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USER MANUAL
ZeelProg PDCIS-MS01

Supported control units: **PDCIS-MS01**

ZeelProg is PC application for programming ZEELTRONIC engine *control units*.
For programming special PC-USB-HRS programmer is needed.

- ***ZeelProg*** automatically detects PC-USB-HRS programmer connection and enables all functions (without PC-USB-HRS programmer, ***ZeelProg*** application is locked).
- ***ZeelProg*** automatically detects type of engine *control unit* connected to PC-USB-HRS programmer.

TECHNICAL DATA

PDCIS-MS01 is twin channel DC/CDI specially designed to run with MSD total loss trigger pickups, or HALL sensors.
It has 2 switchable ignition maps, latching stop. It is programmable with PC.

- minimum revs	200 RPM
- maximum revs	10000 RPM
- minimum supply voltage	9 Volts
- maximum supply voltage	17 Volts
- recommended power supply voltage	12÷15 Volts
- stand by current draw	0,017 Amp
- idle current draw	0,35 Amp
- max current draw	1,5 Amp
- output energy	80mJ

Circuit is protected against reverse supply voltage (wrong connection).
CDI constantly monitoring power supply voltage and cuts ignition when power supply voltage goes above 20 Volts for 1 second.

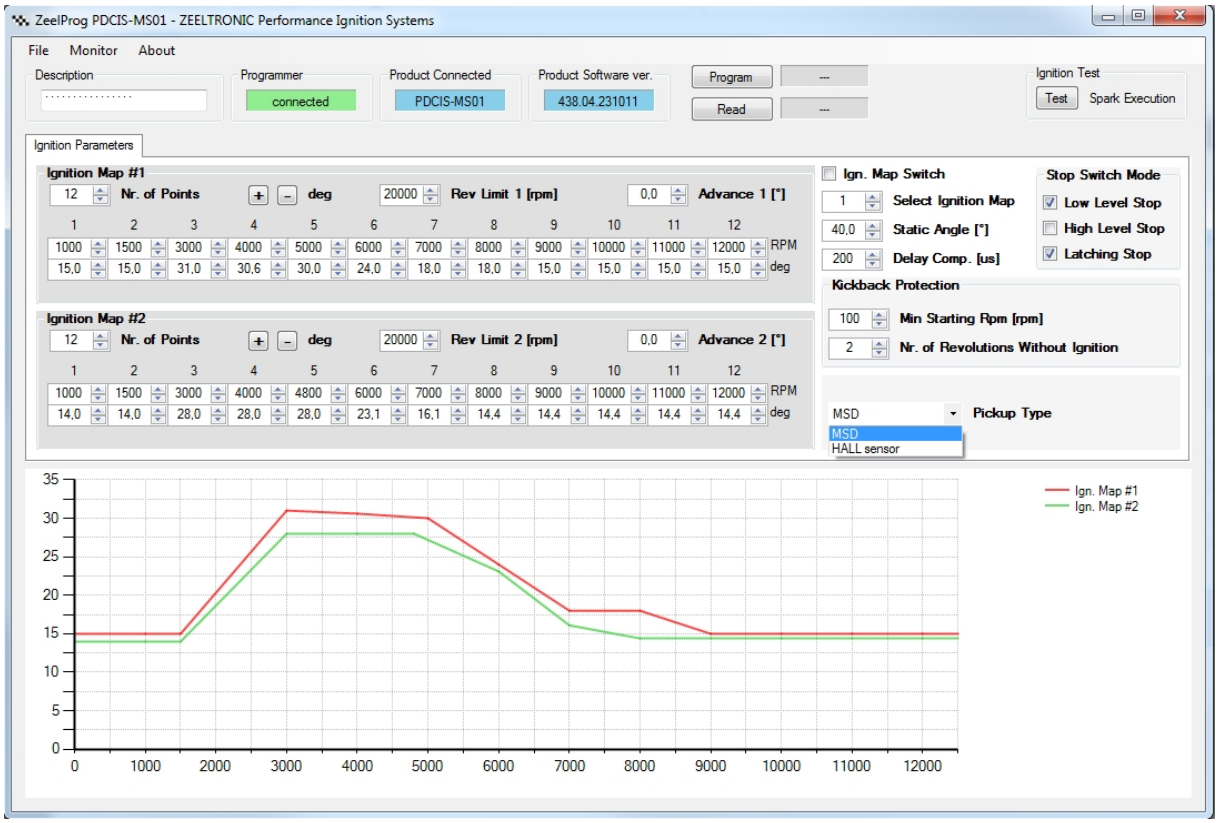
Very important!
Resistor spark plugs must be used, because they produce less electromagnetic disturbances.

