

# ***Igni-Power Racing*** <sup>3Cyl</sup>

*Powered by Franco Dettori*

# ***RACING*** <sup>3Cyl</sup>

**FOR  
COMPETITION  
USE ONLY**



# ***Igni-Power***

[www.igni-power.com](http://www.igni-power.com)

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## **How to use the Igni-Power software?**

1. Install the software on the computer by following the menu

- Insert the delivered CD to the computer
- Choose the language which is suitable
- Choose the mode how the program should be run
- Choose the directory where the program should be installed or use the default address
- Choose the serial interface of the computer to communicate with the ECU of the engine or use the default interface address (com1).
- Finish the Setup program

2. Connect the interface with the ECU of the engine.

**Note:** the ECU has to be connected to the engine

3. Start the ***Igni-Power Racing 3Cyl*** software

4. For communication with the engine ECU switch the ignition on

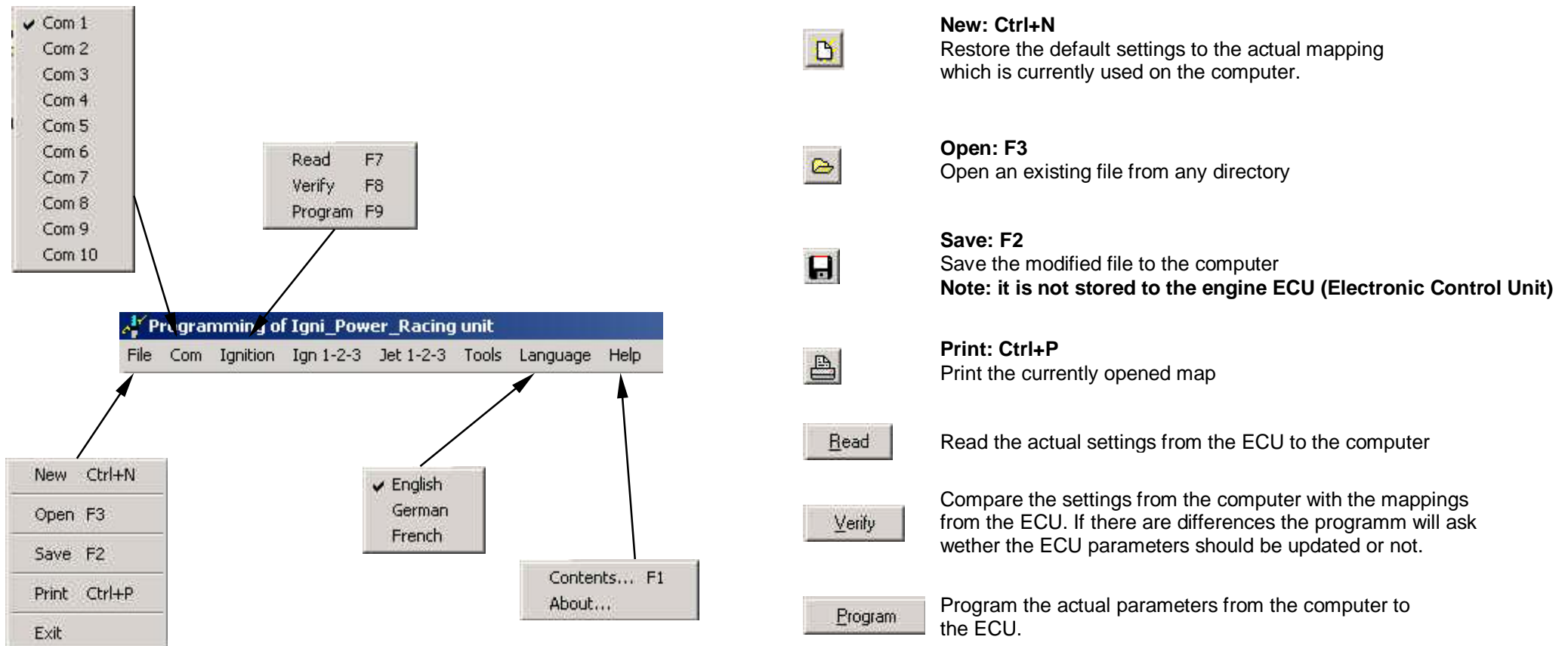


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5.

