

GENERAL INFORMATION



ESP-230 & ESP-120

with battery program back-up

includes Comfort Color™ models



DANGER

ELECTRIC SHOCK OR FIRE HAZARD

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

LEAVE THESE INSTRUCTIONS WITH HOME OWNER

GENERAL INFORMATION:

This thermostat is designed to provide the highest level of accurate temperature control for residential line voltage electric heating in 120 or 208/240 Volt. Almost all electric heaters installed as original equipment in a residential application will be 208 or 240 Volt. It is very rare that a home, apartment or condominium would be wired with all 120 Volt heaters. Check your voltage to make sure you have the right thermostat for your heater voltage. A 2-pole, or double wide circuit breaker, at the panel would indicate you should use the 240 Volt model. A single pole, or single wide breaker, would indicate a 120 Volt circuit. There are some exceptions to this rule so checking with a voltmeter is the only way to know for sure.

Be safe and smart, electricity can cause severe injury or death. If you are uncomfortable hire an electrician for the project.

The thermostat will provide years of comfort control for your family for small fan driven electric heaters, baseboards, radiant ceiling, wall panel heaters, cove heaters, or any line voltage resistance heating systems that do not have an electric motor over 1/3 hp. The thermostat will be warm to the touch on top. This is normal operation and also provides air currents across the face of the thermostat that better help it sense room temperature.

OPERATION:

This precision electronic thermostat will sense the room air at the bottom of the thermostat by a thermistor. This very sensitive sensor will send information to the microprocessor. As the temperature drops, the information it sends will indicate if heat is needed. To reduce any undesirable fast on/off cycles the processor has a built in 3 minute delay. This will save energy and provide the best control of a space. This thermostat does not require batteries and will have a default setting of 68°F when powered up. Temperature is easily changed by tapping the ARROW keys ▼ or ▲ on the front of the thermostat. Up ▲ arrow increases temperature and ▼ down arrow reduces temperature. Backlighting is provided on some models and can be turned off or on by a small switch under the left corner of the thermostat. This will allow you to see the thermostat in low light or at night. A system On/Off switch is located under the lower right corner to disable the thermostat. This will not disconnect all the power to the heater. To perform maintenance on the heater you need to turn the circuit breaker at the circuit breaker panel off.

INSTALLATION:

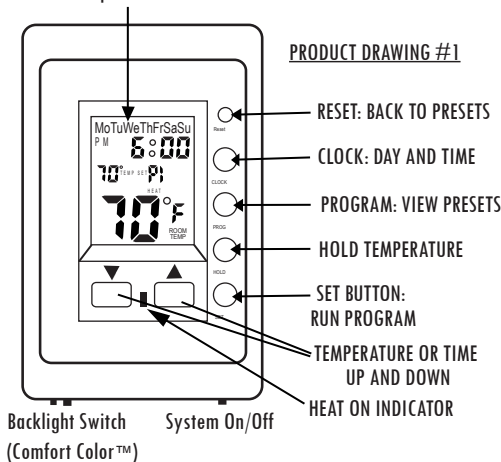
This line voltage device should be installed and serviced by a qualified electrician. The thermostat has been designed to mount to a standard 2" x 4" electrical outlet box (King recommends a 22 cubic inch electric box). Leveling of the thermostat is not required. Mounting screws are provided. Mount the thermostat about five feet above the floor in an open area. A good rule of thumb is to place the thermostat above the light switch for that room. This works well for most bedrooms and makes it very convenient to turn the heat lower when leaving the room. Avoid mounting the thermostat where there may be plumbing pipes in the wall, or placing a lamp or TV too close to the thermostat. The heat from these items affects the thermostat's performance.

COMFORT COLOR™ BACKLIGHT DISPLAY:

At 65°F the backlight will be blue, 75°F red, at 70°F it will have a purple color. The display will vary in color depending on room temperature.

Due to internally generated heat and an offset to compensate for this, the display temperature of the thermostat may not match a digital thermometer placed next to it or in the same room. This thermostat will keep very accurate control of room temperature. Set it to what feels comfortable, not the temperature you were used to with your old thermostat.

