

INTRODUCTION

The continental series is an attractive, low profile enclosure that incorporates a precision thermistor or RTD temperature sensor used to monitor room temperatures. Included is a set-point adjustment, and backlit LCD, with optional manual override, fan speed switch and network jack.

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. **Do not exceed the device ratings.**

MOUNTING

The temperature sensor mounts directly on a wall or onto an electrical wall box. For the most accurate results, the unit should be mounted on an inside wall to a wall box five feet from the floor. Do not mount the sensor near doors, opening windows, supply air diffusers, or other known air disturbances. Avoid areas where the sensor 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 is not required). Use a screw driver 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.

Set 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 it to an electrical box or directly to the wall as shown in Figure 4.

Figure 1

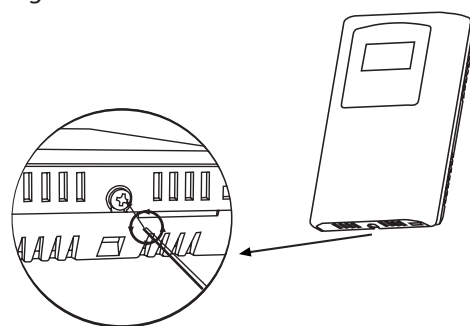


Figure 2

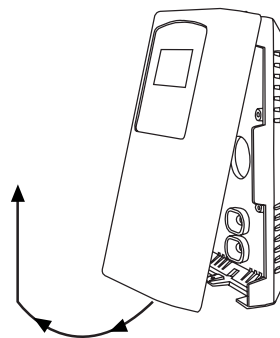


Figure 3

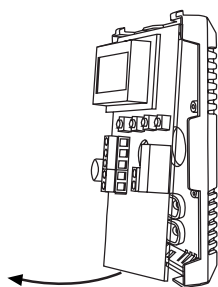


Figure 4

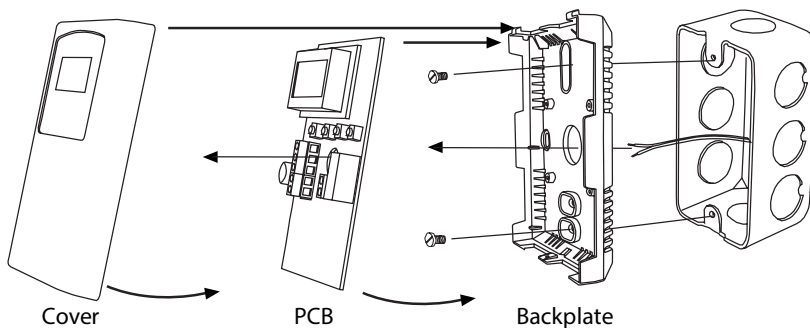
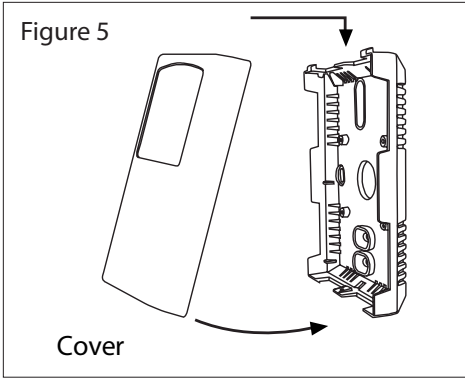


Figure 5



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 the PCB into the PCB holders on the backplate and snap the bottom of the PCB into place as shown in Figure 4.

Make wire connections as per the Wiring Illustrations on page 2. Re-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 5. Tighten security screw with a screwdriver.

WIRING

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. Connect the cable shield to ground at the controller only. Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local codes.

The number of wires required will depend on the installed options and the configuration. See Figure 6. Connect the plus dc or the ac voltage hot side to the POWER terminal. The power supply common is connected to the COMMON terminal. The device is reverse voltage protected and will not operate if connected backwards. It has a half-wave power supply so the supply common is the same as the setpoint signal common. Several devices may be connected to one power supply and the output signals all share the same common. Use caution when grounding the secondary of a transformer or when wiring multiple devices to ensure the ground point is the same on all devices and the controller. See Figure 7.

