

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

### TEC - 2647 - 4

### Applications

The TEC26x7-4 Series Thermostat Controllers are BACnet® Master-Slave/Token-Passing (MS/TP) networked devices that provide control of local hydronic reheat valves, pressure dependent Variable Air Volume (VAV) equipment with or without local reheat, or other zoning equipment using an on/off, floating, or proportional 0 to 10 VDC control input. The technologically advanced TEC26x7-4 Series Thermostat Controllers feature a Building Automation System (BAS) BACnet MS/TP communication capability that enables remote monitoring and programming for efficient space temperature control.

The TEC26x7-4 Series Thermostat Controllers feature an intuitive user interface with backlit display that makes setup and operation quick and easy. The thermostat controllers also employ a unique, Proportional-Integral (PI) time-proportioning algorithm that virtually eliminates temperature offset associated with traditional, differential-based thermostat controllers.

**IMPORTANT:** The TEC26x7-4 Series Thermostat Controllers are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the thermostat controller could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the thermostat controller.



### North American Emissions Compliance

#### United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

#### Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### Installation

#### Location Considerations

Locate the TEC26x7-4 Series Thermostat Controller:

- on a partitioning wall, approximately 5 ft (1.5 m) above the floor in a location of average temperature
- away from direct sunlight, radiant heat, outside walls, behind doors, air discharge grills, stairwells, or outside doors
- away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference

**Note:** Allow for vertical air circulation to the TEC26x7-4 Series Thermostat Controller.

## FlexSys BACnet® MS/TP Networked Thermostat

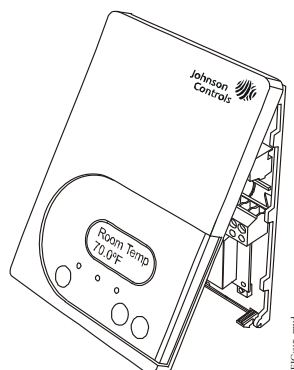
Model: **TEC - 2647 - 4**

To install the thermostat controller:

1. Use a Phillips-head screwdriver to remove the security screw if it is installed on the bottom of the thermostat controller cover.

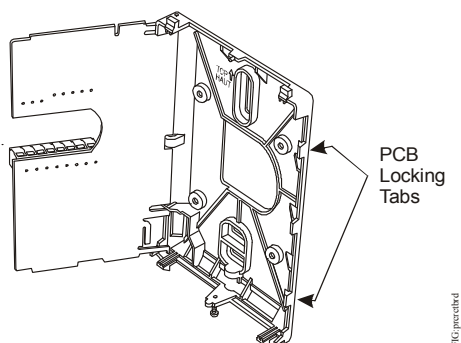
**Note:** Normally, the security screw is packaged separately in a plastic bag with the thermostat controller. Skip this step if the screw is not installed on the bottom of the cover.

2. Pull the bottom edge of the thermostat controller cover and open the thermostat controller as illustrated in Figure 1.



**Figure 1: Removing the Thermostat Controller Cover**

3. Carefully pull the locking tabs on the right side of the thermostat controller mounting base and unlock the Printed Circuit Board (PCB). Open the PCB to the left as illustrated in Figure 2.



**Figure 2: Opening the Thermostat Controller PCB**

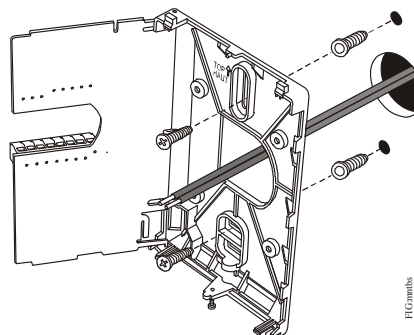
4. Pull approximately 6 in. (152 mm) of wire from the wall and insert the wire through the hole in the thermostat controller mounting base.
5. Align the thermostat controller mounting base on the wall and use the base as a template to mark the two mounting hole locations.
6. Position the thermostat mounting base so that the arrow on the base points upward to indicate the top of the thermostat.

**Note:** If you need to install the thermostat on an electrical junction box, use 2-1/2 x 4 in. (63 x 101 mm) square boxes with mud ring covers, and avoid smaller 1-1/2 x 4 in. (38 x 101 mm) square or 3 x 2 in. (76 x 51 mm) boxes. This procedure ensures you have enough space for cabling and end-of-line devices, if needed.

**Note:** For surface-mount applications, use durable mounting hardware such as Molly bolt anchors that cannot be easily pulled out of the mounting surface.

7. Secure the base to the wall surface using two mounting screws as illustrated in Figure 3.

**Note:** Be careful not to overtighten the mounting screws.



**Figure 3: Securing the Thermostat Controller Mounting Base to the Wall**

8. Swing the PCB back to the right and carefully snap it into the locking tabs on the thermostat controller mounting base.
9. Remove the screw terminal blocks that are attached to a disposable adhesive. Figure 4 illustrates the locations of the screw terminal blocks on the thermostat controller.

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

### TEC - 2647 - 4

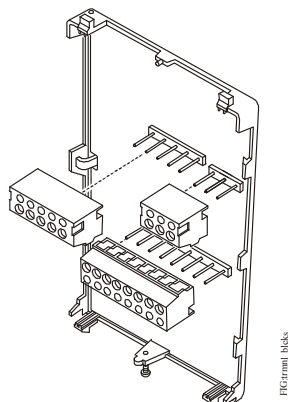


Figure 4: Removing the Screw Terminal Blocks

### Wiring

When an existing thermostat controller is replaced, remove and label the wires to identify the terminal functions. When a TEC26x7-4 Series Thermostat Controller is replaced, simply remove the old screw terminal blocks and reinsert them onto the PCB of the replacement thermostat controller.

**IMPORTANT:** Because some of the objects may not directly correlate to a previous version, you must rediscover all point objects for the TEC26x7-4 version. For detailed information on this mapping, refer to the *TEC BACnet® MS/TP Network Series Thermostat Controllers Technical Bulletin (LIT-12011592)*.



**CAUTION: Risk of Electric Shock.** Disconnect the power supply before making electrical connections to avoid electric shock.



**CAUTION: Risk of Property Damage.**

Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

**IMPORTANT:** Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the TEC26x7-4 Series Thermostat Controller.

To wire the thermostat controller:

1. Strip the ends of each wire 1/4 in. (6 mm) and connect them to the appropriate screw terminals as indicated in Table 1 and Figure 5 through Figure 18.

**Note:** For more details on wiring the MS/TP Communications Bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

2. Carefully push any excess wire back into the wall.

**Note:** Seal the hole in the wall with fireproof material to prevent drafts from affecting the ambient temperature readings.

3. Reinsert the screw terminal blocks onto the PCB.
4. Reattach the MS/TP communication wires to the terminal block.

**Note:** If multiple wires are inserted into the terminals, be sure to properly twist the wires together prior to inserting them into the terminal connectors.

5. Reattach the thermostat controller cover to the mounting base (top side first).
6. Use a Phillips-head screwdriver to reinstall the security screw on the bottom of the thermostat controller cover.

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

Table 1: Terminal Identification (See Figure 5.)

