Made in USA

SC900V

Auto Changeover
85-250 VAC Hardwire

2 or 4 Pipe Fan Coil Thermostat, 3 Speed

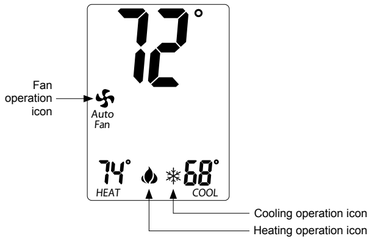
- **2-pipe systems**
- **4-pipe systems**
- **Pipe sensor compatible**
- **Configurable**
- **Large display with backlight**
- **Selectable fahrenheit or celsius**
- **Relay outputs (minimum voltage drop in thermostat)**
- **Remote sensor compatible**

Installation, Operation & Application Guide

For more information on our complete range of American-made products – plus wiring diagrams, troubleshooting tips and more, visit us at **www.icmcontrols.com**

ICM CONTROLS

Icon Descriptions



Specifications

Electrical rating: 85-250 VAC, 6 amp maximum per output

Temperature control range: 45°F to 90°F (7°C to 32°C) **Accuracy:** ± 1°F (± 0.5°C)

Timing: Backlight Operation: 10 seconds

Terminations: L, N, Heat, Cool, FH, FM, FL, PS, RS, SC

Important Safety Information

ELECTRICAL SHOCK HAZARD – ***Turn off power at the main service panel by removing the fuse or switching the appropriate circuit breaker to the OFF position before working on a high voltage thermostat.***

WARNING!: ***Always turn off power at the main power supply before installing, cleaning, or removing thermostat.***

- This thermostat is for 85-250 VAC applications only; do not use on voltages over 250 VAC
- Use this thermostat only as described in this manual

Package Contents/Tools Required

Package includes: SC900V thermostat on base, thermostat cover, wiring labels, screws and wall anchors, Installation, Operation and Application Guide

Tools required for installation: Drill with 3/16" bit, hammer, screwdriver

To Remove Existing Thermostat

ELECTRICAL SHOCK HAZARD – ***Turn off power at the main service panel by removing the fuse or switching the appropriate circuit breaker to the OFF position before removing the existing thermostat.***

1. Turn off power to the heating and cooling system by removing the fuse or switching the appropriate circuit breaker off.
2. Remove cover of old thermostat. This should expose the wires.
3. Label the existing wires with the enclosed wire labels before removing wires.
4. After labeling wires, remove wires from wire terminals or remove wire nuts.
5. Remove existing thermostat base from wall.
6. Refer to the following section for instructions on how to install this thermostat.

To Install Thermostat

ELECTRICAL SHOCK HAZARD – ***Turn off power at the main service panel by removing the fuse or switching the appropriate circuit breaker to the OFF position before removing the existing thermostat.***

IMPORTANT: *Thermostat installation must conform to local and national building and electrical codes and ordinances.*

⁂ **Note:** *Mount the thermostat about five feet above the floor. Do not mount the thermostat on an outside wall, in direct sunlight, behind a door, or in an area affected by a vent or duct.*

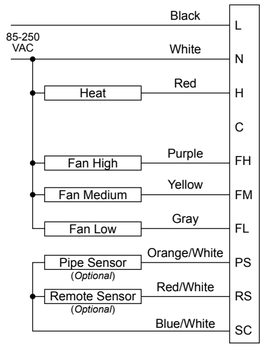
1. Turn off power by removing the fuse or switching the appropriate circuit breaker off.
2. To remove cover, remove screw and pull gently at the seam at the top.
3. Set thermostat away from working area.
4. Align thermostat base with junction box mounting holes and feed the control wires through hole.
5. Use supplied screws to mount thermostat base to junction box.

CAUTION!: *Be sure exposed portion of wires does not touch other wires.*

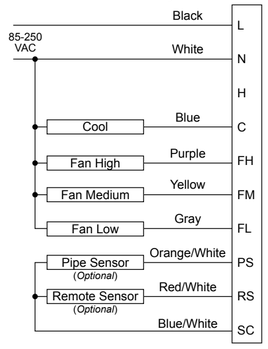
6. Wire nut the thermostat wires to your system wires.
7. Gently tug wire to be sure of proper connection. Double check that each wire is connected to the proper terminal.
8. Snap thermostat to base that is mounted on the wall. Refasten with screw.
9. Turn on power to the system at the main service panel.
10. Test thermostat operation as described in "Testing the Thermostat".

