



# CAPITOL

## ENERGY SYSTEMS

### **TWC46 WI-FI THERMOSTAT USERS MANUAL**

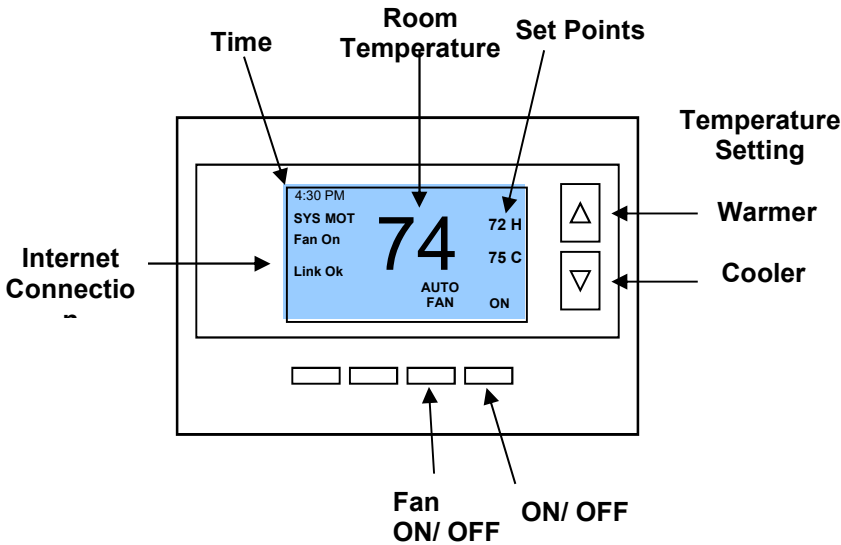
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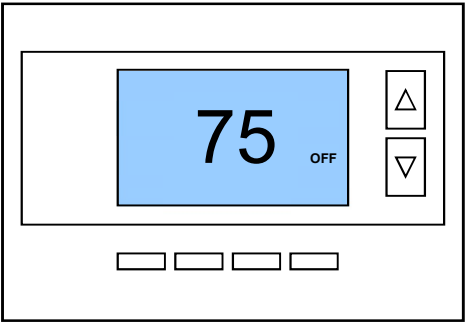
# Operation Guide

