

4-46 1975-79 DISTRIBUTORS & IGNITION SYSTEMS

Delco-Remy Misar Ignition

1977 Oldsmobile Toronado

DESCRIPTION

The Delco-Remy Misar ignition system uses a standard High Energy Ignition (HEI) distributor. The distributor, however, DOES NOT have a vacuum/mechanical advance mechanism, a pick-up coil, or pole piece. The distributor cap, coil and module are the same as the standard HEI distributor, but the rotor is different.

The Misar ignition system has a controller assembly mounted behind glove box in passenger compartment. See Fig. 1. The controller assembly receives signals from a crankshaft position sensor and a coolant temperature sensor. The crankshaft position sensor is located at front of engine. 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 drops as coolant temperature rises).

The controller assembly also receives an intake manifold vacuum signal and an atmospheric pressure signal. The White manifold vacuum hose is connected to carburetor and the Black atmospheric pressure hose is open to the atmosphere in the engine compartment. The system includes a "CHECK IGNITION" indicator light on instrument panel.

OPERATION

The controller assembly receives input signals from the crankshaft position sensor (crankshaft position and RPM), 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 condition. 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.

ADJUSTMENTS

DISTRIBUTOR POSITION & REFERENCE TIMING

- 1) Check and adjust distributor position after disconnecting Black-/Pink wire and removing distributor cap from distributor.
- 2) Crank engine until rotor points toward rear of engine and number one piston is at Top Dead Center (TDC). If necessary, use a socket on crankshaft bolt to turn crankshaft to TDC.
- 3) White mark on side of rotor should be aligned with White pointer in distributor. If not, loosen distributor clamp bolt and turn distributor to align marks. After adjustment, tighten distributor clamp bolt.
- 4) With distributor position correctly adjusted, connect a jumper wire between ground and reference timing connector. See Fig. 3. Connector is located below glove box, next to controller assembly.
- 5) 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.
- 6) If ignition timing is incorrect, stop engine and loosen timing adjuster bolts. See Fig. 4. Rotate timing adjuster bolt clockwise to advance timing or counterclockwise to retard timing.
- 7) Tighten adjuster clamp bolts and recheck ignition timing. Remove jumper wire from reference timing connector. The "CHECK IGNITION" indicator light should go out.

CRANKSHAFT POSITION SENSOR CLEARANCE & PULSE DISC ALIGNMENT

Check crankshaft position sensor clearance between sensor and pulse disc. See Fig. 4. If clearance is incorrect, loosen adjustment bolts and reposition sensor. With clearance correctly set, check crankshaft sensor-to-pulse disc alignment and reference timing.

TROUBLE SHOOTING

ENGINE CRANKS BUT WILL NOT START

- 1) Check Electronic Spark Timing (EST) fuse in fuse block. If fuse is okay, go to step 3). If fuse is blown, disconnect 3-wire connector near controller assembly. Install new fuse and turn ignition on.
- 2) If new fuse does not blow, repair short circuit in Red wire from controller assembly to crankshaft position sensor. If fuse blows, repair short circuit in Pink/Black wire from controller assembly to fuse block.
- 3) Check for spark at one 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).
- 4) Inspect crankshaft position sensor, wiring harness, and pulse disc for damage. Check crankshaft position sensor-to-disc alignment. Check Black ground wire at distributor. If ground wire is okay, go to next step.
- 5) Turn ignition on. Check for battery voltage at distributor Black/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.
- 6) With ignition on, check for battery voltage at controller assembly Pink and Red wires (terminal J). 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 to connector and the Pink/Black wire from connector to fuse block.

