

DTC

P0133/21

Oxygen Sensor Circuit Slow Response
(Bank 1 Sensor 1)

WIRING DIAGRAM

Refer to DTC P0130/21 (Oxygen sensor circuit malfunction (Bank 1 sensor 1))

JEF00216-0000

CIRCUIT DESCRIPTION

Refer to DTC P0130/21 (Oxygen sensor circuit malfunction (Bank 1 sensor 1))

DTC No.	DTC Detecting condition	Trouble area
P0133/21	Response time for heated oxygen sensor voltage output to change from rich to lean, or from lean to rich, is more than a certain length of time during idling after engine is warmed up. (2 trip detection logic)	<ul style="list-style-type: none"> • Air induction system • Fuel pressure • Injector injection • Open or short in heated oxygen sensor circuit • Heated oxygen sensor • Engine ECU

NOTE:

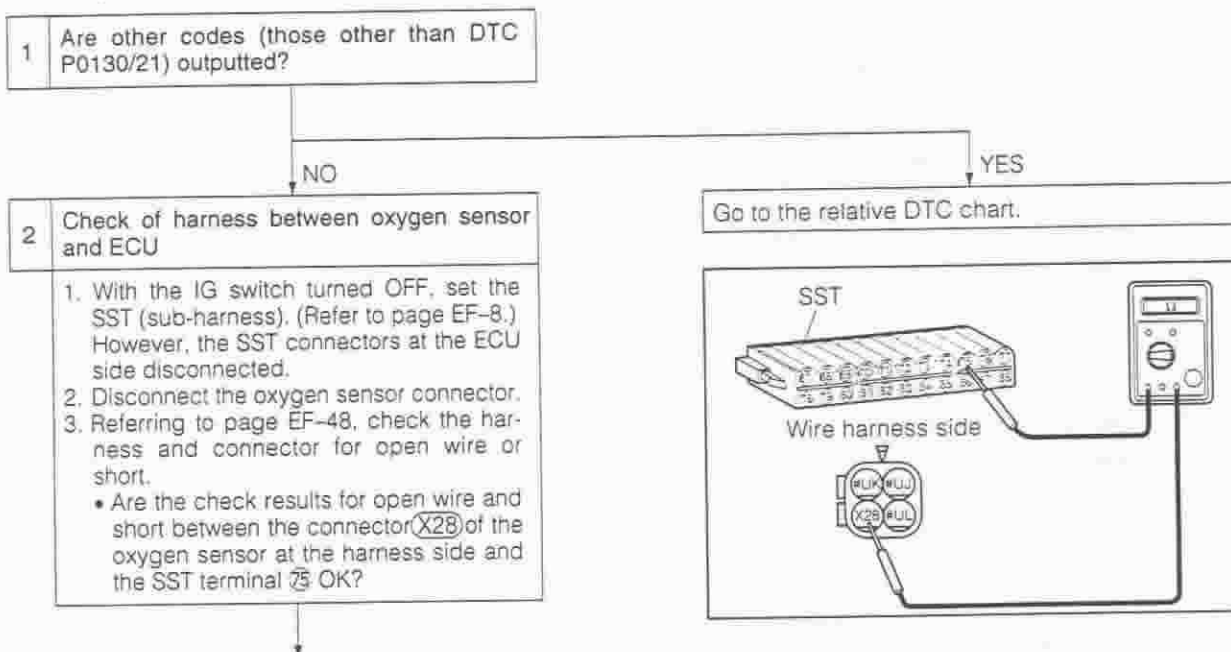
- Sensor 1 refers to the sensor closer to the engine block.

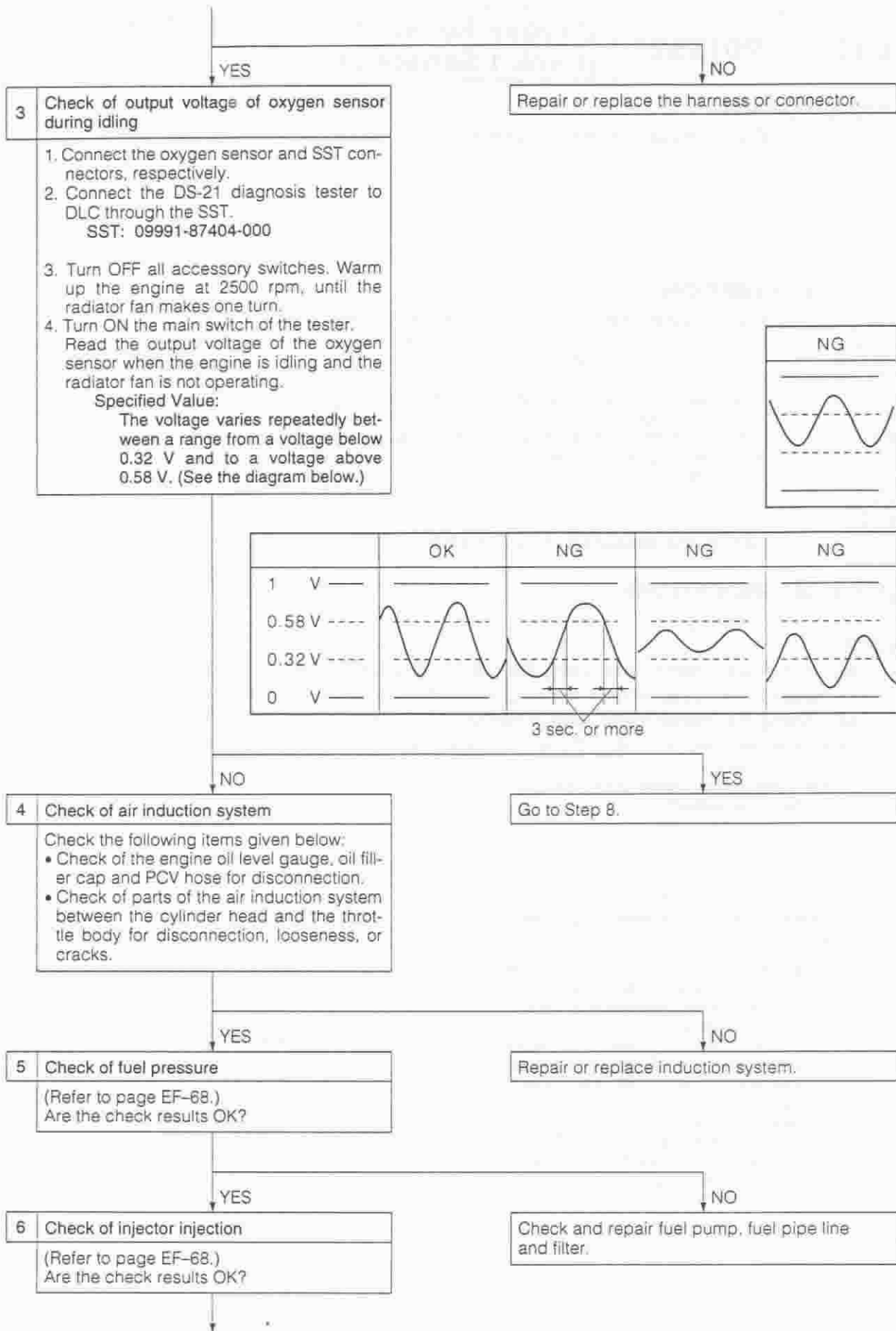
JEF00217-0000

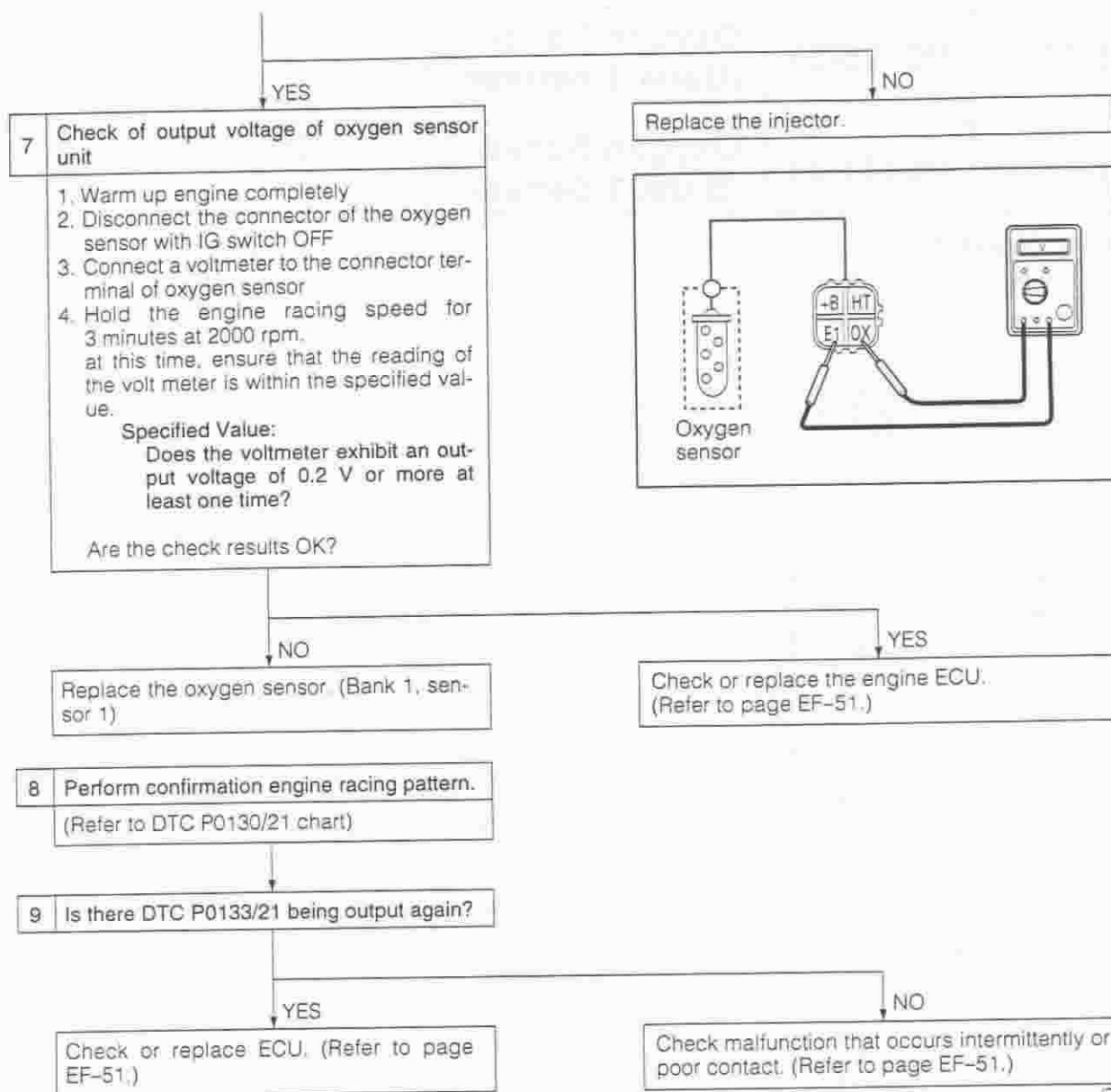
INSPECTION PROCEDURE

NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.



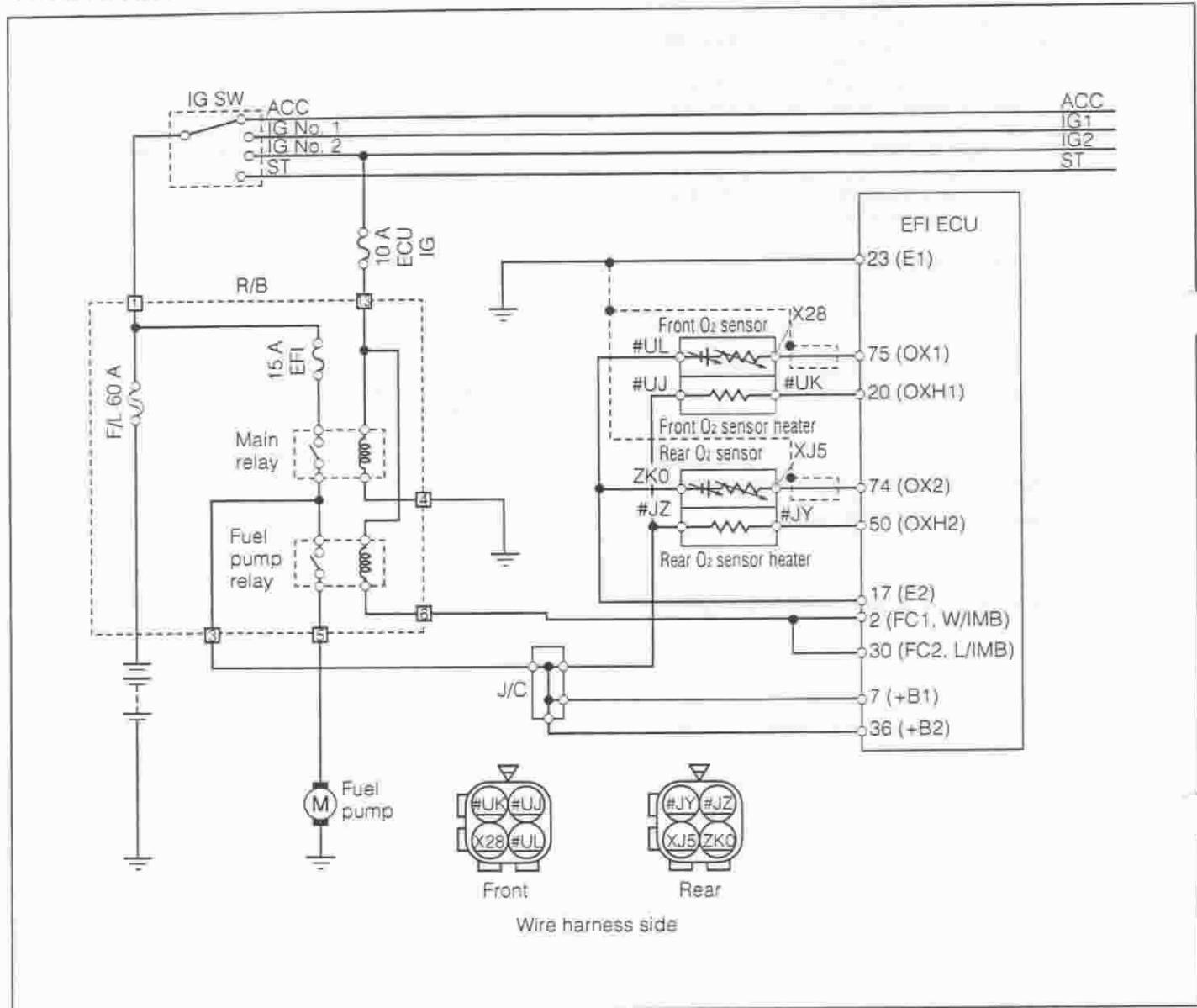




JEF00218-C0138

DTC	P0135/23	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)
DTC	P0141/24	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

WIRING DIAGRAM



JEF00219-00139

CIRCUIT DESCRIPTION

Refer to DTC P0130/21 (Oxygen sensor circuit malfunction (Bank 1 sensor 1))

DTC No.	DTC Detecting condition	Trouble area
P0135/23 P0141/24	When the battery voltage is above 7.5 V and the heater terminal voltage of the ECU is above 1.0 V when the heater is operating or below 7.5 V when the heater is not operating: (2 trip detection logic)	<ul style="list-style-type: none"> Open wire or short in heater circuit of oxygen sensor Oxygen sensor heater Engine ECU

JEF00220-00000

INSPECTION PROCEDURE

NOTE:

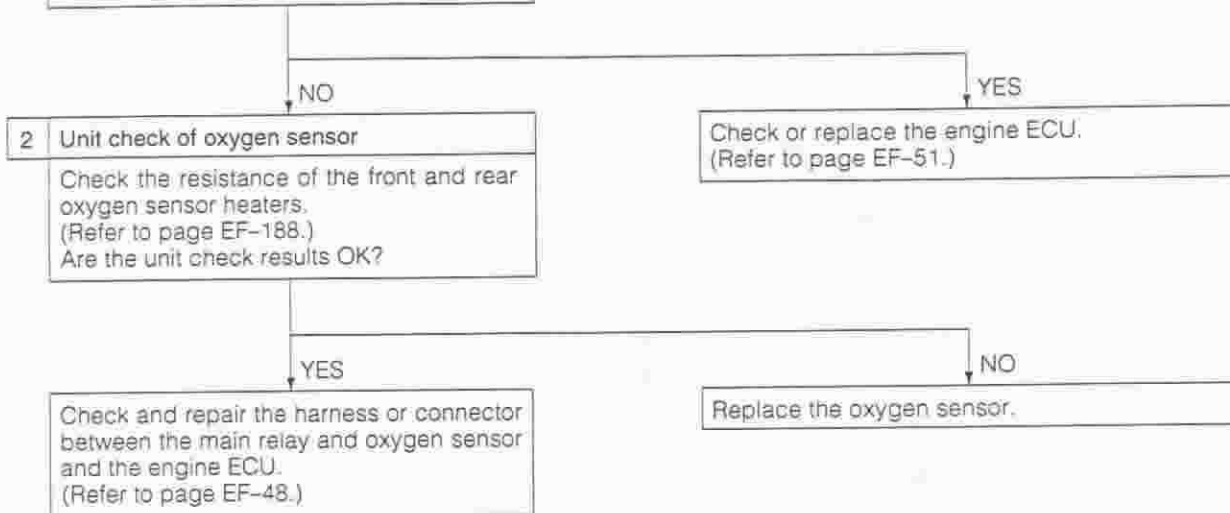
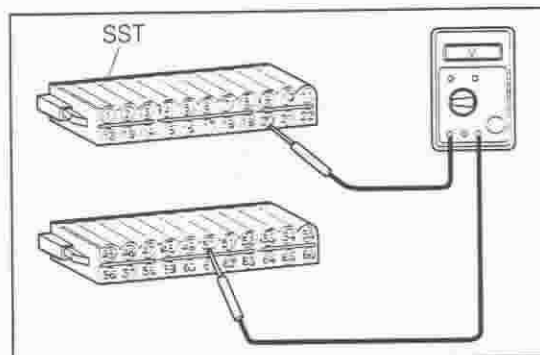
- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

1 Check of output voltage of ECU

- Set the SST (sub-harness). (Refer to page EF-8.)
- Measure the voltage between the SST connectors ② (OXH1), ⑤ (OXH2) and the body ground under the following conditions given below.

	Measurement conditions	
	IG switch ON	After engine started
Front oxygen sensor	Battery voltage	Below 1.0 V/Immediately after
Rear oxygen sensor	Battery voltage	Below 1.0 V/After more than 3 minutes

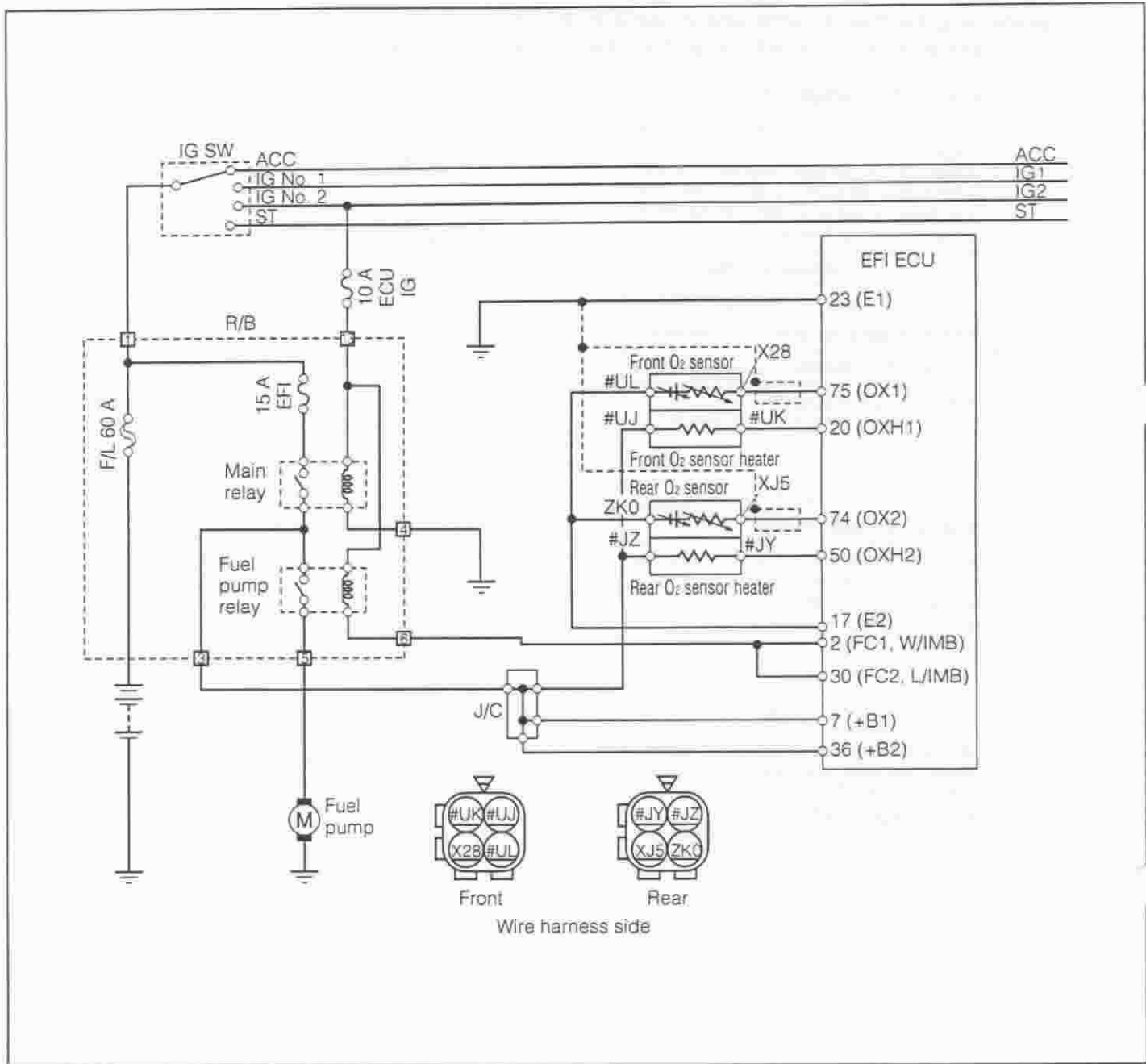
Are the check results OK?



