www.zeeltronic.com
info@zeeltronic.com

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PROGRAMMING MANUAL
ZeelProg PDCIS-32T

Supported control units: **PDCIS-32T**

ZeelProg is a 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.

CONTENT

ZeelProg SOFTWARE

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

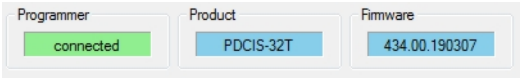
ZeelProg application can be installed on Windows XP/Vista/7/8/10.

ZeelProg USER INTERFACE

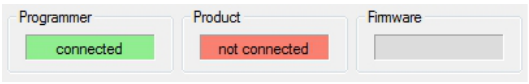
Auto detection

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

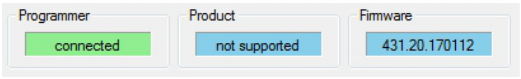
⇨ Programmer connected, product (*control unit*) connected:



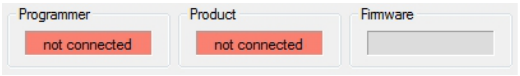
⇨ Programmer connected, product (*control unit*) not connected:



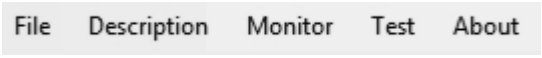
⇨ Programmer connected, product (*control unit*) not supported:



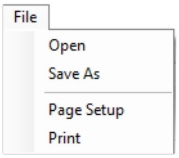
⇨ Programmer not connected, product (*control unit*) not connected:



Menu structure

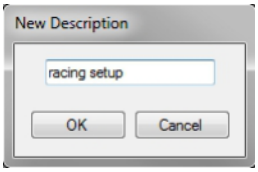


⇨ **File menu** is active when PC-USB programmer is connected.

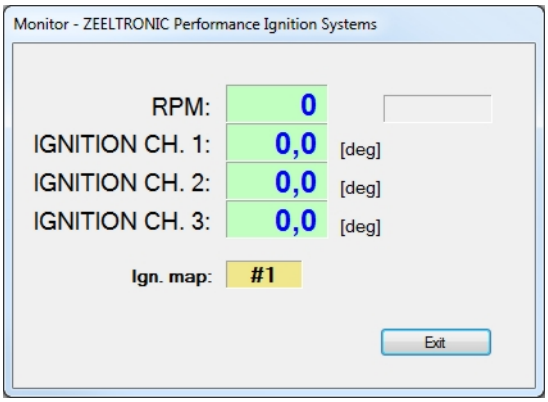


Open → Open an existing *.zee file
Save As → Save all parameters to *.zee file
Page Setup → Page setup for printing
Print → Print ZeelProg screen with all parameters and charts

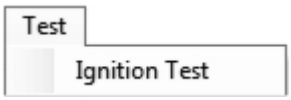
⇨ **Description** can be added to the settings. Description is added to the saved file and also while programming to the product (ECU).



