

# SunStat Dial Dial Thermostat Model 500710

## Owner's Manual

Your new **SunStat Dial thermostat** is designed to control the voltage to either a 120VAC or 240VAC resistive floor warming system.

Please follow this manual for complete installation and operation instructions. If you have any questions or comments, try calling Technical Support at 1-800-276-2419.

**CAUTION:** Make sure you are qualified and are familiar with house wiring. This is a line voltage device that could cause serious injury or damage if improperly installed.

## 1. Preparation

1. Unpack your thermostat and make sure everything is in good condition:

- **Thermostat**
- **Floor sensor**
- **Small screwdriver**
- **Mounting screws**
- **Wire nuts for wiring connections**

If any parts are missing or damaged, contact the store where you purchased this thermostat. Do not install a damaged part.

2. Gather the following tools and supplies:

- Phillips screwdriver, hole saw
- Wire strippers, "fish tape", other electrical tools
- Electrical box for thermostat:
  - a. If you are connecting to power leads from only 1 or 2 floor warming systems, you may use a single-gang, 3½ inch deep box.
  - b. If you are connecting to power leads from 2 or 3 floor warming systems, use a 4x4x2½ inch or deeper box (not a 2-gang box) when your wall studs are still exposed. Install a single-gang "mud-ring" cover on the box before installing drywall materials.
  - c. For more than 3 floor warming systems or other layouts, you may need to install a junction box. See the installation instructions for your floor warming system for more information.

**ALWAYS:** Wire all circuits as Class 1, Electric Light and Power Circuits.

**ALWAYS:** Wire all circuits with insulation rated 600V minimum.

**ALWAYS:** Mount this control only to a grounded metallic box or a nonmetallic box.

**ALWAYS:** Use power supply wires suitable for at least 90°C.

**CAUTION:** High voltage – disconnect power supply before servicing.

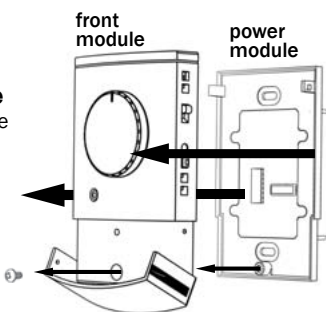
**CAUTION:** The GFCI in this control does not protect against shock if both bare conductors are touched at the same time.

## 2. Installation

### Remove the Thermostat Face

1. Remove the thermostat Front Module from the Power Module by opening the door and loosening the screw.

2. Pull outward near the bottom on the Front Module and lift off. Be careful not to bend or damage the 14-pin electrical connector on the back of the Front Module. bottom on the Front Module and lift off.



### Prepare the Wiring

1. Find a location for your thermostat. It is suitable for indoor use only, on insulated or uninsulated walls. Locate it about 4½ feet to 5 feet above the floor on an inside wall. Make sure it is well ventilated and not located in a confined space such as a small closet or cabinet. Avoid placing it near other heat sources such as hot-water piping, heat duct, wall-mount lighting, and direct sunlight to help prevent adversely affecting the thermostat.

2. Turn off the power to the floor warming system at the main circuit panel before doing any electrical work.

3. A qualified electrician should run a dedicated circuit from the main circuit panel to the thermostat location.

4. If a dedicated circuit is not possible, you may tap from another circuit in the room. Make sure there is enough load capacity (amps) to handle the addition

of your floor warming system, and that it is NOT wired in series with any other device, including other GFCIs.

5. The circuit breaker in the main circuit panel should be 15 amps maximum for a floor warming system totaling 12 amps or less. For larger systems up to 15 amps, use a 20 amp maximum circuit breaker. Never exceed 15 amps on this thermostat. You may consider using an arc-fault (AFCI) type circuit breaker for additional protection.

6. Pull the power supply wiring into this box, leaving about 6 inches of wire.

7. Pull the floor sensor wire and the power lead wires from your floor warming system up the wall, into this box. Refer to your floor warming system installation instructions for placement of the floor sensor tip into the floor area.

