

WINJALL USER'S MANUAL

Begin at best with the ECUs

Release: V1.10 - 12/09/2022

<http://www.skynam.com>



Machine management

Begin at best with the ECUs

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IMPORTANT PRELIMINARY

This documentation has been specifically updated for the Winjall versions distributed from September 12th 2022, including Winjall 9.80

WINJALL:

The Skynam electronic control units are multi-purpose machines that can be re-programmed as many times as necessary to suit your application (within the technical specifications of your ECU).

Consequently, your ECU cannot be delivered with standard tuning:

Before using it, you have to tell the ECU which functions it has to take into account and give it the settings related to such functions.

For that purpose, Skynam has developed some user-friendly, performing software called WINJALL. If you want to work on an ECU, you'll need:

- Winjall, properly installed on a PC (Microsoft Windows operating system, XP SP3, 7, 8, 10 or even more recent)

- The software pack for your ECU must also be installed correctly. It contains all the documentation and Tunewares specific to your ECU.

- It is also advised to install the software pack 'Sensors and actuators'.

You will find all these installation files in the 'Download' section on our website www.skynam.com.

LICENCE OF USE:

When you install Winjall, the installation automatically provides a free 'All users' licence which allows you to communicate with and tune your ECU.

TUNEWARE:

Winjall can communicate with all the ECUs developed by Skynam: the engine management ECUs, petrol and diesel, the electric and hybrid vehicles control ECUs, the injectors drivers, ...

Each ECU has its own specificities and each device managed by the ECU (for example the engine and its peripherals) has its own tunings.

A Tuneware is a file on your computer that describes to Winjall the specificities of your ECU, what are the data and the software it uses, who is entitled to operate it and at which level (the access rights).

There are as many different Tunewares as different types of ECUs, different types of calculations made by the ECU, and specific settings you may have made done.

MACHINE:

It is the nickname of the Electronic Control Unit

But "machine" gives a more functional idea than "ECU".

THE WINJALL SOFTWARE

I) LAUNCHING WINJALL :

1) If you are a professional owning a professional licence, before launching the Winjall software, you have to insert the licence protection USB key supplied by Skynam (called 'dongle'). With that dongle, Winjall can make out some advanced calculations about data and Tunewares.

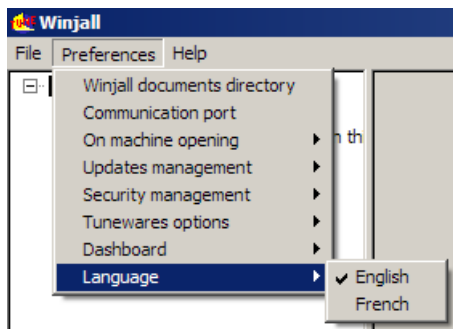
This dongle has to remain in place during the whole of the WINJALL session.

2) If you don't own a professional licence, the Winjall installation automatically provides a free 'All users' licence which allows you to communicate with and tune your ECU, and you have no special thing to do.

II) LANGUAGE SELECTION:

Winjall owns a main menu with a 'Preferences' item.

Two languages can be dynamically selected by the menu 'Preferences', English and French.



Note: two software packs exist, an English pack Winjall_ENU.x.x.x.x and a French pack Winjall_FRA.x.x.x.x. These two packs do not concern the language used by Winjall but only the language of the documentation. So, whichever is the pack that you installed, you can choose the language of Winjall operation.

III) SELECTION OF THE TYPE OF COMMUNICATION WITH THE ECU:

Plug the communication interface of your ECU into your PC.

In the 'Preferences' menu of Winjall, click on 'Communication port'.

Winjall then displays the different interfaces which it can use to communicate with the ECUs: select the interface specific to your ECU.

Winjall memorizes the selected type and you will not have to execute again this operation the next time you launch Winjall.

Select for example:

- a Com interface for Challenger4 ECU
- the USB-FTDI interface for Challenger 5-6-7-8 and Meteor ECUs
- the USB-CAN interface for Commander ECUs



IV) WINJALL MAIN WINDOW:

The window in which Winjall is executed has been divided into two parts by a splitter to make displaying and using it easier.

The left part contains the machines tree.

It is the list of the ECUs connected to the PC (several machines may be connected to the PC by CAN-BUS at the same time). All the tuning pages are available for each separate ECU.

It also contains a Generic Machine which is a virtual ECU allowing to work even if you are not connected to a real ECU.

WINJNET is the name given to the network of interconnected machines. Next to it the communication port currently used by Winjall for communicating is displayed. Actually, several machines can be connected together, for example via the CAN-BUS.

Winjall can then operate several machines at a same time.

The machine is displayed on the machines tree starting from the WinjNet.

The machines tree in the WinjNet network works as an explorer: the branch menu can be expanded or reduced by clicking on the '+' or '-' in front of each branch, or by double-clicking on the name of the branch.

Even when no machine is connected, the network has at least one virtual machine (GENERIC MACHINE) so that you can work and prepare the data, even when not connected to a real ECU.



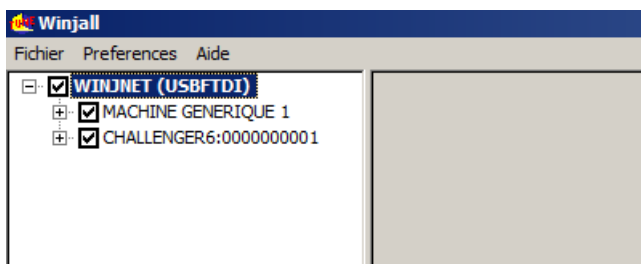
When no Tuneware is open on a machine, the expansion of the machines tree shows four branches:

- the name of the machine (given by the machine),
- the state of the machine (permanently transmitted by the machine),
- the state of the Dashboard (graphic display of variables),
- the state of the Tuneware open on the machine ('not defined' if no Tuneware is open)



V) CONNECTION WITH YOUR ECU:

When you have connected your communication interface, selected the communication port in the 'Preferences' menu and you switch on your ECU, it appears in the machine tree, below the Generic machine.



FIRMWARE UPDATE OF THE ECU

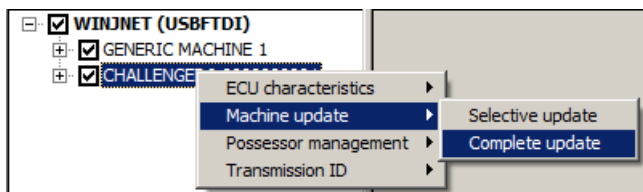
The first time that you install your ECU, before performing the different tunings that will allow to start your engine, you have to execute a 'Machine update'.

This operation will indicate the ECU which types of general calculation it must perform to manage your engine, for example:

- throttle/rpm
- pressure/rpm with or without turbo
- ...

To select the type of calculation, see the document 'Begin at best with the XXX' (XXX being the type of your ECU) that you will find in the specific documentation folder of your ECU.

