

Fortress Power Canbus Tool / Firmware Update Procedure - eFlex

Use on every jobsite to

- update firmware
- balance battery voltages
- observe battery performance
- diagnose error codes
- Obtain serial numbers

Required Materials:

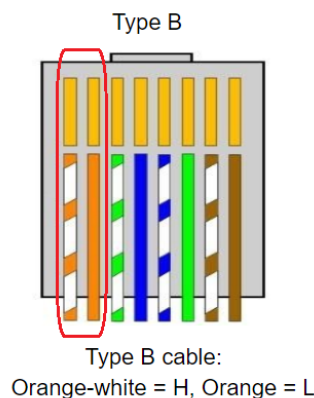
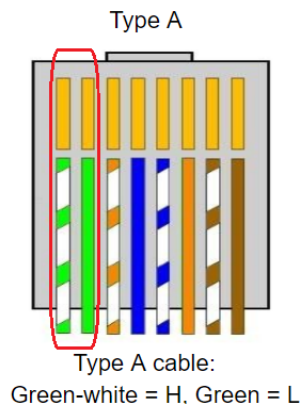
- 1) Canbus Tool. Fortress installers should request **one** from the distributor. The distributor should include it in the next material purchase. If the distributor does not have any, email techsupport@fortresspower.com and we will mail you one. Additional tools can be purchased directly from Fortress Power.
- 2) Precision Flathead Screwdriver - A regular flathead will not fit. It needs to be a small precision flathead screwdriver.
- 3) USB A-to-B Cable. This is included with the Canbus tool. It is a regular USB cable on one end and the large square USB connector on the other, such as for powering a printer.
- 4) Half an Ethernet RJ45 Cable. This is included with the Canbus tool but any ethernet cable should work.
- 5) Cutting and Stripping Tool(s) - for cutting the ethernet RJ45 cable and stripping the individual communication wires within the ethernet cable
- 6) Windows Laptop - Officially the software works with Windows 10 but windows 7 has also been tested successfully.

Before visiting site - Pre-load the **drivers** and **software** to test CAN connection without a battery, before visiting site to reduce time on site!

Mac Users - Either borrow a Windows laptop for firmware updates or attempt to run Windows on a virtual machine on the MAC (virtual machine method has not been tested by Fortress).

A. Setting Up the Canbus Tool

- 1) Observe if the ethernet cable is "Type A" or Type B" by looking on the underside of the ethernet cable. Pins 1+2 will be used in either case.

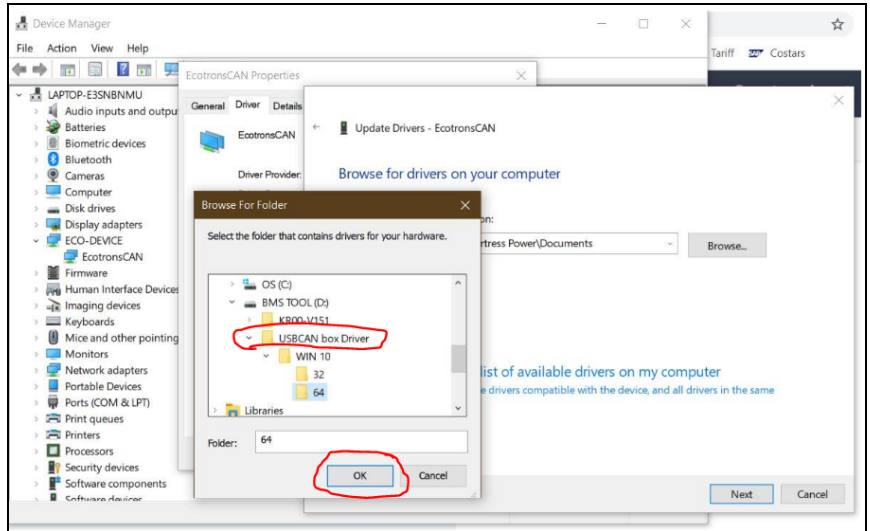
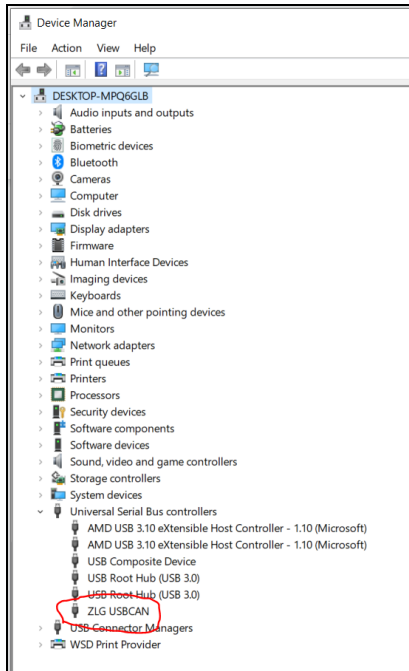


