Use of piezo injectors Driver DPS06

Release: V1.00 – 23/05/2013
http://www.skynam.com

SYBELE by Skynam

Machine management

Use piezo injectors Driver DPS06

Skynam reserves the right to make changes, corrections, modifications, improvements, to this document, to products and to the services which he describes, at any time and without notice preliminary.

No part of the documents may be reproduced or transferred, whatever the reason or the means used, whether mechanical or electronic, without prior authorisation from Skynam.

Skynam's general sales conditions are fully applicable.

WINDOWS is a Microsoft Corporation registered trademark

The WINDOWS logo is a™ Microsoft Corporation trade mark.

THIS DEVICE DELIVERS HIGH TENSIONS UNDER STRONG INTENSITIES:
> **- IT IS FORBIDDEN TO OPEN IT.**
> **- IT IS FORBIDDEN TO MANIPULATE THE HOUSING AND ITS CONNECTIONS DURING ITS WORKING OR IN THE 3 MINUTES WHICH FOLLOW ITS SWITCH OFF.**

THE HOUSING OF THIS DEVICE CAN OVERTAKE 100°C:
> **- PRECAUTIONS MUST BE TAKEN WHEN INSTALLATING IT, AND WHEN MANIPULATING IT AFTER USE.**

DANGER OF DEATH,
OF FIRE AND BURN

CARES OF USE

Piezo electric injectors require a high tension command (up to 180 volts) of high intensity (up to 20 amperes) to be able to open.

The Driver DPS06 is capable of supplying this type of commands by generating this high tension thanks to a switching mode power supply located in its housing.
A capacitor of strong capacity being integrated into the switching mode power supply, the high tension can remain much later the complete switch off of the Driver.

AT THE RISK OF DEATH:
IT IS FORBIDDEN TO OPEN THE HOUSING.
IT IS FORBIDDEN TO MANIPULATE THE DRIVER OR THE CONNECTIONS OF ITS LOOM IN THE 3 MINUTES WHICH FOLLOW ITS COMPLETE SWITCH OFF.

The strong power delivered in case of extensive use (high engine rpm and important number of injections by engine cycle, high tension of injectors) provokes a strong rise of the internal temperature.
The housing of the Driver being used to dissipate this temperature, it can reach temperatures higher than 100 °C

AT THE RISK OF FIRE OR OF BURNS:
IT IS NECESSARY TO TAKE THUS NOT ONLY PRECAUTIONS OF INSTALLATION OF THE DEVICE IN THE VEHICLE REGARDING THE INFLAMMATION OF MATERIALS POSITIONED NEAR THE HOUSING AND TO ITS VENTILATION, BUT ALSO NOT TO TOUCH THE HOUSING DURING OR AFTER THE USE AT THE RISK OF SERIOUS BURNS.

use of piezo injectors driver DPS06/

OVERVIEWS

I) WINJALL SOFTWARE FOR ECUs TUNING :

The DPS06 Driver tuning pack is supplied with accompanying of the program Winjall. It is subjected to the same rules of use and license.

The Winjall program requires a license of use. In its complete shape, this license is established by a file license and a material dongle key

To make access to DPS06 Driver easier, this pack contains a licence made of one single file, without a dongle.
This licence gives you access to the main tuning functions for Commander ECUs.

However, to have access to the complete features, it is necessary to obtain with the Company Skynam a complete license.

Though it is possible to make copies of the Winjall software distributed in this pack, you have to comply with the regulations for use and the licence you have accepted when installing it on your computer.

II) TUNING PACK DOCUMENTATION:

This documentation version has been specifically upgraded for the Tuneware DPS06 versions distributed from May 23rd, 2013, notably:
    - engine: version 1.00

These Tuneware versions only work with the Winjall V6.10 version or a later one, which also requires a XP SP3, 7 or any later version of the Windows operating system of the Microsoft Corporation.

III) WARNING:

The DPS06 Drivers are meant for racing cars, boats or bikes and not for any other purpose.
Remember it mustn't be used on open roads, as it does not comply with road regulations.

PRESENTATION OF THE DRIVER DPS06

DPS06 is an ECU specifically dedicated to the piloting of piezo electric injectors.
Its software of command 'Engine' is made to manage this type of injectors on a diesel engine which is the most common application of use of injectors, although piezo electric injectors can be used to inject some other products than fuel and somewhere else than in an engine. In that case, contact Skynam to get operation softwares other that those dedicated to the engine management.

The Driver DPS06 is intended to be piloted by other types of ECUs than the Skynam ECUs.
If you have to use a Driver with a Skynam Commander ECUs, it is necessary to use a Driver DPz06 and not this Driver DPS06.

I) GENERAL CHARACTERISTICS:

ELECTRICAL CHARACTERISTICS
Power supply from 9 volts to 18 volts DC.
- a power supply by after key +battery
- a power supply by permanent + battery
Separated power supply and power ground
Consumption minimum while operating at 13 volts: 460 milliamperes,
Consumption on stop: 0 milliamperes,
Limit of maximal consumption: 13 amperes

TEMPERATURE CHARACTERISTICS
In operation, -40 ° to +65 °.

SEALING CHARACTERISTICS
IP 67 (on require).

II) OPERATION CHARACTERISTICS:

INJECTORS COMMAND
6 channels of injectors commands
Inputs commands by the ground, 1 KOhm pull-up resistor to +12V After Key integrated into the Driver.
Response time: 2 μs
Injection covering of a channel on the other one (between cylinders) allowed
Maximal power delivered to injectors: 36 watts
Command tension programmable in real time from 115 volts to 180 volts
Maximum number of injections for all channels cumulated at maximum command tension and at 13.5 volts on-board tension : 18000 injections / mn
- corresponds to a maximum 6000 rpm, 6 cylinders, 1 injection per cylinder
- corresponds to a maximum 9000 rpm, 4 cylinders, 1 injection per cylinder
Maximum consecutive time allowed at maximum command tension
- at 18000 injections / mn : not limited

INTERNAL CONTROL OF THE INJECTORS COMMANDS
Measure of the command tension and resting tension in real time, injector by injector
Piloting of the command tension of injectors by looping, following a real time received target.