## Model TWC46 Wi-Fi Thermostat

### In Session Display



### Out of Session Display



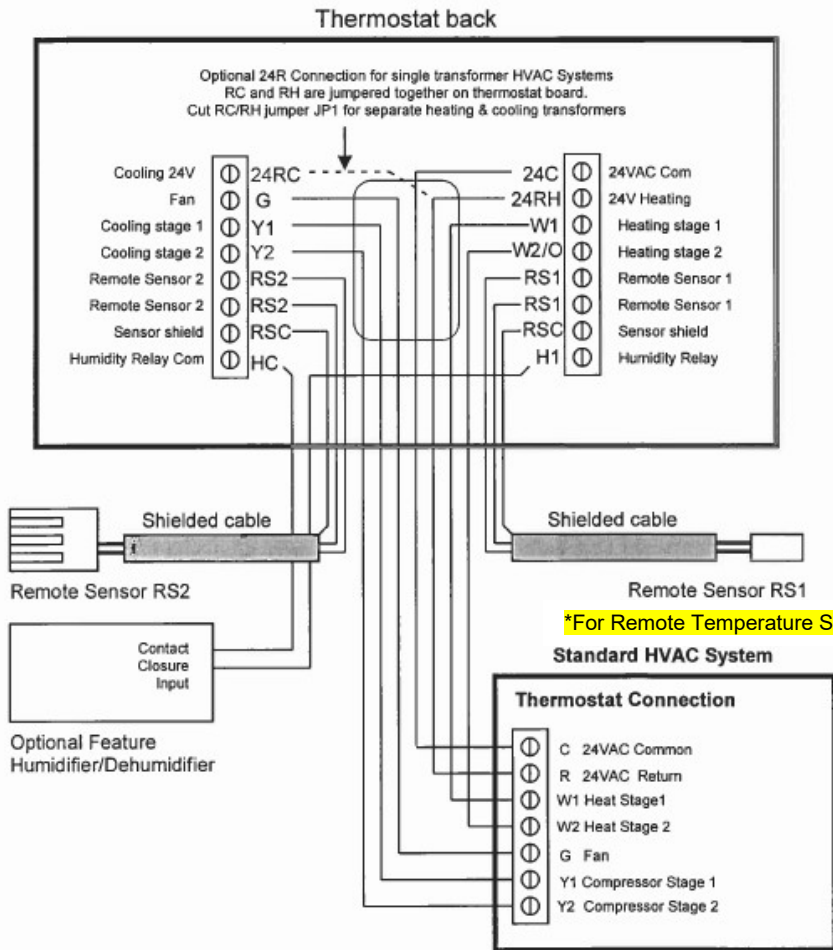


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## Wiring

### Standard Gas/Electric HVAC System Wiring



#### Thermostat Setup:

##### Standard Gas/Electric HVAC Systems

To set the HVAC system type, go to the Main Menu *Thermostat Info* screen and press and hold the **Setup** button.

- Type.** Set the HVAC System Type: set to **Gas/Elec**
- Fan Type.** Set the HVAC Fan Type:  
Set to **Gas** for typical gas furnace (fan is controlled by the furnace)  
Set to **Elec** for electric heat (fan call with heat call)
- 2nd Stage Heat.** Enable second stage heating outputs  
If you have a single stage heating system, leave this set to **N**  
If you have a 2 stage heating system, set to **Y** to enable.
- 2nd Stage Cool.** Enable second stage cooling outputs  
If you have a single stage cooling system, leave this set to **N**.  
If you have a two stage cooling system, set to **Y** to enable.

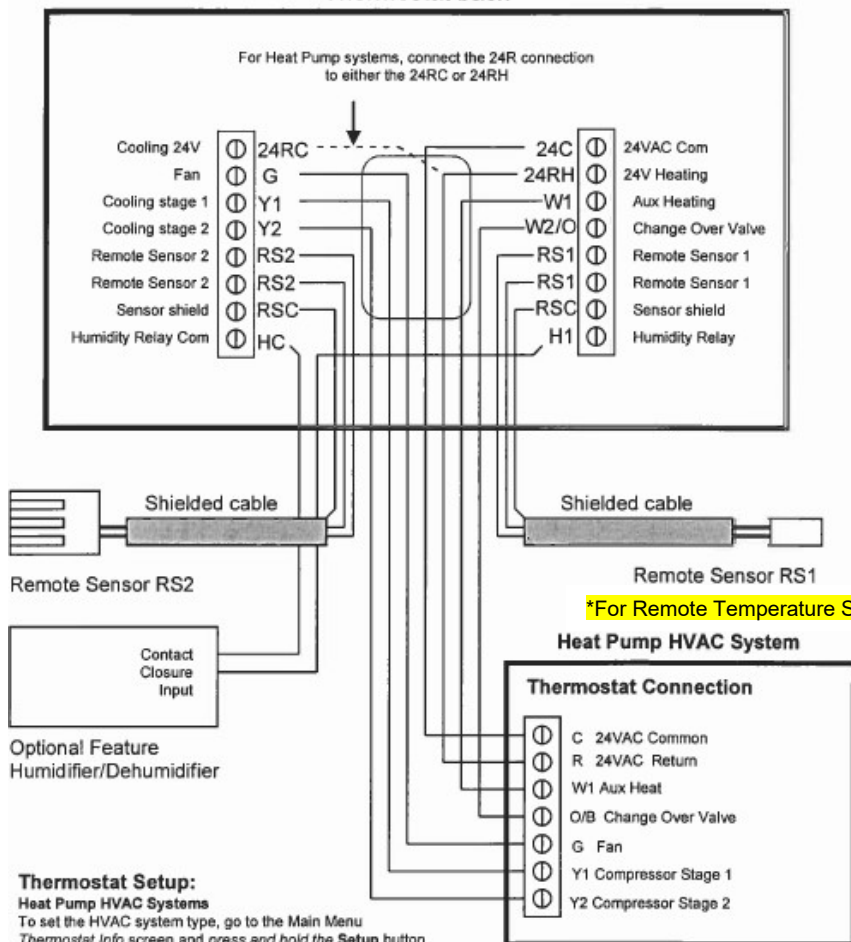
#### Default Setup:

- HVAC Type: Gas/Elec
- Fan Type: Gas
- 2<sup>nd</sup> Stage Heat: No
- 2<sup>nd</sup> Stage Cool: No

No setup required for this configuration

## Heat Pump HVAC System Wiring

### Thermostat back



### Thermostat Setup:

#### Heat Pump HVAC Systems

To set the HVAC system type, go to the Main Menu

Thermostat Info screen and press and hold the Setup button.

