

# INSTALLATION AND MAINTENANCE



**KB** **eco2S+**

**Electronic Unit Heater with  
Remote Temperature Sensor &  
Remote Thermostat Option**



DANGER

ELECTRIC SHOCK OR FIRE HAZARD

READ ALL WIRE SIZING, VOLTAGE REQUIREMENTS AND SAFETY DATA TO  
AVOID PROPERTY DAMAGE AND PERSONAL INJURY

WARNING

**READ CAREFULLY** - Use the heater only as described in this manual. Any other use is not recommended and could result in fire, electric shock, and personal injury. Following these instructions will prevent difficulties that might occur during the installation and use of the heater. Please study the instructions first, as they may save considerable time and trouble during use addition to providing important safety information. Make sure to save these instructions for future use.

- WARNING** To prevent a possible electrical shock, disconnect all power coming to heater at main service panel before wiring or servicing.
- WARNING** All wiring must be in accordance with the National Electrical Code (Canadian Electrical Code in Canada) and all applicable local codes. The heater must be grounded as a precaution against electrical shock. Supply wiring must be copper and suitable for at least 75° C.
- WARNING** Verify power supply and control voltages coming to the heater match the ratings printed on the heater nameplate before energizing.
- WARNING** Heater must be installed so the minimum clearances shown in Specifications table are maintained.
- WARNING** This heater is NOT suitable for use in hazardous locations as described by the National Fire Protection Association (NFPA). this heater has hot and arcing or sparking parts inside. DO NOT use in areas where gasoline, paint or other flammable liquids are used or stored.
- WARNING** The mounting structure and anchoring hardware **MUST BE** capable of reliably supporting the weight of the heater plus mounting bracket if used. Refer to specifications table for heater weight.
- WARNING** Heater air flow **MUST** be directed parallel to or away from adjacent walls.
- WARNING** To prevent a possible fire, DO NOT block air intakes or exhaust openings in any manner. DO NOT allow foreign objects to enter grill openings as this may cause electric shock, fire or damage to heater.
- WARNING** Louver adjustment (Do not attempt to adjust while heater is operational): The Louvers are opened during testing at factory, but may have shifted during shipping, make sure the louvers are rotated less than 45 degrees from horizontal before operation. To adjust the opening angle, grasp the left and right end of louver and twist with two hands to the desired position. CAUTION: Increasing the angle beyond 45° degrees from horizontal may restrict air flow causing the over temperature limit to activate and shut off the heater.



**CAUTION—RISK OF ELECTRIC SHOCK  
DO NOT OPEN HEATER SHELL**



# KB EC02S+ INSTALLATION

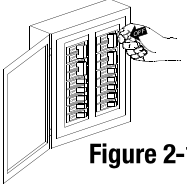


Figure 2-1

**CAUTION!**

**Turn OFF all electrical power to install heater**



## Selecting A Location For Your Heater:

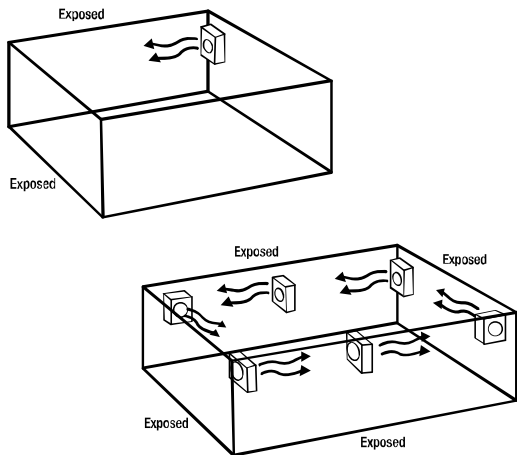
The heater should be installed out of the reach of persons. The direction of air flow should not be restricted by machinery, beams, columns or partitions, etc., and the air flow should wipe exposed walls rather than blowing directly at them.

Heaters should be directed away from room occupants in comfort heating and are directed along the windward side when installed in a building exposed to a prevailing wind.

Small rooms can be heated by one unit heater. Large rooms require multi-unit installations. Number and capacity of units will be determined by volume of building and square feet of floor area to be heated.

When more than one heater is used in an area the heaters should be arranged so that the air discharge of each heater supports the air flow of the others to provide best circulation of warm air.

