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INTRODUCTION

The HTX2 High-Accuracy Humidity and Temperature Transmitter is used in environmental monitoring and control systems that require high accuracy and stability. The state-of-the-art design combines digital linearization and temperature compensation. A highly accurate and Thermoset Polymer-based Sensor Chip humidity sensor and a Bipolar Transistor Sensor Chip temperature sensor provides reliability and accuracy in the most critical applications.

The HTX2 Series Transmitters default measurement variables are relative humidity (RH) and dry-bulb temperature. Additional variables of Dewpoint, Enthalpy and Wet Bulb Temperataure can be field selected. All variables are available via BACnet® or Modbus to provide the most efficient monitoring and control solution. A polycarbonate enclosure protects the electronics. The hinged and gasketed cover provides ease of installation.

WARNING

Read these installation instructions carefully before commissioning the humidity/temperature transmitter. 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 safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Use electrostatic discharge precautions during installation and do not exceed the device ratings.

Do not mount the sensor near opening windows, supply exhaust air louvres or other known air disturbances. Avoid areas where the sensor is exposed to vibrations or rapid temperature changes.

MOUNTING

The humidity/temperature transmitter installs directly on a smooth surface using the two integrated mounting holes provided on the enclosure. The two mounting holes will facilitate a #10 size screw (not supplied).
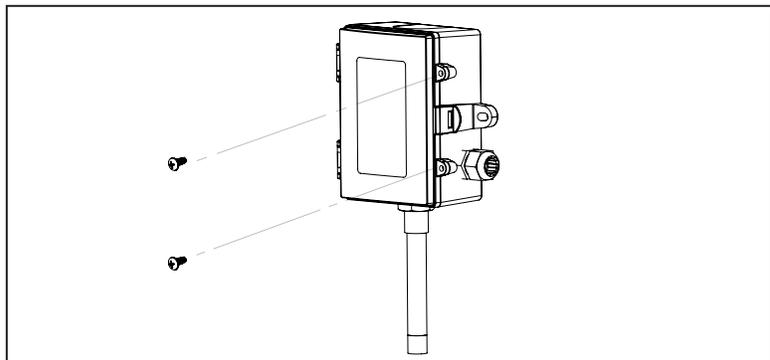
The enclosure has a hinged cover with a latch. Open the cover by pulling slightly on the latch on the right side of the enclosure. At the same time pulling on the cover.
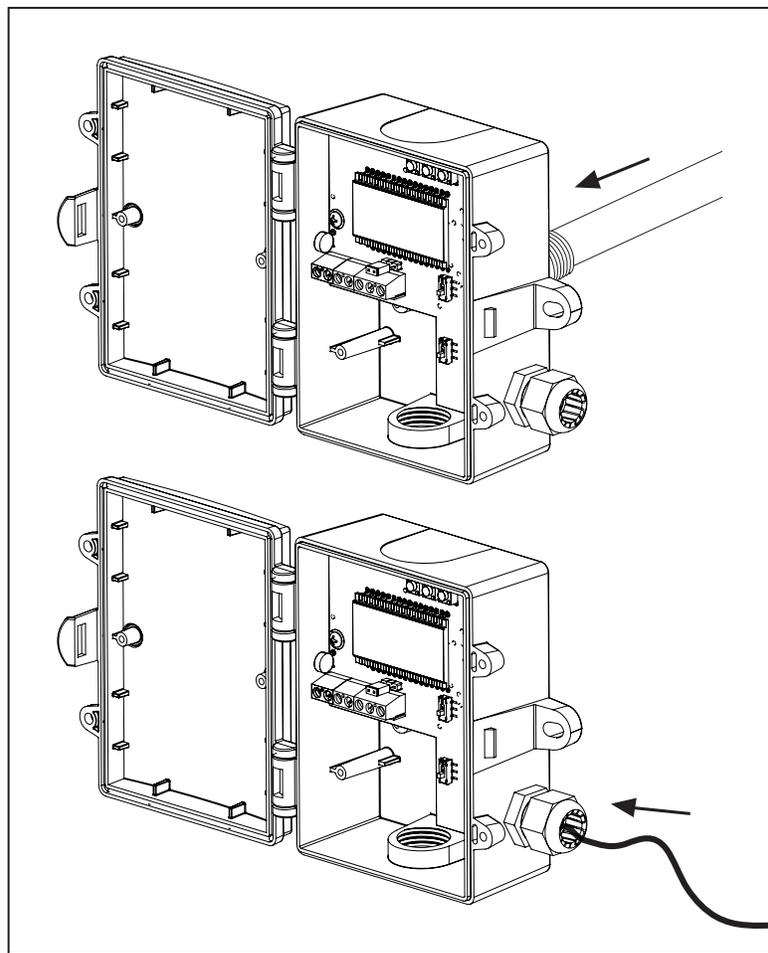
For model using conduit, Feed conduit through the provided hole in the back of enclosure and secure with a lock nut. For model using cable gland, feed control wiring through cable gland and tighten nut.

