

# SPARKER RACING 3

## INSTRUCTIONS

SPARKER RACING 3 is an inductive ignition unit for road motorcycle. The ignition unit can be set by a computer PC with a program RACING3.EXE. Advance (time of ignition) can be set as a function of revolution or as a function of revolution and TPS (throttle position sensor). Ignition contains outputs for tachometer, fuel pump relay... It contains also inputs and outputs for racing use. Blocking, clutch master, gear shift light ... Ignition contains N2O controller with advance retard. On demand contains servo controller. It is by the time of programming connected with computer PC by serial port (COM). The program RACING3.EXE is included to ignition unit.

### HARDWARE

#### **Pick up system.**

Ignition can have maximal four channels. Ignition can be programmed for many pickup systems. Most of them can be choose directly from list in program RACING3.EXE others can be set by special procedure (also by program RACING3.EXE).

#### **Supply voltage +12 V.**

Supply voltage must be within 8 – 18 range. In this range the unit is able to provide optimal control of all the processes. Supply voltage is connected by positive outlet to +12 V (15) and by negative outlet to GND (4, 16, 17).

#### **Throttle position sensor TPS.**

An input is ready for standard TPS sensors used on motorbikes. It is designed to bear voltage up to 5 V. Particular sensor settings 0 % and 100 % are included in RACING3.EXE software.

TPS is powered by referential voltage + 5 V (3) and GND (4, 16, 17). Sensor outlet will be connected to connector (13).

#### **Crankshaft position sensor CKPS.**

An input is ready for standard pickup sensors used on motorbikes as CKPS.

One outlet of the CKPS should be connected to connector (1) and the other one should be connected to GND (4, 16, 17) following the chart. For system 1 trigger - 2 pick-up is one outlet of the second pick-up should be connected to connector (5) and the other one should be connected to GND (4, 16, 17) following the chart.

Polarity of sensors could be proper. By approaching of rotor fingers the voltage must be positive by departing negative. Negative polarity is set within RACING3.EXE software.

#### **Induction coils IC 1, IC 2, IC 3, IC 4.**

One outlet of induction coil of cylinder 1, 4 should be connected to key switched + 12 V and the other one should be connected to corresponding connector IC 1, 4 (9 or 12). One outlet of induction coil of cylinder 2, 3 should be connected to key switched + 12 V and the other one should be connected to corresponding connector IC 2, 3 (9 or 12).

**Excitation (dwell time) of induction coil** can be set to (short/long). Short dwell time is for induction coil with primary coil resistance less than 2 Ohm. If it is used long time for that one coil, coil can be destroyed. If it is used short time for coil that desire long dwell time, the energy of spark could be small especially in high rpm.

Excitation is set within RACING3.EXE software.

#### **Revolution indicator output TACHO.**

The revolution indicator output is compatible with major part of board devices used on motorbikes. Pulse number for one revolution and correction is set within RACING3.EXE software.

TACHO output should be connected to connector (pin 22).

When TACHO/LAMBDA switch is activated LAMBDA sensor voltage is displayed on the tachometer.

**FUEL PUMP RELAY output.**

Fuel relay activates for about 4 s after the unit is switched on and remains active while the motor is running. One fuel pump relay outlet should be connected to connector (pin 21) and the other one should be connected to key switched + 12V. Connect the switched fuel pump relay circuit following the diagram. !!!BE AWARE OF THE FUEL PUMP POLARITY!!!

**Inhibit input BLOCK 1 and 2.**

One outlet of BLOCK (e.g. from fall switch) should be connected to connector and the other one should be connected to GND (4, 16, 17). If BLOCK switch is activated, the unit blocks ignition. Reverse polarity can be configured within RACING3.EXE software.

**ACTIVATE N<sub>2</sub>O input.**

One outlet of ACTIVATE N<sub>2</sub>O switch should be connected to connector (7) and the other one should be connected to GND (4, 16, 17). If ACTIVATE N<sub>2</sub>O switch is activated, the unit allows N<sub>2</sub>O injection. Reverse polarity of the fall sensor can be configured within RACING3.EXE software.

**START LIMITER input.**

One outlet of START LIMITER switch should be connected to connector (19) and the other one should be connected to GND (4, 16, 17). If START LIMITER switch is activated, the unit adjusts limiter and after deactivation START LIMITER initiates N<sub>2</sub>O injection delay. Reverse polarity of the START LIMITER switch can be configured within RACING3.EXE software.

