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Ambient Air Parameters Transducer Operation and Installation Manual (RS-485 Modbus)

Model – MBMet-901A-B; MBMet-901B-A/B; MBMet-901C-A/B; MBMet-901D-A/B; MBMet-901E-B; MBMet-901F-B

Document Number: M4 015 010 010 01(R8)
(Applicable for HW Version-102 and SW Version-111)

Contents

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1. Parts of Transducer.

Ambient Temperature Sensor RS-485 is shipped with the following components

1. Ambient Temperature Transducer – 1 No
2. Data Transmission Cable with Connector – 1No (Default-3 meters)
3. Solar Radiation Shield – 1 No
4. U Clamps with Nut, Screw, Washer and Spring Washer for pole mount – 1Set.

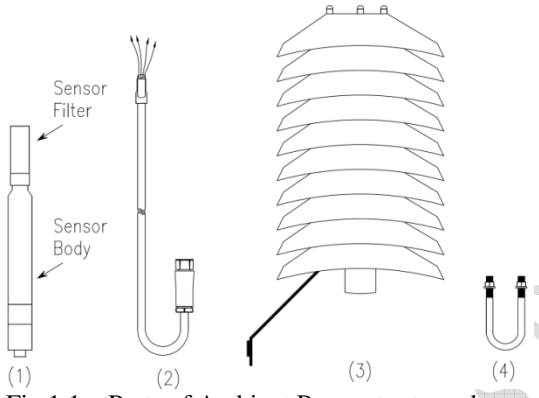

Fig 1.1 – Parts of Ambient Parameter transducer

2. Mounting Shield Mount Clamp on pole.

Mount the radiation shield with the help of the U-clamp as shown below

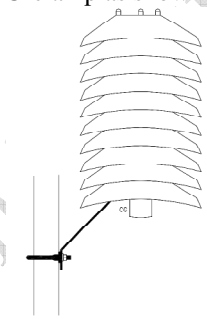

Fig 2.1 – Mounting Clamp (Pole Side)

3. Fixing the Sensor to the radiation shield.

i) Loosen the Cable gland of the shield.

ii) Insert the Temperature probe inside the shield. Take care that the sensor sensing part is not blocked in any way.

iii) Tighten the cable gland so that the temperature probe does not fall off and connect the cable taking care that the alignment between male and female part is ok

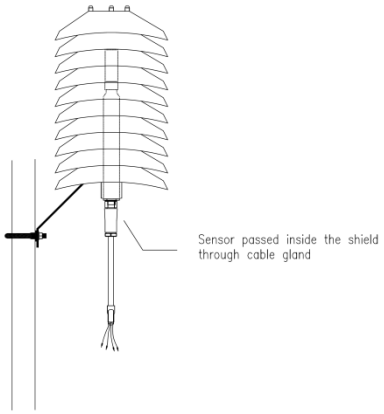

Fig 4.1 – Ambient temperature sensor inside shield

4. Ambient Air Parameters Transducer Specifications

Model / Parameters	MBMet-901A	MBMet-901B		MBMet-901C		MBMet-901D		MBMet-901E	MBMet-901F
Communication Output	-B RS-485 Modbus	-A 4-20mA	-B RS-485 Modbus	-A 4-20mA	-B RS-485 Modbus	-A 4-20mA	-B RS-485 Modbus	-B RS-485 Modbus	-B RS-485 Modbus
Sensor Type	Semi-conductor	Semiconductor		RTD	Semi-conductor	Semiconductor		Semi-conductor	Semi-conductor
Power Consumption	300mW	60mW	300mW	60mW	300mW	80mW	300mW	300mW	300mW
Ambient Temperature									
Measuring Rang	-40°C to +125°C	-40°C to +125°C		-40°C to +100°C	-40°C to +125°C	-		-	-40°C to +125°C
Resolution	0.1°C	0.1°C		0.1°C		-		-	0.1°C
Accuracy	±0.2°C (typical)	±0.3°C (0-90°C)	±0.2°C (typical)	±0.3°C (0-90°C)	±0.2°C (typical)	±0.2°C (typical)		-	±0.2°C (typical)
Response Time	5-30s	5-30s		5-30s		-		-	5-30s
Stability	<0.02°C per year	<0.02°C per year		<0.02°C per yea		-		-	<0.02°C per year
Relative Humidity									
Measuring Rang	0 to 100% RH	0 to 100% RH		-		0 to 100% RH		-	0 to 100% RH
Resolution	0.1% RH	0.1% RH		-		0.1% RH		-	0.1% RH
Accuracy	±2% RH (10-80% RH)	±2% RH (0-90%)	±2% RH (10-80%)	-		±2% RH (0-90%)	±2% RH (10-80% RH)	-	±2% RH (10-80% RH)
Response Time	8-30s	8-30s		-		8-30s		-	8-30s
Stability	<0.25% RH per year	<0.25% RH per year		-		<0.25% RH per year		-	<0.25% RH per year
Dew Point									
Measuring Rang	-40°C to 105°C	-	-40°C to 105°C	-		-		-	-40°C to 105°C
Resolution	0.1°C	-	0.1°C	-		-		-	0.1°C
Accuracy	Calculated	-	Calculated	-		-		-	Calculated
Response Time	8-30s	-	8-30s	-		-		-	8-30s
Barometric Pressure									
Measuring Rang	300 to 1250 hPa	-		-		-		300 to 1250 hPa	300 to 1250 hPa
Resolution	0.01hPa	-		-		-		0.01hPa	0.01hPa
Accuracy	±1hPa	-		-		-		±0.4hPa	±0.4hPa
Response Time	0.1s	-		-		-		0.1s	0.1s
Stability	±1hPa per year	-		-		-		±1hPa per year	±1hPa per year
Air Density									
Accuracy	-	-		-		-		-	Calculated
Calculation Time	-	-		-		-		-	5Sec