*(see air flow chart)*



## Unpack & Inspect Your New Heater

Remove heater from the box and inspect it for any damage. Verify you have received the universal wall/ceiling mounting bracket.

## Tools Needed

You will need the following tools to install your unit heater:

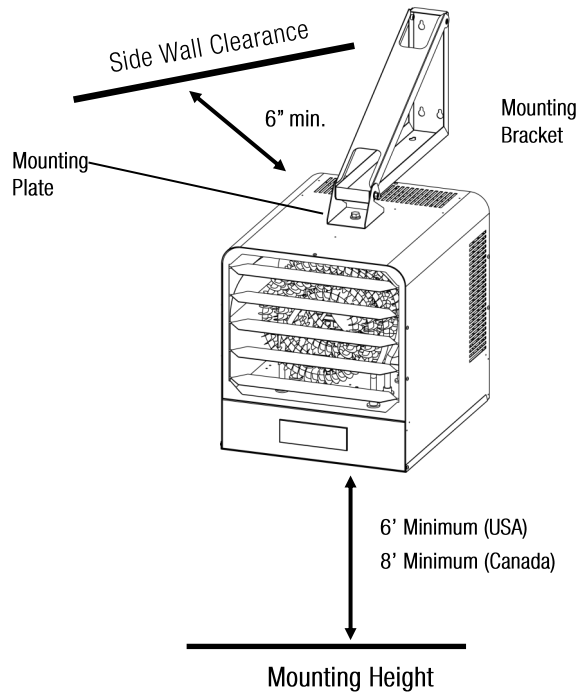
- Screwdriver - (Phillips head & slotted)
- Wire Cutters
- Pliers
- Adjustable Wrench
- Electric Drill

## Hardware Needed For Installation

You will also need the following hardware, which can be purchased from your local hardware store or electrical supply house:

- adequate gauge and length of wire for your application
- proper size fuses or breakers to handle amperage
- proper wire connectors for your application
- fasteners appropriate for application that are strong enough to hold unit

For certain applications conduit may be required. Check local electrical codes. Also, if you run the wiring in conduit and wish to be able to turn the heater, be sure to purchase enough flexible conduit to allow the heater to be turned.



## Mounting Height

When the airflow of the heater is directed vertically or horizontally the minimum mounting height of 6 feet above floor (8 feet above floor for Canada).

Mounting heights depend upon building utilization and heater kW capacity.

## Distance From Vertical Side Walls

Be sure to maintain 6" minimum clearance to walls and ceilings.

# KB ECO2S+ INSTALLATION

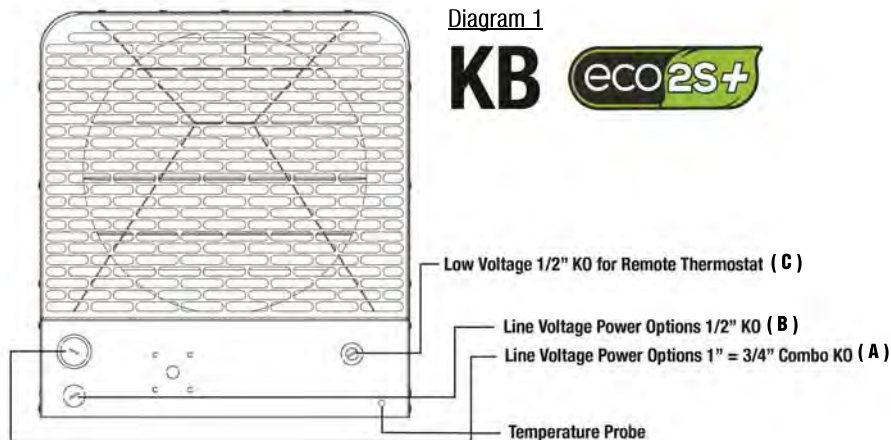
! **DANGER** !

**ELECTRIC SHOCK OR FIRE HAZARD**

LINE VOLTAGE IS PRESENT ON SOME OF THE TERMINALS ON THE CONTROL TERMINAL BOARD. ALWAYS DISCONNECT THE POWER FROM THE HEATER BEFORE MAKING ANY CONNECTIONS TO THE CONTROL BOARD TO PREVENT ELECTRIC SHOCK HAZARD.