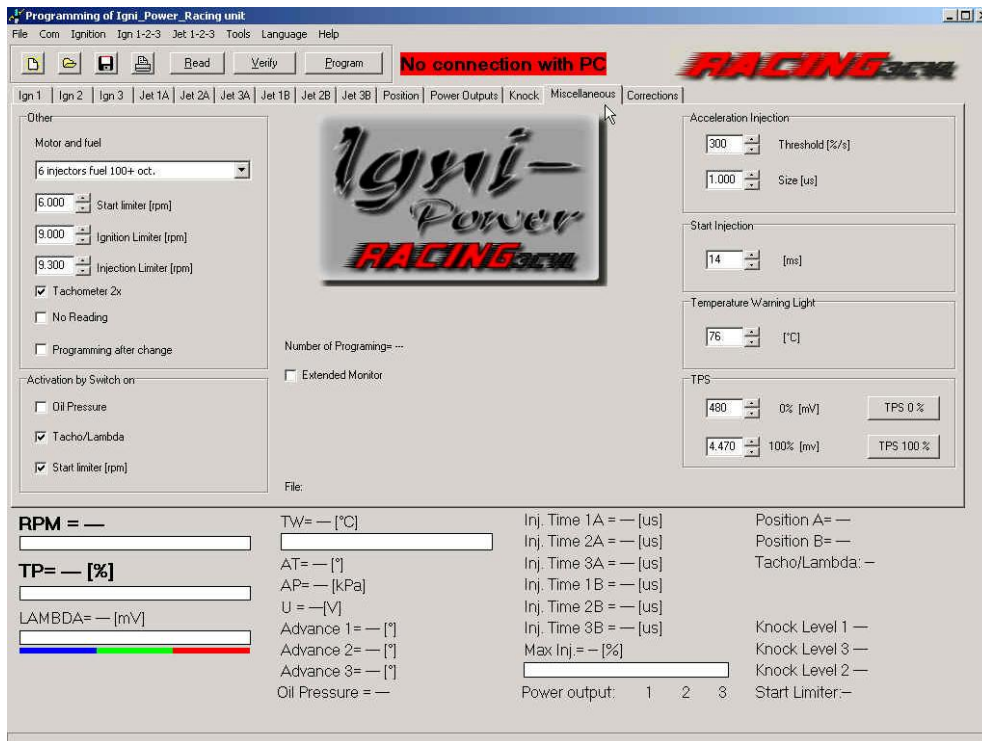
**What are the important functions to steer through the program?**



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## Engine Settings (1)



Open the map **Miscellaneous**

➤ Choose the engine parameters **Motor and fuel**

- \* 6 injectors and fuel type 100+ octane
- \* 6 injectors and fuel type 98 octane
- \* 3 injectors and fuel type 100+ octane
- \* 3 injectors and fuel type 98 octane

by choosing the correct amount of injectors and the fuel type the basic mapping will be set. This mapping should be used as a reference.

➤ Set the **Start limiter** rpm

This limited engine speed is activated by pushing the rev. limiter button on the handlebar of the boat.  
Range: 900 ... 12500 rpm

➤ Set the **Ignition and Injection limiter**

These limiters prevent the engine to exceed its maximum mechanical speed limit. The strategy is to limit the rpm first by the ignition and then by the injection.  
Range: 900 ... 12500 rpm

➤ Choose the type of the tachometer. The output signal can be doubled.

➤ No Reading: working offline

➤ Choose if every change of the map setting should be stored to the engine ECU immediately.

➤ Set the flags when the extended monitor (display) should be activated

- oil pressure: > 0.3 bar
- Tacho / Lambda: engine speed > 1000 rpm
- start limiter: > above set value

