



# Installation Guide

## 53DFS250-HW Thermostat

### System Types

- Cool Only (single stage)
- Heat Pump (with electric heat)

**CAUTION: ELECTRICAL HAZARD**  
Can cause electrical shock or equipment damage. Disconnect power before beginning installation.

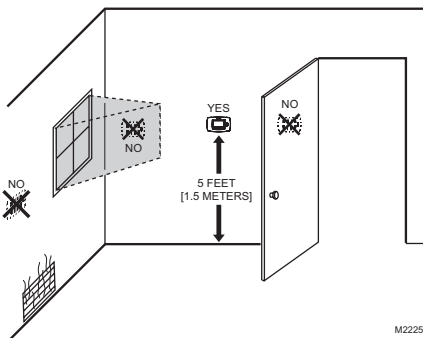
**MERCURY NOTICE:** If this product is replacing a control that contains mercury in a sealed tube, do not place the old control in the trash. Contact your local waste management authority for instructions regarding recycling and proper disposal.

**Must be installed by a trained, experienced technician.** Read these instructions carefully. Failure to follow these instructions can damage the product or cause a hazardous condition.

### Select Thermostat Location

Select a location for the thermostat about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature.

Do not install the thermostat where it can be affected by:



- Drafts or dead spots behind doors and in corners.
- Hot or cold air from ducts.
- Radiant heat from sun or appliances.
- Concealed pipes and chimneys.
- Unheated (uncooled) areas such as an outside wall behind the thermostat.

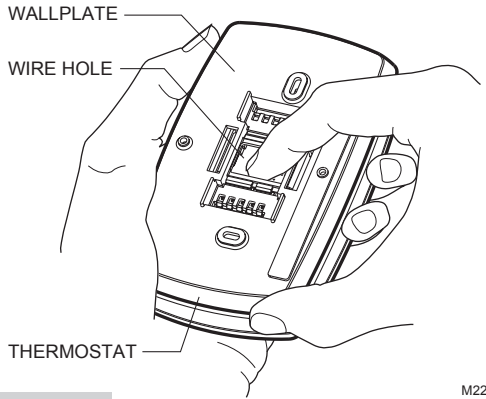
© U.S. Registered Trademark.  
US Patent No. 7,114,554, 7,181,317, 7,225,054, 7,274,972, 7,636,604,  
7,693,582 and other patents pending.  
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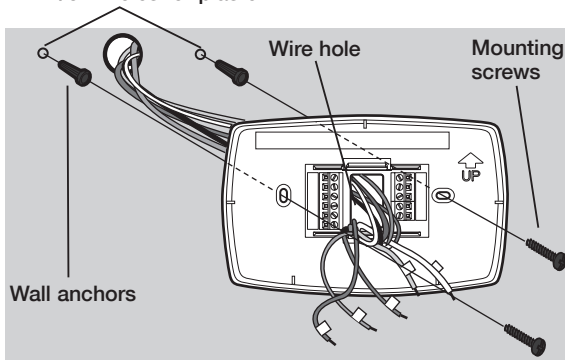
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## Wallplate installation

1. Separate wallplate from thermostat. Grasp top and bottom of wallplate and pull to remove from thermostat.
2. Install the wallplate as shown below.



Drill 3/16" holes for drywall.  
Drill 7/32" holes for plaster.

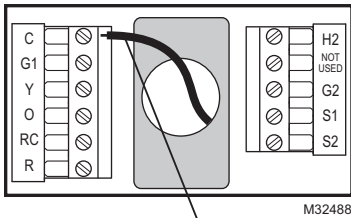


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## Power options

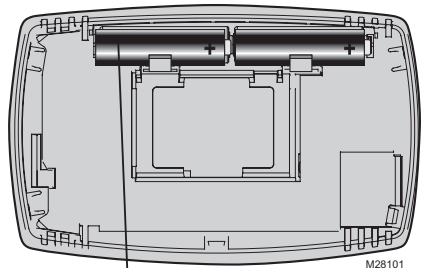
### 24 VAC



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For 24VAC primary power, connect common side of transformer to "C" terminal.