Once you know which type of calculation you want your ECU performs, right click in the name of your ECU and select the Machine complete update function:



Double click on your ECU name in the browser that appears

| Nom ^ | Modifié le | Type | Taille |
|----------|------------------|---------------------|--------|
| Biker110 | 08/12/2017 05:48 | Dossier de fichiers | |
| Chal4 | 01/12/2016 04:49 | Dossier de fichiers | |
| Chal5 | 01/12/2016 04:49 | Dossier de fichiers | |
| Chal6 | 01/12/2016 04:48 | Dossier de fichiers | |

Then select the type of calculation

| Nom ^ | Modifié le | Type |
|----------|------------------|---------------------|
| Throttle | 01/12/2016 04:48 | Dossier de fichiers |
| Vacuum | 01/12/2016 04:48 | Dossier de fichiers |

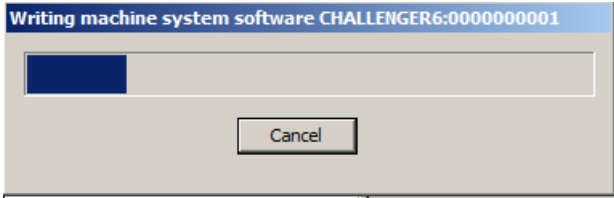
And select the type of Tuneware to load in the ECU

| Nom ^ | Modifié le | Type |
|---|------------------|---------------------|
| Archives | 01/12/2016 04:48 | Dossier de fichiers |
| Throt.Chal6#210.(Chal6#210).WnjTwr | 24/11/2016 18:23 | Machine manageme... |
| Throt_AMoThr.Chal6#210.(Chal6#210).Wnj... | 24/11/2016 18:23 | Machine manageme... |
| Throt_AMoThr_SeqGear.Chal6#210.(Chal6#... | 24/11/2016 18:23 | Machine manageme... |
| Throt_SeqGear.Chal6#210.(Chal6#210).Wn... | 24/11/2016 18:23 | Machine manageme... |

Then let execute the update: Warning, don't switch off the ECU while the update is running.

The Update is automatically done in three parts:

- the loading of the system software
- the loading of the application software
- the loading of the application data



OPEN AND CLOSE THE TUNEWARES HOW TO WORK ON A MACHINE

A Tuneware is a file which explains to Winjall the structure of the machine, the data and the software it uses, who is entitled to operate it and at which level (the access rights).

If you want to tune a machine, you need the Tuneware corresponding to the one which you have performed the Machine update (see above).

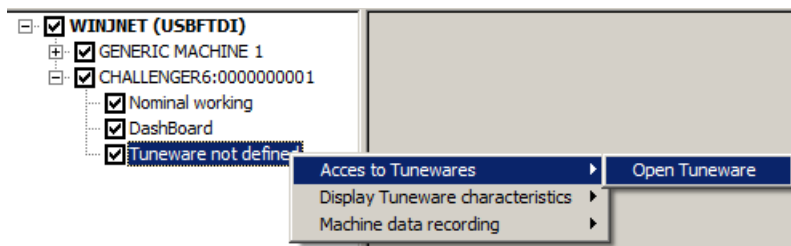
As long as you have not opened a Tuneware on your ECU in the machines tree, you can only get access to the basic system functions of the machine but not to the tuning functions.

D) OPENING A TUNEWARE:

It is extremely easy but at the same time it can be risky: any mistake could erase all the machine data! So, do follow this procedure very thoroughly.

Expand the tree of your ECU by double clicking on its name or by clicking on '+'.
Right-click on the State of the Tuneware displaying "Tuneware not defined" (third branch displayed under the machine name): a popup menu gives you access to the Tuneware functions. Select 'Open Tuneware'.

You can obtain the same result by directly double-clicking on the Tuneware state of the machine.



Winjall then asks you to select the Tuneware corresponding to the machine. It's up to you to define the type of machine software:

Browse through the directories until you get to the Tuneware matching your machine.

If you choose a Tuneware that does not match the machine or its software, Winjall will warn you and refuse to open that particular Tuneware.

In that case, you can ask to Winjall the type and the version of Tuneware loaded in the machine by the function 'ECU Characteristics' (see below).

Please note that all the Tunewares can be opened on the "GENERIC MACHINE".

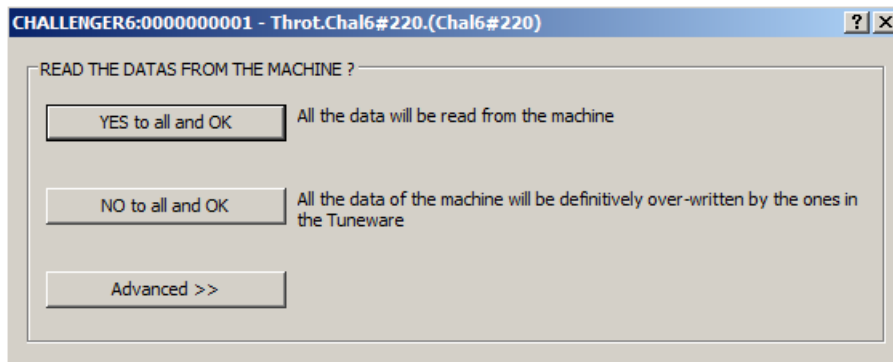
When opening a Tuneware on a real machine (and not on the GENERIC MACHINE), Winjall wants to be completely synchronized with this machine, which means that the machine data in Winjall and the data in the real ECU must be absolutely identical.

There are two ways to do this, either retrieve the data from the ECU, or send to the ECU the data present in the Tuneware.

So Winjall asks you a very important question:

"DO YOU WANT TO READ THE MACHINE SETTINGS OR DO YOU WANT TO SEND THOSE PRESENT IN THE TUNEWARE TO THE MACHINE?"

If you tell Winjall not to read the machine settings, it will send the machine the settings to be found in the Tuneware you open on the PC. **The settings in the machine will then be lost**, and completely replaced by those it is going to receive.



So, unless you are really sure of what you are doing, ask Winjall to read the machine data by answering 'Yes to all and OK'.

Two most commonly used standard actions, as well as advanced actions, are permitted with this dialog box:

STANDARD ACTIONS

Yes to all and OK:

Winjall has to read all the data in the machine. Your Tuneware then becomes a complete image of the machine contents: nothing has been modified in the machine.

No to all and OK:

Winjall has to write all the data to the machine. Your machine then becomes a complete image of the Tuneware contents: all previous settings in the ECU are lost.

II) AUTOMATIC OPENING OF THE TUNEWARES:

When shutting down Winjall without having shut down the Tuneware on your machine(s), Winjall memorizes you have not shut down this or these particular Tuneware(s).

At its next session, as soon as Winjall sees the machines are being connected, it will automatically open the same Tunewares to give the same working configuration as for the last shutting down.

With the automatic reopening, Winjall will not ask the question whether you want to get the data from the ECU or sent them to it - it will systematically recover them so as to be perfectly synchronised with the machine.

III) SAVING A TUNEWARE:

As soon as you perform tuning in your ECU, they are automatically saved in its memory.

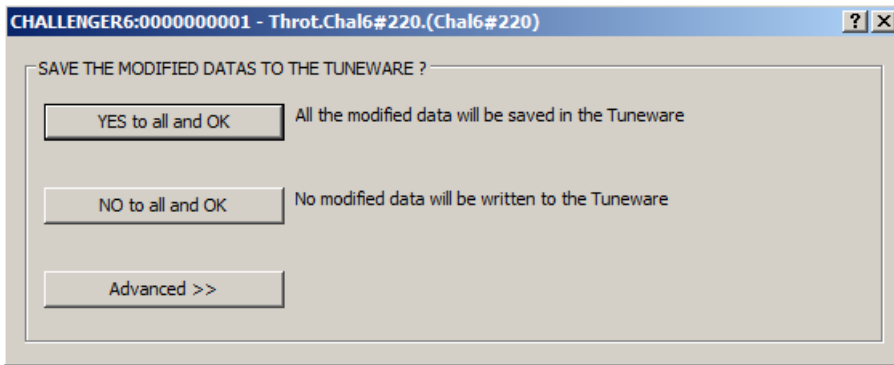
Once you have tuned your ECU, you can also save the tunings on your hard disk for security.

It is a simple operation, but that reverse risks of the opening: an error of manipulation can do not to record the data of the machine in the Tuneware file.

