

# TCM-4 Data Logger Battery Replacement Instructions

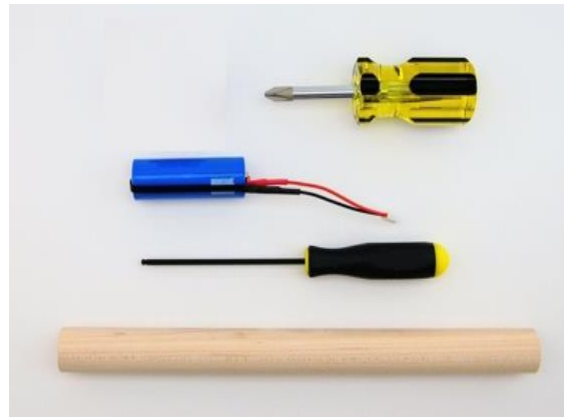
These instructions apply to the following product:

- TCM-4 Shallow Water Current Meter

These instructions assume that the user has purchased a TCM-4 Battery Replacement Tool Kit.

## Materials:

- 3/32" Hex Driver
- 3/4" x 8" Pusher Dowel
- #2 Phillips Screwdriver (grip color may vary)
- Replacement "A" size lithium battery
- Replacement desiccant packs (optional)



**Caution:** This logger is sensitive to static electricity when removed from the logger housing. Avoid working on indoor carpet or in other static prone environments.

**Important:** For loggers with serial numbers **not** between 2004043-2004058, and **lower than** 2006000, the lithium metal batteries should be tested and conditioned prior to deployment. Conditioning is necessary to ensure that the battery has not become passivated during storage. (Passivation is a temporary build-up of resistance in the battery that prolongs its storage life, but reduces peak currents.) Conditioning is performed by running the battery briefly prior to field deployment. See Steps 26-30. **If you are unsure whether this applies to your device, please refer to Step 31: Identifying a Newer Model, after you have completed steps 1-11.**

## Instructions

1. Remove the nose cone of the meter, connect a USB cable and use Domino to stop the logger. Failure to stop a running logger will result in data loss. Once stopped, disconnect the cable.
2. Use the #2 Phillips screw driver to loosen the screw on the other end of the logger. Do not remove this screw fully.



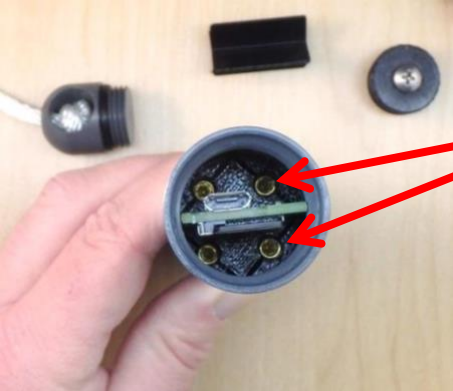
3. Gently pull the end cap up and out of the top of the carbon fiber housing.



4. Remove the plastic "X" spacer from the housing.

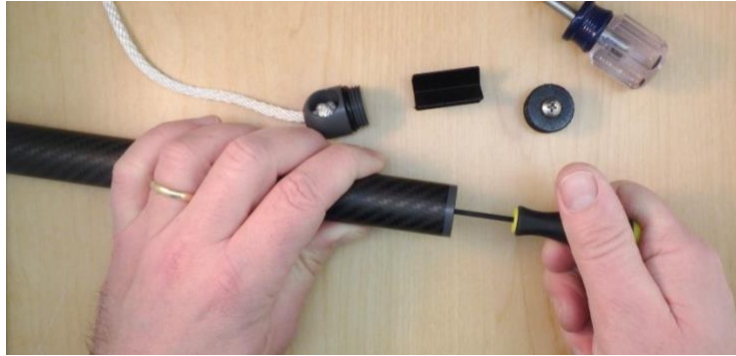


5. Look inside the USB end of the logger and locate the 4 brass setscrews within.

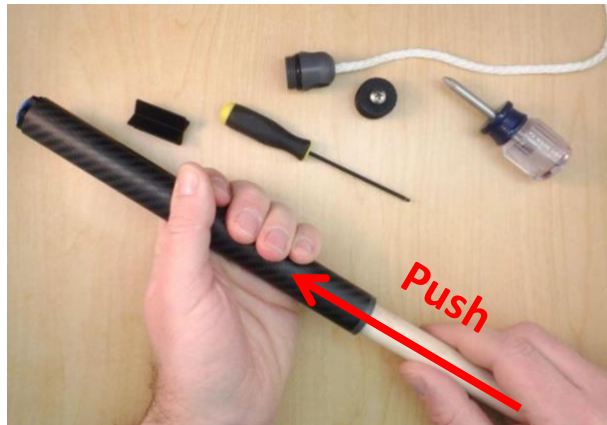


Set Screws (2 of 4)

