www.zeeltronic.com
info@zeeltronic.com

updated 24.10.2024
ZeelProg version: 00.241016

USER MANUAL
ZeelProg PDCI-MS30

Supported control units: **PDCI-MS30**

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

PDCI-MS30 is three channel DC/CDI specially designed to run with MSD total loss trigger pickups, or HALL sensors.
It has 2 switchable ignition maps, latching stop, GPO(General Purpose Output). It is programmable with PC.

- minimum revs	100 RPM
- maximum revs	15000 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	0,5 Amp
- max current draw	2,7 Amp
- GPO maximum continuous current	2 Amp
- output energy	90mJ

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

ZeelProg SOFTWARE

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

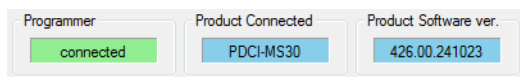*ZeelProg* application can be installed on Windows XP/Vista/7/8/10/11.
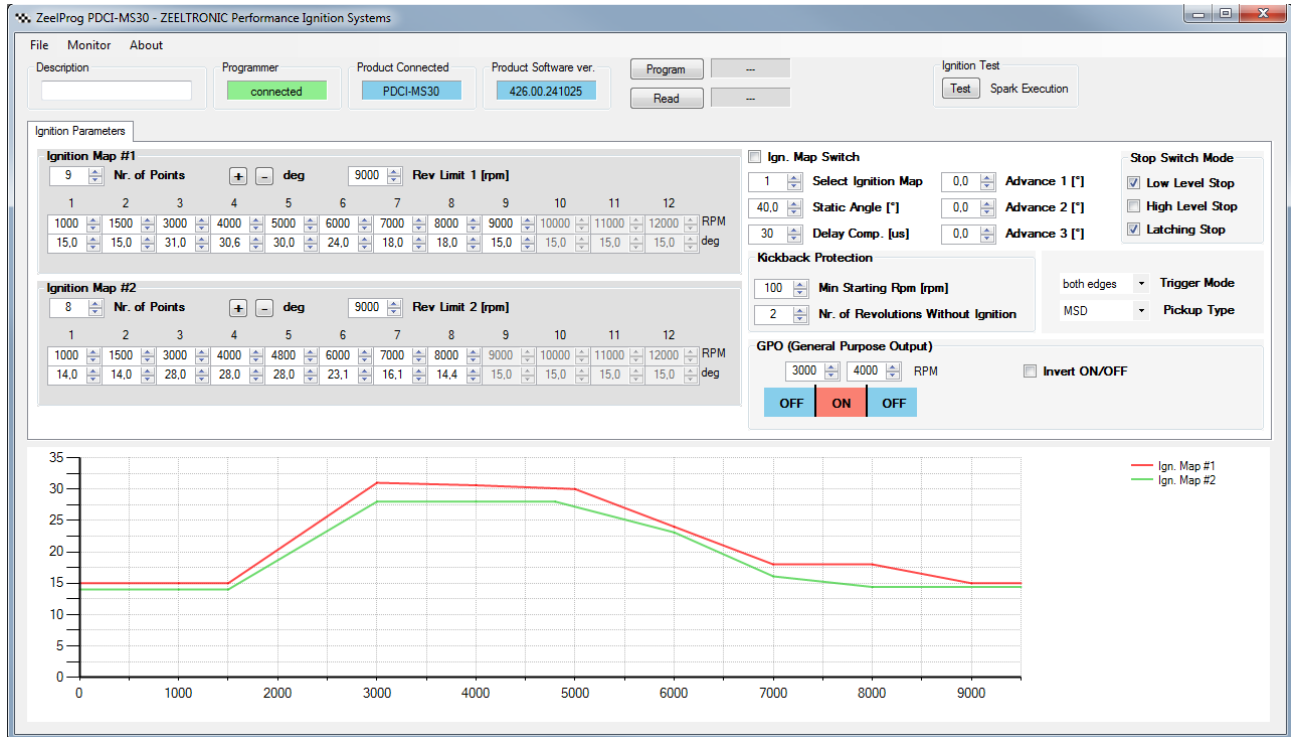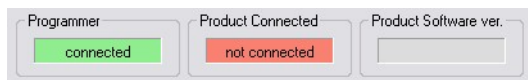

ZeelProg USER INTERFACE

Auto detection

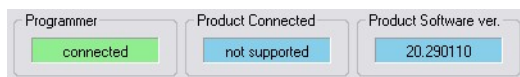*Zeelprog* automatically detects USB-Programmer connection and type of *control unit*.
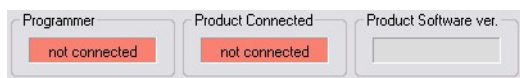⇨ Programmer connected, product (*control unit*) connected:

