

# 1975-79 DISTRIBUTORS & IGNITION SYSTEMS 4-43

## Delco-Remy Electronic Spark Timing Ignition

### 1978 Oldsmobile Toronado

#### DESCRIPTION

The Delco-Remy Electronic Spark Timing (EST) ignition system does not use the standard High Energy Ignition (HEI) distributor. The distributor DOES NOT have a vacuum/mechanical advance mechanism. The distributor cap, coil, module, and rotor are the same as the standard HEI distributor, but the pick-up coil and harness are different. The distributor module has 3 terminals, but operates the same as the 4 wire module.

The EST ignition system has a controller assembly mounted behind glove box in passenger compartment. See Fig. 1. The controller assembly receives signals from coolant temperature sensor, intake manifold vacuum signal, and an atmospheric pressure signal. The manifold vacuum signal hose is connected to carburetor and atmospheric pressure opening is vented to the atmosphere on top of controller.

The coolant temperature sensor is located near upper radiator hose outlet. The coolant temperature sensor is part of the ignition system and operates as a variable resistor (its resistance lowering as coolant temperature rises). The system includes a "CHECK IGNITION" indicator light on instrument panel.

#### OPERATION

The controller assembly receives input signals from the distributor pick-up coil, coolant temperature sensor, manifold (engine vacuum), and atmosphere.

The controller assembly, based on these signals, decides how much ignition advance is required for best engine performance under any given engine operating conditions. The controller assembly then sends a signal to the distributor to fire the spark plugs.

The "CHECK IGNITION" indicator light will come on under the following conditions: Any time ignition switch is turned to the "START" position. If electrical voltage is low. When checking reference timing and the reference timing connector is grounded. If the controller assembly fails to advance spark timing.

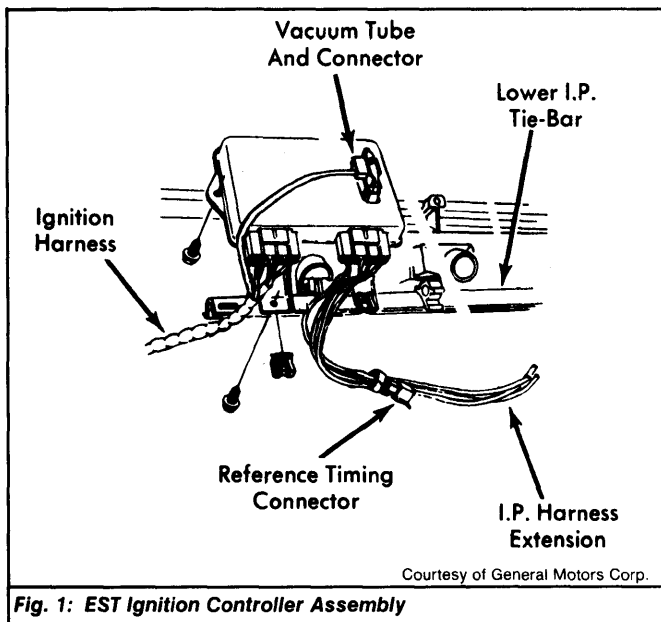


Fig. 1: EST Ignition Controller Assembly

#### ADJUSTMENTS

##### DISTRIBUTOR POSITION & REFERENCE TIMING

1) Check and adjust distributor position after disconnecting Pink wire and removing distributor cap from distributor. Crank engine until rotor points toward rear of engine and number one piston is at

TDC. If necessary, use a socket on crankshaft bolt to turn crankshaft.

2) White mark on rotor should be aligned with White pointer on distributor. If not, loosen distributor clamp bolt and turn distributor to align marks. After adjustment, tighten distributor clamp bolt.

3) With distributor position correctly adjusted, connect a jumper wire between ground and reference timing connector. See Fig. 2. Connector is located below glove box, next to controller assembly.

4) Turn ignition on. The "CHECK IGNITION" indicator light on instrument panel should come on. With transmission in Park, parking brake applied, and drive wheels blocked, start and run engine at idle. Ignition timing should be 20 degrees before top dead center (22 degrees on California models).

5) If ignition timing is incorrect, loosen distributor clamp bolt and rotate distributor until timing is correct. Tighten bolt and recheck timing. Remove jumper wire from reference timing connector. The "CHECK IGNITION" indicator light should go out.

