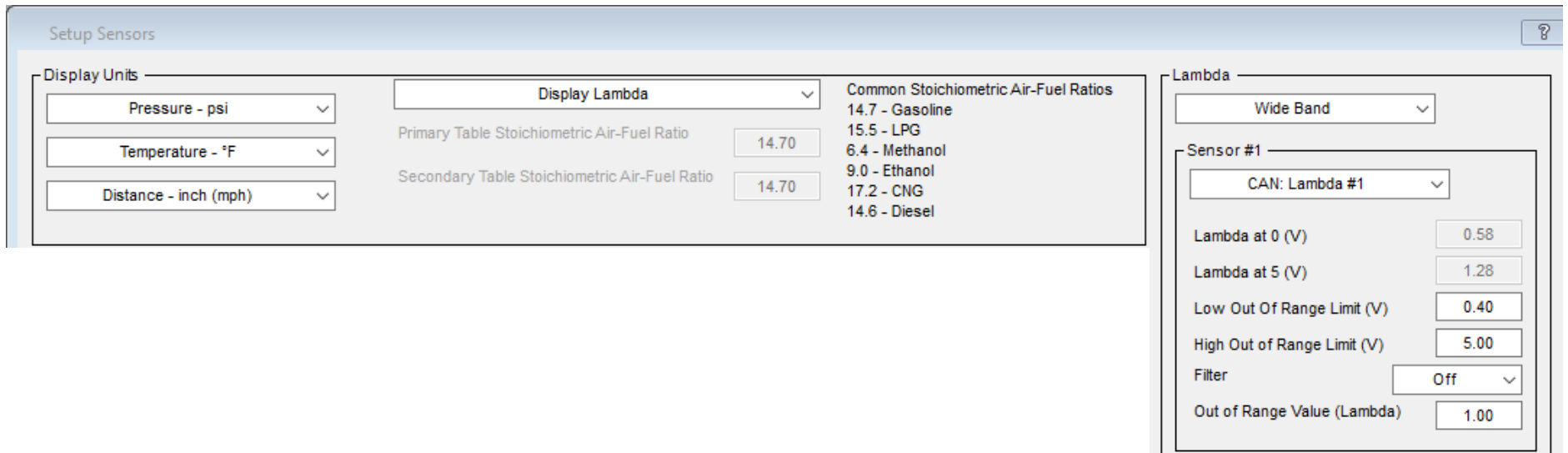
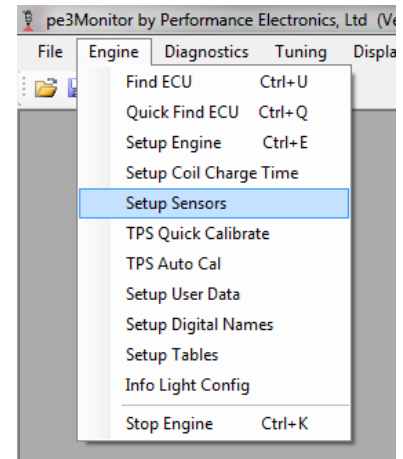


Introduction

The Drive-2-Tune feature in the PE3 ECU allows you to calibrate the amount of fuel delivered to your engine to reach a desired lambda/AFR (air-fuel ratio) that is set by the user. Once the Drive-2-Tune feature is configured, the user simply needs to log data under the desired running conditions for the engine’s specific application and then use this data to easily calibrate the main fuel table.

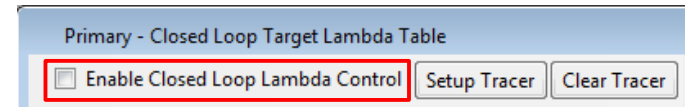
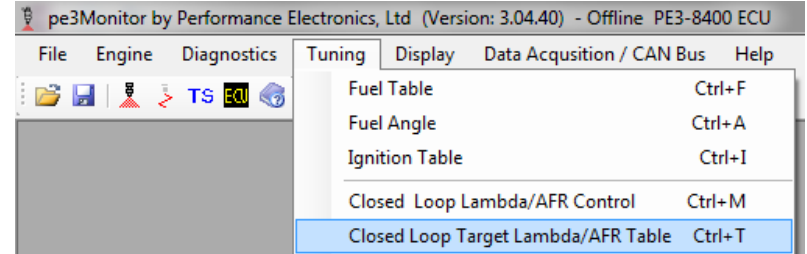
Setup Sensor

