ISSUE DATE:	12-19-2023
SERVICE BULLETIN SUBJECT:	2170 15 Module BMS Software Update
VINs or MODELS AFFECTED:	Service Specified Buses
COMPLETE BY:	Next Service Opportunity
SERVICE BULLETIN #:	SC-23-176
Labor Operation Code:	HA44Z

NOTICE! It is expected that this process will require 0.75 hour per bus. Please schedule appropriately to minimize vehicle downtime.

2170 15 Module BMS Software Update

Retrofit Description:

This procedure updates the BMS software to the latest version.

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Tools/Parts Required

Tools and Supplies Required:

- Proterra Service Laptop with Proterra Diagnostic Tool
- Nexiq USB Link2 Device and Cable

Parts Required:

- 066054 SOFTWARE, APPLICATION, BMS MAIN, VER 152005D9E
- 066056 SOFTWARE, APPLICATION, BMS SAFETY, VER 152005D9E

Summary of Software Changes:

1. LEM Current Sensor UDS Memory write message removal
2. Reduce Penguin External Isolation Warning threshold
3. Unexpected Number of connected strings on PCAN loss of comms

Software Package Link:

https://proterra.my.salesforce.com/sfc/p/50000000BNPQ/a/UV0000007KLN/tthCL7neT1VrjuwzI1dcGmKtYU5iLwhdhjKAV4Ux9gM

Password: kRufVERp

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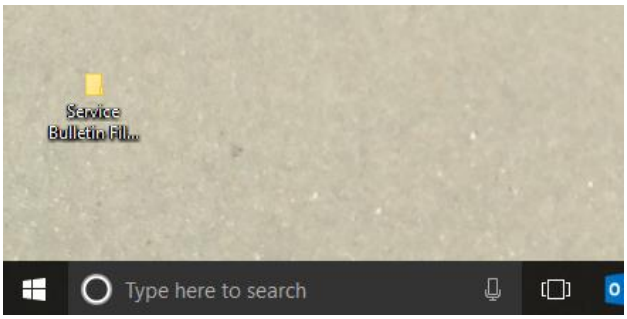
BMS Update:

1. For best results during this procedure, have the LV batteries plugged into external power and the programming laptop plugged into power. If there is loss of power on either the LV batteries or computer, you will brick the controller to not be usable.

2. Navigate to the Navigate to the Service Bulletin page in servicemax or following the link below. Make sure the files are stored on the hard drive and are unzipped on the programming laptop.



3. Ensure that the bus is powered on with the vehicle master disconnect on the Curbside rear of the bus in the on position.

4. Working in the Driver's area, turn the master switch to the ACC position. This will enable the low voltage but leave the high voltage off for battery programming.

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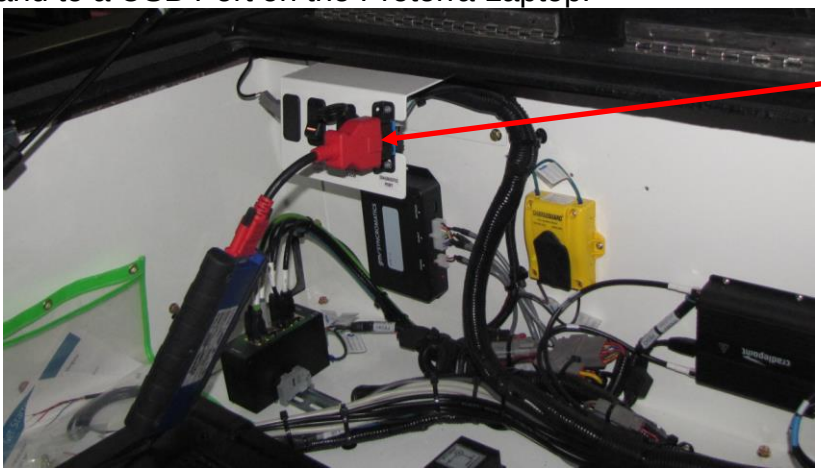
5. Open the Streetside Wheel Well box. Connect the Nexiq programming cable to the OBDII Port and to a USB Port on the Proterra Laptop.



