# SPARKER DC-CDI-P2

SPARKER DC-CDI-P2 RACE is a capacitive ignition unit for road motorcycles. The ignition unit can be programmed via a computer and it is fully tunable as regards ignition timing. It contains an ignition advance curve/map depending on engine revolutions and throttle position. It also contains peripheries such as: tachometer output, three multifunction "power outputs", outputs and input for exhaust valve servomotor, two multifunction inputs. During programming, the ignition unit is connected to a computer via a serial port. A setup application " DCCDIP2.EXE" is included with the ignition unit. Connection is provided via a 20pin connector.

## HARDWARE

**Pick-up system.**
The ignition unit has two channels and it can be used with almost all pick-up systems. Selected pick-up systems are set up directly from a drop-down list in the "DCCDIP2race.EXE" application. Other pick-up systems can be set up using a special procedure in the DCCDIP2.EXE application.

**Supply voltage**
Supply voltage must be within the range from 8 to 18 V. Within this range, the ignition unit is able to optimally control all processes. The ignition unit will be switched off if voltage decreases below 8 V or exceeds 18 V. Supply voltage is connected with the positive pole to outlet no. 13 and with the negative pole to outlets no. 2 and 11.

**Throttle position sensor (TPS) input.**
The input is designed for standard throttle position sensors used in motorcycles. It can accept voltages from 0 to 5 V. Sensor settings for 0 % and 100 % are included in the "DCCDIP2.EXE" application.
TPS is supplied with voltage + 5 V (outlet no. 17) and SENSE GND (outlet no. 16). Sensor output is connected to outlet no. 6.

**Crankshaft position sensor CKPS input.**
An input is ready for standard pickup sensors used on motorbikes as CKPS.
One outlet of the CKPS should be connected to connector (9) and the other one should be connected to SENSE GND (16). See following the chart. For system with two pick-ups should be one outlet of the second pick-up connected to connector (20) and the other one should be connected to SENSE GND (16). See following the chart.

**Crankshaft position sensor (pick-up) inputs.**
Inputs are prepared for standard pick-up sensors (coil-magnet) used in motorcycles. One outlet of the pick-up is connected to the connector (outlet no. 9) and the second outlet is connected to SENSE GND (outlet no. 16). In case of a two-sensor pick-up system, one outlet of the second sensor is connected to the connector (outlet no. 20) and the second outlet is connected to SENSE GND (outlet no. 16).

**Multifunction input 1.**
One outlet of the switch or sensor is connected to the connector (outlet no. 19) and the second outlet is connected to ground. If you activate the switch, a function selected by the "DCCDIP2.EXE" application will be executed. You can select function NONE, KILL SWITCH, CLUTCH MASTER, RETARD and START LIMITER.

**Multifunction input 2.**
One outlet of the switch or sensor is connected to the connector (outlet no. 8) and the second outlet is connected to ground. If you activate the switch, a function selected by the "DCCDIP2.EXE" application will be executed. You can select function NONE, BLOCKING, CLUTCH MASTER, RETARD and START LIMITER.

**Outputs for induction coils IC 1, IC 2.**
One outlet of induction coil IC 1 will be connected to the connector (outlet no. 1) and the second outlet will be connected to ground!  One outlet of induction coil IC 2 will be connected to the connector (outlet no. 10) and the second outlet will be connected to ground!
Warning!!! If you connect the second end of the induction coil to +12 V instead of the ground, the ignition unit will be destroyed.

**Revolution indicator - TACHO output.**

The revolution indicator output is compatible with most of board devices used on motorbikes. Pulse number for one revolution and corrections is set within TCIP4.EXE software. TACHO output should be connected to connector (15).

**Tachometer output.**

The tachometer output is compatible with most dashboard instruments used on motorcycles. The number of pulses per one revolution is set in the "DCCDIP2.EXE" application.

The tachometer is supplied with +12 V against GND. The tachometer input is connected to the connector (outlet no. 15).

