AutoTune User Guide

1) Glossary

AutoTune	A feature with in WRT that allows the user to review and apply logged AFR Data.
Bin File	The program and data that is inside your ECU which controls the electronics on the motorcycle. Bin file contains the map that the ECU uses to determine AFRs dependent upon real time engine measurements.
Logged Data	Data that is logged to the SD card in the Logbox. This includes the AFR from the Wideband O2 sensor and real time engine data from the ECU.
Target AFR	The desired AFRs
IAP	This is a measure of the difference between the atmospheric pressure and the manifold pressure.
TPS	The throttle position measured from fully closed to fully open.
Map	A table of data that is a visual representation that is inside the ECU.

2) Abbreviations

ECU	Engine Control Unit
RPM	Revolutions Per Minute
IAP	Inlet Absolute Pressure
TPS	Throttle Position Sensor
AFR	Air Fuel Ratio
WRT	Woolich Racing Tuned Software

3) Introduction

The aim of User Guide is to show users of our Log Box and Log Box Pro products how to log data and AutoTune their fuel maps using the logged data.

This manual is intended for racing motorcycles to obtain optimum performance which may change or vary with racing conditions and/or tracks. It is important to note this is not applicable to registered motorcycles used on public roads which must comply with your local design and emission standards. Making any changes may result in your motorcycle not being road worthy or legal.

Please refer to bike specific Installation Manuals and Interface user guides on our website to install and setup your Woolich Racing products:
http://www.woolichracing.com/UserGuides.aspx

This guide will not cover basic use of the WRT software, if you need further information on how to use the WRT software, editing maps and settings and writing to the ECU please refer to the video tutorials in the Support Centre on our web site:
http://www.woolichracing.com/supportcenter.aspx

4) Hardware

To use the AutoTune feature you will require the following:

1) The required Logbox and on bike harness for your Motorcycle.
2) The Woolich Racing Zeitronix Wideband Sensor & Zeitronix ZT3 O2 Controller.
3) Associated Zeitronix Hardware including O2 Harness, RJ12 Cable and Power Harness.

5) What is AutoTune

The Woolich Racing AutoTune is used with one of our Log Box or Log Box Pro interfaces to tune the fuel maps in your motorcycle using data collected from the motorcycle. The logged data records the current state of tune of the motorcycle, while the AutoTune module in the WRT software takes the logged data, and the Target AFR uses this to determine what changes are required to the fuel maps to tune your bike.

This approach allows you to log data from your bike in real world conditions, and the AutoTune process then accounts for any modification you have made to your bike e.g. after market exhausts, air filter. The AutoTune process also accounts for the prevailing conditions e.g. Altitude, temperature, fuel etc.

6) Before you start AutoTune

Before you start using the Woolich Racing AutoTune it is recommended you ensure the following is taken into consideration:

You will need a Log Box or Log Box Pro Interface (hereafter referred to as 'Log Box'). The Log Box is a Woolich Racing product that connects to your electronic control unit (ECU) to log engine data from the ECU and AFR from a wideband oxygen sensor. If you do not have a Log Box and a wideband oxygen sensor, then you cannot AutoTune.

The Log Box connects to a Woolich Racing on bike harness, the on bike harness connects to the Diagnostic Plug on your motorcycle. The diagnostic plug provides the real time engine data directly from the ECU.

You should have your motorcycle in optimum serviced condition, particularly with regard to air cleaner and spark plugs, oil and filter. Ensure you have no exhaust leaks as this also detrimentally affects logged AFR and therefore AutoTune results.

Ensure the **PAIR Valve** is blocked off. You can do an internet search based on your motorcycle brand and model to determine how to block off the PAIR valve. It may also be referred to an Air Injection System (AIS).

Rider Aides including **Traction Control, Slip Control, Wheelie Control** etc. should be turned off while logging data to be used for AutoTune. These features can affect the AFR when they are active which will result in the logged data containing incorrect AFR's.

To begin an AutoTune session you will need access to one or more log files generated by the Log Box. It is recommended to have at least 15-30 minutes ride time logged for each log file.

You will need to measure or obtain the *Header Pipe Diameter* and *Header Pipe Length*. So you can enter the parameters for the Exhaust Gas Offset.

If you can select different ride modes on your motorcycle such as Full Power, Rain etc. ensure you select the correct mode that you are tuning for before test riding.

5) The AutoTune Process

At this point you should be ready to use AutoTune for the first time. The following will use the default Target AFR as supplied by Woolich Racing.

The basic AutoTune process in an iterative process where the actual AFR's that are logged during a test ride will trend closer towards the target AFR's after each iteration. As a general rule the process will need to be repeated 4 or 5 times.

1) Test ride and Log Data.

2) Copy Log Files from Log Box to the directory containing the Bin File that was in the ECU when they were created. e.g. if you have saved the current Bin File in "Session 1" folder, move the Log Files from the Log Box to the Session 1 folder.

3) Delete the log files from the Log Box.

4) Open Relevant Bin File in the WRT software.

5) Open AutoTune Screen.

6) Open Log Files from the Session 1 folder.

7) Review Data.

8) Apply AutoTune.

9) Save Bin File to new "Session" folder with the next sequential number e.g. Session 2.

10) Write Bin File to ECU.

Go to step 2 and repeat until bike is satisfactorily tuned.

5) Starting AutoTune and On Screen Navigation

1) Open a new bin file, or a previously edited bin file within the WRT software. The AutoTune functionality is selected from the main WRT software application.
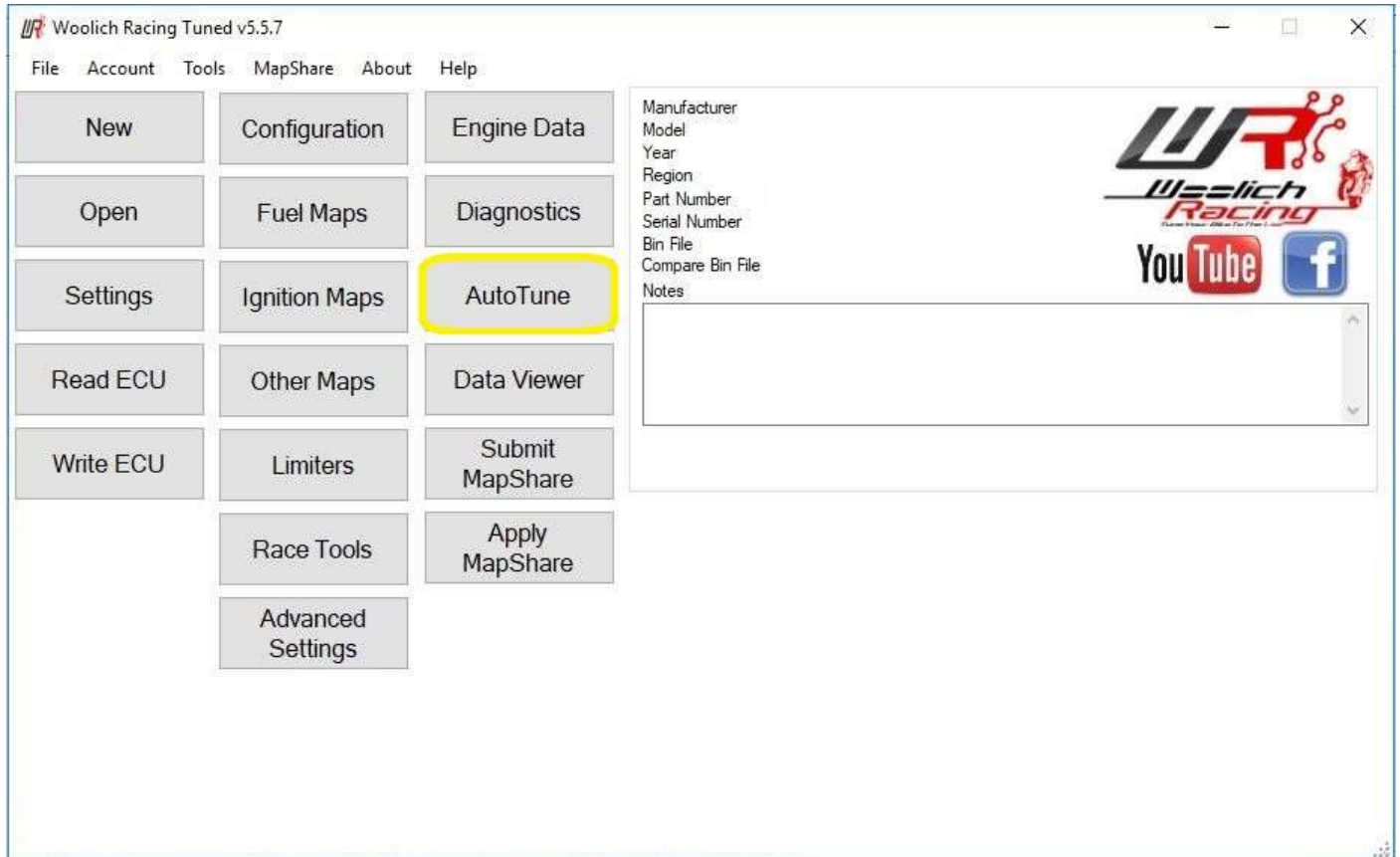
2) You will be prompted to Unify Fuel Map. It is suggested to choose Yes.
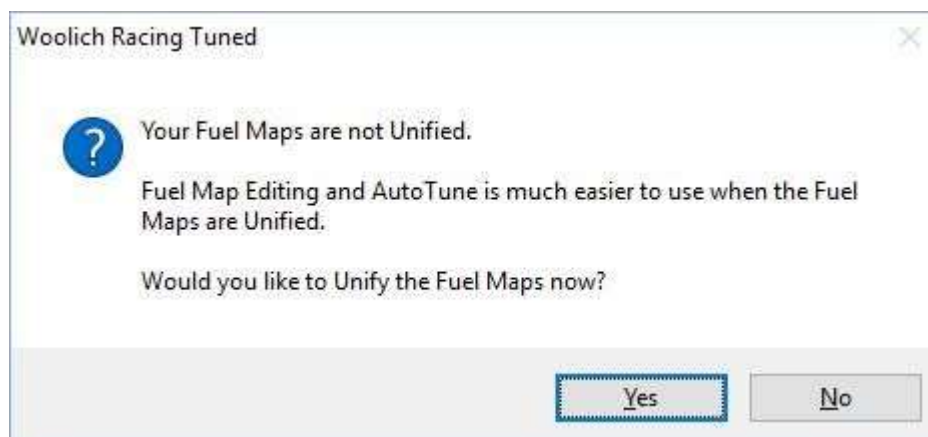
3) In the Bin File Configuration box make the selection as shown: Unifying the Cylinder Fuel maps allows you to tune one map and the changes are applied equally to the Individual Cylinder fuel maps, while maintaining the offset between the maps. The other unification settings may be applicable to your situation, please choose accordingly.
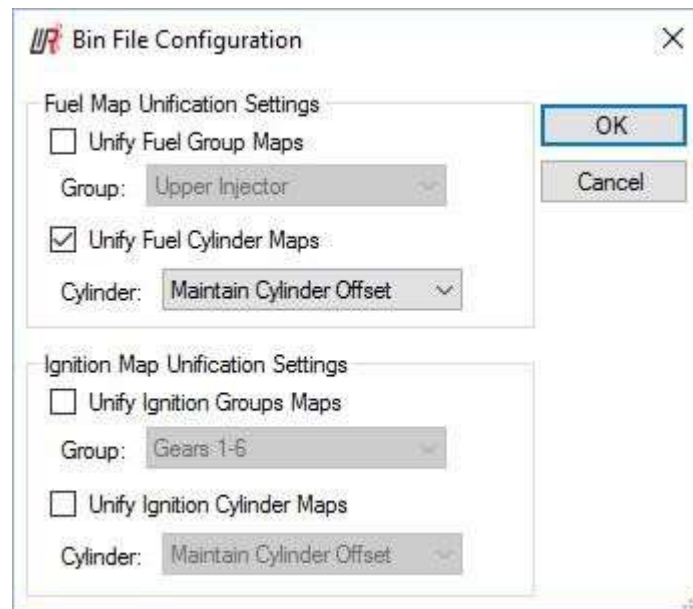
4) In the AutoTune Screen select the Settings option to then access the Exhaust Gas Offset.
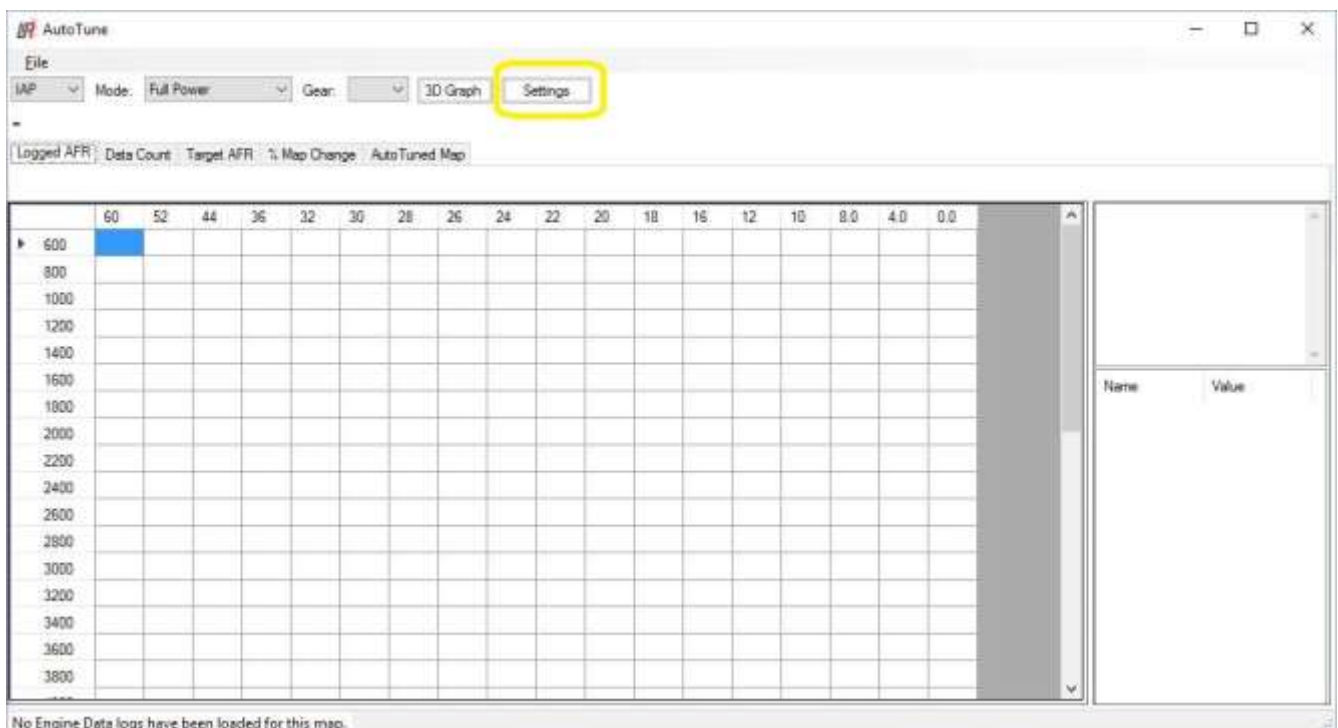
5) The exhaust gas offset accounts for the finite amount of time that it takes for the exhaust gases to travel from the combustion chamber, through the exhaust pipe to the Wideband O2 sensor. Enter the relevant values, in particular Header Pipe Diameter and Header Pipe Length.