**CLUTCH MASTER input.**

One outlet of CLUTCH MASTER switch should be connected to connector (8) and the other one should be connected to GND (4, 16, 17). If CLUTCH MASTER switch is activated, the unit blocks ignition for a defined period of time. This provides for higher gearshift without clutch and gas shut-off, thus minimizing the time losses during gear shifting. Blocking time can be adjusted within RACING3.EXE software. Reverse polarity of the CLUTCH MASTER switch can be configured within RACING3.EXE software.

**TACHO/LAMBDA switch input.**

One TACHO/LAMBDA outlet of should be connected to connector (2) and the other one should be connected to GND (4, 16). If TACHO/LAMBDA switch is activated, the unit displays lambda sensor voltage on the tachometer (instead of revolution) Displayed sensitivity:  $0.4 \div 0.9$  V as  $0 \div 12000$  rpm. Reverse polarity of the switch can be configured within RACING3.EXE software.

**N<sub>2</sub>O injection output.**

Maximum Injection valve output current is 10 A (just for a short period of time - about 30 s). The N<sub>2</sub>O is injected only if "N2O enable" in program RACING3.EXE is checked, TPS > 85 %, input ACTIVATE N<sub>2</sub>O is active, start limiter isn't active and revolution is greater than 2000 rpm. N<sub>2</sub>O injection settings as well as delay after ignition are adjusted within RACING3.EXE software. Together with N<sub>2</sub>O supply so-called RETARD is activated – advance reduction. RETARD and its delay settings after ignition are adjusted within RACING3.EXE software. One N<sub>2</sub>O injection valve outlet should be connected to connector (23) and the other one should be connected to key switched + 12V.

**GEAR SHIFT LIGHT indicator.**

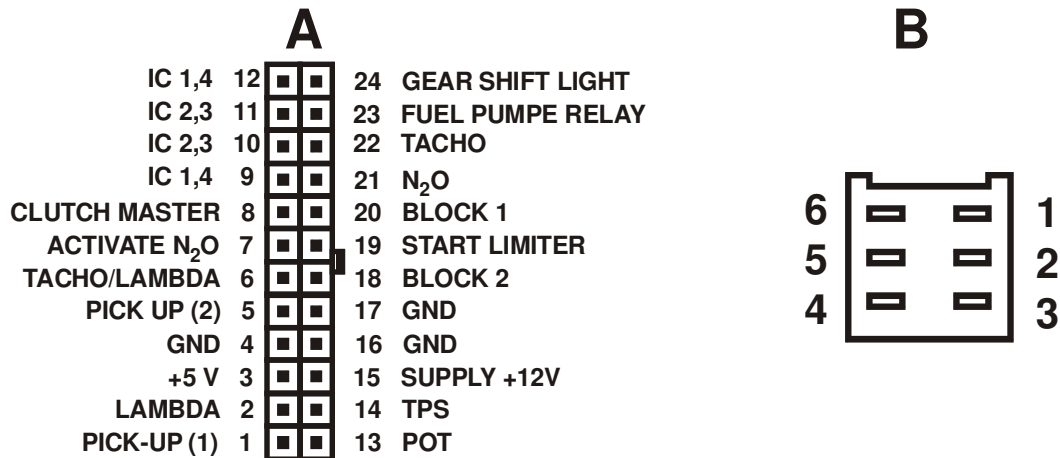
The indicators maximum output current is 5 A (bulb up to 50 W). Gearshift indicator revolution is set within RACING3.EXE software.

One Gearshift indicator outlet should be connected to connector (24) and the other one should be connected to key switched + 12V.

**Outputs and input for SERVO.**

Outputs and input for servo are compatible with most of servo used on motorbikes (e.g.. Yamaha EXUP). Ignition with servo is only done on demand.

