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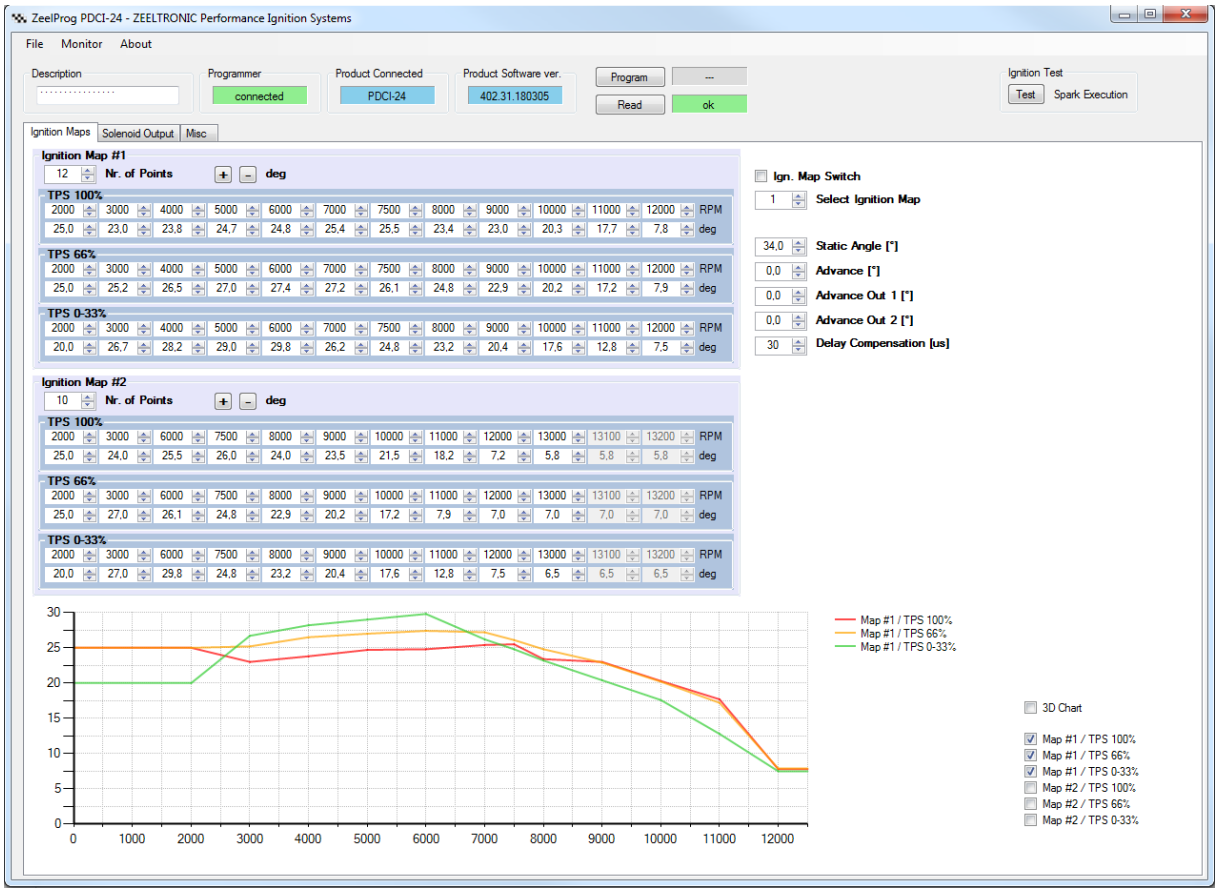
PROGRAMMING MANUAL
ZeelProg PDCI-24

Supported control units: **PDCI-24**

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.



ZeelProg SOFTWARE INSTALLATION GUIDE

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

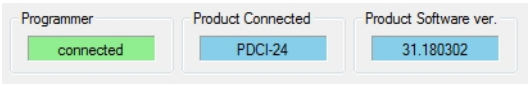
ZeelProg application can be installed on Windows XP/Vista/7/8/10/11.

ZeelProg USER INTERFACE

Auto detection

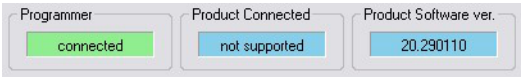
Zeelprog automatically detects USB-Programmer and type of *control unit*.