6. Start the Proterra Diagnostic Tool by double clicking on the desktop icon.

7. When the program opens, read and click OK for the prompt.

8. On the Home tab, select the appropriate device from the drop-down menu and click “Connect”.

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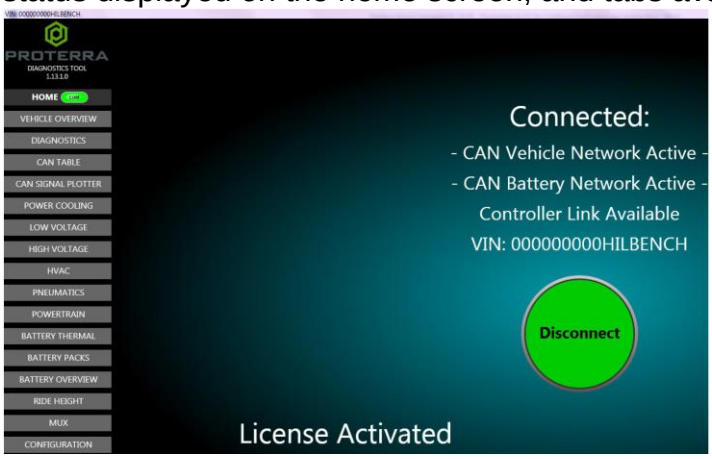
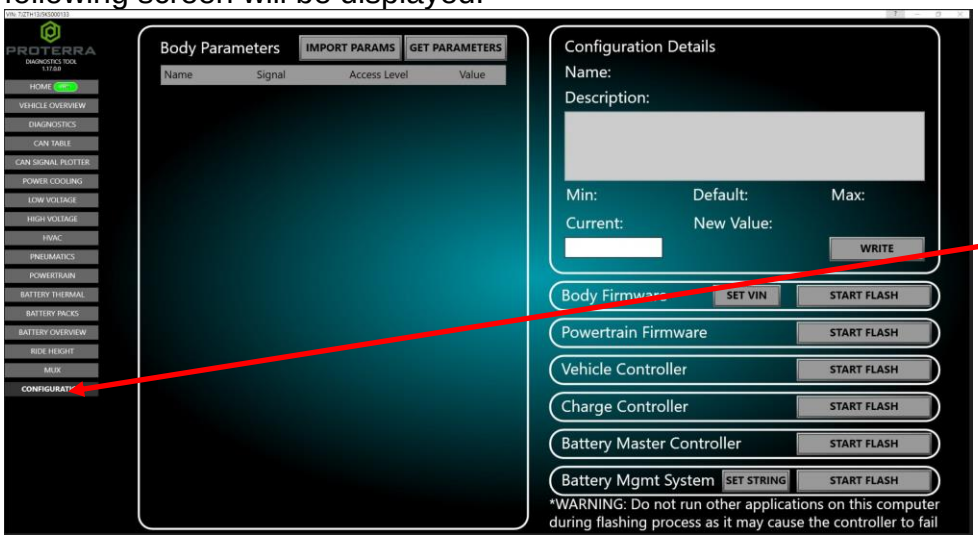
9. Once the diagnostic tool has connected to the vehicle, you will have a VIN and connection status displayed on the home screen, and tabs available to navigate.



10. From the Home Screen, click the “Configuration” tab at the bottom left of the screen. The following screen will be displayed.



11. Click on the “Start Flash” button in the “Battery Mgmt System” at the lower right of the screen as shown be

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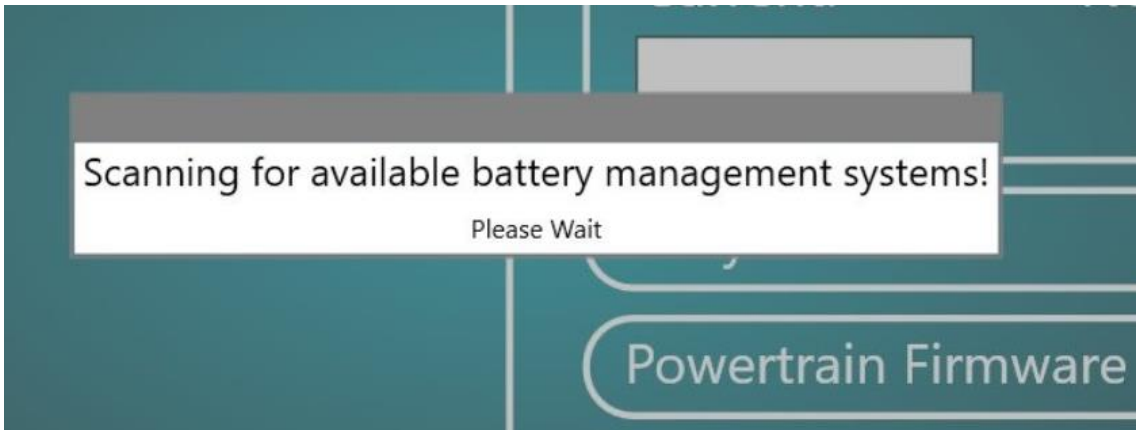
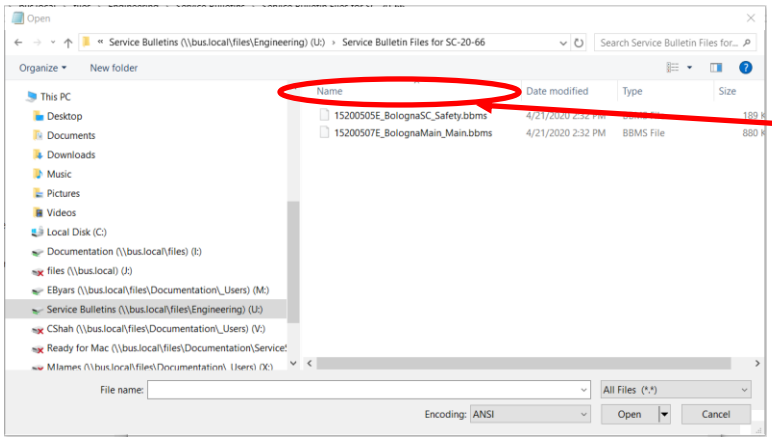
12. The following message will be displayed.

Note: It may take several minutes for the Diagnostic Tool to gather the required information.



