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NABCB QM 004, EM 016
IQC ISO 9001 : 2015 IND/QMS/NAB-C1978/2658

PV Module Temperature Transducer Operation and Installation Manual (RS-485 Modbus)
Model – MBMet-803

Document Number: M4 011 010 010 05 (R2)

Contents

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1. Temperature Transducer - Parts

Module Temperature Sensor RS-485 is shipped with the following parts

A.	PT1000 Sensor Unit (with three meters cable)	– 1 No
B.	PT1000 to RS-485 Transducer JB	– 1 No
C.	Sensor cable holding cable cradles	– 3 Nos
D.	Mounting screws with nut and washer	– 2 Nos
E.	Transducer extension cable	– According to customer requirement.

Fig 1.1 –PV Module Surface Temperature transducer (RS-485)

2. Installation of PV Module Sensor

Selection of the place of mounting the sensor is important factor for the correct temperature measurement of the photo-voltaic module.

i) The sensor is to be pasted to the back side of the PV Module in the center position of the panel. Care is to be taken so that the sensor does not fall in between two cells. It should be at the center of the centermost cell of the panel as shown in the fig 2.1

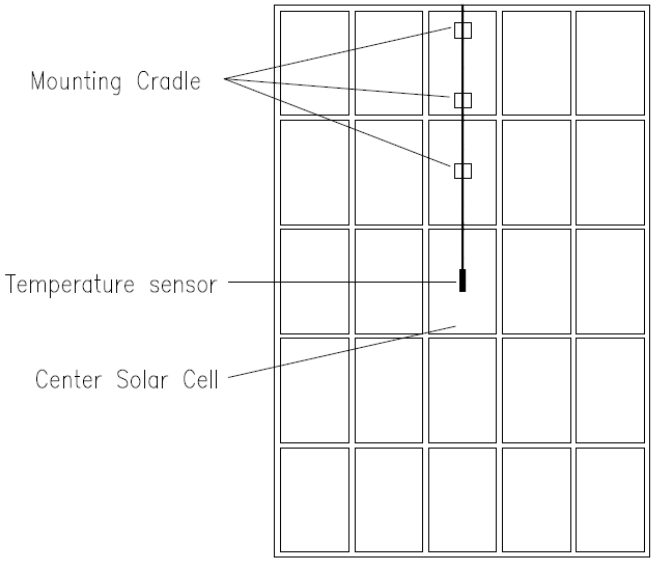

Fig 2.1 – Position of sensor installation

ii) Use the three cable cradles with cable ties to hold the sensor cable in proper position.

3. Installation of Temperature Transmitter

The temperature transmitter is to be fixed on the legs of the solar panel structure.

i) Fix the Mounting screws to the enclosure body with the provided screws

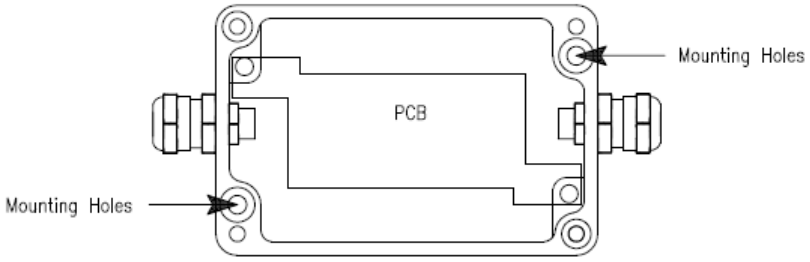

Fig 3.1 – Enclosure mounting holes position

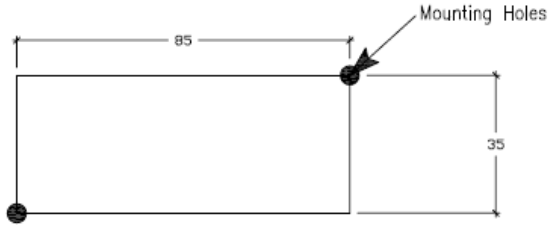

Fig 3.2 – Enclosure mounting hole dimensions

ii) Install the transmitter as per details in the picture provided below.