### 3.0 VDC

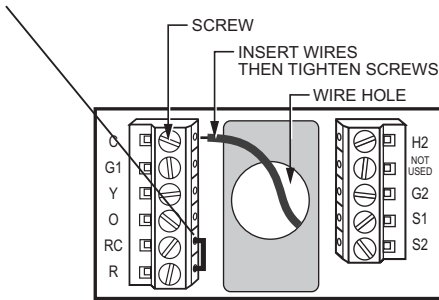


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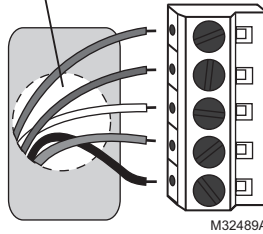
Install two AA alkaline batteries on the back of the thermostat as marked

## Wiring

Leave the metal jumper wire between RC and R.



Push excess wire back into wall opening. Plug wall opening with non-flammable insulation.



### Terminal Designations:

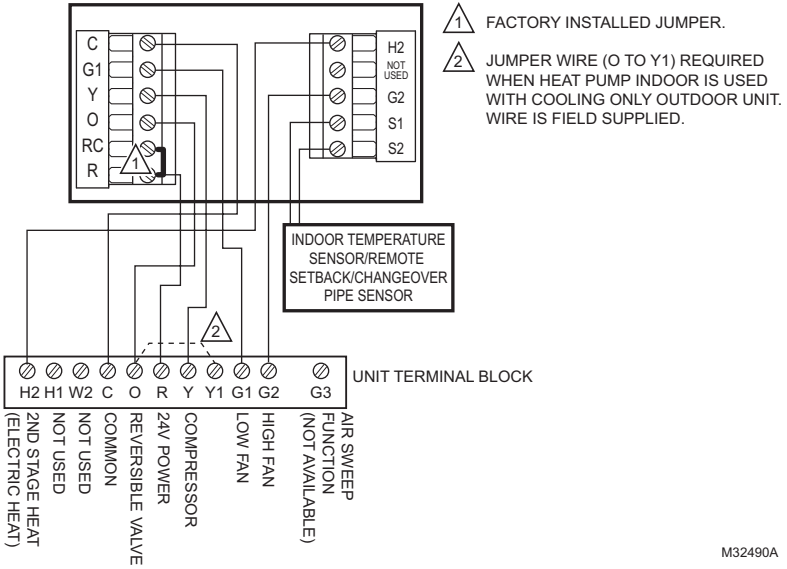
- R 24 Volt power
- Rc Not used [1]
- C 24 Volt common
- H2 2nd stage heat (electric heat)
- Y Compressor
- G1 Low speed fan
- G2 High speed fan
- O Reversing valve for heat pumps
- S1 Remote sensor or remote setback [2]
- S2 Remote sensor or remote setback [2]

### Notes

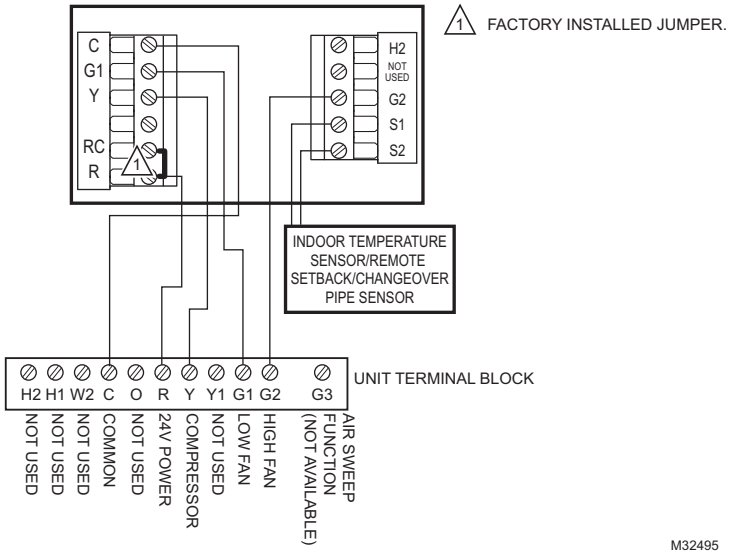
- [1] Leave the metal jumper wire in place between Rc and R.
- [2] Sensor wire must have a cable separate from the thermostat control cable.

