

TOP 3 REASONS WHY YOUR FRIDGE MONITORING SYSTEM'S READINGS FLUCTUATE

GUIDE TO IMPLEMENTING AUTOMATED REFRIGERATOR TEMPERATURE MONITORING



Personnel installing new [temperature monitoring systems](#) in their refrigerators and freezers are often stumped as to why the temperature appears to vary unexpectedly. Our temperature data loggers and fridge monitoring systems provide significantly faster response time and significantly more data than conventional thermometers which often leads to the observation of temperature behavior that was previously missed. We have put together this quick guide to recommend some solutions and help you investigate so that over time you can identify the source and control the rhythm of your fridge or freezer.

There are 3 common reasons the recorded temperatures can periodically change:

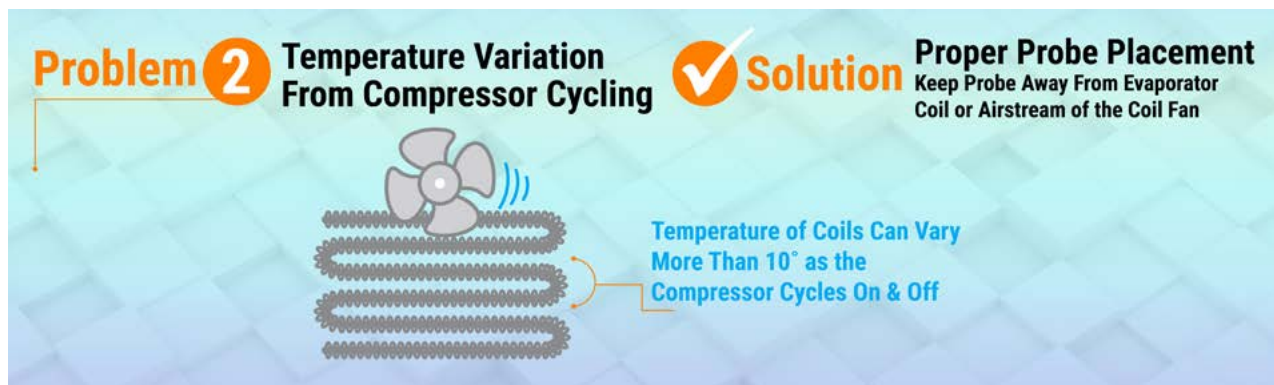
1. FREQUENT DOOR OPENING

The first and simplest cause of unstable temperature readings occurs whenever people open the door, which almost immediately causes a change in your refrigerator/freezer's internal temperature. Electronic temperature monitors have much faster response times and will display random jumps in temperature as much as 5-10 degrees that may be interpreted as a problem with the system. If the presence of these jumps in temperature is an issue for your organization, you can add a [thermal buffer](#), which can be a small bottle of glycol or a nylon block, to the probe. This provides thermal mass which will dampen the system's response time and eliminate the temperature spikes caused by opening the door. Thermal buffers also have the benefit of making the reported temperature more closely mimic the actual temperature of the refrigerated product.



2. FRIDGE/FREEZER COMPRESSOR CYCLING

The second source of temperature variation arises from the normal cycling of the compressor used to cool the refrigerator/freezer. Again, if the temperature displayed by your thermometer is being compared to the temperature reported by your electronic monitoring system, the response time of the thermometer may be masking the actual temperature fluctuations in the cabinet. By looking at a graph of temperature vs. time, this cycling will be revealed by a regular, periodic change in temperature. We occasionally find the probe for the monitoring system placed very close to the evaporator coil or directly in the airstream of the coil fan. These locations aren't ideal since they experience the greatest change in temperature, so relocating the probe to a spot away from the coil or out of the airstream will usually help reduce variation amplitude.



Problem 2 Temperature Variation From Compressor Cycling

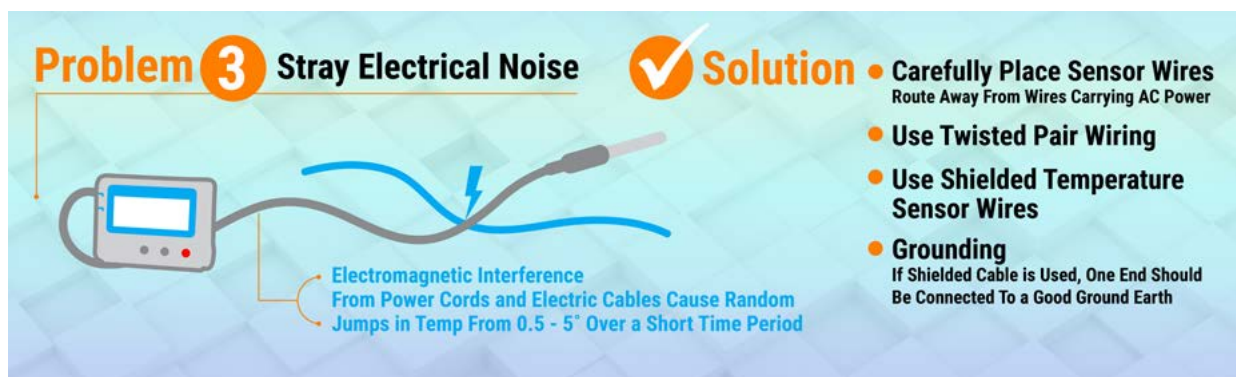
Solution Proper Probe Placement
Keep Probe Away From Evaporator Coil or Airstream of the Coil Fan

Temperature of Coils Can Vary More Than 10° as the Compressor Cycles On & Off

3. ELECTRICAL NOISE

The final cause is due to electrical noise in the monitoring system. This can often be identified from the temperature data in the form of random jumps in temperature from 0.5 to 5 degrees or more happening over a very short time period (such as seconds). The most common cause of electrical noise is the placement of wires from the sensor. The signal levels in an electronic measuring system are often millivolts or microvolts. If the wires carrying these signals pass near to wires carrying line voltage power signals for motors or devices, it's easy to get stray voltage induced by the temperature signal from the sensor. Ways to fix this are to carefully place the temperature monitoring sensor wires away from wires carrying AC power, use twisted pair wiring, use shielded temperature monitoring sensor wires, and ensure the shielded cable is connected to a good earth ground free of potential ground loops.

Utilizing these suggestions with your fridge monitoring system, you should be able to minimize or remove the majority of temperature fluctuations in your medical refrigerator, perishable freezer, or any fridge/freezer/cooler unit you rely on to keep your product safe.



Problem 3 Stray Electrical Noise

Electromagnetic Interference From Power Cords and Electric Cables Cause Random Jumps in Temp From 0.5 - 5° Over a Short Time Period

Solution

- Carefully Place Sensor Wires Route Away From Wires Carrying AC Power
- Use Twisted Pair Wiring
- Use Shielded Temperature Sensor Wires
- Grounding If Shielded Cable is Used, One End Should Be Connected To a Good Ground Earth

For more information [Fridge Monitoring Systems](#) or to find the ideal solution for your application-specific needs, contact a CAS DataLogger Application Specialist at (800) 956-4437 or www.DataLoggerInc.com.