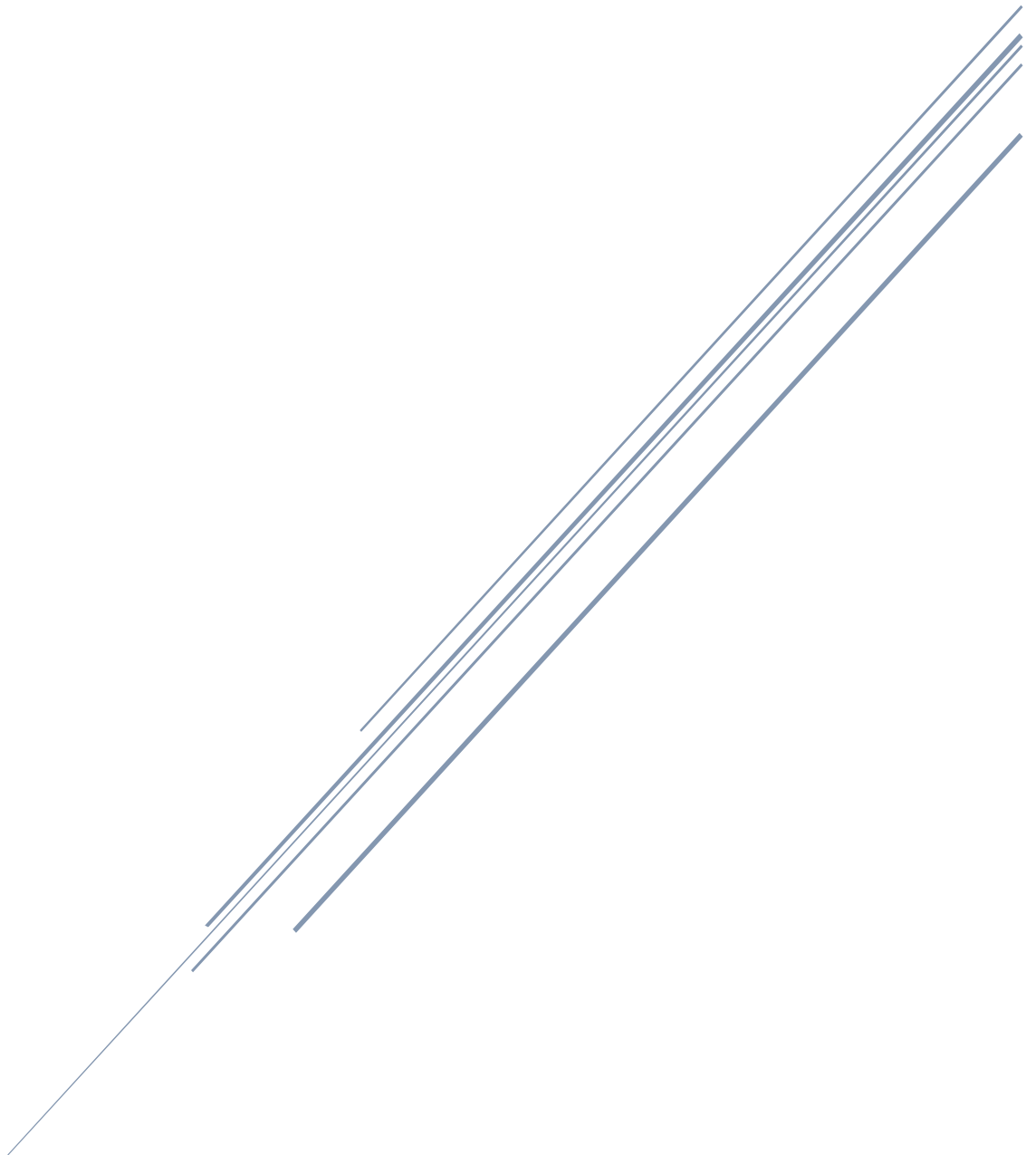


TunerPro

Version 5

Quick guide



Rev 1.4

Source www.tunerpro.net

Edited by OldSkullTuning.com

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OldSkullTuning

¹ You can find the complete manual of TunerPro directly in the software interface clicking Help → Help Topics (or shortcut F12).