JEP00221-00140

DTC	P0136/22	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)
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WIRING DIAGRAM



JEF00222-00141

CIRCUIT DESCRIPTION

Refer to DTC P0130/21 (Oxygen sensor circuit malfunction (Bank 1 sensor 1))

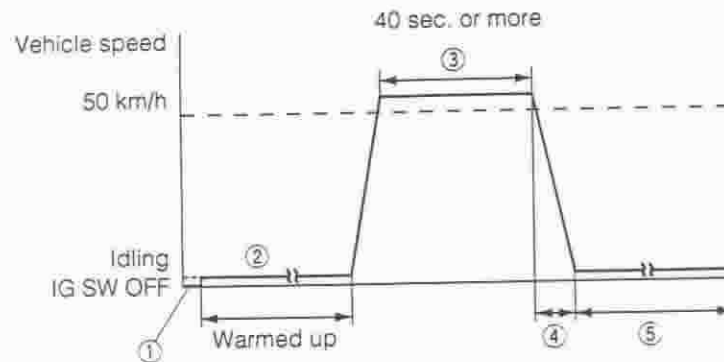
DTC No.	DTC Detecting condition	Trouble area
P0136/22	Voltage output of heated oxygen sensor remains at 0.4 V or more or 0.5 V or less when vehicle is driven at 100 km/h or more after engine is warmed up (2 trip detection logic)	<ul style="list-style-type: none"> • Open wire or short in heated oxygen sensor circuit • Oxygen sensor • Engine ECU

HINT:

Sensor 2 refers to the sensor farther away from the engine block.

JEF00223-00L

CONFIRMATION DRIVING PATTERN



- ① With the IG switch turned OFF, connect the DS-21 diagnosis tester to DLC through the SST. Turn ON the IG switch and the main switch of the tester. Set the tester to the "Continuous monitoring results" of the CARB mode.
- ② Start the engine. With all switch turned OFF, keep on warming the engine until the engine coolant temperature reaches 90°C or above.
- ③ Accelerate the vehicle until the vehicle speed reaches 50 km/h or more in the ② range in the case of automatic transmission vehicles; in the 1st → 2nd gear in the case of manual transmission vehicles. Keep on running the vehicle at that speed for at least 40 seconds.
- ④ Under this condition, release the foot off from the accelerator pedal so as to decelerate the vehicle. Maintain the idling state.
- ⑤ After one minute of idling, press the F1 key of the tester. Check to see if the DTC P0130 is outputted.

CAUTION:

- If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.
- If you do not have DS-21 diagnosis tester, turn the ignition switch OFF after performing steps ② to ⑤, then perform steps ② to ⑤ again.

WARNING:

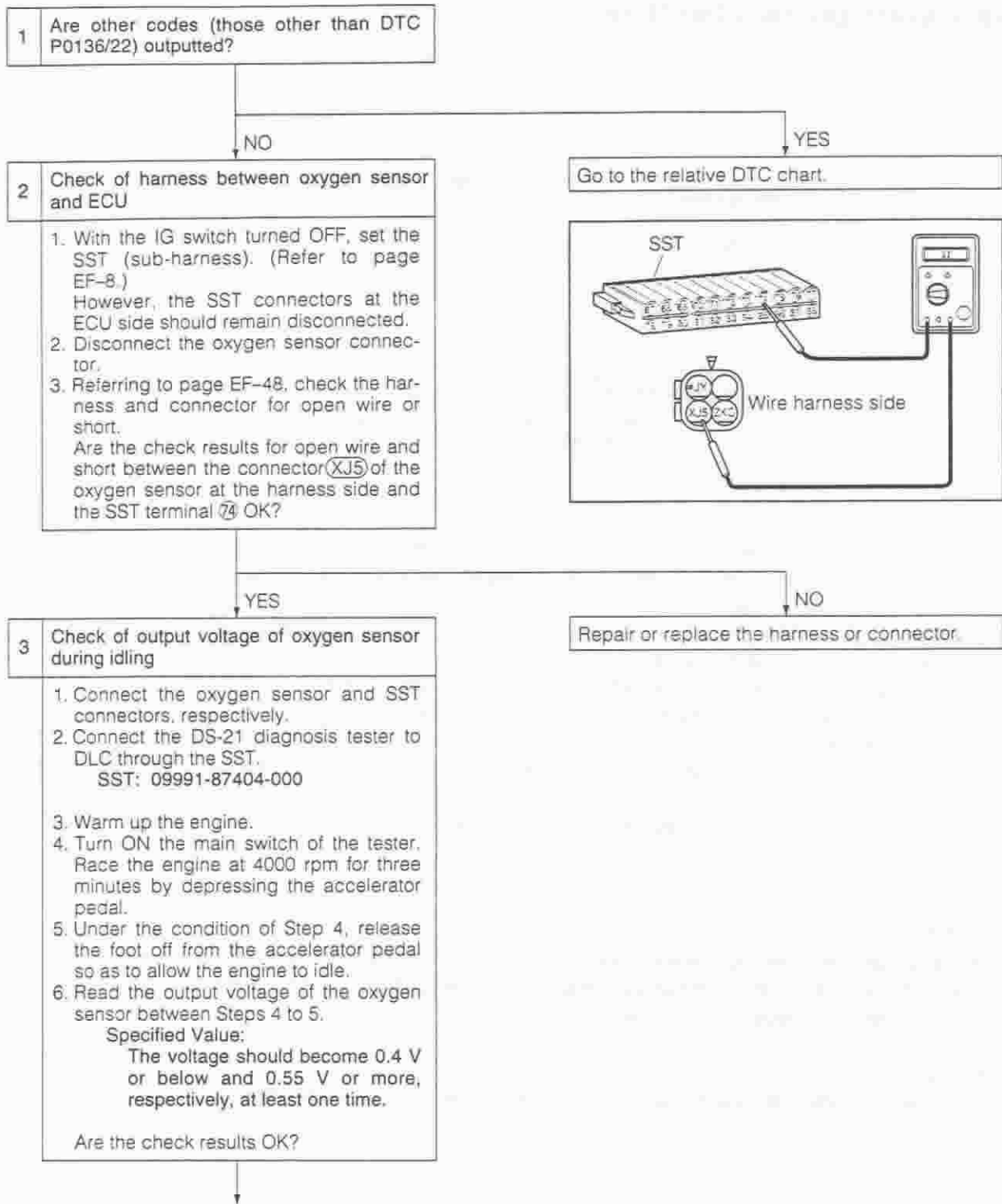
- Be sure to conduct the confirmation test, while observing the instructions at page EF-6.

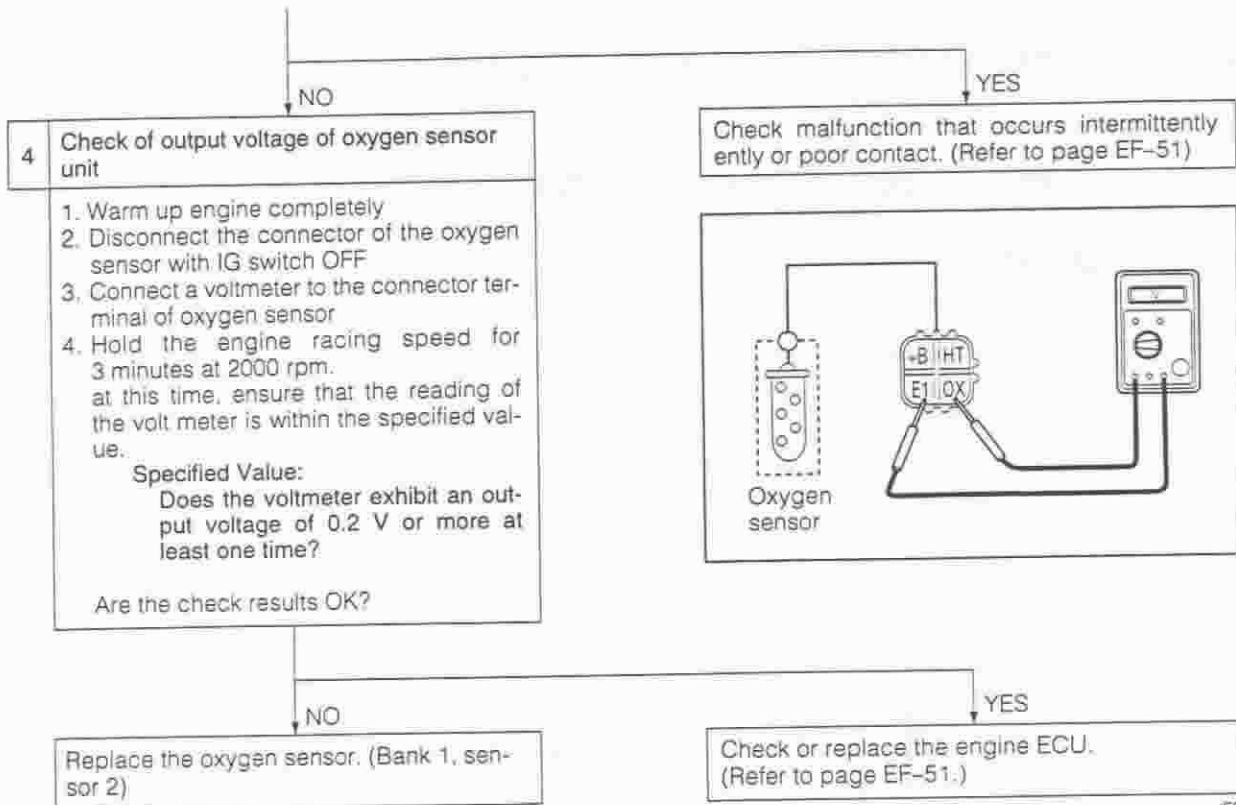
JEF00224-00142

INSPECTION PROCEDURE

NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.



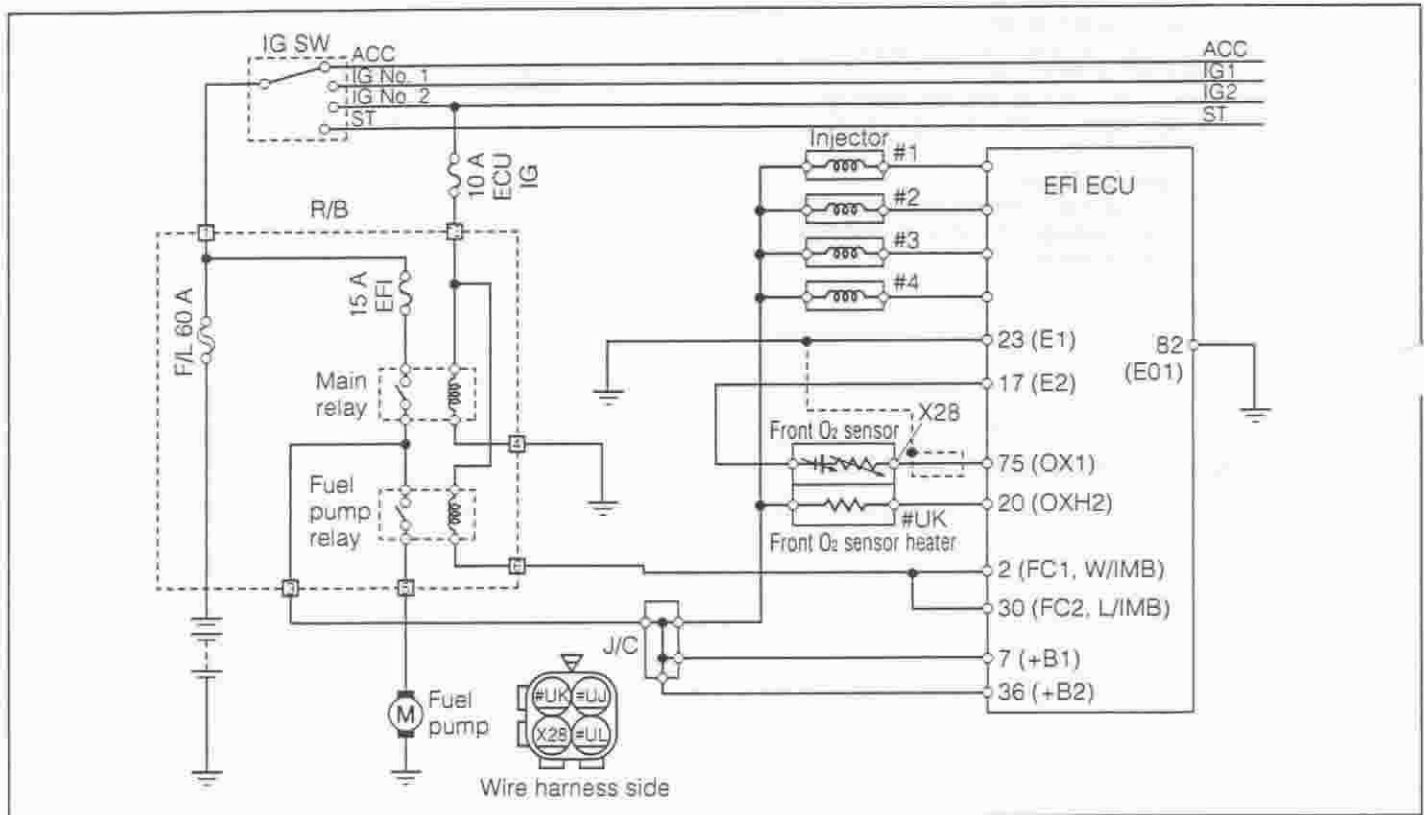


JEF00225-00143

DTC	P0171/25	System too Lean (Fuel Trim)
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DTC	P0172/26	System too Rich (Fuel Trim)
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WIRING DIAGRAM



JEF00226-00144

CIRCUIT DESCRIPTION

The fuel trim means the feedback compensation value that will compensate the basic injection time. The fuel trim comes in two kinds; the short-term fuel trim and the long-term fuel trim.

The short-term fuel trim is a short-term fuel compensation to be carried out to maintain the air-to-fuel ratio the stoichiometric air-to-fuel ratio. The signal from the oxygen sensor indicates whether the current air-to-fuel ratio is rich or lean than the stoichiometric air-to-fuel ratio. Hence, if the air-to-fuel ratio is rich, the fuel injection amount will be reduced. Conversely, if the air-to-fuel ratio is lean, the fuel injection amount will be increased.

The long-term fuel trim is overall fuel compensation over a long period of time in order to compensate a continuous deviation of the short-term fuel trim from the central value, which will be caused by the engine's inherent characteristics, the wear due to operation over a long period of time and the change in operational environment.

If the sum of the short-term fuel trim and long-term fuel trim exceeds a certain value and proves to be lean or rich, the system will detect it as a malfunction, thereby illuminating the MIL lamp.

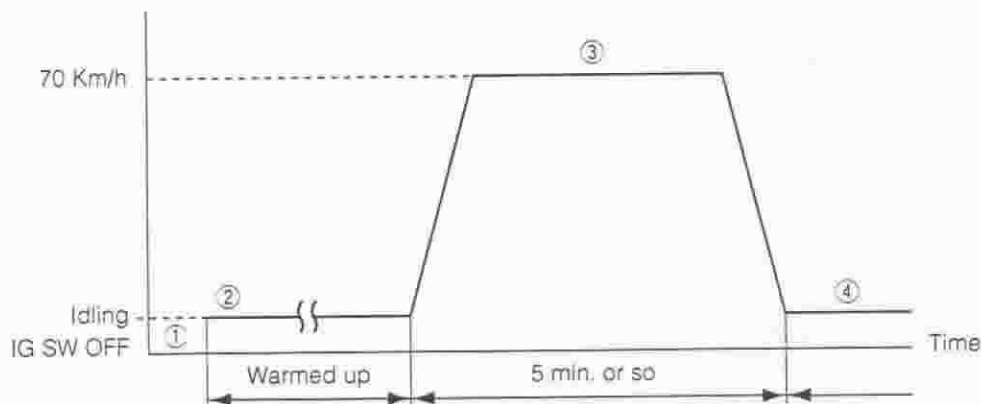
DTC No.	DTC Detecting condition	Trouble area
P0171/25 P0172/26	When the following conditions given below occur while the air-to-fuel feedback after the engine warming-up is being executed: <ul style="list-style-type: none"> The air-to-fuel is too lean: (The total fuel trim (the sum of the short-term fuel trim and long-term fuel trim) exceeds the set value.) The air-to-fuel is too rich: (The total fuel trim is less than the set value.) (2 trip detection logic) 	<ul style="list-style-type: none"> Air intake (hose loose) Fuel line pressure Injector blockage or leakage Open wire or short in oxygen sensor circuit Oxygen sensor malfunction Manifold absolute pressure sensor Engine coolant temp. sensor Gas leakage on exhaust system Purge VSV for EVAP Engine ECU

NOTE:

- If the vehicle has experienced any run out of fuel, the air-to-fuel ratio becomes lean, thus recording the DTC P0171/25.

JEF00227-00000

CONFIRMATION ENGINE DRIVING PATTERN



- With the IG switch turned OFF, connect the DS-21 diagnosis tester to DLC through the SST. Turn ON the IG switch and the main switch of the tester. Set the tester to the "Continuous monitoring results" of the CARB mode.
- Start the engine. Keep on warming the engine for more than five minutes until the engine cooling water temperature reaches 90°C or above.
- Run the vehicle for more than five minutes at a speed of 70 km/h with the gear selected to the 5th gear or the D range.
- After one minute of idling, press the F1 key of the tester. Check to see if the DTC P0171/0172 is detected.

CAUTION

- If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.
- If you do not have DS-21 diagnosis tester, turn the ignition switch OFF after performing steps ② to ④, then perform steps ② to ④ again.

WARNING:

- Be sure to conduct the confirmation test, while observing the instructions at page EF-6.