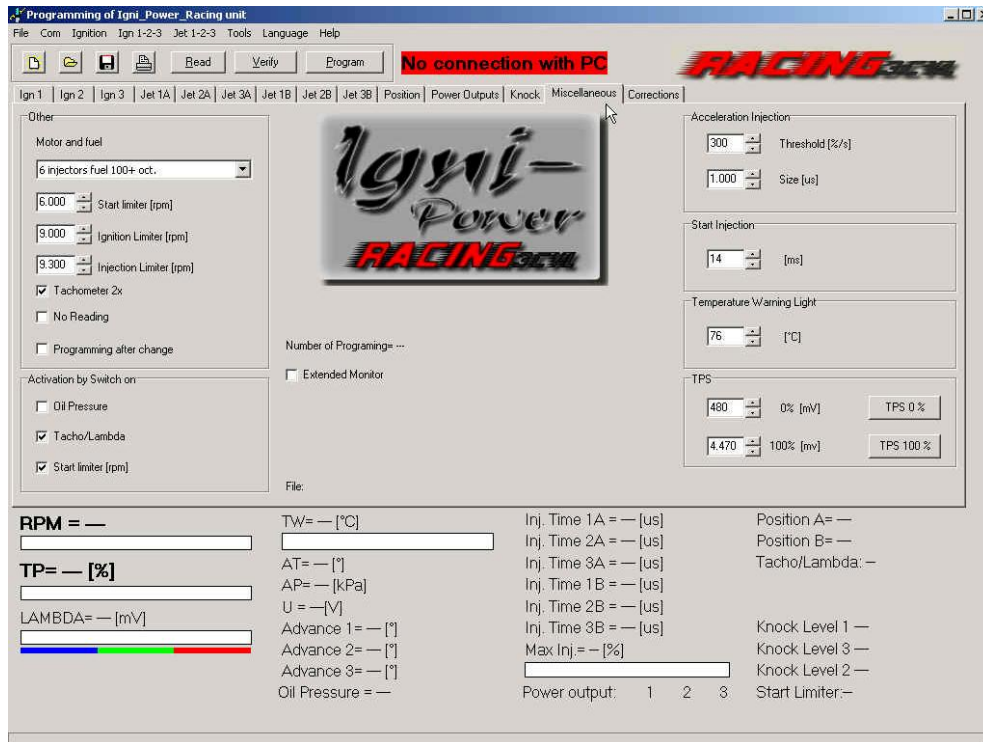
➤ Set if the extended online monitor should be activated.



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## Engine Settings (2)



### ➤ Acceleration Injection:

Determines the acceleration enrichment or leaning time and value.

**Threshold [%/s]:** This value determines what is an acceleration. It is calculated by the throttle position [%] and the time [sec] when it is reached. All values below this value are steady state and will use the original fuel mapping.  
Range: 10 ... 2500 %/s

**Size [μs]:** Determines the time of this acceleration function of how long it should be activated. This value is added to the fuel mapping.  
➤ starts as soon the threshold value is true  
Range: 0 ... 7500 μs

### ➤ Start Injection:

As soon the engine start button is pushed the injectors will inject fuel for the specified time. This choke function is independent from any synchronization of the crankshaft position with the ECU.

### ➤ Temperature Warning Light:

Threshold value when the engine temperature should be activated. This function has no influence to any other map.

### ➤ TPS – Throttle Position Sensor:

1. Release the throttle completely and click **TPS 0%**
2. Open the throttle to WOT and click **TPS 100%**
3. **Program** the values to the engine ECU.

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## Engine Corrections

The screenshot shows the 'Programming of Igni\_Power\_Racing unit' window. The 'Starting Corrections' tab is active, displaying a table for adjusting engine settings at -10°C. The table has two columns: 'Time [s]' and 'Corrections for -10°C [%]'. The 'Time [s]' column has values 0, 5, 10, 15, and 20. The 'Corrections for -10°C [%]' column has values 250, 150, 130, 110, and 100. Below the table, there are input fields for 'Starting corr.= - [%]' and 'U correction= - [us]'. At the bottom of the window, there are various engine parameters and their units, including RPM, TP, LAMBDA, TW, AT, AP, U, Advance 1, 2, 3, Oil Pressure, Inj. Time 1A, 2A, 3A, 1B, 2B, 3B, Max Inj, Power output, Position A, B, Tacho/Lambda, Knock Level 1, 2, 3, and Start Limiter.

Time [s]	Corrections for -10°C [%]
0	250
5	150
10	130
15	110
20	100

Starting corr.= - [%]  
U correction= - [us]

RPM = —  
TP= — [%]  
LAMBDA= — [mV]

TW= — [°C]  
AT= — [°]  
AP= — [kPa]  
U = — [V]  
Advance 1= — [°]  
Advance 2= — [°]  
Advance 3= — [°]  
Oil Pressure = —

Inj. Time 1A= — [us]  
Inj. Time 2A= — [us]  
Inj. Time 3A= — [us]  
Inj. Time 1B= — [us]  
Inj. Time 2B= — [us]  
Inj. Time 3B= — [us]  
Max Inj= — [%]  
Power output: 1 2 3

Position A= —  
Position B= —  
Tacho/Lambda: —  
Knock Level 1 —  
Knock Level 3 —  
Knock Level 2 —  
Start Limiter:—

### ➤ Starting Correction:

With this map the cold start behavior of the engine can be adjusted.