UNIQUE TO KING: ESP models come equipped with the new Comfort Color™ Screen that changes from blue to red as room temperature rises!



SPECIFICATIONS: ESP 230 & 120

Temperature range: 44° to 95°F
 Temperature Default: Your setting
 Display Format: Liquid Crystal Display (LCD)
 Display size: Large format
 Sample Rate: Every 60 seconds
 Delay on or off: 3 minutes
 Illumination: 2-color blue to red gradient
 Heat Indicator: Red LED
 Relay Rating: 30 Amps before de-rating
 Accuracy: ±.9° F (.5°C)
 Maximum Amps: 22 resistive continuous
 Maximum Watts: 5280 (ESP-230)
 2640 (ESP-120)
 Minimum Watts: 0
 Power Supply: 120 Volt (ESP-120)
 208/240 Volt (ESP-230)
 System On/Off Switch
 Battery Program Backup

INSTALLATION AND MAINTENANCE



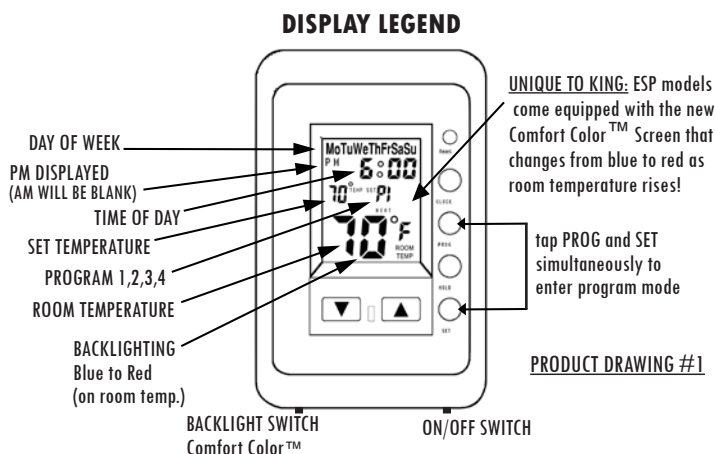
ESP-230 & ESP-120 with battery program back-up



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REPLACES MODELS:

CALV / T4800 /
T4700 / T4600 /
1A66 / D22 /
S22 / M602 /
T498 / T4398 /
MD26 / WR661 /
1D22 / S2022 /
TW242 / TD902 /
T410 / TD942 /
M7 / M402 /
M512 / 1A65



WARNING

READ CAREFULLY - These instructions are written to help prevent difficulties that might arise during installation of thermostat. Studying the instructions first may save you considerable time and money later. Observing the following procedures will cut your installation time to a minimum. Save these instructions for future use.

Thank you for buying this King Thermostat. It should provide years of service and comfort to your home. Inspect the package. You should have received the thermostat with its cover and two screws to attach it to a wallbox.