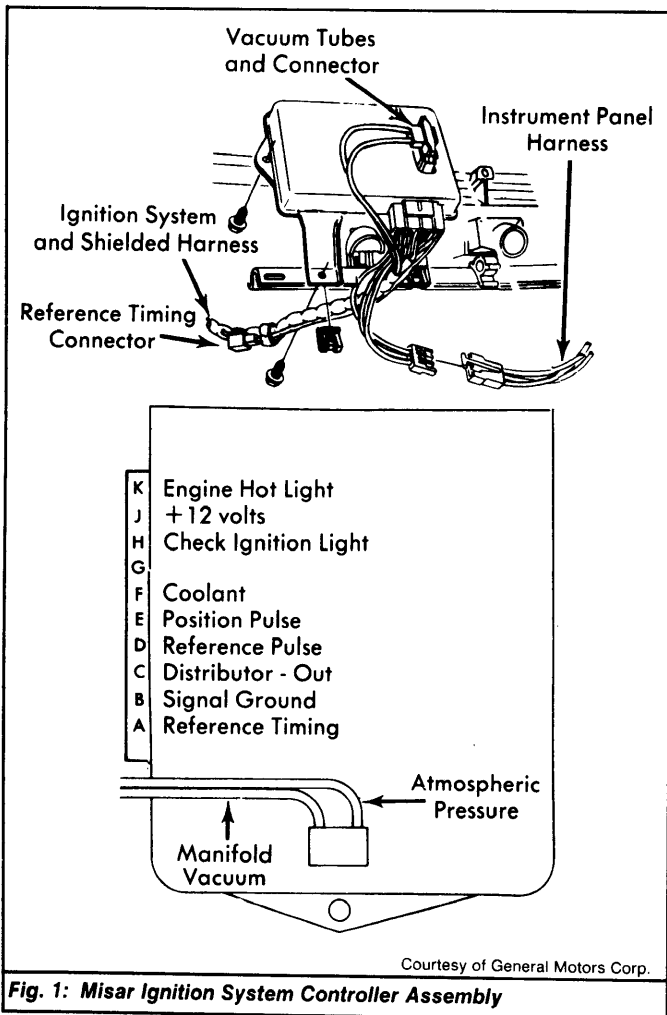


Fig. 1: Misar Ignition System Controller Assembly

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7) While cranking engine and without unplugging connector, check for voltage at Tan wire in 2-wire distributor 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.

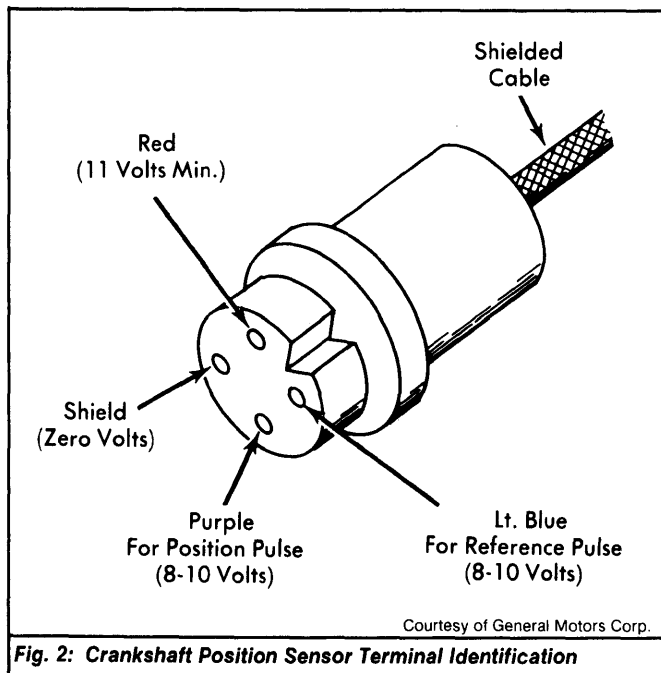
8) While cranking engine, check voltage at Tan wire (terminal C) of controller assembly. Voltage should be .5 to 2 volts while cranking engine. If voltage is incorrect, go to next step. If voltage is correct, check Tan wire for a shorted or open circuit.

9) While cranking engine, check voltage at Light Blue wire (terminal D) of controller assembly. Record voltage reading. Disconnect crankshaft position sensor and check voltage once again. If voltage readings are the same, go to next step. If not (.5 to 2 volts difference), replace controller assembly.

10) Turn ignition on. Check voltage at Red wire and shielded terminal of crankshaft position sensor harness connector. See Fig. 2. If voltages are correct, go to next step. If voltages are incorrect, replace shielded wiring harness.

11) With ignition on, check voltage at Purple and Light Blue wires of crankshaft position sensor harness connector. See Fig. 2. If voltages are incorrect, go to next step. If voltages are okay, replace crankshaft position sensor.