Danger of electric shock!
Avoid connecting PDCIS to power supply, before connecting to ignition coil. High voltage is generated and touching free wires can cause electric shock, or damage the unit.

ZeelProg SOFTWARE

Software can be downloaded from our web site:
http://www.zeeltronic.com/page/zeelprog.php

ZeelProg application can be installed on Windows XP/Vista/7/8/10/11.

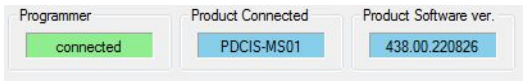


ZeelProg USER INTERFACE

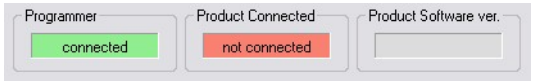
Auto detection

Zeelprog automatically detects USB Programmer connection and type of *control unit*.

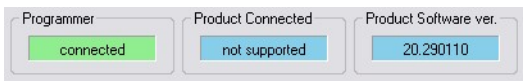
⇨ Programmer connected, product (*control unit*) connected:



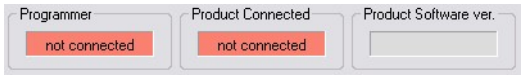
⇨ Programmer connected, product (*control unit*) not connected:



⇨ Programmer connected, product (*control unit*) not supported:

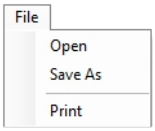


⇨ Programmer not connected, product (*control unit*) not connected:



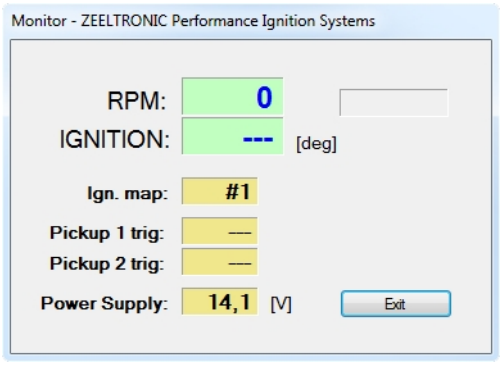
Menu structure

⇨ **File menu** is active when PC-USB-HRS programmer is connected



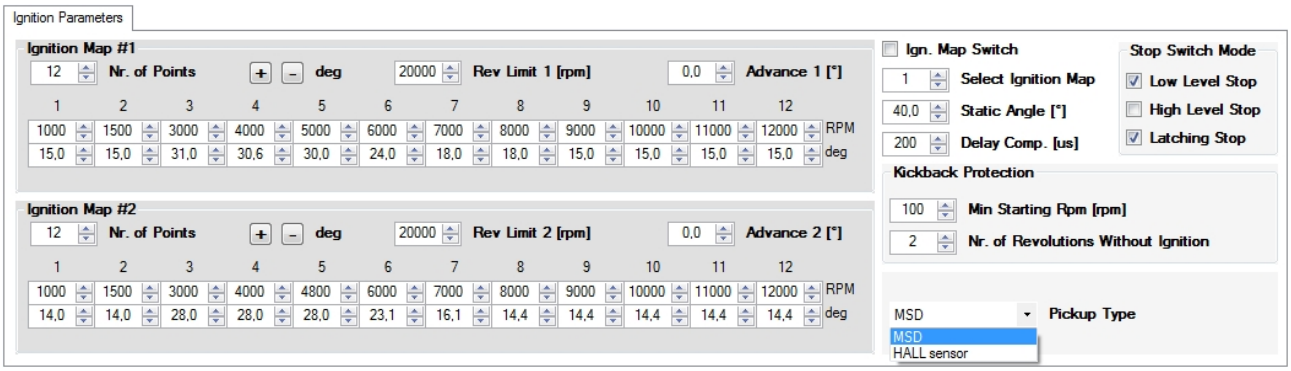
Open → Open an existing *.zee file
Save As → Save all parameters to *.zee file
Print → Print ZeelProg screen with all parameters and charts

⇨ **Monitor** is active when *control unit* is connected to PC-USB-HRS programmer.
Clicking on the **Monitor** opens Monitor window.



