

F - BASIC TESTING

1991 Mazda Miata

1991 ENGINE PERFORMANCE
Basic Diagnostic Procedures

B2200, B2600i, Miata, MPV, MX-6,
Navajo, Protege, RX7, 323, 626, 929

INTRODUCTION

The following diagnostic steps will help prevent overlooking a simple problem. This is also where to begin diagnosis for a no-start condition.

The first step in diagnosing any driveability problem is verifying the customer's complaint with a test drive under the conditions the problem reportedly occurred.

Before entering self-diagnostics, perform a careful and complete visual inspection. Most engine control problems result from mechanical breakdowns, poor electrical connections or damaged/misrouted vacuum hoses. Before condemning the computerized system, perform each test listed in this article.

NOTE: Perform all voltage tests with a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance, unless stated otherwise in test procedure.

PRELIMINARY INSPECTION & ADJUSTMENTS

VISUAL INSPECTION

Visually inspect all electrical wiring, looking for chafed, stretched, cut or pinched wiring. Ensure electrical connectors fit tightly and are not corroded. Ensure vacuum hoses are properly routed and are not pinched or cut. See appropriate M - VACUUM DIAGRAMS article in the ENGINE PERFORMANCE section to verify routing and connections (if necessary). Inspect air induction system for possible vacuum leaks.

MECHANICAL INSPECTION

Compression

1) Check engine mechanical condition with a compression gauge, vacuum gauge, or an engine analyzer. See engine analyzer manual for specific instructions.

2) On RX7 models, connect Compression Tester (49F0189A0) to front rotor housing and battery. Fully depress accelerator pedal and crank engine for 5-10 seconds. Note compression of 3 front combustion chambers and engine cranking speed. See COMPRESSION SPECIFICATIONS TABLE. Use same procedure to check rear chambers.

WARNING: DO NOT use ignition switch during compression tests on fuel injected vehicles. Use a remote starter to crank engine. Fuel injectors on many models are triggered by ignition switch during cranking mode, which can create a fire hazard or contaminate the engine's oiling system.

COMPRESSION SPECIFICATIONS TABLE

Application	Minimum psi (kg/cm ²)@RPM	Standard psi (kg/cm ²)@RPM
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B2200	121	(8.5)@300	173	(12.2)@300
B2600i	142	(10.0)@280	185	(13.0)@280
Miata & 323 (1) .	135	(9.5)@300	192	(13.5)@300
MPV					
2.6L	142	(10.0)@280	.....	185	(13.0)@280
3.0L	121	(8.5)@300	.....	164	(11.5)@300
MX-6 & 626					
Non-Turbo	114	(8.0)@265	.....	162	(11.4)@265
Turbo	98	(6.9)@265	.....	139	(9.8)@265
Navajo	(2)	100 (7.0)	.....	(2)	100 (7.0)
Protege					
SOHC (1)	121	(8.5)@300	.....	173	(12.2)@300
DOHC (1)	128	(9.0)@300	.....	182	(12.8)@300
RX7 (3)	43	(3.0)@250	.....	85	(6.0)@250
929					
SOHC	114	(8.0)@300	.....	164	(11.5)@300
DOHC	125	(8.8)@300	.....	179	(12.6)@300

- (1) - Difference between cylinders should not be more than 28 psi (2.0 kg/cm²).
- (2) - Lowest compression reading should not be less than 75 percent of highest compression reading.
- (3) - Difference between chambers should not be more than 21 psi (1.5 kg/cm²).

Exhaust System Backpressure

The exhaust system can be checked with a vacuum or pressure gauge. Remove O2 sensor or air injection check valve (if equipped). Connect a 0-5 psi pressure gauge and run engine at 2500 RPM. If exhaust system backpressure is greater than 1 3/4-2 psi (.12-.14 kg/cm²), exhaust system or catalytic converter is plugged.

If a vacuum gauge is used, connect vacuum gauge hose to intake manifold vacuum port and start engine. Observe vacuum gauge. Open throttle part way and hold steady. If vacuum gauge reading slowly drops after stabilizing, exhaust system should be checked for a restriction.

FUEL SYSTEM (CARBURETED)

FUEL PRESSURE

Basic diagnosis of fuel system should begin with determining fuel system pressure.

FUEL PUMP (ELECTRICAL)

1) Turn ignition on. Locate fuel control unit under left side of dash. Using a jumper wire, connect terminals "B" to "D". Fuel pump (located in tank) should operate. If pump does not operate, check and replace fuel pump (if necessary). Check fuel pump pressure. See FUEL PUMP PERFORMANCE TABLE.

NOTE: Fuel pump control unit terminal identification is not available from manufacturer.

FUEL PUMP PERFORMANCE TABLE

Application	Pressure psi (kg/cm ²)	Min. Vol. in 30 sec. Pts. (L)
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B2200

Electrical Pump	2.8-3.6 (.20-.25)	1.1 (.53)
Mechanical Pump	3.7-4.7 (.26-.33)9 (.43)

2) If fuel pump operates, remove jumper wire. With ignition on, backprobe rear of fuel pump control unit. There should be 12 volts on terminals "A" and "D" only. If not, check ignition and power feed.

3) Allow engine to idle. There should be 12 volts on terminals "A", "B", "D" and "F" only. If voltage is missing on terminal "B" only, replace fuel pump control unit. If any other terminal is not as described, check ignition coil (tachometer signal) and power feed.

FUEL PUMP (MECHANICAL)

Test pump for pressure and volume. Replace as necessary.

FUEL SYSTEM (FUEL INJECTION)

FUEL PRESSURE

WARNING: ALWAYS relieve fuel pressure before disconnecting any fuel injection related component. DO NOT allow fuel to contact engine or electrical components.

1) On RX7, disconnect fuel pump connector at shock tower in trunk. On all others, disconnect circuit opening relay. See CIRCUIT OPENING RELAY LOCATIONS TABLE.

2) To bleed down fuel in system, start engine (if possible) and allow to die. Connect pressure gauge to fuel line at fuel filter. Reconnect circuit opening relay.

3) On Navajo, install EFI Pressure Gauge (T80L-9974-B) to relief valve. Relief valve is located on fuel supply manifold.

4) Turn ignition on. Using a jumper wire, connect terminals of Yellow fuel pump check connector together. See FUEL PUMP CHECK CONNECTOR (YELLOW) LOCATIONS TABLE. On Miata, Navajo, Protege and 323, jump test connector terminals Fp and ground. If pump runs, check fuel pump circuit, circuit opening relay, and fuel pump resistor (RX7).

FUEL PUMP CHECK CONNECTOR (YELLOW) LOCATIONS TABLE

Application	Location
B2600i, Miata, MX-6, 323 & 626	..... On Firewall, Near Windshield Wiper Motor
MPV, RX7 & 929	..... Near Airflow Sensor
Navajo	..... At Right Inner Fender Panel

5) If possible, start engine. Check fuel pressure with vacuum connected to and disconnected from pressure regulator. Turn engine off and disconnect jumper wire at fuel pump check connector. Wait 10 minutes and ensure residual pressure is at least 21 psi (1.5 kg/cmS2).

6) Operate fuel pump by jumpering fuel pump test connector. Check fuel pump performance. Pinch hose between pressure gauge and fuel filter. Do not hold longer than necessary to check pressure. See FUEL PUMP PERFORMANCE TABLE. If pump does not meet specifications, check fuel pump circuits, fuel pump, fuel tank, fuel filter or replace fuel pump.

FUEL PUMP PERFORMANCE TABLE

Application	Pressure
All Models (1) (2) 64-85 psi (4.5-6.0 kg/cm ²)	
(1) - 4WD Protege, transfer pump pressure is more than 6.0 psi (0.4 kg/cm ²).	
(2) - Minimum volume in 30 seconds is 1.0 pint (.47L).	

REGULATED FUEL PRESSURE (AT IDLE) TABLE

Application	W/Vacuum psi (kg/cm ²)	W/O Vacuum psi (kg/cm ²)
B2600i, Miata, MPV, Protege, 323 & 929	31-38 (2.2-2.7) .	38-46 (2.7-3.2)
MX-6, RX7 & 626	27-33 (1.9-2.3) .	34-40 (2.4-2.8)
Navajo . . . . .	. . . . .	34-46 (2.4-3.2)

FUEL PUMP CIRCUIT (EXCEPT NAVAJO)

1) Turn ignition on. Connect terminals of Yellow fuel pump check connector with a jumper wire. See FUEL PUMP CHECK CONNECTOR (YELLOW) LOCATIONS TABLE. On Miata, Navajo, Protege and 323, attach jumper wire to test connector terminal Fp and to ground in the diagnostic connector, next to battery.

2) Listen for fuel pump operating sound. If there is no sound, check main fuse, circuit operating relay, fuel pump and all electrical connections. On all models, airflow meter grounds circuit opening relay and operates fuel pump whenever airflow is present.

3) Circuit opening relay and fuel pump relay are controlled by the computer. For additional testing, see I - SYS/COMP TESTS or appropriate G - TEST W/ CODES article in the ENGINE PERFORMANCE section.