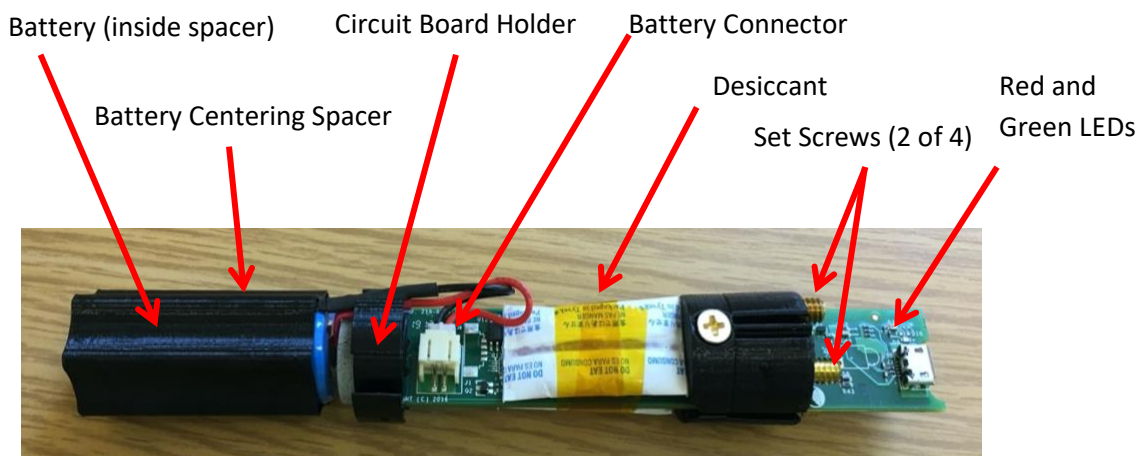
- Use the 3/32" hex driver to loosen the 4 set screws. It is not necessary to remove the screws completely.



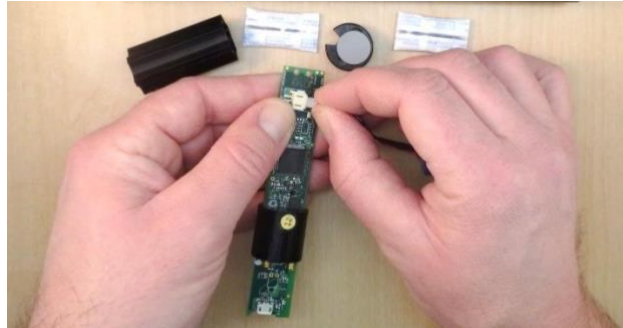
- The board should now be loose within the housing. Use the 3/4" dowel to gently push the circuit board and logger assembly out of the housing, pushing from the USB side towards the end cap side.



- The battery and circuit board will look like this:



9. Slide off the battery centering spacer and circuit board holder and set aside.
10. Disconnect the old battery by gently pulling on the battery leads. You may need to use a pair of pliers to gently rock the plug back and forth. Set the old battery aside and dispose of it according to your local regulations.



11. Inspect the desiccant. Replace or refresh the desiccant if not bright blue. To refresh desiccant, warm it with a toaster oven or hot plate at 100 C (210 F) for 10-20 minutes. Alternatively microwave it for 10-15 seconds at a time until it is bright blue. Retape to the logger.



*The following instructions apply only to loggers with serial numbers **not between 2004043-2004058, and lower than 2006000.** If your logger is a newer model, proceed to Step 32: Newer Models. **Note: you can identify a newer model visually as well.** Instead of two desiccant packs, it will have one, and it has a large blue capacitor on the opposite side of the circuit board (see step 31).*

12. The logger must completely power down for a clean restart. Wait at least 3 minutes between disconnecting the old battery and reconnecting the new battery for the on-board capacitors to discharge.
13. Connect the new battery by gently pushing the polarized connector into the battery socket. Verify that the green and red LED's flash three times. If they do not flash, disconnect the battery, wait 3 minutes and repeat.
14. Slide the battery centering spacer over the new battery.
15. Carefully slide the battery, circuit board holder, and circuit board partially back into the logger housing.





