Troubleshooting for the GFCI thermostat.

Type of error	Possible cause	Activity / action
E0 error in the display	Internal failure	The thermostat must be replaced
E1 error in the display	Internal "built-in" sensor short-circuited or defective	The thermostat must be replaced
E2 error in the display	External sensor is short-circuited, disconnected or defective.	Check the external sensor: - Make sure the sensor cable is correctly connected to the thermostat. - Disconnect the sensor to measure the resistance, Ohm value (please see characteristics below for our 12kOhm sensor) - Replace the sensor if faulty.
E5 error in the display	Overheating of the thermostat	The thermostat must be replaced

NTC-12k sensor Characteristic
Type: ETF-22/33/44/55/99

Sensor, temp. range -30℃ to +125℃
Sensor, temp. range -22℉ to + 257℉
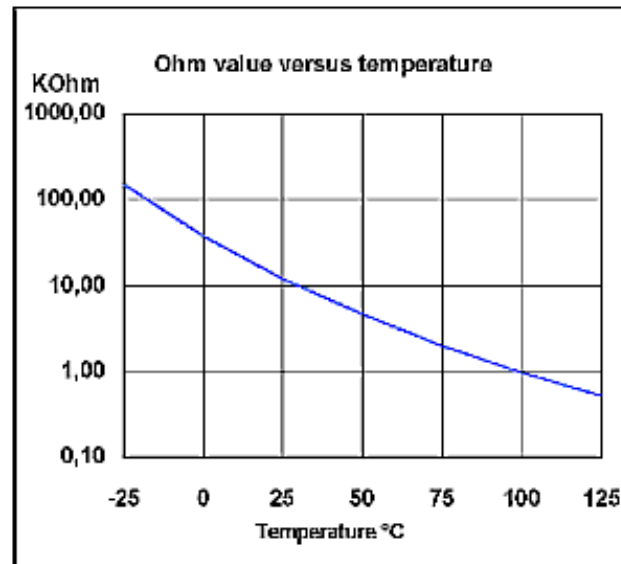
Wide application range, commonly used for normal ambient temperatures.

Precision
 +/- 5% Ohms at 25℃, equal to +/-1,2℃
+/- 5% Ohms at 77℉, equal to +/- 3,8℉

RTemp at 25℃ (77℉) = 12 kOhm.

Ohm value versus temperature

Temp ℃	Ohm	Temp ℉
17	16974	62,6
19	15537	66,2
21	14238	69,8
23	13064	73,4
25	12000	77,0
27	11035	80,6
29	10159	84,2
31	9363	87,8
33	8639	91,4
35	7978	95,0

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Troubleshooting for the GFCI thermostat.

| Type of error	Possible cause	Activity / action
The LED light is RED, (GFCI trips)	Ground-Fault The thermostat has a built-in GFCI that ensures personal safety in case of ground fault. Your electrical installer can measure your system to find the fault / leak to ground.	- Press RESET. - If this causes the red light to go off and stay off, it was nuisance tripping and the system is operating correctly. - If the red light stays on, there is a ground fault - Please contact your electrical installer.
	Ground-Fault Your heat mat (heating cable) or installation between thermostat and heat mat (heating cable) has a fail current to ground.	- Make sure that the floor of concrete is dry - If the fault continues after the concrete is dry, there is a ground fault. - Please contact your electrical installer.
	Ground-Fault Fault / Leak in the sensor	- Replace the sensor - If the red light stays on, there is a ground fault - Please contact your electrical installer.
	Ground-Fault Lack of balance on the 2 phases L1 and L2, can cause the GFCI to trip. (only by 240 VAC installations). The voltage difference between the 2 phases must not be more than +/-10%. E.g. L1 = 132VAC and L2 = 108VAC	- Control the cause of fault e.g. spread the load on the house installations in a more appropriate way. - If the red light stays on, there is a ground fault - Please contact your electrical installer.
	Ground-Fault Bad connection on the terminals L1(L) and L2(N) can cause the GFCI to trip.	- Press RESET. - If this causes the red light to go off and stay off, it was nuisance tripping and the system is operating correctly. - Please tighten the screw terminals to avoid any more nuisance tripping due to bad connections.

Troubleshooting for the GFCI thermostat.