6) Select File | Open Log File and navigate to your WRL file/s and a screen similar to the following will contain the data that was logged during your test ride. Note you can select multiple WRL files in the Open file window using normal Windows selection using the ctrl and/or shift keys. The multiple files will be aggregated into one and displayed Logged AFR using sophisticated algorithms to correlate, filter and smooth the data. Access the Data Filters by selecting Settings.

AutoTune

File

IAP | Map Select: 1 | Mode: A | Group: Gears 1-6 | Gear: | 3D Graph | Settings

Logged AFR | Data Count | Target AFR | % Map Change | AutoTuned Map

RPM	59	51	43	35	33	31	29	27	25	23	21	20	18	16	12	9.8	7.8	5.9	3.9	2.0	0.0
800																					
1000													14.6								
1200							14.0	14.1	14.4	14.6	14.6				14.7	14.7					
1400						14.7	14.2	14.2	14.3	14.4	14.4		14.8	14.8	14.7	14.2	14.0	13.6			
1600					12.4	13.8	13.9	14.0	14.4	14.1	14.0		14.2	13.9	14.1	13.7	14.0	13.8	13.6		
1800					12.6	13.5	13.9	13.7	13.5	13.6	13.6		13.8	13.8	13.7	13.8	13.7	13.5	13.2		
2000				13.4	13.1	13.5	13.6	13.3	13.3	13.3	13.4		13.7	13.6	13.5	13.2	13.3	13.3	13.3	13.3	
2200				13.2	13.3	13.2	12.9	13.0	13.3	13.3	13.2		13.5	13.4	13.4	13.2	13.2	13.2	13.3	13.4	
2400			13.5	13.5	13.3	13.0	12.9	13.0	13.0	13.1	13.0		13.3	13.1	13.2	13.2	13.2	13.2	13.0	13.0	
2600			13.7	13.5	13.3	13.3	13.2	13.2	13.1	13.2	13.1		13.1	13.0	13.0	13.1	13.1	13.0	13.1	13.3	
2800				13.6	13.3	13.0	12.8	12.9	13.0	13.0	13.0		12.9	12.8	12.8	12.9	13.0	13.0	13.0	13.2	12.9
3000			13.7	13.5	13.0	12.9	12.9	12.9	13.0	13.0	12.9		13.0	13.1	13.2	13.3	13.4	13.3	13.4	13.6	
3200				14.0	13.6	13.1	13.2	13.1	13.1	13.3	13.3		13.2	13.1	13.2	13.3	13.4	13.2	13.3	13.5	
3400				13.6	13.3	13.0	13.1	13.1	13.1	13.2	13.2		13.1	13.2	13.3	13.3	13.2	13.3	13.3	13.5	
3600				14.3	13.2	12.9	13.0	13.0	13.0	13.0	13.1	13.2	13.2	13.3	13.3	13.2	13.2	13.2	13.3	13.2	
3800				14.0	13.0	12.6	12.9	13.1	13.1	13.0	13.0		13.0	13.1	13.2	13.2	13.1	13.0	13.2	13.3	13.4
4000				14.5	12.7	12.6	12.9	13.1	13.1	13.1	13.1		13.1	13.2	13.2	13.2	12.9	13.0	13.2	13.2	
4200				13.8	12.6	13.1	13.3	13.1	13.2	13.2	13.2		13.3	13.3	13.1	13.3	13.2	13.1	13.2	13.2	
4400				13.4	12.4	13.5	13.7	13.5	13.5	13.5	13.4		13.4	13.4	13.5	13.8	13.4	13.4	13.5	13.6	
4600		14.9	13.0	11.7	13.6	13.7	13.6	13.5	13.3	13.3	13.4		13.3	13.3	13.2	13.3	13.3	13.4			
4800			12.2	12.7	13.7	13.6	13.5	13.5	13.2	13.3	13.3		13.2	13.2	13.1	13.2	13.3				
5000			12.4	12.4	13.5	13.7	13.2	13.1	13.0	13.0	13.2		13.2	13.2	13.1	13.3	13.2				
5200		16.0	13.3	12.7	13.7	14.0	13.4	13.2	13.2	13.2	13.1		13.0	13.0	13.0	12.9	13.0				
5600		16.5	12.7	11.8	14.9	14.7	13.8	13.6	13.6	13.3	13.1		12.9	13.0	13.0	13.5					

7) AutoTune Screen Navigation

Glossary of features in AutoTune.

Logged AFR	The cells in which the AFR is displayed.
Data Count	The number of data logs that were collected for that cell. Generally more data is better.
Target AFR	A set point to achieve the desired AFR Target.
% Map Change	The calculated change required to move the cell towards the Target AFR. A sophisticated algorithm is applied to each cell with takes into consideration the logged AFR and adjacent cells and a smoothing algorithm to determine a % Map Change.
AutoTune Map	The AutoTuned Map shows what the fuel maps will be once the AutoTune has been applied.
Show Original Map	The Fuel Map before the AutoTune applied.
Apply AutoTune	This is the Fuel Map that will be applied to be written to the ECU.
Add	Increasing Fuel to the Map.
Subtract	Reducing Fuel to the Map.
Copy	Copying the selected value.
Paste	Pasting the selected value
Set	By selecting a number of cells the set feature will set all the values the same.
Default	Default WRT AFR Table.

