F - BASIC TESTING

1990 Nissan 240SX

1990 ENGINE PERFORMANCE
Nissan - Basic Diagnostic Procedures

Nissan; Axxess, Maxima, Pathfinder, Pickup,
Pulsar NX, Sentra, Stanza, Van, 240SX, 300ZX

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.

VISUAL INSPECTION

Visually inspect all electrical wiring. Look 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 M - VACUUM DIAGRAMS article to verify routing and connections (if necessary). Inspect air induction system for possible vacuum leaks.

COMPRESSION CHECK

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

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

EXHAUST SYSTEM BACKPRESSURE CHECK

The exhaust system can be checked with a vacuum or pressure gauge. Remove O2 sensor or air injection check valve (if equipped).

Connect a 1-10 psi pressure gauge and run engine at 2500 RPM. If exhaust system backpressure is greater than 1 3/4-2 psi, 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

FUEL PRESSURE

Basic diagnosis of fuel system should begin with determining fuel system pressure. If fuel pump is inoperative, check fuel pump fuse in fuse panel. If fuse is okay, see FUEL PUMP and FUEL PUMP RELAY charts in I - SYSTEM/COMP TESTS article. See L - WIRING DIAGRAMS article for specific circuit or wire color reference.

WARNING: ALWAYS relieve fuel pressure before disconnecting any fuel injection-related component. DO NOT allow fuel to contact engine or electrical components. If connecting fuel pressure gauge to fuel system without using a "T" connector, DO NOT operate fuel pump for more than a few seconds. Operating fuel pump longer than a few seconds under this condition can damage fuel pump.

1) To relieve fuel system pressure, remove fuel pump fuse. Start engine and allow to run until fuel is exhausted and engine stalls. Crank engine an additional 2 or 3 times to verify all pressure has dissipated. Turn ignition off. Install fuel pump fuse.
2) On Axxess, Maxima, Pickup (4-cylinder), Stanza and 240SX, connect fuel gauge between fuel filter and pressure regulator.
3) On Pathfinder, Pickup (V6) and 300ZX, connect fuel gauge between fuel filter outlet and fuel tube.
4) On Pulsar NX, Sentra and Van, disconnect fuel inlet hose at fuel injection throttle body.
5) On all models, install fuel pressure gauge using a "T" connector. To prevent inaccurate fuel pressure readings, disconnect electrical connector at fuel pressure regulator control solenoid valve (if equipped). Start engine and check fuel line connections for leaks.
6) Check fuel pressure on pressure gauge with engine idling. Disconnect vacuum hose from pressure regulator and recheck fuel pressure. Compare fuel pressure readings on pressure gauge with specifications in FUEL PRESSURE table.
7) Release fuel system pressure as described in step 1). Disconnect fuel pressure gauge. Reconnect fuel lines. Start engine and check for fuel leaks. If necessary, clear trouble code 22 from ECU memory.

FUEL PRESSURE SPECS TABLE

FUEL PRESSURE SPECIFICATION TABLE - psi (kg/cm^2)

Application	Unregulated (w/o Vacuum)	Regulated (w/Vacuum)
Axxess & 240SX	43 (3.0)	33 (2.3)
Maxima & 300ZX	43 (3.0)	36 (2.5)
Pathfinder & Pickup	43 (3.0)	33 (2.3)
Pulsar NX & Sentra	(1)	34 (2.4)
Stanza	43 (3.0)	33 (2.3)
Van	(1)	36 (2.5)

(1) - Information not available at time of publication.

IGNITION CHECKS (EXCEPT 300ZX)

OPTICAL (EXCEPT 300ZX)

To determine cause of no spark condition, perform the following tests in the order given. Deviation from this procedure may cause false diagnosis and replacement of non-defective components.

SPARK

Check for spark at coil wire and at each spark plug wire using a spark tester. DO NOT crank engine continuously for more than 2 seconds. Inspect secondary coil wire for arcing while testing spark at plugs. Check electrical connections at crank angle sensor, ignition coil and power transistor.

IGNITION COIL POWER SOURCE

1) Disconnect ignition coil 2-wire connector. On Van, disconnect intake and exhaust ignition coil 2-wire connectors. Turn ignition on.

2) Check for voltage at wire terminal specified in IGNITION COIL POWER SOURCE TERMINAL IDENTIFICATION table. If voltage is present, go to POWER TRANSISTOR test. If voltage is not present, check continuity of entire circuit between battery and ignition coil, including fuse link and ignition switch.