1. Check the total load of the heaters being connected to the thermostat. The maximum wattage at 240 Volt is 5280 Watts (ESP230). If you have the 120 Volt version the maximum is 2640 Watts (ESP120). You need to stay below this total wattage connected to the thermostat. The lower the wattage the longer the life of the contacts in the relay.
2. To wire the thermostat determine which pair of wires are coming from the circuit breaker panel and which pair lead to the heater.
3. With wire nuts attach the blue wire (white wire on 120 Volt model ESP120) into the pair of white wires in the junction box. (Option is red wires)
4. Use black lead from the circuit breaker panel and attach it to the black lead on the thermostat. This will provide power to the thermostat, LCD display and backlight.
5. Attach black lead going to the heater to the red lead on the thermostat. This will provide power to the heater when the thermostat calls for heat.
6. Remove thermostat cover by holding back of thermostat with one hand and grasp the top and bottom of the cover with the other hand, pulling towards you evenly.
7. Push the wires carefully into the junction box making sure no wires will be pinched when attaching to the wall using #6-32 screws provided.
8. Holding thermostat into wallbox, fasten screws at the top and bottom mounting holes attaching to wallbox. Do not over tighten screws.
9. Turn on power to test. Increase set point to higher than current room temperature by tapping the up button. There will be up to a 3 minute delay in turning on. The red indicator will turn on and you will hear a small click as the heater energizes. Turn the thermostat down by tapping the down arrow.
10. **To turn on backlighting:** Under the bottom left of the thermostat you will feel a small switch. Moving one way will turn on the light and the other will turn off the backlight. The On / Off switch is located on the lower right corner to disable any operation. You have now verified the thermostat is in perfect working order. The display will vary in color from blue to red depending on room temperature.
11. **Mounting tips:** Make sure there is nothing that could affect the average room temperature sensing of the thermostat such as plumbing pipes in the wall, a lamp close by, direct sunlight, a T.V. set, and/or cold drafts from a door opening.
12. **Cleaning:** A damp cloth will clean the plastic case surface of fingerprints and dust. Strong spray cleaners may damage plastic case, remove writing or arrows printed on case. Blow out any dust that may accumulate on air vents on top or bottom. Good air circulation is key to long life and accurate operation.
13. **Humid locations:** Mildly humid locations like bathrooms may see a reduced life due to corrosion on the contact and lint from towels getting into air vents on thermostat. Blow out vent regularly and mount thermostat away from shower locations for longer life.
14. **Power outages:** The internal battery program backup will hold all or your settings. These batteries are constantly charged and should never need to be replaced.

WIRING INSTRUCTIONS



ESP-230 & ESP-120 with battery program back-up

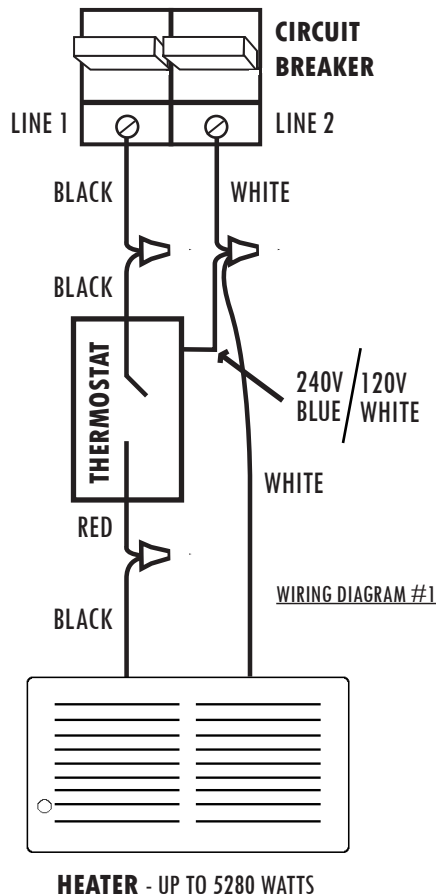
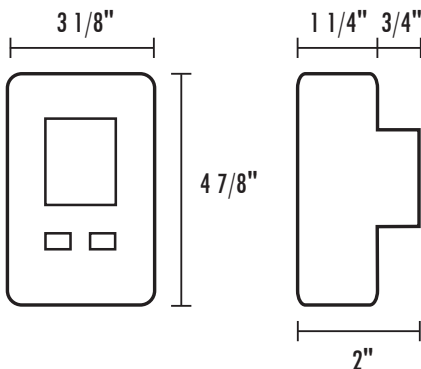


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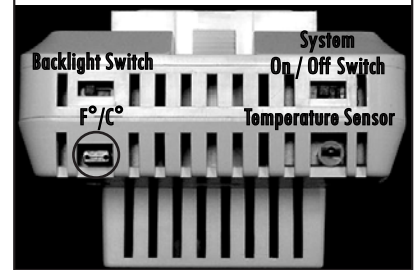
DIMENSIONS:



