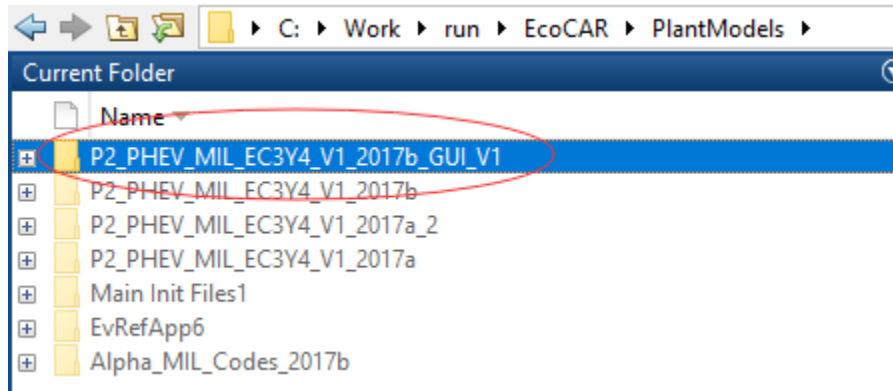


GUI Write-up

1. Installation

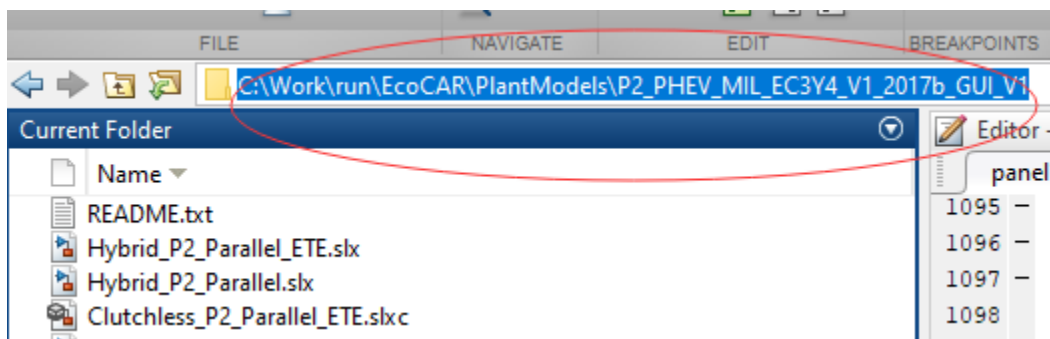
1) Download and open the “P2_PHEV_MIL_EC3Y4_V1_2017b_GUI_V1”



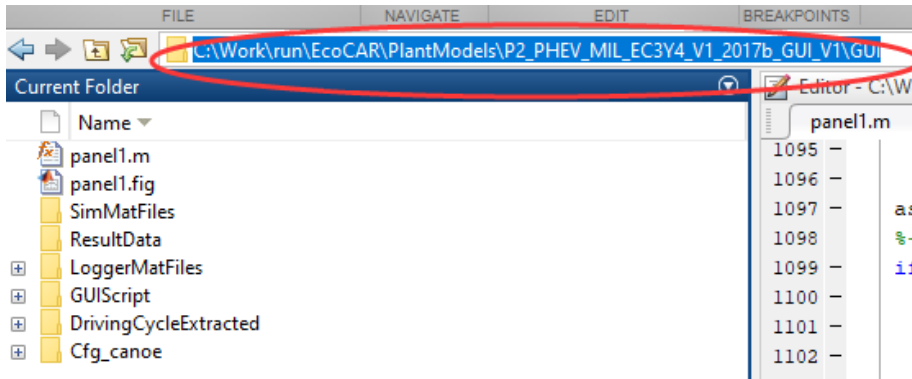
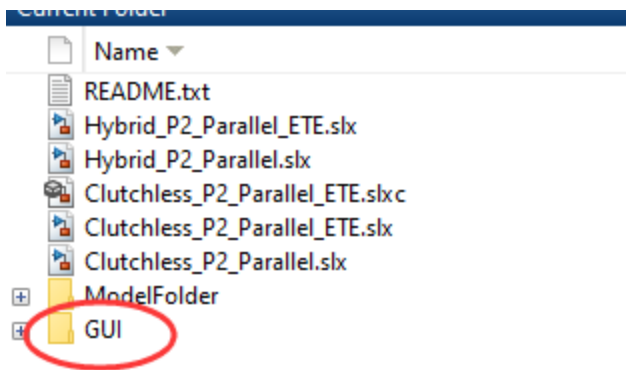
2) Replace the **purple codes** below following steps :

```
addpath(genpath('C:\Work\run\EcoCAR\PlantModels\P2_PHEV_MIL_EC3Y4_V1_2017b'))  
cd C:\Work\run\EcoCAR\PlantModels\P2_PHEV_MIL_EC3Y4_V1_2017b\GUI  
panel1
```