- 2) On one end of the ethernet cable, cut away the cable to reveal wires 1+2. The color of the cables will depend on the cable format above. In most cases, it will be the orange-white and orange cable (i.e. B format).
- 3) Take the wire strippers and strip the jacket off wires 1+2. It does not need to be precise, but only a small amount of cable needs to be stripped.
- 4) Wire 1 connects to port H on the Canbus tool.
Wire 2 connects to port L on the Canbus tool.
The ground (G) is not used.
- 5) Plug the USB cable into the Canbus tool and computer.
- 6) Install the drivers, software, and firmware.
- 7) Check for a successful "CAN" connection before visiting the site.

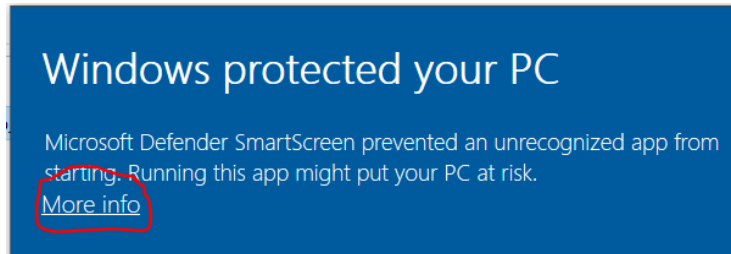
Good News - *The eFlex, eVault, and eVault MAX batteries all have the same CAN communication on wires 1+2, so the same tool and wiring configuration works for each battery.*

B. Installing the Drivers, Software, and Firmware

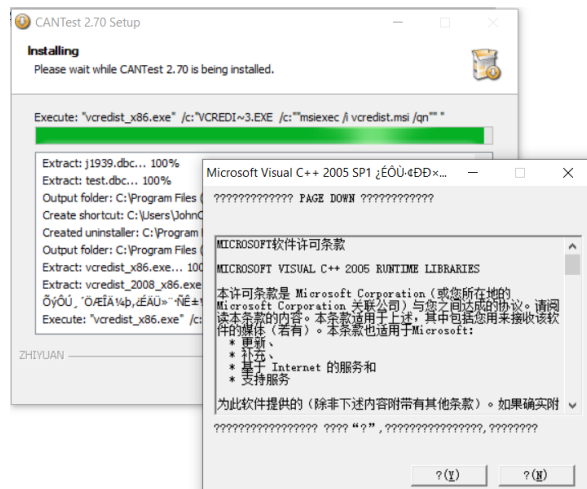
1. Go to www.fortresspower.com/resources. Download *and uncompress/unzip* the following files for your particular battery:
 - a. Drivers for Canbus communication
 - b. Additional Drivers for Canbus communication
 - c. Software - either BMS.exe or BMSTool
 - d. Firmware - *.bin files
2. Testing the computer connection to the CANbus tool before visiting the site saves valuable time. Install the drivers and then open the Cantest software. A successful CAN connection can be made just with the tool and a computer - no Fortress battery is necessary to test this step.
3. After downloading and uncompressing the first set of drivers, go to the Windows Device Manager by clicking the Windows button on the menu bar and typing "Device Manager". Make sure the Canbus tool is plugged into the computer.
4. Find the Canbus tool within the Device Manager list, it commonly appears in the USB devices or as an unidentified USB device. Select "Update Drivers" and then browse to where the drivers were downloaded - commonly the Downloads folder. Select the "Canbox driver" folder and press OK. You do not need to specify the 64 bit or 32 bit folder, simply selecting the "Canbox driver" folder will install the correct drivers.