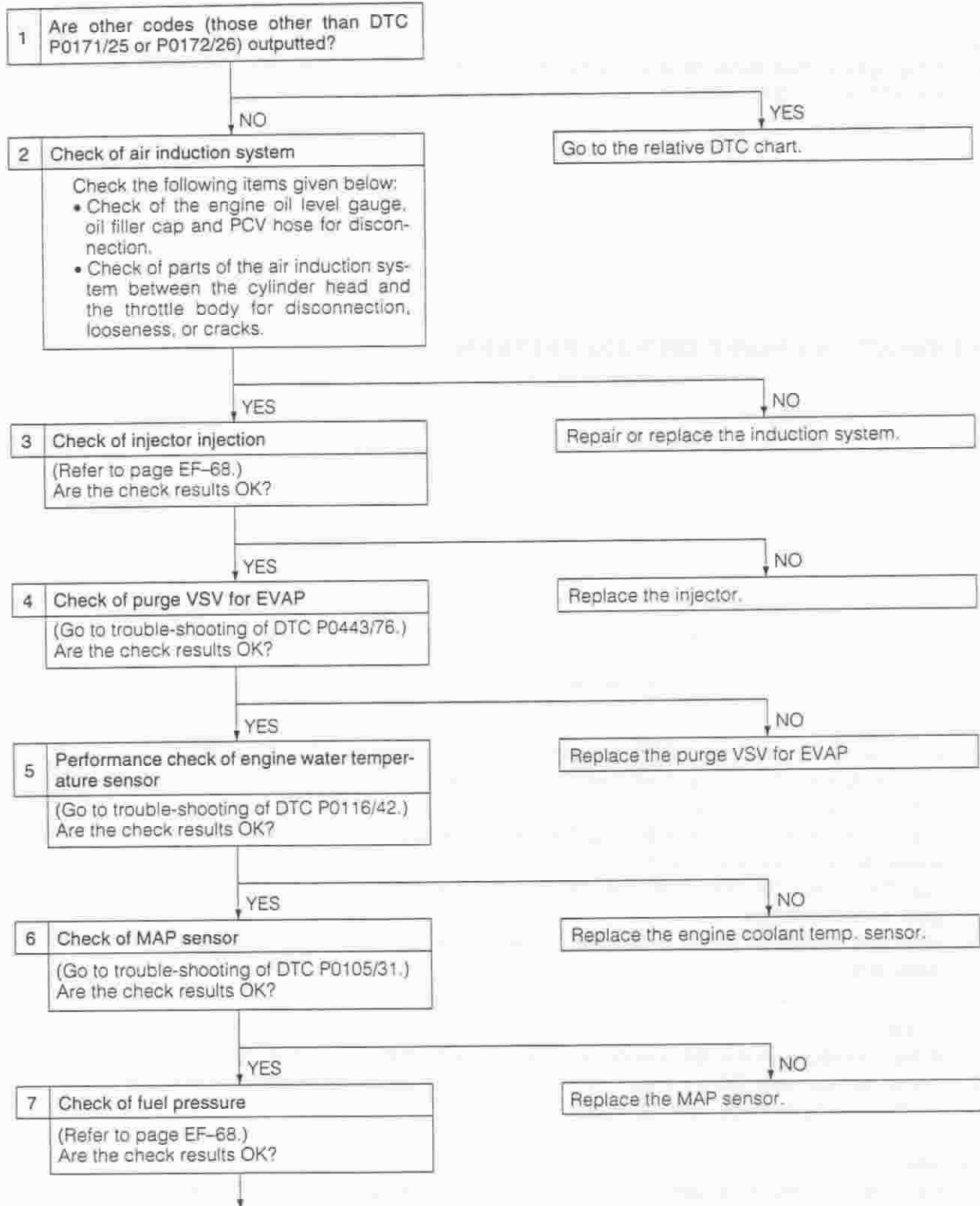
JEF00229-00145

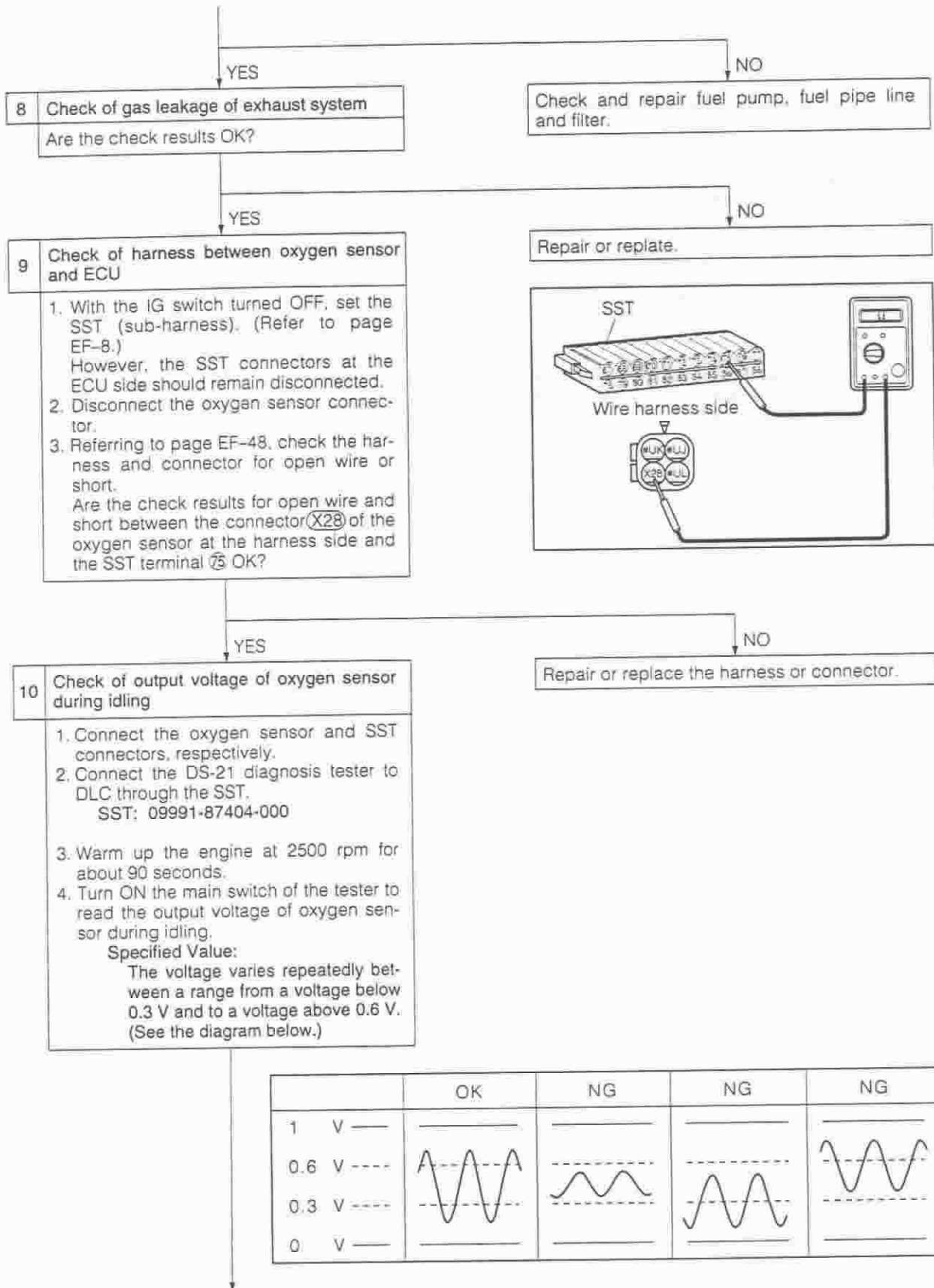
INSPECTION PROCEDURE

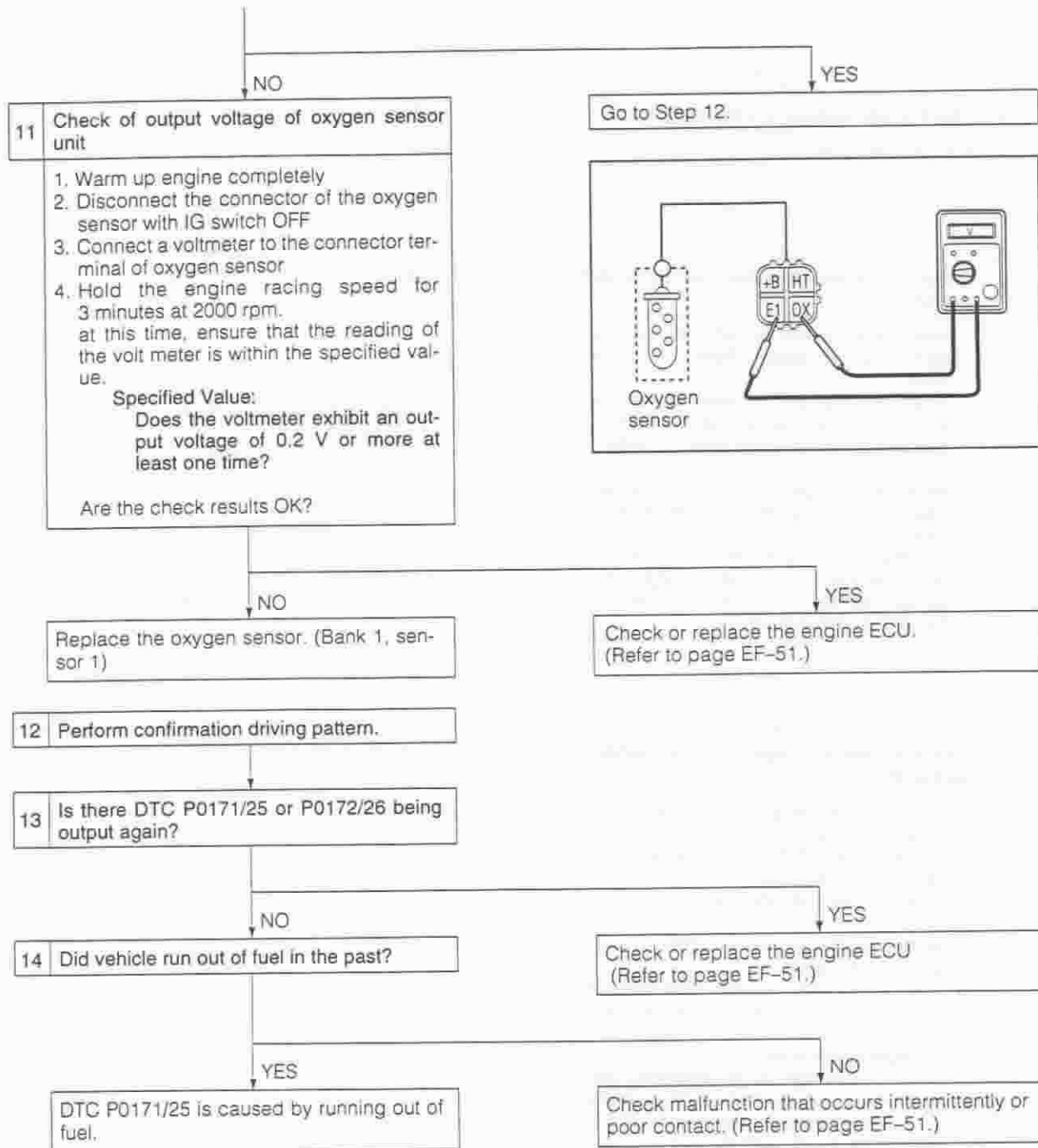
NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

When using DS-21 diagnosis tester or OBD II generic scan tool:

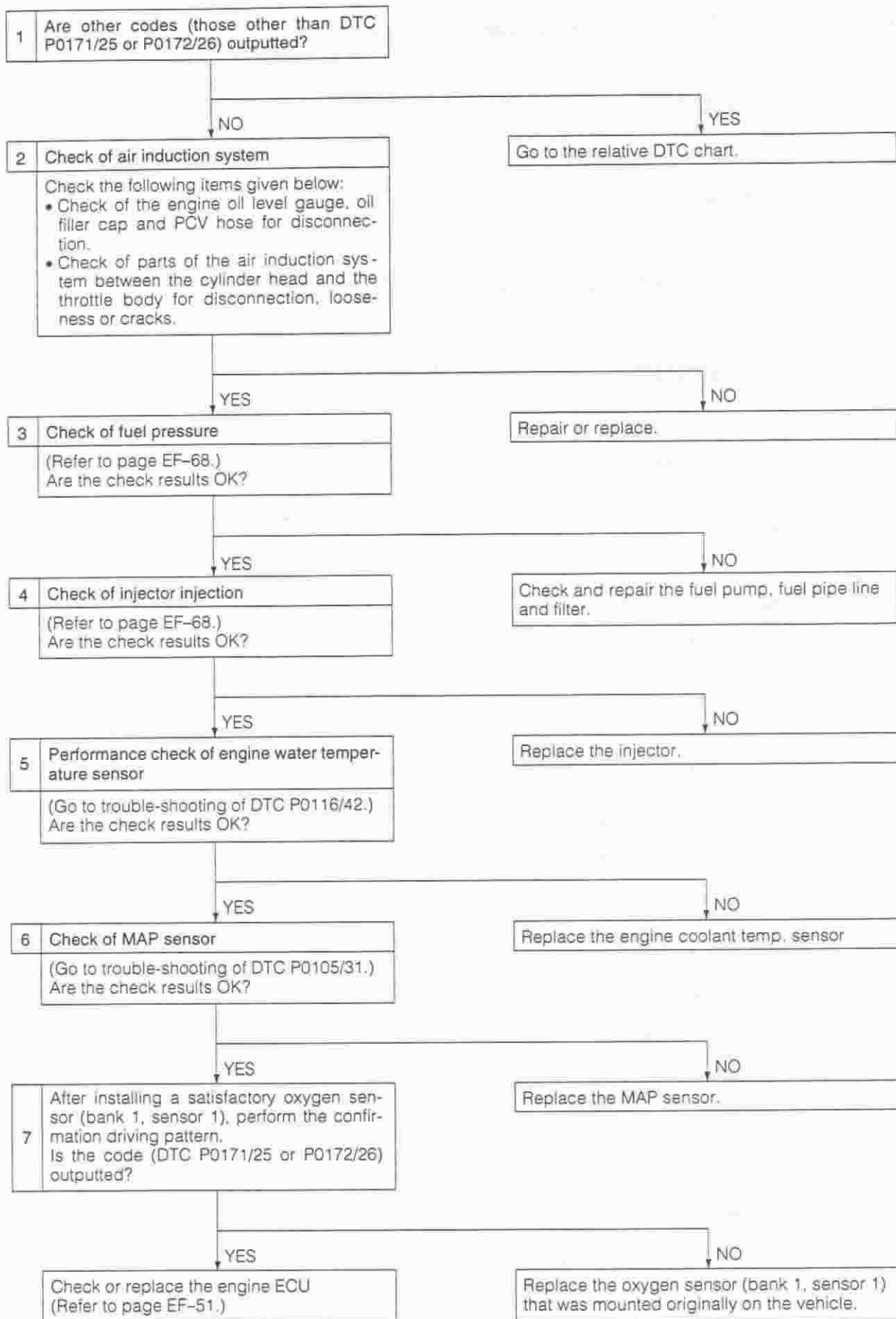






JEF00229-00146

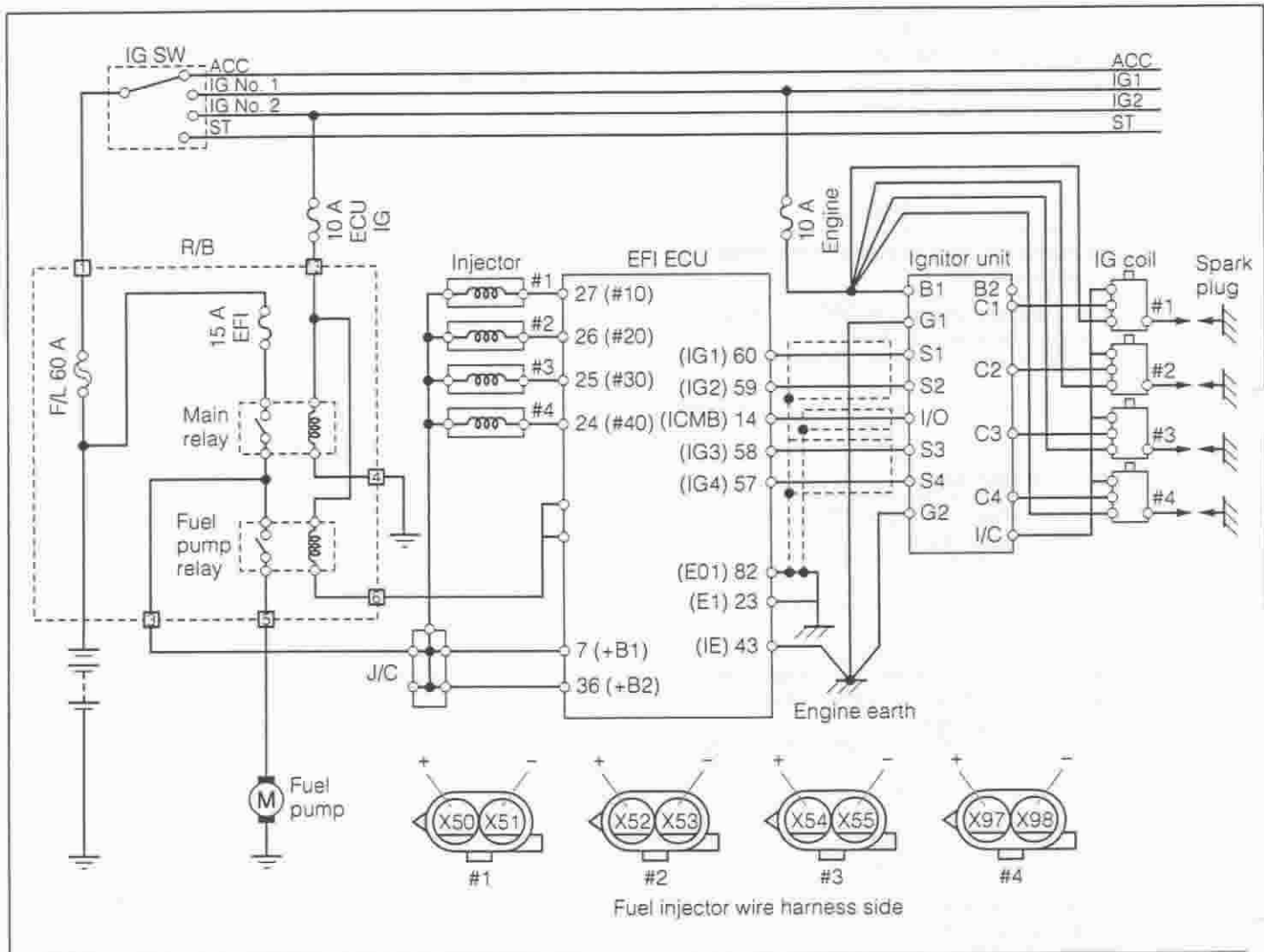
When not using DS-21 diagnosis tester or OBD II generic scan tool:



JEF00230-00000

DTC	P0314/—	Single Cylinder Misfire (Cylinder not Specified)
DTC	P0300/17	Random/Multiple Cylinder Misfire Detected
DTC	P0301/17	Cylinder 1 Misfire Detected
DTC	P0302/17	Cylinder 2 Misfire Detected
DTC	P0303/17	Cylinder 3 Misfire Detected
DTC	P0304/17	Cylinder 4 Misfire Detected

WIRING DIAGRAM



JEF00231-0014

CIRCUIT DESCRIPTION

MISFIRE:

- The ignitor unit detects the ion current that flows in proportion to the combustion pressure. This ion current is converted into a voltage, which will be inputted to the ECU. If the voltage value is below a certain value, the ECU evaluate it as a misfire and counts its occurrence numbers. When the misfire rate becomes or exceeds a number that indicates deteriorated engine conditions, this state will cause the malfunction indicator lamp (MIL) to be illuminated. If such a misfire is occurring whose misfire rate is high enough that the driving condition will most likely cause the catalyst to be overheated, the malfunction indicator lamp (MIL) will flash.

DTC No.	DTC Detecting condition	Trouble area
P0314/ P0300/17	Misfiring of random/multiple cylinders is detected during any particular 400 or 2,000 ignitions.	<ul style="list-style-type: none"> Ignition system (Igniter unit etc.) Ion system (Igniter unit etc.) Injector Fuel pressure
P0301/17 P0302/17 P0303/17 P0304/17	For any particular 400 ignitions for engine, misfiring is detected which can cause catalyst overheating. (This causes MIL to blink) (2 trip detection logic)	<ul style="list-style-type: none"> Valve clearance Valve timing In Mani abs: pressure sensor Engine coolant temp. sensor Open wire or short in engine wire
	For any particular 2,000 ignitions for engine, misfiring is detected which causes a deterioration in emissions (2 trip detection logic)	<ul style="list-style-type: none"> Connector connection Compression pressure Engine ECU

NOTE:

- When the 2 or more codes for a misfiring cylinder are recorded repeatedly but no random/multiply cylinder misfire code is recorded, it indicates that the misfire were detected and recorded at different times.
- When any one or any two or more of P0301 through P0304/17 codes are outputted, the code P0314 is memorized without fail. However, only when the function "Continuous monitoring results" of the CARB mode is used, it is possible to read this code P0314.

JEF00232-00000

CONFIRMATION DRIVING PATTERN

- Connect the DS-21 diagnosis tester or OBD II generic scan tool with IG switch OFF.
 - Record DTC and the freeze frame data with IG switch ON.
 - Erase the DTC.
 - Use the DS-21 diagnosis tester or OBD II generic scan tool to set to "Continuous monitoring results" in CARB mode.
 - Drive the vehicle several times with the engine speed, load and its surrounding range shown with ENGINE RPM, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the data list. If any malfunction is detected, the code P0314 will be outputted. (When F1 key is pressed:)
- If you have no DS-21 diagnosis tester, turn the ignition switch OFF after the symptom is simulated the first time.

Then repeat the simulation process again.

NOTE:

- In order to memorize DTC of misfire, it is necessary to drive around MISFIRE RPM, MISFIRE LOAD in the data list for the following period of time.

Engine speed	Time
Idling	3 minutes 30 seconds or more
1000 rpm	3 minutes or more
2000 rpm	1 minutes 30 seconds or more
3000 rpm	1 minutes or more

6. Check whether there is misfire or not by monitoring DTC and the freeze frame data. After that, record them.
7. Turn ignition switch OFF after least 5 seconds.

WARNING:

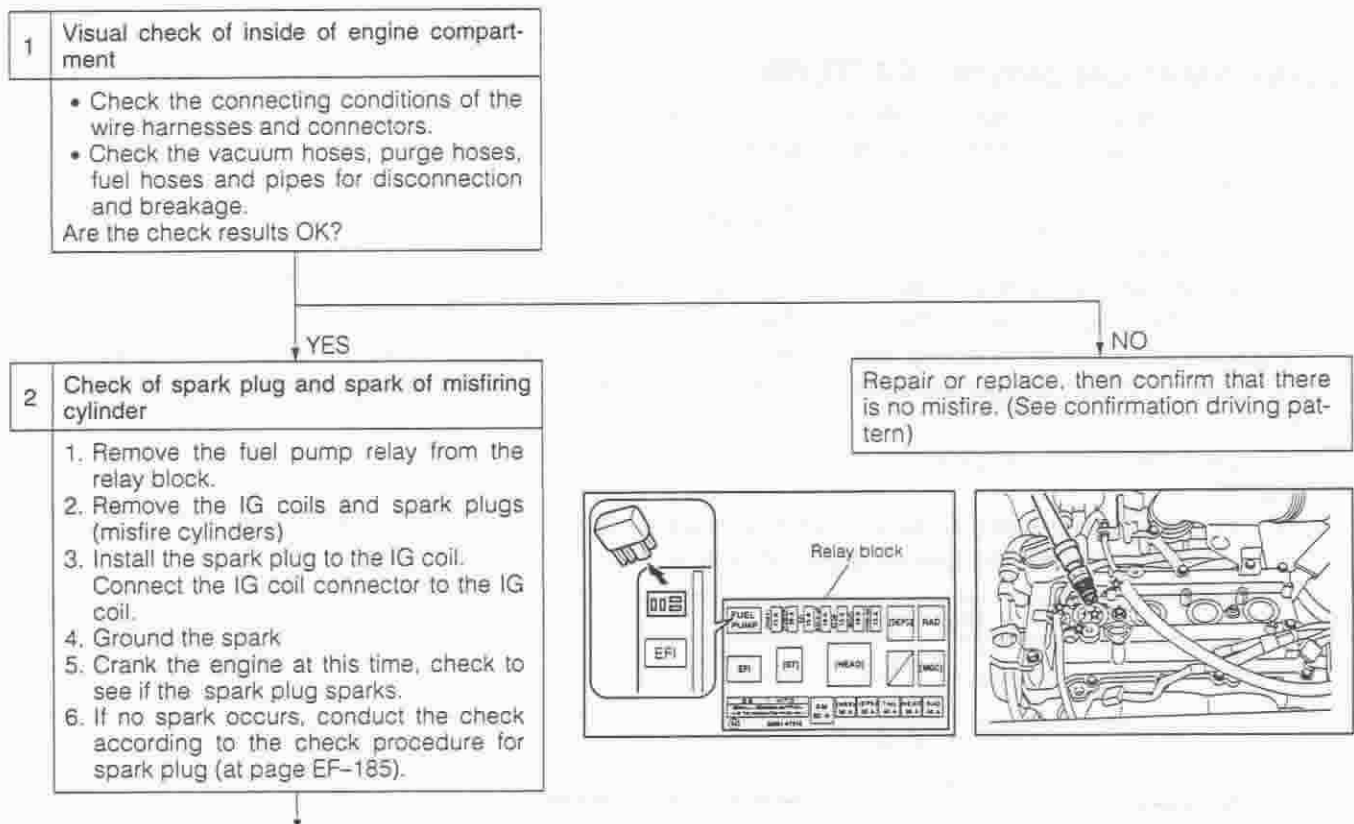
- Be sure to conduct the confirmation test, while observing the instructions at page EF-6.