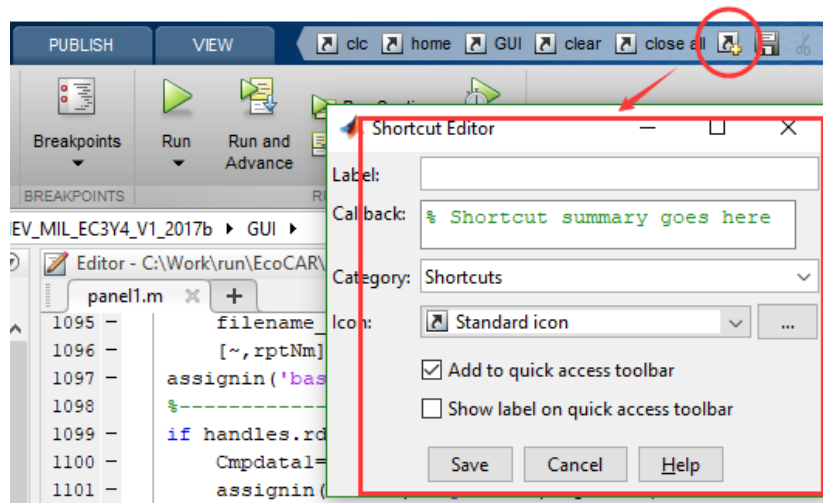
- a. Copy the “full path” of the “P2_PHEV_MIL_EC3Y4_V1_2017b_GUI_V1” in your PC to replace the code ('C:\Work\run\EcoCAR\PlantModels\P2_PHEV_MIL_EC3Y4_V1_2017b') in 1st line above



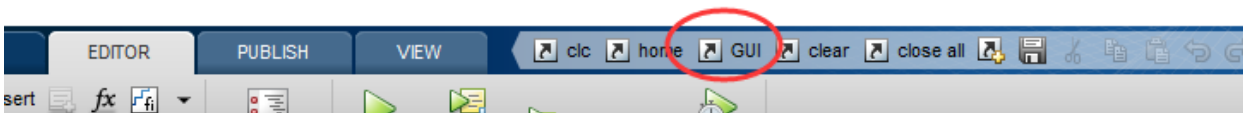
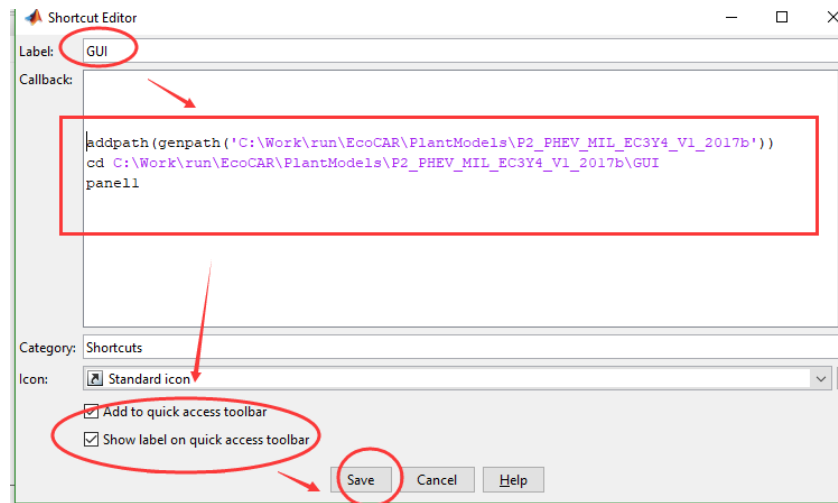
- b. Find the “GUI” folder inside the model and copy its fullpath to replace the code (C:\Work\run\EcoCAR\PlantModels\P2_PHEV_MIL_EC3Y4_V1_2017b\GUI) in 2nd line.