5. Update the drivers.
6. Go to the Downloads folder and install the CANTest software which contains additional drivers commonly needed to CANbus communication (CANTest_Setup_V2.70).
 - a. When the windows message appears, select "More info" and then "Run Anyway".



- b. You may need to respond to your anti-virus software alert, or even disable the anti-virus software for 10 minutes to install the software.
- c. After the software finishes installing, select "Y" to complete the process.
- d. You do not need to run the CANTest software. If it opens, go ahead and close it.
This software is only installed for the extra CAN drivers.



C. Testing the Driver + Software before visiting Site

1. Go to the Downloads folder by clicking the "Folder" icon in the Windows menu and then selecting the Downloads folder. Find the battery software folder and open the appropriate software program. Here are the folder and software names for each battery.
2. Open the appropriate software and then connect to CAN software. You will see a CAN connection success message. See pictures below. If CAN has not connected, please reinstall the drivers and the additional drivers (Step B4-B6 and check the wired connections (Step A4).

CAUTION:

If CAN connection is made but then immediately drops, do not continue with the firmware update. Unplug and reconnect the USB A-B cable between the computer and the CANbus tool.

eFlex

Folder: KR00-V2103

Software: **BMS.exe** (Application File)

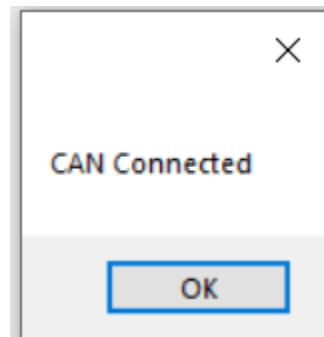
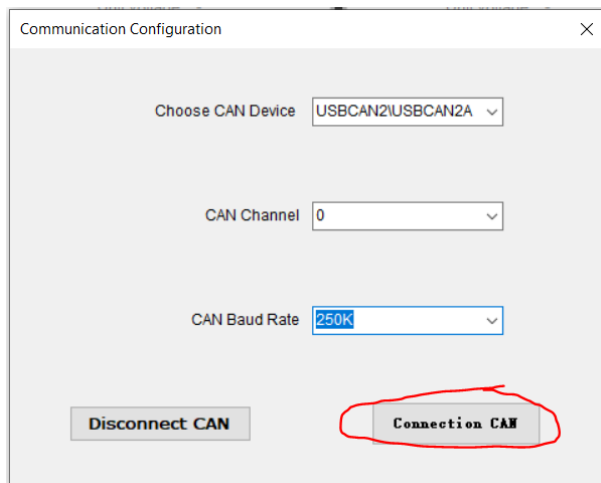
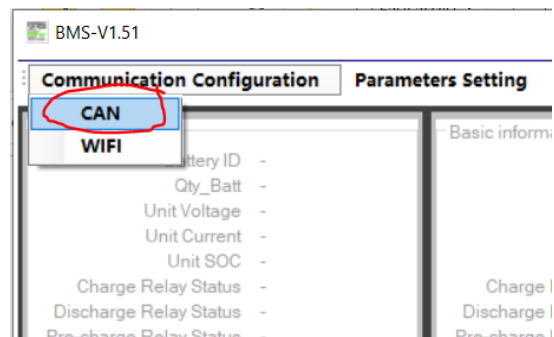
Menu Option: Communication Configuration

-> CAN

-> Connection CAN

use default values that appear on the CANtool

Success Message: "Can Connected"



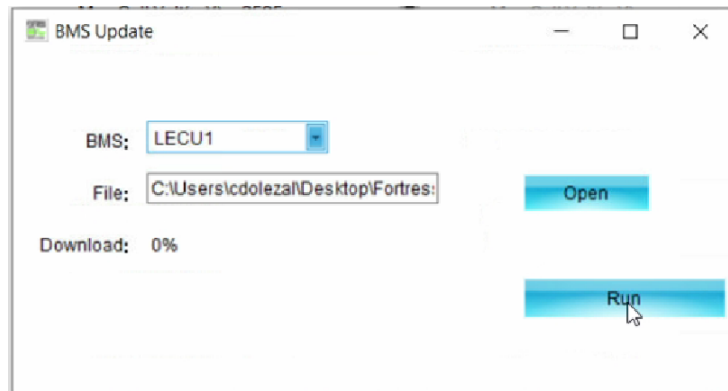
C. Upgrading the Battery Firmware - Getting Started

1. Plug the Canbus tool into either communication port of the Fortress battery - the ports are omnidirectional. The eFlex signal is carried across to all eFlex batteries so it is only necessary to plug into one side of the battery bank. A CANbus terminal or pinout connector should be on the other side of the communication chain.

