

SPARKER DC-CDI-P

Programmable capacitive ignition for motorcycles - detailed description

DCCDIP is a single channel (= with one output for the ignition coil) capacitive type ignition. The ignition is designed especially for classic pick-up system of crankshaft position, which is illustrated in the following diagram (one pick-up, one pulse lobe). The picture of pick-up system is shown in the top dead center position of the engine. Apart from this classic pick-up system the unit can be used for other types of pick-up systems listed in the software. They are for example XT600, KLR600, CBF250 and others. Ignition system contains two complete settings A and B, between which it is possible to switch during engine operation.

1. Description of hardware and connecting plan.

The ignition is suffused by PU plastic into plastic box. The ignition is terminated with a harness of wires with connectors (by default 2 + 3 + 4 pins connectors 2,8).

The dimensions of the box are 67 x 85 x 25 mm. Weight is 240 g. The wires are color coded as follows:

yellow	the pick-up sensor of crankshaft position CKPS
blue	ground (for the pickup)
green	input 1
black	input 2
violet	the output of the gear shift light
red	power +12 V
blue	ground (power)
orange	output into the induction coil IC
yellow-green	output to the tachometer TACHO

Pick-up sensor of crankshaft position CKPS (yellow)

The input is ready for standard pickup sensors (inductive) used on motorcycles. The Pickup is connected to one wire to the input (yellow) and the other to the ground for pick-up (blue).

Input 1 (green)

Multifunction input 1. A function preselected (using the default software DCCDIP.EXE) is activated by grounding of this input.

Input 2 (black)

Multifunction input 2. A function preselected (using the default software DCCDIP.EXE) is activated by grounding of this input.

Supply voltage +12 V (red)

Supply voltage is nominally 14 V. It must be in the range of 8-16 V. In this range the unit is able to provide optimal control of all processes. If supply is higher than 20 V, the unit will turn off the ignition.

Induction coil IC (orange)

The outputs of induction coils are designed for standard induction coils for capacitive ignition used on motorbikes (the resistance of primary coil approx. 0.5 Ohm). **The induction coil must always be connected to the ground to prevent damaging the ignition !!!**

Tachometer output TACHO (green / yellow)

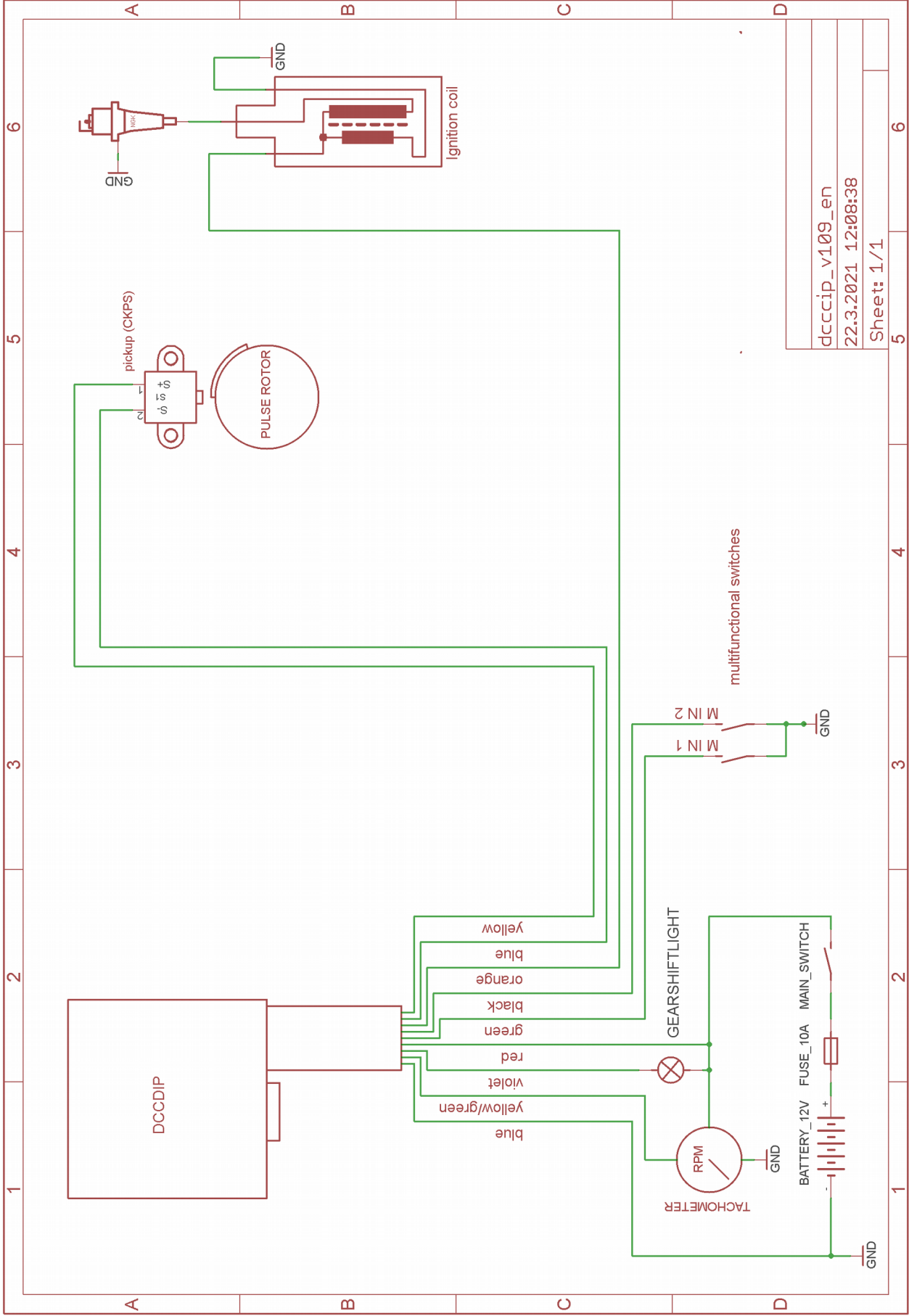
The tachometer output is compatible with most on-board devices used on motorbikes. The output provides impulses with a voltage of 12V with the ratio 1:1. The setting of the TACHO output (number of pulses per revolution and correction) can be selected in software DCCDIP.EXE. Setting the TACHO output (number of pulses per revolution and correction) can be selected in software DCCDIP.EXE. **Output TACHO must never be connected to an output of the ignition coil or to the +12 V!!**