IGNITION COIL POWER SOURCE TERMINAL IDENTIFICATION TABLE

Application	Wire Color
Axxess	White
Maxima	White/Green
Pathfinder, Pickup & Sentra	Black/White
Pulsar NX	White/Black
Stanza & 240SX	Black/Red
Van	(1)

(1) - Wire color not available at time of publication. Voltage should be present on one of 2 wire terminals on 2-wire connector.

POWER TRANSISTOR

To test power transistor, perform appropriate CODE 21 (NO IGNITION REFERENCE) test in G - TESTS W/CODES article.

IGNITION COIL RESISTANCE

1) When ignition coil is suspected of causing ignition problems, carefully inspect coil for signs of secondary circuit arcing to primary or ground circuits. This would be indicated by the presence of burned spots.

2) Disconnect ignition coil primary 2-wire connector. Using ohmmeter, check resistance between primary connector terminals. Check secondary resistance between secondary tower and positive terminal of coil primary connector. To identify positive terminal of coil primary connector, see IGNITION COIL POWER SOURCE TERMINAL IDENTIFICATION table.

3) If primary or secondary resistance is not within specification, replace ignition coil. See IGNITION COIL RESISTANCE table for resistance specifications.

IGNITION COIL RESISTANCE SPECS TABLE

IGNITION COIL RESISTANCE TABLE - Ohms @ 68°F (20°C)

Application	Primary	Secondary
Axxess & 240SX	0.7	(1)
Maxima	1.0	8200-12,400
Pickup		
2.4L	0.7	(1)
3.0L	1.0	10,000
Pulsar NX & Sentra	0.8-1.0	8200-12,400
Stanza	0.7	8000
Van	0.8-1.0	7600-11,400

(1) - Information not available at time of publication.

CRANK ANGLE SENSOR

1) Crank angle sensor is part of the distributor. If a fault is present in crank angle sensor, code 11 may be set in ECU memory. If code 11 is set, perform appropriate CODE 11 (CRANK ANGLE SENSOR) test in G - TESTS W/CODES article.

2) To test crank angle sensor, leave sensor wiring connected. Using a logic probe or DVOM with an analog bar graph function, connect negative lead to ground and alternately connect positive lead to one-degree signal and 120/180-degree signal terminals of ECU connector. See CRANK ANGLE SENSOR ECU INPUT SIGNAL TERMINALS table.

3) With the engine cranking, peak voltage for one-degree signal should measure about 2.3-2.8 volts on DVOM. Peak voltage for 120/180-degree signal should measure about .1-.4 volt with engine cranking. If either signal is not present, check harness for short or open circuit. If no problems are found, replace crank angle sensor.

NOTE: It is possible to measure crank angle sensor voltage with a conventional DVOM without bar graph function; however, it may not be easy to determine peak voltage signal due to the averaging of signal.

CRANK ANGLE SENSOR ECU INPUT SIGNAL TERMINALS TABLE (1)

Model	1° Signal	120°/180° Signal
Maxima	42 & 52	41 & 51
Pulsar NX & Sentra	22 & 32	21 & 31
Van	8	17
All Others	31 & 40	22 & 30

(1) - For ECU terminal identification, see L - WIRING DIAGRAMS article.

IGNITION CHECKS (300ZX)

OPTICAL (300ZX)

To determine cause of no spark condition, perform the following tests in the order given. Deviation from this procedure may cause false diagnosis and replacement of non-defective components.

IGNITION COIL POWER SOURCE & GROUND

1) Disconnect 3-wire ignition coil connector. Turn ignition on. Check voltage between ground and terminal "B" of ignition coil connector. See Fig. 1.

2) If battery voltage is not present, go to IGNITION COIL/POWER TRANSISTOR RELAY test. If battery voltage is present, turn ignition off. Check continuity between ground and terminal "A" of ignition coil connector.

3) If there is no continuity, repair ground circuit between ignition coil connector terminal "A" and ground. Repeat test for each remaining coil.