# Wiring

## Heat Pump with Electric Heat wiring.

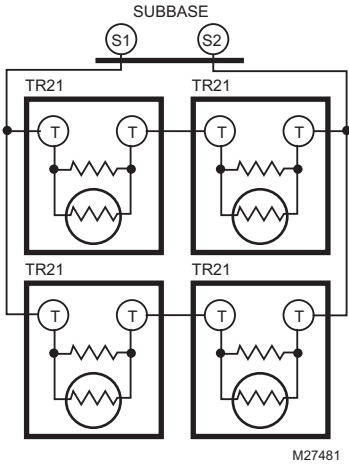


## Cool only wiring.

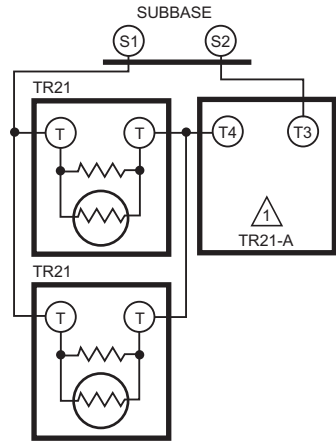


# Sensor wiring for temperature averaging

Wiring four TR21 (20K ohm) Sensors.



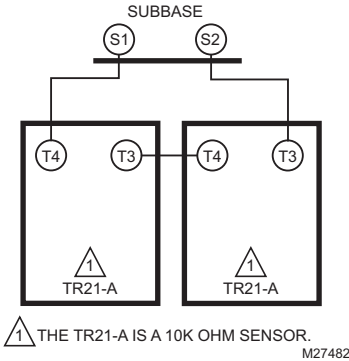
Wiring two TR21 (20K ohm) Sensors and one TR21-A (10K ohm) Sensor to provide a temperature averaging network



⚠ THE TR21-A IS A 10K OHM SENSOR.

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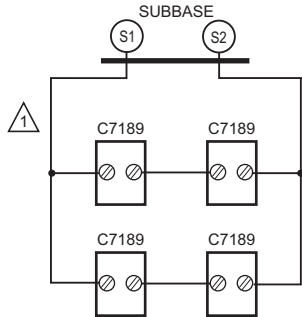
Wiring two TR21-A (10K ohm) Sensors to provide a temperature averaging network.



⚠ THE TR21-A IS A 10K OHM SENSOR.

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Wiring four C7189U (10K ohm) Sensors to provide a temperature averaging network.

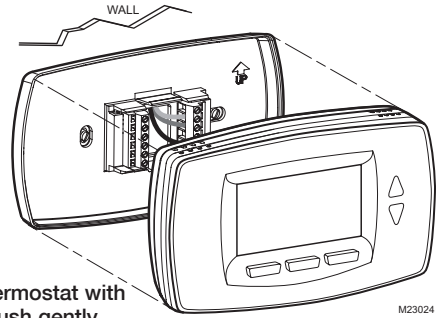
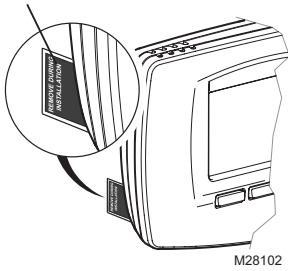


⚠ WIRES MUST HAVE A CABLE SEPARATE FROM THE THERMOSTAT CABLE.

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## Remove tab and mount thermostat

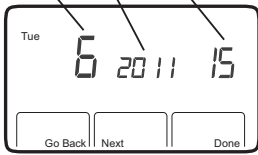
Remove tab.



Align pins on back of thermostat with slots in wallplate, then push gently until thermostat snaps into place.

## Set date and time

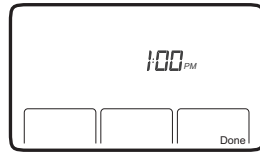
Month Year Date



Press **GO BACK** and **NEXT** to select the Month, Year, Date, or Time function.

Press **▲▼** to change the Month, Year, Date, or Time setting.

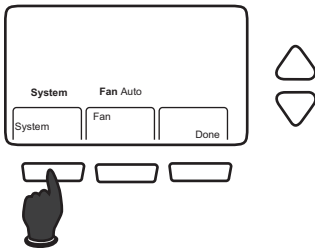
Press **DONE** to save changes.



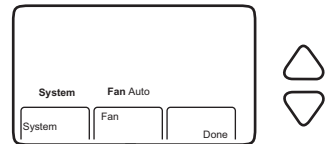
Press **DONE** to save and exit.

