

G - TESTS W/CODES

1993 Toyota Celica

1993 ENGINE PERFORMANCE
Toyota Self-Diagnostics

Celica

INTRODUCTION

If no faults were found while performing the test procedures in the F - BASIC TESTING - 4-CYL article, proceed with self-diagnostics. If no Diagnostic Trouble Codes (DTC) are present after entering self-diagnostics, proceed to H - TESTS W/O CODES article for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.).

NOTE: Diagnostic trouble codes will be referred to as trouble codes in this article.

SELF-DIAGNOSTIC SYSTEM

Hard Failures

Hard failures cause Malfunction Indicator Light (MIL) on instrument panel to illuminate and remain on until problem is repaired. If light comes on and remains on (light may flash) during vehicle operation, corresponding trouble code will be retained in ECM memory on some trouble code applications. Not all trouble codes are retained in ECM memory. The cause of malfunction must be determined using trouble code charts. If a sensor fails, Engine Control Module (ECM) will use a substitute value in its calculations to continue engine operation. In this condition, commonly known as limp-in mode, the vehicle runs but driveability will not be optimum.

NOTE: The MIL may also be referred to as the CHECK ENGINE light. The MIL may not illuminate when certain failures such as faulty starter signal or A/C switch signal exist, or if certain trouble codes are set.

Intermittent Failures

Intermittent failures may cause Malfunction Indicator Light (MIL) to flicker or illuminate and go out after intermittent fault goes away. However, the corresponding trouble code will be retained in ECM memory on some trouble code applications. Not all trouble codes are retained in ECM memory. Intermittent failures may be caused by a sensor, connector or wiring related problem. See INTERMITTENTS in the H - TESTS W/O CODES article.

NOTE: Test Mode (if equipped) and Normal Mode on self-diagnostics system are used for retrieving trouble code from ECM memory for system diagnosis. For information on different mode usage, see RETRIEVING TROUBLE CODES.

RETRIEVING TROUBLE CODES

NOTE: On all models, Normal Mode is used to retrieve trouble code from ECM to determine problem area. On Celica 1.6L (4A-FE), the self-diagnostics system does not have Test Mode. On all other models, Test Mode is used to check for trouble codes when operating vehicle to simulate conditions in which trouble code was set. Test Mode helps determine malfunctions caused by poor electrical connections, which are difficult to determine using Normal Mode. Test Mode also checks for

malfunction in starter signal circuit, A/C switch signal and Park/Neutral switch signal.

NOTE: The Malfunction Indicator Light (MIL) on the instrument panel may also be referred to as CHECK ENGINE light.

Normal Mode

1) Before retrieving trouble code(s), verify MIL on instrument panel light comes on with ignition on and engine off. The MIL light should go off when engine is started.

2) If MIL does not come on, see appropriate DIAGNOSTIC CIRCUIT CHECK chart under TROUBLE CODE DIAGNOSTIC CHARTS.

3) If MIL remains on, self-diagnostic system has detected a malfunction or abnormality. Ensure battery voltage is greater than 11 volts and charging system is okay. Warm engine to normal operating temperature.

4) Apply parking brake. Shift transmission/transaxle into Neutral (M/T) or Park (A/T). Turn A/C and all accessories off. Ensure throttle is in idle position.

5) Turn ignition on with engine off. Install Jumper Wire (SST 09843-18020) between terminals TE1 and E1 in Data Link Connector (DLC). See Fig. 1.

NOTE: Data link connector may be referred to as DLC. See Fig. 1.

6) Count number of flashes from MIL on instrument panel. If system is operating properly (with no trouble codes), MIL will flash continuously and evenly. See Fig. 2.

NOTE: If MIL will not flash, check TE1 and E1 wiring circuit. See the DIAGNOSTIC CHART CHECK chart under TROUBLE CODE DIAGNOSTIC CHARTS.

7) If trouble code exists, digits of trouble code will be flashed at approximately 1/2-second intervals. A 1 1/2-second pause separates first and second digits of code. See Fig. 2.

8) If more than one trouble code is stored, a 2 1/2-second pause will occur before next trouble code is flashed. Once all trouble codes are displayed, a 4 1/2-second pause will occur then trouble code(s) will be repeated.

9) Trouble codes are displayed in order of smallest to largest. After trouble codes are retrieved, remove jumper wire to exit Normal Mode. See NOTES ON TROUBLE CODES. For additional information on trouble codes, see TROUBLE CODE DIAGNOSTIC HINTS table under SELF-DIAGNOSTIC SYSTEM and appropriate table under TROUBLE CODE IDENTIFICATION.

NOTE: To repair failure causing trouble code, refer to proper trouble code chart under TROUBLE CODE CHARTS. Once repairs for trouble code are made, trouble code must be cleared from ECM memory. See CLEARING TROUBLE CODES.

NOTE: Test Mode is not available on Celica 1.6L 4A-FE.

Test Mode

1) Before retrieving trouble code(s), verify MIL on instrument panel light comes on with ignition on and engine off. The MIL light should go off when engine is started.

2) If MIL does not come on, see appropriate DIAGNOSTIC CIRCUIT CHECK chart under TROUBLE CODE DIAGNOSTIC CHARTS.

3) Ensure battery voltage is greater than 11 volts and charging system is okay. Apply parking brake. Shift the transmission/transaxle to Neutral (M/T) or Park (A/T). Turn A/C and

all accessories off. Ensure throttle is in idle position and ignition is off.

NOTE: Test Mode will not operate if jumper wire is installed between terminals TE2 and E1 in Data Link Connector (DLC) AFTER ignition is turned on.

4) Install Jumper Wire (SST 09843-18020) between terminals TE2 and E1 in Data Link Connector (DLC) with ignition off. See Fig. 1.

5) Turn ignition on with engine off. Test Mode is operational if MIL on instrument panel flashes. If MIL light fails to flash, check TE2 wiring circuit.

NOTE: See the L - WIRING DIAGRAMS article for TE2 wiring circuit.

6) Drive vehicle at a speed greater than 6 MPH. The ECM will set Trouble Codes 42 and 43 if vehicle is not driven. Try to simulate conditions of driveability complaint described by the customer and note when MIL comes on. This indicates when the problem exists.

7) Stop vehicle, but DO NOT turn engine off. Install jumper wire between terminals TE1 and E1 in data link connector. See Fig. 1. Count number of flashes from MIL on instrument panel. If system is operating properly (with no trouble codes), MIL will flash continuously and evenly. See Fig. 2.

8) If trouble code exists, digits of trouble code will be flashed at approximately 1/2-second intervals. A 1 1/2-second pause separates first and 2second digits of code. See Fig. 2.

9) If more than one trouble code is stored, a 2 1/2-second pause will occur before next trouble code is flashed. Once all trouble codes are displayed, a 4 1/2-second pause will occur, then trouble code(s) will be repeated. Trouble codes are displayed in order of smallest to largest.

NOTE: On all models, Trouble Code 51 will normally be displayed if transmission/transaxle is in any gear except Park or Neutral, A/C is turned on, or accelerator pedal is depressed.

10) After trouble code(s) is retrieved, remove jumper wires to exit Test Mode. See NOTES ON TROUBLE CODES. For additional information on trouble codes, see TROUBLE CODE DIAGNOSTIC HINTS table under SELF-DIAGNOSTIC SYSTEM and appropriate table under TROUBLE CODE IDENTIFICATION.

NOTE: The MIL may not come on if certain trouble code is set when in Test Mode. See TROUBLE CODE IDENTIFICATION CHARTS.

NOTE: To repair failure causing trouble code, refer to proper trouble code chart under TROUBLE CODE CHARTS. Once repairs for trouble code are made, trouble code must be cleared from ECM memory. See CLEARING TROUBLE CODES.

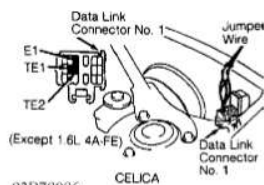
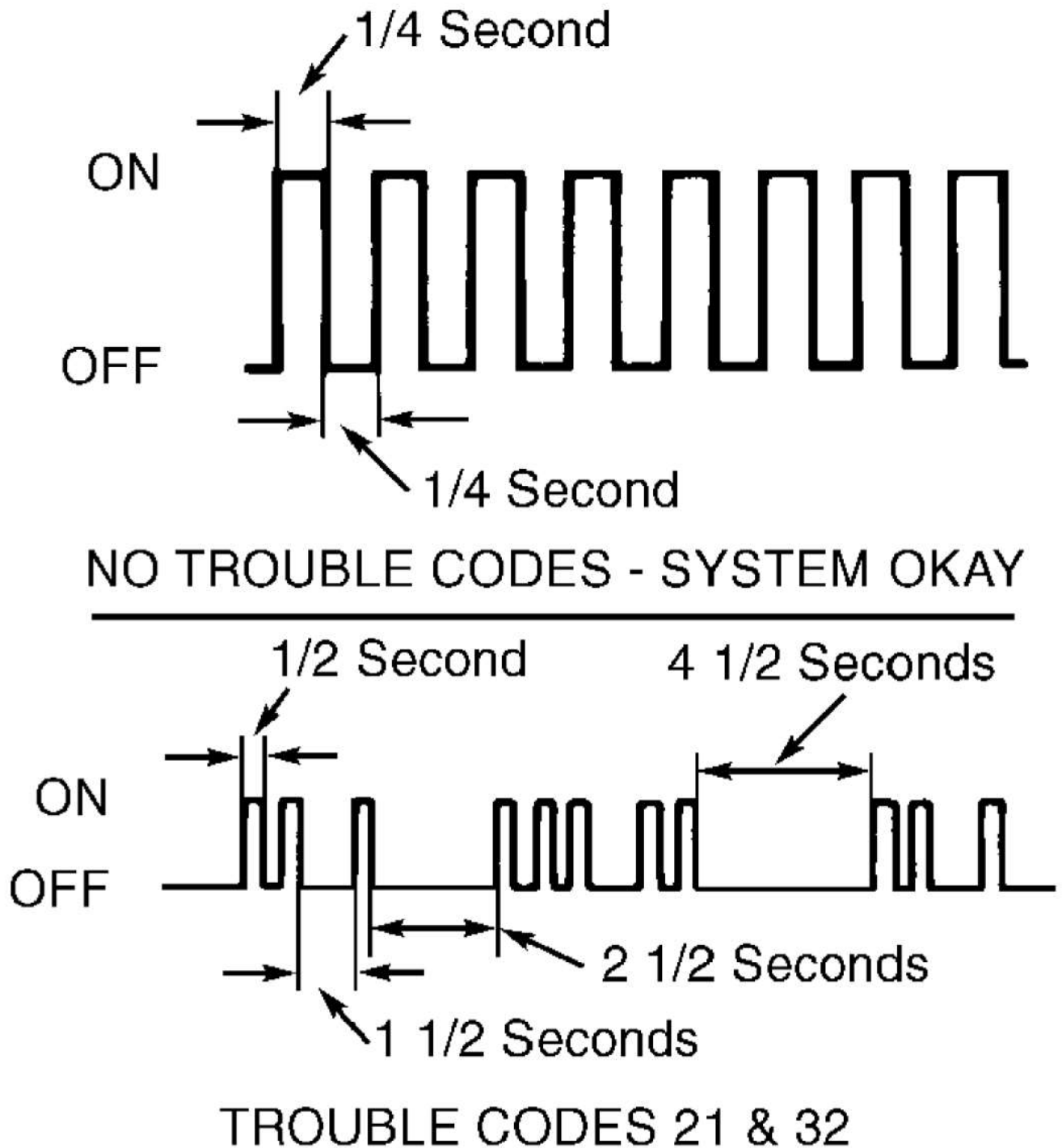


Fig. 1: Installing Jumper Wire In DLC (Celica)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



93E79107

Fig. 2: Normal System Operation & Trouble Code I.D. Using MIL
Courtesy of Toyota Motor Sales, U.S.A., Inc.

NOTES ON TROUBLE CODES

- 1) No other trouble code will appear with Trouble Code 11.

2) On various models when certain trouble codes occur, MIL on instrument panel will not come on. For designation of MIL operation on certain trouble codes, see appropriate table under TROUBLE CODE IDENTIFICATION.

3) On various models when certain trouble codes initially occur, they will be temporarily stored in ECM memory, but MIL on instrument panel will not come on.

4) The second time trouble code is detected, MIL on instrument panel will then come on. This is referred to as the 2 trip detection logic and only applies to specified trouble codes. See DETECTION LOGIC TROUBLE CODES table.

DETECTION LOGIC TROUBLE CODES TABLE

Application	Trouble Code
Celica	
1.6L (4A-FE)	21, 25, 26 & 71
2.0L Turbo (3S-GTE)	(1) 21, 25, 26 & 71
2.2L (5S-FE)	25, 26, 27 & 71

(1) - Detection logic is used on trouble code 21 on all except California models.

5) In Normal Mode, MIL on instrument panel will go off after malfunction is repaired, but trouble codes, except ECM non-memory codes, will be retained in ECM memory until cleared. ECM non-memory codes are not stored in ECM memory. See ECM NON-MEMORY TROUBLE CODES table.

NOTE: Test Mode is not used on Celica 1.6L 4A-FE.

6) In Test Mode (if equipped), all codes except ECM non-memory codes are retained in ECM memory, even with ignition off and repairs made, until cleared. ECM non-memory codes are not retained in ECM memory. See ECM NON-MEMORY TROUBLE CODES table.

NOTE: When in Test Mode, if vehicle is not driven at a speed greater than 6 MPH, ECM will set Trouble Codes 42 and 43. For MIL operation in relation to trouble code when in Test Mode, see appropriate table under TROUBLE CODE IDENTIFICATION.

ECM NON-MEMORY TROUBLE CODES TABLE

Application	Trouble Code
Normal Mode	
1.6L (4A-FE)	51
2.0L Turbo (3S-GTE)	43, 51 & 53
2.2L (5S-FE)	43 & 51
Test Mode	
2.0L Turbo (3S-GTE) & 2.2L (5S-FE)	42, 43 & 51

CLEARING TROUBLE CODES

1) After performing repairs, clear ECM memory of all stored trouble codes. To clear memory, turn ignition off. Remove proper fuse from fuse/relay box for approximately 30 seconds or more. See FUSE/RELAY BOX LOCATION table. See FUSE APPLICATION table to remove

proper fuse.

