www.zeeltronic.com
info@zeeltronic.com

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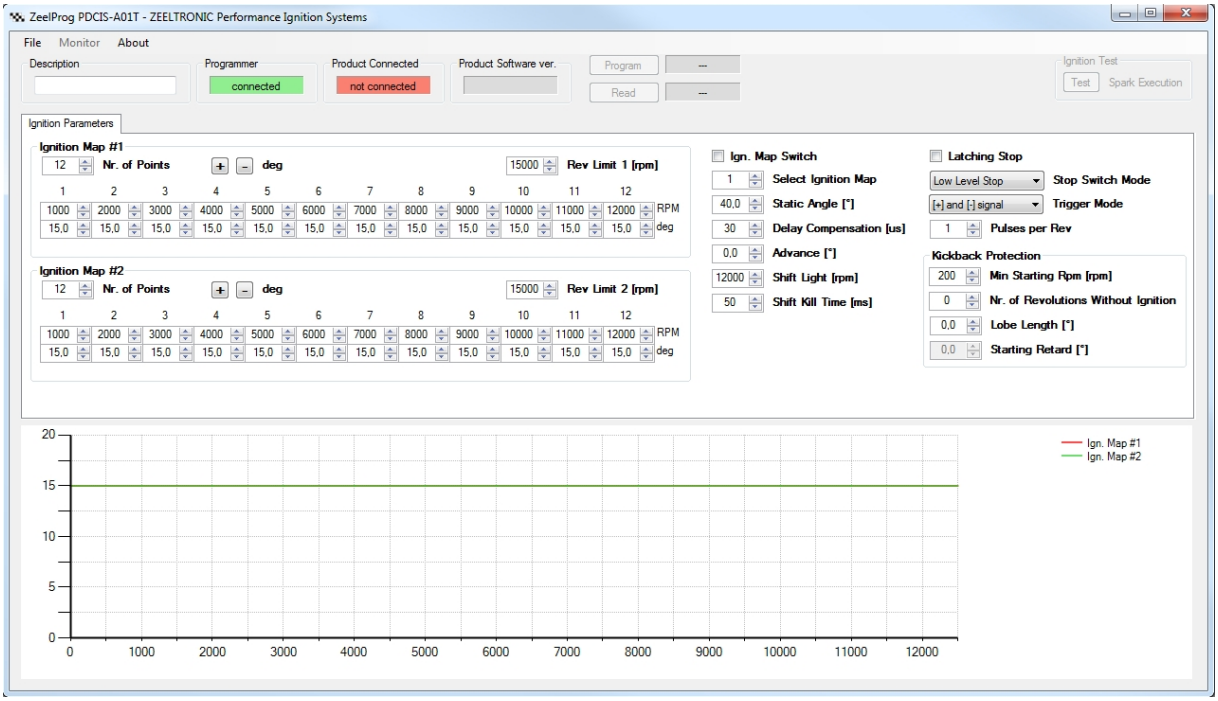
USER MANUAL
ZeelProg PCDIS-A01T

Supported control units: **PCDIS-A01T**

PDCIS-A01T is single channel DC-CDI with 2 switchable ignition maps, shift light, quick shift and output for rev counter.

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

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



Limit values:

- minimum revs	200 RPM
- maximum revs	24000 RPM
- minimum supply voltage	8 Volts
- maximum supply voltage	17 Volts
- recommended power supply voltage	12÷15 Volts
- idle current draw	< 3 mAmp
- max current draw	1.2 Amp
- output energy at 14000 RPM	>54mJ
- output energy at 16000 RPM	>50mJ
- output energy at 20000 RPM	>40mJ
- output energy at 25000 RPM	>30mJ

Features:

- fast power-up (also starts only with condenser)
- full power starting spark energy already at 8Volts power supply
- one isolated input for magnetic pickup
- store and load function for two ignition maps
- external switch for changing ignition map while riding
- shift light output
- quick shift (shift kill)
- soft rev limit (three stage rev limit)
- separate rev limit for each ignition map
- latching stop
- tachometer output
- easy and fast programming on the field, via hand held programmer
- programming with PC
- programming while machine running
- signal delay compensation
- instant monitoring of rev's and angle, via LCD(hand held programmer)
- fast processing for high accuracy - delays from 1us

Very important!

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

Very important!

CDI is protected against static discharge, but too high static charge can damage CDI. Be careful when using programmer on the dyno, because static charge can build up on the bike and static discharge can damage CDI unit, or programmer. Make ground connection between dyno and bike frame to prevent static discharge through programmer and CDI.

Danger of electric shock!

