Installation and Operation Manual for Meriam DC Powered DIN Rail Wireless System

1. Features

- Thermocouples: J, K, T, E, N (others available) full temperature range, linearized to temperature
- RTDs: 100 Ohm platinum, 2 wire, 3 wire, and 4 wire, linearized to temperature
- 4 to 20mAdc and voltage input
- Pressure: 0 to 15000 PSI max.
- Discrete digital input
- Outputs: 4 to 20mAdc, 0 to 5 Vdc, RS232, digital
- 3 relay alarm output alarms
- Variable output power, up to 1 watt
- Variable transmit times
- 902 to 928 FHSS license free ISM band
- Multiple addresses (many units may operate in the same area)

2. Description

The Meriam MWT (RF transmitter) and MWR (RF receiver) wireless systems are designed for reliable, quick installation, industrial applications where wiring is impractical or cost prohibitive. The transmitter and receiver are DIN rail mountable and powered by 12 to 32 Vdc. These devices are programmed at the factory per customer requirements. The input is designed to accept a variety of inputs including mV, mA, RTD, thermocouple, pressure or discrete switch. The outputs are selected and wired per user application: 4 to 20mA, 0 to 5Vdc, RS232, and 3 relay alarms. The output state of discrete switch is mimicked by the receiver.

The transmitters are available in four configurations:

- Explosion-proof battery powered
- Explosion-proof AC powered
- Explosion-proof DC powered
- DIN rail DC powered *(this manual is for this model)*

3. MWT Transmitter Installation

Snap the MWT transmitter onto the DIN rail. The terminals on the DIN enclosure are labeled for easy identification. The input type will be listed on the side label of the MWT. Although the MWT can process several types of inputs, only one may be used at a time. Make the appropriate connections as follows (see figure 1). Do not make connection to any terminal that is not needed; for instance, if the unit is programmed for thermocouple, make no connections to the RTD or other terminals except power. Install the MWT on a 35 mm DIN rail. Once the transmitter is mounted cut wiring to proper length.

Wires must be stripped 3/16” before installing into MWT terminals. Loosen the terminal screws on the transmitter before installing wires.

Note: For optimal RF transmission and reception the antennas of the transmitter and receiver should be vertically oriented. Line of sight between the transmitter and receiver is ideal.

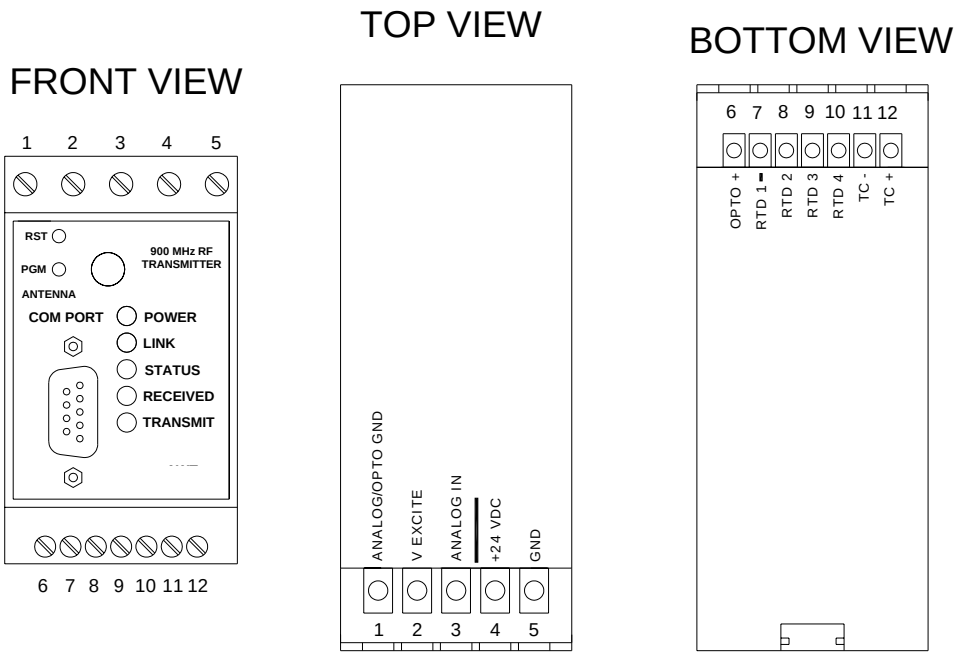

Figure 1. DIN Rail MWT Transmitter Connections.