2) Depending on ambient temperature, fuse may need to be removed for more than 30 seconds in colder temperatures. Install fuse. Road test vehicle, and ensure system operates properly. See Fig. 2.

NOTE: Trouble codes may also be cleared by disconnecting negative battery cable. However, other memory functions (clock, radio, alarm, seats, etc.) will be canceled and must be reset.

FUSE/RELAY BOX LOCATION TABLE

Application	Location
Celica	Driver Side, Front Corner Of Engine Compartment

FUSE APPLICATION TABLE

Model	Fuse (Amperage)
Celica	EFI (15)

ECM LOCATION

NOTE: For illustration of ECM location, refer to the appropriate E - THEORY/OPERATION article in this section.

ECM LOCATION

Model	Location
Celica	Bottom Center Of Dash, In Front Of Console

SUMMARY

If no hard trouble codes are present (or only pass trouble codes), driveability symptoms exist or intermittent trouble codes exist, proceed to H - TESTS W/O CODES article for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.) or intermittent procedures.

NOTE: To determine a common cause for a trouble code to be set, see TROUBLE CODE DIAGNOSTIC HINTS table below.

TROUBLE CODE DIAGNOSTIC HINTS

TROUBLE CODE DIAGNOSTIC HINTS

Trouble Code	(1) Diagnostic Hints
12	No "G1", "G2" or "NE" Ignition Signal To ECM Within 2 Seconds After Engine Is Cranked, No "G" Ignition Signal To ECM For 3 Seconds With Engine Speed Of 600-4000 RPM
13	No "NE" Ignition Signal To ECM When Engine Speed Is Greater Than Approximately 1000 RPM, No "G" Ignition Signal To ECM When "NE" Signal

Is Input 4 Times With Engine Speed Of 500-4000 RPM

14 No "IG" Or "IGF" Ignition Signal To ECM From Ignitor Several Times In Succession

16 Fault In Transmission/Transaxle ECM Or ECM

21 Defective Main O2 Sensor, Open Or Short Circuit In Main O2 Sensor Signal

22 Open Or Short Circuit In Coolant Temp. Sensor Signal

24 Open Or Short Circuit In Intake Air Temp. Sensor Signal

25 Lean Signal Sent By O2 Sensor For Several Seconds

26 Rich Signal Sent By O2 Sensor For Several Seconds

27 Open Or Short Circuit In Sub-O2 Sensor Signal

28 Defective O2 Sensor, Open Or Short Circuit In O2 Sensor Signal

31 Open Or Short Circuit In Airflow Meter, MAP Sensor Or Vacuum Sensor Signal

32 Open Or Short Circuit Between Airflow Meter Terminals

34 Turbocharger Pressure Is Abnormal

35 Open Or Short Circuit In Turbocharging Pressure Sensor Or BARO Sensor

41 Open Or Short Circuit In Throttle Position Sensor Signal

42 No Signal From Vehicle Speed Sensor For Several Seconds

43 No "STA" Signal To ECM Until Engine Reaches 800 RPM With Engine Cranking

47 Open Or Short Circuit In Sub-Throttle Position Sensor Signal

51 (2) Problem In One Of 3 Circuits Monitored By ECM

52 Open Or Short Circuit In Knock Sensor Signal

53 Knock Control In ECM Is Faulty

55 Open Or Short Circuit In Knock Sensor Signal

71 EGR Gas Temperature Less Than Predetermined Level During EGR Control

78 Open Or Short Circuit In Fuel Pump Control Circuit Or Fuel Pump Electronic Control Unit (ECM)

81 Open In ECT1 Circuit Between ECM & Transmission Control Module (TCM) For At Least 2 Seconds

83 Open In ESA1 Circuit Between ECM & Transmission Control Module (TCM) For 1/2 Second After Engine Idles At Least 1/2 Second

84 Open In ESA2 Circuit Between ECM & Transmission Control Module (TCM) For 1/2 Second After Engine Idles At Least 1/2 Second

85 Open In ESA3 Circuit Between ECM & Transmission Control Module (TCM) For 1/2 Second After Engine Idles At Least 1/2 Second

- (1) - Listed are possible areas causing trouble codes. Not all trouble codes are used on all models.
- (2) - Throttle position sensor, Park/Neutral switch and A/C Signal circuits are monitored.

TROUBLE CODE IDENTIFICATION

TROUBLE CODE IDENTIFICATION (CELICA) (1) (2) (3)

CODE No.	System Affected	MIL in NORMAL MODE	MIL in TEST MODE	Probable Cause:
12	RPM Signal	ON	N/A	Distributor, Starter or Ckt, ECM

13	RPM Signal	ON	ON	Distributor or Ckt, ECM
14	Ignition Signal	ON	N/A	Ignitor or Ckt to ECM, ECM
16 (2.2L)	Elect. Controlled A/T Signal	ON	N/A	ECM or Ckt
21 (1.6L)	O2 Sensor Signal	ON	N/A	O2 Sensor or Ckt, ECM
21 (2.0L)	O2 Sensor Signal	ON	(4)	O2 Sensor or Ckt, ECM
21 (2.2L)	O2 Sensor Signal	ON	N/A	O2 Sensor or Ckt, ECM
22	Coolant Temp. Sensor Signal	ON	ON	Coolant Temp. Sensor or Ckt, ECM
24	Intake Air Temp. Sensor Signal	ON (5)	ON	Intake Air Temp. Sensor or Ckt, ECM
25	Lean Air/Fuel Mixture	ON	ON	Loose Ground, Injector or Ckt, Fuel Pressure, Ignition System, Coolant Temp. Sensor, Airflow Meter, Vacuum Sensor, O2 Sensor or Ckt, Compression Pressure, ECM
26 (6)	Rich Air/Fuel Mixture	ON	ON	Loose Ground, Injector or Ckt, Fuel Pressure, Ignition System, Coolant Temp. Sensor, Airflow Meter, Vacuum Sensor, O2 Sensor or Ckt, Cold Start Injector or Ckt, Compression Pressure, ECM
27 (2.2L)	Sub-O2 Sensor Signal (7)	ON	ON	Sub-O2 Sensor or Ckt, ECM
31 (1.6L)	Vacuum Sensor Signal	ON	ON	Vacuum Sensor or Ckt, ECM
31 (2.0L)	Airflow Meter	ON	ON	Airflow Meter or Ckt, ECM
31 (2.2L)	Vacuum Sensor Signal	ON	ON	Vacuum Sensor or Ckt, ECM
32 (2.0L)	Airflow Meter	ON	ON	Airflow Meter or Ckt, ECM
34 (2.0L)	Turbocharging Pressure Sensor	ON	N/A	Turbocharging Pressure Sensor or Ckt, ECM
35 (2.0L)	Turbocharging Pressure Sensor	ON	ON	Turbocharging Pressure Sensor or Ckt, ECM
41	TPS Signal	ON (5)	ON	Throttle Position Sensor or Ckt, ECM
42	Vehicle Speed Sensor Signal	OFF	OFF	Vehicle Speed Sensor or Ckt, ECM

43 (1.6L)	Starter Signal	OFF	..	Starter Signal Ckt, Main Relay, Ignition Switch or Ckt, ECM
43 (2.0L) (2.2L)	Starter Signal	N/A	OFF	Starter Signal Ckt, Main Relay, Ignition Switch or Ckt, ECM
51 (1.6L)	Switch Condition Signal	OFF	..	A/C Switch, Park/Neutral Switch or Ckt, TPS or Ckt, ECM
51 (2.0L) (2.2L)	Switch Condition Signal	N/A	OFF	A/C Switch, Park/Neutral Switch or Ckt, TPS or Ckt, ECM
52 (2.0L) (2.2L)	Knock Sensor Signal	ON	N/A	Knock Sensor or Ckt, ECM
53 (2.0L)	Knock Control Signal	ON	N/A	ECM
71 (7)	EGR System Malfunction	ON	ON	EGR System, EGR Temp. Sensor or Ckt, EGR-VSV, ECM
(1) - The 1.6L is the 4A-FE engine, 2.0L is the Turbo 3S-GTE, and 2.2L is the 5S-FE engine. (2) - Only Normal Mode is used on 1.6L (4A-FE). Both modes are used on all others. Information in Test Mode applies to all models except the 1.6L (4A-FE). (3) - ON indicates MIL on instrument panel will be illuminated. N/A indicates item is not included in malfunction diagnosis when using this mode. OFF indicates MIL on instrument panel will be not be illuminated even if malfunction is detected. (4) - The MIL will be illuminated if problem exists in O2 sensor circuit. The MIL will not be illuminated if problem exists in O2 sensor heater or circuit. (5) - The MIL will be illuminated on California models only. (6) - Applies to California models on 2.2L, or all models on 1.6L and 2.0L. (7) - Applies to California models only.				

TROUBLE CODE DIAGNOSTIC CHARTS

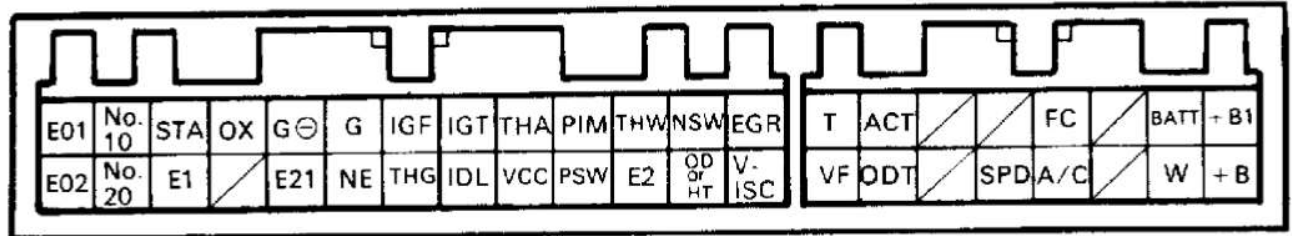
NOTE: All schematics and diagnostic flow charts are courtesy of Toyota Motor Sales, U.S.A., Inc.

ECM TERMINAL IDENTIFICATION

CAUTION: Perform all voltage measurements with ECM harness connector installed. Use a high-impedance DVOM (10,000-ohm minimum). Verify battery voltage is greater than 11 volts.



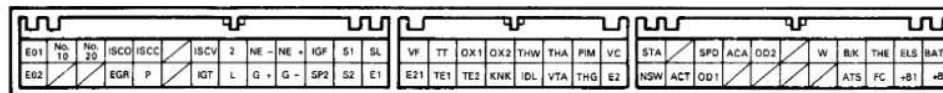
Fig. 3: ECM Terminal ID (3S-GTE)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 4: ECM Terminal ID (4A-FE)

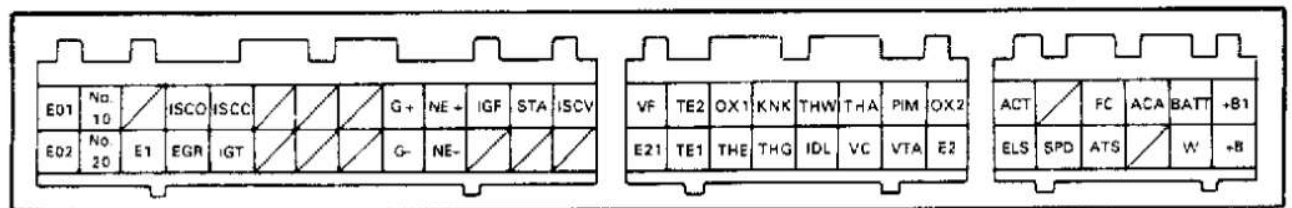
Courtesy of Toyota Motor Sales, U.S.A., Inc.



93F79305

Fig. 5: ECM Terminal ID (5S-FE W/ECT)

Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 6: ECM Terminal ID (5S-FE W/O ECT)

Courtesy of Toyota Motor Sales, U.S.A., Inc.

DIAGNOSTIC CIRCUIT CHECK

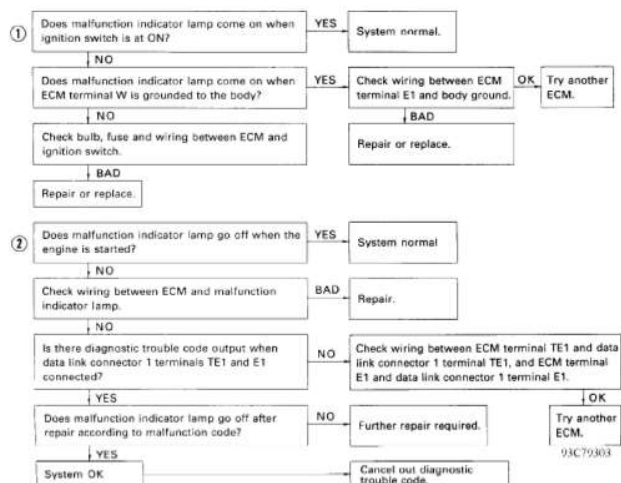
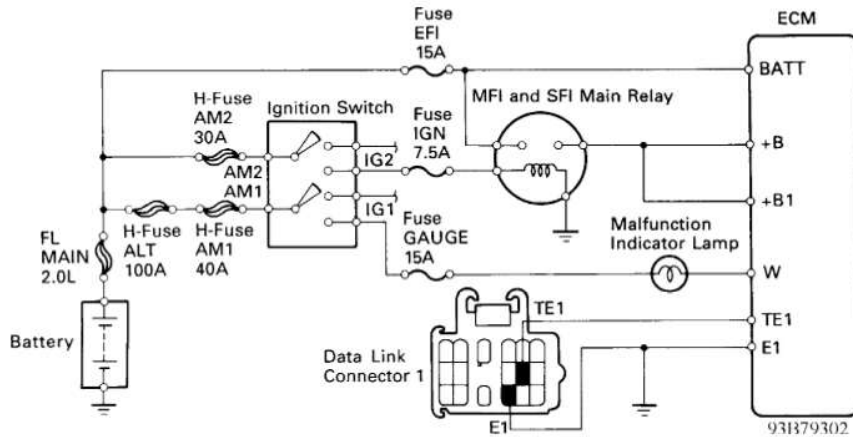