Avoid connecting PDCIS to 12V power supply before connecting to ignition coil. High voltage is generated and touching free wires can cause electric shock, or damage the unit.

For manuals, wiring diagrams and programming software visit our web site:
www.zeeltronic.com

ZeelProg SOFTWARE

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

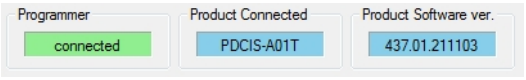
ZeelProg application can be installed on Windows XP/Vista/7/8/10/11.

ZeelProg USER INTERFACE

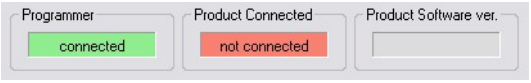
Auto detection

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

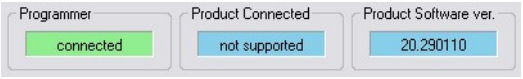
⇨ Programmer connected, product (*control unit*) connected:



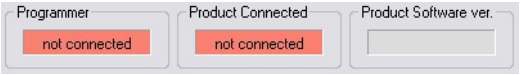
⇨ Programmer connected, product (*control unit*) not connected:



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

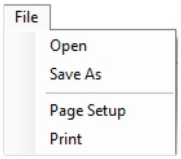


⇨ Programmer not connected, product (*control unit*) not connected:



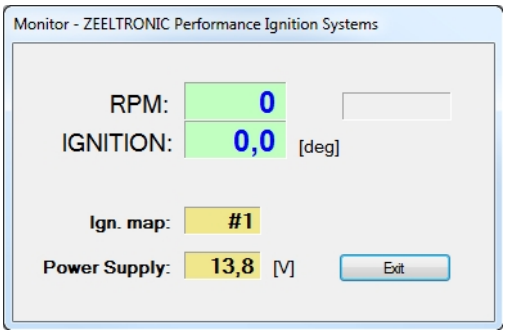
Menu structure

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



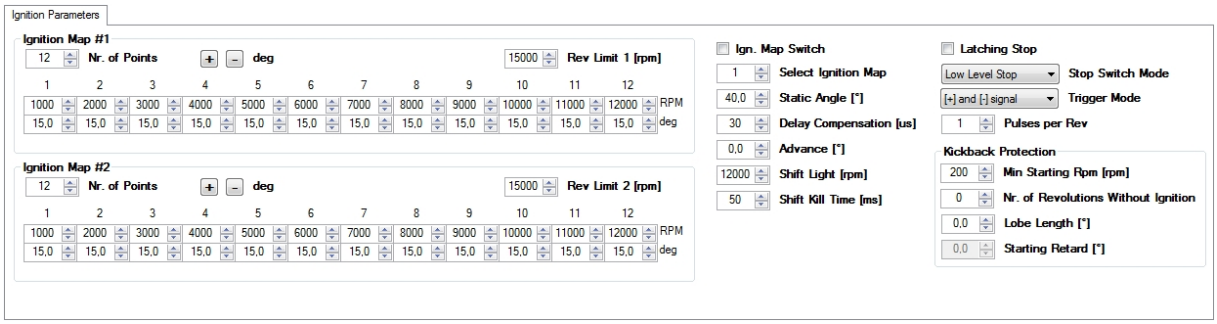
Open → Open an existing *.zee file
Save As → Save all parameters to *.zee file
Page Setup → Page setup for printing
Print → Print ZeelProg screen with all parameters and charts

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

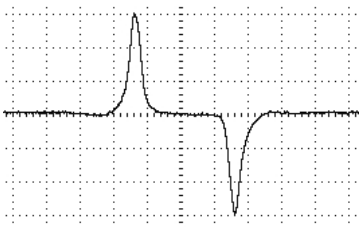


⇨ Clicking on **About** opens About window and show some basic information about ***ZeelProg*** application.