4. MWT Transmitter Electrical Connections

4.1. Read the label on the side of the MWT to determine the type of input (e.g. 4 - 20mA, thermocouple, RTD, etc) and see corresponding terminals below:

4.2. **Pressure**
Terminal 1: **ANALOG/OPTO GND** transducer power ground
Terminal 2: **V EXCITE** transducer excitation output
Terminal 3: **ANALOG IN** transducer output

4.3. **4 to 20 mA**
Terminal 1: **ANALOG/OPTO GND** ground for 4 to 20 mA signal
Terminal 3: **ANALOG IN** positive 4 to 20 mA signal

4.4. **Voltage Input**
Terminal 1: **ANALOG/OPTO GND** ground DC voltage input
Terminal 3: **ANALOG IN** positive voltage input

4.5. **Power Supply**
Terminal 4: **+24 Vdc** positive side of 12 to 32 VDC power supply
Terminal 5: **GND** power supply ground

4.6. **Discrete Input**
Terminal 6: **OPTO+** use in conjunction with terminal 1 for discrete input connection (see figure 5 for example).

4.7. **RTD 2 Wire**
100 ohm platinum RTD alpha: 0.00385 typical.
Terminal 7 **RTD 1** RTD positive
Terminal 8: **RTD 2** no connection
Terminal 9: **RTD 3** no connection
Terminal 10: **RTD 4** RTD negative

RTD 3 Wire
100 ohm platinum RTD alpha: 0.00385 typical.
Terminal 7: **RTD 1**RTD positive
Terminal 8: **RTD 2** RTD positive sense
Terminal 9: **RTD 3** RTD no connection
Terminal 10: **RTD 4** RTD negative

RTD 4 Wire
100 ohm platinum RTD alpha: 0.00385 typical.
Terminal 7: **RTD 1** RTD positive
Terminal 8: **RTD 2** RTD positive sense
Terminal 9: **RTD 3** RTD negative sense
Terminal 10: **RTD 4** RTD negative

4.8. **Thermocouple**
Unit is programmed for a particular type of thermocouple; use only that type (J, K, T etc).
Terminal 11: **TC –** negative thermocouple lead
Terminal 12 **TC +** positive thermocouple lead

After all connections are made turn on the 24Vdc power and observe the LED indicators. The Power, Link and Status indicators will blink once indicating the unit has powered up correctly.

5. MWR Receiver

Snap the MWR receiver onto the DIN rail. Make the appropriate connections as follows (see figure 2).

Terminal 1: GND Output ground for 4 to 20 mAdc or 0 to 5 Vdc (device is factory set for one or the other, they cannot be used at the same time).
Terminal 2: mA OUT Positive side of the 4 to 20 mAdc signal. Maximum load resistance is 1k ohms. Cannot be used simultaneously with Vout. The output will remain at the last received value and will only update when a new value is received from the transmitter.
Terminal 3: Vout The maximum current from the 0 to 5 volt output is 25 mAdc. Cannot be used simultaneously with mA Out. The output will remain at the last received value and will only update when a new value is received from the transmitter.
Terminal 4: +24VDC Power supply positive connection. Voltage may be 12 to 32 Vdc 500 mA maximum.
Terminal 5: GND Power supply ground connection.
Terminal 6: OPTO+ Positive side of discrete output. The status of this directly corresponds to the input to the OPTO on the transmitter. If the transmitters OPTO is high the receivers OPTO output will be low when connected as in figure 5.
Terminal 7: OPTO- Ground for digital output
Terminal 8: N/C No connect
Terminal 9: GND Circuit common
Terminal 10 through 12: N/C No connect

Alarm connections:
Alarms A1 and A2 are typically used for process alarms, alarm A3 can be used for open input detection. The alarm trip points are set at the factory. Hysteresis, manual reset, input open detect, and failsafe modes are typical options. *All relays are limited to 125Vac @ 0.5A or 30VDC @ 2A, the relay connections are as follows:*