Fig. 7: Diagnostic Circuit Check Flow Chart



TEST NO. 1 - ECM POWER SOURCE

TEST NO. 1-ECM POWER SOURCE TROUBLE TABLE

Terminals	Trouble	Condition	STD Voltage
BATT - E1	No Voltage	—	10 - 14V

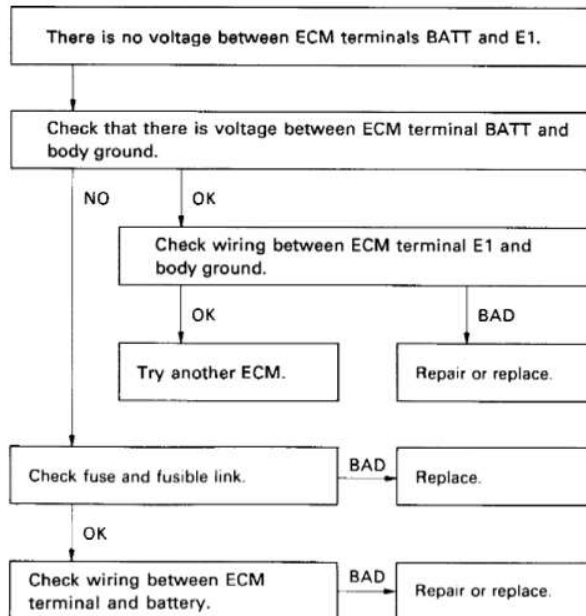


Fig. 9: Test No. 1 Flow Chart - ECM Power Source

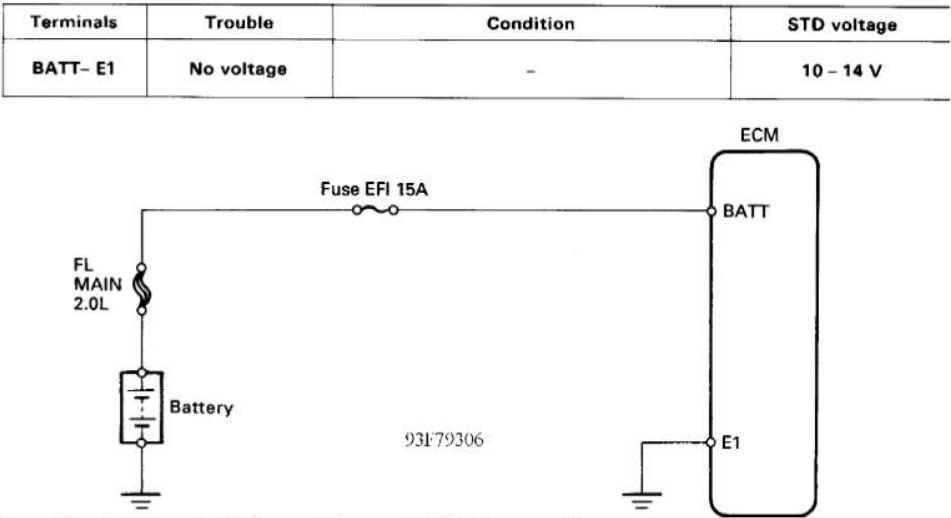


Fig. 10: Test No. 1 Schematic - ECM Power Source

TEST NO. 2 - ECM (+B) CIRCUIT

TEST NO. 2-ECM (+B) CIRCUIT TROUBLE TABLE

Terminals	Trouble	Condition	STD Voltage
+B - E1 +B1 - E1	No Voltage	Ignition Switch ON	10 - 14V

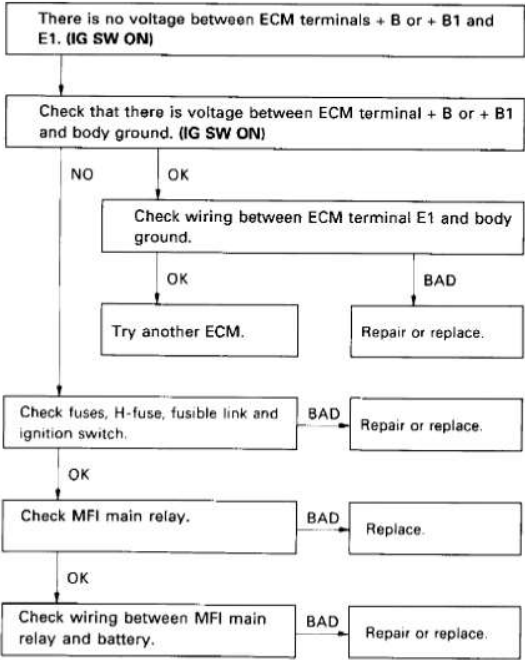


Fig. 11: Test No. 2 Flow Chart - ECM (+B) Circuit

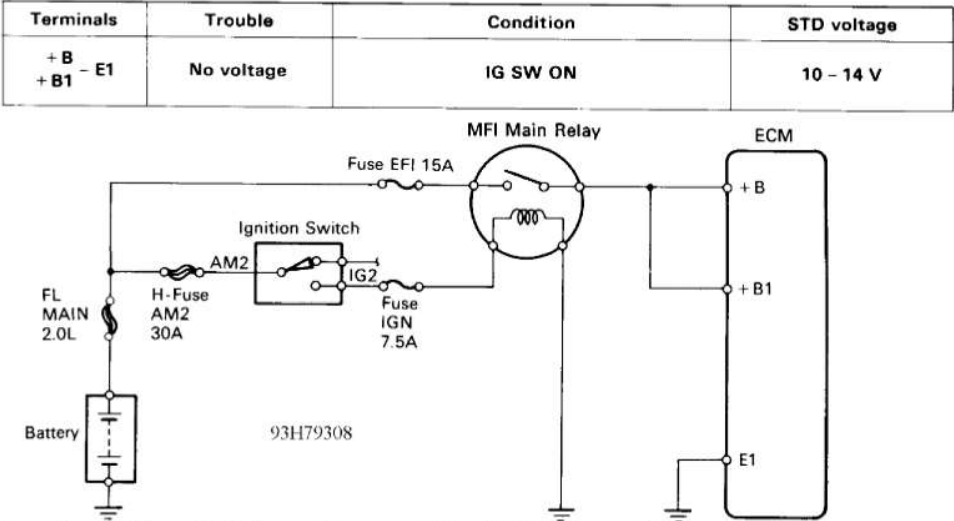


Fig. 12: Test No. 2 Schematic - ECM (+B) Circuit

CODE 12, 13 - RPM SIGNAL

Code 12 is caused by loss of "G2", "G1", or "NE" signal (3S-GTE), or no "G" or "NE" signal (all others), from distributor to ECM for at least 2 seconds after starter signal is received at ECM. Check distributor and ignition system components. See the article I - SYSTEM/COMPONENT TESTS in this section. Ensure starter signal exists at ECM. See CODE 43/TEST NO. 10 - STARTER SIGNAL test procedures in this article.

Code 13 is caused by loss of "NE" signal from distributor to ECM when engine RPM exceeds 1000-1500 RPM. Check for open or short in distributor wiring to ECM. Check distributor and ignition system components. See I - SYSTEM/COMPONENT TESTS article.

Code 12 is caused by loss of signal "G2", "G1", or "NE" (3S-GTE) or "G" or "NE" (all others) from distributor to ECM for at least 2 seconds after starter signal is received at ECM. Ensure starter signal exists at ECM. See CODE 43/TEST NO. 10 - STARTER SIGNAL test procedures in this article.

Code 13 is caused by loss of "NE" signal from distributor to ECM when engine RPM exceeds 1000 RPM.

NOTE: Diagnostic chart not available from manufacturer.

CODE 14/TEST NO. 3 - IGNITION SIGNAL

NOTE: To check ignition system components, see the article I - SYSTEM/COMPONENT TESTS in this section.

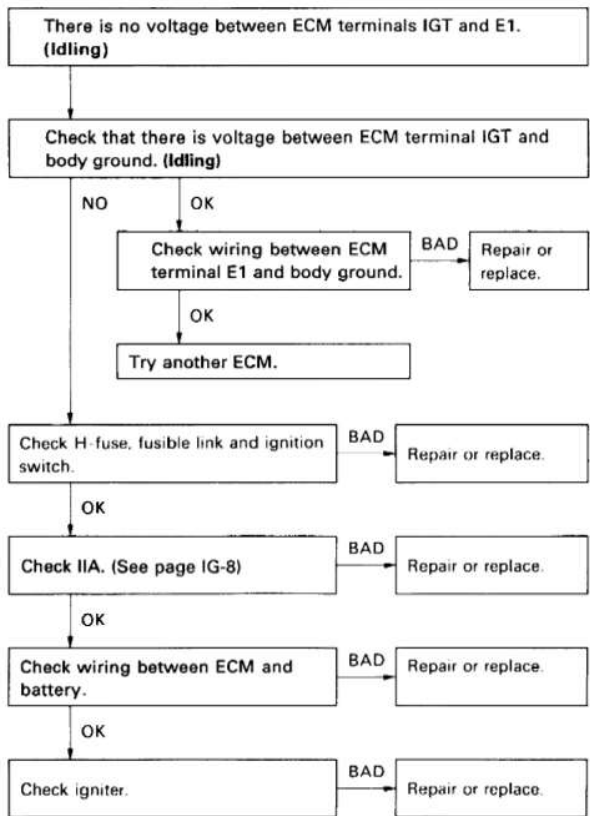


Fig. 13: Code 14/Test No. 3 Flow Chart (All Engines) Ignition Signal

CODE 14/TEST NO. 3-IGNITION SIGNAL TROUBLE TABLE (4A-FE)

Terminals	Trouble	Condition	STD Voltage
IGT - E1	No Voltage	Idling	0.8 - 1.2V

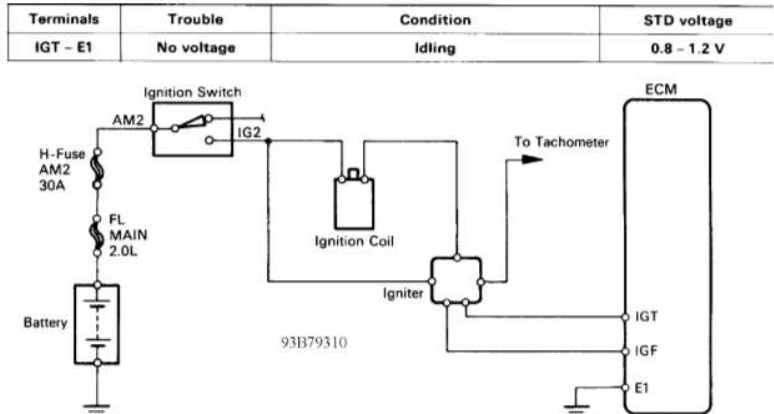


Fig. 14: Code 14/Test No. 3 Schematic (3S-GTE) Ignition Signal

CODE 14/TEST NO. 3-IGNITION SIGNAL TROUBLE TABLE (3S-GTE)

Terminals	Trouble	Condition	STD Voltage
IGT - E1	No Voltage	Idling	0.7 - 1.0V

Terminals	Trouble	Condition	STD voltage
IGT - E1	No voltage	Idling	0.7 - 1.0 V

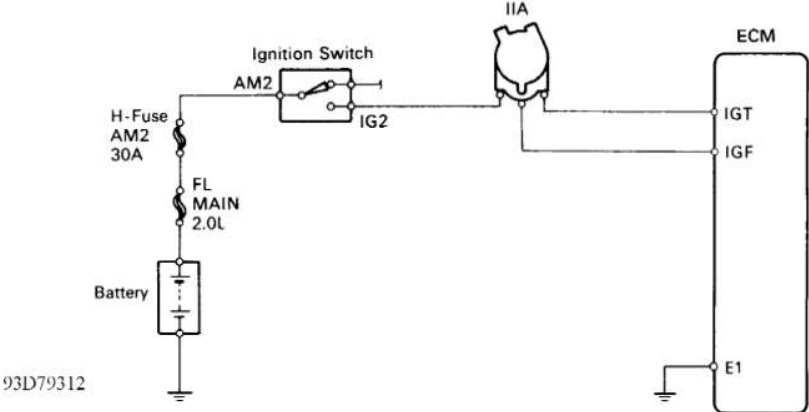


Fig. 15: Code 14/Test No. 3 Schematic (4A-FE)
Ignition Signal

CODE 14/TEST NO. 3-IGNITION SIGNAL TROUBLE TABLE (5S-FE)

NO.	Terminals	Trouble	Condition	STD Voltage
9	IGT - E1	No Voltage	Idling	0.8 - 1.2V

Terminals	Trouble	Condition	STD voltage
IGT - E1	No voltage	Idling	0.8 - 1.2 V

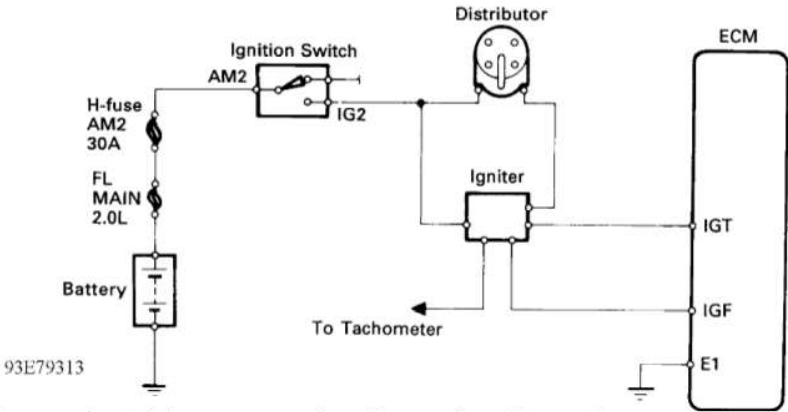


Fig. 16: Code 14/Test No. 3 Schematic (5S-FE)
Ignition Signal

CODE 21, 27/TEST NO. 4 - OXYGEN SENSOR SIGNAL

NOTE: Code 27 applies to 5S-FE only.