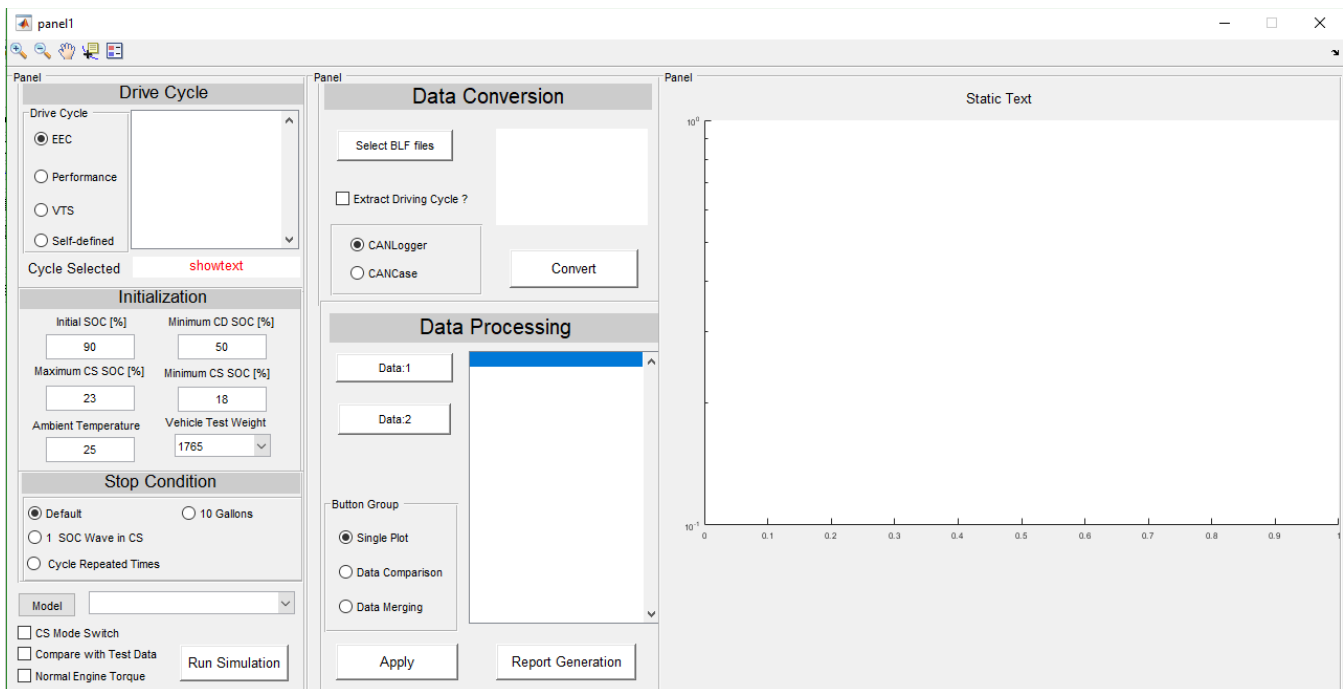
3) Click "Shortcut Editor"



4) Edit the shortcut editor as below (copy the modified codes in "step (2)" to correspondent blank)



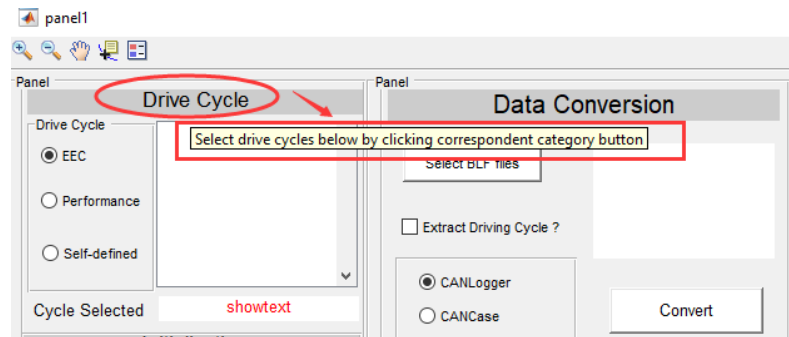
5) Click the GUI button (above) to open GUI



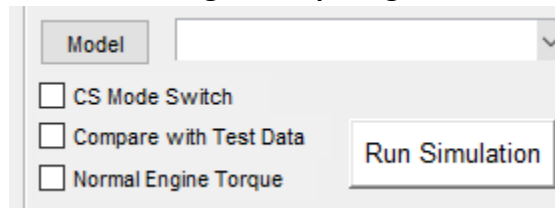
2. Instruction for use

Tips:

