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

Digital Input to RS485 Interface
Operational and Installation Manual
Model –MBMet-807
Document Number: M4 026 010 010 01 (R1)
(Suitable for HW Version-101 and SW Version – 102)

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1. Warnings

- Installation at site should be done by skilled and qualified personal after taking required approvals.
- Use proper protection gear and tool while installing the device.
- Be aware of your surroundings while doing the installation work.
- Serious injury can occur if proper safety norms are not followed.
- Compliance with all utility and electrical safety codes regulations are mandatory.
- Read the manual and get acquainted with the device connections and terminals before commencing installation activity.
- Before connecting the device, read its label to confirm power supply requirements.
- All connections should be done only when power to the device is switched off.
- Improper installation and connections may damage the device and sensor connected to the same.
- Protect from overvoltage and static electricity.
- Physically damaged devices should not be used or connected to main power.
- Use proper earth connection.
- **Use proper size screwdriver (tools) and cable for connection else the terminals might get damaged.**

2. Application

Model MBMet-807 is used to provide RS485 interface for sensors having digital output (NPN or PNP).
Rain gauge and count values are retained on power failure.
Following type of sensors can be interfaced to the device.

i) Status input
ii) Counter input
iii) Rain Gauge input
iv) Wind speed sensor input

3. Technical Specifications

Technical specifications for the device MBMet-807 are provided in table-3.1 below.

Sr. No	Parameter	Specification
1	Power Supply	9-32VDC Power Supply
2	Digital input 0-200Hz	i) Status input ii) Counter input iii) Rain Gauge input iv) Wind speed sensor input
3	LED Indications	CPU Health LED
4	Communication	Isolated (1.5kV) two wire RS485 Modbus RTU
5	Output data format	32 bits signed integer and 32 Bits floating point (Without any scaling factor)
6	Baud rates	Configurable 4200, 9600 and 19200
7	Ingress protection	IP-65
8	Housing Material	Powder coated aluminum enclosure
9	Dimension (L x B x D)	64 x 58 x 34 mm
10	Weight	150g approx.

Table-3.1: MBMet-807 technical specifications

4. Installation

4.1 Mounting the MBMet-807

Step – 1: Drill two holes (M5) at site where the MBMet-807is intended to be mounted according to the following diagram

