

SECTION EC

ENGINE CONTROL SYSTEM

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UBS00EMD

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

×:Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
A/F SEN1 (B1)	P1271	1271	2	×	EC-428
A/F SEN1 (B1)	P1272	1272	2	×	EC-436
A/F SEN1 (B1)	P1273	1273	2	×	EC-444
A/F SEN1 (B1)	P1274	1274	2	×	EC-453
A/F SEN1 (B1)	P1276	1276	2	×	EC-462
A/F SEN1 (B1)	P1278	1278	2	×	EC-471
A/F SEN1 (B1)	P1279	1279	2	×	EC-483
A/F SEN1 (B2)	P1281	1281	2	×	EC-428
A/F SEN1 (B2)	P1282	1282	2	×	EC-436
A/F SEN1 (B2)	P1283	1283	2	×	EC-444
A/F SEN1 (B2)	P1284	1284	2	×	EC-453
A/F SEN1 (B2)	P1286	1286	2	×	EC-462
A/F SEN1 (B2)	P1288	1288	2	×	EC-471
A/F SEN1 (B2)	P1289	1289	2	×	EC-483
A/F SEN1 HTR (B1)	P1031	1031	2	×	EC-353
A/F SEN1 HTR (B1)	P1032	1032	2	×	EC-353
A/F SEN1 HTR (B2)	P1051	1051	2	×	EC-353
A/F SEN1 HTR (B2)	P1052	1052	2	×	EC-353
A/T INTERLOCK	P1730	1730	1	×	AT-141
A/T TCC S/V FNCTN	P0744	0744	2	×	AT-123
APP SEN 1/CIRC	P2122	2122	1	×	EC-536
APP SEN 1/CIRC	P2123	2123	1	×	EC-536
APP SEN 2/CIRC	P2127	2127	1	×	EC-542
APP SEN 2/CIRC	P2128	2128	1	×	EC-542
APP SENSOR	P2138	2138	1	×	EC-556
ASCD BRAKE SW	P1572	1572	1	—	EC-516
ASCD SW	P1564	1564	1	—	EC-509
ASCD VHL SPD SEN*6	P1574	1574	1	—	EC-524
ATF TEMP SEN/CIRC	P0710	0710	2	×	AT-133
BRAKE SW/CIRCUIT	P1805	1805	2	—	EC-531
CAN COMM CIRCUIT	U1000	1000*4	1	×	EC-134
CAN COMM CIRCUIT	U1001	1001*4	2	—	EC-134
CKP SEN/CIRCUIT	P0335	0335	2	×	EC-254
CLOSED LOOP-B1	P1148	1148	1	×	EC-406
CLOSED LOOP-B2	P1168	1168	1	×	EC-406
CMP SEN/CIRC-B1	P0340	0340	2	×	EC-260

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	CONSULT-II GST*2	ECM*3			
CTP LEARNING	P1225	1225	2	—	EC-419
CTP LEARNING	P1226	1226	2	—	EC-421
CYL 1 MISFIRE	P0301	0301	2	×	EC-242
CYL 2 MISFIRE	P0302	0302	2	×	EC-242
CYL 3 MISFIRE	P0303	0303	2	×	EC-242
CYL 4 MISFIRE	P0304	0304	2	×	EC-242
CYL 5 MISFIRE	P0305	0305	2	×	EC-242
CYL 6 MISFIRE	P0306	0306	2	×	EC-242
CYL 7 MISFIRE	P0307	0307	2	×	EC-242
CYL 8 MISFIRE	P0308	0308	2	×	EC-242
D/C SOLENOID/CIRC	P1762	1762	1	×	AT-159
D/C SOLENOID FNCTN	P1764	1764	1	×	AT-162
ECM	P0605	0605	1 or 2	×	EC-350
ECM BACK UP/CIRCUIT	P1065	1065	2	×	EC-360
ECT SEN/CIRCUIT	P0117	0117	1	×	EC-164
ECT SEN/CIRCUIT	P0118	0118	1	×	EC-164
ECT SENSOR	P0125	0125	1	×	EC-177
ENG OVER TEMP	P1217	1217	1	×	EC-409
ETC ACTR	P1121	1121	1	×	EC-364
ETC FUNCTION/CIRC	P1122	1122	1	×	EC-366
ETC MOT	P1128	1128	1	×	EC-377
ETC MOT PWR	P1124	1124	1	×	EC-372
ETC MOT PWR	P1126	1126	1	×	EC-372
EVAP GROSS LEAK	P0455	0455	2	×	EC-315
EVAP PURG FLOW/MON	P0441	0441	2	×	EC-270
EVAP SMALL LEAK	P0442	0442	2	×	EC-275
EVAP SYS PRES SEN	P0451	0451	2	×	EC-298
EVAP SYS PRES SEN	P0452	0452	2	×	EC-301
EVAP SYS PRES SEN	P0453	0453	2	×	EC-307
EVAP VERY SML LEAK	P0456	0456	2	×	EC-323
FR/B SOLENOID FNCT	P1759	1759	1	×	AT-156
FR/B SOLENOID/CIRC	P1757	1757	1	×	AT-153
FTT SEN/CIRCUIT	P0182	0182	2	×	EC-230
FTT SEN/CIRCUIT	P0183	0183	2	×	EC-230
FTT SENSOR	P0181	0181	2	×	EC-224
FUEL LEV SEN SLOSH	P0460	0460	2	×	EC-333
FUEL LEVEL SENSOR	P0461	0461	2	×	EC-335
FUEL LEVL SEN/CIRC	P0462	0462	2	×	EC-337
FUEL LEVL SEN/CIRC	P0463	0463	2	×	EC-337
FUEL SYS-LEAN-B1	P0171	0171	2	×	EC-207
FUEL SYS-LEAN-B2	P0174	0174	2	×	EC-207
FUEL SYS-RICH-B1	P0172	0172	2	×	EC-216

INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
FUEL SYS-RICH-B2	P0175	0175	2	×	EC-216
HLR/C SOL FNCTN	P1769	1769	1	×	AT-168
HLR/C SOL/CIRC	P1767	1767	1	×	AT-165
HO2S2 (B1)	P0138	0138	2	×	EC-185
HO2S2 (B1)	P0139	0139	2	×	EC-195
HO2S2 (B1)	P1146	1146	2	×	EC-382
HO2S2 (B1)	P1147	1147	2	×	EC-394
HO2S2 (B2)	P0158	0158	2	×	EC-185
HO2S2 (B2)	P0159	0159	2	×	EC-195
HO2S2 (B2)	P1166	1166	2	×	EC-382
HO2S2 (B2)	P1167	1167	2	×	EC-394
HO2S2 HTR (B1)	P0037	0037	2	×	EC-137
HO2S2 HTR (B1)	P0038	0038	2	×	EC-137
HO2S2 HTR (B2)	P0057	0057	2	×	EC-137
HO2S2 HTR (B2)	P0058	0058	2	×	EC-137
I/C SOLENOID/CIRC	P1752	1752	1	×	AT-147
I/C SOLENOID FNCTN	P1754	1754	1	×	AT-150
IAT SEN/CIRCUIT	P0112	0112	2	×	EC-160
IAT SEN/CIRCUIT	P0113	0113	2	×	EC-160
IAT SENSOR	P0127	0127	2	×	EC-180
ISC SYSTEM	P0506	0506	2	×	EC-341
ISC SYSTEM	P0507	0507	2	×	EC-343
KNOCK SEN/CIRC-B1	P0327	0327	2	—	EC-249
KNOCK SEN/CIRC-B1	P0328	0328	2	—	EC-249
KNOCK SEN/CIRC-B2	P0332	0332	2	—	EC-249
KNOCK SEN/CIRC-B2	P0333	0333	2	—	EC-249
L/PRESS SOL/CIRC	P0745	0745	2	×	AT-126
LC/B SOLENOID FNCT	P1774	1774	1	×	AT-174
LC/B SOLENOID/CIRC	P1772	1772	1	×	AT-171
MAF SEN/CIRCUIT	P0101	0101	1	×	EC-145
MAF SEN/CIRCUIT	P0102	0102	1	×	EC-153
MAF SEN/CIRCUIT	P0103	0103	1	×	EC-153
MULTI CYL MISFIRE	P0300	0300	2	×	EC-242
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	2	—	BL-136
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	—
P-N POS SW/CIRCUIT	P1706	1706	2	×	EC-526
PNP SW/CIRC	P0705	0705	2	×	AT-112
PURG VOLUME CONT/V	P0444	0444	2	×	EC-284
PURG VOLUME CONT/V	P0445	0445	2	×	EC-284
PURG VOLUME CONT/V	P1444	1444	2	×	EC-495
PW ST P SEN/CIRC	P0550	0550	2	—	EC-345

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Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
SENSOR POWER/CIRC	P1229	1229	1	×	EC-423
TCC SOLENOID/CIRC	P0740	0740	2	×	AT-120
TCM	P0700	0700	1	×	AT-111
TCS C/U FUNCTN	P1211	1211	2	—	EC-407
TCS/CIRC	P1212	1212	2	—	EC-408
THERMSTAT FNCTN	P0128	0128	2	×	EC-183
TP SEN 1/CIRC	P0222	0222	1	×	EC-235
TP SEN 1/CIRC	P0223	0223	1	×	EC-235
TP SEN 2/CIRC	P0122	0122	1	×	EC-170
TP SEN 2/CIRC	P0123	0123	1	×	EC-170
TP SENSOR	P2135	2135	1	×	EC-549
TURBINE REV S/CIRC	P1716	1716	2	×	AT-136
TW CATALYST SYS-B1	P0420	0420	2	×	EC-266
TW CATALYST SYS-B2	P0430	0430	2	×	EC-266
VEH SPD SEN/CIR AT*5	P0720	0720	2	×	AT-115
VEH SPEED SEN/CIRC*5	P0500	0500	2	×	EC-339
VENT CONTROL VALVE	P0447	0447	2	×	EC-291
VENT CONTROL VALVE	P1446	1446	2	×	EC-503

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results). This number is controlled by NISSAN.

*4: The troubleshooting for this DTC needs CONSULT-II.