16. Add the desiccant packs and push the circuit board and battery all the way into the housing. It may take a couple of attempts. Do not use excessive force.



17. Temporarily install the nose cone. (This will provide a stop for the circuit board assembly when inserted into the housing in the next step.)
18. Use the 3/4" dowel to push the assembly all the way into the bottom of the housing towards the nose cone until it stops. The circuit board should now be in contact with the inside of the nose cone.

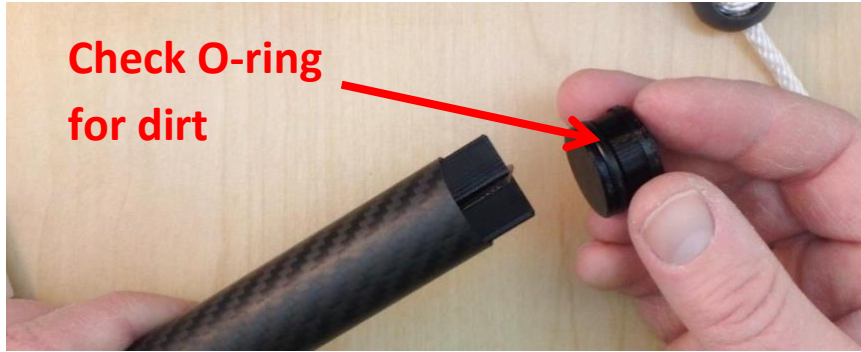


19. Remove the nose cone again and check that the circuit board overlaps the internal threads ~2 threads as shown. If not, reinsert circuit board and push slightly to one side until it overlaps.



Check that circuit board overlaps with threads.

20. Inspect the top end cap assembly and check that there is no dirt/lint/sand on the O-ring. Disassemble, clean and reassemble as required.
21. Put the "X" spacer back into the housing and then insert the top end cap assembly into the top of the meter.



22. Use the screwdriver to tighten the Phillips screw until it is snug.



23. Flip back to the USB end of the housing and insert the circuit board holder tool. use the 3/32" hex driver to tighten the four hex screws taking turns to tighten them evenly by alternating screws. Once again, do not over torque.



24. Reconnect the USB cable and open Domino to the Device tab.
25. Verify that the “Logger Time” has reset to the year 2000, that the battery status is “Good” and that the “Real-time Data” is updating. If not, then the logger was not completely reset and the logger must be power-cycled again. Go back to step 2 and increase the time between disconnecting and reconnecting the battery.

