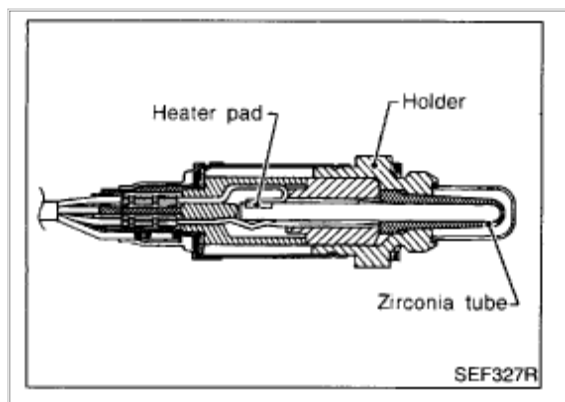


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 Component Search:

2001 Infiniti I30 V6-2988cc 3.0L DOHC MFI (VQ30DE)
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P0138
[Notes](#)


Component Description

The [heated oxygen sensor 2](#) (rear), after three way catalyst (Manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the [heated oxygen sensor 1](#) (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately **1 V** in richer conditions to **0 V** in leaner conditions.

Under normal conditions the [heated oxygen sensor 2](#) (rear) is not used for engine control operation.

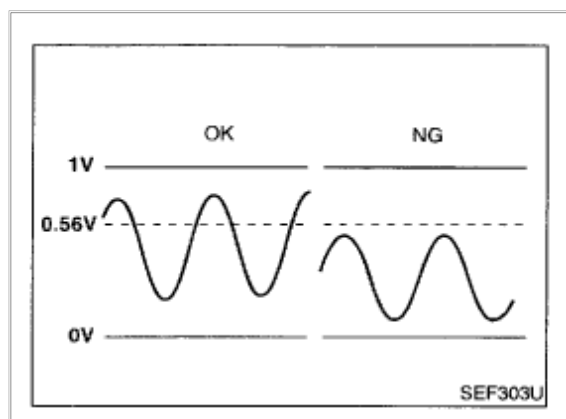
Consult-II Reference Value In Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> Engine: After warming up 	Revolving engine from idle up to 2,000 rpm	LEAN ↔ RICH

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On Board Diagnosis Logic

The [heated oxygen sensor 2](#) (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst (Manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), [ECM](#) monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.

Malfunction is detected when the maximum voltage from the sensor is not reached to the specified voltage.

Possible Cause

- Harness or connectors (The sensor circuit is open or shorted.)
- [Heated oxygen sensor 2](#) (rear)
- [Fuel pressure](#)
- Injectors
- Intake air leaks

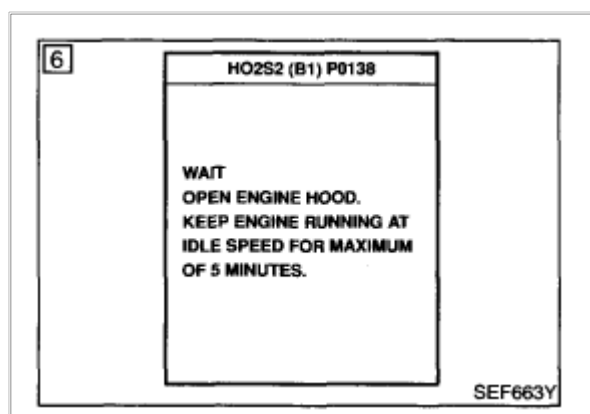
DTC Confirmation Procedure

NOTE: If "DTC Confirmation Procedure" has been previously conducted, always turn [ignition switch](#) "OFF" and wait at least **10 seconds** before conducting the next test.

TESTING CONDITION: Open engine hood before conducting following procedure.

WITH CONSULT-II

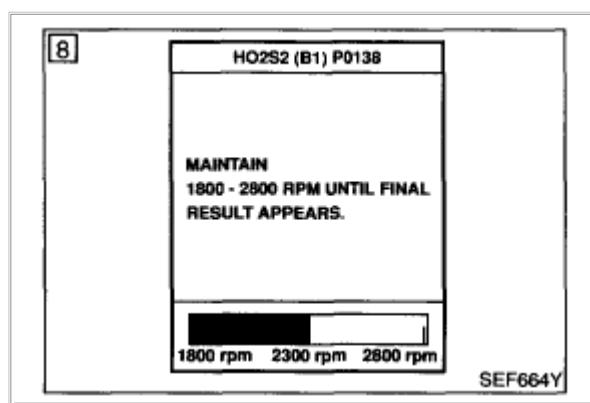
1. Start engine and warm it up to normal operating temperature.
2. Turn [ignition switch](#) "OFF" and wait at least **10 seconds** .
3. Turn [ignition switch](#) "ON" .
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "COOLAN TEMP/S" indicates more than **70 °C (158 °F)** .



