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## USER MANUAL PCDI-11V PROGRAMMABLE CDI IGNITION AND PV CONTROLLER

### TECHNICAL DATA

#### Limit values:

- minimum revs	200 RPM
- maximum revs	20000 RPM
- minimum supply voltage	8 Volts
- maximum supply voltage	16 Volts
- max. supply voltage for 1 minute	35 Volts
- current draw	25 mAmp
- maximum continuous current for shift light output	1 Amp
- peak current for shift light output	5 Amp

Circuit is protected against reverse supply voltage (wrong connection).

#### Features:

- CDI charged from hi voltage charging coils (generator)
- programmable ignition map (3D interpolated)
- store and load function for 2 ignition maps
- one input for magnetic pickup
- TPS input (ignition map is 3D interpolated above TPS33%)
- external switch for changing ignition map while riding
- shift light output
- quick shift (shift kill)
- tachometer output
- advance/retard whole ignition curve
- three stage rev limit (retard timing, reduced spark, spark off)
- signal delay compensation
- timing calculation for every 1 RPM change (1000, 1002, .. , 9805, 9806, ...)
- programmable power valve actuation
- store and load function for 5 PV curves
- programmable PV deviation
- programmable max close and max open positions
- self PV test on power-up
- PV error detecting (position sensor failure, servo motor failure)

- easy and fast programming on the field, via hand held programmer
- programming while machine running - you can immediately see effects
- monitoring of rev's, TPS position, ignition and PV angle, via LCD(hand held programmer)
- fast processing for high accuracy - delays from 1us

## 1. HOW TO ENTER MENU

**PCDI** must be connected to power supply. Connect **programmer** to **PCDI** and wait few seconds for activation of **programmer** and then press . With pressing  or  you can move through menu and select with pressing . Exit menu with selecting **Exit**.

## 2. MENU ORGANISATION

**Set Ign.** - set ignition parameters submenu  
**Set PV** - set PV parameters submenu  
**Exit**

### 2.1. SET IGNITION PARAMETERS SUBMENU

**Load Ign. Curve** - load previously saved ignition curve set (from #1 to #2)  
**Save Ign. Curve** - save new ignition curve set (from #1 to #2)  
**Ignition Curve** - ignition curve parameters submenu  
**Advance** - advance/retard whole ignition curve  
**Shift Light** - shift light  
**Shift Kill Time** - shift kill time  
**Rev Limit** - rev limit  
**Static Angle** - static angle (stator position)  
**Compensation** - signal delay compensation (from pickup to spark plug)  
**TPS close [0%]** - calibrating TPS close position  
**TPS open [100%]** - calibrating TPS open position  
**Remote SW** - activating/deactivating external switch  
**Exit**

### 2.2. SET PV PARAMETERS SUBMENU

**Load PV Curve** - load previously saved curve (from #1 to #5)  
**Save PV Curve** - save new curve (from #1 to #5)  
**Set PV Curve** - valve curve parameters submenu  
**Deviation +-** - deviation of valve position  
**Close Position** - max close valve position  
**Open Position** - max open valve position  
**PV test** - valve position test  
**Exit**

### 3. LOAD IGN. CURVE

Enter menu and move to *Load Ign. Curve* with pressing  or  and then press  .  
Now you can select position number of previously saved ignition curve set, with pressing  or  and then press  .

### 4. SAVE IGN. CURVE

Enter menu and move to *Save Ign. Curve* with pressing  or  and then press  .  
Now you can select position number to which you want to save your ignition curve set, with pressing  or  and then press  .

### 5. Set IGNITION CURVE

Three ignition curves must be programmed for different TPS positions. **PCDI** does not only switch between ignition curves, but also calculate timing between programmed curves for all TPS positions above 33%. From 0% to 33% TPS is used only one ignition curve.

Enter menu and move to *Ignition Curve* with pressing  or  and then press  .  
Now you are in submenu for selecting ignition curve.