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

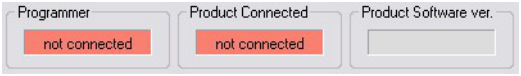


⇨ Programmer connected, product (*control unit*) not connected:

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

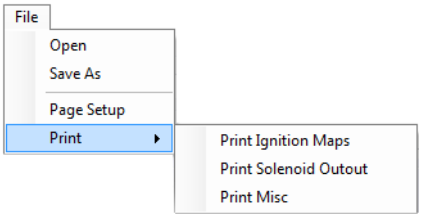


⇨ Programmer not connected, product (*control unit*) not connected:



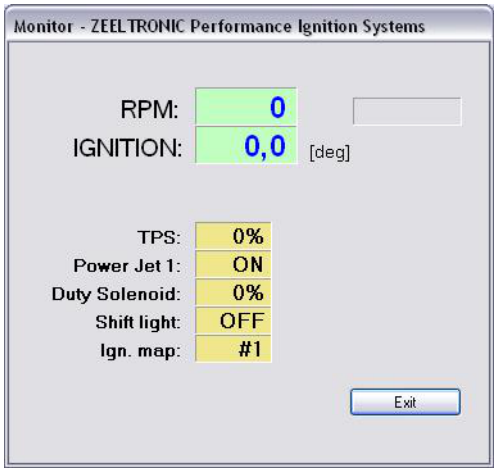
Menu structure

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



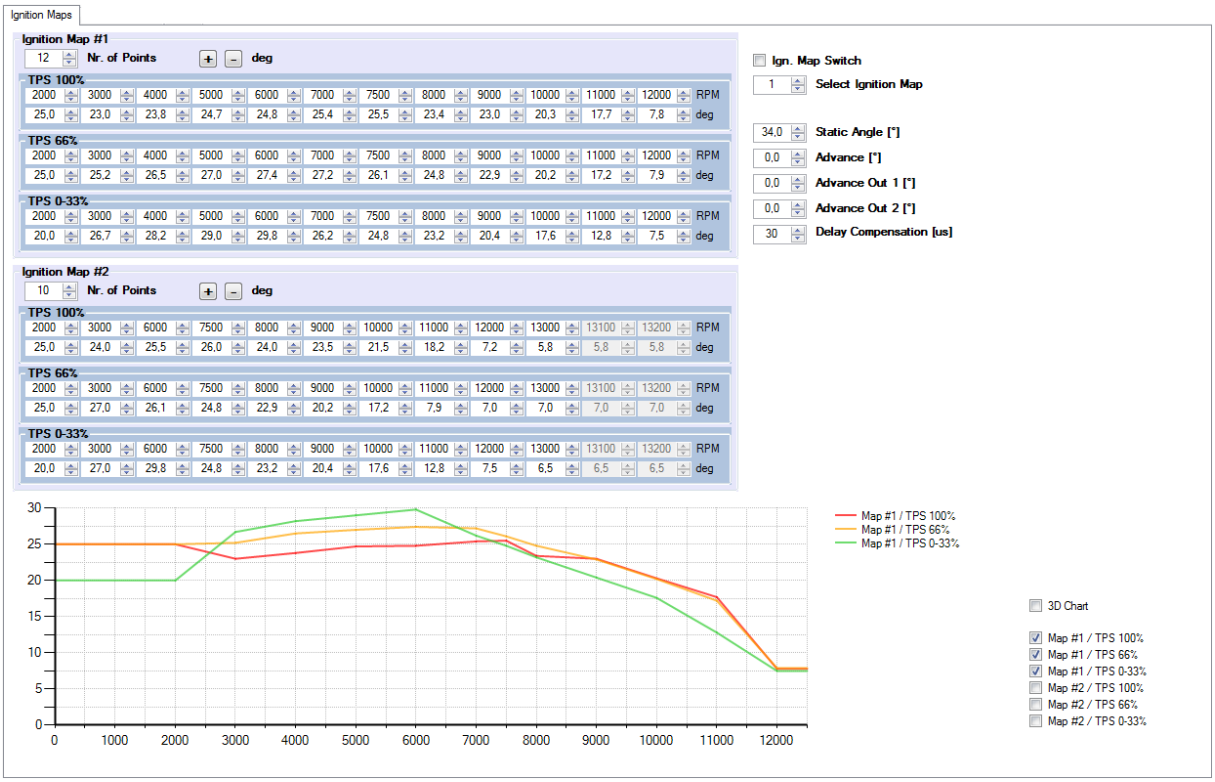
Open → Open an existing *.zee file
Save As → Save all parameters to *.zee file
Page Setup → Page setup for printing
Print Ignition Maps → Print ignition maps page
Print Solenoid Output → Print solenoid maps page
Print Misc → Print miscellaneous settings

