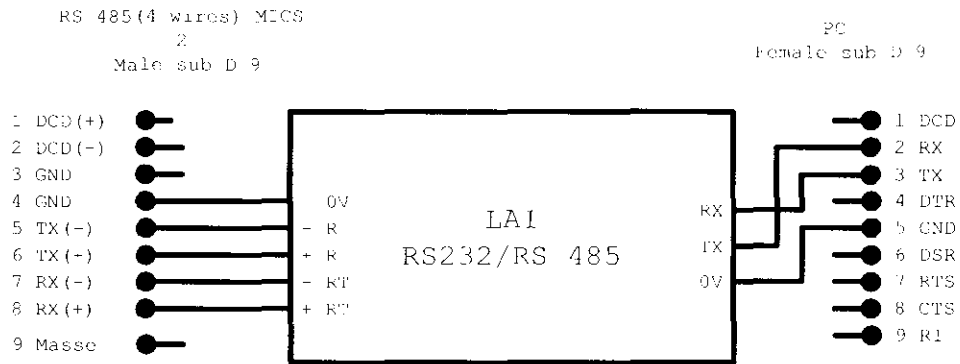
Terminals	Signals	I/O	Meaning
1	DCD (+)	I	Data carrier detection signal (+)
2	DCD (-)	I	Data carrier detection signal (-)
3	GND		Ground
4	GND		Ground
5	TX(-)	O	Serial data transmission signal (-)
6	TX(+)	O	Serial data transmission signal (+)
7	RX(-)	I	Serial data reception signal (-)
8	RX(+)	I	Serial data reception signal (+)
9	GND		Ground

8.5.3 Pin configuration of the communication board RS 485 (female sub D9)

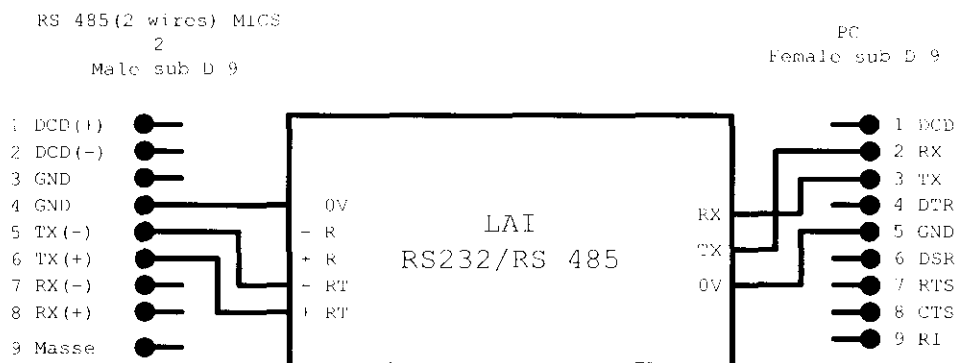
Terminals	Signals	I/O	Meaning
3	GND		Ground
4	GND		Ground
5	TRX (-)	S	Serial data transmission & reception signal (-)
6	TRX (+)	S	Serial data transmission & reception signal (+)
9	GND		Ground

8.6 Typical connecting cables

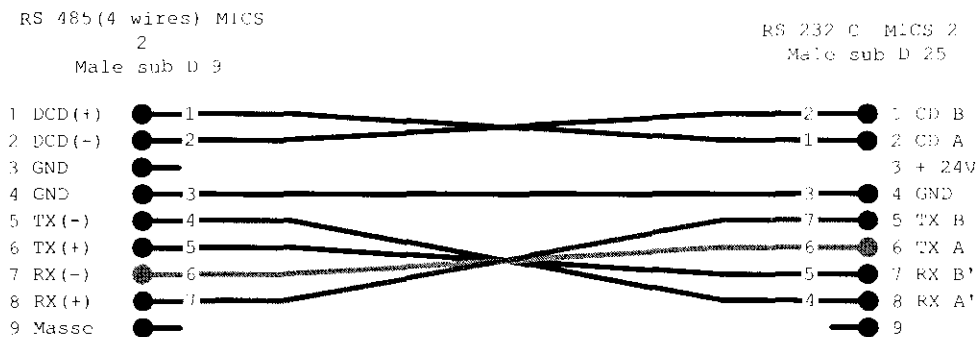
8.6.1 MICS 2 (4-wire RS 485) → L.A.I. interface → P.C.



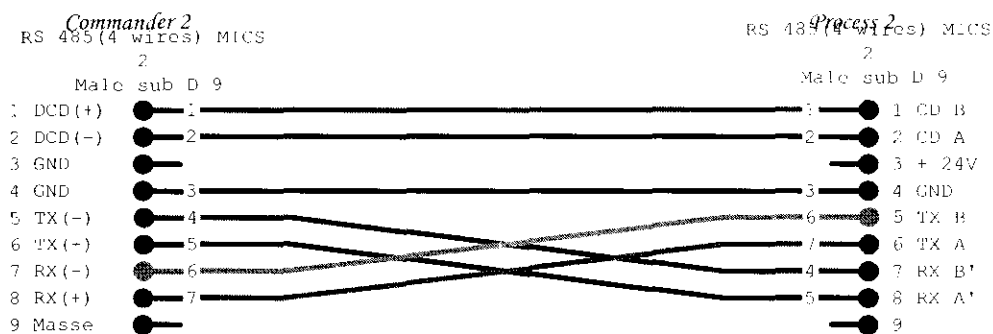
8.6.2 MICS 2 (2-wire RS 485) → L.A.I. interface → P.C.



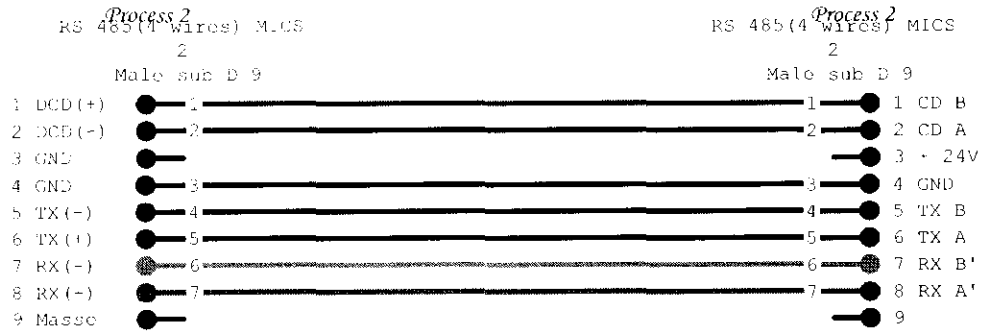
8.6.3 MICS 2 (4-wire RS 485) → ETIC modem



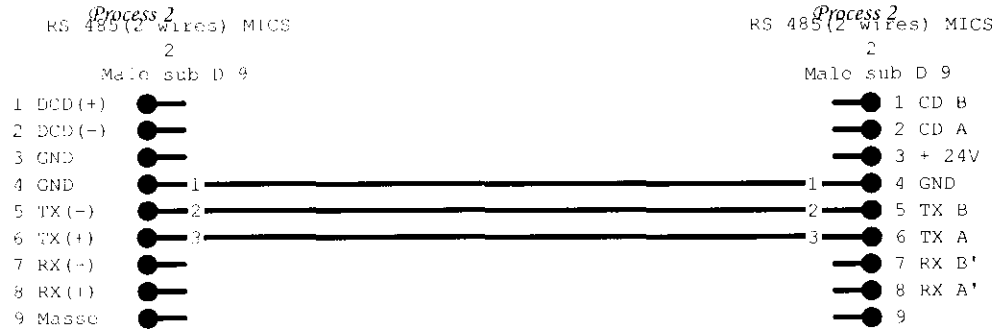
8.6.4 MICS COMMANDER 2 (RS485 4 wires) → MICS PROCESS 2 (RS485 4 wires).



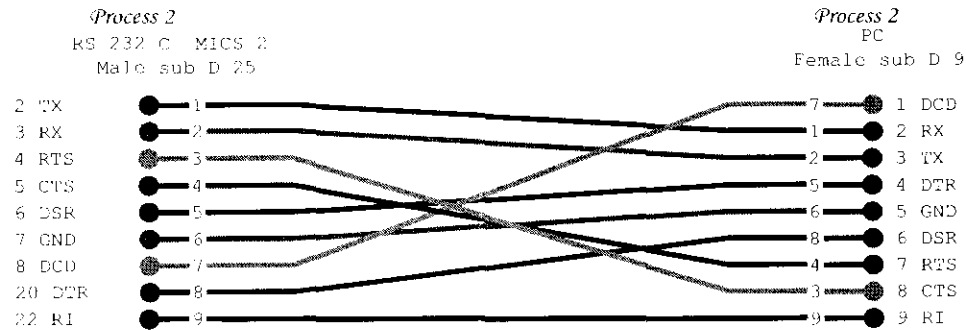
8.6.5 MICS PROCESS 2 (RS485 4 wires) → MICS PROCESS 2 (RS485 4 wires).



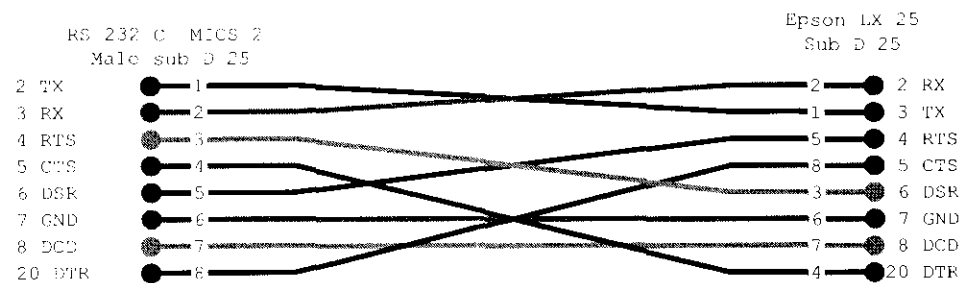
8.6.6 MICS 2 (RS485 2 wires) → MICS 2 (RS485 2 wires).



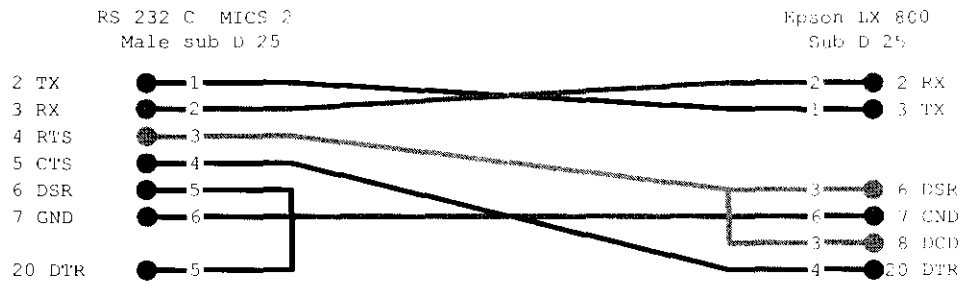
8.6.7 MICS (RS 232) → PC



8.6.8 MICS (RS 232) → EPSON LX300



8.6.9 MICS (RS 232) → EPSON LX300



8.7 Miscellaneous

8.7.1 Access to the level 1 and 2 menus

There are two ways of accessing the coded menus:

-> Without dongle:

The MICS 2 provides the possibility of accessing the level 1 menu through an access code. This code is managed through a mask and from the date displayed on the MICS 2's screen. In order to obtain the access code, you will have to supply these 2 parameters to the authorised departments, which will be able to calculate this code for you.

-> With dongle:

In this case, the process is simpler. Simply connect the dongle to the RS 232 port, which will read automatically the information, needed from the dongle at the time of the various accesses. Nevertheless, one precaution needs to be taken. Since the dongle has a fixed operating duration over time in software, it is essential to check that the MICS 2's date is not incorrect, which would have the effect of erasing the dongle.

In the event of a malfunction of the dongle, a simple operation generally makes it possible to restore all the capabilities to the dongle. It is necessary, using a metal tool, to short-circuit the terminals of the key's male sub D 25.

8.7.2 Using keys F1 to F6

The use of these keys is different depending on whether the MICS is in display or configuration mode.

This means that the functionalities associated with these keys are inoperative when one is in configuration mode.

9. Troubleshooting guide

MICS	Wording	Possible causes	Checking
6000	Local electric network insulation failure	Insulation troubles on the local electric network.	Open successively the starts to control. Call on electric service.
6001	Mains breaker no 1 opening failure	The order to open the disconnecting switch of the N°1 mains power supply has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6002	Mains breaker no 1 closing failure	The order to close the disconnecting switch of the N°1 mains power supply has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6003	Failure of mains breaker no 1 positions	Discrepancy in the position reports of the N°1 mains power supply.	Check position contact and its wiring.
6004	Mains breaker no 1 over current tripped	Overcurrent fault.	Call on electric service.
6005	Mains breaker no 2 opening failure	The order to open the disconnecting switch of the mains N°2 power supply has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6006	Mains breaker no 2 closing failure	The order to close the disconnecting switch of the mains N°2 power supply has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6007	Failure of no 2 mains breaker positions	Discrepancy in the position reports of the mains N°2 power supply.	Check position contacts and wiring.
6008	Mains breaker no 2 overcurrent tripped	Overcurrent fault.	Call on electric service.
6009	Mains breaker no 3 opening failure	The order to open the disconnecting switch of the mains N°3 power supply has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
600A	Mains breaker no 3 closing failure	The order to close the disconnecting switch of the mains N°3 power supply has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
600B	Failure of no 3 mains breaker positions	Discrepancy in the position reports of the mains N°3 power supply.	Check the position contacts and their wiring.
600C	Mains breaker no 3 overcurrent tripped	Overcurrent fault.	Call on electric service.
600D	Emergency breaker no 1 opening failure	The order to open the disconnecting switch of the emergency breaker N°1 has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
600E	Emergency breaker no 1 closing failure	The order to close the disconnecting switch of the emergency breaker N°1 has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
600F	Failure of no 1 emergency breaker positions	Discrepancy in the position reports of the emergency breaker N°1.	Check position contact and its wiring.
6010	Emergency no 1 overcurrent tripped	Overcurrent fault.	Call on electric service.
6011	Emergency breaker no 2 opening failure	The order to open the disconnecting switch of the emergency breaker N°2 has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6012	Emergency breaker no 2 closing failure	The order to close the disconnecting switch of the emergency breaker N°2 has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6013	Failure of no 2 emergency breaker positions	Discrepancy in the position reports of the emergency breaker N° 2.	Check position contacts and their wiring.
6014	Emergency breaker no 2 tripped failure	Overcurrent fault.	Call on electric service.