Fuel Maps:

1) There are generally 2 different types of fuel maps available in a bin file. The IAP fuel maps are used at partial throttle and when cruising up to about 10-14% TPS. Above this range the TPS maps are used. The transition from IAP to TPS fuel maps is not abrupt. There is a region where they blend from one to the other.
You can change between IAP and TPS fuel maps in the drop down toward the top of the AutoTune screen. When IAP is selected the horizontal scale represents a pressure difference between atmospheric pressure and manifold pressure. When TPS is selected the horizontal scales represents the TPS from closed to open.
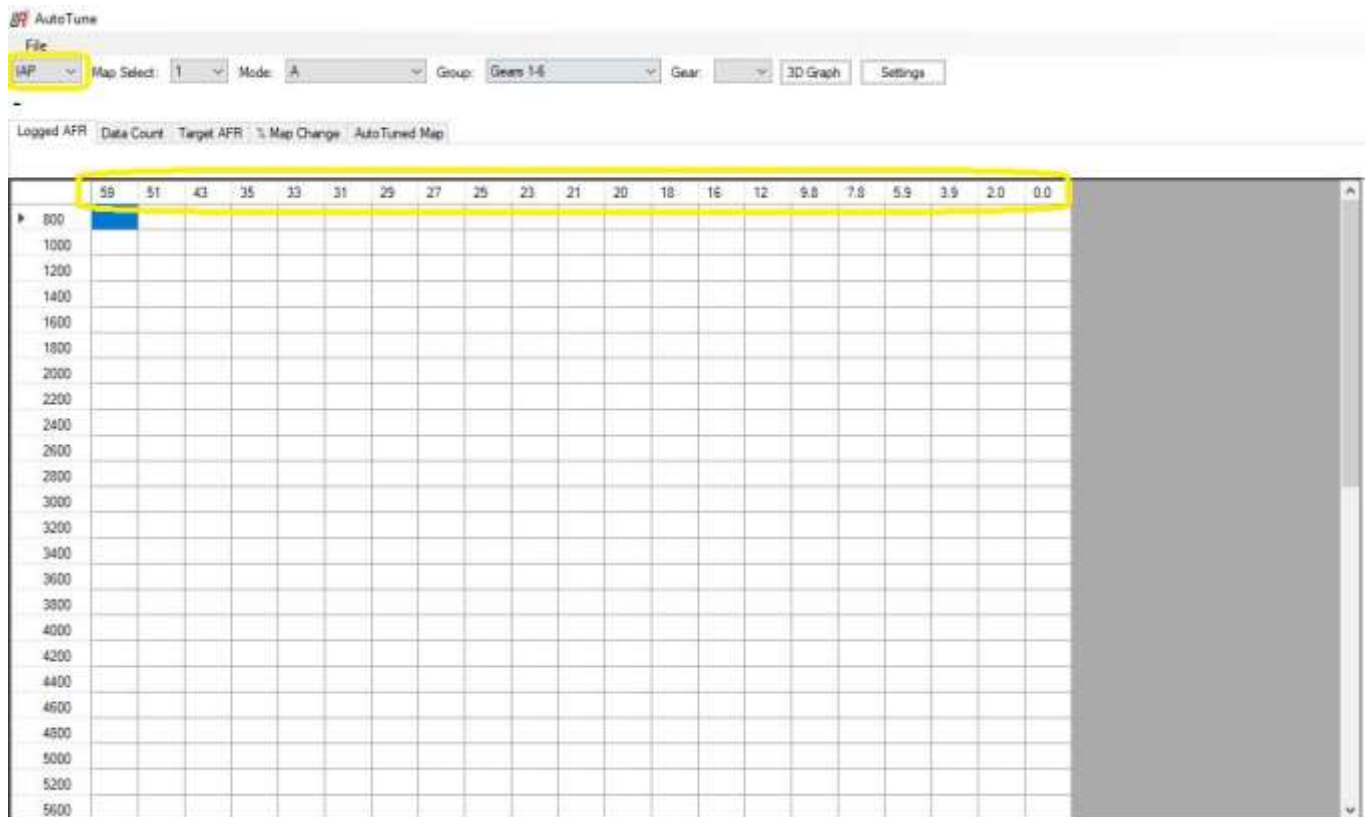
Review Logged AFR:

1) When you first open a log file/s in the AutoTune you should review the data in the Logged AFR tab. Ensure that the data is a reasonable representation of the conditions and riding when the data was logged. Check for any suspicious data that could indicate a problem with the bike.

2) The various tabs across the screen will be described below via examples. The colour codes of each of the cells indicates whether the actual logged data point is running rich or lean compared to the desired Target AFR for the cell. A red cell indicates a lean condition while a blue cell indicates a rich condition. The intensity of the colour is a visual guide to indicate how much of a difference exists between the actual logged AFR and the desired Target AFR for that particular cell.

Logged AFR: The cell at 3800 RPM and 16% TPS shows 13.3 as the logged AFR.

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
800	12.7																						
1000	14.6																						
1200	14.4		14.7								14.8	14.8											
1400	14.3	14.4	14.7	13.8	13.7	14.7			14.6	14.4	14.5	14.7	14.8										
1600	13.9	13.9	14.3	13.9		13.8	13.0	14.3	14.6	14.4	14.2	14.0	13.9										
1800	13.6	13.7	13.9	13.8	13.6	13.7	13.2	14.2	14.5	13.4	13.6	13.6											
2000	13.4	13.2	13.6	13.9	13.5	13.5	13.0	13.1	13.3	13.3	13.2	13.2											
2200	13.2	13.3	13.3	13.5	13.4	13.3	13.2	13.0	13.1	13.3	13.3												
2400	13.3	13.0	12.9	13.1	13.3	13.1	13.1	13.0	13.1	13.1	13.1												
2600	13.4	13.2	13.2	13.1	13.1	13.0	13.2	13.1	13.2	13.1	13.1												
2800	13.2	12.9	13.0	12.9	12.8	12.9	12.8	12.9	13.0	13.1	13.3	13.3											
3000	13.3	12.9	13.0	13.0	13.1	13.1	13.0	13.1	13.4	13.3	13.6	13.7	13.8										
3200	13.7	13.1	13.1	13.3	13.2	13.2	13.3	13.3	13.3	13.2	13.6		13.7	13.6									
3400	13.6	13.1	13.1	13.1	13.1	13.1	13.3	13.3	13.3	13.3	13.5			13.3									
3600	13.8	13.0	13.0	13.0	13.1	13.1	13.4	13.3	13.3	13.2	13.3	13.4	13.4	13.3									
3800	13.7	12.8	13.1	13.1	13.0	13.0	13.3	13.2	13.1	13.1	13.3	13.3	13.3	13.2	13.4	13.5	13.6	13.7	13.7	13.7	13.5	13.1	
4000	14.5	12.7	13.0	13.1	13.1	13.1	13.3	13.2	12.8	13.0	13.3	13.3	13.6	13.4	13.4	13.5	13.3					13.0	12.9
4200	13.5	12.6	13.2	13.1	13.2	13.2	13.3	13.2	13.2	13.1	13.3	13.3			13.6	13.4		13.2	13.1	13.0	12.9		13.5
4400	13.4	12.3	13.3	13.5	13.4	13.5	13.3	13.5	13.8	13.4	13.5	13.5	13.1	13.0	13.1							12.4	13.4
4600	15.3	11.9	12.7	13.6	13.8	13.5	13.4	13.4	13.3	13.2	13.4	13.4	13.3	13.3									13.2
4800	13.6	12.4	12.1	13.5	13.7	13.4	13.2	13.4	13.3	13.2	13.3	13.3	13.3	13.4	13.2	13.3	13.3	13.2					13.5
5000		12.3	12.3	12.1	13.7	13.2	13.0	13.2	13.2	13.1	13.2	13.2	13.1	13.3	13.3	13.3		13.0	12.9				13.3
5200	16.0	12.6	12.5	12.5	13.6	13.4	13.2	13.1	13.1	13.0	13.0	13.1	13.3	13.0	13.1	13.2	13.2	13.1	13.0				13.1
5600	16.5	13.0	12.2	11.8		14.6	13.7	13.3	13.0	13.0	13.1	13.2	13.3	13.1	13.1	13.5	13.4		13.1	13.2	13.6		13.4

Review Data Count:

1) Open the Data Count tab to review the number of data logs in each cell. More data is generally better as it ensures you have a good cross section of conditions covered by the data logs.

Data Count: The cell 3800 RPM and 16% TPS shows 742 as the number of data logs that were collected during the test ride for that cell.

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
800	9																						
1000	308	3	1	11																			
1200	1288	64	25	24	9	10							5	4									
1400	2070	90	86	16	88	90	39	8			6	23	43	34	3								
1600	1033	308	269	217	204	197	114	75	58	85	106	76	50	10									
1800	851	582	667	354	306	404	123	103	108	253	267	174	34	2									
2000	561	541	478	403	428	548	210	189	126	327	342	168	29	3									
2200	778	672	588	287	325	664	283	381	357	392	214	46	5	3	3	2	1	2	1	3	2		
2400	1081	849	879	557	454	840	294	404	465	524	341	29	7	9	8	4	3	2	1	2	1	7	15
2600	1525	1475	1304	1162	487	1222	451	821	443	677	289	64	15	24	27	14	6	7	6	11	7	12	55
2800	1577	1258	2230	1791	1262	1547	556	1024	499	557	366	125	18	14	18	14	11	8	11	15	16	23	115
3000	1101	1807	2170	1977	984	1558	932	953	356	550	284	100	34	53	17	12	6	4	6	10	18	26	205
3200	994	980	1712	1977	1602	2117	851	798	313	650	283	156	10	47	20	18	10	5	8	8	7	9	214
3400	867	1252	1818	1943	2334	2921	699	999	317	812	355	144	22	19	4	3	7	12	17	10	12	22	240
3600	768	1453	2333	2670	3063	3908	859	1229	423	1027	681	214	35	40	18	11	4		5	15	9	8	269
3800	629	1613	2495	4120	5078	4447	1039	1530	636	1483	742	223	82	31	37	11	12	27	1	2	11	11	280
4000	473	1149	1731	3044	4020	5469	1213	1539	521	1218	724	410	98	89	68	22	17	5	10	14	5	16	280
4200	255	885	1565	2581	3454	5525	1200	1718	669	1360	1164	379	135	91	129	29	16	11	16	27	16	12	287
4400	130	788	1715	1850	2492	3405	1031	1259	694	1641	1161	398	126	145	120	50	13	22	11	22	27	25	304
4600	139	449	1168	1590	1711	3252	1057	1352	655	1478	1092	516	160	202	119	62	30	11	4	41	10	35	331
4800	50	103	707	682	1379	2372	854	1023	556	949	1058	478	197	259	149	87	64	8	6	16	27	26	328
5000	81	82	238	224	318	1033	644	498	359	775	892	390	174	252	214	99	60	32	23	44	39	38	282
5200	89	37	127	182	430	940	465	508	282	780	898	446	268	308	301	197	152	40	64	74	44	17	465
5600	97	33	93	65	110	331	144	360	201	632	565	532	240	353	300	174	138	36	75	158	112	28	574

Review Target AFR:

1) The Target AFR already has a GENERIC Target AFR for each bike that can be adjusted to suit your application.

   This is configurable for both the IAP and TPS Fuel Maps. Select from the drop down menu to access the IAP or TPS Target AFR. These values can be adjusted by selecting the cells, rows and or columns, then change the Target values with the ADD, SUBTRACT, COPY, PASTE and SET tabs. Target AFR should generally be configured / checked before starting any AutoTune Live Process.

