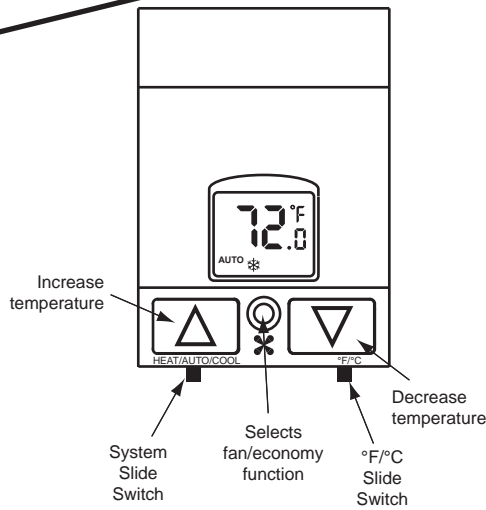


Installation and Operating Instructions

5-10573 Series



Application:

This thermostat is a 24VAC heating and cooling digital temperature control. It is designed for use on PTHP/PTAC systems, but it can also be configured for use on either 4-pipe or 2-pipe fan coil systems. Switching of load circuits is through solid state circuits, allowing the control to switch electronic and relay loads of 1.5 amps. This control can operate in heat only, cool only or automatic changeover using a single setpoint. The fan cycles on/off with calls for heating or cooling or can be on continuously in either low, medium or high speed. The control can be placed in economy mode or off mode with 40.0° freeze protection.

Installation Notice:

This high performance digital thermostat is designed to provide many years of superior comfort control when properly installed and maintained. To achieve maximum performance, this device is designed to draw room air into itself continuously. Reasonable care must therefore be taken with regard to air quality at the time of installation as well as during periods of normal use, see operating conditions below.

Operating Conditions:

The electronic mechanisms incorporated within this unit REQUIRE operating conditions similar to other electronic devices intended for INDOOR USE ONLY, such as would be acceptable for TV and similar household appliances. Relative humidity must be less than 95% and the atmosphere must be non-condensing. Air quality must be maintained FREE of heavy dust or debris which may infiltrate the interior of this device. Installation in any space which is unfinished or undergoing repainting or general rehabilitation is also considered product abuse. This device should be removed from service during any local construction activity.

Cleaning:

This device incorporates a high impact polycarbonate enclosure which is easily cleaned with a dry cloth or vacuum brush. Occasional soiling may be cleaned with a soft cloth lightly dampened with water and/or mild cleaning solution. IN NO CASE should this device be directly sprayed with or exposed to free flowing liquids, including water, which could penetrate its interior.

FAILURE TO OBSERVE ANY OF THE ABOVE CONDITIONS OF USE WILL COMPLETELY VOID THE SUPPLIER WARRANTY.

CAUTION

MAKE SURE UNIT IS PROPERLY CONNECTED. DAMAGE TO THE DIGITAL CONTROL CAN BE CAUSED BY MISWIRING, WHICH WILL VOID THE WARRANTY. FOR SAFETY REASONS ALWAYS USE WIRE NUTS ON ALL WIRE CONNECTIONS!!!

HEAT PUMP CONFIGURATION

Specifications:

Temperature Monitor Range: 32.0°F to 99.9°F (0.0°C to 37.7°C)

Setpoint Range: 60.0°F to 85.0°F (15.5°C to 29.5°C)

***Setpoint:** 72.0°F (22.0°C)

***Comfort Limits:** 65.0°F (18.5°C) cooling
85.0°F (29.5°C) heating

Display Format: Liquid Crystal Display (LCD)

Sampling Rate: Every 5 seconds

Accuracy: ± 1.0°F (0.5°C)

Power Source: 24VAC

Load Rating: 1.5 amps per circuit

Fan Control: Selectable: Auto cycle, Low, High, Economy, Off

Heat/Cool Control: 1 Compressor, 1 Auxiliary Heat

*Economy Limits:

Maintains room temperature between 60.0°F and 85.0°F (15.5°C and 29.5°C) when thermostat is in economy mode

***Fan Purge Timer:** 30 seconds

Anti-short Cycle: 3 minute hold in no call state at all times

***Cycle Rate:** 6 cycles per hour

*Refer to field programming instructions

Installation:

This device should be installed and serviced by a qualified technician. Junction box mounting is highly recommended.