MICS	Wording	Possible causes	Checking
6015	Emergency breaker no 3 opening failure	The order to open the disconnecting switch of the emergency breaker N°3 has not been executed.	Check the device control circuit. Check the MICS output variable. Check the position contact and its wiring.
6016	Emergency no 3 closing failure	The order to close the disconnecting switch of the emergency breaker N°3 has not been executed.	Check the device control circuit. Check the MICS output variable. Check the position contact and its wiring.
6017	Failure of no 3 emergency breaker positions	Discrepancy in the position reports of the N° 3 replacement circuit.	Check position contacts and wiring.
6018	Emergency breaker no 3 tripped failure	Overcurrent fault.	Call on electric service.
6019	Mains transformer Alarm	The protections of the reducer of network voltage measures are released.	Check the protections upstream and downstream. Check electric circuit.
601A	Emergency transformer alarm	The protections of the reducer of emergency voltage measures are released.	Check the protections upstream and downstream. Check electric circuit.
601B	Low Cooling system level	Not enough liquid in the cooling circuit.	Check circuit watertightness . Adjust after controlling circuits and engine. If no apparent leak, call supplier.
601C	Fuel pump no 1 tripped alarm	Mechanical blocking of the pump. Problem with the electric power supply of the drive motor.	Check free pump rotation. Check engine power supply. Check engine.
601D	Fuel pump no 2 tripped alarm	Mechanical blocking of the pump. Problem with electric power supply of the drive motor.	Check free pump rotation. Check engine power supply. Check the engine.
601E	Oil pressure alarm	Chocking of the oil filter	Check oil filter. Call on supplier
601F	Oil pressure failure	Filter clogging. Oil shortage.	Check oil filter. Check oil level. Control there is no leak. Call on supplier.
6020	Oil temperature alarm	Engine overload. Cooling problem. Climatic conditions for use off specs.	If possible reduce the load. Check the cooling circuit If the problem remains, stop the engine and call on supplier.
6021	Oil temperature failure	Engine overload. Cooling problem. Climatic conditions for use off specs. Mechanical problem on the engine.	Call on supplier.
6022	Low Oil level alarm	Oil shortage. Accidental oil leakage.	Manual oil regulation. If the genset is provided with an automatic regulation system, check oil storage and operation. Ensure there is no leak.
6023	High oil level alarm	Tank too filled. Accidental arrival of cooling liquid.	Drain excess oil off. Check oil quality.
6024	Low oil level failure	Tank too filled. Accidental arrival of cooling liquid.	Drain excess oil off. Check oil quality. If required call on supplier.
6025	Oil heater alarm	Heating circuit failure.	Check the heating circuit operation. Check the heating resistance. Check the temperature sensor. Check thermostat.
6026	Engine water temperature Alarm	Engine overload. Cooling problem. Climatic conditions for use off specs.	If possible reduce the load. Check the cooling circuit. If the problem remains, stop the engine and call on supplier.

MICS	Wording	Possible causes	Checking
6027	Engine water temperature failure	Engine overload. Cooling problem. Climatic conditions for use off specs	If possible reduce the load. Check the cooling circuit. If the problem remains, stop the engine and call on supplier.
6028	Pump water temp failure	Engine overload. Cooling problem. Climatic Conditions for use off specs.	If possible reduce the load. Check the cooling circuit. If the problem remains, stop the engine and call on supplier.
6029	Low pump cooling level.	Not enough liquid in the cooling circuit.	Check circuit waterproof. Once check circuits and engine, readjust. If no apparent leak, call the supplier.
602A	Water heater alarm	Heating circuit failure.	Check the heating circuit operation. Check the heating resistance. Check the temperature sensor. Check thermostat.
602B	Cylinder head temperature fault	Engine overload. Cooling troubles. Climatic Conditions for use off specs. Mechanical troubles on the engine.	Call on supplier.
602C	Belt breakage	Belt breakage	Check the belt.
602D	Motorised louvre closed	Due to overspeed or emergency stop.	Authorise emergency stop. Reload the motorised louvre. After overspeed, call on supplier.
602E	Cooling pump failure	Cooling water pump failure.	Check the pump smooth rotation. Check the engine power supply. Check engine.
602F	Under speed fault	Rotation speed security. Power impact too big. Problem in the engine regulation system.	Check the speed regulation settings. Check fuel supply and diesel fuel filters cleanness.
6030	Overspeed fault	Problem in the engine regulation system and/or on the injection kinematics.	Check the speed regulation settings. Check there is no friction point in the injection circuit.
6031	Speed detection fault	Speed measurement circuit failure.	Check wiring and connexions between sensor and equipment. Check the sensor.
6032	Low daily tank level alarm	The filling system of daily tank fails.	Check the filling system operation. Check the main tank level. Check position of the related valves.
6033	High daily fuel tank level alarm	The detection system of daily tank level fails.	Check wiring. Check level sensor.
6034	High daily fuel tank temperature alarm	The detection system of daily tank level fails.	Check wiring. Check level sensor.
6035	Low recuperation tank level Alarm	Liquid detected in the daily water retaining pan. Daily tank leaks. Daily tank overflows.	Check there is no leak in the daily retaining pan or the related tubing. Check refuelling system operation.
6036	Very low (oil)main tank level	Oil low level. Accidental leak.	Manual regulation. If the genset is provided with an automatic regulation system, check oil storage and operation. Make sure there is no leak.
6037	Very low main tank level	Insufficient fuel tank.	Call fuel supplier.
6038	Main tank leak alarm	Fuel detected in the double casing.	Call on supplier.
6039	Very low daily fuel tank level alarm	Failure of the daily refuelling tank.	Check the refuelling system. Check the level of the main tank. Check position of the related valves.
603A	Fuel heating system alarm	Failure of the heating system.	Check power supply. Check wiring.

MICS	Wording	Possible causes	Checking
603B	Battery no1 under-voltage fault	Starting battery voltage insufficient.	Check the charger and/or the load alternator operation. Check wiring. Check battery state.
603C	603C	Not allocated.	
603D	Battery no2 under-voltage fault	Starting battery voltage insufficient.	Check the charger and/or the load alternator operation. Check wiring Check battery state.
603E	603E	Not allocated.	
603F	Charger no1 fault	Charger failure.	Check charger power supply. Check wiring.
6040	Charger no2 Alarm	Charger failure.	Check charger power supply. Check wiring.
6041	Air low pressure alarm	Failure of the starting air storage.	Check compressor operation. Check valves position.
6042	Compressor alarm	Mechanical incident of the compressor. Drive engine troubles	Check compressor operation. Call on supplier.
6043	No start fault	Starting sequence failed.	Check starter operation. Check battery state. Check fuel supply. Check the regulation circuit.
6044	Alternator overload failure	Alternator current overload. Genset overload. Power factor too low.	Reduce the load. Compensate for reactive power supply.
6045	Short-circuit failure	Overcurrent fault.	Call on electric service.
6046	6046	Not allocated.	
6047	6047	Not allocated.	
6048	Alternator under-voltage	Failure of the voltage regulation or the excitation system.	Check setting and excitation system.
6049	6049	Not allocated.	
604A	Alternator over-voltage	Failure of voltage regulation.	Check primary and secondary regulation systems.
604B	604B	Not allocated.	
604C	Under-frequency fault	Rotation speed lower than the security threshold. Power Impact too high. Problem in the engine regulation circuit.	Check regulation speed settings. Check fuel supply and fuel filters cleanness.
604D	604D	Not allocated.	
604E	Over-frequency fault	Speed setting troubles.	Check primary and secondary regulation systems.
604F	604F	Not allocated.	
6050	Active reverse power fault	Speed regulation troubles.	Check primary and secondary regulation systems.
6051	Overload alarm	Engine power overload. Regulation troubles in parallel operation.	Reduce the load. Check regulation circuit.
6052	Alternator temperature alarm	Maximal temperature admissible on the alternators' winding exceeded. Genset overload. Power factor too low Climatic conditions for use off specs.	Reduce the load. Compensate reactive power supply.
6053	Alternator temperature fault	Maximal temperature admissible on the alternator winding exceeded. Genset overload. Power factor too low Climatic Conditions for use off specs.	Reduce the load. Compensate reactive power supply.
6054	Bearing temperature alarm	Maximal temperature admissible on the bearing exceeded.	Check bearing lubrication. Call on supplier

MICS	Wording	Possible causes	Checking
6055	Bearing temperature fault	Maximal temperature admissible on the bearing exceeded.	Check bearing lubrication. Call on supplier.
6056	GS output opening failure	The order to open the disconnecting switch for genset starting-up has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6057	GS output closing failure	The order to close the disconnecting switch for genset starting-up has not been executed.	Check the device control circuit. Check the MICS output variable. Check position contact and its wiring.
6058	GS output position failure	Discrepancy in the position reports of the genset disconnecting switch.	Check position contact and corresponding wiring.
6059	Genset open alarm	Opening of the disconnecting switch set between the genset and the local network connecting device.	Check the position and close the device if required.
605A	Genset breaker coupling failure	The coupling sequence failed as regulation troubles arise (speed and/or voltage). Instability of the reference supply. Unbalanced load on the genset.	Check circuits and adjustments of speed and voltage settings.
605B	Mains breaker coupling failure	The coupling sequence failed as regulation troubles arise (speed and/or voltage). Instability of the reference supply. Unbalanced load on the genset.	Check circuits and adjustments of speed and voltage settings.
605C	Emergency breaker coupling failure	The coupling sequence failed as regulation troubles arise (speed and/or voltage). Instability of the reference supply. Unbalanced load on the genset.	Check circuits and adjustments of speed and voltage settings.
605D	Genset Insulation failure	Low voltage : insulation troubles on the installation or on the alternator. Bloc mounted transformer: insulation troubles on the alternator or the auxiliary circuits.	Check the electric equipment. Call on electric service.
605E	Insulation alarm	Low voltage : insulation troubles on the installation or on the governor. Bloc mounted transformer: insulation troubles on the alternator or the auxiliary circuits.	Check electric equipment. Call on electric service.
605F	Differential failure	Low voltage : insulation troubles on the installation or on the governor. Bloc mounted transformer: insulation troubles on the alternator or the auxiliary circuits.	Check electric equipment. Call on electric service.
6060	Set up transformer temperature alarm	1 st temperature threshold admissible on the alternator winding exceeded. Genset overload. Power factor too low. Climatic Conditions for use off specs.	Decrease the load. Adjust reactive power supply. Check the ventilation.
6061	Set up transformer temperature failure	2 nd temperature threshold admissible on the alternator winding exceeded. Genset overload. Power factor too low. Climatic Conditions for use off specs.	Decrease the load. Adjust reactive power supply. Check the ventilation.
6062	Mains fault	Fault on Distributor mains.	Call distributor services.
6063	6063	Not allocated.	
6064	6064	Not allocated.	
6065	Low impedance failure	Fault on Distributor mains.	Call distributor services.
6066	Emergency stop triggered	Activation of the emergency stop control.	Control you can switch on again, then release the control.
6067	Mains incoming cubicle dc supply failure	Failure of the dc auxiliary supply.	Check the battery charger, batteries, wiring and auxiliary supply breakers.
6068	Genset incoming cubicle dc supply failure	Failure of the dc auxiliary supply.	Check the battery charger, batteries, wiring and auxiliary supply breakers.
6069	Measure circuit breaker tripped	The measure circuit breaker is opened.	Check the circuit status and close the circuit breaker again.

MICS	Wording	Possible causes	Checking
606A	Police fuel valve closed	Activate the police valve.	Control you can switch on again, then release the control.
606B	Fire detection failure	Smoke and/or fire detection.	Follow fire orders.
606C	Cooling system breaker failure	Mechanical blocking of the cooling system. Troubles on the drive engine power supply.	Check cooling fan smooth rotation. Check engine power supply. Check engine.
606D	606D	Not allocated.	
606E	606 ^h	Not allocated.	
606F	Motorized valves closed	The opening system of the motorized valves for air input and/or air output fails.	Check engine and its power supply. Check the opening kinematics of the valves.
6070	Printer fault	Printer failure.	Check printer connection. Check printer operation.
6071	Watchdog failure	« watchdog » Led lit, fault on the display, active keypad. Module loss on a CAN bus Too long cycle.	Check CAN bus wiring. Check all the de modules. Call on supplier.
6072	Communication JBUS/ MODBUS alarm	Failure of a communication bus.	Check communication bus wiring. Check the format of the frames sent by the master.
6073	Distribution bus fault	Distribution bus failure.	Check distribution bus wiring. Check all the MICS connected to the bus.
6074	Communication MDEC fault	Failure of the communication bus with engine regulation.	Check wiring of the communication bus. Check MDEC power supply. Check starting battery voltage.
6075	Cooling system alarm	Cooling system failure.	Check cooling fan smooth rotation. Check engine power supply. Check engine.
6076	Cooling system fault	Cooling fan failure.	Check cooling fan smooth rotation. Check engine power supply. Check engine.
6077	Remote battery under-voltage alarm	Voltage of the remote switch battery insufficient.	Check the charger operation. Check wiring. Check the battery state.
6078	Remote battery charger alarm	Charger failure.	Check the charger power supply. Check wiring.
6079	Under load alarm	Insufficient load on the genset.	On genset level: think of implementing ballast resistance. On power plant level: adjust the wattmetric management system.
607A	Reactive reverse power failure	Insufficient alternator excitation. Over compensation of the reactive power.	Check voltage regulation and excitation system. Jettison its compensation capacitors.
607B	Over reactive reverse power	Coupled : over-excitation of the generator. Independently: power factor too low.	Check voltage regulation and excitation system. Commission compensation capacitors.
607C	Drawout mains breaker alarm	Device in drawout position.	Make sure you can put the device back and make it.
607D	Drawout emergency breaker alarm	Device in drawout position.	Make sure you can put the device back and make it
607E	Bus bar voltage detection failure	Discrepancy between the closed position of the excited governor connecting box and the voltage detection on the bus bars.	Check the voltage detection system.
607F	Genset breaker tripped	Overcurrent fault.	Call on electric service.
60B8	60B8	Not allocated.	
60B9	Fuel cooling breaker alarm	Cooling system failure.	Make sure the fan turns freely. Check engine power supply. Check engine.
60BA	Keltieg communication fault	Communication bus failure.	Check communication bus wiring.
60BB	Upstream short-circuit fault	Short-circuit detected on the alternator.	Call on electric service.

MICS	Wording	Possible causes	Checking
60BC	Carnac fault and alarm Synthesis	A fault on CARNAC has been detected.	Identify the fault. Act on the basis of the fault detected.
60BD	Phase 3 short-circuit	Short circuit detected on the bus bar.	Call on electric service.
60BE	Phase 2 short-circuit	Short circuit detected on the bus bar.	Call on electric service.
60BF	Phase 1 short-circuit	Short circuit detected on the bus bar.	Call on electric service.
60C0	Zero sequence current fault	Low voltage : insulation troubles on the installation or on the governor. Bloc mounted transformer: insulation troubles on the alternator or the auxiliary circuits.	Check the electric installation. Call on electric service.
60C1	Neutral current excess	Excess of neutral current.	Call on electric service.
60C2	Directional over current phase 3	Short circuit detected on the genset.	Call on electric service.
60C3	Directional over current phase 2	Short circuit detected on the genset.	Call on electric service.
60C4	Directional over current phase 1	Short circuit detected on the genset.	Call on electric service.
60C5	Zero sequence directional current fault	Insulation fault detected on the genset.	Call on electric service.
60C6	df/dt u12 fault	Troubles on distributor mains.	Call distributor services.
60C7	df/dt u31 fault	Troubles on distributor mains.	Call distributor services.
60C8	df/dt u23 fault	Troubles on distributor mains.	Call distributor services.
60C9	i3/u12 low impedance fault	Troubles on distributor mains.	Call distributor services.
60CA	i2/u31 low impedance fault	Troubles on distributor mains.	Call distributor services.
60CB	i1/u23 low impedance fault	Troubles on distributor mains.	Call distributor services.
60CC	u12 vector shift fault	Troubles on distributor mains.	Call distributor services.
60CD	u31 vector shift fault	Troubles on distributor mains.	Call distributor services.
60CE	u23 vector shift fault	Troubles on distributor mains.	Call distributor services.
60CF	Zero sequence current fault	Insulation fault detected on the installation.	Call on electric service.

