

## 4 REASONS NOT TO PUT YOUR DATA LOGGER IN THE FREEZER

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We often get inquiries from new customers that are just beginning their search for a data logger to monitor a freezer or refrigerator asking “do you have a data logger that I can put in my freezer?” Based on our experience with several customers that have tried this in the past, we recommend that you **DO NOT** put your data logger in the freezer! While it may seem like an easy way to go, certainly simpler than trying to figure out how to get a probe into the freezer cabinet, there are 4 really good reasons that you don’t want to put your data logger in the freezer.

### REASON #1

First, if you are using a [wireless data logger](#) that has WiFi, Bluetooth or other types of wireless radios, the metal enclosure of the freezer will drastically reduce the [wireless](#) signal. It’s kind of like trying to use your cell phone in an elevator – sometimes it works, sometimes it doesn’t. If the freezer has glass doors, the signal will probably get out. But if the cabinet and doors are metal, you will be relying on the signal to get out through the small gap around the door seal. Generally, this causes a very large decrease in the signal strength resulting in very limited range or intermittent operation.



### REASON #2

Another key reason is that the low temperatures in the freezer will dramatically reduce battery capacity. A common rule of thumb is that the capacity of a lithium cell, the type most commonly used in data loggers, will be reduced by 50% at a temperature of 0°F. Also, the internal resistance of the battery will increase at low temperatures, reducing the output voltage. Taken together, these can lead to

frequent battery replacements. We had one customer that was using a very popular line of [USB loggers](#) that complained that the batteries were lasting less than a month. We were quite surprised because these logger would typically run for 6-9 months on one set of batteries. Then, we found out that they were putting the loggers directly in a freezer that was operating at 0°F.

### REASON #3

If your device has an LCD and you need to read the data or alarm info from the display, it can be very difficult at low temperature. Standard LCD's, which are used in most [low-cost data loggers](#), are only designed to operate down to about 32°F. As the temperature decreases, the display will become very sluggish to respond and eventually it will not be able to update the data on the screen. Normally, this does not cause permanent damage to the display. Once it warms up it will operate normally, but we have seen cases where continued exposure to low temperature caused an LCD to fail.

### REASON #4

Finally, there is always a risk of damage to the data logger from internal condensation when it is removed from the freezer. At some point, you will want to pull the device out of the freezer, usually to download stored data. Setting an ice cold data logger on your desk can be like having a glass of ice water on a table on a warm day – if the dew point is more than the temperature of the logger coming out of the freezer, you are going to get condensation. And, we all know that moisture and electronic devices don't mix well! We have received more than one device in for repair that had obvious signs of internal moisture damage caused by condensation. Generally, we recommend replacement because there is too big a chance of ongoing problems even if the original fault can be repaired.

Ok, so there you have it; 4 good reasons not to put your data logger in the freezer. While it may seem like more work, in the long run it's best to mount the data logger outside of the freezer and run a probe inside. The simplest and most common way of doing this is to run the probe wire through the door seal. Protecting it with a bit of aluminum foil tape (the kind used for HVAC applications) provides protection against abrasion from the door

opening and closing. It's also worth checking to see if the freezer has a built-in port for a probe. Many of the higher end freezers designed for life science applications will have a port on the back to allow insertion of a temperature probe. You might find a place where there is a hole that is filled with a bit of duct seal which is a flexible putty. If you do, you can either poke a hole for the probe through the seal or pry it out, insert the probe, and then push it back in to seal the hole. One thing we don't recommend is trying to drill a hole through the side or back for the probe. We have heard of instances of customers trying to do this and hitting an internal refrigerant line!