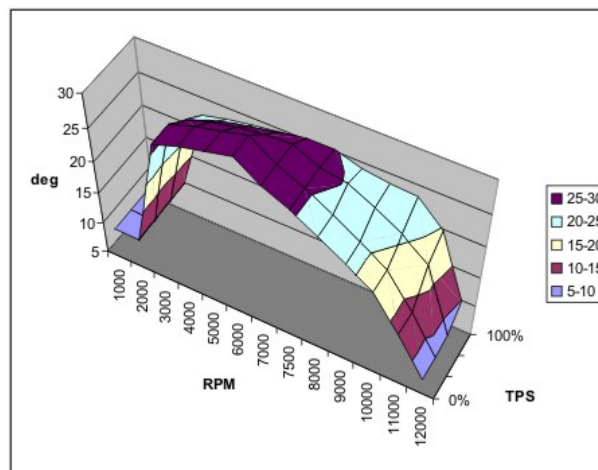
Submenu organisation:

- Nr. of Points* - number of ignition curve points (from 4 to 10)
- Curve 0-33%* - ignition curve from 0 to 33% TPS
- Curve 66%* - ignition curve for 66% TPS
- Curve 100%* - ignition curve for 100% TPS
- Exit* - exit submenu

#### **Important!**

To avoid wrong processing, don't make unreasonable curve course.  
Every time you make any changes to ignition curve, it is automatically saved to #0 position.  
Then you can save it to any other position number from #1 to #2.

Curve Example:



## 5.1. Set NUMBER OF IGNITION CURVE POINTS

Move to *Nr. of Points* with pressing  or  and then press .

Now you can select number of ignition points, with pressing  or  and then press .

## 5.2. Set PARAMETERS OF IGNITION CURVE POINT

Move to point you want to change, with pressing  or  and then press .

Now you can change rev point with pressing  or  (in 100 rpm steps) and then press .

Now you can change advance angle with pressing  or  (in 0.1deg steps) and then press .

## 6. Set ADVANCE

With this setting is possible to advance or retard whole ignition curve. When setting is positive then ignition curve is advanced and when setting is negative than ignition curve is retarded. With *Advance 0.0deg*, ignition curve is unchanged.

Enter menu and move to *Advance* with pressing  or  and then press .

Now you can set advance with pressing  or  (in 0.1deg steps) and then press .

## 7. Set SHIFT LIGHT

Enter menu and move to *Shift Light* with pressing  or  and then press .

Now you can change rev point with pressing  or  (in 100 rpm steps) and then press .

## 8. Set SHIFT KILL TIME

Enter menu and move to *Shift Kill Time* with pressing  or  and then press .

Now you can change kill time with pressing  or  (in 10 ms steps) and then press .

## 9. Set REV LIMIT

Enter menu and move to *Rev Limit* with pressing  or  and then press .

Now you can change rev limit with pressing  or  (in 100 rpm steps) and then press .

## 10. Set STATIC ANGLE

Enter menu and move to *Static Angle* with pressing  or  and then press .

Now you can set static angle with pressing  or  (in 0.1deg steps) and then press .

More information's about static angle you can find in section 22.

## 11. Set COMPENSATION

It is compensation of signal delay from pickup to spark plugs. You can check this delay with stroboscope lamp. Without this compensation, ignition advance angle decreasing with rising revs.

This compensation helps that advance angles in ignition curve are real (more accurate).

How to check, if compensation is correct:

First you must set flat ignition curve. Then measure with stroboscope lamp, if mark at flywheel moving when changing revs. If mark moving, then you must change compensation delay.

Change Compensation:

Enter menu and move to **Compensation** with pressing  or  and then press .  
Now you can change compensation delay with pressing  or  and then press .

## 12. Set TPS close [0%]

For correct operation, TPS close position must be calibrated!

Enter menu and move to **TPS close [0%]** with pressing  or  and then press .  
Leave throttle at close position and confirm calibrating with pressing , or exit calibration with pressing . Displayed number should be between 0 and 500.

## 13. Set TPS open [100%]

For correct operation, TPS open position must be calibrated!

Enter menu and move to **TPS open [100%]** with pressing  or  and then press .  
Move throttle to maximum open position and confirm calibrating with pressing , or exit calibration with pressing . Displayed number should be between 500 and 1010.

## 14. Set REMOTE SW

Enabling or disabling external switch for changing ignition curves while riding.

Enter menu and move to **Remote SW** with pressing  or  and then press .  
Now you can enable or disable external switch with pressing  or  and then press .