Target AFR: The cell at 3800 RPM and 16% TPS shows 13.5 as the Target AFR for that particular cell.

AutoTune

File

TPS ∨ Map Select: 1 ∨ Mode: A ∨ Group: Gears 1-6 ∨ Gear: ∨ [3D Graph] [Settings]

Logged AFR | Data Count | **Target AFR** | % Map Change | AutoTuned Map

0.1 ⇕ +/- ∨ | [Add] | [Subtract] | [Copy] | [Paste] | [Set] | [Default]

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
▶ 800	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
1000	13.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
1200	13.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
1400	13.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
1600	14.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
1800	14.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
2000	14.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
2200	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
2400	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
2600	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
2800	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
3000	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
3200	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
3400	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
3600	14.5	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
3800	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
4000	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
4200	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
4400	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
4600	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
4800	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
5000	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
5200	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2
5600	15.0	14.0	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.4	13.4	13.3	13.3	13.2

2) Once the Target AFR has been configured this can be saved and also accessed for any future tuning. Always check the Target AFR's for both IAP and TPS before accepting the suggested values.

AutoTune

File

Open Log File	Ctrl+O	
Open Target AFR File	Ctrl+T	
Save Target AFR File	Ctrl+S	
Clear Custom Target AFR Files	Ctrl+Alt+C	
Exit	Ctrl+X	

Injector ⌄ Gear ⌄ [3D Graph] [Settings]

Tuned Map

Paste | Set | Default

	9.4	12	14	16	19	23	28	34	39	45	56	67	78	89	100
	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
800	13.8	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
1000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
1200	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
1400	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
1600	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
1800	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
2000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
2200	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
2400	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
2600	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
2800	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
3000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
3200	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
3400	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
3600	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
3800	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
4000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
4500	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
5000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
5500	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
6000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
6500	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0
7000	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0

Review % Map Change:

The calculated change required to move the cell towards the Target AFR. A sophisticated algorithm is applied to each cell with takes into consideration the logged AFR and adjacent cells and a smoothing algorithm to determine a % Map Change.

% Map Change: The cell at 3800 RPM and 16% TPS shows the % Change as -0.5 as it is very close to its Target AFR for that particular cell. The cell at 2200 RPM and 25% TPS shows -11.8% as it needs a larger change for the Target AFR for that particular cell.

AutoTune

File

TPS | Map Select: 1 | Mode: A | Group: Gears 1-6 | Gear: | 3D Graph | Settings

Logged AFR | Data Count | Target AFR | % Map Change | AutoTuned Map

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
800	-8.5																						
1000	7.5	2.9		3.7																			
1200	8.6	2.2	3.3	3.8	1.5	0.6							4.3										
1400	9.0	1.7	1.2	1.7	3.3	2.8	3.2	0.7			4.5	4.3	3.3	3.7	0.3								
1600	0.0	0.4	0.2	1.1	0.6	1.1	1.1	0.8		2.0	4.2	4.1	4.6	4.5									
1800	-1.4	-1.6	-0.6	-0.1	0.0	-0.4	-1.3	-1.1	0.0	1.3	2.6	2.6	2.0										
2000	-3.4	-3.6	-1.6	-0.9	-0.6	-1.0	-2.3	-2.4	-1.1	-0.7	0.0	-0.8	-1.5	-1.9									
2200	-8.5	-4.9	-3.0	-1.3	-1.2	-1.1	-1.6	-2.0	-1.9	-1.7	-1.6	-3.	-11.8	-12.8	-13.9					-15.0			
2400	-8.0	-7.7	-4.6	-2.1	-1.9	-2.0	-1.9	-2.2	-2.9	-3.5	-3.4	-5.0	-10.8	-12.3	-14.5	-14.6	-14.7					-14.1	-13.5
2600	-8.2	-6.3	-4.8	-3.6	-3.1	-3.4	-3.3	-3.2	-3.3	-3.6	-4.1	-5.1	-9.9	-10.7	-12.0	-11.8	-11.6	-12.2	-12.1	-13.1	-10.7	-11.8	-5.8
2800	-8.6	-8.7	-5.2	-3.8	-4.0	-4.0	-3.6	-3.3	-2.3	-3.1	-2.9	-3.7	-6.9	-8.3	-8.0	-5.7	-5.4	-5.3	-5.5	-5.1	-4.6	-2.4	-0.5
3000	-5.1	-7.3	-4.4	-2.1	-1.8	-2.1	-3.1	-2.8	-1.7	-1.5	-0.7	-0.4	-1.2	-1.7	-2.1	-3.4	-2.6	-6.8	-4.7	-1.7	-1.1	0.7	6.0
3200	-5.1	-5.6	-3.6	-1.2	-0.9	-1.1	-1.4	-0.8	-0.5	-0.8		0.7	0.2	0.4	0.7	0.5	-0.4	-1.5	-1.5	-0.2	1.0	2.0	7.7
3400	-5.3	-7.6	-4.3	-1.6	-1.1	-0.7	-0.3	-0.2	-0.3	-0.4	0.4	1.0	0.8	0.1	0.7	1.1	0.8	0.3	0.3	0.8	2.1	2.9	7.5
3600	-4.2	-8.4	-5.2	-2.4	-1.7	-1.1	-0.3	-0.3	-0.9	-1.0	-0.1	0.8	0.2	-0.1	0.1	1.1	2.0		0.3	1.3	3.1	8.1	7.2
3800	-8.9	-10.4	-5.9	-3.6	-3.1	-1.9	-0.8	-1.0	-1.4	-1.5	-0.5	0.5	0.7	-0.2	-0.4	-0.3	0.3	0.6			2.4	2.5	5.0
4000	-8.5	-12.6	-8.6	-4.1	-3.7	-2.8	-1.5	-1.4	-1.5	-1.5	-0.7	0.2	0.9	0.7	0.0	0.3	0.3	-0.3	-0.4	-0.2	0.1	1.2	3.0
4200	-4.9	-13.4	-11.0	-4.7	-3.0	-1.9	-1.1	-1.0	-1.0	-1.1	-0.3	0.5	0.8	0.8	0.5	0.3	-0.5	-0.3	-0.2	-0.2	-0.4	0.6	1.3
4400	-1.6	-13.3	-12.9	-6.0	-2.3	-1.7	-1.2	-0.7	-0.4	-0.6	-0.1	0.4	0.4	0.1	-0.1	-0.2	-0.5	-0.9	-0.8	-0.3	0.0	0.4	0.8
4600	-1.5	-12.8	-13.7	-8.3	-3.3	-1.6	-1.2	-1.1	-1.0	-1.0	-0.6	-0.3	-0.6	-0.7	-0.8	-0.9	-1.0	-1.0	-1.1	-0.6	-0.3	0.4	0.9
4800	-1.5	-10.8	-13.9	-12.4	-3.9	-2.0	-1.3	-1.2	-1.5	-1.6	-1.3	-1.4	-1.8	-1.6	-1.4	-1.7	-1.8	-1.5	-1.4	-1.1	0.2	1.0	0.3
5000	-11.1	-9.3	-13.6	-14.4	-12.1	-4.7	-3.1	-2.0	-1.9	-2.6	-1.8	-2.1	-2.9	-2.8	-1.9	-2.0	-2.9	-2.7	-1.8	-2.3	-0.4	1.7	-0.1
5200	-7.9	-9.2	-11.7	-13.9	-10.3	-6.2	-4.7	-4.0	-3.8	-3.5	-3.0	-2.8	-3.0	-3.2	-2.3	-2.7	-3.1	-3.0	-1.9	-1.4	-0.4	0.7	-0.3
5600	-9.4	-7.9	-10.5	-13.7	-9.9	-5.7	-4.2	-4.1	-4.6	-4.0	-2.7	-1.7	-1.5	-1.8	-1.9	-2.5	-2.0	-2.5	-1.5	-0.7	0.2	-0.1	0.0

AutoTuned Map:

The AutoTuned Map shows what the fuel maps will be once the AutoTune has been applied. The numbers in the fuel map control how long the fuel injectors are opened. The larger the number the longer the time the injector is open.

AutoTune
File
TPS | Map Select: 1 | Mode: A | Group: Gears 1-6 | Gear: | 3D Graph | Settings

Logged AFR | Data Count | Target AFR | % Map Change | AutoTuned Map

Apply AutoTune | Show Original Map | **AutoTuned Map**

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
800	991	1084	1161	1241	1325	1471	1610	1757	1803	1880	2127	2230	2230	2270	2371	2371	2374	2435	2491	2540	2540	2540	2535
1000	991	1084	1160	1241	1325	1470	1605	1756	1798	1880	2127	2230	2229	2269	2371	2372	2358	2432	2489	2540	2535	2538	2535
1200	809	1018	1108	1186	1264	1395	1497	1613	1710	1870	2006	2195	2207	2248	2248	2270	2291	2323	2330	2361	2356	2388	2360
1400	830	987	1092	1155	1240	1419	1516	1604	1700	1882	2154	2227	2203	2263	2235	2237	2262	2291	2292	2288	2262	2298	2282
1600	810	918	1018	1117	1171	1263	1373	1482	1579	1705	2006	2161	2182	2133	2189	2196	2204	2227	2280	2288	2262	2298	2282
1800	688	793	897	997	1079	1129	1204	1303	1381	1477	1792	2041	2114	2132	2188	2196	2204	2226	2280	2298	2274	2328	2302
2000	648	770	848	957	1058	1121	1165	1224	1311	1367	1592	1745	2006	1920	1936	1944	2148	2226	2280	2298	2275	2328	2302
2200	647	709	786	883	999	1091	1121	1175	1241	1297	1542	1769	1992	1920	1936	1896	1948	2124	2198	2298	2254	2328	2300
2400	648	718	779	848	949	1056	1106	1137	1163	1276	1533	1759	1992	1962	1954	1896	1940	2100	2185	2312	2254	2337	2300
2600	624	651	734	804	907	1023	1100	1146	1226	1288	1597	1841	2170	2284	2328	2248	2299	2312	2260	2320	2254	2400	2400
2800	608	626	683	796	897	1061	1153	1216	1311	1466	1690	2102	2363	2441	2558	2548	2516	2542	2550	2560	2577	2663	2733
3000	585	585	665	776	894	1135	1225	1280	1359	1522	1862	2294	2642	2812	2966	2894	2852	2754	2745	2810	2784	2728	3049
3200	538	597	655	763	879	1076	1215	1303	1370	1538	1857	2307	2524	2797	2906	2907	2879	2784	2766	2810	2792	2810	3105
3400	523	591	642	727	848	1005	1143	1252	1297	1406	1673	2097	2391	2612	2739	2711	2700	2708	2883	2893	2792	2780	3056
3600	515	565	599	686	797	841	1092	1179	1226	1333	1590	1950	2220	2543	2676	2690	2686	2688	2838	2902	2932	2932	2982
3800	506	572	599	659	756	904	1035	1122	1179	1277	1499	1858	2187	2496	2672	2690	2696	2688	2687	2734	2902	3032	3092
4000	504	568	592	635	701	846	1010	1086	1161	1259	1401	1844	2144	2456	2705	2727	2720	2718	2790	2892	2869	2897	3128
4200	488	570	579	609	668	809	958	1062	1133	1253	1495	1840	2176	2559	2758	2778	2766	2754	2834	2936	3059	3002	3246
4400	473	567	576	585	638	752	917	1061	1160	1270	1510	1841	2187	2570	2830	2864	2825	2864	2985	3107	3172	3260
4600	468	592	579	611	641	762	548	1066	1192	1316	1536	1834	2194	2537	2808	2862	2896	2903	2920	2958	3096	3422	3271
4800	466	630	617	645	663	779	983	1134	1221	1337	1526	1800	2150	2538	2848	2940	2940	2946	2922	3124	3184	3288	3303
5000	460	626	635	661	664	748	930	1103	1192	1294	1463	1752	2103	2461	2803	2978	2996	2952	2922	3124	3024	3287	3283
5200	454	616	622	638	645	729	918	1045	1152	1256	1455	1713	2006	2416	2834	2986	3024	2981	3045	3193	3390	3374	3428
5600	442	563	555	566	574	684	832	950	1069	1196	1382	1686	1997	2387	2840	3062	3198	3310	3316	3366	3546	3403	3440