**Time [s]:** Defines the time of how long this function is enabled.

**Correction for -10°C [%]:** This table allows to adjust the default engine settings.  
Range: 100 ... 350%

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## Knock Sensor Setting

**Programming of Igni\_Power\_Racing unit**

File Com Ignition Ign 1-2-3 Jet 1-2-3 Tools Language Help

Read Verify Program **No connection with PC** **RACING 3Cyl**

Ign 1 Ign 2 Ign 3 Jet 1A Jet 2A Jet 3A Jet 1B Jet 2B Jet 3B Position Power Outputs **Knock** Miscellaneous Corrections

Cylinder 1						Cylinder 2						Cylinder 3					
RPM	4000	5000	6000	7000	8000	4000	5000	6000	7000	8000	4000	5000	6000	7000	8000		
Alarm level [mV]	1.540	1.700	1.740	1.900	2.000	1.560	1.620	1.840	1.900	2.100	1.440	1.560	1.740	1.740	1.900		

**RPM** = —  
**TP** = — [%]  
**LAMBDA** = — [mV]  
**TW** = — [°C]  
**AT** = — [°]  
**AP** = — [kPa]  
**U** = — [V]  
**Advance 1** = — [°]  
**Advance 2** = — [°]  
**Advance 3** = — [°]  
**Oil Pressure** = —  
**Inj. Time 1A** = — [us]  
**Inj. Time 2A** = — [us]  
**Inj. Time 3A** = — [us]  
**Inj. Time 1B** = — [us]  
**Inj. Time 2B** = — [us]  
**Inj. Time 3B** = — [us]  
**Max Inj** = — [%]  
**Power output:** 1 2 3  
**Position A** = —  
**Position B** = —  
**Tacho/Lambda** = —  
**Knock Level 1** = —  
**Knock Level 3** = —  
**Knock Level 2** = —  
**Start Limiter** = —

### ➤ Knock:

This table allows to adjust the Knock Alarm levels of each cylinder separately.

Cylinder 1: PTO side

Cylinder 2: Center

Cylinder 3: MAG side

The adjusted levels result in an earlier or later activation of the alarm which can be seen on the extended display. The default knock setting of the engine will not be modified. This function should be used as a reference for the new modifications.

Range: 500 ... 5000 mV



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## External Power Output Drivers

### ➤ Power Outputs:

This ECU – Electronic Control Unit allows to control three different outputs separately. Therefore two switching engine speed [rpm] levels can be set. Furthermore the output signal can be inverted. Range: 0 ... 12500 rpm

Note:

General Description

N channel vertical power switch FET in Smart SIPMOS® chip on chip Technology.

Output specifications: **12V, 3,5A**

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## Position of the Injection Start

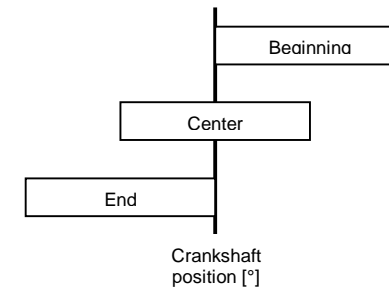
### ➤ Position of Injection:

The mapping specifies the initial starting point of the injection relatively to the crankshaft. Three different calculation methods can be chosen.