*5: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

*6: 2WD models with ASCD

INDEX FOR DTC

DTC No. Index

UBS00EME

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

×:Applicable —: Not applicable

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
U1000	1000*4	CAN COMM CIRCUIT	1	×	EC-134
U1001	1001*4	CAN COMM CIRCUIT	2	—	EC-134
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	—	—
P0037	0037	HO2S2 HTR (B1)	2	×	EC-137
P0038	0038	HO2S2 HTR (B1)	2	×	EC-137
P0057	0057	HO2S2 HTR (B2)	2	×	EC-137
P0058	0058	HO2S2 HTR (B2)	2	×	EC-137
P0101	0101	MAF SEN/CIRCUIT	1	×	EC-145
P0102	0102	MAF SEN/CIRCUIT	1	×	EC-153
P0103	0103	MAF SEN/CIRCUIT	1	×	EC-153
P0112	0112	IAT SEN/CIRCUIT	2	×	EC-160
P0113	0113	IAT SEN/CIRCUIT	2	×	EC-160
P0117	0117	ECT SEN/CIRCUIT	1	×	EC-164
P0118	0118	ECT SEN/CIRCUIT	1	×	EC-164
P0122	0122	TP SEN 2/CIRC	1	×	EC-170
P0123	0123	TP SEN 2/CIRC	1	×	EC-170
P0125	0125	ECT SENSOR	1	×	EC-177
P0127	0127	IAT SENSOR	2	×	EC-180
P0128	0128	THERMSTAT FNCTN	2	×	EC-183
P0138	0138	HO2S2 (B1)	2	×	EC-185
P0139	0139	HO2S2 (B1)	2	×	EC-195
P0158	0158	HO2S2 (B2)	2	×	EC-185
P0159	0159	HO2S2 (B2)	2	×	EC-195
P0171	0171	FUEL SYS-LEAN-B1	2	×	EC-207
P0172	0172	FUEL SYS-RICH-B1	2	×	EC-216
P0174	0174	FUEL SYS-LEAN-B2	2	×	EC-207
P0175	0175	FUEL SYS-RICH-B2	2	×	EC-216
P0181	0181	FTT SENSOR	2	×	EC-224
P0182	0182	FTT SEN/CIRCUIT	2	×	EC-230
P0183	0183	FTT SEN/CIRCUIT	2	×	EC-230
P0222	0222	TP SEN 1/CIRC	1	×	EC-235
P0223	0223	TP SEN 1/CIRC	1	×	EC-235
P0300	0300	MULTI CYL MISFIRE	2	×	EC-242
P0301	0301	CYL 1 MISFIRE	2	×	EC-242
P0302	0302	CYL 2 MISFIRE	2	×	EC-242
P0303	0303	CYL 3 MISFIRE	2	×	EC-242

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DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P0304	0304	CYL 4 MISFIRE	2	×	EC-242
P0305	0305	CYL 5 MISFIRE	2	×	EC-242
P0306	0306	CYL 6 MISFIRE	2	×	EC-242
P0307	0307	CYL 7 MISFIRE	2	×	EC-242
P0308	0308	CYL 8 MISFIRE	2	×	EC-242
P0327	0327	KNOCK SEN/CIRC-B1	2	—	EC-249
P0328	0328	KNOCK SEN/CIRC-B1	2	—	EC-249
P0332	0332	KNOCK SEN/CIRC-B2	2	—	EC-249
P0333	0333	KNOCK SEN/CIRC-B2	2	—	EC-249
P0335	0335	CKP SEN/CIRCUIT	2	×	EC-254
P0340	0340	CMP SEN/CIRC-B1	2	×	EC-260
P0420	0420	TW CATALYST SYS-B1	2	×	EC-266
P0430	0430	TW CATALYST SYS-B2	2	×	EC-266
P0441	0441	EVAP PURG FLOW/MON	2	×	EC-270
P0442	0442	EVAP SMALL LEAK	2	×	EC-275
P0444	0444	PURG VOLUME CONT/V	2	×	EC-284
P0445	0445	PURG VOLUME CONT/V	2	×	EC-284
P0447	0447	VENT CONTROL VALVE	2	×	EC-291
P0451	0451	EVAP SYS PRES SEN	2	×	EC-298
P0452	0452	EVAP SYS PRES SEN	2	×	EC-301
P0453	0453	EVAP SYS PRES SEN	2	×	EC-307
P0455	0455	EVAP GROSS LEAK	2	×	EC-315
P0456	0456	EVAP VERY SML LEAK	2	×	EC-323
P0460	0460	FUEL LEV SEN SLOSH	2	×	EC-333
P0461	0461	FUEL LEVEL SENSOR	2	×	EC-335
P0462	0462	FUEL LEVL SEN/CIRC	2	×	EC-337
P0463	0463	FUEL LEVL SEN/CIRC	2	×	EC-337
P0500	0500	VEH SPEED SEN/CIRC*5	2	×	EC-339
P0506	0506	ISC SYSTEM	2	×	EC-341
P0507	0507	ISC SYSTEM	2	×	EC-343
P0550	0550	PW ST P SEN/CIRC	2	—	EC-345
P0605	0605	ECM	1 or 2	×	EC-350
P0700	0700	TCM	1	×	AT-111
P0705	0705	PNP SW/CIRC	2	×	AT-112
P0710	0710	ATF TEMP SEN/CIRC	2	×	AT-133
P0720	0720	VEH SPD SEN/CIR AT*5	2	×	AT-115
P0740	0740	TCC SOLENOID/CIRC	2	×	AT-120
P0744	0744	A/T TCC S/V FNCTN	2	×	AT-123
P0745	0745	L/PRESS SOL/CIRC	2	×	AT-126
P1031	1031	A/F SEN1 HTR (B1)	2	×	EC-353
P1032	1032	A/F SEN1 HTR (B1)	2	×	EC-353
P1051	1051	A/F SEN1 HTR (B2)	2	×	EC-353