Programmable type of reaction to the injectors working errors

COMMUNICATIONS
One WinjNet CAN-BUS
    - Tunings, calibration and control by protocol WinjNet (™ Skynam).
    - Connection on external CAN-BUS 2.0B passive at 1 Mbits, for receiving informations of the engine management ECU and/or diagnostic transmission to a third party data recording.
    - The 120 Ohms resistor is not integrated.

DIAGNOSTIC LED OF THE ECU OPERATION
A diagnostic LED indicates the major errors of the working of the ECU.

III) CONFIGURATION OF THE OPERATION:

INJECTORS COMMAND TENSION TARGET
Real time reception of the target by CAN-BUS 1Mbits standard 2.0B, with frame identifier, data positions in the frame and minimum reception period tuneable.
The received target (normally the fuel high pressure in Bars) is then converted in command tension by a map tuneable with Winjall calibration software.

DIAGNOSTIC OF THE INJECTORS COMMANDS
Diagnostic transmitted by CAN on frame identifier and emission period tuneable
Control of the working injector by injector
    - transmission of the actual command tension injector by injector
    - transmission of the operation status injector by injector
    - transmission of the operation status of the internal high tension
    - transmission of the level of the internal high tension

INSTALLATION OF DRIVER DPS06

These installation recommendations are simple but very important.

I) ELECTRICAL INSTALLATION :

When the engine is running, make sure that the driver is properly powered and that on-board tension (battery) at the input of the driver voltage is 13.7 volts.
The wiring of the grounds between the driver, the engine block and the battery must be <u>impeccable</u>, the resistance must be at most 0.1 Ohm taking account of the heel resistance of your multimeter (consult the installation instructions of the engine management ECU).

If the voltage is lower, the driver must provide more effort to open the injectors and heat up much more.
If the quality of the grounds is bad, the driver can be destroyed.

II) MECHANICAL INSTALLATION :

The driver must be installed in a vehicle area as cool and ventilated as possible, far from the exhaust heating.
Maximum ambient heat in the area in which the driver must be installed is 60 degrees.

Very often, in the series vehicles, the diesel engine management electronic is installed behind a headlight, taking advantage of the circulation of fresh air, but protected from the weather.
In competition, it may be more difficult to protect the electronics from the weather if it is placed in a cool and well-ventilated area under the engine bonnet.

LOOM

J56		FUNCTION	COMMENTARY	CHARACTERISTICS
1	OUT	INJECTION A +	1st injected cylindre	piezoelectric injector specific command 95-180 volts
2				
3	OUT	INJECTION B +	2nd injected cylindre	piezoelectric injector specific command 95-180 volts
4				
5	OUT	INJECTION C +	3nd injected cylindre	piezoelectric injector specific command 95-180 volts
6				
7	OUT	INJECTION D +	4th injected cylindre	piezoelectric injector specific command 95-180 volts
8				
9	OUT	INJECTION E +	5th injected cylindre	piezoelectric injector specific command 95-180 volts
10				
11	OUT	INJECTION F +	6th injected cylindre	piezoelectric injector specific command 95-180 volts
12				
13	OUT	LED DIAG-ALARM	LED command	10 milliamperes
14	CAN	CAN1_H	CAN 1Mbits 2.0B	Without integrated 120 Ohms resistor
15	IN	INJECTION A SIGNAL INPUT	Injection input A - ground signal	internal pull-up to +15, consumes 15 mA
16	IN	INJECTION B SIGNAL INPUT	Injection input B - ground signal	internal pull-up to +15, consumes 15 mA
17	IN	INJECTION C SIGNAL INPUT	Injection input C - ground signal	internal pull-up to +15, consumes 15 mA
18	POW.SUP.	PERMANENT POWER SUPPLY+ 3	Permanent 12 volts power supply	8-18 volts
19	POW.SUP.	AFTER KEY POWER SUPPLY + 1	12 volts after key power supply	8-18 volts
20	POW.SUP.	AFTER KEY POWER SUPPLY + 1	12 volts after key power supply	8-18 volts
21				
22				
23				
24				
25				
26				
27				
28				
29	OUT	INJECTION A -	Injecteur A return	Masse injecteur
30				
31	OUT	INJECTION B -	Injecteur B return	Masse injecteur
32				
33	OUT	INJECTION C -	Injecteur C return	Masse injecteur
34				
35	OUT	INJECTION D -	Injecteur D return	Masse injecteur
36				
37	OUT	INJECTION E -	Injecteur E return	Masse injecteur
38				
39	OUT	INJECTION F -	Injecteur F return	Masse injecteur
40				
41				
42	CAN	CAN1_L	CAN 1Mbits 2.0B	Without integrated 120 Ohms resistor
43	IN	INJECTION D SIGNAL INPUT	Injection input D - ground signal	internal pull-up to +15, consumes 15 mA
44	IN	INJECTION E SIGNAL INPUT	Injection input E - ground signal	internal pull-up to +15, consumes 15 mA
45	IN	INJECTION F SIGNAL INPUT	Injection input F - ground signal	internal pull-up to +15, consumes 15 mA
46	GROUND	ENGINE GROUND ECU SUPPLY	Ground supply for ECU	
47	GROUND	POWER GROUND ENGINE	Ground input for power commands	
48	GROUND	POWER GROUND ENGINE	Ground input for power commands	
49				
50				
51				
52				
53				
54				
55				
56				
56				

The negative of Alarm LED and the ground of the CAN-Bus DB9 (pin 3) must be connected to the Driver supply ground pin 46.