12) With ignition on, check voltage at controller assembly Light Blue and Purple wires (terminals D and E). Both voltage readings should be 8-10 volts. If voltage readings are okay, replace shielded wiring harness. If either voltage reading is incorrect, replace controller assembly.



ENGINE STARTS THEN STOPS WHEN IGNITION KEY IS RELEASED TO THE "RUN" POSITION

1) Turn ignition on. Check voltages at all terminals of crankshaft position sensor harness connector. See Fig. 2. If voltages are correct, go to step 3). If Light Blue or Purple terminal voltages are incorrect, go to next step. If Red or shielded terminal voltages are incorrect, replace shielded wiring harness.

2) With ignition on, check voltage at controller assembly Light Blue and Purple wires (terminals D and E). Both voltage readings should be 8-10 volts. If voltage readings are correct, replace shielded wiring harness. If either voltage reading is incorrect, replace controller assembly.

3) Reconnect crankshaft position sensor harness connector. Connect a jumper wire between ground and controller assembly reference timing lead. See Fig. 3. The engine should start and continue to run. Run engine at idle and go to next step.

4) Check voltage at Purple wire (terminal E) of controller assembly. Voltage should be 3-5 volts. If voltage is correct, replace controller assembly. If voltage is incorrect, check crankshaft position sensor-to-pulse disc alignment. If correct, replace crankshaft position sensor.

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.

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 controller assembly. Connect a jumper wire between Black wire (terminal B) and White wire (terminal F) of connector. Check resistance across coolant temperature sensor harness connector.

4) If circuit is open or resistance is more than one ohm, repair Black or White wires as required. If resistance is less than one ohm, check reference timing and crankshaft position sensor-to-pulse disc alignment. If both are correct, replace controller assembly.

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 and Red 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 on. Unplug crankshaft position sensor connector and check voltage at Red and shielded terminals of connector. See Fig. 2. If voltages are correct, go to next step. If voltages are incorrect, replace shielded wiring harness.

5) With ignition on, check voltage of Light Blue and Purple wires at crankshaft position sensor harness connector. If voltages are incorrect, go to next step. If voltages are correct, go to step 7).

6) With crankshaft position sensor disconnected and ignition on, check for 8-10 volts on Light Blue and Purple wires (terminals D and E) of controller assembly. If voltages are correct, replace shield wiring harness. If not, replace controller assembly.

7) Reconnect crankshaft position sensor connector. With ignition on, check and record voltage reading at Light Blue wire (terminal D) of controller assembly. Start engine and recheck voltage with engine at idle. If voltage readings are different, go to next step. If not, replace crankshaft position sensor.

8) Check for 3-5 volts at Purple wire (terminal E) of controller assembly. If voltage is correct, go to next step. If not, replace crankshaft position sensor.

9) Check voltage at Tan wire in distributor 2-wire connector. With engine idling, reading should be 1-4 volts. If voltage is okay, go to next step. If not, replace controller assembly.

10) Check ignition timing advance. If ignition timing advance is correct, trouble is not in ignition system. Check fuel system. If ignition timing advance is correct, go to ENGINE DETONATION OR SPARK KNOCK OCCURS WITH USE OF RECOMMENDED FUEL & OCTANE RATING test.