# KB ECO2S+ WIRING



1. Connect heater to the voltage, and frequency specified on the nameplate.
2. Field wiring must be properly sized to carry the amperage of the heater in accordance with the NEC.
3. The electrical wiring compartment access door is hinged and has a screw on the bottom. Remove the screw to gain access.
4. Electrical knockouts (A and B) are provided on the back of the heater close to the power contactor. Use the diameter that fits the required conduit fitting size. See diagram 1 for more details.
5. A ground terminal is provided. The ground wire should be connected before other connections are made.
6. The power contactor is equipped with lugs to accept the power supply wire. Copper wire must be rated at 600 V and 60° C for the heater branch circuit.
7. Each heater has a wiring diagram affixed to the inside of the access door. Consult diagram before making any field connections.
8. Single or three-phase power connections may be used with heater models marked -3MP. These units are factory wired for single phase operation. If these heaters are for use with three-phased power, reconnect the wires as indicated in the wiring diagram attached to the heater.
9. Adjust the louvers to the desired position before operation.

**Note:** KB ECO2S+ heaters come standard with the provisions to connect any 24V remote wall thermostat. The location of the 1/2" KO for the low voltage wiring is shown above (C). Refer to page 6 for more details on the of a 24V thermostat.

# KB EC02S+ INSTALLATION

## Installing the Ceiling/Wall Mounting Bracket

Heater can be installed in either a Ceiling Mount or Wall Mount orientation. Locate a stud in ceiling or wall and securely fasten L-shaped mounting bracket to supporting surface with at least 2 fasteners strong enough to hold unit at least 1-1/4" in length.

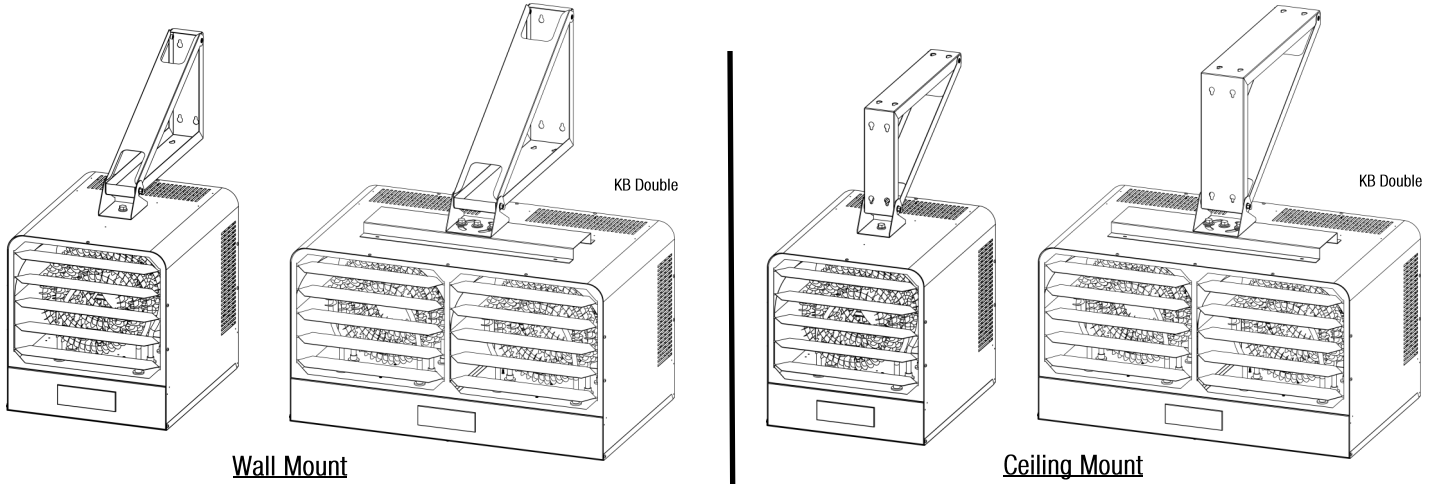
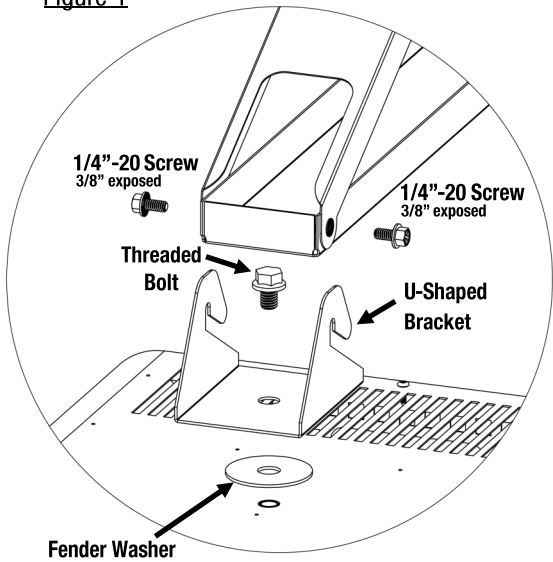