The output for a gear shift lamp (violet)

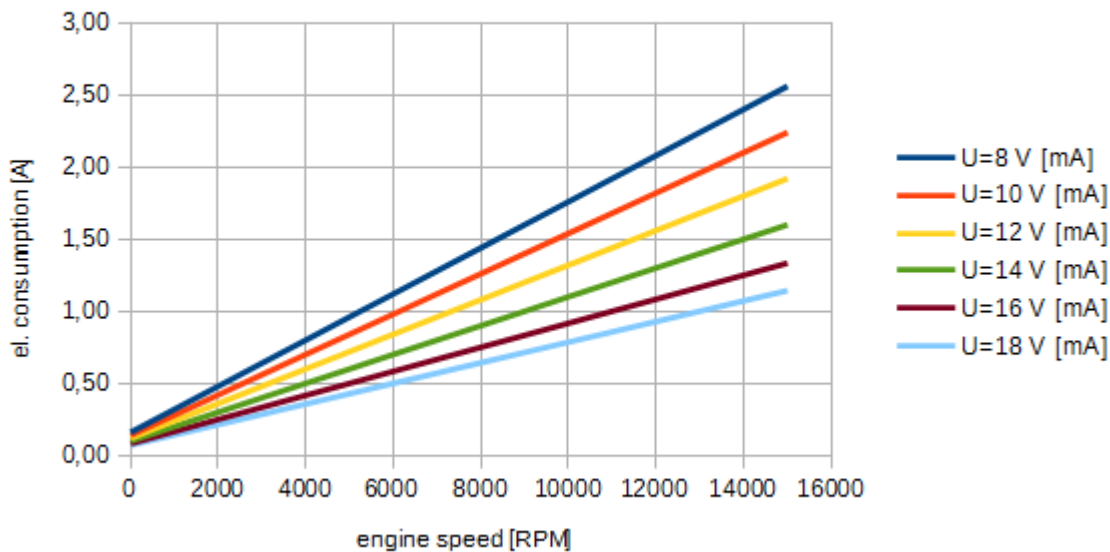
Can also be used to control the exhaust throttle with electromagnet. The current passing through the electromagnet can be modified by using pulse width modulation (PWM). The output can be loaded with a current up to 5 A (50 W lamp). Settings of the gear shift lamp or electromagnet (speed, polarity and PWM) can be chosen in the software DCCDIP.EXE. The gear shift lamp or electromagnet should be connected according to the diagram with one output to the connector (purple) and the other to switched +12 V.