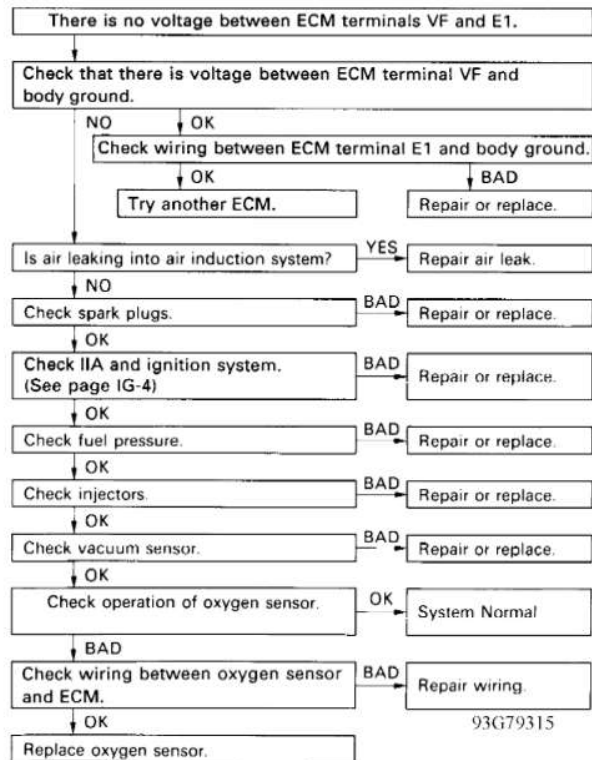


Fig. 17: Code 21/Test No. 4 Flow Chart
Oxygen Sensor Signal

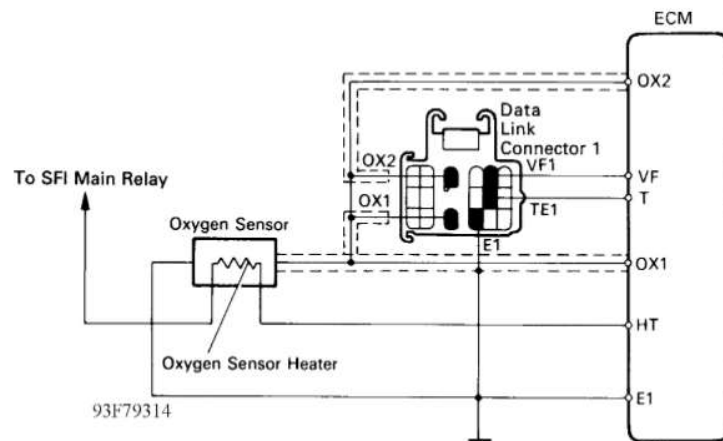


Fig. 18: Code 21/Test No. 4 Schematic (3S-GTE)
Oxygen Sensor Signal

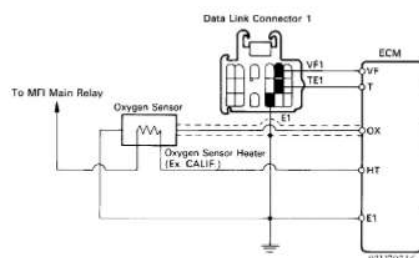


Fig. 19: Code 21/Test No. 4 Schematic (4A-FE)
Oxygen Sensor Signal

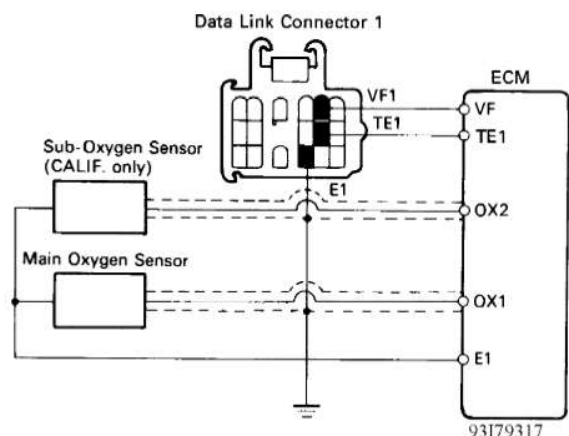


Fig. 20: Code 21, 27/Test No. 4 Schematic (5S-FE)
Oxygen Sensor Signal

CODE 22/TEST NO. 5 - COOLANT TEMPERATURE SENSOR SIGNAL

NOTE: Water temperature sensor is also referred to as coolant temperature sensor.

CODE 22/TEST NO. 5 - CTS SENSOR SIGNAL TROUBLE TABLE

Terminals	Trouble	Condition	STD Voltage
THW - E2	No Voltage	Ignition Switch ON Coolant Temp. 80°C (176°F)	0.1 - 1.1V

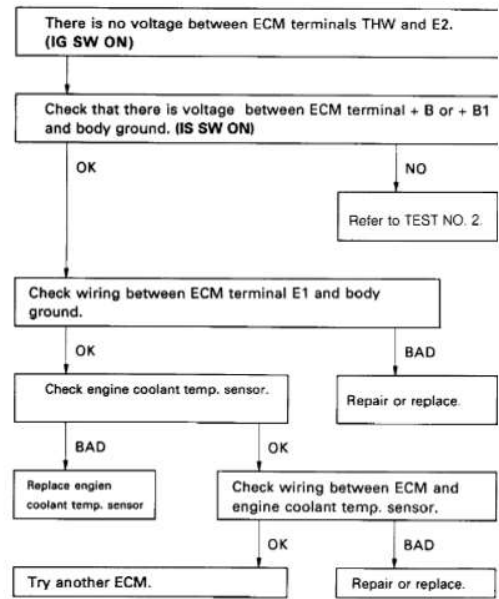


Fig. 21: Code /Test No. 5 Flow Chart
Coolant Temperature Sensor Signal

Terminals	Trouble	Condition		STD voltage
THW- E2	No voltage	IG SW ON	Engine coolant temperature 80°C (176°F)	0.1 – 1.0 V

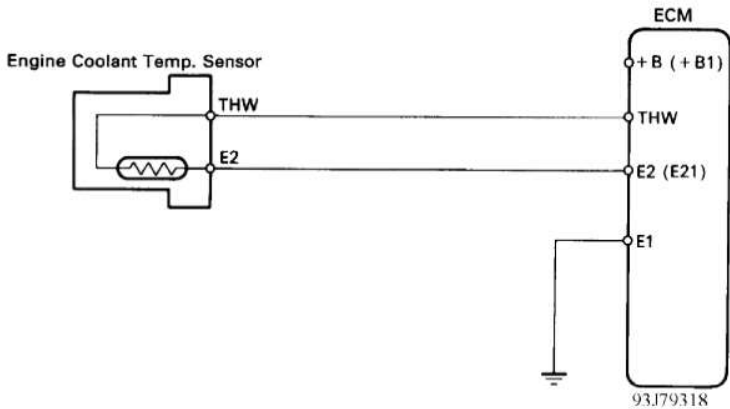


Fig. 22: Code 22/Test No. 5 Schematic
Coolant Temperature Sensor Signal

CODE 24/TEST NO. 6 - INTAKE AIR TEMPERATURE SENSOR SIGNAL

CODE 24/TEST NO. 6 – IAT SENSOR SIGNAL TROUBLE TABLE

Terminals	Trouble	Condition	STD Voltage
3S-GTE			
THA – E2	No Voltage	Ignition Switch ON Int. Air Temp. 20°C (68°F)	1 – 3V
4A-FE			
THA – E2	No Voltage	Ignition Switch ON Int. Air Temp. 20°C (68°F)	1 – 3V
5S-FE			
THA – E2	No Voltage	Ignition Switch ON Int. Air Temp. 20°C (68°F)	1.9 – 2.9V

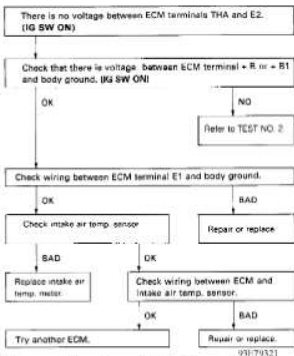


Fig. 23: Code 24/Test No. 6 Flow Chart (All Models)
Intake Air Temperature Sensor Signal

Terminals	Trouble	Condition		STD voltage
THA - E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1 - 3 V

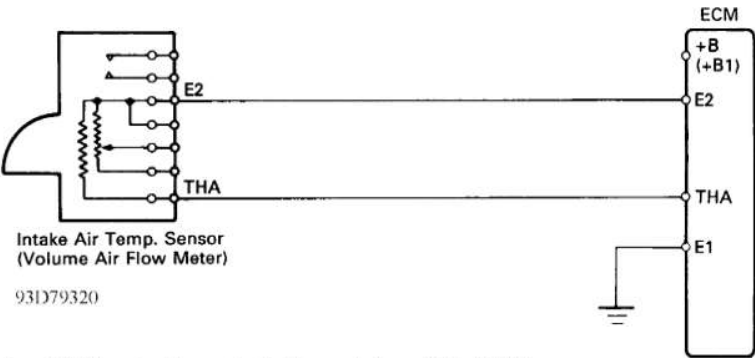


Fig. 24: Code 24/Test No. 6 Schematic (3S-GTE)
Intake Air Temperature Sensor Signal

Terminals	Trouble	Condition		STD voltage
THA- E2	No voltage	IG SW ON	Intake air temperature 20°C (68°F)	1 - 3 V

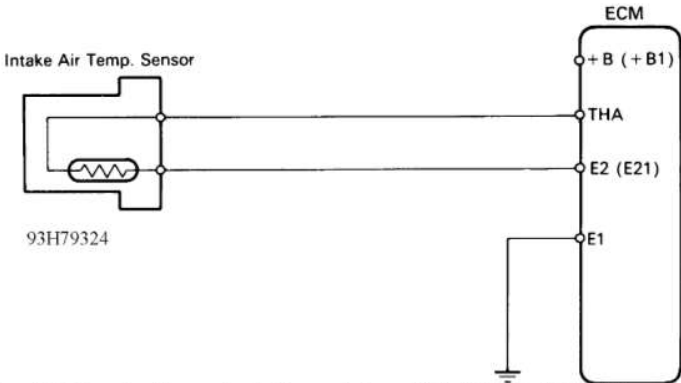


Fig. 25: Code 24/Test No. 6 Schematic (4A-FE & 5S-FE)
Intake Air Temperature Sensor Signal

CODE 25 - LEAN AIR/FUEL MIXTURE

Probable Causes

- * Loose Engine Ground
- * Open E1 Circuit
- * Open Injector Circuit
- * Open Or Short In Oxygen Sensor Or Circuit
- * Fuel Line Pressure (Blocked Injector)
- * Ignition System
- * Coolant Temperature Sensor
- * Airflow Meter Or Air Intake System (3S-GTE)
- * Vacuum Sensor
- * ECM

For oxygen (O2) sensor or circuit testing, see Code 21.
For injector or circuit testing, see TEST NO. 13 - INJECTOR CIRCUIT.

NOTE: Diagnostic chart not available from manufacturer.

CODE 26 - RICH AIR/FUEL MIXTURE

Probable Causes

- * Loose Engine Ground
- * Open E1 Circuit
- * Short In Injector Circuit Or Injector
- * Open Or Short In Oxygen Sensor Or Circuit
- * Fuel Line Pressure (Leaking Injector)
- * Open Or Short In Cold Start Injector Or Circuit
- * Airflow Meter Or Air Intake System (3S-GTE)
- * Compression Pressure
- * Coolant Temperature Sensor
- * Vacuum Sensor Circuit
- * ECM

For oxygen sensor or circuit testing, see Code 21.

For injector or circuit testing, see CELICA TEST NO. 13.

NOTE: Diagnostic chart is not available from manufacturer.

CODE 31/NO. 7 VACUUM SENSOR SIGNAL (4A-FE & 5S-FE)

CODE 31/TEST NO. 7 - VACUUM SENSOR SIGNAL
TROUBLE TABLE (4A-FE & 5S-FE)

Terminal	Trouble	Condition	STD Voltage
PIM-E2	No Voltage	Ignition Switch ON	3.3-3.9V
VCC-E2	No Voltage	Ignition Switch ON	4.5-5.5V

● PIM - E2, VCC - E2

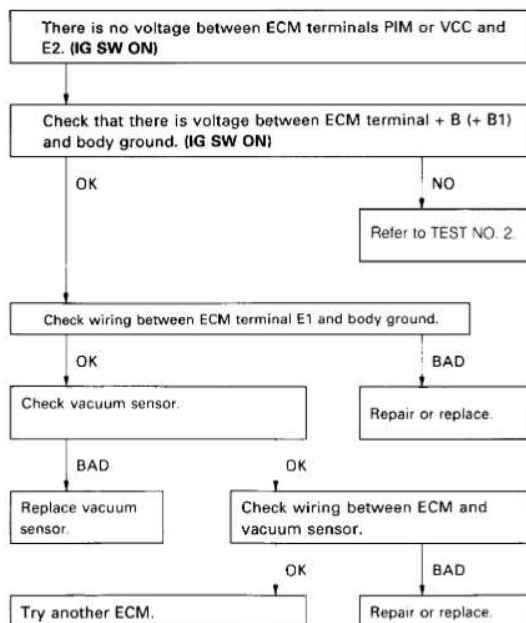


Fig. 26: Code 31/Test No. 7 Flow Chart (4A-FE & 5S-FE)
Vacuum Sensor Signal

93J79326

Terminals	Trouble	Condition	STD voltage
PIM - E2	No voltage	IG SW ON	3.3 - 3.9 V
VCC - E2			4.5 - 5.5 V

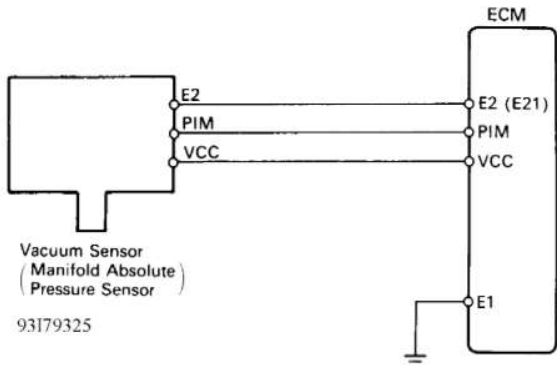


Fig. 27: Code 31/Test No. 7 Schematic (4A-FE & 5S-FE)
Vacuum Sensor Signal

CODE 31, 32/TEST NO. 7 - AIRFLOW METER SIGNAL (3S-GTE)