DIAGNOSTIC LED

The piezo injectors Driver DPS06 is provided of a red diagnostic LED to indicate major errors without the necessity to connect a PC or a data recording.

BLINKING 8 Hz
This 8 times per second blinking (very fast) indicates that the memory of the ECU is damaged, no working of injector is allowed: it is necessary to ask the device maintenance by the Skynam Company.

BLINKING 4 Hz
This 4 times per second blinking (fast) occurs when the ECU backs up data or softwares in its memory,
     - or during the update of the machine,
     - or a very short time in the ECU switch off.
You should not remove the permanent power supply or disconnect the ECU from the loom during this state.

BLINKING 2 Hz
This 2 times per second blinking (medium) occurs when the software application (command of injectors) cannot work:
     - either because it is not loaded in the ECU,
     - or because it was damaged.
     - or because its data of calibration are incorrect (damaged or unusable),

BLINKING 1 Hz
This 1 time per second blinking (slow) occurs when the CAN-BUS does not work correctly:
     - if there is no 120 Ohms resistor between the CAN_L and CAN-H lines.
Even in the case where CAN-BUS function must not be used and is not connected to a functional CAN-BUS (which would supply the necessary 120 ohms resistors), it is necessary to install this resistor at the CAN_L and CAN-H terminals of the Driver.
     - if the internal components of the CAN-BUS management are damaged.
     - if the CAN-BUS is in short circuit, either directly between its terminals, or by a damaged node (other transmitter).
     - if the application software waits for necessary data for its operation, normally transmitted by the CAN-BUS, and if these data are not received.
This defect does not prevent the command of injectors in this driver version.

SUMMARY OF THE USE OF WINJALL

For an exhaustive explanation of use of the software Winjall, consult the file 'Winjall User's manual'.

1) Connect the USB-CAN interface between the PC and the CAN connector of the Driver
2) Launch Winjall

Note: the Driver can have been switched on before or after the Winjall software launch

Once Winjall is launched and the Driver is switched on:
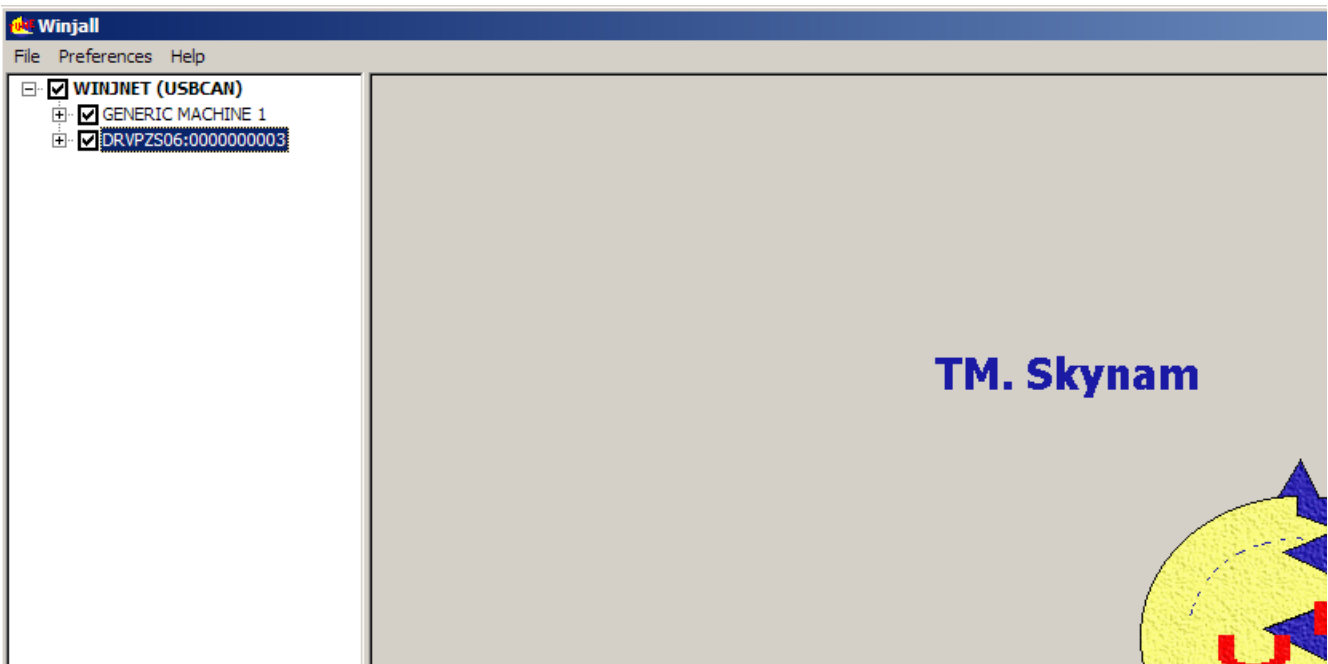
Click on [+] in front of the name of the Driver DRVPZS06:000 to expand the tunings
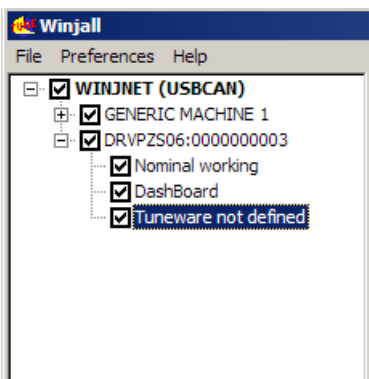
There are 4 possible pop-up menus on a machine in the machines tree:
- the Machine menu, by a right click on the name of the machine.
- the Dashboard menu, by a right click on the Dashboard name.
- the State menu, by a right click on the State of the machine (Nominal working, or other)
- the Tuneware menu, by a right click on the name of Tuneware (or Tuneware not defined if no Tuneware is opened)
Each of these menus concerns functions of different level in the machine.