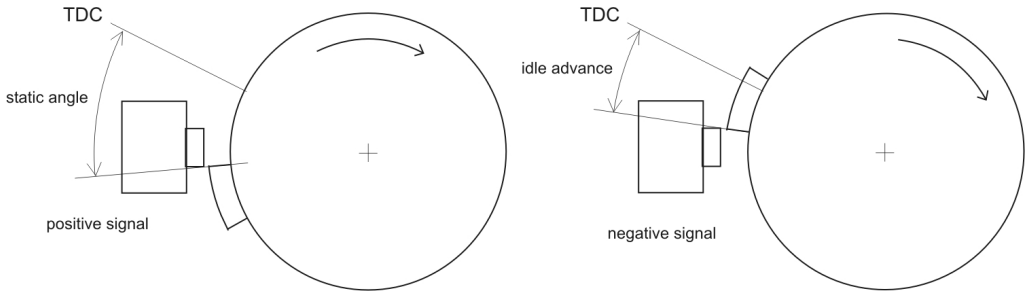
Ignition Parameters



- ⇨ **Nr. of Points** for each ignition map can be set from 4 to 12.
- ⇨ **RPM** of each ignition point can be set from 100 rpm to 25000 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
- ⇨ **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** ... it is compensation of signal delay from pickup to spark plugs. Without compensation ignition advance angle decreasing with rising revs. Compensation helps that ignition advance is accurate. Default value is 30 us.
  How to check, if compensation is correct:
  First set flat ignition curve. Measure with stroboscope lamp, if mark at flywheel moves when changing revs. If mark moves then you must change compensation delay.
- ⇨ **Advance** ... advances, or retards ignition advance of all ignition map. Positive value advances and negative value retards.
- ⇨ **Rev limit 1** ... rev limit for ignition map #1. It can be set to maximum 25000 rpm.
- ⇨ **Rev limit 2** ... rev limit for ignition map #2. It can be set to maximum 25000 rpm.
- ⇨ **Latching Stop** ... when enabled then engine stops with short push on stop switch.
- ⇨ **Pulses per Rev** ... for singles set to 1 and for twins (wasted spark) set to 2. Setting is not applicable for trigger mode "long & short lobe" and "short & long lobe".
- ⇨ **Shift light** ... activates shift light output above programmed revs. It can be set to maximum 25000 rpm.
- ⇨ **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)
- ⇨ **Trigger Mode:** apply to **"only [+] signal"** and **"[+] and [-] signal"**



Trigger signal from pickup consist of positive and negative pulse. Positive pulse must be first and is generated by leading edge of trigger lobe ... negative pulse must be second and is generated by trailing edge of trigger lobe.
If trigger signal is opposite (first negative and second positive), then wires from the pickup needs to be switched ... that changes polarity of signal from pickup.
Positive pulse defines static angle position and negative pulse defines idle running timing position.



⇨ When **"only [+] signal"** is checked, then only positive signal is detected and ignition timing is calculated with all revs as programmed with ignition map.

⇨ When **"[+] and [-] signal"** is checked, then both signals are detected. Rpm setting of first ignition point defines switching point between programmed ignition map and idle running timing position.
- Ignition timing is defined with trailing edge of trigger lobe at revs lower then first ignition point (idle advance ... see drawing above).
- Ignition timing is defined with programmed map at revs higher then first ignition point.
Example: if first ignition point is programmed at 1500 rpm, then below 1500 rpm ignition timing is defined with trailing edge of trigger lobe (idle advance ... see drawing above) and above 1500 rpm ignition timing is defined by programmed ignition map.

⇨ Set **"only [+] signal"** when using custom, or modified trigger rotor, or upgrade from static ignition timing CDI.
⇨ Set **"[+] and [-] signal"** when using original trigger rotors, or flywheels. First ignition point should be programmed somewhere between 1000 - 2000 rpm.

⇨ **Trigger Mode: "long & short lobe"**... when trigger rotor has two lobes, first long and second short. Long lobe meet pickup first. CDI ignore short lobe and use only long lobe. Rpm setting of first ignition point defines switching point between programmed ignition map and idle running timing position.
- Ignition timing is defined with trailing edge of long trigger lobe at revs lower then first ignition point (idle advance ... see drawing above, short lobe is not at the drawing).
- Ignition timing is defined with programmed map at revs higher then first ignition point.
⇨ **Trigger Mode: "short & long lobe"**... when trigger rotor has two lobes, first short and second long. Short lobe meet pickup first. CDI ignore short lobe and use only long lobe. RPM setting of first ignition point define switching point between programmed ignition map and idle running timing position.
- Ignition timing is defined with trailing edge of long trigger lobe at revs lower then first ignition point (idle advance ... see drawing above, short lobe is not at the drawing).

- Ignition timing is defined with programmed map at revs higher then first ignition point.

⇨ **Min Starting RPM** ... it sets minimum rpm required for engine starting. It can be set to minimum 200 rpm.
Minimal required rpm for starting also depends on the pickup, trigger rotor diameter and air gap between pickup and trigger rotor. Larger rotor diameter and smaller air gap gives stronger pickup signal, that means CDI can read pickup signal at lower rpm.
Correct minimum starting rpm protects from kickback at starting.
Engines sensitive on kickback require trigger mode 2 "[+] and [-] signal", also trigger lobe length must be measured and programmed to CDI. In some cases even starting retard have to be programmed.

⇨ **Nr. of Revolutions Without Ignition**...number of revolutions without ignition at starting is sometime necessary to prevent kickback at starting with electro starter.

