

Datalogger diagnostics and troubleshooting for the CRS1000

In the case of malfunctioning telemetry or other problems with the datalogger:

1. Examine connections and cables external to the enclosure.
2. Examine the state of the enclosure. For example, is it latched with all 3 latches?
3. Open the enclosure and:
 - a. *Check the status of the NPMs.*
There is one Neutron Pulse Modules (NPM) per detector tube. Each NPM has an LED that flashes when neutrons are counted. Is each NPM flashing?
Note: The NPMs should flash at a rate of once per every few seconds to several times per second depending on the elevation at the site of the probe.
 - b. *Check the status of the datalogger.*
There are 2 LEDs on the datalogger, labeled “P” and “Q”. The LEDs indicate the state or operating mode of the datalogger (See mode description below). Note the operational mode of the logger.
 - c. *Check/examine electrical connections internal to the box.*
4. Power Cycle the Probe:
 - a. *Switch off the logger and wait for 5 seconds.*
 - b. *Switch on the datalogger.*
The logger should flash rapidly first in Mode 1. Then it will spend approximately 30 seconds in Mode 3 while the logger performs some system setup and some diagnostics. The datalogger should then go to Mode 2, where it will spend most of its time.

To retrieve data that was not telemetered, simply eject the SD card (push to eject) and copy the entire contents of the card to a laptop or computer. Make sure to return the SD card to the datalogger (push to insert) after copying the SD card contents.

LED Modes

Mode 1. The “P” LED flashes rapidly, at a cadence of 8 times per second (8 Hz).

This indicates the datalogger is “booting” up and doing its first initialization. Usually the boot up cycle lasts about 6 seconds. If one is upgrading the firmware, this can take up to 45 seconds.

Mode 2. The “P” LED flashes once every 2 seconds (at a 0.5 Hz rate).

The logger is in idle mode and the 0.5Hz rate is the logger “heartbeat”. The logger should spend 99.5% of its time in this mode.

Mode 3. The “P” LED is flashing two times every second (at a 2 Hz rate).

The logger is actively trying to acquire or transmit data. This should occur at the cadence determined by the record period parameter, once every 60 minutes for COSMOS installations. The transmission sequence can take as long as 2 minutes (usually less than 30 seconds).

Mode 4. The “Q” LED is stuck on.

This indicates that the SD card is being accessed (e.g. data being written to SD card). A normally functioning logger should spend most of its time in idle mode (mode 2). But if it is stuck in the Mode 3 (acquisition and/or transmit mode) then the logger may be “hung up”. The logger employs a watchdog timer which should cause a logger reboot if this condition persists. If the LED indicates the logger is in Mode 3 for more than a few minutes, this condition should be noted.