⇨ Clicking on **About** opens About window and show some basic information about ***ZeelProg*** application.

Ignition Parameters



- ⇨ **Nr. of Points** for each ignition map can be set from 4 to 12.
- ⇨ **RPM** of each ignition point can be set from 500 rpm to 20000 rpm in 100 rpm steps.
- ⇨ **deg**...advance of each ignition point can be set from 0 deg to 85 deg in 0,1 deg steps
- ⇨  ...increasing, or decreasing advance of all ignition points in the ignition map
- ⇨ **Advance 1**...advances, or retards ignition advance of ignition map #1, from -10 deg to 10 deg in 0,1 deg steps. Positive value advances and negative value retards.
- ⇨ **Advance 2**...advances, or retards ignition advance of ignition map #2, from -10 deg to 10 deg in 0,1 deg steps. Positive value advances and negative value retards.
- ⇨ **Rev limit 1**...rev limit for ignition map #1...limits maximum revolutions.
- ⇨ **Rev limit 2**...rev limit for ignition map #2...limits maximum revolutions.
- ⇨ **Ignition Map. Switch**...enables, or disables ignition map switch. When checked, ignition map can be selected with switch.
- ⇨ **Select Ignition Map**...selection is active only when **Ignition Map Switch** is not checked.
- ⇨ **Static Angle** is pickup advance position from TDC (Top Dead Centre)
- ⇨ **Delay Compensation**...ensure correct ignition angle through whole rev range. Default value is 30us.
- ⇨ **Stop Switch Mode: Low Level Stop**... engine stops when low level signal (when stop switch connected to the ground)
- ⇨ **Stop Switch Mode: High Level Stop**... engine stops when high level signal (when stop switch is opened)
- ⇨ **Stop Switch Mode: Latching Stop**... engine stops with short push on stop switch (when latching stop enabled)
- ⇨ **Min Starting RPM**... minimal RPM for starting.
- ⇨ **Nr. of Revolutions Without Ignition**...number of revolutions without ignition at starting.
- ⇨ **Pickup Type**... select MSD, or HALL sensor pickup.

PROGRAMMING AND SETTING NEW PARAMETERS

➲ While programming or reading, *control unit* does not need to be connected to power supply, because it is supplied through PC-USB-HRS programmer.

Changing control unit parameters

① Read parameters from connected *control unit*, by pressing **Read** button.

Progress bar indicate read and verify process.

Successful reading is indicated as: 

Error while reading is indicated as: 

If error occurs, then repeat reading.

② Change parameters

③ Program parameters to connected *control unit*, by pressing **Program** button.

Progress bar indicate program and verify process.

Successful programming is indicated as: 

Error while programming is indicated as: 

If error occurs, then repeat programming.

Make new *.zee file without connecting control unit

① Connect PC-USB-HRS programmer to PC.

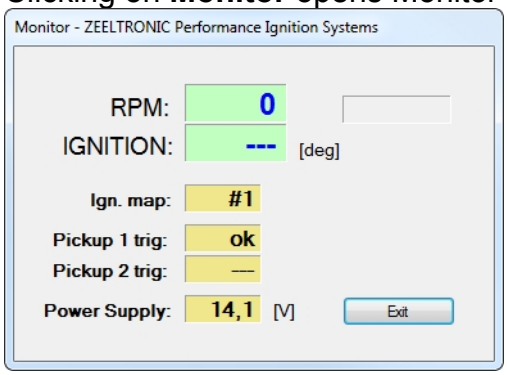
② Set parameters

③ Save parameters by clicking **Save As** from **File menu**.

MONITOR FUNCTION

⇨ **Monitor** function is active when *control unit* is connected to PC-USB-HRS programmer.

Clicking on **Monitor** opens Monitor window.