Zoom

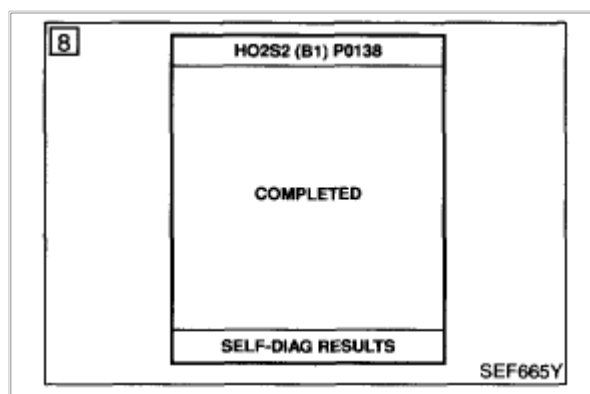
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6. Select "HO2S2 (B1) P0138" or "HO2S2 (B2) P0158" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and follow the instruction of CONSULT-II.



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8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If NG is displayed, refer to "Diagnostic Procedure". If "CANNOT BE DIAGNOSED" is

displayed, perform the following.

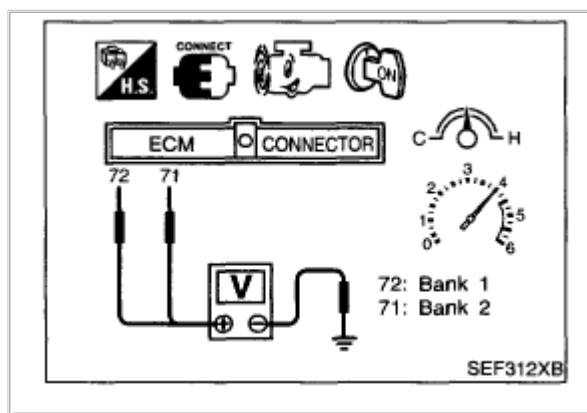
- Stop engine and cool down until "COOLAN TEMP/S" indicates less than **70 °C (158 °F)** .
- Turn [ignition switch](#) "**ON**" .
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine.
- Return to step 6 again when the "COOLAN TEMP/S" reaches to **70 °C (158 °F)** .

Overall Function Check

Use this procedure to check the overall function of the [heated oxygen sensor](#) 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

- Start engine and drive vehicle at a speed of more than **70 km/h (43 MPH)** for **2 consecutive minutes** .
- Stop vehicle with engine running.



Zoom

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- Set voltmeter probes between [ECM](#) terminal 72 [[HO2S2](#) (B1) signal] or 71 [[HO2S2](#) (B2) signal] and engine ground.
- Check the voltage when racing up to **4,000 rpm** under no load at least 10 times. (Depress and release [accelerator pedal](#) as soon as possible.) The voltage should be above **0.56 V** at least once during this procedure. If the voltage can be confirmed in step 4, step 5 is not necessary.
- Keep vehicle at idling for **10 minutes** , then check the voltage. Or check the voltage when coasting from **80 km/h (50 MPH)** in "D" position with "OD" **OFF** . The voltage should be above **0.56 V** at least once during this procedure.
- If NG, go to "Diagnostic Procedure".

