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Smart Interface Operation and Installation Manual
Model –MBMet-806
Document Number: M4 027 010 010 01 (R2)
(Suitable for HW Version-2.01 and SW Version – 1.02)

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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 Smart Interface Module connections and terminals before commencing installation activity.
- Before connecting the Smart Interface Module, read its label to confirm power supply requirements.
- All connections should be done only when power to Smart Interface Module 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 Smart Interface Module 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. Smart Interface Module

Smart interface module enables interfacing of various types of sensors and transducers. Each input channel of the device can be configured to read parameters from different type of sensor.
Digital inputs are optically isolated.
All measured parameters can be read as Integer or Float values via MODBUS RTU protocol.
Excitation voltage is provided for digital and analog sensors. For analog sensors, excitation voltage can be selected between 5V or 12VDC.

Device model can be selected as per application requirement as per details provided in table - 2 below.

Sr. No.	Input Parameters	MBMet-806-AA	MBMet-806-VA	MBMet-806-VV
1	Digital input Channel 1	●	●	●
2	Digital input Channel 2	●	●	●
3	Analog input 1	4-20mA	0-5VDC	0-5VDC
4	Analog input 2	4-20mA	4-20mA	0-5VDC

Table-2: Smart Interface Module – model details

Some of the sensors which can be interfaced with the device are listed below:

Digital Inputs: Status monitoring, Rain Gauge, Wind Speed, Counting etc. Rain gauge and counter values are retained even on power fail.

Analog Inputs: Wind Direction, mA (4-20mA) and voltage (0-5VDC) transducers. Required excitation voltage can be selected.

3. Technical Specifications Smart Interface Module

Technical specifications for the Smart Interface Module are provided in table-3 below.

Sr. No	Parameter		Specification
1	Power Supply	Model- MBMet-806	9-32VDC , 0.5W
2	Digital input Channel 1	0-1000Hz	Can be configured for the following: i) Status input ii) Counter input iii) Rain Gauge input iv) Wind speed sensor input
3	Digital input Channel 2	0-1000Hz	Can be configured for the following: i) Status input ii) Counter input iii) Rain Gauge input iv) Wind speed sensor input
4	Digital input Sensor Excitation power supply		+12V DC (max 60mA) for each digital input channel. Short circuit protected.
5	Analog input 1	0-5.0V DC 4-20mA	ADC resolution- 12 bits Sampling rate – 5 Hz Accuracy – 0.1%
6	Analog input 2	0-5.0V DC 4-20mA	ADC resolution- 12 bits Sampling rate – 5 Hz Accuracy – 0.1%
7	LED Indications		i) Power Input LED ii) CPU Health LED iii) Digital Input status iv) RS485 Rx and Tx LED
8	Analog input Sensor Excitation power supply		Selectable between +5V or +12V DC (max 50mA) for each analog input individually. Short circuit protected.
9	Communication		Isolated (1.5KV) two wire RS485 Modbus RTU
10	Output data format		32 bits signed integer and 32 bits floating point. (Without any scaling factor)
11	Baud rates		Configurable 4200, 9600 and 19200
12	Ingress protection		IP-20
13	Housing Material		ABS Plastic
14	Dimension (L X B X D)		51 mm X 74 mm X 50 mm DIN Rail mounted
15	Weight		100 gm approx.

Table-3: Smart Interface Module technical specifications

Note:

i) Rain gauge values will be accumulated and saved even on power fail to the module.

3.1 Led Indications

Details of LED indicators provided on the device front are provided in table -3 below.

Sr. No	Led indication	Reference / Colour	Description	Led Status
1	Power Input LED	PWR / Green	Power not connected to the module	OFF
			Power connected to the module	ON
2	CPU Health LED	HLT / Green	Device in normal operation	Slow Flash
			Device in calibration mode	Fast Flash
			Device operations fail	Steady
3	Digital Input status LED	DI1 / Green	Digital input 1 Pulse received	ON
			Digital input 2 Pulse received	ON
4	RS485 Rx and Tx LED	RX / Green	Data received	ON
		TX / Green	Data transferred	ON

Table-3: Smart Interface Module Led indication details

4. Smart Interface Module– Installation

Smart Interface Module can be Mount on Din Rail as shown in Fig – 4.

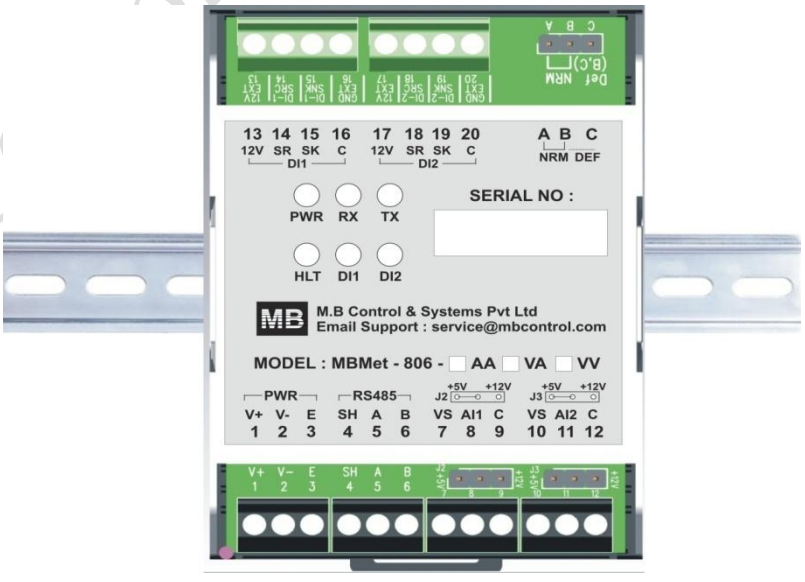

Fig – 4: Smart Interface Module Din Rail Mount

5. Smart Interface Module – Connections

Smart Interface module terminal details, signal details and description are provided in below table-5.

Terminal No	Signal	Description
1	V+	24VDC +
2	V-	24VDC -
3	E	Earth connection
4	SH	RS485 Shield
5	A	A – RS485 D+
6	B	B – RS485 D-
7	VS	Selectable +12V DC or +5V DC Output, 50mA for external sensor
8	AI1	Analog Input 1 +
9	C	Analog Input 1 - / Common
10	VS	Selectable +12V DC or +5V DC Output, 50mA for external sensor
11	AI2	Analog Input 2 +
12	C	Analog Input 2 - / Common
13	12V	+12V DC, 60mA for external sensor
14	SR	DI 1 + / DI 1 Source
15	SK	DI 1 - / DI 1 Sink
16	C	DI 1 - / DI 1 Common
17	12V	+12V DC, 60mA for external sensor
18	SR	DI 2 + / DI 2 Source
19	SK	DI 2 - / DI 2 Sink
20	C	DI 2 - / DI 2 Common

Table-5: Smart Interface Module connections

5.1 Power Supply

Device power supply connections are provided in figure -5.1 below.