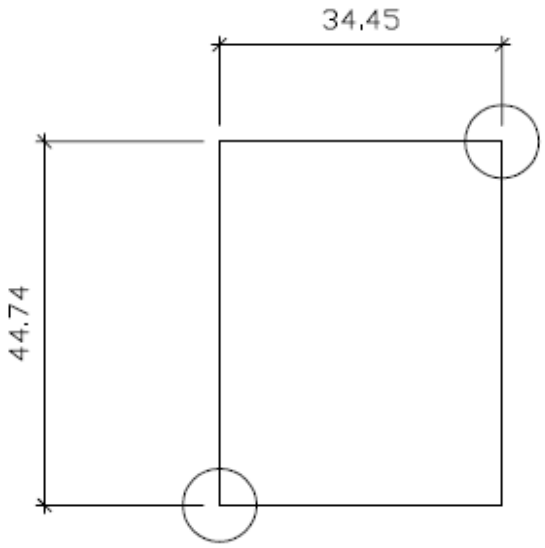

Fig – 4.1.1: Mounting hole dimensions

Step – 2: Open the cover to access the mounting hole of the enclosure

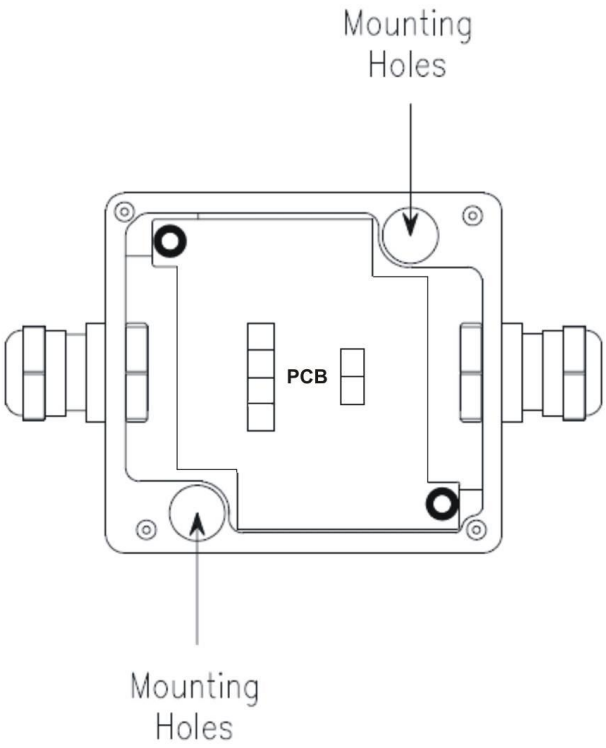

Fig – 4.1.2: MBMet-807 mounting details

Step – 3: Mount the enclosure with the M5 X 36mm screw nut and washer set provided along with the package

5. MBMet-807 Connections

Care should be taken so that no components on the PCB are touched.
Terminal numbers on the sensor PCB are given in the figure5.1 below.

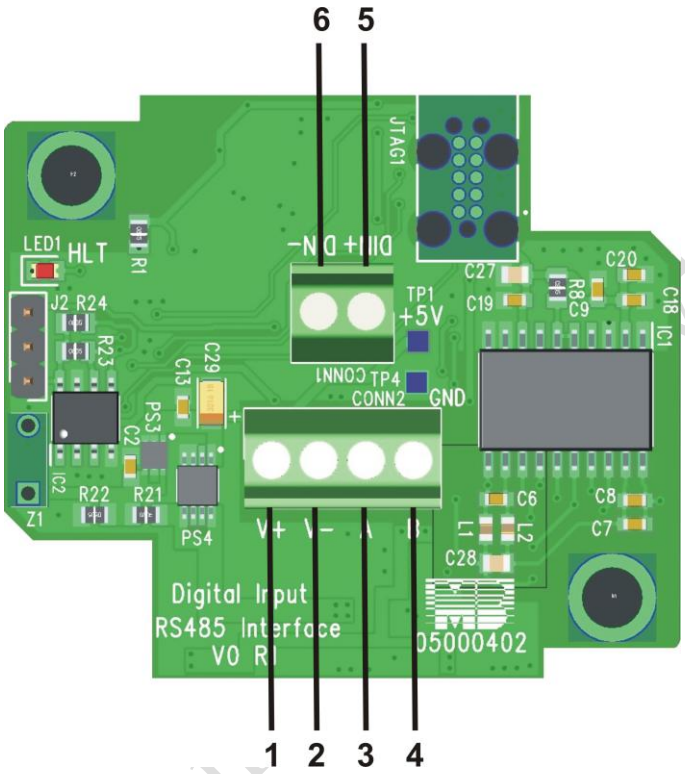

Fig – 5.1: Terminal Numbers

Terminal No	Terminal Notation	Connected to
1	V+	9-32 VDC+
2	V-	GND
3	A	RS485 D+
4	B	RS485 D-
5	DIN+	Digital Input +
6	DIN-	Digital Input -

Table-5.1: MBMet-807 connections

5.1 Power, RS485 and DI Connections

Input Power Supply, RS485 Modbus RTU and Digital Input Connection are provided in Fig – 5.1.1

Note: Refer Technical Specification details provided in Table-3.1 for minimum and maximum external power rating.