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



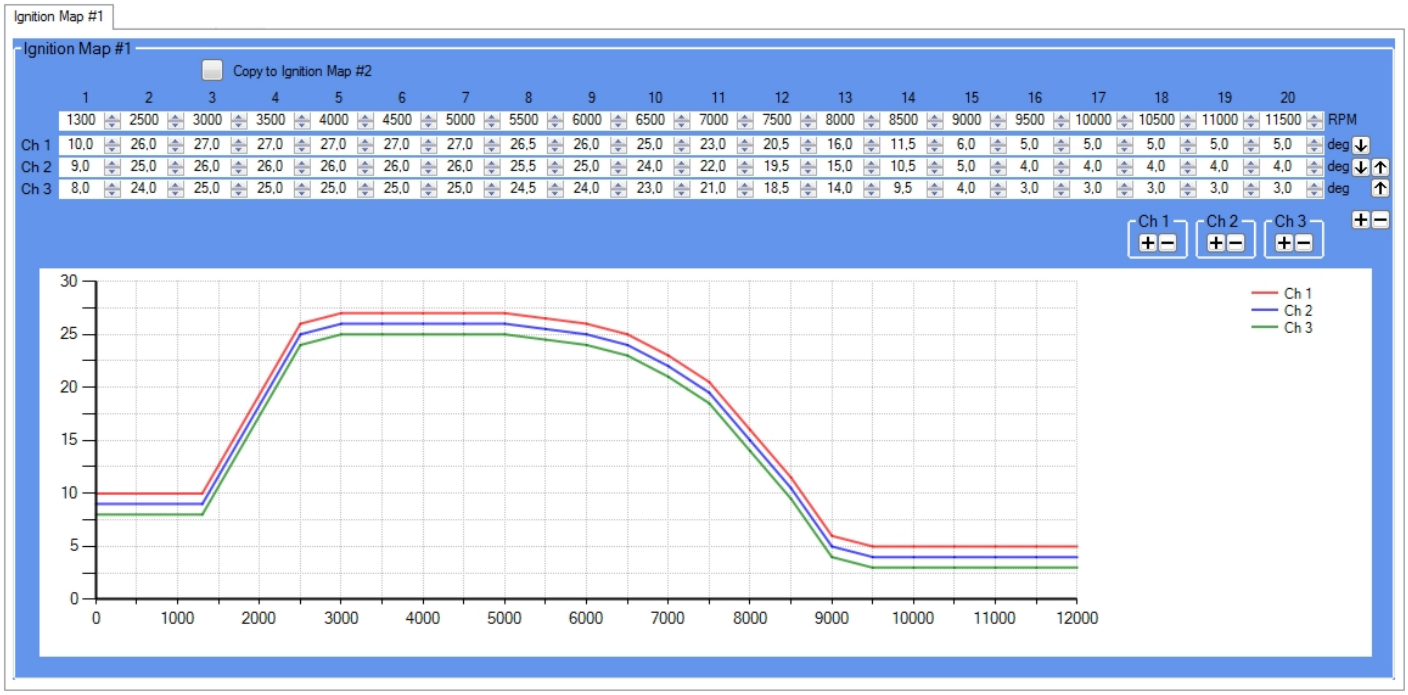
⇨ **Ignition Test** without running engine. Spark can be optically checked, with removed spark plug connected to plug cup and to the ground.