1. Overview

TunerPro is a software platform designed to enable you manipulate the calibration data used by modern vehicle engine and transmission. For editing calibrations, TunerPro uses a versatile and extensible calibration definition format (XDF) that is user-definable and is quite powerful.

What do I need?

- The **binary file** itself (a **BIN** file, etc): it is the file readed from your vehicle
- The **bin definition file**, called the **XDF**, contains "maps" that deciphers what each byte in the bin stands for in the "real world"
- The hardware used to read and write your original and tuned file from your vehicle

The **binary file** is the partial or complete image of the calibration information, the code that the computer executes, or both. The bin file contains raw binary data imaged from the vehicle's static memory, and each byte or set of bytes in the file corresponds to a particular function that the car's ECM needs to operate. The bin contains the information the vehicle's computer (which goes by various names: ECM, ECU, etc), needs to make sense/use of the data it receives from the various sensors in and around the engine.

The **bin defition file (XDF)** tells the editing software how to interpret each byte in the bin file. TunerPro's native definition format is "XDF". The definition basically says, in plain English, "the byte at location X in the bin file should be multiplied/divided/offset by W, Y, Z to come up with a real world number. TunerPro uses this entry to take the binary information and present it to you, the user, in a useful, understandable representation.

Older vehicles tend to have EPROMs, which can be read with a special piece of hardware called an EPROM reader/programmer. It is used to read the information off a chip. Most EPROM programmers interact with a computer and, once the chip is read, the file which contains the information from the chip can be saved via computer to file (the bin file). Once the bin is edited (using TunerPro), the EPROM burner must be utilized for burning the new, or modified, bin file back onto the chip.

Starting around the mid-90's, many vehicle computers utilized flash memory to store the calibration and code. This flash memory is typically read using a special set of instructions passed to the computer through the diagnostic port (OBD port).

Once extracted, the information is usually stored in the PC as a single binary file. The filename extension for that file is typically .bin, but it can really be any extension. It is this file that TunerPro manipulates.

There are a lot of different tools used to read and write bin file by OBDII.

2. TunerPro interface

The first step is to open **bin** file readout from vehicle and **bin definition file (XDF)** containing maps.

To do this, you must first load your binary file and its corresponding definition file.

To open the **bin**:

- Via the menu, select File -> Open Bin
- Browse to the desired bin and double click it

To open the **definition file**:

- Via the menu, select XDF -> Select XDF
- Browse to the appropriate XDF file and double click it.

Opening the XDF file will enumerate the XDF Item tree with the available bin parameters (maps) available for editing. Once you have your bin and XDF file loaded, select the bin parameter you'd like to edit from the tree.

A screen capture of a typical TunerPro screen layout is shown below. The three major areas are marked in the screenshot.

The screenshot displays the TunerPro interface with the following components:

- Parameter Tree (1):** A list of parameters on the left side. The 'Spark Tip In Retard' parameter is highlighted with a red '1'.
- PT Spark Adder for ECT vs Load (2):** A table showing spark adder values for different engine speeds and loads. A red '2' is placed next to the table.
- Spark Base Table:** A table showing spark base values for different engine speeds and loads.
- Parameter Summary (3):** A table at the bottom showing a summary of parameters. The 'Spark Base Table' row is highlighted with a red '3'.

	60	75	90	106	196	210	230
5.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00
10.00	8.00	8.00	8.00	6.00	0.00	0.00	0.00
20.00	10.00	10.00	8.00	8.00	0.00	0.00	0.00
30.00	10.00	10.00	8.00	8.00	0.00	0.00	-4.00
40.00	10.00	10.00	8.00	8.00	0.00	0.00	-6.00
50.00	10.00	10.00	8.00	8.00	0.00	0.00	-6.00
60.00	10.00	10.00	8.00	6.00	0.00	0.00	-6.00
75.00	8.00	8.00	6.00	4.00	0.00	0.00	-6.00