Right-click on the Tuneware State to get the popup menu for access to the Tuneware functions. Select the 'Save Tuneware' function.

Winjall will then ask you:

"DO YOU WANT TO SAVE THE TUNING MODIFICATIONS INTO THE TUNEWARE ?"



This question is only about saving the Tuneware on the PC disk: all the data that can have been modified in the machine will remain changed in it (except in the GENERIC MACHINE but it is just a virtual one).

With this dialog box, two most common standard actions are possible, as well as advanced actions:

STANDARD ACTIONS

Yes to all and OK:

Winjall has to write all the data in the Tuneware. It replaces the original settings of the Tuneware file by new ones.

The previous settings in this particular Tuneware file will then be finally replaced by the ones received from the machine or the ones you have modified by hand.

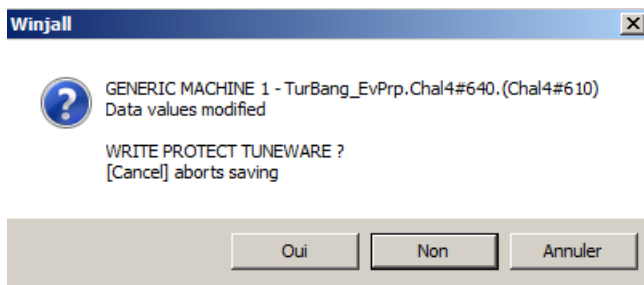
No to all and OK:

Winjall must not save the data in the Tuneware. All the new settings are then abandoned and not transferred to the Tuneware.

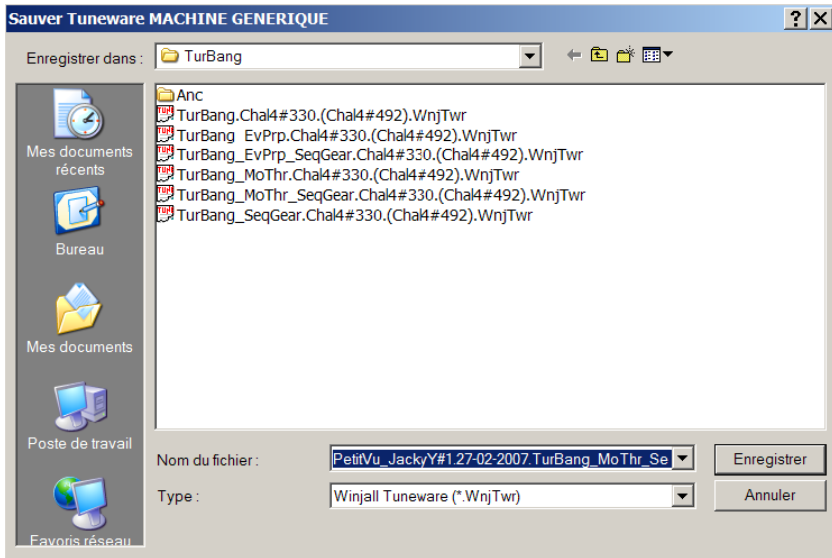
TYPES OF SAVING

Winjall then suggests saving the modified Tuneware file with a summary of the new modifications. It asks a question to know if you want to write protect the Tuneware:

- Yes: The saved Tuneware cannot further be written again under the same name. This allows to protect a tuning from a subsequent modification.
- No: The Tuneware is normally saved. It can be re-written under the same name. It is not protected from a subsequent modification.
- Cancel: The Tuneware is not saved.



If you wish to save this new Tuneware, do it under a different name so that you can easily retrieve these settings later and without altering the settings of the original Tuneware.



You'll then have two Tunewares for this type of machine, one with original settings, the other one with the new ones.

IV) CLOSING A TUNEWARE:

Right-click on the Tuneware State to get the popup menu for access to the Tuneware functions. Select the 'Close Tuneware' function.

The same result may be obtained directly by double-clicking on the machine Tuneware state that is open.

If the Tuneware has been modified since it was opened, either by receiving new data from the ECU, or by yourself, Winjall proposes you to save this Tuneware (see above).

TUNING THE ECU

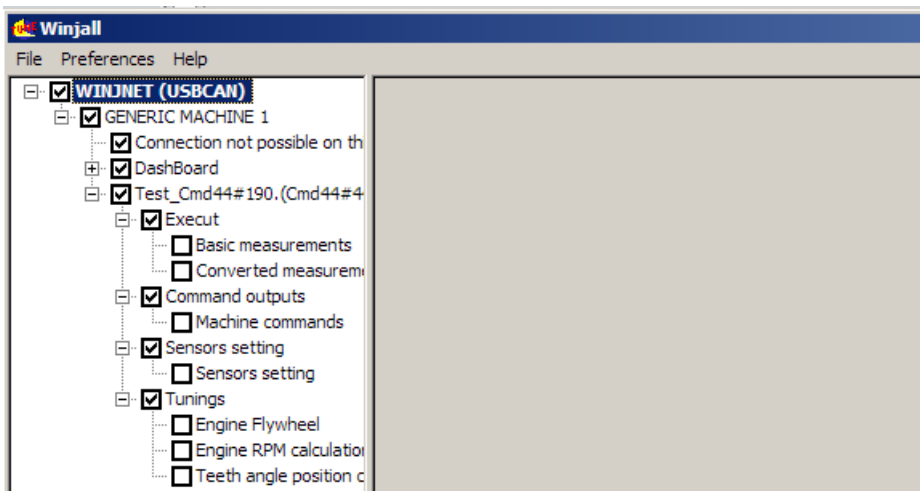
The WINJALL software is based on intensive use of popup menus.

They can be opened by right clicking on the displayed items:

In the machines tree, the main menus are

- **on the WinjNet name:** choose the communication interface to be used, create supplementary Generic machines (detailed in file 'Preferences')
- **on the name branch** of each machine: system functions of each machine (detailed in file 'Operations on the ECUs')
- **on the state branch** of each machine: state function of each machine (detailed in file 'Operations on the ECUs')
- **on the Dashboard branch** of each machine: management of Dashboard functions of each machine (detailed in file 'Dashboard')
- **on the Tuneware branch** of each machine: management of Tuneware functions of each machine (detailed in files 'Operations on the Tunewares' and 'ECUs tuning')

When a Tuneware is open on a machine (in this example, on the generic machine, the one that is never connected and only virtual but the same works on a real ECU), the possible application functions for this machine are displayed in the machines tree under the machine.



The name of the open Tuneware is displayed instead of the message "Tuneware not defined" on the line of the Tuneware state, and under this state line appears the tree of the functions known by this ECU.

