

FireBall™

INSTALLATION INSTRUCTIONS XR-i IGNITION POINTS CONVERSION IGNITION SYSTEM

CAUTION: READ INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

OVERVIEW

The XR-i electronic ignition module is designed to replace conventional breaker points on small block Chevrolet and Ford V8 engines with single point distributors. The XR-i requires ballast resistance to limit coil current.

The XR-i ignition uses a Hall Effect Sensor to detect the lobes of the distributor points cam. Dwell is controlled by the battery voltage and engine RPM to provide maximum ignition energy and minimum component heating. The mechanical and vacuum advance mechanisms work the same as with the original breaker points.

IGNITION INSPECTION

The XR-i ignition requires an OE specification distributor cap and rotor to avoid clearance problems and arcing. You should replace the rotor and cap when installing the new ignition system. For best results, you should also replace the spark plugs, plug wires, and ignition coil. Carefully inspect wiring to the coil and replace any worn or frayed sections. For maximum performance, use Crane coils and FireWire spark plug wires.

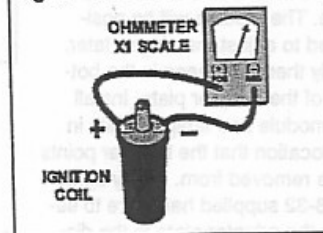
Study the ballast resistance sections carefully. Most installation problems result from improper ballast resistance.

CAUTION: Disconnect the vehicle's battery ground cable before continuing installation.

BALLAST RESISTANCE

1. All vehicles with OE breaker points ignition are factory equipped with ballast resistance. This can be external resistance in the form of a ceramic ballast resistor or a resistance wire between the ignition key and COIL+ terminal. Most Chevrolet vehicles have a resistance wire. Ballast resistance can also be in the form of internal resistance within the coil. Coils with internal resistance will measure 3 to 4 ohms from COIL- to COIL+ terminals.
2. If you are changing coils and your vehicle has a ceramic ballast resistor or resistance wire, do not use any additional ballast resistor
3. If your OE coil had internal resistance and you are changing to a new coil with lower resistance (such as an aftermarket performance coil), you must add a 1.2 to 1.9 ohm ballast resistor. If a resistor is not supplied with the new coil, use a Chrysler style two terminal ballast resistor such as Echlin ICR23 or Wells CR107. Connect the ballast resistor between the COIL+ terminal and ignition switch.

Figure 1. Coil Resistance Test



Quick Test for Ballast Resistance

You can determine if your vehicle has external ballast resistance with this simple test. Disconnect any wires going to COIL-. Reconnect battery. Turn the ignition key on but do not start the engine. Use a voltmeter as shown in Figure 2 and read voltage between COIL+ terminal and ground. It should be about 12 volts. Then momentarily jumper the COIL- terminal to ground. If voltage at COIL+ terminal drops below 8 volts, there is ballast resistance between the ignition key and COIL+ terminal. To determine if your coil has internal ballast resistance, use an ohm meter as shown in Figure 1. Coils with internal resistance will read 3 to 4 ohms from COIL- to COIL+ terminals.