DISPLAY CHANGE

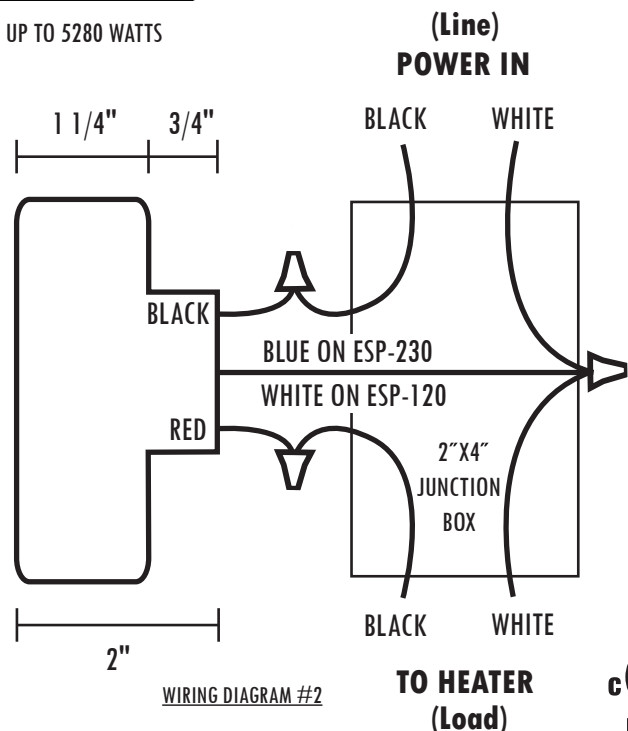
Fahrenheit to Celsius:

On the bottom edge of the thermostat, there are air vents. In one of the vents on the left side, just behind the illumination switch, there is a larger opening with a pin collector attached. With needle nose pliers, pull the connector off. This will put the thermostat into the metric Celsius mode. Turning off power to stat completes reset.



BACKLIGHT SWITCH: Comfort Color™ (blue to red)

1. To wire the thermostat determine which pair of wires are coming from the breaker panel and which pair lead to the heater.
2. With wire nuts attach the blue wire (white wire on 120 Volt model ESP120) into the pair of white wires in the junction box.
3. Take a black lead from the circuit breaker panel and attach it to the black lead on the thermostat. This will provide power to the thermostat, LCD display, backlighting and heater relay.
4. Take the black lead that goes to the heater and attach it to the red lead on the thermostat. This will provide power to the heater when the thermostat calls for heat.
5. Remove cover of thermostat by holding back of thermostat and, with a finger and thumb on the top and bottom of the thermostat, pull cover towards you evenly to remove cover and expose mounting holes and buttons.
6. Push the wires carefully into the junction box making sure no wires are pinched or will get in the way of the screws mounting the thermostat. Now attach the thermostat to the wallbox with the #6-32 screws provided.
7. Hold thermostat into wallbox and place screws in top and bottom mounting hole and attach to wallbox.
8. Turn on power and test by increasing set point to higher than room temperature by tapping the up button. There will be up to a 3 minute delay in turning on. The indicator light will turn on and you will here a small click and at the same time and the heater should be on. Turn the thermostat down by tapping on the down arrow.



Due to internally generated heat and an offset to compensate for this, the display temperature of the thermostat may not match a digital thermometer placed next to it or in the same room. This thermostat will keep very accurate control of room temperature. Set it to what feels comfortable, not the temperature you were used to with your old thermostat.





ESP-230 PROGRAMMING INSTRUCTIONS

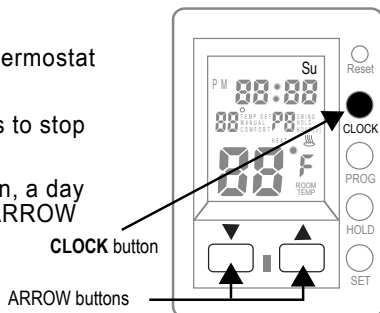
With Battery Program Backup



1 Set Date

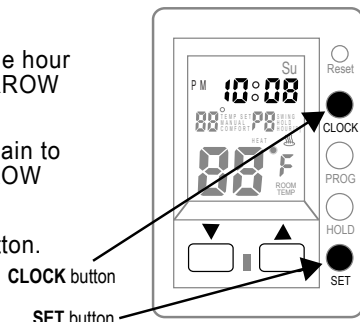
Upon initial power-up, the thermostat will be flashing.