#### TROUBLE SHOOTING

##### ENGINE CRANKS BUT WILL NOT START

1) Using Spark Tester (J-26792), check for spark at spark plug. If spark does not occur, go to next step. If spark occurs, check distributor position and reference timing. If no trouble is found, check fuel system (ignition system is okay).

2) Check Black ground wire at distributor. If ground wire is okay, turn ignition on. Check for battery voltage at distributor Pink wire. If reading is 12 volts or more, go to next step. If reading is less than 12 volts, check for open or short circuit in distributor-to-ignition switch wire and ignition switch.

3) With ignition on, check for battery voltage at controller assembly Pink wire (terminal J of 4-wire connector). If reading is 12 volts or more, go to next step. If reading is less than 12 volts, check for open or short circuit in Pink wire from controller assembly to ignition switch.

4) While cranking engine and without unplugging connector, check for voltage at controller assembly Brown wire (terminal J of 6-wire connector). Voltage should be .5 to 2 volts while cranking engine. If voltage is incorrect, go to next step. If voltage is okay, check distributor cap, coil, and module.

5) Turn ignition off. Disconnect distributor wiring harness connector from controller assembly. Check resistance of each of the 3 terminals in the distributor half of the connector. See Fig. 2.

6) Each terminal should indicate a minimum of 1000 ohms. If ohm readings are low, use Tester (J-24642) to check ignition module. Also check for shorts in wiring to module. If all items are okay, go to next step.

7) Connect ohmmeter to pick-up coil terminals in connector. Pick-up coil resistance should be 500-1500 ohms. If correct, go to next step. If not, replace defective pick-up coil.

8) Disconnect single wire terminal from module and check resistance to ground. Resistance should be zero ohms. If correct, go to next step. If not, replace defective pick-up coil.

9) Connect a jumper wire to ground and to wire just removed from module. Connect distributor harness connector and remove 6-wire connector from controller assembly. See Fig. 2.

10) Connect ohmmeter between White and Dark Green wires (terminal E and C) of controller assembly connector. Resistance should be 500-1500 ohms. Connect ohmmeter between Brown wire (terminal J) and ground. Resistance should be zero ohms. If both readings are correct, replace controller assembly. If not replace wiring harness.

##### ENGINE DETONATION OR SPARK KNOCK OCCURS WITH USE OF RECOMMENDED FUEL & OCTANE RATING

1) Check White vacuum hose from controller assembly to intake manifold for obstruction or other damage. If vacuum hose is okay, disconnect leads at coolant temperature sensor and check sensor resistance.

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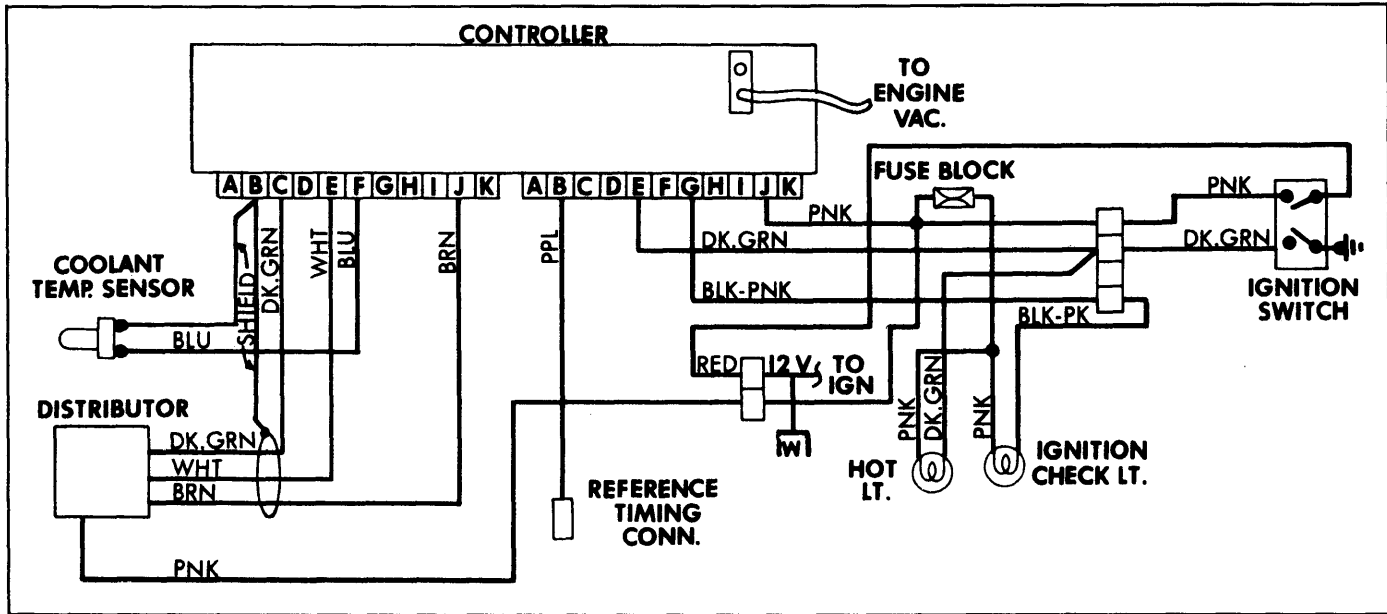