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.
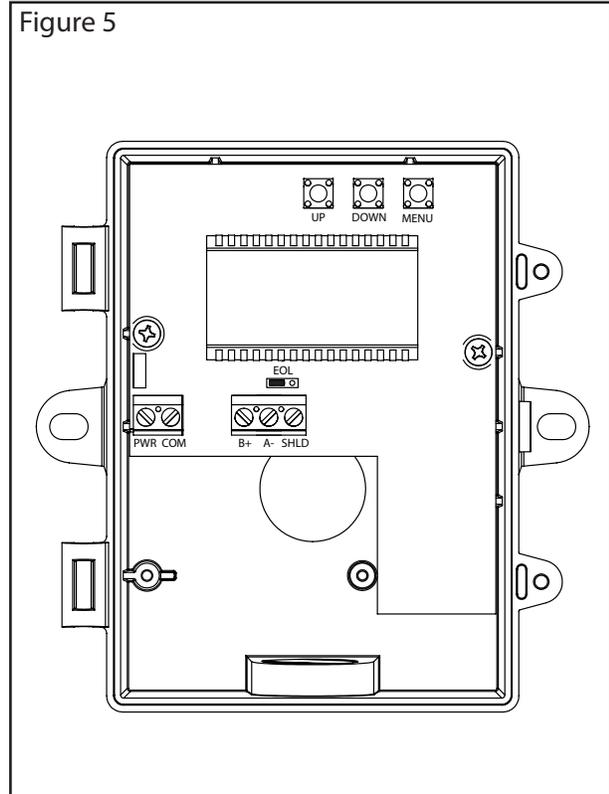