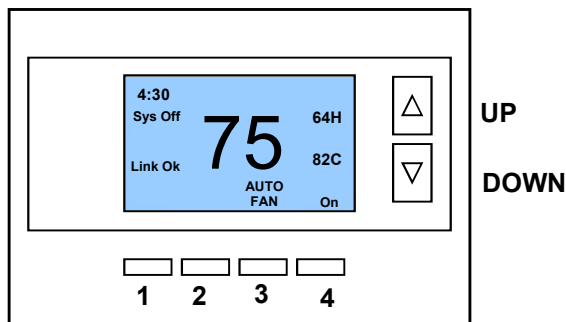
- Type.** Set the HVAC System Type: set to **Heat Pump**
- C/O type.** Change Over (reversing) Valve Type. Heat pumps change from heating to cooling by reversing operation. You must configure the thermostat's changeover valve setting to work correctly with your HVAC system. Check your system information to be sure and note the color of original thermostat wire and the terminal it was connected to. No matter what the old stat connection was (O or B), connect the wire to the thermostats W2/O terminal. The setting of the C/O Type will set the correct system operation.  
For change over with cool systems (Orange wire, O terminal): set **C/O type** to w/cool (most common and default setting)  
For change over with heat systems (Brown wire, B terminal): set **C/O type** to w/heat
- 2nd Stage Heat.** Enable second stage heating outputs  
If you have a single stage heating system, leave this set to **N**  
If you have a 2 stage heating system, set to **Y** to enable.
- Aux Heat (HP).** If you have auxiliary heat strips, set this to **Y** to enable.
- 2nd Stage Cool.** Enable second stage cooling outputs  
If you have a single stage cooling system, leave this set to **N**.  
If you have a two stage cooling system, set to **Y** to enable.

**Note!** If you get heating when you expected cooling, change the C/O type to the opposite setting.



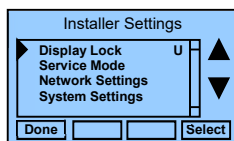
## Accessing the Thermostat Menu

The programming menu's on the thermostat will normally be locked to prevent tampering since all of the programming should be done online through TECS. To access the thermostats programming menu's you need to enter a code.



Hold down the number one button then enter the following sequence:  
UP – UP – Down - Down – 2 - 4 – 2 - 4  
Then release the number 1 button

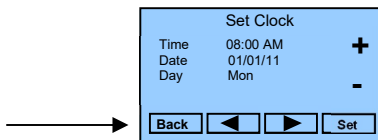
The EMS sends a command to lock the programming screens to prevent tampering. If you are unable to use the up and down arrows in the Menu Selection Screen hold down the #2 and #3 buttons to launch the Installer Settings Menu



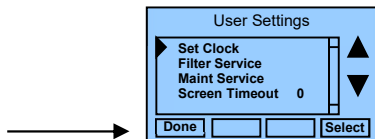
**Display Lock:** Use the + and – button until you display the U (Unlock) button to unlock the programming screens.

## Initial Set-Up

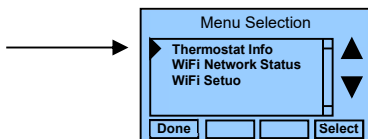
**Set Clock:** The first screen you will see is to set the clock. You do not need to set the time since the time will automatically be set once the thermostat connects to the online EMS. Press the #1 back button to access the next menu.