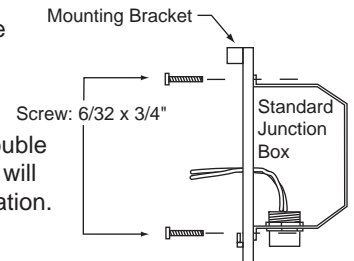
- ▲ Caution:** Make sure that power has been disconnected.
- All wiring must comply with applicable codes and ordinances.
- A thorough check-out of the system should be made after installation is complete.
- If retrofitting old thermostat, remove old thermostat from the junction box, carefully noting the wire connections on the old unit. Record wire color and legend in spaces provided below.

Old thermostat wire function	Cable wire color
Control Feed	_____
Load Feed	_____
Common	_____
Auxiliary Heat	_____
Compressor	_____
Low Fan	_____
High Fan	_____
Reversing Valve	_____

Disconnect old thermostat and remove any existing backplate or mounting plate.

- Install the mounting bracket to the junction box with the two long mounting screws provided. See mounting detail at right.

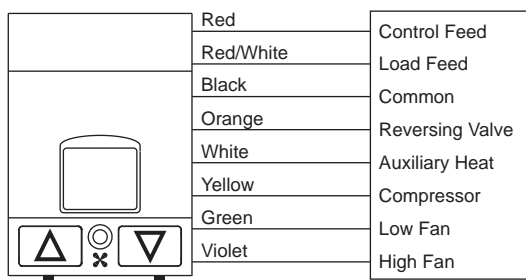
Note: If application involves a double ganged junction box, a backplate will be required for a complete installation. Please consult your supplier.



User Note: The top of this unit will become warm to the touch. This is a normal operation. Internal heating is employed to continuously convect air upward through the thermostat, thereby improving room air temperature measurement. Direct conflict with a downward ceiling fan or system fan air flow may result in false temperature reading. Locate thermostat to avoid interference.

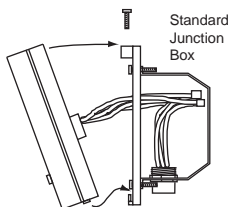
6. From the wire chart found in step 4, assign, according to function, the cable wire colors to the thermostat wire legend provided below. If this is a new installation record the cable wire colors in the thermostat legend provided below.

New thermostat wire function	New thermostat wire color	Cable wire color
Control Feed	Red	_____
Load Feed	Red/White	_____
Common	Black	_____
Auxiliary Heat	White	_____
Compressor	Yellow	_____
Low Fan	Green	_____
High Fan	Violet	_____
Reversing Valve	Orange	_____

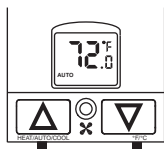


7. Connect the thermostat wires to the cable wires recorded in Step 6.

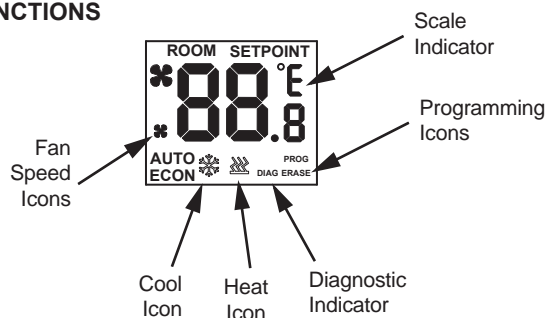
8. Push the wires into the junction box. Tilt the thermostat so that the bottom of the thermostat is resting on the mounting tabs of the mounting plate. Push the top of the thermostat towards the wall and secure into place with the self-tapping screw as shown to the right.



9. Turn power on.



BASIC FUNCTIONS



Adjust Temperature Setpoint:

- Press up button (▲) to raise the temperature (warmer)
- Press down button (▼) to lower the temperature (cooler)

Select Fan Operation:

- Press fan button (✖) to select the following fan functions
- AUTO - auto on/off with automatic speed change
- Small fan icon - continuous LOW speed fan
- Large fan icon - continuous HIGH speed fan
- ECo ECON – directly to economy mode
- Off - heating and cooling controls are disabled and the fans are off

Change Scale Units:

- Slide the °F/°C switch to the left to display °F
- Slide the °F/°C switch to the right to display °C
- When the °F/°C switch is invoked, the thermostat will reset and display the default setpoint in the selected scale.

