CCRS MODBUS

Technical Documentation

"CCRS MODBUS COMMUNICATION OPTION VIA MODBUS PROTOCOL (232/485/422)"

Part Number:
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CRE TECHNOLOGY, INFORMATION NOTE

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NOTE:

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Apply all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

Motors, turbines and any other type of generator must be equipped with protections (overspeed, high temperature, low pressure,…depending on the power plant).

Any changes of the normal use of the equipment can cause human and material damage.

For further information, please contact your CRE technology distributor or the After-Sales Service Team.

All CRE Technology products are delivered with one year warranty, and if necessary we will be happy to come on site for product commissioning or troubleshooting. The company also provide specific trainings on our products and softwares.

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INFORMATION

You can download the most up-to-date version of this documentation and different other documentations relating to TC-GEN on our web site:

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Date	Version	Comments	Author
03/01/11	1.0	Version 1	MM

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TABLE OF CONTENT

1. SYSTEM REQUIREMENTS

The *CCrs Modbus* needs the following elements for its installation:

- Connection to the controller through CAN bus communication.
- Power supply.
- Connection to the control, management and communication device that implement the Modbus protocol in its master configuration.

2. CCRS MODBUS SETTINGS

CCrs Modbus option is delivered with an application that allows settings for a proper operation.
The configuration of option is made through Modbus protocol.
The configuration parameters of CCrs Modbus option are:

- Data transmitting by codification RTU (NOT CONFIGURABLE).
- Slave configuration (NOT CONFIGURABLE).
- Address (parameter HOLDING REGISTER 40100). Allowed values 1 to 255 (Default value **57h**).
- Default baud rate 9600 bps (parameter HOLDING REGISTER 40101).

Allowed values:

- **0: 9600 bps** (Default value).
- 1: 19200 bps.
- 2: 57600 bps.
- 3: 115200 bps.

- Parity (parameter HOLDING REGISTER 401012). Allowed values:
  - 0: **NONE** (Default value).
  - 1: ODD.
  - 2: EVEN.
  - 3: MARK.
  - 4: SPACE.

The configuration parameters of CCRs Modbus are updated when rebooting.

3. MODBUS PROTOCOL

Implemented functions.

- **01** READ COIL Status
- **02** READ INPUT Status
- **03** READ HOLDING REGISTER
- **04** READ INPUT REGISTER
- **05** FORCE SINGLE COIL
- **06** PRESET SINGLE REGISTER
- **16** (10 HEX) WRITE MULTIPLE REGISTERS
- **17** (11 HEX) REPORT Slave Id

4. REGISTER MAPPING

4.1. COIL STATUS

00001 Reset
00002 Engine Start
00003 Engine Stop
00004 Automatic mode
00005 Manual mode
00006 Test mode
00007 Lock mode
00008 Activate /deactivate Fuel transfer pump
00009 Activate/deactivate (toggle) genset contactor
00010 Activate/deactivate (toggle) mains contactor

4.2. INPUT STATUS

10001 High coolant temperatures
10002 Low oil pressures
10003 Emergency stop
10004 Battery charging alternator failure
10005 Failure to start
10006 Low coolant level
10007 Fuel reserve
10008 Over speed
10009 Under speed
10010 Over load
10011 Signal genset asymmetry
10012 Maximum voltage in genset signal
10013 Maximum frequency in genset signal
10014 Failure in phases sequence of genset
10015 Inverse Power
10016 Low voltage battery
10017 Pre alarm: Low coolant temperature
10018 Pre alarm: Low oil pressure
10019 Low fuel level
10020 Short-circuit
10021 Minimum voltage in genset signal
10022 Minimum frequency in genset signal
10023 Unexpected stop
10024 Failure to stop

10025 Low engine temperature
10026 Drop in genset signal
10027 Alarm 1
10028 Alarm 2
10029 Alarm 3
10030 Failure to communicate with ATS
10031 Maximum voltage in Mains signal
10032 Minimum voltage in Mains signal
10033 Maximum frequency in Mains signal
10034 Minimum frequency in Mains signal
10035 Failure in phase sequence of Mains
10036 Droop in Mains signal
10037 Failure to activate CR
10038 Failure to activate CG