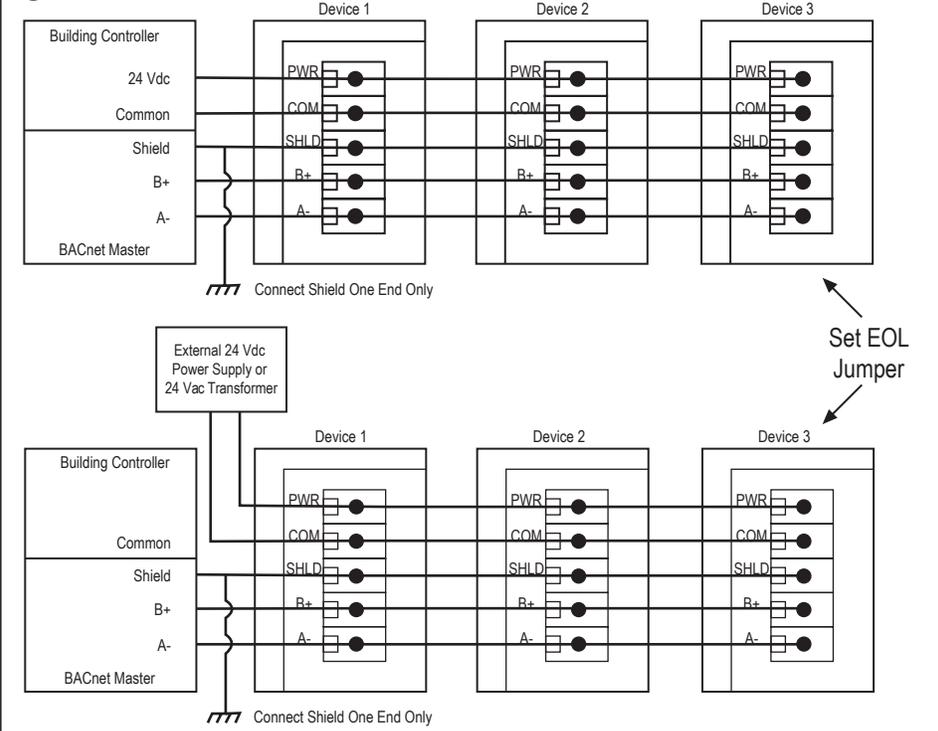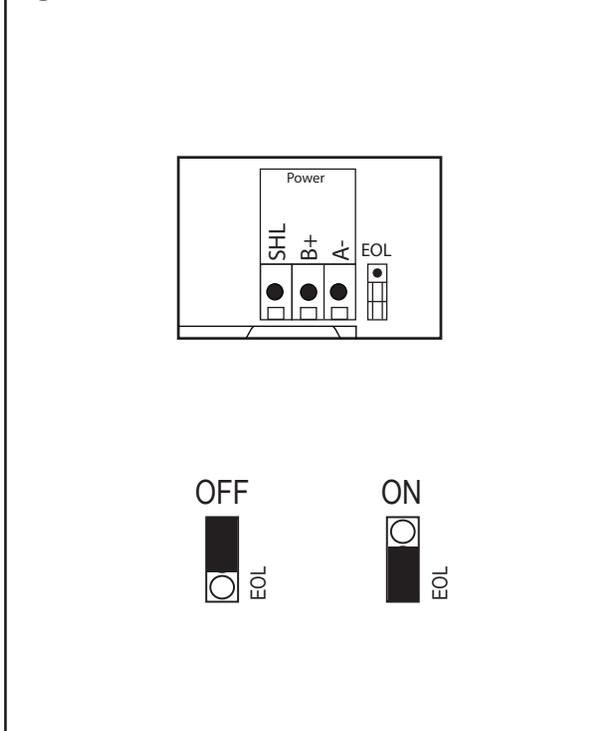
Figure 5