**Note:** The sensor wires should not be run in the same conduit as line voltage wires to avoid possible interference. If the sensor lead wires are not long enough, they may be extended an additional 15 feet (4.5 m) using minimum 20-gage 2-conductor wire or up to 50 feet (15 m) using shielded wire.

8. Mount the electrical box.

### Connect Wires

1. Match and connect the two wires marked "LINE1" and "LINE2" to the power supply wires using the wire nuts provided.

2. Gently tug on the wires to make sure they are secure, otherwise a wire could loosen and cause failure.

3. Overwrap the wire nuts with electrical tape to better secure them to the wires.

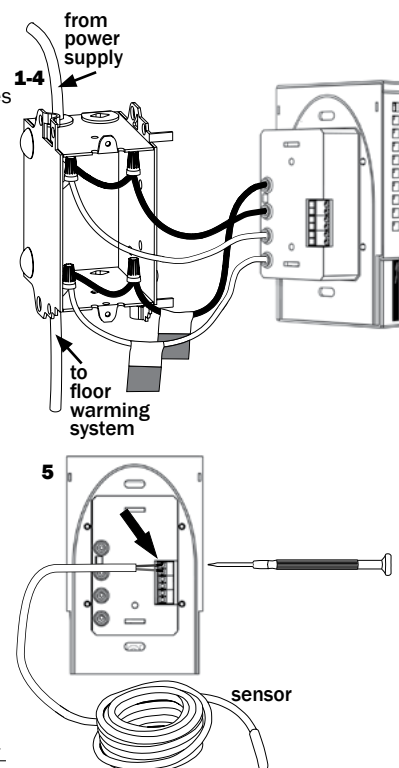
4. Match and connect the two wires marked "LOAD1" and "LOAD2" to the floor warming system lead wires and secure these wires the same way.

5. Connect the house ground wire to the green or bare lead wire(s) of your floor warming system.

6. Insert the ends of the floor sensor wire into the "SENSOR" terminals (1 and 2) and tighten the screws. There is no polarity, so it does not matter which wire end goes into which terminal.

**CAUTION:** Before continuing, make sure your power supply voltage matches the voltage rating of your floor warming system.

Connecting 240V to a 120V floor warming system will cause overheating and damage to the system and may damage the control, other wiring, floor coverings, etc.



### SunStat Relays

1. If you want to use your thermostat to drive a SunStat Relay(s) (ask your dealer about this convenient way to control larger systems with one thermostat), first read and follow the instructions for the SunStat Relay thoroughly.

2. Pull 2-conductor wire, size 18- to 24-gage, through the wall from the SunStat Relay, into this electrical box. This wire may be up to 100 feet (30 m) in length from the thermostat to the last SunStat Relay installed.

3. Connect the wire ends into the "RELOUT" terminals (3 and 4) and tighten the screws (Observe polarity of the wires when connecting to the SunStat Relay).

### Mount the Thermostat

1. Carefully fold and press the wires back into the electrical box. Do not use the thermostat to push them in, as this may cause connections to loosen and possible failure.

2. Secure the thermostat Power Module into the box with the mounting screws provided.

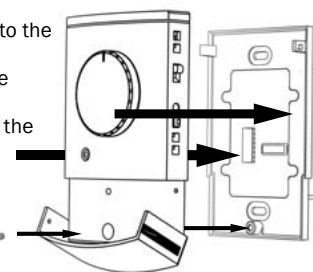
3. Carefully snap the Front Module onto the Power Module. Be careful not to bend or damage the 14-pin electrical connector on the back of the Front Module.

4. Tighten the screw.

5. Switch on the power at the main circuit panel.

**NOTE to contractors:** After installing the thermostat, be sure to:

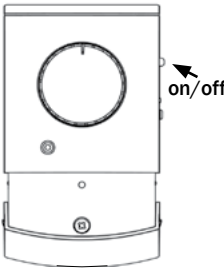
- a. Switch on the thermostat and turn up the temperature to make sure it is heating for a few minutes (section 3)
- b. Test the GFCI (section 3).