Fig. 2: 1978 Oldsmobile Toronado EST Ignition System Wiring Diagram

- 2) At engine operating temperature, resistance should be 500-2000 ohms. At room temperature (65-70°F), resistance should be 25,000-55,000 ohms. If sensor resistance is correct, go to next step. If not, replace coolant temperature sensor.
- 3) With ignition off, unplug 6-wire connector at controller assembly. Connect a jumper wire between Black wire (terminal B) and Blue wire (terminal F) of controller assembly connector. Check resistance across coolant temperature sensor harness connector.
- 4) If circuit is open or resistance is more than one ohm, replace 6-wire wiring harness. If resistance is less than one ohm, check reference timing. If timing is correct, trouble is not in ignition system.

## HARD STARTING, ROUGH IDLE & POOR PERFORMANCE

- 1) Ensure fuel system is in proper working order. Ensure that all ignition system components are properly adjusted. Ensure that all electrical connections are clean, tight, and undamaged.
- 2) With engine idling and transmission in Park, check for battery voltage at Black/Pink wire at distributor and at Pink wire (terminal J) of controller assembly. If readings are less than 11 volts, check affected circuit(s). If readings are 11 volts or more, go to next step.
- 3) Turn ignition off. Remove distributor cap and check rotor for signs of arcing. Also check ground wire in distributor. If available, use Tester (J-24642) to check ignition module. If items are okay, go to next step.
- 4) Turn ignition off. Disconnect leads at coolant temperature sensor and check sensor resistance. At engine operating temperature, resistance should be 500-2000 ohms. At room temperature (65-70°F), resistance should be 25,000-55,000 ohms. If sensor resistance is correct, go to next step. If not, replace coolant temperature sensor.
- 5) Unplug 6-wire connector at controller assembly. Connect a jumper wire between Black wire (terminal B) and Blue wire (terminal F) of controller assembly connector.
- 6) Check resistance across coolant temperature sensor harness connector. If circuit is open or resistance is more than one ohm, replace 6-wire wiring harness. If resistance is less than one ohm, replace controller assembly.

## ENGINE "HOT" LIGHT COMES ON WITH IGNITION ON

- 1) Check cooling system and engine oil level. Correct if necessary. If no trouble is found, disconnect coolant temperature sensor lead and

turn ignition on. If "HOT" light remains on, go to next step. If light goes out, replace coolant temperature sensor.

- 2) Turn ignition off and disconnect 3-wire instrument panel harness connector near controller assembly. Turn ignition on. If "HOT" light remains off, go to next step. If "HOT" light comes on, locate and repair short circuit in Dark Green wire from 3-wire connector to instrument panel and to ignition switch.
- 3) Unplug controller assembly connector. With ignition off, connect ohmmeter across Black and Blue wires (terminals B and F) of controller assembly connector. Ohmmeter should indicate an open circuit. Go to next step.
- 4) Check continuity between ground and Black and Blue wires. Ohmmeter should indicate an open circuit on Blue wire. If all readings are correct, replace controller assembly. If any reading is incorrect, replace wiring harness.