Verify that the logger's clock has reset

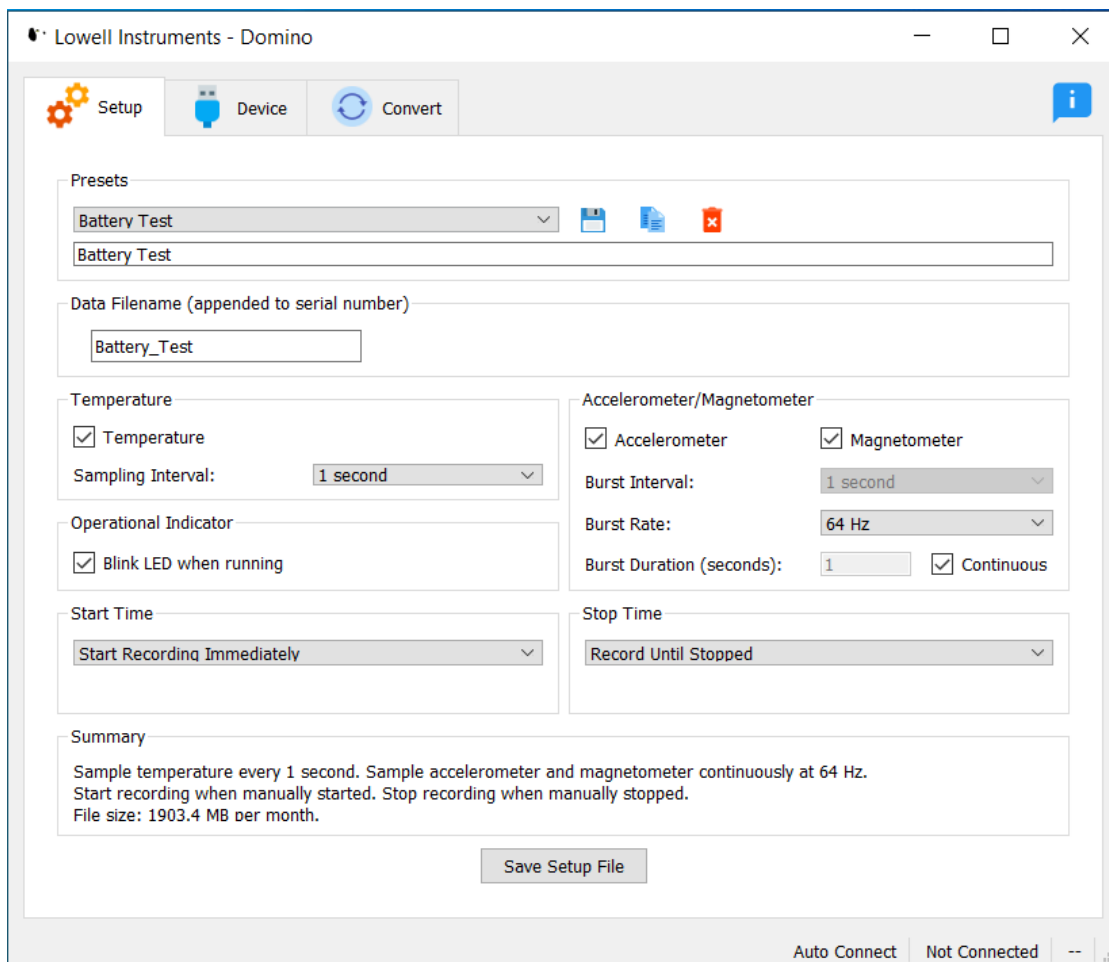
Verify the battery voltage is greater than 3.5V

Spot check sensor readings

Sensor	Enabled	Value
Accelerometer X (g)	Yes	0.352
Accelerometer Y (g)	Yes	-0.934
Accelerometer Z (g)	Yes	0.006
Magnetometer X (mG)	Yes	0
Magnetometer Y (mG)	Yes	-56
Magnetometer Z (mG)	Yes	75
Temperature (°C)	Yes	25.233
Battery (V)	n/a	3.71

**IMPORTANT: You are not done yet. Perform a battery test run to test for, and to remove, passivation of the lithium metal battery before starting a field deployment (see below).**

26. Perform a test run of the battery. A meaningful test will record at least 128Kbytes of data with the USB cable disconnected. To perform this test quickly, set the logger to run at 64Hz as shown below:

