

The A419 Control Functions

Setpoint (SP) establishes the temperature value at which the equipment is switched on or off, depending on the user selected mode of operation. Setpoint range is -30 to 212°F or -34 to 100°C (in 1-degree increments).

If Setpoint mode is set to cut-in, setpoint is the temperature value at which the control closes the Normally Open (N.O.) contacts. If Setpoint mode is set to cutout, setpoint is the temperature at which the N.O. contacts open.

Differential (dIF) establishes the difference in temperature between the cut-in value and cutout value. The differential is set relative to Setpoint and may be set from 1 to 30 F° or C° (in 1-degree increments).

Anti-Short Cycle Delay (ASd) establishes the minimum time that the output relay remains de-energized before the next on-cycle. The *ASd* does not allow the output relay to re-energize until the programmed time delay has elapsed. The delay is activated when the control is first turned on and every time an on-cycle ends. When the delay is activated, the LCD alternately flashes the sensor temperature and *ASd*. The Anti-short Cycle Delay range is 0 to 12 minutes (in 1-minute increments).

Sensor Failure Operation (SF) establishes how the A419 control's output-relay operates the equipment in the event of a sensor or sensor wiring failure. The user may select to run the equipment continuously or to shut it down. When the control detects a sensor circuit failure, the LCD flashes *SF* alternately with *OP* (if the sensor circuit is open), or *SH* (if the sensor circuit is shorted). Before indicating a failure, the control implements a 1-minute delay, which allows verification of failure condition and avoids nuisance failure indications.

Temperature Offset (OFS) establishes a set secondary **Setpoint** and **Differential** values that may be invoked to control an application when a circuit is closed between the binary input (**BIN**) and common (**COM**) terminals (and **BIN** appears on the display). See Figure 3. Offset range is 0 to 50F° or C° (in 1- degree increments). A typical application might use a switching time clock to invoke night-setback temperature settings.

Display Symbols, Control Function, Ranges, Units, Values

Display Symbol	Control Function	Range – Units/Value
<i>SP</i>	Setpoint*	-30 to 212 – °F (-34 to 100 – °C)
<i>dIF</i>	Differential*	1 to 30 – (F° or C° in 1-degree increments)
<i>ASd</i>	Anti-short Cycle Delay	0 to 12 – (in 1-minute increments)
<i>OFS</i>	Temperature Offset	0 to 50 (F° or C° in 1-degree increments)
<i>SF</i>	Sensor Failure Operation	(No range)— 0 = output relay de-energized 1 = output relay energized
<i>F or C</i>	Temperature Units	(No range) – F° or C°
<i>BIN</i>	Temperature Offset Indicator	(No range) – <i>BIN</i> is displayed and the A419 control operates on the secondary setpoints when the circuit between the <i>BIN</i> and <i>COM</i> terminals is closed.
 or 	Cooling or Heating Mode of Operation	(No range) –  (Cooling Mode) is displayed when the Jump1 jumper is removed.  (Heating Mode) is displayed when the Jump1 jumper is installed.

* The sum of the Setpoint and Differential values must be within the Setpoint range, or the control may not function properly.

JOHNSON CONTROL® A419 CONTROLLER CHANGING SETPOINTS

Changing the A419 Control Temperature Units

The A419 control is set at the factory to display in Fahrenheit temperature units.



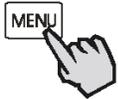
To convert to Celsius units, press the **Up** and **Down** buttons simultaneously. Press them again to return to Fahrenheit units.

Notes: Make sure the Touchpad Lock jumper is in the unlocked (installed) position before adjusting the control. See Figure 13.

Verify that the A419 control is displaying the desired temperature units (F° or C°) before establishing the setpoint value.

Setting the Setpoint

To view and adjust the temperature setpoint, follow these steps and refer to Table 3:



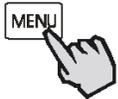
1. Press and hold the **MENU** button until the display changes to flashing **SP**. This will take about 2 seconds.



2. Press the **MENU** button again. The current setpoint is displayed.



3. Press the **Up** or **Down** button to adjust the setpoint temperature.



4. Press the **MENU** button to save. The display then returns to the sensor temperature.

Notes: If no entries are made for 30 seconds while programming is in progress, the control reverts to the normal temperature display.

If the **MENU** button is not pressed after changing the setpoint value, the new value is not saved and the A419 control reverts to the previously saved setpoint value.

Any **saved** A419 control setting values are **non-volatile** and remain in the control's memory during power interruptions.

