Use of piezo injectors Driver DPz06

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http://www.skynam.com

![SYBELE by Skynam logo] Machine management

Use piezo injectors Driver DPz06

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 DPz06 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.

I) WINJALL SOFTWARE FOR ECUs TUNING :

The DPz06 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 Commander ECUs 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 DPz06 versions distributed from May 23rd, 2013, notably:
      - engine: version 1.00

These Tuneware versions only work with the Winjall V9.00 version or a later one, which also requires a XP SP3, 7, 8, 10 or any later version of the Windows operating system of the Microsoft Corporation.

III) WARNING:

The DPz06 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 DPz06

DPz06 is an ECU specifically dedicated to the piloting of piezo electric diesel 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 DPz06 is intended to be only piloted by the Skynam ECUs of engine management like the Commander diesel. <u>If it is not piloted by a Commander diesel and if it is not connected with it by CAN-BUS, this Driver cannot work.</u>
- If you have to use a Driver with a gasoline direct injection Skynam Commander ECUs, it is necessary to use a Driver EPz06 and not this Driver DPz06.
- If you have to use a Driver with an ECU other one than Skynam Commander ECUs, it is necessary to use a Driver DPs06 and not this Driver DPz06.

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 °.

SEALIN 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

INJECTORS COMMAND WITH TWO DRIVERS
It is possible to use two drivers with a single ECU, either to command more than 6 cylinders (up to 12) with an ECU able to manage this type of engine, or to perform more injections per engine cycle.
In this case, the maximum number of injection per minute is double: all channels cumulated with the maximum command tension and at 13.5 volts on-board tension: 36000 injections / mn
- corresponds to a maximum 6000 rpm, 12 cylinders, 1 injection per cylindre
- corresponds to a maximum 4500 rpm, 8 cylinders, 2 injections per cylindre
- corresponds to a maximum 4000 rpm, 6 cylinders, 3 injections per cylindre
- corresponds to a maximum 4500 rpm, 4 cylinders, 4 injections per cylindre
Maximum consecutive time allowed at maximum command tension
- at 36000 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).
- Master / slave communication with Commander ECUs.
- The 120 Ohms resistor 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:

DIAGNOSTIC OF THE INJECTORS COMMANDS
Engine management diagnostic transmitted by CAN to the Commander ECU
Control of the working injector by injector
- transmission of the operation status injector by injector
- transmission of the operation status of the internal high tension
- transmission of the used ratio of the total power available
- transmission of the level of the internal high tension
- transmission of the target level of the internal high tension
- transmission of the actual command tension injector by injector

MECHANICAL INSTALLATION OF DRIVER DPz06

These installation recommendations are simple but very important.

I) MECHANICAL INSTALLATION FOR MONO DRIVER SYSTEM:

The driver must be installed in a vehicle area as cool and ventilated as possible, far away from the heat of the exhaust.

Maximum ambient heat in the area in which the driver must be installed is 60 Celsius 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.

II) MECHANICAL INSTALLATION FOR DUAL DRIVERS SYSTEM:

The two drivers can be installed one above the other, with <u>a space of at least 5 cm between them</u>, in order to ensure a good ventilation of the drivers.
All must be installed in a vehicle area as cool and ventilated as possible, far away from the heat of the exhaust.

Maximum ambient heat in the area in which the system must be installed is 60 Celsius degrees.

ELECTRICAL INSTALLATION OF DRIVER DPz06

These installation recommendations are simple but very important.
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 impeccable, 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.

I) GROUNDS INSTALLATION:

See lower the loom plan.
You have to take particular care to connect the grounds brown wires of the loom directly onto the ENGINE BLOCK where there is no paint, varnish or oxidation. For safety reason, clean the fixation of the grounds with emery (abrasive) cloth or a metal brush.
- The power grounds must be fixed together, with the ECU power ground.
- The power supply grounds of the ECU and of the driver must be fixed necessarily together, but separated from the power grounds of at least 10 cm.

Take care not to place the grounds next to some source of interference (starter, alternator, injectors).

On all installations a ground braid (16 mm²) has to connect DIRECTLY the negative end of your battery and your engine block (and not onto the gearbox!).

II) POWER SUPPLIES INSTALLATION:

The power supplies must be connected together following the schematics below, with the fuses. Only one relay must be used to power the ECU and the drivers.