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



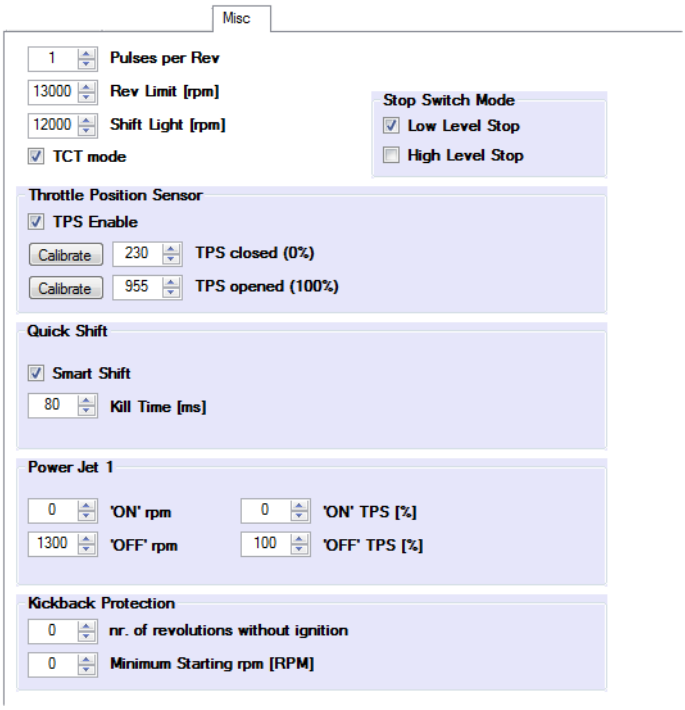
⇨ Clicking on **About** opens About window and show some basic information about ***ZeelProg*** application.

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 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
- ⇨ **Static Angle** is pickup advance position from TDC (Top Dead Centre). More info at the end of the manual.
- ⇨ **Advance**...advances, or retards whole ignition map from -10 deg to 10 deg in 0,1 deg steps. Positive value advances and negative value retards.
- ⇨ **Advance out 1**...advances, or retards ignition output 1 for -10 deg to 10 deg in 0,1 deg steps. Positive value advances and negative value retards.
- ⇨ **Advance out 2**...advances, or retards ignition output 2 for -10 deg to 10 deg in 0,1 deg steps. Positive value advances and negative value retards.
- ⇨ **Delay Compensation**...ensures correct ignition angle through whole revs. Default value is 30 us and is correct for most applications.
  Delay compensation is compensation of signal delay from pickup to spark plugs. It can be checked with stroboscope lamp. Without this compensation, ignition advance angle decreasing with rising revs.
  Compensation helps that advance angles in ignition map are accurate.
  How to check, if compensation is correct?
  Set flat ignition curve. Measure with stroboscope lamp, if mark at flywheel moving when changing revs. If mark moving, then compensation delay must be adjusted.
- ⇨ **Ignition Map Switch**...enables, or disables ignition map switch. Ignition map can be selected with switch, when function is enabled.
- ⇨ **Select Ignition Map**...selection is active only when **Ignition Map Switch** is not enabled.