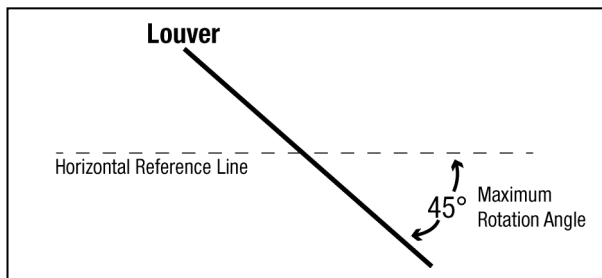
Figure 1



## Louver Adjustment: (Do not adjust while heater is operational):

The Heater is shipped with louvers in the closed position and must be opened prior to use. Confirm louvers are rotated less than 45 degrees from horizontal before operation. To adjust the opening angle, grasp the left and right end of louver and twist with two hands to the desired position. CAUTION: Increasing angle beyond 45° degrees from horizontal may restrict air flow causing over temperature limit to activate & shut off the heater.

### Louver Adjustment



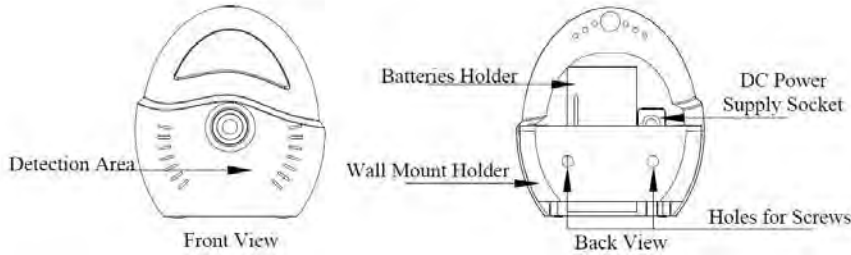
# SETUP OF REMOTE TEMPERATURE SENSOR

A wireless temperature sensor is provided to monitor the ambient temperature from any remote location. It needs to be paired with the heater and will transmit real-time temperature to the heater for highly accurate room temperature control.

## Sensor Placement

Important: Avoid areas that can have temperature extremes, making the sensor think the room is cooler or warmer than it actually is. Don't install the sensor near doors that could let in drafts, or on exterior walls or near windows in direct sunlight.

## Product Overview



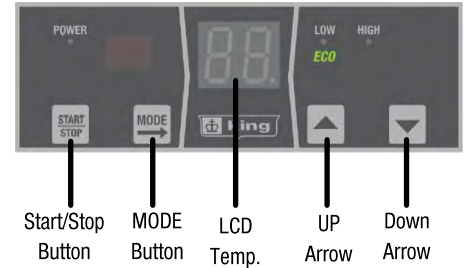
## ECO2S REMOTE SENSOR:

**IMPORTANT:** The remote sensor must be paired to the heater prior to use. If display shows "L5" the sensor has not been paired successfully. Repeat Pairing Process

## Technical Specifications:

Protocol: Wireless 2.4G  
 Transmit Distance: 98'  
 Working Voltage: DC 3V (battery);  
 Detecting Temperature: 0° to 99°

## ECO2S+ Control Panel



## Pairing and Installation Guide

Since it is possible that more than one heater/sensor would be used in a home, you must first pair the remote sensor to a specific heater. Each remote sensor has a unique ID number, which will be used in the pairing process. When installing the remote sensor first time, users need to pair the remote sensor with KB heater, so the heater can learn and save the remote sensor's ID.