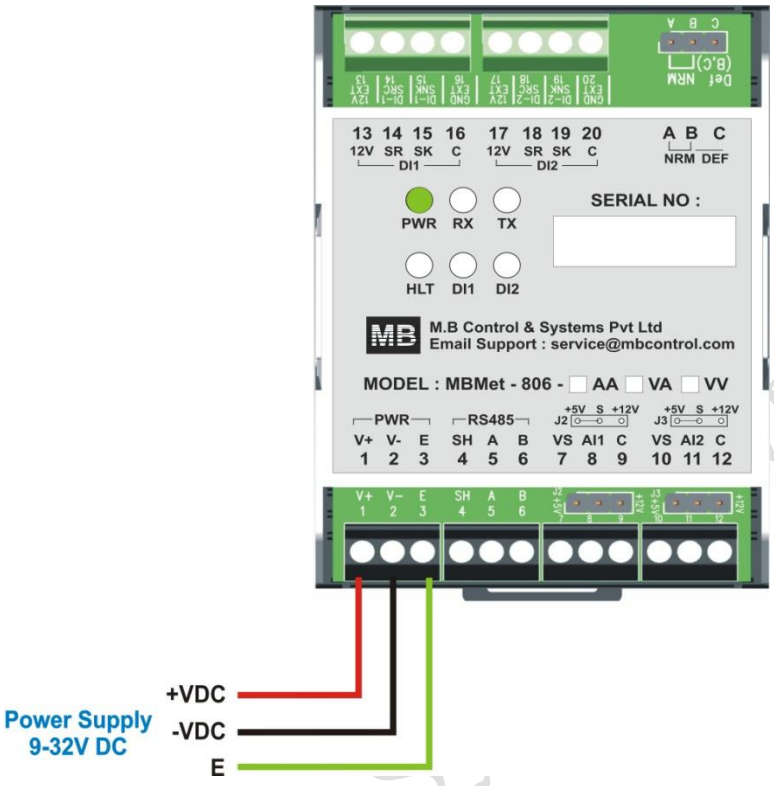

Fig – 5.1: Cable Connection for Input Power Supply

Note: Verify power supply rating for the Smart Interface Module prior to connection. Wrong power supply connection will damage the device

5.2 Serial RS485 Communication

Connections for RS485 communication are shown in figure-5.2 below.

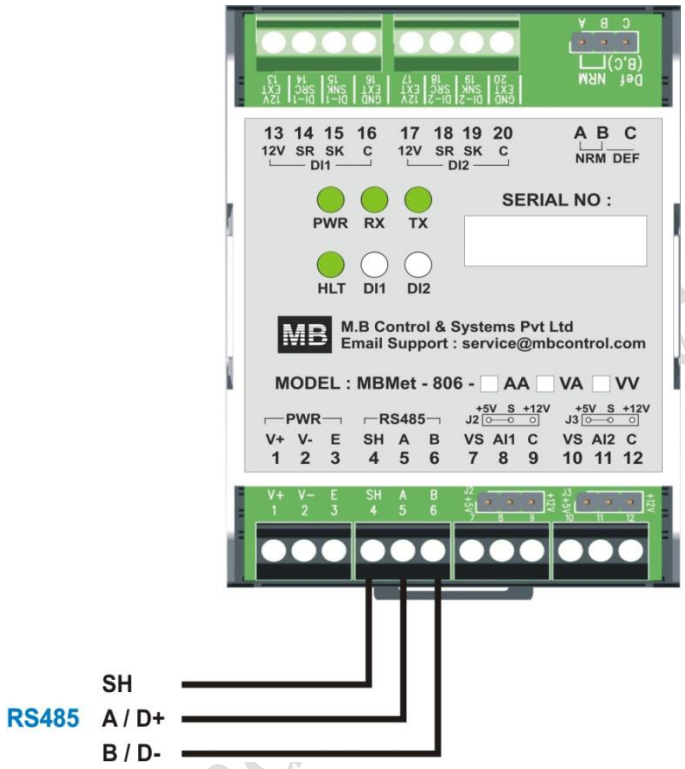

Fig – 5.2: Connection for RS485 communication

5.3 Analog Channel-1

5.3.1 Analog Channel 1 Voltage Input

Applicable for Model MBMet-806 – VV and MBMet-806 – VA

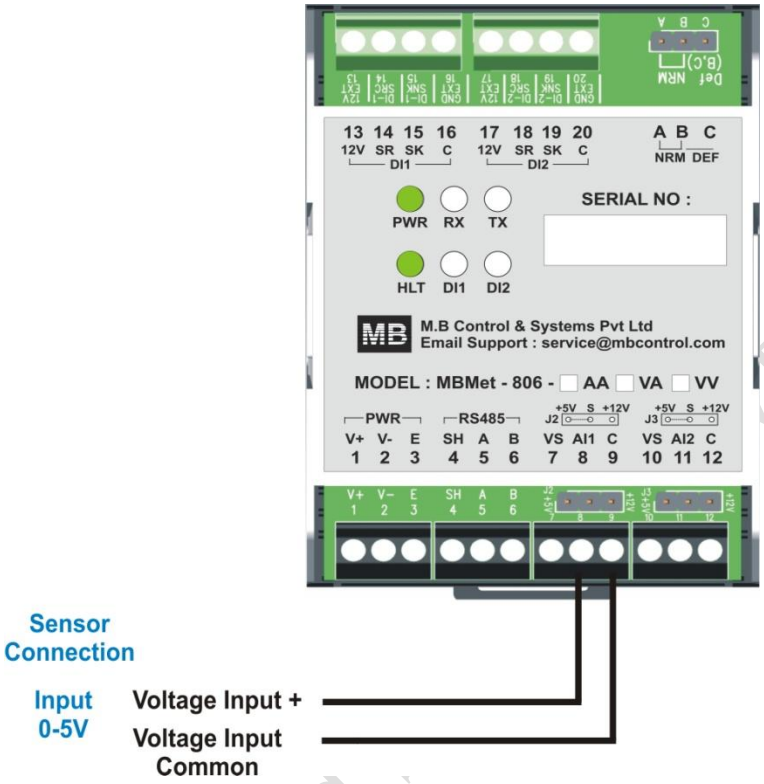

Fig – 5.3.1.1: Connection for Analog Channel 1 (0-5000mV) without using internal excitation voltage