## Installer setup

1. Press **SYSTEM** and **FAN**.



2. Press and hold **SYSTEM** and **DONE** until the display changes.



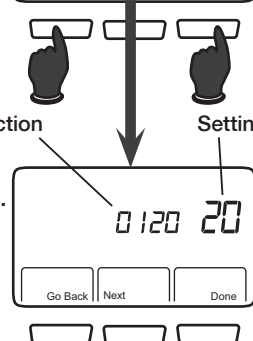
Function

Setting

3. Change settings as required (see pages 7-9). Press **GO BACK** and **NEXT** to select the function.

Press **▲▼** to change the setting.

Press **DONE** to save changes.



## Installer setup

Setup Number	Setup Name	Settings & Options (factory default in bold)
0120	Date (Year Upper)	<b>20</b> (2011-2078) 21 (2101-2178)
0130	Date (Year Lower)	<b>08</b> (2008) [Other options: 00-99]
0140	Date (Month)	<b>6</b> [Other options: 1-12]
0150	Date (Day)	<b>15</b> [Other options: 1-31]
0160	Schedule Options	<b>4</b> Programmable 0 Non-programmable
0170	System Selection	<b>1</b> Cooling only 2 Heat pump plus electric heat
0185	Pre-occupancy Purge Duration	<b>0</b> No duration [Other options: 1, 2, or 3 hours]
0220	Cycles Per Hour (CPH) for first stage cooling/ compressor	<b>3</b> Recommended for most compressors [Other options: 1, 2, 4, 5 or 6 CPH]
0270	Cycles Per Hour (CPH) for heating first and second stage	<b>9</b> Recommended [Other options: 1-12 CPH]
0280	Continuous Backlight	<b>0</b> No 1 Yes
0300	Changeover	<b>1</b> Auto 0 Manual
0310	Deadband	<b>3</b> 3°F (2.0°C) [Options: 2-9 °F (1.5-5.0°C)]
0320	Temperature Indication Scale	<b>0</b> °F 1 °C
0330	Daylight Saving Time	<b>1</b> ON 0 OFF
0340	Remote Temp Sensor/ Remote Setback/ Changeover Input	<b>0</b> None 1 Remote 10K Indoor 2 Remote 20K Indoor
0340 (Non-programmable)	Remote Temp Sensor/ Remote Setback/ Changeover Input	<b>0</b> None 1 Remote 10K Indoor 2 Remote 20K Indoor 5 Remote Setback, normally open 6 Remote Setback, normally closed
0341	Delay for Remote Setback	<b>0</b> No Delay 2 2 Minute Delay
0342	Override Option (only available in non-programmable mode)	<b>1</b> Override 0 No Override
0343	Unoccupied Heating Setpoint (only when remote setback enabled)	<b>60</b> 60°F (15.5°C) [Options: 50-65 °F (10-18°C)]

Continued on next page

## Installer setup

Setup Number	Setup Name	Settings & Options (factory default in bold)
0346	Unoccupied Cooling Setpoint (only when remote setback is enabled)	<b>80</b> 80°F (27°C) [Options: 75–90 °F (24–32°C)]
0347	Fan Ramping	<b>1</b> ON <b>0</b> OFF (Lo, Med, Hi)
0348	Fan Mode	<b>0</b> User can choose Cycle or Constant 3 speed: Low, Med, High, Auto <b>1</b> Cycle Only - Auto only
0349	Auto Fan Reset	<b>0</b> OFF <b>1</b> Reset back to Auto after 2 hours <b>2</b> Reset back to Auto after 4 hours
0535	Temporary Occupied Duration Limit	<b>3</b> hours [Other options: 0–12 hours]
0540	Number of Periods	<b>4</b> 4 Periods <b>2</b> 2 Periods
0580	Minimum Compressor Off Time	<b>3</b> 3 minutes <b>4</b> 4 minutes <b>5</b> 5 minutes
0600	Heat Temperature Range Stops	<b>90</b> 90°F (32°C) [Options: 40–90°F (4–32°C)]
0610	Cool Temperature Range Stops	<b>50</b> 50°F (10°C) [Options: 50–99°F (10–37°C)]
0640	Clock Format	<b>12</b> 12 Hour <b>24</b> 24 Hour
0650	Extended Fan-on time Heat	<b>0</b> Off <b>90</b> 90 seconds
0660	Extended Fan-on time Cool	<b>0</b> Off <b>40</b> 40 seconds
0670	Keypad Lockout	<b>0</b> Unlocked <b>1</b> Partial Lockout 1: Locks out schedule and system changes <b>2</b> Partial Lockout 2: Locks out schedule, system, and fan changes <b>3</b> Partial Lockout 3: Locks out schedule, system, fan, and up/down arrow changes <b>4</b> Fully Locked: Entire interface locked/non-functional
0680	Temperature Control Heat	<b>2</b> Standard <b>1</b> Less Aggressive <b>3</b> More Aggressive
0685	Recovery Heat Ramp Rate	<b>5</b> 5°F (2.8°C)/hour [Options: 0–20°F (0–11°C)]
0690	Temperature Control Cool	<b>2</b> Standard <b>1</b> Less Aggressive <b>3</b> More Aggressive

