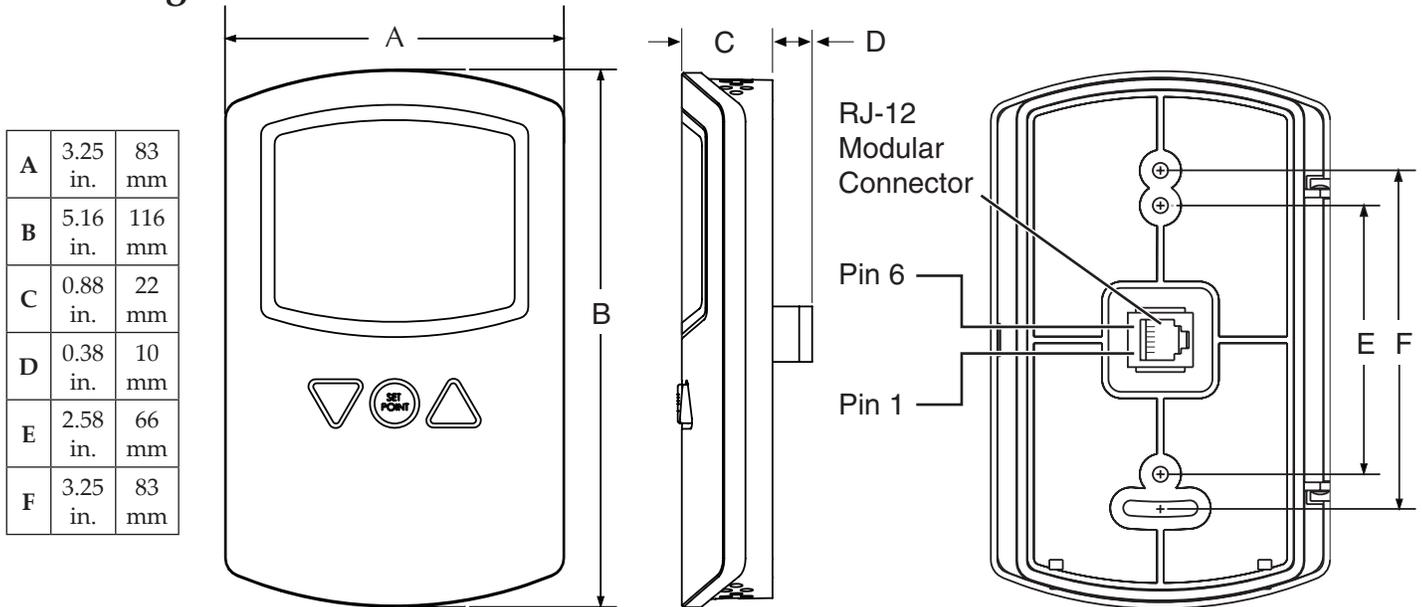


## Installation and Operation Guide

### Mounting



### Rough-in Preparation

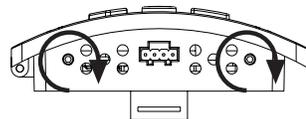
For optimum temperature sensor performance, the thermostat must be mounted on an interior wall and away from heat sources, sunlight, windows, air vents, and air circulation obstructions (e.g., curtains, furniture).

Complete rough-in wiring prior to installation:

- Route the cable from the thermostat location to the actuator to which it will connect. See [Wiring on page 2](#).
- If needed, install the HMO-1161 mounting backplate. See [Additional Information on page 4](#).

### Mounting the Thermostat

1. If the thermostat is locked on the backplate, turn the two hex screws (in the **two outermost holes**) in the backplate **CLOCKWISE** until they (just) clear the cover. Swing the thermostat up and away from the backplate to remove it.



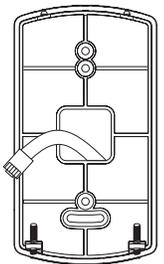
### ⚠ CAUTION

To prevent damage to the board, do not insert a screwdriver into any holes other than the two outermost holes. To prevent mounting screw heads

Pin 1 and 6	Pin 2 and 5	Pin 3	Pin 4
N/C	Common	Supply (14–19 VDC)	Output (2–10 VDC)*
*0 VDC during Unoccupied Off mode when temperature stays above 50° F			

from touching the circuit board in the thermostat, use only the mounting screws supplied by KMC Controls. Using other screws may damage the thermostat. Do not turn screws in farther than necessary to remove the cover.