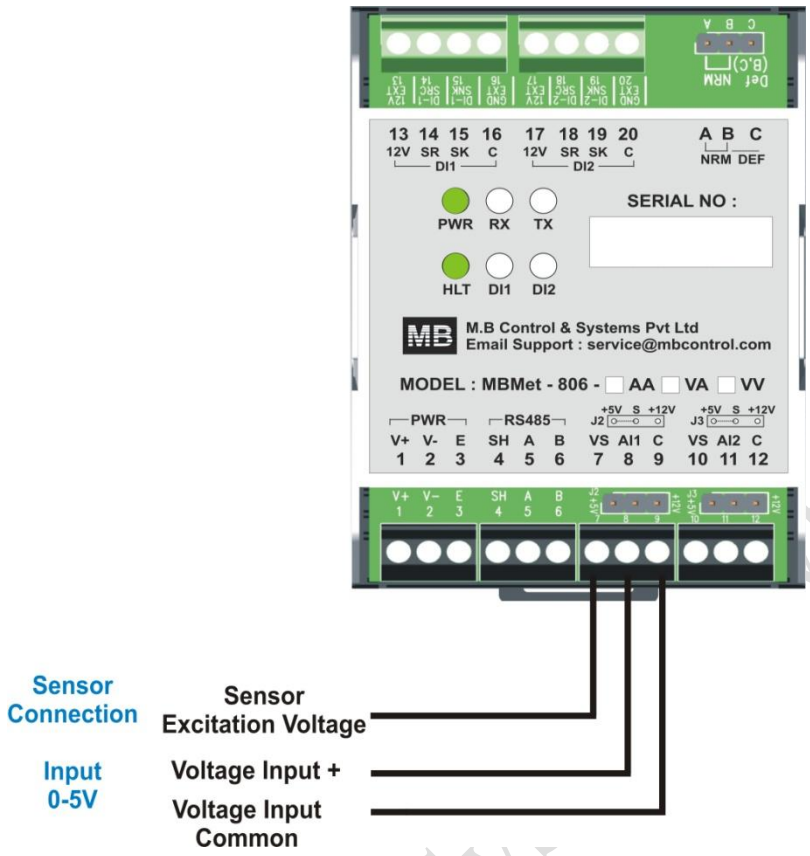

Fig – 5.3.1.2: Connection for Analog Channel 1 (0-5000mV) with internal excitation voltage

Note: Select require excitation voltage using J2.
Short +5V and S for +5V internal excitation voltage.
Short +12V and S for +12V internal excitation voltage.

5.3.2 Analog Channel 1 Current Input

Applicable for Model MBMet-806 – AA.

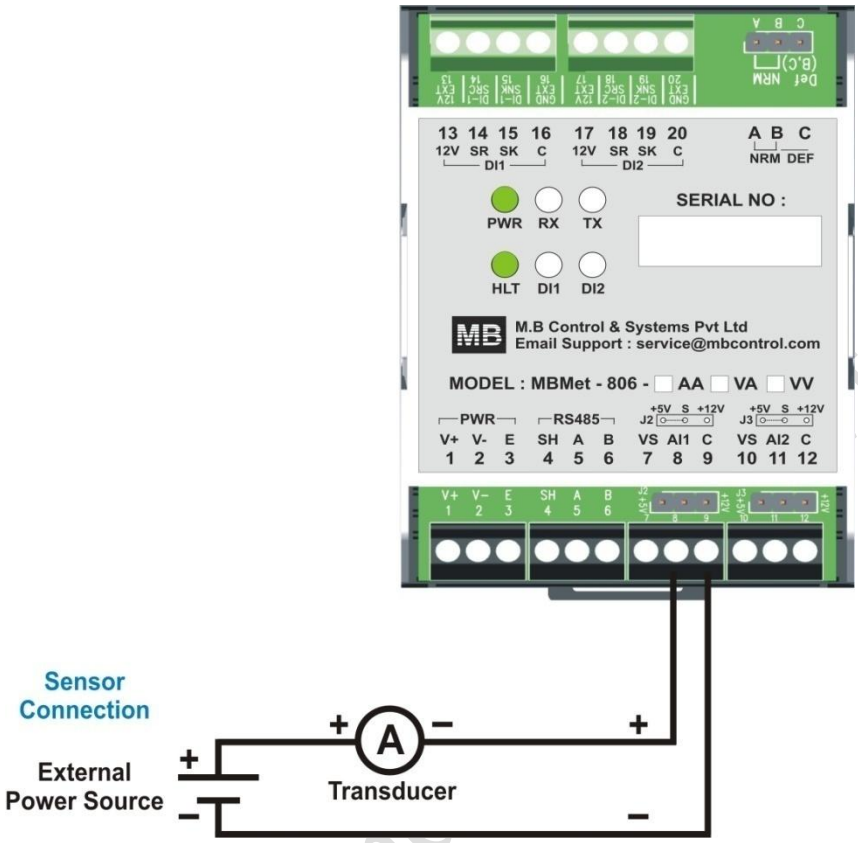

Fig – 5.3.2.1: Connection for Analog Channel 1 (4-20mA) with external excitation voltage

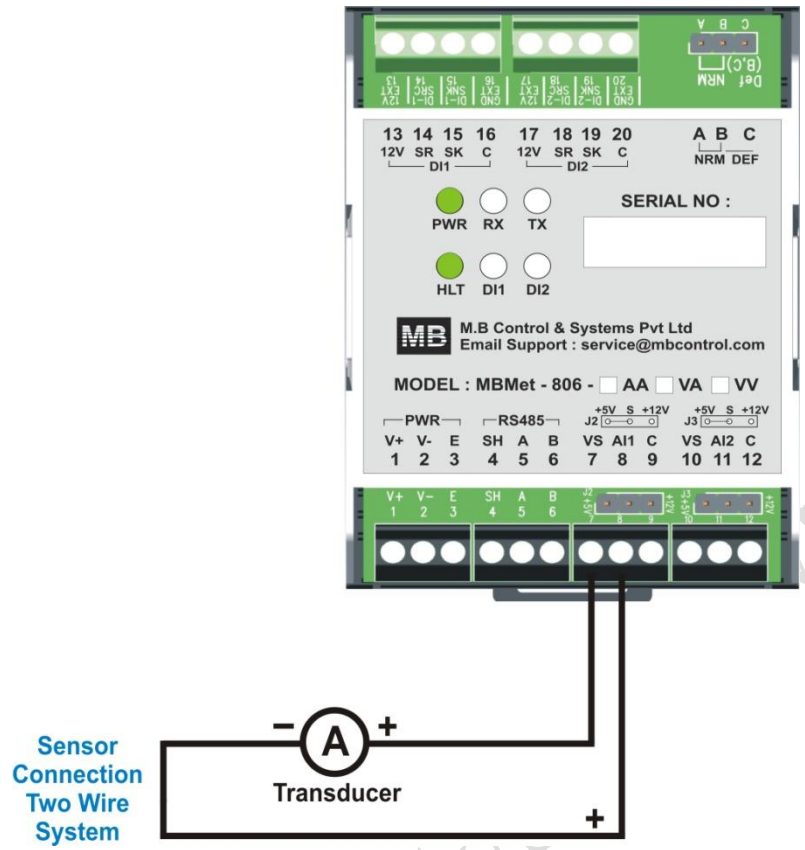

Fig – 5.3.2.2: Connection for Analog Channel 1 (2 wire 4-20mA) with internal excitation voltage