**Connector connection (unit view):**

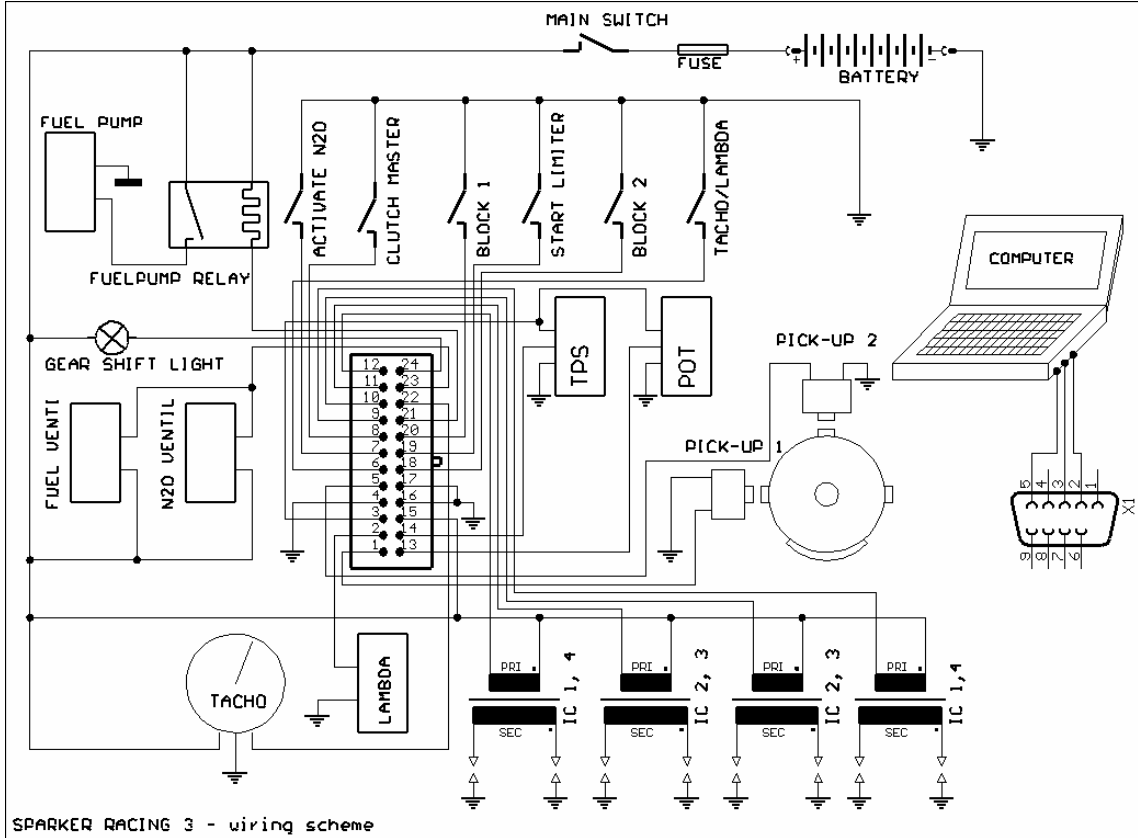


connector A

PIN no.	NAME	DESCRIPTION	SPECIFICATION
1	PICK-UP (1)	position sensor input 1	for two sensor models cyl. 1, 4
2	LAMBDA	LAMBDA sensor input	
3	+5 V	supply for TPS	
4	GND	ground	
5	PICK-UP (2)	position sensor input 2	for two sensor models cyl. 2, 3
6	TACHO/LAMBDA	revolution/lambda indicator switch	
7	ACTIVATE N <sub>2</sub> O	activate N <sub>2</sub> O switch input	
8	CLUTCH MASTER	clutch master input	
9	IC 1,4	induction coil 1,4	15 A
10	IC 2,3	induction coil 2,3	15 A
11	IC 2,3	induction coil 2,3	15 A
12	IC 1,4	induction coil 1,4	15 A
13	POT	potentiometer for start limiter	
14	TPS	throttle position sensor input	
15	+ 12 V	supply voltage + 12V input	8 - 18 V
16	GND	ground	
17	GND	ground	
18	BLOCK 2	inhibit input 2	
19	START LIMITER	start limiter input	
20	BLOCK 1	inhibit input 1	
21	N <sub>2</sub> O	metering N <sub>2</sub> O output	5 A
22	TACHO	revolution indicator output	
23	FUEL PUMPE RELAY	fuel pump relay output	5 A
24	GEAR SHIFT LIGHT	gear shift indicator output	5 A

connector B (for servo)

PIN no.	wire color	NAME	DESCRIPTION
1	white	M	output for motor of servo
2			
3	white	M	output for motor of servo
4	white/red	+5 V	supply of sensor of servo
5	white/blue	STPS	sensor of servo
6	blue	SENSE GND	ground of sensor of servo



## SOFTWARE RACING3.EXE

### Pull down menus

<b>File</b> – includes items	<b>New</b>	- default settings
	<b>Open</b>	- opens data file
	<b>Save</b>	- saves data file
	<b>Print</b>	- prints the current settings
	<b>Exit</b>	- exits the program

Warning!!! Clicking **New** results in automatic default settings of all parameters.

**Port** – includes items **Com1** to **Com10** - selection of communication line  
For PC without COM (USB only) apply adapter USB/RS232.