**FUEL PUMP RELAY output.**

Fuel relay is switch on while the motor is running, for about 4 s after the unit is switched on and for about 4 sec. after motor has stopped. One fuel pump relay outlet should be connected to connector (3) and the other one should be connected to key switched + 12V. Connect the switched fuel pump relay circuit following the diagram.

**"Power output" 1.**

This is a multifunction output (open-type collector) which can be set via the "DCCDIP2.EXE" application to execute one of pre-defined functions. It is outlet no. 3 in the connector. The instrument is connected with one end to outlet no. 3 and with the second end to + 12 V.

Power output 1 is predefined (default) as a fuel pump relay switch.

**"Power output" 2.**

This is a multifunction output (open-type collector) which can be set via the "DCCDIP2.EXE" application to execute one of pre-defined functions. It is outlet no. 12 in the connector. The instrument is connected with one end to outlet no. 12 and with the second end to + 12 V.

Power output 2 is predefined (default) as a gear-shift pilot light switch.

**"Power output" 3.**

This is a multifunction output (open-type collector) which can be set via the "DCCDIP2.EXE" application to execute one of pre-defined functions. It is outlet no. 14 in the connector. The instrument is connected with one end to outlet no. 14 and with the second end to + 12 V.
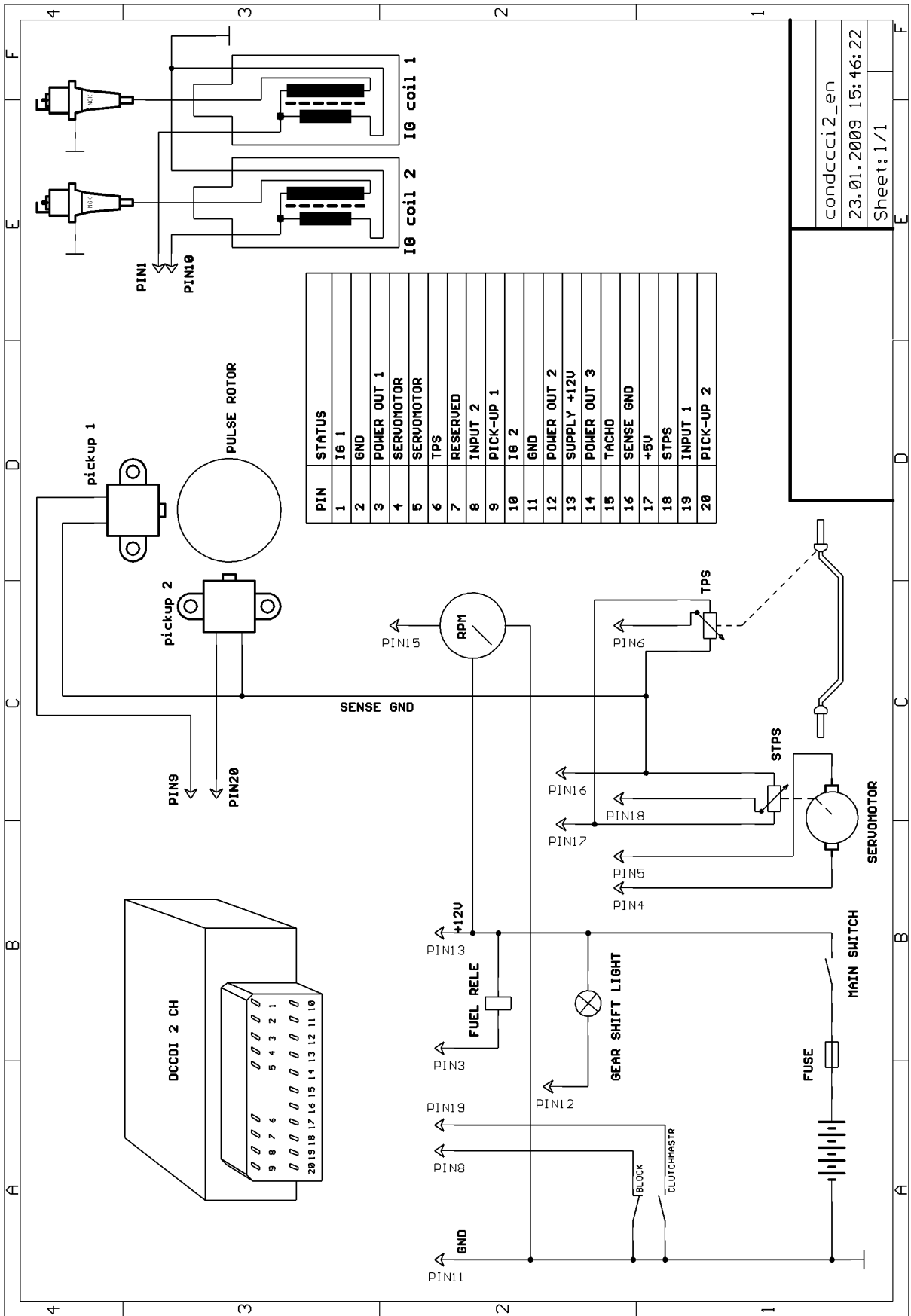
Power output 3 is predefined (default) as a "POWERJET" electromagnetic valve switch.