UPDATE OF THE MACHINE

This operation allows to load a new software into the machine (what is different to simply change the tuning data)

1) Verify that the line of Tuneware of the machine is 'Tuneware not defined'. Otherwise, double click on the Tuneware name to close it.

2) Right click on the name of the machine
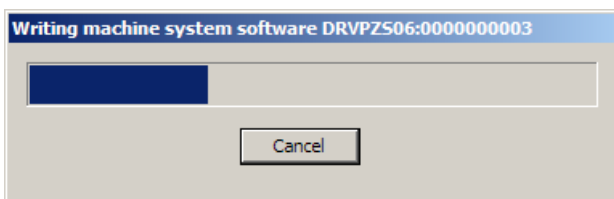then select Machine update / complete update.
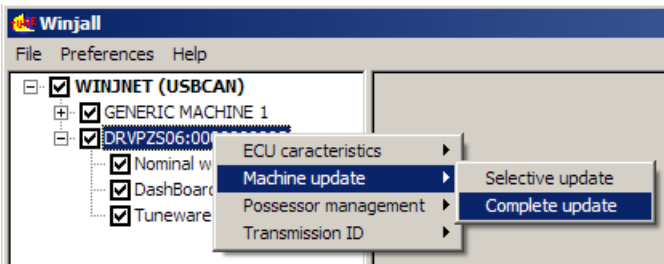
Select specific Tuneware of the machine to be load
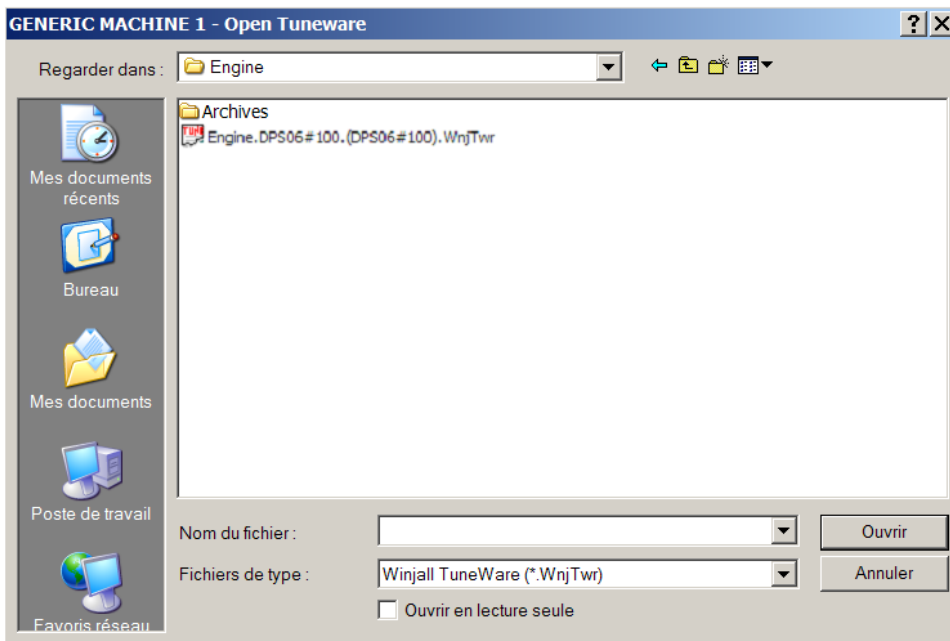
Let the loading be made: 3 phases
- system load
- application software load
- application data load

ACCESS TO THE TUNING OF THE MACHINE

Before being able to access the tunings and the displays of the machine, it is necessary to open a Tuneware corresponding to the type of software which we loaded in it.

A Tuneware is a file in which the totality of the data necessary for the ECU where grouped together in a single set. It consists:
- of the description of the ECU operation, used by Winjall.
- of the system software which allows your ECU to make automatically its measurements, to pilot its outputs or to communicate with your PC.
- of the application software which tells it how it has to calculate and what it has to make with its measurements and its commands to pilot a device (an engine for example).
- of all the tunings (calibrations, maps, etc.) necessary for the working, specific to this device.

1) We open Tuneware by the menu Tuneware:
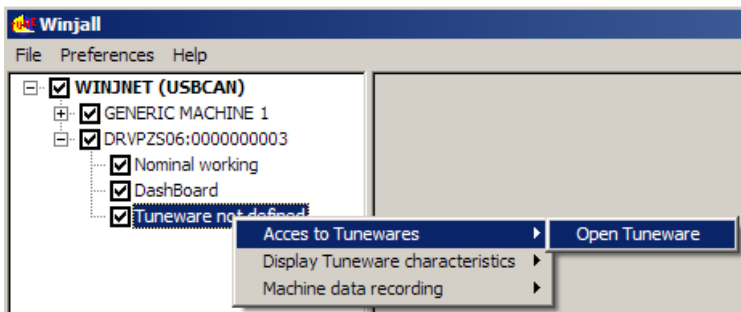
or more simply by double clicking the line 'Tuneware not defined'