	625.00	700.00	900.00	1100.00	1300.00	1500.00	2000.00	2500.00	3000.00	4000.00
5.00	32.00	32.00	32.00	36.00	36.00	30.00	30.00	30.00	30.00	30.00
10.00	32.00	32.00	32.00	36.00	36.00	30.00	30.00	30.00	30.00	30.00
20.00	32.00	32.00	36.00	36.00	36.00	37.00	38.00	38.00	38.00	38.00
30.00	37.00	38.00	42.00	33.00	35.00	36.00	38.00	40.00	39.00	39.00
40.00	25.00	25.00	31.00	28.00	29.00	30.00	33.00	34.00	34.00	35.00
50.00	18.00	18.00	19.00	14.00	19.00	20.00	27.00	25.00	29.00	29.00
60.00	14.00	14.00	15.00	12.00	15.00	19.00	22.00	25.00	26.00	26.00
75.00	14.00	14.00	15.00	10.00	12.00	15.00	20.00	22.00	23.00	23.00

Item Name	Location	Hex	Calculated	Adjust
Sea Level Multiplier vs BP	2AEC-A->...	N/A	(N/A)	
Spark Altitude Table	2ABE2->...	N/A	(N/A)	
Spark Base Table	2AB42->...	N/A	(N/A)	
Spark Sea Level Table	2AB92->...	N/A	(N/A)	

UI Components	
Title Bar	At the very top of the main window is the application title bar, which shows the currently open BIN, XDF files, as well as their modified state.
Main Menus	Below the title bar is the main application menu. The menus allow you to directly access most of the features of the application.
Main Toolbar	Immediately below the menu is the application's main toolbar. The toolbar is designed to give you quick access to the more commonly used features and commands, and it is broken down into groups.
XDF Item Tree (1)	<p>Under the '1' at the left side of the illustration above, there is the XDF Item Tree. This tree list exposes all the editable items (maps) in the XDF definition that you have loaded. Double clicking an item in the list will open the item's respective binary editor in the workspace to the right ('2' in the illustration).</p> <p>The XDF Item Tree can be arranged in various ways, depending on the selection in "View By" at the top of the tree window. You can arrange items in the list by type, category, or in a flat, ordered list. If you wish to rearrange the order of XDF items in the tree, you must do so in the "Ordered List" mode.</p>
Workspace (2)	Under the '2' in the illustration above, there is the main editor workspace. This is where all binary editors will be opened when you double click an item from the XDF Item Tree. Multiple editors can be open within the workspace simultaneously.
Bottom Utility Tab (3)	Under the '3' in the illustration, there is the bottom utility tab. Many of the utility windows accessible from the menus and toolbars will open in this tab view, including the Item Summary List and Item Comments.
Notes	By moving the "arrow" over icons and fields, you can read a brief description of their content.

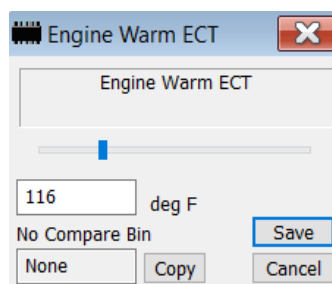
3. Editing bin

The most widespread types of maps are: constants, flags and tables (2D and 3D).

3.1 Constants

A constant (sometimes referred to as a "scalar") is a singular value in a binary.

A constant might be used, for example, to represent the temperature above which a cooling fan engages, or the maximum RPM of a motor.



To edit a constant, select the constant from the constants list. The desired parameter and its current value are displayed in the constant editor. You can select the number in the edit field and type in the value you desire. When the item is saved (either by pressing the save button in the editor or by saving the bin out to file), the chosen value will automatically get rounded to the nearest possible value in the bin.

Another chance is to hit the keypad + and - keys or Ctrl + "+" or Ctrl + "-" on the main keyboard to increment and decrement the values to their nearest possible values.

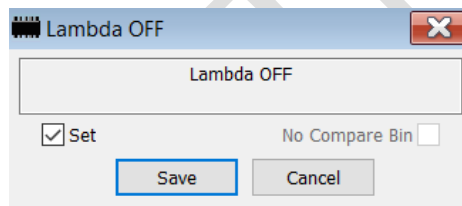
If you have a comparison bin selected, the compared bin's value will also be displayed. You may copy it manually or by pressing the "copy" button.

You may use the slider provided in the editor window to select a value within the possible range of values for the item. Updating the value in the edit box updates the position of the slider in realtime.

3.2 Flags

A flag represents a bit within a series of bits. A byte contains a series 8 bits. A bit can only be set or clear (1 or 0). Each bit, therefore, can represent a "switch" or "flag." For instance, a flag could be used to enable or disable a feature, where a bit value of 1 represents "on" and a bit value of 0 represents "off."