3. Operation

On/Off Switch

- 1. Slide the on/off switch to the upper position, turning the thermostat on. A green light will show on the front indicating the thermostat is turned on. If the light is amber, it indicates power is applied to the floor warming system.
- 2. To turn the thermostat off anytime, slide the on/off switch to the lower position. No heating will occur.



Adjust the Temperature

- 1. Turn the dial clockwise to increase the floor temperature. The light on the front will be amber when power is applied to the floor warming system.
- 2. Turn the dial counterclockwise to decrease the floor temperature.

Air or Floor Sensing

During installation, your thermostat should have been connected to a floor sensor to be embedded with the floor warming system. This is the recommended method to properly control the system.

However, if the floor sensor was not connected or was damaged, the thermostat will sense the air temperature instead, becoming an air thermostat. A new floor sensor should be installed to enable operation in Floor Sense Mode as soon as possible. The air sense mode must be used with caution to avoid overheating the floor.

Test the GFCI

There is a GFCI (Ground Fault Circuit Interrupter) inside the thermostat. It is designed to help protect people from possible electrical shock if the floor warming system has been damaged.

To make sure the GFCI is operating, test it after it is installed and once each month:

- 1. Make sure the thermostat is **HEATING**. You may need to increase the temperature temporarily.
- 2. Press the GFCI Test button on the side of the thermostat. A red light should show next to the GFCI Test button. You should also hear a click, indicating power has been removed from the floor warming system. If any of these indicators fail, turn off the thermostat and replace it. Do not continue to use.
- 3. To reset the GFCI, slide the On/Off switch off and back on. If the GFCI does not reset, turn the thermostat off and go to section 4 **“Troubleshooting”** for help.

4. Troubleshooting

Problem	Solution
Thermostat works but no heat from the system.	1. Check wiring connections. 2. If GFCI is tripped, reset thermostat with on/off switch. 3. Check resistances on floor warming system. See manual for system.
No lights showing.	1. Check wiring connections. 2. Check circuit breaker or other protection “upstream” of thermostat. 3. Check the 14-pin connection on the back of the Front Module. Sometimes the pins can become misaligned when connecting the Front Module to the Power Module.
GFCI is tripped.	1. Check wiring connections. 2. Reset thermostat by switching off/on. 3. Check resistances on floor warming system. See manual for system.
Right light blinking on front of thermostat.	> 1s on / 1s off : floor sensor fault. Check connections, replace floor sensor, or disconnect floor sensor and use air sensing. > 0.5s on / 0.5s off : air sensor fault. Connect floor sensor, or replace thermostat. > 0.1s on / 0.1s off : “End-of-life” indication. GFCI will no longer function correctly or safely. Reset the circuit breaker or replace Relay.

5. Specifications

Power Supply	120/240 VAC, 50/60 Hz
Maximum Load	15 amps, resistive
Maximum Power	1800 watts at 120 VAC 3600 watts at 240 VAC
GFCI	Class A (5 milliamp trip)
Setting Range	40 °F to 99 °F (4 °C to 37 °C)
Accuracy	± 0.9 °F (0.5 °C)
Sensor	Thermistor, 10k NTC, double-insulated
Storage Temp	0 °F to 120 °F (0 °C to 49 °C)
ETL Listing	Control No. 3037530 Conforms to UL 873, UL 943, CSA C22.2 No. 24, and CAN/CSA C22.2 No. 144



Limited Warranty

Watts Radiant, Inc. warrants this thermostat control and sensor (the product) to be free from defects in material and workmanship for a period of (2) years from the date of original purchase from authorized dealers. During this period, Watts Radiant, Inc. will replace the product or refund the original cost of the product at Watts Radiant’s option, without charge, if the product is proven defective in normal use. Please return the thermostat to your distributor to begin the warranty process.

This limited warranty does not cover shipping costs. Nor does it cover a product subjected to misuse or accidental damage. This warranty does not cover the cost of installation, diagnosis, removal or reinstallation, or any material costs or loss of use. This limited warranty is in lieu of all other warranties, obligations, or liabilities expressed or implied by the company. In no event shall Watts Radiant, Inc. be liable for consequential or incidental damages resulting from installation of this product. Some states or provinces do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from state to state.