Liquid Crystal Display, Touch pad, and LED Indicator

Function	Range
SP: Setpoint	-30 to 212°F (-34 to 100°C)
dIF: Differential	1 to 30° (F or C)
ASd: Anti-short Cycle Delay	0 to 12 minutes
OFS: Temperature Offset	0 to 50° (F or C)
SF: Sensor Failure Operation	0 = output de-energized 1 = output energized

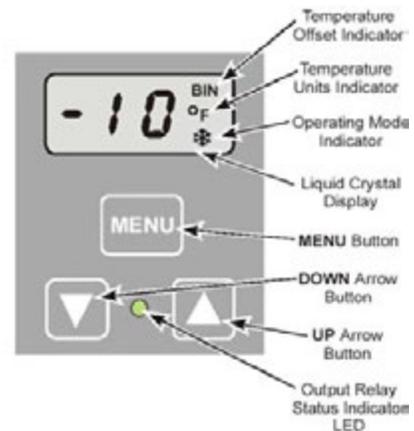
Operation at Extremes: If the combination of setpoint plus or minus the differential falls outside the temperature range (-30 to 212°F [-34° to 100°C]), the A419 control operates as follows:

Cooling/Cut-in: If the control is operating in Cooling/Cut-in mode and setpoint minus differential is less than -30°F, the control switches on at setpoint and off when the temperature drops below -30°F (-34°C).

Heating/Cut-in: If the control is operating in Heating/Cut-in mode and setpoint plus differential is greater than 212°F (100°C), the control switches on at setpoint and off when the temperature exceeds 212°F (100°C).

Cooling/Cutout: If the control is operating in Cooling/Cutout mode and setpoint plus differential is greater than 212°F (100°C), the control switches on when the temperature exceeds 212°F (100°C) and off at setpoint.

Heating/Cutout: If the control is operating in Heating/Cutout mode and setpoint minus differential is less than -30°F (-34°C), the control switches on when the temperature drops below -30°F (-34°C) and off at setpoint.



JOHNSON CONTROL® A419 CONTROLLER FAULT CODES

Fault Codes Defined

Fault Code	Definition	System Status	Solution
<i>SF</i> flashing alternately with <i>OP</i>	Open temperature sensor or sensor wiring	Output functions according to the selected sensor failure mode (SF setting)	See <i>Troubleshooting</i> section. Cycle power to reset the control.
<i>SF</i> flashing alternately with <i>SH</i>	Shorted temperature sensor or sensor wiring	Output functions according to the selected sensor failure mode (SF setting)	See <i>Troubleshooting</i> section. Cycle power to reset the control.
<i>EE</i>	Program failure	Output is off	Reset the control by pressing MENU . If problems persist, replace the control.

Jumper Designations, Jumper Positions and Control Settings

Function	Jumper Pins Designation on Control	Setting	Jumper Position	Factory Default Setting (and Jumper Position)
Cooling/Heating Operating Mode	JUMP1 (Top Pair of Pins on Block P4)	Cooling Mode	Removed	Cooling Mode (Jumper Removed)
		Heating Mode	Installed	
Setpoint at Cut-in or Cutout	JUMP2 (Bottom Pair of Pins on Block P4)	Setpoint at Cut-in	Removed	Cut-in (Jumper Removed)
		Setpoint at Cutout	Installed	
Touchpad Lock	P5	Locked	Removed	Unlocked (Jumper Installed)
		Unlocked	Installed	

Setup and Adjustments



WARNING: Risk of Electrical Shock.

To avoid the risk of electrical shock disconnect all power sources to the control before opening control cover and repositioning jumpers. More than one disconnect may be required to completely de-energized the control and equipment.

IMPORTANT: To ensure that the output relay operates as intended, verify that all three of the jumpers are positioned properly for the application before powering the A419 control.

IMPORTANT: The touchpad cannot be unlocked without a jumper installed across the P5 jumper pins. Do not discard jumpers in case they are required in the future. See Figure 4 and Figure 5.

Positioning the Jumpers

The **P5 jumper** position determines if the touchpad is locked or unlocked.

The **P4 jumper** pin block has two pairs of jumper pins. The top pair of pins (JUMP1), determines if the control is set for Heating or Cooling mode. The bottom pair of pins, (JUMP2) establishes whether Setpoint is at cut-in or at cutout. See Figure 4 and Figure 5.

To position a jumper in the **Installed** position, place the jumper on both pins, which closes the circuit between the pins. To position a jumper in the **Removed** position, place the jumper on one pin only. See Figure 4.