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

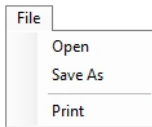⇨ Programmer connected, product (*control unit*) not supported:

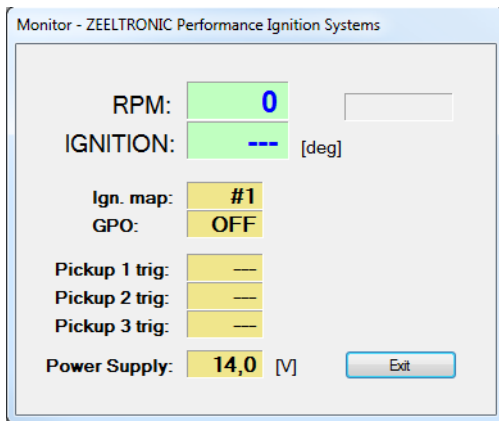⇨ Programmer not connected, product (*control unit*) not connected:

Menu structure

File   Monitor   About

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

File
    Open
    Save As

    Print

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.

Monitor - ZEELTRONIC Performance Ignition Systems

RPM:	0
IGNITION:	--- [deg]
Ign. map:	#1
GPO:	OFF
Pickup 1 trig:	---
Pickup 2 trig:	---
Pickup 3 trig:	---
Power Supply:	14,0 [V] Exit

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

About ZeelProg PDCI-MS30

zeeltronic
PERFORMANCE IGNITION SYSTEMS

Supported products: PDCI-MS30

Version: 00,241016

ZEELTRONIC d.o.o.
http://www.zeeltronic.com
info@zeeltronic.com
zeeltronic@gmail.com

Ignition Parameters

Ignition Parameters

Ignition Map #1

9	Nr. of Points	+ − deg	9000	Rev Limit 1 [rpm]		

1	2	3	4	5	6	7	8	9	10	11	12	
1000	1500	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	RPM
15,0	15,0	31,0	30,6	30,0	24,0	18,0	18,0	15,0	15,0	15,0	15,0	deg

Ignition Map #2

8	Nr. of Points	+ − deg	9000	Rev Limit 2 [rpm]		

1	2	3	4	5	6	7	8	9	10	11	12	
1000	1500	3000	4000	4800	6000	7000	8000	9000	10000	11000	12000	RPM
14,0	14,0	28,0	28,0	28,0	23,1	16,1	14,4	15,0	15,0	15,0	15,0	deg

☐ Ign. Map Switch

1	Select Ignition Map	0,0	Advance 1 [°]
40,0	Static Angle [°]	0,0	Advance 2 [°]
30	Delay Comp. [us]	0,0	Advance 3 [°]

Kickback Protection

100	Min Starting Rpm [rpm]
2	Nr. of Revolutions Without Ignition

both edges ▾ Trigger Mode
MSD ▾ Pickup Type

GPO (General Purpose Output)

3000	4000	RPM	☐ Invert ON/OFF

OFF | ON | OFF

Stop Switch Mode
☑ Low Level Stop
☐ High Level Stop
☑ Latching Stop

⇨ **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 10 rpm steps.

⇨ **deg**...advance of each ignition point can be set from 0 deg to 85 deg in 0,1 deg steps

⇨ [+] [−] **deg** ...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.

⇨ **Advance 3**...advances, or retards ignition advance of ignition map #3, 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). Look at section "MEASURING STATIC ANGLE".

⇨ **Delay Compensation**...ensure correct ignition angle through whole rev range. Default value is 30us.
Delay compensation is compensation of signal delay from pickup to spark plugs.
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 same, then compensation delay must be adjusted

⇨ **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.

⇨ **Pickup Mode**... select "leading edge", or "both edges". Leading edge mode means that CDI is triggered by leading edge of the magnet (static angle position). Both edges mode means that ignition advance for starting and idle is defined by trailing edge of the magnet and static angle is at leading edge of the magnet ... look at example at the end of the manual.

⇨ **GPO (General Purpose Output)**:
- **Invert ON/OFF**... inverts GPO operation. ON means energized GPO and OFF means de-energized GPO.
- **RPM** of each point can be set from 0 rpm to 20000 rpm in 10 rpm steps.

Example of GPO operation:
Apply to above screen shoot settings...
- GPO is de-energized (OFF) below 3000 rpm and above 4000 rpm
- GPO is energized (ON) between 3000 and 4000 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-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.
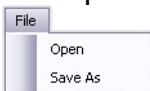
Successful programming is indicated as:
Error while programming is indicated as:
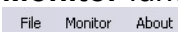If error occurs, then repeat programming.