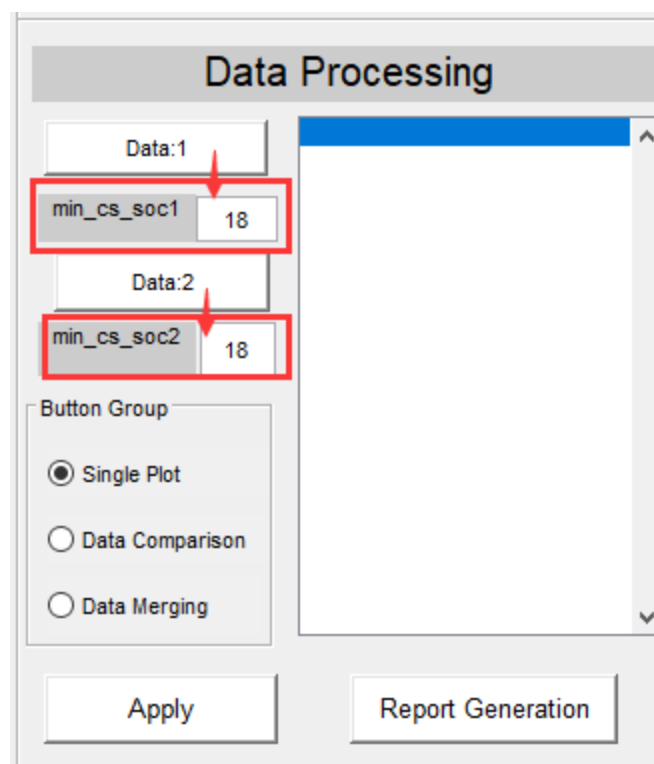
- Move your cursor to the contents to get detail instructions about the related item.



- When you want to compare test result after completing simulation, the normal engine torque checkbox below should be checked if the engine torque signal we use is the actual engine signal.



- When generate test report, the Minimum CS SOC should be set as the value in road test, for EEC calculation.



1) Run simulation

The screenshot shows a software interface for configuring a drive cycle simulation. The panel is titled "Drive Cycle" and contains several sections: "Drive Cycle" with radio buttons for EEC, Performance, VTS, and Self-defined (selected); a list of drive cycles with "D0209CD_EV" selected; a "Cycle Selected" box showing "D0209CD_EV"; an "Initialization" section with input fields for SOC and temperature; a "Stop Condition" section with radio buttons for Default, 10 Gallons, 1 SOC Wave in CS, and Cycle Repeated Times; a "Model" dropdown menu set to "Clutchless_P2_Parallel"; checkboxes for "CS Mode Switch", "Compare with Test Data", and "Normal Engine Torque"; and a "Run Simulation" button. Arrows point from numbered text boxes to these specific elements.

1' select drive cycle category

2' select drive cycle (e.g. D0209CD_EV)

PS: When the name of selected drive cycle is shown in the box in "Cycle Selected", it indicates the selection is effective, otherwise, ineffective, check the warning information in "Command Window"

3' Set initial values for parameters

4' Termination condition for simulation

Choose how you want to terminate the simulation. Put your cursor on the item to get details.

5' Click "Model" to display all plant models in the pop-up menu, then select the one you want to use

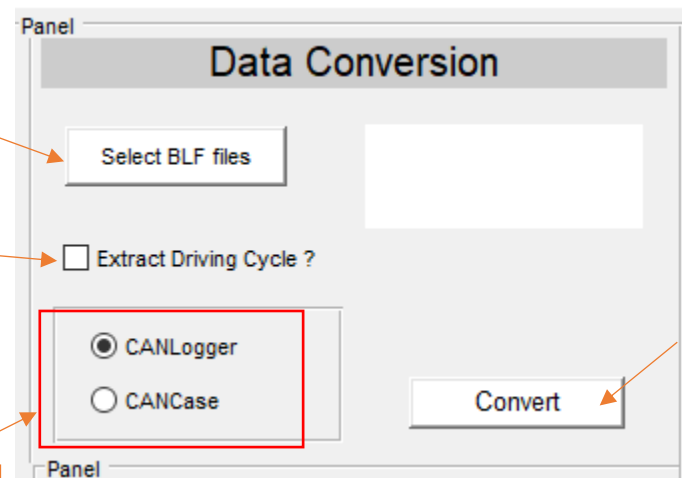
6' Choose operation on model / simulation result.