10. Appendices

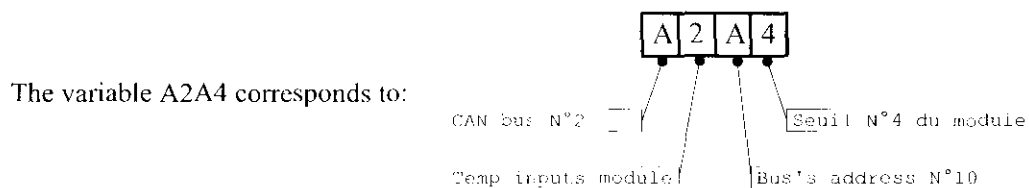
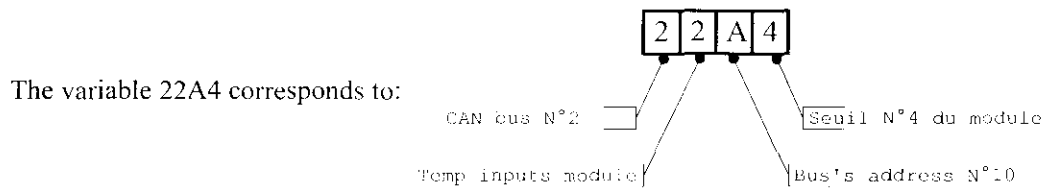
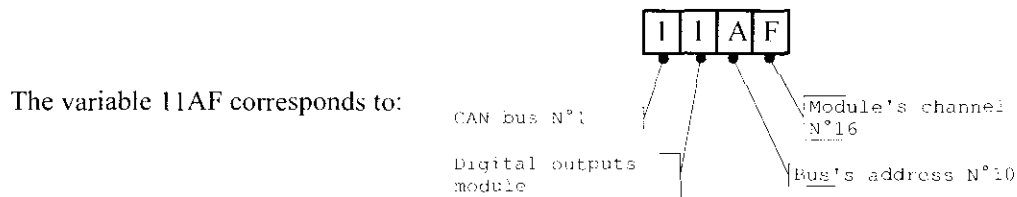
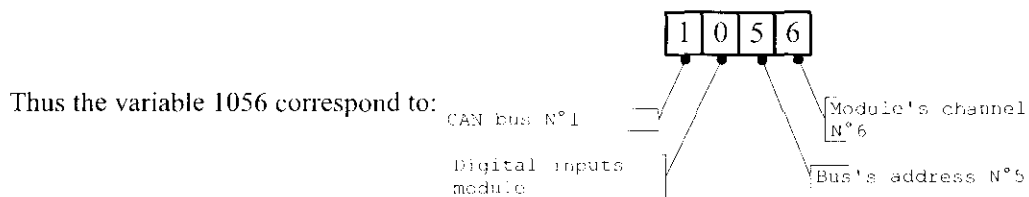
10.1 Organisation of the variables

All the MICS's variables are identified by a four-digit address.
The table below gives the list.

Address				
Upper weight		Lower weight		Data type
Digit 1	Digit 2	Digit 3	Digit 4	
1: Bus CAN N°1 (TOR)	0: ETOR	Module's address	Channel n° (0-F)	Digital input
	1: STOR	Module's address	Channel n° (0-F)	Digital output
	2: ETEMP	Module's address	Channel n° (0-F)	Digital input
	3: EANA	Module's address	Threshold n°(0-F)	Digital input
	4: EMIXTE	Module's address	Channel n° (0-F)	Digital input
2: Bus CAN N°2 (TOR)	5: SMIXTE	Module's address	Channel n° (0-F))	Digital output
	0: ETOR	Module's address	Channel n° (0-F)	Digital input
	1: STOR	Module's address	Channel n° (0-F)	Digital output
	2: ETEMP	Module's address	Channel n° (0-F)	Digital input
	3: EANA	Module's address	Threshold n°(0-F)	Digital input
3: Bus CAN N°3 (TOR)	4: EMIXTE	Module's address	Channel n° (0-F)	Digital input
	5: SMIXTE	Module's address	Channel n° (0-F))	Digital output
	0: ETOR	Module's address	Channel n° (0-F)	Digital input
	1: STOR	Module's address	Channel n° (0-F)	Digital output
	2: ETEMP	Module's address	Channel n° (0-F)	Digital input
4: Variables internes (TOR)	3: EANA	Module's address	Threshold n°(0-F)	Digital input
	4: EMIXTE	Module's address	Channel n° (0-F)	Digital input
	5: SMIXTE	Module's address	Channel n° (0-F)	Digital output
	0: Residente variables	De 00h à FFh		Digital I/O
	1: Residente variables	De 00h à FFh		Digital I/O
	2: Residente variables	De 00h à Fh		Digital I/O
	3: Operator variables	De 00h à Fh		Digital I/O
	4: Operator variables	De 00h à FFh		Digital I/O
5: Operator variables	0		Digital I/O	
5: Miscellaneous parameters (TOR)	6: Keyboard keys	Voir \$Erreur ! Source du renvoi introuvable.		Digital input
	7: Fixed LEDs	Voir \$Erreur ! Source du renvoi introuvable.		Digital output
	8: Flashing LEDs	Voir \$Erreur ! Source du renvoi introuvable.		Digital output
6: Shutdowns and Events (TOR)	0: Parameters	De 00h à 5Ah		
	1: Serial interfaces parameters	De 00h à 06h		Structure
	2: Carantec parameters	De 00h à 6Fh		Analog value
	3: Carnac parameters	De 00h à 2Fh		Analog value
6: Shutdowns and Events (TOR)	0: Fault output variable	00h to CFh		Digital
	1: Fault input variable	00h to CFh		Variable
	2: Inhibition mode	00h to CFh		(0-1-2)
	3: Delayed fault.	00h to CFh		Analog value
	4: Fault LED affectation	00h to CFh		(0-1-2)
	5: Fault wording variable	00h to CFh		Text
	6: Fault action variable	00h to CFh		(0-1-2)
	7: Fault reset variable	00h to CFh		(0-1)
	8: Event output variable	00h to 8Fh		Digital
	9: Event Input variable	00h to 8Fh		Variabl
	A: Eveent wording variable	00h to 8Fh		Text
	B: Acquisition mode	00h to 8Fh		(0-1-2-3-4)

		Address			
Upper weight		Lower weight		Data type	
Digit 1	Digit 2	Digit 3	Digit 4		
7: Timer Counters	0: Resident timer output	00h to 2Fh		Digital	
	1: Operator timer output	00h to 2Fh		Digital	
	2: Resident counter overflow	00h to 2Fh		Digital	
	3: Operator counter overflow	00h to 2Fh		Digital	
	4: Resident counter current value	De 00h à 0Fh		Analog value	
	5: Operator counter current value	De 00h à 2Fh		Analog value	
8: Timers Counters (Configuration)	0: Resident timer input	De 00h à 2Fh		Digital	
	1: Resident timer duration	De 00h à 2Fh		Analog value	
	2: Resident timer time base	De 00h à 2Fh		(0-1-2)	
	3: Operator timer input	De 00h à 2Fh		Digital	
	4: Operator timer duration	De 00h à 2Fh		Analog value	
	5: Operator timer time base	De 00h à 2Fh		(0-1-2)	
	6: Resident counter Clock	De 00h à 0Fh		Digital	
	7: Resident counter reset	De 00h à 0Fh		Digital	
	8: Resident counter threshold	De 00h à 0Fh		Analog value	
	9: Resident counter impulse weight	De 00h à 0Fh		Analog value	
	A: Operator counter Clock	De 00h à 2Fh		Digital	
	B: Operator counter reset	De 00h à 2Fh		Digital	
	C: Operator counter threshold	De 00h à 2Fh		Analog value	
	D: Operator counter impulse weight	De 00h à 2Fh		Analog value	
9: Bus CAN N°1 (ANA)	2: ETEMP current value	Module's address	Channel n° (0-3)	Analog value	
	3: EANA current value	Module's address	Channel n° (0-7)	Analog value	
	4: ETEMP type	Module's address	Channel n° (0-3)	Analog value	
	5: ETEMP threshold	Module's address	Threshold n°(0-F)	Analog value	
	6: ETEMP Tolerance	Module's address	Threshold n°(0-F)	Analog value	
	7: ETEMP Channel/threshold	Module's address	Threshold n°(0-F)	Analog value	
	8: EANA unit	Module's address	Channel n° (0-7)	Analog value	
	9: EANA Nb. decimal	Module's address	Channel n° (0-7)	(0-1-2-3)	
	A: EANA Min scale value	Module's address	Channel n° (0-7)	Analog value	
	B: EANA Max scale value	Module's address	Channel n° (0-7)	Analog value	
	C: EANA Threshold	Module's address	Threshold n°(0-F)	Analog value	
	D: EANA Tolerance	Module's address	Threshold n°(0-F)	Analog value	
	E: EANA Channel/threshold	Module's address	Threshold n°(0-F)	Channel n° (0-7)	
	A: Bus CAN N°2 (ANA)	2: ETEMP current value	Module's address	Channel n° (0-3)	Analog value
3: EANA current value		Module's address	Channel n° (0-7)	Analog value	
4: ETEMP type		Module's address	Channel n° (0-3)	Analog value	
5: ETEMP threshold		Module's address	Threshold n°(0-F)	Analog value	
6: ETEMP Tolerance		Module's address	Threshold n°(0-F)	Analog value	
7: ETEMP Channel/threshold		Module's address	Threshold n°(0-F)	Analog value	
8: EANA unit		Module's address	Channel n° (0-7)	Analog value	
9: EANA Nb. decimal		Module's address	Channel n° (0-7)	(0-1-2-3)	
A: EANA Min scale value		Module's address	Channel n° (0-7)	Analog value	
B: EANA Max scale value		Module's address	Channel n° (0-7)	Analog value	
C: EANA Threshold		Module's address	Threshold n°(0-F)	Analog value	
D: EANA Tolerance		Module's address	Threshold n°(0-F)	Analog value	
E: EANA Channel/threshold		Module's address	Threshold n°(0-F)	Channel n° (0-7)	

Address				
Upper weight		Lower weight		Data type
Digit 1	Digit 2	Digit 3	Digit 4	
B: Bus CAN N°3 (ANA)	2: ETEMP current value	Module's address	Channel n° (0-3)	Analog value
	3: EANA current value	Module's address	Channel n° (0-7)	Analog value
	4: ETEMP type	Module's address	Channel n° (0-3)	Analog value
	5: ETEMP threshold	Module's address	Threshold n°(0-F)	Analog value
	6: ETEMP Tolerance	Module's address	Threshold n°(0-F)	Analog value
	7: ETEMP Channel/threshold	Module's address	Threshold n°(0-F)	Analog value
	8: EANA unit	Module's address	Channel n° (0-7)	Analog value
	9: EANA Nb. decimal	Module's address	Channel n° (0-7)	(0-1-2-3)
	A: EANA Min scale value	Module's address	Channel n° (0-7)	Analog value
	B: EANA Max scale value	Module's address	Channel n° (0-7)	Analog value
	C: EANA Threshold	Module's address	Threshold n°(0-F)	Analog value
	D: EANA Tolerance	Module's address	Threshold n°(0-F)	Analog value
	E: EANA Channel/threshold	Module's address	Threshold n°(0-F)	Channel n° (0-7)



10.2 List of parameters

General parameters		
Title	Default value	Other possible settings
Type of installation	Solo	Power plant
Number of gensets	1	1 to 12
Run mode	LV	HV
Synchroniser mode	Running	Shutdown
Number of fuel pumps	1	2
Load shedding delay	5 s	0 to 10 s
Load shedding duration	10s	0 to 3600 s
Speed stabilisation	5 s	0 to 20
Global running duration	10 min	0 to 240 min
Closing autorisation on stop mode	8 s	1 to 20
Fault inhibition	100 s/10	0 s/10 to 100 s/10
Engine cooling	3 mins	0 mins to 10 mins
Booster pump command	2 mins	1 min to 10 mins
Auxiliairies start sequence	5 s	0 to 240

Source parameters		
Title	Default value	Other possible settings
Number of networks	1	2 or 3
Priority during the EJP (France only)	Load	EJP
Main circuit breaker type	Main & emergency	Main - None
Type of source changeover command	Mains/standby	Synchronizing
Type of synchronizing	Transient	Permanent
Action on non-synchronizingof	None	Inversion
Action on non-synchronizingof mains	None	Inversion
Mains recovery confirmation request	None	With
EJP notice	20 mins	0 mins to 60 mins
EJP disappearance	10 mins	0 mins to 60 mins
Inhibition of synchronizing	10 s	0 s to 60 s
Putting into service of synchronization chain	5 s	0 s to 60 s
Duration of synchronization	1 min	0 mins to 60 mins
Load transfer (transient)	10 s	0 s to 240 s
Load transfer (permanent)	20 mins	1 min to 9999 mins
Mains/standby switch	10 s/10	0 s/10 to 100 s/10
Set load shedding	10 s	0 s to 20 s
Excitation duration	5 s	0 to 20 s

Speed parameters		
Title	Default value	Other possible settings
Speed detection location	Internal	External
Type of speed detection	Alternator	Pick-up
Number of pairs of poles	2	1 to 12
Number of starting crown wheel teeth	168	0 to 255
Frequency	50 Hz	60 Hz
Electric starter cut-off threshold	300 rpm	0 to 500 rpm
Pneumatic starter cut-off threshold	200 rpm	0 to 500 rpm
Excitation threshold	1450 rpm	1 to 2000 rpm
Under-speed threshold	1800 rpm	0 to 3620 rpm
Overspeed threshold	1350 rpm	0 to 3000 rpm
Speed sensor fault threshold	100 rpm	0 to 500 rpm
Speed rising duration	5 s	0 to 60 s
Speed sensor fault timer	3 s	1 to 60 s

Starting parameters		
Title	Default value	Other possible settings
Starting system	1 electric	1 pneumatic - 2 electric 2 pneumatic - 1 electric & 1 pneumatic
Starting mode	Non-alternate	Alternate
Number of attempts	3	0 to 10
Immobilization of the set	3 s	0 s to 60 s
Duration of attempt	5 s	0 s to 10 s
Duration of interval between attempts	5 s	0 s to 10 s
Starting of the auxiliaries	5 s	0 s to 240 s

10.3 List of te safetys

Led: S = Shutdown Al = alarm **Inibhition:** A S=at a standstill I O = in operation W O =without
Action: In=instant stopping Del=delayed stopping W O=Without **Reset:** A M=any mode O D=out of duty

	Wording	Control	Timer S/10	Led	Action	Reset	Inhibitio n	@ JBUS word bits	N°	@ JBUS Bits
6000	Mains insulation shutdown	4132		S.	Del.	A.M.	W.O.	120	0	5408
6001	Open of mains no1 shutdown	4119	100	S.	W.O.	O.D.	W.O.	120	1	5409
6002	Closure of mains no1 shutdown	4118	100	S.	W.O.	O.D.	W.O.	120	2	5410
6003	Position of the mains no1 shutdown	411A	100	S.	W.O.	O.D.	W.O.	120	3	5411
6004	Mains no1 tripped shutdown	413B		S.	W.O.	O.D.	W.O.	120	4	
6005	Open of mains no2 shutdown			S.	W.O.	O.D.	W.O.		5	5413
6006			100	S.	W.O.		W.O.	120	6	5414
	Position of the mains no2 shutdown		100		W.O.	O.D.	W.O.	120		5415
6008	Mains no2 tripped shutdown			S.	W.O.	O.D.		120	8	5416
6009	Open of mains no3 shutdown		100	S.		O.D.	W.O.	120	9	
600A	Closure of mains no3 shutdown			S.	W.O.	O.D.	W.O.		10	5418
600B			100	S.	W.O.		W.O.	120	11	5419
	Mains no3 tripped shutdown				W.O.	O.D.	W.O.	120		5420
600D	Open of emergency n1 shutdown		100	S.	W.O.	O.D.		120	13	5421
600E	Closure of emerg.no1 shutdown	411B	100	S.		O.D.	W.O.	120	14	
600F	Position of the emerg.no1 shutdown	411D		S.	W.O.	O.D.	W.O.		15	5423
6010				S.	W.O.		W.O.	121	0	5424
	Open of emergency n2 shutdown		100		W.O.	O.D.	W.O.	121		5425
6012	Closure of emerg.no2 shutdown		100	S.	W.O.	O.D.		121	2	5426
6013	Position of the emerg.no2 shutdown		100	S.		O.D.	W.O.	121	3	
6014	Emergency n2 tripped shutdown			S.	W.O.		W.O.	121		5428
6015				S.	W.O.		W.O.	121		5429
	Closure of emerg.no3 shutdown		100		W.O.		W.O.	121		5430
6017	Position of the emerg.no3 shutdown			S.	W.O.	O.D.	W.O.	121	7	5431
6018	Emergency n3 tripped shutdown			S.	W.O.	O.D.	W.O.	121	8	5432
6019	Mains voltage transformer alarm				W.O.		W.O.	121		5433
	Emerg.voltage transformer alarm				W.O.		W.O.	121		5434
601B	Cooling fan water low level		100		Inst.		W.O.		11	5435
	Fuel pump no1 tripped			Al.		O.D.	W.O.	121		5436
601D				Al.		O.D.	W.O.	121	13	
601E	Oil pressure alarm			Al.	W.O.	O.D.	St.	121	14	5438
601F	Oil pressure shutdown			S.	Inst.	A.M.	St.	121	15	5439
6020	Oil temperature alarm			Al.	W.O.	O.D.	W.O.	122	0	5440
6021	Oil temperature shutdown			S.	Inst.	A.M.	W.O.	122	1	5441
6022	Oil low level alarm		30	Al.	W.O.	O.D.	W.O.	122	2	5442
6023	Oil high level alarm		30	Al.	W.O.	O.D.	W.O.	122	3	5443
6024	Oil very high level shutdown		30	S.	Inst.	A.M.	W.O.	122	4	5444
6025	Oil heater failure alarm			Al.	W.O.	O.D.	W.O.	122	5	5445
6026	Engine water temp.alarm			Al.	W.O.	O.D.	W.O.	122	6	5446
6027	Engine water temp.shutdown			S.	Del.	A.M.	W.O.	122	7	5447
6028	Pump temp failure shutdown			S.	Del.	A.M.	W.O.	122	8	5448
6029	A/cooler low level failure shutdown			S.	Inst.	A.M.	W.O.	122	9	5449
602A	Water heater failure alarm		1800	Al.	W.O.	O.D.	I.O.	122	10	5450