Then, each ECU owning specific tunings, report to the ECU documentation provided by the software pack installation of the ECU

MODIFICATIONS OF THE DATA VALUES IN THE PAGES

There are two types of data:

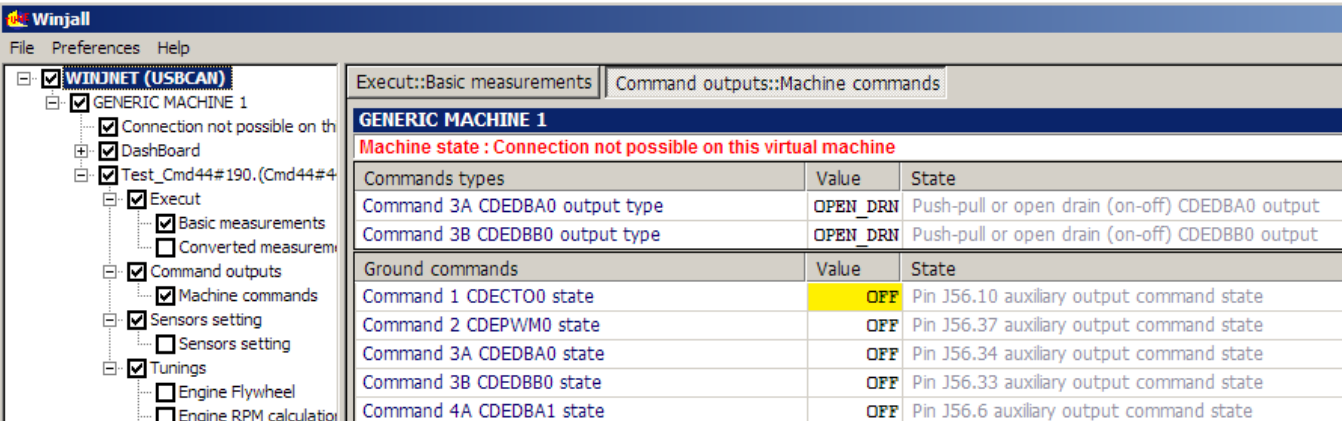
- informative data the user cannot modify
- tune-up data the user can modify

If the user's access rights for a machine are not sufficient, maybe a particular tune-up data won't be displayed, or may be displayed but can't be changed.

Tune-up data the user has full access to can receive the modification cursor so as to be modified.

The modification cursor is represented by the colouring (yellow) of the cell background corresponding to the value of the particular variable.

I) SINGLE VARIABLES



The screenshot shows the Winjall application window. On the left is a tree view under 'WINJNET (USBCAN)' with 'GENERIC MACHINE 1' expanded. On the right, the 'Command outputs::Machine commands' page is active, displaying a table for 'GENERIC MACHINE 1'. A red message at the top states 'Machine state : Connection not possible on this virtual machine'. The table is divided into 'Commands types' and 'Ground commands'. The 'OFF' value in the first row of the 'Ground commands' section is highlighted in yellow.

| Commands types | Value | State |
|--------------------------------|------------|---|
| Command 3A CDEDBA0 output type | OPEN_DRN | Push-pull or open drain (on-off) CDEDBA0 output |
| Command 3B CDEDBB0 output type | OPEN_DRN | Push-pull or open drain (on-off) CDEDBB0 output |
| Ground commands | | |
| | Value | State |
| Command 1 CDECTO0 state | OFF | Pin J56.10 auxiliary output command state |
| Command 2 CDEPWM0 state | OFF | Pin J56.37 auxiliary output command state |
| Command 3A CDEDBA0 state | OFF | Pin J56.34 auxiliary output command state |
| Command 3B CDEDBB0 state | OFF | Pin J56.33 auxiliary output command state |
| Command 4A CDEDBA1 state | OFF | Pin J56.6 auxiliary output command state |

When a particular value has been modified, it appears in italics to remind you it has been changed.

A) CHOOSING THE VARIABLE THAT MUST BE MODIFIED

If you want to move the modification cursor to another variable, you either click on the new variable or press [PGUP] or [PGDOWN] on the keypad.

B) CHANGING THE VALUE OF A SINGLE VARIABLE

If you want to modify the value allocated to the data when the cursor is on it, you only have to press [+] or [-] on the keypad (for a laptop, on the numeric keypad by using [Fn][+] or [Fn][-]) for a fixed modification of value.

The data will then be increased or decreased by 1.

If you press [SHIFT][+] or [SHIFT][-], the data will be modified by 10.

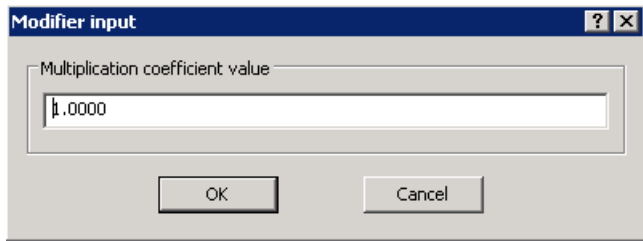
If you press [CTRL][+] or [CTRL][-], the data will be modified by 100.

If you want to modify the value of the data in percentage when it has the cursor, you only have to press [*] or [/] on the keypad (for a laptop, [Fn] [*] or [Fn] [/] for a proportional modification of value. The data will then be increased or decreased by 0.1%.

If you press [SHIFT][*] or [SHIFT][/], the data will be modified by 1%.

If you press [CTRL][*] or [CTRL][/], the data will be modified by 10%.

To modify the value of the data with a selected coefficient when it has the cursor, you only have press [CTRL] [ALT] [*] on the keypad. A window appears, asking by which value you want to multiply the data:

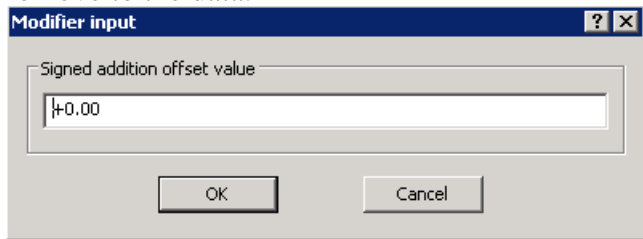


A coefficient of 1.00000 does not change the value

A coefficient of 1.25000 multiplies by 1.25, that is it will increase the value by 25%

A coefficient of 0.82000 multiplies by 0.82, that is it will decrease the value by 18%

To modify the value of the data with a selected signed offset when it has the cursor, you only have press [CTRL] [ALT] [+] on the keypad. A window appears, asking by which value you want to add or remove to the data:

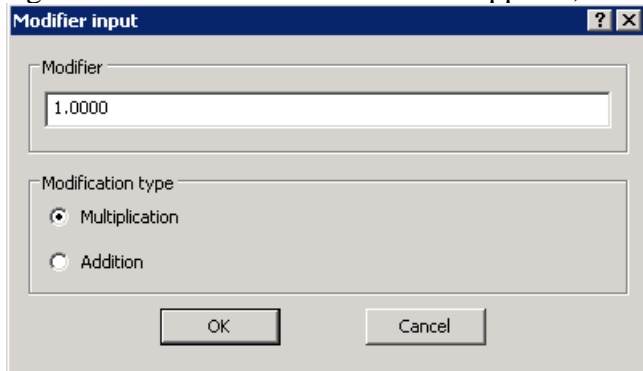


An offset of +0.0 does not change the value

An offset of +10.5 adds 10.5 to the value

An offset of -5.1 removes 5.1 to the value

To modify the value of the data when it has the cursor, you only have press [CTRL] [ALT] [+] while a right click on the mouse. A window appears, asking by which value you want to modify to the data:



II) MAPS:

A map is a set-up unit representing a mathematical function of the $z = f(x, y)$ type. The results are not calculated but read (interpolated) in a table of values.

| THK-C ⁹ conversion | | 0-30 V Alimentation tension | | | | | 0.000 | Standard interpolation |
|-------------------------------|--------|--------------------------------|------|------|------|------|-------|------------------------|
| LINE SCALE | | Channel ADC 09 0-5 volts value | | | | | 0 | Standard interpolation |
| COLUMN SCALE | | 1000 | 2000 | 3000 | 4000 | 5000 | | |
| | 0 | | | | | | | |
| | 14.000 | +200 | +397 | +589 | +781 | +984 | | |
| | 28.000 | -6 | +193 | +386 | +571 | +758 | +956 | |

Consequently, this grid has two scales, the one for 'y' (lines) and the one for 'x' (columns), which are the cells with a dark background. The data (function results) are at the crossing of the lines and columns of the scales in the grid.

Above, for example the line input number = 28.000 and the column input number 4000 give the output value = +758.