Misc Parameters

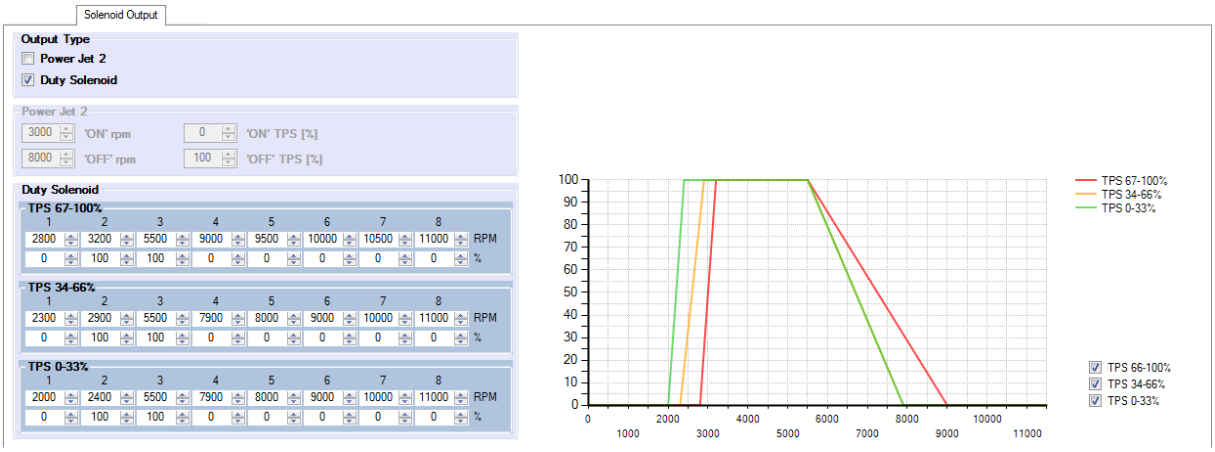


- ⇨ **Pulses per Rev**...set to 1 for single cylinder and set to 2 for wasted spark twin cylinder.
- ⇨ **Rev limit**...limits maximum revolutions. Set to maximum 20000 rpm in 100 rpm steps.
- ⇨ **Shift light**...activate shift light output above programmed revs. Set to maximum 20000 rpm in 100 rpm steps.
- ⇨ **TCT mode**... Throttle Close spark Termination mode, reduces number of sparks above 8000 rpm (spark is active every third revolution), when throttle is closed. TCT mode ensure better engine cooling.
- ⇨ **TPS Enable**... enable, or disable TPS (Throttle Position Sensor).
- ⇨ **TPS closed [0%]**... for correct TPS operation, TPS close position must be calibrated!
- ⇨ **TPS opened [100%]**... for correct TPS operation, TPS open position must be calibrated!
- ⇨ **Smart Shift**... enable, or disable Smart Shift. Smart shift function automatically adjusts kill time for different revs. Shift kill time must be always set, as basic kill time.
- ⇨ **Kill Time**... for shifting without using clutch - shift sensor is required. Function is disabled with setting to 0 ms.
- ⇨ **Power Jet 1 'ON' rpm**... revs for activating Power Jet 1
- ⇨ **Power Jet 1 'OFF' rpm**... revs for deactivating Power Jet 1
- ⇨ **Power Jet 1 'ON' TPS**... throttle position for activating Power Jet 1
- ⇨ **Power Jet 1 'OFF' TPS**... throttle position for deactivating Power Jet 1
- ⇨ **Stop Switch Mode: Low Level Stop**... engine stops with low level signal (stop switch connected to the ground)
- ⇨ **Stop Switch Mode: High Level Stop**... engine stops with high level signal (stop switch is opened)
- ⇨ **Kickback Protection: nr. of revolutions without ignition**... nr. of revolutions without spark...apply only at starting
- ⇨ **Kickback Protection: Minimum Starting RPM**... minimum RPM required for starting

Power Jet 1 example:
Power jet 1 ON (RPM) = 8000rpm
Power jet 1 OFF (RPM) = 10000rpm
Power jet 1 ON (TPS) = 70%TPS
power jet 1 OFF (TPS) = 90%TPS

Power jet is switched on when revs are between 8000-10000rpm and throttle position is between 70-90%, otherwise power jet is switched off.

Solenoid parameters



⇨ **Solenoid Output Type**... Solenoid output function can be configured as Power Jet 2, or Duty Solenoid. Duty solenoid is used for adjusting A/F ratio on some carburettors.
⇨ **Power Jet 2 'ON' rpm**... revs for activating Power Jet 2
⇨ **Power Jet 2 'OFF' rpm**... revs for deactivating Power Jet 2
⇨ **Power Jet 2 'ON' TPS**... throttle position for activating Power Jet 2
⇨ **Power Jet 2 'OFF' TPS**... throttle position for deactivating Power Jet 2
⇨ **RPM** of each Duty Solenoid point can be set from 100 rpm to 20000 rpm in 100 rpm steps.
⇨ **%** of each Duty Solenoid point can be set from 0% to 100%.