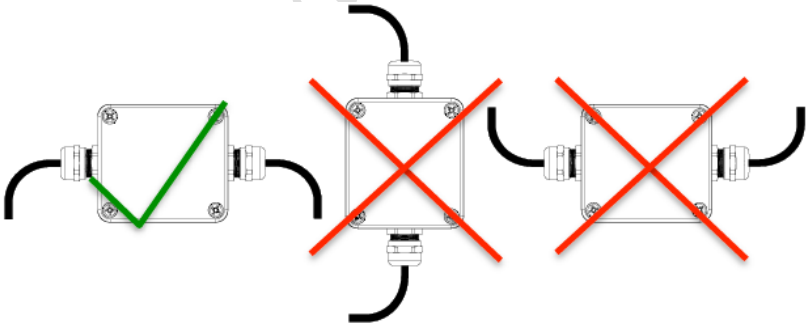

Fig 3.3 – Enclosure mounting in correct way

iii) Fix the enclosure to the structure.

4. Connection of PV Temperature Transducer

i) Open the top cover of the transmitter.
ii) Connect the sensor extension cable as shown in the fig 4.1.

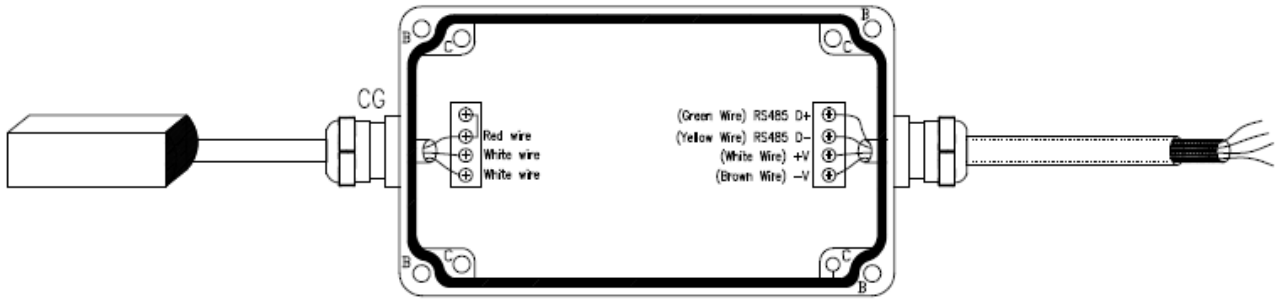

Fig 4.1 – Wiring inside the enclosure

Fig 4.2 – Field wiring

5. PV Temperature Transducer Specifications

Model	MBMet-803
Measurement Range	-40° to +110°C
Temperature Accuracy	±0.1°C
Temperature Stability	<0.02°C per year
Sensor Element Type	RTD Class A
Sensor Cable-Length	Silicone cable – 3 meters
Sensor Housing	Self-Adhesive Aluminum
Self-Adhesive Tape	High temperature conductive acrylic adhesive Tape. Operating temperature tolerance up to 149°C.
Sensor Transmitter Housing	Powder Coated-Cast Aluminum, IP67
Sensor Transmitter Cable	Length : 5 meters (default), PVC insulated, 4-wire cable
Sensor Transmitter Output	Rs-485 Modbus
Power supply	12 to 24 VDC
Power Consumption	30mA @ 12VDC
Operating Atmospheric Temperature	-10°C to +70°C
Operating Ambient Humidity	0.1 to 99.9% RH
Sensor Standard	Meets IEC-61724-1 (2017-03) Class A

Table No:5.1 – PV Temperature RS-485 Transducer Specification

6. Modbus Address for reading temperature

MODBUS Register Address	Length (bits)	Parameter	Parameter Type
0	16	PV Module Temperature*	Signed Integer