FUEL PUMP RELAY (NAVAJO)

1) Remove fuel pump relay (located under power distribution box on right inner fender). Connect 12 volts to terminal "C" and ground terminal "D". Check for continuity between terminals "A" and "B". If continuity is present, relay is okay. If continuity is not present, replace relay.

2) Turn ignition on. Ensure 12 volts present on Red and Black/Yellow or Yellow wires. If 12 volts is not present, repair circuits from Electronic Engine Control power relay, battery or power distribution box.

3) Connect 12 volts to terminal "A". Fuel pump should operate. If not, repair wiring to inertia switch, fuel pump, fuel pump ground, or replace fuel pump.

INERTIA SWITCH (NAVAJO)

Inertia switch is located under dash to the right of transmission tunnel. To reset switch, make sure no fuel leaks are present. Push reset button.

CIRCUIT OPENING RELAY (EXCEPT NAVAJO)

1) With relay connected, ensure specified voltage is present at relay terminals. See FUEL PUMP RELAY CIRCUIT VOLTAGES TABLE. For

locations of circuit opening relay, see CIRCUIT OPENING RELAY LOCATIONS TABLE.

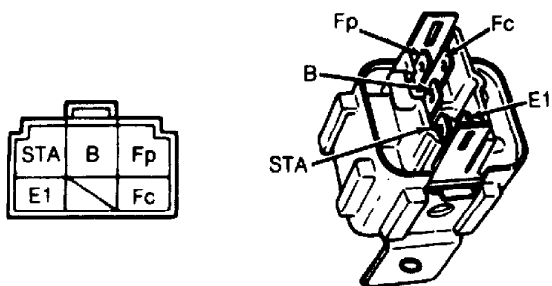
2) If voltages are okay, remove relay from vehicle. Check relay operation using a 12-volt battery source and perform resistance tests. See Fig. 1.

CIRCUIT OPENING RELAY LOCATIONS TABLE

Application	Location
B2200, B2600i & 929	Behind Left Kick Panel
Miata	Under Dash, Left Of Steering Column
MPV	Mounted On ECU, Under Protective Cover On Passenger Side Floor
MX-6 & 626	On Fuse Block
Protege & 323	On Passenger Side Of Firewall, Near ECU
RX7	On Bracket Behind Instrument Panel

FUEL PUMP RELAY CIRCUIT VOLTAGES TABLE

Terminal	Ignition ON Volts	Ignition START Volts	Idle Volts
Fp	0	12	12
Fc	12	0	0
B	12	12	12
STA	0	12	0
E1	0	0	0



12V	Grounded	Correct result
STA	E1	B-Fp: Continuity
B	Fc	Fp: Battery voltage

RELAY VOLTAGE CHECK

Between terminals	Resistance (Ω)
STA-E1	21—43
B-Fc	109—226
B-Fp	∞

RELAY RESISTANCE CHECK

Fig. 1: Testing Fuel Pump Relay (Except Navajo)
Courtesy of Mazda Motors Corp.

RESISTOR RELAY (RX7)

1) Remove air cleaner and airflow meter. Disconnect fuel pump resistor. Ensure continuity exists between terminals "a" and "b". See Figs. 2 and 3.

2) Measure resistance between the following terminals. Resistance between terminals "c" and "d" should be 60-92 ohms and between "e" and "f" should be .70-.94 ohms. If resistor relay does not test as specified, replace relay.

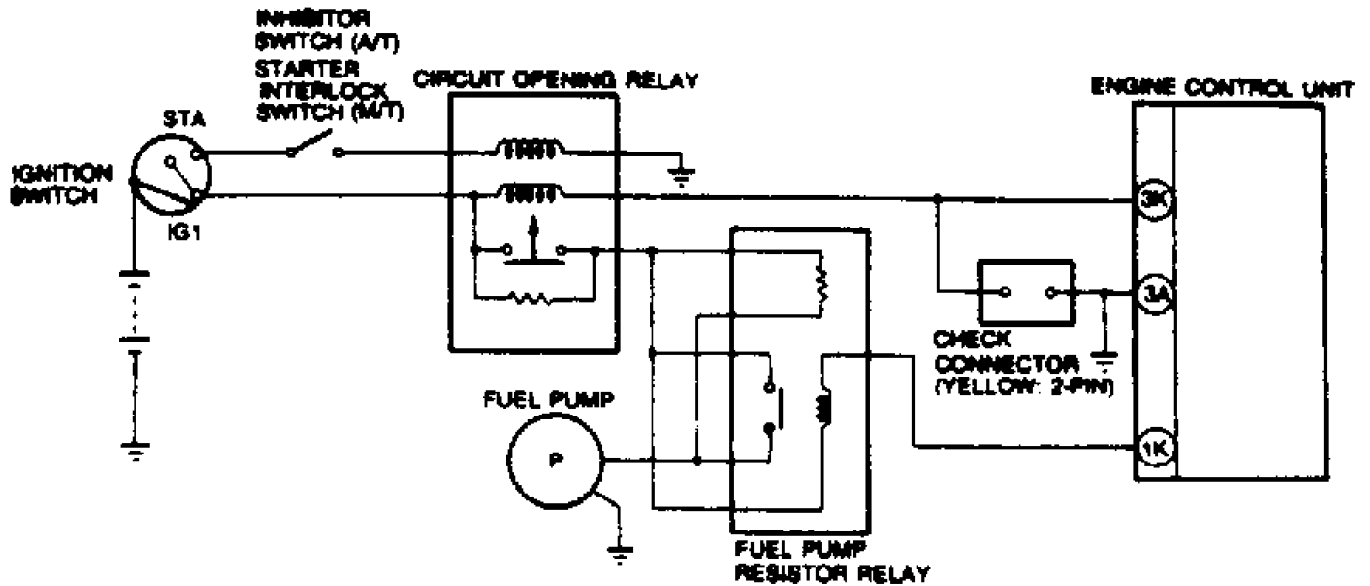
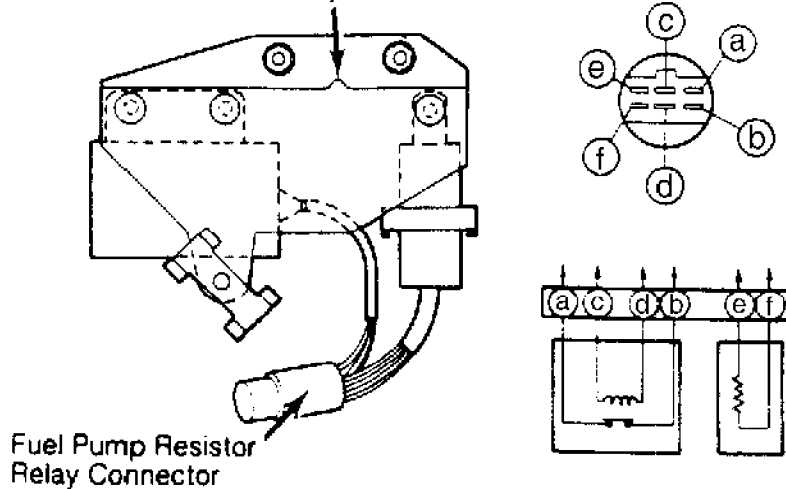


Fig. 2: Fuel Pump Control Circuit (RX7)
Courtesy of Mazda Motor Corp.

Fuel Pump Resistor Relay



36015

Fig. 3: Testing Fuel Pump Resistor Relay (RX7)
Courtesy of Mazda Motors Corp.

TRANSFER PUMP (PROTEGE 4WD)

Because of the rear drive shaft, the fuel tank is in 2 sections. A transfer pump keeps both sides of tank at equal fuel levels. An access panel is located under the rear seat. Transfer pump control unit is located under driver's seat. Disconnect the transfer pump connector at the fuel tank, and check continuity between Black/White and Yellow wires. If no continuity is present, replace transfer pump.

TRANSFER PUMP CONTROL UNIT (PROTEGE 4WD)

1) Turn ignition on. Ensure fuel gauge reads more than half full and transfer pump operation is heard. Ground transfer pump connector Yellow/Blue wire, and verify pump stops. Remove the ground from terminal Yellow/Blue wire, and verify pump operates after about 10 seconds. If pump does not operate as specified, see TRANSFER PUMP. See Fig. 4.