MONO DRIVER SYSTEM
The loom supplied with the system owns 5 wires of power supply:
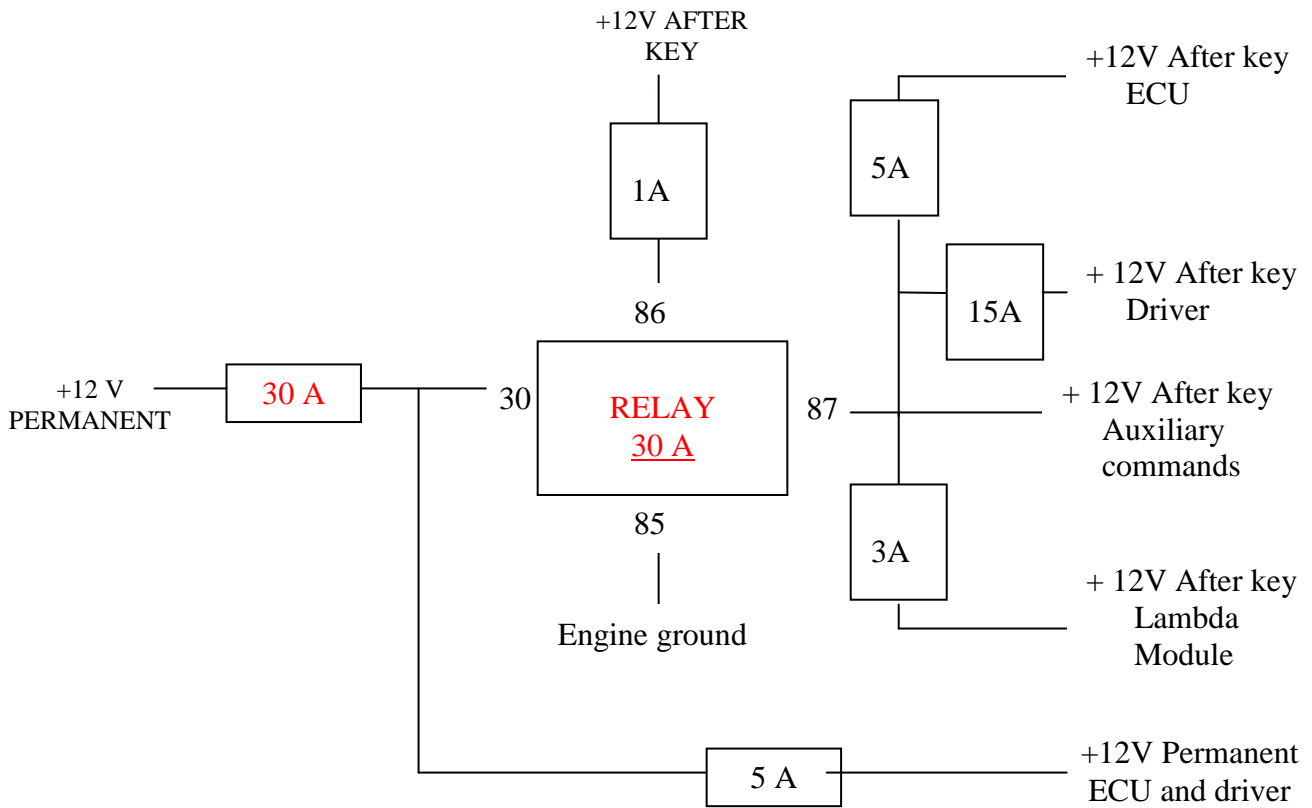- 1 white wire section 0.75 mm2, for the 12 volts after key power supply of the ECU
- 1 white wires section 2.5 mm2, for the 12 volts after key power supply of the driver
- 1 red-white wire section 0.5 mm2, for the permanent 12 volts power supply of the ECU, to connect on BATTERY 12v AND NOT CIRCUIT BREAKER.
- 1 red-white wire section 0.5 mm2, for the permanent 12 volts power supply of the driver, to connect on BATTERY 12v AND NOT CIRCUIT BREAKER.
- 1 red wire section 1.5 mm2, 12 volts after key, for the power supply of the ECU auxiliary commands.
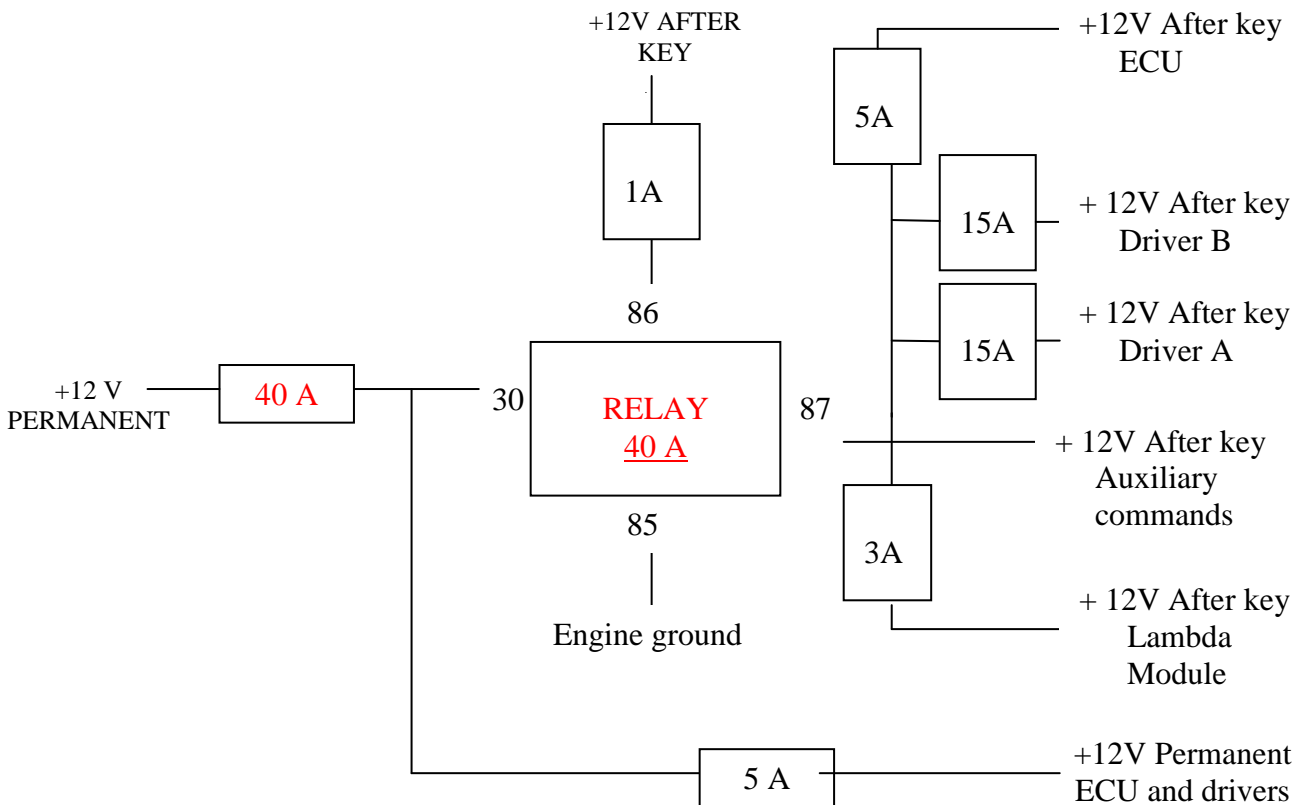**DUAL DRIVER SYSTEM**
For a dual driver system, the loom owns two more power supply wires:
- 1 white wires section 2.5 mm2, for the 12 volts after key power supply of the 2nd driver
- 1 red-white wire section 0.5 mm2, for the permanent 12 volts power supply of the 2nd driver, to connect on BATTERY 12v AND NOT CIRCUIT BREAKER.