Choose then the Tuneware to open:
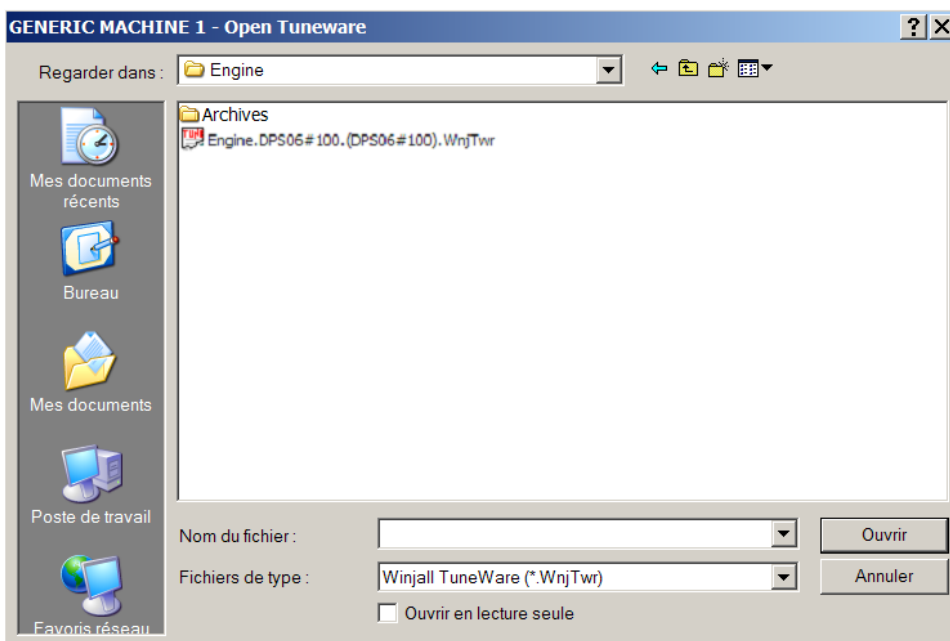
At the opening of Tuneware, Winjall has to synchronize with the machine: 2 solutions:
- send the data of opened Tuneware to the machine
- Get back the data from the machine in the opened Tuneware

Generally, we choose to get back the data from the machine, and at the contrary we risk to erase the tunings of the machine with that ones of Tuneware opened with Winjall

To the question ' READ DATA IN THE MACHINE ', we shall answer by clicking the button [Yes for all and OK]
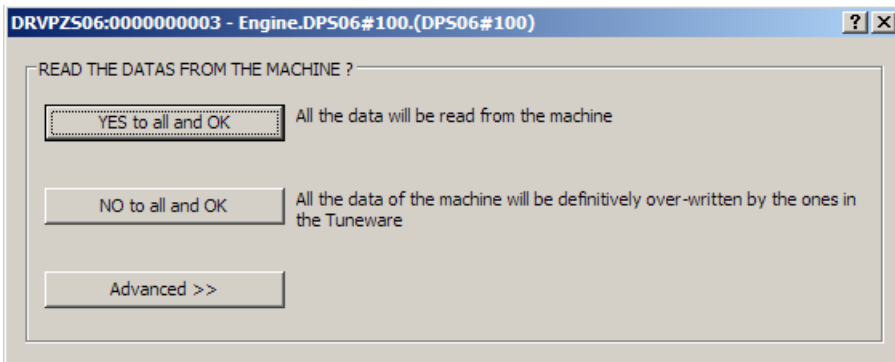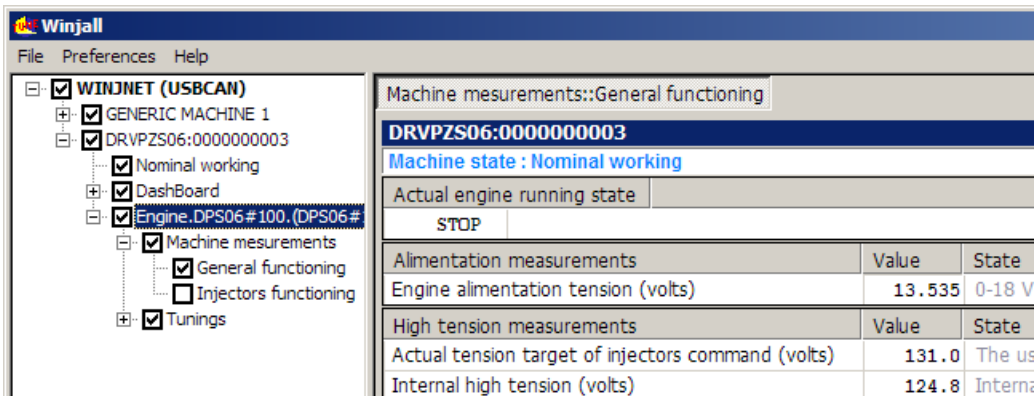

Once the Tuneware is opened, its name is displayed on the line 'Tuneware of the machine'.
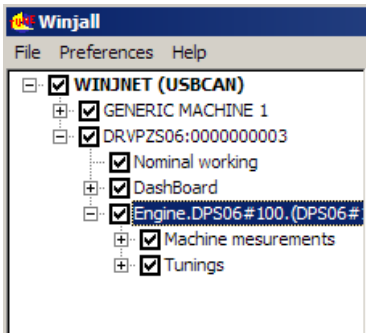
To access the special functions of tuning, we shall use the pop-up State menu.

To access displays and map tunings, expand the functions by clicking on [+] in front of lines, and check the box in front of the line of the desired page.

If we open several pages, we toggle between them with [ALT] [TAB] with the keyboard, or by clicking with the mouse in the tab at the top of the page.

TUNING OF THE MAP
OF INJECTORS COMMAND TENSION

Much of the electric piezo injectors need the same voltage curve according to the fuel pressure and to the injectors temperature (which can be estimated by the engine temperature).
A bad management can cause malfunctions of the injectors, or by heating them too much if the voltage is too high, or some opening defects if the voltage is too low.