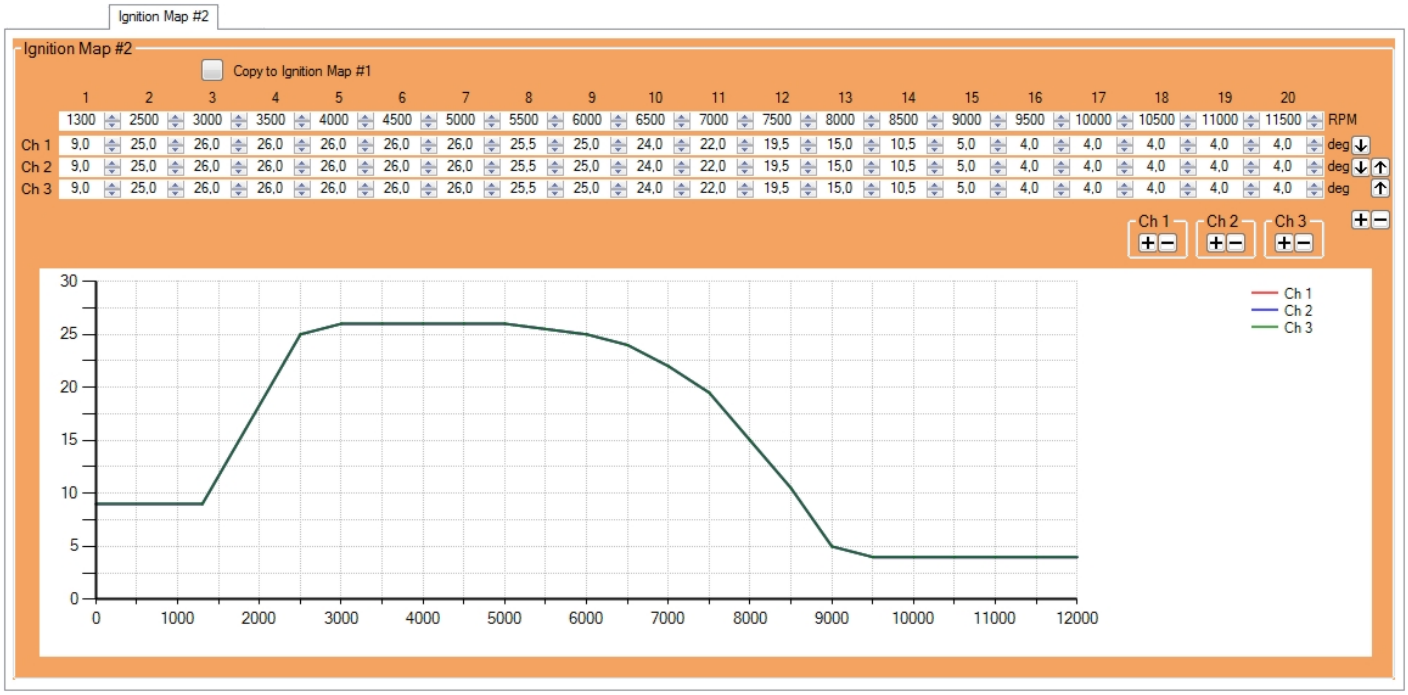


Ignition test function is possible only when engine is not running.
After clicking **Ignition Test**, sparks are generated on each spark plug for few seconds.

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

Ignition Map #1 and #2

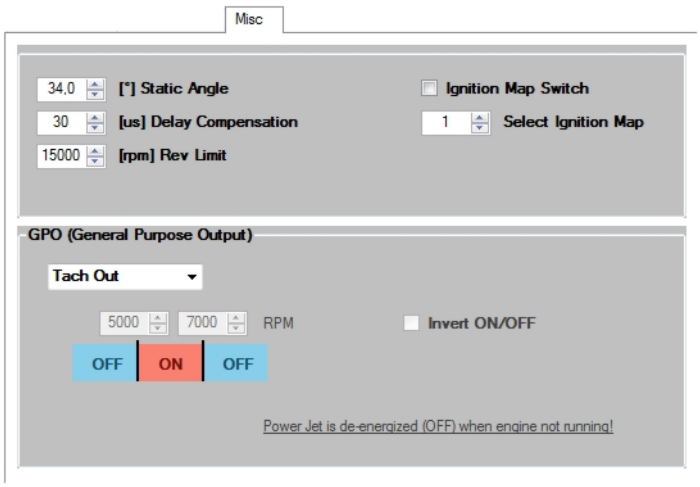




Each ignition output channel can be programmed with separate ignition curve.

⇨ **RPM** of each ignition point can be set from 500rpm to 20000rpm in 10rpm steps. At the left side RPM value must be the lowest and each next point must have higher value then previous...
⇨ **deg**...advance of each ignition point can be set from 0deg to 85deg in 0,1deg steps
⇨ ➕... increment ignition points
⇨ ➖... decrement ignition points
⇨ ⬇... copy down ignition points
⇨ ⬆... copy up ignition points

Misc Parameters



⇨ **Static Angle** is a pickup advance position from TDC (Top Dead Centre).
⇨ **Delay Compensation**...ensure correct ignition angle through whole revs. Default value is 30us.
Delay compensation is compensation of signal delay from a pickup to spark plugs.
Compensation ensures that ignition advance is same as programmed (accurate).
How to check, if compensation is correct:
- program flat ignition curve
- measure ignition advance with strobe light at low and at high revs
- if advance at low and high revs is not the same, then compensation delay must be adjusted

⇨ **Rev limit**...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.

