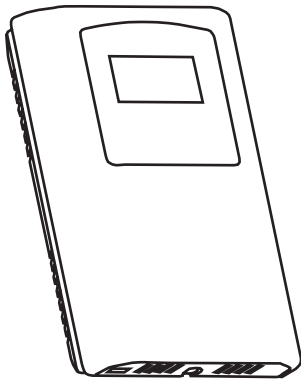# Room Network Dewpoint Transmitter
Installation Instructions

INTRODUCTION

The dewpoint transmitters are designed for use in environmental monitoring and control systems where high performance and stability are demanded. It's state-of-the-art design combines digital linearization and temperature compensation with a highly accurate and reliable thermoset polymer based capacitance humidity sensor and curve-matched NTC thermistor temperature sensor for reliability and accuracy in the most critical applications. The dewpoint transmitter has four measurement variables which include dewpoint, dry-bulb temperature, wet-bulb temperature and enthalpy which are available in either BACnet® or Modbus signal to provide the most efficient monitoring and control solution.

BEFORE INSTALLATION

Read these instructions carefully before installing and commissioning the device. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. Take electrostatic discharge precautions during installation and do not exceed the device ratings.

MOUNTING

The dewpoint transmitter installs directly on a standard electrical box and should be mounted five feet from the floor of the area to be controlled. Do not mount the sensor near doors, opening windows, supply air diffusers or other known air disturbances. Avoid areas where the detector is exposed to vibrations or rapid temperature changes.

The cover is hooked to the base at the top edge and must be removed from the bottom edge first. Use a small Phillips screwdriver to loosen the security screw as shown in Figure 1. (Complete removal of this screw is not required). Use a screwdriver to carefully pry each bottom corner if necessary. Tip the cover away from the base and sit it aside as shown in Figure 2.

The PCB must be removed from the base to access the mounting holes. Follow usual anti-static procedures when handling the PCB and be careful not to touch the sensors. The PCB is removed by pressing the enclosure base to unsnap the latch near the bottom edge, then the PCB can be lifted out of the base as shown in Figure 3.

Sit the PCB aside until the base is mounted on the wall. For added protection, place the PCB in the supplied anti-static bag.

Mount the base by screwing to an electrical box or directly to the wall as shown in Figure 4. The mounting hole locations are shown on page 4.

After the base is screwed to an electrical box or the wall using the appropriate holes, remove the PCB from the anti-static bag, feed connection wires through center hole and place the top of PCB into the PCB holders on backplate and snap bottom of PCB into place as shown in Figure 4.

Make wire connections as per the Wiring Illustrations on Page 2 and install decorative cover by placing the top of the cover into the cover holder on the top of the backplate and snapping the bottom into place as shown in Figure 4. Tighten security screw with a Phillips screwdriver.
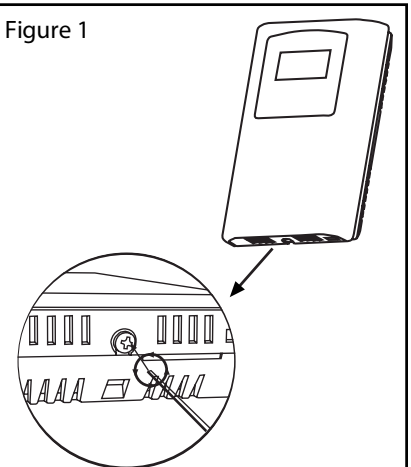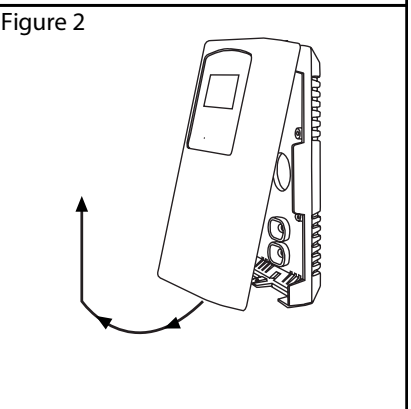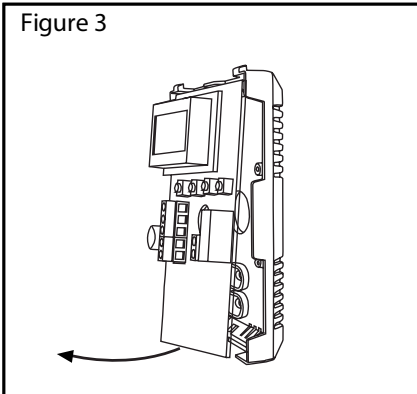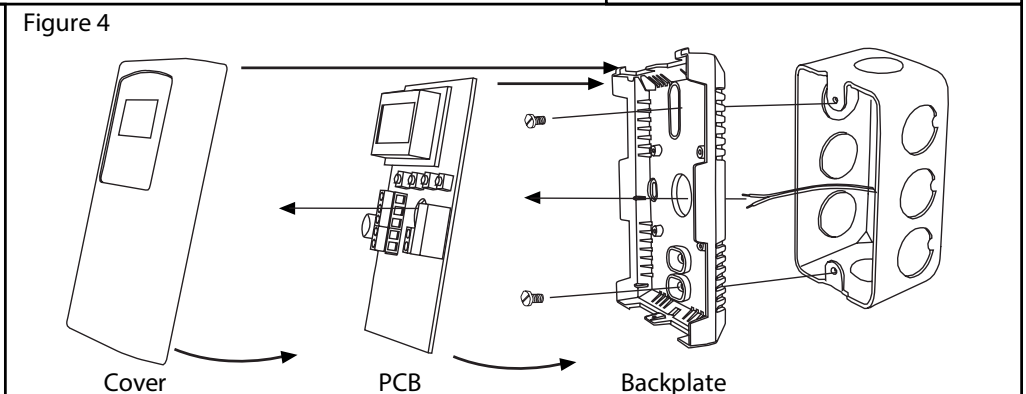
Figure 1