Positions 10101 – 10116: Errors in the change-over board 0
Positions 10201 – 10216: Errors in the change-over board 1
Positions 10301 – 10316: Errors in the change-over board 2
Positions 10401 – 10416: Errors in the change-over board 3
Positions 10501 – 10516: Errors in the change-over board 4

10101 Maximum voltage in Mains signal
10102 Minimum voltage in Mains signal
10103 Maximum frequency in Mains signal
10104 Minimum frequency in Mains signal
10105 Failure in phase sequence of Mains
10106 Droop in Mains signal
10107 Failure to activate CR
10108 Failure to activate CG
10109 Assymetry of genset signal
10110 Minimum voltage in genset signal
10111 Maximum voltage in genset signal
10112 Minimum frequency in genset signal
10113 Maximum frequency in genset signal
10114 Failure in phase sequence of genset
10115 Droop in genset signal
10116 Emergency stop

4.3. INPUT REGISTERS

30001 Mains frequency (Hz x10)
30002 Mains voltage 12 (Volt)

30003 Mains voltage 23 (Volt)
30004 Mains voltage 13 (Volt)
30005 Mains voltage 1N (Volt)
30006 Mains voltage 2N (Volt)
30007 Mains voltage 3N (Volt)
30008 Genset frequency (Hz x 10)
30009 Genset voltage 12 (Volt)
30010 Genset voltage 23 (Volt)
30011 Genset voltage 13 (Volt)
30012 Genset voltage 1N (Volt)
30013 Genset voltage 2N (Volt)
30014 Genset voltage 3N (Volt)
30015 Phase current 1 (Ampere)
30016 Phase current 2 (Ampere)
30017 Phase current 3 (Ampere)
30018 Flags current

4.3.1. FOR ALL THE PF INFORMATION:

Primer byte shows (0000T321):	**0**	**0**	**0**	**0**	**P**	**3**	**2**	**1**
Bit	7	6	5	4	3	2	1	0

1-PF1 1-inductive / 0-capacitive
2-PF2 1-inductive / 0-capacitive
3-PF3 1-inductive / 0-capacitive
0000T-PF total value

30019 Total PF
30020 PF1
30021 PF2
30022 PF3
30023 Active Power (P)
30024 Apparent Power (S)
30025 Reactive Power (Q)
30026 Speed (RPM)
30027 % Fuel level (% x10)
30028 Alternator voltage (V x10)
30029 Battery voltage (V x10)
30030 Engine coolant temperature (ºC x10)
30031 Oil pressure (bar x10)
30032 Oil temperature (ºC x10)

30033 Sensors detection:	-	-	B	D	C	T	P	N
Bit	7	6	5	4	3	2	1	0

N: 1-Present Fuel Level Sensor

P: 1-Present Pressure Sensor
T: 1-Present Water temperature Sensor
C: 1-Present Oil Temperature Sensor
D: 1-Present Sensor Alternator

30034 Units:	-	-	-	-	-	-	**T**	**P**
Bit	7	6	5	4	3	2	1	0

T:Temperature Units: 0-ºC/1-ºF

4.4 P:PRESSURE UNITS: 0-BARES/1-PSI

30034 Units
30035 Total instant energy (hourly). Part 1 (Most significant)
30036 Total instant energy (hourly). Part 2 (Least significant)
30037 Partial instant energy (hourly). Part 1 (Most significant)
30038 Partial instant energy (hourly). Part 2 (Least significant)
30039 Daily Energy
30040 Monthly Energy
30041 Yearly Energy
30042 Total running time. Part 1 (seconds)
30043 Total running time. Part 1 (minutes)
30044 Partial running time. Part 1 (seconds)
30045 Partial running time. Part 2 (minutes)
30046 Successful starts
30047 Faul**y** starts