Cycle Timing: (Anti-short cycle protection)

- 3 minute (minimum) dwell time in no-call states (both heat and cool).
- 1 minute (minimum) dwell time in call states (both heat and cool).
- Temperature is sampled every 5 seconds.

SYSTEM CHECK:

Check Low Fan Function:

- Fan should turn on immediately after power is applied.
- Auto mode only: Low fan will turn off after the first initial 3 minutes or will remain on if the heat or cool symbol appears on the display.

Check High Fan Function:

- Press and release the fan button until the fan indicator moves to the high fan position.
- High fan will turn on.

Check Heating:

- Move the "°F/°C" slide switch to the opposite side and then back to the desired scale.
- The LCD will flash its legends and then the default setpoint.
- Use the "up" button to adjust the setpoint until the heat symbol appears on the display.
- The reversing valve will activate within 3 minutes after the heat symbol appears.
- The compressor will activate 10 seconds later.

Check Cooling:

- Move the "°F/°C" slide switch to the opposite side and then back to the desired scale.
- The LCD will flash its legends and then the default setpoint.
- Press "down" button to adjust the setpoint until the cool symbol appears on the display.
- Within 3 minutes the compressor will turn on.

Press "UP" or "DOWN" button to set temperature.

Cooling: Compressor (see Reversing Valve) and low fan turn on automatically when temperature rises 0.4°F above setpoint. Fan will switch to high speed if temperature continues to rise to 4.0°F above setpoint. High fan will remain inactive for a minimum of 1.5 minutes on initial cool call from a no-call state. High fan will turn off when room temperature is within 2.0°F of setpoint. Compressor has a 15 second delay before activation. After first cooling call, compressor and low fan will turn on automatically when temperature rises above setpoint. Compressor will turn off when temperature drops below setpoint.

Heating: Compressor (see Reversing Valve) and low fan turn on automatically when temperature drops 0.4°F below setpoint. Fan will switch to high speed if temperature continues to fall to 4.0°F below setpoint. High fan will remain inactive for a minimum of 1.5 minutes on initial heat call from a no-call state. High fan will turn off when room temperature is within 2.0°F of setpoint. Compressor will activate 15 seconds after fan turns on. Auxiliary heat will become active only after the first 3 minutes of compressor operation. When active, auxiliary heat will remain on until setpoint is satisfied or has operated for more than 3 minutes. Auxiliary heat will automatically turn on when temperature drops 4.0°F below setpoint. After first heating call, compressor and low fan will turn on automatically when temperature drops below setpoint. Compressor will turn off when temperature rises above setpoint.

Automatic Changeover: When thermostat is currently in cooling mode and the temperature drops to 2.0°F plus the differential below the setpoint, the mode will automatically switch to heating.

When thermostat is currently in heating mode and the temperature rises to 2.0°F plus the differential above the setpoint, the mode will automatically switch to cooling.

Reversing Valve:

Type O will energize in cooling.

Reversing valve will turn on 15 seconds prior to heat/cool activity. Reversing valve will de-energize 3 minutes after compressor call.

TROUBLE SHOOTING TESTS

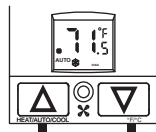
Voltage: When using a voltmeter across "Black" and "Red", the voltage must be 24VAC.

To Check Continuity: (Using a Voltmeter with all loads connected)

- A) When thermostat is calling for compressor, meter should read 24VAC from "Black" to "Yellow". When compressor is deactivated, meter should read 0VAC from "Black" to "Yellow".
- B) When thermostat is calling for reversing valve, meter should read 24VAC from "Black" to "Orange". When reversing valve is deactivated, meter should read 0VAC from "Black" to "Orange".
- C) When thermostat is calling for high fan, meter should read 24VAC from "Black" to "Violet". When high fan is deactivated, meter should read 0VAC from "Black" to "Violet".
- D) When thermostat is calling for low fan, meter should read 24VAC from "Black" to "Green". When low fan is deactivated, meter should read 0VAC from "Black" to "Green".
- E) When thermostat is calling for auxiliary heat, meter should read 24VAC from "Black" to "White". When auxiliary heat is deactivated, meter should read 0VAC from "Black" to "White".