Figure 6

Figure 7

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

-88.8 °C Td °F Tw kJ/kg BTU/lb

All segments lit for 2 seconds.

STEP 2. MODEL

bAC

Displays the model type (BACnet®) for 2 sec.

bUS

Displays the model type (Modbus) for 2 sec.

STEP 3. SOFTWARE VERSION FOR 2 SEC

b10

STEP 4. ADDRESS FOR 2 SEC

1

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 analog outputs
- 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. 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

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.

ADDRESS

MODBUS   (default = 1)
Use <UP> or <DOWN> to set the address 1-255.
°C and Td blink to indicate the mode.

1 °C Td

<MENU>

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

1 °C Td

<MENU>

BAUD RATE

MODBUS   (default = 9600)

Use <UP> or <DOWN> to select a baud rate of 960 (9600), 192 (19200), 384 (38400), 576 (57600), 768 (76800) or 115 (115200),
°F and Tw blink to indicate the mode.

960 °F Tw

<MENU>

BACnet®   (default = 9600)

Use <UP> or <DOWN> to select a baud rate of 960 (9600), 192 (19200), 384 (38400), 576 (57600), 768 (76800) or 115 (115200).
°F and Tw blink to indicate the mode.

960 °F Tw

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

MODBUS SETUP ONLY

PARITY   (default = none)

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

```
P  n
```

<MENU>

STOP BITS   (default = 1)

Use <UP> or <DOWN> to set the stop bits to 1 or 2.

```
Sb1
```

<MENU>

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>

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.

```
0  BTU/lb
```

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

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.
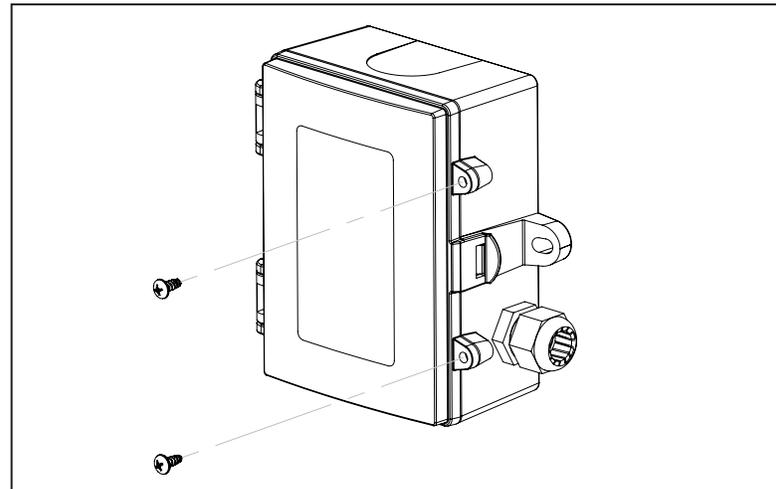
BACnet® PROTOCOL

https://downloads.greystoneenergy.com/SG/SG-HTX2XXXBAC-001.pdf

MODBUS PROTOCOL

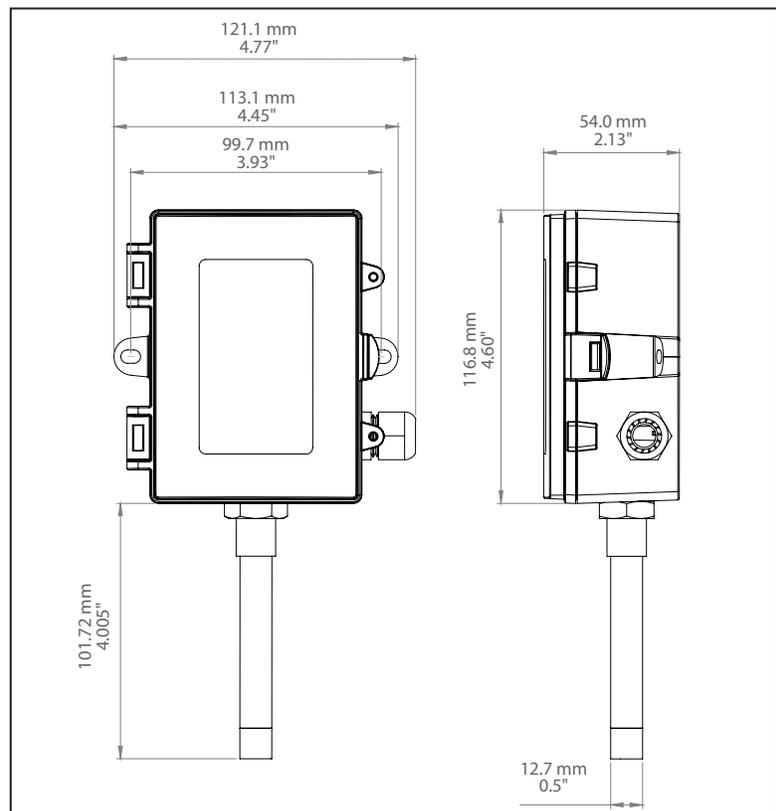https://downloads.greystoneenergy.com/SG/SG-HTX2XXXMOD-001.pdf

WIRING

Swing door closed until securely latched. For added security, two screws are provided that may be installed in the integrated screw tabs.