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MICS	Wording		Timer S/10	Led		Reset		@ JBUS word N° bits		@ JBUS Bits
602B	Cylinder head temperature shutdown			S.	Inst.	A.M.	W.O.	122	11	5451
602C	Fanbelt break shutdown			S.	Inst.	A.M.	W.O.	122	12	5452
602D	Motorised louvre closed shutdown			S.	Inst.	A.M.	W.O.	122	13	5453
602E	A/cooler pump failure shutdown			S.	Inst.	A.M.	W.O.	122	14	5454
602F	Underspeed shutdown	4164	50	S.	Inst.	A.M.	St.	122	15	5455
6030	Overspeed shutdown	4165		S.	Inst.	A.M.	W.O.	123	0	5456
6031	Speed detection shutdown	416B	0	S.	Inst.	A.M.	W.O.	123	1	5457
6032	Daily tank low level alarm		30	Al.	W.O.	O.D.	W.O.	123	2	5458
6033	Daily tank high level alarm		30	Al.	W.O.	O.D.	W.O.	123	3	5459
6034	Daily tank very high level alarm		30	Al.	W.O.	O.D.	W.O.	123	4	5460
6035	Recuperation tank low level alarm		30	Al.	W.O.	O.D.	W.O.	123	5	5461
6036	Oil very low level shutdown		30	S.	Inst.	A.M.	W.O.	123	6	5462
6037	Main tank very low level alarm		30	Al.	W.O.	O.D.	W.O.	123	7	5463
6038	Main tank leak alarm		30	Al.	W.O.	O.D.	W.O.	123	8	5464
6039	Daily tank very low level alarm		30	Al.	W.O.	O.D.	W.O.	123	9	5465
603A	Tripping of fuel heating prot. alarm			Al.	W.O.	O.D.	W.O.	123	10	5466
603B	Battery no1 mini voltage fault		1800	Al.	W.O.	O.D.	W.O.	123	11	5467
603C	603C			Al.	W.O.	O.D.	W.O.	123	12	5468
603D	Battery no2 mini voltage fault		1800	Al.	W.O.	O.D.	W.O.	123	13	5469
603E	603E			Al.	W.O.	O.D.	W.O.	123	14	5470
603F	Charger no 1 fault		600	Al.	W.O.	O.D.	W.O.	123	15	5471
6040	Charger no 2 fault		600	Al.	W.O.	O.D.	W.O.	124	0	5472
6041	Air low pressure fault			Al.	W.O.	O.D.	W.O.	124	1	5473
6042	Compressor tripped fault			Al.	W.O.	O.D.	W.O.	124	2	5474
6043	No start fault	4174		S.	Inst.	A.M.	W.O.	124	3	5475
6044	Alternator overload shutdown	4240	300	S.	Del.	A.M.	W.O.	124	4	5476
6045	Short-circuit shutdown			S.	Inst.	A.M.	W.O.	124	5	5477
6046	6046			Al.	W.O.	O.D.	W.O.	124	6	5478
6047	6047			Al.	W.O.	O.D.	W.O.	124	7	5479
6048	Alternator mini voltage shutdown	4248	100	S.	Inst.	A.M.	St.	124	8	5480
6049	6049			Al.	W.O.	O.D.	W.O.	124	9	5481
604A	Alternator maxi voltage shutdown	4247	100	S.	Inst.	A.M.	W.O.	124	10	5482
604B	604B			Al.	W.O.	O.D.	W.O.	124	11	5483
604C	Mini frequency shutdown	424A	100	S.	Del.	A.M.	St.	124	12	5484
604D	604D			Al.	W.O.	O.D.	W.O.	124	13	5485
604E	Maxi frequency shutdown	4249	100	S.	Del.	A.M.	W.O.	124	14	5486
604F	604F			Al.	W.O.	O.D.	W.O.	124	15	5487
6050	Active power reverse shutdown	4241	300	S.	Inst.	A.M.	W.O.	125	0	5488
6051	Maxi power fault	4243	100	Al.	W.O.	O.D.	W.O.	125	1	5489
6052	Alternator temperature alarm			Al.	W.O.	O.D.	W.O.	125	2	5490
6053	Alternator temperature shutdown			S.	Inst.	A.M.	W.O.	125	3	5491
6054	Bearing temperature alarm			Al.	W.O.	O.D.	W.O.	125	4	5492
6055	Bearing temperature shutdown			S.	Inst.	A.M.	W.O.	125	5	5493
6056	Open of genset output shutdown	4180	100	S.	W.O.	O.D.	W.O.	125	6	5494
6057	Close of genset output shutdown	417F	100	S.	Inst.	A.M.	W.O.	125	7	5495

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MICS	Wording	Control	Timer S/10	Led	Action		Inhibitio n	@ JBUS word N° bits	JBUS Bits
6058	Posit.of genset output shutdown	4181	100	S.	Inst.	A.M.	W.O.	125 8	5496
6059	Genset departure open fault	416C	30	Al.	W.O.	O.D.	W.O.	125 9	5497
605A	No sync of genset departure shutdown	414C		S.	Del.	A.M.	W.O.	125 10	5498
605B	No sync of mains shutdown	414A		S.	W.O.	O.D.	W.O.	125 11	5499
605C	No sync of standby supply shutdown	414B		S.	W.O.	O.D.	W.O.	125 12	5500
605D	Genset insulation shutdown	4131		S.	Inst.	A.M.	W.O.	125 13	5501
605E	Insulation alarm			Al.	W.O.	O.D.	W.O.	125 14	5502
605F	Insulation shutdown			S.	Inst.	O.D.	W.O.	125 15	5503
6060	Transformer temp. HV/LV alarm			Al.	W.O.	O.D.	W.O.	126 0	5504
6061	Transformer temp. HV/lv shutdown			S.	Inst.	A.M.	W.O.	126 1	5505
6062	Fault GTE	4110		S.	W.O.	O.D.	W.O.	126 2	5506
6063	6063			Al.	W.O.	O.D.	W.O.	126 3	5507
6064	6064			Al.	W.O.	O.D.	W.O.	126 4	5508
6065	Mini impedance shutdown	4112		S.	W.O.	O.D.	W.O.	126 5	5509
6066	Emergency stop engaged shutdown	404C		S.	Inst.	A.M.	W.O.	126 6	5510
6067	Mains switchboard cc supply alarm			Al.	W.O.	O.D.	W.O.	126 7	5511
6068	Genset switchboard cc supply alarm			Al.	W.O.	O.D.	W.O.	126 8	5512
6069	Measure circuit tripped shutdown			S.	Inst.	A.M.	W.O.	126 9	5513
606A	Police fuel valve closed shutdown			S.	Inst.	A.M.	W.O.	126 10	5514
606B	Fire detection shutdown			S.	Inst.	A.M.	W.O.	126 11	5515
606C	Cooling fan tripped shutdown			Al.	W.O.	O.D.	W.O.	126 12	5516
606D	606D			Al.	W.O.	O.D.	W.O.	126 13	5517
606E	606E			Al.	W.O.	O.D.	W.O.	126 14	5518
606F	Motorized valves closed shutdown			S.	Inst.	A.M.	W.O.	126 15	5519
6070	Printer fault	40F6		Al.	W.O.	O.D.	W.O.	127 0	5520
6071	Overrun stroke shutdown	40F5		S.	Inst.	O.D.	W.O.	127 1	5521
6072	Communication jbus/modbus fault	40F7		Al.	W.O.	O.D.	W.O.	127 2	5522
6073	Fault communication distribution bus	40F8		Al.	W.O.	O.D.	W.O.	127 3	5523
6074	Communication MDEC fault	40F9		S.	Inst.	A.M.	W.O.	127 4	5524
6075	Alarm aero			Al.	W.O.	O.D.	W.O.	127 5	5525
6076	Fault aero			S.	Inst.	A.M.	W.O.	127 6	5526
6077	Fault telecommand battery mini voltage		1800	Al.	W.O.	O.D.	W.O.	127 7	5527
6078	Telecommand battery charger fault		600	Al.	W.O.	O.D.	W.O.	127 8	5528
6079	Mini active power fault	4244	6000	Al.	W.O.	O.D.	Sl.	127 9	5529
607A	Reactive power reverse shutdown	4242	300	S.	Inst.	A.M.	W.O.	127 10	5530
607B	Maxi reactive power shutdown	4245	100	Al.	W.O.	O.D.	W.O.	127 11	5531
607C	Alarm disengaged position of the mains	405F		Al.	W.O.	O.D.	W.O.	127 12	5532
607D	Alarm disengaged position of the emergency	4069		Al.	W.O.	O.D.	W.O.	127 13	5533
607E	Fault emergency voltage control	4116	20	S.	Del.	O.D.	W.O.	127 14	5534
607F	Genset tripped shutdown			S.	Del.	O.D.	W.O.	127 15	5535
6080	Synthesis MDEC alarm	4200		Al.	W.O.	O.D.	W.O.	128 0	5536
6081	Synthesis MDEC fault	4201		S.	Del.	O.D.	W.O.	128 1	5537
6082	Electric MDEC alarm	4202		Al.	W.O.	O.D.	W.O.	128 2	5538
6083	Electric MDEC fault	4203		S.	Del.	O.D.	W.O.	128 3	5539
6084	Sensor MDEC shutdown	4204		S.	Del.	O.D.	W.O.	128 4	5540

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MICS	Wording	Control	Timer S/10	Led	Action	Reset	Inhibition	@ JBUS word bits	@ JBUS Bits
6085	Fault transistor output MDEC	4205		S.	Del.	O.D.	W.O.	128 5	5541
6086	Power stage no1 MDEC shutdown	4206		S.	Del.	O.D.	W.O.	128 6	5542
6087	Power stage no2 MDEC shutdown	4207		S.	Del.	O.D.	W.O.	128 7	5543
6088	Power supply shutdown	4208		S.	Del.	O.D.	W.O.	128 8	5544
6089	Alarm temperature housing MDEC	4209		Al.	W.O.	O.D.	W.O.	128 9	5545
608A	Fault temperature housing MDEC	420A		S.	Del.	O.D.	W.O.	128 10	5546
608B	Low coolant level alarm	420B		Al.	W.O.	O.D.	W.O.	128 11	5547
608C	Low coolant level shutdown	420C		S.	Del.	O.D.	W.O.	128 12	5548
608D	Low coolant pressure alarm	420D		Al.	W.O.	O.D.	W.O.	128 13	5549
608E	Low coolant pressure shutdown	420E		S.	Del.	O.D.	W.O.	128 14	5550
608F	Coolant temperature alarm	420F		Al.	W.O.	O.D.	W.O.	128 15	5551
6090	Coolant temperature shutdown	4210		S.	Del.	O.D.	W.O.	129 0	5552
6091	Level intercooler alarm	4211		Al.	W.O.	O.D.	W.O.	129 1	5553
6092	Level intercooler shutdown	4212		S.	Del.	O.D.	W.O.	129 2	5554
6093	Pressure intercooler alarm	4213		Al.	W.O.	O.D.	W.O.	129 3	5555
6094	Pressure intercooler shutdown	4214		S.	Del.	O.D.	W.O.	129 4	5556
6095	Temp.intercooler alarm	4215		Al.	W.O.	O.D.	W.O.	129 5	5557
6096	Temp.intercooler shutdown	4216		S.	Del.	O.D.	W.O.	129 6	5558
6097	Charge air pressure alarm	4217		Al.	W.O.	O.D.	W.O.	129 7	5559
6098	Charge air pressure shutdown	4218		S.	Del.	O.D.	W.O.	129 8	5560
6099	Charge air temp. alarm	4219		Al.	W.O.	O.D.	W.O.	129 9	5561
609A	Charge air temp. shutdown	421A		S.	Del.	O.D.	W.O.	129 10	5562
609B	Temp. intake air alarm	421B		Al.	W.O.	O.D.	W.O.	129 11	5563
609C	Temp. intake air shutdown	421C		S.	Del.	O.D.	W.O.	129 12	5564
609D	Common rail leaking shutdown	421D		S.	Del.	O.D.	W.O.	129 13	5565
609E	Pressure common rail alarm	421E		Al.	W.O.	O.D.	W.O.	129 14	5566
609F	Pressure common rail shutdown	421F		S.	Del.	O.D.	W.O.	129 15	5567
60A0	Low fuel pressure alarm	4220		Al.	W.O.	O.D.	W.O.	130 0	5568
60A1	Low fuel pressure shutdown	4221		S.	Del.	O.D.	W.O.	130 1	5569
60A2	Temperature fuel alarm	4222		Al.	W.O.	O.D.	W.O.	130 2	5570
60A3	Temperature fuel shutdown	4223		S.	Del.	O.D.	W.O.	130 3	5571
60A4	Level leakagefuel alarm	4224		Al.	W.O.	O.D.	W.O.	130 4	5572
60A5	Level leakagefuel shutdown	4225		S.	Del.	O.D.	W.O.	130 5	5573
60A6	Pressure crankcase alarm	4226		Al.	W.O.	O.D.	W.O.	130 6	5574
60A7	Pressure crankcase shutdown	4227		Al.	W.O.	O.D.	W.O.	130 7	5575
60A8	Alarm pressure oilfilter differential	4228		Al.	W.O.	O.D.	W.O.	130 8	5576
60A9	Fault pressure oilfilter differential	4229		S.	Del.	O.D.	W.O.	130 9	5577
60AA	Pressure lube oil alarm	422A		Al.	W.O.	O.D.	W.O.	130 10	5578
60AB	Pressure lube oil shutdown	422B		S.	Inst.	O.D.	W.O.	130 11	5579
60AC	Temperature lube oil alarm	422C		Al.	W.O.	O.D.	W.O.	130 12	5580
60AD	Temperature lube oil shutdown	422D		S.	Del.	O.D.	W.O.	130 13	5581
60AE	Engine overspeed shutdown	422E		S.	Del.	O.D.	W.O.	130 14	5582
60AF	Charger 1 overspeed shutdown	422F		S.	Del.	O.D.	W.O.	130 15	5583
60B0	Temperature exhaust alarm	4230		Al.	W.O.	O.D.	W.O.	131 0	5584
60B1	Temperature exhaust shutdown	4231		S.	Del.	O.D.	W.O.	131 1	5585