The resistive setpoint signal is available on the SETPOINT terminal and it is referenced to COMMON. The override switch output is a dry-contact and is usually available on the SWITCH + and SWITCH - terminals. The resistive sensor output is available on the SENSOR + and SENSOR - terminals. The LCD occupied input signal is available on the OCC IN terminal. This is an active low input signal and requires that the OCC IN terminal be shorted to COMMON to activate the input. The resistive fan output signal is usually available on the FAN + and FAN - terminals. Note that some of these signals can be factory configured with a different wiring layout. For example, the override switch can be factory configured to be in parallel with the sensor or referenced to COMMON. The fan speed may also be referenced to COMMON. So the terminal layout may change depending on the application. See Figure 8.

Figure 6

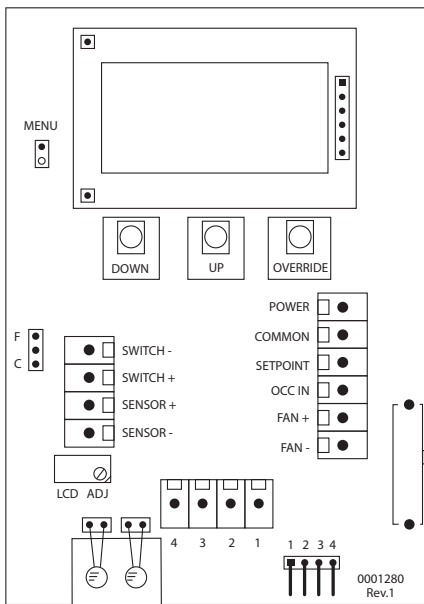


Figure 7

Wiring for voltage output signal and 24 Vdc power from controller

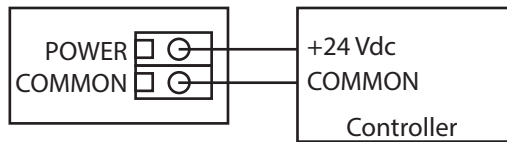


Figure 8

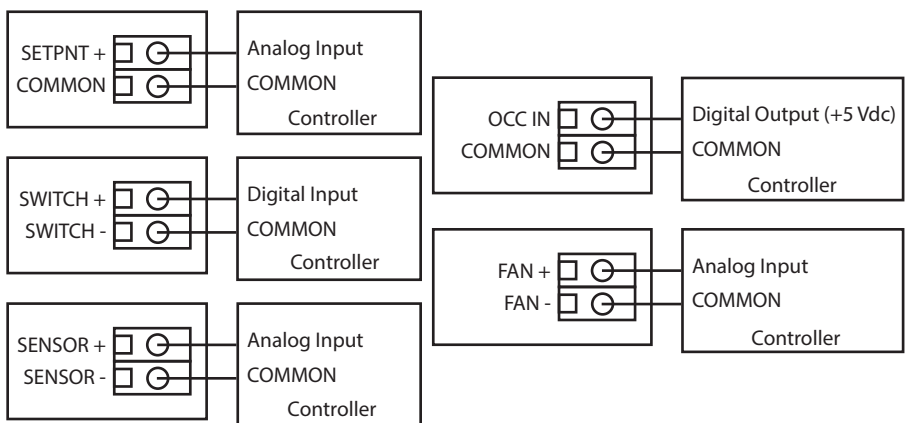
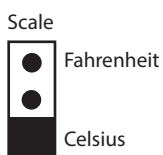


Figure 9



The scale can be set to either °C or °F via the Scale jumper. See Figure 9. If the unit is also equipped with the backlight option it can be enabled or disabled via the Backlight jumper. The LCD display can be calibrated by adjusting the LCD ADJ pot.

NORMAL OPERATION

Verify that the transmitter is properly wired and connections are tight. On startup, the LCD displays a 5 second glass test where all the segments are lit, including the F, C and OCC symbols. Then the software version number is displayed such as flashing "-01" or "-02" for 5 seconds. After startup, the device begins normal operation.