Terminal Number	Terminal Label		Function
	TEC2627-4 (On/Off or Floating Control)	TEC2647-4 (Proportional 0 to 10 VDC Control)	
4	24 V~ Hot	24 V~ Hot	24 VAC from Transformer
5	24 V~ Com	24 V~ Com	24 VAC (Common) from Transformer
6	BO5 Aux	BO5 Aux	Aux BO (Auxiliary Output)
7	BO5 Aux	BO5 Aux	Aux BO (Auxiliary Output)
8	BO3	Blank	Open Heat
9	BO4	AO2	Close Heat
10	BO1	AO1	Open Cool
11	BO2	Blank	Close Cool
12	BI1	BI1	Configurable Binary Input 1
13	RS	RS	Remote Sensor
14	Scom	Scom	Sensor Common
15	BI2	BI2	Configurable Binary Input 2
16	UI3	UI3	Configurable Universal Input 3
Blank	+, -, REF	+, -, REF	MS/TP Bus

# FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

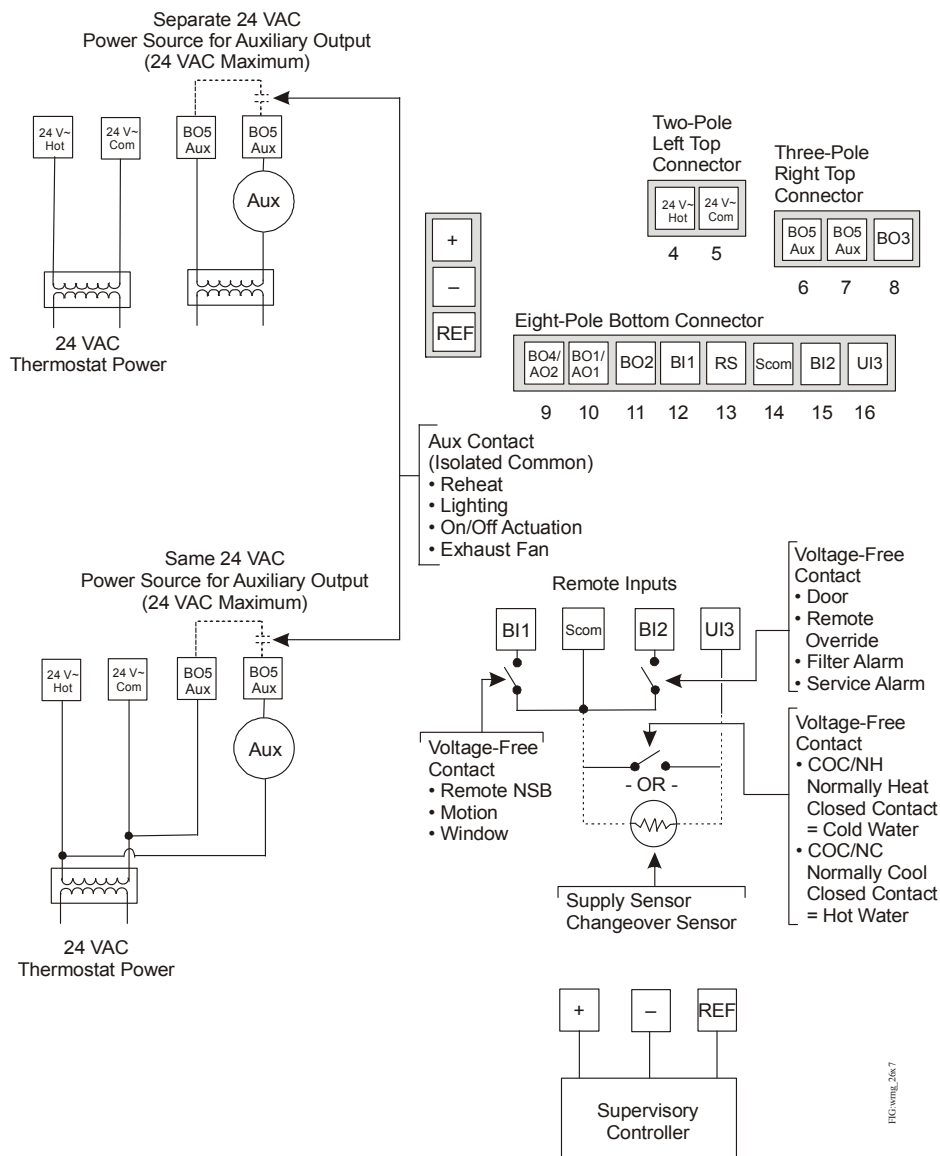
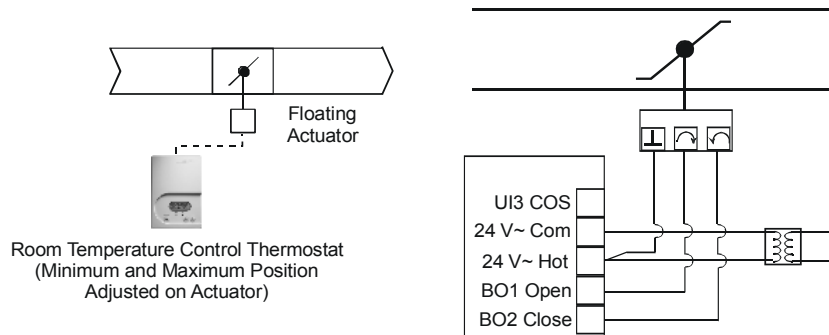


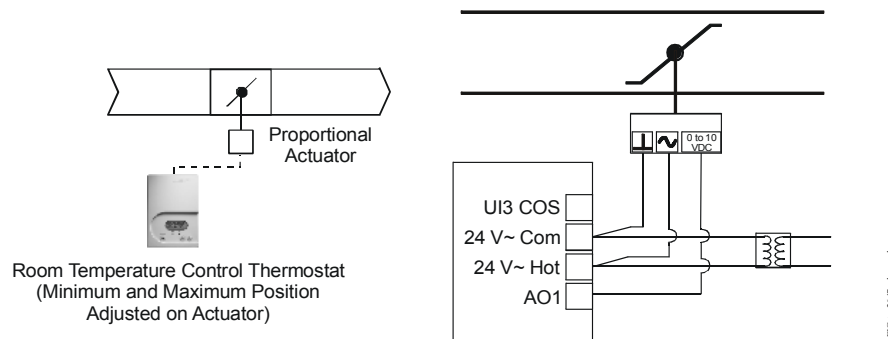
Figure 5: Wiring the TEC26x7-4 Series Thermostat Controller (See Table 1.)

# FlexSys BACnet® MS/TP Networked Thermostat

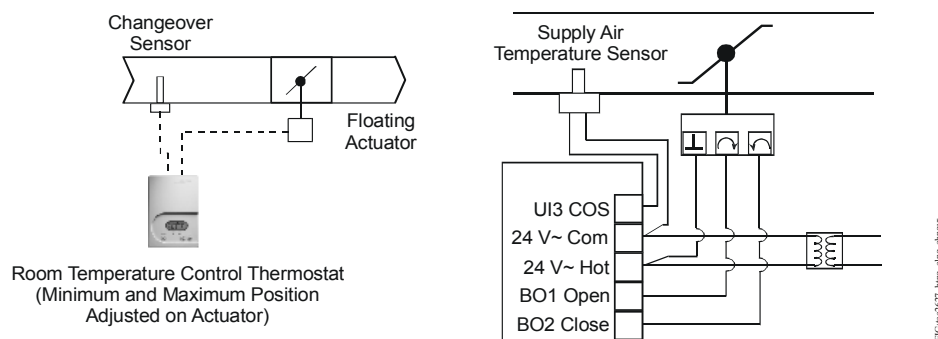
Model: **TEC - 2647 - 4**



**Figure 6: Wiring the TEC2627-4 Thermostat Controller for Floating Control (Pressure-Dependent VAV Cooling Only)**



**Figure 7: Wiring the TEC2647-4 Thermostat Controller for Proportional 0 to 10 VDC Control (Pressure-Dependent VAV Cooling Only)**

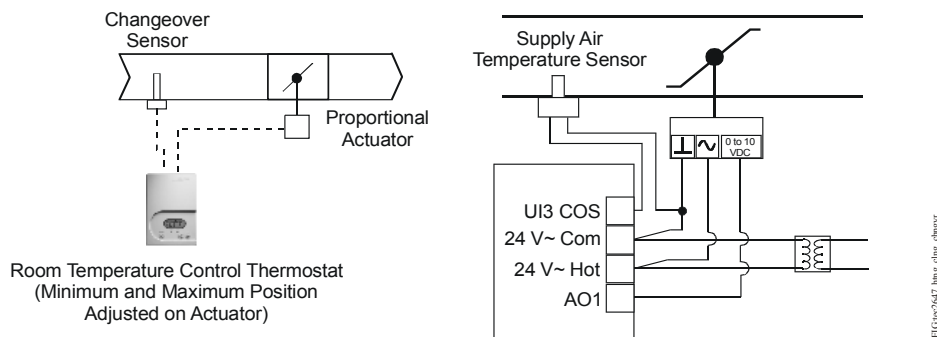


**Figure 8: Wiring the TEC2627-4 Thermostat Controller for Floating Control (Pressure-Dependent VAV Heating/Cooling with Changeover)**