Power Jet 2 example:
Power jet 2 ON (RPM) = 8000rpm
Power jet 2 OFF (RPM) = 10000rpm
Power jet 2 ON (TPS) = 70%TPS
power jet 2 OFF (TPS) = 90%TPS

Power jet is switched on when revs are between 8000-10000rpm and throttle position is between 70-90%, otherwise power jet is switched off.

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

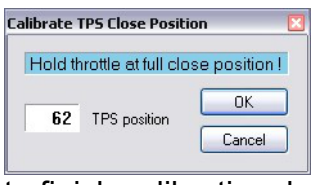
③ Save parameters by clicking **Save As** from **File menu**.

TPS Close Position [0%]

For correct operation of TPS function, TPS close position must be calibrated!

TPS close position can be set manually by entering number, or calibrated by clicking on **Calibrate** button.
Using **Calibrate** function is more recommended.

Clicking on **Calibrate** button opens **Calibrate TPS Close Position** window.



⇨ to finish calibration: hold throttle at full close position and press **OK** button

⇨ to cancel calibration: press **Cancel** button

TPS Open Position [100%]

For correct operation of TPS function, TPS open position must be calibrated!

TPS open position can be set manually by entering number, or calibrated by clicking on **Calibrate** button.
Using **Calibrate** function is more recommended.

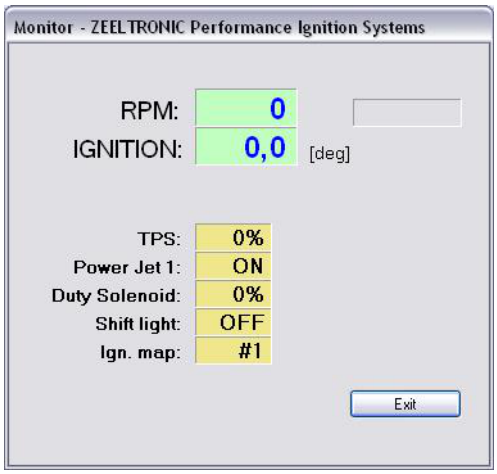
Clicking on **Calibrate** button opens **Calibrate TPS Open Position** window.

⇨ to finish calibration: hold throttle at full open position and press **OK** button
⇨ to cancel calibration: press **Cancel** button

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, TPS position, selected ignition map, shift light operation, rev limit operation, power jet 1 operation, duty solenoid operation

MEASURING STATIC ANGLE

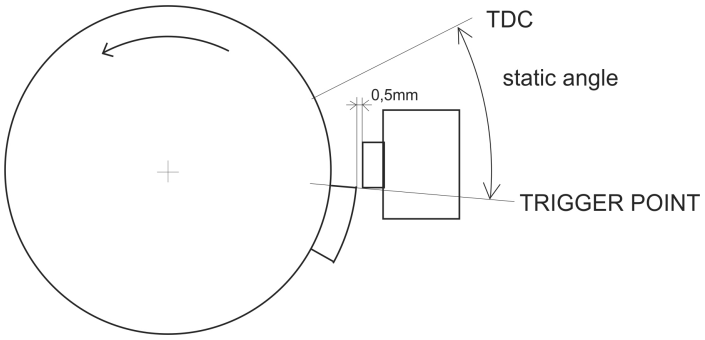
Measuring correct static angle is very important. Wrong static angle will cause inaccurate ignition advance. If static angle is programmed larger than mechanical static angle then ignition advance will be smaller than programmed, or vice versa. The most accurate procedure of measuring static angle is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

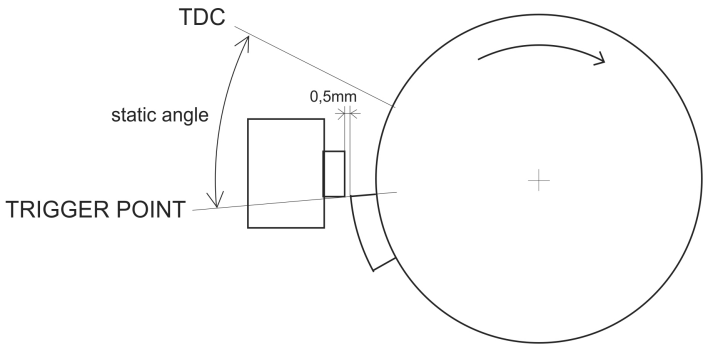
Necessary tools:
- strobe light
- dial gauge

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...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:
a = 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 1,3 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 31 deg.
- 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).

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.