



# Small Cap Distributor

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## Installation Instructions ver.1

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### General Information

- The Progression Ignition distributor controls ignition timing 100% electronically. There are NO mechanical adjustments inside the distributor.
- The user must use a smartphone or tablet with the Progression Ignition Tuner app to change the desired ignition timing.
- The timing range is 10 degrees BTDC to 50 degrees BTDC.
- Changes to ignition timing can be made in real time with the engine running.
- Virtual gauges allow you to monitor RPM, MAP and Timing Advance via the app
- 2.5 bar MAP sensor for boosted applications
- Coil current is maximized for operation up to 10,000 RPM.
- Built in Rev Limiter adjustable via the app from 2000-9990 RPM
- Theft prevention feature allows you to "lock" the ignition and prevent the engine from starting via the app

### Requirements

#### SMARTPHONE or TABLET

Must have a smartphone or tablet with Bluetooth 4.0 or higher capability. Both iOS and Android are supported. Install the Progression Ignition Tuner app from the Apple App Store or Google Play Store.

#### ELECTRICAL SYSTEM

The distributor will operate on a negative ground, 12 volt electrical system. It must receive full battery voltage during all operating conditions. If a points distributor is being replaced, any ballast resistor or resistive wire must be bypassed.

#### COILS

The coil used must be designed for electronic distributors **NOT** points. It must be a high output type with a primary resistance of less than 1 ohm. There are many acceptable aftermarket coils with primary resistance around 0.7 ohms. Be sure that the

coil is designed for inductive ignitions NOT capacitive discharge. If you are using a capacitive discharge box, follow that manufacturers coil recommendations.

## **SPARK PLUGS AND WIRES**

Solid core spark plug wires CANNOT be used. Spiral core and suppression core wires are acceptable. Non-Resistor spark plugs CANNOT be used. Correct spark plug gap for most engines is 0.035"-0.045". If the engines compression ratio is above 10.5:1 , spark plug gap must decrease. Too much spark plug gap increases the chance of crossfire in small diameter cap distributors. If crossfire is suspected, decrease the gap.

## **TACHOMETER OUTPUT**

Small cap distributors have a dedicated gray wire for tachometers. The signal is a 12 volt square wave that is compatible with most tachometers.

## **MECHANICAL**

In order for **ANY** distributor to produce accurate ignition timing, the mechanical components driving the distributor must not be worn and must be properly installed. A good, mechanically tight engine will show 2 degrees or less of variance throughout the RPM range. Here is a list of possible causes of inaccurate timing.

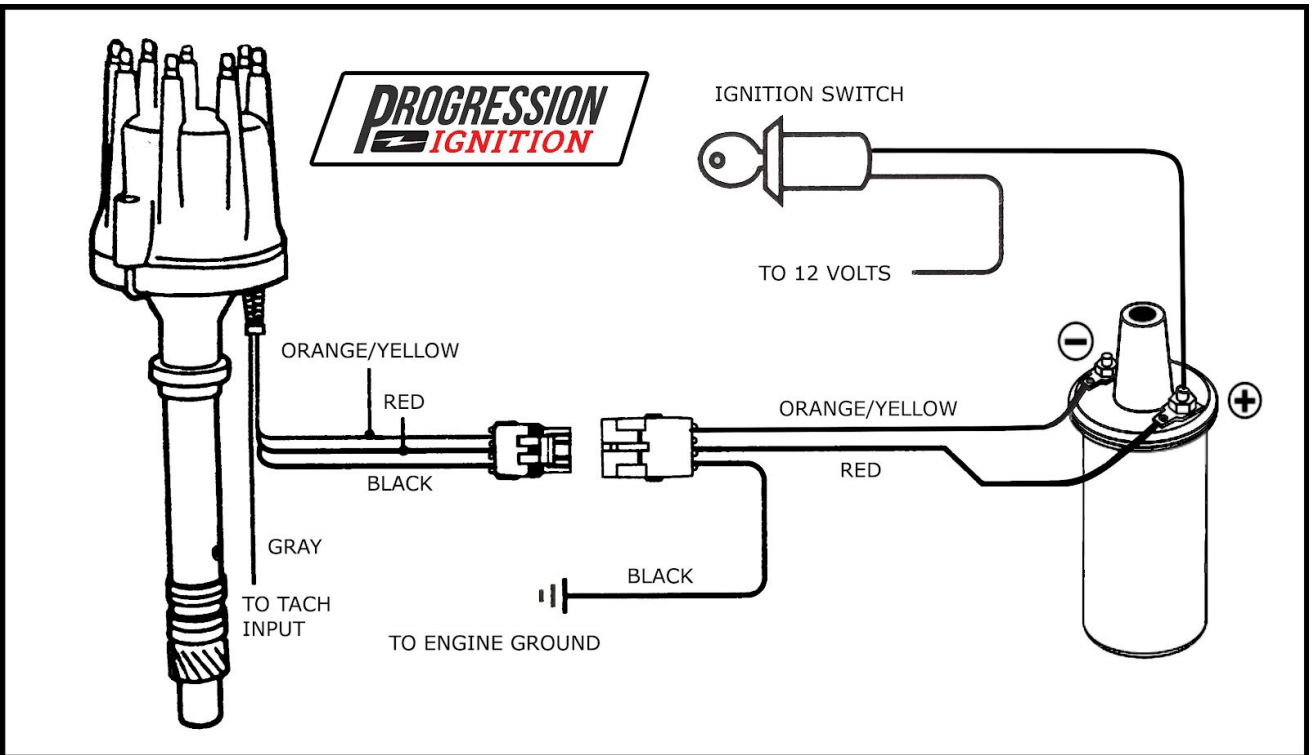
1. Worn distributor gear
2. Worn distributor drive gear on the camshaft
3. Loose timing chain
4. "Cam walk" which is camshaft movement fore and aft in the block. Resistance due to driving the oil pump results in the cam being pushed forward in the block as RPM increases. This is usually caused by installing a camshaft without proper thrust control, for example a cam button.
5. Oil pump- When the oil pump is driven by the distributor shaft, too much oil pressure or volume can cause EXTREME stress on the distributor gear/cam gear mating surfaces. This can be caused by a high volume oil pump installed in an engine with tight/stock bearing clearances. This can cause excessive distributor gear wear in a short time. Too high viscosity oil can cause this as well. Symptoms of this may be an erratic retard in timing at high RPM.