In normal operation, the room temperature is displayed on the LCD in either °C or °F as selected by the C/F jumper. The temperature range of the device is limited to 0.0-35.0 °C or 32.0-95.0 °F.

The sensor monitors the OCC IN signal. If this terminal is left open the LCD OCC segment will not light. If the input is set to logic 0 by shorting the terminal to COMMON, then the OCC symbol will be turned on. The OCC segment will remain lit as long as the OCC IN terminal is at logic 0.

SETPOINT OPERATION

The sensor has one setpoint control output and two buttons labeled UP and DOWN for setpoint adjustment. During normal operation, the LCD displays the room temperature. When either the UP or DOWN buttons are pressed the display will change to the setpoint mode. This is indicated by a flashing display. The display will show the previous temperature setpoint setting such as 22 °C or 77 °F. If no other action is taken for 5 seconds then the device will reset to normal operation.

While the display is still flashing the setpoint can be modified by pressing the UP or DOWN buttons to increase or decrease the setpoint value. The LCD will update to show the new setpoint and the output signal will update accordingly. When the desired setpoint is shown on the LCD, leave the unit for 5 seconds to reset to normal operation and save the new setting. Note that the setpoint can only be set around the programmed midpoint and within the programmed range. For °C, the setpoint range is ± 10 steps of 0.5 °C. For °F, the setpoint range is ± 10 steps of 1.0 °F. As the setpoint is changed the SETPOINT output signal will change in resistance.

Custom models are available that have a setpoint range of ± 5 steps or of 1.0 °C increments or 2.0 °F increments for example. Contact the factory for customization.

The following table shows typical default values of the setpoint control. The device starts at the midpoint value. If °C is selected with the jumper then the midpoint will be 21.0. If °F is selected then the midpoint will be 70.0. Each press of the UP or DOWN buttons will increase or decrease the setpoint value shown on the LCD until the maximum or minimum limit is reached as shown in the table.

For this example, the setpoint output is factory configured for 1-21 K Ω of resistance. Both a forward and reverse acting resistance is shown, the device may be configured either way.

	Setpoint Temperature		Resistance F	Resistance R
+10	80.0°F	26.0°C	21 K Ω	1 K Ω
+9	79.0°F	25.5°C	20 K Ω	2 K Ω
+8	78.0°F	25.0°C	19 K Ω	3 K Ω
+7	77.0°F	24.5°C	18 K Ω	4 K Ω
+6	76.0°F	24.0°C	17 K Ω	5 K Ω
+5	75.0°F	23.5°C	16 K Ω	6 K Ω
+4	74.0°F	23.0°C	15 K Ω	7 K Ω
+3	73.0°F	22.5°C	14 K Ω	8 K Ω
+2	72.0°F	22.0°C	13 K Ω	9 K Ω
+1	71.0°F	21.5°C	12 K Ω	10 K Ω
Midpoint	70.0°F	21.0°C	11 K Ω	11 K Ω
-1	69.0°F	20.5°C	10 K Ω	12 K Ω
-2	68.0°F	20.0°C	9 K Ω	13 K Ω
-3	67.0°F	19.5°C	8 K Ω	14 K Ω
-4	66.0°F	19.0°C	7 K Ω	15 K Ω
-5	65.0°F	18.5°C	6 K Ω	16 K Ω
-6	64.0°F	18.0°C	5 K Ω	17 K Ω
-7	63.0°F	17.5°C	4 K Ω	18 K Ω
-8	62.0°F	17.0°C	3 K Ω	19 K Ω
-9	61.0°F	16.5°C	2 K Ω	20 K Ω
-10	60.0°F	16.0°C	1 K Ω	21 K Ω

The Setup Menu can be used to change the midpoint for both °C and °F within a limited range. The midpoint factory default is 21.0 °C and 70.0 °F but may be changed. If the midpoint is changed, the maximum and minimum values will also change accordingly. The menu may also be used to change the direction of the setpoint signal plus other parameters.

Generally, the device is factory configured to specific requirements so the menu is not typically used.