**Outputs and input for SERVO.**

Outputs and input for servo are compatible with most brush servomotors used on motorcycles.

The servomotor is connected to outlets no. 4 and 5. The wiper of the servo's sensing potentiometer is connected to outlet no. 18. The servo's potentiometer is supplied with voltage + 5 V (outlet no. 17) and SENSE GND (outlet no. 16).

| Outlet | Description | Outlet | Description |
|---|---|---|---|
| 1 | IG 1 (ignition coil 1) | 11 | GND (power ground) |
| 2 | GND (power ground) | 12 | POWER OUT 2 (multifunctional output 2) |
| 3 | POWER OUT 1 (multifunctional output 1) | 13 | SUPPLY +12V (supply voltage input) |
| 4 | SERVOMOTOR (motor of exhaust valve) | 14 | POWER OUT 3 (multifunctional output 3) |
| 5 | SERVOMOTOR (motor of exhaust valve) | 15 | TACHO (tachometer otput) |
| 6 | TPS (throttle position sensor input) | 16 | SENSE GND (ground for sensors) |
| 7 | reserved | 17 | + 5 V output (sensor supply) |
| 8 | INPUT 2 (multifunctional input 2) | 18 | STPS (exhaust valve position sensor) |
| 9 | PICK-UP 1 (pick-up input 1) | 19 | INPUT 1 (multifunctional input 1) |
| 10 | IG 2 (ignition coil 2) | 20 | PICK-UP 2 (pick-up input 2) |

IG coil 1

IG coil 2

NGK

PIN1  PIN10

pickup 1

pickup 2

PULSE ROTOR

PIN9  PIN20

DCCDI 2 CH

| PIN | STATUS |
|---|---|
| 1 | IG 1 |
| 2 | GND |
| 3 | POWER OUT 1 |
| 4 | SERVOMOTOR |
| 5 | SERVOMOTOR |
| 6 | TPS |
| 7 | RESERVED |
| 8 | INPUT 2 |
| 9 | PICK-UP 1 |
| 10 | IG 2 |
| 11 | GND |
| 12 | POWER OUT 2 |
| 13 | SUPPLY +12U |
| 14 | POWER OUT 3 |
| 15 | TACHO |
| 16 | SENSE GND |
| 17 | +5U |
| 18 | STPS |
| 19 | INPUT 1 |
| 20 | PICK-UP 2 |