## **Installation**

1. Rotate engine to 10 degrees BTDC on cylinder #1 compression stroke, by doing one of the following:
  - a. If old distributor is still installed.
    - i. Mark the position of the cylinder #1 spark plug wire on the distributor housing.

- ii. Note the firing order and direction of rotation. Remove spark plug wires from cap and remove cap.
    - iii. Rotate the engine until the timing mark on the balancer is at 10 degrees BTDC and the distributor rotor is pointed toward the cylinder #1 mark you made in step i.
  - b. If no distributor is installed.
    - i. Remove cylinder #1 spark plug.
    - ii. Rotate engine until you hear, or feel with your finger, air rushing OUT of the spark plug hole. This confirms you are on the compression stroke.
    - iii. Stop rotating when the timing mark on the balancer is at 10 degrees BTDC.
    - iv. Replace spark plug in cylinder #1.
2. Disconnect battery.
3. If old distributor is still installed. Disconnect old distributor wiring harness. Remove hold down clamp and remove old distributor from the engine.
4. Install Progression Ignition distributor.
  - a. Remove cap.
  - b. Coat distributor gear and O-rings(if applicable) with engine oil or assembly lube.
  - c. Install distributor into engine with rotor pointing in the general direction of where the #1 spark plug wire will be.
  - d. Make sure the distributor is fully seated. If the distributor shaft does not align with the oil pump drive, the distributor will not seat fully. If this is the case, insert the distributor as far as it will go. Then, rotate the engine until the distributor drops into place. You must now rotate the engine until it is back at 10 BTDC on cylinder #1 compression stroke as it was before.
  - e. Install and tighten the hold down clamp leaving it just loose enough to allow the distributor housing to be rotated by hand.
  - f. The top ring of the distributor housing has 8 engraved black marks which represent proper rotor position at 10 degrees BTDC. Rotate the distributor housing so the rotor tip is perfectly aligned with one of the black marks. Mark this rotor position with a pen or a piece of tape on the outside of the housing. This will be the cylinder #1 spark plug wire location on the cap. Make sure the wiring harness and vacuum port are accessible.
  - g. Install the cap and spark plug wires. Make sure to put the cylinder #1 wire on the contact nearest the mark you made in the previous step. Make sure the direction of rotation and firing order is correct.

- h. Connect the vacuum port to a FULL intake manifold vacuum source. DO NOT use ported vacuum.
- i. Connect the wiring harness as shown in the following diagram.