**User Settings:** The next menu which appears is the User Settings. Press the #1 Done button

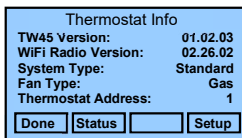


**Menu Selection:** The next menu which appears is Menu Selection. Use the down arrow to scroll down to Thermostat Info.



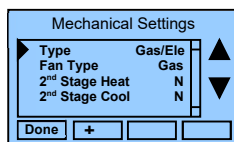
## **Thermostat Info**

The Thermostat Info screen displays the current configuration of the thermostat. Press the #4 Setup button to open the Mechanical Settings Menu





## Mechanical Settings



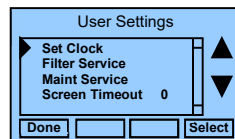
- **Type** – Use the + and – buttons to choose Gas/ Elec or Heatpump
- **Fan Type** – if HVAC type = Standard: Gas or Elect  
**OR**
- **Changeover** – if HVAC type = Heat Pump: Changeover with cool or changeover with heat
- **2<sup>nd</sup> Stage Heat** – Use the + and – button for Y (yes) or N (no)
- **2<sup>nd</sup> Stage Cool** - Use the + and – button for Y (yes) or N (no)

Press the #1 Done button once the mechanical settings are properly entered.

## User Settings Menu

### **Menu Items:**

- Set Clock > go to the clock setting screen
- Filter Service > go to the filter timer setup screen
- Maint Service > go to the maintenance timer setup screen
- Screen Timeout > sets the time in seconds to switch to the minimized screen
- F/C Settings > go to the F/C mode selection screen
- Sensor Calibration > go to the sensor calibration screen
- Backlight/Display > go to the backlight and display setup screen



**Filter Service:** Go to the Filter Service Screen to set/reset the filter timer/alert. This screen shows the filter runtime in hours and the service interval alert in hours (typically 300 hrs). You can change the service interval with the +/- buttons. You should reset the service alert after you have changed the filter.

**Maintenance Service:** Go to the Maintenance Service Screen. On this screen you can sets/reset the maintenance timer/alert.

The Maintenance Service screen will show the accumulated Heat and Cool runtime hours as well as the Service Interval that will be used to trigger a Maintenance alert.





Service interval is 3000 hours. Use the +/- buttons to adjust service interval.

Press reset to clear the service alert and reset the runtimes to zero.

When the combined HEAT and COOL Runtime hours equals the Service Interval hours, a "Maint" message will be displayed as a reminder that the HVAC system may require periodic maintenance. Pressing the Menu button will take you to the Filter Service screen. The Reset button can be pressed and the HEAT and COOL Runtime values will be reset to zero.

**Screen Timeout: Minimized Screen.** Set the display timeout time in seconds. Options are 0 or 15 to 120 (default set to 0 seconds). This is the time before the main thermostat screen reverts to the minimized temperature only display screen, after the last button press. The Minimized Screen feature is disabled by setting this time to "0".

***! Any button press will restore the main thermostat screen display.***

**F/C Settings:** Go to the F/C Settings Screen. Select which temperature display mode you desire, Fahrenheit (F) or Celsius (C).

**Sensor Calibration:** Go to the Sensor Calibration Screen. This screen allows you to adjust the calibration of the internal sensor. You can change the temperature calibration by +/- 7 degrees using the + and – buttons

When the Sensor Calibration screen is selected it will show the current temperature calibration and the current number of degrees of offset being applied (typically 0). If the sensor's actual temp is (74) with 0 degrees of offset and you want it to show 75, then press "+" to add 1 degree and it will show (75).

***! You can refresh the info on this screen by pressing the right hand (blank) button.***

When you close this screen, it may take a few seconds for the temperature displayed on the main thermostat screen to update to the new temperature selected.

**Backlite/Display:** Go to the Backlite/Display settings screen. This menu allows you to set the backlight timeout period and adjust the display contrast.

**Backlite Timeout:** Sets the time from last button press that the backlite will timeout and turn off. The timeout value is adjustable from 0 or 20 to



120 seconds. If set to "0", the Backlite will always be ON. If set in the range of 20 to 120 seconds, the Backlite will turn OFF after the selected time expires.