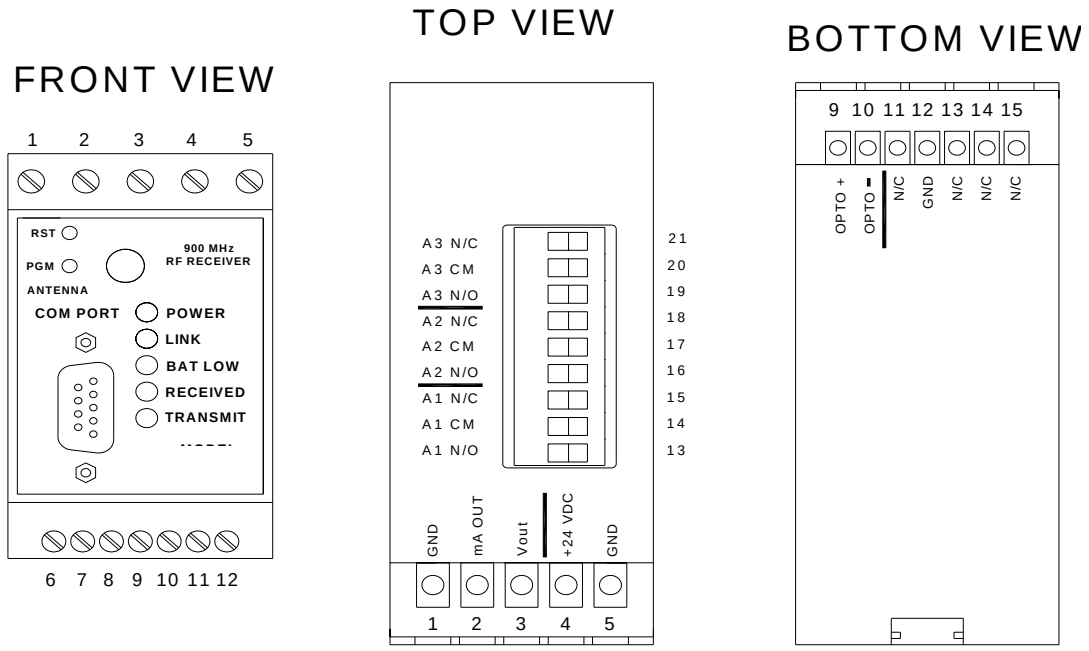

Figure 2. Receiver.

Terminal 13: A1 N/O Alarm 1 normally open connection
Terminal 14: A1 CM Alarm 1 common connection
Terminal 15: A1 N/C Alarm 1 normally closed connection
Terminal 16: A2 N/O Alarm 2 normally open connection
Terminal 17: A2 CM Alarm 2 common connection
Terminal 18: A2 N/C Alarm 2 normally closed connection
Terminal 19: **A3 N/O** Alarm 3 normally open connection
Terminal 20: A3 CM Alarm 3 common connection
Terminal 21: A3 N/C Alarm 3 normally closed connection

MWR Steady State Output

The output of the MWR receiver is maintained at the last received value even when the transmitter is off. Example: the output of the receiver is reading 12.00 mA when the MWT transmitter is turned off. The receiver will hold the output at 12.00 mA until the transmitter is turned back on and a new value is transmitted to the receiver; the receiver will then update the output. When the transmitter is turned off the receiver link indicator will eventually turn off and remain off until the transmitter is turned back on and a valid link has been re-established.

6. Communications Port MWT Transmitter and MWR Receiver

The RS232 COM PORT (communications port) can be configured to output data and upgrade firmware (see figures 1 and 2). Typical outputs include the process variable as a 16 bit word, discrete input and alarm status. The default communication is: 9600 baud, 8 data bits, no parity, 1 stop bit and no flow control (9600, 8,N,1).

7. Antennas

Use only the antennas that came with the transmitter and receiver. The antennas supplied are ½ wave dipole with 2.0 dBi gain. Monopole antennas should not be used with these devices and may be in violation of FCC regulation.

8. Operation

LEDs on the transmitter and receiver provide status indications as follows (see figures 1 and 2):

MWR Receiver Indicators

Power: The power switch is on and power is applied to the receiver. This LED will blink when initially powered to indicate receiver is under operation.

