

GE MILLENIUM II

APPLICATION NOTE

Document Name:

GE-M2_Application
Note_2020-05-04

Date (MM/DD/YYYY):

May 2020

PURPOSE: This application note presents a step-by-step approach to integrate an intelligent DC Power Plant controller to a FUSION.

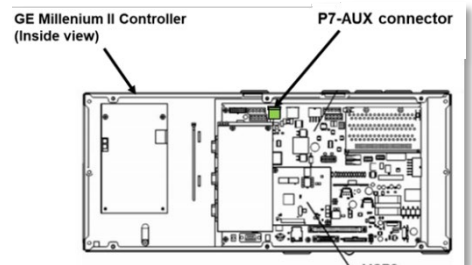


Target Equipment: GE MILLENIUM II

Equipment Description: The GE Millennium II is an intelligent DC Power Plant controller manufactured by ABB. The controller provides a mean to communicate via standard 2-wire RS-485 using Modbus RTU protocol.

PRODUCT DESCRIPTION	
Name	MILLENIUM 2 (M2)
Manufacturer	ABB (Formerly GE)
System Type	48V DC Power System
Modbus Version	1.0.3
Manufacture Technical Support	1-800-843-1797
Specificities	RPM modules for shunt monitoring

The connector to use is the AUX GP connector P7 and not the TB1 connector. It's an RJ45 connector. The pins to use are pin #1 (TX/RX -) and pin #2 (TX/RX +).



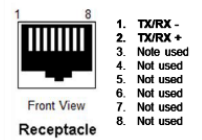
EQUIPMENT CONNECTIONS

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 22AWG stranded, twisted shielded wire to perform the termination at P7-AUX connector. Polarity must be respected throughout the RS-485 network, otherwise communication failures will prevail.



1. Locate the P7-AUX connector on the back side of the M2 controller, remove the plastic cover to access the P7-AUX connector. This connector is an RJ-45 type.
2. A special pigtail available at Multitel can be ordered to facilitate the wiring to the RJ-45 P7-AUX connector. (Part# is C-7000-RJ45)
3. Wire the MODBUS cable as per the following instructions:
 - a. Use PIN #1 for TX/RX – (Orange/white stripe)
 - b. Use PIN #2 for TX/RX + (Orange solide)

P7-AUX Connector

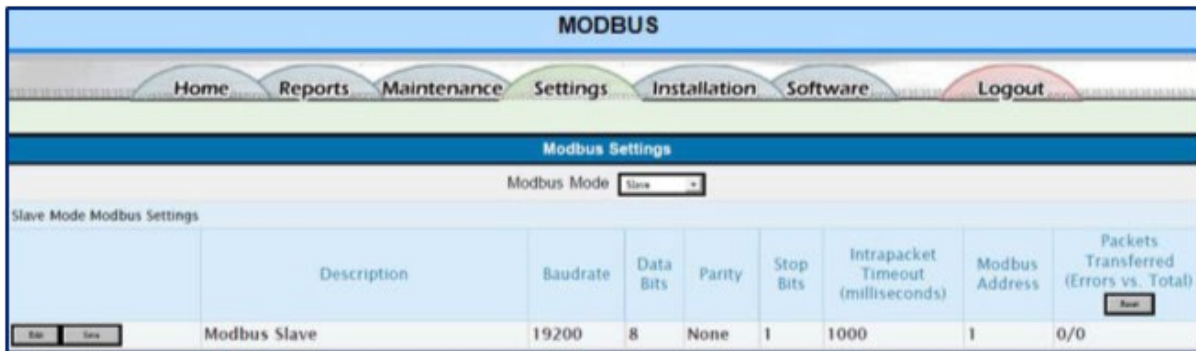


EQUIPMENT COMMUNICATION SETTINGS:

Once the MODBUS wiring is completed, one has to setup a laptop and reach the M2 controller's web interface, once you are logged in, follow the subsequent steps:

1. Access the HTTP interface of the millennium controller to perform MODBUS settings as required. (Default Password: administrator)
2. Click **Settings**, then click **Communications**, then click **Modbus**.
 - a. Set the **Slave Mode Modbus Settings** to slave RTU,
 - b. Edit the port parameters to 9600 baud, 8 data bits, 1 stop bit and parity to : None
 - c. Set slave ID address accordingly.
3. Save all settings.
4. Reset the packet counter and check for no errors.
5. Under Software, click on save config (.gal file). This document is required for Multitel to complete the Fusion configuration

- Under Reports, click on Inventory and take a screen capture of every section (Plant, Controller, Battery, Rectifiers, Remote peripheral and channels)



RMP Shunt monitoring integration

Every RPM is made up of seven possible channels (1-7) and a two digits module ID. The two digits ID can be anything from 01 to FF. Using Hexadecimal addressing, allows us to get up to 255 RPMS on a bus. When setting the IDs, after you get to module 09, you can use 0A, then 0B, 0C, 0D, 0E, 0F, then 10. You shouldn't read this as module ten, but module one-zero. After 10 would be 11, 12, 13, 14, 15, 16, 17, 18, 19, 1A, 1B, 1C, 1D, 1E, 1F, 20, 21, etc.

NOTE

Only module address M01 (Hex) to M19 (Hex) are accessible through Modbus.

FUSION CONNECTIONS

Refer to you 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).

FUSION's RS-485



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 forwarding, 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
M6	Value	
The module state is	Enabled	
The name is	ABB MILLENIUM 2	
The slave ID is	4	
The port is	RS485 Back Port	
The number of retry is	4	
The module type is	GEN	
The time out is	40	
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	0	

*Configure the name of the Module using the reference name of the DC Plant, such as
“Transport #1”*

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 M2 controller 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 as follows:

M1A1	Value
The channel state is	Enabled
The name is	Plant voltage
The measure unit is	V
The number of decimal digits is (4 = auto)	2
The bits for the mask used to extract value is	None
The strings associated to each code is	Not Programmed
The register address is	1
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	1
The channel offset is	-0.01