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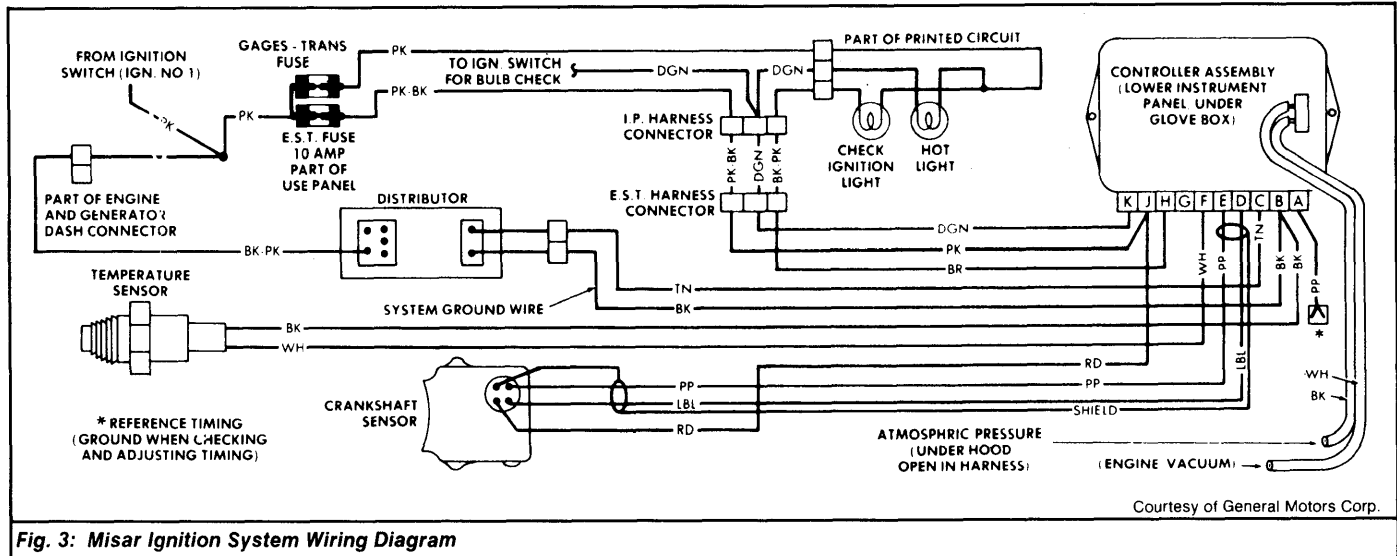


Fig. 3: Misar Ignition System Wiring Diagram

ENGINE "HOT" LIGHT & BUZZER (IF EQUIPPED) COME 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 and buzzer remain on, go to next step. If light and buzzer go off, 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 and buzzer remain off, go to step 7).
- 3) If light comes on models with "HOT" light only, locate and repair short circuit in Dark Green wire from 3-wire connector to instrument panel and to ignition switch.
- 4) If light and buzzer come on models with "HOT" light and buzzer, reconnect 3-wire instrument panel harness connector. With coolant temperature sensor disconnected, turn ignition on. If light and buzzer go off, remove ignition key fuse, clock/cigar lighter fuse, and buzzer control module. Turn ignition on.
- 5) If "HOT" light remains off, replace buzzer control module and install fuses. If light comes on, disconnect 3-wire instrument panel harness connector near controller assembly.
- 6) If "HOT" light now goes off, go to next step. If light still remains on, locate and repair short circuit in Dark Green wire from 3-wire connector to instrument panel and to buzzer control module.
- 7) Unplug controller assembly connector. With ignition off, connect ohmmeter across Black and White wires (terminals B and F) of controller assembly connector. Ohmmeter should indicate an open circuit.
- 8) Check continuity between ground and Black and White wires. Ohmmeter should indicate an open circuit on White wire. If all readings are correct, replace controller assembly. If any reading is incorrect, Black and White wires are shorted to each other. Repair or replace as necessary.

"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. 3. With engine running and transmission in Park, check voltage at Red and Pink wires (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 Brown wire (terminal H).

- 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.

IGNITION TIMING ADVANCE SPECIFICATIONS

Engine RPM	Vacuum (Inches Hg)	Crankshaft Degrees
California		
600	13.5	17-20
600	12	17-20
1000	12	19-22
1400	15	44-61
2000	18	31-49
2000	0	31-34
Federal & High Altitude		
600	16.5	29-34
600	15	27-31
1000	12	29-37
1400	15	44-61
1400	10.5	37-41
2000	18	44-53
2000	0	28-31

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.