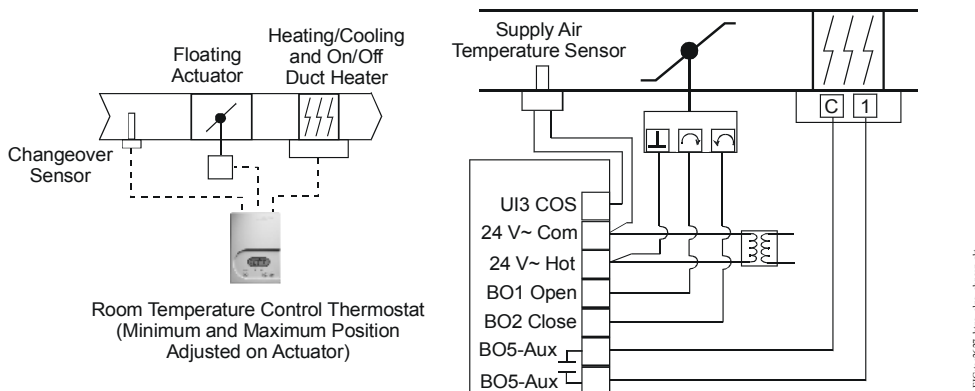
# FlexSys BACnet® MS/TP Networked Thermostat

**Model:**

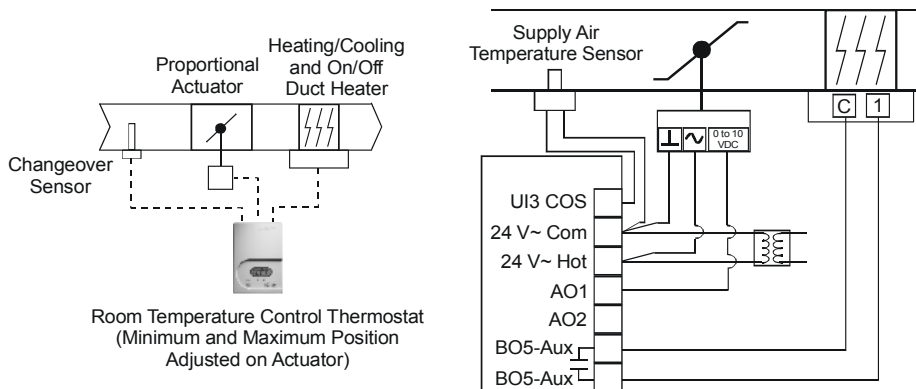
**TEC - 2647 - 4**



**Figure 9: Wiring the TEC2647-4 Thermostat Controller for Proportional 0 to 10 VDC Control (Pressure-Dependent VAV Heating/Cooling with Changeover)**



**Figure 10: Wiring the TEC2627-4 Thermostat Controller for Floating Control (Pressure-Dependent VAV Heating Cooling with Changeover and Reheat)**

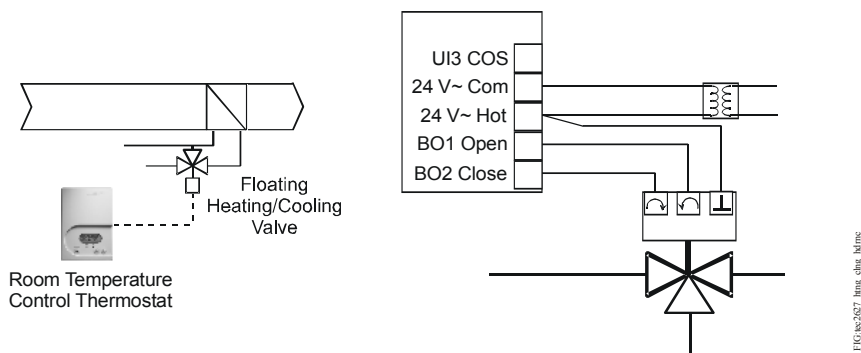


**Figure 11: Wiring the TEC2647-4 Thermostat Controller for Proportional 0 to 10 VDC Control (Pressure-Dependent VAV Heating/Cooling with Changeover and Reheat)**

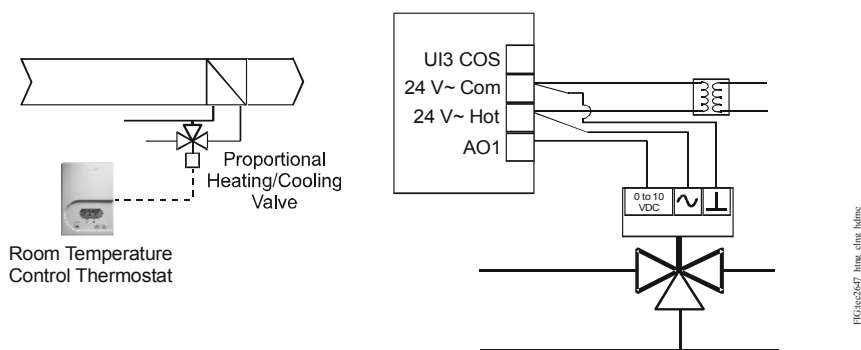
# FlexSys BACnet® MS/TP Networked Thermostat

Model:

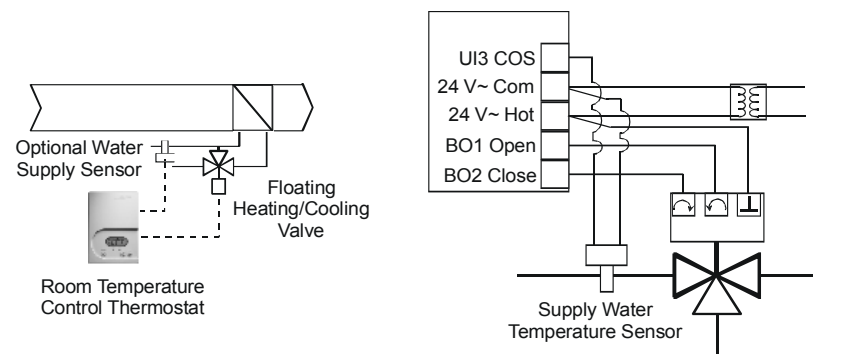
**TEC - 2647 - 4**



**Figure 12: Wiring the TEC2627-4 Thermostat Controller for Floating Control (Heating/Cooling Hydronic Valve Control)**



**Figure 13: Wiring the TEC2647-4 Thermostat Controller for Proportional 0 to 10 VDC Control (Heating/Cooling Hydronic Valve Control)**



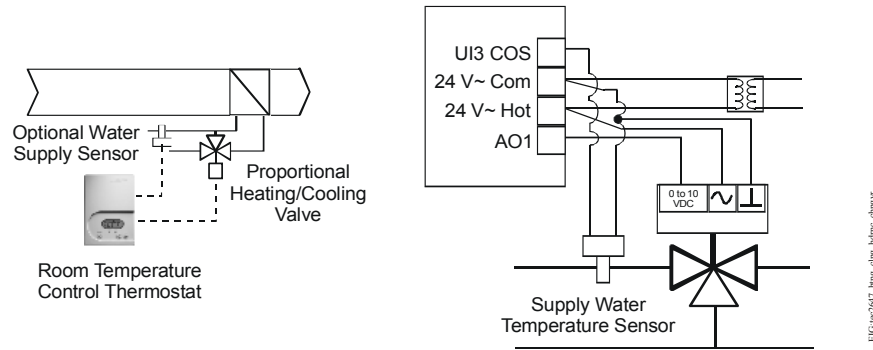
**Figure 14: Wiring the TEC2627-4 Thermostat Controller for Floating Control (Heating/Cooling Hydronic Valve Control with Changeover)**