- You must have a wideband O2 sensor and module for Drive-2-Tune to operate
- Once you have connected a wideband module to the ECU (via analog input or CAN), navigate to ‘Engine’ >> ‘Setup Sensors’
- In this menu, you can also setup whether your units will be in lambda or AFR



Configure Target Lambda Table

- Navigate to 'Tuning' >> 'Closed Loop Target Lambda/AFR Table' or press 'Ctrl+T' on the keyboard.
- In the 'Primary – Closed Loop Target Lambda Table', confirm that the 'Enable Closed Loop Lambda Control' checkbox highlighted is NOT checked.
- Enter your desired values in the target lambda table. These values will be used by the Drive-2-Tune feature to calculate the appropriate correction factor to each cell in the primary fuel table.
- Example target lambda tables can be found online, below is for a forced induction application



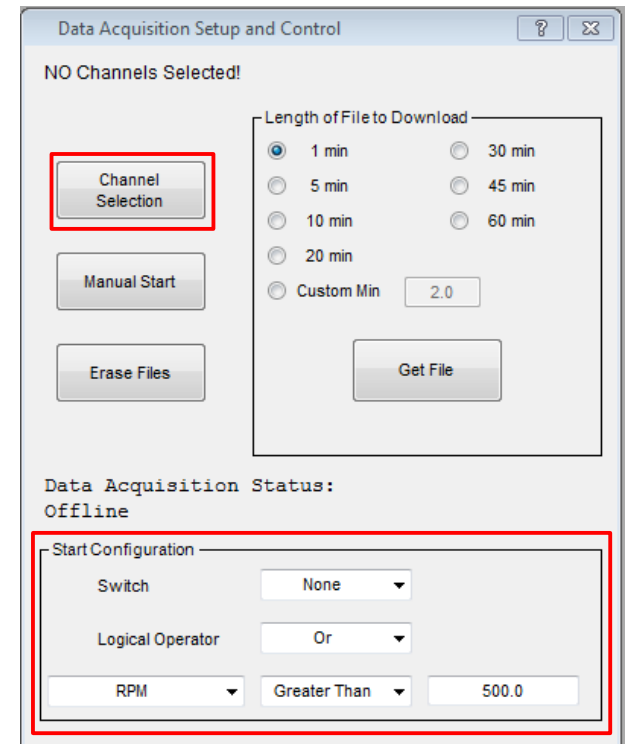
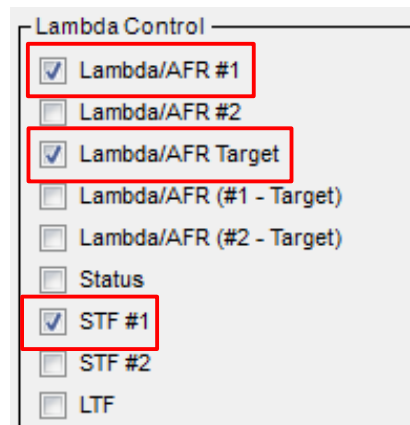
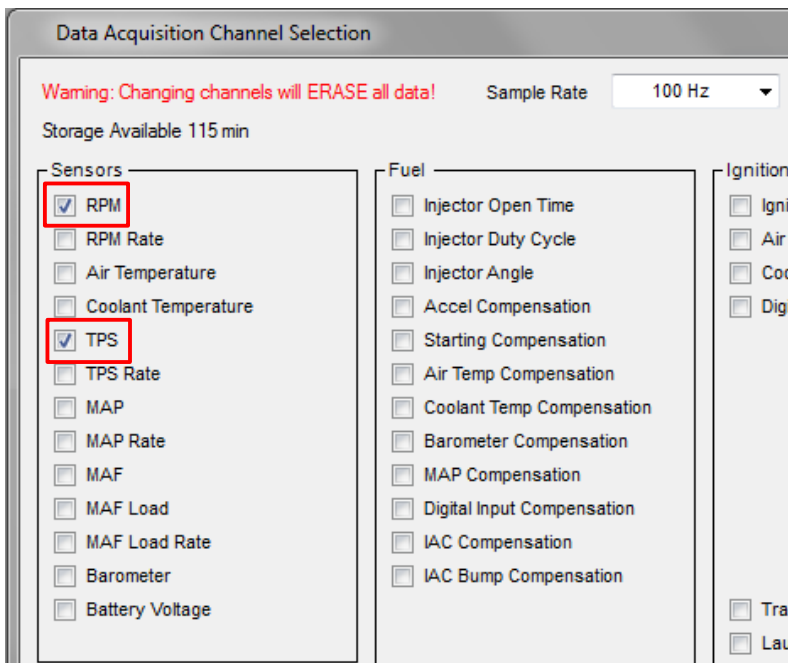
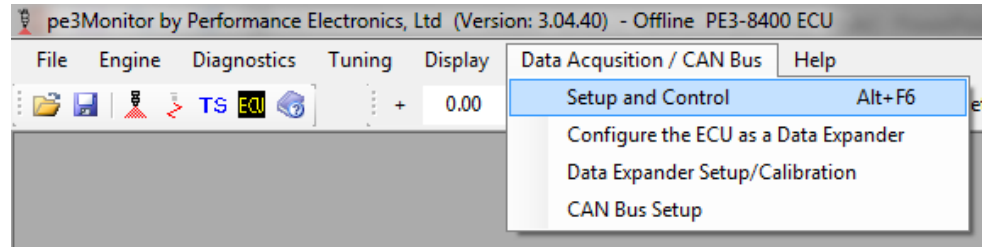
Primary - Closed Loop Target Lambda Table