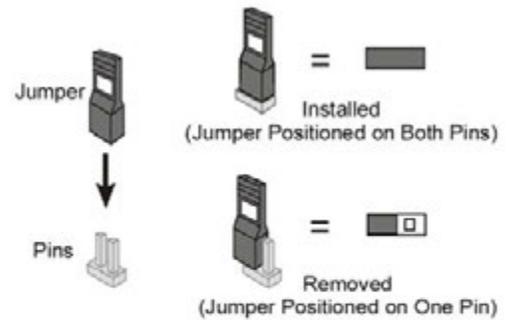


Figure 4: Positioning the Jumpers

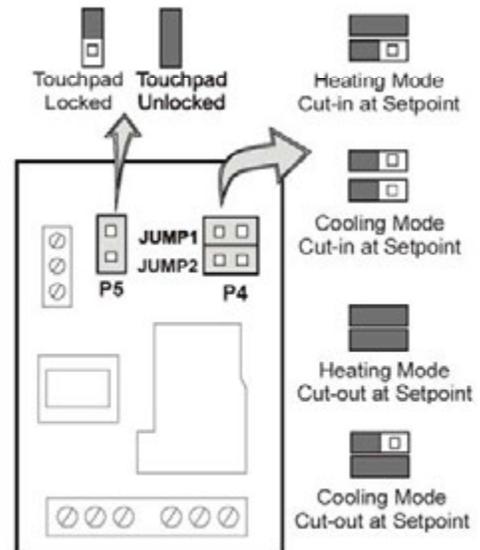


Figure 5: Jumper Positions and Control Settings

Troubleshooting



WARNING: Risk of Electrical Shock.

Hazardous voltages may be present at electrical terminals and other exposed internal metal surfaces. Do not touch any metal parts within the control when cover is removed. Any contact with metal parts, including with metal or conductive tools, may result in serious injury or death.

If the control system does not function properly, verify that the control is wired, and set up properly. If the problem persists, use the following procedures to determine the cause of the problem:

IMPORTANT: Follow these troubleshooting procedures in the order presented. Do not skip any of the steps in the procedures.

1. **Check for proper voltage to the A419 control.**
 - a. Remove the cover by loosening the four captive cover screws.
 - b. Use a reliable AC voltmeter to check the voltage between the **COM** and **120V** or **240V** terminals on-line voltage models and the two **24V** terminals on low-voltage models. Refer to Figure 3.
 - c. The voltage must be between 20 and 30 VAC for 24 VAC applications, 102 and 132 VAC for 120 VAC applications, 177 and 264 VAC for 208/240 VAC applications.
 - d. If the voltage reading is not within the required range, check the power source and input power wires for problems.
2. **Check for proper sensor operation.**
 - a. Disconnect all power sources to control.
 - b. Using an accurate thermometer, take a temperature reading at the sensor location.
 - c. Disconnect the sensor from the control.
 - d. Using an ohmmeter, measure the resistance across the two sensor leads while the sensor is at the temperature taken in Step 2b.
 - e. Consult Figure 7 to verify that the measured temperature and resistance conform to established temperature and resistance values.
 - f. If the measured values conform to the values in Figure 7, proceed to Step 3.

- g. If the sensor's measured resistance value is substantially different from the expected value for that temperature, check the sensor wiring. If sensor wiring is okay, replace the sensor.

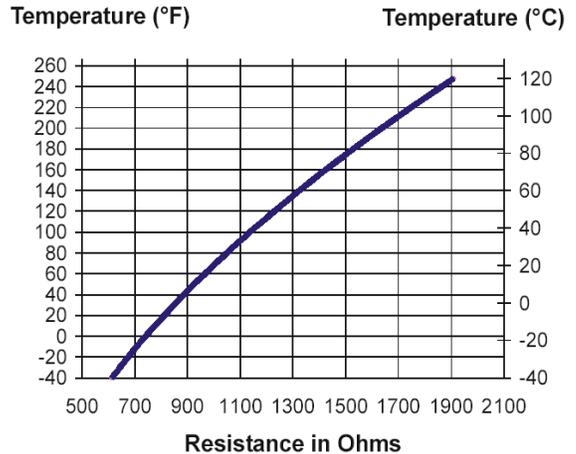


Figure 7: Temperature vs. Sensor Resistance

3. **Check the A419 for proper operation.**

Note: Perform *Troubleshooting* Steps 1 and 2 before performing this step.

 - a. Disconnect the load from the output relay terminals.
 - b. Ensure that the Touchpad Lock jumper is installed, so that the touchpad is unlocked.
 - c. Reconnect the sensor leads and supply power to the control.
 - d. Replace the cover.
 - e. Check the control settings for proper values.
 - f. Press and hold MENU until Setpoint appears (This takes about 2 seconds).
 - g. Press the **Up** and **Down** (arrows) to change the Setpoint temperature above and below the sensor temperature until the relay energizes and de-energizes as shown in Table 5.

Note: If the anti-short cycle delay has a set delay-time value greater than 0 minutes when the control is powered On, the relay does not energize until the time delay has elapsed.

 - h. If the output relay does **not** perform as indicated in Table 5, replace the A419 control.
 - i. If proper operation of the A419 control is verified, reconnect the load and consult the equipment manufacturer's instructions for troubleshooting the controlled equipment.