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INDEX FOR DTC

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P1052	1052	A/F SEN1 HTR (B2)	2	×	EC-353
P1065	1065	ECM BACK UP/CIRCUIT	2	×	EC-360
P1121	1121	ETC ACTR	1	×	EC-364
P1122	1122	ETC FUNCTION/CIRC	1	×	EC-366
P1124	1124	ETC MOT PWR	1	×	EC-372
P1126	1126	ETC MOT PWR	1	×	EC-372
P1128	1128	ETC MOT	1	×	EC-377
P1146	1146	HO2S2 (B1)	2	×	EC-382
P1147	1147	HO2S2 (B1)	2	×	EC-394
P1148	1148	CLOSED LOOP-B1	1	×	EC-406
P1166	1166	HO2S2 (B2)	2	×	EC-382
P1167	1167	HO2S2 (B2)	2	×	EC-394
P1168	1168	CLOSED LOOP-B2	1	×	EC-406
P1211	1211	TCS C/U FUNCTN	2	—	EC-407
P1212	1212	TCS/CIRC	2	—	EC-408
P1217	1217	ENG OVER TEMP	1	×	EC-409
P1225	1225	CTP LEARNING	2	—	EC-419
P1226	1226	CTP LEARNING	2	—	EC-421
P1229	1229	SENSOR POWER/CIRC	1	×	EC-423
P1271	1271	A/F SENSOR (B1)	2	×	EC-428
P1272	1272	A/F SENSOR (B1)	2	×	EC-436
P1273	1273	A/F SENSOR (B1)	2	×	EC-444
P1274	1274	A/F SENSOR (B1)	2	×	EC-453
P1276	1276	A/F SENSOR (B1)	2	×	EC-462
P1278	1278	A/F SENSOR (B1)	2	×	EC-471
P1279	1279	A/F SENSOR (B1)	2	×	EC-483
P1281	1281	A/F SENSOR (B2)	2	×	EC-428
P1282	1282	A/F SENSOR (B2)	2	×	EC-436
P1283	1283	A/F SENSOR (B2)	2	×	EC-444
P1284	1284	A/F SENSOR (B2)	2	×	EC-453
P1286	1286	A/F SENSOR (B2)	2	×	EC-462
P1288	1288	A/F SENSOR (B2)	2	×	EC-471
P1289	1289	A/F SENSOR (B2)	2	×	EC-483
P1444	1444	PURG VOLUME CONT/V	2	×	EC-495
P1446	1446	VENT CONTROL VALVE	2	×	EC-503
P1564	1564	ASCD SW	1	—	EC-509
P1572	1572	ASCD BRAKE SW	1	—	EC-524
P1574	1574	ASCD VHL SPD SEN*6	1	—	EC-509
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	2	—	BL-136
P1706	1706	P-N POS SW/CIRCUIT	2	×	EC-526
P1716	1716	TURBINE REV S/CIRC	2	×	AT-136
P1730	1730	A/T INTERLOCK	1	×	AT-141

INDEX FOR DTC

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P1752	1752	I/C SOLENOID/CIRC	1	×	AT-147
P1754	1754	I/C SOLENOID FNCTN	1	×	AT-150
P1757	1757	FR/B SOLENOID/CIRC	1	×	AT-153
P1759	1759	FR/B SOLENOID FNCT	1	×	AT-156
P1762	1762	D/C SOLENOID/CIRC	1	×	AT-159
P1764	1764	D/C SOLENOID FNCTN	1	×	AT-162
P1767	1767	HLR/C SOL/CIRC	1	×	AT-165
P1769	1769	HLR/C SOL FNCTN	1	×	AT-168
P1772	1772	LC/B SOLENOID/CIRC	1	×	AT-171
P1774	1774	LC/B SOLENOID FNCT	1	×	AT-174
P1805	1805	BRAKE SW/CIRCUIT	2	—	EC-531
P2122	2122	APP SEN 1/CIRC	1	×	EC-536
P2123	2123	APP SEN 1/CIRC	1	×	EC-536
P2127	2127	APP SEN 2/CIRC	1	×	EC-542
P2128	2128	APP SEN 2/CIRC	1	×	EC-542
P2135	2135	TP SENSOR	1	×	EC-549
P2138	2138	APP SENSOR	1	×	EC-556

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results). This number is controlled by NISSAN.

*4: The troubleshooting for this DTC needs CONSULT-II.

*5: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

*6: 2WD models with ASCD

PRECAUTIONS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

UBS00EMF

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

On Board Diagnostic (OBD) System of Engine and A/T

UBS00EMG

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

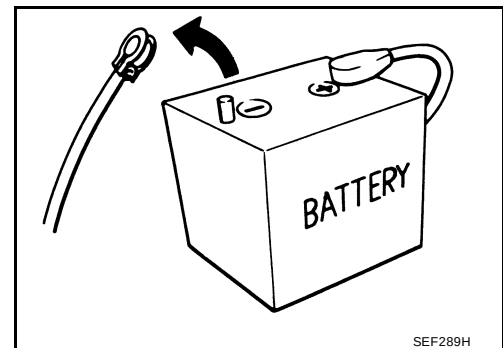
CAUTION:

- Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-69, "HARNESS CONNECTOR"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

Precaution

UBS00EMH

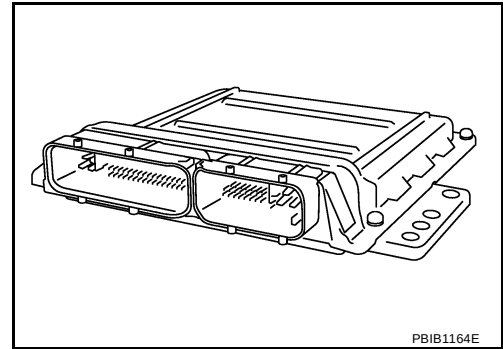
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.