A flag in TunerPro has two states - set or not set (or, in terms of a bitmask, the mask either matches or does not match).



To edit a flag, select the desired flag set from the flag list. You will be presented with the flag info in the flag editor. Check or uncheck the values you wish. A checked item means the bit for that item within the mask is set (= 1). No check means the bit is cleared (= 0).

3.3 Tables

A table (sometimes referred to as a map) is a group of values representing the output on two or more axes where each value is a cell in a table. For instance, the spark advance to be applied at a given load and RPM might be represented as a 3D table in a binary where the X axis is the load, Y is the RPM, and Z is the output - the spark advance . Similarly, the idle speed for a given coolant temperature might be represented as a 2D table where the dependent (fixed) axis is the temperature, and the independent (variable or output) axis is the the idle RPM.

	625.00	700.00	900.00	1100.00	1300.00	1500.00	2000.00	2500.00	3000.00	4000.00
5.00	32.00	32.00	32.00	36.00	36.00	30.00	30.00	30.00	30.00	30.00
10.00	32.00	32.00	32.00	36.00	36.00	30.00	30.00	30.00	30.00	30.00
20.00	32.00	32.00	36.00	36.00	36.00	37.00	38.00	38.00	38.00	38.00
30.00	37.00	38.00	42.00	33.00	35.00	36.00	38.00	40.00	39.00	39.00
40.00	25.00	25.00	31.00	28.00	29.00	30.00	33.00	34.00	34.00	35.00
50.00	18.00	18.00	19.00	14.00	19.00	20.00	27.00	29.00	29.00	29.00
60.00	14.00	14.00	15.00	12.00	15.00	19.00	22.00	25.00	26.00	26.00
75.00	14.00	14.00	15.00	10.00	12.00	15.00	20.00	22.00	23.00	23.00

To edit a table, double click the table in the table list. This brings up the table editor. Edit the values you wish to edit using the same guidelines as the constants.

Range Selection

You can select a range of cells in a table by either left-clicking on the first cell in the range and, while holding the mouse button, dragging the mouse to the last cell in the range. With a range of cells selected, you can increment or decrement the values in the selection range all at once, or make use of the table functions in the table editor toolbox to modify the selected range. You can also copy and paste data to and from the selected range.

Copying/Pasting

Table data can be copied to and pasted from the Windows clipboard.

Once you have selected a cell or range of cells in the editor, you can copy the data to the clipboard by either pressing control + c or by right-clicking in the table and selecting "Copy Selection". When data is copied to the clipboard, it can be pasted elsewhere into the table or into another program such as Microsoft Excel.

To paste data into a table, select the first cell and hit control + v, or right-click in the table and select "Paste starting at cursor".

Note: when pasting data into the table, the data in the clipboard must be able to fit in the table, and fit within the space provided by the current cursor location and the bounds of the table. If this requirement is not met, the data will not be pasted.

Table Tools

The table editor toolbar has a group in it that allows you to edit the current selection with special functions, such as smooth, offset, multiply, etc. This allows you to, for instance, multiply an entire row, column, or table by a desired factor, or add to an entire column.

- Offset adds or subtracts to the values
- Multiply multiplies by the desired factor
- Divide divides by the desired factor
- Scale by % add or subtracts a % to the selected cells
- Copy from compare copies the corresponding values from the comparison bin
- Fill w/ value replace selected area or single cell with a chosen value
- Smooth allows a smooth transition among adjacent cells (values from 0.01 to 0.99)

Input the factor/offset you wish to use. You may use a "-" to input negative numbers. Select the area you want modify and then click "Execute".

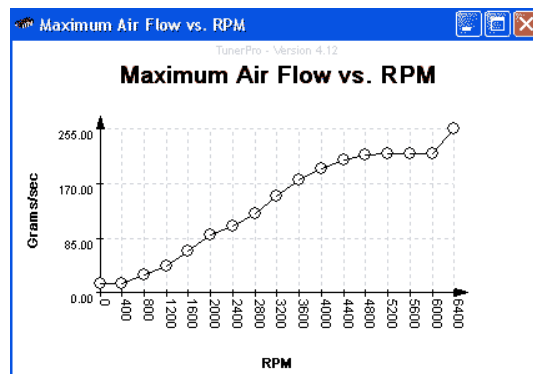
You can see units of maps and axes opening the 2D/3D view. To open this view just click on button "show table graph" or F11 shortcut on the keyboard.