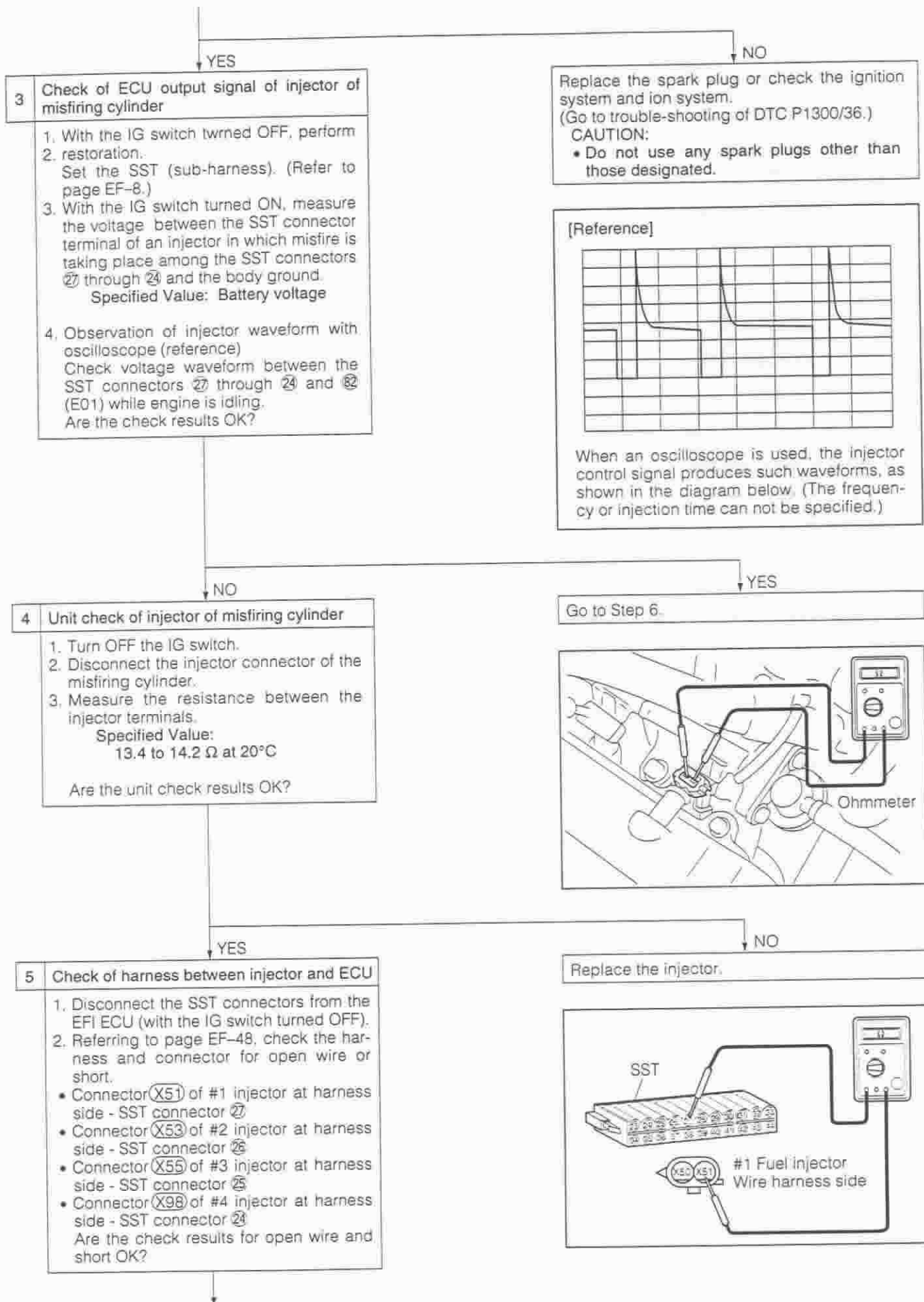
JEF00233-00000

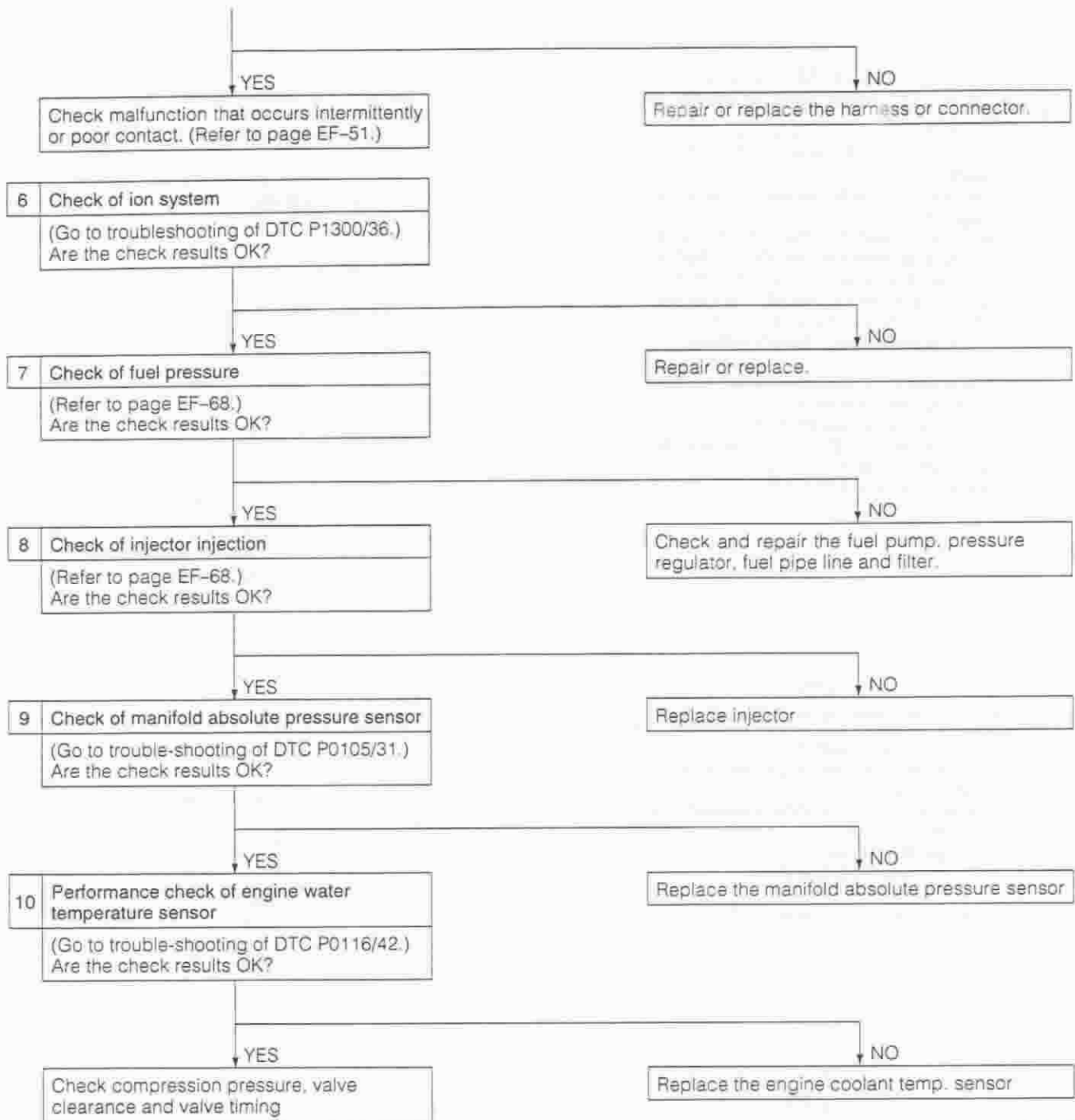
INSPECTION PROCEDURE

NOTE:

- If it is the case that any DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition of freeze frame data. Also, after finishing the repair, confirm that there is no misfire. (See the confirmation driving pattern)
- When either of SHORT FT, LONG FT in the freeze frame data is besides the range of $\pm 20\%$, there is a possibility that the air-fuel ratio is inclining either to RICH (-20% or less) or LEAN ($+20\%$ or more).
- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility of misfire only during warming up.
- In the case that misfire cannot be reproduced, the reason may be because of the driving with lack of fuel, the use of improper fuel, a stain of spark plug, and etc.
- If an open wire exists in the ion signal input line between the ignitor unit and the EFI ECU, it may be detected as misfire.



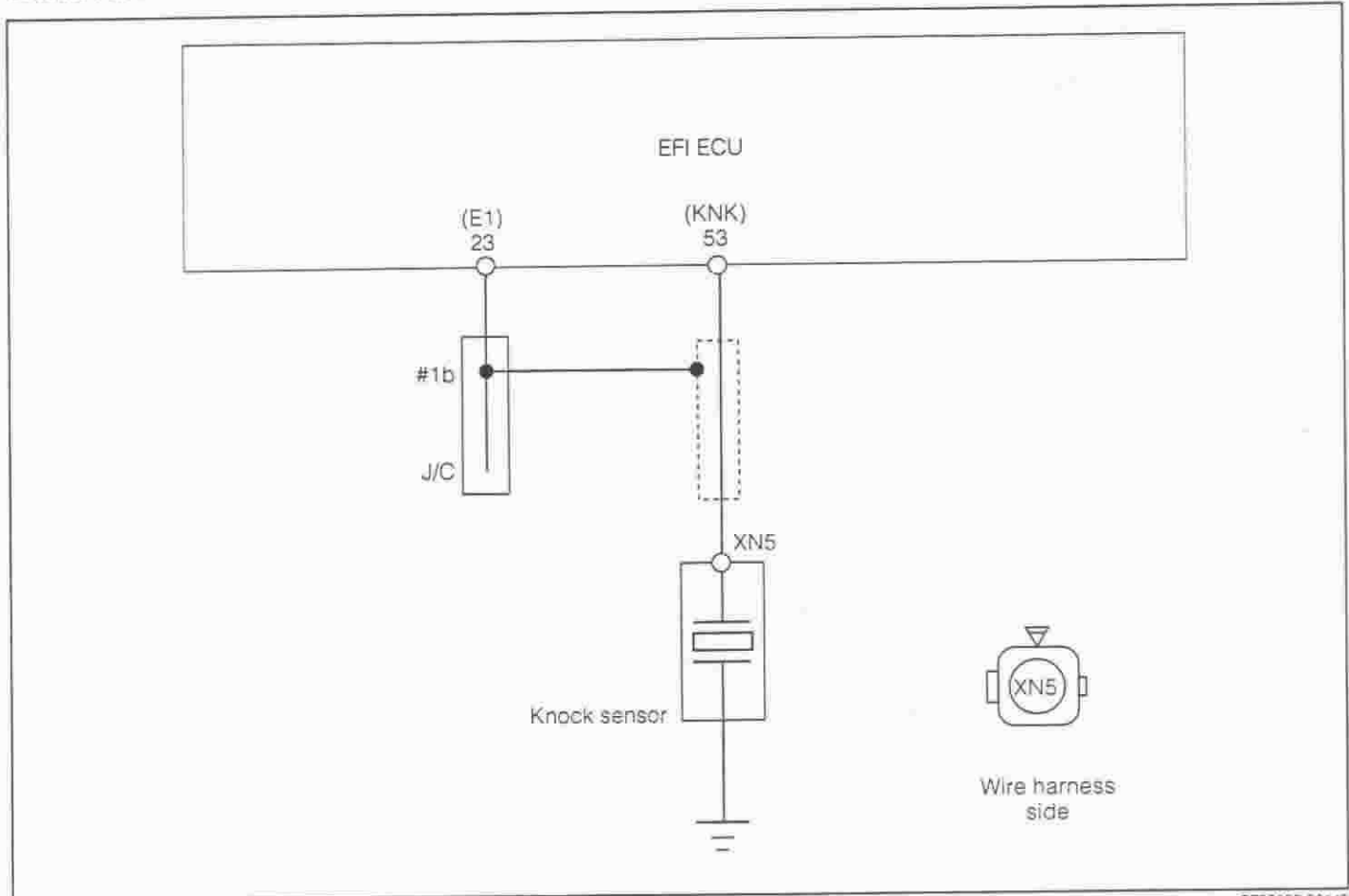




JEF00234-00148

DTC	P0325/18	Knock Sensor 1 Circuit Malfunction
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WIRING DIAGRAM



JEF00235-00149

CIRCUIT DESCRIPTION

Knock sensor are fitted to the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting condition	Trouble area
P0325/18	When the signal from the knock sensor exceeds the voltage preset according to the engine revolution speed continuous by for more than a certain length of time while accelerating at a certain engine revolution speed of 2000 rpm or more.	<ul style="list-style-type: none"> • Open wire or short in knock sensor circuit • Knock sensor (Looseness) • Engine ECU

JEF00235-00000

INSPECTION PROCEDURE

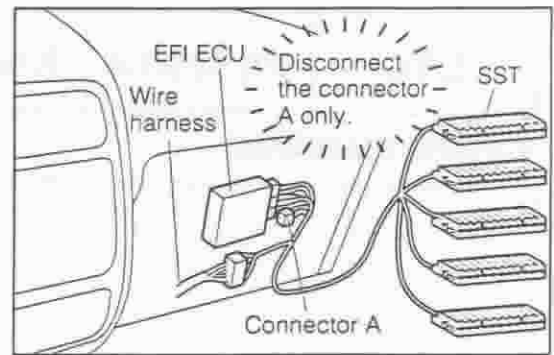
NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

1 Check of continuity of knock sensor circuit

1. Set the SST (sub-harness). (Refer to page EF-8.) However, the SST connector "A" should remain disconnected from the ECU connector.
2. With the IG switch turned OFF, measure the resistance between the SST connector 53 and the body ground.
Specified Value: 1 MΩ or higher

Are the unit check results OK?



[Reference]

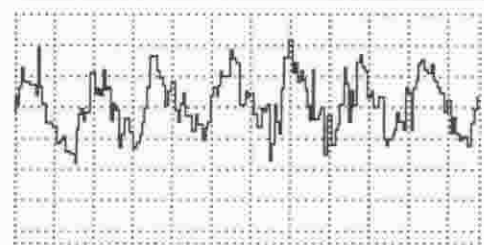
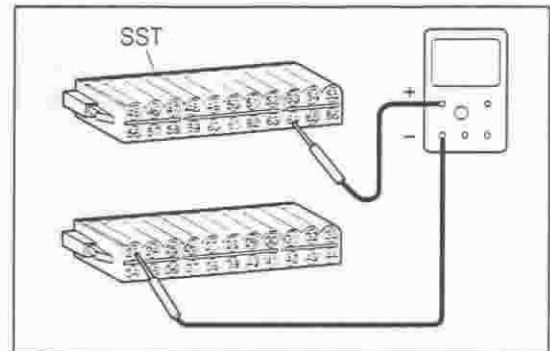
Check by oscilloscope

1. Connect the SST connector "A" to the ECU.
2. Start the engine and keep it idling.
3. Connect the positive ⊕ and negative ⊖ probes of an oscilloscope to the SST connector terminals 64 and 23, respectively.
4. When the waveforms as shown in the right figure are observed, the knock sensor circuit is functioning properly.

(The measurement can be conducted using the oscilloscope function of the DS-21 diagnosis tester.)

NOTE:

- The waveform at the time of racing becomes greater than that at the time of idling.



When an oscilloscope is used, the signal of the knock sensor will become as indicated in the figure above. (The waveform cannot be specified.)

NO

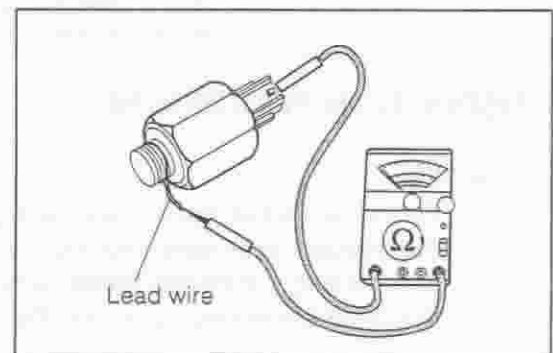
2 Check of knock sensor

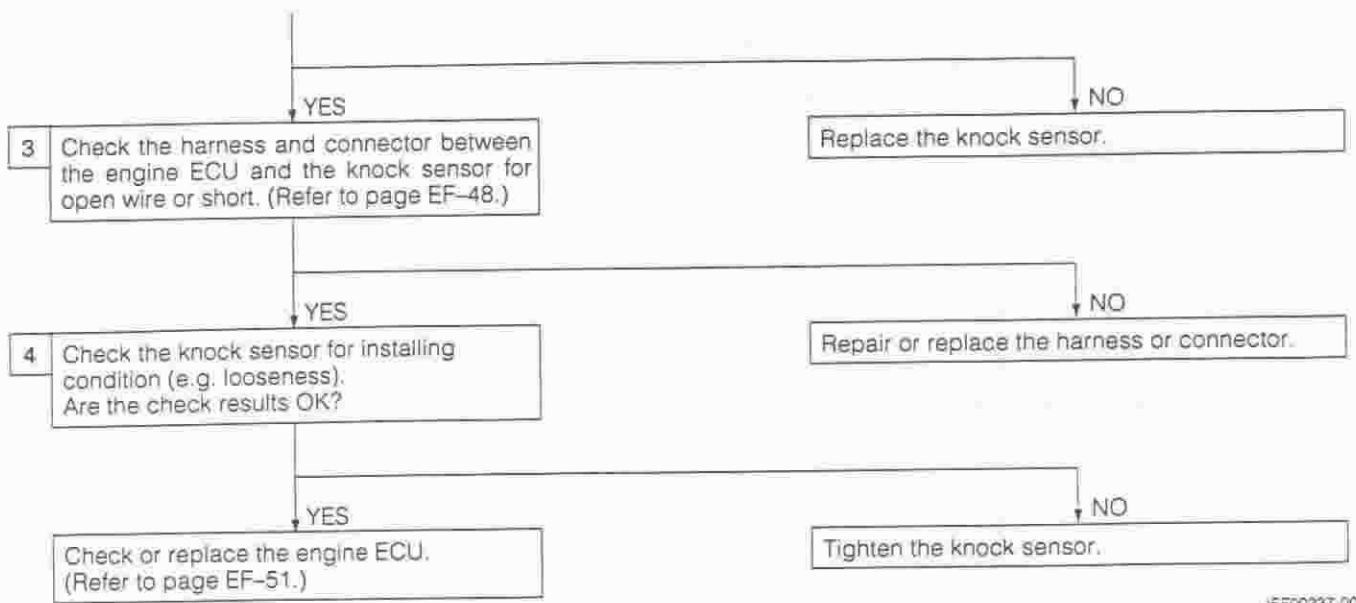
1. Disconnect the connector of the knock sensor with ignition switch OFF
2. Remove the knock sensor from the cylinder block.
3. Using an ohmmeter, check the resistance between the terminal and body.
Specified Value: 1 MΩ or higher

Are the check results OK?

YES

Go to Step 3.

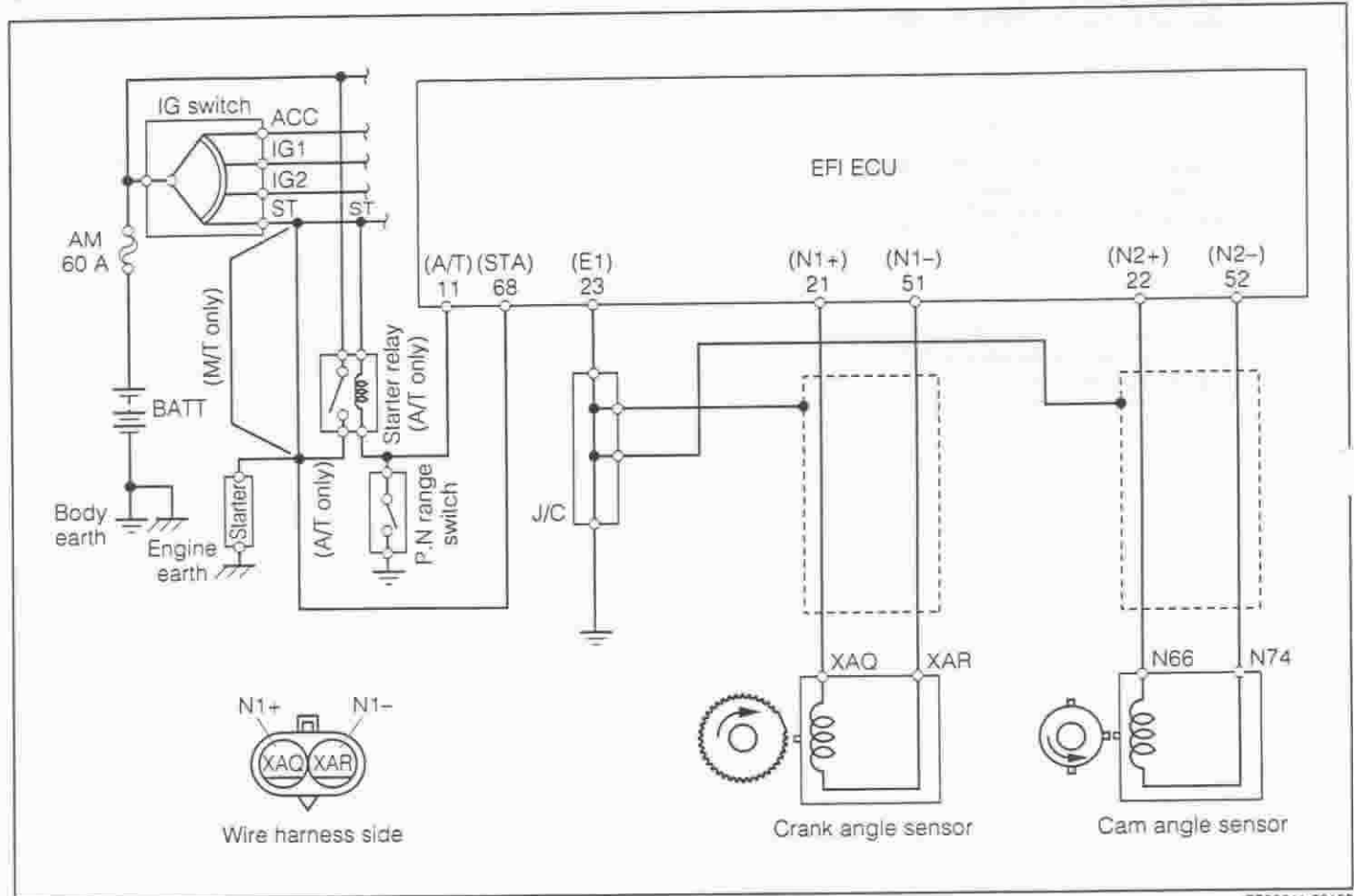




JEF00237-00150

DTC	P0335/13	Crankshaft Position Sensor "A" Circuit Malfunction
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WIRING DIAGRAM



JEF00241-00153

CIRCUIT DESCRIPTION

The crankshaft angle sensor (NE signal) consists of a signal rotor and a pickup coil. The NE signal rotor has 34 teeth and is mounted on the crankshaft. The NE sensor generates 34 signals of every engine revolution. The engine ECU detects the standard crankshaft angle based on the N2+ signal, the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting condition	Trouble area
P0335/13	No crankshaft angle sensor signal to engine ECU during cranking	<ul style="list-style-type: none"> • Open wire or short in crankshaft angle sensor circuit • Crankshaft angle sensor • Signal rotor • Starter • Engine ECU

JEF00242-00300

INSPECTION PROCEDURE

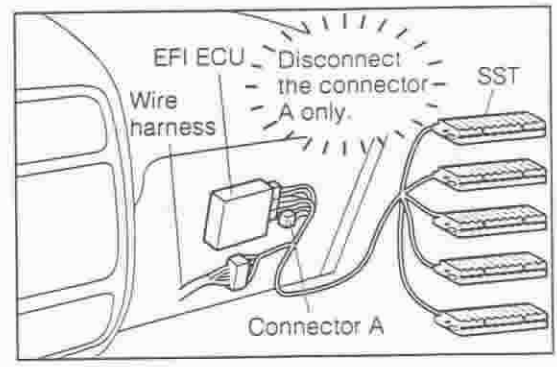
NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

1 Check of resistance of crank angle sensor circuit

1. Set the SST (sub-harness). (Refer to page EF-8.) However, the SST connector "A" should remain disconnected from the ECU connector.
2. With the IG switch turned OFF, measure resistance between the SST terminals ① - ⑤ (N1+ - N1-).
Specified Value:
1850 to 2450 Ω at 20°C

Are the check results OK?