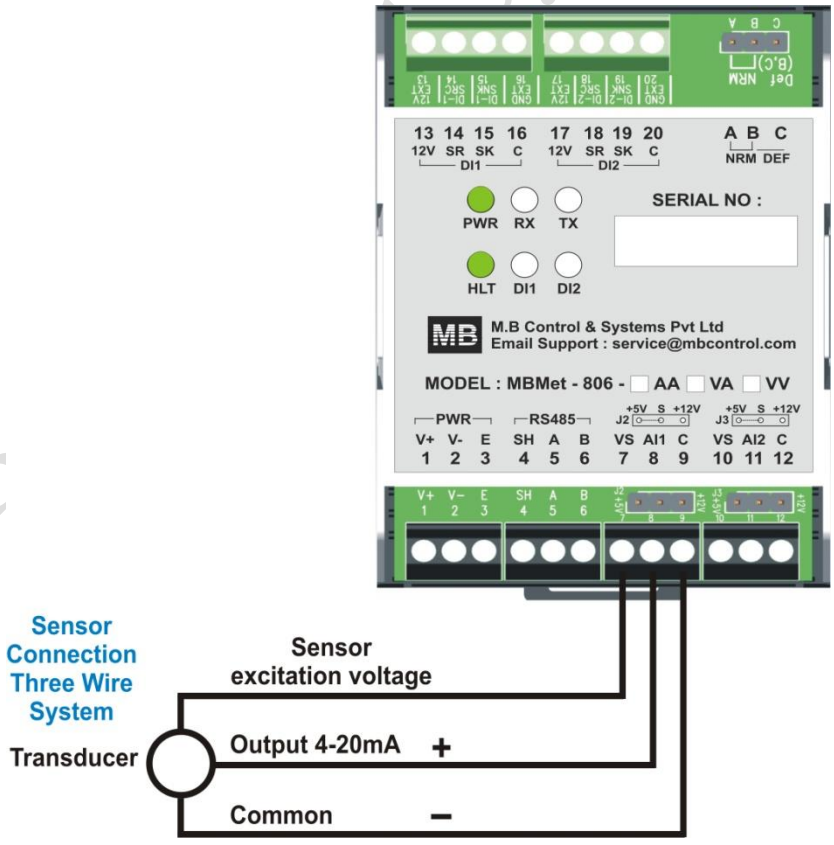

Fig – 5.3.2.3: Connection for Analog Channel 1 (3 wire 4-20mA) with internal excitation voltage

Note: Select require excitation voltage using J2.
Short +5V and S for +5V internal excitation voltage
Short +12V and S for +12V internal excitation voltage

5.4 Analog Channel-2

5.4.1 Analog Channel 2 Voltage Input

Applicable for Model MBMet-806 – VV

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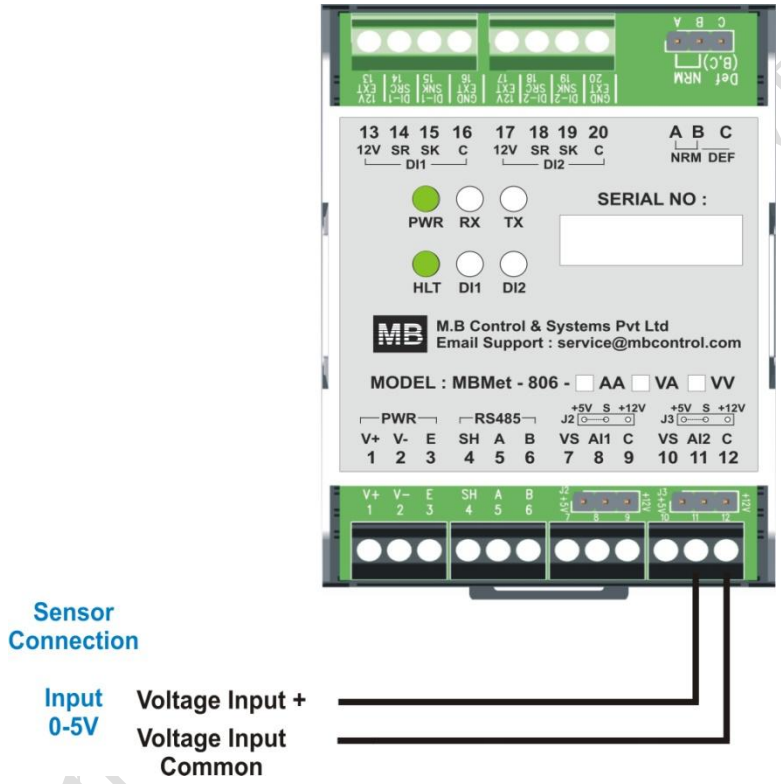

Fig – 5.4.1.1: Connection for Analog Channel 2 (0-5000mV) with external excitation voltage

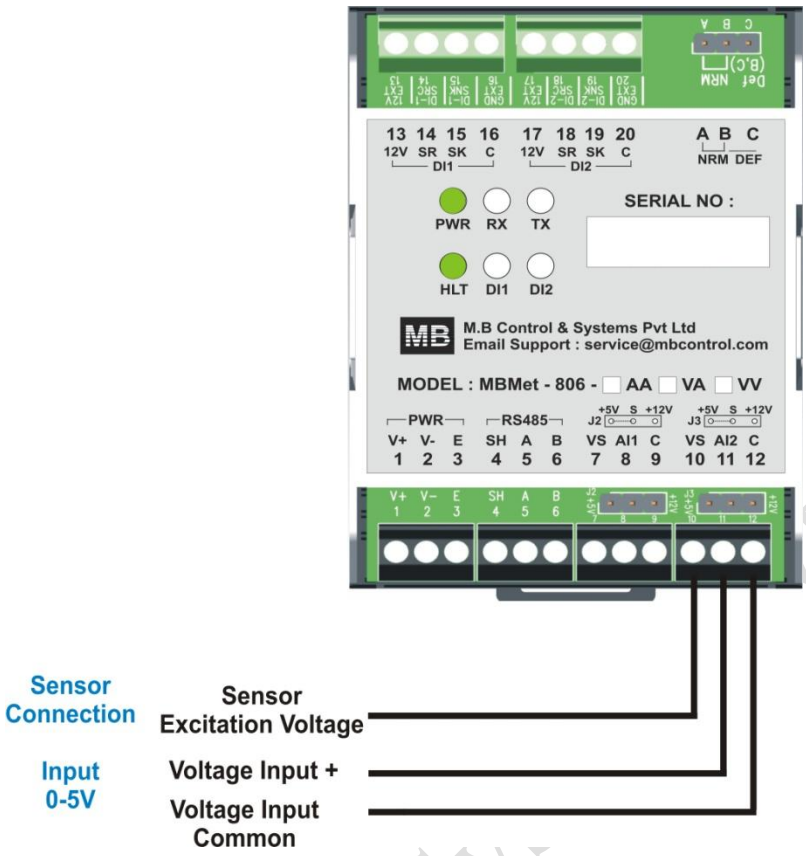

Fig – 5.4.1.2: Connection for Analog Channel 2 (0-5000mV) with internal excitation voltage