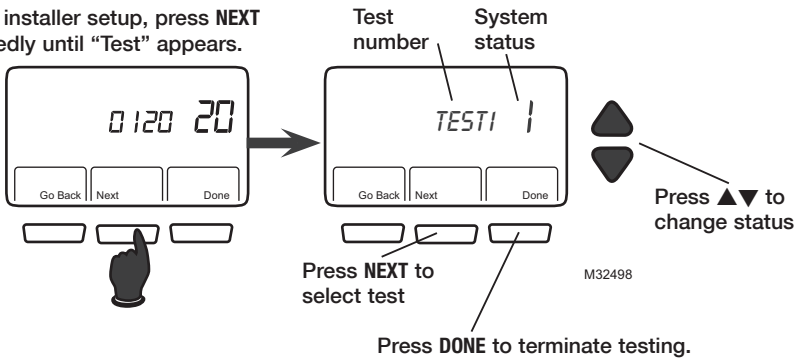


## Installer setup

Setup Number	Setup Name	Settings & Options (factory default in bold>)
0695	Recovery Cool Ramp Rate	<b>3</b> 3°F (1.7°C)/hour [Options: 0–20°F (0–11°C)]
0700	Temperature Display Offset	<b>0</b> 0°F (0.0°C) [Options: -3–3°F (-1.5–3°C)]
0710	Restore Factory Defaults	<b>0</b> No 1 Yes
0720	Screen Display	<b>2</b> Display Both 0 Display Room Temperature 1 Display Setpoint

## Installer system test

During installer setup, press NEXT repeatedly until “Test” appears.



System test	System status
<b>1 Installer Test Cool</b>	0 Off 1 Cool Stage 1 On
<b>2 Installer Test Fan</b>	0 Off 1 Low 2 Med 3 High
<b>3 Installer Test Heat</b>	0 Off 1 Heat Stage 1 On 2 Heat Stage 2 On
<b>4 Installer Test EM Heat</b>	0 Off 1 EM Heat On



**CAUTION: EQUIPMENT DAMAGE HAZARD.** Compressor protection is bypassed during testing. To prevent equipment damage, avoid cycling the compressor quickly.

## Special functions

**Fan Sequence Operations** (Setup Function 0347, 0348, 0349): The thermostat comes factory default with the fan ramping algorithm enabled (ISU 347). This gives the user the ability to select Auto-Lo-Med-Hi option in ISU 348 or Auto only option in ISU 348. Auto sets the thermostat into the fan ramping algorithm mode and automatically sets the sufficient speed for PI control. Auto also automatically shuts the fan off when there is not a call for heating or cooling. If the user decides to disable ISU 347, then the fan will only have Lo-Med-Hi option available.

If ISU 347 is not enabled, then ISU 348 does not appear as a user selection choice.

If ISU 347 is enabled, then ISU 349 is available as a selection choice. The user can select either a 2 hour or 4 hour timer fan reset function. The fan will reset from a constant speed to auto mode after the time period expires. If ISU 347 is not enabled, then ISU 349 does not appear as a user selection choice.

**Auto Changeover** (Setup Function 0300): When set to Auto, the thermostat automatically selects heating or cooling depending on the indoor temperature.

**Compressor Protection** (Setup Function 0580): Forces the compressor to wait a few minutes before restarting, to prevent damage. During this time, the message “Wait” flashes on the display.

### Special Programmable Mode Functions

Installer Setup 0160 allows the thermostat to be configured for either a mode with a programmable 7 day schedule or as a non-programmable thermostat.

**Preoccupancy purge** (ISU 0185): This feature is available only when the thermostat is configured as a programmable schedule and when a fan is used. The fan will run 1-3 hours before the occupied schedule starting time to circulate air.