Make new *.zee file without connecting control unit

① Connect PC-USB programmer to PC.
② Set parameters
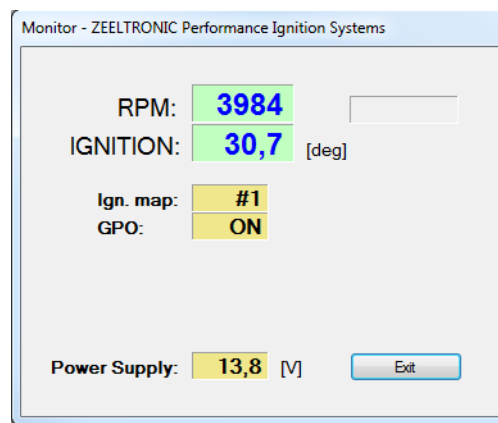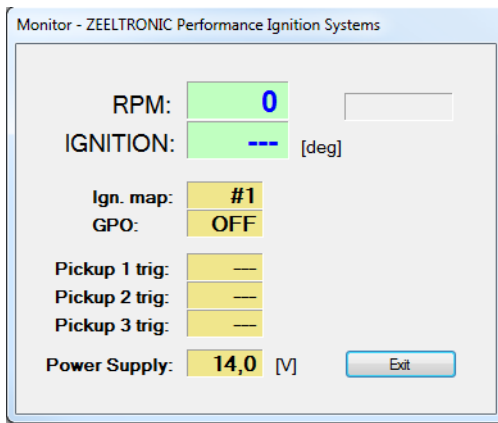③ Save parameters by clicking **Save As** from **File menu**.

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, GPO output state, 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.
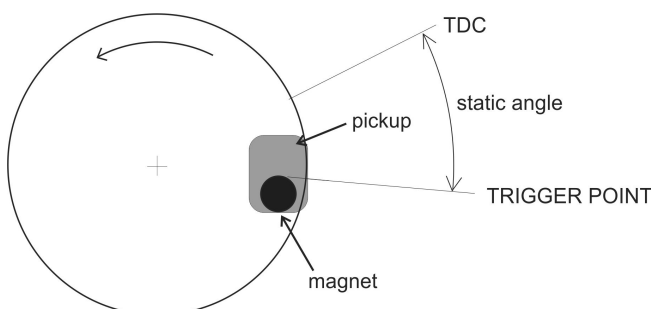
Necessary tools:
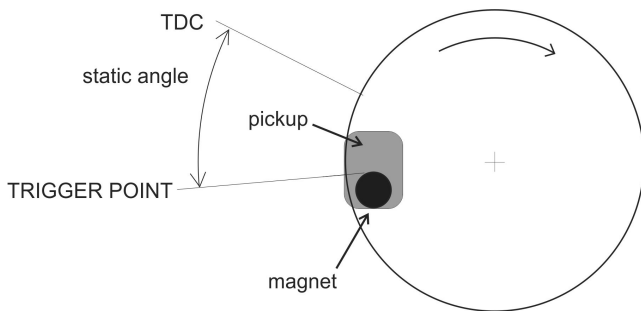- strobe light
- dial gauge

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:

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

- o   remove sparkplug from cylinder head and mount dial gauge in cylinder.
- o   find TDC (Top Dead Centre)
- o   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
- o   remove dial gauge and install sparkplug back in cylinder head
- o   start engine and run at constant speed of 3000 rpm to 4000 rpm
- o   use a strobe light to check alignment of marks on rotor and stator
- o   adjust static angle with programmer to align marks on the rotor and stator

Result of above procedure is very accurate static angle.
Important!
- o   Static angle is reference point for CDI to calculate delay for programmed ignition advance.
- o   Static angle has to be greater then maximum ignition advance!
- o   Example - If maximum advance in ignition map is 30 deg, then static angle has to be at least 31deg.
- o   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).

At the drawings below is example of 35 deg static angle and 15 deg starting/ idle advance.
- when trigger mode is programmed to "both edges" then starting advance is fixed with position of trailing edge of the magnet. After first ignition rpm point CDI starts to calculate ignition advance from ignition map.
- when trigger mode is programmed to "leading edge" then CDI is triggered only from leading edge of the magnet and ignition advance is always calculated from ignition map.
- engines prone for kickback have to use trigger mode "both edges" and trailing edge have to be set to correct starting advance. Magnet diameter have to be big enough to get static angle large enough.

CLOCKWISE/ RIGHT ROTATION   COUNTERCLOCKWISE/ LEFT ROTATION