13. When the information gathering process is complete, the Diagnostic Tool will prompt you to select a file. Navigate to the desktop folder where the files were stored to perform this service campaign. Double click on the file named "152005D9E_BolognaMain_Main.bbms" to open it. This file will be in the BMS subfolder.



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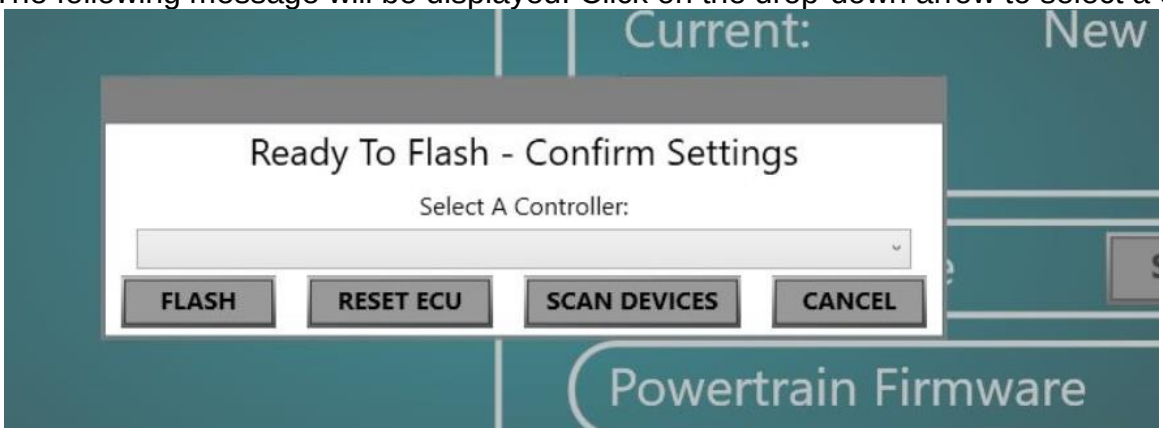
14. The following message will be displayed. Click on the drop-down arrow to select a controller.



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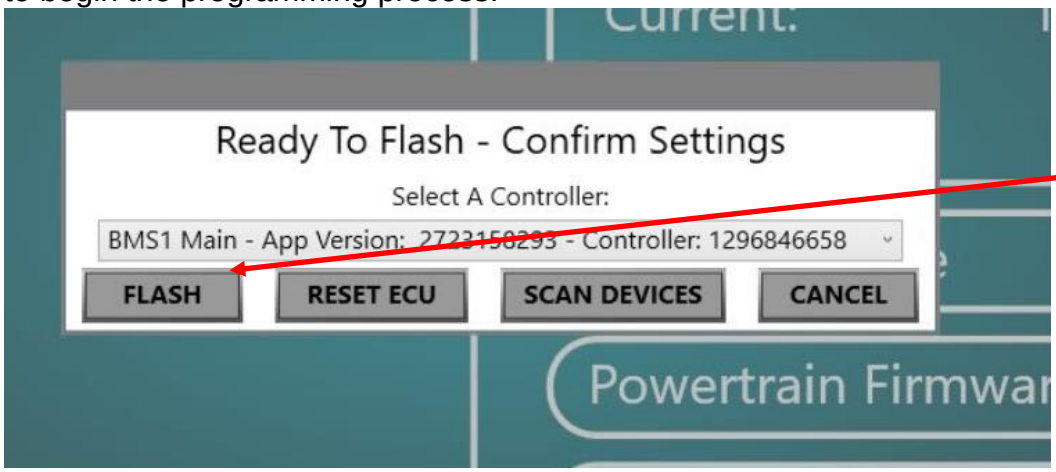
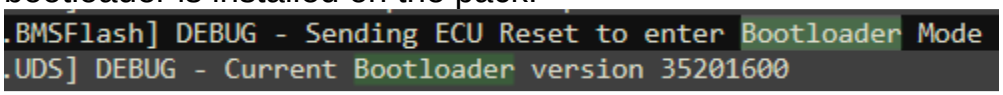
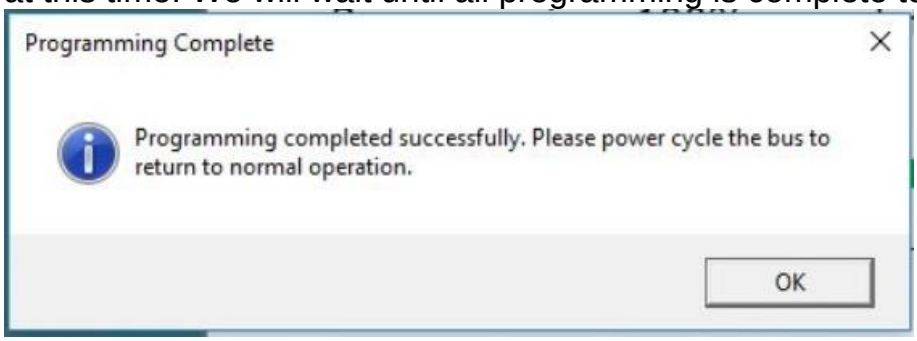
15. Select the first “BMS Main” entry as shown on the following screen. Click the “FLASH” button to begin the programming process.