⇨ Monitor shows engine revolution, ignition advance angle, selected ignition map, rev limit activation, pickup signal test and power supply voltage.

Pickup trig must be “ok” when pickup is connected and magnet is close to the pickup.

MEASURING STATIC ANGLE

Measuring correct static angle is very important. Wrong static angle will cause inaccurate ignition advance. If static angle is programmed larger than mechanical static angle ignition advance will be smaller than programmed, or vice versa.
The most accurate procedure of measuring static angle is with dial gauge and strobe light.

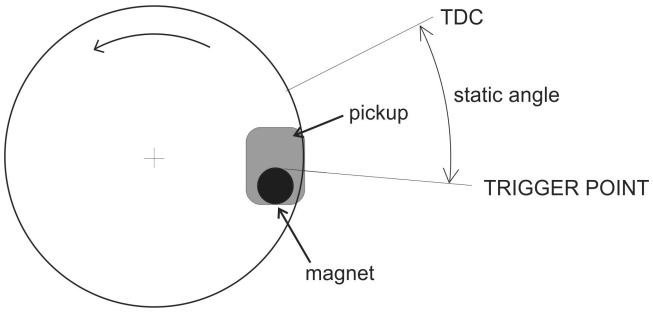
Recommended static angle is between 35 to 40 deg.

Procedure applies to single and multiple cylinder engines. If you have a multi cylinder engine with multple pickups it is recommended (but not required) that you perform this procedure on each cylinder/pickup pair for most accurate timing.

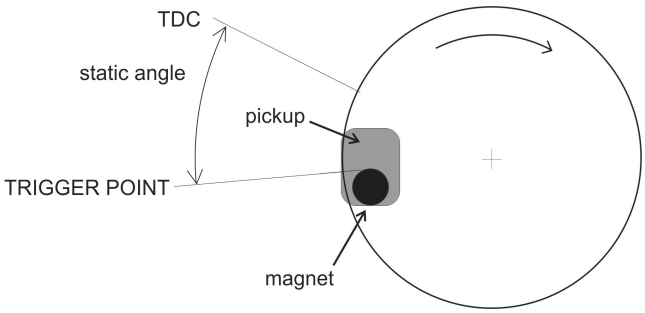
Necessary tools:
- strobe light
- dial gauge

Follow the procedure:
Measure approximate static angle with a degree wheel, just to have starting point...look at the drawings below.

Counterclockwise rotation:



Clockwise rotation:



- program CDI with measured approximate static angle
- program CDI with flat ignition curve...16 deg advance is suitable for most engines.

- find information about engine stroke and conrod length
- convert programmed flat ignition advance angle to millimetres

Example:
α =16 deg (ignition advance)
L=110 mm (conrod length)
R=54/2=27 mm (engine stroke divided by 2)
T=1,3 mm (calculated ignition advance in mm)
Equation for calculating from degrees to millimetres:

$\alpha = \text{ignition advance in degrees}$
$T = \text{ignition advance in mm}$
$R = \text{engine stroke divided by 2 in mm}$
$L = \text{conrod length in mm}$

$$T = L + R \cdot (1 - \cos\alpha) - \sqrt{L^2 - (R \cdot \sin\alpha)^2}$$

Downloadable spreadsheet is available on request.

- remove sparkplug from cylinder head and mount dial gauge in cylinder.
- find TDC (Top Dead Centre)
- rotate engine backwards (opposite from running engine rotation) to calculated advance in millimetres (in example above it is 1,3 mm) and make marks on rotor and stator
- remove dial gauge and install sparkplug back in cylinder head
- start engine and run at constant speed of 3000 rpm to 4000 rpm
- use a strobe light to check alignment of marks on rotor and stator
- adjust static angle with programmer to align marks on the rotor and stator

Result of above procedure is very accurate static angle.
Important!

- Static angle is reference point for CDI to calculate delay for programmed ignition advance.
- Static angle has to be greater then maximum ignition advance!
- Example - If maximum advance in ignition map is 30 deg, then static angle has to be at least 31deg.
- Very large static angles are not a good solution, because it decreases electronic ignition advance stability (do not use static angle greater then 45 deg if not necessary).