Wiring Diagrams

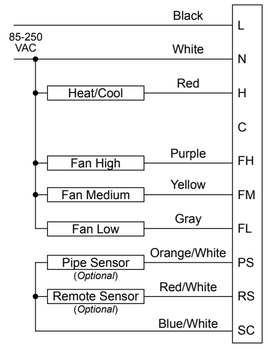
System 1
Heat Only



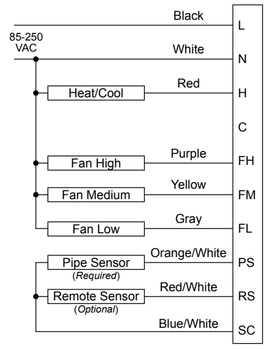
System 2
Cool Only



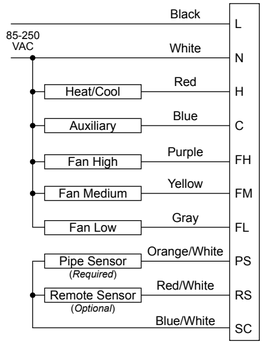
System 3
2-Pipe Manual Changeover



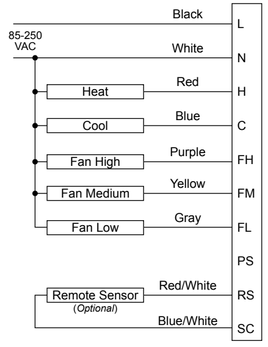
System 4
2-Pipe Seasonal Changeover



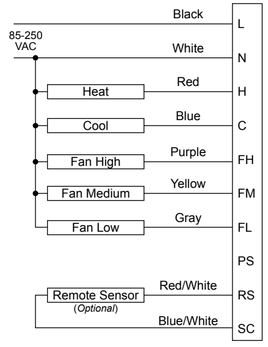
System 5
2-Pipe Manual Changeover with Auxiliary



System 6
4-Pipe Manual Changeover



System 7
4-Pipe Auto Changeover



Wire Designator Descriptions

L – 120 VAC Hot	Black	FM – Fan Medium	Yellow
N – 120 VAC Neutral	White	FL – Fan Low	Gray
H – Heat	Red	PS – Pipe Sensor (optional)	Orange/White
C – Cool	Blue	RS – Remote Sensor (optional)	Red/White
FH – Fan High	Purple	SC – Sensor Common	Blue/White

Configuration Mode

The configuration mode is used to set the **SC900V** to match your heating/cooling system.

To configure the **SC900V**, perform the following steps:

1. Verify the **SC900V** is in the **OFF** mode. Press the **SYS** (left) button until off mode displays.
2. Press the **CONFIG** button for 5 seconds while the **SC900V** is in **OFF** mode.

Press the **up** or **down** button to change settings within each screen.

Press the **CONFIG** button to advance to the next screen.

⁂ **Note:** *Pressing the **SYS** button will return you to the previous screen.*

To exit configuration mode, press the **CONFIG** switch for 5 seconds.

Configuration Mode Settings

1 – System

Select the type of operation you require.

1. Heat Only is for a system with only heating.
2. Cool Only is for a system with only cooling.
3. 2-Pipe Manual Changeover is for a 2 pipe system that handles both heating and cooling. The user selects whether the system will be set to heating or set to cooling.
4. 2-Pipe Seasonal Changeover is for a 2 pipe system that handles both heating and cooling. The thermostat selects whether the system will be set to heat or set to cool based on the pipe sensor temperature.
5. 2-Pipe Manual Changeover with Auxiliary is for a 2 pipe system that handles both heating and cooling. The user selects whether the system will be set to heat or set to cool. If set to heat and the pipe sensor indicates there is not heat, the auxiliary output will be turned on.
6. 4-Pipe Manual Changeover is for a 4 pipe system. The user selects whether the system will be set to heat, cool or off.
7. 4-Pipe Auto Changeover is for a 4 pipe system. The user selects whether the system will be set to heat, cool, heat & cool or off.

"1" Heat only
"2" Cool only
"3" 2-pipe manual changeover
"4" 2-pipe seasonal changeover
"5" 2-pipe seasonal changeover w auxiliary
"6" 4-pipe manual changeover
"7" 4-pipe auto changeover (**Default)**

2 – Temperature Scale

This thermostat can function in Fahrenheit and Celsius.

F = Fahrenheit (**Default)**

C = Celsius

3 – Valve Type

This thermostat operates with Normally Open or Normally Closed valves. Select the correct valve type for your system.

no = Normally Open (**Default)**

nc = Normally Closed

4 – Temperature Sensor

Select the type of room temperature sensor you are using.

o = Onboard temperature sensor (**Default)**

r = Remote temperature sensor

5 – Fan Operation

Select either Automatic Fan or Continuous Fan.