Connection to a PC.

The connection to the PC is realized using a 9-pin serial port (COM).



DCCDIP - dependency of el. consumption to engine speed and to supply voltage



2. Software DCCDIP.EXE

Pull down menus

File - includes items	New	- default settings
	Open	- opens data file
	Open from exe dir	- opens a data file from a directory where it is placed the setting software.
	Save	- saves data into a data file
	Save to exe dir	- saves a data file into a directory where it is placed the setting software.
	Print	- prints the current settings
	Exit	- exits the program

Attention!! When selecting the item "New", all parameters are automatically set to default values.

Port - includes items	Com offline	- selection off the communication line
	Com auto	- communication line is automatically selected by the software
	Com (X)	- manual selection of communication line





Ignition - includes items	Read	- reads data from the unit
	Verify	- compares data in PC with data in the unit
	Program	- sends data to the unit and conducts verification
	Reset	- executes reset of unit (the same as switch off and switch on)
	Upload	- opens web site for firmware exchange

Tools - Contains the tools for setting of the advance. There is also possible to activate utility for record of monitored values.

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

Help – includes items	Help	- opens web site with assembly instructions (this file)
	About the program	- information about the program (version, date)

Icon menu

	- Default settings Caution!	Clicking this icon sets all parameters to the default values.
	- Open the data file	
	- Save the file data	
	- Print the current settings	



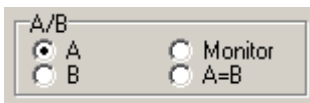
- Step back - return to the previous setting



- Step forward - the abolition step back



- See pull down menu Device



- selection of settings A or B.

- A/B** - here's a switch to determine the setting of the set A or B.
- A** - possibility to set values of settings A (RPM, advance, RPM limiters, gear shift light, clutch master etc.).
- B** - possibility to set values of settings B (RPM, advance, RPM limiters, gear shift light, clutch master etc.).
- Monitor** - is possible to set settings which is currently active in unit (RPM, advance, RPM limiters, gear shift light, clutch master etc.). This is possible only when unit is on-line.
- A=B** - will copy values from settings A to settings B.

Setting elements

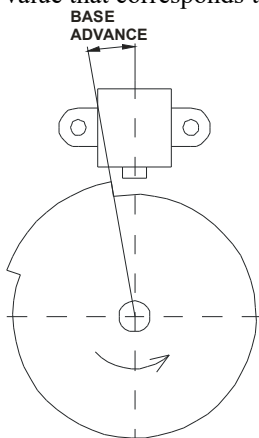
Advance curve depending on the revolutions.

Setting the advance curve is possible in several ways:

- by typing Individual values directly into the edit boxes of the PC keyboard.
- using graphic tools up/down (to the right of the value of the edit box).
- by pressing F4 and F5. F4 key has the same function as the key “-” F5 key has the same function as the “+”.
- by dragging and sliding the highlighted points on the graph using the cursor on the screen.
- by using the scroll wheel of the mouse. Double-clicking the edit box to activate the option to change scrolling. With the engine running the current segment is highlighted in the advance curve in green.
- pomocí tlačítek +/- . Tato volba umožňuje měnit v režimu „za chodu“ pouze aktivní hodnotu (políčko je zelené) nebo je-li aktivována volba „All“ posunovat celou křivku a to v režimech za chodu i v klidu.
- By using + / - buttons. This option allows you to change the regime "running" only active value (the green box) or if it is activated as selecting "All" to move the entire curve in modes "running" and “at rest”.

Number of points - number of points of advance curve. Ignition can use up to 15 points adjustable revolution / advance.

Base advance - the angular difference between the position when Pick-up sensor of the crankshaft position is directed to the end of the pulse lobe and the position of the top dead center. (see angle base advance in the picture at the beginning of this manual). **This value is always determined by the mechanical constitution of the pickup system and software settings can not be changed!!** The "Base advance" has not been intended to change the basic advance, but is it necessary to type in the value that corresponds to the physical condition of the engine.