Link: There is a successful RF link between transmitter and receiver LED is always on when there is an acceptable link between transmitter and receiver.

Bat Low: Used to indicate transmitter battery power is low. Not used on this model, LED will be off.

Received: Data has been successful received by the receiver. LED will quickly blink on then off when a data packet is received

Transmit: Data has been successfully transmitted by the receiver. This LED is normally off; however, it will quickly blink on then off when the transmitter is initially powered on.

MWT Transmitter Indicators

Power: The DC power is on and applied to the transmitter. This LED will blink when initially powered to indicate transmitter is functioning properly.

Link: There is a successful RF link between transmitter and receiver. LED is always on when there is an acceptable link between transmitter and receiver.

Status: This indicator is not used by this model and will be off.

Received: Data has been received by the transmitter. This LED is normally off; however, it will quickly blink when initially powered.
Transmit: Data has been transmitted to the receiver. LED will quickly blink on then off when a data packet is transmitted.

Note: Apply power to the receiver before the transmitter to synchronize data. Optionally, perform a reset on the receiver (see RST switch on front panel of transmitter).

9. Options

This wireless system can be configured in a number of ways from the factory, here are the configuration variables

9.1. Thermocouples: J, K, T, E, N (others available) full temperature range, linearized to temperature, internal cold junction compensation.
9.2. RTDs: 100 ohm platinum, 2, 3, and 4 wire, linearized to temperature
9.3. Pressure: 0 to 15000 PSI max.
9.4. DC voltage or 4 to 20 mAdc.
9.5. Discrete optically isolated digital input/output (typically 0 to 5Vdc). Both the input and the output are optically isolated see figure 5 for an example connection.
9.6. Alarms: Alarm trip points are configured at the factory. Optional alarm resets are: by any amount of hysteresis or manual. All alarms have normally open or closed contacts.

10. Maintenance

These devices are design to be maintenance free. If units should require calibration or repair contact the factory.

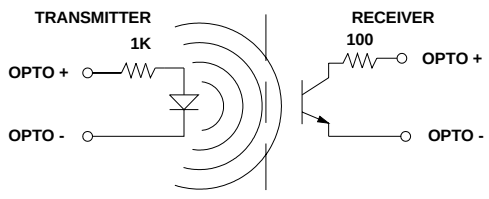

Figure 4. Discrete opto circuit.

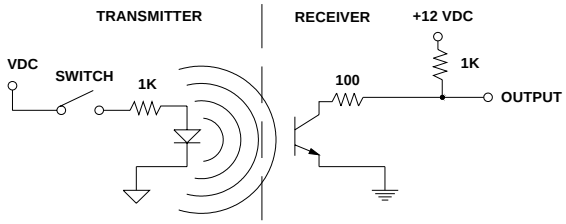

Figure 5. Typical use of discrete opto circuit.

11. Specifications

	Transmitter - MWT	Receiver - MWR
RF Frequency	902 – 928 MHz frequency hopping spread spectrum	902 – 928 MHz frequency hopping spread spectrum
Accuracy	-	.2% of full scale (input sensor not included)
Power Source	12 – 32 Vdc, 500 mA	12 to 32 Vdc, 500 mA
Input Type	Volts, 4 to 20 mA, TC, RTD, Pressure	-
Output	-	4 to 20 mAdc (max. loop impedance 1k) or 0 to 5 Vdc RS232 (9600, 8,N,1)
Alarms	-	Qty 3: 125Vac @ 0.5A or 30VDC @ 2A
Discrete Opto	Input: 80 mAdc maximum	Output: floating transistor, maximum ratings: 80 Vdc, 50 mA
Communications Port	DB9 RS232, default setting: 9600 baud, 8 data bits, no parity, 1 stop bit	DB9 RS232, default setting: 9600 baud, 8 data bits, no parity, 1 stop bit
Dimensions	3” H x 1-3/4” W x 4-1/4D	3” H x 1-3/4” W x 4-1/4D
Weight	.6lbs	.6lbs
Operating Temperature	-25 ^{o}C to + 85 ^{o}C	-25 ^{o}C to + 85 ^{o}C

Contains FCC ID OUR-9XTEND:
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept interference received, including interference that may cause undesired operation.

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