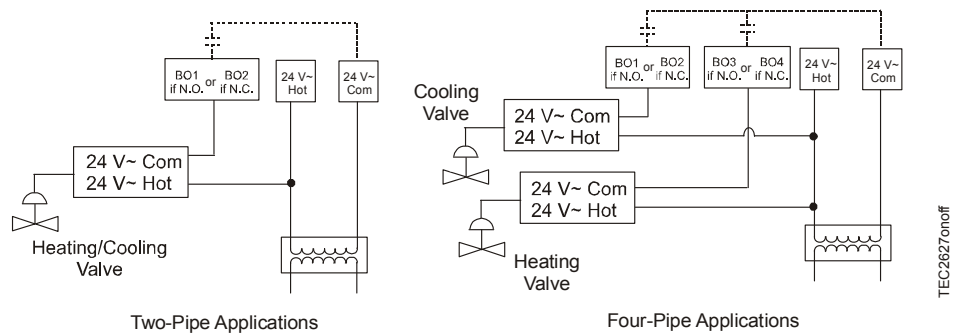
# FlexSys BACnet® MS/TP Networked Thermostat

Model:

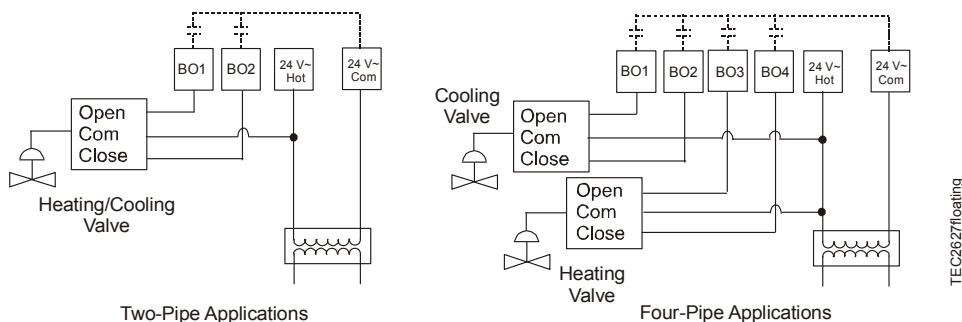
**TEC - 2647 - 4**



**Figure 15: Wiring the TEC2647-4 Thermostat Controller for Proportional 0 to 10 VDC Control (Heating/Cooling Hydronic Valve Control with Changeover)**



**Figure 16: Wiring the TEC2627-4 Thermostat Controller for On/Off Control**

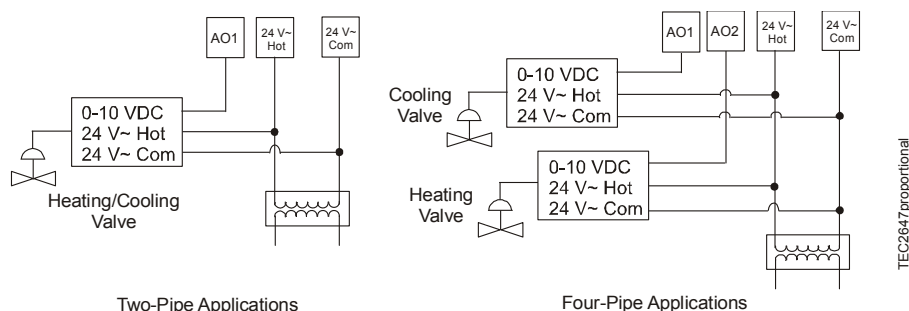


**Figure 17: Wiring the TEC2627-4 Thermostat Controller for Floating Control**

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

### TEC - 2647 - 4



**Figure 18: Wiring the TEC2647-4 Thermostat Controller for Proportional Control**

### Connecting the MS/TP Bus

To connect the MS/TP Bus:

1. Set the MS/TP address of the TEC BACnet MS/TP Network Series Thermostat Controller per the engineering drawings and test for bus voltage, polarity, and isolation prior to wiring the MS/TP Bus. Use the **Com addr** parameter to set the MS/TP address for the thermostat controller.

**Note:** The wiring rules for the MS/TP Bus differ from the wiring rules for the N2 Bus. For more details on wiring the MS/TP Communications Bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

2. Observe the polarity when connecting the bus wires to the thermostat controller.
3. After the bus wires are connected to the first thermostat controller, continue in a daisy-chained fashion to the next thermostat controller.

**Note:** The bus wiring must be twisted-pair lines. Do not run the bus wiring in the same conduit as line voltage wiring (30 VAC or above) or other wiring that switches power to highly inductive loads (such as contactors, coils, motors, or generators).

The MS/TP Bus requires proper termination and biasing at each end of a segment (a segment is a physically continuous length of wire). Because the rooftop controller is not equipped with end-of-line termination, a Johnson Controls MS-BACEOL-0 End-of-Line Terminator (see Table 5; ordered separately) or similar device is recommended to provide this end-of-line termination. An end-of-line terminator is required if a supervisory controller is not at the end of the segment. If a supervisory controller is at the end of the segment, then the end-of-line terminator switch on the supervisory controller must be set in the ON position.

The thermostat controller has automatic baud rate detection. Do not exceed the maximum number of devices allowed on a field bus. Be sure that the wiring terminations are set correctly and that all communication wiring is daisy-chained with no taps.

A small green light under the thermostat controller cover (on the left edge when facing the thermostat controller) indicates the communications mode when the thermostat controller is operating.

The following blink codes may be seen:

- **Short-Short-Long:** Indicates that the baud rate is known and that communication is active.
- **Short-Short:** Indicates that the thermostat controller is scanning for the correct baud rate and that there is no communication.
- **Off:** Indicates that there is no power to the thermostat controller or that the MS/TP wiring polarity is reversed.
- **Long:** Indicates that the MS/TP communication daughter board is the wrong type for the main board.

### MS/TP Thermostat Controller Mapping

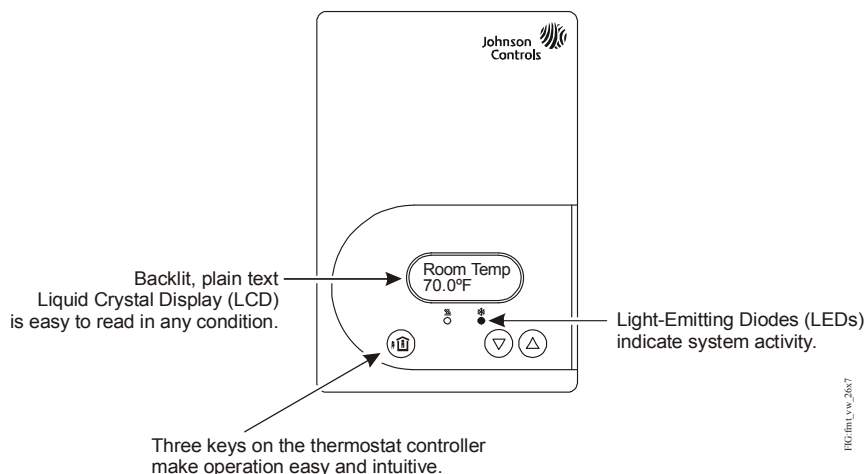
For detailed information on MS/TP Bus objects and thermostat controller mapping, refer to the *TEC BACnet MS/TP Network Series Thermostat Controllers Technical Bulletin (LIT-12011592)*.

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

### TEC - 2647 - 4

### Setup and Adjustments



**Figure 19: Front Cover of Thermostat Controller**

#### Thermostat Controller User Interface Keys

The TEC26x7-4 Series Thermostat Controller user interface consists of three keys on the front cover (Figure 19). The function of each key is as follows:

- **OVERRIDE** key overrides the unoccupied mode to occupied at the local user interface for the specified TOccTime. (TOccTime is defined by selecting the appropriate time period in the Installer Configuration Menu.) If one of the binary inputs is configured to operate as a remote override contact, this **OVERRIDE** function is disabled. The **OVERRIDE** key also allows access to the Installer Configuration Menu. See the [Configuring the TEC26x7-4 Series Thermostat Controller](#) section.
- **UP/DOWN** arrow keys change the configuration parameters and activate a setpoint adjustment.

#### Backlit Liquid Crystal Display (LCD)

The TEC26x7-4 Series Thermostat Controllers include a 2-line, 8-character backlit display. Low-level backlighting is present during normal operation, and it brightens when any user interface key is pressed. The backlight returns to low level when the thermostat controller is left unattended for 45 seconds.