SETUP MENU

The setup menu allows for installer setup of some of the program parameters. The values are stored in EEPROM so are saved during a power loss.

With the device powered and in normal operation, briefly short the two MENU pins to enter the Setup Menu. Then proceed as described below to configure the device.

Note that the menu items may change depending on the model. Available software options are described below. Contact the factory for custom programming. Two available versions of the menu are described below, Version -01 and Version -02. The operation depends on the model ordered.

MENU VERSION - 01 (FOR TYPICAL PRODUCTS)

Short the MENU pins on the PCB to enter the Setup Menu. The menu will exit at the end of the cycle. The second column, such as "C21", indicates the LCD display.

1. MIDPOINT - CELSIUS

C Midpoint C21

The default midpoint of the setpoint scale is 21 for °C. It can be changed to 20, 21, 22, 23, 24 or 25 by pressing the <UP> key. It cycles around 23-24-25-20-21-22...etc. When the correct value is shown, press the <DOWN> key to save the change and go to the next item. This item can be changed by the installer if a new setpoint range is required.

<DOWN>

Press to advance to next menu item

2. MIDPOINT FAHRENHEIT

F Midpoint F70

The default midpoint of the setpoint scale is 70 for °F. It can be changed to 68, 69, 70, 71, 72, 73, 74, 75, 76 or 77 by pressing the <UP> key. When the correct value is shown, press the <DOWN> key to save and go to the next step. This item can be changed by the installer if a new setpoint range is required.

<DOWN>

Press to advance to next menu item

3. SETPOINT ACTION

Action AF

The default setpoint action is F = Forward. This means that as the setpoint value increases output resistance increases. It can be changed to A r with the <UP> key to indicate Reverse. This means that as the setpoint value increases, the output resistance decreases. This item can be changed by the installer if the setpoint action must be reversed.

<DOWN>

Press to advance to next menu item

4. ± SETPOINT

Points P10

The default ± setpoint points is 10. This can be limited to ± 5 points by using the <UP> key to change it to P 5. Use the <DOWN> key to save and advance. **This item must not be changed by the installer since it also requires a hardware change. The device will not function correctly if this is changed from the factory setting.**

<DOWN>

Press to advance to next menu item

5. RESOLUTION - CELSIUS

C Resolution L0.5

The default °C resolution is 0.5°C per setpoint step (i.e. 23.0, 23.5, 24.0). This can be changed to 1.0°C per setpoint step. Use <UP> to change to L1.0 and then <DOWN> to save and advance. This can be changed by the installer.

<DOWN>

Press to advance to next menu item

6. RESOLUTION - FAHRENHEIT

F Resolution H1.0

The default °F resolution is 1.0°F per setpoint step (i.e. 70.0, 71.0, 72.0). This can be changed to 2.0°F per setpoint step. Use <UP> to change to H2.0 and then <DOWN> to save and advance. This item can be changed by the installer.

<DOWN> Press to advance to next menu item

7. SETPOINT SAVE

Setpoint Save U1

The default setpoint save is set to 1 = ON. This means if the power is removed and restored the setpoint is restored to the last value. Use the <UP> key to change it to 0 = OFF which means that on a power reset the setpoint always returns to the midpoint value. This item can be changed by the installer if necessary.

<DOWN> Press to advance to next menu item

8. BACKLIGHT

Backlight bL0

The default backlight mode is 0 = Auto (backlight lights for 5 seconds with a key press). Can be set to 1 = Off (backlight never lights) or 2 = On (backlight is always on) using the <UP> key. This item can be changed by the installer.

<DOWN> Exits the menu and returns to normal operation

MENU VERSION - 02

Short the MENU pins on the PCB to enter the Setup Menu. The menu will exit at the end of the cycle. The second column, such as "L18", indicates the LCD display.

1. LOWPOINT - CELSIUS

C Lowpoint L18

The default low limit of the setpoint scale is 18°C. It can be changed from 16 to 24 in 1°C steps by pressing the <UP> key. It cycles around. When the correct value is shown, press the <DOWN> key to save the change and to go to the next item.