III) SCHEMATICS FOR MONO DRIVER SYSTEMS:

+12V AFTER KEY

1A

86

+12 V PERMANENT — 30 A — 30 RELAY 30 A 87

85

Engine ground

5A → +12V After key ECU

15A → + 12V After key Driver

→ + 12V After key Auxiliary commands

3A → + 12V After key Lambda Module

5 A → +12V Permanent ECU and driver

IV) SCHEMATICS FOR DUAL DRIVER SYSTEMS:

+12V AFTER KEY

1A

86

+12 V PERMANENT — 40 A — 30 RELAY 40 A 87

85

Engine ground

5A → +12V After key ECU

15A → + 12V After key Driver B

15A → + 12V After key Driver A

→ + 12V After key Auxiliary commands

3A → + 12V After key Lambda Module

5 A → +12V Permanent ECU and drivers

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LOOM FOR MONO DRIVER SYSTEM

The driver connector is a 56-way.
The pins not referenced in the list are not used.

PIN	COLOR	FUNCTION	COMMENTARY	CHARACTERISTICS
1	Grey	INJECTION A +	1st injected cylindre	piezoelectric injector specific command 95-180 volts
3	White	INJECTION B +	2nd injected cylindre	piezoelectric injector specific command 95-180 volts
5	Blue	INJECTION C +	3rd injected cylindre	piezoelectric injector specific command 95-180 volts
7	Black	INJECTION D +	4th injected cylindre	piezoelectric injector specific command 95-180 volts
9	Yellow	INJECTION E +	5th injected cylindre	piezoelectric injector specific command 95-180 volts
11	Green	INJECTION F +	6th injected cylindre	piezoelectric injector specific command 95-180 volts
13	Yellow	LED DIAG-ALARM	LED command	10 milliamperes
14	White	CAN1_H	CAN WinjNet	Without integrated 120 Ohms resistor
15	Grey	INJECTION A SIGNAL INPUT	Injection input A - ground signal	internal pull-up to +15, consumes 15 mA
16	White	INJECTION B SIGNAL INPUT	Injection input B - ground signal	internal pull-up to +15, consumes 15 mA
17	Blue	INJECTION C SIGNAL INPUT	Injection input C - ground signal	internal pull-up to +15, consumes 15 mA
18	White-red	PERMANENT POWER SUPPLY+ 30	Permanent 12 volts power supply	8-18 volts
19	White	AFTER KEY POWER SUPPLY + 15	12 volts after key power supply	8-18 volts
20	White	AFTER KEY POWER SUPPLY + 15	12 volts after key power supply	8-18 volts
29	Grey	INJECTION A -	Injecteur A return	Injector negative
31	White	INJECTION B -	Injecteur B return	Injector negative
33	Blue	INJECTION C -	Injecteur C return	Injector negative
35	Black	INJECTION D -	Injecteur D return	Injector negative
37	Yellow	INJECTION E -	Injecteur E return	Injector negative
39	Green	INJECTION F -	Injecteur F return	Injector negative
42	Blue	CAN1_L	CAN WinjNet	Without integrated 120 Ohms resistor
43	Black	INJECTION D SIGNAL INPUT	Injection input D - ground signal	internal pull-up to +15, consumes 15 mA
44	Yellow	INJECTION E SIGNAL INPUT	Injection input E - ground signal	internal pull-up to +15, consumes 15 mA
45	Green	INJECTION F SIGNAL INPUT	Injection input F - ground signal	internal pull-up to +15, consumes 15 mA
46	Brown	ENGINE GROUND ECU SUPPLY	Ground supply for ECU	Must be wired to engine block
47	Brown	POWER GROUND ENGINE	Ground input for power commands	Must be wired to engine block
48	Brown	POWER GROUND ENGINE	Ground input for power commands	Must be wired to engine block