Table No: 6.1 – Modbus Address for Temperature

* Resolution for PV Module Temperature is 0.1^{o}C

7. Configuration of communication parameters

7.1. Default Communication Parameters

Modbus ID: 1
Baud Rate: 9600
Parity: None
Stop Bit: 1
Temperature Unit: ^{o}C

7.2. Modbus register details for communication parameters

MODBUS Register Address	Length (bits)	Parameter	Register Type	Parameter Type
100	16	MODBUS ID (Default:1) 1<ID<247	Read/Write	Unsigned Integer
101	16	Baud rate (Default: 1) 0=4800; 1=9600; 2=19200	Read/Write	Unsigned Integer
102	16	Parity (Default: 0) 0=None; 1=Odd; 2=Even	Read/Write	Unsigned Integer
103	16	Stop bits (Default: 1) 1; 2	Read/Write	Unsigned Integer
104	16	Temperature Units (Default: 0) 0 = ^{o}C; 1 = ^{o}K; 2 = ^{o}F	Read/Write	Unsigned Integer
105	16	Save Configured parameters 1=Save **	Write only	Unsigned Integer

Table No: 7.1 – Modbus Details of MBMet-803 Transducer

** You must send 1 in register 105 to save the settings otherwise the settings will not be saved

7.3. Setting Required Communication Parameter

Let's take the example that the following communication parameters need to be set

Modbus ID: 10
Baud rate: 19200
Parity: Even
Stop Bit: 2
Temp: ^{o}C

Step-1 Connect the sensor to the Modbus Master Software with the default settings.

Step-2 Set the following

Function: Write Multiple Registers
Starting Address: 100
Number of register: 6
Data Type: Integer

Step-3 Set the communication parameters as per your requirement. (See example settings)

Modbus Register	Value with description
100	10 (Modbus ID=10)
101	2 (Baud Rate = 19200)
102	2 (Parity = Even)
103	2 (Stop Bit = 2)
104	0 (Temperature: ^{o}C)
105	1 (Save)**

Table No 7.2 – Set values according to your requirement

** You must set 1 in register 105 to save the settings otherwise the settings will not be saved

Step-4 After all the Parameters are set, send the same to the sensor. The sensor will stop communication. Please note that writing single register is not allowed. All the registers are to be written in one go.

Step-5 Connect the sensor using the modified communication parameters that is set in Step-3. The sensor will start communicating.

7.4. Re-setting Default Communication Parameter

Procedure for re-setting default communication parameters is as follows.

Step-1: Switch Off the power supply of the Transducer.
Step-2: Open the transducer cover for gaining access to the PCB.
Step-3: Locate the Jumper JP1 in the PCB.

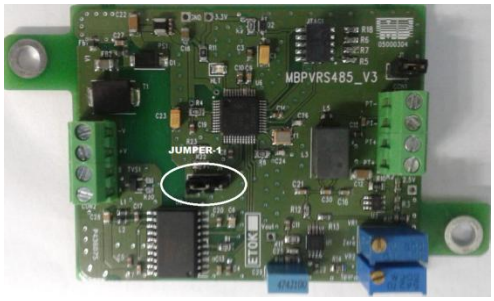

Fig – 8.1: Position of Jumper-1 in board

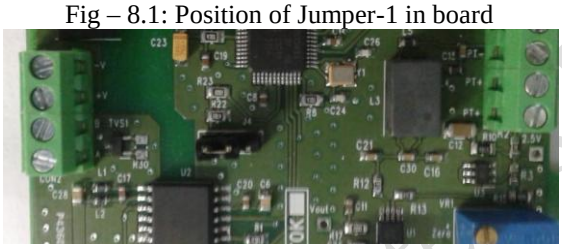

Fig – 8.2: Jumper position (factory setting)

Step-4: Change the jumper position from Fig 8.2 to Fig 8.3

Fig – 8.3: Jumper position (for factory resetting)

Step-5: Switch On power supply, wait for 30 sec and switch off the power supply
Step-6: Reconnect the jumper in the original factory position as in Fig 8.2
Step-7: Close the transducer cover securely

The transducer is reset to it's factory settings. It can now be reconfigured according to requirement.

8. PV Module Temperature Transducer Hardware Information Modbus Addresses:

Modbus Register Addresses	Length (bits)	Parameters	Register Type	Parameter Type
110	16	Device Model No	Read only	Unsigned 16 Bits
111	16	Hardware Version	Read only	Unsigned 16 Bits
112	16	Software Version	Read only	Unsigned 16 Bits
113	16	Manufacture Year	Read only	Unsigned 16 Bits
114	16	Device Sl No	Read only	Unsigned 16 Bits

Table No 8.1 – Hardware Information Modbus Addresses