8) Applying AutoTune Settings

Apply Autotune:

Use the Apply AutoTune tab to send the Auto Tuned map directly to the TPS or IAP Fuel Map from the drop down menu. You should always apply both the IAP and TPS AutoTune Maps.

You will then be notified that the Map has been applied.

1) To check to see if the Fuel maps have been applied go to the Main Screen and select Fuel Maps.
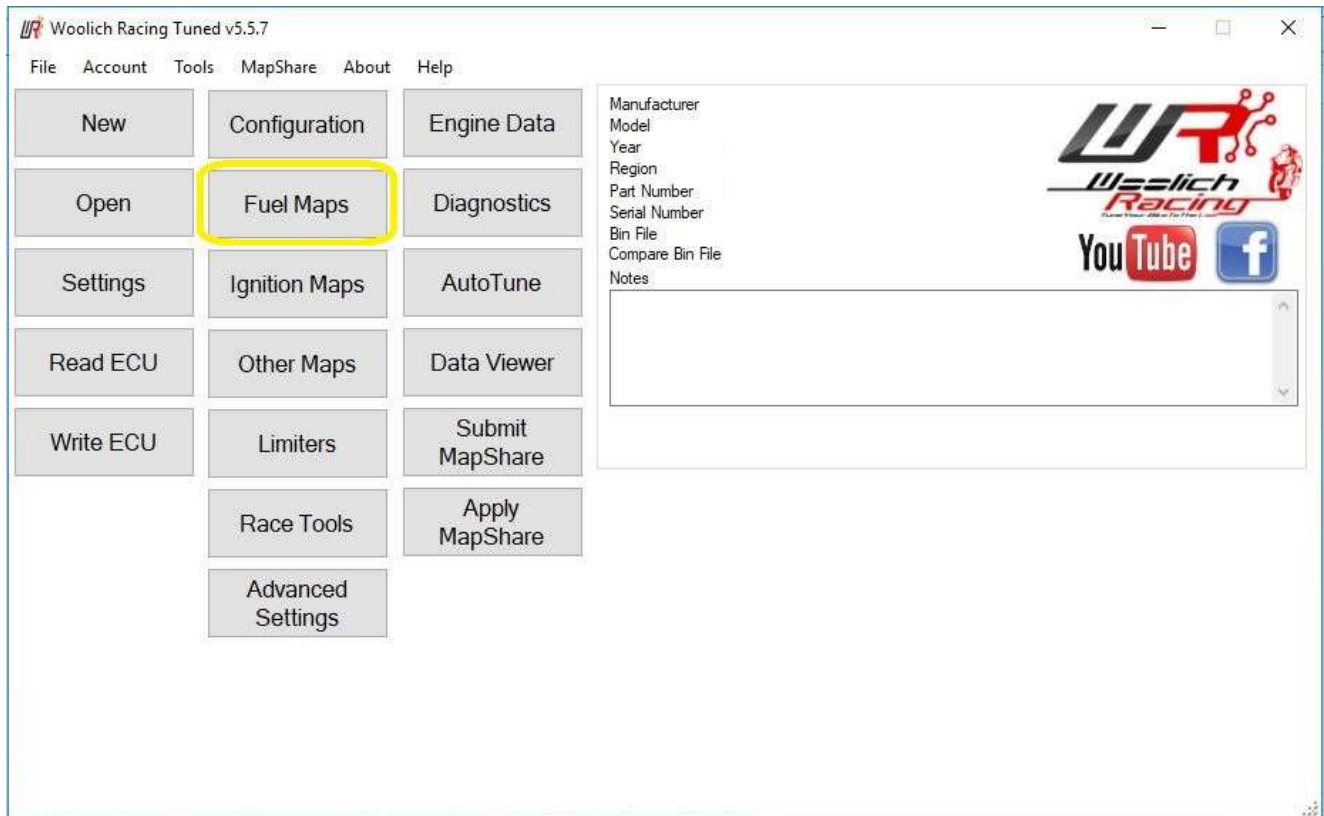
2) Select IAP or TPS in the drop down menu and you will see the applied changes to the Fuel Map.

Fuel Maps Editor

Toolbar: 5.0 % | Add | Subtract | Copy | Paste | Undo | Redo | Set Values | Smooth

TPS | Map Select: 1 | Map Mode: A | Group: Gears 1-6 | Settings | **1.9 : 800 (-0.3%)**

Tabs: Values | % Trim | Value Trim | 3D Graph

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
800	991	1084	1161	1241	1325	1471	1610	1757	1803	1880	2127	2231	2230	2270	2371	2371	2374	2435	2491	2540	2540	2540	2535
1000	991	1085	1160	1246	1325	1470	1605	1756	1798	1880	2127	2231	2322	2269	2371	2372	2358	2432	2489	2540	2535	2538	2535
1200	889	1018	1110	1191	1267	1396	1497	1613	1710	1878	2180	2289	2237	2266	2255	2270	2291	2323	2339	2361	2356	2388	2368
1400	830	987	1093	1156	1233	1402	1477	1611	1713	1877	2172	2284	2265	2274	2235	2237	2262	2291	2292	2288	2262	2298	2282
1600	810	918	1018	1117	1167	1259	1363	1473	1559	1694	2030	2199	2178	2133	2189	2196	2204	2227	2280	2288	2262	2298	2282
1800	688	793	897	996	1078	1127	1198	1297	1376	1473	1783	2046	2148	2135	2188	2196	2204	2226	2280	2298	2274	2328	2302
2000	648	770	849	957	1057	1120	1163	1223	1310	1370	1589	1714	2006	1920	1936	1944	2148	2226	2280	2298	2275	2328	2302
2200	647	709	788	894	1001	1090	1119	1169	1238	1292	1549	1614	1730	1638	1645	1896	1948	2124	2198	1953	2254	2328	2300
2400	648	717	779	849	951	1054	1103	1129	1154	1269	1504	1673	1765	1747	1673	1618	1654	2100	2185	2312	2254	2007	1989
2600	624	651	734	802	905	1018	1094	1137	1219	1274	1573	1789	1950	2009	2049	1983	2032	2030	1987	2015	2013	2117	2261
2800	608	626	693	796	896	1059	1148	1206	1304	1460	1668	2052	2207	2262	2380	2435	2410	2407	2409	2467	2484	2600	2718
3000	585	584	664	774	893	1134	1224	1275	1357	1519	1870	2284	2487	2752	2890	2796	2777	2566	2617	2762	2754	2829	3322
3200	538	596	654	762	878	1075	1217	1305	1371	1539	1865	2407	2529	2779	2888	2884	2844	2742	2724	2803	2820	2865	3389
3400	523	591	641	726	847	1004	1143	1251	1298	1408	1682	2117	2409	2615	2737	2741	2706	2707	2866	2885	2825	2880	3327
3600	515	565	598	685	796	941	1092	1178	1224	1333	1600	1964	2224	2541	2679	2718	2740	2688	2838	2900	2970	3170	3239
3800	506	571	599	658	754	903	1035	1121	1177	1276	1506	1874	2200	2468	2662	2682	2694	2703	2687	2734	2947	3005	3275
4000	504	568	590	633	700	844	1009	1084	1159	1258	1487	1861	2180	2486	2688	2715	2709	2709	2787	2885	2872	2832	3217
4200	488	568	576	607	667	808	957	1061	1130	1251	1502	1859	2209	2579	2772	2786	2752	2748	2844	2929	3045	3021	3295
4400	473	566	571	581	636	750	914	1059	1157	1269	1512	1849	2202	2579	2827	2859	2863	2800	2840	2972	3071	3184	3304
4600	468	591	575	605	638	760	945	1063	1188	1312	1536	1835	2189	2547	2785	2835	2865	2874	2888	2979	3085	3344	3306
4800	466	627	612	635	658	776	979	1128	1215	1330	1518	1794	2128	2522	2808	2890	2888	2901	2881	3088	3191	3321	3322
5000	460	623	634	650	650	740	922	1096	1184	1277	1451	1740	2099	2403	2765	2919	2907	2872	2870	3052	3012	3342	3309