Enable Closed Loop Lambda Control Setup Tracer Clear Tracer

		RPM																								
		500	750	1000	1250	1500	1750	2000	2500	3000	3500	4000	4250	4500	4750	5000	5250	5500	5750	6000	6500	7000	7500	8000	8500	9000
270.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
260.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
250.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
240.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
230.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
220.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
210.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
200.0	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78
190.0	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.81	0.81	0.80	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78
180.0	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.83	0.82	0.82	0.81	0.80	0.79	0.79	0.79	0.79	0.79	0.79
170.0	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.84	0.83	0.83	0.82	0.81	0.80	0.80	0.80	0.80	0.80	0.80
160.0	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.86	0.85	0.84	0.83	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
150.0	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.88	0.87	0.86	0.85	0.84	0.84	0.84	0.84	0.84	0.84	0.84
140.0	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.89	0.88	0.88	0.87	0.86	0.86	0.86	0.86	0.86	0.86
130.0	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.91	0.90	0.90	0.89	0.88	0.88	0.88	0.88	0.88	0.88
120.0	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.93	0.92	0.92	0.91	0.90	0.90	0.90	0.90	0.90	0.90
110.0	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.94	0.94	0.93	0.92	0.91	0.91	0.91	0.91	0.91	0.91
100.0	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.96	0.96	0.95	0.94	0.93	0.93	0.93	0.93	0.93	0.93
90.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
80.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
70.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
60.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
50.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
40.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
30.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95
20.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.95