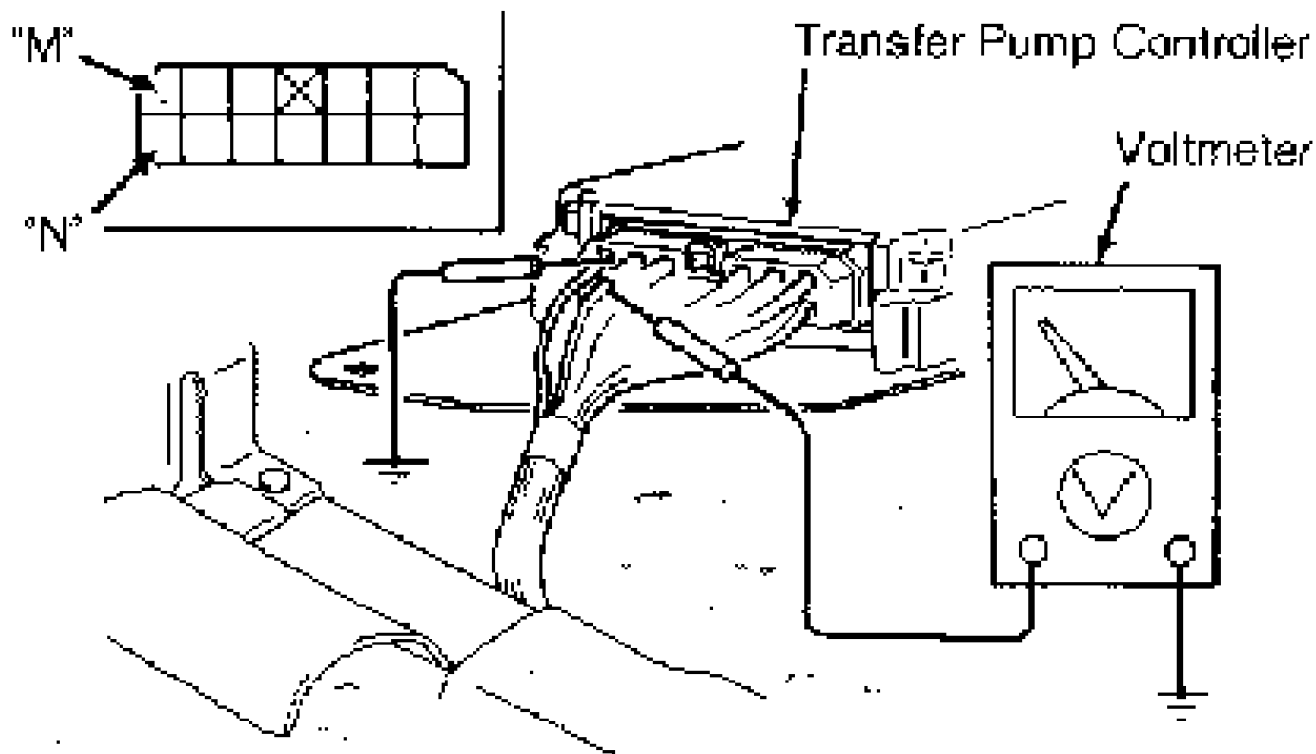


Fig. 4: Testing Transfer Pump Control System
Courtesy of Mazda Motors Corp.

2) Turn ignition on. Ground fuel pump control unit terminal "M" with jumper wire. Verify that zero volts is present at control unit terminal "N". Remove the jumper wire and check that voltage is 12 volts in about 10 seconds. If voltage is not as specified, disconnect transfer pump connector. Turn ignition on. Verify that the voltage is 12 volts at terminal "N" of the transfer pump connector. If not, replace transfer pump control unit.

IGNITION CHECKS

SPARK (EXCEPT NAVAJO & RX7)

Check for spark at coil wire and at each spark plug wire

using a high output spark tester. Check spark plug wire resistance on suspect wires. Resistance should be no less than 4878 ohms per foot.

IGNITION COIL POWER SOURCE (EXCEPT NAVAJO & RX7)

Turn ignition on. Using voltmeter, check for 12 volts between positive (+) terminal and ground. If no voltage is present, check battery feed, main fuse, main relay No. 1 (MX-6 and 626 models), injector main relay (929 models), ignition switch and fusible links.

IGNITION COIL RESISTANCE (EXCEPT NAVAJO & RX7)

1) Remove primary and secondary leads from ignition coil. Using ohmmeter, check primary resistance between positive and negative terminals of coil. See Fig. 5. Resistance should be as specified in IGNITION COIL RESISTANCE TABLE. If resistance is not as specified, replace ignition coil.

2) Check secondary resistance between (positive) terminal and coil tower. See Fig. 5. See IGNITION COIL RESISTANCE TABLE. If resistance is not within specifications, replace coil.

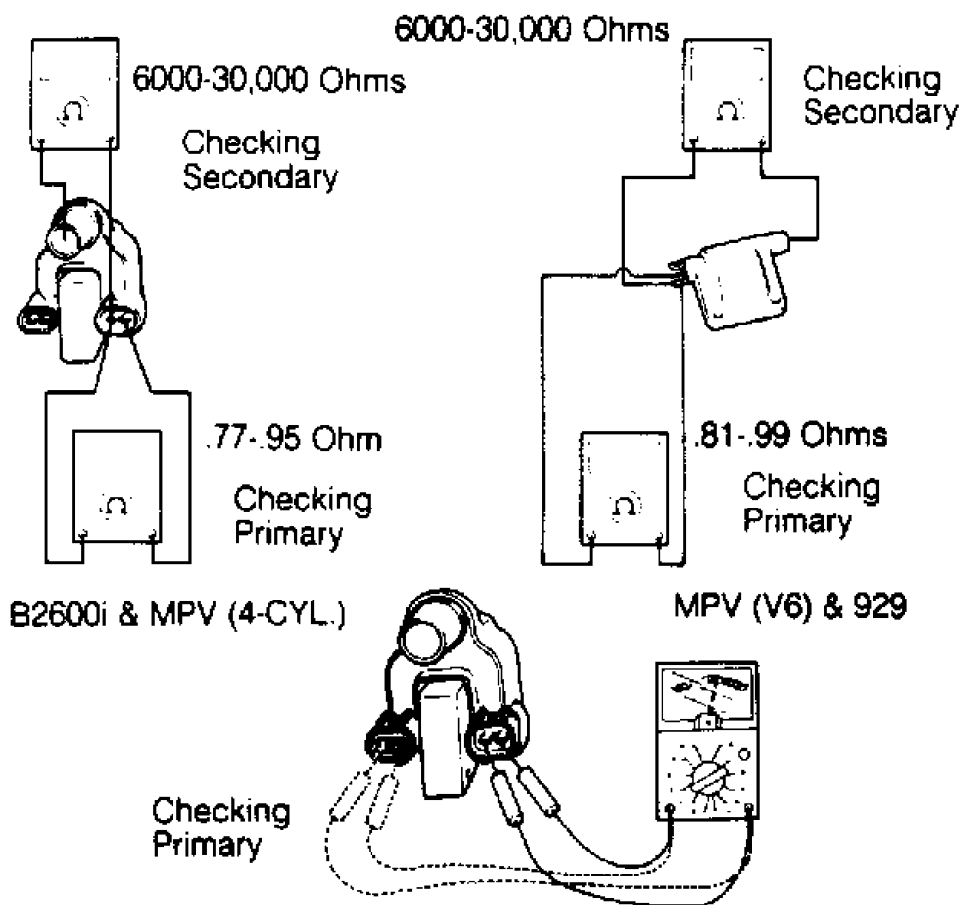


Fig. 5: Checking Coil (B2600i & MPV Others Are Similar)
Courtesy of Mazda Motor Corp.

Application	Primary	Secondary
B2200 (Carbureted)	1.0-1.3	6000-30,000
B2200 (PFI) .....	.81-.99	6000-30,000
B2600i		
Right Side .....	.77-.95	6000-30,000
Left Side	900-1100	
Miata .....	.78-.94	11,200-15,200
MPV		
2.6L (4-Cyl.)		
Right Side .....	.77-.95	6000-30,000
Left Side .....	.90-1.1	6000-30,000
3.0L (V6) .....	.81-.99	6000-30,000
MX-6 & 626		
Non-Turbo .....	.77-.95	10,300-13,900
Turbo .....	.72-.88	10,300-13,900
Protege & 323 .....	.81-.99	10,000-16,000
929 .....	.72-.88	10,000-30,000

OPTICAL DISTRIBUTOR VOLTAGE (MIATA, PROTEGE & 323)

Turn ignition on. Check optical distributor ignition source by backprobing distributor terminal for correct voltage. See OPTICAL DISTRIBUTOR VOLTAGE SPECIFICATIONS TABLE.

OPTICAL DISTRIBUTOR VOLTAGE SPECIFICATIONS TABLE

Wire Color	Volts
Miata, Protege & 323	
White/Red	12
White	(1) 0-5
Yellow/Blue	(1) 0-5
Black/Lt. Green	0

(1) - Voltage should fluctuate from 0-5 volts as engine is turned slowly.

DISTRIBUTOR PICK-UP COIL RESISTANCE (B2200, B2600I, MPV, MX-6 NON-TURBO & 626 NON-TURBO)

1) Disconnect pick-up coil from distributor. Using an ohmmeter, measure resistance between 2 inner terminals on pick-up coil. Replace pick-up coil if resistance is not as specified in DISTRIBUTOR PICK-UP COIL RESISTANCE TABLE.

2) Ensure ignition coil has battery voltage. If ignition coil resistance and pick-up coil test okay, check for spark. If spark is still not available, see appropriate G - TESTS W/ CODES article in ENGINE PERFORMANCE section.