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GM 8 CYLINDER DISTRIBUTOR

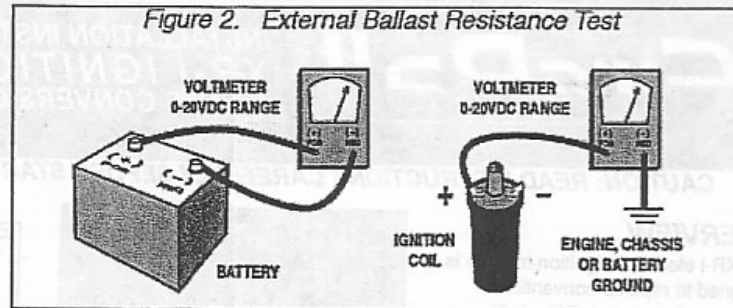
1. Refer to Figure 3. Use the supplied hardware. Check the orientation of the adapter bracket, it will only fit one way.
2. Apply thermal grease to the bottom side of the XR-i module. Install the 6-32 hardware by hand to secure the module to the adapter plate. The module will be positioned to adjust the air gap later.
3. Apply thermal grease to the bottom of the adapter plate. Install the module and adapter plate in the location that the breaker points were removed from. Firmly tighten the 8-32 supplied hardware to secure the adapter plate to the distributor.
4. Route the wires as shown in Figure 4. Be sure that the wires do not interfere with the vacuum advance mechanism.
5. Install the supplied grommet over the wire harness and insert into the cable exit of the distributor. A lubricant such as WD40 is helpful in installing the grommet. Install the cable clamp as shown in Figure 4 using the supplied 8-32 screw.
6. Loosen the 6-32 hardware to allow the XR-i module to slide on the adapter plate. Push the module as close to the points cam as possible without touching the points cam lobe. Tighten the hardware to secure the module in place.

FORD 8 CYLINDER DISTRIBUTOR

Remove distributor from vehicle. Ford distributors require removal of original points plate assembly. Refer to Figure 5 to perform the following steps:

1. Remove the e-clip holding the vacuum linkage arm to the points plate with a small screwdriver.
2. Remove the 2 screws and the vacuum mechanism from the distributor body and set aside.
3. Carefully remove the 2 screws holding the points plate assembly

Figure 2. External Ballast Resistance Test



to the inside of the distributor. Use WD40 or similar solvent to lubricate these screw to avoid damage to the threads in the distributor body.

4. Remove the points plate assembly from the distributor. This assembly should be saved since replacements are not available.

Refer to Figure 6 to perform the following steps for installation of the adapter plates and the XR-i ignition:

1. Press the nylon center ring into the bottom plate and ensure it is fully seated.
2. Test fit the top adapter plate on the center ring. If it does not rotate smoothly, polish the inner diameter of the top adapter plate with fine emery cloth until it does rotate smoothly.
3. Press the four supplied nylon slides into the top plate from the bottom side.
4. Assemble the adapter plates and the center ring. Align the two small cut outs in the top plate with the mounting holes in the bottom plate. If they do not align, flip the bottom plate over.
5. Place the adapter plate assembly into the distributor and align the holes in the bottom plate with the holes in the distributor body.
6. Place the larger ring terminal of the jumper wire on one of the supplied 8-32 screws with the flat side of the ring terminal facing away from the head of the screw.

Figure 3. GM Installation

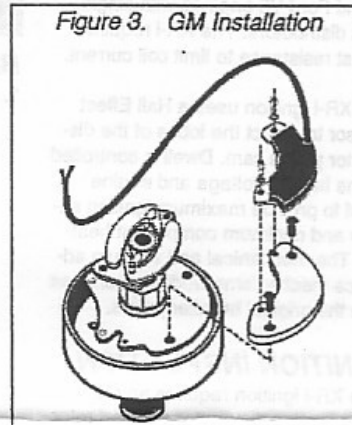
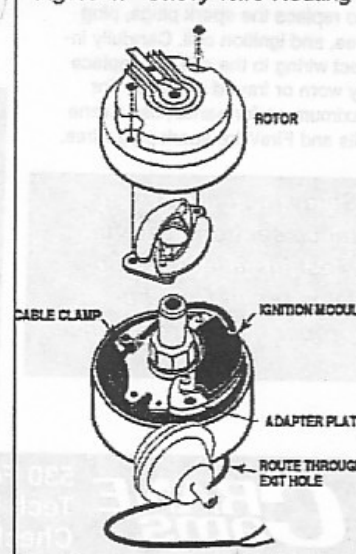


Figure 4. Chevy Wire Routing



7. Secure the adapter plate assembly to distributor with the 8-32 screws, plastic washers, and aluminum spacers as shown. It is recommended to apply a thread lock compound such as Lockite™ to the screw before installing them in the distributor.
8. Route the XR-i wire harness through the hole in the distributor as shown.
9. Install the supplied grommet over the wire harness and insert into the cable exit of the distributor. A lubricant such as WD40 is helpful in installing the grommet.
10. Apply thermal grease to the bottom side of the XR-i module. Install the 6-32 hardware but do not tighten. The jumper wire must be installed on the XR-i mounting ear with the metal pad. The flat side of the ring terminal should contact the XR-i mounting ear.
11. Push the module as close to the points cam as possible without touching the points cam lobe. Tighten the hardware to secure the module in place.