3) To complete the process Write the bin file into the ECU.
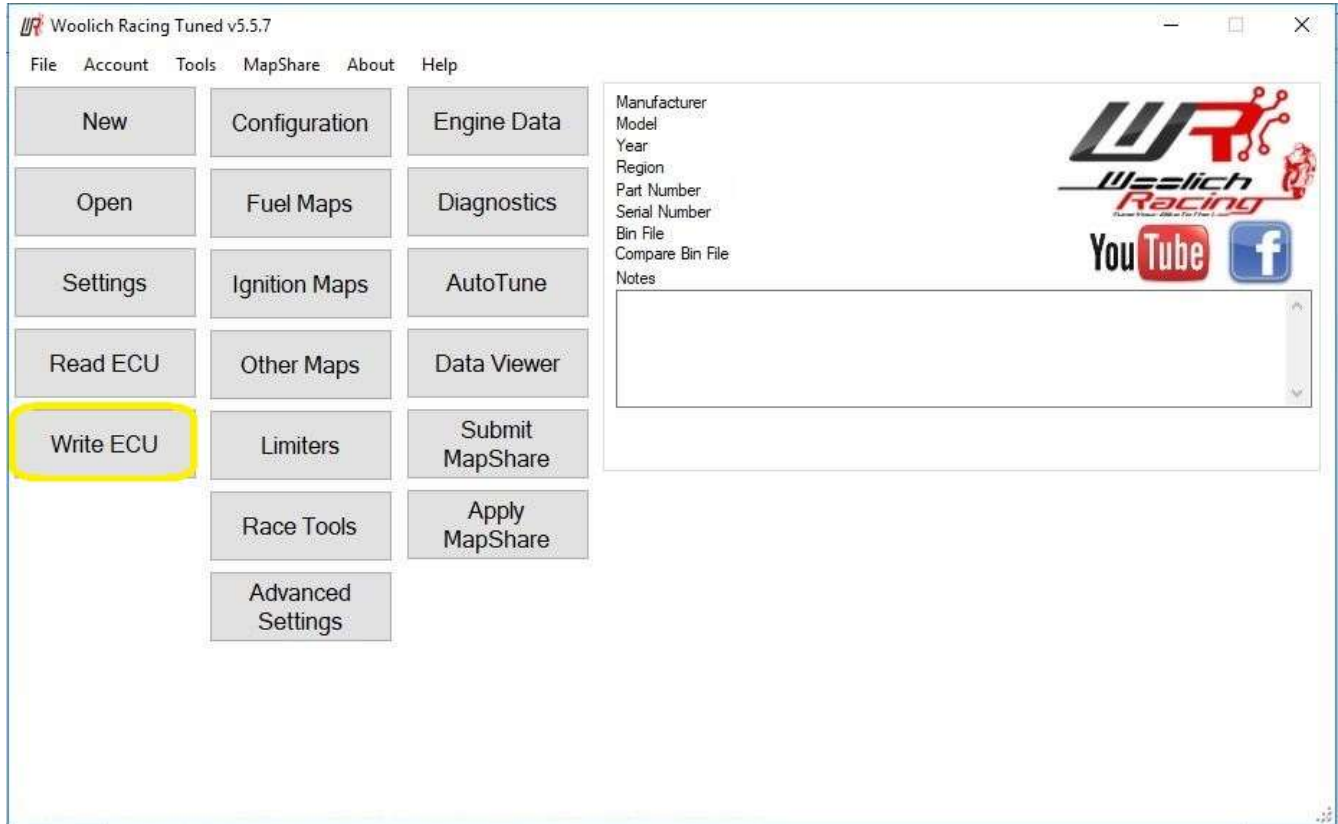
9) Maintaining Files

1) It is highly recommended to use a systematic and simple system to save and maintain all the original, logged, and modified files so that it is possible to revert back to a known point of tune. Whether this is the original configuration or a particular modified tune.

   The following is a suggested directory/file structure.
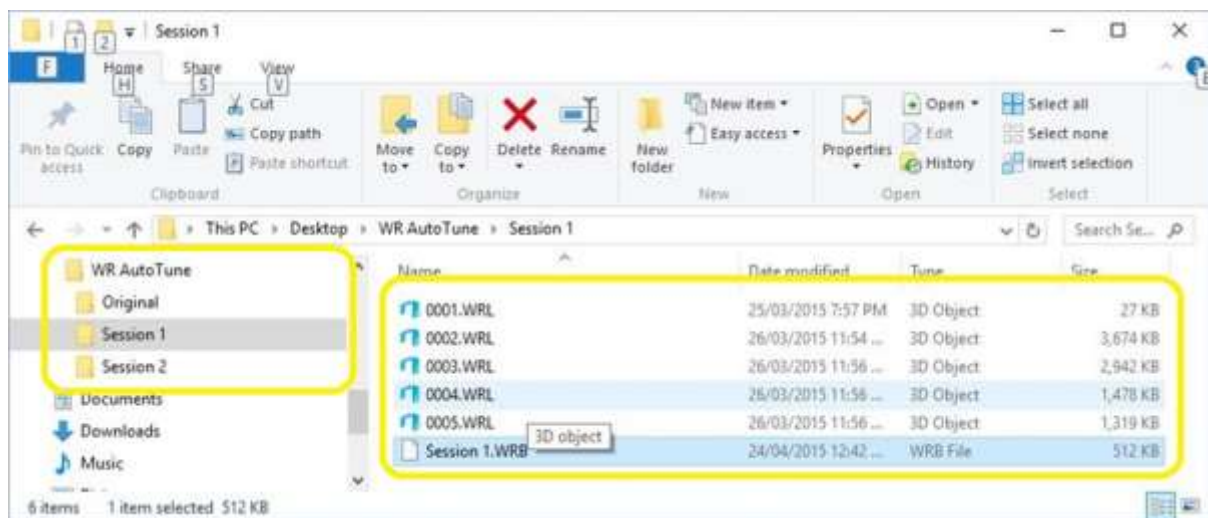
2) It is strongly suggested to copy the log files from the Log Box to your computer after each logging session. Once copied the log files should be deleted from your Log Box prior to logging more data. This avoids confusion as any new log files are then applicable to the most recent Bin File. This is especially true if several log files are generated from multiple rides before you iterate through the AutoTune process.

Only use log files with the Bin File that was used to create them. Old log files are no longer relevant when a new Bin file is flashed to your ECU as these old log files are only related to the Bin file in your ECU when the data logging was completed.
You should open the Bin File that was in the ECU when the Log Files were created, this will ensure that the Log Files are applied to the Bin File that was used to create them.

You should use meaningful and sequential directory/file names to assist you. The overall aim is ensure it is possible for you to roll back any changes to a known point or have the correct Bin file depending on the conditions, location etc.
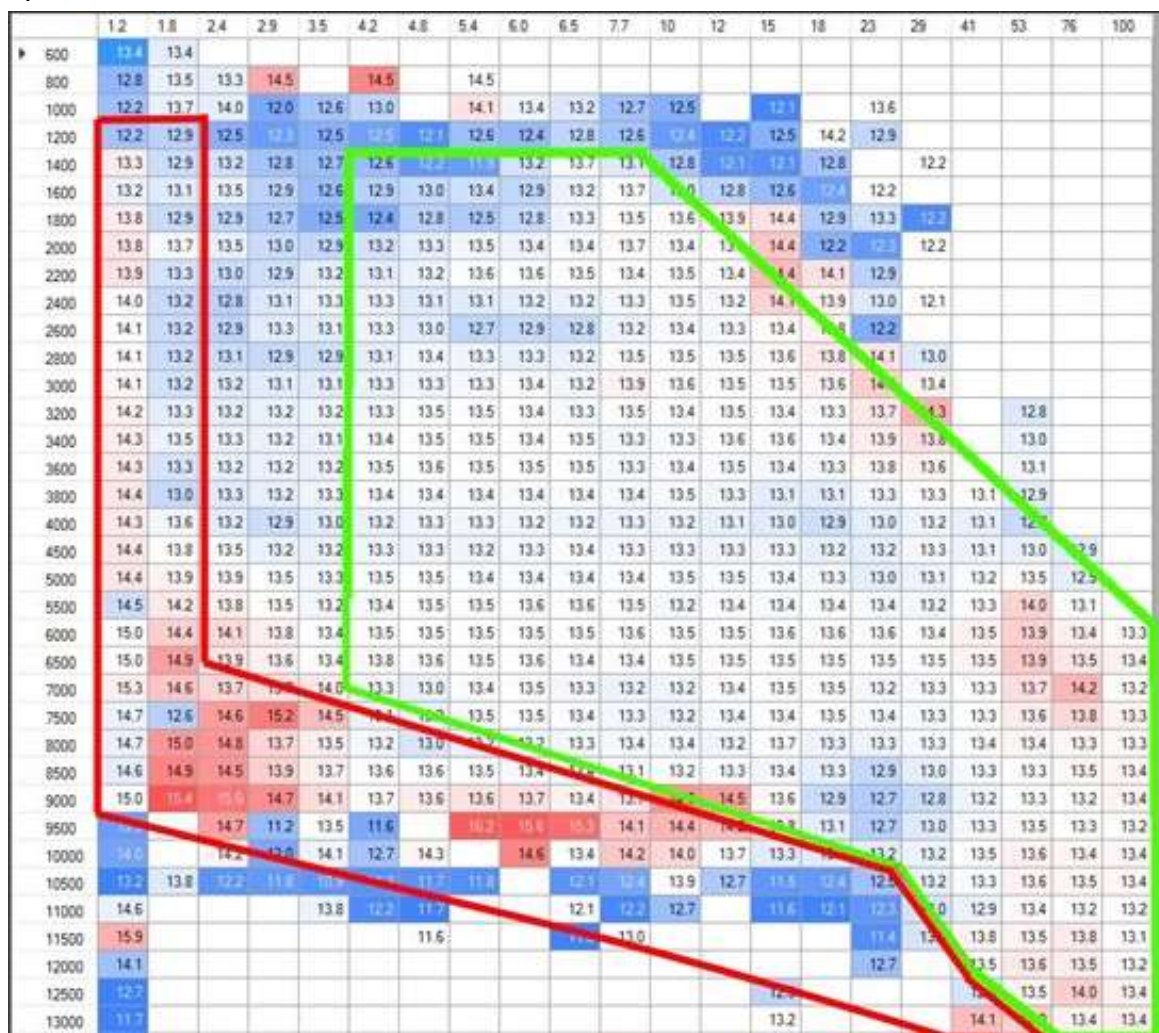
9) General Notes

1) For either TPS or IAP maps don't be too focussed on values that are close to target AFR where the colour of the cell is very light or close to white. The aim is to reduce extreme differences in the area of interest. It is important to do the test rides to feel an improvement.

You may find that some areas of the fuel maps consistently display lean data. This is generally in the deceleration region, when the Throttle is closed and the bike is decelerating. These areas of the Fuel Maps are much less important than the regions where the bike is fully loaded under acceleration.

The regions of the TPS map highlighted below in Green are the areas where you should focus your tuning. The region in Red is the deceleration area and this is a less important area to focus on.