DISTRIBUTOR PICK-UP COIL RESISTANCE TABLE

Application	Ohms
B2200, B2600i & MPV	900-1200
MX-6 Non-Turbo, 626 Non-Turbo	900-1200

CRANK ANGLE SENSOR RESISTANCE (MX-6 TURBO, 626 TURBO & 929)

1) Disconnect crank angle sensor connector from distributor.

On 929, crank angle sensor is a separate unit located on the back of the camshaft. Measure resistance between terminals indicated in CRANK ANGLE SENSOR RESISTANCE TABLE. See Fig. 6. If resistance is not as indicated, replace distributor assembly.

2) If ignition coil resistance and crank angle sensor test okay, check for spark. If spark is still not available, go to IGNITOR test.

CRANK ANGLE SENSOR RESISTANCE TABLE

Application	Ohms
MX-6 Turbo & 626 Turbo	
Between Ignitor Terminals	
"A" & "B"	210-260
"C" & "D"	210-260
"E" & "F"	210-260
929 SOHC	
Ne & COM	140-180
G1 & COM	140-180
G2 & COM	140-180
929 DOHC	
Ne & COM	180-220
G1 & COM	140-180
G2 & COM	140-180

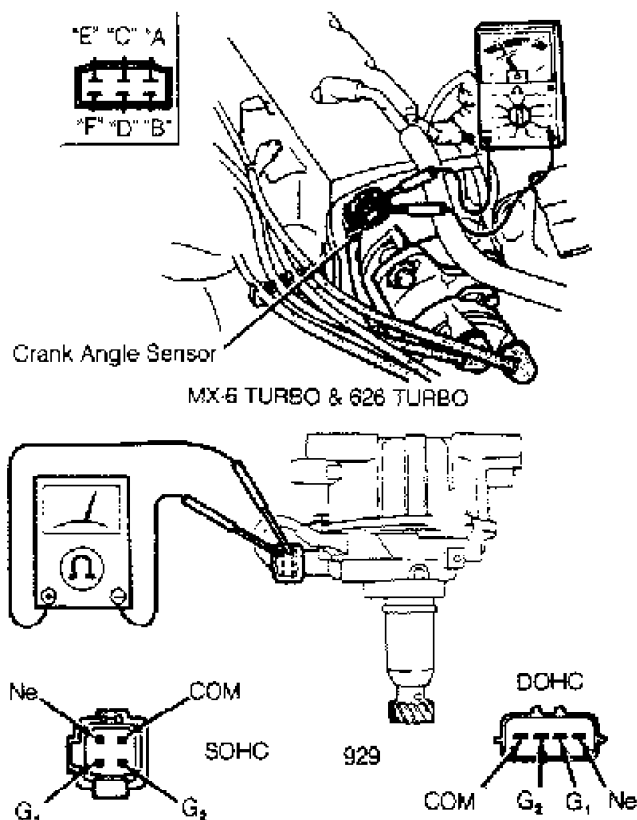


Fig. 6: Checking Crank Angle Sensor (MX-6 Turbo, 626 Turbo & 929)
Courtesy of Mazda Motors Corp.

CAUTION: While checking the ignitor, disconnect connector from the ignition coil.

IGNITOR (MIATA, PROTEGE & 323)

1) Ensure coil and power source are okay before checking ignitor. Disconnect coil ignitor connector. Install Ignitor Checker (49 F018 002) and Adapter Harness (49 N018 011). Connect the ignitor checker and adapter between the ignitor and wiring harness, connect the power leads to the battery.

2) Turn ignition on. Disconnect the high-tension coil lead from the distributor and hold it about 1/4" from ground. Flip the SW2 on and off, and verify a strong Blue spark is discharged from lead. If spark is weak in color, replace the coil. If no spark is present, check battery feed, main fuse, ignition switch and fusible links. Repair or replace as necessary.

CAUTION: DO NOT hold the SW2 switch on longer than one second.

3) Turn ignition on. Using voltmeter, check voltage on Black wire of adapter harness. Flip SW2 switch on and off. Verify voltmeter fluctuates. If voltmeter does not fluctuate, replace ignitor and retest.

IGNITOR (MX-6 TURBO, 626 TURBO & 929)

1) Turn ignition off. Disconnect ignitor connector and install Test Harness (49 F018 002). Using a needle-type ohmmeter, connect (+) lead to ground and (-) lead to single-pin test wire of test harness.

CAUTION: Ensure ohmmeter is installed with (+) lead to ground and (-) lead to single-pin wire of test harness. DO NOT reverse leads or damage may result.

2) Connect Ignitor Checker (49 H018 910) to other lead of test harness and to battery. See Fig. 7. Set ohmmeter to X1 scale.

3) Turn ignition on. DO NOT touch ignitor checker SW1 switch. Push up ignitor checker SW2 switch and note ohmmeter reading. Ohmmeter needle should jump to 1/2 of the scale and then return. If ohmmeter does not operate as specified, replace ignitor.

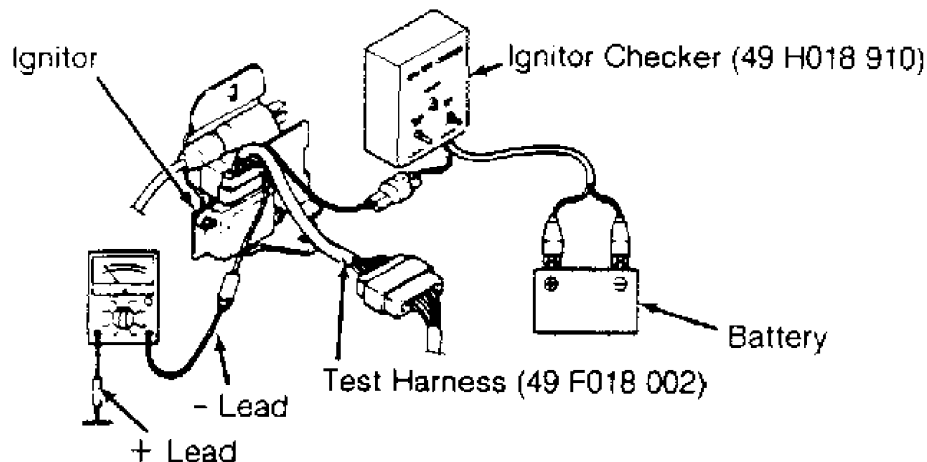


Fig. 7: Checking Ignitor (MX-6 Turbo, 626 Turbo & 929)
Courtesy of Mazda Motors Corp.

INITIAL TEST (NAVAJO)

NOTE: While performing EDIS diagnostics, DO NOT connect Electronic Control Assembly (ECA) to breakout box unless directed otherwise. Unless test procedures indicate otherwise, perform the following tests in sequence shown.

Check for any stored trouble codes and repair as necessary. See appropriate G - TEST W/ CODES article in the ENGINE PERFORMANCE section. Using a high-output spark plug tester, check for spark at all spark plugs. If spark is present at ALL spark plugs, go to CHECK PROFILE IGNITION PICKUP (PIP) AT EDIS MODULE (NAVAJO). If no spark is indicated or spark only occurs at some spark plugs, go to CHECKING PLUGS & WIRES (NAVAJO).

CHECK PROFILE IGNITION PICKUP (PIP) AT EDIS MODULE (NAVAJO)

1) Turn key off. Connect EDIS Diagnostic Cable (007-00059) to breakout box (T83L-50-EEC-IV), EDIS module and coil pack. DO NOT connect Crankshaft (VRS) sensor tee. See Fig. 8. Use EDIS No. 6 overlay.

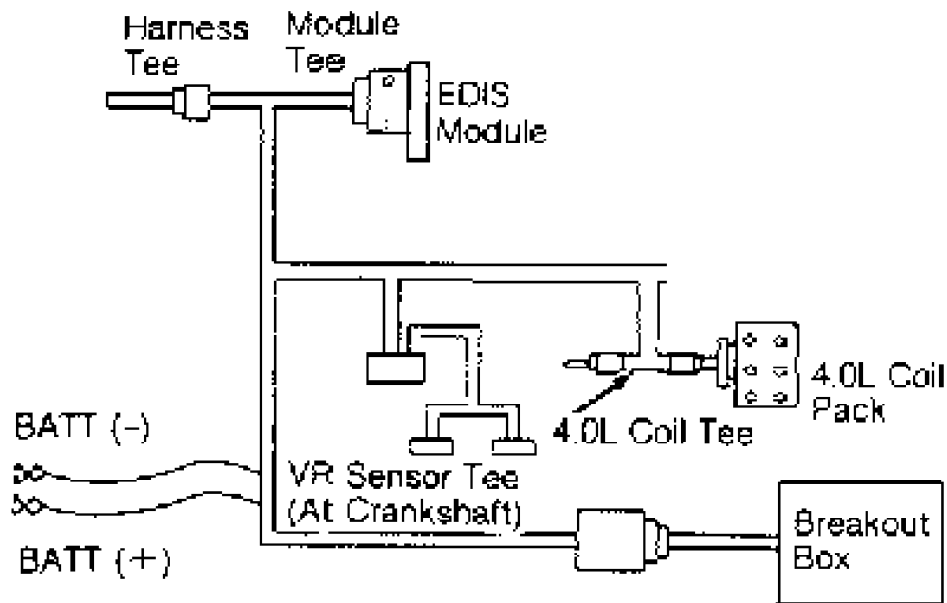


Fig. 8: Installing EDIS Diagnostic Cable
Courtesy of Mazda Motors Corp.