16. If the flashing were to fail, go to your C drive “C:\” on your local computer, access the logs folder then Phoenix folder TXT file. Within the latest TXT file look for the following message. If the boot loader version is not equal to 11174503 the escalate a single WO to the CSE Team to correct this. **DO NOT POWER CYCLE!** If the software fails to load you must install the previous version SW until CSE helps resolve the bootloader. Use software package from Service Campaign “SC-21-086”.in the event the wrong bootloader is installed on the pack.



17. Wait for the programming process to complete. When the process completes, the following dialog box will appear. Click on the “OK” button. Do not Power Cycle the bus at this time. We will wait until all programming is complete to Power Cycle the bus.



18. The following screen will appear. Click the drop-down arrow to select the next Main Controller. In this case it will be BMS2 Main. Click “Flash” to program the second BMS.

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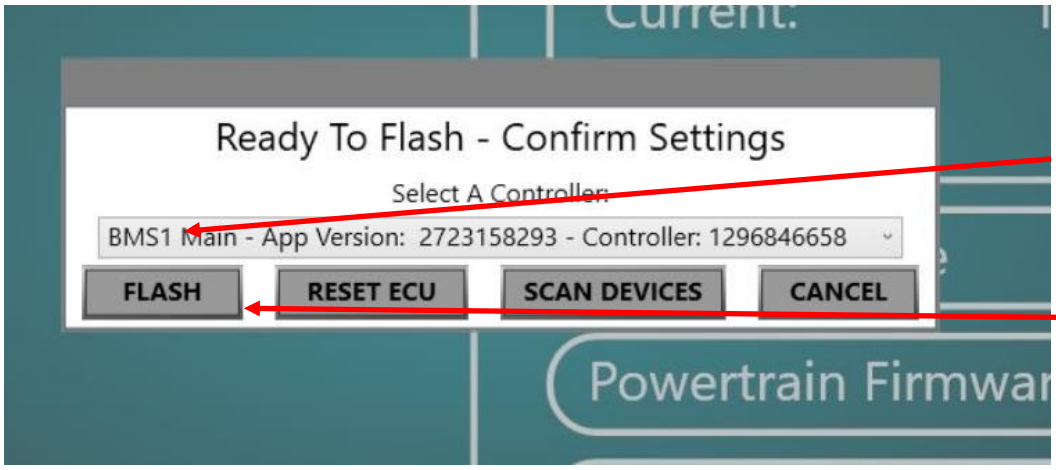
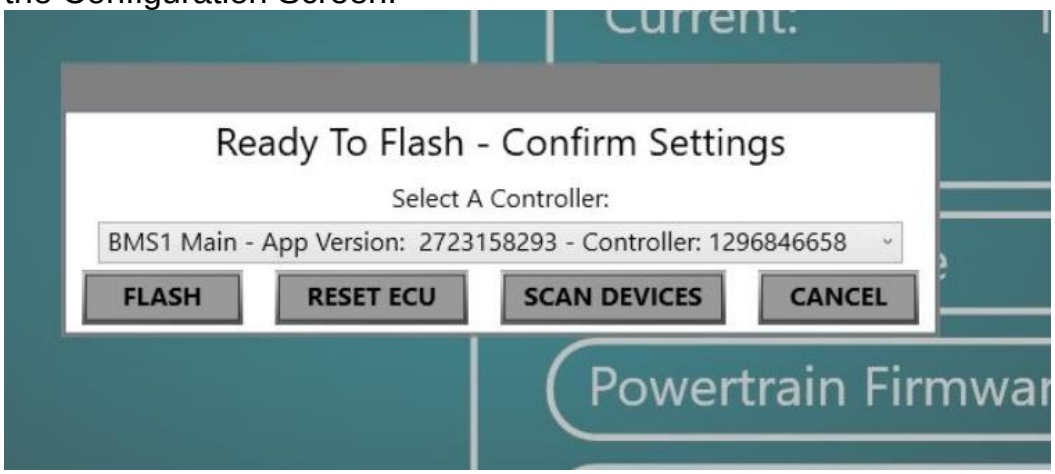


Select "BMS2 Main"

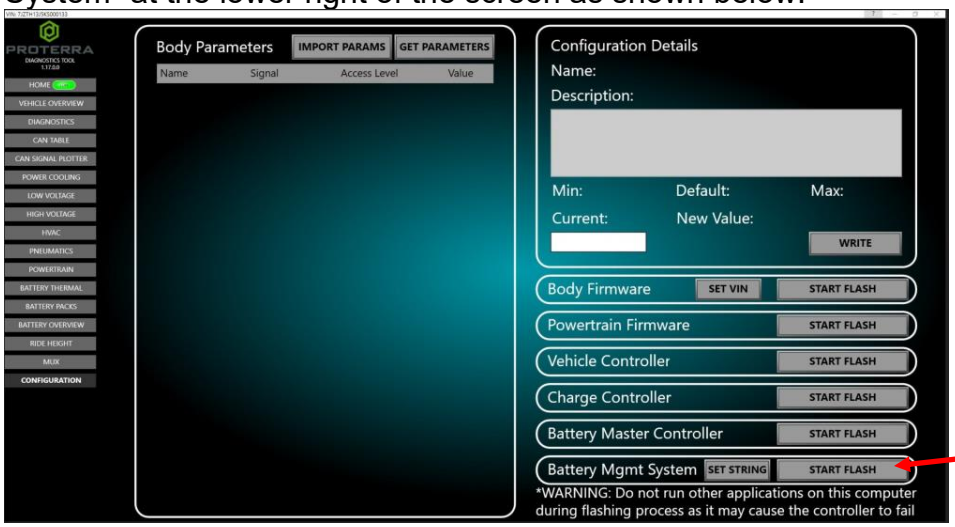
Click "Flash"