Figure 2

Figure 3

Figure 4

Cover   PCB   Backplate

WIRING

- Deactivate the 24 Vac/dc power supply until all connections are made to the device to prevent electrical shock or equipment damage.
- Follow proper electrostatic discharge (ESD) handling procedures when installing the device or equipment damage may occur.
- Use 22 AWG shielded wiring for all connections and do not locate the device wires in the same conduit with wiring used to supply inductive loads such as motors.
- Make all connections in accordance with national and local codes.

Connect the 24 Vac/dc power supply to the terminals labeled PWR (power) and COM (common) as shown in Figure 6. This device has a half-wave type power supply so use caution when wiring multiple devices so that the circuit ground point is the same on all devices and the controller. Use caution if 24 Vac power is used and one side of the transformer is earth-grounded. In general, the transformer should NOT be connected to earth ground when using devices with RS-485 network connections. The device is reverse voltage protected and will not operate if connected backwards.

Connect the RS-485 network with twisted shielded pair to the terminals marked A-, B+ and SHLD (shield) as shown in Figure 6. The positive wire connects to B(+) and the negative wire connects to A(-) and the cable shield must be connected to the SHLD terminal on each device. If the device is installed at either end of the network, an end-of-line (EOL) termination resistor (121 ohm) should be installed in parallel to the A(-) and B(+) terminals. This device includes a network termination jumper and will connect the resistor correctly on the pcb. Simply move the pcb jumper to the EOL position and no external resistor is required as shown in Figure 7. The ground wire of the shielded pair should be connected to earth ground at the end of the network and the master is not grounded. Do not run bus wiring in the same conduit as line voltage wiring.

A network segment is a single shielded wire loop run between several devices (nodes) in a daisy chain configuration. The total segment length should be less than 4000 feet (1220 meters) and the maximum number of nodes on one segment is 127. Nodes are any device connected to the loop and include controllers, repeaters and sensors such as the RH/T Sensor but does not include the EOL terminators. To install more devices, or to increase the network length, repeaters will be required for proper communication. The maximum daisy chain length (segment) depends on transmission speed (baud rate), wire size and number of nodes. If communication is slow or unreliable, it may be necessary to wire two daisy chains to the controller with a repeater for each segment.