[Reference]
Check by oscilloscope

1. Connect the SST connector "A" to the ECU.
2. Start the engine and keep it idling.
3. Connect the positive ⊕ and negative ⊖ probes of an oscilloscope to the SST connector terminals between ① and ③ and between ② and ④, respectively.
4. When the waveforms as shown in the right figure are observed, the crank angle sensor circuit is functioning properly.

NOTE:

- The waveform at the time of racing becomes greater than that at the time of idling.

Cam angle sensor

Crank angle sensor

When an oscilloscope is used, the signal of the cam/crank angle sensor will become as indicated in the figure above. (The waveform cannot be specified.)

NO

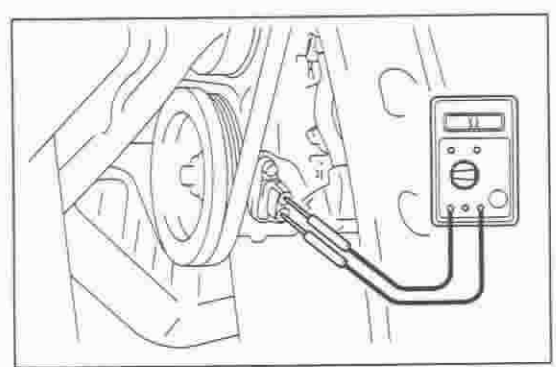
2 Unit check of crank angle sensor

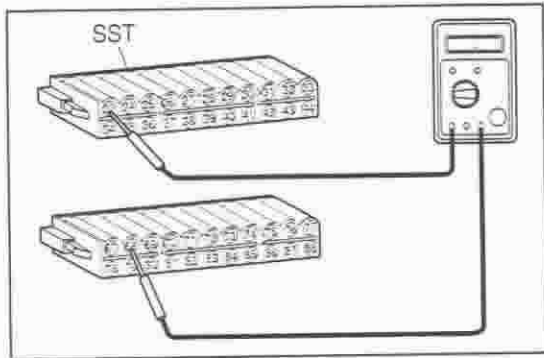
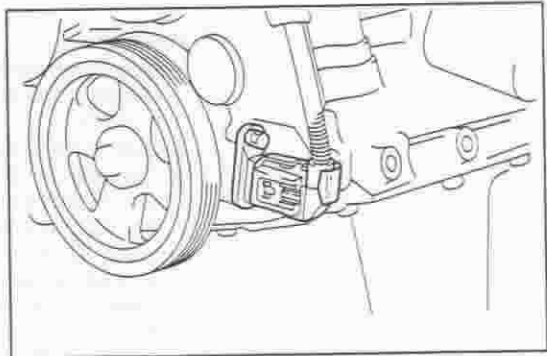
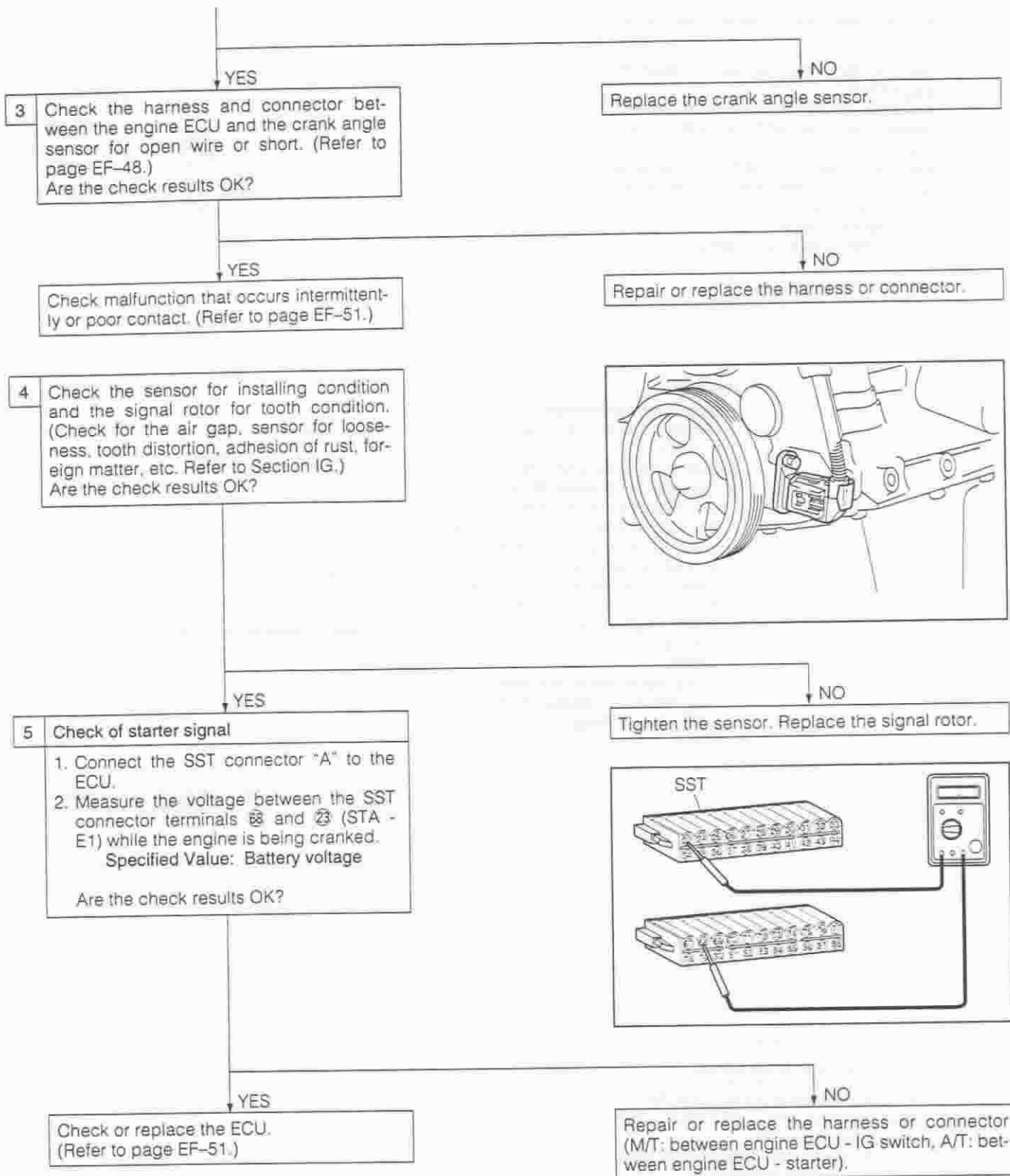
1. Remove the engine under cover RH.
2. While sliding the connector lock, remove the connector.
3. Using an ohmmeter, measure the resistance between the terminals
Specified Value:
1850 - 2450 Ω at 20°C

Are the check results OK?

YES

Go to Step 4.

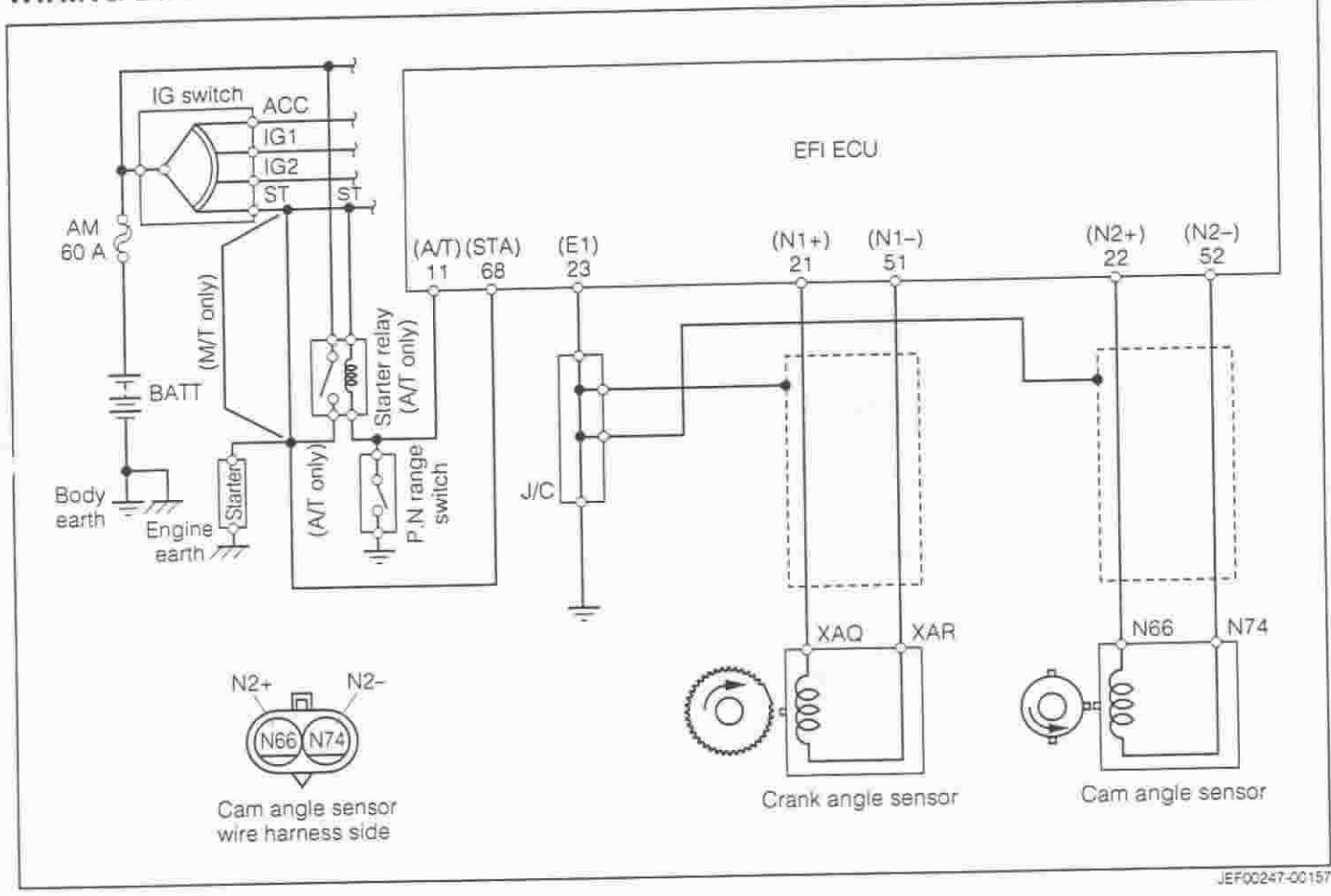




JEP0243-00154

DTC	P0340/14	Camshaft Position Sensor Circuit Malfunction
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WIRING DIAGRAM



JEF00247-00157

CIRCUIT DESCRIPTION

The camshaft angle sensor (N2+ signal) consists of a signal rotor and a pickup coil. The N2+ signal rotor has three timing pins on its outer disk surface and is integrated with the intake camshaft. The detection of the actual camshaft position and the discrimination of cylinders are carried out by these three timing pins (360-180-180° CA).

DTC No.	DTC Detecting condition	Trouble area
P0340/14	No camshaft angle sensor signal to engine ECU during cranking	<ul style="list-style-type: none"> • Open wire or short in camshaft angle sensor circuit • Camshaft angle sensor • Starter • Engine ECU
	Open in N2 circuit	

JEF00248-00000

INSPECTION PROCEDURE

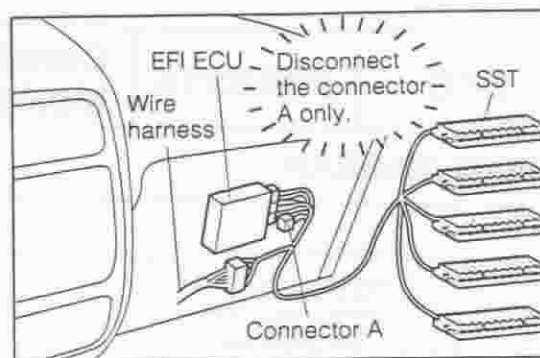
NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

1 Check of resistance of cam angle sensor circuit

1. Set the SST (sub-harness). (Refer to page EF-8.) However, the SST connector "A" should remain disconnected from the ECU connector.
2. With the IG switch turned OFF, measure resistance between the SST terminals ② - ⑤ (N2+ - N2-).
Specified Value: 1850 to 2450 Ω

Are the check results OK?



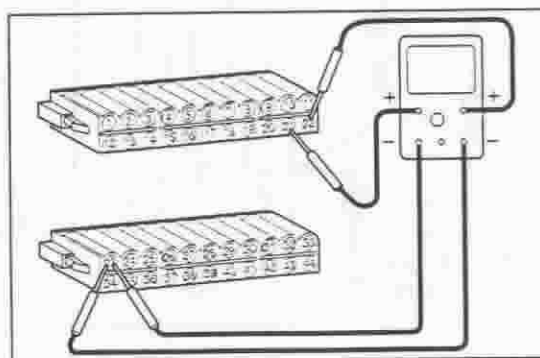
[Reference]

Check by oscilloscope

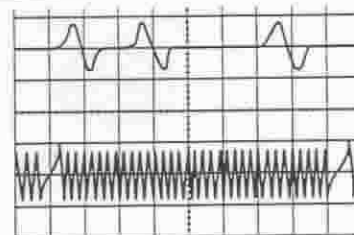
1. Connect the SST connector "A" to the ECU.
2. Start the engine and keep it idling.
3. Connect the positive ⊕ and negative ⊖ probes of an oscilloscope to the SST connector terminals between ② and ③ and between ④ and ⑤, respectively.
4. When the waveforms as shown in the right figure are observed, the cam angle sensor circuit is functioning properly.

NOTE:

- The waveform at the time of racing becomes greater than that at the time of idling.



Cam angle sensor



Crank angle sensor

When an oscilloscope is used, the signal of the cam/crank angle sensor will become as indicated in the figure above. (The waveform cannot be specified.)

NO

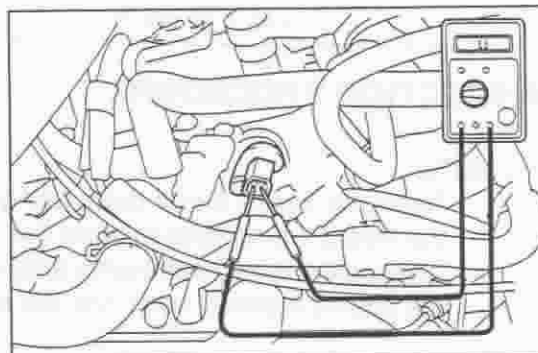
2 Unit check of cam angle sensor

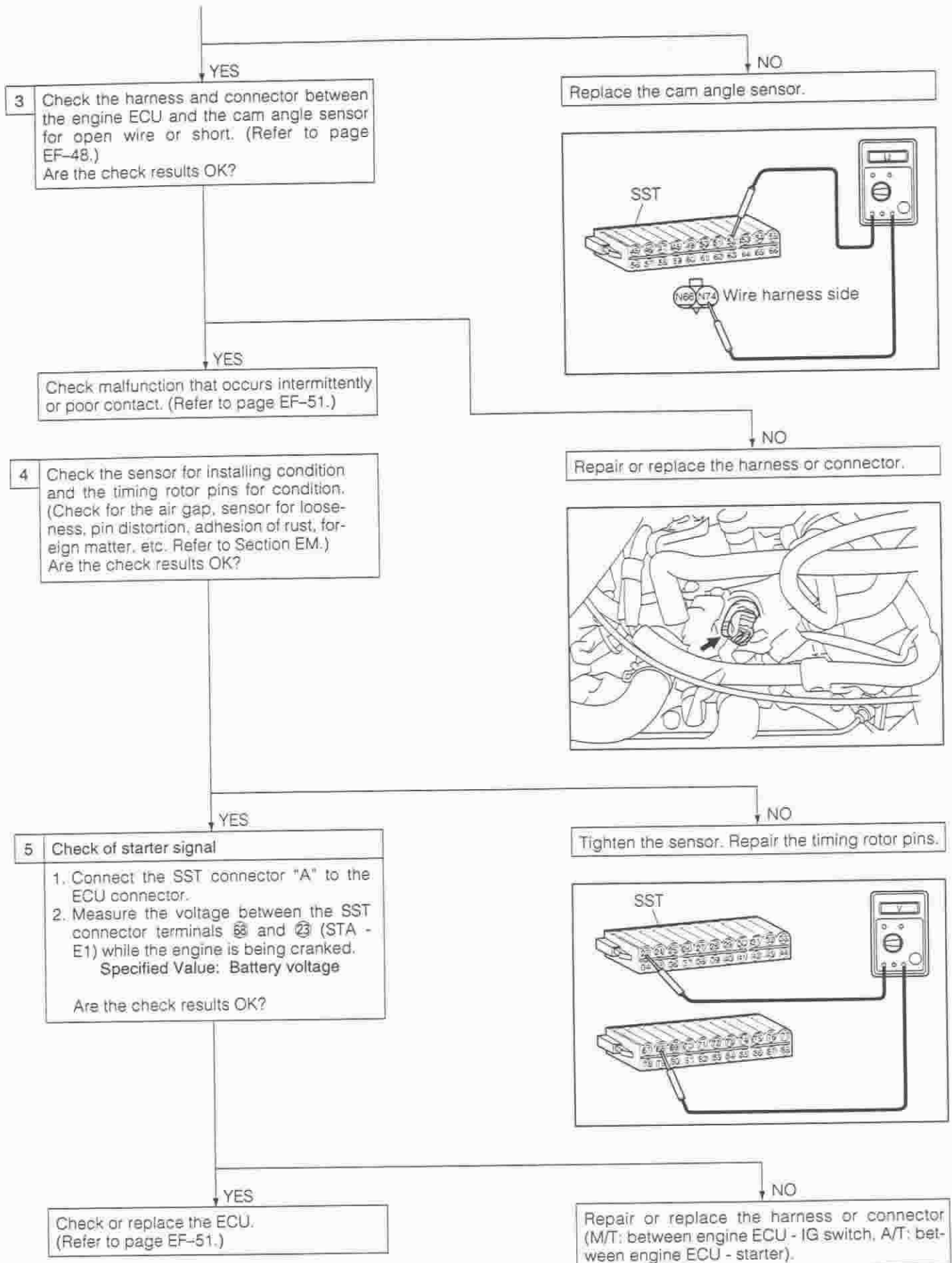
1. Remove the air intake chamber.
2. Disconnect the camshaft angle sensor connector.
3. Using an ohmmeter, measure the resistance between the terminals.
Specified Value:
1850 - 2450 Ω at 20°C

Are the check results OK?

YES

Go to Step 4.

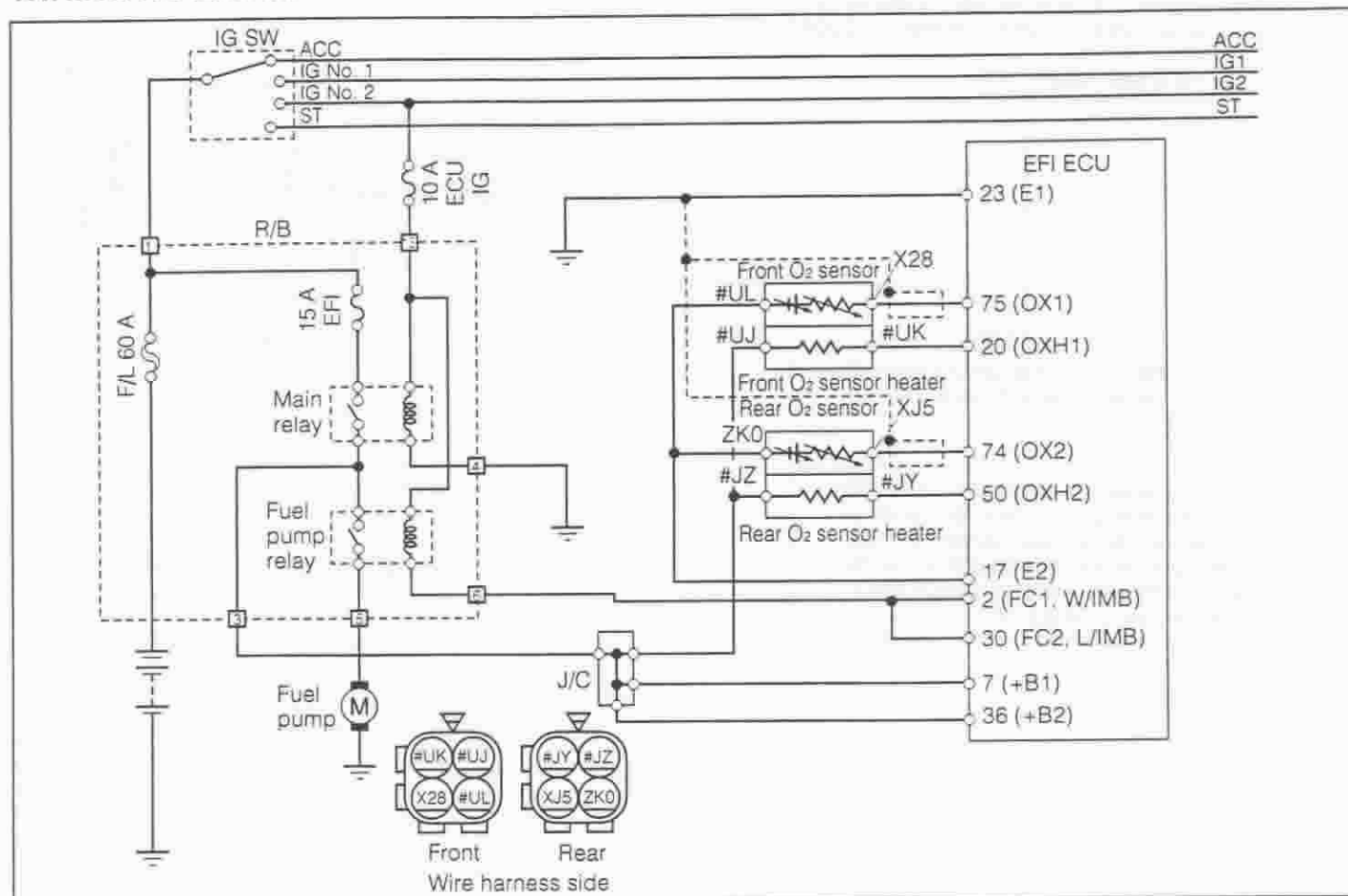




JEF00249-00158

DTC	P0420/27	Catalyst System Efficiency Below Threshold
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WIRING DIAGRAM



JEF00250-C0159

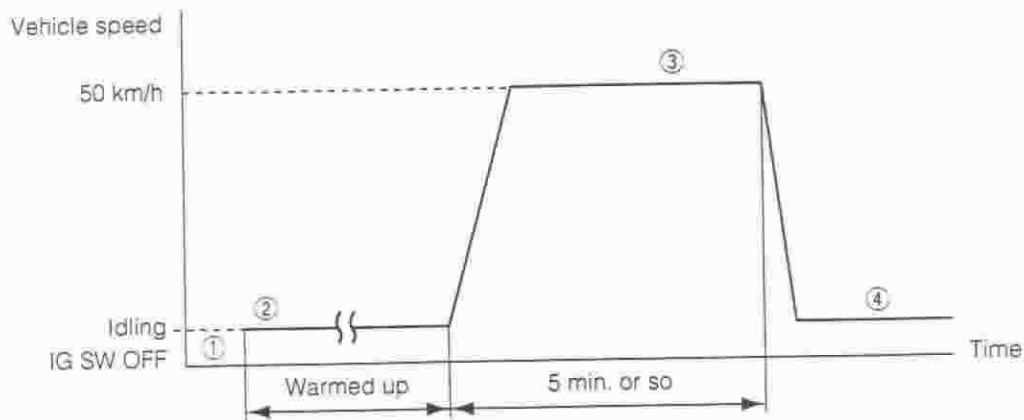
CIRCUIT DESCRIPTION

The ECU monitors the concentration of oxygen in the exhaust gas that is flowing through the three-way catalytic converter, using the rear oxygen sensor. When the catalyst is functioning properly, the varying cycle of the output voltage of the rear oxygen sensor is slower than that of the output voltage of the front oxygen sensor. However, if both the output waveforms of the front and rear sensors are varying at the same rate, it indicates that the catalyst performance has deteriorated.