PS: Put your cursor on the item to get details.

7' Apply and Run simulation

PS: Correspondent calculation results generated and saved to the "SimMatFiles" folder.

2) Data conversion & Cycle extraction



1' Select BLF files

2' Choose whether to extract drive cycle simultaneously

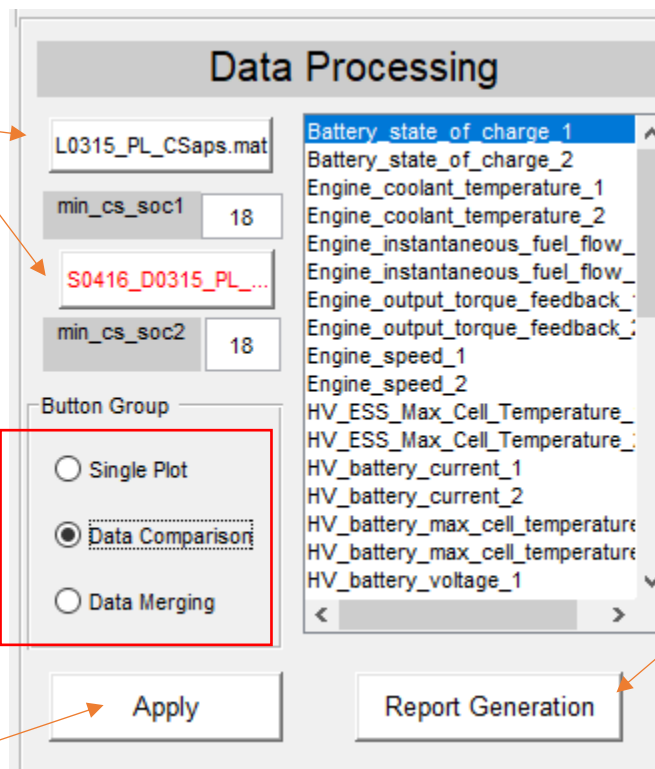
3' Select device where files from

4' Convert the file

PS: 1) mat file will be stored in "LoggerMatFiles" folder, and drive cycle will be stored in "DrivingCycleExtracted" folder

2) Extracted cycle automatically added to the GUI panel.

3) Data processing



1' click to select files

PS: If you want to process different files, import additional files using "select data 2"

2' select operation;

Input minimum CS SOC for EEC calculation if you want to generate related reports.

3' apply and plot signals

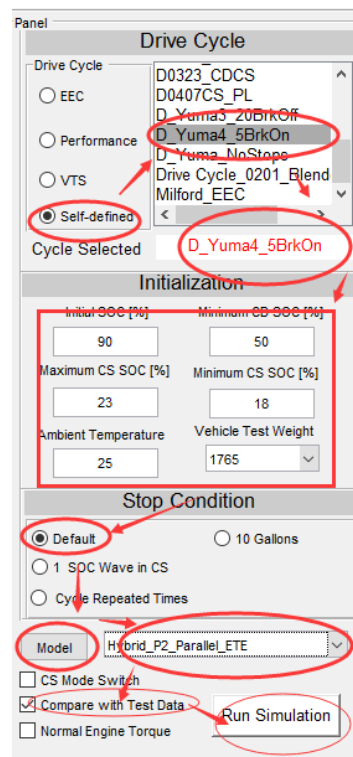
PS: Skip the step if not attempt to plot signal in the GUI