A) OPERATION CURSOR

In the Winjall display, the cells used by the connected machine are called 'Operation cursor' and their values are displayed in red. The operation cursor is shown in real time (changes when input values change).

| Injection time calculation | | | | | | | | | | | |
|----------------------------|--------|--------|------------------------|--------|--------|--------|--------|--------|------------------------|--------|--------|
| LINE SCALE | | | RPM measurement (RPM) | | | | 2426 | | Standard interpolation | | |
| COLUMN SCALE | | | Intake pressure (bars) | | | | 1.154 | | Standard interpolation | | |
| Inj.° | 0.000 | 0.350 | 0.550 | 0.750 | 0.950 | 1.050 | 1.100 | 1.300 | 1.600 | 2.000 | 2.500 |
| 600 | 6.85 | 6.85 | 10.77 | 17.53 | 23.16 | 25.93 | 27.26 | 32.60 | 40.43 | 52.24 | 65.94 |
| 800 | 10.12 | 10.12 | 15.92 | 24.92 | 32.21 | 35.89 | 37.61 | 44.51 | 55.40 | 71.27 | 89.96 |
| 1300 | 18.64 | 18.64 | 29.31 | 44.32 | 56.14 | 62.08 | 64.95 | 76.45 | 94.94 | 121.29 | 152.86 |
| 1700 | 25.45 | 25.45 | 40.02 | 60.46 | 75.64 | 83.19 | 87.00 | 102.32 | 126.15 | 160.01 | 201.79 |
| 2100 | 33.41 | 33.41 | 52.51 | 77.76 | 96.26 | 105.69 | 110.40 | 129.37 | 158.10 | 198.65 | 250.29 |
| 2500 | 65.52 | 41.67 | 65.52 | 94.83 | 117.51 | 128.79 | 134.61 | 157.95 | 193.02 | 242.07 | 305.10 |
| 3000 | 117.64 | 53.38 | 83.91 | 117.64 | 144.61 | 158.47 | 165.56 | 194.04 | 236.91 | 297.00 | 374.36 |
| 3600 | 149.26 | 70.28 | 110.51 | 149.26 | 179.93 | 197.43 | 205.76 | 239.16 | 291.69 | 365.27 | 459.83 |
| 4200 | 185.78 | 87.39 | 137.34 | 185.78 | 223.28 | 244.90 | 252.71 | 284.21 | 343.29 | 428.57 | 539.81 |
| 4800 | 216.86 | 102.58 | 161.28 | 216.86 | 259.48 | 284.42 | 293.29 | 329.06 | 394.67 | 491.27 | 619.02 |
| 5400 | 247.27 | 117.48 | 184.68 | 247.27 | 294.97 | 323.29 | 333.26 | 373.38 | 446.28 | 553.65 | 697.77 |
| 6200 | 279.90 | 132.73 | 208.62 | 279.90 | 334.66 | 365.98 | 377.14 | 422.16 | 503.33 | 622.82 | 784.58 |
| 7000 | 313.33 | 147.84 | 232.35 | 313.33 | 375.07 | 410.27 | 422.79 | 473.11 | 562.66 | 694.54 | 874.39 |

B) MODIFICATION CURSOR

- 1) Select a set of cells by positioning the cursor with the four arrows of the keypad [UP] [DOWN] [LEFT] [RIGHT] or by using the mouse for clicking on them.
- 2) You enlarge the modification cursor to the bottom or to the right by pressing [SHIFT][DOWN] and [SHIFT][RIGHT].
- 3) You shrink the modification cursor to the top or to the left by pressing [SHIFT][UP] and [SHIFT][LEFT].

Data cell selection is then reported to the scales with a specific background colour of the corresponding cells:

Below, the +193 field has been selected and the corresponding line scale = 28,000 and column scale=1000 have been given a blue background.

| Catalysor temperature | | Value | State |
|---|--|-------|-------|
| Analog thermocouple 1 input in millivolts | | 0 | |
| Thermocouple 1 temperature in C° | | -273 | |
| Thermocouple 2 temperature in C° | | -273 | |
| Thermocouple 3 temperature in C° | | -273 | |
| Thermocouple 4 temperature in C° | | -273 | |

| THK-C° conversion | | | | | | |
|-------------------|----|---|------|------|--------------------------|------|
| LINE SCALE | | Not defined | | | Standard interpolation | |
| COLUMN SCALE | | Analog thermocouple 1 input in millivolts | | | 0 Standard interpolation | |
| | 0 | 1000 | 2000 | 3000 | 4000 | 5000 |
| 14000 | +0 | +200 | +397 | +589 | +781 | +984 |
| 28000 | -6 | +193 | +386 | +571 | +758 | +956 |

The particular background colour of the scale cells corresponds to the selected data cells so that you can easily spot the position of maps with a huge number of lines and columns in the scales.

Two very useful additional functions for handling the modification cursor can be used when tuning up in real time. With these two functions you can match the modification cursor to the operation cursor.

1) Position the modification cursor on the operation cursor: by pressing [ENTER], the modification cursor is directly positioned at the place and size of the operation cursor.

| | | | | | | |
|---------|---------|---------|---|---------|---------|---------|
| + 8.00 | + 13.00 | + 13.00 | → | + 8.00 | + 13.00 | + 13.00 |
| + 8.00 | + 15.00 | + 15.00 | | + 8.00 | + 15.00 | + 15.00 |
| + 8.00 | + 19.00 | + 19.00 | | + 8.00 | + 19.00 | + 19.00 |
| + 8.00 | + 21.00 | + 20.00 | | + 8.00 | + 21.00 | + 20.00 |
| + 8.00 | + 22.00 | + 21.00 | | + 8.00 | + 22.00 | + 21.00 |
| + 0.00 | + 24.00 | + 23.00 | | + 0.00 | + 24.00 | + 23.00 |
| - 20.00 | + 27.00 | + 25.00 | | - 20.00 | + 27.00 | + 25.00 |

2) Get the operation cursor to track the modification cursor: press on [SPACE BAR]. The modification cursor self-positions and keeps following the heaviest (most important) cell of the operation cursor. You only need to modify the data without using the arrows anymore. If you want to recover the positioning command for the modification cursor, either press on one of the four arrows, or on the space bar again, or on the enter key.

To request or stop operation cursor tracking by the modification cursor on all maps of the ECU, navigate to the Tuneware popup menu by right-clicking in the name of Tuneware, then select the 'Engine following'.

B) MODIFICATION OF CELLS UNDER CURSOR

The modification always applies to the whole set of selected cells. You modify the value of the selected zone like a single variable (see just above) [SHIFT, CTRL, ALT, +, -, *, /]

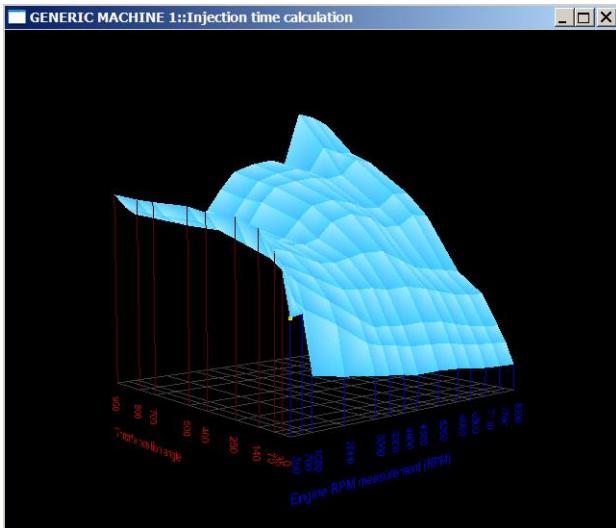
III) 3D MAP DISPLAY:

All the maps, besides the digital display, can be displayed in 3 dimensions. The 3D display allows to easily track down maps calibration errors by locating immediately not wished holes and bumps.