Note: Select require excitation voltage using J3.
Short +5V and S for +5V internal excitation voltage
Short +12V and S for +12V internal excitation voltage

5.4.2 Analog Channel 2 Current Input

Applicable for Model MBMet-806 – AA and MBMet-806 – VA

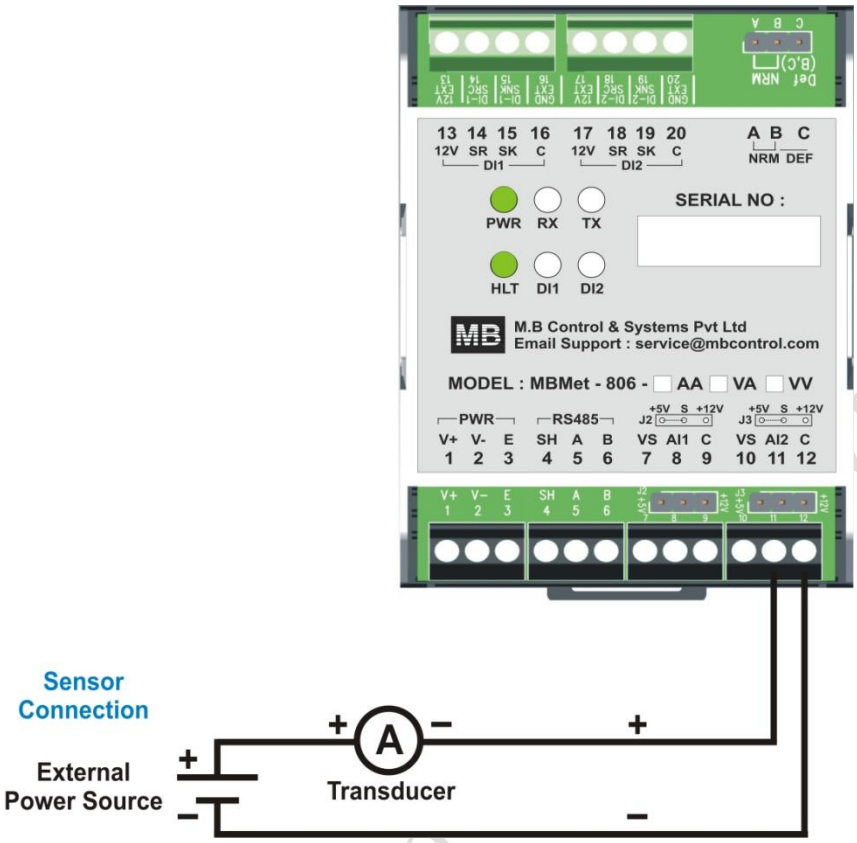

Fig – 5.4.2.1: Connection for Analog Channel 2 (4-20mA) with external excitation voltage

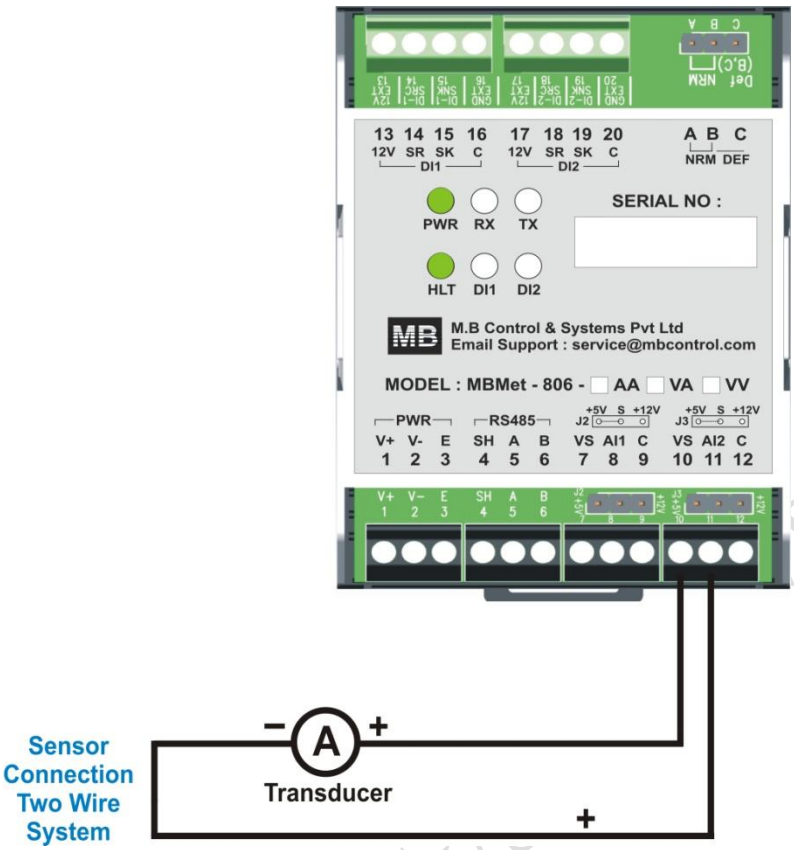

Fig – 5.4.2.2: Connection for Analog Channel 2 (2 wire 4-20mA) with internal excitation voltage