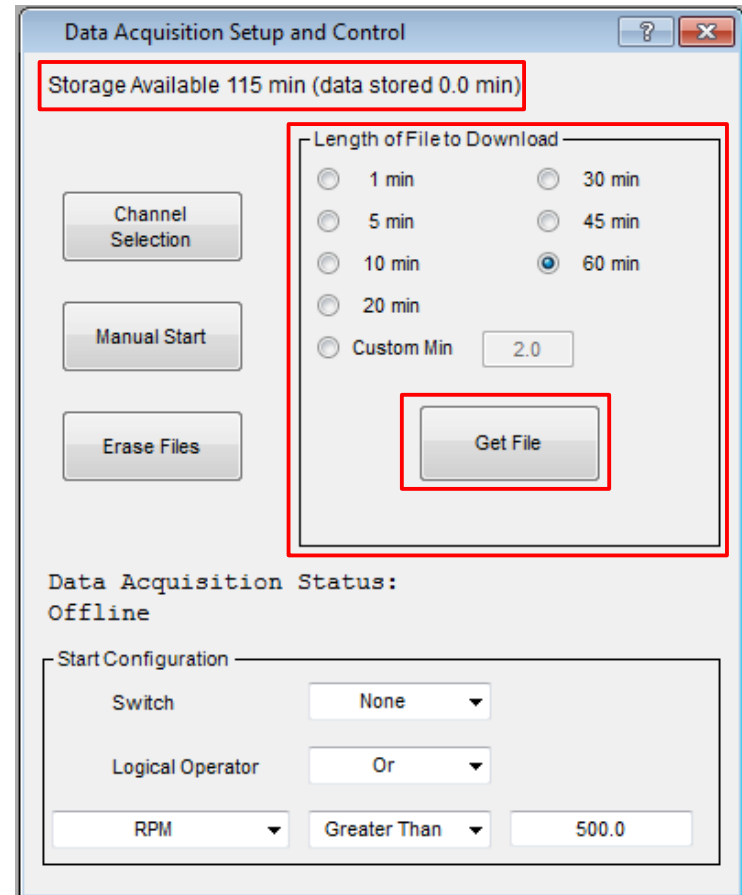
Configure Data Acquisition

- Go to 'Data Acquisition/CAN Bus' >> 'Setup and Control' or press 'Alt+F6'.
- Setup the 'Start Configuration'. This controls when the data starts recording, in this case, anytime the RPM is greater than 500.
- In the 'Data Acquisition Setup and Control' menu, select 'Channel Selection' and select the checkboxes next to the following: RPM, Load (TPS, MAP, or MAF depending on your engine configuration), Lambda/AFR, Target Lambda/AFR, and Lambda/AFR STF.



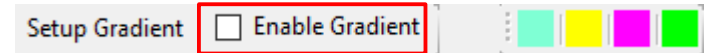
Save Changes, Drive the Vehicle, and Download Data

- Save all the changes made to the ECU and go operate the vehicle like normal.
- To save the data from vehicle operation, select the length of time of the operating session, then select 'Get File' in the 'Data Acquisition Setup and Control' menu, and select a file location on your PC.
- Note: The number of minutes of storage available and number of minutes of data stored can be viewed at the top of the 'Data Acquisition Setup and Control' menu.



Drive-2-Tune

- Connect to the ECU with your PC.
- Open the Primary Fuel Table by going to 'Tuning' >> 'Fuel Table' or pressing 'Ctrl+F'
- Check that 'Enable Gradient' is unchecked
- In the Primary Fuel Table, select 'Setup Tracer'
- Select the 'Enable Tracer' checkbox and select the 'Drive-2-Tune' button.
- Input your desired gradient values in the highlighted area.
- Enter the minimum number of lambda/AFR averages in the highlighted area. This is the number of lambda/AFR samples required in a specific cell before the Drive-2-Tune feature will allow you to adjust your injector open time in that particular cell
- Select 'Read lambda/AFR data from .csv file', and open the data file of the vehicle being driven you saved earlier
- Select 'OK'



Primary - Fuel Table - Injector Open Time (ms)

Enable Fuel **Setup Tracer** Clear Tracer

	0	325	650	975	1300
100.0	6.00	6.00	6.00	6.00	6.00
96.0	5.81	5.81	5.81	5.81	5.81

Setup Tracer

Enable Tracer

Solid color tracer

Color based on lambda/AFR value of the cell

Drive-2-Tune

0.70 Lambda/AFR value where the gradient is blue

1.00 Lambda/AFR value where the gradient is red

Drive-2-Tune

In order to read lambda/AFR from a .csv file the file must include at a minimum lambda/AFR, target lambda/AFR, lambda/AFR STF, rpm and load.

The engine configuration must be exactly the same as when the data was stored.

Minimum number of lambda/AFR averages: 10

Viewing the Data

- In the primary fuel table, the average lambda/AFR values for each cell of your vehicles operation are displayed with the color gradient.