A) 3D DISPLAY LAUNCHING

We execute the 3D display with the map header context menu:

| Injection time calculation, displayed in milliseconds or crankshaft degrees | | Inj. Time | | Inj. Angle | | Inj. Duration | | Inj. Pressure | | Inj. Temperature | |
|---|--------------|-----------|-------|------------|-------|---------------|-------|---------------|--------|------------------|--|
| LINE SCALE | COLUMN SCALE | 0 | 140 | 250 | 400 | 500 | 700 | 800 | 950 | | |
| 350 | 5.0 | 6.398 | 8.816 | 8.954 | 9.188 | 9.322 | 9.416 | 9.630 | | | |
| 700 | 5.1 | 7.180 | 7.618 | 8.210 | 8.510 | 8.686 | 8.774 | 9.000 | | | |
| 1000 | 2.6 | 6.922 | 7.586 | 8.150 | 8.240 | 8.408 | 8.478 | 8.658 | | | |
| 2000 | 2.4 | 6.306 | 7.278 | 8.016 | 7.946 | 8.048 | 8.124 | 8.334 | | | |
| 3000 | 2.2 | 5.642 | 6.688 | 7.382 | 7.510 | 7.804 | 7.850 | 8.284 | | | |
| 3500 | 2.1 | 5.584 | 6.656 | 7.368 | 7.582 | 8.124 | 8.332 | 8.768 | | | |
| 4000 | 2.0 | 5.612 | 6.824 | 7.608 | 8.416 | 9.220 | 9.368 | 9.840 | | | |
| 4500 | 1.950 | 3.110 | 3.978 | 5.464 | 7.020 | 8.360 | 9.106 | 9.994 | 10.270 | 10.750 | |
| 5250 | 1.954 | 3.084 | 4.012 | 5.526 | 7.048 | 8.730 | 9.368 | 10.276 | 10.678 | 11.186 | |
| 6000 | 1.898 | 2.988 | 3.916 | 5.338 | 6.534 | 8.480 | 9.186 | 10.464 | 10.922 | 11.410 | |
| 6500 | 1.800 | 2.848 | 3.736 | 5.150 | 6.164 | 8.038 | 8.936 | 10.396 | 10.764 | 11.222 | |
| 7100 | 1.708 | 2.734 | 3.548 | 4.948 | 6.042 | 8.036 | 8.936 | 10.594 | 12.068 | 13.976 | |
| 7700 | 1.656 | 2.680 | 3.442 | 4.848 | 5.922 | 8.580 | 9.632 | 11.420 | 11.824 | 13.832 | |
| 8300 | 1.630 | 2.626 | 3.374 | 4.824 | 5.818 | 8.488 | 9.656 | 11.296 | 11.800 | 13.454 | |



B) MANIPULATING THE 3D DISPLAY

Five actions are possible to manipulate the 3D display:

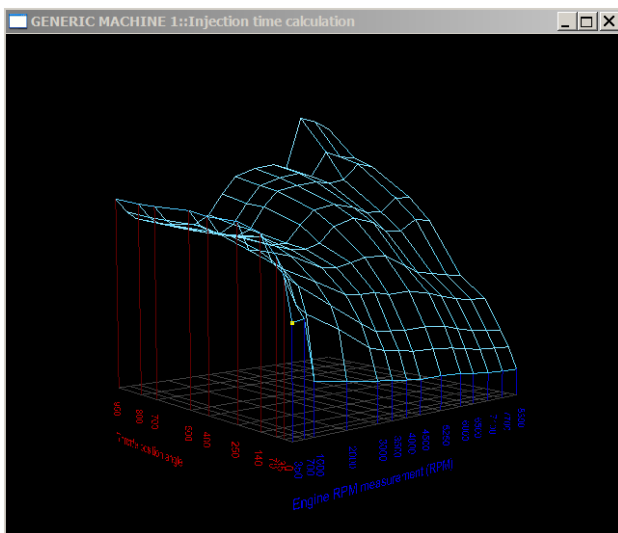
1) modify the size of the window: drag with the mouse an edge or a corner of the window to give it the wished size. It is also possible to put the window in full-screen mode with the Control menu of the window.

2) revolve the map: click with the left button in the window and drag the mouse (move the mouse while remaining clicked).

3) move the map: click with the left button in the window while pressing the [CTRL] keyboard key and dredge the mouse (move the mouse while remaining clicked).

4) zoom the map: click with the left button in the window while pressing the [SHIFT] keyboard key and dredge the mouse (move the mouse while remaining clicked).

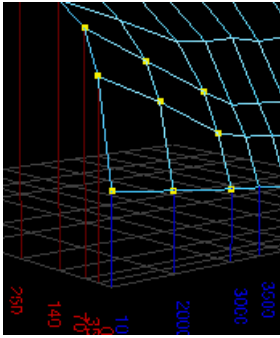
5) pass in wired mode or return to the textured mode: click with the right button in the window.



C) MODIFY THE MAP WHILE VISUALIZING THE 3D DISPLAY

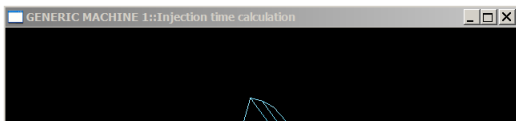
The cursor of modification of the digital display is also present and allows to select points to be modified in the map.

The modification cursor in the 3D graph is displayed with small yellow squares.



The cursor on the 3D display follows the cursor on the digital display.

To be able to modify the map and show it in 3D at the same time, display the page of the digital map and give it the focus if it does not have it (by clicking the digital page): the system bar of the 3D map must be greyed.



| Injection time | Value | State |
|------------------------------|-------|------------------|
| Engine RPM measurement (RPM) | 0 | Engine RPM m |
| Throttle position angle | 0 | Throttle positio |
| Final injection time | 0.000 | Injection time |

| Richness correction fast help | Value | State |
|------------------------------------|----------|-----------------|
| Richness measurement | 0 | Engine richnes |
| Injection time richness correction | 1.000000 | Richness calcul |
| Richness target | 1000 | Engine richnes |

| Engine temperature fast help | Value | State |
|------------------------------|-------|---------------|
| Engine temperature (°C) | -273 | Engine temper |

| Richness correction permission | Value | State |
|--|-------|------------------|
| Richness injection correction permission | NO | Allows injection |

| Injection time calculation | Base injection time calculation, displayed in mil | | | | | | | | | | |
|----------------------------|---|-------|-------|-------|-------|-------|-------|--------|--------|--------|--|
| LINE SCALE | Engine RPM measurement (RPM) | | | | | | | | | | |
| COLUMN SCALE | Throttle position angle | | | | | | | | | | |
| Inj.Time | 0 | 35 | 70 | 140 | 250 | 400 | 500 | 700 | 800 | 950 | |
| 1000 | 2.630 | 5.236 | 6.316 | 6.922 | 7.586 | 8.150 | 8.240 | 8.408 | 8.478 | 8.658 | |
| 2000 | 2.404 | 4.468 | 5.398 | 6.306 | 7.278 | 8.016 | 7.946 | 8.048 | 8.124 | 8.334 | |
| 3000 | 2.204 | 3.530 | 4.488 | 5.642 | 6.688 | 7.382 | 7.510 | 7.804 | 7.850 | 8.284 | |
| 3500 | 2.124 | 3.330 | 4.074 | 5.584 | 6.656 | 7.368 | 7.582 | 8.124 | 8.332 | 8.768 | |
| 4000 | 2.036 | 3.254 | 4.030 | 5.612 | 6.824 | 7.608 | 8.416 | 9.220 | 9.368 | 9.840 | |
| 4500 | 1.950 | 3.110 | 3.978 | 5.464 | 7.020 | 8.360 | 9.106 | 9.994 | 10.270 | 10.750 | |
| 5250 | 1.954 | 3.084 | 4.012 | 5.526 | 7.048 | 8.730 | 9.368 | 10.276 | 10.678 | 11.186 | |
| 6000 | 1.898 | 2.988 | 3.916 | 5.338 | 6.534 | 8.480 | 9.186 | 10.464 | 10.922 | 11.410 | |
| 6500 | 1.800 | 2.848 | 3.736 | 5.150 | 6.164 | 8.038 | 8.936 | 10.396 | 10.764 | 11.222 | |
| 7100 | 1.708 | 2.734 | 3.548 | 4.948 | 6.042 | 8.036 | 8.936 | 10.594 | 12.068 | 13.976 | |
| 7700 | 1.656 | 2.680 | 3.442 | 4.848 | 5.922 | 8.580 | 9.632 | 11.420 | 11.824 | 13.832 | |
| 8300 | 1.630 | 2.626 | 3.374 | 4.824 | 5.818 | 8.488 | 9.656 | 11.296 | 11.800 | 13.454 | |