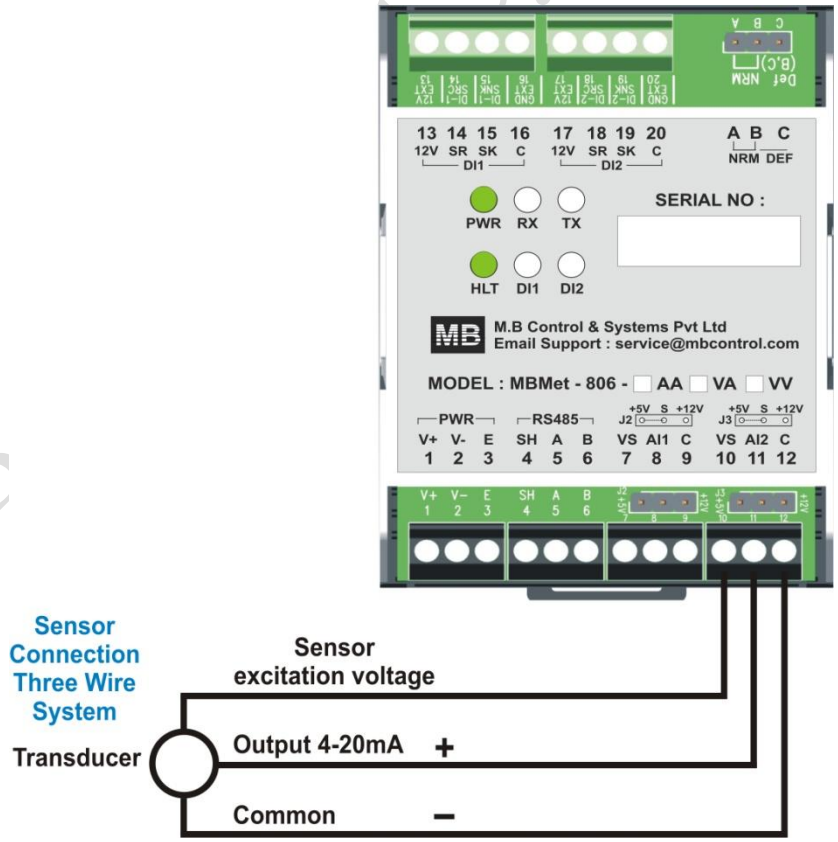

Fig – 5.4.2.3: Connection for Analog Channel 2 (3 wire 4-20mA) with internal excitation voltage

Note: Select require excitation voltage using J3.
Short +5V and S for +5V internal excitation voltage
Short +12V and S for +12V internal excitation voltage

5.5 Digital Input Channel-1

Connection for digital input as sink is shown in figure 5.5.1 below. This can also be used to monitor status.

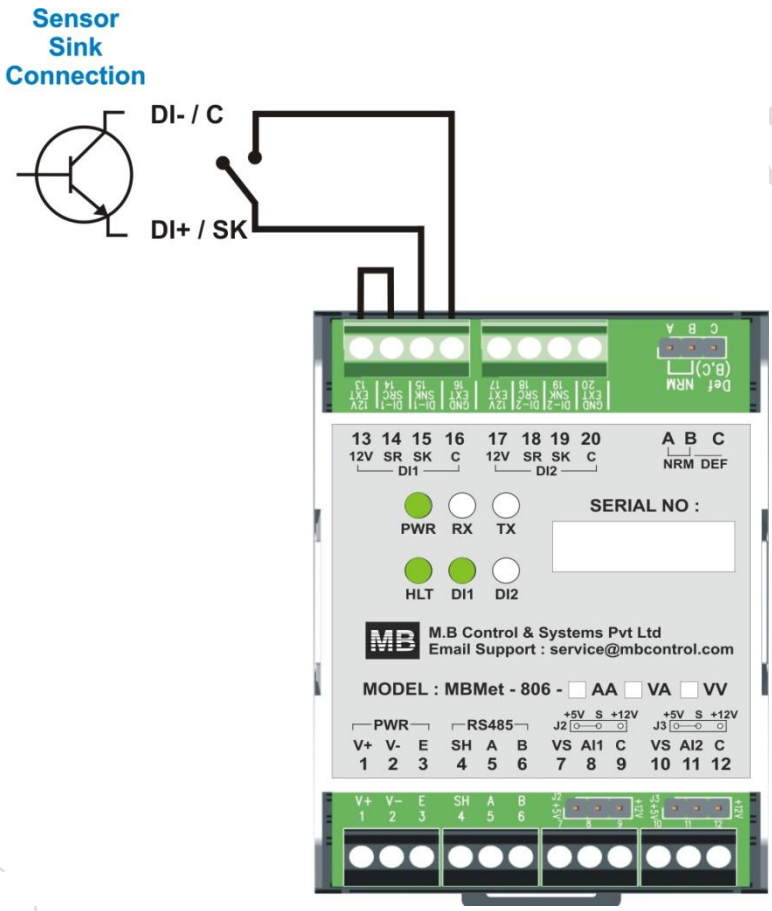

Fig – 5.5.1: Connection for Digital input channel 1 sink connection

Connection for digital input as source is shown in figure 5.5.2 below. This can also be used to monitor status.

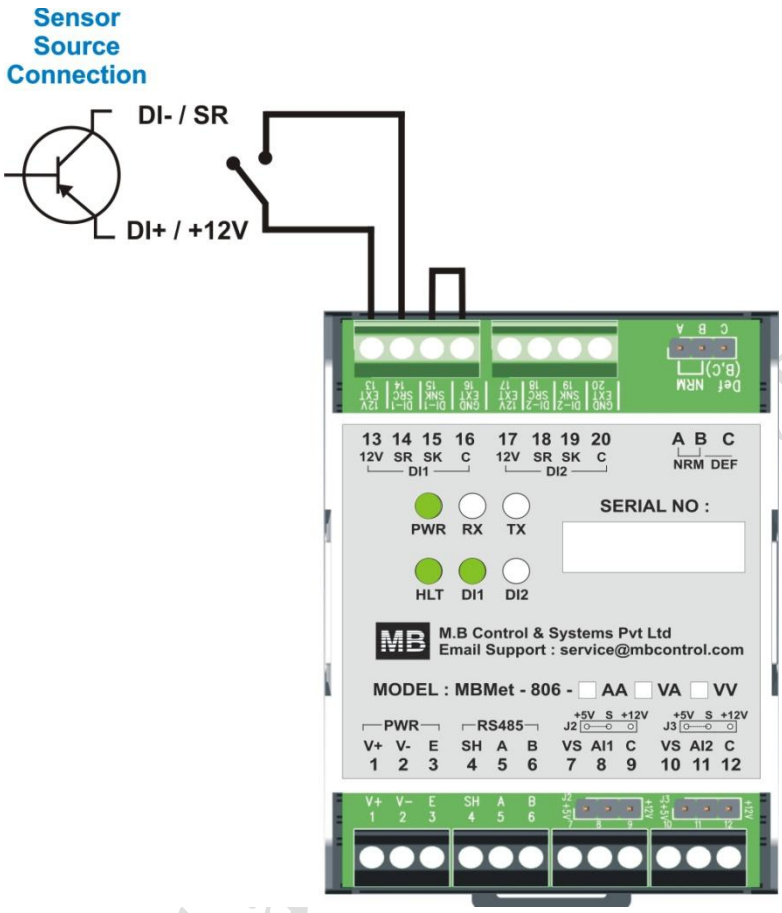

Fig – 5.5.2: Connection for Digital input channel 1 source connection

5.6 Digital Input Channel-2

Connection for digital input as sink is shown in figure 5.6.1 below. This can also be used to monitor status.