DTC No.	DTC Detecting condition	Trouble area
P0420/27	When both the waveforms of the front and rear oxygen sensors indicate the same frequency when the vehicle is running at a predetermined speed with the engine rotational speed within a predetermined range: (2 trip detection logic)	<ul style="list-style-type: none"> • Three-way catalyst • Open wire or short in oxygen sensor circuit • Oxygen sensor

JEF00251-00000

CONFIRMATION DRIVING PATTERN



- ① With the IG switch turned OFF, connect the DS-21 diagnosis tester to DLC through the SST. Turn on the IG switch and the main switch of the tester. Set the tester to the "continuous monitoring results" of the CARB mode.
- ② Start the engine. With all switch turned OFF, keep on warming the engine until the engine coolant temperature reaches 90°C or above.
- ③ Run at a constant speed of 50 km/h for about five minutes (in the 4th gear in the case of manual transmission vehicles; in **D** range in the case of automatic transmission vehicles).
- ④ After one minute of idling, press the F1 key of the tester. Check to see if the DTC P0420 is outputted.

JEF00252-00160

CAUTION

- If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.
- If you do not have DS-21 diagnosis tester, turn the ignition switch OFF after performing steps ② to ④, then perform steps ② to ④ again.

WARNING:

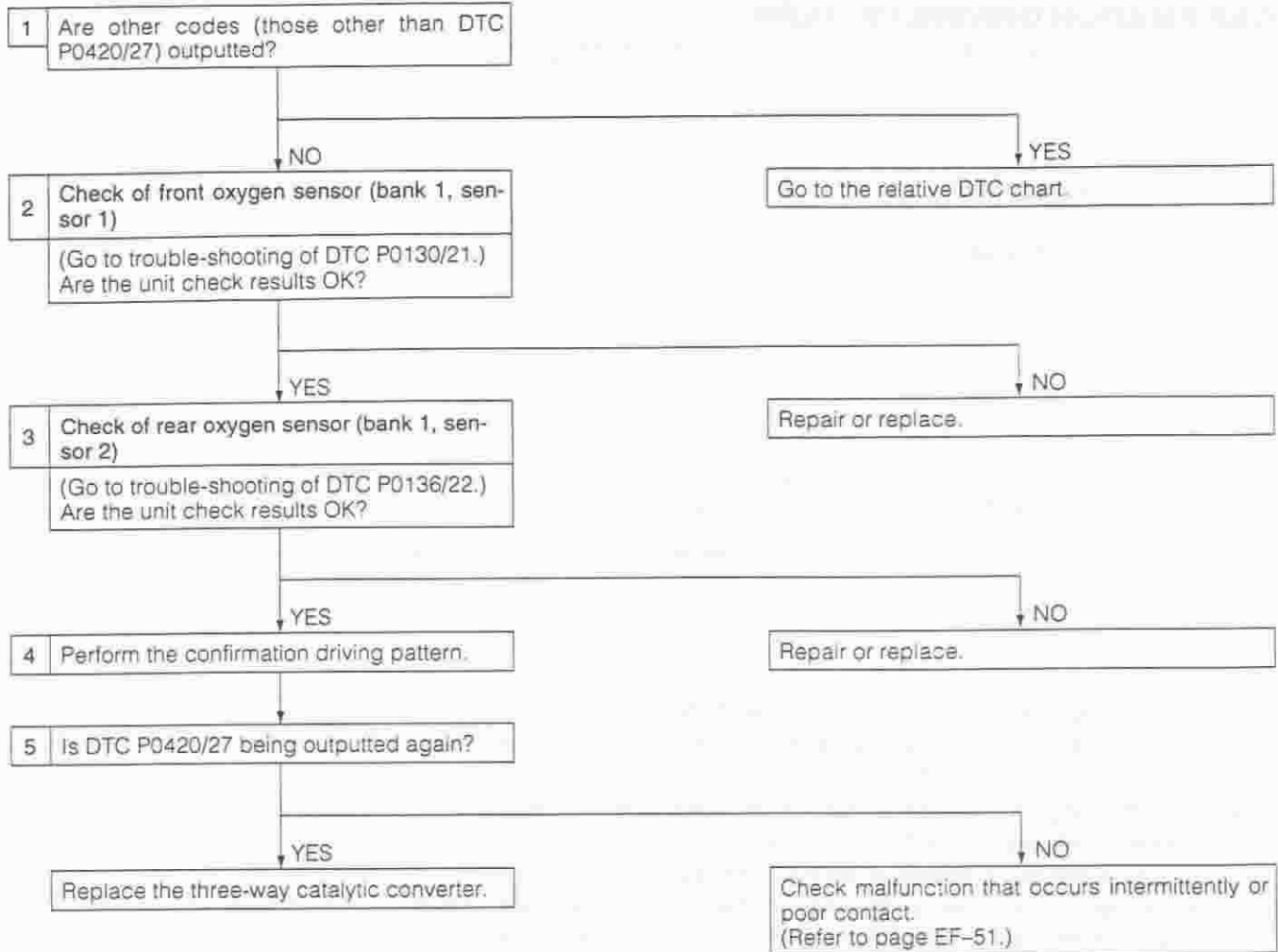
- Be sure to conduct the confirmation test, while observing the instructions at page EF-6.

JEF00253-00161

INSPECTION PROCEDURE

NOTE:

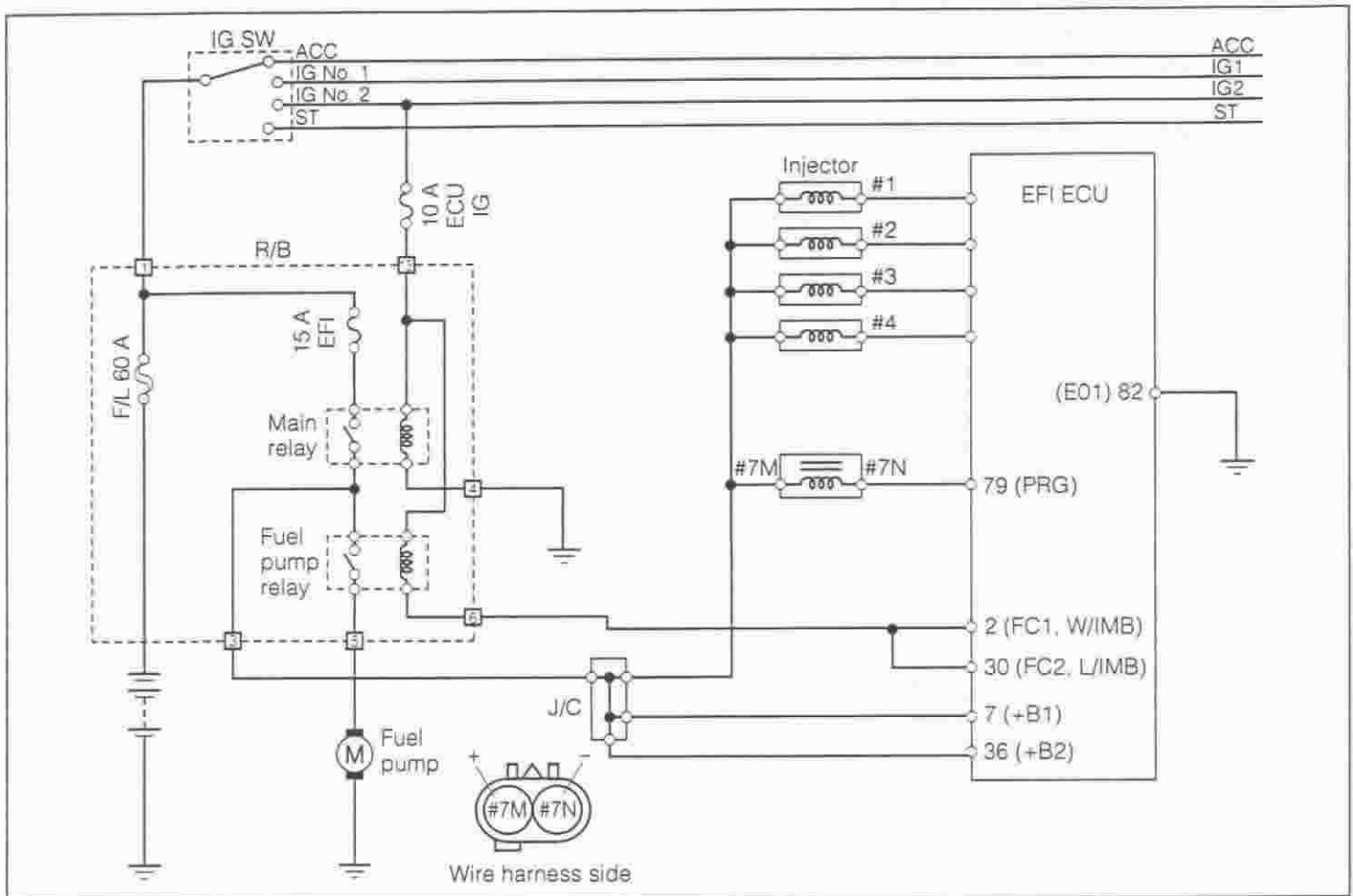
- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.



JEF00254-00000

DTC	P0443/76	Evaporative Emission Control System Purge Control Valve Circuit Malfunction
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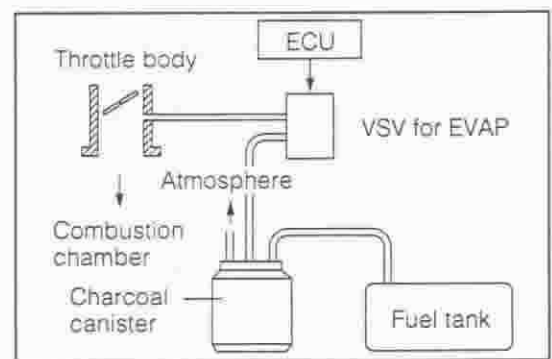
WIRING DIAGRAM



JEF00255-00162

CIRCUIT DESCRIPTION

When the execution conditions for the evaporative emission purging are met, the ECU performs the duty control for the VSV for evaporative emission purging and purges the evaporative emissions into the combustion chamber.



JEF00256-00163

DTC No.	DTC Detecting condition	Trouble area
P0443/76	When open wire or short takes place in VSV circuit for EVAP while the execution conditions for the evaporative emission purging are being met: (2 trip detection logic)	<ul style="list-style-type: none"> • Open wire or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU

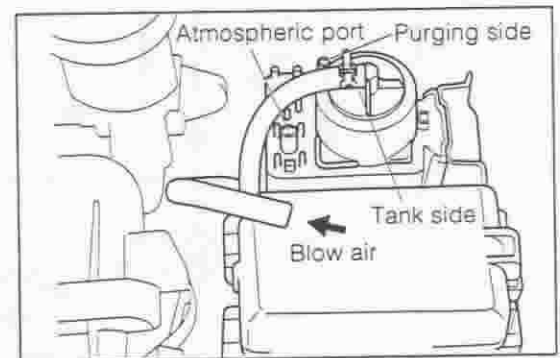
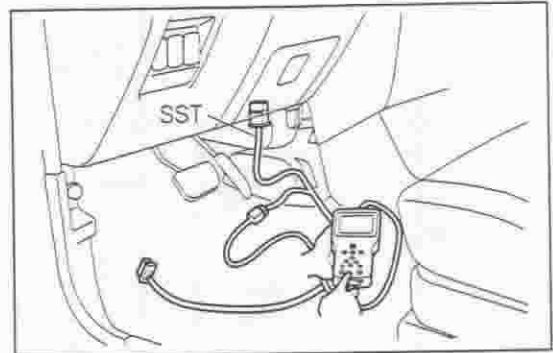
INSPECTION PROCEDURE

NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester or OBD II generic scan tool. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

When using DS-21 diagnosis tester:

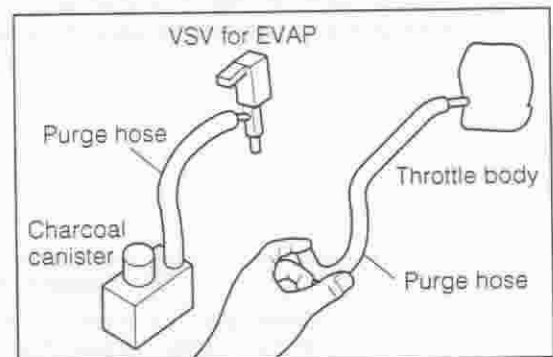
1	<p>Operation check of EVAP purge control system</p> <ol style="list-style-type: none"> With the IG switch turned OFF, connect the DS-21 diagnosis tester to the DLC through the SST. <p>SST: 09991-87404-000</p> <ol style="list-style-type: none"> Disconnect the hose going to the VSV from the charcoal canister. Turn ON the IG switch, and turn ON the main switch of the tester. Erase the DTC. Select the "Purge VSV" of the "Actuator driving." When executing "ON" and "OFF", check the operation of the VSV for purging. <p>VSV "OFF" --- No air continuity should exist when air is blown into the hose.</p> <p>VSV "ON" --- Air continuity should exist when air is blown into the hose.</p> <p>Are the check results OK?</p>
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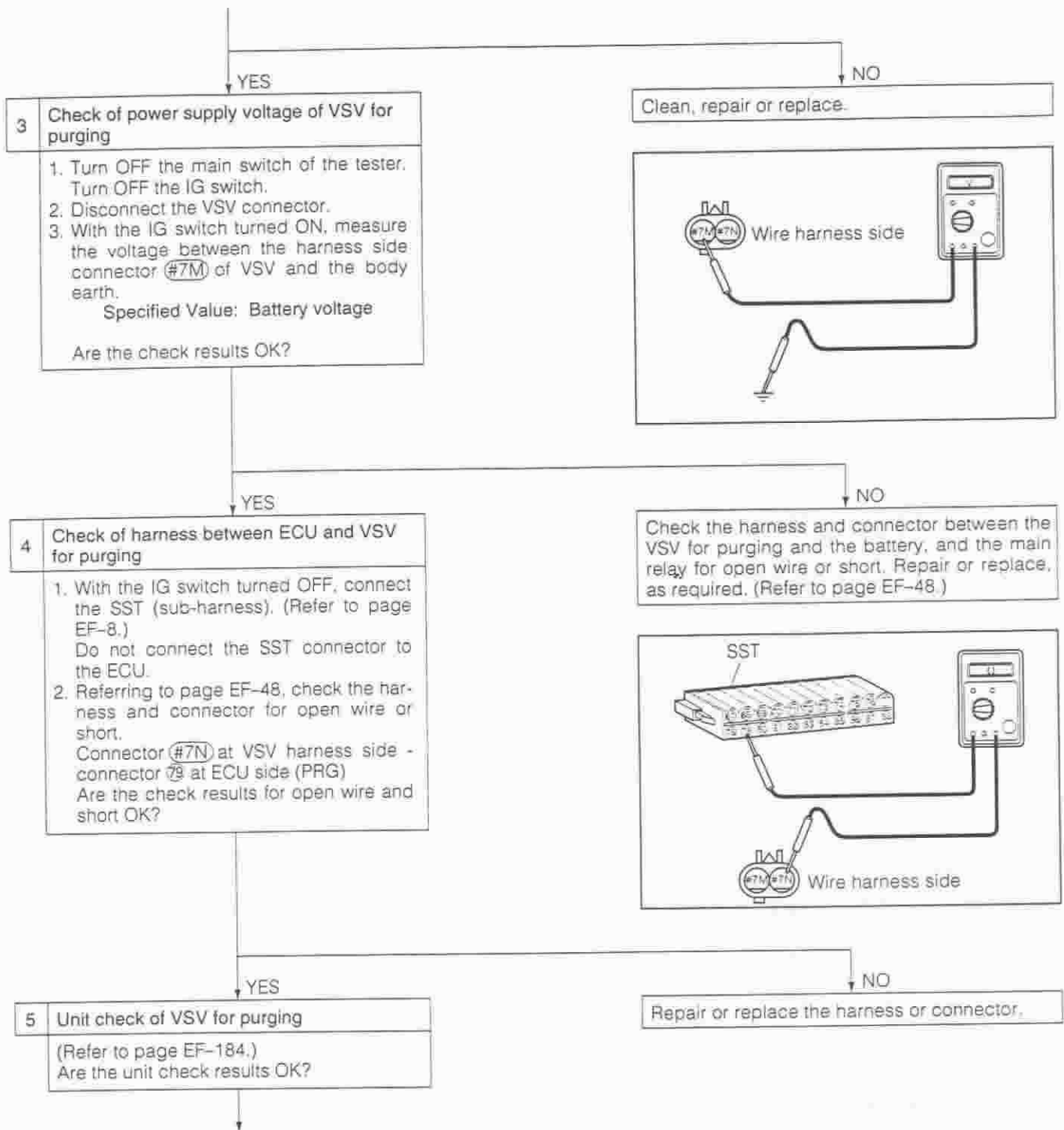


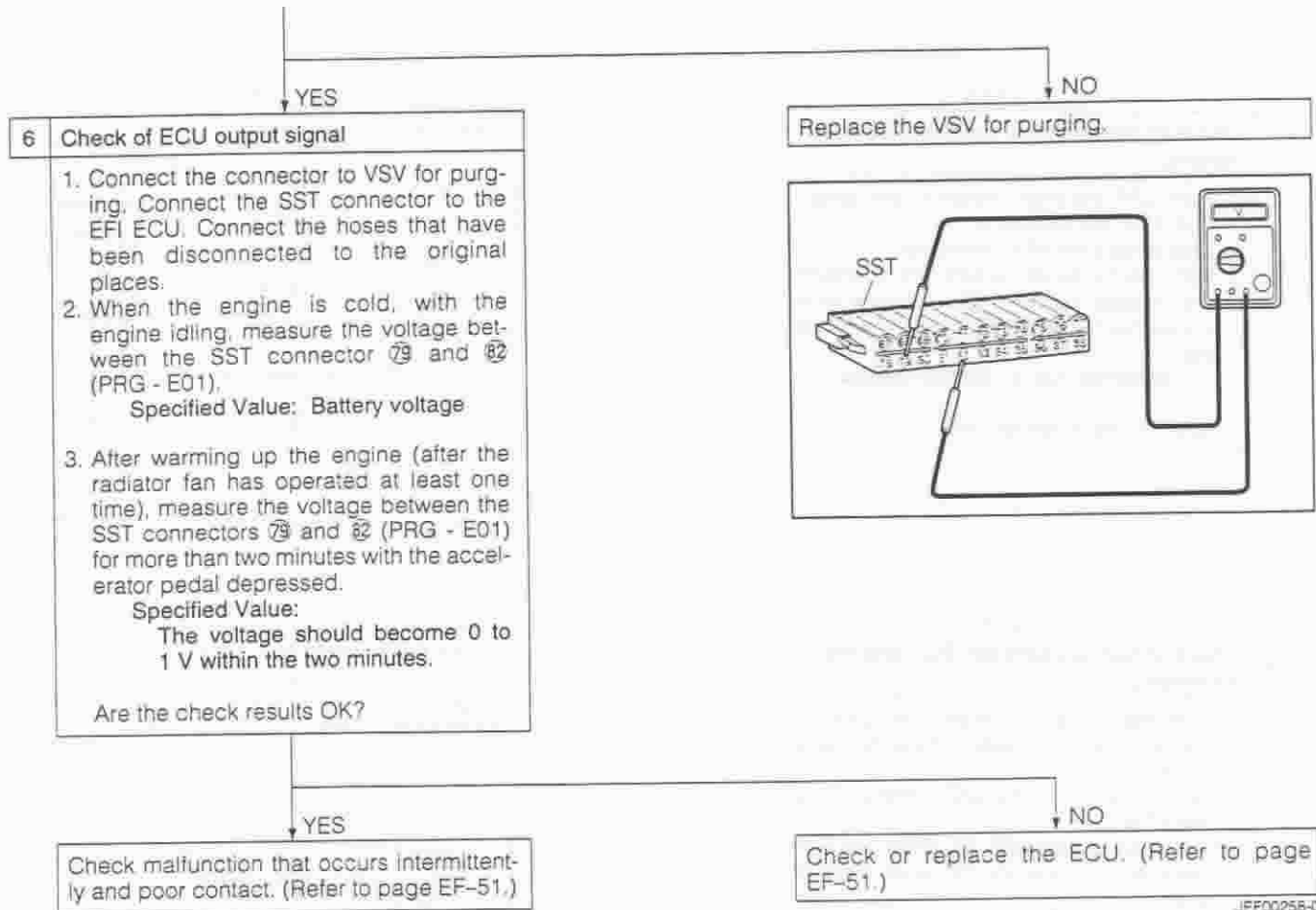
NO → YES

2	<p>Check of purge hose and passage</p> <ol style="list-style-type: none"> Execute the VSV "Release" so as to return the VSV for purging to the original operating state. Start the engine and keep the engine racing. Disconnect the hose going from the VSV for purging to the intake manifold. Apply your finger to the disconnected hose. Ensure that a negative pressure is applied. <p>Specification: Negative pressure should be applied.</p> <ol style="list-style-type: none"> Check the hose for connecting state, leakage, restriction, bending and deterioration. <p>Are the check results OK?</p>
---	--

Check malfunction that occurs intermittently and poor contact. (Refer to page EF-51.)