CODE 31,32/TEST NO. 7-AIRFLOW METER SIGNAL TROUBLE TABLE

Terminals	Trouble	Condition	STD Voltage
VC - E2	No Voltage	—	4.5-5.5V
VS - E2		Ignition Switch ON Measuring Plate CLOSED	3.7-4.3V
VS - E2		Ignition Switch ON Measuring Plate OPEN	0.2-0.5V
VS - E2		Idling	1.6-4.1V
VS - E2		3000 RPM	1.0-2.0V

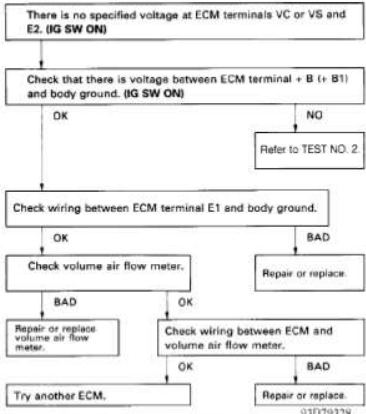


Fig. 28: Code 31, 32/Test No. 7 Flow Chart (3S-GTE)
Airflow Meter Signal

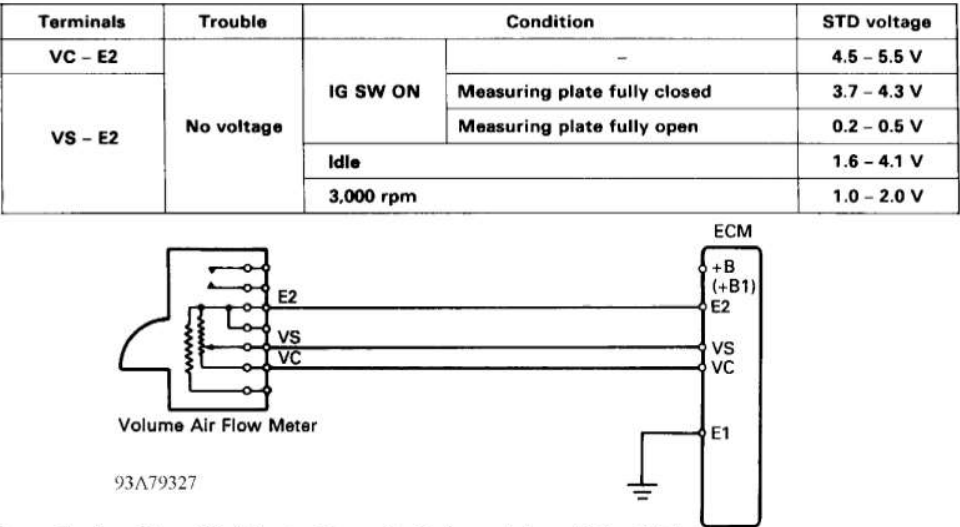


Fig. 29: Code 31, 32/Test No. 7 Schematic (3S-GTE) Airflow Meter Signal

CODE 34, 35/TEST NO. 8 - TURBOCHARGER PRESSURE (3S-GTE)

CODE 34, 35/TEST NO. 8-TURBOCHARGER PRESSURE TROUBLE TABLE

Terminal	Trouble	Condition	STD Voltage
PIM-E2	No Voltage	Ignition Switch ON	2.5-4.5V
VC-E2	No Voltage	Ignition Switch ON	4.5-5.5V

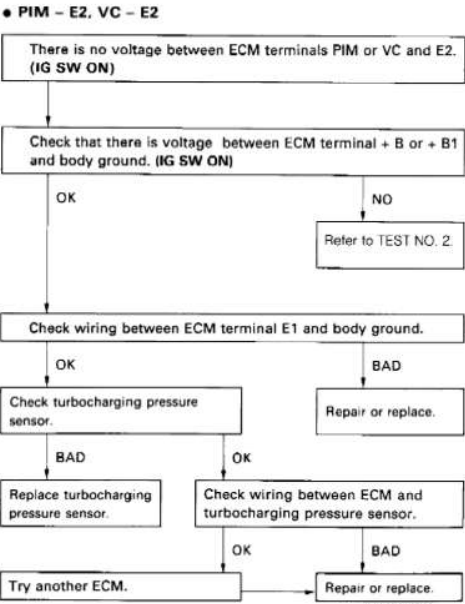


Fig. 30: Code 34, 35/Test No. 8 Flow Chart (3S-GTE) Turbocharger Pressure

Terminals	Trouble	Condition	STD voltage
PIM - E2	No voltage	IG SW ON	2.5 - 4.5 V
VC - E2			4.5 - 5.5 V

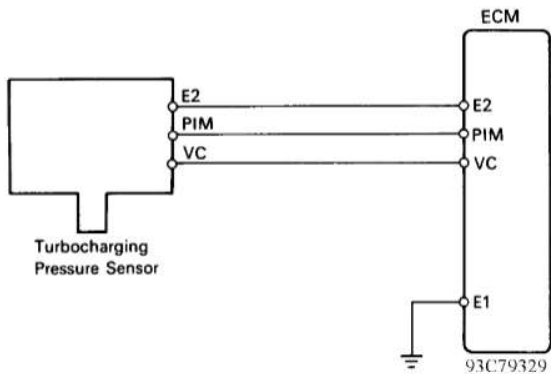
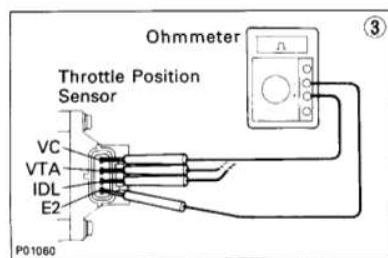
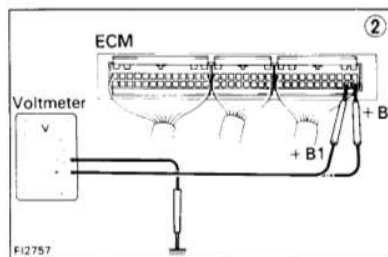
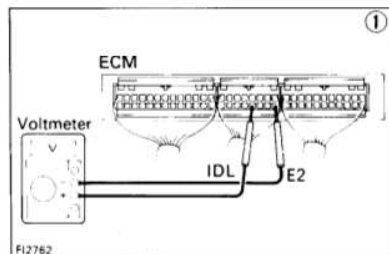


Fig. 31: Code 34, 35/Test No. 8 Schematic (3S-GTE)
Turbocharger Pressure

CODE 41/TEST NO. 9 - THROTTLE POSITION SENSOR SIGNAL (3S-GTE)

CODE 41/TEST NO. 8-TPS SENSOR SIGNAL TROUBLE TABLE (3S-GTE)

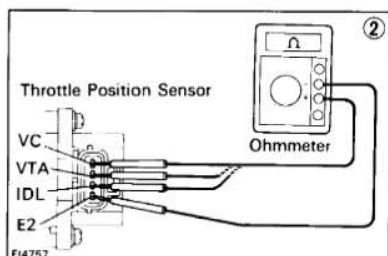
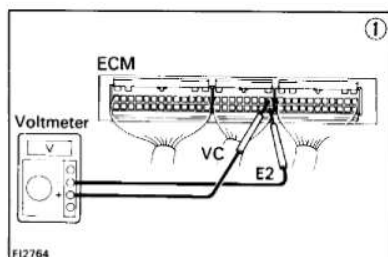
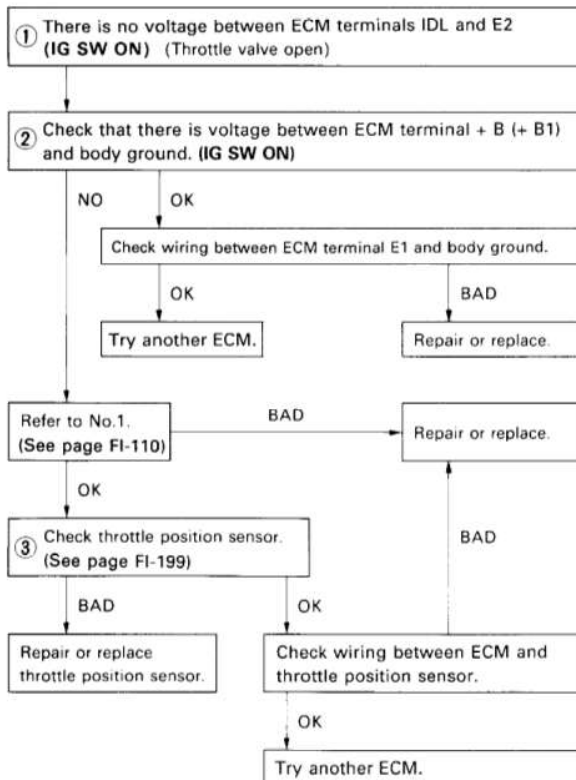
Terminals	Trouble	Condition	STD Voltage
IDL - E2	No Voltage	IG SW ON-Throttle valve OPEN	4.5-5.5V
VC - E2		IG SW ON ———	4.5-5.5V
VTA - E2		IG SW ON-Throttle valve SHUT	0.1-1.0V
		IG SW ON-Throttle valve OPEN	3.2-4.2V



93H79332

Fig. 32: Code 41/Test No. 9 Flow Chart, Terminals IDL - E2 (3S-GTE) Throttle Position Sensor Signal

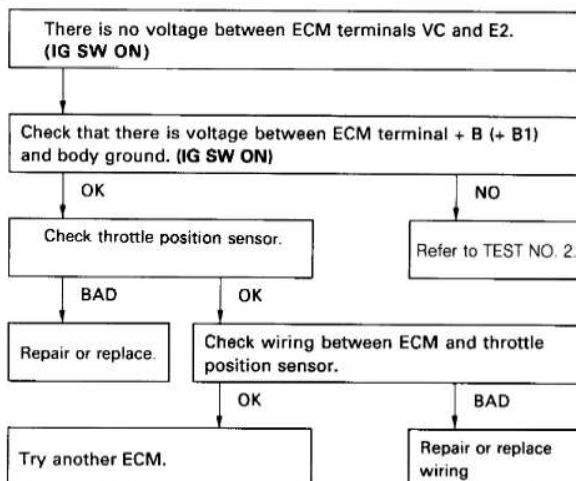
● IDL - E2



93H79333

Fig. 33: Code 41/Test No. 9 Flow Chart, Terminals VC - E2 (3S-GTE) Throttle Position Sensor Signal

● VC - E2



93H79333

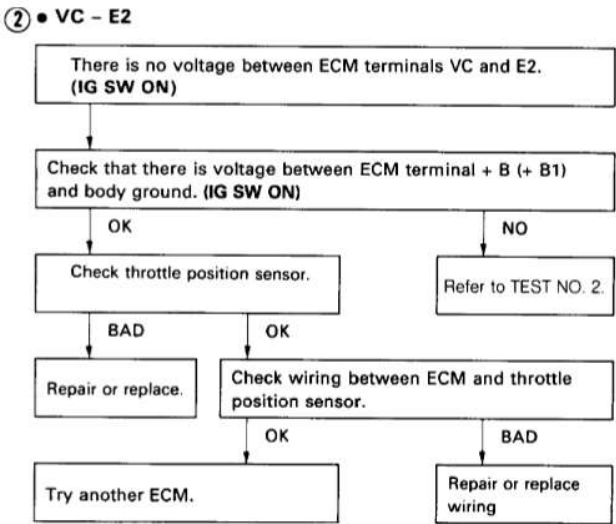


Fig. 34: Code 41/Test No. 9 Flow Chart, Terminals VTA - E2 (3S-GTE)
Throttle Position Sensor Signal

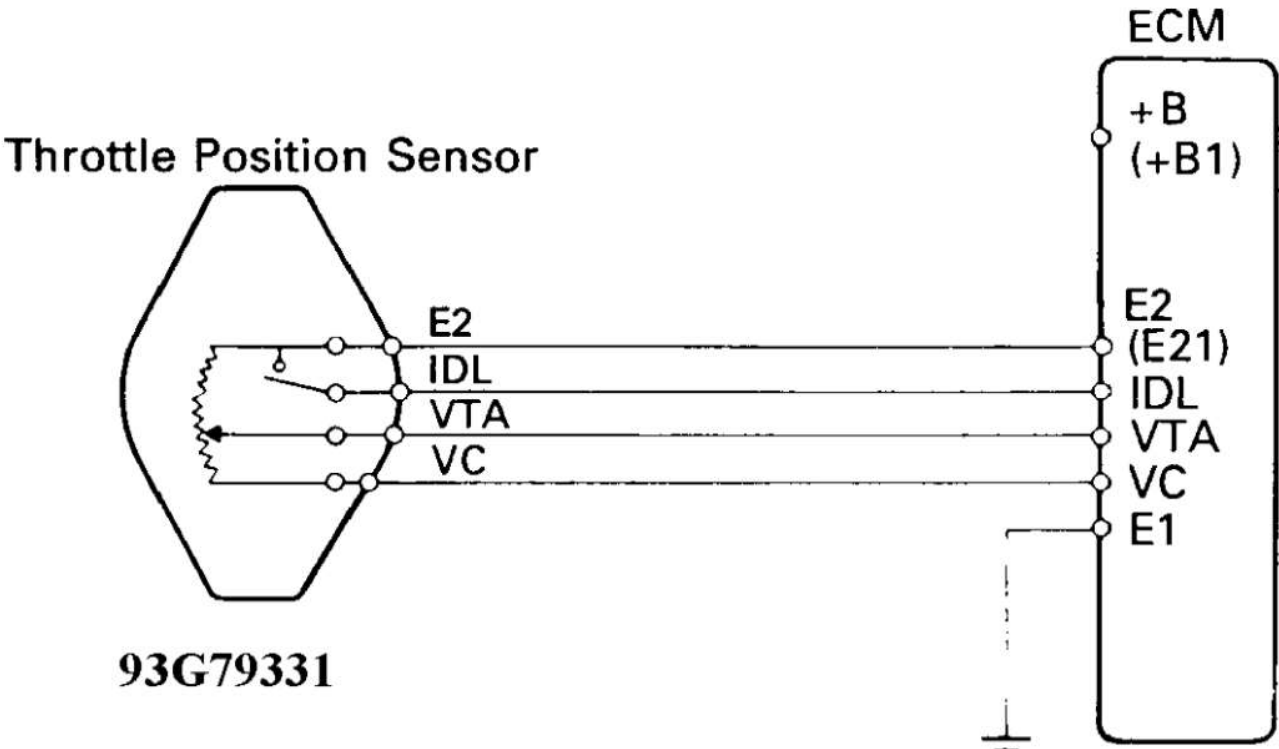


Fig. 35: Code 41/Test No. 9 Schematic (3S-GTE)
Throttle Position Sensor Signal

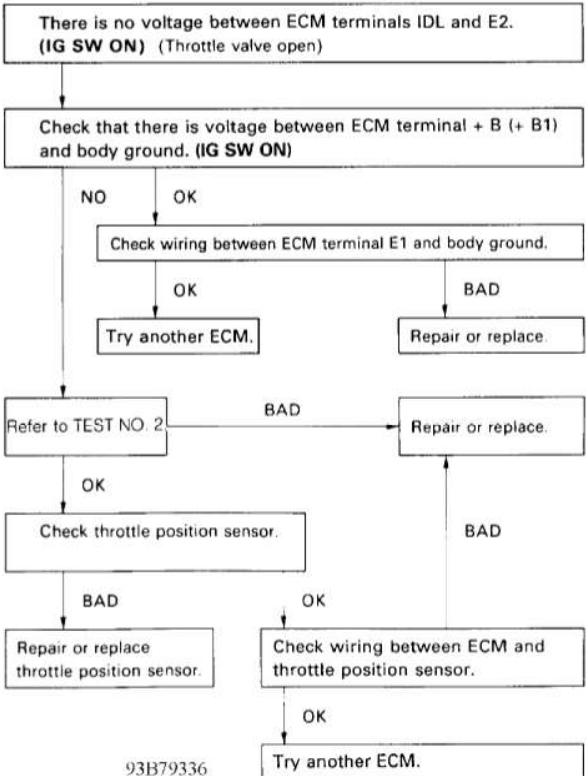
CODE 41/TEST NO. 9 - THROTTLE POSITION SENSOR SIGNAL (4A-FE)