Positions 30101 – 30125: values of change-over board 0
Positions 30201 – 30225: values of change-over board 1
Positions 30301 – 30325: values of change-over board 2
Positions 30401 – 30425: values of change-over board 3
Positions 30501 – 30525: values of change-over board 4

30101 Mains frequency (Hz x10) change-over 0
30102 Mains voltage 12 (Volt) change-over 0
30103 Mains voltage 23 (Volt) change-over 0
30104 Mains voltage 13 (Volt) change-over 0
30105 Mains voltage 1N (Volt) change-over 0
30106 Mains voltage 2N (Volt) change-over 0
30107 Mains voltage 3N (Volt) change-over 0
30108 Genset frequency (Hz x10) change-over 0
30109 Genset voltage 12 (Volt) change-over 0
30110 Genset voltage 23 (Volt) change-over 0
30111 Genset voltage 13 (Volt) change-over 0
30112 Genset voltage 1N (Volt) change-over 0
30113 Genset voltage 2N (Volt) change-over 0
30114 Genset voltage 3N (Volt) change-over 0
30115 Current Phase 1 (Ampere) change-over 0
30116 Current Phase 2 (Ampere) change-over 0

30117 Current Phase 3 (Ampere) change-over 0
30118 Flags current change-over 0
30119 Total PF change-over 0
30120 PF1 change-over 0
30121 PF2 change-over 0
30122 PF3 change-over 0
30123 Active Power (P) change-over 0
30124 Apparent Power (S) change-over 0
30125 Reactive Power (Q) change-over 0

4.5 HOLDING REGISTERS

40001 Starts numbers
40002 Time interval between Starts
40003 Start delay
40004 Glow plug pre heating time
40005 Start-up time
40006 Load activation time
40007 Nominal condition time
40008 D+ activation time
40009 EJP1 activation delay time
40010 Mains activation delay
40011 Cooling time
40012 PE activation time
40013 Counter detection time
40014 Alarm activation maximum time
40015 Three Phase, Bi-phase, , Single phase or Three phase without neutral
40016 Maximum genset voltage
40017 Minimum genset voltage
40018 Maximum genset asymmetry value
40019 Maximum genset frequency
40020 Minimum genset frequency
40021 Maximum genset current
40022 Short-circuit detection
40023 Nominal genset power
40024 Maximum reverse power
40025 PICK UP maximum speed
40026 PICK UP minimum speed
40027 Mains maximum voltage
40028 Mains minimum voltage
40029 Mains maximum frequency
40030 Mains minimum frequency

40031 Low battery voltage
40032 Fuel transfer pump: Minimum fuel level
40033 Fuel transfer pump: Maximum fuel level
40034 Starting voltage in signal genset
40035 Starting voltage in the alternator
40036 Starting speed (PICK UP)
40037 RESERVED
40038 Engine flywheel teeth
40039 Fuel reserve level
40040 Low oil pressure threshold
40041 High coolant temperature threshold
40042 Low engine temperature through sensor
40043 Preheating resistance minimum temperature
40044 Preheating resistance maximum temperature

4.6 SLAVE PARAMETERS CONFIGURATION

40100 Slave address
[1-255]
40101 Port speed
0x00 ==>9600
0x01 ==>19200
0x02 ==>57600
0x03 ==>115200
40102 Parity
0x00 ==>NONE
0x01 ==>ODD
0x02 ==>EVEN
0x03 ==>MARK
0x04 ==>SPACE

5. DEVICE STATUS: VISUALIZATION VIA LEDS.

Led Type Description:

- GREEN Fixed : Correct supply
- GREEN Intermittent: Correct supply and active modem connection
- RED Intermittent: Communication with the controller
- RED Fixed: Error in the line of CAN communication

6. TECHNICAL DATA.

6.1. PHYSICAL CHARACTERISTICS.

Element	Characteristics
Dimensions	100x50x25mm
MODBus connection	Connector disconnectable 5 pins (Weidmüller SL 5.08/5/90B & BLZ 5.08/5/180)
Bus CAN connection	Connector disconnectable 2 pins (Weidmüller SL 5.08/2/90B & BLZ 5.08/2/180)
Connection supply	Connector disconnectable 2 pins (Weidmüller SL 5.08/2/90B & BLZ 5.08/2/180)