Type of error	Possible cause	Activity / action
No GFCI function and no thermostat function.	The supply voltage has been over 275 VAC e.g. because of bad weather or supply lines.	Replace the thermostat
The thermostat can not maintain the program	Bad contact to the heating cable may cause electrical noise, which can reset the default program.	The screw terminals on the thermostat must be tightened and the connection must be controlled.
The symbol for heating SSS is showed in the display, but the heating cable gives no heat.	No output on the thermostat. Defect heating cable. Bad connected heating cable.	Check the output of the thermostat: - Measure the output voltage from the thermostat. - If there is no voltages, the thermostats relay is defect, please replace the thermostat. - If there is voltage on the output terminal, the thermostat is ok. - Control if the heating cable is correctly connected to the terminals of the thermostat. - If the connection of the heating cable is correct, please contact your electrical installer as the heating cable must be defect.
Why can the temperature not be set higher than (e.g. 82℉)	The thermostat is set to a limit for the maximum temperature of the floor. The maximum limit is used to protect wooden floors, which can be destroyed by high temperature.	1. Go in the menu "Application" 2. Choose "Floor" 3. Set the temperature on the maximal temperature for the floor. 4. Now you can set the temperature to the new maximum.

Troubleshooting for the GFCI thermostat.

Why can the thermostat be ON while the room/floor temperature is above set point?

- **The UCG/UDG is not a simple ON/OFF Thermostat – it works with a PI-regulator**
  - This means that the reaction of the controller could seem illogic.

- An ON/OFF Thermostat reacts immediately on temperature changes
  - If the temperature rises above set point the thermostat switches off.
  - If it gets below set point in switches on again.

  - In rooms with fast reacting floors/rooms
    - This means a high comfort due to small temperature variations.
    - But it also decreased relay life time due to more often relay switches.

  - In rooms with slow reacting floors/rooms
    - The number of relay switches will be limited
    - But the temperature fluctuations will be much larger, and the temperature will not feel pleasant.

- **With the UCG/UDG (which uses a PI-regulator)**
  - No matter what floor you have:
    - The Temperature fluctuations will be controlled and kept within limits and the heating will be comfortable.
    - The number of relay will be controlled and kept within limits, this means longer lifetime for the relay/thermostat.

  - **This means with a PI-regulator, the heating in the room is under control, with optimum comfort temperature and minimum energy consumption.**
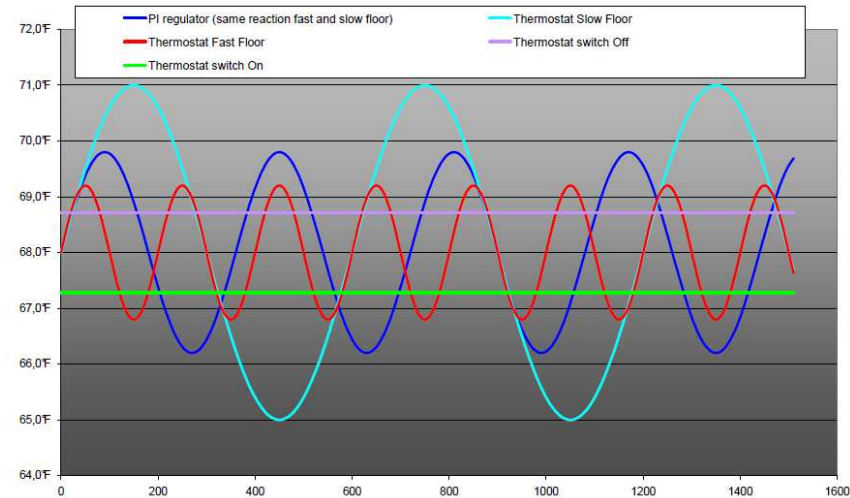
How is the temperature then controlled?
- The UCG/UDG measures the main temperature over a period of time - typically 20 min.
- Then it compares this with the set point.
- Based on philosophy that 50% power should equal the heat loss from the room. The controller will start with this amount of power.
- During the heating period the main temperature is measured again, and a new heat amount for the next heating period is calculated.
- Every heating period always starts with heating no matter the temperature at the present time
  - This is why the heating could be on even though the temperature is higher than the setpoint.

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