**Beginning:** the set value is the starting point of the calculation of the injection time.

**Center:** the set value is exactly in the middle of the injection time.

**End:** the set value determines the end of the injection.



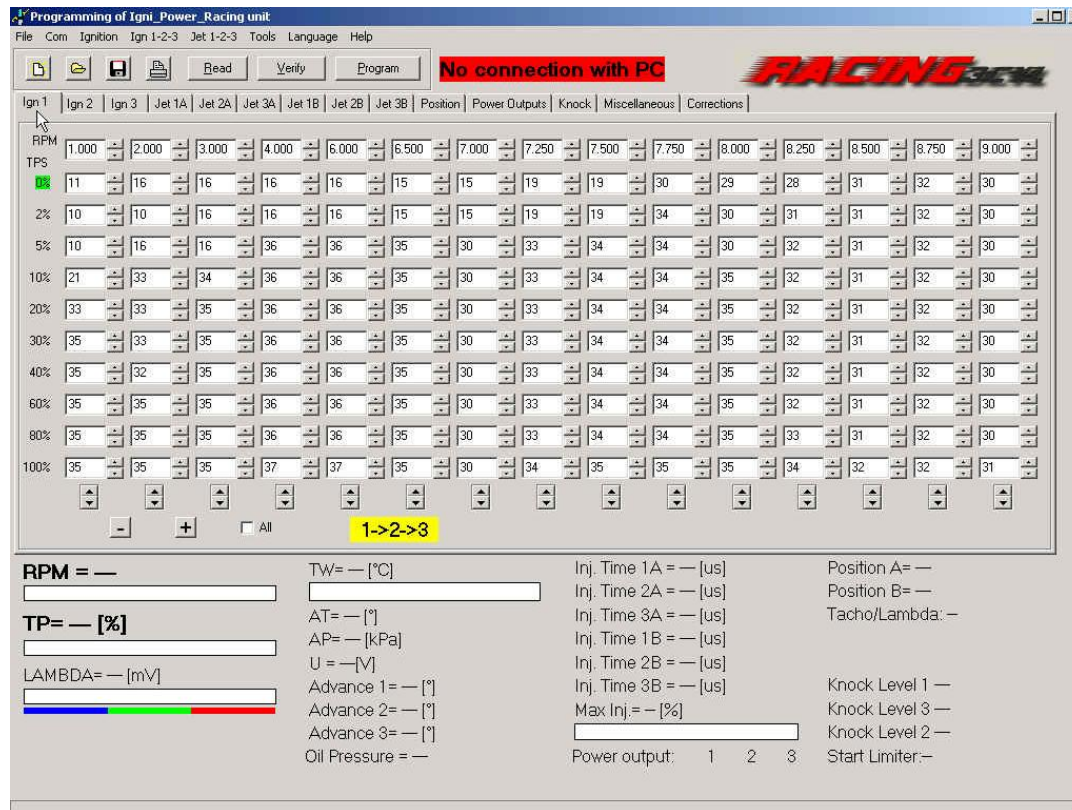
**Injector A:** Injector positioned on top of the intake manifold.

**Injector B:** Injector positioned below of the intake manifold.

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## Ignition mapping



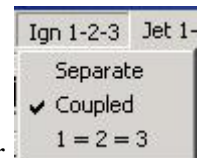
### Principal function:

The ignition table is a function of the Throttle Position (TPS) over the engine speed (RPM).

### How to use the table?

- The basic engine ignition settings are stored in the default value.
- Choose the engine configuration (6 or 3 injectors, fuel type) in the sheet Miscellaneous.
- press the button  to restore the default settings

The ignition timing can be set for each cylinder individually or dependant.



- Choose the adjustment mode from the menu bar

**Separate:** the mapping for each cylinder has to be done individually

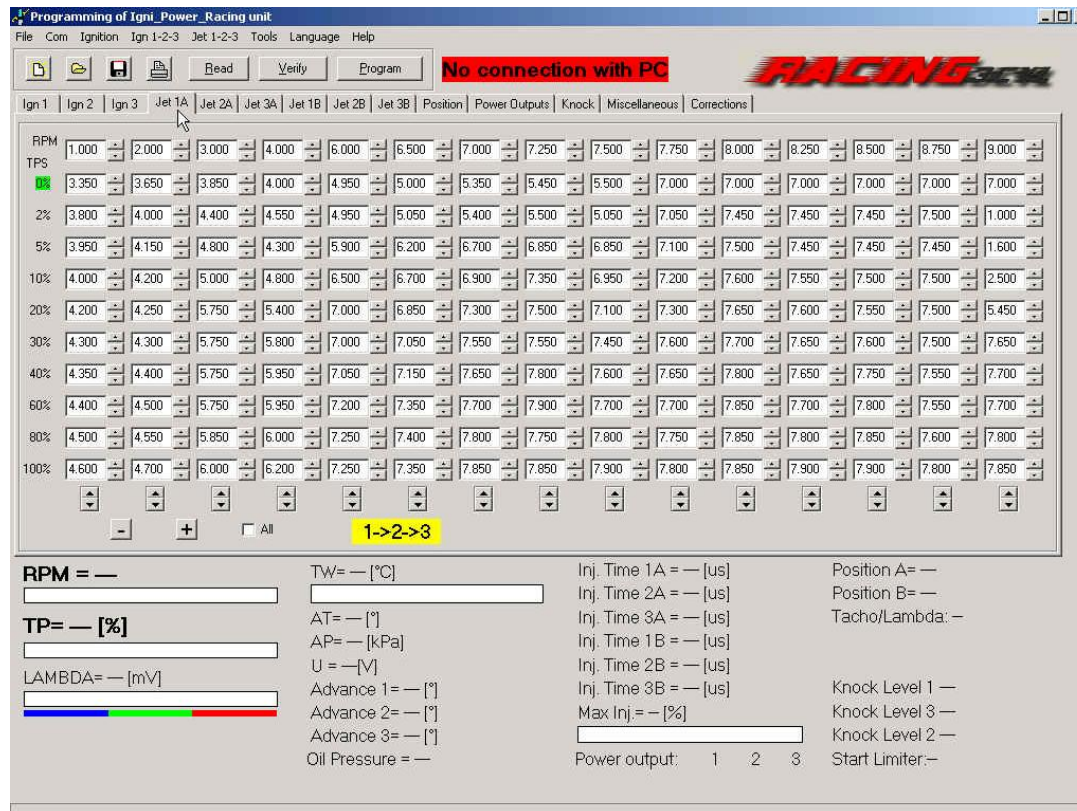
**Coupled:** the default mappings for cylinder 2 and 3 will be modified by the same amount as the cylinder 1 has been adjusted