The map provided in Skynam original Tunewares fits with the functioning of standard piezo injectors.
If this map is to be modified, it should not be changed after an engine tuning because the fuel quantities given by the injectors would be also modified.

In the machines tree, click on the [+] in front of the line 'Tunings'
Then check the box 'Injectors command tension'

The map of target of injectors command tension allows to choose the tension with which injectors must be commanded, between 115 volts and 180 volts.
This map has two input values:
- the fuel pressure in bars
- the injectors temperature in signed degrees (for kelvin, use only the positive part of the range).
Generally, the temperature of the injectors can be replaced by the engine temperature.
In the standard Tunewares provided by Skynam, the temperature is in Celsius degrees.

It is possible to get the rail pressure and the injectors temperature input values in two ways:
- by receiving with CAN-BUS a rail pressure information and an injectors temperature information. These values are then used as real time input values of the map to calculate the command tension.
- without using any information from the CAN-BUS. In the Driver , the rail pressure is then fixed to 0 bar and the temperature to +0 degree. These fixed 0 values are used as input values of the map to calculate the command tension.

The pressure value received from the CAN-Bus is a 16 bits word of which the value must be between 0 and 32767 (positive binary values).
The temperature value received from the CAN-Bus is a 16 bits word of which the value must be between -32768 and 32767 (signed binary values).

I) RAIL PRESSURE AND TEMPERATURE RECEIVED FROM THE CAN-BUS:

When a receive frame of pressure and temperature values is validated in the configuration of the CAN-BUS (see chapter 'Configuring the data of the CAN-BUS'), the pressure and the temperature received in this frame serve as input to the map of tension command of injectors.

The two values received from the CAN-BUS are displayed in the 'injectors commands tensions information' (at the top of page), and also on the head line of the map with the title 'Fuel high pressure' and 'Injectors temperature'.
If the information is not regularly received within the allowed time (defined by the function of configuration of CAN-Bus, see chapter 'Configuring the data of the CAN-BUS'):
- each of the values are replaced by its value of error given in the configuration of the frame,
- the bit 6 of the byte flag of diagnostic of the CAN-BUS emission frame is set (see chapter 'Diagnostic Frame'),
- Winjall sets the state of the data of the ECU to the 'Not received' value in the pages of measurement.

General functionment state	
Injections	enabled
Data in injectors driver	valid
State data from management ECU	completed
High tension state	nominal

At the initialization of the Driver, before receiving the first information of pressure and temperature from the CAN-BUS, the pressure rail and the temperature are each initialized with its value of error given in the configuration of the frame.

II) OTHER VALUES RECEIVED FROM THE CAN-BUS :

In fact, any value of interest for this command could be received as far as its value is between 0 and 32767 for the lines input variable and -32768 and 32767 for the columns input variable.
You can so receive from the CAN-BUS as input of the map any other value than the fuel pressure or than the temperature. It will be sufficient to adapt the values of command tension in the map to the type of data received from the CAN-Bus.

For example, you could send, instead of the pressure, the command tension value itself that would be calculated in the engine management ECU and directly match the data of the map to those of the input. Then, the temperature would not be used:

Injectors command tension target (volts)	Injectors command tension target, corrects the internal hight tension alimentation		
LINE SCALE	Fuel high pressure (bars)	0	Standard interpolation
COLUMN SCALE	Injectors temperature (signed)	+0	Standard interpolation
	+0		
100	100.0		
180	180.0		

III) RAIL PRESSURE AND TEMPERATURE FIXED TO 0:

When the frame of reception of pressure and temperature is not validated in the configuration of the CAN-BUS, the Driver fixes the rail pressure and the temperature to value 0.
Only the first line and column of the map will then be used and the tension of command of injectors will be given only by this first cell.
It is then advised to delete all the lines and columns of the map except one, and to give in this cell a sufficient command tension of injectors for the highest rail pressure which will be used to supply the fuel in the engine. For example:

Injectors command tension target (volts)	Injectors command tension target, corrects the internal hight tension alimentation		
LINE SCALE	Fuel high pressure (bars)	0	Standard interpolation
COLUMN SCALE	Injectors temperature (signed)	+0	Standard interpolation
	+0		
0	144.0		

INTERNAL REGULATION
OF INJECTORS COMMAND TENSION

The Driver controls internally that the immediate number of injections is not too important for the power capacity of its internal high tension power supply.

I) SOFTWARE REGULATION:

The Winjall software displays in the pages 'Machine measurement' and 'Injector command tension' the variable giving the immediate ratio of use of the Driver 'Ratio of injectors use'.

General functionment state			
Injections	enabled		
Data in injectors driver	valid		
State data from management ECU	completed		
High tension state	nominal		

High tension measurements	Value	State
Actual tension target of injectors command (v	0.0	The user command tension target can be modified by the driver on some exception condition:
Internal high tension (volts)	0.0	Internal high tension alimentation, base of injectors commands
Injectors use ratio	0.000000	Give the use coefficient of the injectors according to the allowable power of the injectors driver

This ratio is calculated according to the immediate used power compared with the maximal power that the internal high tension power supply can deliver.
The immediate used power depends
    - on the total number of injections per second, for all the used injectors
    - on the value of the internal high tension used to generate the injectors command tension
    - on the intensity supplied during every command of opening of injectors

As long as this ratio is lower or equal to 1, the Driver agrees to command the injectors with the tension required by the target map.

If this ratio exceeds 1, the internal high tension power supply requires to be protected: the software of the Driver
    - decreases the target tension of injectors command until to return to a ratio 1,
    - sends to Winjall and the Commander which pilots it the new value of target, the new value of internal high tension and the state of the high tension 'OVERLOADED',
    - Sets to ON in the diagnostic frame sent on the CAN-BUS the bit 7 of the data byte 1 (see chapter 'Diagnostic frame').