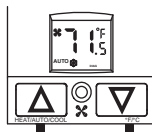
Diagnostic Mode:

Press and hold the "up" and "fan" buttons together until "DIAG" appears on the display. Release the buttons.

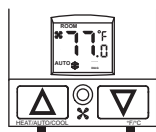


Diagnostic mode will alternately display setpoint and room temperature every 5 seconds.

Current Setpoint Display

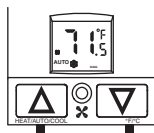


Room Temperature Display



The room temperature is displayed "ROOM". Both setpoint and room temperature displays will indicate the fan speed activity and "DIAG".

Diagnostic mode can be deactivated by changing the °F/°C slide switch.



4-PIPE FAN COIL CONFIGURATION

Specifications:

Temperature Monitor Range: 32.0°F to 99.9°F (0.0°C to 37.7°C)

Setpoint Range: 60.0°F to 85.0°F (15.5°C to 29.5°C)

***Setpoint:** 72.0°F (22.0°C)

***Comfort Limits:** 65.0°F (18.5°C) cooling
85.0°F (29.5°C) heating

Display Format: Liquid Crystal Display (LCD)

Sampling Rate: Every 5 seconds

Accuracy: ± 1.0°F (0.5°C)

Power Source: 24VAC

Load Rating: 1.5 amps per circuit

Fan Control: Selectable: Auto cycle, Low, Medium, High Economy, Off

Heat/Cool Control: 1 Heat and 1 cool circuit

***Economy Limits:**

Maintains room temperature between 60.0°F and 85.0°F (15.5°C and 29.5°C) when thermostat is in economy mode

***Fan Purge Timer:** 30 seconds

Anti-short Cycle: 3 minute hold in no call state at all times

***Cycle Rate:** 8 cycles per hour

*Refer to field programming instructions

Installation:

This device should be installed and serviced by a qualified technician. Junction box mounting is highly recommended.

1. **▲ Caution:** Make sure that power has been disconnected.
2. All wiring must comply with applicable codes and ordinances.
3. A thorough check-out of the system should be made after installation is complete.
4. If retrofitting old thermostat, remove old thermostat from the junction box, carefully noting the wire connections on the old unit. Record wire color and terminal legends in spaces provided below.

Old thermostat wire function

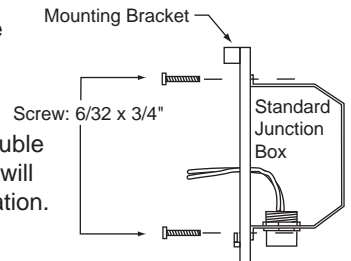
- Control Feed
- Load Feed
- Common
- Heat
- Cool
- Low Fan
- Medium Fan
- High Fan

Cable wire color

Disconnect old thermostat and remove any existing backplate or mounting plate.

5. Install the mounting bracket to the junction box with the two long mounting screws provided. See mounting detail at right.

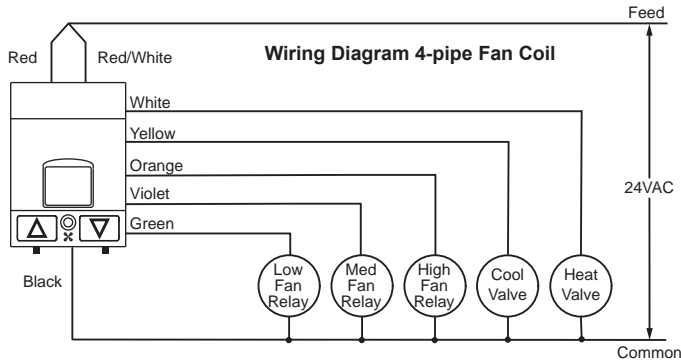
Note: If application involves a double ganged junction box, a backplate will be required for a complete installation. Please consult your supplier.