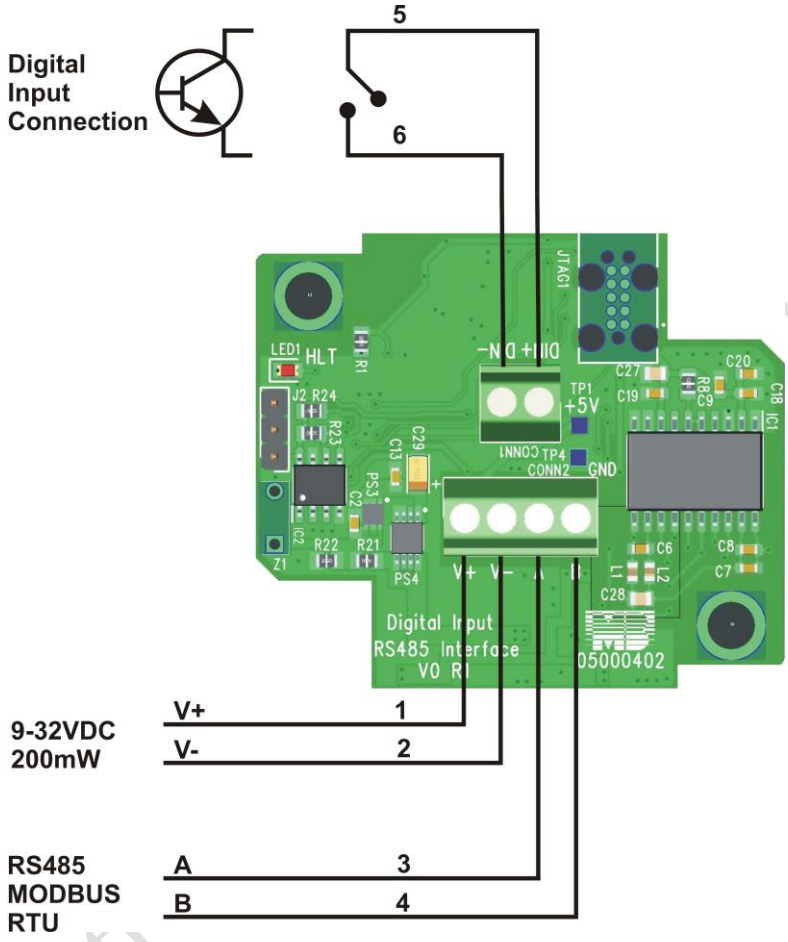

Fig – 5.1.1: Terminal Numbers

6. Led Indications

Details of LED indicators provided on the device front are provided in table -6 below.

Sr. No	Led indication	Reference / Colour	Description	Led Status
1	CPU Health LED	HLT / Green	Device in normal operation	Slow Flash
			Device operations fail	Steady

Table-6: Digital Interface Module Led indication details

7. Default Configuration

Default configuration for MBMet-807isprovidedin table-7 below.

Sr. No	Parameter	Default Setting
1	Communication Parameters	
1.1	Device MODBUS address	1
1.2	Baud rate	9,600
1.3	Parity	None
1.4	Stop bits	1
2	Digital input channel	
2.1	Rain Gauge Constant	20
2.2	Wind Speed Constant	21
2.3	Wind Speed Slope	620

Table-7: Default configuration for MBMet-807

8. MODBUS Registers for Reading Measured Parameters

Parameters from the device can be read via MODBUS protocol in both signed integer and float data formats.

8.1 MODBUS Registers for reading measured parameters in signed integer format

Register Address	Measured Parameter	Register Length (bits)	Register Type	Parameters Type
0	Digital Input parameter value	32	Read only	Unsigned Integer
2	Number of Pulses	32	Read only	Unsigned Integer

Table No: 8.1 – Modbus Addresses for reading parameters via MODBUS RTU

8.2 MODBUS Registers for reading measured parameters in float data format

Register Address	Measured Parameter	Register Length (bits)	Register Type	Parameters Type
20	Digital Input parameter value	32	Read only	Float
22	Number of Pulses	32	Read only	Float

Table No: 8.2 – Modbus Addresses for reading parameters via MODBUS Float

Note:

i) For status input – value read shall be 0 for ‘Off’ status and 1 for ‘On’ status.
ii) All other integer values will be multiplied by ‘10’.
iii) Float values will be without any multiplication factor.