CODE 41/TEST NO. 9-TPS SENSOR SIGNAL TROUBLE TABLE (4A-FE)

Terminal	Trouble	Condition	STD Voltage
IDL-E2		IG SW ON - Throttle Valve OPEN	10-14V

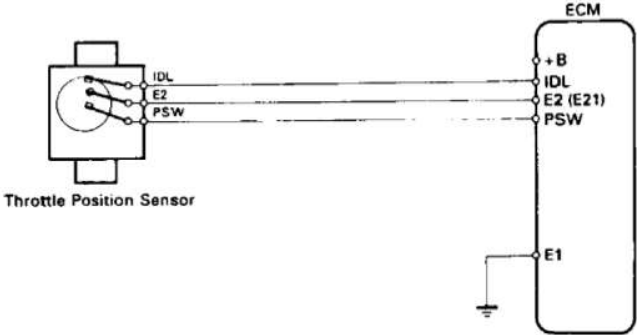
PSW-E2	No Voltage	IG SW ON - Throttle Valve CLOSED	10-14V
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① • IDL - E2



93B79336
Fig. 36: Code 41/Test No. 9 Flow Chart (4A-FE)
Throttle Position Sensor Signal

Terminals	Trouble	Condition	STD voltage
IDL - E2	No voltage	IG SW ON Throttle valve open	10 - 14 V
PSW - E2		Throttle valve fully closed	10 - 14 V

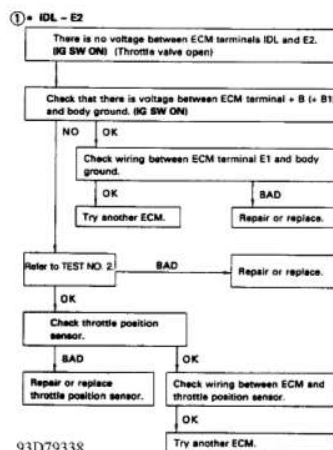


93A79335
Fig. 37: Code 41/Test No. 9 Schematic (4A-FE)
Throttle Position Sensor Signal

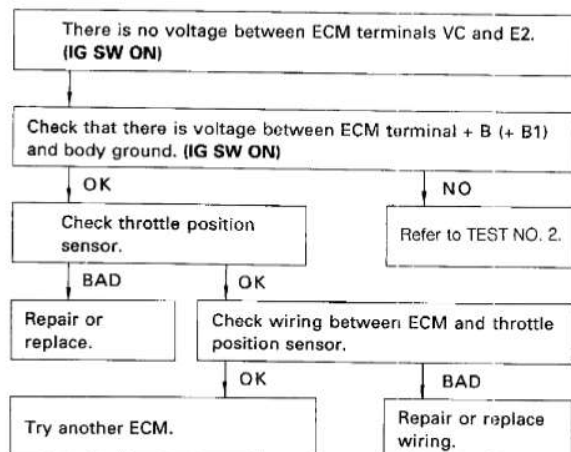
CODE 41/TEST NO. 9 - THROTTLE POSITION SENSOR SIGNAL (5S-FE)

CODE 41/TEST NO. 8-TPS SENSOR SIGNAL TROUBLE TABLE (5S-FE)

Terminals	Trouble	Condition	STD Voltage
IDL - E2	No Voltage	IG SW ON-Throttle valve OPEN	8 - 14V
VC - E2		IG SW ON-	4.5-5.5V
VTA - E2		IG SW ON-Throttle Valve SHUT (Throttle Opener Must Be Canceled First)	0.8 - 1.2V
		IG SW ON-Throttle valve OPEN	3.2 - 4.2V



93D79338

Fig. 38: Code 41/Test No. 9 Flow Chart Terms. IDL - E2 (5S-FE)
Throttle Position Sensor Signal

93E79339

Fig. 39: Code 41/Test No. 9 Flow Chart Terms. VC - E2 (5S-FE)
Throttle Position Sensor Signal

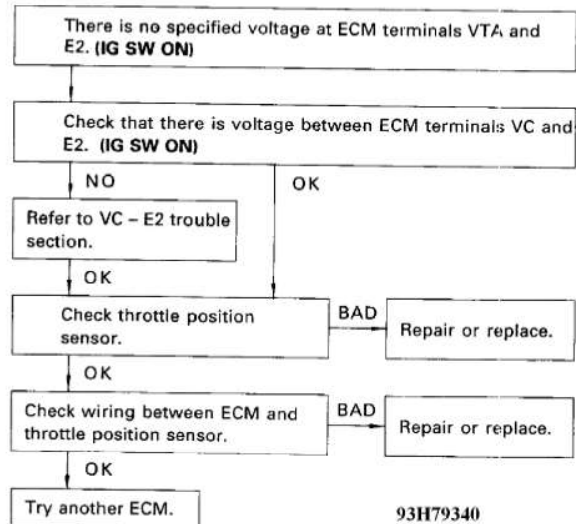


Fig. 40: Code 41/Test No. 9 Flow Chart Terms. VTA - E2 (5S-FE)
Throttle Position Sensor Signal

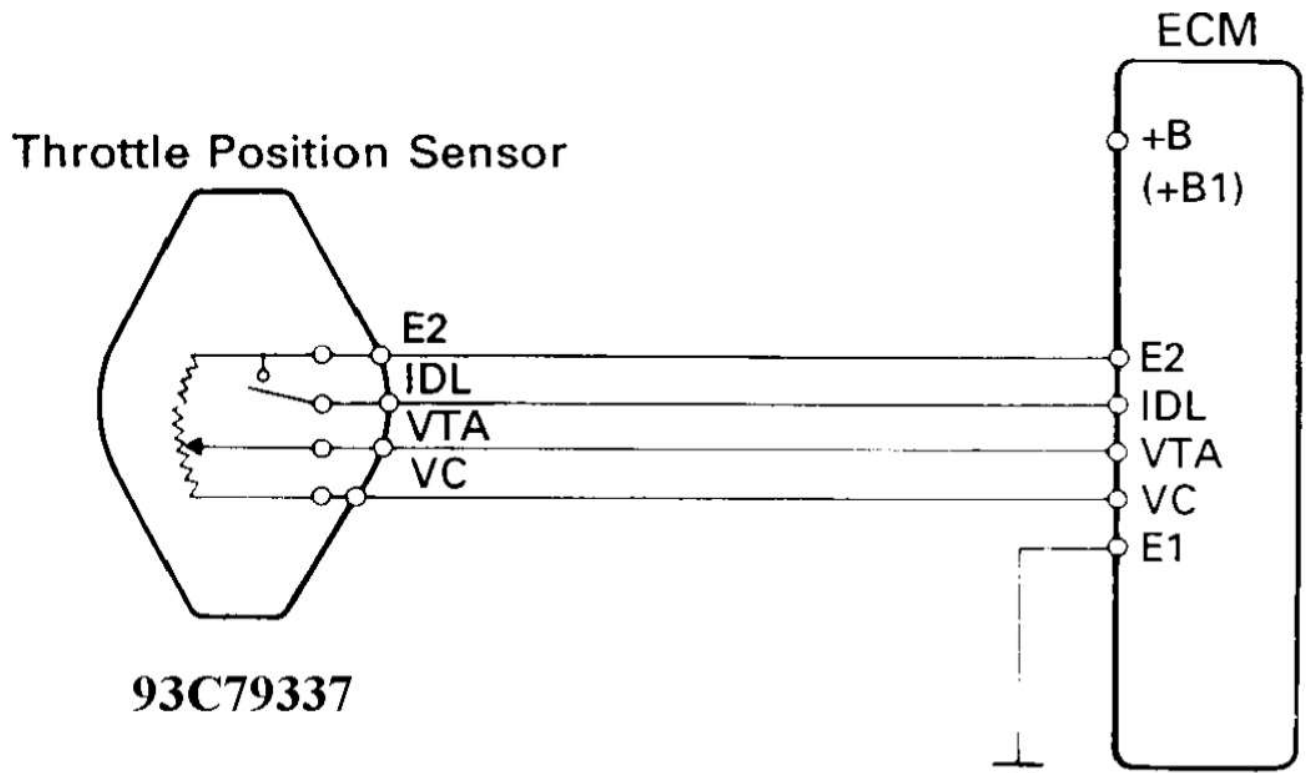


Fig. 41: Code 41/Test No. 9 Schematic (5S-FE)
Throttle Position Sensor Signal

CODE 42 - VEHICLE SPEED SENSOR SIGNAL

Probable Causes:

- * Open or Short in Vehicle Speed Sensor or Sensor Circuit
- * ECM

NOTE: Diagnostic chart not available from manufacturer.

CODE 43/TEST NO. 10 - STARTER SIGNAL

CODE 43/TEST NO. 10-STARTER SIGNAL TROUBLE TABLE

Terminal	Trouble	Condition	STD Voltage
STA-E1	No Voltage	Cranking	6-14V

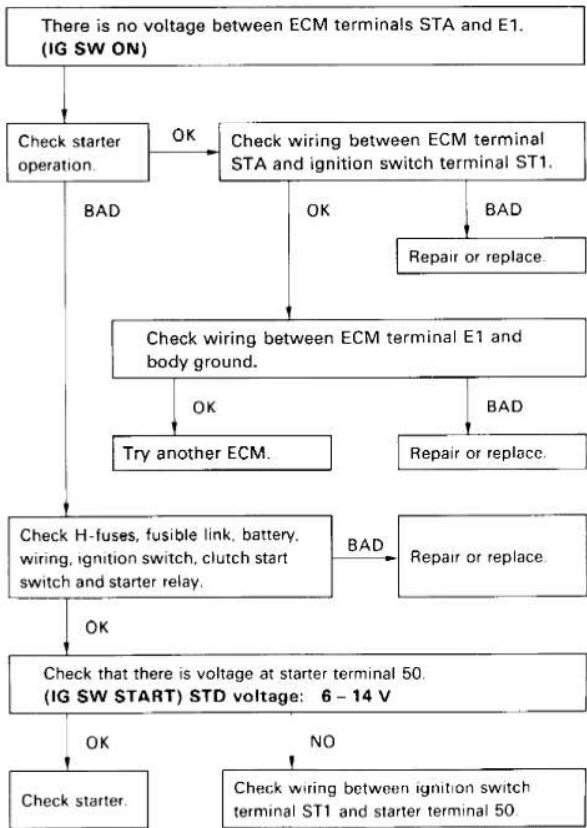


Fig. 42: Code 43/Test No. 10 Flow Chart Starter Signal

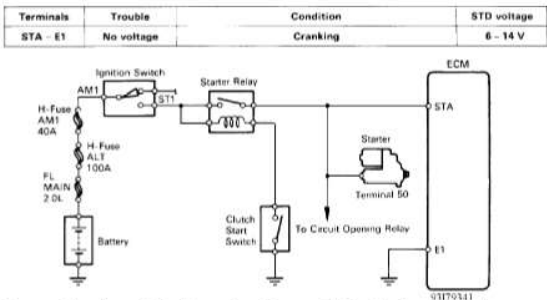


Fig. 43: Code 43/Test No. 10 Schematic Starter Signal

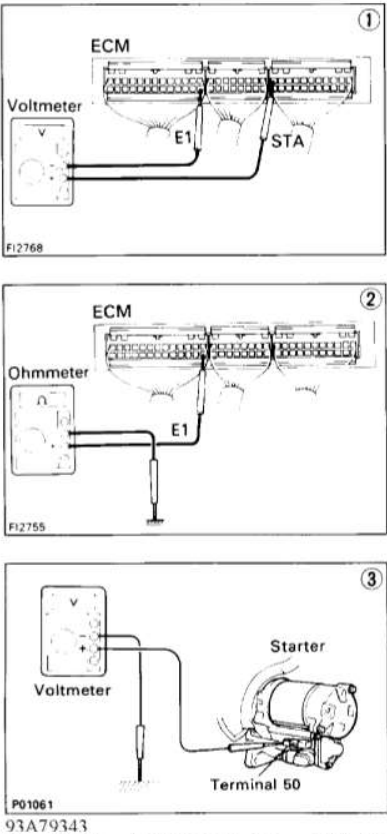


Fig. 44: Code 43/Test No. 10 Component Diagram
Starter Signal

CODE 51/TEST NO. 11 - SWITCH SIGNAL

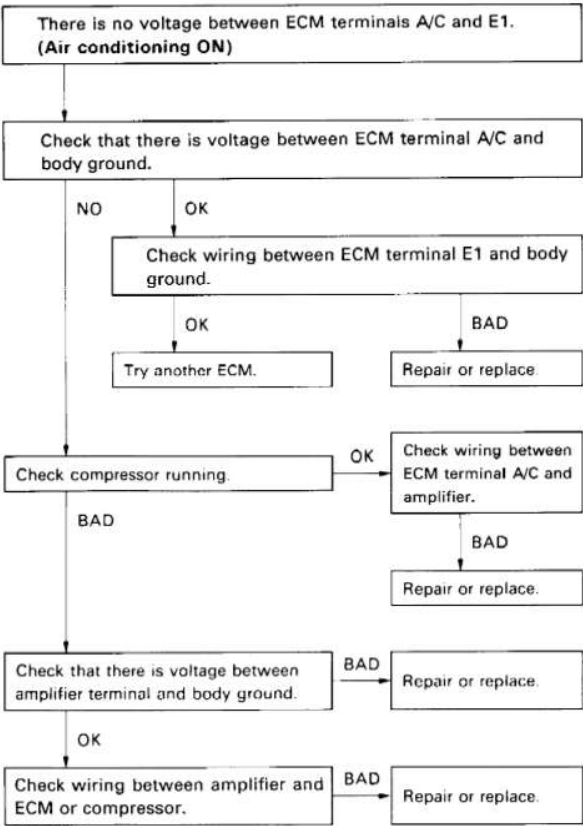
Probable Causes:

- * A/C Switch or Switch Circuit
- * Accelerator Pedal or Cable
- * Neutral/Start Switch or Switch Circuit
- * Throttle Position Sensor IDL Circuit
- * ECM

To check throttle position sensor signal, see Code 41.
To check A/C switch signal, use the following procedure.