19. Repeat this process to program the remaining BMS Main controllers.

20. When all of the BMS Main controllers have been programmed, click "Cancel" to return the Configuration Screen.



21. The following screen appears. Click on the "Start Flash" button in the "Battery Mgmt System" at the lower right of the screen as shown below.



Start Flash

22. The following message will be displayed.

Note: It may take several minutes for the Diagnostic Tool to gather the required

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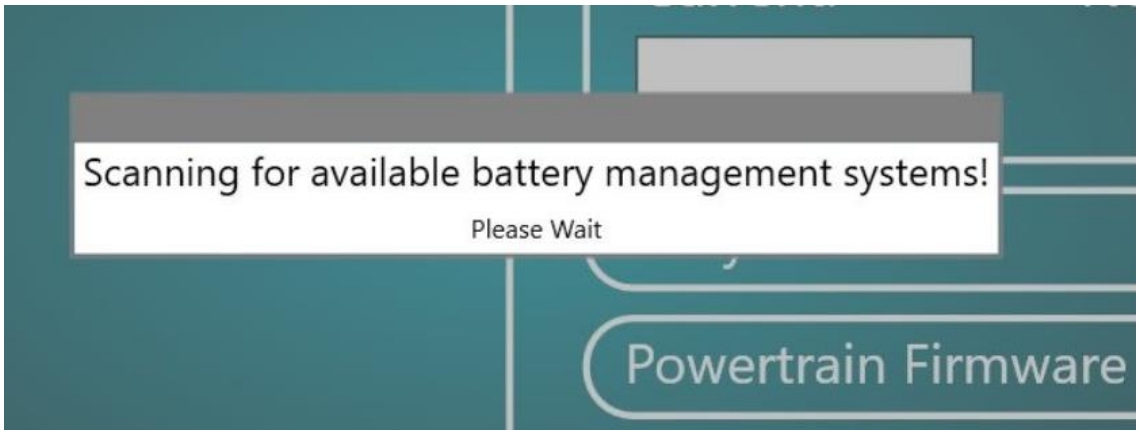
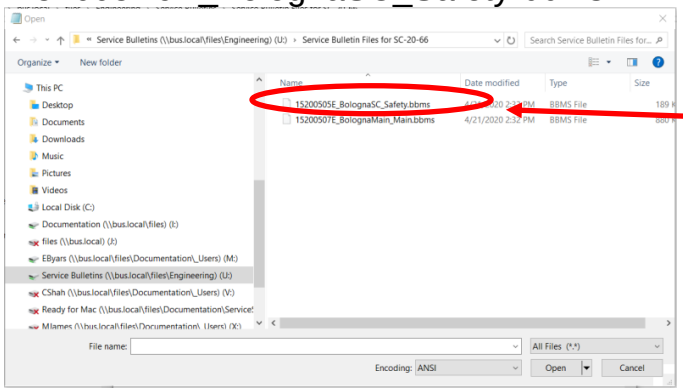
information.

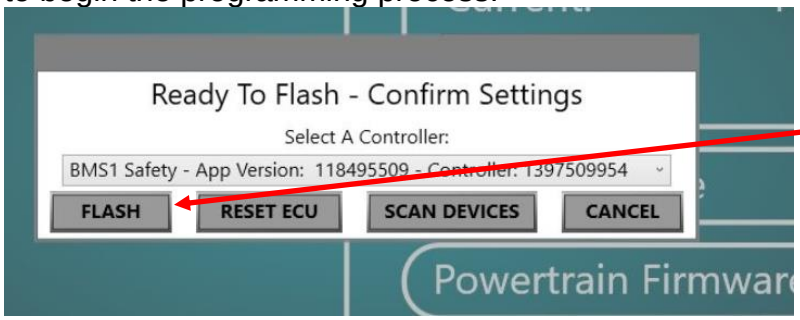


23. When the information gathering process is complete, the Diagnostic Tool will prompt you to select a file. Navigate to the desktop folder where the files were stored to perform this service campaign. Double click on the file named "152005D9E_BolognaSC_Safety.bbms" to open it.



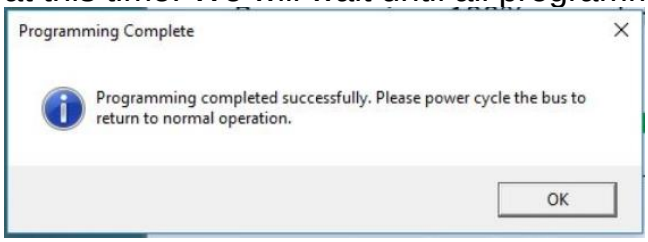
Double Click the "Safety" Program

24. Select the first "BMS Safety" entry as shown on the following screen. Click the "FLASH" button to begin the programming process.