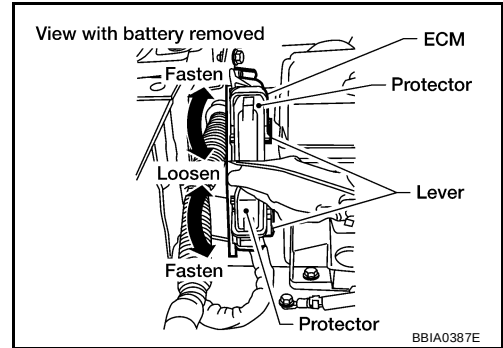
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PRECAUTIONS

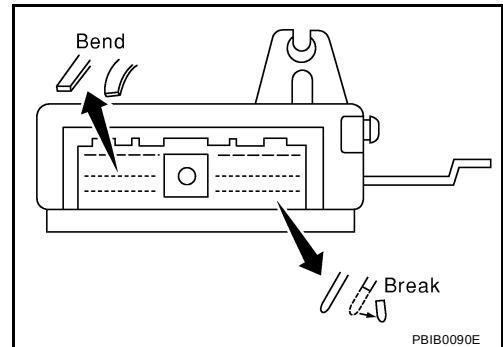
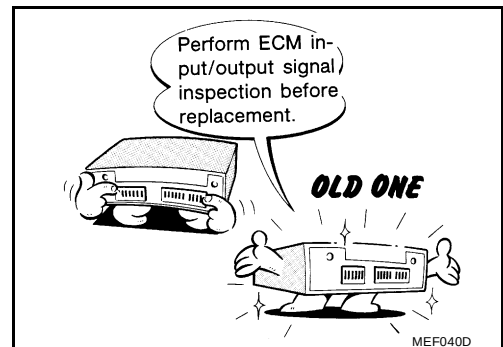
- Do not disassemble ECM.
- If a battery cable is disconnected, the memory will return to the ECM value.
The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.



- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown in the figure.

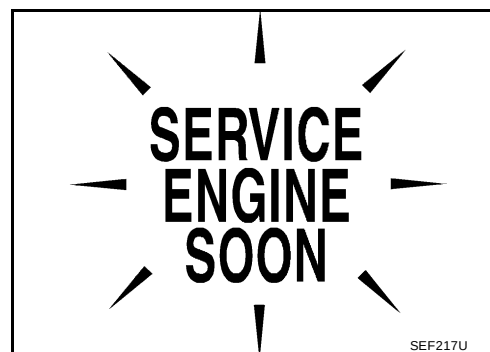


- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- Securely connect ECM harness connectors.
A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to [EC-96, "ECM Terminals and Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).

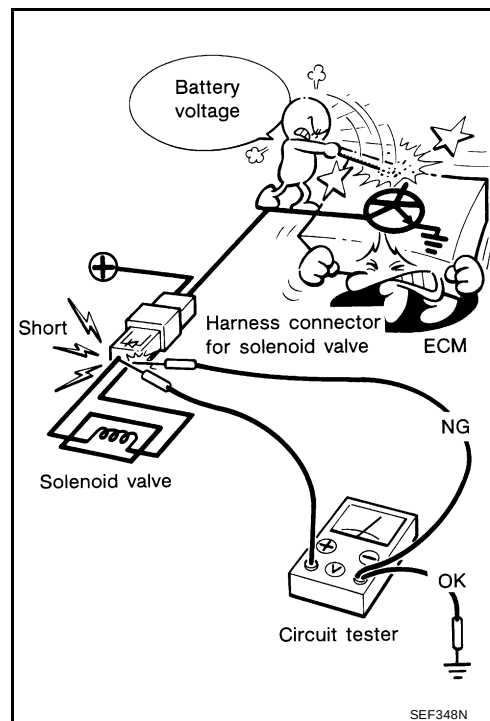


PRECAUTIONS

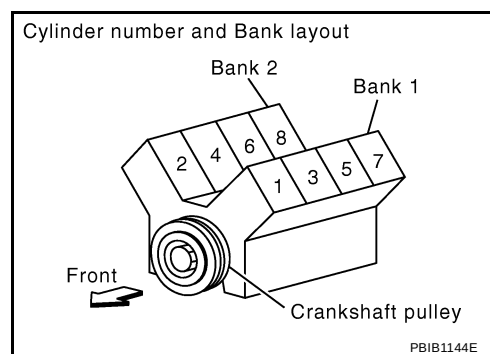
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.



- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- 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.

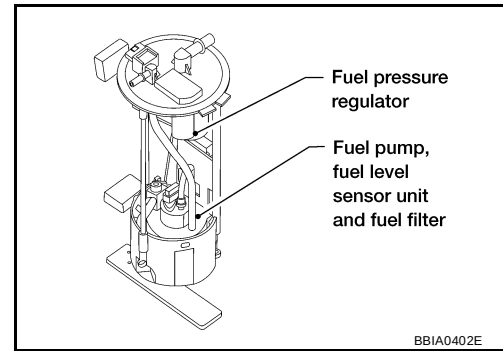


- B1 indicates the bank 1, B2 indicates the bank 2 as shown in the figure.

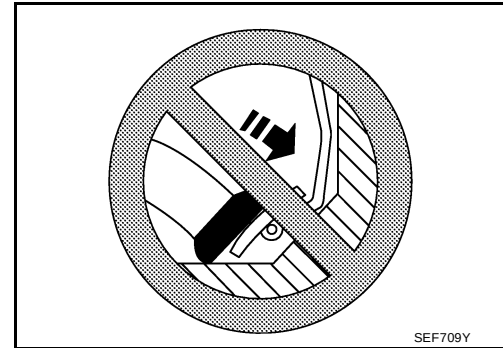


PRECAUTIONS

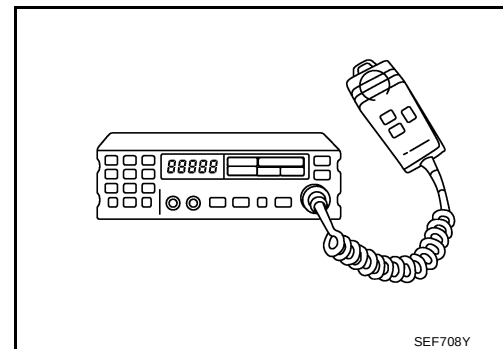
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.



- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.



- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
 - Keep the antenna as far as possible from the electronic control units.
 - Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
 - Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - Be sure to ground the radio to vehicle body.



UBS00EMI

Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following:

- [GI-14, "How to Read Wiring Diagrams"](#)
- [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- [GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

PREPARATION

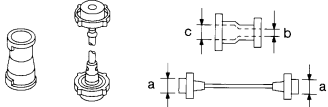
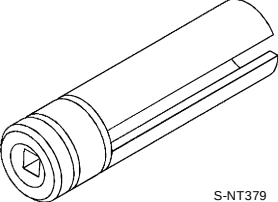
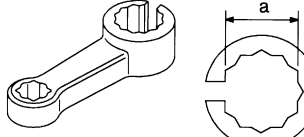
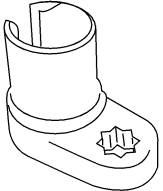
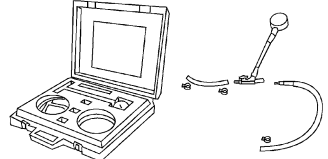
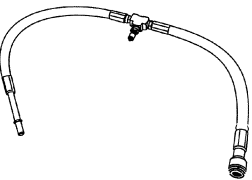
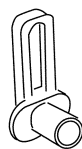
PREPARATION

PFP:00002

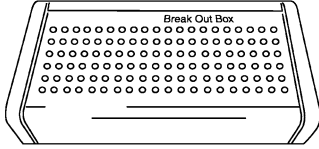
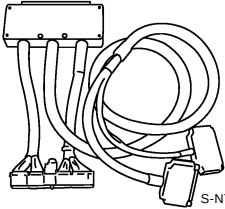
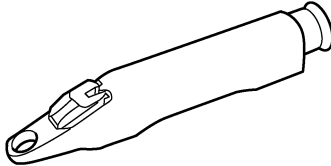
Special Service Tools

UBS00EMJ

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
EG17650301 (J-33984-A) Radiator cap tester adapter	 <p>S-NT564</p>	Adapting radiator cap tester to radiator cap and radiator filler neck a: 28 (1.10) dia. b: 31.4 (1.236) dia. c: 41.3 (1.626) dia. Unit: mm (in)
KV10117100 (J36471-A) Heated oxygen sensor wrench	 <p>S-NT379</p>	Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
KV10114400 (J-38365) Heated oxygen sensor wrench	 <p>S-NT636</p>	Loosening or tightening heated oxygen sensors a: 22 mm (0.87 in)
(J-44626) Air fuel ratio (A/F) sensor wrench	 <p>LEM054</p>	Loosening or tightening air fuel ratio (A/F) sensor 1
(J44321) Fuel pressure gauge kit	 <p>LEC642</p>	Checking fuel pressure
(J-44321-6) Fuel pressure adapter	 <p>LBIA0376E</p>	Connecting fuel pressure gauge to quick connector type fuel lines.
(J-45488) Quick connector re- lease	 <p>PBIC0198E</p>	Remove fuel tube quick connectors in engine room.

PREPARATION

Tool number (Kent-Moore No.) Tool name	Description		
KV109E0010 (J-46209) Break-out box		Measuring the ECM signals with a circuit tester	EC
KV109E0080 (J-45819) Y-cable adapter		Measuring the ECM signals with a circuit tester	C D E
(J-23688) Engine coolant refrac- tometer		Checking concentration of ethylene glycol in en- gine coolant	F G H

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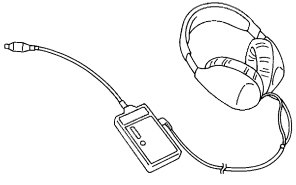
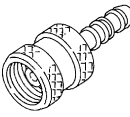
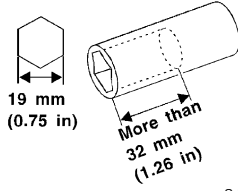
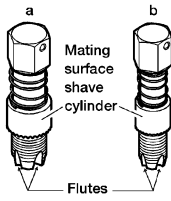
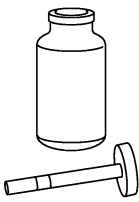
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PREPARATION