COMPLETING THE INSTALLATION

1. Refer to Figure 7. Connect the black/yellow wire of the module to the Coil- terminal of the coil with one of the ring terminals, and connect the other ring terminal to the black/red wire of the module and connect this to the COIL + terminal of the COIL.
2. Double check all connections. Reconnect the battery if you have not already done so. Momentarily crank engine and visually check for clearance around all parts.
3. Start your engine and set ignition timing according to manufacturer's specifications. Note: Dwell meter readings are meaningless with electronic ignitions and should be ignored.

TROUBLESHOOTING

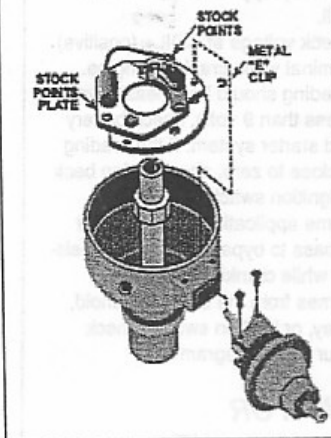
TACH INOPERATIVE

1. Most tachs are connected to the COIL- terminal. If the tach is inoperative, trace out the wire. Refer to the vehicle service manual for further information.
2. If the tach is erratic or reads high, you can put a resistor in the tach wire to reduce the signal level. Start with a 10K ohm 1/2 watt. You can go as low as 1K ohm 1/2 watt. You can buy the resistors from Radio Shack or other electronic suppliers. Solder into tach wire and wrap with electrical tape for protection. If the resistor fix does not help, you may require a tach adapter. Refer to Figure 8.

ENGINE WILL NOT START

1. Pull the high voltage coil wire out of the distributor and connect it to a test spark plug or place the wire 3/8" away from ground. Crank the engine. If sparks fire, the problem is in the secondary system. Possible causes: rotor left out, rotor, cap, or spark plug wires defective, or timing is off (distributor was moved, or plug wire firing order was changed).
2. If there are no sparks, connect a test light between COIL- (negative) terminal and ground. Crank the engine. If the light flashes on and off, the module is okay, but the coil may have failed. Try another coil.
3. If the light does not flash, repeat test in step 2 with a known good coil. Try disconnecting any wires to COIL- other than the black/yellow wire from the Crane module. The only extra wire normally connected to COIL- is the tach wire. If the light still does not flash, the module may have failed.
4. Fuel injected vehicles only. The fuel injection system typically requires a trigger signal from the

Figure 5. Ford Points Plate Removal

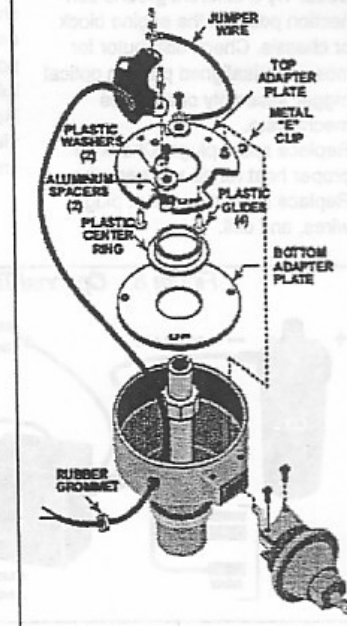


COIL- terminal. Refer to vehicle service manual for details.