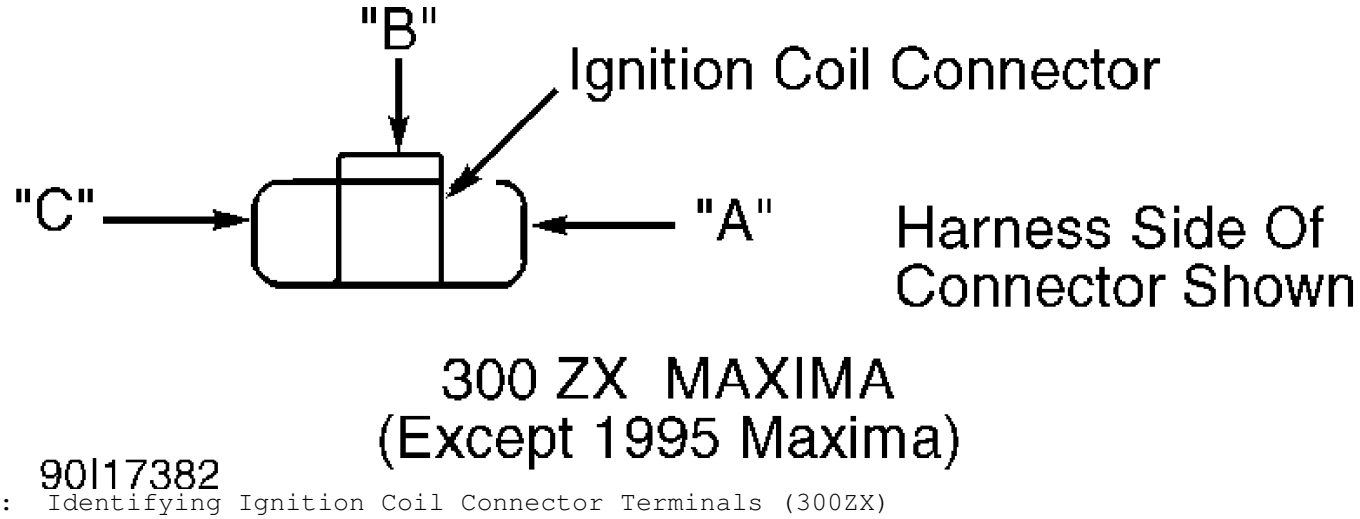

Fig. 1: Identifying Ignition Coil Connector Terminals (300ZX)
Courtesy of Nissan Motor Co., U.S.A.

IGNITION COIL/POWER TRANSISTOR RELAY

1) Connect a 12-volt power source between terminals No. 1 and 2 of relay. See Fig. 2. Check continuity between terminals No. 3 and 5. Continuity should exist while relay is energized.

2) Disconnect power source and check continuity between terminals No. 3 and 5. Continuity should NOT exist. Check harness and connectors. If harness and connectors are okay, replace ignition coil/power transistor relay.

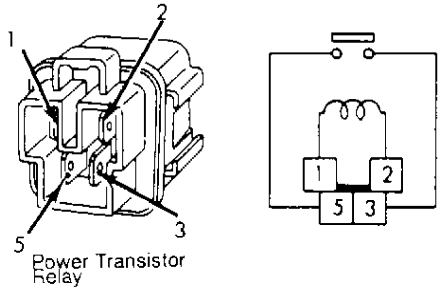

Fig. 2: Identifying Ignition Coil/Power Transistor Relay Terminals
Courtesy of Nissan Motor Co., U.S.A.

IGNITION COIL RESISTANCE

Disconnect 3-wire connector from ignition coil. Check primary resistance between terminals "1" and "2" of ignition coil. See Fig. 3. Resistance should be 0.7 ohm.

