Appliantology.org The Samurai Appliance Repair Academy

GE Refrigerator Appliantology: Dampers and Thermistors

by Scott Brown, Samurai Appliance Repair Man, www.Appliantology.org

This is the first in a series of articles I'm doing about the technology in some of the gizmos and doodads found in GE refrigerators. Understanding some of the basics of how these refrigerators work will give you a lot of troubleshooting insight when you're trying to track down a problem. This post gives useful tips and Fun Facts to Know and Tell™ for diagnosing the Damper Door and Thermistors.

Damper Door

The Damper Assembly has two motors: one to open the Damper Door and another to close it.

The Damper Door should always be either fully open or fully closed; if you ever see it in a halfway state, there's a problem. Check it in diagnostic/self-test mode where you can run a test to open and close the damper door.

Thermistors

Thermistors are basically variable resistors whose resistance changes with temperature. They come in two flavors: Positive Temperature Coefficient (PTC) and Negative Temperature (NTC). In the PTC thermistors, the resistance increases with increasing temperature whereas in NTC thermistors, the resistance decreases as the temperature increases. All thermistors used in GE refrigerators are NTC.

Most of the side-by-side units will have four thermistors:
- attached to the evaporator coil
- freezer space
- beer section space
- damper

Units with the Custom Cool feature will have a fifth thermistor for the Custom Cool compartment. Lower end units will just have three thermistors.

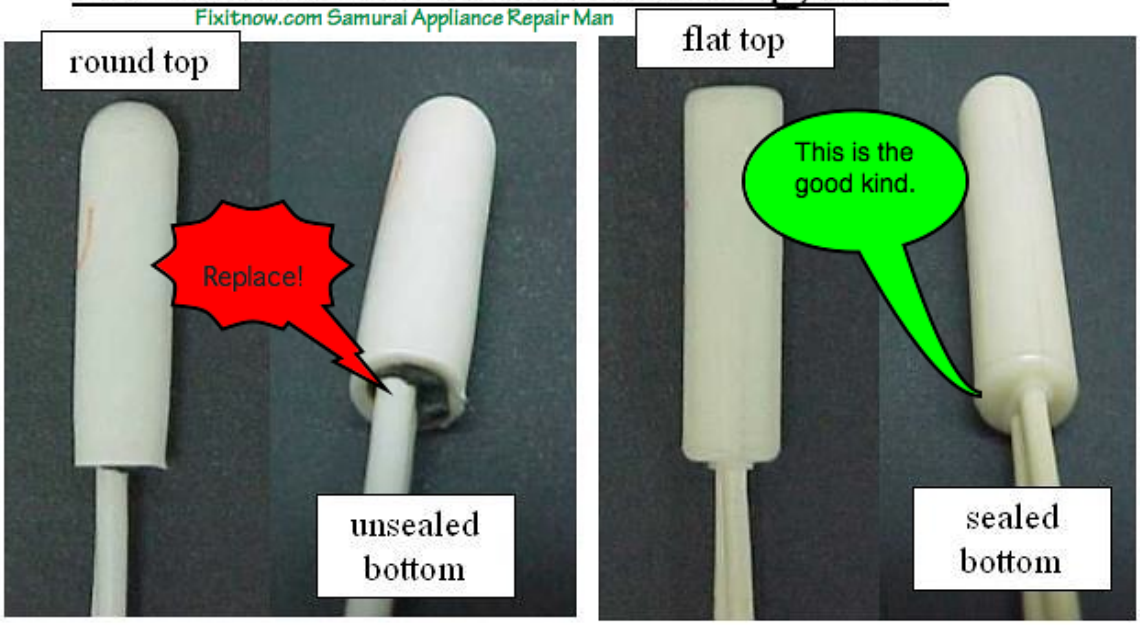
In all units, the thermistor attached to the evaporator coil is the most troublesome.