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MICS	Wording	Control	Timer S/10	Led	Action		Inhibitio n	@ JBUS word bits	@ JBUS Bits
60B2	Enginestop due to wiring shutdown	4232		S.	Del.	O.D.	W.O.	131 2	5586
60B3	Timing bank shutdown	4233		S.	Del.	O.D.	W.O.	131 3	5587
60B4	Wiring bank shutdown	4234		S.	Del.	O.D.	W.O.	131 4	5588
60B5	Open load bank shutdown	4235		S.	Del.	O.D.	W.O.	131 5	5589
60B6	Coolant preheat temp alarm	4236		Al.	W.O.	O.D.	W.O.	131 6	5590
60B7	Engine speed control shutdown	4237		S.	Del.	O.D.	W.O.	131 7	5591
60B8	Fault system	40FD		S.	W.O.	O.D.	W.O.	131 8	5592
60B9	Fuel cooling fan tripped fault			Al.	W.O.	O.D.	W.O.	131 9	5593
60BA	Fault communication Keltieg	40FC		Al.	W.O.	O.D.	W.O.	131 10	5594
60BB	Fault short circuit upstream	41FF		S.	Inst.	A.M.	W.O.	131 11	5595
60BC	Synthesis Carnac fault	40FB		S.	W.O.	O.D.	W.O.	131 12	5596
60BD	Fault short circuit phase 3	4273		S.	Inst.	A.M.	W.O.	131 13	5597
60BE	Fault short circuit phase 2	4274		S.	Inst.	A.M.	W.O.	131 14	5598
60BF	Fault short circuit phase 1	4275		S.	Inst.	A.M.	W.O.	131 15	5599
60C0	Fault zero sequence current	4276		S.	Inst.	A.M.	W.O.	132 0	5600
60C1	Fault neutral overcurrent	4277		S.	Inst.	A.M.	W.O.	132 1	5601
60C2	Fault directionnal overcurrent phase 3	4278		S.	Inst.	A.M.	W.O.	132 2	5602
60C3	Fault directionnal overcurrent phase 2	4279		S.	Inst.	A.M.	W.O.	132 3	5603
60C4	Fault directionnal overcurrent phase 1	427A		S.	Inst.	A.M.	W.O.	132 4	5604
60C5	Fault directionnal zero sequence current	427B		S.	Inst.	A.M.	W.O.	132 5	5605
60C6	Fault df/dt U12	427C		Al.	W.O.	O.D.	W.O.	132 6	5606
60C7	Fault df/dt U31	427D		Al.	W.O.	O.D.	W.O.	132 7	5607
60C8	Fault df/dt U23	427E		Al.	W.O.	O.D.	W.O.	132 8	5608
60C9	Fault low impedance U12/13	427 F		Al.	W.O.	O.D.	W.O.	132 9	5609
60CA	Fault low impedance U31/12	4280		Al.	W.O.	O.D.	W.O.	132 10	5610
60CB	Fault low impedance U23/11	4281		Al.	W.O.	O.D.	W.O.	132 11	5611
60CC	Fault vector jump U12	4282		Al.	W.O.	O.D.	W.O.	132 12	5612
60CD	Fault vector jump U31	4283		Al.	W.O.	O.D.	W.O.	132 13	5613
60CE	Fault vector jump U23	4284		Al.	W.O.	O.D.	W.O.	132 14	5614
60CF	Fault zero sequence voltage	4285		S.	Inst.	A.M.	W.O.	132 15	5615

10.4 List of status

N°	En tête	Wording	Cde
6800	Appear	Mics on	"40ED
6801	Appear	Mode auto	"4100
6802	Appear	Mode manu	"4101
6803	Appear	Mode out of service	"4102
6804	Pres/abst	Mains voltage	"4106
6805			"400A
6806			"400B
6807			"400C
6808	Appear/Disappear	Start order	"400D
6809	Appear/Disappear	Start order in forced mode	"400E
680A	Begin/end	On load test	"4108
680B	Begin/end	Off load test	"4109
680C	Open/clos	Genset C.B.	"406C
680D	Open/clos	Mains C.B.1	"4020
680E	Open/clos	Emergency C.B.1	"4022
680F	Open/clos	Mains C.B.2	"4024
6810	Open/clos	Emergency C.B.2	"4026
6811	Open/clos	Mains C.B.3	"4028
6812	Open/clos	Emergency C.B.3	"402A
6813	On/off	Genset	"416A
6814	Begin/end	Exciter control	"412E
6815	Begin/end	Synchronization	"4146
6816	Appear	End of load transfert to genset	"414D
6817	Appear	End of load transfert to mains	"414E
6818	Appear	Genset synchronised	"412A
6819	Pres/abst	Mains voltage	0000
681A	Pres/abst	Mains voltage 2	0000
681B	Pres/abst	Mains voltage 3	0000
681C	Appear	Synchronization mode (CARANTEC)	"4250
681D	Appear	Power mode (CARANTEC)	"4251
681E	Appear	Plant mode (CARANTEC)	"4254
681F	Appear	Request mode (CARANTEC)	"4255
6820	Appear	Manual speed mode (CARANTEC)	"425D
6821	Appear/Disappear	Drp speed mode (CARANTEC)	"425B
6822	Appear	Integral mode (CARANTEC)	"425C
6823	Appear	On load ramps (CARANTEC)	"4252
6824	Appear	Off loading ramps (CARANTEC)	"4253
6825	Appear	Voltage regulation O.S (CARANTEC)	"4256
6826	Appear	U - U function (CARANTEC)	"4257
6827	Appear	Voltage mode (CARANTEC)	"4258
6828	Appear	Kvar mode (CARANTEC)	"425A
6829	Appear	PW factor mode (CARANTEC)	"4259
682A	Appear/Disappear	Manu voltage mode (CARANTEC)	"425E
682B	Appear/Disappear	Drp voltage mode (CARANTEC)	"4286
6819 à 6881		Status un affected	"

10.5 List of input variables

@ MICS	Wording	@ JBUS		
		Mots	N° bits	@ JBUS
4000	Auto mode	64	0	4512
4001	Auto mode key lock	64	1	4513
4002	Manual mode	64	2	4514
4003	Manual mode key lock	64	3	4515
4004	Mode out of service	64	4	4516
4005	Mode out of service key lock	64	5	4517
4006	Mains voltage n° 1 "on"	64	6	4518
4007	Mains voltage n° 2 "on"	64	7	4519
4008	Mains voltage n° 3 "on"	64	8	4520
4009	Confirmation mains voltage recovery	64	9	4521
400A	EJP alert Used in France only	64	10	4522
400B	EJP notice Used in France only	64	11	4523
400C	EJP pip Used in France only	64	12	4524
400D	Forced main 1 present	64	13	4525
400E	Forced main 2 present	64	14	4526
400F	Forced main 3 present	64	15	4527
4010	Set operating request	65	0	4528
4011	Test on load (test 1)	65	1	4529
4012	Test off load (test 2)	65	2	4530
4013	Alternator voltage "on"	65	3	4531
4014	Busbar voltage absent	65	4	4532
4015	Number of sets started > = 1	65	5	4533
4016	Unavailability of genset	65	6	4534
4017	Test on load (test 1) key lock	65	7	4535
4018	Test off load (test 2) key lock	65	8	4536
4019	GTE box	65	9	4537
401A	Mains open	65	10	4538
401B	Mini-impedance	65	11	4539
401C	Desynchro by the standby	65	12	4540
401D	Forced return on main in EJP	65	13	4541
401E	Synchronization time n° 1	65	14	4542
401F	Synchronization time n° 2	65	15	4543
4020	Mains n° 1 open	66	0	4544
4021	Mains n° 1 closed	66	1	4545
4022	Standby n° 1 open	66	2	4546
4023	Standby n° 1 closed	66	3	4547
4024	Mains n° 2 open	66	4	4548
4025	Mains n° 2 closed	66	5	4549
4026	Standby n° 2 open	66	6	4550
4027	Standby n° 2 closed	66	7	4551
4028	Mains n° 3 open	66	8	4552
4029	Mains n° 3 closed	66	9	4553
402A	Standby n° 3 open	66	10	4554
402B	Standby n° 3 closed	66	11	4555
402C	Changeover request	66	12	4556
402D	Excitation	66	13	4557
402E	Ancillary opening of mains 1	66	14	4558
402F	Ancillary 1 opening of mains 1	66	15	4559
4030	Ancillary closing of mains 1	67	0	4560

@ MICS	Wording	@ JBUS		
		Mots	N° bits	@ JBUS
4031	Ancillary opening of mains 2	67	1	4561
4032	Ancillary closing of mains 2	67	2	4562
4033	Ancillary opening of mains 3	67	3	4563
4034	Ancillary closing of mains 3	67	4	4564
4035	Ancillary opening of standby 1	67	5	4565
4036	Ancillary 1 opening of standby 1	67	6	4566
4037	Ancillary closing of standby 1	67	7	4567
4038	Ancillary opening of standby 2	67	8	4568
4039	Ancillary closing of standby 2	67	9	4569
403A	Ancillary opening of standby 3	67	10	4570
403B	Ancillary closing of standby 3	67	11	4571
403C	Entry into NS sync service	67	12	4572
403D	Synchronizing by standby	67	13	4573
403E	Homopolar fault	67	14	4574
403F	Synchro in service	67	15	4575
4040	Synchronizing by the mains	68	0	4576
4041	Power station paralleled on the main	68	1	4577
4042	Daily tank level very high	68	2	4578
4043	Daily tank level high	68	3	4579
4044	Daily tank level very low	68	4	4580
4045	Daily tank level low	68	5	4581
4046	Stop horn	68	6	4582
4047	Fault reset	68	7	4583
4048	Lamp test	68	8	4584
4049	Locking user settings menu	68	9	4585
404A	Set starting key lock	68	10	4586
404B	Set stopping key lock	68	11	4587
404C	Emergency stop	68	12	4588
404D	Request call on fault	68	13	4589
404E	Inhibition request call on fault	68	14	4590
404F	Synchro enable	68	15	4591
4050	Manual opening of mains 1	69	0	4592
4051	Manual closing of mains 1	69	1	4593
4052	Authorisation selection external frequency	69	2	4594
4053	External frequency selection	69	3	4595
4054	Authorisation. external coupling type selection	69	4	4596
4055	Selection ext. fugitive / permanent type.	69	5	4597
4056	Authorisation selection of priority starter	69	6	4598
4057	Selection of priority starter	69	7	4599
4058	Authorisation external voltage selection	69	8	4600
4059	External voltage selection	69	9	4601
405A	More excitation	69	10	4602
405B	Less excitation	69	11	4603
405C	More speed	69	12	4604
405D	Less speed	69	13	4605
405E	Input forced ventilation request synchronisation	69	14	4606
405F	Main CBI unplugged position	69	15	4607
4060	Inhibition request for generator start-up	70	0	4608
4061	Auxiliary request for generator start-up	70	1	4609
4062	Room thermostat	70	2	4610
4063	Speed > 400 rpm	70	3	4611
4064	Speed > electric starter cut-off threshold	70	4	4612

@ MICS	Wording	@ JBUS		
		Mots	N° bits	@ JBUS
4065	Speed > pneumatic starter cut-off threshold	70	5	4613
4066	Speed > excitation threshold	70	6	4614
4067	Speed < under-speed threshold	70	7	4615
4068	Speed > overspeed threshold	70	8	4616
4069	Emergency CBI unplugged position	70	9	4617
406A	Set manual starting	70	10	4618
406B	Set manual stopping	70	11	4619
406C	CB set off	70	12	4620
406D	CB set on	70	13	4621
406E	Manual opening CB set	70	14	4622
406F	Manual closing CB set	70	15	4623
4070	Genset CB manual operation lock	71	0	4624
4071	Synchronizing by the main CB request (CP)	71	1	4625
4072	Power station excitation request (PC)	71	2	4626
4073	Reduced operation	71	3	4627
4074	Genset CB closing lock	71	4	4628
4075	Ctrl fet complementary 1 distribution bus	71	5	4629
4076	Ctrl fet complementary 2 distribution bus	71	6	4630
4077	Set standbysynchronizing input (CP)	71	7	4631
4078	Synchronizing to network request (PC)	71	8	4632
4079	Power station synchronized to network (PC)	71	9	4633
407A	End of power plant production	71	10	4634
407B	Preheating thermostat	71	11	4635
407C	Damper valve closed	71	12	4636
407D	Auxiliary Ctrl excitation	71	13	4637
407E	Auxiliary Inhibition Ctrl excitation	71	14	4638
407F	Var to Ctrl main setting	71	15	4639
4080	Var to carantec sync mode	72	0	4640
4081	Var to Ctrl carantec sync mode	72	1	4641
4082	Var to carantec W regul	72	2	4642
4083	Var to Ctrl carantec W regul	72	3	4643
4084	Var to carantec loading ramp	72	4	4644
4085	Var to Ctrl carantec loading ramp	72	5	4645
4086	Var to carantec load shedding ramp	72	6	4646
4087	Var to Ctrl carantec load shedding ramp	72	7	4647
4088	Var to carantec power plant mode	72	8	4648
4089	Var to Ctrl carantec power plant mode	72	9	4649
408A	Var to setting mode	72	10	4650
408B	Var to Ctrl setting mode	72	11	4651
408C	Var to Ctrl HS excitation regul	72	12	4652
408D	Var to U- U mode	72	13	4653
408E	Var to Ctrl. U=U mode	72	14	4654
408F	Var to voltage mode	72	15	4655
4090	Var to Ctrl voltage mode	73	0	4656
4091	Var to cos phi mode	73	1	4657
4092	Var to Ctrl cos phi mode	73	2	4658
4093	Var to KVAR mode	73	3	4659
4094	Var to Ctrl KVAR mode	73	4	4660
4095	Var to Ctrl droop mode	73	5	4661
4096	Var to integral mode	73	6	4662
4097	Var to Ctrl integral mode	73	7	4663
4098	Var to speed manual mode	73	8	4664

@ MICS	Wording	@ JBUS		
		Mots	N° bits	@ JBUS
4099	Var to Ctrl speed manual mode	73	9	4665
409A	Var to Ctrl genset setting	73	10	4666
409B	Var to Ctrl tension manual mode	73	11	4667
409C	Var to droop mode	73	12	4668
409D	Forced ventilation request overall running	73	13	4669
409E	Input forced ventilation KVAR settings	73	14	4670
409F	Input forced ventilation droop mode voltage	73	15	4671
40A0	Load shedding installation carried out	74	0	4672
40A1	Control Master Modbus	74	1	4673
40A2	manual mode voltage input	74	2	4674
40A3	Inhibition overall running	74	3	4675
40A4	Input selection management Ge/active Network	74	4	4676
40A5	Input selection management Ge/reactive Network	74	5	4677
40A6	Input 1 selection active threshold	74	6	4678
40A7	Input 2 selection active threshold	74	7	4679
40A8	Input 1 selection reactive threshold	74	8	4680
40A9	Input 2 selection reactive threshold	74	9	4681
40AA	Without mains recovery confirmation	74	10	4682
40AB	Two networks	74	11	4683
40AC	Three networks	74	12	4684
40AD	Load priority	74	13	4685
40AE	LT operation	74	14	4686
40AF	ATS operation	74	15	4687
40B0	Permanent synchronisation to mains	75	0	4688
40B1	Changeover on non-synchronizing of mains	75	1	4689
40B2	Changeover on non-synchronizing of standby	75	2	4690
40B3	2 fuel pumps	75	3	4691
40B4	Fuel pump 1 priority	75	4	4692
40B5		75	5	4693
40B6	Internal speed detection	75	6	4694
40B7	Without watt management	75	7	4695
40B8	2 starters active	75	8	4696
40B9	Alternate starts	75	9	4697
40BA	Starter 1 priority	75	10	4698
40BB	Starter 1 electric	75	11	4699
40BC	Starter 2 electric	75	12	4700
40BD	Solo set	75	13	4701
40BE	Generator without P.C.	75	14	4702
40BF	Generator with P.C.	75	15	4703
40C0	Without source device management	76	0	4704
40C1	Without Nomal management source device	76	1	4705
40C3	Coupling with halt	76	3	4707
40C4	Load sharing by bus	76	4	4708
40C5	Regulator setting	76	5	4709
40C6 to 40DF	Not used			
40E0	Variable forced to 0	78	0	4736
40E1	Variable forced to 1	78	1	4737
40E2		78	2	4738
40E3		78	3	4739
40E4		78	4	4740
40E5		78	5	4741