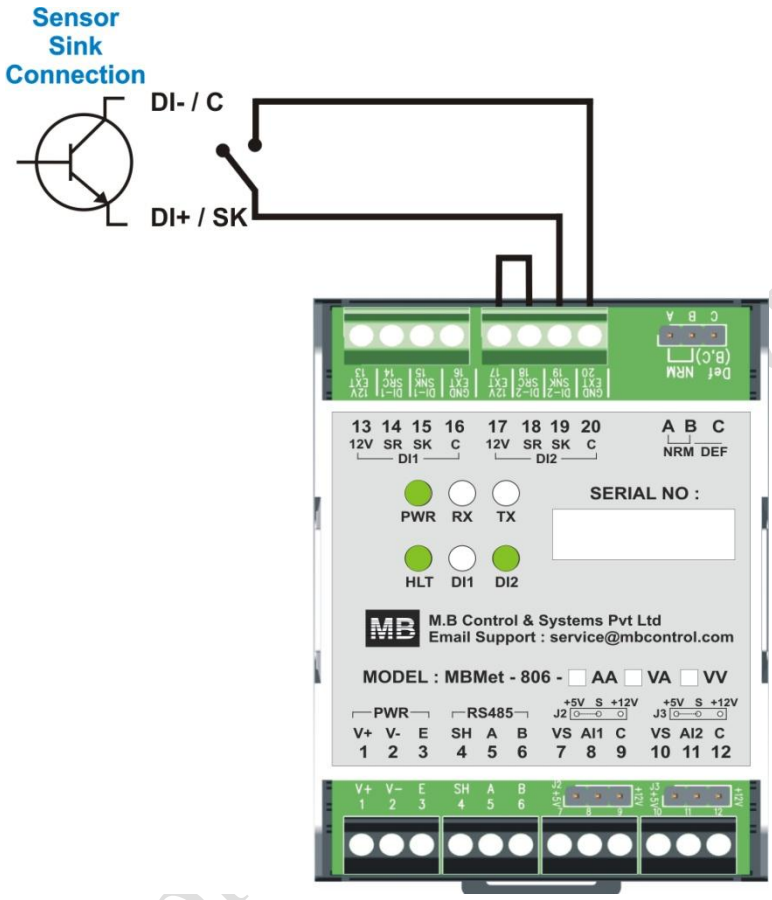

Fig – 5.6.1: Connection for Digital input channel 2 sink connection

Connection for digital input as source is shown in figure 5.6.2 below. This can also be used to monitor status.

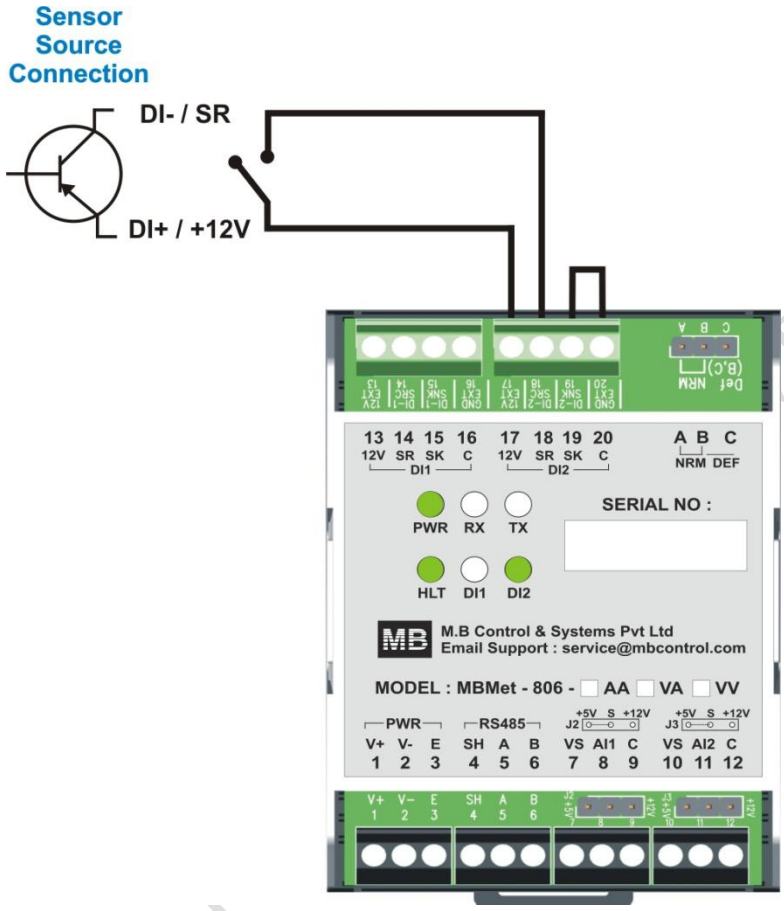

Fig – 5.6.2: Connection for Digital input channel 2 source connection

6. Smart Interface Module – Default Configuration

Default configurations for Smart Interface module is shown in table-6 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	**Analog input channel-1**	
2.1	Analog input status	Not used
2.2	Enable filter	filter disabled
2.3	Low range	0
2.4	High range	100
3	**Analog input channel-2**	
3.1	Analog input status	Not used
3.2	Enable filter	filter disabled
3.3	Low range	0
3.4	High range	100
4.	**Digital input channel -1**	
4.1	Signal input type	Not used
4.2	Rain Gauge Constant	20
4.3	Wind Speed Constant	21
4.4	Wind Speed Slope	620
5	**Digital input channel -2**	
5.1	Signal input type	Not used
5.2	Rain Gauge Constant	20
5.3	Wind Speed Constant	21
5.4	Wind Speed Slope	620

Table-6: Default configuration for Smart Interface Module

7. MODBUS Registers for Reading Measured Parameters

Parameters from Smart Interface module can be read via MODBUS protocol in both unsigned integer and float data formats for digital input channels and in both signed integer and float data formats for analog input channels.

7.1 MODBUS Registers for Measured Parameters - Integer

MODBUS Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
Parameters Read Registers					
0	Digital Input Channel 1 Parameter value	-	32	Read only	Unsigned Integer
2	Digital Input Channel 2 Parameter	-	32	Read only	Unsigned Integer
4	Analog Input-1 Parameter	-	32	Read only	Signed Integer
6	Analog Input-2 Parameter	-	32	Read only	Signed Integer

Table No: 7.1 – MODBUS registers for reading parameters as integer values

Note:

i) Status value =0 for OFF and 1 for ON.

ii) Accumulated rain value parameter is x10 mm.

iii) Wind speed value parameter is x100 meters/sec.