⇨ **Lobe Length**...lobe length is applicable only when trigger mode 2 "[+] and [-] signal". Lobe length is used to calculate RPM at starting. Wrong value results in wrong calculation. Engines sensitive on kickback require trigger mode 2 "[+] and [-] signal", minimum starting rpm, trigger lobe length must be measured and programmed to CDI. In some cases even starting retard have to be programmed.
Lobe length can be programmed to 0 deg, with engines less sensitive on kickback.

⇨ **Starting Retard**...starting retard is applicable only when trigger mode 2 "[+] and [-] signal" and lobe length larger then 0 deg.
Starting retard is in function only at starting. Starting retard is necessary with most kickback sensitive engines. Lobe length have to be measured correctly for correct starting retard function.

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 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.

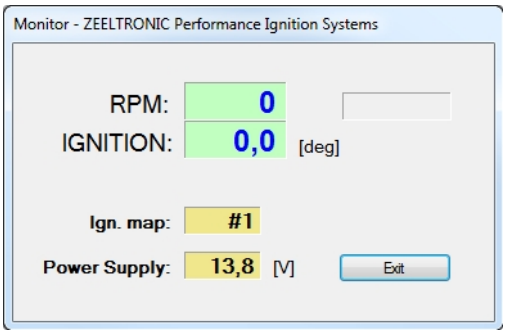
Make new *.zee file without connecting control unit

① Connect PC-USB 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 programmer.

Clicking on **Monitor** opens Monitor window.



⇨ Monitor show engine revolution, ignition advance angle, selected ignition map, rev limit activation and power supply voltage.

MEASURING STATIC ANGLE

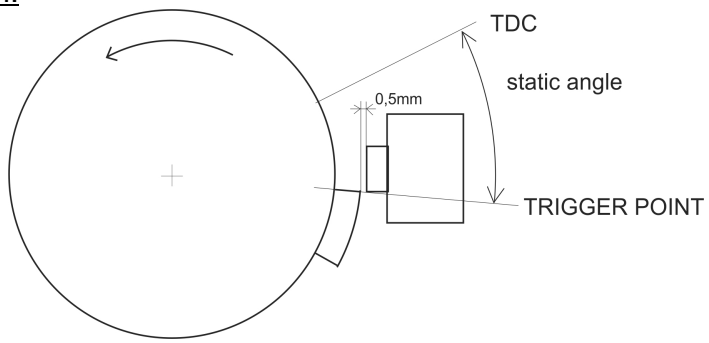
Measuring correct static angle is very important. Wrong static angle will cause inaccurate ignition advance. If static angle is programmed larger than mechanical static angle ignition advance will be smaller than programmed, or vice versa.
The most accurate procedure of measuring static angle is with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

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.

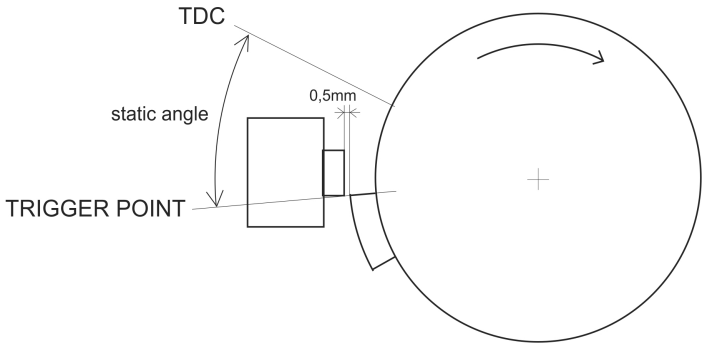
Necessary tools:
- strobe light
- dial gauge

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

Counterclockwise rotation:



Clockwise rotation:



- program CDI with measured approximate static angle
- program CDI with flat ignition curve...16deg advance is suitable for most engines.
- find information about engine stroke and conrod length
- convert programmed flat ignition advance angle to millimetres

Example:
α =16deg (ignition advance)
L=110mm (conrod length)
R=54/2=27mm (engine stroke divided by 2)
T=1,3mm (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 1,3mm) 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 3000rpm to 4000rpm
- 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 30deg, 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 45deg if not necessary).

If you find when testing with your strobe light that your timing marks are off by 10 or more degrees it may be neccessary to reverse the wiring from the reluctor pickup to the ignition and test again. Reluctor pickups have polarity but it is rarely marked on the pickups so must be determined by the trial and error method. Incorrect wiring polarity will cause the reluctor pickup to send the trigger signal on the trailing edge of the rotor instead of the required leading edge of the rotor.