**Step 1:** First, power off the remote sensor (remove the battery or unplug the adapter).

**Step 2:** On the Heater's Display Press  and  button at the same time for 5 seconds. The LED display will flash "id".

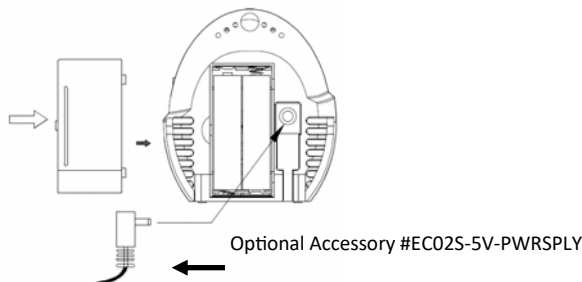
**Step 3:** Release buttons, put the remote sensor within 3 feet of the heater and power on the remote sensor again. The green LED light in the remote sensor will flash, and KB the controller display indicator lights will illuminate (LED tubes show 88) for 1 second and then turn off. This means the remote sensor and the controller have paired with each other successfully.

**NOTE:** If the KB display flashes "id" for 20 seconds and then turns off, it means that the heater failed to pair with the remote sensor and has exited the Pair mode. Repeat the above steps to pair the remote sensor.

**Step 4:** After pairing the remote sensor successfully, put the sensor in the room where you want to detect temperature. The KB heater display will display the temperature from the remote sensor.

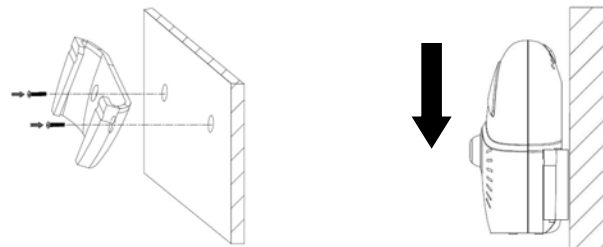
## Installing Batteries

Open the battery cover and insert 2pcs AAA batteries, reinstall the battery cover.



## Mounting The Remote Sensor

Sensor can be placed on any flat surface or can be fixed to the wall with the mounting bracket. **Mounting Bracket Install:** Select location for the sensor on the wall, Secure the bracket to with 2 appropriate anchors and screws. Insert remote sensor into bracket.



## Low Battery Indicator

When batteries are low, "BA" will flash on the ECO2S+ heater display to indicate batteries should be replaced. **Note:** If batteries fail, the ECO2S+ is designed to revert back to the onboard temperature sensor for temperature control until the batteries are replaced in the remote sensor.

## Low Signal Indicator

When the sensor is not paired with the heater or if the signal is being blocked, the display flashes "L5". After 10 minutes, the controller will automatically switch to work with the on-board temperature sensor, but the display will continue to flash "L5" until the signal restored.

1. Following Pairing process above to successfully pair the sensor.
2. Move Sensor closer to the heater or away from metal objects that might block the signal.

# CONNECTION OF OPTIONAL 24V REMOTE THERMOSTAT

## Controlling ECO2S+ with a Remote 24V Thermostat

KB ECO2S+ heaters come standard with the provisions to connect any 24V remote wall thermostat, for remote temperature sensing and control. Provides silent operation control for use with a 24 Volt Thermostat. Follow steps below for setup and to select Sigle Stage or Two Stage Control.

### Step 1:

Dip Switch Selection On Display For Remote Wall Thermostat—  
Local or Remote Thermostat (Figure 1)

The 2 dip switches on the back of the display are used for selecting between the onboard thermostat control and the optional remote wall thermostat control.

Set dip switch 1 to ON and dip switch 2 to the OFF position if using 24V Remote Wall Thermostat Control

### 24V Remote Wall Thermostat



Dip switch #1 = ON

Dip switch #2:  
Off = Remote 24V  
Thermostat Control

### Local Thermostat (default)



Dip switch #1 = OFF

Dip switch #2:  
On = Local Thermostat  
Control (default)

### Step 2:

Dip Switch Selection On Controller PCB—1-Stage or 2-Stage Thermostat (Figure 2)

Refer to the thermostat operating instructions to determine if the thermostat is a single stage or two stage thermostat.

Select the dip switch setting required.

For 2-Stage Heating > Dip Switch = OFF

For 1-Stage Heating > Dip Switch = ON

### Step 3:

Wiring 24V Remote Thermostat to KB Platinum (Figure 3)

Following thermostat manufacturer's instructions.