#### Light-Emitting Diodes (LEDs)

Two LEDs are included to call for heat or call for cooling:

- The heat LED is on when heating is on.
- The cool LED is on when cooling is on.

#### Status Display Menu

The Status Display Menu is displayed during normal thermostat controller operation. This menu continuously scrolls through the following parameters:

- Room Temperature
- System Mode
- Occupancy Status (Occupied/Unoccupied/Override)
- Applicable Alarms (The backlight lights up as an alarm condition is displayed.)

**Note:** An option is available within the Installer Configuration Menu to lock out the scrolling display and show only the **Room Temperature** parameter.

## FlexSys BACnet® MS/TP Networked Thermostat

Model: **TEC - 2647 - 4**

### Configuring the TEC26x7-4 Series Thermostat Controller

The TEC26x7-4 Series Thermostat Controller ships from the factory with default settings for all configurable parameters. The default settings are shown in Table 4. To reconfigure the parameters via the thermostat controller, follow the steps in this section.

1. To access the Installer Configuration Menu, press and hold the **OVERRIDE** key for approximately 8 seconds.

**Note:** If the **Password** parameter is configured, Password 0 appears on the thermostat controller display indicating that the configured password is required to proceed. Use the **UP/DOWN** arrow keys to indicate the configured password, then press the **OVERRIDE** key to proceed through the Installer Configuration Menu parameters.

2. Once the Installer Configuration Menu begins, release and press the **OVERRIDE** key to scroll through the parameters listed in Table 4.
3. When the desired parameter is displayed, use the **UP/DOWN** arrow keys to choose the desired selection option.
4. Press and release the **OVERRIDE** key to continue scrolling through the parameters.

When the thermostat controller is in the Installer Configuration Menu and left unattended for approximately 8 seconds, the thermostat controller reverts to the Status Display Menu.

### Configuring Inputs BI1, BI2, and UI3

When BI1 and BI2 are configured for an alarm condition, an alarm condition is displayed locally when the input is closed. An alarm message is included on the scrolling Status Display Menu and when the message is displayed, the backlight momentarily lights up.

The UI3 input provides changeover of hot/cold water switching or supply air temperature monitoring at the thermostat controller.

Each input can be configured to the Selection Options included in Table 4.

### Configuring the Output Options (Out1Conf)

For applications that enable heating/cooling operation from the same output, choose the selection option **(2.0)** in the **Out1Conf** parameter. For applications that enable heating/cooling operation from different outputs, choose the selection option **(4.0)**.

### Configuring the Sequence of Operation (SeqOpera)

Choose the appropriate sequence of operation. The modes presented are user-dependent on the sequence of operation selected. For two-pipe applications using a changeover sensor, choose the selection option **(0): Cooling Only**. Changeover occurs between **Cooling Only** and **Heating Only**. See Figure 20 through Figure 25 for sequence of operation examples.

**Table 2: Selection Options for Sequence of Operation in Two-Pipe Applications**

Selection Option	Control Curve	Terminal Numbers Used (See Table 1 and Figure 5.)		
		On/Off Control	Floating Control	Proportional 0 to 10 VDC Control
<b>(0): Cooling Only</b>	See Figure 20.	<b>10:</b> N.O. Cooling <b>11:</b> N.C. Cooling	<b>10:</b> Open Cooling <b>11:</b> Closed Cooling	<b>10:</b> Proportional Cooling
<b>(1): Heating Only</b>	See Figure 21.	<b>10:</b> N.O. Heating <b>11:</b> N.C. Heating	<b>10:</b> Open Heating <b>11:</b> Closed Heating	<b>10:</b> Proportional Heating
<b>(2): Cooling and Reheat</b>	See Figure 22.	<b>6 and 7:</b> Reheat <b>10:</b> N.O. Cooling <b>11:</b> N.C. Cooling	<b>6 and 7:</b> Reheat <b>10:</b> Open Cooling <b>11:</b> Closed Cooling	<b>6 and 7:</b> Reheat <b>10:</b> Proportional Cooling
<b>(3): Heating and Reheat</b>	See Figure 23.	<b>6 and 7:</b> Reheat <b>10:</b> N.O. Heating <b>11:</b> N.C. Heating	<b>6 and 7:</b> Reheat <b>10:</b> Open Heating <b>11:</b> Closed Heating	<b>6 and 7:</b> Reheat <b>10:</b> Proportional Heating

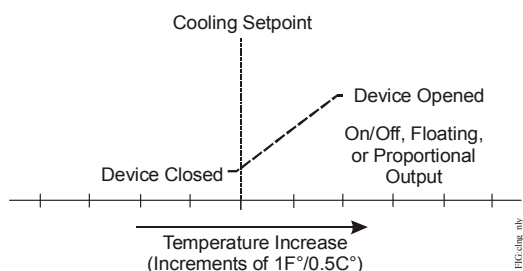
# FlexSys BACnet® MS/TP Networked Thermostat

Model:

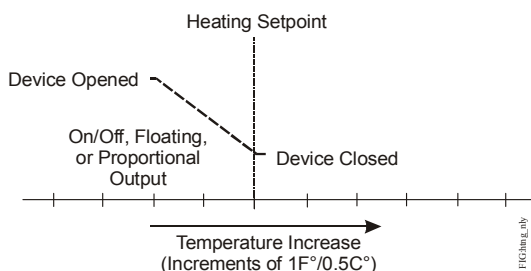
**TEC - 2647 - 4**

**Table 3: Selection Options for Sequence of Operation in Four-Pipe Applications**

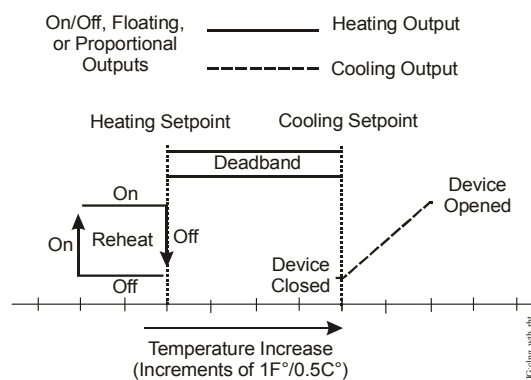
Selection Option	Control Curve	Terminal Numbers Used (See Table 1 and Figure 5.)		
		On/Off Control	Floating Control	Proportional 0 to 10 VDC Control
(0): Cooling Only	See Figure 20.	10: Normally Open (N.O.) Cooling 11: Normally Closed (N.C.) Cooling	10: Open Cooling 11: Closed Cooling	10: Proportional Cooling
(1): Heating Only	See Figure 21.	8: N.O. Heating 9: N.C. Heating	8: Open Heating 9: Closed Heating	9: Proportional Heating
(2): Cooling and Reheat	See Figure 22.	6 and 7: Reheat 10: N.O. Cooling 11: N.C. Cooling	6 and 7: Reheat 10: Open Cooling 11: Closed Cooling	6 and 7: Reheat 10: Proportional Cooling
(3): Heating and Reheat	See Figure 23.	6 and 7: Reheat 8: N.O. Heating 9: N.C. Heating	6 and 7: Reheat 8: Open Heating 9: Closed Heating	6 and 7: Reheat 9: Proportional Heating
(4): Cool/Heat Four-Pipe	See Figure 24.	8: N.O. Heating 9: N.C. Heating 10: N.O. Cooling 11: N.C. Cooling	8: Open Heating 9: Closed Heating 10: Open Cooling 11: Closed Cooling	9: Proportional Heating 10: Proportional Cooling
(5): Cool/Heat Four-Pipe and Reheat	See Figure 25.	6 and 7: Reheat 8: N.O. Heating 9: N.C. Heating 10: N.O. Cooling 11: N.C. Cooling	6 and 7: Reheat 8: Open Heating 9: Closed Heating 10: Open Cooling 11: Closed Cooling	6 and 7: Reheat 9: Proportional Heating 10: Proportional Cooling