RPM

PIN15

SENSE GND

TPS

PIN6

STPS

PIN16

PIN18

PIN17

SERVOMOTOR

PIN5

PIN4

+12U

PIN13

FUEL RELE

PIN3

GEAR SHIFT LIGHT

PIN12

PIN19

PIN8

BLOCK

CLUTCHMASTR

MAIN SWITCH

FUSE

GND

PIN11

# SOFTWARE DCCDIP2.EXE

## Pull down menus

**File** – includes items

| | |
|---|---|
| **New** | - sets default values for all parameters. These correspond approx. to a four-cycle engine without a TPS. |
| **Open** | - opens data file |
| **Open from exe dir** | - opens data file from location of aplication |
| **Save** | - saves data file |
| **Save to exe dir** | - saves data file to location of aplication |
| **Print** | - prints the current settings of the current tab sheet |
| **Print all** | - prints the current settings all tab sheets |
| **Exit** | - exits the program |

**Port  -** contains items **Com1** to **Com 20** and **Com auto** - selection communication lines, manually or automatically. For PCs which only have a USB port, it is necessary to use the adapter  USB/RS232.

**Ignition    -** includes items

| | |
|---|---|
| **Read** | - reads data from the unit |
| **Verify** | - compares data in the PC and in the unit |
| **Program** | - sends data to the unit and verifies it |

**Tools**       - include items of collective settings

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

**Help –** includes items

| | |
|---|---|
| **Help** | - opens assembly guide (this file) |
| **About the program** | - information about the program (version, date) |

## Icons menus

- default settings
Warning!!! Click this icon to automatically set all parameters to their default values.

- opens data file

- saves data file

- prints the current settings

Read  Verify  Program  - see pull down menu **Device**

## Tab sheet Miscellaneous

| | |
|---|---|
| **Start limiter** | - sets revolution of classic starting limiter. Value of revolutions, from which ignition is switched off, if it is activated by one of the "Starting limiter" function multifunction inputs. |
| **Limiter** | - sets revolution of classic limiter. Value of revolutions, from which ignition is switched off |
| **Clutch master time** | - sets ignition switch off period during gear shift |
| **Clutch master pause** | - sets time of insensibility after gear shift. This is the protective period during which no other requirements are accepted from the clutch master sensor. This prevents the undesirable switching-on of the clutch master, e.g. when the gear-shift lever returns. |
| **Retard** | - setting of value for reduction advance by retard |
| **Revolutions without ignition** | - sets number of starting revolution without ignition |

**No reading**         - reading is not allowed (after programming with this option data cannot be read from the unit)

**Input 1** - choice of multifunctional input 1 function
Input 1 may have the following functions:
- Off:  The input has no function.
- Kill switch:  If the input is grounded, ignition is not performed.
- Clutch master:  After activation (switch to ground), ignition is switched off for clutch master time.
- Retard:  If the input is grounded, the ignition advance decreases about preset value.
- Starting limiter: If the input is grounded, revolution limiters are reconfigured according to the "Start limiter" value.

**Input 2** - choice of multifunctional input 2 function
Input 2 may have the following functions:
- Off:  The input has no function.
- Blocking:   If the input is not grounded, ignition is not performed.
- Clutch master:  After activation (switch to ground), ignition is switched off for clutch master time.
- Retard:  If the input is grounded, the ignition advance decreases about preset value.
- Starting limiter: If the input is grounded, revolution limiters are reconfigured according to the "Start limiter" value.
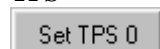
- Here, absolute limits of the throttle position sensor (TPS) are set.
Using the button TPS -> 0%, it is possible to insert a value for the zero throttle.
Using the button TPS -> 100%, it is possible to insert for a fully open throttle.
Values can also be inserted manually. After determining the limit values, it is necessary to store these values in the ignition by pushing the "program" button, otherwise they will not be executed.