CHECK ELECTRICAL CONNECTIONS

1. Check ground connection. Verify continuity from the tin plated tab of

Figure 6. Ford Installation



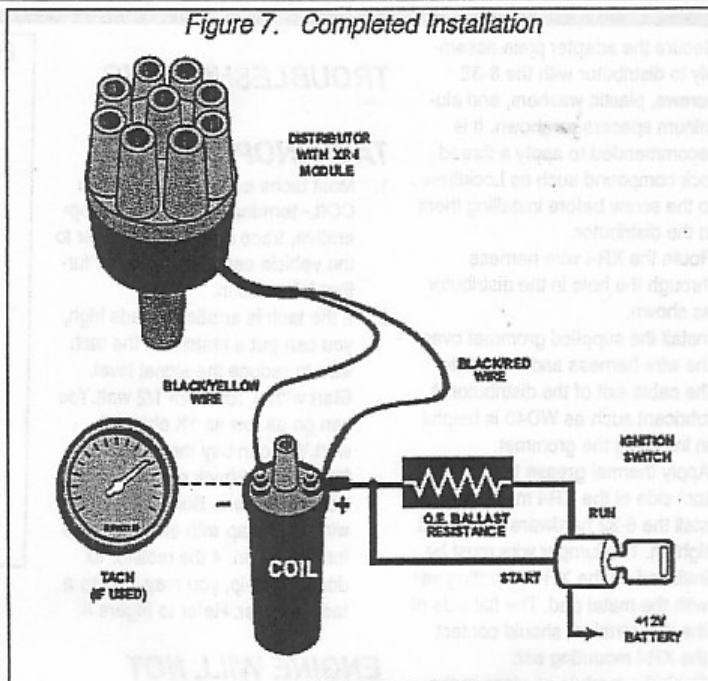
the module to chassis ground. If there is no continuity, remove the 6-32 screw and lockwasher, clean with isopropyl alcohol, and reinstall.

2. Check voltage at COIL+ (positive) terminal while cranking engine. Reading should be at least 9 volts. If less than 9 volts, check battery and starter system. If the reading is close to zero, check wiring back to ignition switch and battery. Some applications use a starter bypass to bypass the ballast resistor while cranking. This wire comes from the starter solenoid, relay, or ignition switch. Check your wiring diagram.

ROUGH OR INTERMITTENT OPERATION

1. Check for disconnected or cracked vacuum hoses, stuck PCV valve, or clogged fuel filter. These problems may cause symptoms similar to ignition trouble.
2. Check electrical connections and optical trigger as explained in the above sections. Check for loose or corroded connections and broken wires. Try a different ground connection point on the engine block or chassis. Check distributor for loose or misaligned parts in optical trigger assembly or advance mechanism.
3. Replace spark plugs. Check for proper heat range and gap size. Replace rotor, cap, spark plug wires, and coil.

Figure 7. Completed Installation



REV LIMIT SETTING

The rev limit of the XR-i ignition is intended to be used as a safety feature to prevent engine damage in over-revving situations such as missed shifts. The potentiometer rotates 270 degrees with full counter clockwise position representing 4000 RPM and full clockwise representing 8000 RPM. Refer to Figure 9 below for a detailed view of the rev limit adjuster. The rev limit in Figure 9 is set to 6000 RPM.

Figure 8. Optional Tach Adapter

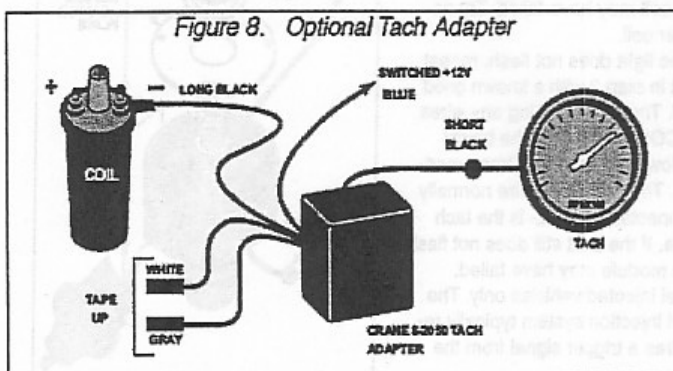


Figure 9. Rev Limit Setting