2. Route the cable through the backplate.
3. With the hex screws toward the floor, fasten the backplate to the outlet box with the supplied screws. (The backplate mounts directly on **vertical** 2 x 4 inch boxes, but requires an HMO-1161 wall mounting plate for horizontal or 4 x 4 boxes.)
4. Insert the modular end of the cable into the jack of the thermostat.

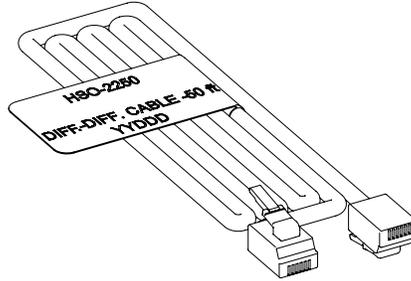


5. Place the top of the thermostat over the top of the mounting base and swing it down over the hex screw brackets. Be careful not to pinch the wiring.
6. Back the hex screws out of the backplate brackets (**counterclockwise**) until they engage the thermostat and hold it in place.

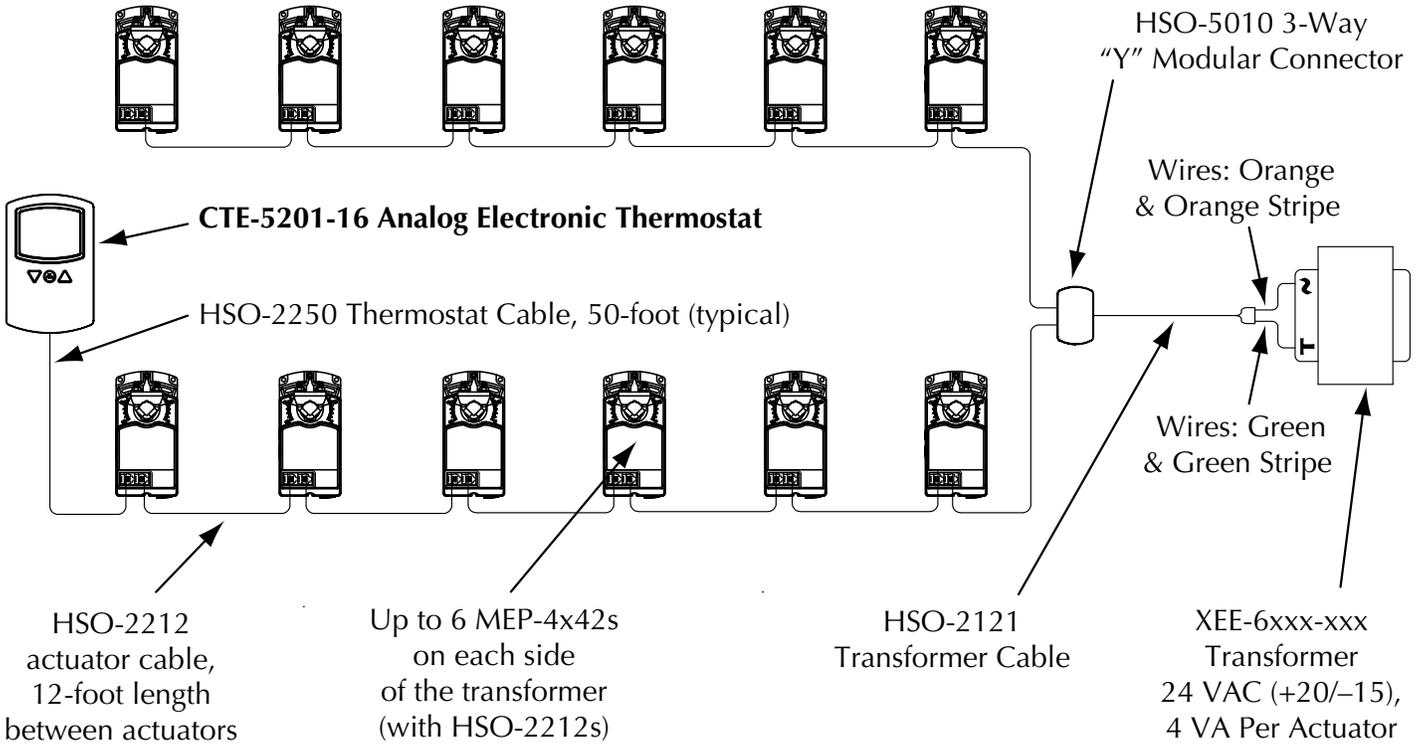
# Wiring

## Modular to Modular (HSO-22xx Cable)

Use HSO-22xx cables to connect the thermostat to MEP-4x42 actuators, using the modular connectors, as shown in the chart and sample application below.



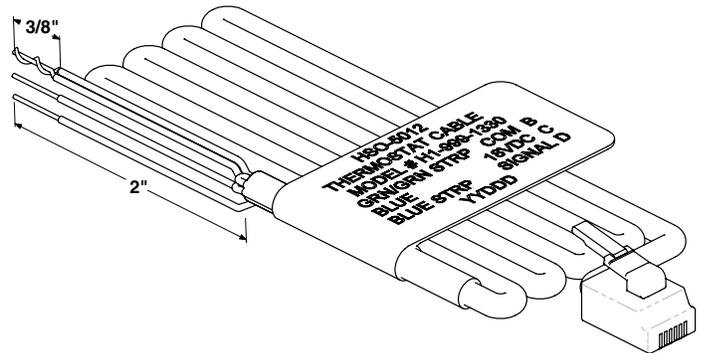
Cable P/N	Cable Length
HSO-2203	3 feet
HSO-2206	6 feet
HSO-2212	12 feet
HSO-2220	20 feet
HSO-2250	50 feet



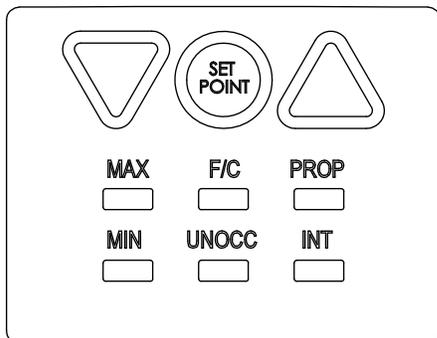
## Modular to Leads (HSO-5012 Cable)

If using the HSO-5012 cable, plug the modular connector into the thermostat, and connect the stripped leads as follows:

- Blue **stripe** to actuator signal input (proportional 2–10 VDC)
- Blue to power (14–19 VDC)
- Green and Green-Stripe (twisted together) to common
- (Wires from Pins 1 and 6 are not connected)



## Operation



### Turn On Backlight

Pressing any button turns on the backlight, which will remain on until about nine seconds after the last button press.

### Change Setpoint

To change the setpoint, push the Setpoint button to display the current value. Use the Up/Down buttons to change the value. After the display reverts back (after about nine seconds) to displaying the room temperature, the thermostat will control at the new setpoint.

**NOTE:** After a power loss, the setpoint will revert to the default value (70° F or 21.1° C is the factory default). This default value is also used in the deadband unoccupied mode. To change the default value, see [Configuration on page 3](#).

### Start Unoccupied Mode

Flip open the cover (hinged on the left side) and momentarily push the UNOCC button. The thermostat will stay in Unoccupied mode until the Setpoint button or one of the Up/Down buttons are pushed.

**NOTE:** There are two unoccupied mode options, Off (the default) or Deadband. See [Configuration on page 3](#) for details.

### Toggle Between °F and °C

To **temporarily** view the other temperature scale, flip open the cover (hinged on the left side), and momentarily press the F/C button. The alternative scale will appear as long as the backlight is on.

To make the desired F or C scale mode **permanent** (the scale persists instead of being momentary), press and hold the F/C button down for approximately 10 seconds until the display begins to flash. To return to the previous scale mode, repeat the process.