EC-O2S2B1-01

ECM Terminals And Reference Value

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

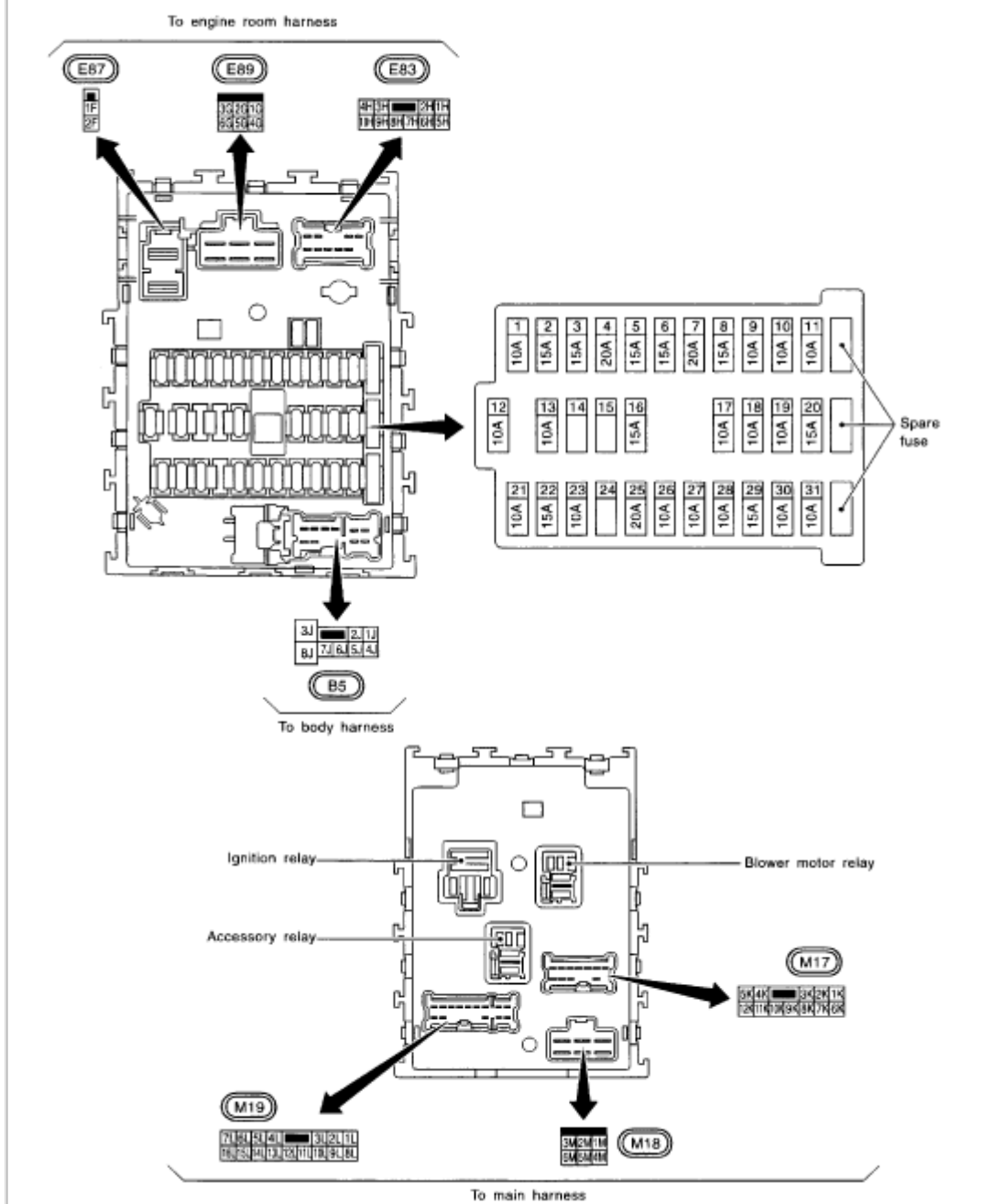
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
72	W	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

Zoom

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Wiring Diagram

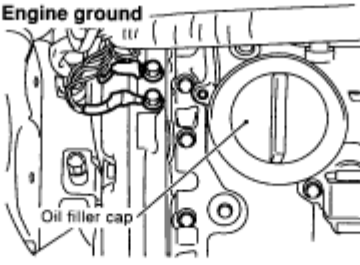
Fuse Block - Junction Box (J/B) - Terminal Arrangement




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Steps 1 - 2

1	RETIGHTEN GROUND SCREWS
<ol style="list-style-type: none"> Turn ignition switch "OFF". Loosen and retighten engine ground screws. 	
	
SEF255X	
▶	GO TO 2.

2	CLEAR THE SELF-LEARNING DATA
<p><input checked="" type="radio"/> With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. Clear the self-learning control coefficient by touching "START". 	
	