Figure 5

Figure 6

Figure 7
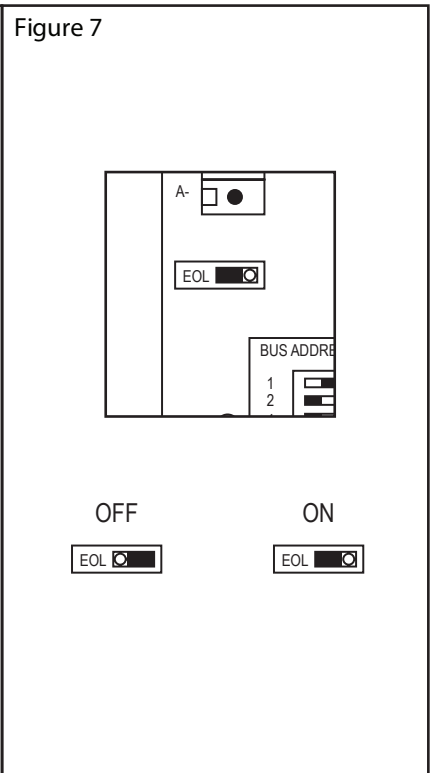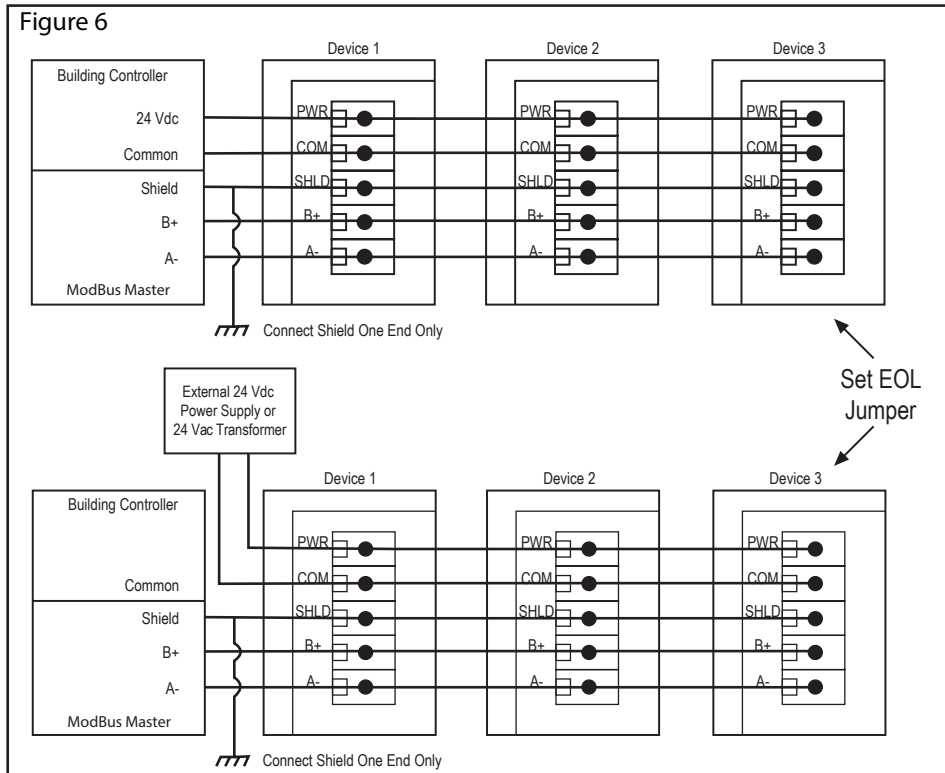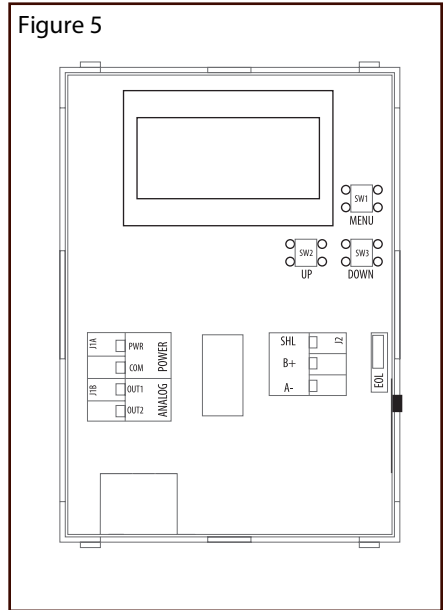
OPERATION

Start-Up Mode
When the device is powered on, it will go through a brief start-up mode. The LCD will display a sequence of information depending on the model. At the end of the start-up sequence, normal operation will begin.