## 15. LOAD PV CURVE

Enter menu and move to **Load PV Curve** with pressing  or  and then press .  
Now you can select position number of previously saved ignition curve set, with pressing  or  and then press .

## 16. SAVE PV CURVE

Enter menu and move to *Save PV Curve* with pressing  or  and then press  .  
Now you can select position number to which you want to save your ignition curve set, with pressing  or  and then press  .

## 17. Set PV Curve

Enter menu and move to *Set PV Curve* with pressing  or  and then press  .  
Now you are in submenu for setting valve curve.

Submenu organisation:

<i>Nr. of Points</i>	- number of valve curve points (from 2 to 8)
1)	- first valve position point
2)	- second valve position point
...	...
...	...
<i>Exit</i>	- exit submenu

### **Important!**

To avoid wrong processing, don't make unreasonable curve course.  
Every time you make any changes to valve curve, it is automatically saved to #0 position.  
Then you can save it to any other position number from #1 to #5.

### 17.1. Change Number of Curve Points

Move to *Nr. of Points* with pressing  or  and then press  .  
Now you can select number of curve points, with pressing  or  and then press  .

### 17.2. Change Parameters of Valve Position Curve Points

Move to point you want to change, with pressing  or  and then press  .  
Now you can change rev point with pressing  or  (in 100 rpm steps) and then press  .  
Now you can change valve position from 0% to 100%, with pressing  or  (in 1% steps) and then press  .

## 18. Deviation

Enter menu and move to *Deviation* with pressing  or  and then press  .  
Now you can change deviation from 2% to 20% with pressing  or  (in 1% steps) and then press  .

Deviation means how accurate valve is moved to calculated position. If deviation is too low then servo motor won't be stable – it will always search for calculated position in small movements. Default setting is +-5% and should meet in most cases.

## 19. Max Close Position

Enter menu and move to **Close Position** with pressing  or  and then press .

Now you can set close position with pressing  or  and then press .

Max close position is when curve is set to 0%. This close position can be moved to any desired position. For RZ350 default close position is 240. Max close position can be moved to deeply closed or less closed position.

## 20. Max Open Position

Enter menu and move to **Open Position** with pressing  or  and then press .

Now you can set open position with pressing  or  and then press .

Max open position is when curve is set to 100%. This open position can be moved to any desired position. For RZ350 default open position is 512. Max open position can be moved to more open or less open position.

## 21. PV Test

Enter menu and move to **PV Test** with pressing  or  and then press .

Now you can set valve position with pressing  or  and then press .

PV test can be used for testing or measuring valve position. Valve can be moved to any position from 0% to 100%, without engine running.

## 22. MECHANICAL SETTINGS (Static Angle)

**Static Angle** is ignition advance angle, set with stator (generator).

Measure this angle with dial gauge. This measured **Static Angle** is your maximum advance angle you can set with **PCDI**.

Example:

*Measured Static Angle = 39.2deg (this angle you must enter in PCDI)*

*Calculating mm to deg or vice versa:*

$\alpha$  = ignition advance in degrees

$T$  = ignition advance in mm

$R$  = engine stroke divided by 2 in mm

$L$  = conrod length in mm

$P = R + L - T$

$$\alpha = \cos^{-1} \left( \frac{P^2 + R^2 - L^2}{2 \cdot P \cdot R} \right)$$

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

## 23. MONITORING

Connect **programmer** to **PCDI** and wait few seconds for activation of **programmer**. First information displayed on the **programmer** is software version.

With **programmer** you can watch revs, calculated advance ignition angle, PV valve position and TPS position.

### **Information!**

You can connect or disconnect **PCDI** unit from **programmer** any time you want, without any harm. It is not important, if motor running or not and if power supply is connected or not.

### **Important!**

Do not use too much force when connecting or disconnecting **programmer** unit!

## 24. ERROR REPORTS

Two errors can be displayed:

**Program Memory Error** - when program memory is corrupted. With this error present, function of program could be faulty.

**EEPROM Error** - when eeprom memory is corrupted. All programmable data are stored in eeprom memory (curve, rev limit...). With this error present, function of program could be faulty. *You must check all your settings and correct changed.*

**PVerror 1** – position sensor error, or servo motor disconnected

**PVerror 2** – servo motor error (short connection)