	1.2	1.8	2.4	2.9	3.5	4.2	4.8	5.4	6.0	6.5	7.7	10	12	15	18	23	29	41	53	76	100
600	13.4	13.4																			
800	12.8	13.5	13.3	14.5		14.5		14.5													
1000	12.2	13.7	14.0	12.0	12.6	13.0		14.1	13.4	13.2	12.7	12.5		12.1		13.6					
1200	12.2	12.9	12.5	12.3	12.5	12.5	12.1	12.6	12.4	12.8	12.6	12.4	12.2	12.5	14.2	12.9					
1400	13.3	12.9	13.2	12.8	12.7	12.6			13.2	13.7	13.1	12.8	12.1	12.1	12.8		12.2				
1600	13.2	13.1	13.5	12.9	12.6	12.9	13.0	13.4	12.9	13.2	13.7	13.0	12.8	12.6	12.4	12.2					
1800	13.8	12.9	12.9	12.7	12.5	12.4	12.8	12.5	12.8	13.3	13.5	13.6	13.9	14.4	12.9	13.3	12.3				
2000	13.8	13.7	13.5	13.0	12.9	13.2	13.3	13.5	13.4	13.4	13.7	13.4		14.4	12.2	12.3	12.2				
2200	13.9	13.3	13.0	12.9	13.2	13.1	13.2	13.6	13.6	13.5	13.4	13.5	13.4		14.1	12.9					
2400	14.0	13.2	12.8	13.1	13.3	13.3	13.1	13.1	13.2	13.2	13.3	13.5	13.2		13.9	13.0	12.1				
2600	14.1	13.2	12.9	13.3	13.1	13.3	13.0	12.7	12.9	12.8	13.2	13.4	13.3	13.4		12.2					
2800	14.1	13.2	13.1	12.9	12.9	13.1	13.4	13.3	13.3	13.2	13.5	13.5	13.5	13.6	13.8	14.1	13.0				
3000	14.1	13.2	13.2	13.1	13.1	13.3	13.3	13.3	13.4	13.2	13.9	13.6	13.5	13.5	13.6		13.4				
3200	14.2	13.3	13.2	13.2	13.2	13.3	13.5	13.5	13.4	13.3	13.5	13.4	13.5	13.4	13.3	13.7			12.8		
3400	14.3	13.5	13.3	13.2	13.1	13.4	13.5	13.5	13.4	13.5	13.3	13.3	13.6	13.6	13.4	13.9			13.0		
3600	14.3	13.3	13.2	13.2	13.2	13.5	13.6	13.5	13.5	13.5	13.3	13.4	13.5	13.4	13.3	13.8	13.6		13.1		
3800	14.4	13.0	13.3	13.2	13.3	13.4	13.4	13.4	13.4	13.4	13.4	13.5	13.3	13.1	13.1	13.3	13.3	13.1	12.9		
4000	14.3	13.6	13.2	12.9	13.0	13.2	13.3	13.3	13.2	13.2	13.3	13.2	13.1	13.0	12.9	13.0	13.2	13.1	12.?		
4500	14.4	13.8	13.5	13.2	13.2	13.3	13.3	13.2	13.3	13.4	13.3	13.3	13.3	13.3	13.2	13.2	13.3	13.1	13.0	12.9	
5000	14.4	13.9	13.9	13.5	13.3	13.5	13.5	13.4	13.4	13.4	13.4	13.5	13.5	13.4	13.3	13.0	13.1	13.2	13.5	12.5	
5500	14.5	14.2	13.8	13.5	13.2	13.4	13.5	13.5	13.6	13.6	13.5	13.2	13.4	13.4	13.4	13.4	13.2	13.3	14.0	13.1	
6000	15.0	14.4	14.1	13.8	13.4	13.5	13.5	13.5	13.5	13.5	13.6	13.5	13.5	13.6	13.6	13.6	13.4	13.5	13.9	13.4	13.3
6500	15.0	14.9	13.9	13.6	13.4	13.8	13.6	13.5	13.6	13.4	13.4	13.5	13.5	13.5	13.5	13.5	13.5	13.9	13.5	13.4	
7000	15.3	14.6	13.7		14.0	13.3	13.0	13.4	13.5	13.3	13.2	13.2	13.4	13.5	13.5	13.2	13.3	13.3	13.7	14.2	13.2
7500	14.7	12.6	14.6	15.2	14.5			13.5	13.5	13.4	13.3	13.2	13.4	13.4	13.5	13.4	13.3	13.3	13.6	13.8	13.3
8000	14.7	15.0	14.8	13.7	13.5	13.2	13.0		13.3	13.4	13.4	13.2	13.7	13.3	13.3	13.3	13.4	13.4	13.3	13.3	
8500	14.6	14.9	14.5	13.9	13.7	13.6	13.6	13.5	13.4		13.1	13.2	13.3	13.4	13.3	12.9	13.0	13.3	13.3	13.5	13.4
9000	15.0			14.7	14.1	13.7	13.6	13.6	13.7	13.4			14.5	13.6	12.9	12.7	12.8	13.2	13.3	13.2	13.4
9500		14.7	11.2	13.5	11.6			16.2	15.8	15.3	14.1	14.4			13.1	12.7	13.0	13.3	13.5	13.3	13.2
10000	14.0		14.2	13.0	14.1	12.7	14.3			14.6	13.4	14.2	14.0	13.7	13.3		13.2	13.5	13.6	13.4	13.4
10500	13.2	13.8	12.2	11.8			11.7	11.8		12.1	12.4	13.9	12.7	11.5	12.4	12.5	13.2	13.3	13.6	13.5	13.4
11000	14.6				13.8	12.2	11.7		12.1	12.2	12.7		11.6	12.1		12.0	12.9	13.4	13.2	13.2	
11500	15.9				11.6			13.0					11.4		13.8	13.5	13.8	13.1			
12000	14.1												12.7		13.5	13.6	13.5	13.2			
12500	12.7														13.5	14.0	13.4				
13000	11.7										13.2				14.1		13.4	13.4			

Changing AutoTune Strength

2) You may need to iterate through the AutoTune process a few times, and the Logged AFR is converging on the Target AFR, you can reduce the AutoTune strength. The AutoTune strength reduces the amount that an AutoTune session will change the fuel maps. This reduces "overshoot" of the Target AFR as it allows you to progressively approach the Target AFR with each iteration, rather than oscillating either side of it. You will find AutoTune Strength in the Settings screen on the AutoTune tab. The default value is 100%, a suggested value once you are approaching the Target AFR is 60%.

Selecting Regions of the fuel map to AutoTune

3) In some situations you may only want to apply the AutoTune to smaller regions of the map. This can be done by selecting the cells (so they appear blue) in the AutoTune screen and clicking the Apply AutoTune button. Using by using the "ctrl" key you can select pockets of tuning areas.

	1.9	2.5	3.1	3.7	4.4	5.6	6.8	8.1	9.3	11	16	21	25	30	40	50	55	60	65	70	80	90	100
800	993	1086	1161	1241	1325	1471	1610	1757	1805	1880	2129	2230	2230	2270	2373	2373	2374	2437	2493	2540	2540	2540	2537
1000	993	1087	1161	1246	1325	1471	1609	1757	1800	1880	2129	2244	2230	2270	2373	2386	2362	2433	2491	2556	2540	2552	2537
1200	889	1022	1103	1179	1245	1361	1491	1615	1712	1880	2086	2195	2261	2188	2248	2270	2293	2324	2338	2362	2358	2390	2368
1400	830	990	1089	1153	1231	1370	1477	1610	1706	1844	2171	2289	2237	2256	2242	2239	2262	2291	2292	2286	2262	2296	2282
1600	810	921	1020	1112	1173	1267	1360	1486	1572	1714	2051	2228	2234	2229	2189	2196	2204	2227	2274	2274	2256	2284	2260
1800	688	797	902	996	1082	1152	1240	1321	1401	1566	1840	2078	2179	2132	2188	2196	2204	2226	2280	2300	2282	2328	2302
2000	648	774	852	961	1060	1133	1189	1255	1328	1390	1622	1707	1961	1826	1918	1928	2123	2227	2280	2300	2282	2328	2302
2200	648	712	792	898	1004	1102	1155	1217	1269	1325	1581	1731	1757	1677	1668	1894	1870	2042	2132	1897	2243	2324	2280
2400	648	723	788	859	961	1066	1126	1175	1212	1313	1547	1713	1676	1687	1658	1616	1654	1886	1898	2226	2242	2006	1994
2600	624	660	747	817	923	1037	1125	1189	1270	1348	1623	1848	1976	2034	2031	1972	2032	2027	1981	1986	1997	2113	2269
2800	608	632	705	808	909	1073	1170	1244	1338	1486	1680	2058	2220	2281	2350	2392	2405	2398	2395	2447	2481	2598	2707
3000	585	588	670	780	895	1132	1210	1271	1366	1521	1848	2187	2355	2702	2690	2645	2666	2554	2593	2693	2738	2829	3322
3200	538	600	659	764	878	1066	1202	1280	1360	1526	1810	2212	2388	2654	2766	2751	2726	2699	2679	2734	2796	2865	3322
3400	523	594	649	730	849	1001	1131	1239	1291	1402	1637	2025	2300	2547	2733	2746	2712	2685	2681	2696	2766	2859	3277
3600	515	573	605	689	799	940	1090	1176	1231	1341	1584	1915	2172	2459	2619	2682	2710	2672	2678	2709	2793	2958	3202
3800	506	578	613	668	761	911	1039	1123	1186	1288	1498	1848	2172	2438	2626	2646	2664	2687	2670	2730	2812	2834	3187
4000	504	578	606	646	711	859	1021	1096	1165	1262	1475	1829	2143	2441	2664	2697	2695	2684	2733	2829	2880	2845	3167
4200	488	576	596	622	676	820	968	1067	1138	1247	1477	1816	2152	2509	2732	2768	2739	2744	2820	2874	3002	3055	3268
4400	475	574	593	603	651	763	924	1061	1153	1257	1488	1816	2164	2541	2795	2837	2838	2801	2846	2944	3011	3142	3290
4600	468	596	616	637	662	774	955	1071	1191	1312	1529	1848	2176	2543	2789	2840	2850	2865	2893	2967	3078	3143	3308
4800	466	629	656	671	689	789	985	1135	1225	1344	1528	1808	2151	2535	2823	2907	2900	2943	2977	3070	3271	3424	3378
5000	460	629	678	686	689	762	934	1112	1209	1303	1476	1758	2123	2436	2802	2953	2928	2966	3017	3061	3261	3425	3441
5200	454	615	653	664	671	750	933	1063	1171	1267	1463	1726	2003	2383	2803	2980	3008	3024	3087	3166	3266	3388	3529
5600	442	567	589	591	596	688	838	973	1084	1207	1373	1661	1974	2361	2809	3011	3138	3169	3216	3289	3406	3383	3364

10) Trouble Shooting

If you notice you are not getting any response in changes to your fuel map there are a few items to look at.

Pair valve not blocked off or not blocked off correctly.

1) The Pair valve opens to allow clean air from the air box to go into the exhaust port. This is to ensure unburnt fuel in the exhaust system is burnt to reduce emissions so the motorcycle complies with local emission regulations.
   If the PAIR valve is not blocked off the logged AFR will show very lean running conditions and the bike will not respond to changes in the fuel maps.

O2 sensor.

2) The factory O2 sensor **MUST** be removed or unplugged and disabled in the WRT software when the Zeitronix Wideband sensor is installed.
   If left in place the factory O2 sensor will still command its predetermined AFR and adjust itself in the closed loop portion of the fuel map to correct itself.
   The Zeitronix wideband sensor must also be place in the correct position. After the collector when all the pipes have merged into one is most desired provided you are tuning with Unified Cylinders.
   You must also remove any aftermarket "Fuel Controller" that is plugged into the O2 sensor.