GPO (General Purpose Output):

GPO can be configured as tachometer output, or as Power Jet.
⇨ **Invert ON/OFF**... inverts Power Jet operation. ON means energized Power Jet and OFF means de-energized Power Jet.
⇨ **RPM** of each point can be set from 500rpm to 20000rpm in 10rpm steps.

Example of Power Jet *operation:*
Apply to above screen shoot settings...
- Power Jet is de-energized (OFF) below 5000 rpm and above 7000 rpm
- Power Jet is energized (ON) between 5000 and 7000 rpm

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 indicates reading and verifying 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 indicates programming and verifying process.

Successful programming is indicated as: 

Error while programming is indicated as: 

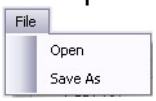
If error occurs, then repeat programming.

Make new *.zee file without connecting control unit

① Connect PC-USB programmer to PC.

② Set parameters.

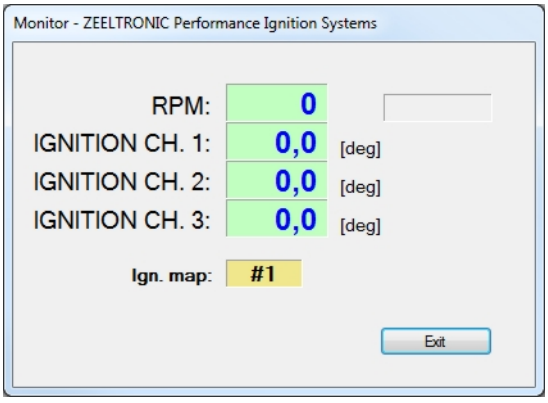
③ Save parameters by clicking **Save As** from **File menu**.



MONITOR FUNCTION

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

Clicking on **Monitor** opens Monitor window.



⇨ Monitor shows engine revolution, ignition advance angle, selected ignition map, rev limit.

MEASURING STATIC ANGLE

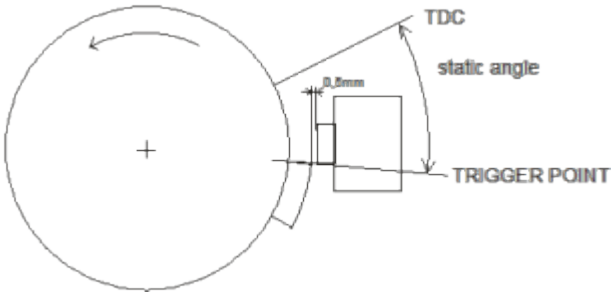
Measuring correct static angle is very important. Wrong static angle will cause inaccurate ignition advance. If static angle is programmed larger than mechanical static angle ignition advance will be smaller than programmed, or vice versa.
The most accurate procedure of measuring static angle is with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

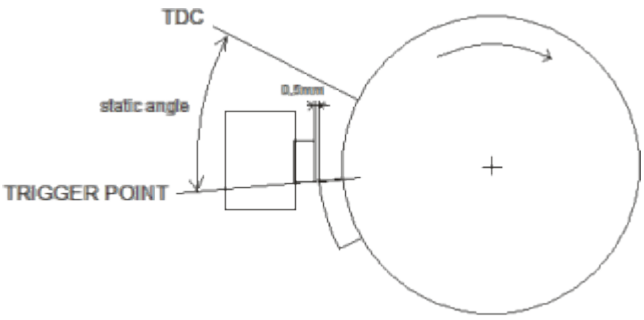
Necessary tools:
- strobe light
- dial gauge

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:

α = ignition advance in degrees
T = ignition advance in mm
R = engine stroke divided by 2 in mm
L = 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 a very accurate static angle.

Important!

- Static angle is a 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.

Explanation of trigger signal from pickup

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