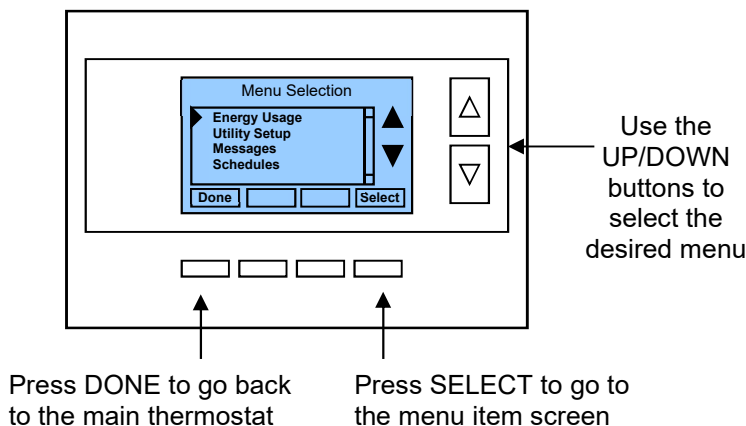
**ON Level:** Sets the backlight brightness when it is on. Adjustable from 0 to 100% in 5% steps. Screen will change brightness as you adjust setting.

**OFF Level:** Sets the backlight brightness when it is off. Adjustable from 0 to 100% in 5% steps. Can be 0% = off or a low level for night viewing.

**Contrast:** Sets the contrast level of the LCD display, adjustable from 0 to 20. Use this control to adjust the sharpness of the display. To light and the display looks faded, too dark and dark lines will appear in the display. Typically, 10-15 is a good setting. Adjust as needed.

## Menu Selection

- Schedules > Optional, used to view and set programmable schedules
- Occupied Settings > set occupied cool setpoint and heat setpoint
- User Settings > set various user preferences
- Usage Graph > show heating and cooling run times
- Away Setpoints > show and set the heating and cooling setback setpoints
- Thermostat Info > displays thermostat setup info
- WiFi Network Status > displays IP Network Info
- WiFi Setup > Set IP Network parameters



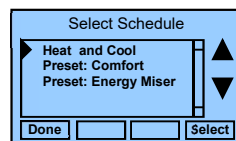


**Schedules:** Provides for local schedule control. This will be overridden by the EMS if the thermostat is connected online. The Schedules Screen allows you to review and set the setback schedule for the thermostat. The thermostat has a 4 x 7 schedule. Four times a day can be selected for changes to the heating and cooling setpoints. Each day of the week can have a different schedule. Groups of days can be copied with the same schedule. When the thermostat is set to “Run” mode, the schedule will be executed daily, with the setpoints being changed as per that days schedule stored in the thermostat. “Hold” mode stops schedule operation and holds the current setpoints until changed manually or by network commands.

The Schedules Screen gives you the option of setting a custom setback schedule or to load one of two preset schedules.

## Menu Options

- **Heat and Cool:** You can change the individual day/hour and setpoints for the Heating and Cooling schedule by selecting this menu item.
- **Preset: Comfort:** This is a preset schedule with mild setbacks. Select this menu item to load the Comfort schedule into the thermostat. Confirmation screen will be displayed for Yes/No entry.
- **Preset: EnergyMiser:** This is a preset schedule with deeper setbacks. Select this menu item to load the EnergyMiser schedule into the thermostat. Confirmation screen will be displayed for Yes/No entry.



## Schedule Screen

Monday Schedule				
	Time	Heat	Cool	
Wake	06:00 A	70	79	+
Day	08:00 A	62	85	
Eve	04:00 P	70	78	
Sleep	10:00 P	62	82	C -
		<div> <span>DONE</span> <span>◀</span> <span>▶</span> <span>NEXT</span> </div>		

When you select the Heat and Cool Schedule menu item, the “day” schedule programming screen opens and the schedule for current day will be displayed. Use the scroll buttons to highlight the data to be modified. Once the data has been highlighted, use the +/- buttons to change the value of the data.

To copy a days schedule to another day or group of days, move the cursor to “C” on the bottom right of the schedule screen. When you highlight the “c”, the button below will become “Copy”. Press this button to change to the Copy Schedule Screen.



## Copy Schedule Screen

Copy Monday Schedule  
TO

Tue	Wed	Thu	Fri	Sat	Sun	Yes
N	N	N	N	N	N	No

BACK ◀ ▶ COPY

The Copy Schedule screen is a sub screen of the Schedule screen. The Copy Schedule screen allows you to copy a day's schedule to another day or group of days.