Automatic Fan will automatically adjust the fan speed (Low, Medium, High) based on the set point and room temperature. The more the room temperature is from the set point the faster the fan will operate. The fan will be off in OFF mode.

Continuous Fan will run the fan at the fan speed that is selected with the FAN button. It can be turned OFF only when in OFF mode.

A = Automatic Fan (**Default)**

C = Continuous Fan

6 – Pipe Sensor (Y/N) (for 2 pipe system only)

Select whether you are using a pipe sensor to monitor the pipe temperature.

n = No Pipe Sensor Connected (**Default)**

y = Pipe Sensor Connected

7 – Pipe Sensor Cooling

Pipe temperature below this setting is considered to be cooling. If pipe sensor temperature is above this selected temperature for more than the Pipe Sensor Delay Time the cool valve will be turned off.

Changes setting between 50ºF and 65ºF (10.0ºC and 18.0ºC) **Default:** 60

8 – Pipe Sensor Heating

Pipe temperature above this setting is considered to be heating. If pipe sensor temperature is below this selected temperature for more than the Pipe Sensor Delay Time the heat valve will be turned off.

Changes setting between 70ºF and 90ºF (21.0ºC and 32.0ºC) **Default:** 80

9 – Pipe Sensor Delay Time

This is the time that the valve will be open to verify the pipe temperature before the valve is turned off. This gives time for circulation through the system.

Changes setting between 0 and 5 minutes at 1 minute intervals **Default:** 5

10 – 1st-Stage Differential

Differential is the number of degrees between the set point temperature and the turn on temperature.

Changes setting between d1ºF and d6ºF (0.5ºC and 3.0ºC) **Default:** d1ºF

11 – Dead Band

Dead band is the minimum number of degrees allowed between heat set point and cool set point in auto changeover operation.

Select setting between 0ºF and 9ºF (0.0ºC and 4.5ºC) **Default:** 4ºF

12 – Minimum Set Point Cooling (Lower Limit)

The minimum cooling set point can be limited so the cooling cannot be set too low.

Adjust setting between 45ºF and 90ºF (7.0ºC and 32.0ºC) **Default:** 45ºF

13 – Maximum Set Point Heating (Upper Limit)

The maximum heating set point can be limited so the heating cannot be set too high.

Adjust setting between 45ºF and 90ºF (7.0ºC and 32.0ºC) **Default:** 90ºF

14 – Temperature Calibration

The room temperature can be offset to display a different temperature. Example: 70F room temperature with -2 setting displays 68F.

Changes displayed room temperature between -9ºF and 9ºF (-4.5ºC and 4.5ºC) **Default:** 0ºF

15 – Lock Feature

Thermostat can be locked so temperature, configurations and mode cannot be changed. Thermostat must be locked for this setting to take affect (see Lockout Feature)

0-9 - number of degrees that can be adjusted, mode cannot be changed

Cool-Heat – can adjust up to max heat and min cool but cannot change mode **Default:** 0

16 – Temperature Display

Select whether to display room temperature only, set point temperatures only or both.

“S” Display set point only

“r” Display room temperature only

“rS” Display set point and room temperature **Default:** “rS”

17 – Valve Purge

Select time to open valves during inactivity period. This feature purges the lines so water does not become stagnant and helps keeps valves from sticking.

“0” Disabled **(Default)** “1” 1 minute every 24 hours “3” 3 minutes every 24 hours

Mode of Operation

The **SC900V** high voltage fan coil thermostat can be used for two pipe or four pipe systems. It can control heat only, cool only or heat & cool systems. A pipe sensor can be used for two pipe systems to verify the system is operating or automatically change to the correct operating mode. The thermostat is configurable for all fan coil systems. The configuration setup is used to match the thermostat to your system and turn on the features you want to utilize.

The thermostat can be setup for continuous fan or automatic fan. Continuous fan operates on the fan speed that you have selected. You can turn the fan off in OFF mode when in continuous fan. Automatic fan adjusts to the appropriate fan speed based on the set temperature and the room temperature. The further the room temperature is away from the set point temperature the faster the fan will operate.

A lock feature can be enabled so the setting can not be tampered with. A valve purge feature can be used to cycle the valve so water does not become stagnant and to stop valves from sticking.

Button Functions

UP – Used to increase the set temperatures and to adjust configuration settings.

DOWN – Used to decrease the set temperatures and to adjust configuration settings.

SYS – Used to change from OFF, HEAT, COOL and AUTO changeover modes.

CONFIG – Used to enter configuration and advance to the next configuration screen.

FAN – Used to turn the fan on and off. Also used to cycle through fan speeds

SYS then CONFIG – Held in simultaneously for 10 seconds to lock and unlock the thermostat.