6.2. CONNECTION OF THE CCRS OPTION.

Signal	Description	Type	Characteristics
8÷36V	Battery Positive	Supply	Controller voltage supply from 8 to 36V
-BAT	Battery Negative	Supply	Controller negative supply
CANL	CANL Line	Bus CAN	CAN communication
CANH	CANH Line	Bus CAN	CAN communication
RX-	Data Reception -	MODBus	MODBus communication
RX+	Data Reception +	MODBus	MODBus communication
TX-	Data Transmission -	MODBus	MODBus communication
TX+	Data Transmisión +	MODBus	MODBus communication
⏚	Cable shield	MODBus	MODBus screening cable

NOTE: The communication Modbus can be done in RS-422 (with 4 wires) or in RS-485 (with 2 wires).

The RS485 communication requires the connection of terminal TX+ (Data transmission +) to terminal RX+ (Data reception +) and terminal TX- (Data transmission-) to terminal RX- (Data reception -).

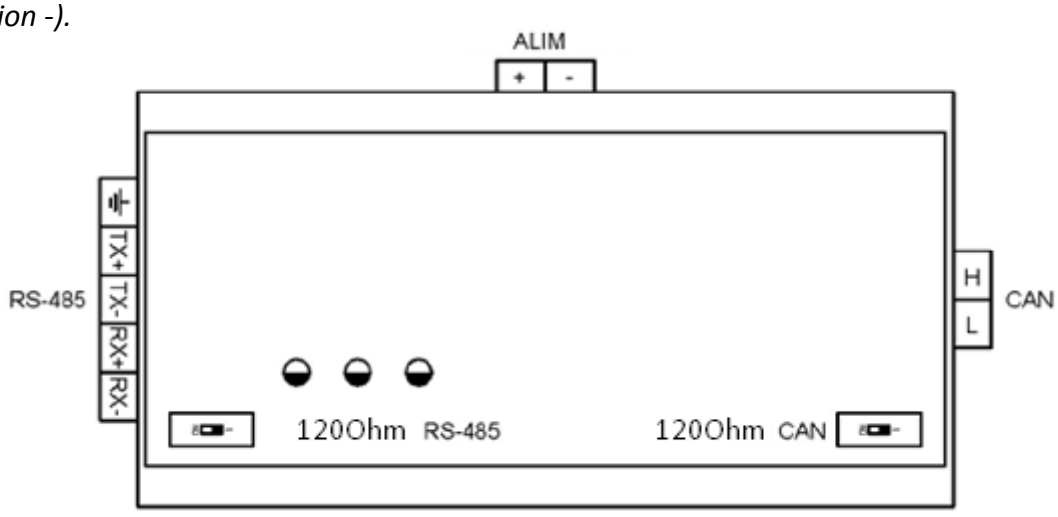

FIG 1: CONNECTION CCRS.

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SARL au Capital de 300.000 Euros - RCS Antibes: 7488 625 000 15 N°TVA FR54 488 625 583