CODE 51/TEST NO. 11-SWITCH SIGNAL TROUBLE TABLE

Terminal	Trouble	Condition	STD Voltage
A/C-E1	No Voltage	Air Conditioning ON	8-14V



93C79345
Fig. 45: Code 51/Test No. 11 Flow Chart - Switch Signal

Terminals	Trouble	Condition	STD voltage
A/C - E1	No voltage	Air conditioning ON	8 - 14 V

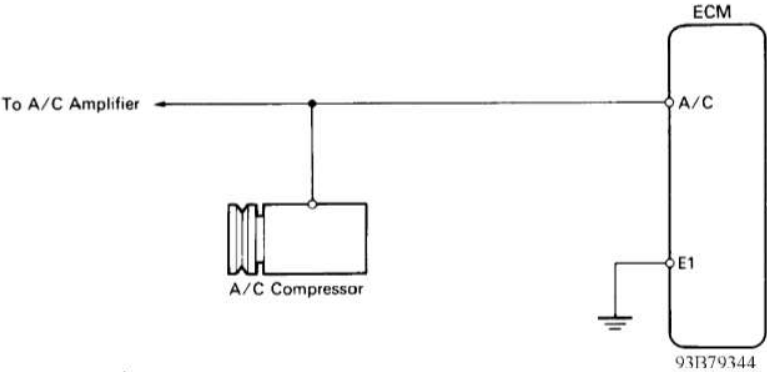


Fig. 46: Code 51/Test No. 11 Schematic - Switch Signal

CODE 52 - KNOCK SENSOR SIGNAL (3S-GTE & 5S-FE)

Probable Causes:

- * Open Or Short In Knock Sensor Or Circuit
- * ECM Defective

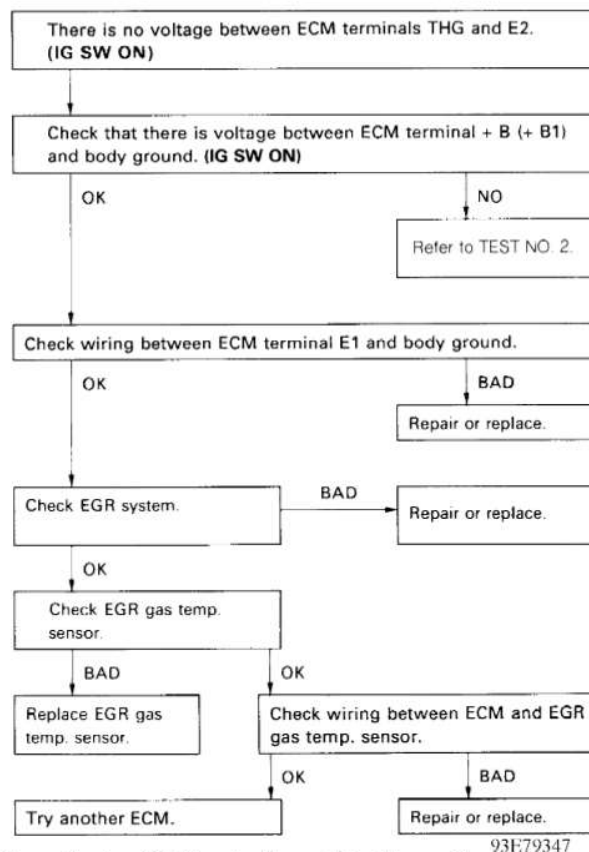
NOTE: Diagnostic chart not available from manufacturer.

CODE 53 - KNOCK SENSOR CONTROL (ECM) (3S-GTE)

- Probable Causes:
 * ECM Defective

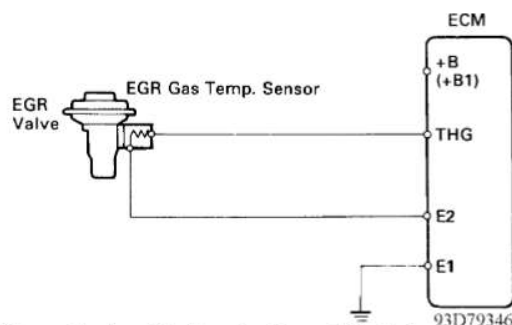
NOTE: Diagnostic chart not available from manufacturer.

CODE 71/TEST NO. 12 - EGR SYSTEM MALFUNCTION



93F79347

Fig. 47: Code 71/Test No. 12 Flow Chart
EGR System Malfunction



93D79346

Fig. 48: Code 71/Test No. 12 Schematic
EGR System Malfunction

TEST NO. 13 - INJECTOR CIRCUIT

TEST NO. 13-INJECTOR CIRCUIT TROUBLE TABLE

Terminal	Trouble	Condition	STD Voltage
3S-GTE			
No.1,2,3 & 4 to E01 & E02	No Voltage	Ignition Switch ON	10-14V
4A-FE & 5S-FE			
No.10 & No.20 to E01 & E02	No Voltage	Ignition Switch ON	10-14V

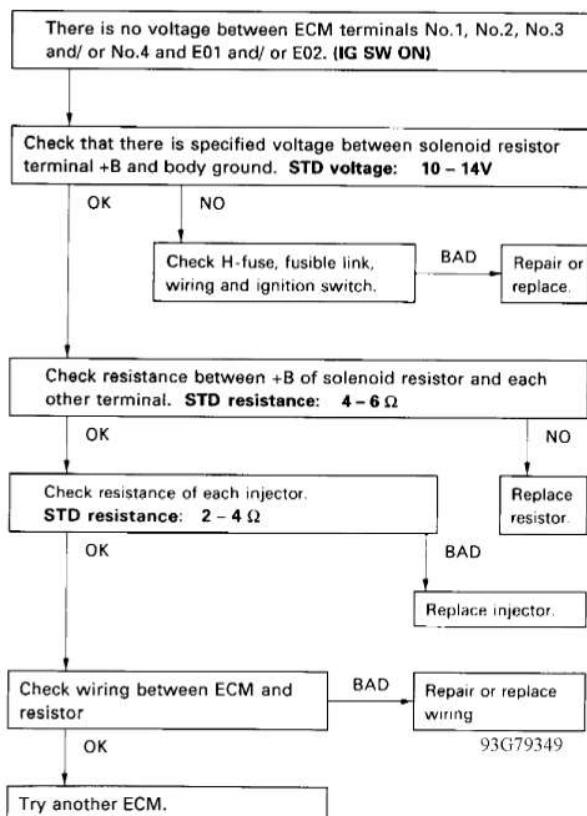


Fig. 49: Test No. 13 Flow Chart (3S-GTE) Injector Circuit

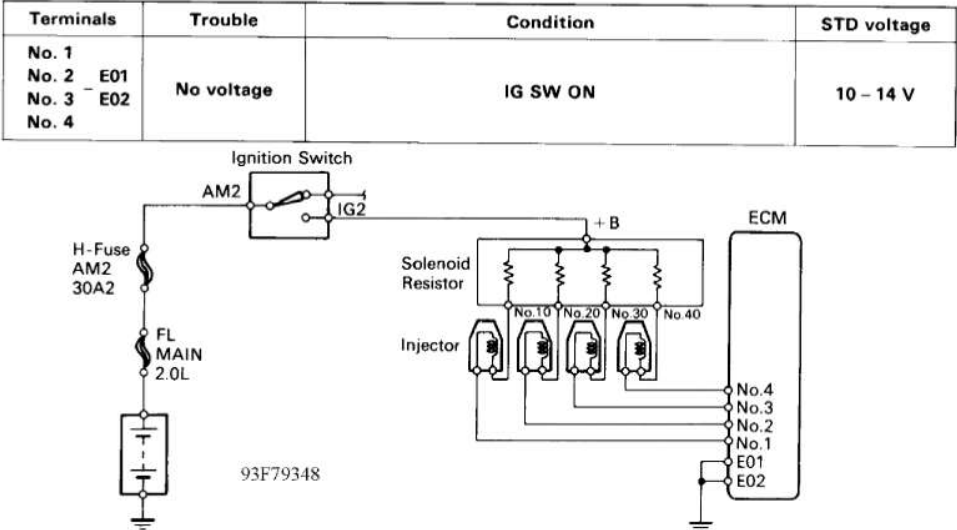
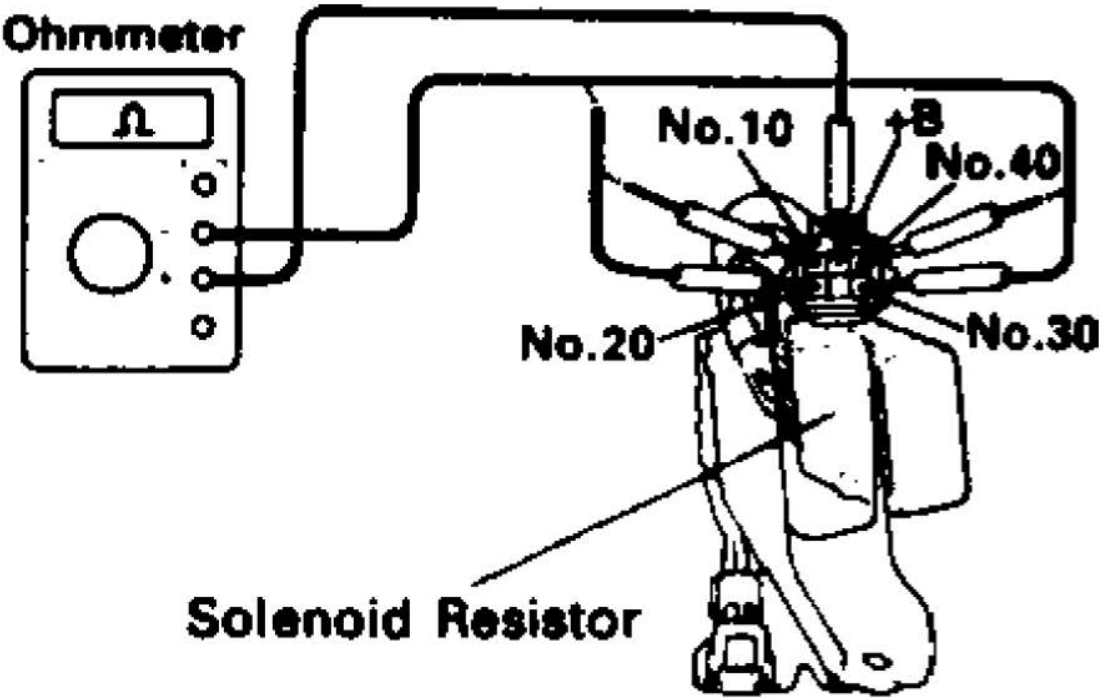
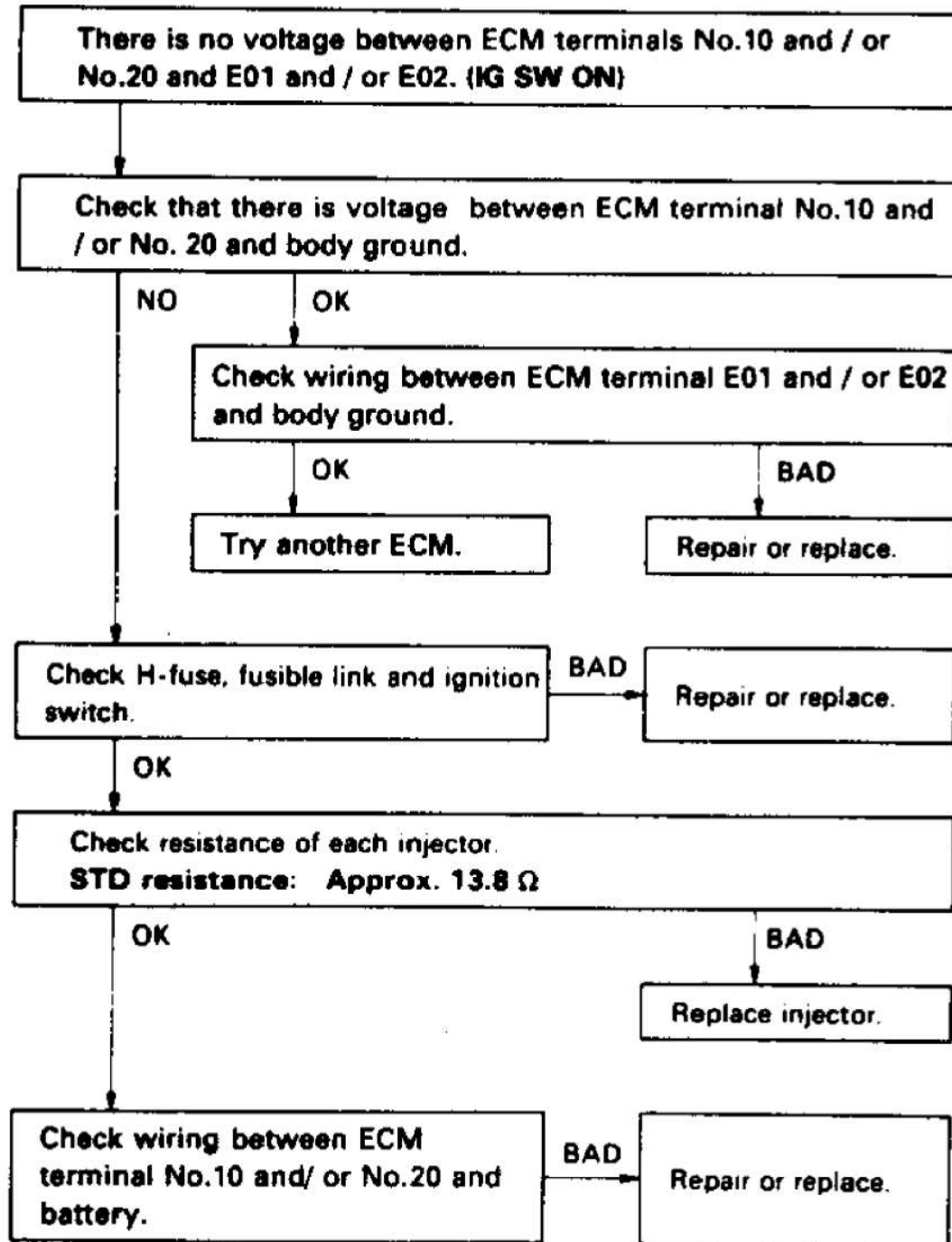