Figure 2: Controller PCB

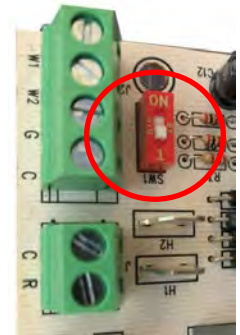


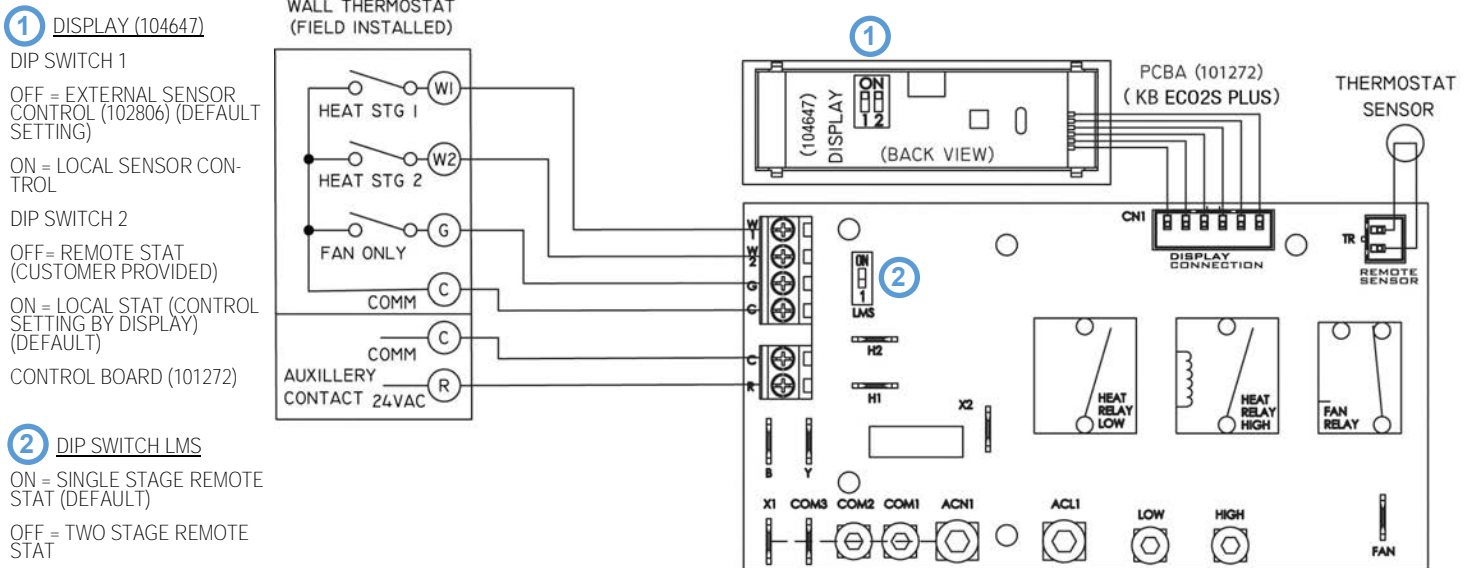
Figure 1: Back of Display



(dip switch factory default settings shown)

**IMPORTANT:** if display shows "L5" when using 24V remote thermostat switch Dip Switch #1 to ON.

Figure 3: Wiring Schematic Overview



# CONNECTION OF OPTIONAL NEST LEARNING THERMOSTAT



To connect a Nest Learning to ECO2S+, you will need to run multi-conductor thermostat wire between the Nest Thermostat and the ECO2S+ terminal board per the wiring diagram below. Thermostat wire is a class 2 power-limited circuit cable for use in thermostat control applications.

**Nest King ECO2S+**

- G ----- G, FAN ONLY
- W1 ----- W1, STAGE 1 HEAT
- W2 ----- W2, STAGE 2 HEAT
- RH ----- R, POWER (24VAC)
- C ----- C, COMMON

## Conventional 2 Stage Heating



**NOTES:**

- Y1, Y2, OB, RC, & (\*) are for Heat Pumps and Air Conditioning, NOT USED on KING HEATERS. The C wire keeps the Nest battery power charged.

# CONNECTION OF OPTIONAL NEST BASIC / E THERMOSTAT



To connect a Nest / Nest E Series to ECO2S+, you will need to run multi-conductor thermostat wire between the Nest Learning Thermostat and the ECO2S+ terminal board per the wiring diagram below. Thermostat wire is a class 2 power-limited circuit cable for use in thermostat control applications.