Up to the first revolution point of advance curve unit ignites at the value of base advance (end of the pulse lobe). The exception is the system "start of lobe" that can ignite at the start of lobe.

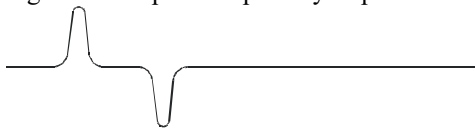
For speeds lower than the first point of advance curve the point of ignition advance therefore can not be set. This point is determined by the mechanical design of the pick-up system!! The first revolution point of the curve in most cases should be chosen above idle speed!!

In case of uncertainties regarding the construction of the pick-up systems and their functioning unit DCCDIP you can contact us.

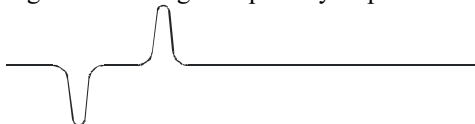
Selection of polarity of pulses from the crankshaft position sensor CKPS

The pick-up system produces positive and negative pulses. Depending on the polarity of the pick-up comes a positive pulse at the start of the pulse lobe and a negative on its end (positive polarity) or inverted (negative polarity). See the pictures below. The ignition can handle pulses of both polarities. Any of them can be set with software DCCDIP.EXE.

Signal with a positive polarity of pulses:



Signal with a negative polarity of pulses:



If the polarity can not be determined in advance, you can use the third option "Selfsearch". With this option, you will find the polarity of the ignition of pulses itself. However, this option may bring some problems, especially for engines without starter. Running of the pick-up and the polarity are indicated by the ignition on the monitor. When selecting the wrong polarity the ignition stops to ignite and monitor this indicates a red background of the data on polarity.

Input 1 (green)

On this multifunction input can be chosen these functions:

- Off** - no function.
- Kill switch** - if the input is grounded, the unit blocks the ignition. The function status is indicated on the monitor.
- Clutch master** - when connected to ground, the unit turns off the ignition for the required time (quickshifter).
- Curve B** - if the input is grounded, the unit uses the settings parameters from the set B.
- Start limiter** - if the input is grounded, the unit uses instead of normal limiter starting limiter.

Input 2 (black)

On this multifunction input can be chosen these functions:

- Off** - no function.
- Blocking** - If the input is not grounded, the unit blocks the ignition. The function status is indicated on the monitor.
- Clutch master** - when connected to ground, the unit turns off the ignition for the required time (quickshifter).
- Curve B** - if the input is grounded, the unit uses the settings parameters from the set B.
- Start limiter** - if the input is grounded, the unit uses instead of normal limiter starting limiter.

Choice of Pick-up system - selecting the type of pickup system of crankshaft position.

- Standard** - classic pickup system one pulse lobe. Base advance is at end of pulse lobe.
- Honda CBF250** - pickup system with two pulse lobes. Base advance is at end of long pulse lobe.
- Husaberk SEM** - inside generator pickup system used on motorcycles Husaberk with ignition SEM.
- KTM 4T SEM** - inside generator pickup system used on motorcycles KTM with ignition SEM.
- Suzuki DR650** - pickup system with two pulse lobes. Base advance is at end of long pulse lobe, but start advance is at begin of short lobe.
- Suzuki Freewind** - pickup system with two pulse lobes. Base advance is at end of long pulse lobe.
- 2T SEM** - inside generator pickup system used on two-stroke motorcycles with ignition SEM.
- Start of lobe** - classic pickup system with one pulse lobe. Base advance is at begin of pulse lobe.

Use - determines if unit will use only positive pickup signals or only negative signals or both.

The number of ignitions per revolution - the setting of the configuration of the engine.

- 1 ignition per revolution - for one cylinder, parallel twin cylinder, twin cylinder boxer (1x 360 °).
- 2 ignitions per revolution - twin cylinder (2x 180).
- 3 ignitions per revolution - three-cylinder (3x 120 °).
- 1 ignition per two revolutions - the single cylinder sensor system on the cam (1x 720 °).

Spark possible before lobe

- without this selection is maximal available advance limited by first edge of virtual lobe. With this selection is possible to control advance also before first edge of virtual lobe. Virtual lobe is 360° in this case. We recommend to use it only in exceptional cases. This setting can cause instability of advance, mainly at low engine speed.