Click Flash

25. Wait for the programming process to complete. When the process completes, the following dialog box will appear. Click on the "OK" button. Do not Power Cycle the bus at this time. We will wait until all programming is complete to Power Cycle the bus.



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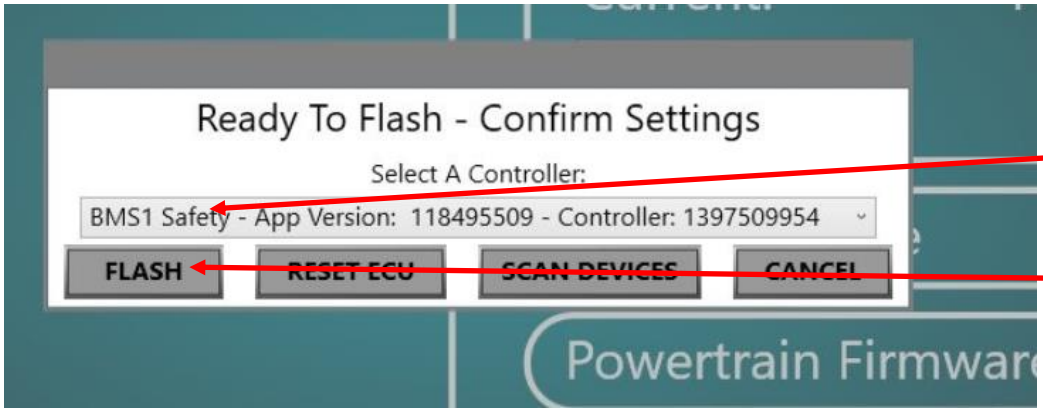
26. The following screen will appear. Click the drop-down arrow to select the next Safety Controller. In this case it will be BMS2 Safety. Click “Flash” to program the second BMS.

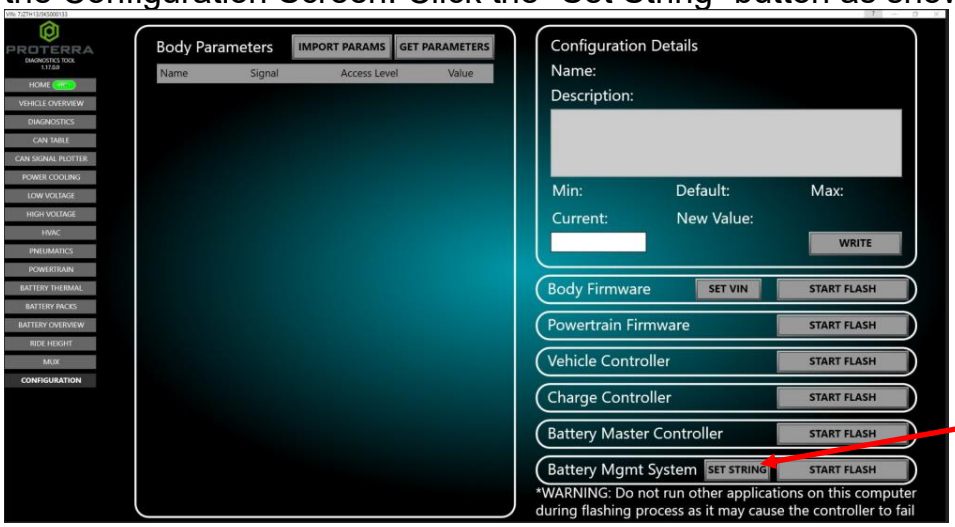


Select “BMS2 Safety”

Click “Flash”

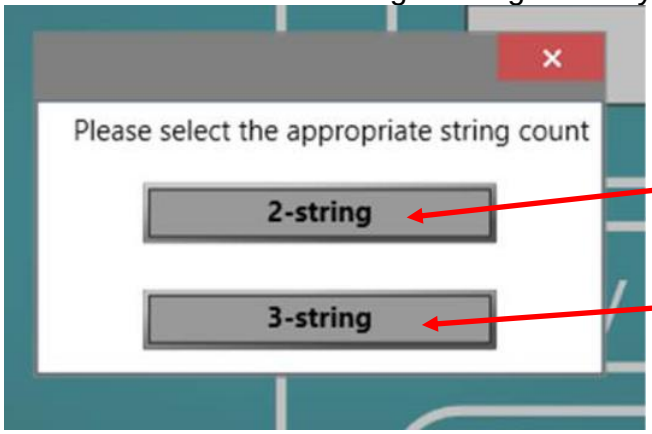
27. Repeat this process to program all the remaining BMS Safety controllers.

28. When all the BMS Safety controllers have been programmed, click “Cancel” to return the Configuration Screen. Click the “Set String” button as shown below.



Click Set String

29. Click the “2-String” Button on buses with four High Voltage Battery Packs or click the “3-String” Button for buses with six High Voltage Battery Packs.



Click 2-String for Buses with 4 High Voltage Battery Packs

Click 3-String for Buses with 6 High Voltage Battery Packs

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31. The BMS Main and Safety Controller programming is now complete.