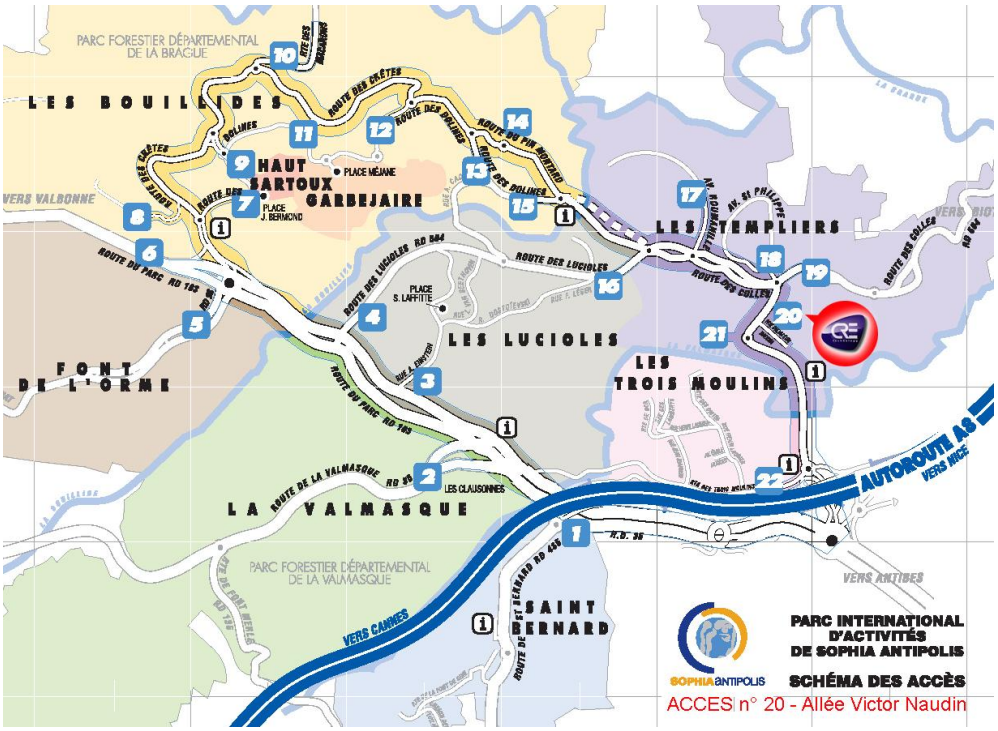

FIGURE 1 - ACCESS TO CRE TECHNOLOGY

Found our entire distributors list into the world, www.cretechnology.com tab “DISTRIBUTEURS”

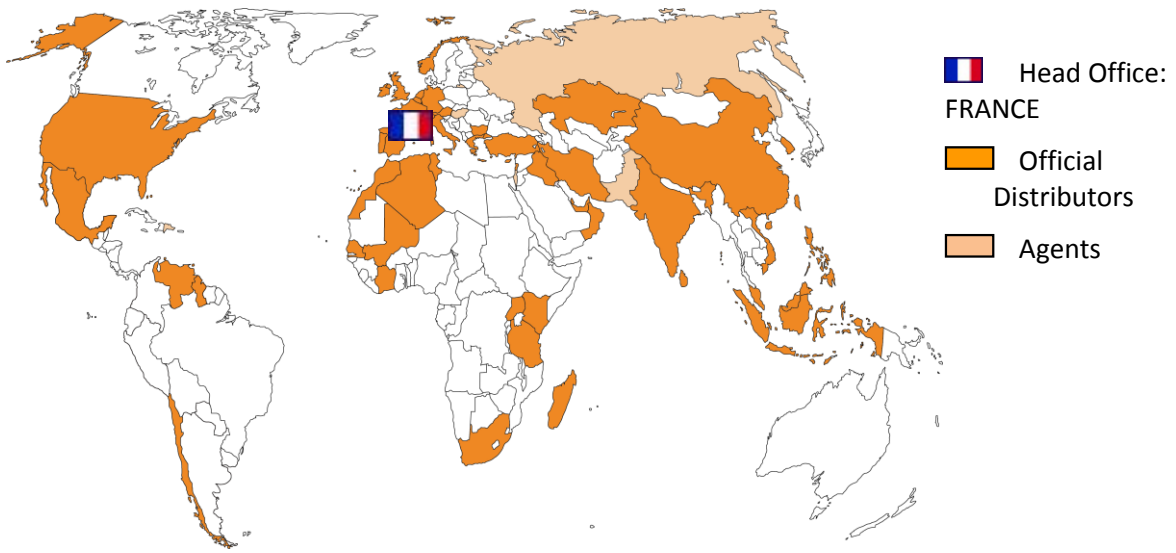

FIGURE 2 - CRE TECHNOLOGY DISTRIBUTORS