There was a rash of problems with one of GE's old thermistor suppliers a while back where they weren't sealed properly so moisture got into 'em and knocked 'em out of calibration. The photo below shows you how to spot the older, bad thermistors:

GE Refrigerator Thermistor Guide

Thermistor reference guide

Fixitnow.com Samurai Appliance Repair Man



Keystone/ Thermometrics (GEIS)

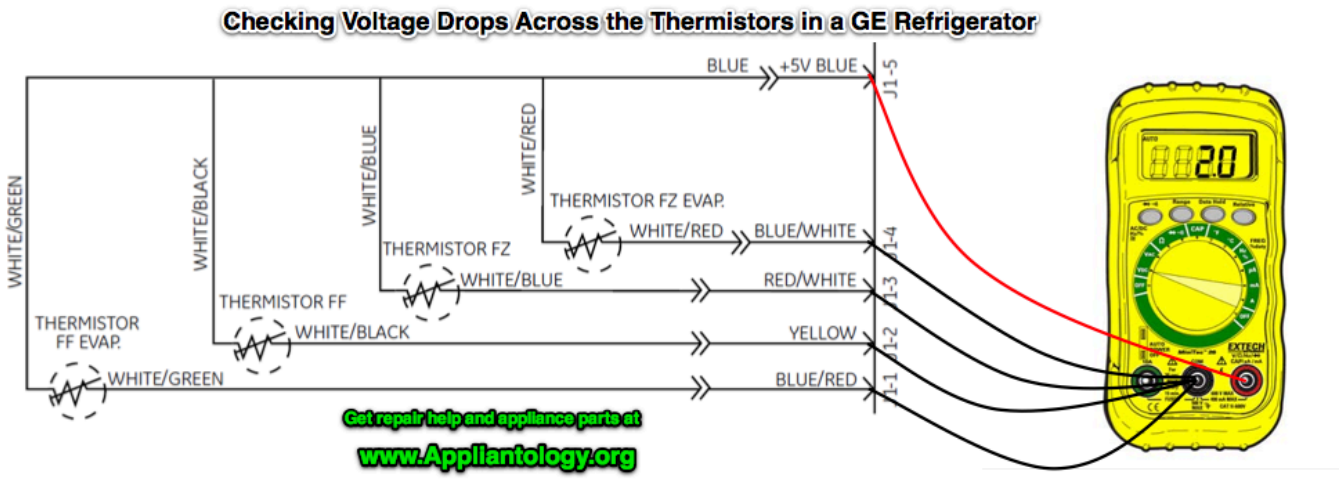
EPCOS

The refrigerator control has a self test for the thermistors, but it only tests if they're open or closed. In real life, the thermistors rarely fail that way– usually they simply go out of calibration resulting in poor temperature control.

The Quick n' Dirty Appliantology Thermistor Test™

Place the thermistor in a cup of ice water. You want the cup to be mostly ice because the water needs to be at 32°F. Leave the thermistor in the ice water for five minutes and do a resistance measurement. You should get 16kΩ ±5%. You can measure the resistances of the thermistors back at the J1 connector on the muthaboard.

A more thorough check but still pretty quick n' dirty is to check the voltage drop across each thermistor. To do this, place one meter probe in J1 pin 5 and check each voltage to J1 pins 1 through 4 as shown in the diagram below:



Typical voltage drop is between 1 to 4 dc volts. A thermistor voltage drop of 0vdc indicates a shorted thermistor, 5vdc would indicate an open thermistor. Any voltages below 1vdc or above 4vdc could indicate a suspect thermistor, follow up with a direct test of the thermistor.

The table below gives you the thermistor resistances at various temperatures:

Thermistors in GE Refrigerators

www.Appliantology.org

Thermistor Resistance		
Temperature (°F)	Temperature (°C)	Resistance in Kilo-Ohms
-40	-40	166.8 kΩ
-31	-35	120.5 kΩ
-22	-30	88 kΩ
-13	-25	65 kΩ
-4	-20	48.4 kΩ
5	-15	36.4 kΩ
14	-10	27.6 kΩ
23	-5	21 kΩ
32	0	16.3 kΩ
41	5	12.7 kΩ
50	10	10 kΩ
59	15	7.8 kΩ
68	20	6.2 kΩ
77	25	5 kΩ
86	30	4 kΩ
95	35	3.2 kΩ
104	40	2.6 kΩ
113	45	2.2 kΩ
122	50	1.8 kΩ
131	55	1.5 kΩ
140	60	1.2 kΩ

Next month, we'll get into more GE refrigerator appliantology with a rousing and awe-inspiring discussion about the evaporator and condenser fan motors.

Samurai Appliance Repair Man
www.Appliantology.org