## Configuration

### Changing Defaults

The factory default settings are:

- Setpoint (Default): 70 F
- MAX: 100%
- MIN: 20%
- F/C Mode: Degrees F
- UNOCC Mode: Off
- PROP: 4 F
- INT: 30 Minutes

**To change configuration values:**

1. Flip open the cover (hinged on the left side).
2. Push the desired button to display the value to be changed.
3. Use the Up/Down buttons to change the value (except for toggling between °F and °C, which uses the F/C button only)
4. Press and hold the corresponding button for approximately 10 seconds until after the display starts flashing (and the new value is stored in memory).

### MAX

This is the **maximum** (high limit) value ( $H L\%$ ) that the output can attain. It is adjustable up to 100% (10 volts) and down to the MIN setting.

### MIN

This is the **minimum** (low limit) value ( $L L\%$ ) that the output can attain. It is adjustable down to 0% (0 volts) and up to the value of the MAX setting.

### F/C

To toggle between **degrees F and C MODES** (selected scale persists), press and hold the F/C button (only) down for about 10 seconds (do not use the Up/Down buttons) until the display begins to flash. Room temperature, setpoint, proportional band, deadband, and offset will thereafter be displayed in the desired units. See also [Toggle Between °F and °C on page 3](#).

### UNOCC

Momentarily pressing this button will put the unit into the **Unoccupied** mode ( $U N O C C$ ). It will stay in this mode until either the Setpoint or Up/Down buttons are pushed. There are two unoccupied mode options, Off (the default) or Deadband:

- In **Off Mode** ( $O F F$ ), the output voltage is forced to 0 VDC (0%). If the room temperature falls

below 50° F, a safety override will bring the output up to 2 volts. The output will return to 0 volts when the room temperature reaches 55° F.

- In **Deadband Mode** (*db*), the integral action is disabled, the setpoint reverts to the default setpoint, and a deadband of  $\pm 10^{\circ}$  F is established around the setpoint. As long as the room temperature is within the deadband the output will be half-way between the MIN and MAX values. For example, with the factory defaults (setpoint of 70° F, Min. of 20%, and Max. of 100%) in Deadband Mode, while the room temperature is between 60 and 80°, the output remains at 60%.

**NOTE:** Using Deadband Mode would usually keep the unoccupied room temperature closer to the default (occupied) setpoint temperature than the Off Mode.

## PROP

The **proportional band** (*Pb*) is the temperature band around the setpoint over which the output will vary from MIN to MAX due to the proportional action alone. The proportional band is adjustable from 2 to 6° F (1.1 to 3.3° C).

## INT

As long as there is an error between room temperature and setpoint, the **integral action** (*Int*) will cause the output to integrate up or down. The integral time is the time it takes the integral action to repeat the effect of the proportional action. The integral time is adjustable from 15 to 30 minutes. Setting the integral time to 0 will disable the integral action.

## Calibration (Temperature Offset)

Pressing both MIN and INT buttons simultaneously enables the option to calibrate the thermostat by offsetting the internal temperature sensor by up to  $\pm 2^{\circ}$  F ( $\pm 1.1^{\circ}$  C). To test/calibrate:

1. Carefully position an accurate thermometer or temperature probe next to the thermostat and (after sufficient time for the thermometer or probe to stabilize) compare readings. If there is an undesirable discrepancy, adjust the temperature offset value.

**NOTE:** Body heat can affect the temperature of the thermostat and/or a thermometer.

2. Momentarily press both MIN and INT buttons simultaneously.

3. After using the Up/Down buttons to change (*Odd* or *Sub*) the offset the appropriate value, press and hold both the MIN and INT buttons until the display starts flashing and the new offset is stored in memory.

## Maintenance

Remove dust as necessary from holes in top and bottom. Clean the display with soft, damp cloth and mild soap. Each component is designed for dependable, long-term reliability, and performance. Careful installation will also ensure long-term reliability and performance.

## Additional Information

For specifications, a complete list of accessories, and other information, see the [CTE-5201-16 Data Sheet](#).



For more information about the sample application with MEP-4x42 actuators, see the [MEP-4x42 Installation Guide](#) and [Data Sheet](#).



KMC Controls, Inc.  
19476 Industrial Drive  
New Paris, IN 46553  
574.831.5250  
[www.kmccontrols.com](http://www.kmccontrols.com)  
[info@kmccontrols.com](mailto:info@kmccontrols.com)