- No polarity check** - without this setting is polarity of pickup signal checked. If polarity is wrong - unit will stop ignitions. With this setting will polarity not checked.
- Lower advance by start** - advance will be retarded under 500 RPM. Retardation time is percentual part of time of pulse lobe.
- Max length of virtual lobe** - if time of virtual lobe is longer than setting value - unit will block ignition. This is software protection against back-kick during starting.
- Ignition every other revolution (4 cycle)** - if unit find repeated oscillations in engine speed (difference between compression revolution and non-compression revolution) - it will ignites only in compression revolution.
- Starting limiter** - setting revolutions for starting revolution limiter.
- Soft limiter** - setting revolutions for soft revolution limiter (omission 2 ignitions from 3).
- Limiter** - setting of revolutions for revolution limiter.
- Clutch master time** - time adjustment clutch master (quickshifter).
- Clutch master pause** - setting up the time of insensivity the clutch master (quickshifter).

Multifunctional input 1 (green)

This multifunctional input can be set for several functions. Function is activates by connection of input to ground. Status of input (grounded or not grounded) is indicated. Status of preselected function is indicated in on-line monitor.

- Off** - no function.
- Kill switch** - ignitions will be stopped when input will be connected to ground.
- Clutch master** - ignitions will be stopped for demanded time when input will be connected to ground (quickshifter).
- Curve B** - advance curve B will be used when input will be connected to ground.
- Start limiter** - start limiter will be activates when input will be connected to ground.

Multifunctional input 2 (black)

This multifunctional input can be set for several functions. Function is activates by connection of input to ground. Status of input (grounded or not grounded) is indicated. Status of preselected function is indicated in on-line monitor.

- Off** - no function.
- Block** - ignitions will be stopped when input will be diconnected from ground.
- Clutch master** - ignitions will be stopped for demanded time when input will be connected to ground (quickshifter).
- Curve B** - advance curve B will be used when input will be connected to ground.
- Start limiter** - start limiter will be activates when input will be connected to ground.

- Tachometer output** - determines behavior of tachometer output.
- Pulses for revolution** - output is possible to set for 0-6 pulses per one revolution. There is possible to set choice "Pickup". In this case will tachometer output copy signal from pickup.
- Correction** - there is possible to correct tachometer signal +/- 60%.

- Power out** - here you can set the parameters of the power output "gear shift light".
- Gear shift light** - is the value of revolutions per minute at which an output is activated (connect to ground).
- Reverse polarity** - with this setting the output is on the contrary, is disconnected from the ground.
- PWM** - is the value to how many % will be reduced by the current passing through the light after a time of 0.2 s after the activation of the output. During the first 0.2 sthe output is switched with 100% duty cycle.

- Number of programming:** - number of programming of the unit.
- Hour meter** - hour/minute counter when engine is running.
- No reading** - by setting this option is impossible to read out the data, the data can only be reprogrammed.
- Programming after change** - setting of automatic programming (will program after every change made in the software).

Monitor

Here you can watch the sensor values and motor operational characteristics.

- No connection with PC** - the unit is not connected to the communication line.
- COM** - current communication line
- U** - supply voltage [V]
- Input 1 to ground** - signaling if multifunctional input 1 is activated (grounded).
- Input 2 to ground** - signaling if multifunctional input 2 is activated (grounded).
- RPM** - engine speed [1/min]
- ADVANCE** - current ignition advance and maximal achievable advance. [°]

Pick-up (CKPS)	- signaling the pick-up sensor operation (green highlighted when pickup signals are received).
Polarity of CKPS	- signaling of pickup polarity (positive/negative) and error of pickup polarity.
Kill switch	- signaling of blocking of the ignition if it is selected and active choice "kill switch"
Motor off:	- signaling of blocking of the ignition if it is selected and active choice "blocking"
Used curve	- signaling that the preference (A or B) is active
Clutch master	- indication of whether the function "Clutchmaster" is active
Start limiter	- indication of whether the function "Start limiter" is active
Limiter	- signaling whether the function "revolution limiter" is active
Gear shift light	- signaling whether the function "gear shift" is active

Tests

Ignition	- by activation of the button (only possible at rest) is the one ignition invoked.
Pilot light	- by activation of the button (only possible at rest) is for 0,5s invoked the output „gear shift light“.
RPM	- by activation of the button (only possible at rest) are for 0,5s set on the tachometer output the revolutions that are listed in the edit box below the button (to change this value it is necessary to program the ignition).