**Nest King ECO2S+**

- G ----- G, FAN ONLY
- W1 ----- W1, STAGE 1 HEAT
- \*OB ----- W2, STAGE 2 HEAT
- R ----- R, POWER (24VAC)
- C ----- C, COMMON

## Conventional 2 Stage Heating

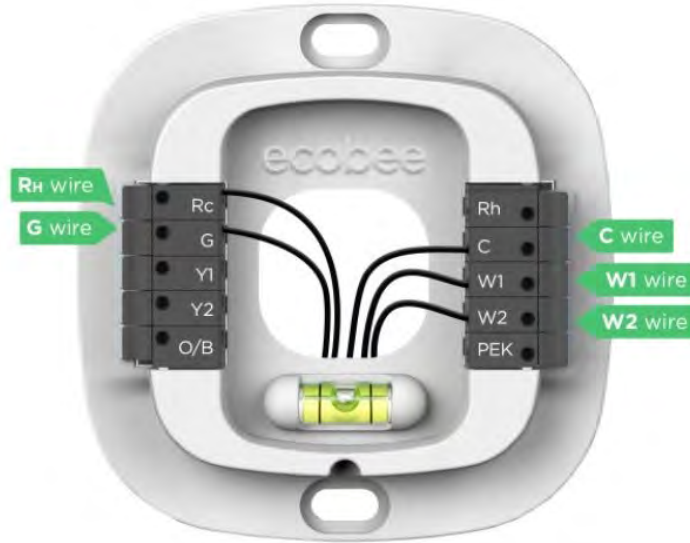


## CONNECTION OF OPTIONAL ECOBEE THERMOSTAT



To connect a Ecobee to ECO2S+, you will need to run multi-conductor thermostat wire between Ecobee Thermostat and the ECO2S+ terminal board per the wiring diagram below. Thermostat wire is a class 2 power-limited circuit cable for use in thermostat control applications.

### Conventional 2 Stage Heating



#### Ecobee King ECO2S+

- G ----- G, FAN ONLY
- W1 ----- W1, STAGE 1 HEAT
- W2 ----- W2, STAGE 2 HEAT
- RC ----- R, POWER (24VAC)
- C ----- C, COMMON

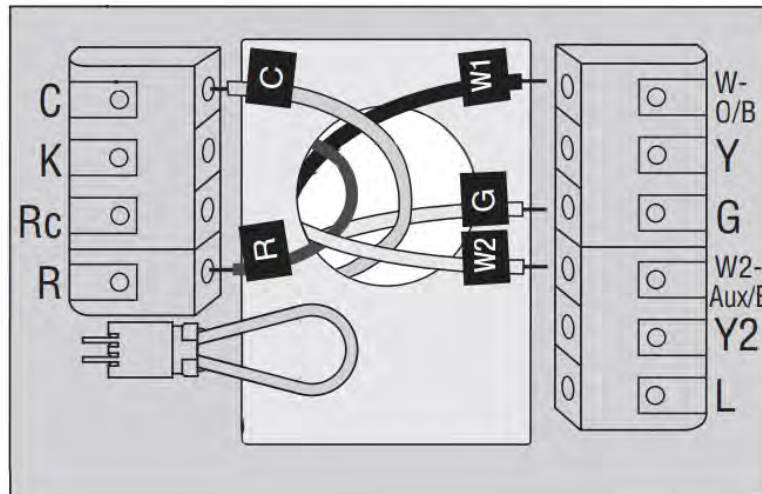
## CONNECTION OF OPTIONAL HONEYWELL THERMOSTAT



Model: RTH9585WF1004

To connect a Honeywell model RTH9585WF1004 to ECO2S+, you will need to run multi-conductor thermostat wire between the Honeywell Thermostat and the ECO2S+ terminal board per the wiring diagram below. Thermostat wire is a class 2 power-limited circuit cable for use in thermostat control applications.