<p>4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 or P0174 detected? Is it difficult to start engine?</p>	
<p><input checked="" type="radio"/> Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Turn ignition switch "OFF". Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed. Stop engine and reconnect mass air flow sensor harness connector. Make sure 1st trip DTC P0100 is displayed. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION". Make sure DTC P0000 is displayed. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 or P0174 detected? Is it difficult to start engine? 	
Yes or No	
Yes	▶ Perform trouble diagnosis for DTC P0171, P0174.
No	▶ GO TO 3.


Zoom

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Step 3

3 CHECK HO2S2 (REAR) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch "OFF".
- Check heated oxygen sensor 2 (rear) harness protector color.

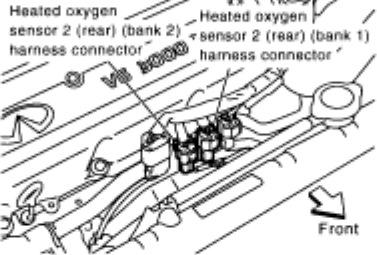


HO2S2 (rear) harness protector color

HO2S2 (rear) (bank 1): White
 HO2S2 (rear) (bank 2): Red

SEC021C

- Disconnect corresponding heated oxygen sensor 2 (rear) harness connector.



Heated oxygen sensor 2 (rear) (bank 2) harness connector

Heated oxygen sensor 2 (rear) (bank 1) harness connector

Front

SEF467WB

- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal and HO2S2 (rear) terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	72	1	1
P0158	71	1	2

MTBL0602

Continuity should exist.

- Check harness continuity between ECM terminal or HO2S2 (rear) terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0138	72 or 1	Ground	1
P0158	71 or 1	Ground	2

MTBL0603

Continuity should not exist.

- Also check harness for short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Zoom

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Steps 4 - 5

4 CHECK HO2S2 (REAR) GROUND CIRCUIT FOR OPEN AND SHORT	
1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.	
2. Also check harness for short to power.	
OK or NG	
OK (With CONSULT-II) ▶	GO TO 5.
OK (Without CONSULT-II) ▶	GO TO 6.
NG ▶	Repair open circuit or short to power in harness or connectors.

5 CHECK HEATED OXYGEN SENSOR 2 (REAR)	
(i) With CONSULT-II	
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.	
2. Stop vehicle with engine running.	
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.	
4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.	
(Reference data)	
"HO2S2 (B1)/(B2)" should be above 0.56V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.	
CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.	
OK or NG	
OK ▶	GO TO 9.
NG ▶	GO TO 8.

Zoom

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Steps 6 - 8

6	CHECK HEATED OXYGEN SENSOR 2 (REAR)-I
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes. Stop vehicle with engine running. Set voltmeter probes between ECM terminal 72 [HO2S2 (B1) signal] or 71 [HO2S2 (B2) signal] and engine ground. Check the voltage when revving up to 4,000 rpm under no load at least 10 times. (Depress and release accelerator pedal as soon as possible.) 	
SEF313XB	
OK or NG	
OK	▶ GO TO 9.
NG	▶ GO TO 7.

7	CHECK HEATED OXYGEN SENSOR 2 (REAR)-II
<p>Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 6; or check voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF.</p> <p>The voltage should go below 0.54V at least once during this procedure.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p>	
OK or NG	
OK	▶ GO TO 9.
NG	▶ GO TO 8.

8	REPLACE HEATED OXYGEN SENSOR 2 (REAR)
<ol style="list-style-type: none"> Stop vehicle and turn ignition switch "OFF". Check heated oxygen sensor 2 (rear) harness protector color. 	
<p>HO2S2 (rear) (bank 1): White HO2S2 (rear) (bank 2): Red</p>	
SEC021C	
<p>CAUTION: Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
▶ Replace malfunctioning heated oxygen sensor 2 (rear).	

Zoom

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Steps 9 - 10

9	CHECK HO2S2 (REAR) SHIELD CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect joint connector-17. 3. Check the following. ● Continuity between joint connector terminal 1 and ground ● Joint connector (Refer to "HARNES LAYOUT".) Continuity should exist.	
4. Also check harness for short to power. 5. Then reconnect joint connector-17.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Repair open circuit or short to power in harness or connectors.
10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT".	
	▶ INSPECTION END

Zoom

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Diagnostic Procedure

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