User Note: The top of this unit will become warm to the touch. This is a normal operation. Internal heating is employed to continuously convect air upward through the thermostat, thereby improving room air temperature measurement. Direct conflict with a downward ceiling fan or system fan air flow may result in false temperature reading. Locate thermostat to avoid interference.

6. From the wire chart found in step 4, assign, according to function, the cable wire colors to the thermostat wire legend provided below. If this is a new installation record the cable wire colors in the thermostat legend provided below.

New thermostat wire function	New thermostat wire color	Cable wire color
Control Feed	Red	_____
Load Feed	Red/White	_____
Common	Black	_____
Heat	White	_____
Cool	Yellow	_____
Low Fan	Green	_____
High Fan	Violet	_____
Reversing Valve	Orange	_____



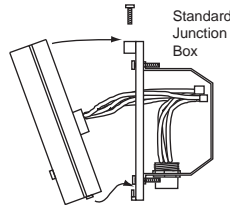
Note: Fan Coil Only

If the mechanical system has only two fan speeds

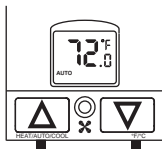
- Green - low fan
- Violet - high fan
- Orange - not used

7. Connect the thermostat wires to the cable wires recorded in Step 6.

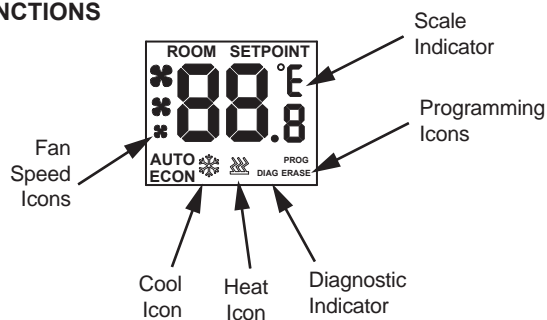
8. Push the wires into the junction box. Tilt the thermostat so that the bottom of the thermostat is resting on the mounting tabs of the mounting plate. Push the top of the thermostat towards the wall and secure into place with the self-tapping screw as shown to the right.



9. Turn power on.



BASIC FUNCTIONS



Adjust Temperature Setpoint:

- Press up button (▲) to raise the temperature (warmer)
- Press down button (▼) to lower the temperature (cooler)

Select Fan Operation:

- Press fan button (✖) to select the following fan functions
- AUTO - auto on/off with automatic speed change
- Small fan icon - continuous LOW speed fan
- Medium fan icon - continuous MEDIUM speed fan
- Large fan icon - continuous HIGH speed fan
- ECo ECON – directly to economy mode
- Off - heating and cooling controls are disabled and the fans are off

Change Scale Units:

- Slide the °F/°C switch to the left to display °F
- Slide the °F/°C switch to the right to display °C
- When the °F/°C switch is invoked, the thermostat will reset and display the default setpoint in the selected scale.

Cycle Timing: (Anti-short cycle protection)

- 3 minute (minimum) dwell time in no-call states (both heat and cool).
- 1 minute (minimum) dwell time in call states (both heat and cool).
- Temperature is sampled every 5 seconds.

SYSTEM CHECK:

Check Low Fan Function:

- Fan should turn on immediately after power is applied.
- Auto mode only: Low fan will turn off after the first initial 3 minutes or will remain on if the heat or cool symbol appears on the display.

Check Medium Fan Function:

- Press and release the fan button until the fan indicator moves to the middle fan position.
- Medium fan will turn on.

Check High Fan Function:

- Press and release the fan button until the fan indicator moves to the high fan position.
- High fan will turn on.

Check Heating:

- Move the "°F/°C" slide switch to the opposite side and then back to the desired scale.
- The LCD will flash its legends and then the default setpoint.
- Use the "up" button to adjust the setpoint until the heat symbol appears on the display.
- Heating will activate within 3 minutes after the heat symbol appears.

Check Cooling:

- Move the "°F/°C" slide switch to the opposite side and then back to the desired scale.
- The LCD will flash its legends and then the default setpoint.
- Press "down" button to adjust the setpoint until the cool symbol appears on the display.
- Within 3 minutes cooling will turn on.

Press "UP" or "DOWN" button to set temperature.