@ MICS	Wording	Mots	N° bits	@ JBUS
40E6		78	6	4742
40E7		78	7	4743
40E8		78	8	4744
40E9		78	9	4745
40EA		78	10	4746
40EB		78	11	4747
40EC		78	12	4748
40ED	Powering up	78	13	4749
40EE	Alarms summary	78	14	4750
40EF	Faults summary	78	15	4751
40F0	Instantaneous stop faults summary	79	0	4752
40F1	Deferred stop faults summary	79	1	4753
40F2	Horn stop order	79	2	4754
40F3	Horn command	79	3	4755
40F4	Faults and alarms summary	79	4	4756
40F5	Software watchdog fault	79	5	4757
40F6	Printer fault	79	6	4758
40F7	Slave Jbus communication fault	79	7	4759
40F8	Distribution bus fault	79	8	4760
40F9	MDEC communication fault	79	9	4761
40FA	Distribution bus alarm	79	10	4762
40FB	Carnac faults and alarms summary	79	11	4763
40FC	Keltieg communication fault	79	12	4764
40FD	System fault	79	13	4765
40FE		79	14	4766
40FF	Carantec issue 2	79	15	4767
46B0	DF/DT in service on main	136	0	5664
46B1	DF/DT in service on genset	136	1	5665
46B2	DF/Dt alarm	136	2	5666
46B3	MINI Z in service on main	136	3	5667
46B4	MINI Z in service on genset	136	4	5668
46B5	MINI Z alarm	136	5	5669
46B6	Vector shift in service on main	136	6	5670
46B7	Vector shift in service on genset	136	7	5671
46B8	Vector shift alarm	136	8	5672
46B9	Reset main protection relais 1	136	9	5673
46BA	Reset main protection relais 2	136	10	5674
46BB	Reset Keltieg protection	136	11	5675
46BC	Power setting MICS CDER inhibition	136	12	5676
46BD	Power com. MICS CDER inhibition	136	13	5677
46BE	Trip main's CB 1	136	14	5678
46BF	Main's CB 1 maintenance input	136	15	5679
46C0	Bus control function n°3	137	0	5680
46C1	Bus control function n°4	137	1	5681
46C2	Bus control function n°5	137	2	5682
46C3	Bus control function n°6	137	3	5683
46C4	Bus control function n°7	137	4	5684
46C5	Bus control function n°8	137	5	5685
46C6	Bus control function n°9	137	6	5686
46C7	Bus control function n°10	137	7	5687
46C8	Bus control function n°11	137	8	5688

@ MICS	Wording	@ JBUS		
		Mots	N° bits	@ JBUS
46C9	Bus ctrl fct n°12 (Bus voltage 41FC)	137	9	5689
46CA	Bus ctrl fct n°13 (Off load test plant)	137	10	5690
46CB	Bus ctrl fct n°14 (over all running)	137	11	5691
46CC	Bus ctrl fct n°15 (over all running key)	137	12	5692
46CD	Bus ctrl fct n°16 (Test 1 key)	137	13	5693
46CE	Bus ctrl fct n°17 (Manual)	137	14	5694
46CF	Bus ctrl fct n°18 (Auto)	137	15	5695
46D0	Live frame emission MDEC inhibition	138	0	5696
46D1	Inhibition V2 Carantec	138	1	5697
46D2	Inhibition control PID2 active power	138	2	5698
46D3	Validation control PID2 active power	138	3	5699
46D4	Inhibition control PID2 reactive power	138	4	5700
46D5	Validation control PID2 reactive power	138	5	5701
46D6	Inhibition control mode stabilized setpoint	138	6	5702
46D7	Validation control mode stabilized setpoint	138	7	5703
46D8	Inhibition droop tension	138	8	5704
46D9	Inhibition direct droop	138	9	5705
46DA	Forced paralleling droop control input	138	10	5706
46DB	Return to Vn et Fn inhibition input	138	11	5707
46DC	Control return to Fn and Vn input	138	12	5708
46DD	Inhib.repartition bus emission	138	13	5709
46DE	Shutdowns inhibition	138	14	5710
46DF	Power plant off load test key	138	15	5711
46E0	Filling request level	139	0	5712
46E1	C.B. control inhibition	139	1	5713
46E2	MDEC CAN sélection module (0-201;1-302)	139	2	5714
46E3	Record measures validation	139	2	5715
46E4	Autorisation writing JBUS(4300-437F)	139	3	5716
46E5	Autorisation writing JBUS(4380-43FF)	139	4	5717
46E6	Autorisation writing JBUS(4400-447F)	139	5	5718
46E7	Autorisation writing JBUS(4480-44FF)	139	6	5719
46E8	Up arrow key input	139	7	5720
46E9	Down arrow key input	139	8	5721
46EA	Left arrow key input	139	9	5722
46EB	Right arrow key input	139	10	5723
46EC	Menu key input	139	11	5724
46ED	Enter key input	139	12	5725
46EE	Rest fault key input	139	13	5726
46EF	Visualisation key input	139	14	5727
46F0		139	15	5728
46F1	Enter voltage N°1 selection	140	1	5729
46F2	Enter voltage N°2 selection	140	2	5730
46F3	Enter voltage N°3 selection	140	2	5731
46F4	Enter voltage N°4 selection	140	3	5732
46F5	Enter voltage N°5 selection	140	4	5733
46F6	Enter voltage N°6 selection	140	5	5734
46F7		140	6	5735
46F8		140	7	5736
46F9		140	8	5737

10.6 List of internal variables

@ MICS	Wording	@	JBUS Mots N° bits	JBUS Bits
4100	Auto mode	80	0	4768
4101	Manual mode	80	1	4769
4102	Mode out of service	80	2	4770
4103	Mains n° 1 "off"	80	3	4771
4104	Mains n° 2 "off"	80	4	4772
4105	Mains n° 3 "off"	80	5	4773
4106	Mains "off"	80	6	4774
4107	Return to mains during EJP (France only)	80	7	4775
4108	Test on load (test 1) in progress	80	8	4776
4109	Test off load (test 2) in progress	80	9	4777
410A	Request for production of energy	80	10	4778
410B	Genset operation request	80	11	4779
410C	Genset available in auto	80	12	4780
410D	Request for wattmetric halt	80	13	4781
410E	Overall running in service	80	14	4782
410F	DF/DT fault	80	15	4783
4110	GTE	81	0	4784
4111	Mains feeder open	81	1	4785
4112	Mini-impedance	81	2	4786
4113	Desynchro on network fault	81	3	4787
4114	Desynchro of mains	81	4	4788
4115	Desynchro of standby	81	5	4789
4116	Bus voltage control fault	81	6	4790
4117	Vector shift fault	81	7	4791
4118	Check mains 1 closed	81	8	4792
4119	Check mains 1 open	81	9	4793
411A	Check positions of mains 1	81	10	4794
411B	Check standby 1 closed	81	11	4795
411C	Check standby 1 open	81	12	4796
411D	Check positions of standby 1	81	13	4797
411E	Check mains 2 closed	81	14	4798
411F	Check mains 2 open	81	15	4799
4120	Check positions of mains 2	82	0	4800
4121	Check standby 2 closed	82	1	4801
4122	Check standby 2 open	82	2	4802
4123	Check positions of standby 2	82	3	4803
4124	Check mains 3 closed	82	4	4804
4125	Check mains 3 open	82	5	4805
4126	Check positions of mains 3	82	6	4806
4127	Check standby 3 closed	82	7	4807
4128	Check standby 3 open	82	8	4808
4129	Checking positions of standby 3	82	9	4809
412A	Set synchronized	82	10	4810
412B	Changeover request	82	11	4811

@ MICS	Wording	@ JBUS Mots N° bits	@ JBUS Bits	
412C	Generator coupled to other generators	82	12	4812
412D	Master authorisation excitation	82	13	4813
412E	Excitation control	82	14	4814
412F	Authorisation power plant excitation	82	15	4815
4130	Insulation fault	83	0	4816
4131	Set insulation fault	83	1	4817
4132	Load insulation fault	83	2	4818
4133	Putting into service C/P	83	3	4819
4134	Request power plant inversion	83	4	4820
4135	Order to open mains CB n° 1	83	5	4821
4136	Order to close mains CB n° 1	83	6	4822
4137	Order to open mains CB n° 2	83	7	4823
4138	Order to close mains CB n° 2	83	8	4824
4139	Order to open mains CB n° 3	83	9	4825
413A	Order to close mains CB n° 3	83	10	4826
413B	Mains cb 1 triped	83	11	4827
413C	Order to open standby CB n° 1	83	12	4828
413D	Order to close standby CB n° 1	83	13	4829
413E	Order to open standby CB n° 2	83	14	4830
413F	Order to close standby CB n° 2	83	15	4831
4140	Order to open standby CB n° 3	84	0	4832
4141	Order to close standby CB n° 3	84	1	4833
4142	Coupling by the generator	84	2	4834
4143	Request for mains to synchronize	84	3	4835
4144	Request for standby to synchronize	84	4	4836
4145	Synchronization request	84	5	4837
4146	Auto synchronization	84	6	4838
4147	Bus voltage switching	84	7	4839
4148	Changeover on non-synchro of standby	84	8	4840
4149	Changeover on non-synchro of mains	84	9	4841
414A	Mains non-synchro	84	10	4842
414B	Standby non-synchro	84	11	4843
414C	Non-synchro of set	84	12	4844
414D	End of load transfer to genset	84	13	4845
414E	End of load transfer to network	84	14	4846
414F	GS Sync authorisation	84	15	4847
4150	Filling request	85	0	4848
4151	Fuel pump 1 order	85	1	4849
4152	Fuel pump 2 order	85	2	4850
4153	Room fan control	85	3	4851
4154	Paralleling authorization	85	4	4852
4155	Mains cb 1 open	85	5	4853
4156	Mains cb 1 closed	85	6	4854
4157	Standby cb 1 open	85	7	4855
4158	Standby cb 1 closed	85	8	4856
4159	Distribution bus emission active	85	9	4857

@ MICS	Wording	@ JBUS Mots N° bits	@ JBUS Bits	
415A		85	10	4858
415B	Order emission on distribution bus	85	11	4859
415C		85	12	4860
415D		85	13	4861
415E	Speed pick-up fault	85	14	4862
415F	Speed pick-up threshold	85	15	4863
4160	400 rpm threshold	86	0	4864
4161	Electric starter cut-off threshold	86	1	4865
4162	Pneumatic starter cut-off threshold	86	2	4866
4163	Excitation threshold	86	3	4867
4164	Under-speed	86	4	4868
4165	Overspeed	86	5	4869
4166	Insufficient set speed	86	6	4870
4167	Set stopped	86	7	4871
4168	Inhibition of faults in operation	86	8	4872
4169	Inhibition of faults at standstill	86	9	4873
416A	Set started	86	10	4874
416B	Tachometer chain fault variable	86	11	4875
416C	Opening of thegenset output fault	86	12	4876
416D	Booster pump control	86	13	4877
416E		86	14	4878
416F		86	15	4879
4170	Starting sequence controller stage n° 1	87	0	4880
4171	Starting sequence controller stage n° 2	87	1	4881
4172	Starting sequence controller stage n° 3	87	2	4882
4173	Starting sequence controller stage n° 4	87	3	4883
4174	Non-starting fault	87	4	4884
4175	End of first sequence	87	5	4885
4176	Change of starter	87	6	4886
4177	Initialization of active starter	87	7	4887
4178	Starter 1 active	87	8	4888
4179	Starters order	87	9	4889
417A	Starter 1 order	87	10	4890
417B	Starter 2 order	87	11	4891
417C	Fuel solenoid-operated valve order	87	12	4892
417D		87	13	4893
417E		87	14	4894
417F	Control of closing of set CB	87	15	4895
4180	Control of opening of set CB	88	0	4896
4181	Control of positions of set CB	88	1	4897
4182	Set CB opening order	88	2	4898
4183	Set CB closing authorization	88	3	4899
4184	Set CB closing order	88	4	4900
4185	Manual off control start generator	88	5	4901
4186		88	6	4902
4187		88	7	4903

@ MICS	Wording	@ JBUS Mots N° bits	@ JBUS Bits
4188	Water preheating	88 8	4904
4189	Damper valve command	88 9	4905
418A	Slave @ on distribution bus 1	88 10	4906
418B	Speed detection fault timer	88 11	4907
418C	Parametered n° GS	88 12	4908
418D	No. ge started up in auto = 0	88 13	4909
418E	No. starts shut down in auto > No. ge mini	88 14	4910
418F	No. ge auto >= 1	88 15	4911
4190	No. starts shut down in auto > 1	89 0	4912
4191	No. starts shut down in auto > 1	89 1	4913
4192	No. starts shut down > 1	89 2	4914
4193	No. starts shut down >= 1	89 3	4915
4194	No. starts shut down >= No. ge mini	89 4	4916
4195	No. ge started up >= No. ge mini	89 5	4917
4196	No. ge halted with throughput shut down = 0	89 6	4918
4197	No. ge started up > 1	89 7	4919
4198	Power plant avail in auto	89 8	4920
4199	P cent > load shedding threshold	89 9	4921
419A	P cent > loading threshold	89 10	4922
419B	Ge in halt priority	89 11	4923
419C	Ge in running priority	89 12	4924
419D	Change priority	89 13	4925
419E	Request for wattmetric load shedding	89 14	4926
419F	Request for wattmetric loading	89 15	4927
41A0	Request for wattmetric instant start up	90 0	4928
41A1	Authorisation prise in charge	90 1	4929
41A2	Control function 1 distribution bus	90 2	4930
41A3	Control function 2 distribution bus	90 3	4931
41A4	Control function 3 distribution bus	90 4	4932
41A5	Control function 4 distribution bus	90 5	4933
41A6	Control function 5 distribution bus	90 6	4934
41A7	Control function 6 distribution bus	90 7	4935
41A8	Control function 7 distribution bus	90 8	4936
41A9	Control function 8 distribution bus	90 9	4937
41AA	Control function 9 distribution bus	90 10	4938
41AB	Control function 10 distribution bus	90 11	4939
41AC	Control function 11 distribution bus	90 12	4940
41AD	Control function 12 distribution bus	90 13	4941
41AE	Control function 13 distribution bus	90 14	4942
41AF	speed < pick-up fault threshold	90 15	4943
41B0	Speed > 400 rpm	91 0	4944
41B1	Electric starter cut-off	91 1	4945
41B2	Pneumatic starter cut-off	91 2	4946
41B3	Speed > excitation threshold	91 3	4947
41B4	Speed < under-speed threshold	91 4	4948
41B5	Speed overspeed threshold	91 5	4949