SUMMARY OF INJECTORS OUTPUTS				
FOLLOWING FIRING ORDER	FUNCTION	WIRE COLOR	POSITIVE PIN	NEGATIVE PIN
1st injected cylindre	INJECTION A	Grey	1	29
2nd injected cylindre	INJECTION B	White	3	31
3rd injected cylindre	INJECTION C	Blue	5	33
4th injected cylindre	INJECTION D	Black	7	35
5th injected cylindre	INJECTION E	Yellow	9	37
6th injected cylindre	INJECTION F	Green	11	39

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LOOM FOR DUAL DRIVER SYSTEM

The connector of each driver is a 56-way.
The pins not referenced in the list are not used.

PIN	COLOR	FUNCTION	COMMENTARY	CHARACTERISTICS
DRIVER A				
1	Grey	INJECTION A +	1st injected cylindre	piezoelectric injector specific command 95-180 volts
3	Grey-Black	INJECTION G +	7th injected cylindre	piezoelectric injector specific command 95-180 volts
5	Blue	INJECTION C +	3rd injected cylindre	piezoelectric injector specific command 95-180 volts
7	Blue-Red	INJECTION I +	9th injected cylindre	piezoelectric injector specific command 95-180 volts
9	Yellow	INJECTION E +	5th injected cylindre	piezoelectric injector specific command 95-180 volts
11	Yellow-Black	INJECTION K +	11th injected cylindre	piezoelectric injector specific command 95-180 volts
13	Yellow	LED DIAG-ALARM	LED command	10 milliamperes
14	White	CAN1_H	CAN WinjNet	Without integrated 120 Ohms resistor
15	Grey	INJECTION A SIGNAL INPUT	Injection input A - ground signal	internal pull-up to +15, consumes 15 mA
16	Grey-Black	INJECTION G SIGNAL INPUT	Injection input G - ground signal	internal pull-up to +15, consumes 15 mA
17	Blue	INJECTION C SIGNAL INPUT	Injection input C - ground signal	internal pull-up to +15, consumes 15 mA
18	White-red	PERMANENT POWER SUPPLY+ 30	Permanent 12 volts power supply	8-18 volts
19	White	AFTER KEY POWER SUPPLY + 15	12 volts after key power supply	8-18 volts
20	White	AFTER KEY POWER SUPPLY + 15	12 volts after key power supply	8-18 volts
29	Grey	INJECTION A -	Injecteur A return	Injector negative
31	Grey-Black	INJECTION G -	Injecteur G return	Injector negative
33	Blue	INJECTION C -	Injecteur C return	Injector negative
35	Blue-Red	INJECTION I -	Injecteur I return	Injector negative
37	Yellow	INJECTION E -	Injecteur E return	Injector negative
39	Yellow-Black	INJECTION K -	Injecteur K return	Injector negative
42	Blue	CAN1_L	CAN WinjNet	Without integrated 120 Ohms resistor
43	Blue-Red	INJECTION I SIGNAL INPUT	Injection input I - ground signal	internal pull-up to +15, consumes 15 mA
44	Yellow	INJECTION E SIGNAL INPUT	Injection input E - ground signal	internal pull-up to +15, consumes 15 mA
45	Yellow-Black	INJECTION K SIGNAL INPUT	Injection input K - ground signal	internal pull-up to +15, consumes 15 mA
46	Brown	ENGINE GROUND ECU SUPPLY	Ground supply for ECU	Must be wired to engine block
47	Brown	POWER GROUND ENGINE	Ground input for power commands	Must be wired to engine block
48	Brown	POWER GROUND ENGINE	Ground input for power commands	Must be wired to engine block

PIN	COLOR	FUNCTION	COMMENTARY	CHARACTERISTICS
DRIVER B				
1	White	INJECTION B +	2nd injected cylindre	piezoelectric injector specific command 95-180 volts
3	White-Black	INJECTION H +	8th injected cylindre	piezoelectric injector specific command 95-180 volts
5	Black	INJECTION D +	4th injected cylindre	piezoelectric injector specific command 95-180 volts
7	Black-Red	INJECTION J +	10th injected cylindre	piezoelectric injector specific command 95-180 volts
9	Green	INJECTION F +	6th injected cylindre	piezoelectric injector specific command 95-180 volts
11	Green-Black	INJECTION L +	12th injected cylindre	piezoelectric injector specific command 95-180 volts
13	Yellow	LED DIAG-ALARM	LED command	10 milliamperes
14	White	CAN1_H	CAN WinjNet	Without integrated 120 Ohms resistor
15	White	INJECTION B SIGNAL INPUT	Injection input B - ground signal	internal pull-up to +15, consumes 15 mA
16	White-Black	INJECTION H SIGNAL INPUT	Injection input H - ground signal	internal pull-up to +15, consumes 15 mA
17	Black	INJECTION D SIGNAL INPUT	Injection input D - ground signal	internal pull-up to +15, consumes 15 mA
18	White-red	PERMANENT POWER SUPPLY+ 30	Permanent 12 volts power supply	8-18 volts
19	White	AFTER KEY POWER SUPPLY + 15	12 volts after key power supply	8-18 volts
20	White	AFTER KEY POWER SUPPLY + 15	12 volts after key power supply	8-18 volts
29	White	INJECTION B -	Injecteur B return	Injector negative
31	White-Black	INJECTION H -	Injecteur H return	Injector negative
33	Black	INJECTION D -	Injecteur D return	Injector negative
35	Black-Red	INJECTION J -	Injecteur J return	Injector negative
37	Green	INJECTION F -	Injecteur F return	Injector negative
39	Green-Black	INJECTION L -	Injecteur L return	Injector negative
42	Blue	CAN1_L	CAN WinjNet	Without integrated 120 Ohms resistor
43	Black-Red	INJECTION J SIGNAL INPUT	Injection input J - ground signal	internal pull-up to +15, consumes 15 mA
44	Green	INJECTION F SIGNAL INPUT	Injection input F - ground signal	internal pull-up to +15, consumes 15 mA
45	Green-Black	INJECTION L SIGNAL INPUT	Injection input L - ground signal	internal pull-up to +15, consumes 15 mA
46	Brown	ENGINE GROUND ECU SUPPLY	Ground supply for ECU	Must be wired to engine block
47	Brown	POWER GROUND ENGINE	Ground input for power commands	Must be wired to engine block
48	Brown	POWER GROUND ENGINE	Ground input for power commands	Must be wired to engine block