4. Generate related report

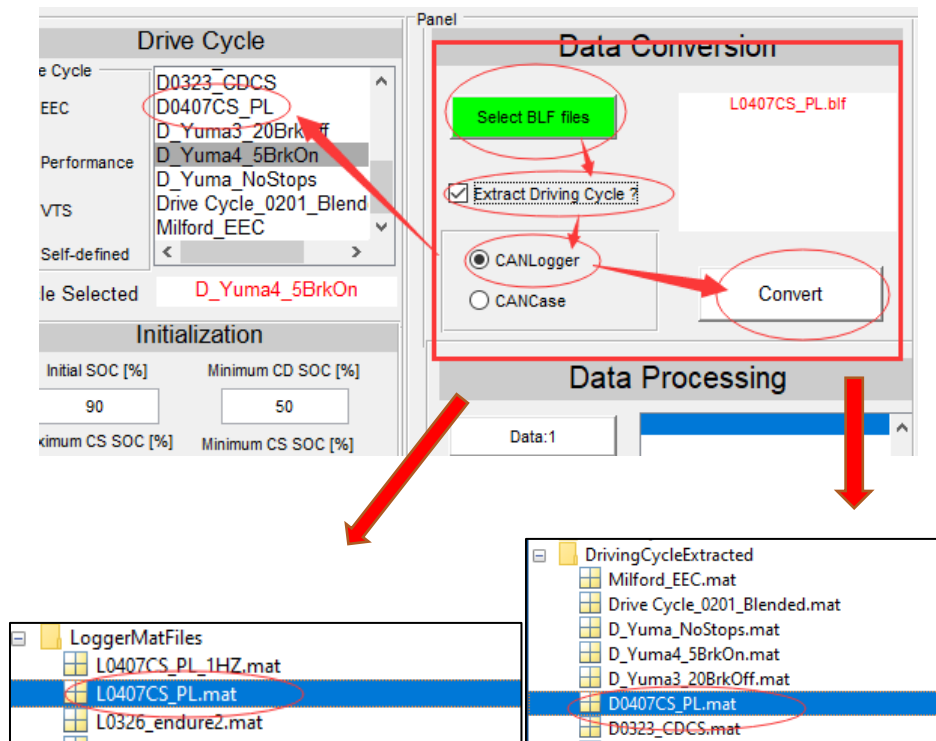
PS: report and figure will be stored in "ResultData" folder.

3. Examples for use

- 1) Conduct simulation for "Yuma 5 min break" drive cycle and compare the simulation result with test data result.



- 2) Convert BLF to MAT which will then be saved to “LoggerMatFiles” folder; and extract drive cycle which will be then stored in “DrivingCycleExtracted” and displayed in GUI “Drive Cycle”.



- 3) Test report generation (e.g. Compare 2 different data)

- Input different data, choose data comparison, then input minimum CS SOC for both data separately
- Report will be generated and saved to “Result Data” folder.

Data Processing

L0315_PL_CSaps.mat

min_cs_soc1 18

S0416_D0315_PL_...

min_cs_soc2 18

Button Group

☐ Single Plot

☒ Data Comparison

☐ Data Merging

Battery state of charge 1

Battery state of charge 2

Engine_coolant_temperature_1

Engine_coolant_temperature_2

Engine_instantaneous_fuel_flow_1

Engine_instantaneous_fuel_flow_2

Engine_output_torque_feedback_1

Engine_output_torque_feedback_2

Engine_speed_1

Engine_speed_2

HV_ESS_Max_Cell_Temperature_1

HV_ESS_Max_Cell_Temperature_2

HV_battery_current_1

HV_battery_current_2

HV_battery_max_cell_temperature_1

HV_battery_max_cell_temperature_2

HV_battery_voltage_1

Apply

Report Generation

ResultData

ToParkinglot_Result_1646

ToParkinglot319_Result_1558

ToGarage_Result_1652

L0407CS_PL_Result_1355

WithClutch_Clutchless_Transmission Operation.fig

WithClutch_Clutchless_Temperatures.fig

WithClutch_Clutchless_Motor and Engine Torque.fig

WithClutch_Clutchless_ESS.fig

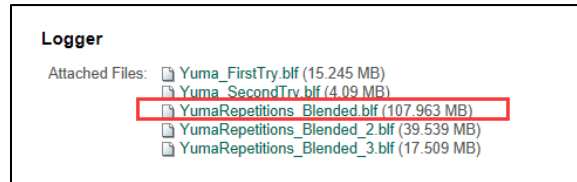
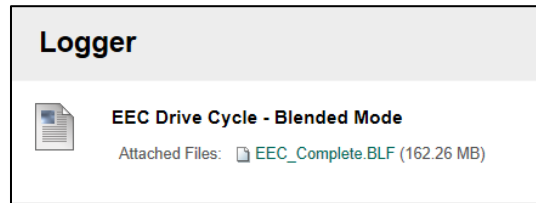
Vehicle Speed.fig