**Figure 20: Cooling Only, Two- or Four-Pipe Applications**



**Figure 21: Heating Only, Two- or Four-Pipe Applications**

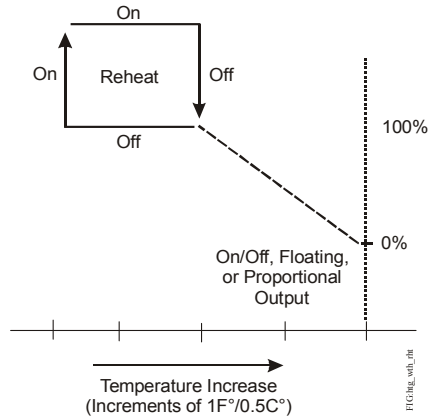


**Figure 22: Cooling with Reheat, Two- or Four-Pipe Applications**

# FlexSys BACnet® MS/TP Networked Thermostat

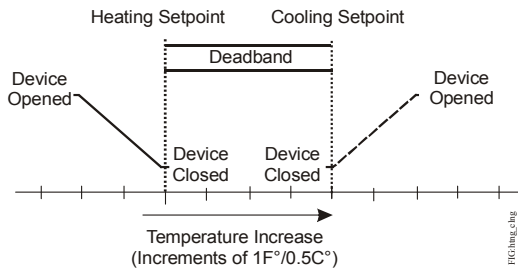
Model:

**TEC - 2647 - 4**

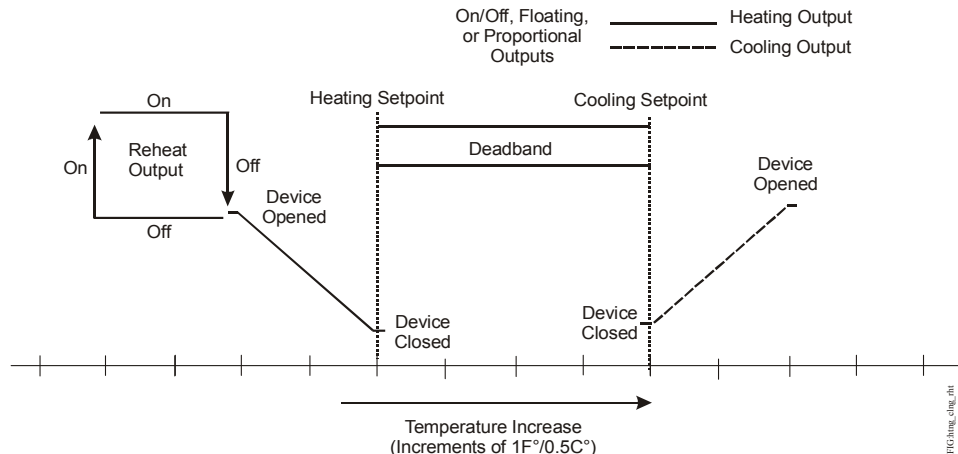


**Figure 23: Heating with Reheat, Two- or Four-Pipe Applications**

On/Off, Floating, or Proportional Outputs  
 — Heating Output  
 - - - - - Cooling Output



**Figure 24: Heating/Cooling, Four-Pipe Applications**



**Figure 25: Heating/Cooling with Reheat, Four-Pipe Applications**

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

Table 4: Installer Configuration Menu (Part 1 of 6)

Parameter Appearing on Display	Description and Default	Selection Options
<b>Pswrd</b>	Sets the protective access password to prevent unauthorized access to the Installer Configuration Menu. Default: <b>0</b> <b>Note:</b> The default setting does not lock out access to the Installer Configuration Menu.	Range: <b>0 to 1,000</b>
<b>Com addr</b>	MS/TP address at the thermostat controller; coincides with the address assigned at the supervisory controller. Default: <b>254</b>	Range: <b>004 to 127</b>
<b>BI1</b>	Configuration of Binary Input 1. Default: <b>None</b>	<p><b>(None):</b> No function is associated with an input.</p> <p><b>(Rem NSB):</b> Remote Night Setback (NSB) via a time clock input, an occupancy sensor, or from a voltage-free contact. Contact open = Occupied; contact closed = Unoccupied.</p> <p><b>(MotionNO*):</b> Temporary occupancy request via a motion detector input. Contact open = Unoccupied. When the contact closes, the thermostat controller goes into the occupied mode for a specified TOccTime. Once the TOccTime begins, the thermostat controller remains in the occupied mode if the contact is open, until the TOccTime expires.</p> <p><b>(MotionNC*):</b> Temporary occupancy request via a motion detector input. Contact closed = Unoccupied. When the contact opens, the thermostat controller goes into the occupied mode for a specified TOccTime. Once the TOccTime begins, the thermostat controller remains in the occupied mode if the contact is closed, until the TOccTime expires.</p> <p><b>(Window**):</b> Cancels the thermostat controller heating or cooling action when a window is open. A Window alarm is displayed indicating that the window needs to be closed to resume heating or cooling.</p> <p>* These settings disable any local override function.</p> <p>** When this setting is selected, the heating and or cooling outputs are enabled only when the contact is closed. If the fan is set to Auto, it is enabled only when the contact is closed. If the fan is set to On, it is not affected by this setting.</p>

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

Table 4: Installer Configuration Menu (Part 2 of 6)

Parameter Appearing on Display	Description and Default	Selection Options
<b>BI2</b>	Configuration of Binary Input 2. Default: <b>None</b>	<p><b>(None):</b> No function is associated with an input.</p> <p><b>(Door Dry):</b> Door contact only has an effect if BI1 is set to MotionNO or MotionNC. (See the <i>BI1</i> parameter in this table.) The occupancy is now dictated via BI1 and BI2. Any motion detected sets the zone to Occupied status. The zone remains permanently in occupied mode until the door contact switch opens momentarily. The thermostat controller then enters stand-by mode. If more movements are detected, the occupied mode resumes. While the door is opened, any movements detected by the remote PIR sensor or the PIR accessory cover are ignored. Use a Normally Closed contact switching device. Contact opened = Door opened, Contact closed = Door closed.</p> <p><b>(RemOVR):</b> Temporary occupancy request via a remote input. This override function is controlled by a manual remote occupancy override. When enabled, this condition disables the override capability of the thermostat controller.</p> <p><b>(Filter):</b> A Filter alarm is displayed. This alarm can be connected to a differential pressure switch that monitors a filter.</p> <p><b>(Service):</b> A Service alarm is displayed on the thermostat controller when the input is energized. This input can be tied into the air conditioning unit control card, which provides an alarm should there be a malfunction.</p>
<b>UI3</b>	Configuration of Universal Input 3. Default: <b>None</b>	<p><b>(None):</b> No function is associated with an input.</p> <p><b>(COC/NH):</b> Changeover Contact/Normally Heat: A dry contact input is used to signal seasonal hot/cold water changeover. The contact closes when cold water is present. Valid only for two-pipe systems.</p> <p><b>(COC/NC):</b> Changeover Contact/Normally Cool: A dry contact input is used to signal seasonal hot/cold water changeover. The contact closes when hot water is present. Valid only for two-pipe systems.</p> <p><b>(COS):</b> Changeover Analog Sensor: Used for hot/cold water changeover switching. Valid only for two-pipe systems.</p> <p><b>Note:</b> Choose the selection option <b>(0): Cooling Only</b> for the <i>SeqOpera</i> parameter to allow changeover to occur between <b>Cooling Only</b> and <b>Heating Only</b>. Choose the selection option <b>(2): Cooling and Reheat</b> to allow changeover to occur between <b>Cooling and Reheat</b> and <b>Heating and Reheat</b>.</p> <p><b>(SS):</b> Supply Air Sensor Monitoring</p>
<b>MenuScro</b>	Gives the option of having the display continuously scroll the parameters. Default: <b>on</b>	<p><b>(off):</b> The scroll is inactive.</p> <p><b>(on):</b> The scroll is active.</p>
<b>C or F</b>	Provides temperature scale options for display. Default: <b>°F</b>	<p><b>(°C):</b> Celsius scale</p> <p><b>(°F):</b> Fahrenheit scale</p>



## FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

Table 4: Installer Configuration Menu (Part 3 of 6)