7.2 MODBUS Registers for Measured Parameters -Float

MODBUS Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
Parameters Read Registers					
20	Digital Input Channel 1 Parameter value	-	32	Read only	Float
22	Digital Input Channel 2 Parameter value	-	32	Read only	Float
24	Analog Input-1 Parameter value	-	32	Read only	Float
26	Analog Input-2 Parameter value	-	32	Read only	Float

Table No: 7.2 – MODBUS registers for reading parameters as float values

8. Configuration – MODBUS Communication Parameters

Configuration details of MODBUS communication parameters are provided here.

8.1 Register for MODBUS Communication Parameters

MODBUS Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
MODBUS Communication Parameters					
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	Number of stop bits. 1 (only stop bit 1 setting is allowed)	1	16	Read/Write	Unsigned Integer
104	Save communication parameters (i)	0	16	Write only	Unsigned Integer

Table No: 8.1 – MODBUS communication parameters

Note:

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

8.2 Configuration of MODBUS Communication

Example is provided below for setting following communication parameters for the Smart Interface Module.

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

Step-1: Connect the Smart Interface Module 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)

MODBUS 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 -8.2: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 Smart Interface Module. The Smart Interface Module will stop communication and restart again with modified parameters.

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

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

8.3 Default MODBUS Communication Parameters

Procedure for setting default MODBUS communication parameters is as follows.

Step-1: Switch Off the power supply of the Smart Interface Module.
Step-2: Locate the Jumper in the PCB as shown in below Fig – 8.3.1.

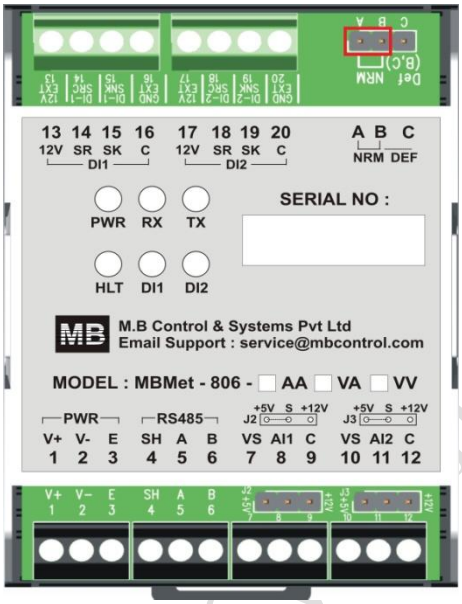

Fig – 8.3.1: Jumper Position for normal operation

Step-3: Change the jumper position from Normal (NRM) to Default (Def) position as shown in below Fig – 8.3.2.

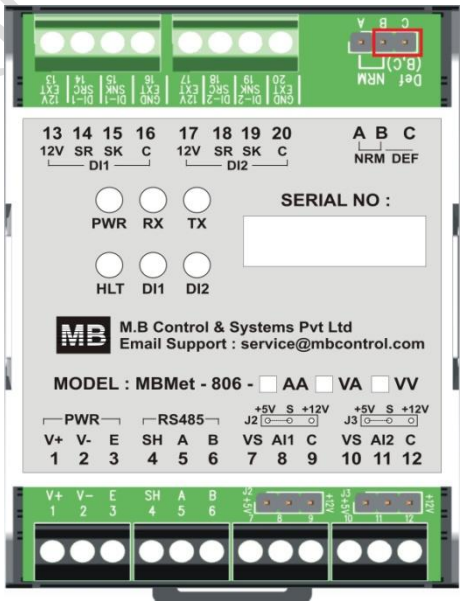

Fig – 8.3.2: Jumper position for setting default MODBUS communication parameters

Step-4: Switch On power supply, wait for 30 sec and switch off the power supply
Step-4: Reconnect the jumper in the original factory position as in Fig 8.3.1

MODBUS Communication parameters will be set to default settings. This will not change any other configuration of the Smart Interface Module.

9. Configuration –Digital and Analog channels

Configuration details for digital and analog channels of Smart Interface module are provided here.

MODBUS Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
Digital Input Channel-1					
120	Signal input Type 0 = Not used, 1= Status 2= Counter 3= Rain Gauge 4= Wind Speed	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 1	1	16	Write only	Unsigned Integer
Digital Input Channel-2					
125	Signal input Type 0 = Not used, 1= Status 2= Counter 3= Rain Gauge 4= Wind Speed	0	16	Read/Write	Unsigned Integer
126	Rain Gauge Constant. Note: Constant x 100 Range: 0.01 to 100.00	20	16	Read/Write	Unsigned Integer
127	Wind Speed Constant. Note: Constant x 100 Range: 0.00 to 100.00	21	16	Read/Write	Signed Integer

128	Wind Speed Slope. Note: Slope x 1000 Range: 0.001 to 10.00	620	16	Read/Write	Signed Integer
129	Save configuration DI Channel 2	1	16	Write only	Unsigned Integer
Analog Input Channel-1					
130	Analog input status 0= Not used 1= used	0	16	Read/Write	Unsigned Integer
131	Enable filter. = 0 filter disabled =1 filter enabled (average of four samples)	0	16	Read/Write	Unsigned Integer
132	mV Range	5000	16	Read/Write	Signed Integer
133	Signal low scaling range	0	16	Read/Write	Signed Integer
134	Signal high range	5000 (2000mA)	16	Write only	Unsigned Integer
135	Save configuration AI Channel 1	1	16	Write only	Unsigned Integer
Analog Input Channel -2					
136	Analog input status 0= Not used 1= used	0	16	Read/Write	Unsigned Integer
137	Enable filter. = 0 filter disabled =1 filter enabled (average of four samples)	0	16	Read/Write	Unsigned Integer
138	mV Range	5000	16	Read/Write	Signed Integer
139	Signal low scaling range	0	16	Read/Write	Signed Integer
140	Signal high range	5000 (2000mA)	16	Write only	Unsigned Integer
141	Save configuration AI Channel 1	1	16	Write only	Unsigned Integer

Table -9: MODBUS registers for device configuration

Note:

i) Rain gauge accumulated values will be reset to '0' if the digital input type is changed.
ii) Smart Interface device can be configured using any MODBUS Master.
iii) The device can also be configured via MBCS Dataloggers.

10. Smart Interface module Hardware Information

Hardware details of Smart Interface module can be read via MODBUS registers as per details provided below.

MODBUS Register Address	Parameter	Default Values	Length (bits)	Register Type	Parameters Type
Device Manufacturing Details					
110	Device Model No 8061= MBMet -806 AA 8062= MBMet -806 VA 8063= MBMet -806 VV	-	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: 10 – Smart Interface module hardware details read registers