First select the day to be copied in the Schedule screen. Scroll to the "c" at the bottom of the Schedule screen to highlight it. The "Next" button will change to the "Copy" button. Press the "Copy" button to open the Copy Schedule screen.

Scroll through the days and select the days you want to copy the schedule to by setting the "N" under each day to "Y" by using the Yes/No buttons.

After selecting all the days desired, press the "COPY" button.

Exit the Copy Schedule screen with the "DONE" button.

## Occupied Settings:

Use the buttons under the + and – keys to set the occupied setpoints. This will be set and overridden by the EMS if the thermostats are connected online.

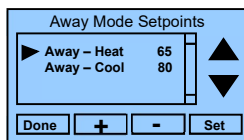
Occupied Settings

Occ Cool SP	74	▲ ▼
Occ Heat SP	68	

Done + - Set

## Away Setpoints

Away setpoints are used when the thermostat is set to the setback or away mode. Use the buttons under the + and – keys to set the away setpoints. This will be set and overridden by the EMS if the thermostats are connected online.



Use up/down buttons to select setpoint to change

Press DONE to store the setting and exit back to the main menu

Use +/- buttons to increase or decrease the temperature

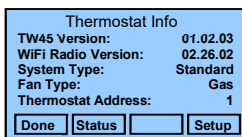
## Thermostat Info

The Thermostat Info screen displays the current configuration of the thermostat. This information is useful for quick check of firmware versions and HVAC system setup.

Thermostat information displayed is:

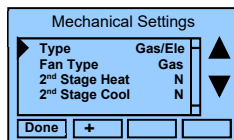
- **Thermostat Version** - Model and firmware version number.
- **WiFi Radio Version** - Firmware version of the WiFi radio
- **System Type** - Standard or Heat Pump HVAC system
- **Fan Type** - if HVAC type = Standard: Gas or Elect
- **OR**
- **Changeover** - if HVAC type = Heat Pump: Changeover with cool or changeover with heat
- **Network Address** - This is an internal address, not the IP address

## Thermostat Info Screen



## Mechanical Settings

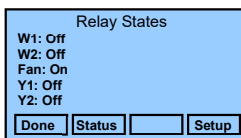
Press the #4 Setup button to open the Mechanical Settings Menu



- **Type** – Use the + and – buttons to choose Gas/ Elec or Heatpump
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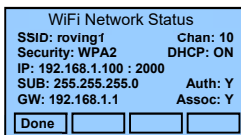
## Relay Info

Pres the #2 Status button on the Thermostat info screen to assess the Relay States Screen. Here you will find the commands that the thermostat is passing to the HVAC Unit.



## WiFi Network Status

This screen displays all known network status parameters as shown below:



## Ad Hoc Mode

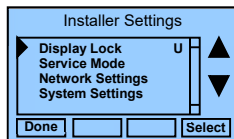
The Wi-Fi radio can also be placed into Ad Hoc mode which enables Peer-to-Peer communication without a network router. \*\*\*This is the only way to program the TW46 thermostat.

- Enable Ad Hoc mode by pressing the “+” key at the appropriate screen
- This sets the Thermostat IP Address to: 192.168.0.1 and the Subnet to: 255.255.255.0
- Use your PC to connect to the thermostat and set the wifi settings.



### Installer Settings

When you are in the Menu Selection Screen hold down the #2 and #3 buttons to launch the Installer Settings Menu



**Display Lock:** Use the + and – button until you display the U button to unlock the programming screens. The EMS sends commands to lock these menu's when not in use to prevent changing thermostat settings.

**Service Mode:** Use the + and – buttons to change the test mode to Y when servicing the HVAC unit. This will disable the EMS temperature set point parameters for 2 hours to allow for testing the unit outside of normal temperature set points.

**System Settings:** All system setting will be programmed in TECS and will override the temperatures set at the thermostat if the thermostat is online

**Max Heat SP:** Use the + and – buttons to adjust the maximum heat set point.

**Min Cool SP:** Use the + and – buttons to adjust the minimum cool set point. This will be set and overridden by the online EMS.

**Min Run Time:** Use the + and – buttons to adjust the minimum run time. The default is 3 minutes.

**Min Off Time:** Use the + and – buttons to adjust the minimum off time. The default is 5 minutes.

**Fan Cyclers:** Use the + and – buttons to adjust the minimum run time. The default is 0 minutes for the fan ON time and 10 minutes for the fan OFF time.