FOLLOWING FIRING ORDER	FUNCTION	WIRE COLOR	DRIVER	POSITIVE PIN	NEGATIVE PIN
SUMMARY OF INJECTORS OUTPUTS					
1st injected cylindre	INJECTION A	Grey	A	1	29
2nd injected cylindre	INJECTION B	White	B	1	29
3rd injected cylindre	INJECTION C	Blue	A	5	33
4th injected cylindre	INJECTION D	Black	B	5	33
5th injected cylindre	INJECTION E	Yellow	A	9	37
6th injected cylindre	INJECTION F	Green	B	9	37
7th injected cylindre	INJECTION G	Grey-Black	A	3	31
8th injected cylindre	INJECTION H	White-Black	B	3	31
9th injected cylindre	INJECTION I	Blue-Red	A	7	35
10th injected cylindre	INJECTION J	Red-Black	B	7	35
11th injected cylindre	INJECTION K	Yellow-Black	A	11	39
12th injected cylindre	INJECTION L	Green-Black	B	11	39

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DIAGNOSTIC LED

The inductive injectors Driver DPz06 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 blinking 8 times per second (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 blinking 4 times per second (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 blinking twice per second (medium) occurs when the software application (command of injectors) cannot work:
> - or 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 blinking 1 time per second (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 piloting of injectors in the external version (commanded by other types of ECUs of engine management than Skynam ECUs), but does not allow the working in the internal version (command by the Skynam engine management ECUs)

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 switch on before or after the Winjall software launch