<b>Device</b> – includes items	<b>Read</b>	- reads data from the unit
	<b>Verify</b>	- compares data in PC with data in the unit
	<b>Program</b>	- sends data to the unit and conducts verification

**Tools** – include items of collective settings

**Language** – language settings: **English, Czech, and German**

<b>Help</b> – includes items	<b>Help</b>	- opens assembly guide (this file)
	<b>About the program</b>	- data on the software (version, date)

### Icons menus



- default settings

Warning!!! Clicking this icon results in automatic default settings of all parameters



- opens data file



- saves data file



- prints the current settings



- see pull down menu **Device**

### Tab sheet Miscellaneous

<b>Starting limiter min</b>	- sets min revolution of starting limiter
<b>Starting limiter max</b>	- sets max revolution of starting limiter

- Limiter** - sets revolution of classic starting limiter
- Clutch master time** - sets ignition switch off period during gear shift
- Clutch master pause** - sets time of insensibility after gear shift
- Gearshift light** - sets revolution of gearshift light
- Excitation long** - sets long excitation of induction coils
- Tachometer 2x** - tachometer output settings
- Switch activation** - input logic settings (if the box is checked the function is activated by switch on input)
- No reading** - reading is not allowed (after programming with this option data cannot be retrieved from the unit)
- Programming after a change** - automatic programming settings (after every change)

**TPS**

Set TPS 0

Set TPS 100

- limit TPS voltage values can be set here [mV]
- measures and sets 0% TPS (supply on, unit connected with PC, no gas)
- measures and sets 100% TPS (supply on, unit connected with PC, full gas)

**File:** - full path of using file

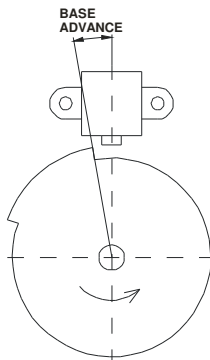
**Tab sheet Advance map**

**Advance map**

TP map includes 100 adjustable advance options (in relation revolution and throttle position). Collective setting of the whole column is possible using the arrows under columns. Collective adjustment of the whole map can be done by collective change tool (+ and – buttons with selection **All**)

When the motor is running and PC connected with the unit current segment in the fuel map is highlighted. Use of collective change tool + and – button without selection **All** - just the current segment will be changed.

- TPS** - option advance map/advance curve
- Base advance** - setting of base advance



**N<sub>2</sub>O tab sheet**

**N<sub>2</sub>O allowed** - software activation of N<sub>2</sub>O dosage controller

- N<sub>2</sub>O**
- N<sub>2</sub>O 1** - initial N<sub>2</sub>O injection
- N<sub>2</sub>O 2** - final N<sub>2</sub>O injection
- Build-up time** - period between initial and final gas injection
- Delay** - delay period after starting limiter activation

- Retard Retard 1** - initial RETARD
- Retard 2** - final RETARD
- Build-up time** - period between initial and final advance reduction
- Delay** - delay period after starting limiter activation

## Tab sheet Servo

**Servo allowed** - software activation of servo controller

### **10 adjustable options for revolution/required voltage of servo position sensor**

Collective adjustment of the whole servo curve can be done by collective change tool (+ and – buttons with selection **All**)

When the motor is running current segment is highlighted in the servo curve. Use of collective change tool + and – button without selection **All** - just the current segment will be changed.

### **Hysteresis – fineness of servo driver steps can be set here**

!!!Warning!!! - in case you set too low value there is a risk of servo oscillation

## Monitor

Monitor is located on the right and lower side of the screen – sensor values and motor operational characteristics can be observed here. Should there be **NO CONNECTION** prompt displayed in the upper right corner, the unit is not connected.

<b>Extended monitor</b>	- monitor extended mode activation Monitor will display voltage of separate sensors and other parameters in this mode.
<b>RPM</b>	- motor revolution [1/min]
<b>TP</b>	- Throttle position [%]
<b>LAMBDA</b>	- Lambda sensor voltage measured [mV]
<b>Advance</b>	- Ignition advance [°]
<b>Blocking 1</b>	- Blocking 1 activation signal
<b>Blocking 2</b>	- Blocking 2 activation signal
<b>Tacho/Lambda</b>	- Display of lambda sensor voltage using tachometer activation signal
<b>Clutch master</b>	- Clutch master activation signal
<b>Start limiter</b>	- Start limiter activation signal
<b>Activate N<sub>2</sub>O</b>	- Hardware activation of N <sub>2</sub> O controller signal (works only after software N <sub>2</sub> O activation)
<b>Servo required</b>	- Required value of servo position sensor
<b>Servo measured</b>	- Measured value of servo position sensor
<b>Number of programming</b>	- Number of times the unit has been programmed (applies only for Extended monitor option)