Modify then your map as usual.

The modifications made on the numerical value are immediately put back in the 3D value.

MAP SPECIFIC EDITING

You quite often need to modify the number of lines or columns of a map.

- Winjall has a specific function to do it.

Right-click on the name of the map to be edited, select the 'Map specific editing' function in the popup menu.

| LINE SCALE | Standard interpolation | |
|--------------|------------------------|---------|
| COLUMN SCALE | 0.000 | 0.350 |
| 600 | + 8.00 | + 13.00 |
| 800 | + 8.00 | + 15.00 |
| 1300 | + 8.00 | + 19.00 |
| 1700 | + 8.00 | + 21.00 |
| 2100 | + 12.00 | + 23.00 |

GENERIC MACHINE

Ignition advance calculation

Ignition angle advance calculation in crankshaft degrees

| LINE SCALE | RPM measurement | | | | Standard interpolation | | | | |
|--------------|------------------------|------------------------|---------|---------|------------------------|---------|---------|---------|---------|
| COLUMN SCALE | Intake pressure (bars) | Standard interpolation | | | | | | | |
| | 0.000 | 0.350 | 0.550 | 0.750 | 0.950 | 1.050 | 1.100 | 1.150 | 1.200 |
| 600 | + 8.00 | + 13.00 | + 13.00 | + 13.00 | + 15.00 | + 15.00 | + 15.00 | + 15.00 | + 15.00 |
| 800 | + 8.00 | + 15.00 | + 15.00 | + 15.00 | + 16.00 | + 17.00 | + 17.00 | + 17.00 | + 17.00 |
| 1300 | + 8.00 | + 19.00 | + 19.00 | + 19.00 | + 20.00 | + 21.00 | + 21.00 | + 21.00 | + 22.00 |
| 1700 | + 8.00 | + 21.00 | + 21.00 | + 20.00 | + 22.00 | + 24.00 | + 24.00 | + 25.00 | + 25.00 |
| 2100 | + 12.00 | + 23.00 | + 22.00 | + 21.00 | + 25.00 | + 25.00 | + 25.00 | + 25.00 | + 26.00 |
| 2500 | + 16.00 | + 25.00 | + 24.00 | + 23.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 27.00 |
| 3000 | + 20.00 | + 27.00 | + 27.00 | + 25.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 27.00 |
| 3600 | + 24.00 | + 29.00 | + 29.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 27.00 |
| 4200 | + 28.00 | + 31.00 | + 30.00 | + 27.00 | + 27.00 | + 27.00 | + 27.00 | + 27.00 | + 28.00 |
| 4800 | + 28.00 | + 31.00 | + 30.00 | + 27.00 | + 27.00 | + 27.00 | + 27.00 | + 27.00 | + 27.00 |
| 5400 | + 28.00 | + 30.00 | + 29.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 |
| 6200 | + 28.00 | + 29.00 | + 28.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 |
| 7000 | + 28.00 | + 29.00 | + 28.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 |

Buttons: Validate, Cancel, Insert before, Insert after, Suppress, Interpol

ECU interpolation type: Selection of ECU interpolation method for this map

I) ADDING AND REMOVING LINES AND COLUMNS:

If you want to add or remove a line or a column, you have to position the modification cursor (yellow) with the keypad arrows or the mouse on the heading of the line or column you want to add or remove, then press one of the 'Insert' or 'Suppress' button.

II) INTERPOLATING:

If you are adding a line or a column, you can fill it automatically by Winjall via the [Interpol] function: position the modification cursor (yellow) with the keypad arrows or the mouse on the header or the line or column to be filled in.

This will fill it with transparent values for calculation: the line or column does not affect the tuning. This is a good way for starting with a new line or column.

Note that if you set the cursor on the first or last line or column, Winjall extrapolates its value by keeping the slopes found with the two next values.

III) EXITING:

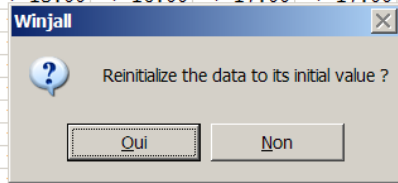
Finally, if you want to exit this function, select [Validate] to save the new map, or [Cancel] to give it up and go back to the previous settings.

MAP RE-INITIALIZATION

If, in the normal mode, the modification cursor is positioned on a modified map and you want to return to the complete original value of this map, press [ESC] or [ECHAP]: Winjall will then asks you if you want to come back to the initial settings.

Note that the original value is either the map value given at the Tuneware opening, or if you have saved the Tuneware since you opened it, the value of the map at the time of the Tuneware saving.

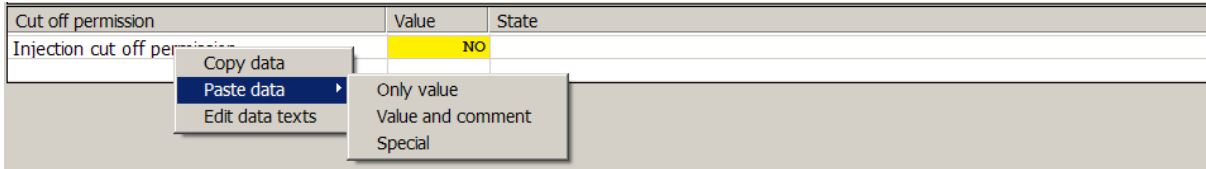
| Ignition advance calculation | | RPM measurement (RPM) | | | | | | 2427 | Standard interpolation | | |
|------------------------------|---------|------------------------|---------|---------|---------|---------|---------|---------|------------------------|---------|-------|
| LINE SCALE | | Intake pressure (bars) | | | | | | 1.154 | Standard interpolation | | |
| COLUMN SCALE | | 0.000 | 0.550 | 0.750 | 0.950 | 1.050 | 1.100 | 1.300 | 1.600 | 2.000 | 2.500 |
| 600 | + 8.00 | + 13.00 | + 13.00 | + 15.00 | + 15.00 | + 15.00 | + 15.00 | + 14.00 | + 14.00 | + 12.00 | |
| 800 | + 8.00 | + 15.00 | + 15.00 | + 16.00 | + 17.00 | + 17.00 | + 17.00 | + 19.00 | + 18.00 | + 15.00 | |
| 1300 | + 8.00 | + 19.00 | | | | | | + 24.00 | + 21.00 | + 18.00 | |
| 1700 | + 8.00 | + 21.00 | | | | | | + 25.00 | + 22.00 | + 19.00 | |
| 2100 | + 8.00 | + 22.00 | | | | | | + 26.00 | + 23.00 | + 21.00 | |
| 2500 | + 0.00 | + 24.00 | | | | | | + 27.00 | + 23.00 | + 22.00 | |
| 3000 | - 20.00 | + 27.00 | | | | | | + 27.00 | + 23.00 | + 22.00 | |
| 3600 | - 20.00 | + 29.00 | | | | | | + 27.00 | + 23.00 | + 22.00 | |
| 4200 | - 20.00 | + 30.00 | | | | | | + 28.00 | + 24.00 | + 23.00 | |
| 4800 | - 20.00 | + 30.00 | | | | | | + 27.00 | + 23.00 | + 22.00 | |
| 5400 | - 20.00 | + 29.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 23.00 | + 21.00 | |
| 6200 | - 20.00 | + 28.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 23.00 | + 20.00 | |
| 7000 | - 20.00 | + 28.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 26.00 | + 23.00 | + 20.00 | |