3.4 Graphing

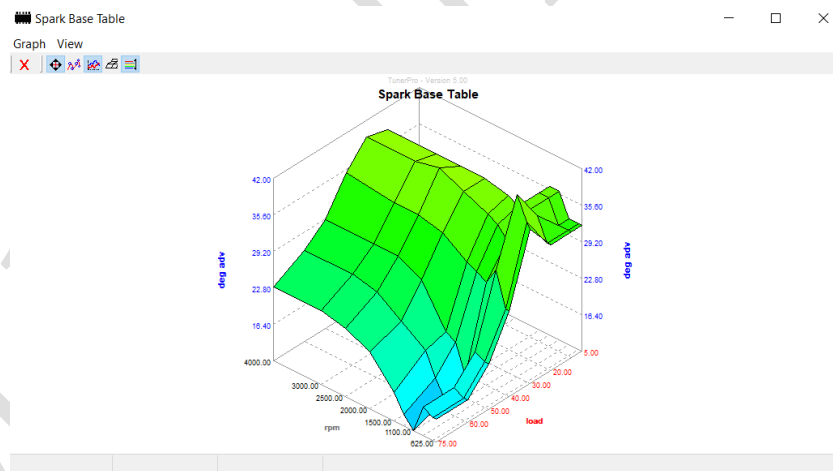
TunerPro allows you to graph 2 and 3 dimensional tables.

To do this, open the table of your choice from the table list or item summary. Within the table editor you will find a button titled "Graph". Pressing this button will open the graph for the active table. The table will be a line graph for 2D tables (2D = comparing 2 values, i.e. "Power Enrich Vs. Temp") or a surface plot for 3D tables (3D = comparing 3 values, i.e. "LV8 vs. RPM vs. Degrees Spark Advance").

Below is an example of a 2D graph:



Below is an example of a 3D graph:



In both 2D and 3D graphs, data points can be dragged and changed by clicking on the data point you wish to change and dragging the mouse.

In 2D graphs, the active point is coloured red.

In 3D graphs the active point is outlined in bold.

The graph and corresponding table value will update in real-time with your mouse movements. Changing values in an actively-graphed table will also automatically update the corresponding graph.

Multi-Selection

Dragging the mouse while the left mouse button is down will draw a selection rectangle. All the points that fall within that rectangle will be selected. Alternately, you can select using Ctrl + Left click. Clicking on a selected point while holding the Ctrl key will unselect the point.

Rotating, Shifting, and Zooming a 3D graph

Using the mouse:

Rotate = hold Ctrl, click on the graph, and move the mouse

Shift = hold Shift, click on the graph and move the mouse

Zoom = hold both Shift & Ctrl, click on the graph and move the mouse

Using the keyboard:

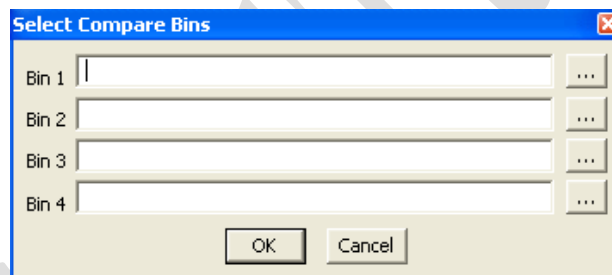
Rotate = hold Ctrl and use the arrow keys

Shift = hold Shift and use the arrow keys

Zoom = hold Ctrl & Shift and use the [(out) and] (in) keys

3.5 Comparing bin

TunerPro allows you to select up to 4 bin for easy comparison. To load comparison bin, in the "Compare" menu choose "Load Compare Bin...". You will be presented with the following dialog:

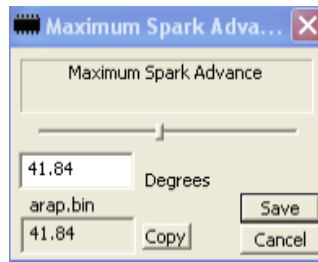


Browse to each bin using the "..." button. You do not need to use all 4. Once your compare bin are selected, you will be able to see, simultaneously, the values of both the current editable bin as well as the active comparison bin.