**Override Button, Temporary Override** (Duration Limit ISU 0535): While in the programmable schedule mode, an override button is available to perform temporary override control. The default override time can be configured through ISU 0535. Lockout configuration via ISU 0670 can provide restrictions on access to setpoint changes, system changes, and schedule changes.

**No remote setback:** The remote setback feature only works in the nonprogrammable mode.

### Special Non-Programmable Mode Functions

**Override (Optional):** The override feature is optional in the non-programmable mode. The override can be configured through ISU 0342. When the override is activated in the non-programmable mode it will temporarily override to a new setpoint until the end time expires.

**Remote Setback:** Remote Setback is available (ISU 0340). Occupancy sensors, manual time clock inputs, and DDC night setback can be used to provide inputs to setback the thermostat. Unoccupied heating (ISU 0343) and unoccupied cooling (ISU 0346) setpoints are available to configure the setback setpoints.

## Troubleshooting

Symptom	Possible Cause	Action
Display does not come on.	Thermostat is not being powered.	Check for 24 Vac between C and R. Check that AA batteries are installed correctly and are good.
Temperature settings do not change.	The upper or lower temperature limits were reached.	Check temperature setpoints. Check Installer Setup Numbers 0600 and 0610; modify as needed.
	The keypad is fully locked.	Check Installer Setup Number 0670 to change keypad locked options.
Heating or cooling does not come on.	Thermostat minimum off-time is activated.	Wait up to five minutes for the system to respond.
	System selection not set to Heat or Cool.	Set system Selection to correct position.
	System type Selection is incorrect.	Check Installer Setup Number 0170 and make sure correct System type is chosen.
Heat does not turn on (Heat On is solid in the display).	Heating equipment failure.	Check for 24 Vac at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the heating equipment to find the cause of the problem. Check for 24 Vac between the heat terminal (Y and H2) and transformer common. If 24 Vac is present, the thermostat is functional. Check the heating equipment to find the cause of the problem.
	Loose or broken wire connection between thermostat and heating equipment.	Check for 24 Vac between the heat terminal (Y and H2) and transformer common. If voltage is not present, check wire connection (loose or broken) between the thermostat and the heating equipment.
Cooling does not turn on (Cool On is solid in the display).	Cooling equipment failure.	Check for 24 Vac at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the cooling equipment to find the cause of the problem. Check for 24 Vac between the cool terminal (Y) and transformer common. If 24 Vac is present, the thermostat is functional. Check the cooling equipment to find the cause of the problem.
	Loose or broken wire connection between thermostat and cooling equipment.	Check for 24 Vac between the cool terminal (Y) and transformer common. If voltage is not present, check the wire connection (loose or broken) between the thermostat and the cooling equipment.
Heat On is not in the display.	System setting is not set to Heat and/or temperature setting is not set above room temperature.	Set the system setting to Heat and set the temperature setting above the room temperature.
Cool On is not in the display.	System setting is not set to Cool and/or the temperature setting is not set below room temperature.	Set the system setting to Cool and set the temperature setting below the room temperature.
Wait is in the display.	Compressor minimum off timer is active.	Wait up to five minutes for the cooling or heating (heat pump) equipment to turn on.

## Accessories & replacement parts

Please contact your distributor to order replacement parts.

<b>Indoor Sensor</b> .....	Part Number P350-ISEN-CM20
<b>Indoor Sensor</b> .....	Part Number P350-ISEN-CM10
<b>Duct Probe</b> .....	Part Number P350-PRB01
<b>Indoor Sensor</b> .....	Part Number P350-ISEN-R340
<b>Coverplate*</b> .....	Part Number P350-CP-MULTI

\*(Use to cover marks left by old thermostats.)

## Specifications

### Temperature Ranges

- Heat: 40° to 90°F (4.5° to 32°C)
- Cool: 50° to 99°F (10° to 37°C)

### Operating Ambient Temperature

- 0° to 120°F (-18° to 48.9°C)

### Shipping Temperature

- -30° to 150°F (-34° to 66°C)

### Operating Relative Humidity

- 5% to 90% (non-condensing)

### Physical Dimensions

- 3-3/4" H x 6" W x 1-3/8" D
- 95 mm H x 152 mm W x 35 mm D

### Electrical Ratings

Terminal	Voltage (50/60Hz)	Running Current
<b>H2</b> Heating	20-30 Vac	0.02-1.0 A
<b>Y</b> Cooling	20-30 Vac	0.02-1.0 A
<b>G</b> Fan	20-30 Vac	0.02-0.6 A