9. Configuration –Communication Parameters

Configuration details of MODBUS communication parameters are provided here.

9.1 Register Addresses for MODBUS Communication Parameters

Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
100	MODBUS ID 1<ID<247	1	16	Read/Write	Unsigned Integer
101	Baud rate 0=4800; 1=9600; 2=19200	1	16	Read/Write	Unsigned Integer
102	Parity 0=None; 1=Odd; 2=Even	0	16	Read/Write	Unsigned Integer
103	Stop bits 1 (only stop bit 1 setting is allowed)	1	16	Read/Write	Unsigned Integer
104	Save communication parameters	0	16	Write only	Unsigned Integer

Table No: 9.1 – Modbus communication parameters

Note: To save the communication parameters, write'1' in register 104else the settings will not be saved.

9.2 Configuration of MODBUS Communication Parameters

Example is provided below for setting following communication parameters for the MBMet-807.

Modbus ID: 10
Baud rate: 19200
Parity: Even
Stop Bit: 2

Step-1: Connect the MBMet-807 to the Modbus Master Software with the default settings.

Step-2: Set the following in the MODBUS Master:

Function:	Write Multiple Registers
Starting Address:	100
Number of registers:	5
Data Type:	16 bits Integer

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

Register Address	Parameter	Parameter Value
100	MODBUS ID	10 (Modbus ID=10)
101	Baud rate	2 (Baud Rate = 19200)
102	Parity	2 (Parity = Even)
103	Stop bits	1 (Stop Bit = 1)
104	Save	1 (Save)

Table No: 9.2 – Modbus communication parameter configuration

Notes:

i) To save the communication parameters, write 1 in register 104 else the settings will not be saved.

ii) Please note that writing single register is not allowed. All the registers are to be written in one MODBUS write command.

Step-4: After all the parameters are set in MODBUS Master, write the same to the MBMet-807. The MBMet-807will stop communication and restart again with modified parameters.

Step-5: Connect to MBMet-807using the modified MODBUS communication parameters in the MODBUS Master that is set in Step-3. The MBMet-807will start communicating.

Step-6: Configured communication parameters can be verified by reading the communication MODBUS registers (100 to 103) of the MBMet-807.

9.3 Setting Default MODBUS Communication Parameters

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

Step-1: Switch Off the power supply of the MBMet-807.
Step-2: Open the MBMet-807cover for gaining access to the PCB.
Step-3: Locate the Jumper J2 in the PCB

.