- Cooling:** Cooling and low fan turn on automatically when temperature rises 2.0°F above setpoint (see deadband). Fan will switch to medium speed if temperature continues to rise to 2.0°F above setpoint. Fan will switch to high speed if temperature continues to rise to 4.0°F above setpoint. High fan will turn off when temperature changes to 3.0°F above setpoint. Medium fan will turn off when temperature changes to 1.0°F above setpoint. Cooling will turn off when temperature drops 0.4°F below setpoint. After first cooling call, cooling and low fan will turn of automatically when temperature rises 0.4°F above setpoint. Cooling will turn off when temperature drops 0.4°F below setpoint.

Heating: Heating and low fan turn on automatically when temperature drops 2.0°F below setpoint (see deadband). Fan will switch to medium speed if temperature continues to drop to 2.0°F below setpoint. Fan will switch to high speed if temperature continues to drop to 4.0°F below setpoint. High fan will turn off when temperature changes to 3.0°F below setpoint. Medium fan will turn off when temperature changes to 1.0°F below setpoint. Heating will turn off when temperature rises 0.4°F above setpoint. After first heating call, heating and low fan will turn on automatically when temperature drops 0.4°F below setpoint. Heating will turn off when temperature rises 0.4°F above setpoint.

Automatic Changeover: When thermostat is currently in cooling mode and the temperature drops to 2.0°F plus the differential below the setpoint, the mode will automatically switch to heating. When thermostat is currently in heating mode and the temperature rises to 2.0°F plus the differential above the setpoint, the mode will automatically switch to cooling.

TROUBLE SHOOTING TESTS

Voltage: When using a voltmeter across "Black" and "Red", the voltage must be 24VAC.

To Check Continuity: (Using a Voltmeter with all loads connected)

- A) When thermostat is calling for cooling, meter should read 24VAC from "Black" to "Yellow". When cooling is deactivated, meter should read 0VAC from "Black" to "Yellow".
- B) When thermostat is calling for heating, meter should read 24VAC from "Black" to "White". When heating is deactivated, meter should read 0VAC from "Black" to "White".
- C) When thermostat is calling for high fan, meter should read 24VAC from "Black" to "Orange". When high fan is deactivated, meter should read 0VAC from "Black" to "Orange".
- D) When thermostat is calling for medium fan, meter should read 24VAC from "Black" to "Violet". When medium fan is deactivated, meter should read 0VAC from "Black" to "Violet".
- E) When thermostat is calling for low fan, meter should read 24VAC from "Black" to "Green". When low fan is deactivated, meter should read 0VAC from "Black" to "Green".

2-PIPE FAN COIL CONFIGURATION:

Follow the instructions for a 4-Pipe installation with the following exceptions -

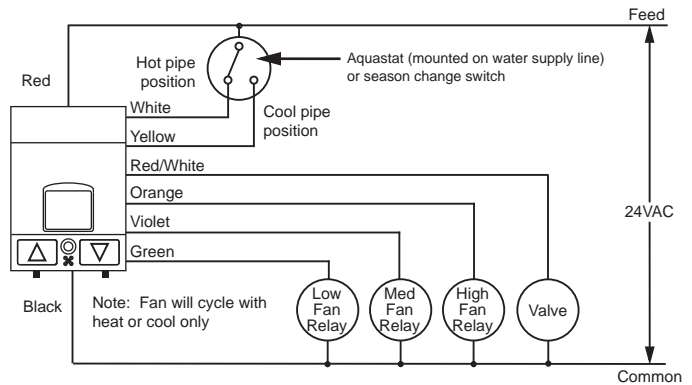
NOTE: Continuous fan is not available on 2-pipe with aquastat systems. Continuous fan is available on 2-pipe with electric heat systems.