L0407CS_PL_Report_1355.docx

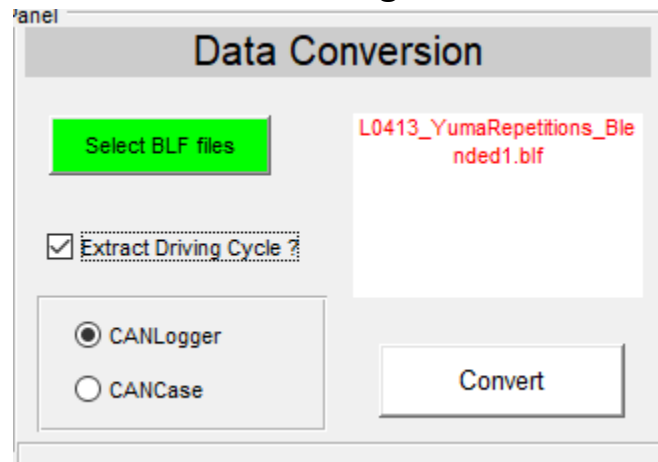
4. GUI Tests

1) Convert files

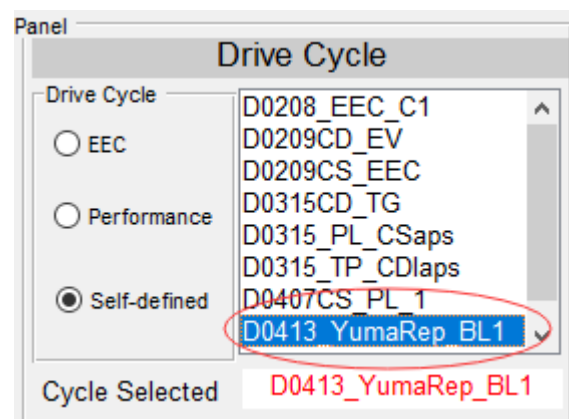
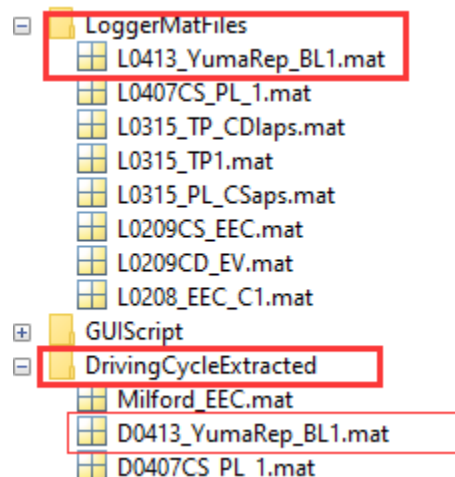
- a) Download 0208/0413 logging data and change their names to “L0208_EEC_Cmplt” and” L0413_YumaRep_BL1”



- b) Convert the files using “Data Conversion ” section in GUI as below



- c) After conversion completed, check if the converted file has been saved to the “LoggerMatFiles”,and extracted cycle to “DrivingCycleExtracted” folder.



2) Data analysis

a) Select data 1 and data 2 as below, and check “Data Comparison”