Up and Down – Pressed simultaneously to display pipe sensor temperature if pipe sensor is connected.

Operating Modes

There are four possible operating modes for the **SC900V**. **OFF**, **Cool**, **Heat**, and **Cool & Heat** modes are accessed by pressing the **SYS** button.

⁂ **Note:** *The modes you can access are based on your configuration.*

OFF Mode

- In this mode, the thermostat will not turn on the heating or cooling devices

⁂ **Note:** *The fan (when configured as continuous fan) can be turned on manually in off mode by pressing the FAN button. The word FAN shows on the display and the fan icon ✣ appears when the fan operates.*

Heat Mode

- In this mode, the thermostat controls the heating system. When the heat outputs, the flame icon ♣ apprears on the display.

Cool Mode

- In this mode, the thermostat controls the cooling system. When the cooling outputs, the snowflake icon ❄ apprears on the display.

Heat & Cool Mode

- In this mode, the thermostat can automatically turn on heat or cool as needed. AUTO appears on display with heat set point and cool set point.

Testing the Thermostat

Once the thermostat is configured, it should be thoroughly tested.

⁂ **Note:** *If using pipe sensors, verify pipe sensor is within range to output. Check pipe temperature by pressing the **UP** and **DOWN** buttons simultaneously.*

Heat Test (For systems with heat)

1. Press **SYS** button until heat mode is displayed.
2. Adjust the set temperature so it is 5 degrees above the room temperature.
3. Heat should come on within a few seconds.
4. Adjust the set temperature 2 degrees below the room temperature and the heat should turn off. There may be a fan delay on your system.

Cool Test (For systems with cooling)

1. Press **SYS** (left) button until cool mode is displayed.
2. Adjust set temperature so it is 5 degrees below room temperature.
3. Cooling should come on within a few seconds.
4. Adjust the set temperature 2 degrees above the room temperature and the cool should turn off. There may be a fan delay on your system.

Fan Test (Continuous fan mode only, configuration setting #5)

1. Press **FAN** button. Fan displays. Fan turns ON.
2. Press **FAN** button. Fan turns OFF.

Lockout Feature

The **SC900V** has a button lockout feature so the mode cannot be changed and the temperature adjustment is limited. Select the appropriate lockout from Configuration Mode Settings (Step 15) of this guide.

To activate the **LOCK** feature:

1. Press the **SYS** button in, then press the **CONFIG** button in also. Hold both in for 10 seconds
2. 🔒 will display and the lockout function will be enabled.

To deactivate the **LOCK** feature, repeat steps 1 and 2 above.

Troubleshooting

Symptom	Remedy
No display	Check for voltage at thermostat; display is blank when voltage is not present
System fan does not come on properly	Verify wiring is correct, check connections are correct (see Configuration Mode Setting 5)
Thermostat turns on and off too frequently	Adjust temperature differential (see Configuration Mode Setting 10)
Room temperature is not correct	Calibrate thermostat (see Configuration Mode Setting 14) If remote sensor is used, check connections
🔒 displays when any button is pressed	Thermostat has the button lockout function activated (see Lockout Feature and Configuration Mode Setting 15)
- - on display instead of room temperature	Check for a bad connection if remote sensor is used (see Configuration Mode Setting 4)
Heat or Cool not coming on *(No pipe sensor)*	Verify wiring is correct, gently pull on each wire to verify there is a good connection, verify configuration settings
Heat or Cool not coming on *(Pipe sensor connected)*	Check pipe sensor temperature by pressing up and down buttons in – if out of range, outputs may not turn on (see Configuration Mode Settings 6-9)

FIVE-YEAR LIMITED WARRANTY

The Seller warrants its products against defects in material or workmanship for a period of five (5) years from the date of manufacture. The liability of the Seller is limited, at its option, to repair, replace or issue a non-case credit for the purchase prices of the goods which are provided to be defective. The warranty and remedies set forth herein do not apply to any goods or parts thereof which have been subjected to misuse including any use or application in violation of the Seller’s instructions, neglect, tampering, improper storage, incorrect installation or servicing not performed by the Seller. In order to permit the Seller to properly administer the warranty, the Buyer shall: 1) Notify the Seller promptly of any claim, submitting date code information or any other pertinent data as requested by the Seller. 2) Permit the Seller to inspect and test the product claimed to be defective. Items claimed to be defective and are determined by Seller to be non-defective are subject to a $30.00 per hour inspection fee. This warranty constitutes the Seller’s sole liability hereunder and is in lieu of any other warranty expressed, implied or statutory. Unless otherwise stated in writing, Seller makes no warranty that the goods depicted or described herein are fit for any particular purpose.

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