Once Winjall is launched and the Driver is switched on:
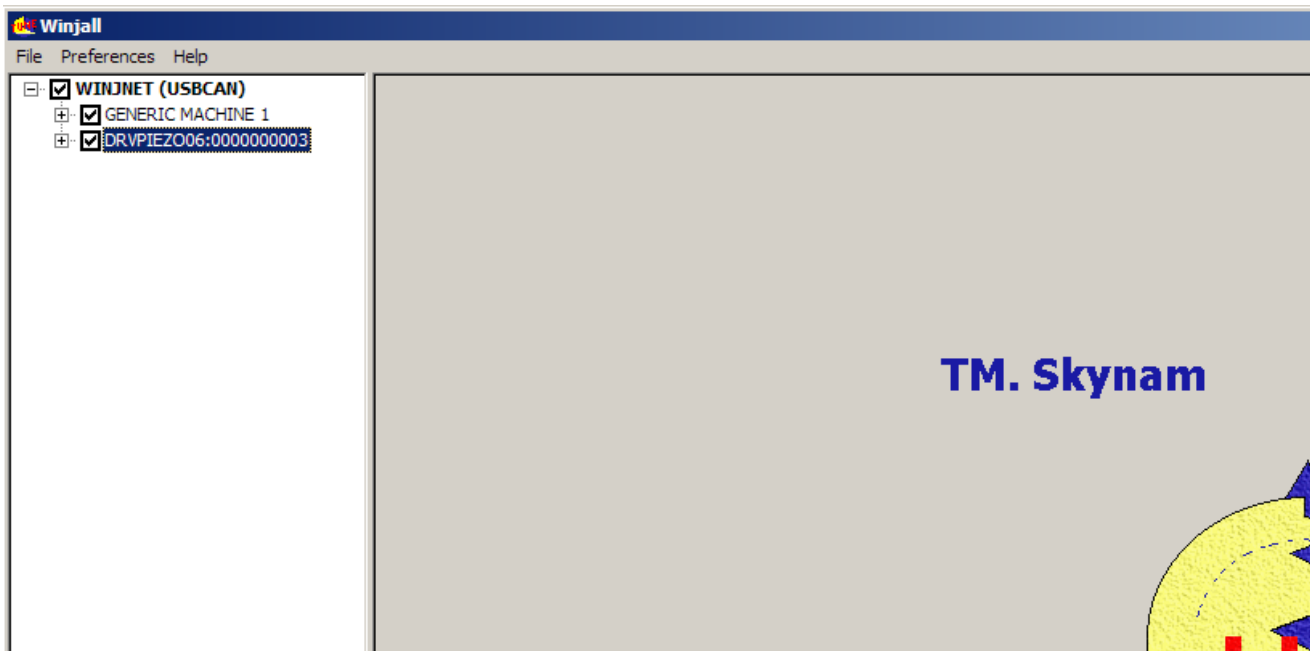
Click on [+] in front of the name of the Driver DRVPIEZO06:000 to expand the tunings
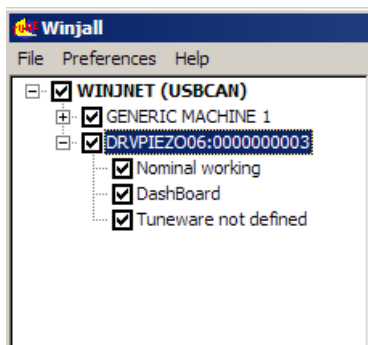
There are 4 possible pop-up menus on a machine in the machines tree:
    - the Machine menu, by a right click on the name of the machine.
    - the Dashboard menu, by a right click on the Dashboard name.
    - the State menu, by a right click on the State of the machine (Nominal working, or other)
    - 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
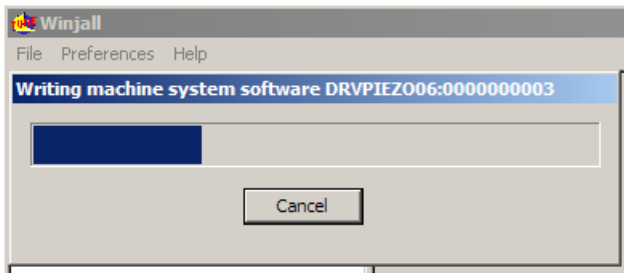then select Machine update / complete update.
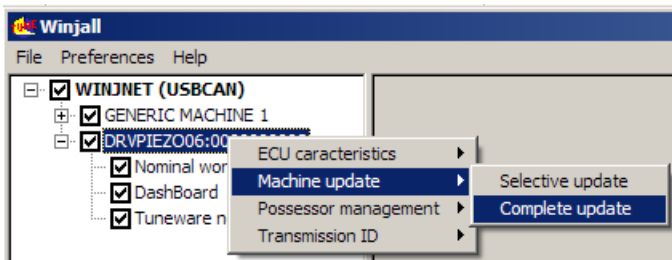
Select specific Tuneware of the machine to be load
- "**Engine.DPz06**" for a mono driver system
- "**Engine.DPz06_A**" for driver A of a dual driver system
- "**Engine.DPz06_B**" for driver B of a dual driver system
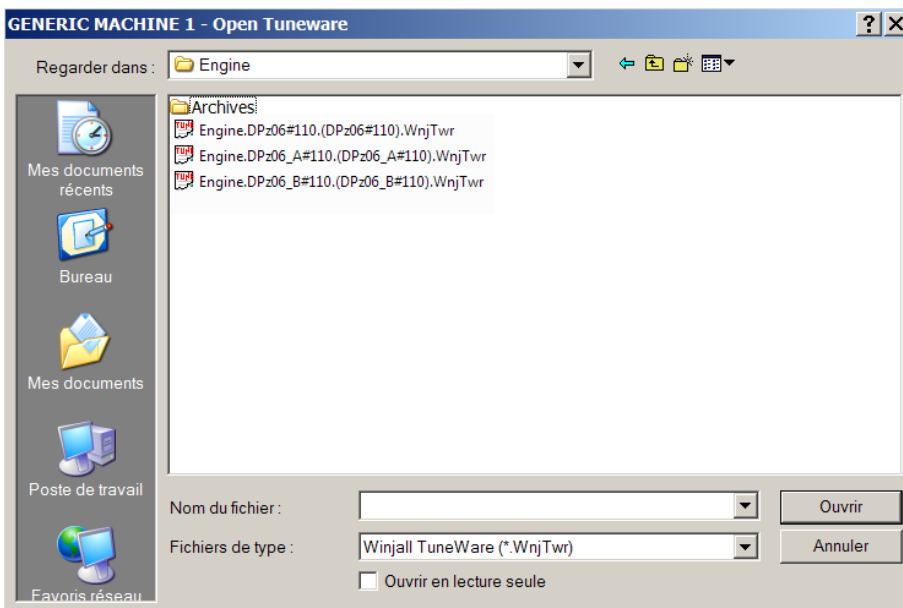
Let the load be made: 3 phases
- system load
- application software load
- application data load