<DOWN> Press to advance to next menu item

2. HIGHPOINT - CELSIUS

C Highpoint H20

The default high limit of the setpoint scale is 20°C. It can be changed from 18 to 26 in 1°C steps using the <UP> key. When the correct value is shown, press the <DOWN> key to save and go to the next item. Note the minimum span is fixed at 2.0°C.

<DOWN> Press to advance to next menu item

3. SETPOINT ACTION

Action Ar

The default setpoint action is r = Reverse. This means that as the setpoint value increases the output resistance decreases. It can be changed to A F with the <UP> key to indicate Forward. This means that as the setpoint value increases, the output resistance also increases.

<DOWN> Press to advance to next menu item

4. SETPOINT SAVE

Setpoint Save P1

The default setpoint save is set to 0 = OFF. This means if the power is removed and restored the setpoint goes back to the default (midpoint) value. Use the <UP> key to change it to 1 = ON which means that on a power reset to setpoint is restored to the last setting before the power loss.

<DOWN> Press to advance to next menu item

5. BACKLIGHT

Backlight bL2

The default backlight mode is 2 = On (backlight is always on). Can be set to 1 = Off (backlight never lights) or 0 = Auto (backlight lights for 5 seconds with a key press) using the <UP> key.

<DOWN>

Exits the menu and returns to normal operation

SPECIFICATIONS

GENERAL

Power Supply.....	24 Vac/dc $\pm 10\%$ (non-isolated half-wave rectified)
Consumption.....	20 mA max
Operating Conditions.....	0 to 50°C (32 to 122°F), 0-95 %RH non-condensing
Wiring Connections.....	Screw terminal block (14 to 22 AWG)
Enclosure.....	White ABS, IP30 (NEMA 1) 84mm W x 119mm H x 29mm D (3.3" x 4.7" x 1.15")
Country of Origin.....	Canada

TEMPERATURE SIGNAL

Sensor Type:	Various thermistors or RTD
Sensor Accuracy:	RTD Class A: $\pm 0.15^\circ\text{C}$ ($\pm 0.27^\circ\text{F}$) @ 0°C (32°F) RTD 1/3 DIN: $\pm 0.1^\circ\text{C}$ ($\pm 0.18^\circ\text{F}$) @ 0°C (32°F) RTD 1/10 DIN: $\pm 0.03^\circ\text{C}$ ($\pm 0.054^\circ\text{F}$) @ 0°C (32°F) NTC Thermistor Type 39: $\pm 0.05^\circ\text{C}$ ($\pm 0.09^\circ\text{F}$), 0 to 70°C (32 to 158°F) NTC Thermistor Type 55: $\pm 0.03^\circ\text{C}$ ($\pm 0.054^\circ\text{F}$), 0 to 70°C (32 to 158°F) NTC Thermistor Type 40/46: $\pm 0.1^\circ\text{C}$ ($\pm 0.18^\circ\text{F}$), 0 to 70°C (32 to 158°F)

SETPOINT CONTROL

Range.....	Up/Down pushbuttons for ± 10 or ± 5 resistive steps
Signal	Several resistance ranges available
Midpoint.....	Programmable, 20 to 25°C (68 to 77°F)
Action	Programmable, direct or reverse acting

LCD DISPLAY (TEMPERATURE)

Range.....	0.0- 35.0°C or 32.0- 95.0°F selectable via jumper
Resolution.....	$0.5^\circ\text{C}/^\circ\text{F}$
Display Size.....	38.1mm W x 16.5mm H (1.5" x 0.65")
Symbols	$^\circ\text{C}$, $^\circ\text{F}$, OCC

OCCUPIED INPUT

Signal Type.....	Digital input, 0-5 Vdc, active low, lights "OCC" on LCD
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OVERRIDE SWITCH

Momentary Pushbutton ...	Front panel, dry-contact output, 50 mA @ 12 Vdc
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FAN SPEED SWITCH

5 Position.....	Auto, Off, Low, Medium, High (0, 2, 4, 6 and 8 K Ω standard)
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DIMENSIONS