32. Working in the Driver's area, turn the master switch to the OFF position.

33. Open the hatch at the Curbside rear of the bus to access the vehicle master disconnect. Turn the disconnect to the Off position and leave it there for at least 10 seconds. Turn the vehicle master disconnect back to the On position.

34. Working in the Driver's workplace, turn the Master Switch to the On position.

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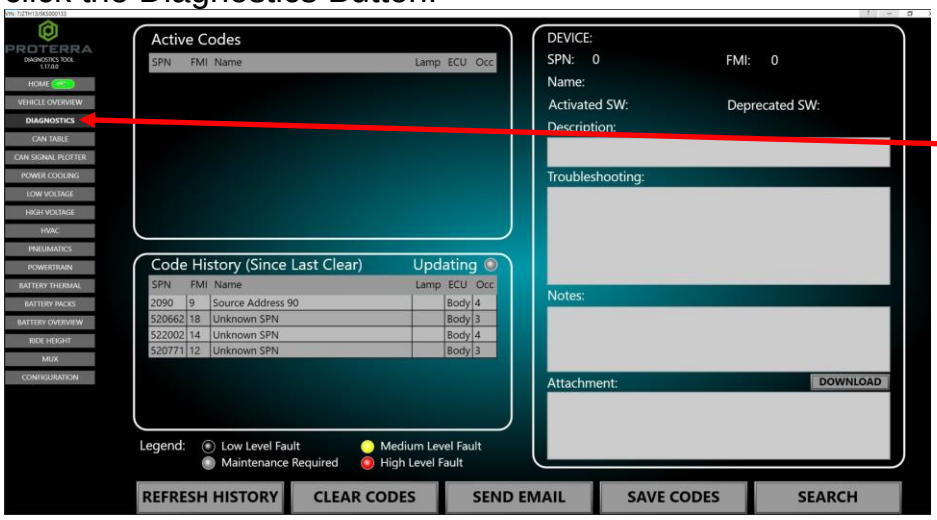
35. The bus will power on. Allow a minute or so and verify that “Running” is displayed on the dash.

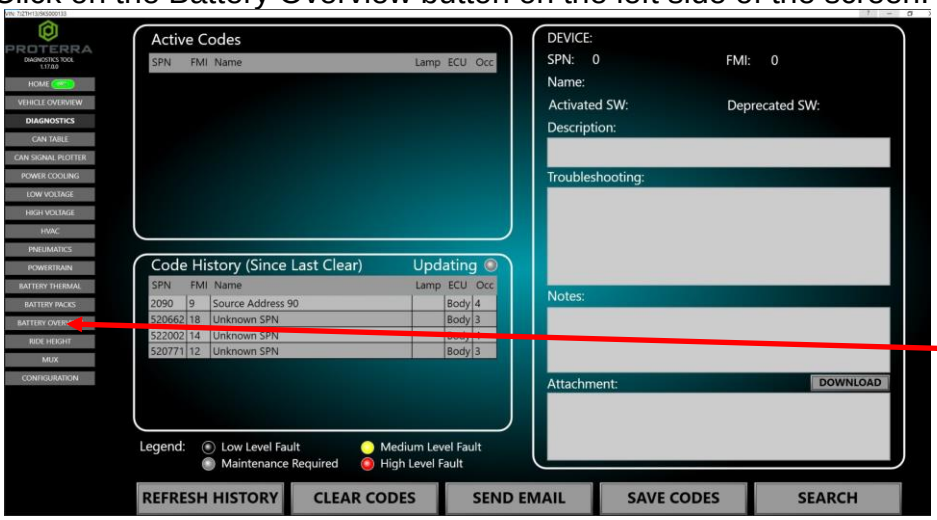
36. Re-start and re-connect the Diagnostic Tool. From the Home or Configuration screen, click the Diagnostics Button.



Click Diagnostics

37. Look for any faults related to the battery system.

38. Click on the Battery Overview button on the left side of the screen.



Click Battery Overview

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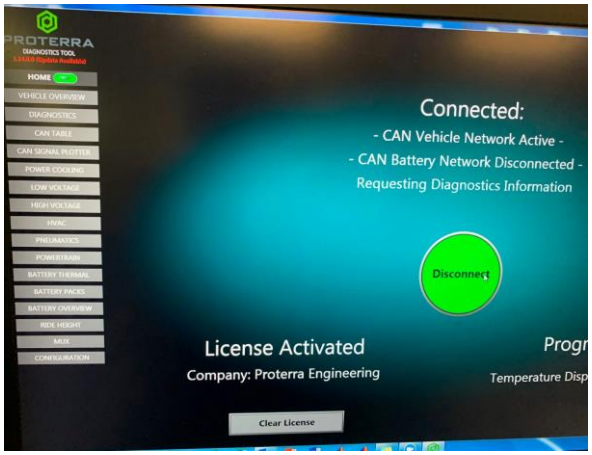
39. The following screen will appear. Verify that all battery packs are connected to the high voltage by the presence of the Green Contactor indicators as shown below.