Old thermostat wire function	Cable wire color
Control Feed	_____
Load Feed	_____
Common	_____
Heat	_____
Cool	_____
Low Fan	_____
Medium Fan	_____
High Fan	_____

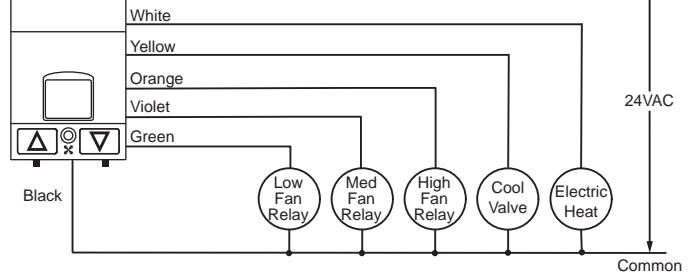
From the wire chart found above, assign, according to function, the cable wire colors to the thermostat wire legend provided below. If this is a new installation, record the cable wire colors in the thermostat legend provided below.

New thermostat wire function	New thermostat wire color	Cable wire color
Control Feed	Red	_____
Load Feed	Red/White	_____
Common	Black	_____
Heat	White	_____
Cool	Yellow	_____
Low Fan	Green	_____
Medium Fan	Violet	_____
High Fan	Orange	_____

Wiring Diagram 2-pipe Fan Coil with Aquastat



Wiring Diagram 2-pipe Fan Coil with Electric Heat



Check Heating:

Move the "°F/°C" slide switch to the opposite side and then back to the desired scale.
The LCD will flash its legends and then the default setpoint.
Use the "up" button to adjust the setpoint until the heat symbol appears on the display.
Heating valve will activate within 4 seconds after the heat symbol appears.

Check Cooling:

Move the "°F/°C" slide switch to the opposite side and then back to the desired scale.
The LCD will flash its legends and then the default setpoint.
Press "down" button to adjust the setpoint until the cool symbol appears on the display.
Cooling valve will activate within 4 seconds after the heat symbol appears.

NOTE: To check heating/cooling will depend on the temperature or position of the season switch.

TROUBLE SHOOTING TESTS (2-Pipe System)

Voltage: When using a voltmeter across "Black" and "Red", the voltage must be 24VAC.

To Check Continuity: (Using a Voltmeter with all loads connected)

Cooling: supply pipe aquastat or season change switch to cool

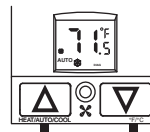
- A) When thermostat is calling for Cooling and Low Fan, meter should read 24VAC from "Black" to "Red/White" and from "Black" to "Green". When Cooling is deactivated, meter should read 0VAC from "Black" to "Red/White" and from "Black" to "Green".
- B) When thermostat is calling for Cooling and Medium Fan, meter should read 24VAC from "Black" to "Red/White" and from "Black" to "Violet". When Cooling is deactivated, meter should read 0VAC from "Black" to "Red/White" and from "Black" to "Violet".
- C) When thermostat is calling for Cooling and High Fan, meter should read 24VAC from "Black" to "Red/White" and from "Black" to "Orange". When Cooling is deactivated, meter should read 0VAC from "Black" to "Red/White" and from "Black" to "Orange".

Heating: supply pipe aquastat or season change switch to heat

- A) When thermostat is calling for Heating and Low Fan, meter should read 24VAC from "Black" to "Red/White" and from "Black" to "Green". When Heating is deactivated, meter should read 0VAC from "Black" to "Red/White" and from "Black" to "Green".
- B) When thermostat is calling for Heating and Medium Fan, meter should read 24VAC from "Black" to "Red/White" and from "Black" to "Violet". When Heating is deactivated, meter should read 0VAC from "Black" to "Red/White" and from "Black" to "Violet".
- C) When thermostat is calling for Heating and High Fan, meter should read 24VAC from "Black" to "Red/White" and from "Black" to "Orange". When Heating is deactivated, meter should read 0VAC from "Black" to "Red/White" and from "Black" to "Orange".

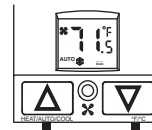
Diagnostic Mode:

Press and hold the "up" and "fan" buttons together until "DIAG" appears on the display.
Release the buttons.



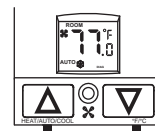
Current Setpoint Display

Diagnostic mode will alternately display setpoint and room temperature every 5 seconds.



Room Temperature Display

The room temperature is displayed "ROOM". Both setpoint and room temperature displays will indicate the fan speed activity and "DIAG".



Diagnostic mode can be deactivated by changing the °F/°C slide switch.