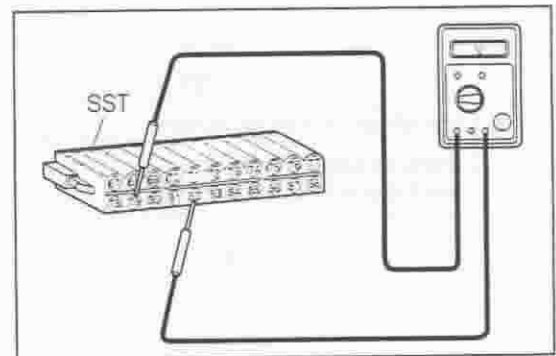
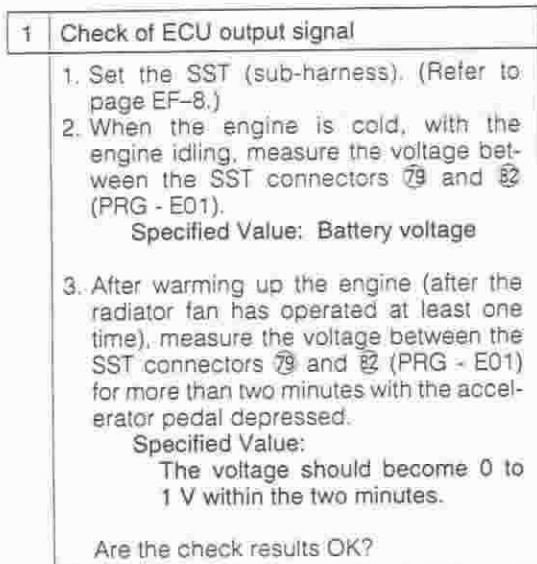


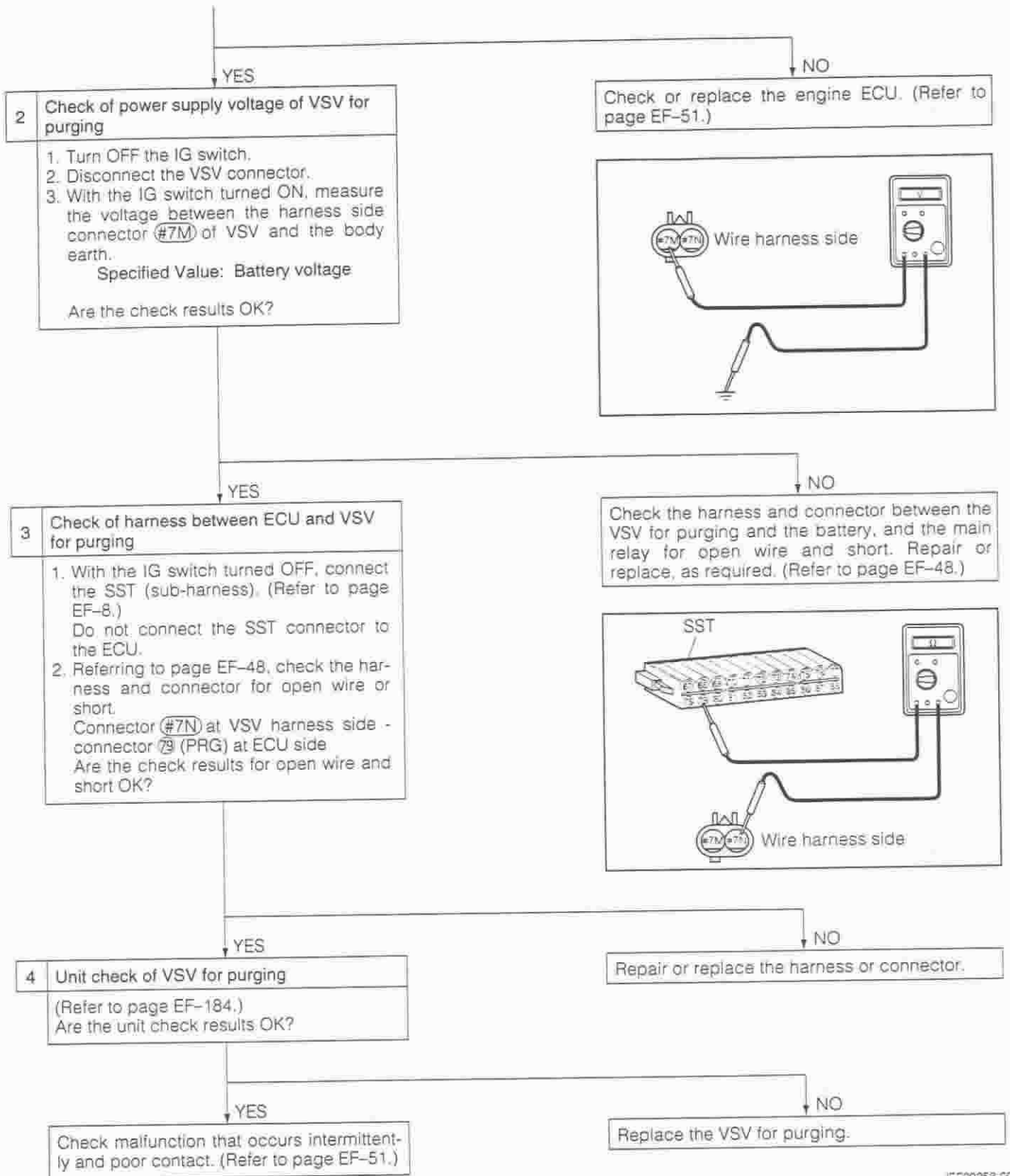




JEF00256-00164

When not using DS-21 diagnosis tester:

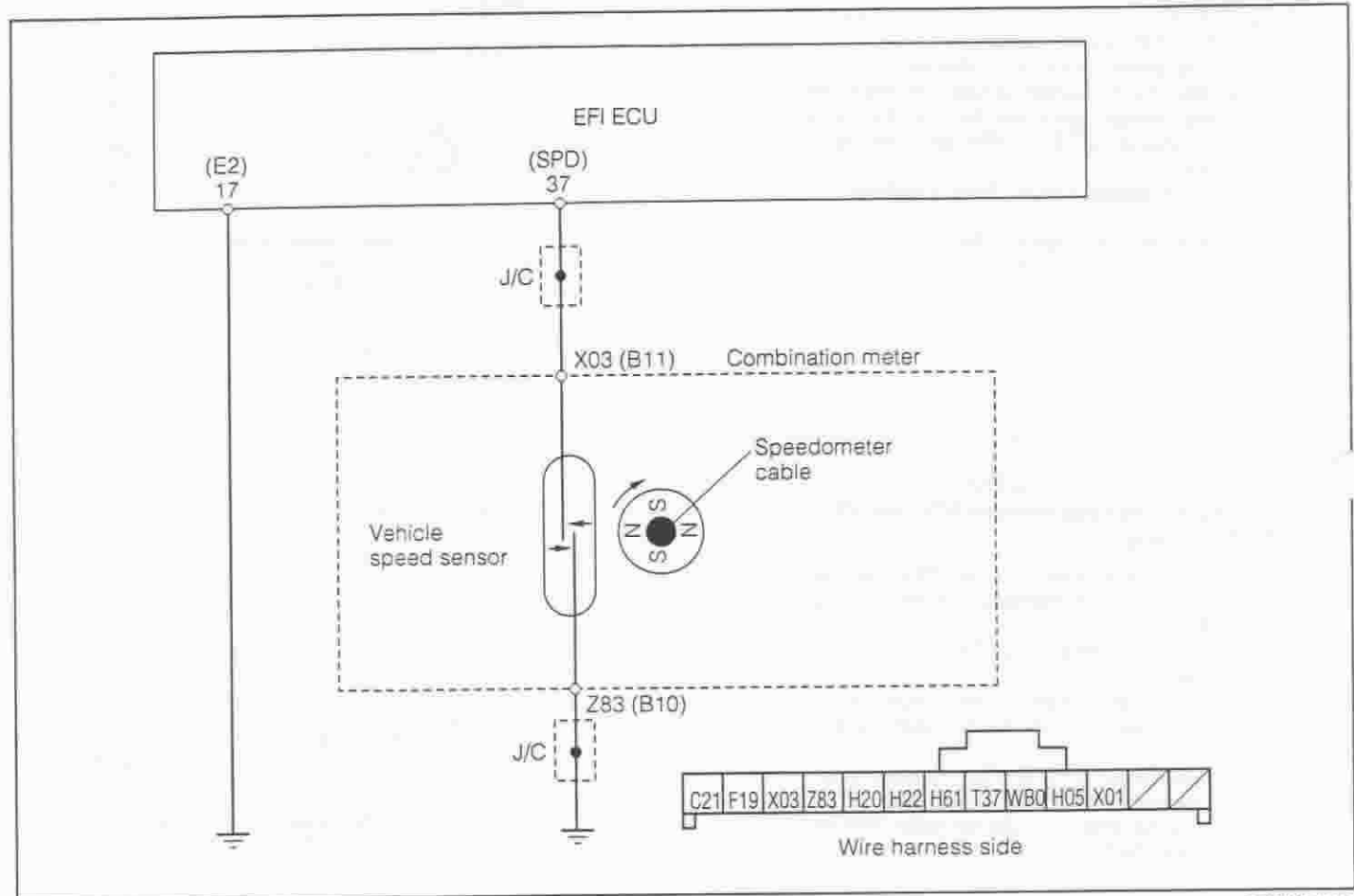




JEF00258-00165

DTC	P0500/52	Vehicle Speed Sensor Malfunction
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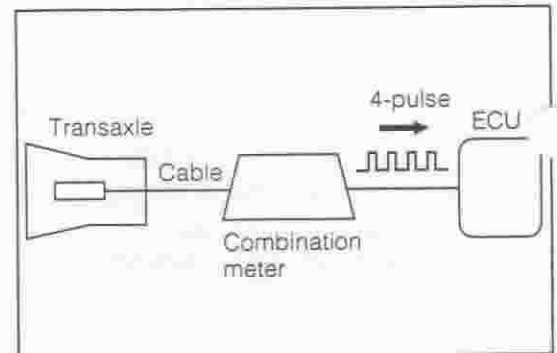
WIRING DIAGRAM



JEF00338-00233

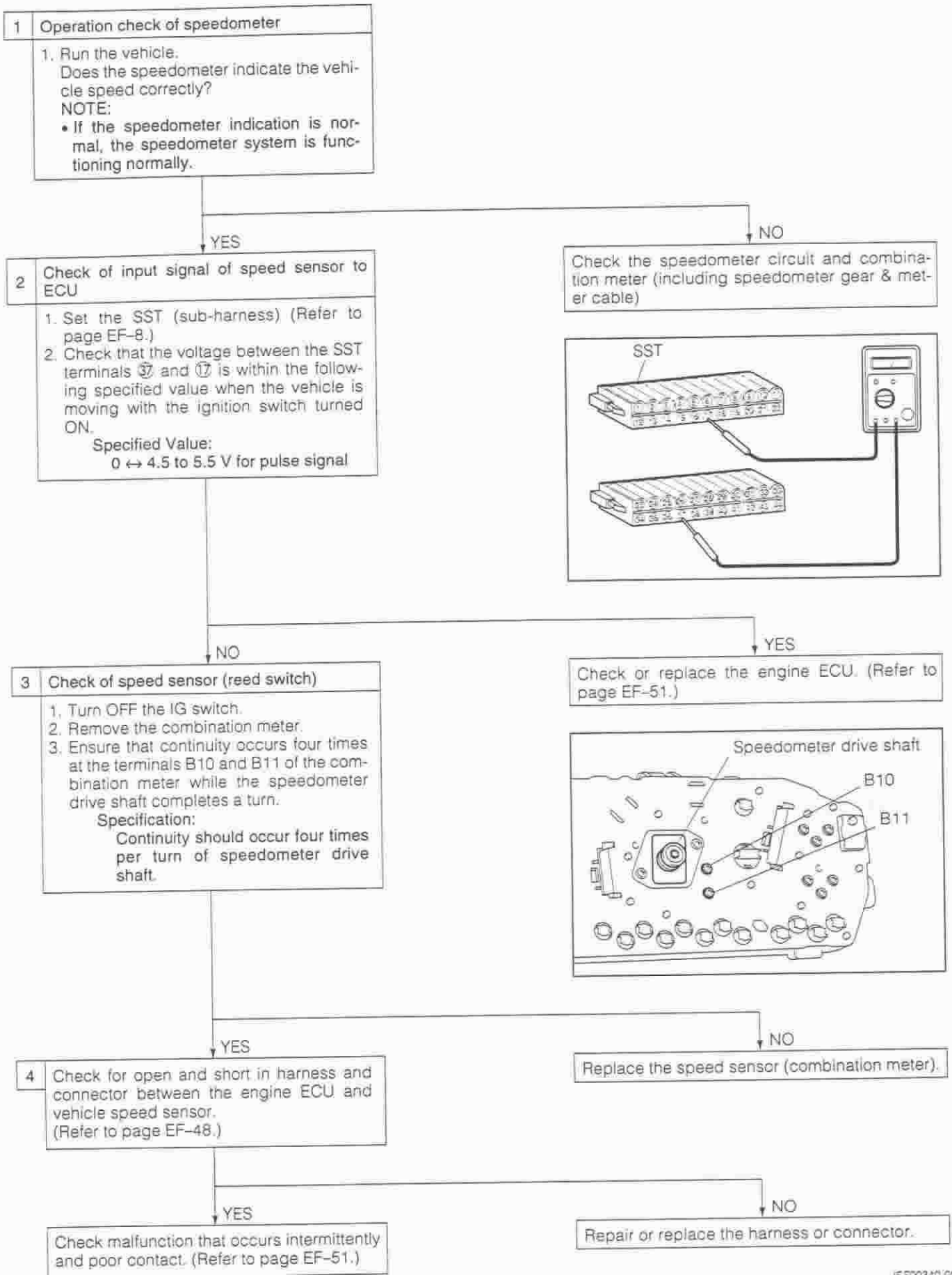
CIRCUIT DESCRIPTION

This sensor is mounted in the combination meter. It contains a magnet which is rotated by the speedometer cable. The reed switch is turned ON and OFF four times for every revolution of the speedometer. It is then transmitted to the ECU. The ECU determines the vehicle speed based on the frequency of these pulse signals.



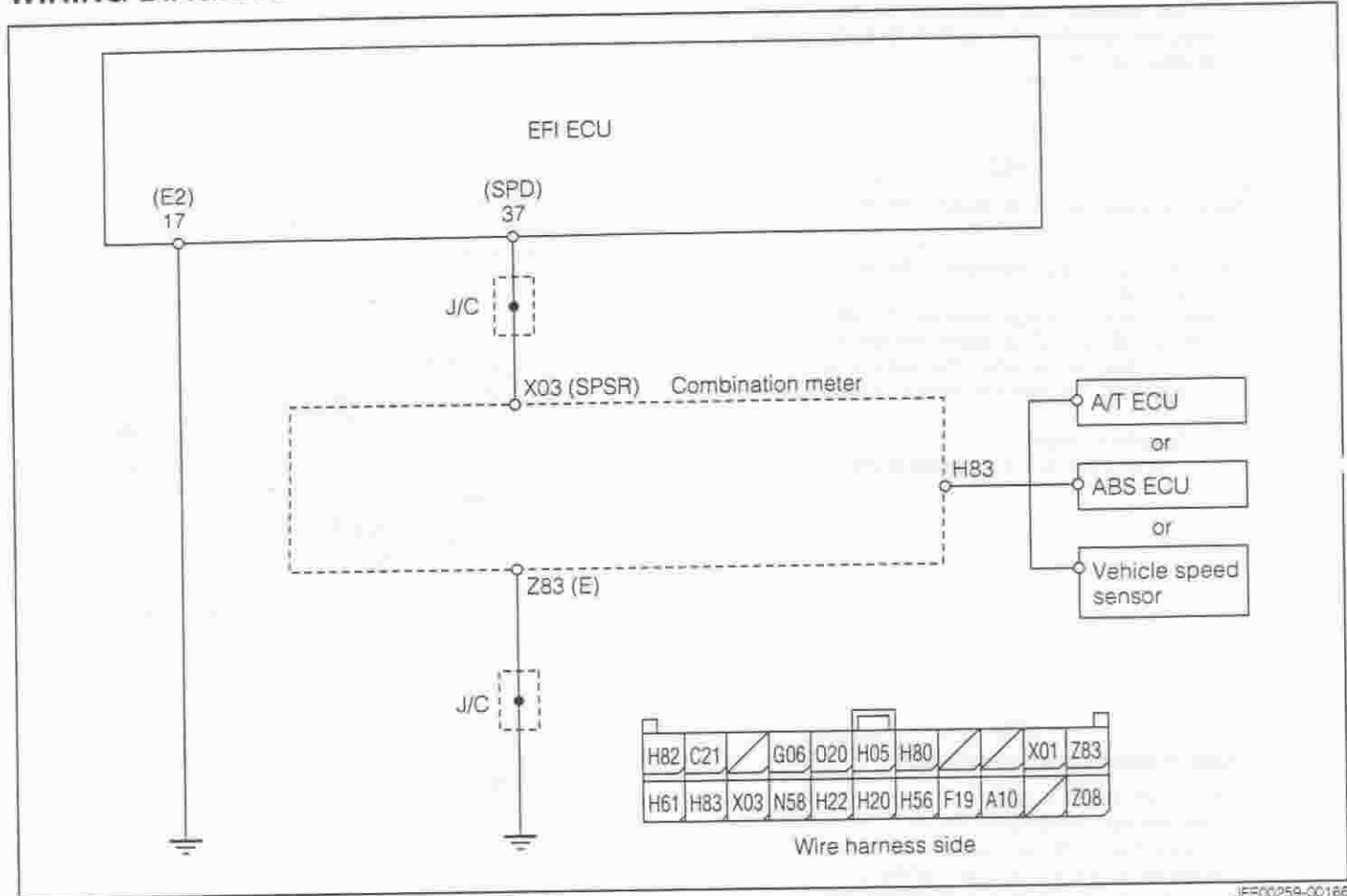
JEF00339-00234

DTC No.	DTC Detecting condition	Trouble area
P0500/52	No signal is inputted from the speed sensor to the ECU for a certain length of time when the fuel cut operation is performed during deceleration. (2 trip detection logic)	<ul style="list-style-type: none"> • Combination meter • Open wire or short in vehicle speed sensor circuit • Vehicle speed sensor • Engine ECU



DTC	P0500/52	Vehicle Speed Sensor Malfunction
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WIRING DIAGRAM

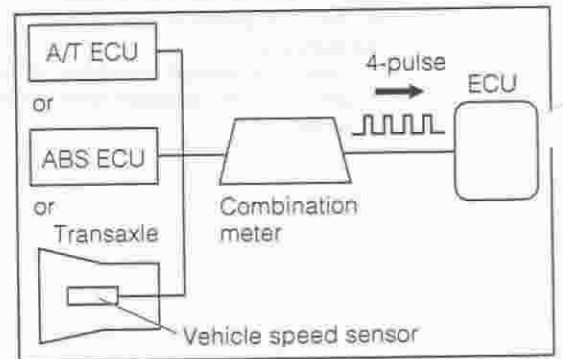


JEF00259-00186

CIRCUIT DESCRIPTION

A vehicle speed sensor driven by a microcomputer is used. Signals driven by the microcomputer in the combination meter are inputted into the EFI ECU, based on the signals from the A/T ECU in the case of automatic transmission vehicles; from ABS ECU in the case of ABS-equipped vehicles; from the vehicle speed sensor mounted on the transaxle in the case of other vehicles.

The EFI ECU determines the vehicle speed based on the frequency of these pulse signals.



JEF00260-00187

DTC No.	DTC Detecting condition	Trouble area
P0500/52	No signal from the speed sensor is inputted into the ECU for a certain length of time during the fuel cut operation at time of deceleration. (2 trip detection logic)	<ul style="list-style-type: none"> • Combination meter • Open wire or short in signal line from A/T ECU or ABS ECU • Vehicle speed sensor • Engine ECU or A/T ECU or ABS ECU

1 Operation check of speedometer

- Run the vehicle.
Does the speedometer indicate the vehicle speed properly?
NOTE:
• If the speedometer indication is normal, the speedometer system is functioning properly.

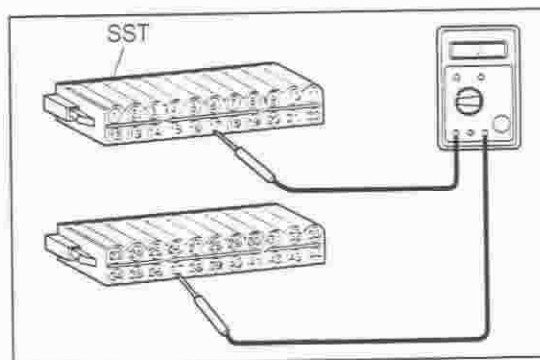
YES

NO

2 Check of input signal to EFI ECU

- Set the SST (sub-harness) (Refer to page EF-8.)
- Check that the voltage between the SST terminals ⑩ and ⑪ is within the following specified value when the vehicle moves and the ignition switch is turned to the ON position.
Specified Value:
0 ↔ 4.5 to 5.5 V for pulse signal.