STEP 1   LCD Test
All segments lit for 2 seconds

-88.8 °C Td °F Tw kJ/kg BTU/lb

STEP 2   Model
Displays the protocol type (bAC for BACnet®, bUS for Modbus) for 2 sec.

bUS

STEP 3   Software Version for 2 sec

b10

STEP 4   Address for 2 sec

001

STEP 5   Baud rate for 2 sec

960

Normal Mode

In normal operation the device:
- reads the temperature and RH sensors
- calculates values for dewpoint, wet bulb and enthalpy
- updates the LCD values
- updates the BACnet®/Modbus object values
- monitors the menu key for activity

If the <MENU> key is pressed, normal operation is suspended while the menu functions are serviced. The program will automatically exit the menu after a period of inactivity.

MENU
The device has several parameters that can be configured locally via the User menu using the keypad and LCD. All parameters default to typical values but the installer may want to change some values. In some cases, such as the device network address, the installer MUST change the settings before operation. Any changes made are saved in non-volatile memory and are restored in case of a power loss. Only the menu items relevant to the device model will be shown. The menu can be accessed at any time after the start-up mode and if there is 5 minutes of inactivity the menu will close and normal operation will continue.

User Menu - Network Device
To enter the menu, press and release the <MENU> key. This will enter the User menu step 1, pressing the <MENU> key a second time advances to step 2. Each press of the <MENU> key saves the current setting and advances the menu item. The <UP> and <DOWN> keys are used to make changes to program variables by scrolling through the available options. When a value is changed, use the <MENU> key to save it to memory and advance to the next menu item.

<MENU> Press and release to enter the User menu.

BACnet®/MODBUS ADDRESS   (default = 1)
Use <UP> or <DOWN> to set the address 0-127 for BACnet or 1-255 for Modbus.
 °C and Td blink to indicate the mode.

888 °C Td

<MENU>

BACnet®/MODBUS BAUD RATE   (default = 9600)
Use <UP> or <DOWN> to select a baud rate for:
BACnet: 960 (9600), 192 (19200), 384 (38400),
576 (57600), 768 (76800) or 115 (115200)
Modbus: 30 (300), 60 (600), 120 (1200), 240 (2400),
480 (4800), 960 (9600), 192 (19200) or 384 (38400),
°F and Tw blink to indicate the mode.

888 °F Tw

<MENU>

MODBUS PARITY   (default = none)
Use <UP> or <DOWN> to select a parity value of n (none), O (odd) or E (even).

P n

<MENU>

MODBUS STOP BITS   (default = 1)
Use <UP> or <DOWN> to set the stop bits to 1 or 2.

Sb1

<MENU>

MODBUS CRC   (default = 1)
Use <UP> or <DOWN> to select a CRC value of 1 (A001 = CRC-16 reverse),
2 (1021 = CITT),   3 (8005 = CRC-16) or 4 (8408 = CITT reverse).

Cr1

<MENU>

MODBUS DELAY   (default = 0)
Use <UP> or <DOWN> to change the value from 0 (minimum) to
50, 100, 150, 200, 250, 300 or 350 ms. BTU/lb blinks to indicate the mode.

888 BTU/lb

<MENU> Exits the menu and returns to normal operation.

SENSOR TYPE:

RH Sensor	Thermoset polymer based capacitive
Temperature Sensor	NTC Thermistor

MEASUREMENT RANGE:

Relative Humidity	0 - 100 %RH
Dry Bulb Temperature	0 – 50 ℃ (32 – 122 ℉)

CALCULATED VALUES:

Dewpoint Temperature	-30 – 50 ℃ (-22 – 122 ℉)
Wet Bulb Temperature	-30 – 50 ℃ (-22 – 122 ℉)
Enthalpy	0 – 340 kJ/kg (0 – 146 BTU/lb)

ACCURACY:

|	
Relative Humidity (RH)	± 2% RH, 10 – 90 %RH @ 25 ℃
Dry Bulb Temp.(T)	± 0.2 ℃ (± 0.4 ℉) / 0 – 50 ℃ (32 – 122 ℉)
Dewpoint Temp. (Td)	± 1.0 ℃ (± 1.8 ℉) @ 40 %RH / 25 ℃
Wet Bulb Temp.(Tw)	± 1.0 ℃ (± 1.8 ℉) @ 50 %RH / 25 ℃
Enthalpy (En)	± 2 kJ/kg (± 1 BTU/lb) @ 50 %RH / 25 ℃