DIMENSIONS

121.1 mm
4.77"

113.1 mm
4.45"

99.7 mm
3.93"

54.0 mm
2.13"

116.8 mm
4.60"

101.72 mm
4.005"

12.7 mm
0.5"

SPECIFICATIONS

Humidity Sensor Type: Thermoset polymer-based capacitance sensor chip
Temperature Sensor Type: Bipolar Transistor Sensor Chip
Measurement Range: Relative Humidity:
0-100% RH
Dry Bulb Temperature:
-30°C to 50°C (-22°F to 122°F)
Calculated Values: Dewpoint Temperature:
-30 to 50 °C (-22 to 122 °F)
Wet Bulb Temperature:
-22°C to 50°C (-40°F to 122°F)
Enthalpy: 0 to 340 kJ/kg (0 to 146 BTU/lb)
Accuracy: Relative Humidity:
±1% RH, 20% to 70% RH @ 25°CTypical
±1.5% RH, 0% to 20% RH and 70 % to 90%RH @ 25°C Typical
Dry Bulb Temperature (T):
±0.1°C (±0.2°F) @ –40 to +125°C (-40 to 257°F)
Dewpoint Temperature (Td): ±1.0°C (±1.8°F) @ 40 %RH / 25°C
Wet Bulb Temperature (Tw): ±1.0°C (±1.8°F) @ 50 %RH / 25°C
Enthalpy: ±2 kJ/kg (±1 BTU/lb) @ 50 %RH / 25°C
Response Time: < 8 seconds
Calibration: Humidity: -10 to 10%RH Offset, Resolution = 1% RH
Temperature: -5°C to 5°C (-10°F to 10°F) Offset, Resolution = 0.1°C/F

OUTPUT

Network Interface: MS/TP, 2-wire RS-485
Modbus: Baud rate: 300, 600, 1200, 2400, 4800, 9600, 19200 or 38400
Address range: 1-255
BACnet: Baud rate: 9600, 19200, 38400, 57600, 76800 or 115200
Address range: 0-127 slave address range

POWER SUPPLY

Power Source UL: 24Vac/dc ±10% typical, SELV (Class 2) supply, non-isolated, half wave rectified
Consumption: Current: 50 mA max @ 24 Vdc, 1 VA Max. 70 mA @ 24 Vac
Voltage: 30mA @ 24vdc, 1VA @ 24Vac

LCD DISPLAY VALUES

Relative Humidity: 0 to 100% RH (1% Resolution)
Dry Bulb Temperature: -30.0 to 50.0°C (0.1°C resolution) or -22 to 122°F (0.1°F resolution)
Dewpoint Temperature: -30.0 to 50.0°C (0.1°C resolution) or -22 to 122°F Td (0.1°F resolution)
Wet Bulb Temperature: -20.0 to 50.0°C Tw (0.1°C resolution) or -4 to 122°F Tw (0.1°F resolution)
Enthalpy: 0 to 340 kJ/kg (1 kJ/kg resolution or 0 to 146 BTU/lb (1BTU/lb resolution)

ENCLOSURE

Enclosure Material: Grey Polycarbonate, UL94-V0
Enclosure Rating: IP65 (NEMA 4X)
Wiring Access: Rear: 0.895" hole for EMT connection or
Side: M16 x 1.5 Cable gland
Dimensions: 116.5mm W x 112.5mm H x 54.0mm (4.58" x 4.43" x 2.125")
Probe: 304 S/S, 104.1 mm x 12.7 mm (4.1 in. x 0.5 in.)
Filter: 20 Micron porous PTFE filter

GENERAL

Operating Conditions: -30 to 60°C (-22 to 140°F), 0 to 95%RH non-condensing
Storage Conditions: -40 to 70°C (-40 to 158°F), 0 to 95 %RH non-condensing
Protection Class: III
Purpose of Control: Operating Control
Type of Action: Type 1
Impulse Voltage: 330V
Pollution Degree: 2
Wiring: Screw terminal block (14 to 22 AWG)
Country of Origin: Canada

CONFORMITY / CERTIFICATION

EU Conformity: CE, UKCA
UL Model: MRHLWMCSHT
Certification: UL 60730 & CSA, E60730, (UL E539555 file#)