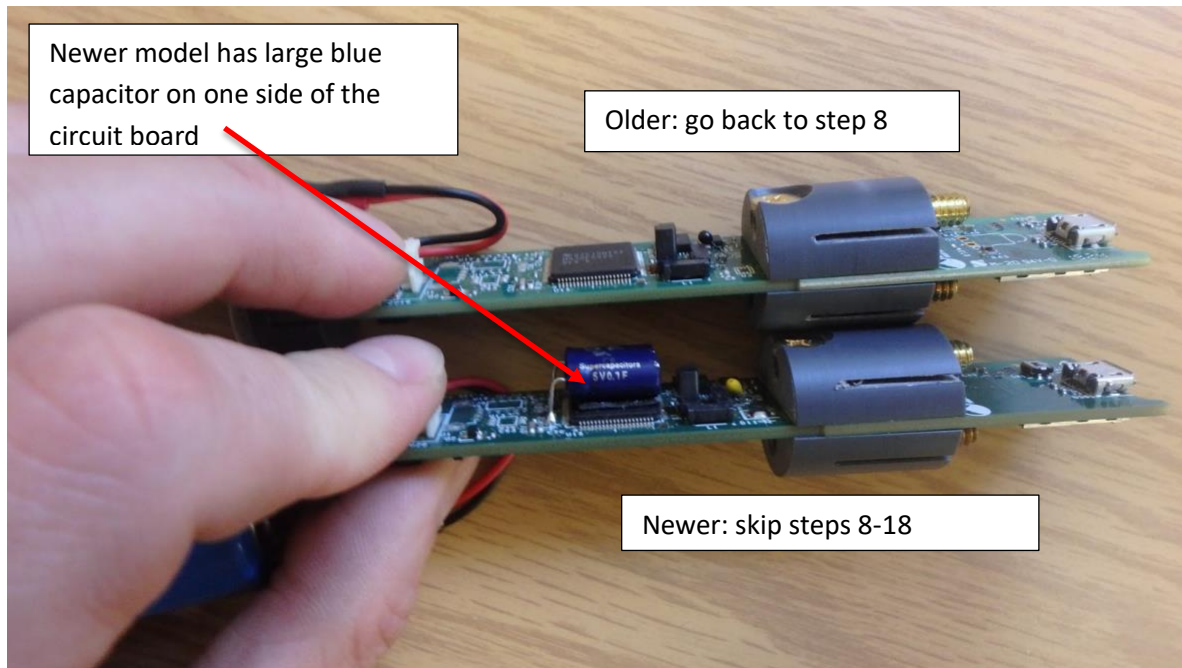


27. Start the logger, disconnect the USB cable, wait 2.5 minutes and check to see if the red LED of the meter is blinking.
28. If the red error LED is indicating, reconnect the USB cable, stop the logger, disconnect the USB cable and wait 5 minutes. Then repeat steps 25-27.
29. If only the green LED is blinking, reconnect the USB cable, stop the meter and load a new setup file with you desired deployment logging intervals (MAT.cfg).
30. If, after two attempts, the red LED continues to indicate a problem, then something else is wrong. Contact technical support for advice.



*Models with serial number between 2004043-2004058, or greater than 2006000. These newer models have a supercapacitor on the circuit board which makes battery testing unnecessary. Instead, you will perform a software reset.*

31. Identifying a newer model:



32. Newer Models: there is no need to wait before connecting a new battery. Connect the battery now, and replace the logger in its housing according to steps 14-23. **Note:** these models only have one desiccant pack. Tape the desiccant pack on the **opposite** side of the circuit board from the capacitor (above). This ensures that the device is centered in the housing.
33. Connect the logger to your computer and open the Device tab in Domino.
34. Perform a software reset: hold down **Control+Shift** and click on the USB icon directly to the left of "Connected on USB." The logger should temporarily disconnect, and then reconnect. The device time should then say that the year is 2000.

Hold **Control+Shift** and click here to perform a software reset:

Lowell Instruments - Domino

Setup Device Convert

Connected on USB

Device stopped

File size 0.00 MB

SD card free space: 7.39 of 7.39 GB available

Device Time: 2020/09/03 11:55:25

Computer Time: 2020/09/03 11:55:26

Serial Number: 1910117

Firmware Version: 1.8.86

Model Number: MAT-1

Deployment Number: 23

Real-Time Data

Sensor	Enabled	Value
Accelerometer X (g)	Yes	0.287
Accelerometer Y (g)	Yes	-0.954
Accelerometer Z (g)	Yes	0.009
Magnetometer X (mG)	Yes	-16
Magnetometer Y (mG)	Yes	-40
Magnetometer Z (mG)	Yes	-31
Temperature (°C)	Yes	26.634
Battery (V)	n/a	3.71

Auto Connect Connected to 1910117 Stopped

35. Reset the clock to your computer time by clicking “Set Device Clock” and verify that the new battery voltage is greater than 3.5 volts by looking at the “Real-Time Data” box.
36. **Save a new setup file with your desired deployment settings** in the “Setup” tab. Your logger should now be ready for deployment!
37. Should you encounter any problems, please do not hesitate to contact technical support for advice.

## Support

Additional information is available on the Lowell Instruments web site. Please see:  
<http://www.lowellinstruments.com/support> for the most up-to-date support information.

**Warning:** Do not cut open, incinerate, heat above 85°C (185°F), or recharge the lithium batteries. The battery may explode if the logger is exposed to extreme heat or conditions that could damage or destroy the battery case. Do not dispose of loggers or batteries in fire. Do not expose the contents of the batteries to water. Dispose of the batteries according to local regulations for lithium batteries.

## Contact Information

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