Parameter Appearing on Display	Description and Default	Selection Options		
Lockout	Selectable Lockout Levels for limiting end user keypad interaction. Default: <b>0</b>	Lockout Level	Function	
			Unoccupied Override	Occupied Temperature Setpoints
		(0)	Access	Access
		(1)	No Access	Access
		(2*)	This lockout level is not used.	
		(3*)	This lockout level is not used.	
		(4)	Access	No Access
		(5)	No Access	No Access
		* If lockout level (2) or (3) is selected, the lockout functions like lockout level (0) or (1) respectively.		
Out1Conf	Defines the type of operation needed for Output 1. Default: <b>4.0</b>	(2.0): Limits the number of sequences of operation available from 0 to 3, and enables heat/cool operation from the same output. (4.0): Allows access to all sequences of operation from 0 to 5, and enables heat/cool operation from different outputs.		
CntrlTyp	Defines the control output for the type of valves used in the installation (TEC2627-4 model). Default: <b>Floating</b>	(On/Off): For Normally Open (N.O.) or Normally Closed (N.C.) 24 VAC two-position valves. (Floating): For proportional three-wire control of 24 VAC floating valves.		
SeqOpera	Determines the sequence of operation. Default: <b>1</b>	(0): Cooling Only (Off-Cool). The default is <b>Cool</b> . (1): Heating Only (Off-Heat). The default is <b>Heat</b> . (2): Cooling and Reheat (Off-Auto-Heat-Cool). The default is <b>Auto</b> . (3): Heating and Reheat (Off-Heat). The default is <b>Heat</b> . (4*): Cool/Heat Four-Pipe (Off-Auto-Heat-Cool). The default is <b>Auto</b> . (5*): Cool/Heat Four-Pipe and Reheat (Off-Auto-Heat-Cool). The default is <b>Auto</b> . * Selection option (4.0) for <i>Out1Conf</i> only. (See <i>Out1Conf</i> parameter earlier in this table.) <b>Note:</b> Choose the selection option (0): <b>Cooling Only</b> when using a changeover sensor to allow changeover to occur between <b>Cooling Only</b> and <b>Heating Only</b> . Choose the selection option (2): <b>Cooling and Reheat</b> when using a changeover sensor to allow changeover to occur between <b>Cooling and Reheat</b> and <b>Heating and Reheat</b> .		
St-By TM	Sets the Stand-By timer value (PIR models). Default: <b>0.5 hours</b>	Time delay between the moment the PIR cover detected the last movement in the area and the time at which the thermostat controller Stand-By mode and setpoints become active. Range: <b>0.5 to 24.0 hrs</b> adjustable in 0.5-hour increments		
Unocc TM	Sets the Unoccupied timer value (PIR models). Default: <b>0.0 hours</b>	Time delay between the moment the thermostat controller toggled to Stand-By mode and the time at which the thermostat controller Unoccupied mode and setpoints become active. Setting this parameter to the factory value (0.0 hours) disables the Unoccupied timer. This prevents the thermostat controller from switching from Stand-By mode to Unoccupied mode when PIR functions are used. Range: <b>0.0 to 24.0 hrs</b> adjustable in 0.5-hour increments		

## FlexSys BACnet® MS/TP Networked Thermostat

Model: **TEC - 2647 - 4**

Table 4: Installer Configuration Menu (Part 4 of 6)

Parameter Appearing on Display	Description and Default	Selection Options	
St-By HT	Sets Stand-by heating setpoint; value is between occupied and unoccupied heating setpoints. Default: <b>69.0°F/20.6°C</b>	Range: <b>40.0°F/4.5°C</b> to <b>90.0°F/32.0°C</b>	<b>Note:</b> When adjusting the temperature, press the <b>UP/DOWN</b> arrow keys to change the temperature in 0.5°F/0.5°C increments; press and hold the <b>UP/DOWN</b> arrow keys to change the temperature in 5.0°F/5.0°C increments.
St-By CL	Sets Stand-by cooling setpoint limit; value is between occupied and unoccupied cooling setpoints. Default: <b>78.0°F/25.6°C</b>	Range: <b>54.0°F/12.0°C</b> to <b>100.0°F/37.5°C</b>	
Unocc HT	Sets the Unoccupied Heating setpoint value. Default: <b>62.0°F/16.5°C</b>	Range: <b>40.0°F/4.5°C</b> to <b>90.0°F/32.0°C</b>	
Unocc CL	Sets the Unoccupied Cooling setpoint value. Default: <b>80.0°F/26.5°C</b>	Range: <b>54.0°F/12.0°C</b> to <b>100.0°F/37.5°C</b>	
Heat max	Sets the Occupied and Unoccupied maximum Heating setpoint values. Default: <b>90.0°F/32.0°C</b>	Range: <b>40.0°F/4.5°C</b> to <b>90.0°F/32.0°C</b>	
Cool min	Sets the Occupied and Unoccupied minimum Cooling setpoint values. Default: <b>54.0°F/12.0°C</b>	Range: <b>54.0°F/12.0°C</b> to <b>100.0°F/37.5°C</b>	
Pband	Proportional Band used by the PI temperature control loop of the thermostat controller.  Pband is not converted with C or F scale and is always shown with a range of 3 to 10. Default: <b>3 (3°F/1.7°C)</b>	Value	F Scale Pband/C Scale Pband
		3	3.0°F/1.7°C°
		4	4.0°F/2.2°C°
		5	5.0°F/2.8°C°
		6	6.0°F/3.3°C°
		7	7.0°F/3.9°C°
		8	8.0°F/4.4°C°
		9	9.0°F/5.0°C°
		10	10.0°F/5.6°C°
<b>Note:</b> The use of a larger proportional band is not to use the thermostat controller as a discharge air controller device. The use of a larger proportional band can be used to solve issues for flawed HVAC design with basic sizing and thermostat controller location errors that cannot be worked around.			
Set type	Provides the option of temporarily changing the heating or cooling setpoint by pressing the <b>UP/DOWN</b> arrow keys. Default: <b>permanent</b>	<b>(temporar):</b> Local changes to the heating or cooling setpoints are temporary, and remain effective for the specified TOccTime. <b>(permanent):</b> Local changes to the heating or cooling setpoints are permanently stored in the thermostat controller memory.	
TOccTime	Sets the duration of the Temporary Occupancy Time when the heating or cooling setpoints in the Occupied mode are established by: <ul style="list-style-type: none"><li>an Override Function enabled in the Main User Menu (when the thermostat controller is in the Unoccupied mode)</li><li>a temporary heating or cooling setpoint</li></ul> Default: <b>2.0 hrs</b>	Range: <b>0.0</b> to <b>24.0 hrs</b> in 1-hour increments	

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

Table 4: Installer Configuration Menu (Part 5 of 6)

Parameter Appearing on Display	Description and Default	Selection Options			
Deadband	Sets the minimum deadband between the heating and cooling setpoints. Default: <b>2.0F°/1.0C°</b>	Range: <b>2.0F°/1.0C°</b> to <b>5.0F°/2.5C°</b> (adjustable in 1.0F°/0.5C° increments)			
Cal RS	Sets the desired room air sensor calibration (offset). The offset can be added to or subtracted from the actual displayed room temperature. Default: <b>0.0F°/0.0C°</b>	Range: <b>-5.0F°/-2.5C°</b> to <b>5.0F°/2.5C°</b> (adjustable in 1.0F°/0.5C° increments)			
Aux cont	Determines the auxiliary contact function and configuration. Default: <b>0</b>	(0)	Not used, or used for reheat	If the Sequence of Operation is set to reheat (2, 3, or 5), ignore this parameter.	
		(1)	Auxiliary N.O.	Occupied = contact closed Unoccupied = contact open	The output aligns with occupancy.
		(2)	Auxiliary N.C.	Occupied = contact open Unoccupied = contact closed	
		(3*)	This selection option is not used.		
		(4*)	This selection option is not used.		
		(5)	Auxiliary On/Off control through the auxiliary network command. The output can be commanded through the network for any required auxiliary functions via a separate and dedicated network variable.	The output aligns with the secondary network occupancy command.	
		* If option (3) or (4) is selected, the option functions like option (1) or (2) respectively.			
FL time	Sets the maximum actuator stroke timing (floating <i>CntrlTyp</i> TEC2627-4 model). Default: <b>1.5 min</b>	Range: <b>0.5</b> to <b>9.0 min</b> (adjustable in 0.5 minute increments)			
Cph	Sets the maximum number of cycles per hour (on/off <i>CntrlTyp</i> TEC2627-4 model). Default: <b>4</b>	Range: <b>3</b> to <b>8 cycles per hour</b>			
RA/DA	Choice of reverse or direct acting analog output signal (TEC2647-4 model). Default: <b>DA</b>	<b>(RA):</b> Reverse acting, 0 to 100% = 10 to 0 VDC <b>(DA):</b> Direct acting, 0 to 100% = 0 to 10 VDC			