Intake and Exhaust Leaks.

3) Ensure throttle bodies are seated, no vacuum leaks on any hoses and no exhaust leaks.

No data appearing in AutoTune

4) The most common cause for no data being shown in the AutoTune is where you have logged data in particularly cold conditions. The ECU is programmed to enrichen the AFR of the engine in the warm-up stage of running. This data is filtered out so it does not affect the tuning process. There is a filter in the "AutoTune Settings" that filters out data logged before the Coolant Temp reaching normal operating temperature. In the example below it will filter out data below 80℃. If you are not seeing data in the AutoTune screen after having opened log files, you can change this filter value.
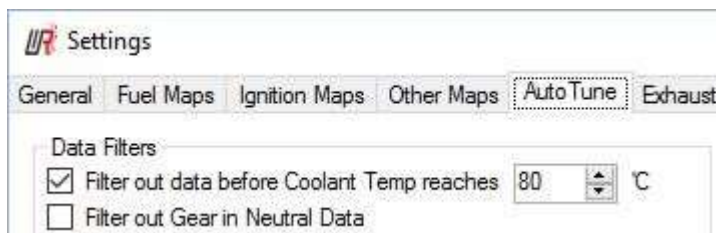
Another common cause of no data appearing in the AutoTune include, incorrectly installed Wideband and/or on bike harness. If no AFR data or engine data is in the data logs, nothing will appear in the AutoTune.

5) You can use the Data Viewer to review logged data to determine if both Engine Data and AFR is being logged correctly.
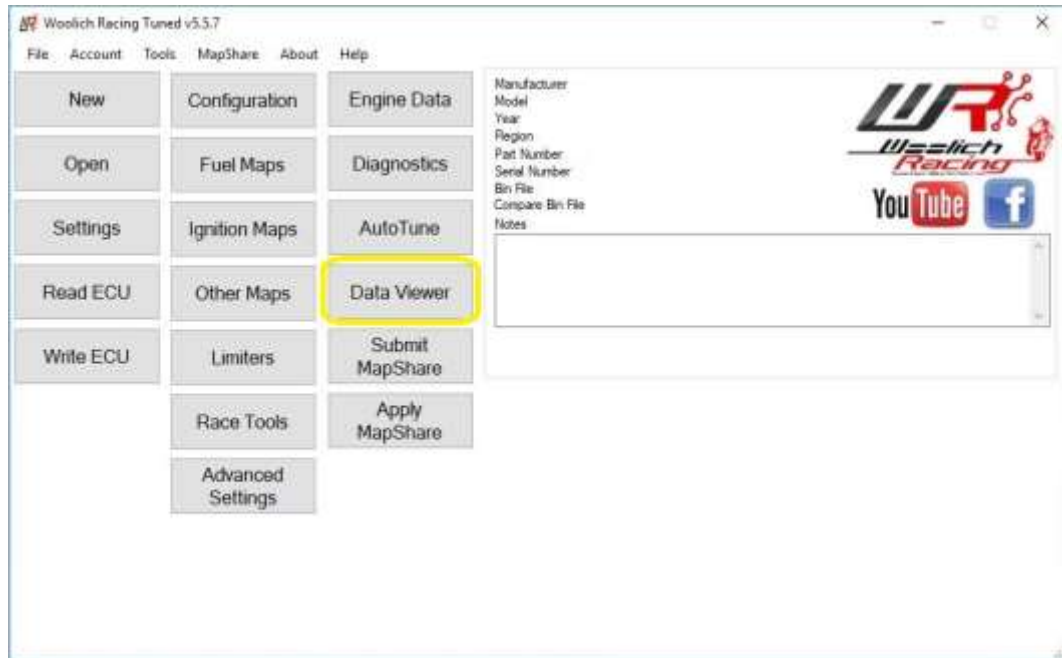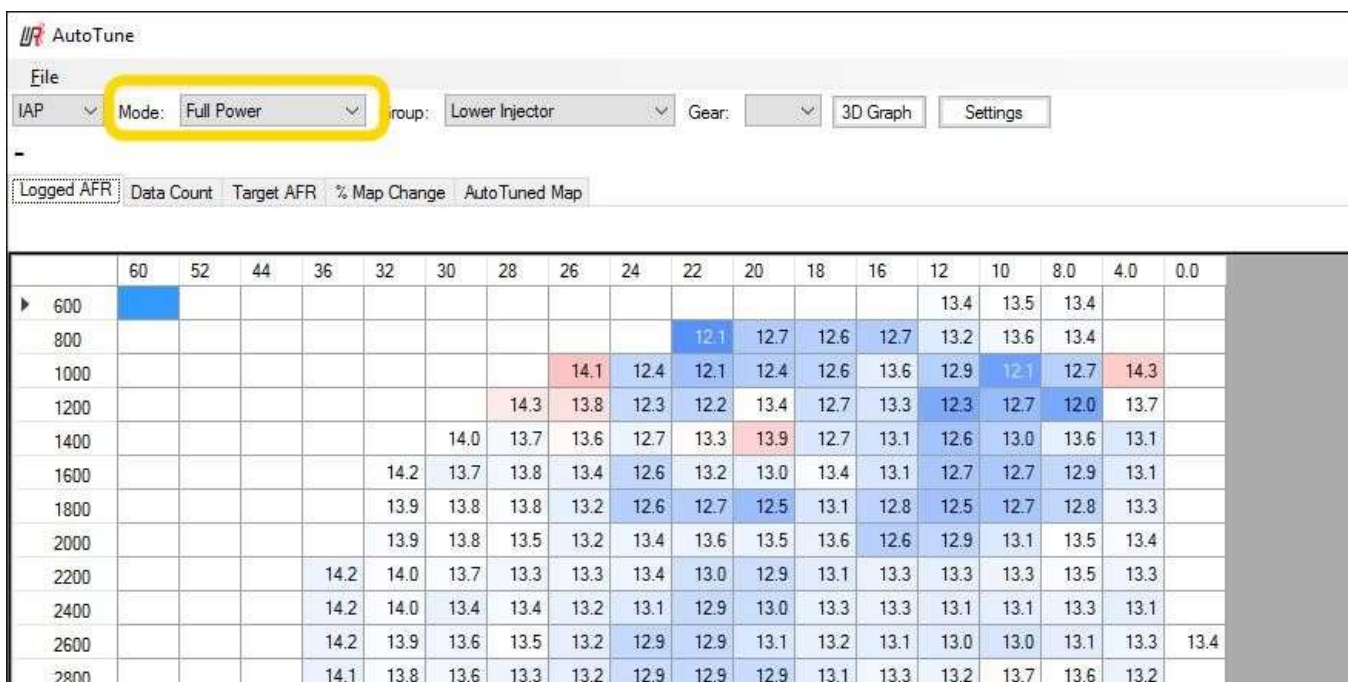

6) The Data Log Viewer shows logged data from .WRL files in a graphical format, it can be a useful tool to review logged data and also to help determine if there is valid data in the log file.

Different Power Modes Set on Motorcycle

7) If your motorcycle has different power modes available, please ensure you apply the AutoTune to the mode that corresponds to the mode used to log the data. If applied to the wrong mode's fuel maps, the changes will not be apparent in subsequent data logging sessions.

	60	52	44	36	32	30	28	26	24	22	20	18	16	12	10	8.0	4.0	0.0
▶ 600														13.4	13.5	13.4		
800										12.1	12.7	12.6	12.7	13.2	13.6	13.4		
1000								14.1	12.4	12.1	12.4	12.6	13.6	12.9	12.1	12.7	14.3	
1200							14.3	13.8	12.3	12.2	13.4	12.7	13.3	12.3	12.7	12.0	13.7	
1400						14.0	13.7	13.6	12.7	13.3	13.9	12.7	13.1	12.6	13.0	13.6	13.1	
1600					14.2	13.7	13.8	13.4	12.6	13.2	13.0	13.4	13.1	12.7	12.7	12.9	13.1	
1800					13.9	13.8	13.8	13.2	12.6	12.7	12.5	13.1	12.8	12.5	12.7	12.8	13.3	
2000					13.9	13.8	13.5	13.2	13.4	13.6	13.5	13.6	12.6	12.9	13.1	13.5	13.4	
2200				14.2	14.0	13.7	13.3	13.3	13.4	13.0	12.9	13.1	13.3	13.3	13.3	13.5	13.3	
2400				14.2	14.0	13.4	13.4	13.2	13.1	12.9	13.0	13.3	13.3	13.1	13.1	13.3	13.1	
2600				14.2	13.9	13.6	13.5	13.2	12.9	12.9	13.1	13.2	13.1	13.0	13.0	13.1	13.3	13.4
2800				14.1	13.8	13.6	13.3	13.2	12.9	12.9	12.9	13.1	13.3	13.2	13.7	13.6	13.2	

Warranty

Woolich Racing Warranty obligations are limited to the terms set forth below.

Woolich Racing warrants this product against defects in material and workmanship for the period of one (1) year. The warranty period begins with the date of original retail purchase.

This limited warranty is made only to the original end user purchaser ("you") of the product and does not extend to any subsequent purchasers or owners of the product. The "original end user" is the first user to put the product into service in any fashion. It is your responsibility to establish the warranty period by verifying the original purchase date.

If you discover a defect, Woolich Racing will, at its option, repair or replace this product with a new or reconditioned product at no charge to you, provided you return it during the warranty period, with transportation charges prepaid, to Woolich Racing. Please attach your name, address, telephone number, and a copy of the receipt from Paypal as proof of date of original purchase, as well as a detailed description of the problem for which service is requested. You are responsible for packing the product to be returned. If the repairs are covered by the Limited Warranty and if the product was properly shipped to Woolich Racing, Woolich Racing will pay the return shipping charges. This warranty applies only to Woolich Racing products. This warranty does not cover damaged resulting from accident, misuse, abuse, or neglect and/or damage during any type of transportation resulting from improper packaging; damage to any product which has been altered in any fashion, including damage resulting from causes other than product defects, including and not by way of limitation, lack of technical skill, competence, or experience of the user, and/or failure to use the product in accordance with the instructions provided in the User's Manual or Installation Manual; and service performance by an unauthorized person or entity. Any implied warranties including fitness for use and merchantability are limited to the period of the expressed warranty set forth above. The remedies provided under this warranty are exclusive and in lieu of all others.

Disclaimer

This product is meant for Off-Road use only and is not street legal. Owner assumes responsibility for his or her own actions when using this product. Woolich Racing hereby expressly disclaims liability and shall not be responsible for incidental, consequential and contingent damages or any kind or nature, including, without limitation: damages to persons or property, whether a claim for such damages is based upon warranty, contract, tort or otherwise; damages due to or arising out of the loss of time; or loss of profits. Woolich Racing shall not be responsible for any damages caused by the presence of error or omission in any of its manuals, instructions or related materials.