**Remote Sensors** A shielded wire is required for all sensors to avoid interference. Sensors can be Type 2, Type 3, or A curve.

**RS1 Enabled (Y/N)-** This terminal is for a remote temperature sensor only and can override or average with the internal thermostat temperature sensor. Use the +/- keys to select Y if a sensor is installed in RS1



**RS2 Enabled (Y/N)**- This terminal is for any type of sensor, including LAT

Use the +/- keys to select Y if a sensor is installed in RS1

**RS1 Type**- Use the +/- keys to select A Curve, Type 2, or Type 3

**RS2 Type**- Use the +/- keys to select A Curve, Type 2, or Type 3

**RS2 Location**- Use the +/- keys to select IN, OUT or LAT

**R1 Node ID**-

**R2 Node ID**-

**Restore Defaults:** Use the arrows to select the Yes option to restore all factory defaults.





## System Status Indicators

When the main thermostat screen is displayed, the on-screen labels indicate the following.

### System Operation mode indicator

"SYS OFF" displayed > System is OFF

"SYS MOT"<sup>1</sup> displayed > System is OFF and Minimum Off Time (MOT) delay On is active

"HEAT ON" displayed > System is ON and heating

"COOL ON" displayed > System is ON and cooling

"HEAT MRT"<sup>2</sup> displayed > System is ON and heating. Minimum Run Time (MRT) delay off is active.

"COOL MRT" displayed > System is ON and cooling. Minimum Run Time (MRT) delay off is active.

### Staging display

"2<sup>nd</sup> Stg" displayed > Stage 2 heating or cooling is ON

"Aux Heat" displayed > Stage 3 heating is ON

For Heat Pump systems only: "EHEAT" > emergency heat mode active

### Home/Away display

**Home** mode is active (current setpoints are being used)

**Away** setback mode is active (setback setpoints are being used)

### System Alerts

Alert Text displayed > Specific alert text (Filter or Maintenance Timer)

## Thermostat Operation

### Minimum Run Time (MRT)

The thermostat has a Minimum Run Time after the start of any heating or cooling call. This minimum run time assures even heating and cooling cycles. The MRT delay will keep the system on even if reaches setpoint or you change the setpoint to a temperature that would satisfy the call, until the MRT expires. Changing the Mode to OFF will cancel the MRT and the system will turn off immediately. The MRT can be adjusted in the Installer Settings menu of the thermostat.

### Minimum Off Time (MOT)

The thermostat has a Minimum Off Time after any heating or cooling call is finished. This delay prevents rapid heating/cooling cycles and also provides "short cycle protection" for compressor calls. This delay may be noticeable when you change a setpoint and it does not respond



immediately due to another call that has recently completed and the MOT delay timer is preventing the system from restarting. The MOT delay time can be adjusted in the Installer Settings menu of the thermostat. There is a minimum of 5 minutes delay to assure compressor protection.

## **Trouble Shooting**

**The thermostat LCD reads “COOL ON”, but hot air is supplied**  
**Or**

**The thermostat LCD reads “HEAT ON”, but cool air is supplied**

Go to the thermostat info menu (pg 7) and double check that the thermostat is configured correctly for the HVAC unit. Double check if it is set for Gas/ Electric or Heat pump and if the changeover is set correctly.

If changing the settings does not fix the problem double check the wiring to confirm it is wired correctly for gas/ electric or heat pump. Refer to the wiring diagrams on pages 3 & 4.

**The thermostat is displaying “No Link”**

Here are a few steps to walk through to reestablish connectivity

1. Double check that there is a Wifi signal where the thermostat is being installed. You can do this by confirming the wifi signal is accessible from a smart phone or laptop.
2. Double check that the wifi credentials were entered correctly.
3. Press the restore default button

## **Working on the HVAC unit**

When doing repair work on the HVAC unit, you can set the thermostat into maintenance mode through the online software. This will override the temperature settings for 2 hours so you can test the unit as needed.

Capitol Energy Solutions Technical Support can be reached at [\(916\) 443-5395](tel:9164435395)



## INFORMATION TO USER

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



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