Fig. 50: Test No. 13 Schematic (3S-GTE)
Injector Circuit



93A79350

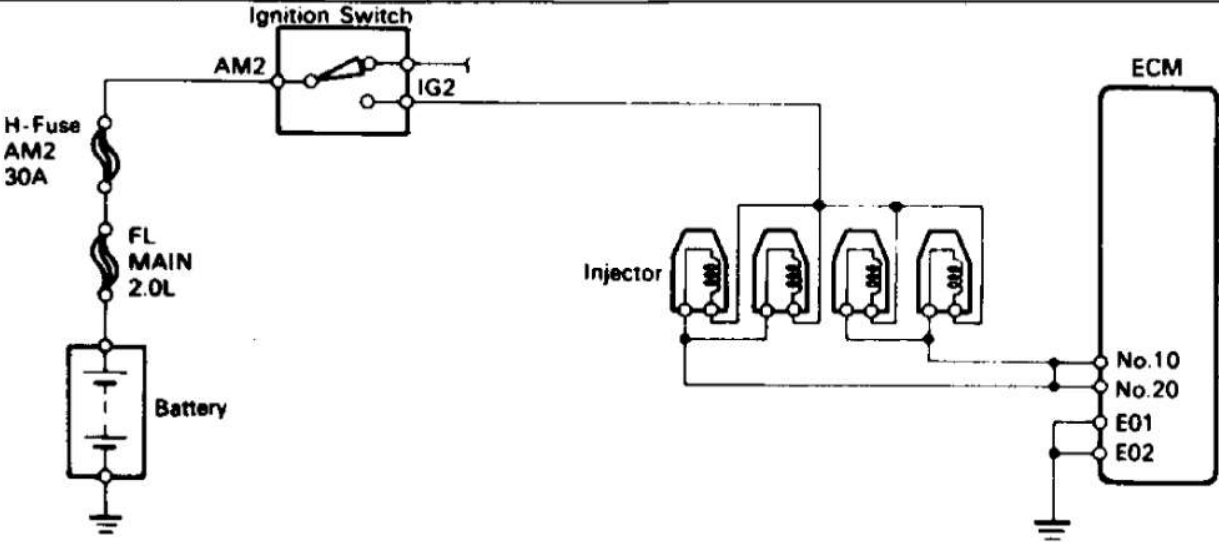
Fig. 51: Test No. 13 Component Diagram (3S-GTE)
Injector Circuit



93C79352

Fig. 52: Test No. 13 Flow Chart (4A-FE & 5S-FE)
Injector Circuit

Terminals	Trouble	Condition	STD voltage
No.10 - E01 No.20 - E02	No voltage	IG SW ON	10 - 14 V



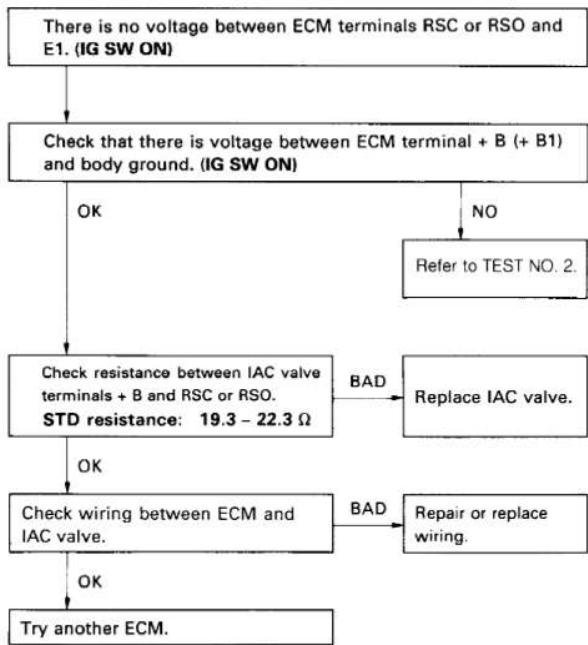
93B79351

Fig. 53: Test No. 13 Schematic (4A-FE & 5S-FE)
Injector Circuit

TEST NO. 14 - IDLE SPEED CONTROL CIRCUIT

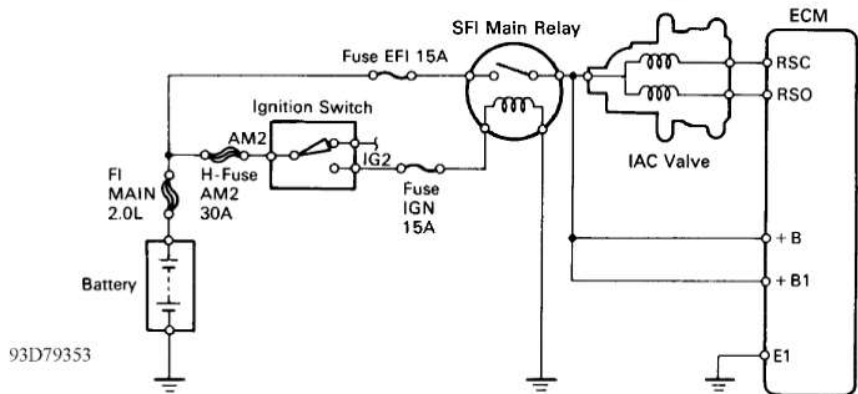
TEST NO. 14-IDLE SPEED CONTROL CIRCUIT TROUBLE TABLE

Terminal	Trouble	Condition	STD Voltage
3S-GTE			
RSC-E1 RSO-E1	No Voltage No Voltage	Ignition Switch ON	8-14V
5S-FE			
ISCC-E1 ISCO-E1	No Voltage	Ignition Switch ON	8-14V

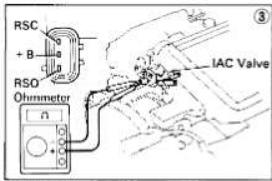


93E79354
Fig. 54: Test No. 14 Flow Chart (3S-GTE)
Idle Speed Control Circuit

Terminals	Trouble	Condition		STD voltage
RSC RSO – E1	No voltage	IG SW ON	Engine ECM connectors disconnected	8 – 14 V



93D79353
Fig. 55: Test No. 14 Schematic (3S-GTE)
Idle Speed Control Circuit



93F79355
Fig. 56: Test No. 14 Component Diagram (3S-GTE)
Idle Speed Control Circuit

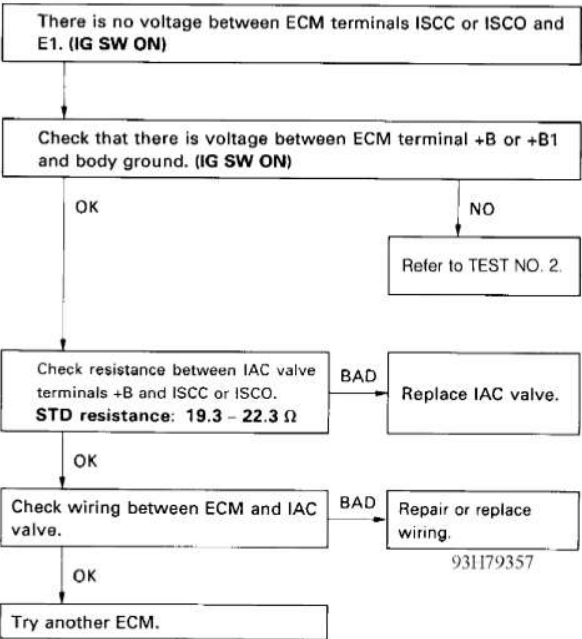


Fig. 57: Test No. 14 Flow Chart (5S-FE) Idle Speed Control Circuit

Terminals	Trouble	Condition		STD voltage
ISCC ISCO - E1	No voltage	IG SW ON	ECM connectors disconnected	8 - 14 V

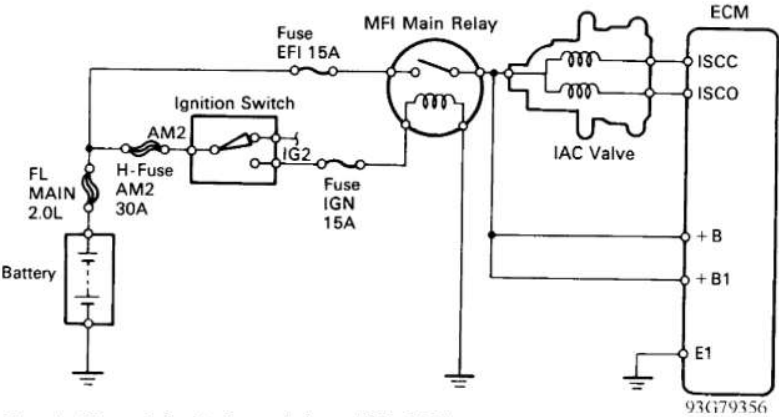


Fig. 58: Test No. 14 Schematic (5S-FE) Idle Speed Control Circuit

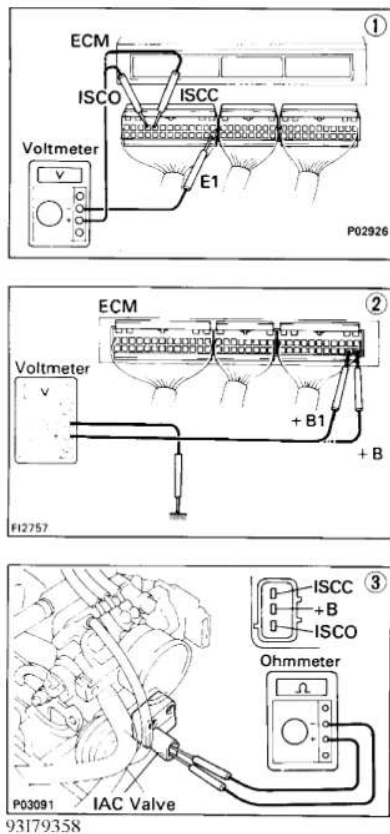


Fig. 59: Test No. 14 Component Diagram (5S-FE) Idle Speed Control Circuit

TEST NO. 15 - CHECK ENGINE LIGHT CIRCUIT

TEST NO. 14-CHECK ENGINE LIGHT CIRCUIT TROUBLE TABLE

Terminal	Trouble	Condition	STD Voltage
W-E1	No Voltage	No Trouble (Check Engine Light OFF) and Engine Running	10-14V

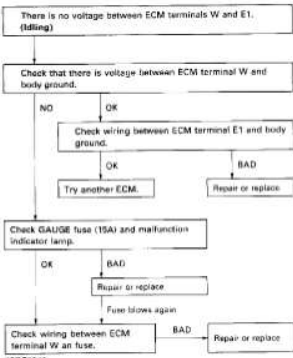


Fig. 60: Test No. 15 Flow Chart Check Engine Light Circuit

Terminals	Trouble	Condition	STD voltage
W - E1	No voltage	No trouble (malfunction indicator lamp off) and engine running	10 - 14 V

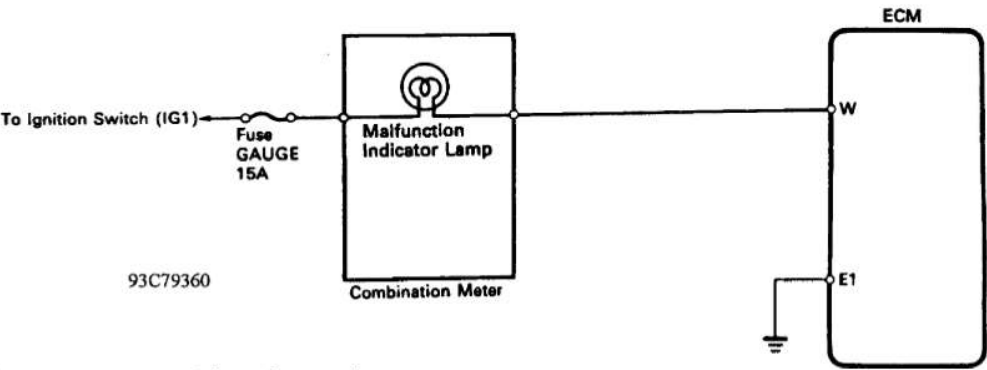


Fig. 61: Test No. 15 Schematic
Check Engine Light Circuit