**TPS**         - here, absolute limits of the throttle position sensor (TPS) are set

Set TPS 0         - using the button TPS -> 0%, it is possible to insert a value for the zero throttle

Set TPS 100         - using the button TPS -> 100%, it is possible to insert for a fully open throttle

Values can also be inserted manually. After determining the limit values, it is necessary to store these values in the ignition by pushing the "program" button, otherwise they will not be executed.

## Tab sheet Bike

**Motorbike type**         - selection of a pick-up system
**Pulses per revolution**         - rough setting of the tachometer output
**Correction**         - percentual correction of the tachometer output value
**Inverse polarity pick-up 1**         - allows the setting of opposite polarity (first negative) on pick-up 1
**Inverse polarity pick-up 2**         - allows the setting of opposite polarity (first negative) on pick-up 2

**Specification of synchronization**         - method of synchronization (consult with the manufacturer)
- channel 1 - assignment of an ignition position for the first channel
- channel 2 - assignment of an ignition position for the second channel
- setting of the number of ignitions per one revolution
The settings in this menu are only active if a "special" type motorcycle is selected.

**File:**         - full path of using file
**Number of programming:**         - number of times the unit has been reprogrammed
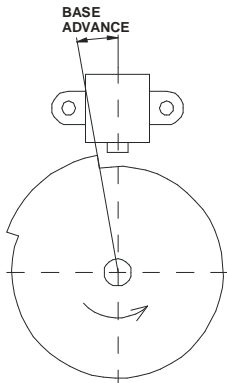**Correction**         - frequency adaptation of pick-up input

## Tab sheet Advance map

**Advance map**

The ignition advance map contains 100 adjustable points depending on revolutions and on throttle position. It is possible to collectively set whole columns using arrows under the columns. Collective setting of the whole ignition advance curve can be done using the collective change tool (+ and - buttons with the "All" selection).

When the motor is running, the current segment in the ignition advance curve/map is highlighted (in green). When the collective change tool (+ and - buttons without the "All" selection) is used, only the current segment will be changed. Individual channels can be corrected with a value in the "Correction for cyl. 1,2" cells.

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

BASE
ADVANCE

**.... i.e. you must enter such an ignition advance value in the "base ignition advance" field which equals to the "base advance" angle (base advance – see the image). The image depicts the top dead centre of the given cylinder. It is recommended to check whether the current advance corresponds with the setting made using the stroboscope lamp.**


## 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.


## Tab sheet Power out (three equivalent power outputs)

**Power output mode**
**1) Off**                  The power output will not be activated by anything.
**2) Fuel pump**            The power output will be activated if RPM is higher than  0 RPM.
**3) Pilot light**          The power output will be activated if RPM is higher than the preset "RPM" value.
**4) Power Jet Honda**      The power output will be active according to the truth table; one TPS levels; two RPM levels. This is corresponding to Honda RS125.
**5) Special**              The power output will be active according to the truth table; two TPS levels; three RPM levels.

## **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 with PC** prompt displayed in the upper right corner, the unit is not connected.

| | |
|---|---|
| **RPM** | - engine revolution [1/min] |
| **TP** | - throttle position [%] |
| **Advance** | - ignition advance [°] |
| **Pick up 1** | - display whether pick up 1 is running or stopped |
| **Pick up 2** | - display whether pick up 2 is running or stopped |
| **U** | - supply voltage [V] |
| **Servo required** | - required value of servo position sensor |
| **Servo measured** | - measured value of servo position sensor |
| **Motor off** | - blocking activation signal |
| **Clutch master** | - clutch master activation signal |
| **Retard** | - retard activation signal |
| **Start limiter** | - start limiter activation signal |
| **Kill switch** | - kill switch activation signal |
| **Power out 1** | - condition of power output 1 |
| **Power out 2** | - condition of power output 2 |
| **Power out 3** | - condition of power output 3 |
| **COM=** | - number of the current communication port |
| **Programming after change** | - activation of the "programming after change" function. If it is selected, any changes in the software application will be immediately saved in the unit. |