Commercial Service Tools

UBS00EMK

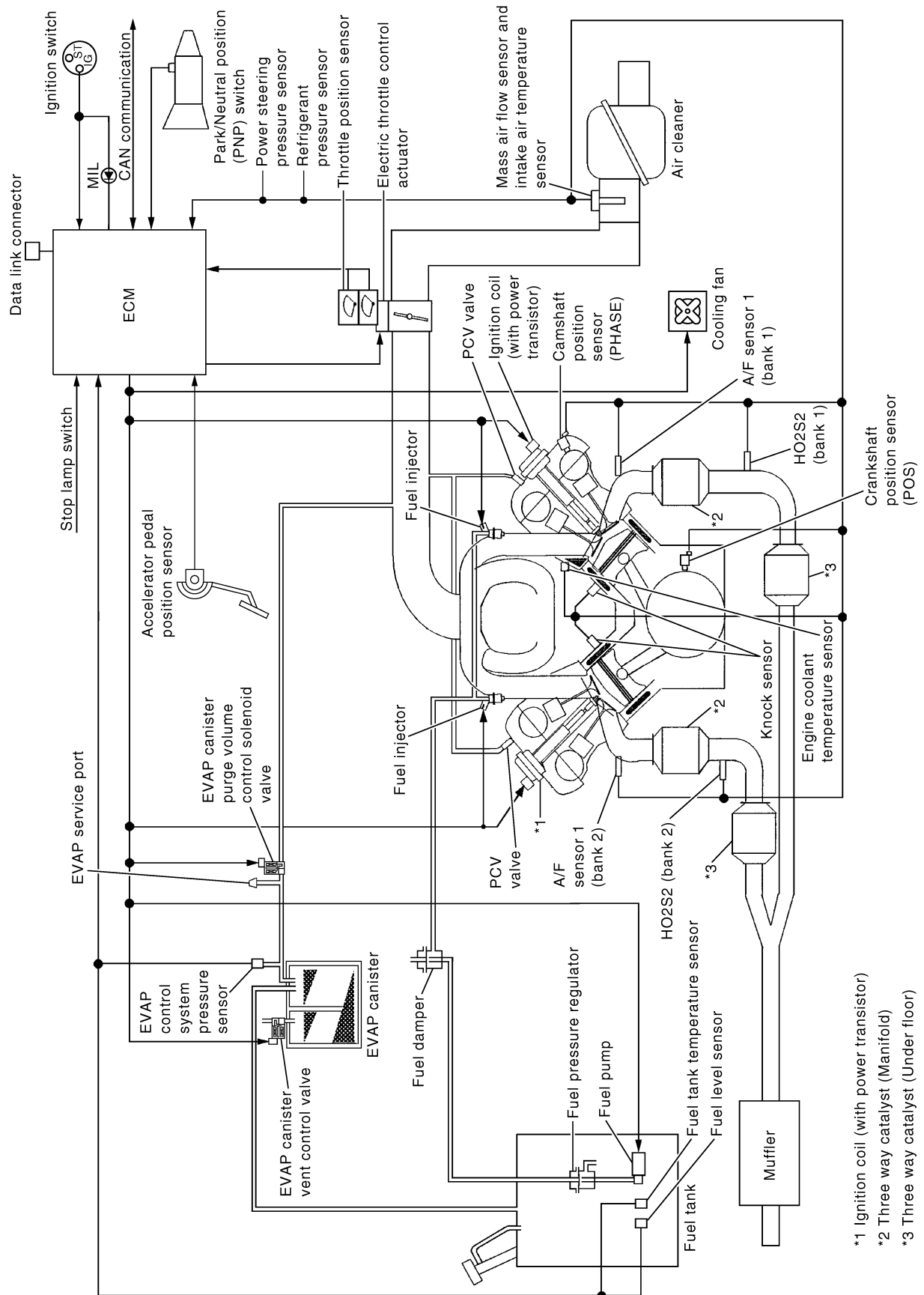
Tool name (Kent-Moore No.)	Description	
Leak detector i.e.: (J41416)	 S-NT703	Locating the EVAP leak
EVAP service port adapter i.e.: (J41413-OBD)	 S-NT704	Applying positive pressure through EVAP service port
Fuel filler cap adapter i.e.: (MLR-8382)	 S-NT815	Checking fuel tank vacuum relief valve opening pressure
Socket wrench	 S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)	 AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