If the number of injections per second decreases, by decreasing the engine rpm or the number of injections by cycle, or if the injectors command tension target given by the map decreases, and if the ratio of use of injectors becomes again lower or equal to 1 without internal limitation, the software of the Driver
    - sends to Winjall and the Commander which pilots it the 'NOMINAL' state of the high tension,
    - Erases the bit 7 of the data byte 1 of the diagnostic frame sent to the engine management ECU.

II) HARDWARE REGULATION:

If the use of the Driver is highly extensive (ratio of use of injectors very close to 1) in a continuous way and that the driver has been installed in a very hot environment, the internal temperature of the switching power supply increases too much and a protection by overshoot of temperature is generated: during some seconds, the time needed for the temperature to get down again, the high tension power supply is stopped.

The software of the Driver sends then to Winjall and in the diagnostic frame an information of error of high tension state:
- the bit 6 of the diagnostic flag byte of the CAN-bus frame is set (see chapter 'Diagnostic frame'),
- the high tension State of the pages of Measures information in Winjall switches to 'Blocked'.

ERROR HANDLING
OF INJECTORS OPERATION

The Driver permanently measures and analyzes the injectors working.
It is capable of detecting four types of errors of injectors working:

I) DETECTION OF THE DEFECTS OF INJECTORS WORKING:

As soon as a defect is detected,
      - the bit corresponding to the faulty injector is switched on in the diagnostic frame sent the engine management Commander ECU.
      - the state of every injector is sent in the variable of state of the corresponding injector.

The variable of state of every injector displayed by Winjall can take the values
      - NOMINAL: Nominal (no defect, bit of the injector switched off in the diagnostic frame)
      - INACTIVE: Not commanded channel (no command signal received from the ECU)
      - DECONNEC: Not connected to the output of the Driver
      - SHORTCRC: Stopped by short-circuit
      - ERRCLOSE: Stopped by closing error (the injector could not be closed)

DEFECT OF COMMAND SIGNAL
The input of the injector command signal is not commanded: state 'INACTIVE'
This defect can appear only if the engine has been running and that this injector was not commanded or that the injector has been commanded and is not any more commanded.
The Driver is capable of recognizing deceleration cutoff in the majority of the cases and will not display this state of defect during recognized deceleration cutoff.

INJECTOR NOT CONNECTS TO THE OUTPUT OF THE DRIVER
The input of the command signal of the injector is commanded (not 'INACTIVE') and the injector does not answer its commands: state 'DECONNEC'

INJECTOR IN SHORT-CIRCUIT
The command wire of the injectors is in short circuit to ground, fully or partially : state 'SHORTCRC'
When this appears, the driver does not try to command the injector before one second, and if the command is still found in short-circuit, the one second wait begins again.
When the driver is switched off and on, this fault is still displayed as long as the engine is not started. The when the engine is started, if the fault has disappeared, the indication is removed.


INCORRECT TENSION OF RESTING
The injector resting tension is too high: state 'ERRCLOSE'
When this appears, the driver completely stops to command the injector, until the driver is switched off and on.
When the driver is switched off and on, this fault is still displayed as long as the engine is not started. The when the engine is started, if the fault has disappeared, the indication is removed.

CAN-BUS DATA CONFIGURATION

We access this function by the State pop-up menu:
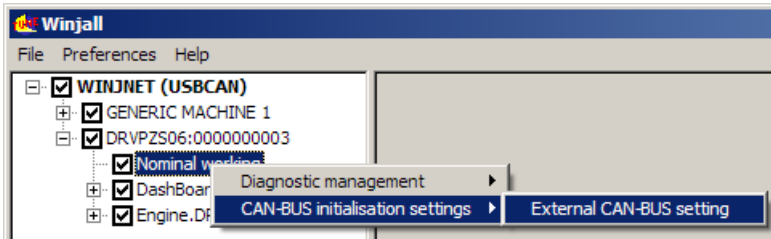
The CAN-bus speed is fixed to 1 Mbits.
Two tabs allow adjusting the CAN-BUS:
- Diagnostic frame emission
- Injectors command tension reception

Do not hesitate to use the on-line help by clicking in [?] and by clicking on the box zone for which one we need help.

I) TRANSMISSION OF THE DIAGNOSTIC:

To allow the transmission of the diagnostic frame, check the box 'Enable diagnostic frame transmission' (the content of this frame is described in the following chapter).
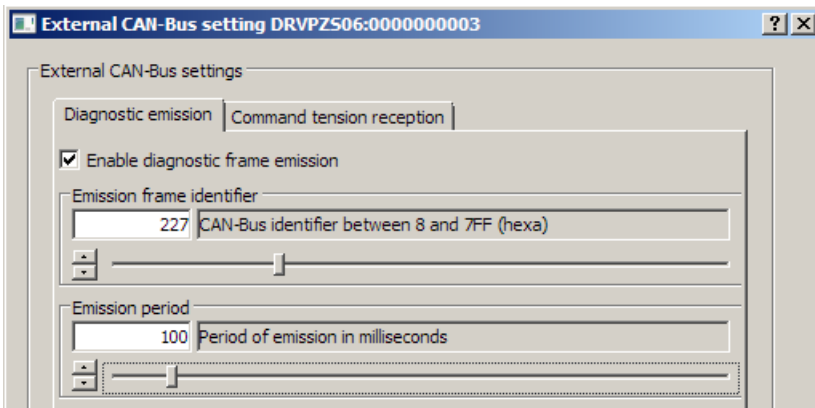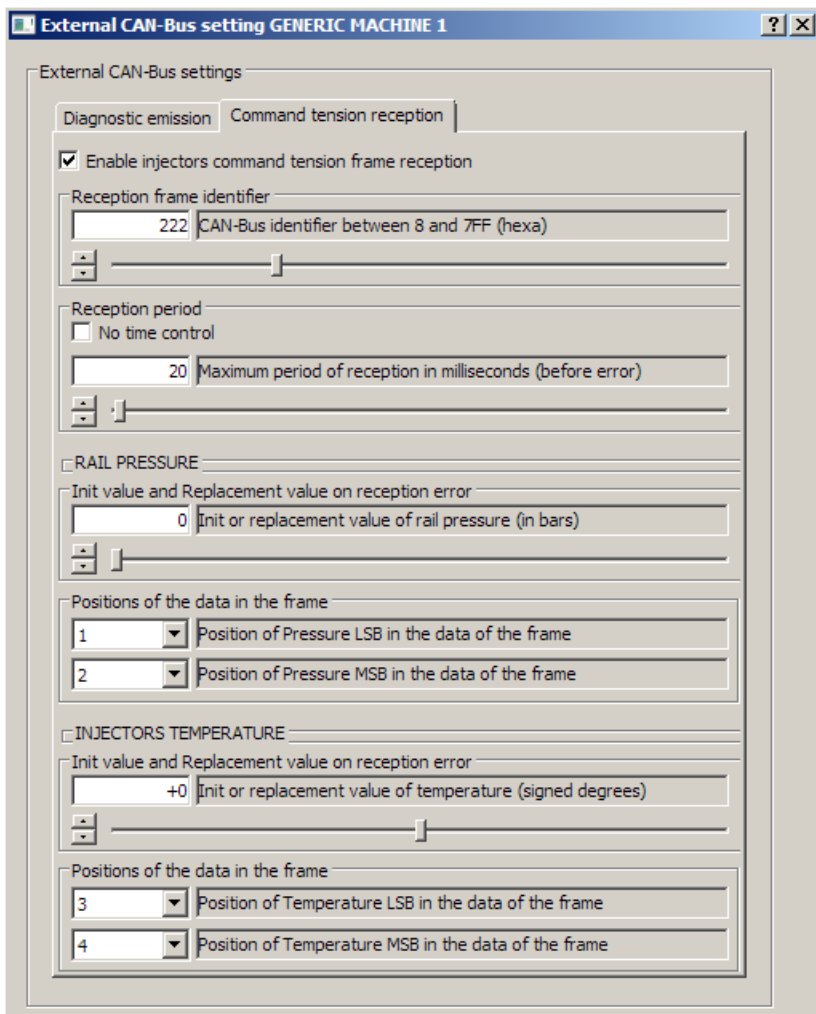

Select the frame identifier in hexadecimal and the period of transmission with which the Driver DPS06 has to send the diagnostic frame.

II) RECEPTION OF THE COMMAND TARGET OF INJECTORS COMMAND TENSION:

The values to be received are in general the fuel pressure in bars in the injectors rail, and the engine temperature used to evaluate the injectors temperature.
These two values must be passed to the driver in the same frame, each being a word of 16 bits:
- the pressure value must be between 0 and 32767 (positive binary value).
- the temperature value must be between -32768 and 32767 (signed binary value).

Select the frame identifier in hexadecimal and the maximum period of reception (by precaution the double of maximum period with which the transmitter spends the frame).
If the transmitter does not respect this period, the values of rail pressure and injectors temperature will be declared in error and the Driver will use for each one its replacement value.

If we do not want of the temporal control, check 'No temporal control'

The replacement values must be supplied even if we do not ask for temporal control because at the initialization of the Driver, before receiving the first frame, the rail pressure and the injectors temperature are initialized with their value of error.

For each of the two values, select also the place of its LSB and its MSB (16-bit word) in the data of the frame.

DIAGNOSTIC FRAME SENDED
TO EXTERNAL CAN

Full diagnostic is spent on a single CAN frame, with an adjustable 11 bits identifier and an adjustable period.

This frame always contains 8 bytes of data:

DATA BYTE 1: DIAGNOSTIC FLAG BIT BY BIT

For a more precise diagnostic, use the Winjall software

bit 0: 1 if injector 1 fault (short circuit or closing error or not connected or not commanded)
bit 1: 1 if injector 2 fault (short circuit or closing error or not connected or not commanded)
bit 2: 1 if injector 3 fault (short circuit or closing error or not connected or not commanded)
bit 3: 1 if injector 4 fault (short circuit or closing error or not connected or not commanded)
bit 4: 1 if injector 5 fault (short circuit or closing error or not connected or not commanded)
bit 5: 1 if injector 6 fault (short circuit or closing error or not connected or not commanded)
bit 6: working critical error:
       - internal high tension does not follow the target,
       - or configuration error of the Driver
       - or reception error of injectors tension target.
Bit 7: error condition of internal high tension operation:
       - too much load (injections too numerous)
       - injectors command tension out of allowed range, could not be followed

DATA BYTE 2: INTERNAL HIGH TENSION IN VOLTS

DATA BYTE 3: INJECTOR 1 TENSION COMMAND IN VOLTS

DATA BYTE 4: INJECTOR 2 TENSION COMMAND IN VOLTS

DATA BYTE 4: INJECTOR 3 TENSION COMMAND IN VOLTS

DATA BYTE 5: INJECTOR 4 TENSION COMMAND IN VOLTS

DATA BYTE 6: INJECTOR 5 TENSION COMMAND IN VOLTS

DATA BYTE 7: INJECTOR 6 TENSION COMMAND IN VOLTS

       use of piezo injectors driver DPS06/