Table -3: – MBMet-901 Ambient Parameter Specifications

5. Transducer Connections.

Pin numbers for the transducer connector pins are shown in figure 3.1 below:

Figure-4.1: Transducer pin numbers

5.1 Connections for MBMet-901 with RS485 Communication.

Pin No	Wire Color	Connection to PCB Points
1	White Wire	+V (12V/24V DC)
2	Green Wire	+D RS-485
3	Yellow Wire	-D RS-485
4	Brown Wire	-V (12V/24V DC)

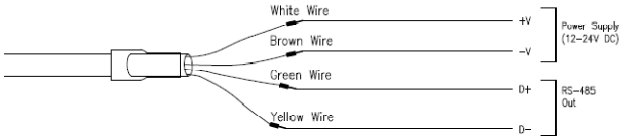

Fig 4.1 –Connection for MBMet-901A/B/C/D/E/F-B

5.2 Connections for MBMet-901 with Analog (4-20mA) outputs.

Pin No	Wire Color	Connection to PCB Points
1	White Wire	+V (12V/24V DC)
2	Green Wire	Temperature (4-20mA)
3	Yellow Wire	Humidity (4-20mA)
4	Brown Wire	-V (12V/24V DC)

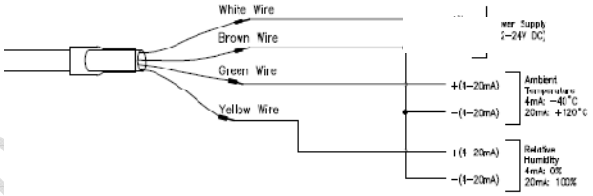

Fig 4.2.1 – Connections for MBMet-901B-A

Pin No	Wire Color	Connection to PCB Points
1	White Wire	+V (12V/24V DC)
2	Brown Wire	Temperature (4-20mA)
3	No connection	
4	No Connection	

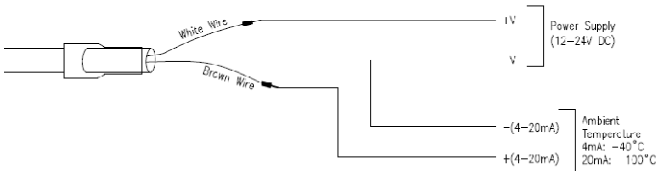

Fig 4.2.2 – Connections for MBMet-901C/D-A

6. MODBUS Registers (Only for models with RS485 Communication):

Measured parameters can be read as per model number only. Parameters not supported by the model will be read as '0' value.