### Conventional 2 Stage Heating



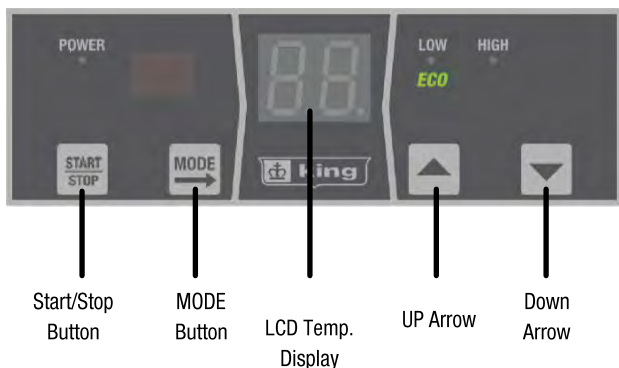
#### Honeywell King ECO2S+

- G -----G, FAN ONLY
- W-O/B ----- W1, STAGE 1 HEAT
- W2-Aux/E --- W2, STAGE 2 HEAT
- R ----- R, POWER (24VAC)
- C ----- C, COMMON



# ECO2S+ OPERATING INSTRUCTIONS

ECO2S+ Control Panel



Infrared Remote Control

## Operating Instructions

1. Push the button, the heater will come on and heat to the default setting of 72°F.
2. Once the room temperature reaches the set point, heat elements will turn off followed by a 3 minute fan delay period to exhaust excess heat from the case. Afterwards the unit will turn off.
3. In normal operation the display will show the current room temperature.

## Room Temperature Selection

- During operation, push or arrow buttons to set the temperature from 40°F-99°F, Hold down the UP or DOWN arrow to speed up the selection process. The LCD will go back to display room temperature after 5 seconds.

## Timer Mode Selection

- During operation, press the button 1 time, the display window will show the timer mode setup. Push the UP or DOWN arrows to set the timer from 1 hour—9 hours.

## Fan Only Mode Selection

- During operation, press the button 2 times, the display window will show [ H ] (Heat Mode) or [ F ] (Fan Only Mode). Push or to switch between Fan Only & Heat modes.

## Display Lock Feature

Display Lock is designed for high traffic areas and deactivates the heater display buttons to prevent unwanted temperature adjustments. However settings can still be adjusted through the remote control.

- During operation, press the and HOLD for 5 seconds to set

the display lock. [ L ] will appear on the display temporarily if a user attempts to make a temperature adjustment. While in Display Lock, heater can be adjusted using remote control.

## Setting “Environment” Mode

Two Environment Options: Standard [ SF ] and Bedroom [ BE ].

Bedroom Mode turns off the display after 30 seconds for people using this heater in a light sensitive environment. Once any button is pressed the display turns back on.

- During operation, press the and HOLD the and buttons for 3 seconds. Then press or to select “Bedroom Mode” [ BE ] or “Standard Mode” [ SF ]

## Factory Reset

During operation, press the and HOLD for 5 seconds to reset to the factory settings.

## Sensor Error Code

- During operation, if the display shows [E1] that indicates an issue with the sensor. The sensor connector may have come loose from the control board. Open the wiring compartment and reseal the sensor onto the control board. Or it may be possible the sensor needs to be replaced. Contact customer support for assistance.

## Setting Differential Value

The differential or gap affects how often the heater cycles. The lower the differential setting, the more the heater will cycle. If heater cycles too often, raise the differential setting to a higher degree.

Press the and HOLD the and buttons for 5 seconds. The display will show the previously set differential. Press UP or DOWN to adjust the differential value between -0 to -5.

## SMART LIMIT PROTECTION AND MAINTENANCE



### Heater Safety Limit Tripped?

This heater is equipped with a thermal overload Smart Limit Protection which disconnects elements and motor in the event normal operating

temperatures are exceeded. If thermal overload trips due to abnormal operating temperatures, thermal overload shall remain open until manually reset by turning the heater OFF for fifteen minutes. Inspect for any objects on or adjacent to the heater that may cause high temperatures. After inspecting the heater, keep the power to the heater off for 15 minutes to reset the SLP thermal protector. If the SLP thermal protector shuts the heater off again, immediately turn the heater OFF at the circuit breaker and inspect the heater for possible fan motor failure or dirt and lint on the heating element. Repeat the starting procedure.

DO NOT TAMPER OR REMOVE THIS THIS DEVICE

### Maintenance

With proper care your electric heater should last a lifetime, however, seasonal cleaning is recommended to maintain the efficiency of the heater. Keep heating element, fan and motor free of debris. Use compressed air to blow out any debris.

### We're Here to Help!

For any difficulties installing or operating this product

Call Us Toll Free at:

**1-800-603-5464**

7:00 am -3:30 pm PST Mon-Fri

Visit [king-electric.com](http://king-electric.com)

or email us at [tech@king-electric.com](mailto:tech@king-electric.com)



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Every install is unique, and we'd love to share with others.  
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