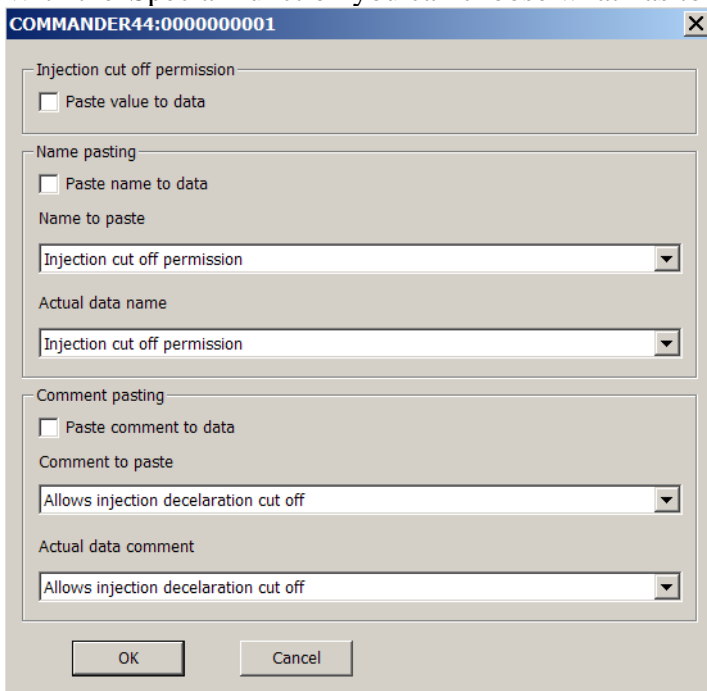
Be careful: you'll then lose all the modifications!

COPY&PASTE DATA

With a right click on the name of a variable, the popup appears so that you can get to the 'Copy data' and 'Paste data' functions.



The 'Copy data' function copies the value, the name and the comment (help) of a data. With the 'Paste data' function you can paste either the value, or the value together with the comment. With the 'Special' function you can choose what has to be pasted: the value, title and/or the comment.



The pasting of the value can only be carried out on a variable of the same type: you cannot paste the value of a variable to a map. Sometimes, it is not allowed to paste the name of the data, and moreover, it is sometime not allowed to paste any text on some data.

HOW TO USE IT

Open a Tuneware on the generic machine in which you want to take a tune-up to put it on an ECU (for example, a map).

Display the page with the data to be copied, copy the data with a right click on 'Copy data'.

Display the page where the data has to be pasted, and paste it with a right-click function 'Paste data'.

You can also do it between two machines, whichever they are, Generic or real.

READ-SAVE DATA FILE

With a right click on the name of the variable, you can read the popup menu and get to the 'Read data file' and 'Save data file' functions.

| Ignition advance calculation | | | | | | | | | | |
|------------------------------|--------|-------|--|--------|---------|------------------------|---------|---------|---------|---------|
| LINE SCALE | | | | (RPM) | 2427 | Standard interpolation | | | | |
| COLUMN SCALE | | | | (bars) | 1.154 | Standard interpolation | | | | |
| | 0.000 | 0.5 | | 0 | 1.050 | 1.100 | 1.300 | 1.600 | 2.000 | 2.500 |
| 600 | + 8.00 | + 13. | | 0 | + 15.00 | + 15.00 | + 15.00 | + 14.00 | + 14.00 | + 12.00 |
| 800 | + 8.00 | + 15. | | 0 | + 17.00 | + 17.00 | + 17.00 | + 19.00 | + 18.00 | + 15.00 |
| 1300 | + 8.00 | + 19. | | 0 | + 21.00 | + 21.00 | + 22.00 | + 24.00 | + 21.00 | + 18.00 |
| 1700 | + 8.00 | + 21. | | 0 | + 24.00 | + 24.00 | + 25.00 | + 25.00 | + 22.00 | + 19.00 |
| 2100 | + 8.00 | + 22. | | 0 | + 25.00 | + 25.00 | + 26.00 | + 26.00 | + 23.00 | + 21.00 |

With these functions you can save a map or a table on the disc and read it again, whereas Tuneware reads or saves all the data together in the Tuneware file.

These reading saving functions are mainly used to get to the sensor conversion maps and the standard tune-up maps supplied with Winjall.

Indeed: when you launch the ECU, you have to adjust it to the configuration of the engine or the device where it has to be installed.

If this engine or device has sensors, such as temperature or pressure sensors, you have to tell it the exact ECU type of these sensors. You then have to display the conversion map of the sensor and use the 'Read data file' function to give it the required value (and the comment).

I) READ DATA FILE:

| Engine water temperature conversion (°C) | | | | | | | | | | |
|--|------|------|----|---------------------------|------|------------------------|------|------------------------|--|--|
| LINE SCALE | | | | temperature input tension | 430 | Standard interpolation | | | | |
| COLUMN SCALE | | | | 0 | 371 | 417 | 468 | Standard interpolation | | |
| | 182 | 200 | | 0 | +125 | +120 | +115 | | | |
| 0 | +160 | +155 | +1 | | | | | | | |

The 'Read data file' function has two sub-functions:

1) With comment insertion: with the value, the name of the file you are reading will be directly inserted as a map comment (example: Bosch_0280130026.TempCtn)

| Engine water temperature conversion (°C) | | Bosch_0280130026 | | | | | | | | | |
|--|------|------------------|------|-----------------------------|------|------------------------|------|------|------|------|----|
| LINE SCALE | | | | temperature NTC input level | 0 | Standard interpolation | | | | | |
| COLUMN SCALE | | | | 0 | 298 | 334 | 371 | 417 | 468 | 5 | |
| | 182 | 200 | 220 | 242 | 268 | 298 | 334 | 371 | 417 | 468 | 5 |
| 0 | +160 | +155 | +150 | +145 | +140 | +135 | +130 | +125 | +120 | +115 | +1 |

This is very handy if you want to remember which type of sensor the engine Tuneware is fitted with.

2) Without comment insertion: only the value will be used.

II) SAVE DATA FILE:

| Engine water temperature conversion (°C) | | | | | | | | | | |
|--|------|------|----|---------------------------|-----|------------------------|-----|-----|-----|---|
| LINE SCALE | | | | temperature input tension | 430 | Standard interpolation | | | | |
| COLUMN SCALE | | | | 0 | 298 | 334 | 371 | 417 | 468 | 5 |
| | 182 | 200 | 2 | | | | | | | |
| 0 | +160 | +155 | +1 | | | | | | | |

The 'Save data file' function has two sub-functions:

- 1) **With comment insertion:** When you give the name under which the file has to be saved on the disc, this file name will be directly inserted as map comment.
- 2) **Without comment insertion:** the value will be simply saved.