Data Processing

L0413_YumaRep_B...
min_cs_soc1: 18
L0208_EEC_C1.mat
min_cs_soc2: 52

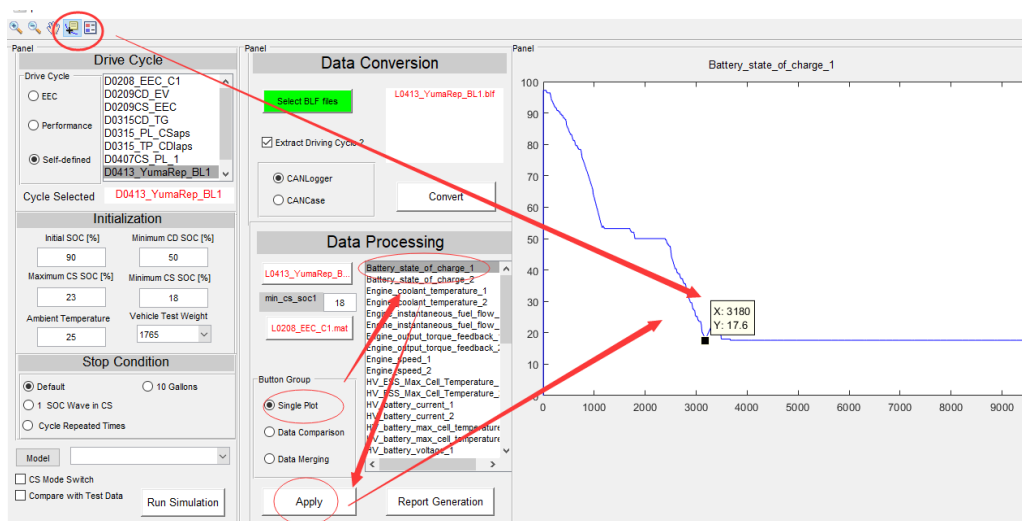
Button Group

☐ Single Plot
☒ Data Comparison
☐ Data Merging

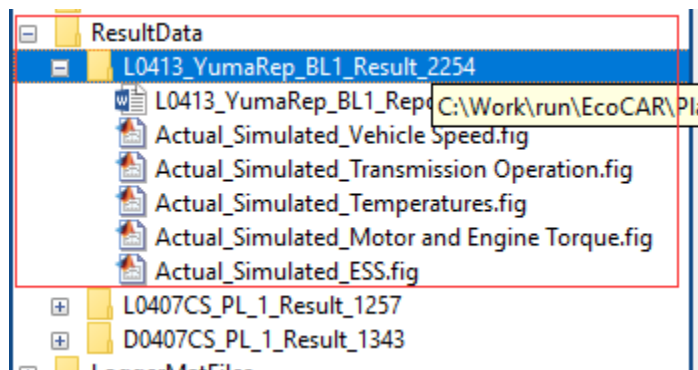
Apply Report Generation

b) Input cs_min_soc in the boxes separately, and press “Report Generation” to generate report.

(PS: Obtain the correspondent “cs_min_soc” as following)

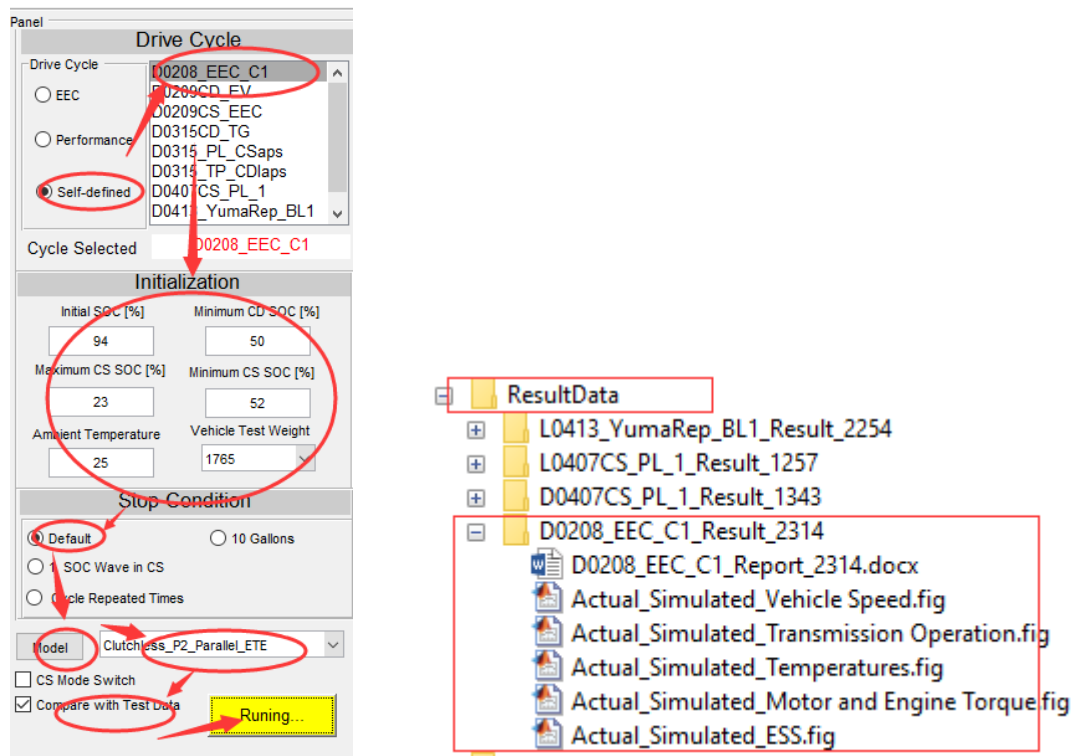


- c) Check if the report has been generated and saved to “ResultData” folder as below.



3) Simulation and result comparison

- a) Select and input values as following and conduct simulation.



- b) Check if the report has been generated and saved to “ResultData” folder as right above.