Winjall

File   Preferences   Help

Writing machine system software DRVPIEZO06:0000000003

Cancel

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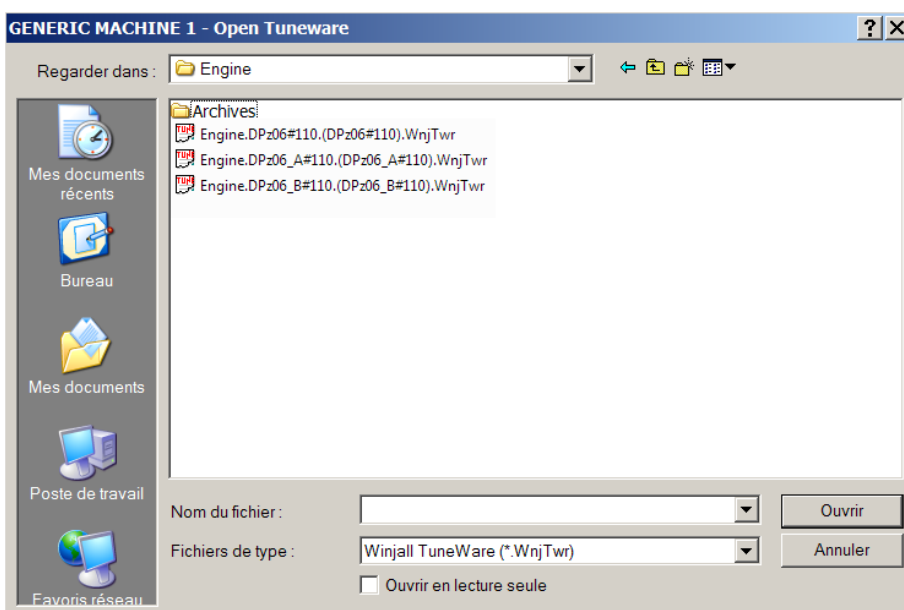
1) We open Tuneware by the menu Tuneware:
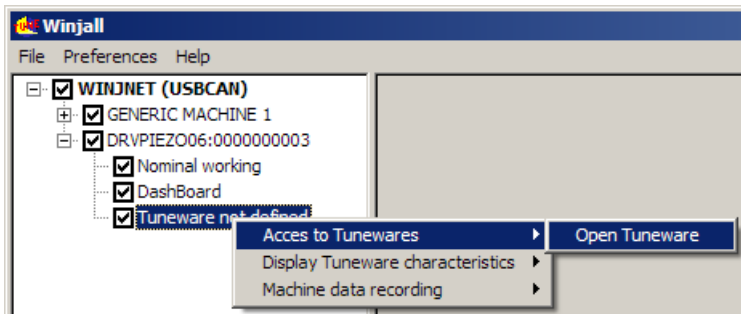
or more simply by double clicking the line 'Tuneware not defined'

Choose then the Tuneware to open:
- "**Engine.DPz06**" for a mono driver system
- "**Engine.DPz06_A**" for driver A of a dual driver system
- "**Engine.DPz06_B**" for driver B of a dual driver system

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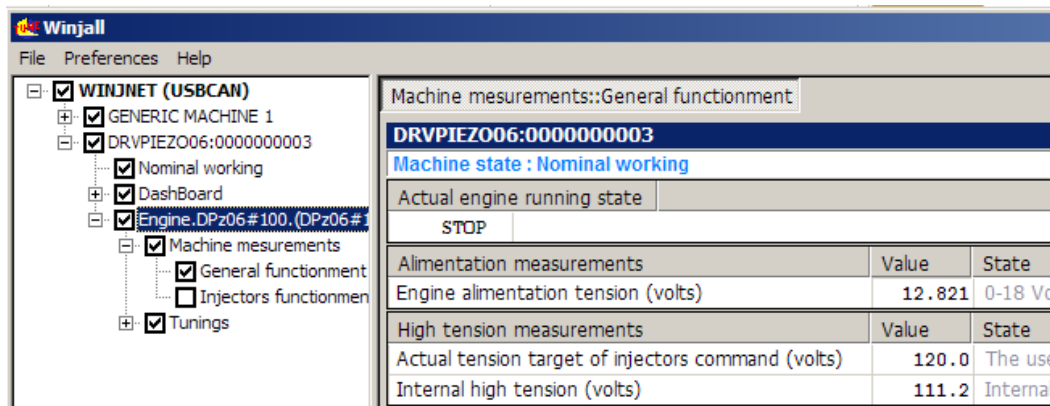and OK]
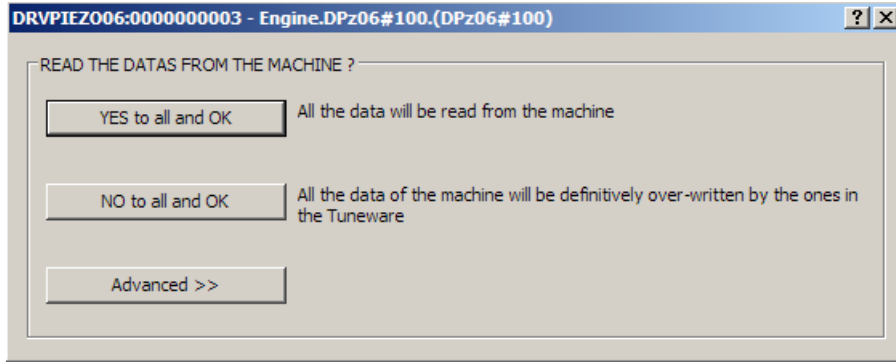
Once the Tuneware is opened, its name is displayed on the line 'Tuneware of the machine'.
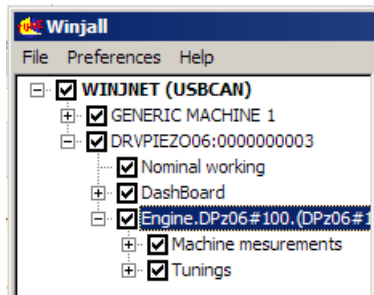
To access the special functions of tuning, we shall use the pop-up State menu.

