



**D21-TSSR**  
**(PCB color blue)**  
**(FW THF-2109 and newer)**

**Safety features:**

1- SSR+ output is short protected, short current 60mA max.

2- Low air-flow modulation/shut-off:

If the heater's air-flow sensor senses a temperature higher than 44°C (111°F) threshold, the output's pulse width will be reduced from the actual down to zero (at approximately 51°C threshold), proportionally by the sensor's temperature.

In this mode the yellow (or red) warning light is continuously ON. (44°C-51°C D21-PS like). Accuracy:  $\pm 2^{\circ}\text{C}$  ( $\pm 4^{\circ}\text{F}$ ).

**Shorted or broken Air-Flow sensor detection:**

If the air-flow sensing Thermistor connection (A-A) of the D21-TSSR controller is shorted, or open, the controller will disable SSR/Elements and go into a 60 second warning timer.

While in this 60 second counting, the yellow (or red) light begins to quickly blink indicating this warning mode.

If a normal air-flow condition is detected again within that 60 seconds, the controller goes back to normal operation and the yellow (or red) light turns OFF.

If the normal air-flow condition does NOT come back within the 60 second timeframe, the yellow (or red) Warning LED light begins to flash with a pattern of 1-second ON and 2-seconds OFF, and the controller switches off the SSR output (i.e. lockdown).

To cancel: fix the short or open air-flow sensor connection, and then turn the controller's power OFF and then ON.

### **Useful diagnostic/ testing process:**

To force **FULL** power to the elements to verify the load current, operation etc. without requiring thermostat control.

1. Turn the Power ON.
2. Remove one of the air-flow connections. The yellow (or red) light begins to blink quickly.
3. Short together the air-flow sensor connections (A-A) momentarily for 2-seconds. The program goes to a “Diagnose Heater” process.

The Yellow (or red) light keeps blinking.

The heater instantly turns Full ON, regardless of the potentiometer temperature setting.

After 1 minute with Full ON, the controller turns OFF the elements and the yellow (or red) warning LED light flashes with a pattern of 1-second ON and 2-seconds OFF.

4. To put to normal operation: Remove the short, connect back the air-flow sensor and then turn controller's power off and on (to reset).

**Some important notes:**

- **LOW**: -15°C (5°F) to 27°C (80.6°F)
- **STD**: 14°C (57.2°F) to 55°C (131°F)
- Range switch is underneath the board as per diagram.

