Multitel

CATERPILLAR EMCP4
APPLICATION NOTE

Document Name:	Caterpillar EMCP4_Application Note_2020-11
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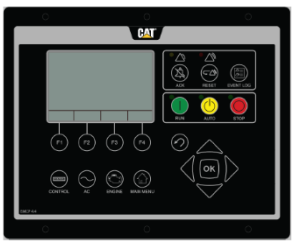
Purpose: This application note presents a step-by-step approach to integrate an intelligent Genset Control System to a FUSION.



Target Equipment: Power Command

Equipment Description: the EMCP is a generator set control panel used by Caterpillar. The controller provides a mean to communicate via standard 2-wire RS-485 using Modbus RTU protocol.

PRODUCT DESCRIPTION	
Name	EMCP
Manufacturer	Caterpillar
System Type	Genset Control System
Modbus Version	EMCP 4.2/4.3/4.4
Manufacture Technical Support	**1(888)614-4328**
Specificities	

EQUIPMENT CONNECTIONS

MODBUS RTU over RS-485 must be wired in a daisy chain pattern, star network is not allowed as it modifies drastically the electrical characteristics of the RS-485 driver and can ultimately cause communication failures. The use of a good quality cable such as a 22AWG stranded, twisted shielded wire to perform the termination at the EMCP panel. Polarity must be respected throughout the RS-485 network, otherwise communication failures will prevail.

1. RS-485 Pinout on EMCP 4.2
    a. Pin #3 : MB- (Rx/Tx-)
    b. Pin #5 : MB+ (Rx/Tx+)
2. RS-485 Pinout on EMCP 4.3 & 4.4
    a. Pin #90 : MB- (Rx/Tx-)
    b. Pin #100 : MB+ (Rx/Tx+)

EQUIPMENT COMMUNICATION SETTINGS

Using the control unit display, apply the following parameters for Modbus communication Parameters under Configure > All Setpoints > Networks > RS-485 Scada

- Node Address: 1-247, An address cannot be used more than once on the same network
- Baud rate: 9600 bps
- Parity: none
- Stop Bits: 1

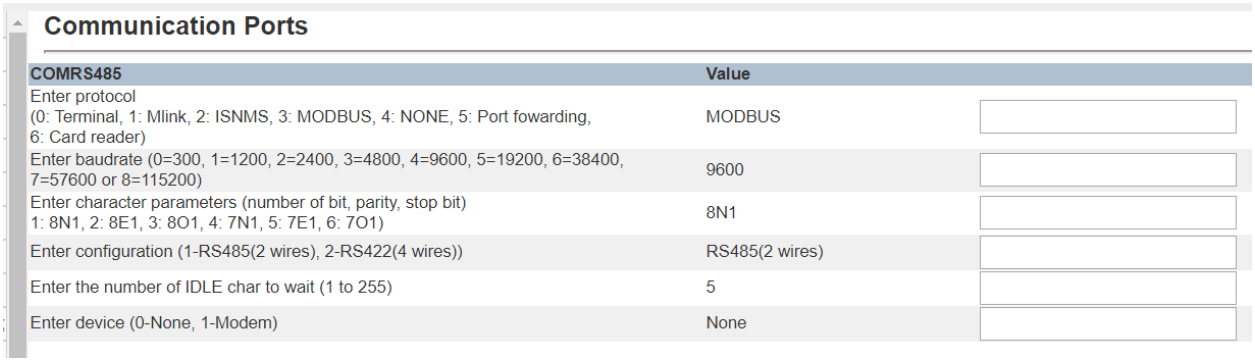
FUSION CONNECTIONS

Refer to your detailed engineering or the layout of your MODBUS network, respect the MODBUS best practises at all times by preventing star shape network, thus terminate to the last equipment of the current MODBUS daisy chain trunk or if this is you first equipment on the network device, then terminate directly at the FUSION back panel. The FUSION offers (2) RS-485 ports, one called MLINK and the other one RS-485. Use the connector available from Multitel to convert the RJ-12 connector to a screw type connector. (Part# is C-7000-MOD).

Figure 1
C-7000-MOD

FUSION COMMUNICATION SETTINGS

Once you have logged into the FUSION using the "supervisor" username and no password, click on **CONFIG** menu and select "**Communication Ports**" from the left menu. Select the **MLINK** or **RS-485** port and configure operating parameters as follows:

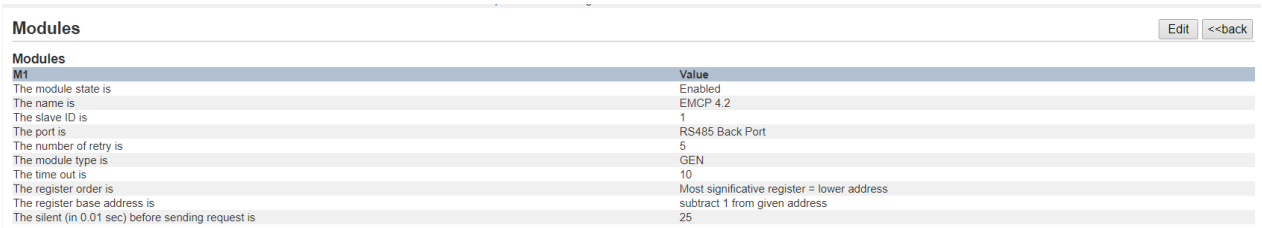


Communication Ports

COMRS485	Value	
Enter protocol (0: Terminal, 1: Mlink, 2: ISNMS, 3: MODBUS, 4: NONE, 5: Port fowarding, 6: Card reader)	MODBUS	
Enter baudrate (0=300, 1=1200, 2=2400, 3=4800, 4=9600, 5=19200, 6=38400, 7=57600 or 8=115200)	9600	
Enter character parameters (number of bit, parity, stop bit) 1: 8N1, 2: 8E1, 3: 8O1, 4: 7N1, 5: 7E1, 6: 7O1)	8N1	
Enter configuration (1-RS485(2 wires), 2-RS422(4 wires))	RS485(2 wires)	
Enter the number of IDLE char to wait (1 to 255)	5	
Enter device (0-None, 1-Modem)	None	

FUSION "MODULE" SETTINGS

Once the FUSION communication port is setup, associate the equipment to a specific Module number. Select "**Modules**" from the left menu and choose the pre-assigned module or click on a module available (State = None).



Modules Edit <<back

Modules

M1	Value
The module state is	Enabled
The name is	EMCP 4.2
The slave ID is	1
The port is	RS485 Back Port
The number of retry is	5
The module type is	GEN
The time out is	10
The register order is	Most significative register = lower address
The register base address is	subtract 1 from given address
The silent (in 0.01 sec) before sending request is	25

Configure the name of the Module using the reference name of the Genset, such as "EMCP"

FUSION "TEST CHANNEL" SETTINGS

Once the Equipment is associated to a module, a list of channels will appear and be available for Multitel to configure. However, in order to test the MODBUS RTU wiring and EMCP communication settings, it is highly recommended to configure a test channel as per the following to validate. Click on M1A1 and configure the operating parameters for generator Battery Voltage as follows:

Modules Edit

M1A15	Value
The channel state is	Enabled
The name is	BATTERY VOLTAGE
The measure unit is	VDC
The number of decimal digits is (4 = auto)	4
The bits for the mask used to extract value is	None
The strings associated to each code is	Not Programmed
The register address is	202
The reading function code is	3
The sign is	Normal
The data type is	16-Bit Integer
The sign is	Signed Integer
The multiplication factor is	0.05
The channel offset is	0