## "CHECK IGNITION" LIGHT COMES ON WITH ENGINE RUNNING & BATTERY FULLY CHARGED

- 1) Ensure that reference timing connector is not connected or shorted to ground. See Fig. 2. With engine running and transmission in Park, check voltage at Pink wire (terminal J) of controller assembly connector. If reading is 11 volts or more, go to next step. If not, go to step 3).
- 2) With ignition on, disconnect 3-wire instrument panel harness connector near controller assembly. If "CHECK IGNITION" light goes off, replace controller assembly. If light remains on, repair grounded circuit between light and controller assembly.
- 3) Connect voltmeter to battery. Turn all accessories off. Start and run engine at idle. If voltmeter reading is less than 12 volts, check alternator drive belt tension and charging system. If more than 12 volts, repair circuit between fuse block and controller assembly Pink wire (terminal J).

## IGNITION TIMING IN CRANKSHAFT DEGREES

- 1) With engine at normal operating temperature, connect tachometer and magnetic timing probe to engine. Disconnect White (manifold vacuum signal) hose from manifold "T". Plug "T" and connect a hand-held vacuum pump to White vacuum hose.
- 2) Start and run engine at specified engine RPM. See IGNITION TIMING ADVANCE SPECIFICATIONS table. Apply specified amount of vacuum and check crankshaft degrees on timing meter. If timing advance is not within specifications, replace controller assembly.

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## Delco-Remy Electronic Spark Timing Ignition (Cont.)

### IGNITION TIMING ADVANCE SPECIFICATIONS

Engine RPM	Vacuum (Inches Hg)	Crankshaft Degrees
California		
600	13.5	15-22
600	12	15-22
1000	12	17-25
1400	15	39-65
2000	18	24-33
2000	0	23-32
Federal & High Altitude		
600	16.5	29-34
600	15	27-31
1000	12	32-35
1400	15	49-62
1400	10.5	38-40
1400	6	27-35
2000	18	44-47
2000	0	29-31

## REMOVAL & INSTALLATION

### DISTRIBUTOR

**Removal & Installation - 1)** Release spark plug cable latches and pull spark plug cables out of way. Unplug distributor harness connectors. Remove distributor cap. Crank engine until rotor points toward rear of engine and number one piston is at TDC. White mark on rotor should be aligned with White pointer on distributor.

**2)** Remove distributor clamp bolt. Pull up on distributor until rotor just stops turning. Note position of rotor and remove distributor. To install, reverse removal procedure. Adjust distributor position. See DISTRIBUTOR POSITION & REFERENCE TIMING in this article.

### CONTROLLER ASSEMBLY

**Removal & Installation -** With ignition off, remove controller assembly housing screws from lower edge of instrument panel. Lower controller assembly and disconnect vacuum hose and electrical connectors. Remove controller assembly. To install, reverse removal procedure.

### COOLANT TEMPERATURE SENSOR

**Removal & Installation -** Partially drain cooling system. Remove nut and harness connector from sensor. Unscrew coolant temperature sensor from engine. To install, apply sealer to sensor threads and install. Refill cooling system.

## OVERHAUL

### DISTRIBUTOR

**Disassembly - 1)** Remove distributor cap and rotor. Mark distributor shaft and gear for reassembly reference. Drive out roll pin from drive gear while supporting gear to avoid damage to distributor shaft.

**2)** Remove gear, shim and tanged washer from distributor shaft. Clean any burrs from shaft. Remove distributor shaft from housing. Remove 2 attaching screws holding module to housing and position module to disconnect pick-up coil and wiring harness connectors.

**3)** Remove washer from upper end of distributor housing. Remove pole piece, magnet and pick-up coil. Remove lock ring at top of housing, pick-up coil retainer, shim, and felt washer. DO NOT attempt to service shaft bushings in housing.

**4)** Disconnect capacitor lead, remove attaching screw and capacitor. Remove wiring harness from position in distributor housing. Remove 3 coil cover attaching screws and lift off cover. Remove 4 ignition coil attaching screws, disconnect coil leads, and remove coil from cap. Remove ignition coil and seal.

**Reassembly - 1)** Ensure there is silicone lubricant between module and distributor base to provide heat transfer for module cooling. Lubricate felt washer with a few drops of engine oil.

**2)** After installation of distributor shaft, rotate to check for even clearance between pole piece and shaft projections. Notch on side of rotor must engage tab on cam weight base.