Modbus Register Addresses	Parameters	Resolution	Register Type	Data Type
Parameter Values - Integer				
0	Ambient Air Temperature ()	0.1	Read only	Signed 16 Bits
1	Dew Point	0.1	Read only	Signed 16 Bits
2	Atmospheric Pressure in hPa (Low)*	0.01	Read only	Unsigned 32 Bits
3	Atmospheric Pressure in hPa (High)*			
4	Relative Humidity in %	0.1	Read only	Unsigned 16 Bits
5	Air Density in Kg/m^3	0.001	Read only	Unsigned 16 Bits
Parameter Values - Float				
20, 21	Ambient Air Temperature	0.1	Read only	Float 32 Bits
22, 23	Dew Point	0.1	Read only	Float 32 Bits
24, 25	Atmospheric Pressure - hpa	0.01	Read only	Float 32 Bits
26, 27	Relative Humidity - %RH	0.1	Read only	Float 32 Bits
28, 29	Air Density - Kg/m^3	0.001	Read only	Float 32 Bits
Communication Parameters				
100	MODBUS ID (Default:1) 1<ID<247		Read/Write	Unsigned 16 Bits
101	Baud rate (Default: 1) 0=4800; 1=9600; 2=19200		Read/Write	Unsigned 16 Bits
102	Parity (Default: 0) 0=None; 1=Odd; 2=Even		Read/Write	Unsigned 16 Bits
103	Stop bits (Default: 1) 1; 2		Read/Write	Unsigned 16 Bits
104	Temperature Units (Default: 0) 0 = ^oC; 1 = ^oK; 2 = ^oF		Read/Write	Unsigned 16 Bits
105	Save configured parameter (1 to save) **		Write only	Unsigned 16 Bits
Transducer Model Details				
110	Device Model No = 9010 None = 9011 MBMet-901AB = 9012 MBMet-901BB = 9013 MBMet-901CB = 9014 MBMet-901DB = 9015 MBmet-901EB = 9016 MBmet-901FB		Read only	Unsigned 16 Bits
111	Hardware Version		Read only	Unsigned 16 Bits
112	Software Version		Read only	Unsigned 16 Bits
113	Manufacture Year		Read only	Unsigned 16 Bits
114	Device Serial Number		Read only	Unsigned 32 Bits

Table – 5: MODBUS Registers

* Pressure is a 32 bits Parameter and should be read accordingly.

** Write '1' in register 105 to save the settings, else the settings will not be saved.

7. Transducer Communication Parameters:

These settings are applicable only for models having RS485 communication.

7.1. Default communication Parameters:

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

7.2. Set Required Communication Parameters:

Example is provided to set the following communication parameters:
Modbus ID: 10
Baud rate: 19200
Parity: Even
Stop Bits: 2
Temperature unit: ^{o}C

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

Step-2: Set the following
Function: Write Multiple Registers
Starting Address: 100
Number of registers: 6
Data Type: Integer

Step-3: Set the communication parameters as per requirement.

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

Table No 6.2 – Set communication parameters.

** Write '1' in register 105 to save the settings, else the settings will not be saved.

Step-4: After all the Parameters are set, write 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 as one set.

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

7.3. Reset Default Communication Parameter:

This operation should be done by experienced engineer only.
Step-1: Remove the sensor from the Radiation Shield but do-not disconnect the cable.
Step-2: Open the Filter Cap of the sensor. Please be careful and do-not soil the Filter.
Step-3: Locate the J1 Shorting points as shown in the fig 6.3.

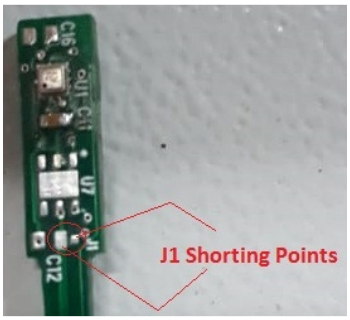

Fig: 6.3 Open top part of the sensor

Step-4: Short the two points carefully so that no other points are touched. Do not touch the sensors, it will get dmaged if touched.

Step-5: Screw on the cap filter, Re-cycle the Power Supply and reinsert the sensor in the Radiation Shield. The sensor is set to it's factory default communication parameters.

8. Transducer Maintenance: Change the Filter cap

Change the filter cap when it becomes dirty and does not allow free air flow.

Step-1: Power off the Sensor
Step-2: Disconnect the Sensor Cable.
Step-3: Loosen the Cable gland of the shield and take out the sensor.

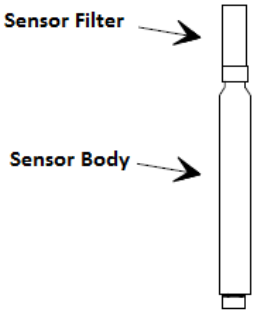

Fig -7: – Sensor after taking out of the radiation shield.

Step-4: Hold the sensor body in one hand firmly and the sensor filter cap with the help of index finger and thumb of the other hand and un-screw the cap rotating it in anti-clock direction. Care to be taken so that the sensing element inside the filter is untouched and undamaged.

Step-5: Hold the new filter cap carefully in the plastic part so that the filter does not soil. Rotate the cap in the clockwise direction. **Do not touch any part on the board. This will damage the sensor.**

Step-6: Insert the sensor in the shield and tighten the cable gland.

Step-7: Reconnect the cable to the sensor.

Step-8: Power on the sensor and use the same.