Pack	Contactor	Moisture Detected	Max Voltage	Min Voltage	Voltage	Current	Max Temp	Min Temp	Energy Throughput
S1 P1			3.46 V	3.45 V	311.96 V	-1.80 A	84°F	82°F	841 kWh
S1 P2			3.46 V	3.45 V	312.48 V	-3.00 A	86°F	82°F	838 kWh
S2 P1			3.46 V	3.45 V	311.84 V	-1.80 A	82°F	82°F	828 kWh
S2 P2			3.46 V	3.45 V	313.88 V	-1.80 A	82°F	82°F	828 kWh

40. If no faults are found and the battery packs are all connected, disconnect the laptop, close the Streetside Wheel Well box, and return the bus to service.

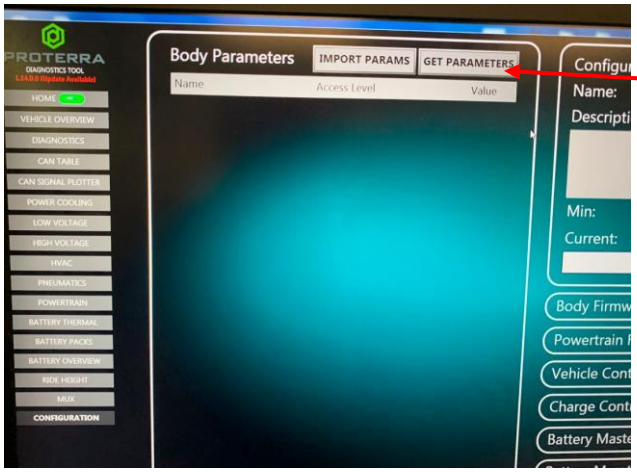
41. If faults are found or battery packs are not connected, contact Proterra Service for help in resolving these issues.

42. Click “Home” to return to the main screen.



Click Home

43. Click the “Configuration” button at the bottom of the screen. The following screen will appear. Clock on the “Get Parameters” button to download information for the vehicle. Allow a few seconds for the information to populate the screen.



Click Get Parameters

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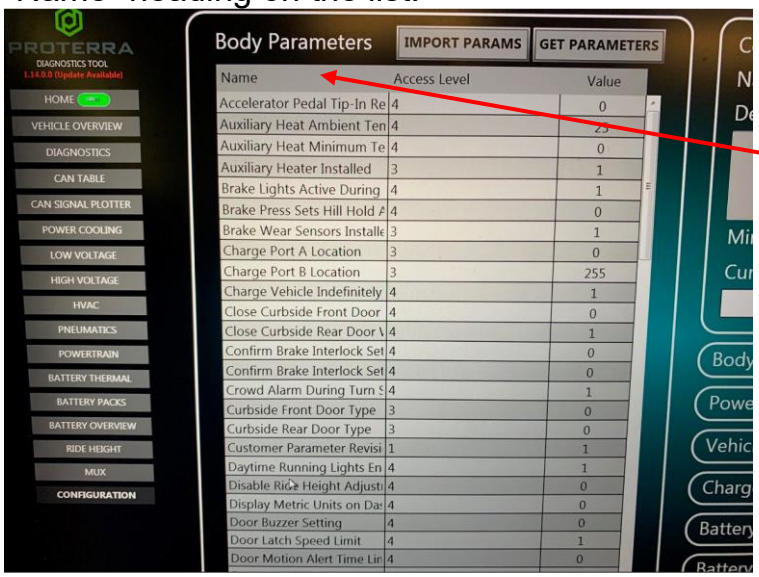
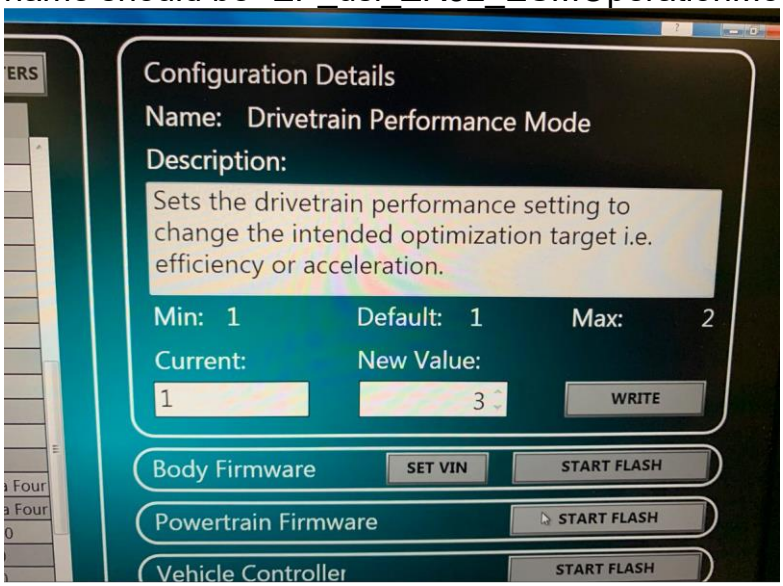
44. Once the screen has populated, sort the values alphabetically by clicking on the "Name" heading on the list.



Click Name

45. Scroll through the list to find the "EP_usi_ZR32_ESMOperationMode". Click on the name of this parameter.

46. A screen similar to the following appears. The difference it the parameter name. The name should be "EP_usi_ZR32_ESMOperationMode".



47. Enter a 13 in the "New Value" box and hit the "Write Button".

48. Disconnect the cable from the ODB-II port.

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