@ MICS	Wording	@ JBUS Mots N° bits	@ JBUS Bits	
41B6	Req. call on fault (distribution bus)	91	6	4950
41B7	Req. halt klaxon (distribution bus)	91	7	4951
41B8	Req. of lamps test (distribution bus)	91	8	4952
41B9	Req. of test in charge (distribution bus)	91	9	4953
41BA	Appearance of EJP notice & EJP loss (7006 & 7007) (France only)	91	10	4954
41BB	Set cooling duration (7021)	91	11	4955
41BC	Duration of the interval between attempts (7025)	91	12	4956
41BD	ATS 1 off (700F)	91	13	4957
41BE	ATS 2 off (7010)	91	14	4958
41BF	ATS 3 off (7011)	91	15	4959
41C0	Putting into service of synchronization chain (7016)	92	0	4960
41C1	(Permanent) load transfer (7018)	92	1	4961
41C2	Transient synchronisation (7019)	92	2	4962
41C3	Duration of operation of set (7028)	92	3	4963
41C4	Tempo load shedding	92	4	4964
41C5	Tempo overall running	92	5	4965
41C6	Tempo speed up delay	92	6	4966
41C7	Tempo speed stabilisation	92	7	4967
41C8	Tempo halt authorisation	92	8	4968
41C9	Tempo control excitation	92	9	4969
41CA	Starting attempts counter clock (7200)	92	10	4970
41CB	Starting attempts counter reset (7200)	92	11	4971
41CC	Active lamps test	92	12	4972
41CD	View active events stack	92	13	4973
41CE	Set up mode	92	14	4974
41CF	Detection of the carrier	92	15	4975
41D0	Threshold 1 composite voltage slave 1	93	0	4976
41D1	Threshold 2 composite voltage slave 1	93	1	4977
41D2	Threshold 3 composite voltage slave 1	93	2	4978
41D3	Threshold 4 composite voltage slave 1	93	3	4979
41D4	Threshold 1 active power slave 1	93	4	4980
41D5	Threshold 2 active power slave 1	93	5	4981
41D6	Threshold 3 active power slave 1	93	6	4982
41D7	Threshold 4 active power slave 1	93	7	4983
41D8	Threshold 1 frequency slave 1	93	8	4984
41D9	Threshold 2 frequency slave 1	93	9	4985
41DA	Threshold 1 composite voltage slave 2	93	10	4986
41DB	Threshold 2 composite voltage slave 2	93	11	4987
41DC	Threshold 3 composite voltage slave 2	93	12	4988
41DD	Threshold 4 composite voltage slave 2	93	13	4989
41DE	Threshold 1 active power slave 2	93	14	4990
41DF	Threshold 2 active power slave 2	93	15	4991
41E0	Threshold 3 active power slave 2	94	0	4992
41E1	Threshold 4 active power slave 2	94	1	4993
41E2	Threshold 1 frequency slave 2	94	2	4994
41E3	Threshold 2 frequency slave 2	94	3	4995

@ MICS		@ JBUS Mots	N° bits	JBUS Bits
41E4	Fet Carantec: Nothing	94	4	4996
41E5	Fet Carantec: Calibration	94	5	4997
41E6	Fet Carantec: Queued system	94	6	4998
41E7	Fet Carantec: Auto synchronisation	94	7	4999
41E8	Fet Carantec: ILS	94	8	5000
41E9	Fet Carantec: ILS	94	9	5001
41EA	Fet Carantec: Power plant mode	94	10	5002
41EB	Fet Carantec: Upward ramp in power plant mode	94	11	5003
41EC	Fet Carantec: Power plant mode	94	12	5004
41ED	Fet Carantec: Downward ramp in mode power plant	94	13	5005
41EE	Fet Carantec: Solo mode	94	14	5006
41EF	Fet Carantec: Upward ramp in solo mode	94	15	5007
41F0	Fet Carantec: Solo mode	95	0	5008
41F1	Fet Carantec: Downward ramp in solo mode	95	1	5009
41F2	Fet Carantec: Power plant mode	95	2	5010
41F3	Fet Carantec: Solo mode	95	3	5011
41F4	Upper limit reached	95	4	5012
41F5	Lower limit reached	95	5	5013
41F6	Closing order of the CB	95	6	5014
41F7	Opening order of the CB	95	7	5015
41F8	Status of the distribution mode with integral	95	8	5016
41F9	Carantec voltage generator	95	9	5017
41FA	Pilot generator	95	10	5018
41FB	No generator started up	95	11	5019
41FC	VBUS Voltage	95	12	5020
41FD	Carry frequency selection (0: 50Hz ; 1: 60Hz)	95	13	5021
41FE	Carry voltage selection (0: U1 ; 1: U2)	95	14	5022
41FF	Upstream short circuit	95	15	5023
4200	MDEC alarm	96	0	5024
4201	MDEC fault	96	1	5025
4202	MDEC electric alarm	96	2	5026
4203	MDEC electric fault	96	3	5027
4204	MDEC sensor fault	96	4	5028
4205	MDEC output transistor fault	96	5	5029
4206	Power stage 1 fault	96	6	5030
4207	Power stage 2 fault	96	7	5031
4208	MDEC supply voltage fault	96	8	5032
4209	MDEC unit temperature alarm	96	9	5033
420A	MDEC unit temperature fault	96	10	5034
420B	HT water low level alarm	96	11	5035
420C	HT water low level fault	96	12	5036
420D	HT water pressure alarm	96	13	5037
420E	HT water pressure fault	96	14	5038
420F	HT water temperature alarm	96	15	5039
4210	HT water temperature fault	97	0	5040
4211	LT water low level alarm	97	1	5041

@ MICS	Wording	@ JBUS Mots	N° bits	@ JBUS Bits
4212	LT water level fault	97	2	5042
4213	LT water pressure alarm	97	3	5043
4214	LT water pressure fault	97	4	5044
4215	LT water temperature alarm	97	5	5045
4216	LT water temperature fault	97	6	5046
4217	Booster air pressure alarm	97	7	5047
4218	Booster air pressure fault	97	8	5048
4219	Booster air temperature alarm	97	9	5049
421A	Booster air temperature fault	97	10	5050
421B	Intake air temperature alarm	97	11	5051
421C	Intake air temperature fault	97	12	5052
421D	Common rail leak fault	97	13	5053
421E	Common rail pressure alarm	97	14	5054
421F	Common rail pressure fault	97	15	5055
4220	Fuel inlet pressure alarm	98	0	5056
4221	Fuel inlet pressure fault	98	1	5057
4222	Fuel temperature alarm	98	2	5058
4223	Fuel temperature fault	98	3	5059
4224	Fuel leak tank high level alarm	98	4	5060
4225	Fuel leak tank high level fault	98	5	5061
4226	Oil sump pressure alarm	98	6	5062
4227	Oil sump pressure fault	98	7	5063
4228	Oil filter pressure alarm	98	8	5064
4229	Oil filter pressure fault	98	9	5065
422A	Oil pressure alarm	98	10	5066
422B	Oil pressure fault	98	11	5067
422C	Oil temperature alarm	98	12	5068
422D	Oil temperature fault	98	13	5069
422E	Overspeed fault	98	14	5070
422F	Turbocharger overspeed fault	98	15	5071
4230	Exhaust temperature alarm	99	0	5072
4231	Exhaust temperature fault	99	1	5073
4232	Solenoid-operated valve wiring fault	99	2	5074
4233	Solenoid-operated valve setting fault	99	3	5075
4234	Solenoid-operated valve inclination wiring fault	99	4	5076
4235	Solenoid-operated valve opening fault	99	5	5077
4236	Preheating temperature too low alarm	99	6	5078
4237	Engine speed regulator fault	99	7	5079
4238		99	8	5080
4239	MDEC stop	99	9	5081
423A		99	10	5082
423B	Engine speed greater than 80 rpm	99	11	5083
423C	Starter active	99	12	5084
423D	Starting sequence active	99	13	5085
423E	Engine state	99	14	5086
423F	Set on load	99	15	5087

@ MICS	Wording	@ JBUS Mots N° bits		@ JBUS Bits
4240	Overload fault	100	0	5088
4241	Reverse active power fault	100	1	5089
4242	Reverse reactive power fault	100	2	5090
4243	Max P fault	100	3	5091
4244	Min P fault	100	4	5092
4245	Max Q fault	100	5	5093
4246		100	6	5094
4247	Max U fault	100	7	5095
4248	Min U fault	100	8	5096
4249	Max F fault	100	9	5097
424A	Max F fault	100	10	5098
424B		100	11	5099
424C		100	12	5100
424D		100	13	5101
424E		100	14	5102
424F		100	15	5103
4250	GS sync authorisation	101	0	5104
4251	Load mode	101	1	5105
4252	Up load ramp	101	2	5106
4253	Down load ramp	101	3	5107
4254	Central mode	101	4	5108
4255	Solo mode	101	5	5109
4256	Excitation regulator off	101	6	5110
4257	Excitation regulator U ₀ - U	101	7	5111
4258	Excitation regulator Tension	101	8	5112
4259	Excitation regulator cos phi	101	9	5113
425A	Excitation regulator kVar	101	10	5114
425B	Droop mode	101	11	5115
425C	Load sharring with integral mode	101	12	5116
425D	Manual speed control	101	13	5117
425E	Manual excitation control	101	14	5118
425F		101	15	5119
4260	Central active power threshold N°1	102	0	5120
4261	Central active power threshold N°2	102	1	5121
4262	Central active power threshold N°3	102	2	5122
4263	Central active power threshold N°4	102	3	5123
4264	Central active power threshold N°5	102	4	5124
4265	Central active power threshold N°6	102	5	5125
4266	Central active power threshold N°7	102	6	5126
4267	Central active power threshold N°8	102	7	5127
4268	load sharring mode(carantec)	102	8	5128
4269	mains load setting mode (carantec)	102	9	5129
426A	genset load setting mode (carantec)	102	10	5130
426B	fct 14 distribution bus (over all running on)	102	11	5131
426C	fct 15 distribution bus (over all running key)	102	12	5132
426D	fct 16 distribution bus (Test 1 key)	102	13	5133

@ MICS	Wording	@ JBUS Mots N° bits	@ JBUS Bits	
426E	fc1 17 distribution bus (Manual)	102	14	5134
426F	fc1 18 distribution bus (Auto)	102	15	5135
4270	Main faults synthesis	103	0	5136
4271	Genset faults synthesis	103	1	5137
4272	Informations synthesis	103	2	5138
4273	I3 short circuit fault	103	3	5139
4274	I2 short circuit fault	103	4	5140
4275	I1 short circuit fault	103	5	5141
4276	I homopolar fault	103	6	5142
4277	Fault Zero Sequence Current	103	7	5143
4278	Fault Directionnal Overcurrent Phase 3	103	8	5144
4279	Fault Directionnal Overcurrent Phase 2	103	9	5145
427A	Fault Directionnal Overcurrent Phase 1	103	10	5146
427B	Fault Directionnal Zero Sequence Current	103	11	5147
427C	Fault Df/Dt U12	103	12	5148
427D	Fault Df/Dt U31	103	13	5149
427E	Fault Df/Dt U23	103	14	5150
427F	Fault Low Impedance U12/I3	103	15	5151
4280	Fault Low Impedance U31/I2	104	0	5152
4281	Fault Low Impedance U23/I1	104	1	5153
4282	Fault Vector Jump U12	104	2	5154
4283	Fault Vector Jump U31	104	3	5155
4284	Fault Vector Jump U23	104	4	5156
4285	Fault Zero Sequence Voltage	104	5	5157
4286	Voltage droop mode			
4287	PID 2 active power validation			
4288	PID 2 reactive power validation			
4289	Over excitation			
428A	Mains unparralleling trigger			
428B	Mains unparralleling memory			
428C	Synchronisation request memory			
428D	Synchronisation request break			
428E	Go back to Fn and Un			
428F	Carnac protection validation			
4290	ATS			
4291	On load test timer emission bus control			
4292	Off load test timer emission bus control			
4293	Off load plant test running			
4294	Over all running function			
4295	Over all running timer emission bus control			
4296	Mains control output			
4297	Standby control output			
4298	+ speed Carantec			
4299	- speed Carantec			
429A	Room fan timer control			
429B	Alternator voltage > 40% of Un			
429C	On load test emission bus control			
429D to 42D7	Not used			
42D8	Distribution bus MICS Commander input 1	109	8	5240
42D9	Distribution bus MICS Commander input 2	109	9	5241

42DA	Distribution bus MICS Commander input 3	109	10	5242
42DB	Distribution bus MICS Commander input 4	109	11	5243
42DC	Distribution bus MICS Commander input 5	109	12	5244
42DD	Distribution bus MICS Commander input 6	109	13	5245
42DE	Distribution bus MICS Commander input 7	109	14	5246
42DF	Distribution bus MICS Commander input 8	109	15	5247
42E0	Distribution bus MICS Commander input 9	110	0	5248
42E1	Distribution bus MICS Commander input 10	110	1	5249
42E2	Distribution bus MICS Commander input 11	110	2	5250
42E3	Distribution bus MICS Commander input 12	110	3	5251
42E4	Distribution bus MICS Commander input 13	110	4	5252
42E5	Distribution bus MICS Commander input 14	110	5	5253
42E6	Distribution bus MICS Commander input 15	110	6	5254
42E7	Distribution bus MICS Commander input 16	110	7	5255
42E8	Distribution bus MICS Commander input 17	110	8	5256
42E9	Distribution bus MICS Commander input 18	110	9	5257
42EA	Distribution bus MICS Commander input 19	110	10	5258
42EB	Distribution bus MICS Commander input 20	110	11	5259
42EC	Distribution bus MICS Commander input 21	110	12	5260
42ED	Distribution bus MICS Commander input 22	110	13	5261
42EE	Distribution bus MICS Commander input 23	110	14	5262
42EF	Distribution bus MICS Commander input 24	110	15	5263
42F0	Distribution bus MICS Commander input 25	111	0	5264
42F1	Distribution bus MICS Commander input 26	111	1	5265
42F2	Distribution bus MICS Commander input 27	111	2	5266
42F3	Distribution bus MICS Commander input 28	111	3	5267
42F4	Distribution bus MICS Commander input 29	111	4	5268
42F5	Distribution bus MICS Commander input 30	111	5	5269
42F6	Distribution bus MICS Commander input 31	111	6	5270
42F7	Distribution bus MICS Commander input 32	111	7	5271
42F8	Distribution bus MICS Commander input 33	111	8	5272
42F9	Distribution bus MICS Commander input 34	111	9	5273
42FA	Distribution bus MICS Commander input 35	111	10	5274
42FB	Distribution bus MICS Commander input 36	111	11	5275
42FC	Distribution bus MICS Commander input 37	111	12	5276
42FD	Distribution bus MICS Commander input 38	111	13	5277
42FE	Distribution bus MICS Commander input 39	111	14	5278
42FF	Distribution bus MICS Commander input 40	111	15	5279

10.7 List of the MTU points

MICS PROCESS				MTU	
@ Alarm	@ Internal		Index	@ MTU	Wording
6074	40F9	MDEC communication fault			
6080	4200	Alarms summary			Yellow alarm
6081	4201	Faults summary			Red alarm
				130	Curve error
				170	MJ module fail
				171	MJ not active
6082	4202	MDEC electric alarm	001	133	L1 15V pos supply
			002	135	L1 15V neg supply
			003	137	L1 5V BUFFER TEST
			004	139	L1 TE BUFFER TEST
			005	141	L1 BANK 1 TEST
			006	143	L1 BANK 2 TEST
			007	146	L1 AD-TEST 1 SUPPLY
			008	148	L1 AD-TEST 2 SUPPLY
			009	150	L1 AD-TEST 3 SUPPLY
6083	4203	MDEC electric fault	001	100	EDM not valid
			002	101	Idm not valid
			003	102	Illegal data EER 1
			004	103	Illegal data EER 2
			005	104	OP hours 1 not valid
			006	105	OP hours 2 not valid
			007	106	ERR rec 1 not valid
			008	107	ERR rec 2 not valid
			009	134	15V pos ECU defect
			010	136	15V neg ECU defect
			011	140	TE buf. ECU defect
			012	142	BANK 1 Ecu defect
			013	144	BANK 2 Ecu defect
			014	147	AD test 1 ECU defect
			015	149	AD test 2 ECU defect
			016	151	AD test 3 ECU defect
			017	172	TBO expired
			018	173	Module write limit
6084	4204	MDEC sensor fault	001	138	Sensor power defect
			002	201	SD T coolant
			003	202	SD T fuel
			004	203	SD T charge air
			005	204	SD T charge air B
			006	205	SD T coolant intere.
			007	206	SD T exhaust A
			008	207	SD T exhaust B
			009	208	SD P charge air