2) Connect EDIS diagnostic cable negative lead to battery, leaving positive lead disconnected. Set EDIS diagnostic cable box to 4/6 CYLINDER position. Connect LED test light leads between breakout box pins No. J43 (PIP E) and J7 (ground). Crank engine. If LED test light blinks, go to step 3). If test light does not blink, go to ISOLATE EDIS MODULE/PIP FAULT (NAVAJO).

3) Turn key off. Disconnect ECA. Check continuity of PIP and Ignition Ground (IGND) wires between EDIS and ECA. If any problems are

found, repair circuits and components. Clear Continuous Memory, and run QUICK TEST in appropriate G - TEST W/ CODES article in the ENGINE PERFORMANCE section. If continuity is present and wires are not shorted or open, replace EDIS module.

ISOLATE EDIS MODULE/PIP FAULT (NAVAJO)

With key off, disconnect ECA. Connect LED test light leads between breakout box pins No. J43 (PIP E) and J7 (ground). Crank engine. If LED test light blinks, replace ECA. If test light does not blink, check PIP for short to ground or power. Repair any problems found. If no problems are found, replace EDIS module.

Checking Plugs & Wires Crank engine. Using a high-output spark tester, check for spark at both spark plug wires of each coil. If no spark at all coils, go to CHECK FOR VBAT TO EDIS MODULE (NAVAJO). If spark is missing from both spark plug wires of one or 2 coils, go to CHECK VBAT OPEN TO COIL (NAVAJO). If spark is missing from one wire, replace spark plug wire and spark plug. Recheck ignition system.

CHECK FOR VBAT TO EDIS MODULE (NAVAJO)

Turn key off and disconnect ECA, set DVOM to 20-volt scale. Turn key on. Measure voltage between breakout box pins No. (+) J51 (VBAT E) and (-) J7 (BAT negative). If voltage is greater than 10.5 volts, go to CHECK FOR GROUND OPEN TO EDIS MODULE (NAVAJO). If voltage is 10.5 volts or less, repair open or short in circuit from ignition switch.

CHECK FOR GROUND OPEN TO EDIS MODULE (NAVAJO)

Turn key off and disconnect ECA. Measure resistance between breakout box pins J27 (PWR GND E) and chassis ground. If resistance is less than 5 ohms, go to CHECK VRS RESISTANCE (NAVAJO). If resistance is 5 ohms or more, repair open in ground circuit.

CHECK VRS RESISTANCE (NAVAJO)

Turn key off and disconnect ECA. Connect EDIS diagnostic cable negative lead to negative battery terminal. Set DVOM to 20-k/ohm scale. Measure resistance between breakout box pins No. J48 (VRS E) and J35 (VRS+ E). If resistance is 2580-2700 ohms, go to VRS SENSOR (NAVAJO). If resistance is not 2580-2700 ohms, repair wires between VRS and EDIS or replace VRS.

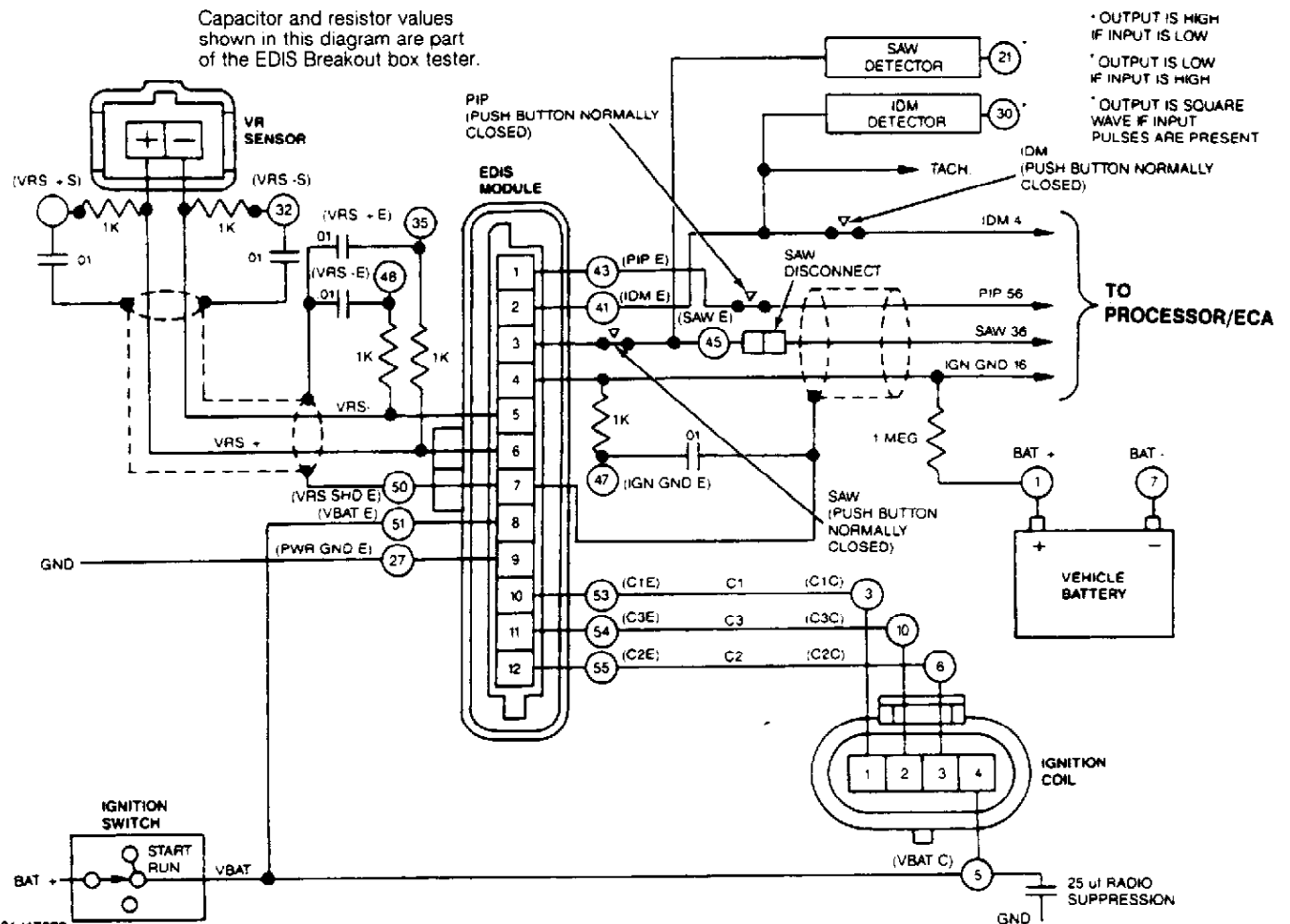


Fig. 9: EDIS Test Schematic (4.0L)
Courtesy of Mazda Motors Corp.

VRS SENSOR (NAVAJO)

Make sure trigger wheel on crank pulley and VRS are not damaged. Ensure VRS is not touching trigger wheel. If no problems are found, disconnect EDIS connector. Crank engine and check for A/C voltage at EDIS harness terminals No. 4 and 5. If A/C voltage is not pulsing greater than 1 volt, check VRS circuits for opens or shorts. If no problems are found, replace VRS sensor. If A/C voltage pulses greater than 1 volt, go to CHECK VBAT OPEN TO COIL (NAVAJO).

CHECK VBAT OPEN TO COIL (NAVAJO)

Turn key off, and disconnect harness at coil pack. Turn key on. Measure voltage between coil pack harness terminal No. 4 and ground. If more than 10.5 volts is present, go to next step. If there is less than 10.5 volts, repair open circuit. Remove all test equipment, and reconnect all components. Clear Continuous Memory and check for fault codes.

VERIFY COIL OPERATION (NAVAJO)

Crank engine. If there is no spark, go to NAVAJO CHECK C1, C2 & C3 AT COIL PACK (CRANKING). If spark is present at any coil, go to

NAVAJO CHECK C1, C2 & C3 AT COIL PACK (RUNNING) .

NAVAJO CHECK C1, C2 & C3 AT COIL PACK (CRANKING)

Turn key off. Reconnect harness at coil pack. Set DVOM on 20-volt AC scale. While cranking engine, backprobe between coil terminals No. 1, 2 and 3, and chassis ground. If any voltage reading while cranking is NOT 0.2-1.0 volt, go to CHECKING EDIS CONTROL (NAVAJO). If all voltage readings while cranking are 0.2-1.0 volt, go to CHECKING COIL PACK.