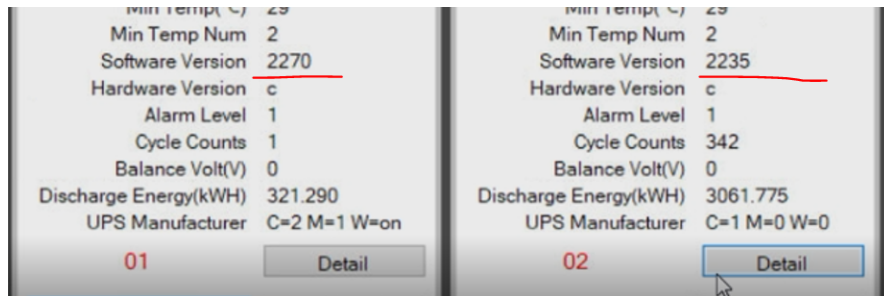
2. Before updating any firmware, make sure there is no current flowing in or out of the battery. Turn off any solar charge controllers and inverter loads/disconnects relative to the battery bank. Avoid disconnecting a breaker under load, if at all possible.
 - a. If the charge controllers or inverters do not have disconnects, uninstall the positive battery cable on the positive terminal of each battery.
 - b. If your charge controllers and inverters have their own disconnects, you do not need to install any battery cables and can rely on the power buttons on the battery itself to turn the batteries on and off.
3. When updating the actual firmware, only have one battery powered on at a time. Use the push button on the batteries to turn them on and off. When actually applying the firmware, only have one battery powered on at a time. Turn the battery off before proceeding with the firmware update on the next battery.
4. When the firmware is physically loading onto the battery, do not do anything else. Make sure the computer power supply is good, so that the computer will not power down during the firmware update.
5. Plug the Canbus tool into the Fortress battery and connect to CAN using the battery specific software.

D. Performing the firmware upgrade

1. All eFlex batteries on the communication circuit will show up within the eFlex software. This makes it easy to inspect battery voltage, current, firmware version, relay contactor status, cell voltage, and warning codes.
2. Use the eFlex push buttons to disconnect all batteries except one. Remember not to disconnect the eFlex batteries while under load. Do a check of the eFlex amperage to make sure no current is flowing in or out of the eFlex battery before starting the firmware update.
3. Make the Can connection (step B8) and then click “Update” and browse to the Download folder. Find the “SW_DZKR00XXXX” folder where the BIN file of the same name is stored. Select the Bin File and click Run. Relax and let the firmware load to 100%



4. The updated firmware version can be confirmed within the software



5. Don't forget to push button off the previous battery before applying the firmware update to the next battery.
6. You can also click "Detail" to get cell level information and read alarm messages.
7. Use the Canbus tool to help charge each eFlex individually to within 0.5V of each other (resting voltage) before commissioning or recommissioning the battery.

Hint: The eFlex push buttons can be used to turn on just the highest or lowest voltage eFlex batteries, so long as those specific eFlex are within 1/2V of each other. Repeating this process will move the highest or lowest voltage batteries towards the average battery voltage.

For example, if 4 eFlex batteries read 51.5V, 51.8V, 52V, and 52.3V, the two lower batteries could be averaged to ~51.7V and the two higher batteries can be averaged to 52.1V, after which all batteries can be commissioned as they are now within 1/2V of each other.

E. Finishing Up

1. Before leaving site, confirm that all batteries are charging/discharging via a blinking state of charge indicator light (charging) or via the software interface for the eFlex. Batteries that are improperly commissioned will have zero amperage flowing in or out of the battery.