**1 = 2 = 3:** only the mapping of cylinder 1 can be modified. Cylinder 2 and 3 will have the same values

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## Injection mapping



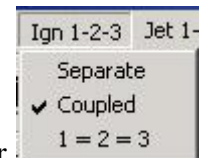
### Principal function:

The injection table is a function of the Throttle Position (TPS) over the engine speed (RPM).

### How to use the table?

- The basic engine injection settings are stored in the default value.
- Choose the engine configuration (6 or 3 injectors, fuel type) in the sheet Miscellaneous.
- press the button  to restore the default settings

The injection time can be set for each injector individually or dependant.



- Choose the adjustment mode from the menu bar

**Separate:** the mapping for each injector has to be done individually

**Coupled:** the default mappings for injector 2 and 3 will be modified by the same amount as the injector 1 has been adjusted

**1 = 2 = 3:** only the mapping of injector 1 can be modified. injector 2 and 3 will have the same values




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## **Extended Monitor**

The Extended Monitor allows to follow the important engine values directly on the screen.

<b>RPM = —</b> <input type="text"/>	<b>TW= — [°C]</b> <input type="text"/>	<b>Inj. Time 1A = — [us]</b>	<b>Position A= —</b>
<b>TP= — [%]</b> <input type="text"/>	<b>AT= — [°]</b>	<b>Inj. Time 2A = — [us]</b>	<b>Position B= —</b>
<b>LAMBDA= — [mV]</b> <input type="text"/>	<b>AP= — [kPa]</b>	<b>Inj. Time 3A = — [us]</b>	<b>Tacho/Lambda: —</b>
	<b>U = — [V]</b>	<b>Inj. Time 1B = — [us]</b>	
	<b>Advance 1= — [°]</b>	<b>Inj. Time 2B = — [us]</b>	<b>Knock Level 1 —</b>
	<b>Advance 2= — [°]</b>	<b>Inj. Time 3B = — [us]</b>	<b>Knock Level 3 —</b>
	<b>Advance 3= — [°]</b>	<b>Max Inj.= — [%]</b> <input type="text"/>	<b>Knock Level 2 —</b>
	<b>Oil Pressure = —</b>	<b>Power output: 1 2 3</b>	<b>Start Limiter:—</b>

<b>RPM</b>	Engine Speed [rpm]	<b>Oil Pressure</b>	Engine Oil pressure [bar]
<b>TP</b>	Throttle opening [%]	<b>Inj. Time 1A ... 3B</b>	Injection Time per injector [us]
<b>Lambda</b>	stoichiometric combustion	<b>Max Inj.</b>	
<b>TW</b>	Water Temperature of the engine [°C]	<b>Power output 1, 2, 3</b>	shows if an external driver is activated
<b>AT</b>	Airbox Temperature [°C]	<b>Position</b>	
<b>U</b>	Voltage of the battery [V]	<b>Tacho / Lambda</b>	
<b>Advance 1, 2, 3</b>	Ignition timing per cylinder [°]	<b>Knock Level 1, 2, 3</b>	Knock Sensor signal
		<b>Start Limiter</b>	shows the actual set value of the start limiter rpm

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