NAVAJO CHECK C1, C2 & C3 AT COIL PACK (RUNNING)

Turn key off. Reconnect harness at coil pack. Set DVOM on 20-volt AC scale. Start engine, backprobe between coil terminals No. 1, 2 and 3, and chassis ground. If any voltage reading while running is NOT 1.0-2.0 volts, go to CHECKING EDIS CONTROL (NAVAJO). If voltage readings of each coil (while running) is 1.0-2.0 volts, go to CHECKING COIL PACK (NAVAJO) .

CHECKING COIL PACK (NAVAJO)

Turn key off, and disconnect coil pack. Measure resistance between coil pack terminals No. 4 and all other terminals. If each resistance is greater than 0.8 ohm, replace coil pack. If any resistance is less than 0.5 ohm, replace coil pack and EDIS module. Remove all test equipment, and reconnect all components. Clear Continuous Memory and check for fault codes.

CHECKING EDIS CONTROL NAVAJO

If voltage was less than described in CHECK NAVAJO C1, C2 & C3 AT COIL PACK (RUNNING) or NAVAJO CHECK C1, C2 & C3 AT COIL PACK (CRANKING), replace coil pack. If voltage was greater than that described, check circuits between coil pack and EDIS module for opens or shorts. If circuits okay, replace EDIS module. Remove all test equipment, and reconnect all components. Clear Continuous Memory, and check for fault codes.

SPARK (RX7)

1) Crank engine. Using a spark tester (or by holding wire 5/16" from ground), check for a strong Blue spark at coil wire and at each spark plug wire. Check spark plug wire resistance on suspect wires.

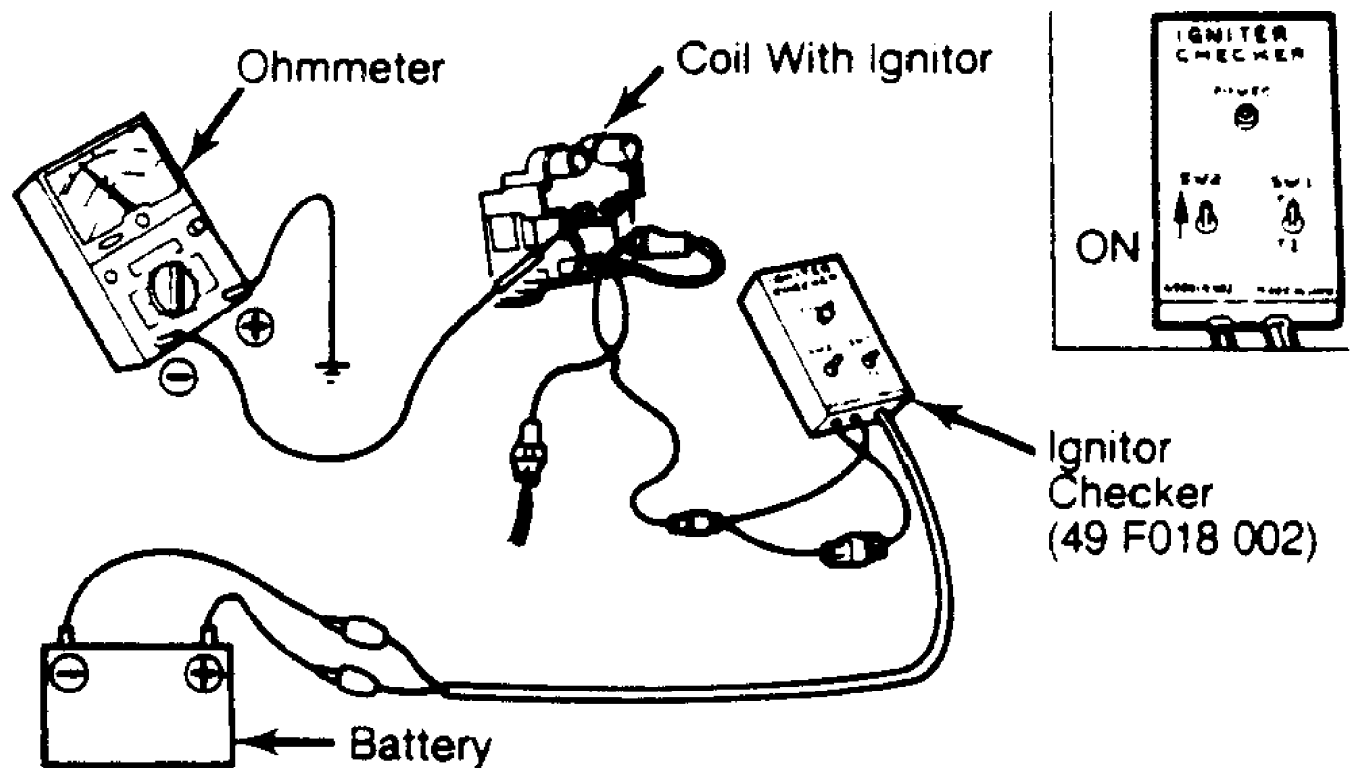
2) Using ohmmeter, check resistance of high tension leads. Resistance should be 4878 ohms per foot. Disconnect and inspect all related ignition system connectors and harnesses. Clean or repair as necessary and recheck spark. If connectors and harnesses are okay, go to LEADING SIDE IGNITOR (RX7) .

CAUTION: During testing procedure, ensure high tension leads remain connected to coil. Disconnecting of high tension leads may cause high voltage sparks. Ensure battery is fully charged.

LEADING SIDE IGNITOR (RX7)

1) Disconnect the 2-prong connector at ignitor. Connect a voltmeter (in series) between disconnected Black/Yellow wire terminals of 2 connector halves. Turn ignition on and note voltage.

2) Voltage should be about 12 volts. Turn ignition off. Remove voltmeter and negative battery cable. Install Ignitor Checker (49 F018 002) between 2-prong connectors. See Fig. 10.



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Fig. 10: Installing Ignitor Checker (RX7)
Courtesy of Mazda Motors Corp.

3) Disconnect Black wire from coil. Reconnect negative battery cable. Connect ohmmeter between Black wire and ground.

CAUTION: Ensure negative battery cable is disconnected prior to removing Black wire from coil. DO NOT disconnect Brown wire from coil. Ensure ohmmeter leads are installed with (+) lead to ground and (-) lead to Black wire.

4) Turn ignition on. Place ohmmeter on the X1 scale. Hold ignitor checker SW2 switch on and note ohmmeter reading. Ohmmeter needle should rise to 1/3 the distance of the scale and then return. Replace ignitor if needle operation was incorrect.

LEADING SIDE COIL (RX7)

Disconnect negative battery cable. Connect ohmmeter to appropriate terminals to check coil resistance. See Fig. 11. Replace coil if resistance is not .2-1.0 ohm.

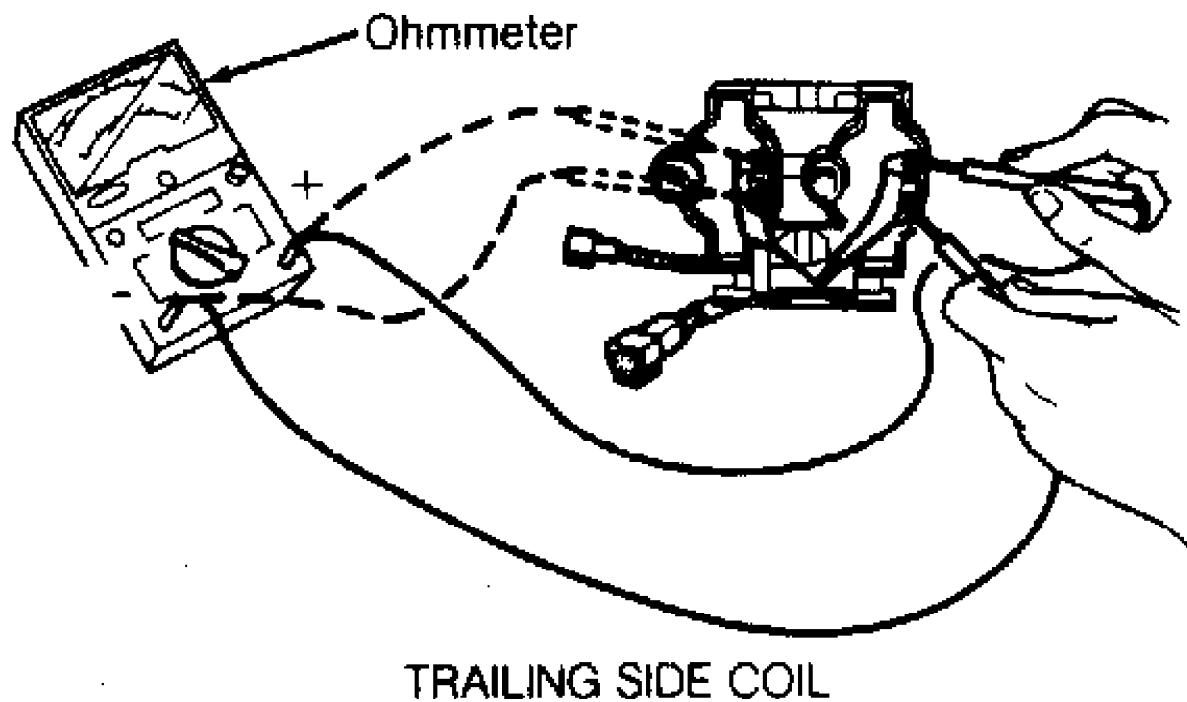
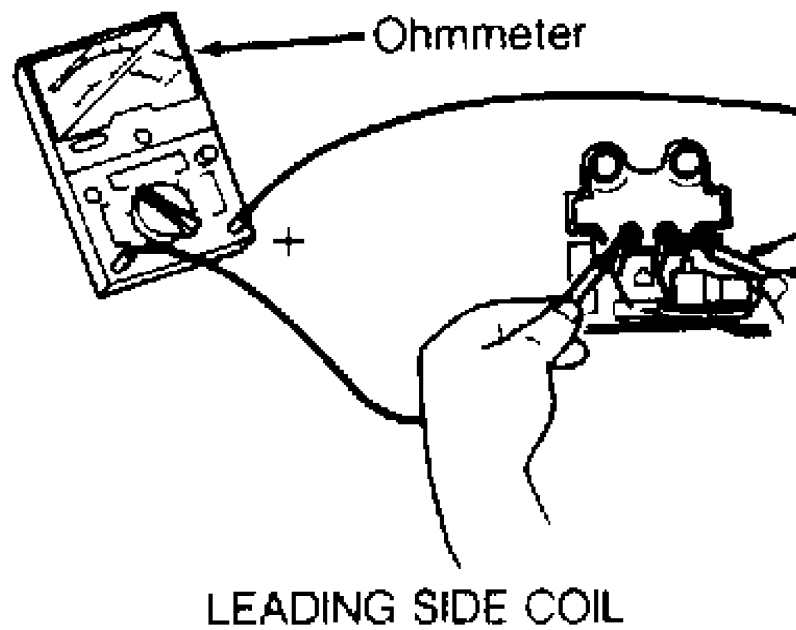