- Press the ARROW buttons to stop flashing.
- Press the "CLOCK" button, a day will flash, then press the ARROW buttons to set today's day.



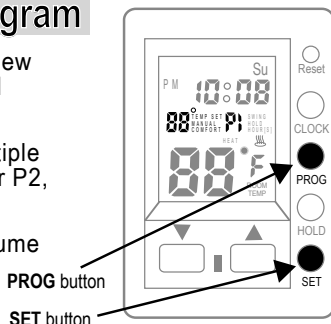
2 Set Time

- Press the CLOCK button, the hour will flash, then press the ARROW buttons to set the hour.
- Press the CLOCK button again to set the minute with the ARROW buttons.
- To exit, press the "SET" button.



3a View Current Program

- Press the "PROG" button to view the P1 temperature or Preset 1 setting for that day.
- Press the "PROG" button multiple times to scroll thru presents for P2, P3, and P4.
- Press the "SET" button to resume normal operation.



3b Energy Saving Schedule

- P1 Morning wake-up program
 P2 Daily away from home program
 P3 Evening home program
 P4 Nightly sleep program

default schedule

Program	Temp.	Mo-Su
P1	70°	6:00am
P2	62°	8:00am
P3	70°	6:00pm
P4	62°	10:00pm

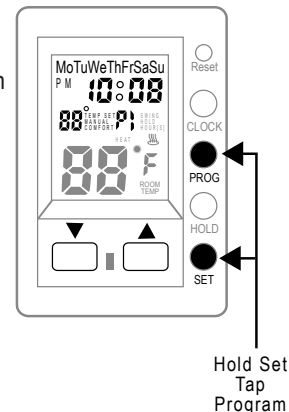
Before programming fill out chart below

your customized schedule

Program	Temp.	Mo	Tu	We	Th	Fr	Sa	Su
P1								
P2								
P3								
P4								

4 Program Adjustments

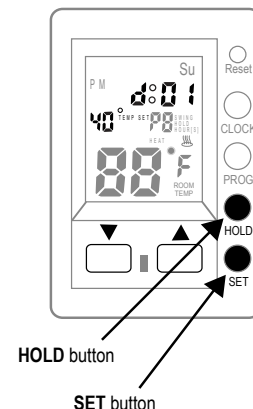
- Press the "SET" button and tap the "PROG" button quickly and release both buttons. This puts you into Program mode and the days will be flashing.
- Press the ARROW buttons to select all seven days or one at a time.
- Press the "PROG" button to highlight the time.
- Press the ARROW buttons to adjust time.
- Press the "PROG" button again to set the temperature for that specified time.
- Repeat these steps for all Presets: P1, P2, P3, and P4.
- When you reach P1 again, press one of the ARROW buttons to change the day and repeat Programming.
- For P2, P3, & P4 if all the days are identical for that temperature, select all seven days for that P number.
- Press the "SET" button to resume normal operation.



5 Vacation Hold

For extended days of absence:

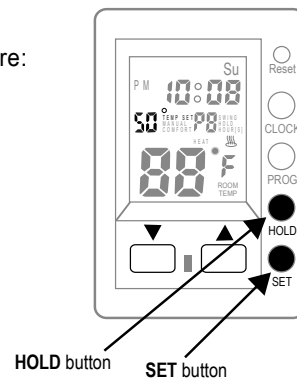
- Press the ARROW buttons to set temperature.
- Press the "HOLD" button until d:01 displays in the time window.
- Press the ARROW buttons until your number of days on vacation is displayed. Up to 99 days can be programmed.
- To stop vacation hold press "SET" button and normal operation is resumed.



6 Permanent Hold

To permanently hold the temperature:

- Press "HOLD" button.
- Press ARROW buttons to set temperature.
- To stop permanent hold press "SET" button and normal operation is resumed.



When looking at the bottom of the unit the switches are as follows:

- upper left: backlight
- upper right: system on/off
- lower right: temperature sensor