To select an active compare bin, you can select the desired bin from the "Compare" menu or you can use the quick-key command. Ctrl + 1 selects the first compare bin, Ctrl + 2 selects the second, and so on. If a bin is not loaded into a slot, you cannot select the slot.

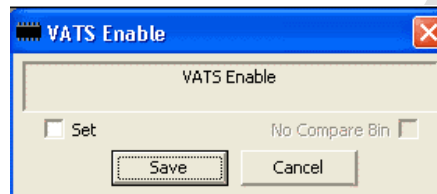
The default active compare bin after bin selection is the first slot that contains a bin, i.e. if slot 1 does not contain a bin but slot 2 does, when pressing "OK" in the selection dialog, the default compare bin will be slot 2.

Comparing Constants:



To compare constants, select the desired constant from the constant list. You will be presented with your editable bin's value for your that item. Below that, you can find the name of the compare bin followed by it's value for the item. You can copy the comparison bin's value to the editable bin value by pressing the "Copy" button.

Comparing Flags:



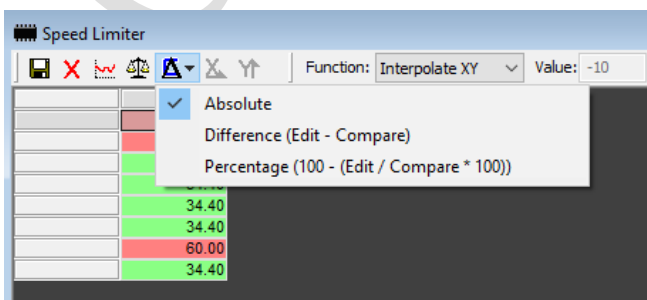
To compare flags, select the desired flag from the flag list. On the left side of the flag editor is the editable bin's flag value. On the right is the comparison bin's value.

Comparing Tables:

To compare tables, double click on the desired table in the table list. The table editor will open with the editable bin's information. To view the comparison bin's table, click the "compare" button. If a compare bin has not been selected yet, you will be presented with a browse window to select the compare bin. Once selected (or if already selected), the table editor changes to show the compare bin's values. When in compare mode, the table background changes to the color you specify in the preferences ("Non-editable Cell background color").

You can choose how to see the differences:

- Absolute values (shown original and tuned values)
- Difference. Edit – Compare (shown the numeric differences between original and tuned file)
- Percentage (shown the % differences between original and tuned file)



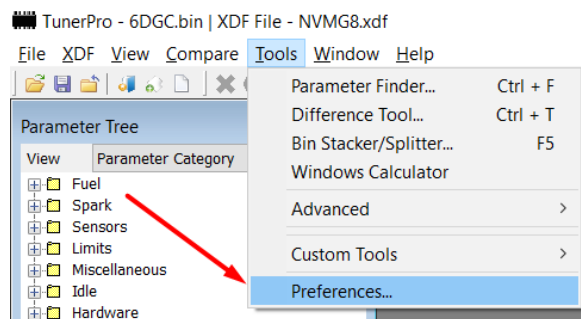
Then click on "Show Compare Bin Data":

	20.00	25.00	30.00	40.00	50.00
600.00	0.95	0.95	0.94	0.93	0.93
720.00	1.00	1.00	1.00	1.00	1.00
1400.00	1.00	1.00	1.00	1.00	1.00
1600.00	1.00	1.00	1.00	1.00	1.00
2000.00	1.00	1.00	1.00	1.00	1.00
2600.00	1.00	1.00	1.00	1.00	1.00
3200.00	1.00	1.00	1.00	1.00	1.00

Here you can also copy and paste values from compared bin.