- j. If using a capacitive discharge ignition box, follow that manufacturer's wiring diagram for a Points/Amplifier Style Ignition. Keep in mind, the distributor's red wire must be connected to switched 12 volts.
- k. Double check all connections and reconnect the battery.
- l. Start the engine
- m. The distributor is delivered pre-programmed with a timing table that is fixed at 10 deg. BTDC. Connect a timing light to the cylinder #1 spark plug wire. With the engine running steady at 1200 RPM or higher, rotate the distributor housing until the timing mark on the balancer reads 10 degrees BTDC with the timing light. If you are using a dial-back timing light, make sure the RPM is VERY steady.
- n. Tighten the hold down clamp fully and check timing again. Re-adjust if necessary.
- o. Turn off engine.
- p. The next section will show you step by step how to generate a custom timing table for your engine and store it in the distributor.

## Generating a Timing Table-Step by Step

1. Install the Progression Ignition Tuner app from the Apple App Store, or Google Play Store into your smartphone or tablet.
2. Turn the key on to power the distributor.
3. On your phone or tablet, make sure that Bluetooth is turned on.
4. Open the Progression Ignition Tuner app.
5. Press the SCAN button. This will show you any Progression Ignition distributors within range.
6. Press the name of your distributor. Every distributor has a unique name. Something like "ProXXXXX". If you don't see any available, make sure that power is on to the distributor. Keep in mind that wireless Bluetooth range is around 30 ft. but may be less due to the distributor being under the hood.
7. Enter PIN. Every distributor has a PIN number included in the documentation. You only have to enter the PIN the first time you connect with a particular phone or tablet. **DO NOT LOSE THE PIN!! VERY IMPORTANT!!**
8. Now you should see the main screen. Press the GENERATOR button.
9. Now you must enter some basic parameters of the ignition timing you want.
  - a. Engine type- Choose the number of cylinders of your engine. This must match the type of distributor you purchased.
  - b. Idle Speed- Enter the RPM that your engine typically idles at.
  - c. Idle Timing-Enter the timing you want at idle. This does not affect cranking timing.
  - d. Max RPM-Based Timing- Enter the maximum timing you want as RPM increases. This is essentially maximum "centrifugal" timing on a traditional distributor.
  - e. "All In" RPM- Enter the RPM at which the Max RPM-Based timing you entered in the previous step is reached.
  - f. Max Vacuum Advance- Enter the maximum degrees ADDED to the RPM-Based timing as vacuum increases. If no vacuum advance is desired enter 0.
  - g. Start Vacuum Adv. at- **The default value of 80 is good for most engines.** See the Tuner App Guide for more info.
  - h. Max Vacuum Adv. at- **The default value of 20 is good for most engines.** See the Tuner App Guide for more info.
  - i. Rev Limit- Enter the RPM that will activate the Rev limiter. Range is 2000-9990 RPM and the last digit must always be 0.
  - j. Press the GENERATE TABLE button.
10. Now you see the new table displayed on the screen. Look it over. If it is acceptable, it can be saved to the distributor. To do this, press the lower left corner button. A menu will popup. Press Save. Enter a name for the table if desired. If no name is entered, the time and date will be used as a name.

Then press Save. The table is now saved in the distributor memory and in phone memory.

11. Start the engine. The timing advance displayed in the app should match the number seen on the balancer with a timing light. It may vary slightly due to the mechanism between the crankshaft and the distributor drive gear. You can re-adjust by twisting the distributor housing. You may have to experiment to get the best match. It may be more accurate on a particular engine, to match the timing at a higher RPM for example. If timing drifts as RPM is increased by more than 2 degrees, see the above section "Requirements:Mechanical".
12. For info on how to edit the table, see the Tuner App Guide and the Tuning Guide. There are also demonstration videos on [www.progressionignition.com/videos](http://www.progressionignition.com/videos).

#### **Limited Warranty**

Progression Ignition, LLC warrants this product to be free from defects in materials and workmanship, under its intended normal use, for a period of one year from the date of original purchase. This product must have been purchased directly from Progression Ignition, LLC, or from a dealer authorized by Progression Ignition, LLC. If the product is found to be defective and meeting the conditions above, Progression Ignition, LLC will, at its option, repair or replace the defective item. If the item is covered under this warranty, it will be returned free of charge using ground shipping.

This shall be the sole remedy of the purchaser and the sole liability of Progression Ignition, LLC. Progression Ignition, LLC is not liable for damage to the engine or other parts, labor, personal injury, or any other damage which might be claimed to be related to the use of any products sold or distributed by Progression Ignition, LLC.

This warranty shall be void if the product has been modified in any way by the purchaser or if the product has been used in an application that is inconsistent with that which Progression Ignition, LLC has intended.