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 the one to the other one with [ALT] [TAB] at the keyboard,
or by clicking with the mouse in the tab at the top of the page.

**This map is preset for the electric piezo injectors of all kinds of diesel engines.
It should never be changed except specific request of injectors manufacturer.
Major malfunctions may result from a non-specific or hazardous modification.**

In the machines tree, click on the [+] in front of the line 'Tunings'
Then check the box 'Injectors command tension'
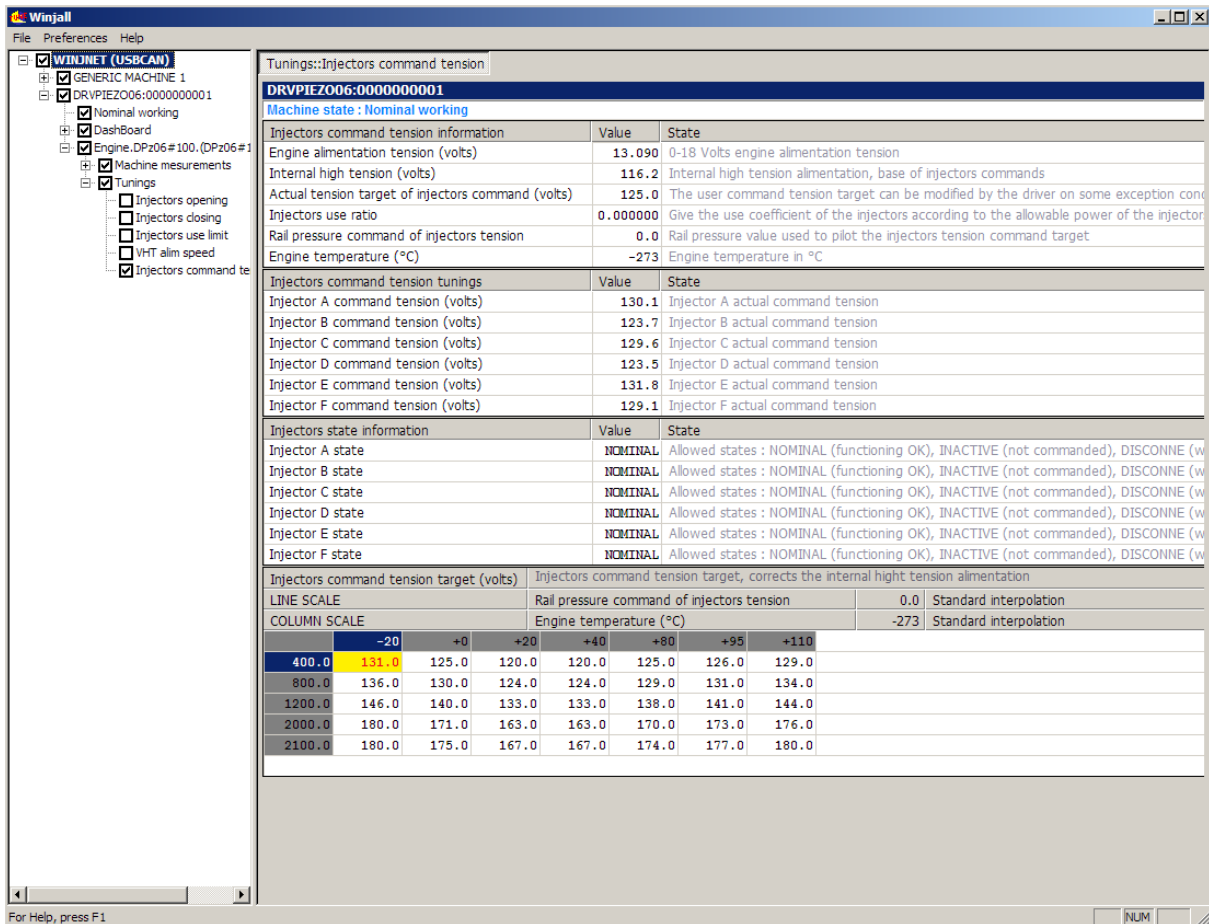
The map of target of injectors command tension allows to choose the tension with which injectors
must be piloted, between 115 volts and 180 volts.

The map managing the injectors command tension has for inputs two values transmitted by the engine
management Commander ECU:
- the first one, in bars, is a function of the measured fuel pressure and the target of fuel pressure,
- the second is the engine temperature, which gives a close image of the injectors temperature.
In output the map gives the desired tension of injectors command.

WARNING:
**In the dual driver systems, if you modify this map for one of the drivers, you must modify it the same
way for the second driver.**

INTERNAL REGULATION
OF INJECTORS COMMAND TENSION

The Driver controls internally that the immediate number of injections is not too important for the capacity of power 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
    - of the total number of injections per second, for all the used injectors
    - of the value of the internal high tension used to generate the injectors command tension
    - of 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 demanded 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 peak tension of injectors command until 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',

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 regulation, the software of the Driver
    - sends to Winjall and the Commander which pilots it the 'NOMINAL' state of the high tension,
    - Erases the flag of overshoot in 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 flag of high tension error of the diagnostic frame is set,
    - 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. 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. When the engine is started, if the fault has disappeared, the indication is removed.