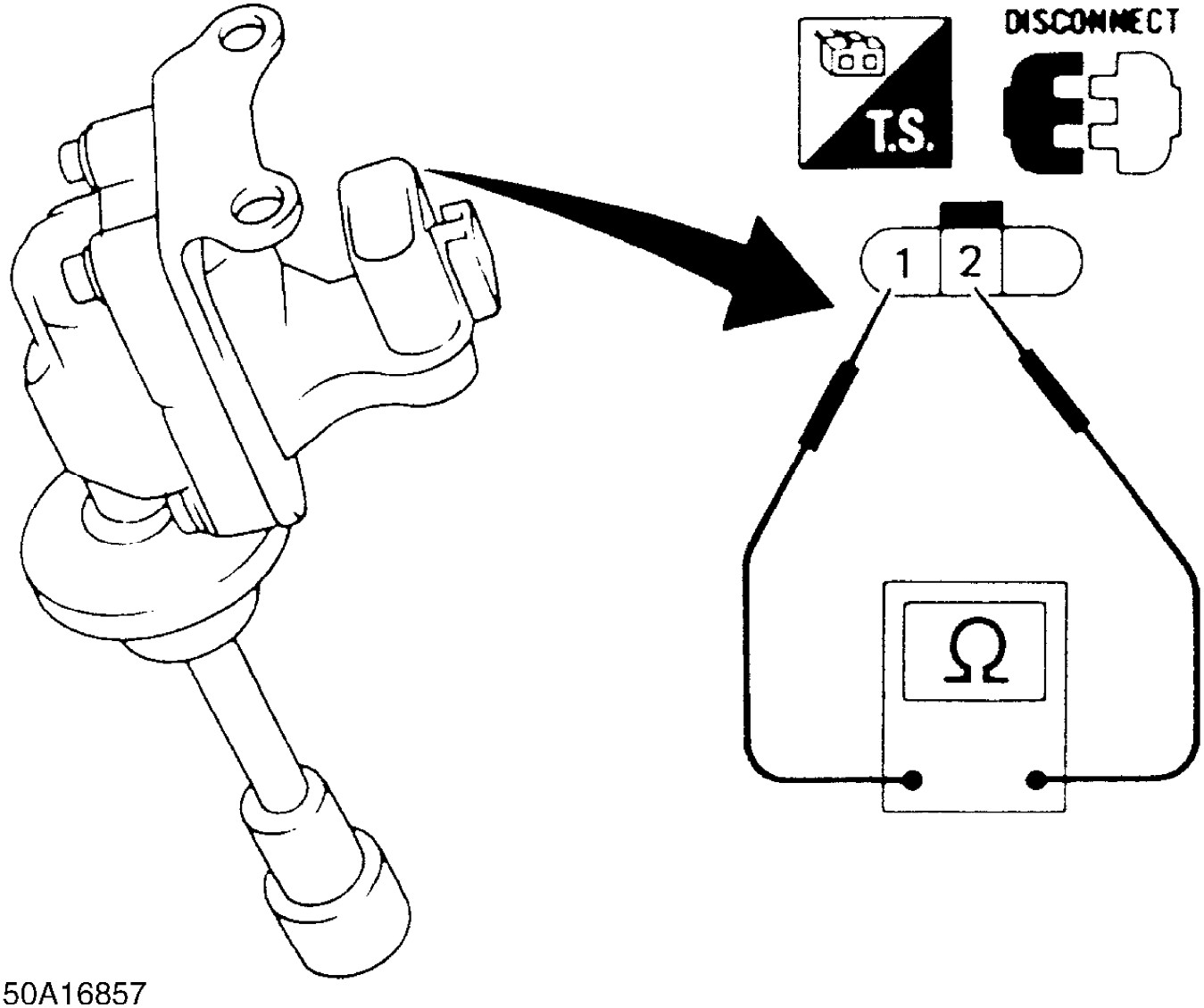

Fig. 3: Identifying Ignition Coil Terminals
Courtesy of Nissan Motor Co., U.S.A.

CRANK ANGLE SENSOR

1) If a fault is present in crank angle sensor, code 11 may be set in ECU memory. If code 11 is set, perform appropriate CODE 11 (CRANK ANGLE SENSOR) test in G - TESTS W/CODES article.

2) To test crank angle sensor, leave sensor wiring connected. Using a logic probe or DVOM with an analog bar graph function, connect negative lead to ground and alternately connect positive lead to terminals No. 42 and 52 of ECU connector (one-degree input signal). Crank the engine and note voltage pulse signals. For ECU connector terminal identification, see L - WIRING DIAGRAMS article.

3) Alternately probe ECU connector terminals No. 41 and 51 (120-degree input signals). Crank engine and note voltage pulse signals.

4) Peak voltage for one-degree signal should measure about 2.3-2.8 volt on bar graph DVOM. Peak voltage for 120-degree signal should measure about .1-.4 volt. If one-degree or 120-degree signal is not present, check harness for short or open circuit. If no problems are found, replace crank angle sensor.

NOTE: It is possible to measure crank angle sensor voltage with a conventional DVOM (no bar graph function); however, it may not be easy to determine peak voltage signal due to the "averaging" of digital signal.