Fig. 11: Testing Coil Resistance (RX7)
Courtesy of Mazda Motors Corp.

CAUTION: During testing procedure, ensure high tension leads remain connected to coil. Disconnecting of high tension leads may

cause high voltage sparks. Ensure battery is fully charged.

TRAILING SIDE IGNITOR (RX7)

1) Disconnect 2-prong connector at ignitor. Connect voltmeter (in series) between the wire terminals of 2 connector halves. See Fig. 12. Turn ignition on and note voltage.

2) Voltage should be approximately 12 volts. Turn ignition off. Remove the voltmeter and negative battery cable. Reconnect 2-prong connector. Disconnect 4-prong connector.

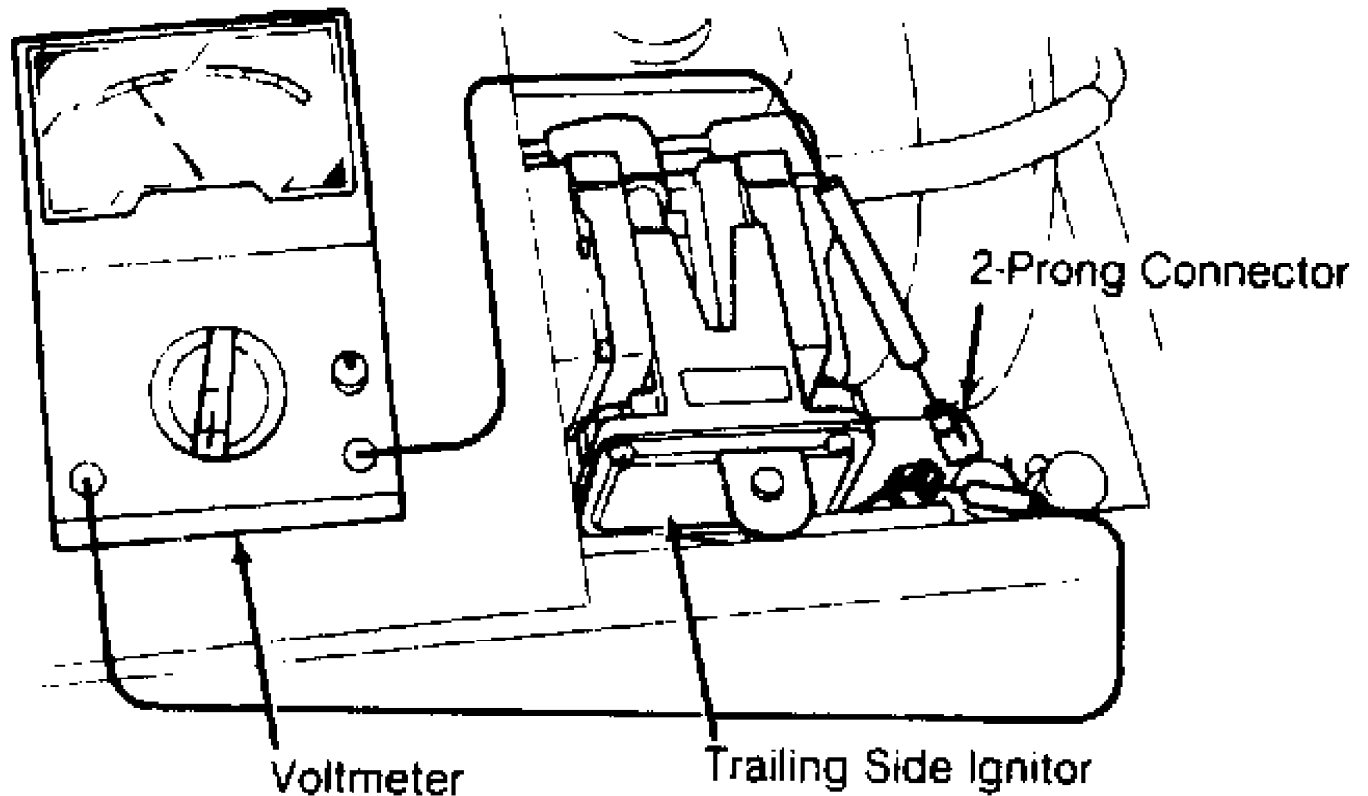
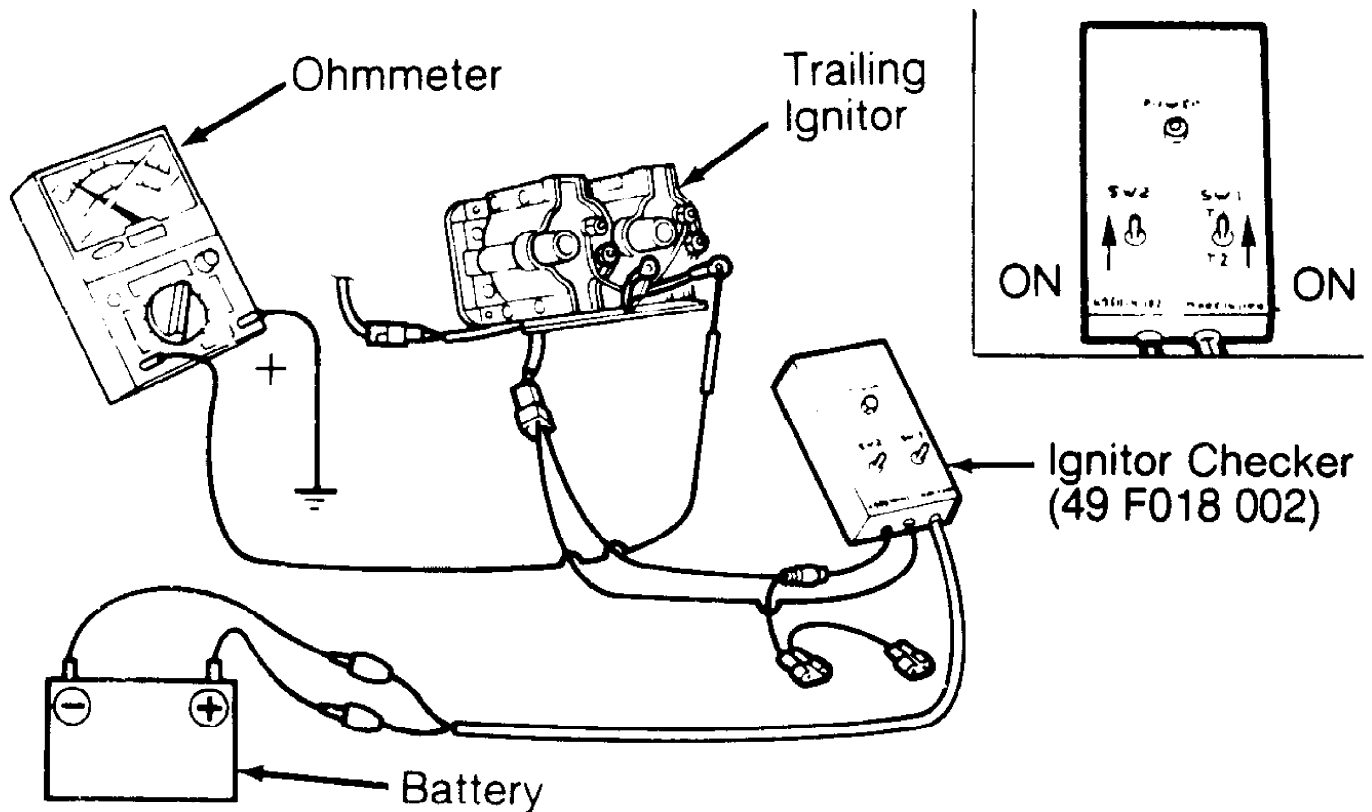


Fig. 12: Testing Trailing Side Ignitor Voltage (RX7)
Courtesy of Mazda Motors Corp.