## FlexSys BACnet® MS/TP Networked Thermostat

Model: **TEC - 2647 - 4**

Table 4: Installer Configuration Menu (Part 6 of 6)

Parameter Appearing on Display	Description and Default	Selection Options
Reheat	Sets the duty cycle time for reheat output (if Option 2, 3, or 5 is chosen in the <i>SeqOpera</i> parameter). Default: <b>0</b>	(1): 10 seconds (six cycles per minute), for various equipment with solid-state relays that withstand short duty cycles such as electric heat. (0): 15 minutes (four cycles per hour), for various equipment with mechanical relays or contactors controlling mechanical reheat systems.
UI3 dis	Displays the supply or changeover temperature when UI3 is configured as an analog input (supply sensor or changeover sensor). Default: <b>-40°F/-40°C</b>	Used as a diagnostic/service help, to troubleshoot and diagnose sensor operation.

### Troubleshooting

See Table 6 for display messaging and Table 7 for troubleshooting details.

### Accessories

All the accessories in Table 5 include mounting hardware; contact the nearest Johnson Controls® representative to order any of these parts.

**Note:** Review the technical specifications of the accessories prior to their use in an application.

### Repair Information

If the TEC26x7-4 Series Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls representative.

Table 5: Accessories (Order Separately)

Code Number	Description
TEC-7-PIR <sup>1</sup>	Zone Controller Cover with Occupancy Sensor
SEN-600-1	Remote Indoor Air Temperature Sensor
TE-6361M-1 <sup>2</sup>	Duct Mount Air Temperature Sensor
SEN-600-4	Remote Indoor Air Temperature Sensor with Occupancy Override and LED
TE-636S-1	Strap-Mount Temperature Sensor
MS-BACEOL-0	RS485 End-of-Line Terminator

1. The TEC-7-PIR Accessory Cover can be used to replace the existing cover on a non-PIR TEC26x7-4 Thermostat Controller to provide occupancy sensing capability.
2. Additional TE-636xx-x Series 10k ohm Johnson Controls Type II Thermistor Sensors are available; refer to the *TE-6300 Series Temperature Sensors Product Bulletin (LIT-216320)* for more details.

Table 6: Display Messages

Display	Function
Service	Indicates that there is a service alarm in accordance with the programmable Binary Input (BI2).
Filter	Indicates that the filter(s) is dirty in accordance with the programmable Binary Input (BI2).
Window	Indicates that an outside window or door is open and has cancelled the thermostat controller heating or cooling action in accordance with the programmable Binary Input (BI1).

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

### TEC - 2647 - 4

Table 7: Troubleshooting Details<sup>1</sup>

Symptom	Probable Causes
<b>Multiple Symptoms</b>	Excessive bus errors may be occurring.
	A device may have been added or changed with a duplicate address (may not be the same address as some devices having problems, and may have happened sometime before the problem was noticed).
	Wiring errors or wire problems may exist.
	The baud rate may have been changed on some devices on the network, but not all devices.
	Max_Master may have been changed incorrectly (may have happened sometime before the problem was noticed).
	A download may be in progress.
	There may be a fault at a device.
	A repeater may be needed or may be configured incorrectly.
	There may be a duplicate device object name or instance.
<b>Poor Performance</b>	See the probable causes listed previously in the <i>Multiple Symptoms</i> section of this table.
	Excessive bus traffic may exist (bus overload).
	The baud rate may be set too low.
	There may be too many devices on the network.
	There may be unaccounted devices on the network (not mapped to the NAE).
	There may be unusually slow devices on the network or devices that are slow to respond.
<b>Thermostat Controller Goes Offline</b>	See the probable causes listed previously in the <i>Multiple Symptoms</i> section of this table.
	A power failure or other failure may have occurred at the thermostat controller.
	Communication may have been disabled at the thermostat controller.
<b>Thermostat Controller Does Not Come Online</b>	See the probable causes listed previously in the <i>Multiple Symptoms</i> section of this table.
	A thermostat controller may be connected to the wrong bus.
	A baud rate may be specified in the new thermostat controller that is incompatible with the running network.
	No device on the network is configured to use a specific baud rate (normally the NAE), but all devices are set to use auto baud. At least one device, typically the bus supervisor (NAE), must have an assigned baud rate. Set the baud rate in the bus supervisor and set all other devices to auto baud.

1. For common MS/TP troubleshooting information, refer to the *MS/TP Communications Bus Technical Bulletin* (LIT-12011034).

### Technical Specifications

#### TEC26x7-4 Series BACnet MS/TP Networked Thermostat Controllers with Two Outputs (Part 1 of 2)


<b>Power Requirements</b>		19 to 30 VAC, 50/60 Hz, 2 VA (Terminals 4 and 5) at 24 VAC Nominal, Class 2 or Safety Extra-Low Voltage (SELV)
<b>Relay/Triac Contact Rating</b>	<b>On/Off and Floating Control</b>	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush, Class 2 or SELV
<b>Analog Output Rating</b>	<b>Proportional Control</b>	0 to 10 VDC into 2k ohm Resistance (Minimum)
<b>Auxiliary Output Rating</b>	<b>Triac Output</b>	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum 3.0 A In-Rush
<b>Binary Inputs</b>		Voltage-Free Contacts across Terminal Scom to Terminals BI1, BI2, or UI3
<b>Analog Inputs</b>		Resistive Inputs (RS and UI3) for 10k ohm Johnson Controls Type II Negative Temperature Coefficient (NTC) Thermistor Sensors
<b>Temperature Sensor Type</b>		Local 10k ohm Negative Temperature Coefficient (NTC) Thermistor

## FlexSys BACnet® MS/TP Networked Thermostat

Model:

**TEC - 2647 - 4**

### TEC26x7-4 Series BACnet MS/TP Networked Thermostat Controllers with Two Outputs (Part 2 of 2)

<b>Wire Size</b>		18 AWG (1.0 mm Diameter) Maximum, 22 AWG (0.6 mm Diameter) Recommended
<b>MS/TP Network Guidelines</b>		32 Devices Maximum; 4,000 ft (1,219 m) Maximum Cable Length
<b>Temperature Range</b>	<b>Backlit Display</b>	-40.0°F/-40.0°C to 122.0°F/50.0°C in 0.5° Increments
	<b>Heating Control</b>	40.0°F/4.5°C to 90.0°F/32.0°C
	<b>Cooling Control</b>	54.0°F/12.0°C to 100.0°F/38.0°C
<b>Accuracy</b>		±0.9°F/±0.5°C at 70.0°F/21.0°C Typical Calibrated
<b>Minimum Deadband</b>		2°F/1°C between Heating and Cooling
<b>Ambient Conditions</b>	<b>Operating</b>	32 to 122°F (0 to 50°C); 95% RH Maximum, Noncondensing
	<b>Storage</b>	-22 to 122°F (-30 to 50°C); 95% RH Maximum, Noncondensing
<b>Compliance</b>  	<b>United States</b>	UL Listed, File E27734, CCN XAPX, Under UL 873, Temperature Indicating and Regulating Equipment FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	<b>Canada</b>	UL Listed, File E27734, CCN XAPX7, Under CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment Industry Canada, ICES-003
	<b>Europe</b>	CE Mark – Johnson Controls, Inc., declares that the BACnet Thermostats are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	<b>Australia and New Zealand</b>	C-Tick Mark, Australia/NZ Emissions Compliant
	<b>BACnet International</b>	BACnet Testing Laboratories™ (BTL) 135-2001 Listed BACnet Application Specific Controller (B-ASC)
<b>Shipping Weight</b>		0.75 lb (0.34 kg)

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.