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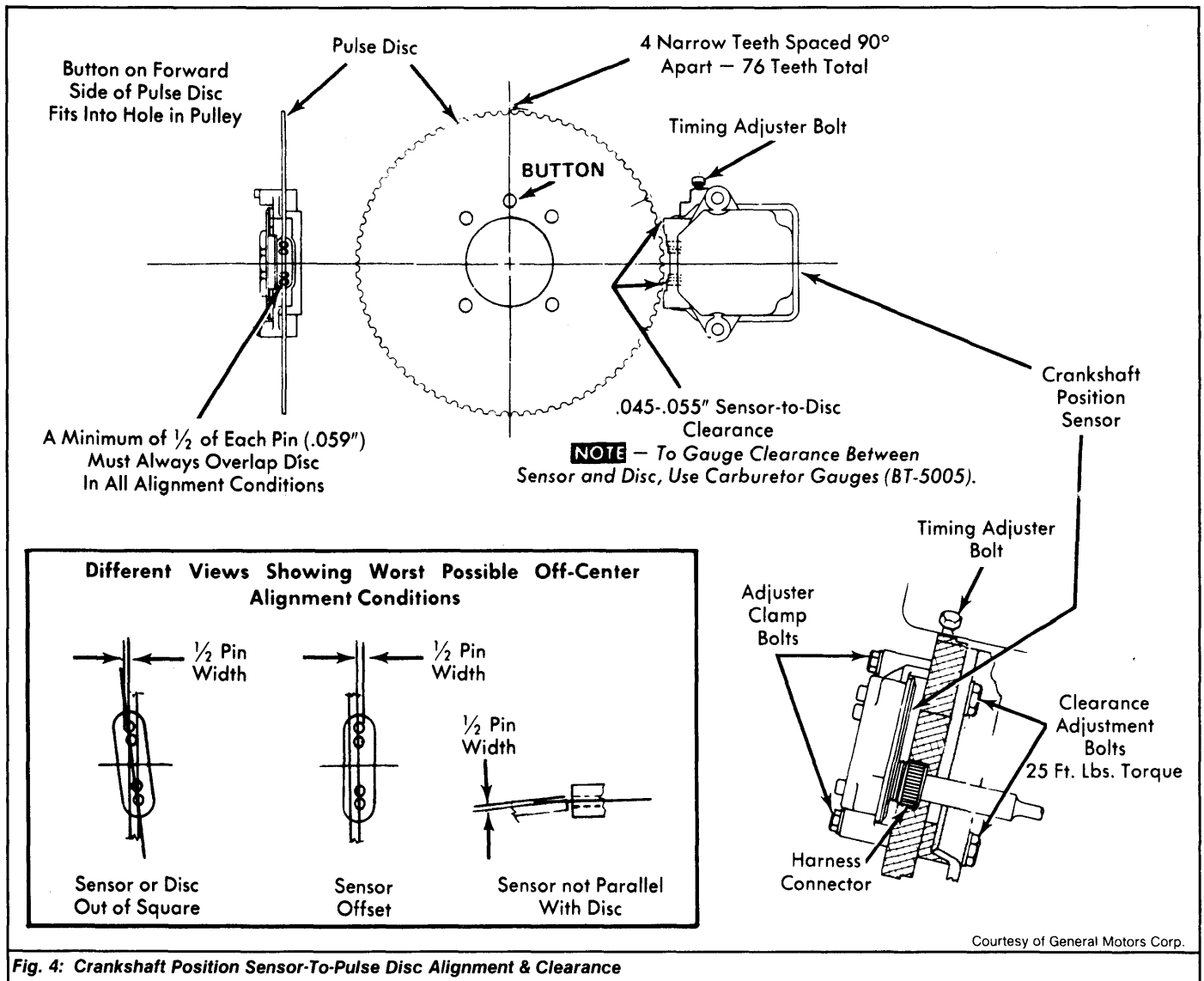


Fig. 4: Crankshaft Position Sensor-To-Pulse Disc Alignment & Clearance

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 connector. 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.

CRANKSHAFT POSITION SENSOR

Removal & Installation — 1) Raise vehicle on hoist. Mark sensor position for installation reference. See Fig. 4. Unplug wiring harness connector from rear of sensor. Remove crankshaft position sensor timing adjuster bolts and sensor.

2) Install crankshaft position sensor, leaving adjuster bolts slightly loose. Check and adjust crankshaft position sensor-to-pulse disc clearance. See CRANKSHAFT POSITION SENSOR CLEARANCE & PULSE DISC ALIGNMENT in this article.

OVERHAUL

DISTRIBUTOR

Disassembly — 1) Remove 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. Remove gear, shim and tanged washer from distributor shaft. Clean any burrs from shaft. Remove distributor shaft from housing.

3) Remove 2 attaching screws and module. Remove washer from upper end of distributor housing. Remove lock ring at top of housing, 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 — 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.