MICS PROCESS				MTU	
Alarm	@ Internal			MTU	Wording
			010	210	SD ICE 2
			011	211	SD P lube oil
			012	212	SD P coolant
			013	213	SD P coolant intere.
			014	214	SD P crankcase
			015	215	SD P rail fuel
			016	216	SD T lube oil
			017	217	SD T TE 10
			018	219	SD T intake air
			019	220	SD coolant level
			020	221	SD P oilfilter diff.
			021	222	SD level leakagefuel
			022	223	SD levelintercooler
			023	230	SD crankshaft speed
			024	231	SD camshaft speed
			025	232	SD charger speed 1
			026	233	SD charger speed 2
			027	234	SD charger speed 3
			028	235	SD charger speed 4
			029	240	SD P fuel
			030	245	SD power supply
			031	246	SD T electronic
			032	249	SD CAN stop
			033	250	SD CAN speed demand
			034	251	SD CAN up/down
			035	252	SD CANnotch pos
			036	253	SD CANoverride
			037	254	SD CANtest oversp
			038	255	SD CANengage signal
			039	256	SD CAN cyl. cutout
			040	257	SD CAN local
			041	258	SD CAN RCS engage S.
			042	259	SD CAN RCS cyl. Cut.
			043	260	SD 15v pos supply
			044	261	SD 15v neg supply
			045	262	SD 5V BUFFER TEST
			046	263	SD TE BUFFER TEST
			047	264	SD BANK 1 TEST
			048	265	SD BANK 2 TEST
			049	266	SD speed demand an.
			050	267	SD sp.dem.test bench
			051	268	SD SPINOUT
			052	269	SD load pulse analog
			053	270	SD SPIN DEMAND FH
			054	271	SD T extern 1
			055	272	SD T extern 1

MICS PROCESS				MTU	
@ Alarm	Internal		Index	@ MTU	
			056	273	SD P extern 1
			057	274	SD P extern 2
			058	275	Mis data bin ext. 1
			059	276	Mis data bin ext. 2
			060	277	Mis data bin ext. 3
			061	278	Mis data bin ext. 4
			062	279	SD CAN RES TRIP FUEL
			063	280	SD CAN ALARM RESET
			064	281	SD AD-TEST1 SUPPLY
			065	282	SD AD-TEST2 SUPPLY
			066	283	SD AD-TEST3 SUPPLY
			067	284	SD CAN LAMP TEST
6085	4205	MDEC output transistor fault	001	371	Tran.. out 1 engine def
			002	372	Tran.. out 2 engine def
			003	373	Tran.. out 3 engine def
			004	374	Tran.. out 4 engine def
			005	381	Tran.. out 1 plant def
			006	382	Tran.. out 2 plant def
			007	383	Tran.. out 3 plant def
			008	384	Tran.. out 4 plant def
			009	385	Tran.. out 5 plant def
			010	386	Tran.. out 6 plant def
6086	4206	Power stage 1 fault		361	Power stage fail 1
				363	Stop power stage 1
6087	4207	Power stage 2 fault			Power stage fail 2
					Stop power stage 2
6088	4208	MDEC supply voltage fault	001	145	15v good ECU defect
			002	118	L1 supply volt.low
			003	119	L2 supply volt.low
			004	120	L1 supply volt.high
			005	121	L2 supply volt. high
6089	4209	MDEC unit temperature alarm		122	MDEC unit temperature alarm
608A	420A	MDEC unit temperature fault		123	MDEC unit temperature fault
608B	420B	HT water low level alarm		23	HT water low level alarm
				50	HT water low level alarm
608C	420C	HT water low level fault		24	HT water low level fault
608D	420D	HT water pressure alarm		57	HT water pressure alarm
608E	420E	HT water pressure fault		58	HT water pressure fault
608F	420F	HT water temperature alarm		67	HT water temperature alarm
6090	4210	HT water temperature fault		68	HT water temperature fault
6091	4211	LT water low level alarm		44	LT water low level alarm
6092	4212	LT water level fault		45	LT water level fault
6093	4213	LT water pressure alarm		59	LT water pressure alarm
6094	4214	LT water pressure fault		60	LT water pressure fault
6095	4215	LT water temperature alarm		9	LT water temperature alarm
6096	4216	LT water temperature fault		10	LT water temperature fault

MICS PROCESS				MTU	
@ Alarm	@ Internal			@ MTU	Wording
6097	4217	Booster air pressure alarm		11	Booster air pressure alarm A
				13	Booster air pressure alarm B
6098	4218	Booster air pressure fault		12	Booster air pressure fault
				14	
6099	4219	Booster air temperature alarm		5	Booster air temperature alarm A
				7	Booster air temperature alarm B
609A	421A	Booster air temperature fault		6	Booster air temperature fault A
				8	Booster air temperature fault B
609B	421B	Intake air temperature alarm		53	Intake air temperature alarm A
				61	Intake air temperature alarm B
609C	421C	Intake air temperature fault		54	Intake air temperature fault A
				62	Intake air temperature fault B
609D	421D	Common rail leak fault		81	Common rail leak fault
609E	421E	Common rail pressure alarm		17	Common rail pressure alarm
609F	421F	Common rail pressure fault		18	Common rail pressure fault
60A0	4220	Fuel inlet pressure alarm		65	Fuel inlet pressure alarm
60A1	4221	Fuel inlet pressure fault		66	Fuel inlet pressure fault
60A2	4222	Fuel temperature alarm		3	Fuel temperature alarm
60A3	4223	Fuel temperature fault		4	Fuel temperature fault
60A4	4224	Fuel leak tank high level alarm		27	Fuel leak tank high level alarm
60A5	4225	Fuel leak tank high level fault		28	Fuel leak tank high level fault
60A6	4226	Oil sump pressure alarm		63	Oil sump pressure alarm
60A7	4227	Oil sump pressure fault		64	Oil sump pressure fault
60A8	4228	Oil filter pressure alarm		25	Oil filter pressure alarm
60A9	4229	Oil filter pressure fault		26	Oil filter pressure fault
60AA	422A	Oil pressure alarm		15	Oil pressure alarm
60AB	422B	Oil pressure fault		16	Oil pressure fault
60AC	422C	Oil temperature alarm		51	Oil temperature alarm
60AD	422D	Oil temperature fault		52	Oil temperature fault
60AE	422E	Overspeed fault		30	Overspeed fault
60AF	422F	Turbocharger overspeed fault		31	Turbocharger overspeed fault 1
				32	Turbocharger overspeed fault 2
60B0	4230	Exhaust temperature alarm		19	Exhaust temperature alarm A
				21	Exhaust temperature alarm B
60B1	4231	Exhaust temperature fault		20	Exhaust temperature fault A
				22	Exhaust temperature fault B
60B2	4232	Solenoid-operated valve wiring fault		365	Solenoid-operated valve wiring fault
60B3	4233	Solenoid-operated valve setting fault	001	301	Timing bank 1 MV 1
			002	302	Timing bank 1 MV 2
			003	303	Timing bank 1 MV 3
			004	304	Timing bank 1 MV 4
			005	305	Timing bank 1 MV 5
			006	306	Timing bank 1 MV 6
			007	307	Timing bank 1 MV 7
			008	308	Timing bank 1 MV 8
			009	309	Timing bank 1 MV 9

MICS PROCESS				MTU	
@ Alarm	@ Internal		Index	@ MTU	Wording
			010	310	Timing bank 1 MV 10
			011	311	Timing bank 1 MV 1
			012	312	Timing bank 1 MV 2
			013	313	Timing bank 1 MV 3
			014	314	Timing bank 1 MV 4
			015	315	Timing bank 1 MV 5
			016	316	Timing bank 1 MV 6
			017	317	Timing bank 1 MV 7
			018	318	Timing bank 1 MV 8
			019	319	Timing bank 1 MV 9
			020	320	Timing bank 1 MV 10
60B4	4234	Solenoid-operated valve inclination wiring fault	001	321	Wiring bank 1 MV 1
			002	322	Wiring bank 1 MV 2
			003	323	Wiring bank 1 MV 3
			004	324	Wiring bank 1 MV 4
			005	325	Wiring bank 1 MV 5
			006	326	Wiring bank 1 MV 6
			007	327	Wiring bank 1 MV 7
			008	328	Wiring bank 1 MV 8
			009	329	Wiring bank 1 MV 9
			010	330	Wiring bank 1 MV 10
			011	331	Wiring bank 2 MV 1
			012	332	Wiring bank 2 MV 2
			013	333	Wiring bank 2 MV 3
			014	334	Wiring bank 2 MV 4
			015	335	Wiring bank 2 MV 5
			016	336	Wiring bank 2 MV 6
			017	337	Wiring bank 2 MV 7
			018	338	Wiring bank 2 MV 8
			019	339	Wiring bank 2 MV 9
			020	340	Wiring bank 2 MV 10
60B5	4235	Solenoid-operated valve opening fault	001	341	Open load bank 1 MV 1
			002	342	Open load bank 1 MV 1
			003	343	Open load bank 1 MV 1
			004	344	Open load bank 1 MV 1
			005	345	Open load bank 1 MV 1
			006	346	Open load bank 1 MV 1
			007	347	Open load bank 1 MV 1
			008	348	Open load bank 1 MV 1
			009	349	Open load bank 1 MV 1
			010	350	Open load bank 1 MV 1
			011	351	Open load bank 2 MV 1
			012	352	Open load bank 2 MV 1

MICS PROCESS				MTU	
@ Alarm	@ Internal		Index	@ MTU	
			013	353	Open load bank 2 MV 1
			014	354	Open load bank 2 MV 1
			015	355	Open load bank 2 MV 1
			016	356	Open load bank 2 MV 1
			017	357	Open load bank 2 MV 1
			018	358	Open load bank 2 MV 1
			019	359	Open load bank 2 MV 1
			020	360	Open load bank 2 MV 1
60B6	4236	Preheating temperature too low alarm			
60B7	4237	Engine speed regulator fault			
	4240	Engine speed greater than 80 rpm			
	4241	Starter active			
	4242	Starting sequence active			
	4243	Engine state			
	4244	Set on load			
		Maintenance request message			Data not valid
		Speed setpoint mode message			Data not valid
		Engine speed threshold 1 reached			Data not valid
		Engine speed threshold 2 reached			Data not valid
		Oil pressure current value			
		Oil pressure alarm threshold			
		Oil pressure fault threshold			
		Oil sump pressure current value			Data not valid
		Oil sump pressure fault threshold			
		Intake air pressure current value			
		HT water temperature current value			
		HT water temperature alarm threshold			
		HT water temperature fault threshold			
		Intake air temperature current value			
		Intake air temperature alarm threshold			
		Intake air temperature fault threshold			
		LT water temperature current value			
		LT water temperature alarm threshold			
		Oil temperature current value			
		Oil temperature alarm threshold			
		Oil temperature fault threshold			
		Fuel temperature current value			
		Current value of the supply voltage			
		Engine speed			
		Engine operating time (hours)			
		Engine operating time (seconds)			

10.8 List of time-delays

@ MICS	Wording	Ctrl	Default value		Max	Time base	Setting possible
7000	Failure of main N° 1	4006	3	0	600	Sec.	YES
7001	Recovery of main N° 1	4006	180	0	3600	Sec.	YES
7002	Failure of main N° 2	4007	3	0	600	Sec.	YES
7003	Recovery of main N° 2	4007	180	0	3600	Sec.	YES
7004	Failure of main N° 3	4008	3	0	600	Sec.	YES
7005	Recovery of main N° 3	4008	180	0	3600	Sec.	YES
7006	Appearance of EJP notice (France only)	41BA	1200	0	3600	Sec.	YES
7007	Loss of EJP (France only)	7006	300	0	3600	Sec.	YES
7008		412E	5	0	60	Sec.	YES
7009	Tempo overall running	41C5	600		9999	Sec	YES
700A	Ventilation duration	429A	60	0	9999	Sec.	
700B	Unload installation request	41C6	5	0	10	Sec	YES
700C	No-load test (test 2)	4292	600	30	3600	Sec	YES
700D	Duration of load-shedding	41C4	10	0	3600	Sec	YES
700E	Inhibition of synchronization	4113	10	0	60	Sec.	YES
700F	Switch mains / standby 1	41BD	10	0	100	S/10	YES
7010	Switch mains / standby 2	41BE	10			S/10	NO
7011	Switch mains / standby 3	41BF	10			S/10	NO
7012	Inhibition of GTE box	412A	10			S/10	NO
7013	Main CB N°1 open	4155	10			S/10	NO
7014	Speed stabilisation	41C7	5	0	20	Sec	YES
7015	Duration of discrimination	4130	5			S/10	NO
7016	Putting into service of synchronisation chain	41C0	5	0	60	Sec.	YES
7017	Duration of synchronisation	4146	60	0	3600	Sec.	YES
7018	(Permanent) load transfer	41C1	1200	1	9999	Sec.	YES
7019	Load transfer (Transient synchronisation)	41C2	10	0	240	Sec.	YES
701A	Threshold loading delay		10	0	240	Sec.	YES
701B	Threshold lift off delay		10	0	240	Sec.	YES
701C	Duration of getting up to speed	4160	5	0	60	Sec	YES
701D	Immobilisation of set	4160	10	0	60	Sec.	YES
701E	Inhibition of faults	4160	100	0	100	S/10	YES
701F	Loading delay	4013	1	0	20	Sec.	YES
7020	Starting of ancillaries	701F	1	0	240	Sec.	YES
7021	Duration of set cooling	41BB	180	0	600	Sec.	YES
7022	Operation of the booster pump	416A	120	0	600	Sec.	YES
7023	Speed detection fault timer	418B	2	1	60	Sec.	YES
7024	Duration of starting attempt	4171	5	0	60	Sec.	YES
7025	Duration of the interval between attempts	41BC	5	0	60	Sec.	YES
7026	Go back to Fn and Un	428D	20	20	100	S/10	YES
7027	Duration of de-excitation	41C8	8	1	20	Sec.	YES
7028	Duration of operation of set	41C3	60			Sec	NO
7029	On load test running emission bus	4291	20			S/10	NO
702A	MDEC request	4179	5			S/10	NO
702B	Over all running emission bus	4295	50			S/10	NO
702C		429C	10			S/10	NO
702D							
702E							
702F							

10.9 Addresses of the keyboard's and LEDs

Component	Command	Fixed LED	Flashing LED
Function n° 1 LED		4711	4811
Function n° 2 LED		4712	4812
Function n° 3 LED		4713	4813
Function n° 4 LED		4714	4814
Function n° 5 LED		4715	4815
Function n° 6 LED		4716	4816
Function n° 7 LED		4717	4817
Function n° 8 LED		4718	4818
Function n° 1 key	4621	4721	4821
Function n° 2 key	4622	4722	4822
Function n° 3 key	4623	4723	4823
Function n° 4 key	4624	4724	4824
Function n° 5 key	4625	4725	4825
Function n° 6 key	4626	4726	4826
AUTO key	4630	4730	4830
MANUAL key	4631	4731	4831
Out of service key	4632		
Start key	4633		
Stop key	4634		
On-load test key	4635		
Off-load test key	4636		
Flow opening key	4637	4737	4837
Flow closing key	4638	4738	4838
Horn stop key	4639		
Reset key	463A		
Lamp test key	463B		
Display key	463C		