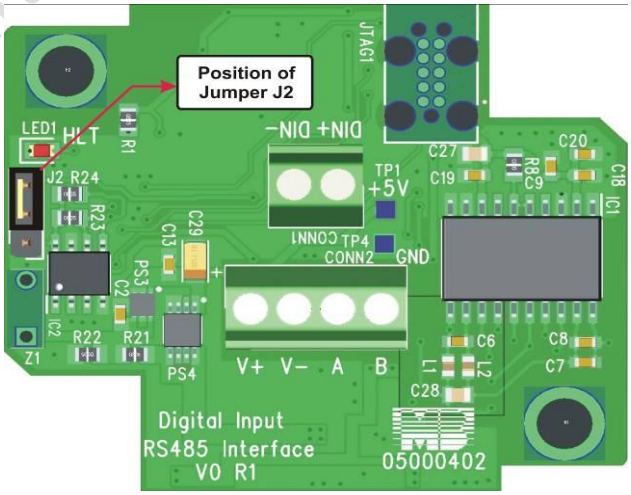

Fig –9.3.1: Position of Jumper-J2 in Pcb

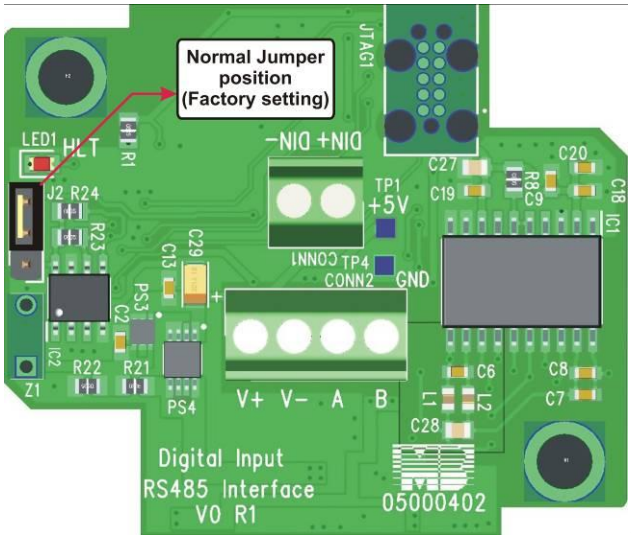

Fig – 9.3.2: Normal Jumper position (factory setting)

Step-4: Change the jumper position from Fig 9.3.1 to Fig 9.3.3 as shown below

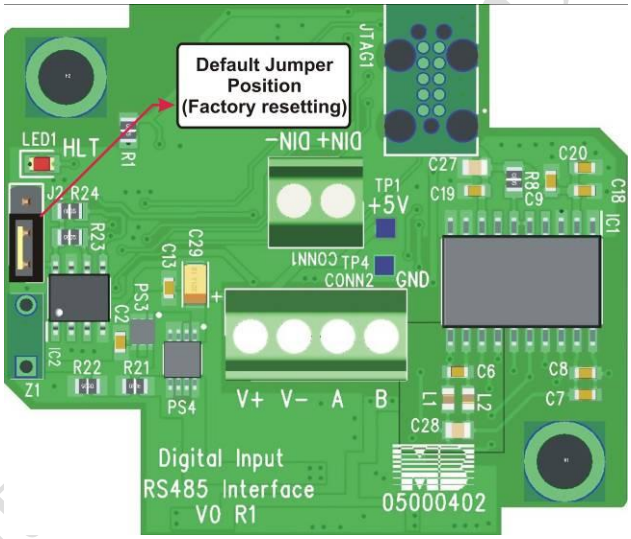

Fig – 9.3.3: Default Jumper position (for factory resetting)

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 9.3.2
Step-7: Close the transducer cover securely

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

10. Configuration – Digital Input

Configuration details for digital channel are provided here.

Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
Digital input Channel					
120	Signal input Type 3= Rain Gauge	0	16	Read/Write	Unsigned Integer
121	Rain Gauge Constant. Note: Constant x 100 Range: 0.01 to 10.00	20	16	Read/Write	Unsigned Integer
122	Wind Speed Constant. Note: Constant x 100 Range: 0.01 to 10.00	21	16	Read/Write	Signed Integer
123	Wind Speed Slope. Note: Slope x 1000 Range: 0.001 to 1.000	620	16	Read/Write	Signed Integer
124	Save configuration DI Channel	20	16	Write only	Unsigned Integer

Table No: 10.1 – Analog input channel configuration

Note:

i) **Calibration constant is user defined and shall be used for calculation, if the same is enabled. Calibration constant is 16 bits unsigned integer with range 1.00 to 655.34. If calibration constant is enabled, range parameters for the channel are not used. Calculation is then done as shown below in (ii).**

ii) **To save the configuration parameters, write 1 in register 124 else the settings will not be saved.**

11. Hardware Information

Hardware details of MBMt-807 can be read via MODBUS registers as per details provided below.

Register Address	Parameter	Length (bits)	Register Type	Parameters Type
110	Device Model No MBMet-807	16	Read only	Unsigned Integer
111	Hardware Version	16	Read only	Unsigned Integer
112	Software Version	16	Read only	Unsigned Integer
113	Manufacture Year	16	Read only	Unsigned Integer
114	Device Serial number	16	Read only	Unsigned Integer

Table No: 11.1 – MBMet-807 hardware details read registers