INTERFACE:

ModBus Protocol	ModBus RTU, 2-wire RS-485
	300, 600, 1200, 2400, 4800, 9600, 19200 or 38400 baud 1-255 slave address range
BACnet Protocol	BACnet MS/TP, 2-wire RS-485
	9600, 19200, 38400, 57600, 76800 or 115200 baud 0-127 slave address range

SPECIFICATIONS:

Power Supply	20 – 27 Vdc, 16 – 27 Vac
	(non-isolated half-wave rectified)
Consumption	50 mA max @ 24 Vdc, 1.5 VA max @ 24 Vac
Operating Conditions	0 – 50 ℃ (32 – 122 ℉),
	0 – 95 %RH non-condensing
Storage Conditions	-20 – 70 ℃ (-4 – 158 ℉),
	0 – 95 %RH non-condensing
Wiring Connections	14 – 22 AWG terminal block
Enclosure	Continental
Dimensions	84W x 117H x 29D mm (3.3W x 4.6H x 1.15D in)
Material	White ABS
Weight	105 gm (3.7 oz)
Approvals	CE, RoHS

LCD DISPLAY VALUES:

Temperature	0.0 – 50.0 ℃ (0.5 ℃ resolution)
	or 32 – 122 ℉ (1 ℉ resolution)
Dewpoint	-30.0 – 50.0 ℃ Td (0.5 ℃ resolution)
	or -22 – 122 ℉ Td (1 ℉ resolution)
Wet Bulb	-10.0 – 50.0 ℃ Tw (0.5 ℃ resolution)
	or 14 – 122 ℉ Tw (1 ℉ resolution)
Enthalpy	0 – 340 kJ/kg (1 kJ/kg resolution)
	or 0 – 146 BTU/lb (1 BTU/lb resolution)

DIMENSIONS

84 mm
3.3"

29 mm
1.15 "

58 mm
2.3 "

117 mm
4.6"

82.6 mm
3.25 "
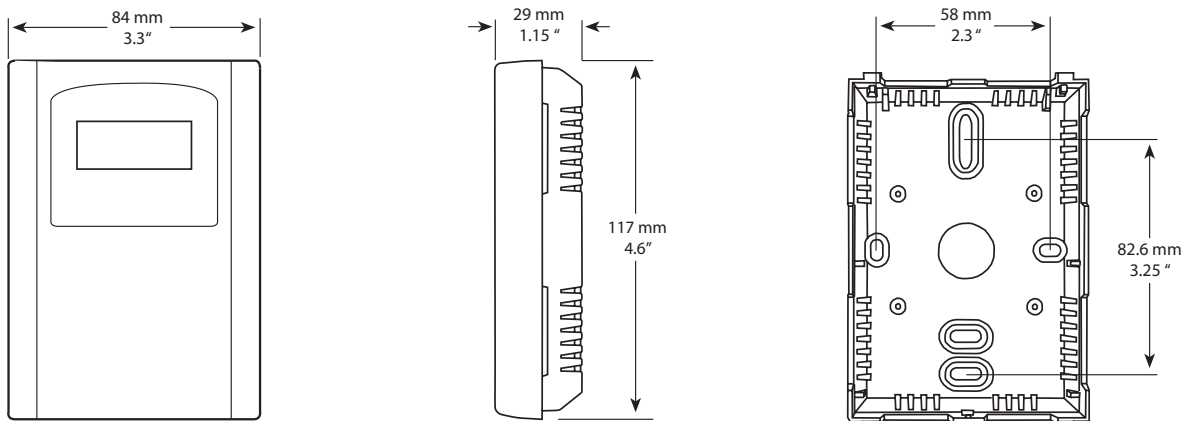
NETWORK SETUP GUIDE

The network setup guide describes the implementation of the BACnet® or Modbus protocol. It is intended to assist control system programmers who may need to add support to their systems to communicate with this device.

BACnet® and Modbus setup guide downloads are available online.

BACnet® PROTOCOL

https://downloads.greystoneenergy.com/SG/SG-DPRCXXXBAC.pdf

MODBUS PROTOCOL

https://downloads.greystoneenergy.com/SG/SG-DPRCXXXMOD.pdf