4. Preferences of software

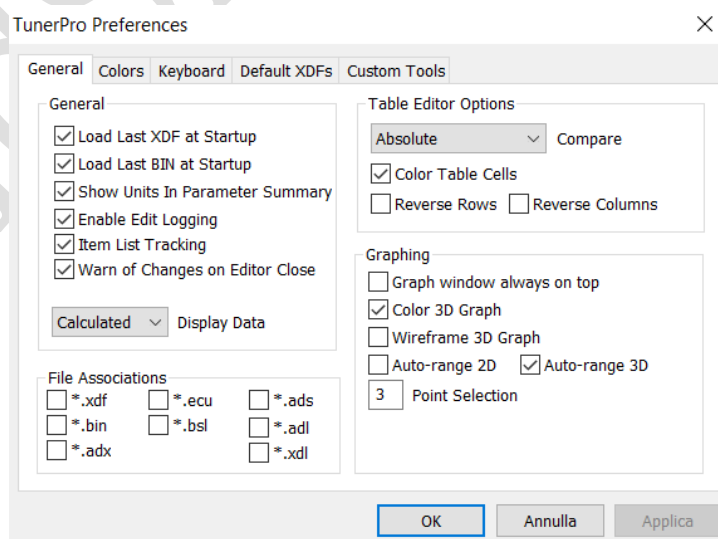
Preferences editor can be found in the tools menu, or by right-clicking in the workspace window. Below is a short description of each option.



In this section most important are:

- General Options
- Color Preferences
- Keyboard Shortcuts

General Options:



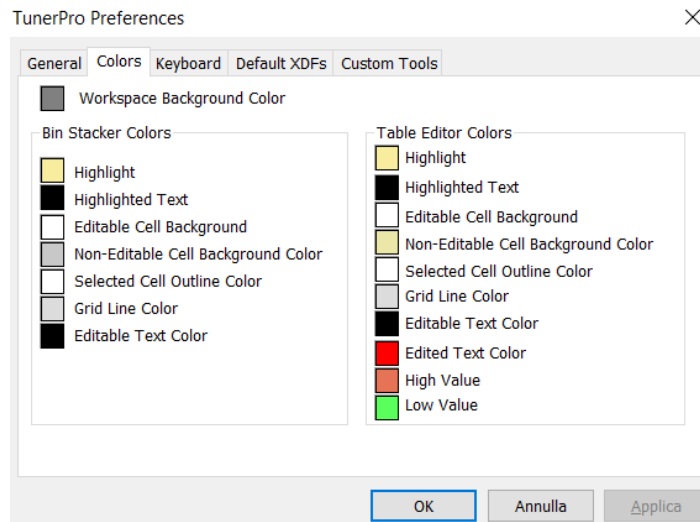
Show Units in Item Summary List - If checked, the item's units are outputted to the value column of the Item Summary List.

Color Table Cells - When checked, table cells are coloured based on the table-defined maximum and minimum values. If no max/min is set, the cells will not be coloured.

Color 3D Graph - If selected, the surface (or data points) in a 3D graph is coloured to represent relative values.

Auto-range 2D / Auto-range 3D - If selected, the X/Y (2D) or Z (3D) visual range will automatically be adjusted to the maximum and minimum values within the graph.

Colors preferences:



Workspace Background Color	This is the background color of the main workspace. Defaults to Dark Gray.
Highlight	Color of the highlighted row
Highlight Text	Color of highlighted text
Editable Cell Background	Color of a cell in which you can type
Non-Editable Cell Background Color	Color of a cell in which you cannot type
Selected Cell Outline Color	Color of the line drawn around the active cell
Grid line Color	Color of the table grid lines
Editable Text Color	Color of editable text
Highlight	Color of the highlighted row
Highlight Text	Color of highlighted text
Editable Cell Background	Color of a cell in which you can type
Non-Editable Cell Background Color	Color of a cell in which you cannot type

Selected Cell Outline Color	Color of the line drawn around the active cell
Grid line Color	Color of the table grid lines
Editable Text Color	Color of editable text
Edited Text Color	Color of edited text
High Value	Color of high value
Low Value	Color of low value

5. Additional information about maps and its functions

You can find additional information about maps and what they do by moving the “arrow” on name’s maps.

Acceleration Enrichment Fuel
 Fuel Base Table
 Fuel Startup Table
 PIPs per Crank Injector Firing
 Startup Fuel FN1306 - Subtracted from 'Fuel Base Table' for start up enrichment.
 Startup Fuel Warning: The top row must always contain zeros to prevent post warmup enrichment still occurring.
 Startup Fuel The column input value is the ratio of ACT to ECT where the ACT contribution is defined by the 'ACT Fraction for Fuel Startup Table' (aka FRCSFT) parameter.
 Time at High
 TPS Min Delt
 Warm HEGO