Check of A/T ECU, ABS ECU or vehicle speed sensor circuit, and combination meter (Refer to sections A/T, BE and BR.)



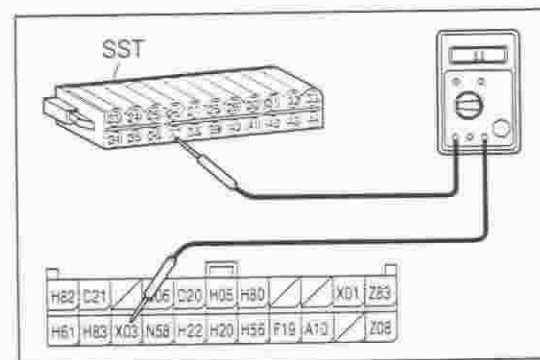
NO

YES

3 Check of harness between EFI ECU and combination meter

- Turn OFF the IG switch. Disconnect the SST connector at the ECU side.
- Remove the combination meter.
- Disconnect the harness from the combination meter.
- Referring to page EF-48, check the harness and connector for open wire or short.
 - SST connector ⑩ - Harness side connector (X03) of combination meter
 - Harness side connector (Z83) of combination meter - Body ground
 Are the check results for open wire and short OK?

Check or replace the engine ECU. (Refer to page EF-51.)



YES

NO

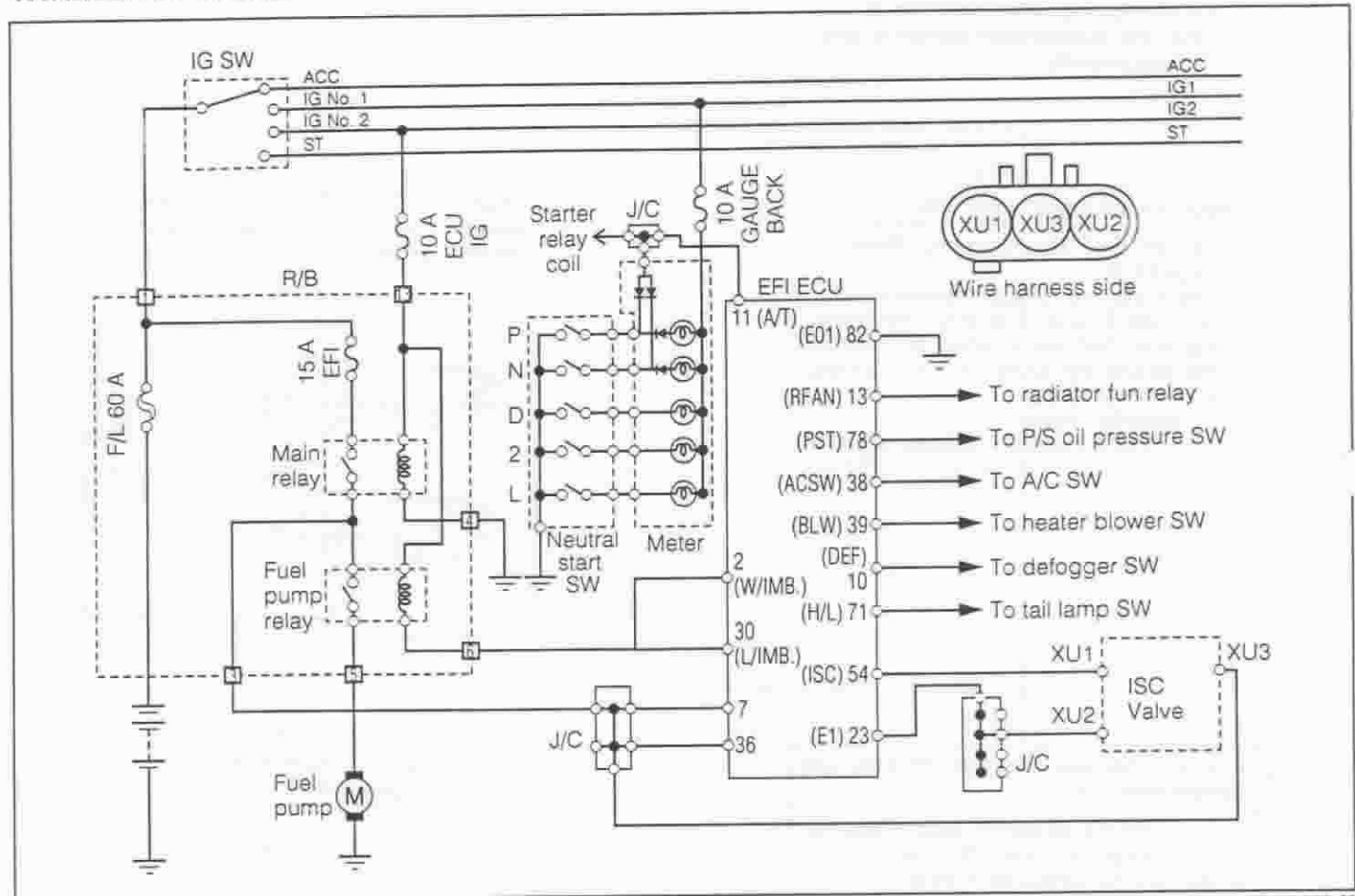
Replace the combination meter.

Repair or replace the harness or connector.

JEP00261-00168

DTC	P0505/71	Idle Control System Malfunction
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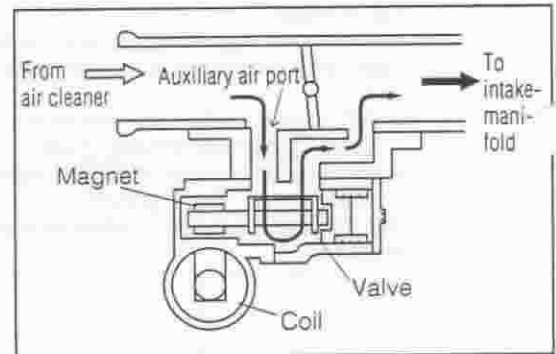
WIRING DIAGRAM



JEF00262-00169

CIRCUIT DESCRIPTION

The rotary solenoid type ISC valve is located in front of the intake manifold and the intake air bypassing the throttle valve is directed to the ISC valve through a passage. In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed. The engine ECU operates only the ISC valve to perform idle-up and provide feedback for the target idling speed.



JEF00263-00170

DTC No.	DTC Detecting condition	Trouble area
P0505/71	Open wire or short in ISC valve circuit	<ul style="list-style-type: none"> • Open wire or short in ISC valve circuit • ISC valve • Engine ECU

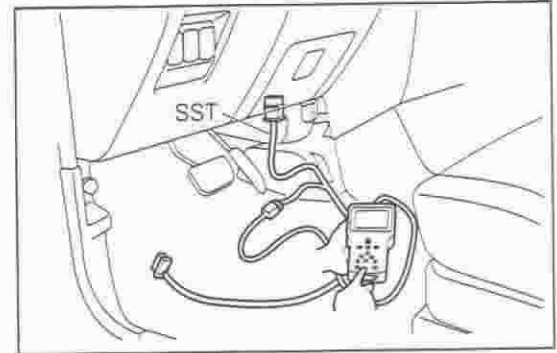
INSPECTION PROCEDURE

NOTE:

- Read the freeze frame data, using the DS-21 diagnosis tester. Because the freeze frame data records the engine conditions when the malfunction was detected, when troubleshooting the freeze frame data is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

When using DS-21 diagnosis tester:

1	<p>Operation check of ISC valve</p> <ol style="list-style-type: none"> 1. With the IG switch turned OFF, connect the DS-21 diagnosis tester to the DLC through the SST. SST: 09991-87404-000 2. Warm up the engine fully. 3. Turn ON the main switch of the DS-21 diagnosis tester. 4. With the engine idling, select the "ISC" in the "Actuator driving." Execute the "5 % open" and "50 % open", respectively. Does the engine speed increase or decrease in accordance with the change in the ISC duty ratio (5 %, 50 %)?
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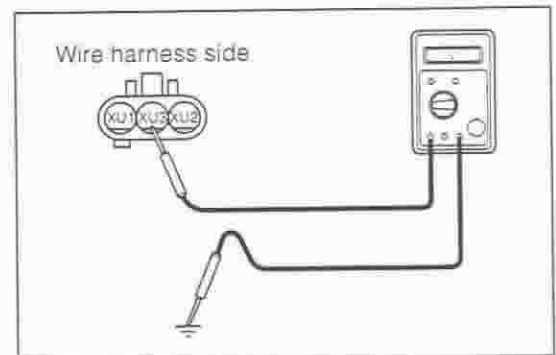


NO

2	<p>Check of power supply voltage of ISC valve</p> <ol style="list-style-type: none"> 1. Turn OFF the main switch of the tester. Turn OFF the IG switch. 2. Disconnect the connector of the ISC valve. 3. Measure the voltage between the terminals XU3 of the wire harness connector and the body ground when the ignition switch is turned to the ON position. Specified Value: Battery voltage <p>Is the measured value the specified value?</p>
----------	---

YES

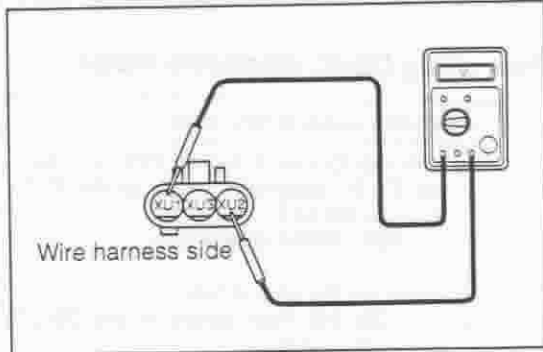
Check malfunction that occurs intermittently and poor contact. (Refer to page EF-51.)



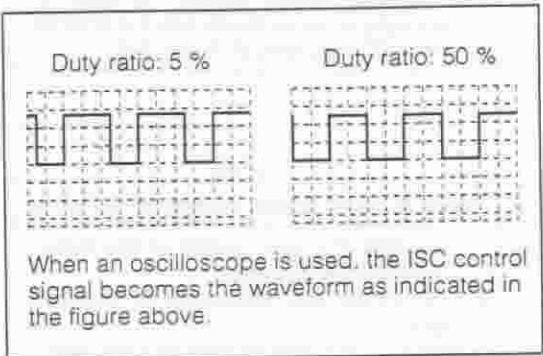
3 Check of input signal of ISC valve

1. After warming up the engine fully, turn ON the main switch of the DS-21 diagnosis tester.
2. With the engine idling, select the "ISC" in the "Actuator driving." Execute the "5 % open" and "50 % open", respectively. Measure the voltage between (XU1) and (XU2).
Does the voltage increase or decrease in accordance with the change in the ISC duty ratio (5 %, 50 %)?

NO
Check the harness and connector between the ISC valve and the battery, and main relay for open wire and short. (Refer to page EF-48.)



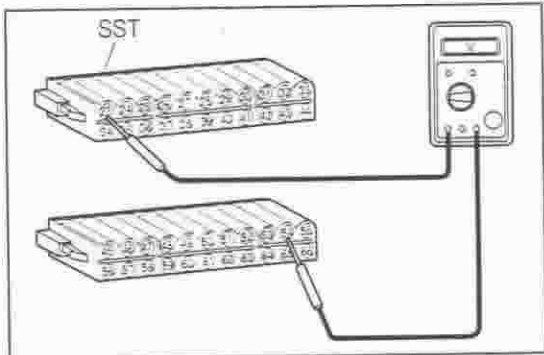
[Reference]
Check by oscilloscope

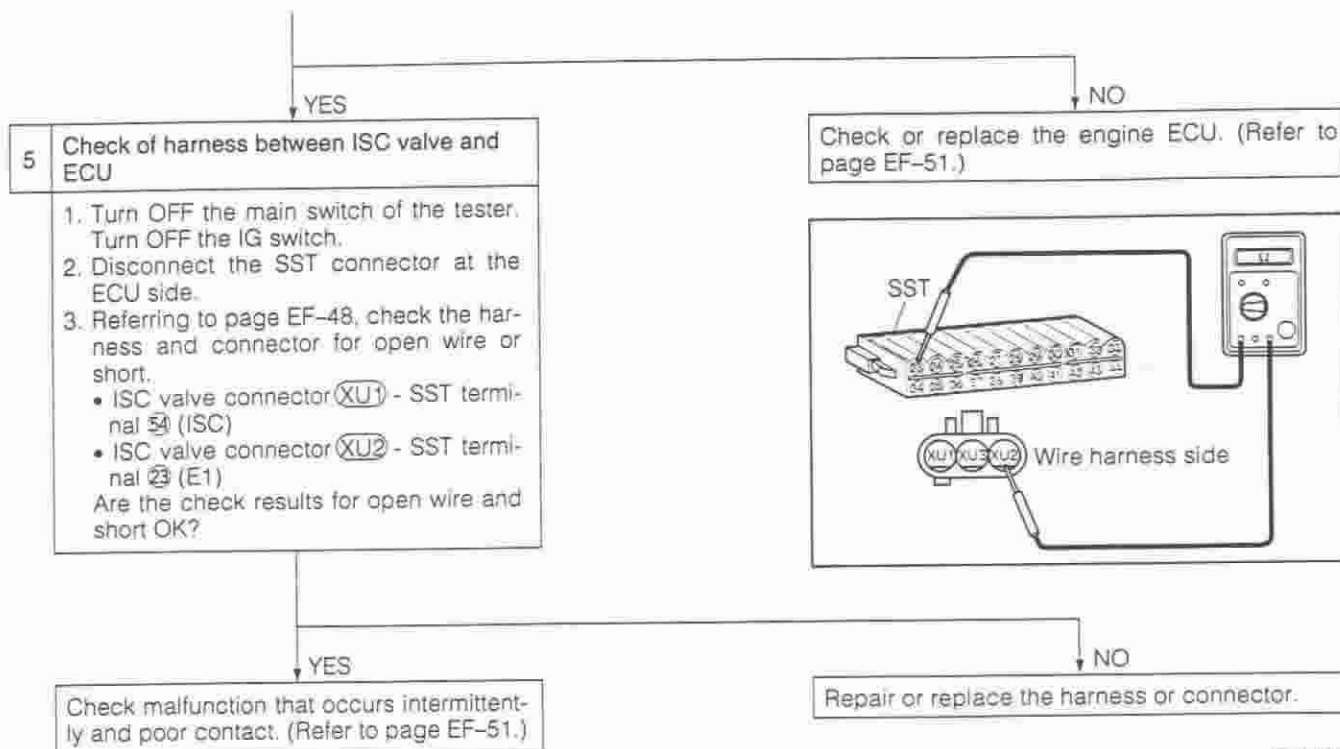


4 Check of output signal of ISC valve of ECU

1. Turn OFF the main switch of the tester. Turn OFF the IG switch.
2. Connect the SST between the ECU connectors and the wire harness connectors.
SST: 09842-97203-000
3. Warm up the engine. With the engine idling, select the "ISC" in the "Actuator driving." Execute the "5 % open" and "50 % open", respectively. Measure the voltage between the SST terminals 54 and 53 (ISC - E1).
Does the voltage increase or decrease in accordance with the change in the ISC duty ratio (5 %, 50 %)?

YES
Replace the ISC valve.



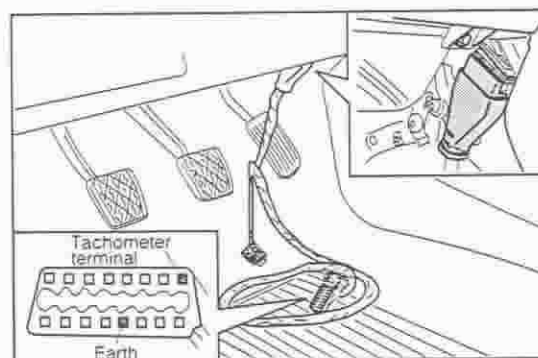


JEF00264-00171

When not using DS-21 diagnosis tester:

1 Operation check of ISC valve

Ensure that the engine revolution speed is high during the cold period. Also, ensure that the engine revolution speed drops as the engine warms up and that the idle speed is maintained. Are the check results OK?



2 Check of power supply voltage of ISC valve

1. Turn OFF the IG switch.
2. Disconnect the connector of the ISC valve.
3. Measure the voltage between the terminals (XU3) of the wire harness connector and the body ground when the ignition switch is turned to the ON position.

Specified Value: Battery voltage

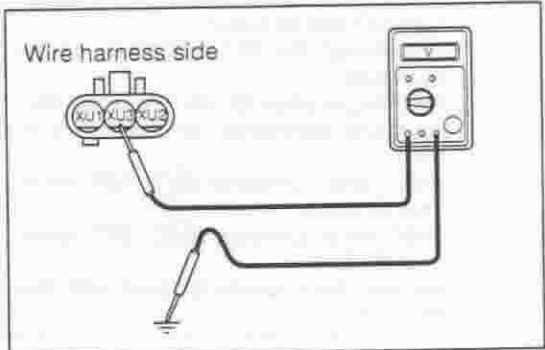
Is the measured value the specified value?

NO

YES

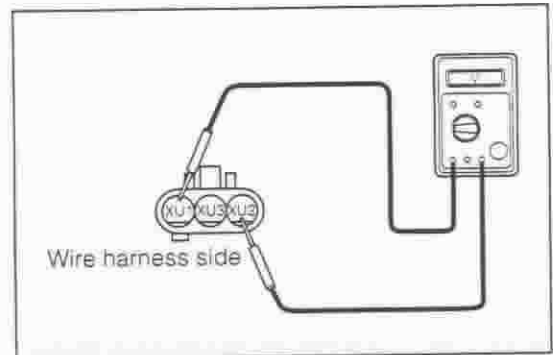
YES

Check malfunction that occurs intermittently and poor contact. (Refer to page EF-51.)



NO

Check the harness and connector between the ISC valve and the battery, and main relay for open wire and short. (Refer to page EF-48.)



3 Check of input signal of ISC valve

1. Warming up the engine fully.
2. With the engine idling (with the ISC valve connector disconnected), measure the voltage between (XU1) and (XU2) at the harness connector side.

Specification:

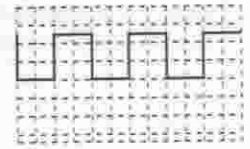
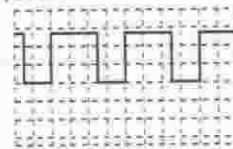
The voltage should be stable at a constant value. (The value of the voltage can not be specified.)

[Reference]
Check by oscilloscope

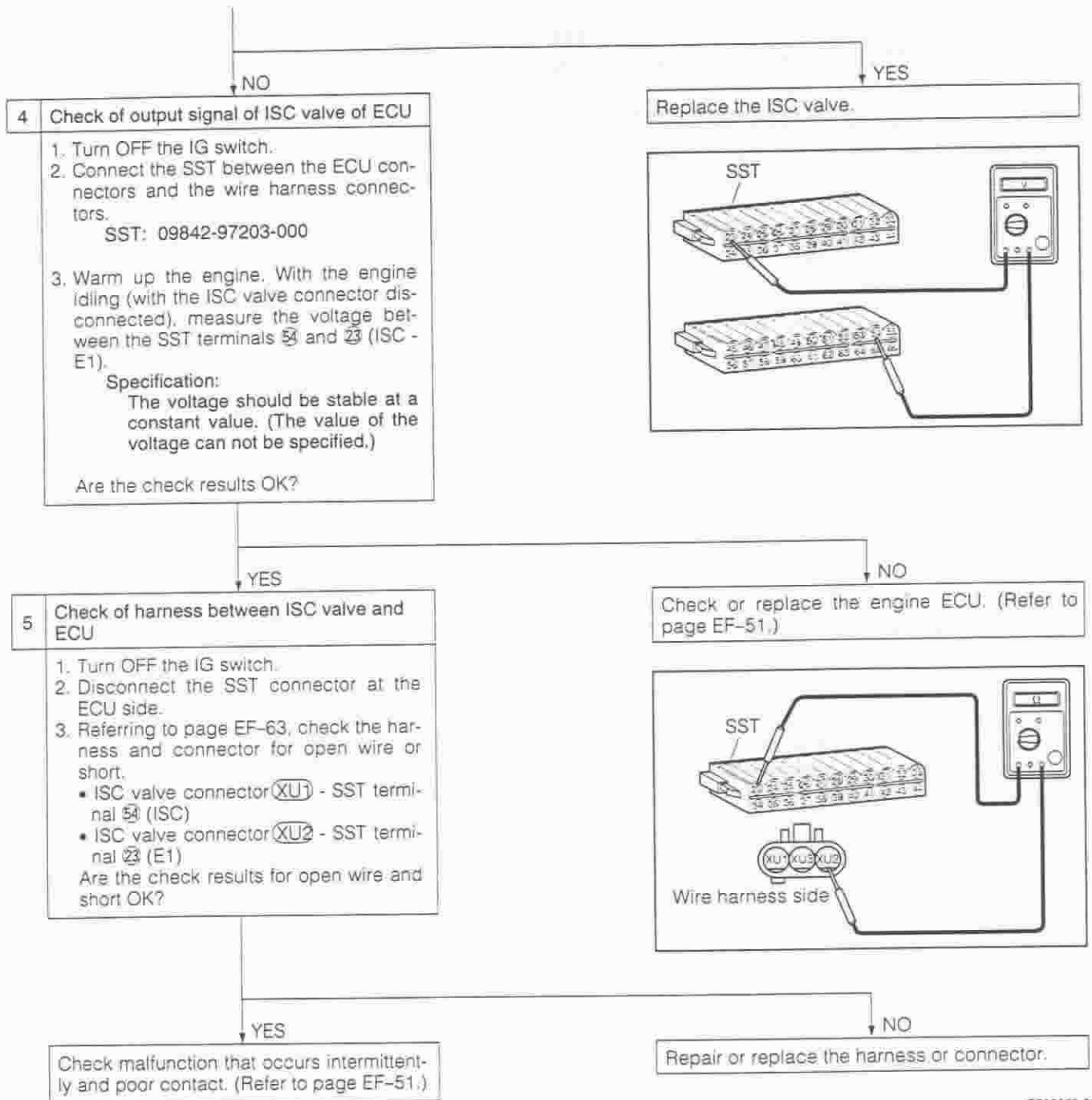
Idling condition

(Electrical load "OFF")

(Electrical load "ON")



When an oscilloscope is used, the ISC control signal becomes the waveform as indicated in the figure above. (The duty ratio cannot be specified.)



JEP00265-00172