3) Install Ignitor Checker (49 F018 002) between 4-prong connectors. See Fig. 13. Disconnect Black and Blue wires from coil. Install negative battery cable.



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Fig. 13: Testing Trailing Side Ignitor (RX7)
Courtesy of Mazda Motors Corp.

CAUTION: Ensure negative battery cable is disconnected prior to removing Black and Blue wires from coil. DO NOT disconnect Brown wire from coil. Ensure ohmmeter leads are installed with (+) lead to ground and (-) lead to Black wire.

4) Install ohmmeter between Black wire and ground. See Fig. 13. Place ignitor checker SW1 switch to the T1 position. Hold ignitor checker SW2 switch on and note ohmmeter reading. Ohmmeter needle should rise to 1/3 the distance of the scale and then return. Replace ignitor if needle operation was incorrect.

5) Turn ignition off. Disconnect ohmmeter and reconnect (+) lead to ground and (-) lead to Blue wire.

CAUTION: Ensure ohmmeter is installed with (+) lead to ground and (-) lead to Blue wire. DO NOT reverse leads or damage may result.

6) Turn ignition on. Place ignitor checker SW1 switch to the T2 position. Hold ignitor checker SW2 switch on and note ohmmeter reading. Ohmmeter needle should rise to 1/3 the distance of the scale and then return. Replace ignitor if needle operation was incorrect.

TRAILING SIDE COIL (RX7)

Disconnect negative battery cable. Connect ohmmeter to appropriate terminals to check coil resistance. See Fig. 11. Replace coil if resistance is not .2-1.0 ohm.

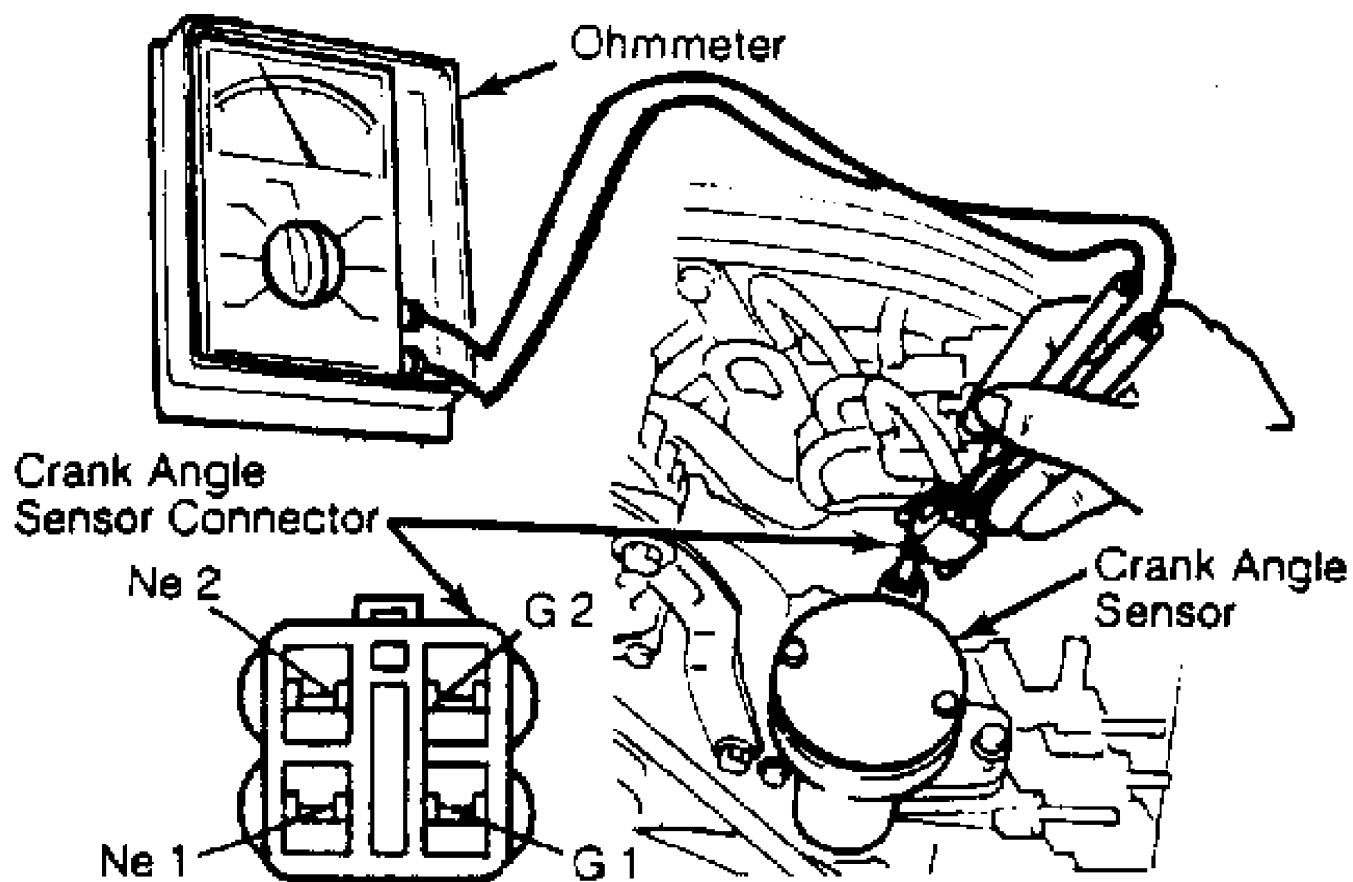
CRANK ANGLE SENSOR (RX7)

Remove sensor connector. Note terminal identification. See Fig. 14. Using ohmmeter, check resistance at specified terminals. See CRANK ANGLE SENSOR RESISTANCE SPECIFICATIONS (RX7) TABLE. Ensure resistance is within specifications.

CRANK ANGLE SENSOR RESISTANCE SPECIFICATIONS (RX7) TABLE

Application	Ohms
RX7 (1)	
G1 & G2 (Green & Black)	110-210
Ne1 & Ne2 (Red & White)	110-210

(1) - Check at 4-way connector.



36020

Fig. 14: Checking Crank Angle Sensor (RX7)
Courtesy of Mazda Motors Corp.

IDLE SPEED & IGNITION TIMING

Ensure idle speed and base ignition timing are set to specification. If necessary, see D - ADJUSTMENTS article in the ENGINE PERFORMANCE section.

PISTON ENGINE IGNITION TIMING TABLE (Degrees BTDC@RPM) (1)

Application	Man. Trans.	(2) Auto. Trans.
B2200		
Carbureted	6@825	6@825
Fuel-Injected	6@750	6@770
B2600i	5@750	5@770
Miata	10@850	8@850
MPV		
2.6L 4-Cyl.	5@750	5@770
3.0L V6	11@800	11@800
MX-6		
Non-Turbo	6@750	6@750
Turbo	9@750	9@750
Navajo	(3) 10°@Idle	(3) 10°@Idle
Protege		
SOHC	5@750	5@750
DOHC	10@750	10@750
323	7@750	7@750
626		
Non-Turbo	6@750	6@750
Turbo	9@750	9@750
929		
SOHC .....	.....	15@650
DOHC .....	.....	8@700

- (1) - With test terminal grounded.
(2) - Automatic transmission in "P".
(3) - Not adjustable.

ROTARY ENGINE TABLE (Degrees ATDC @ RPM) (1)

Application	Leading (Yellow)	Trailing (Red)
RX7	5 @ 750	20 @ 750

- (1) - With test terminal grounded.

THROTTLE POSITION SENSOR (TPS)

TPS VOLTAGE SPECIFICATIONS TABLE (1)

Application	Idle	Wide Open Throttle
4.0L	0.20	4.84

- (1) - Minimum and maximum specifications are given.

SUMMARY

If no faults were found while performing BASIC DIAGNOSTIC PROCEDURES, proceed to appropriate SELF-DIAGNOSTICS article. If no hard codes are found in self-diagnostics, proceed to H - TESTS W/O CODES article in the ENGINE PERFORMANCE section for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.) or intermittent diagnostic

procedures.