Primary - Fuel Table - Injector Open Time (ms)

Enable Fuel

RPM

	0	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575	3900	4225	4550	4875	5200	5525	5850	6175	6500	6825	7150	7475	7800		
100.0	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
96.0	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81
92.0	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63
88.0	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44
84.0	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
80.0	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06
76.0	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88
72.0	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69
68.0	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
64.0	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31	4.31
60.0	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13
56.0	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94
52.0	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
48.0	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56
44.0	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
40.0	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19
36.0	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
32.0	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81
28.0	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63
24.0	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
20.0	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
16.0	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06
12.0	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
8.0	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
4.0	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
0.0	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31

- When you hover the cursor over a cell, the following 3 values for that particular cell will pop up:
 - average lambda/AFR (.72 in this example)
 - (number of samples taken) (18 in this example)
 - [correction factor required to achieve lambda = 1.00] (.84 in this example)

	6500	6825	7150	7475	7800
6.00	6.00	6.00	6.00	6.00	6.00
5.81	5.81	5.81	5.81	5.81	5.81

0.72 (18) [0.84]

Tuning the Primary Fuel Table

- To make fuel corrections in your primary fuel table, highlight the cells you would like to correct by clicking and dragging, then use one of the two following methods:

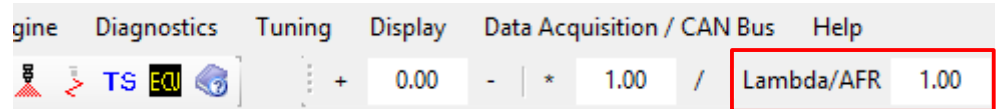
1. To correct fuel to achieve the value you've entered in the tool bar at the top of the screen:

- right click over the selected area and select 'Lambda/AFR Selected Adjust'
- or
- press 'Ctrl+L' on the keyboard

2. To correct fuel to achieve your target lambda table:

- right click over the selected area and select 'Lambda/AFR Target Selected Adjust'
- or
- press 'Ctrl+?'

- This will multiply the injector open time by the calculated correction factor for each individual cell in order to meet the desired target lambda.
- Once you've modified a cell, it will be 'Locked', preventing the cell from being accidentally corrected multiple times.
- Save the tune to the ECU and the corrections you made will be saved. You can repeat this process to continuously refine your vehicle's tune!



6500	6825	7150	7475	7800	
6.00	6.00	6.00	6.00	6.00	
5.81	5.81	5.81	5.81	5.81	
5.63	5.63	5.63	5.63	5.63	
5.44	5.44	5.44	5.44	5.44	
5.25	5.25	5.25	5.25	5.25	
5.06	5.06	5.06	5.06	5.06	
4.88	4.88	4.88	4.88	4.88	
4.69	4.69	4.69	4.69	4.69	
4.50	4.50	4.50	4.50	4.50	
4.31	4.31	4.31	4.31	4.31	
4.13	4.13	4.13	4.13	4.13	
3.94	3.94	3.94	3.94	3.94	
3.75	3.75	3.75	3.75	3.75	
3.56	3.56	3.56	3.56	3.56	
3.38	3.38	3.38	3.38	3.38	
3.19	3.19	3.19	3.19	3.19	
3.00	3.00	3.00	3.00	3.00	
2.81	2.81	2.81	2.81	2.81	
2.63	2.63	2.63	2.63	2.63	
2.44	2.44	2.44	2.44	2.44	
2.25	2.25	2.25	2.25	2.25	
2.06	2.06	2.06	2.06	2.06	
1.88	1.88	1.88	1.88	1.88	

Add Selected	0.00	Ctrl+Add
Subtract Selected	0.00	Ctrl+Subtract
Multiply Selected	1.00	Ctrl+Multiply
Divide Selected	1.00	Ctrl+Divide
Interpolate by Row and Column		Ctrl+H
Interpolate by Row		
Interpolate by Column		
Weighted Average by Row and Column		Ctrl+W
Weighted Average by Row		
Weighted Average by Column		
Add Red Block	0.00	Alt+Add
Subtract Red Block	0.00	Alt+Subtract
Multiply Red Block	1.00	Alt+Multiply
Divide Red Block	1.00	Alt+Divide
Copy		Ctrl+C
Paste		Ctrl+V
Undo		Ctrl+Z
Lambda/AFR Red Block Adjust	1.00	Alt+L
Lambda/AFR Selected Adjust	1.00	Ctrl+L
Lambda/AFR Target Red Block Adjust		Alt+R
Lambda/AFR Target Selected Adjust		Ctrl+R