POWER TRANSISTOR CIRCUITS

1) Disconnect 7-pin connector from power transistor unit. Disconnect 3-wire ignition coil connector.

2) Check continuity of each circuit between ignition coil connector terminal "C" and corresponding wire terminal of power transistor unit 7-pin connector. See Fig. 1 for ignition coil connector terminal identifications. For wire colors and related ECU connector terminals, see L - WIRING DIAGRAMS article.

3) Disconnect power transistor unit 6-pin connector. Disconnect ECU connector. Check continuity of each wire circuit between power transistor unit and corresponding wire terminal of ECU connector.

4) If continuity does not exist in any of the power transistor 6-pin connector wire terminals, repair open circuit in wires. If there is continuity in all wires but one or more ignition coils is inoperative, reconnect all connectors. Go to ECU POWER TRANSISTOR OUTPUT SIGNAL test.

ECU POWER TRANSISTOR OUTPUT SIGNAL

1) Using a logic probe or DVOM with an analog bar graph function, carefully backprobe 20-pin ECU connector terminals No. 1, 2, 3, 11, 12 and 13 while cranking engine. This tests ECU output signals for triggering the power transistor unit.

2) If pulse signals of approximately 0.1 volt are available at each specified ECU terminal, replace power transistor unit. If pulse signals are not available at any terminals, crank engine and check for battery voltage at terminal No. 43 of ECU connector. This checks the start signal to ECU.

3) If voltage remains at zero during cranking, repair start signal circuit and retest. If all 6 output signals from ECU to the power transistor are okay, replace power transistor.

IDLE SPEED & IGNITION TIMING

Ensure idle speed and ignition timing are set to specification. Improper setting of ignition timing and idle speed may cause driveability problems and/or false setting of trouble codes. For adjustment procedures, see D - ADJUSTMENTS article.

4-CYL IDLE SPEED (RPM) SPECS TABLE

4-CYLINDER IDLE SPEED (RPM) TABLE

Application	(1) TPS Connected	(1) TPS Disconnected
Axxess	(2) 650-750	(2) 600-700
Pickup	(2) 750-850	(2) 700-800

Pulsar NX & Sentra		
Auto. Trans.	(2) 800-1000	(2) 750-850
Man. Trans.	700-900	675-775
Stanza	(2) 650-750	(2) 600-700
Van		
Auto. Trans.	(2) 850-950	(3)
Man. Trans.	750-850	(3)
240SX	(2) 700-800	(2) 650-750

(1) - See D - ADJUSTMENTS article.
(2) - Auto. trans. in Neutral.
(3) - Idle speed is adjusted only with TPS connected.

V6 IDLE SPEED (RPM) SPECS TABLE

V6 IDLE SPEED (RPM) TABLE

Application	AAC Connected	AAC Disconnected
Maxima		
Auto. Trans.	(1) 650-750	(1) 700
Man. Trans.	650-750	700
Pathfinder & Pickup	(1) 700-800	(1) 700
300ZX		
Auto. Trans.	(1) 720-820	(1) 720
Man. Trans.	650-750	650

(1) - Auto. transmission/transaxle in Neutral.

4-CYLINDER IGNITION TIMING SPECS TABLE

4-CYLINDER IGNITION TIMING (Degrees BTDC @ RPM)

Application	Man. Trans.	(1) Auto. Trans.
Axxess & Stanza	15 @ 650-750	15 @ 650-750
Pathfinder & Pickup	10 @ 750-850	10 @ 750-850
Pulsar NX & Sentra	7 @ 700-900	7 @ 800-1000
Van	10 @ 750-850	10 @ 850-950
240SX	15 @ 700-800	15 @ 700-800

(1) - Auto. trans. in Neutral.

V6 IGNITION TIMING SPECS TABLE

V6 IGNITION TIMING (Degrees BTDC @ RPM)

Application	Man. Trans.	(1) Auto Trans.
Maxima	15 @ 650-750	15 @ 650-750
Pathfinder & Pickup	15 @ 700-800	15 @ 700-800
300ZX	15 @ 650-750	15 @ 720-820

(1) - Auto. trans. in Neutral.

SUMMARY

If no faults were found while performing F - BASIC TESTING, proceed to G - TESTS W/CODES article. If no code is found in self-diagnostics, proceed to H - TESTS W/O CODES article for diagnosis by symptom (i.e. ROUGH IDLE, NO START, etc.).