ENGINE CONTROL SYSTEM

System Diagram

PFP:23710

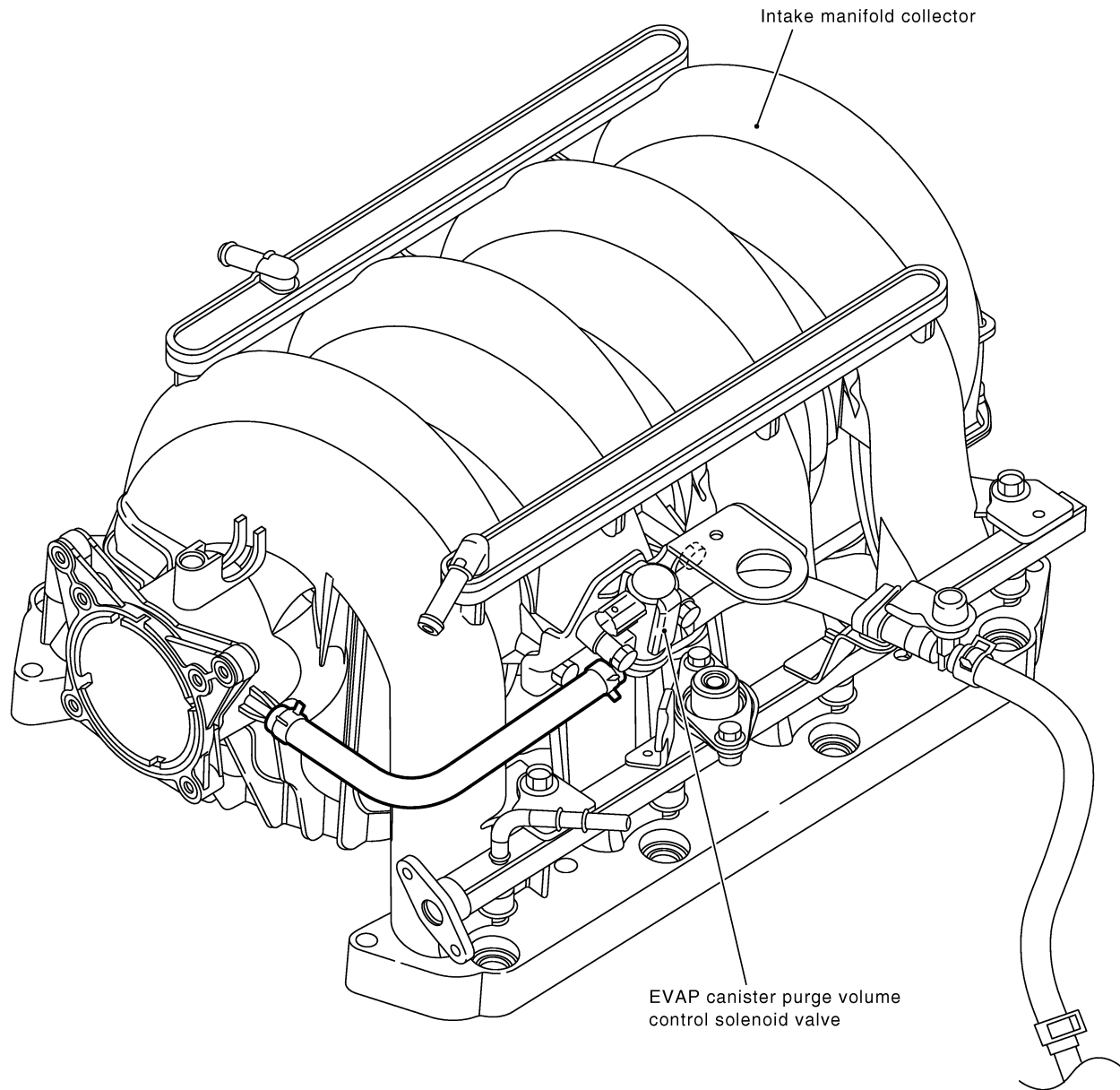
UBS00EML



PBIB2051E

Vacuum Hose Drawing

UBS00EMM



NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

Refer to [EC-23, "System Diagram"](#) for Vacuum Control System.

PBIB2052E

ENGINE CONTROL SYSTEM

System Chart

UBS00EMN

Input (Sensor)	ECM Function	Output (Actuator)
<ul style="list-style-type: none"> ● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Mass air flow sensor ● Engine coolant temperature sensor ● A/F sensor 1 ● Throttle position sensor ● Accelerator pedal position sensor ● Park/neutral position (PNP) switch ● Intake air temperature sensor ● Power steering pressure sensor ● Ignition switch ● Battery voltage ● Knock sensor ● Refrigerant pressure sensor ● Stop lamp switch ● ASCD steering switch ● ASCD brake switch ● Fuel level sensor*¹ *³ ● EVAP control system pressure sensor ● Fuel tank temperature sensor*¹ ● Heated oxygen sensor 2*² ● TCM (Transmission control module)*³ ● ABS actuator and electric unit (control unit)*³ ● Air conditioner switch*³ ● Wheel sensor*³ ● Electrical load signal*³ 	Fuel injection & mixture ratio control	Fuel injector
	Electronic ignition system	Power transistor
	Nissan torque demand control system	<ul style="list-style-type: none"> ● Electric throttle control actuator ● Fuel injector
	Fuel pump control	Fuel pump relay
	ASCD vehicle speed control	Electric throttle control actuator
	On board diagnostic system	MIL (On the instrument panel)* ⁴
	A/F sensor 1 heater control	A/F sensor 1 heater
	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
	Air conditioning cut control	Air conditioner relay* ⁴
	Cooling fan control	Cooling fan relay* ⁴
	ON BOARD DIAGNOSIS for EVAP system	EVAP canister vent control valve

*1: This sensor is not used to control the engine system. This is used only for the on board diagnosis.

*2: This sensor is not used to control the engine system under normal conditions.

*3: This input signal is sent to the ECM through CAN communication line.

*4: This output signal is sent from the ECM through CAN communication line.

ENGINE CONTROL SYSTEM

Multiport Fuel Injection (MFI) System INPUT/OUTPUT SIGNAL CHART

UBS00EMO

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed* ³	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
A/F sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Knock sensor	Engine knocking condition		
Battery	Battery voltage* ³		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 2* ¹	Density of oxygen in exhaust gas		
ABS actuator and electric unit (control unit)* ²	VDC/TCS operation command		
Air conditioner switch* ²	Air conditioner operation		
Wheel sensor* ²	Vehicle speed		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

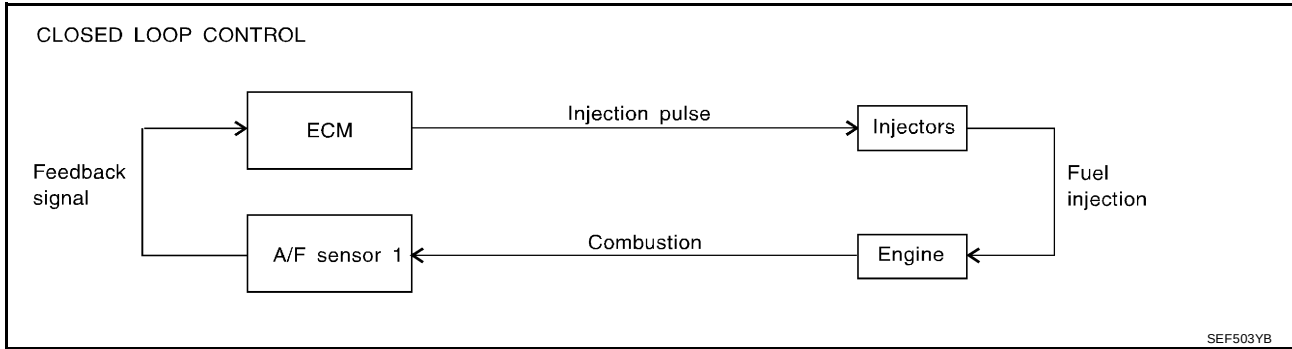
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

ENGINE CONTROL SYSTEM

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses air fuel ratio (A/F) sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about air fuel ratio (A/F) sensor 1, refer to [EC-428](#). This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of air fuel ratio (A/F) sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of air fuel ratio (A/F) sensor 1 or its circuit
- Insufficient activation of air fuel ratio (A/F) sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from A/F sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

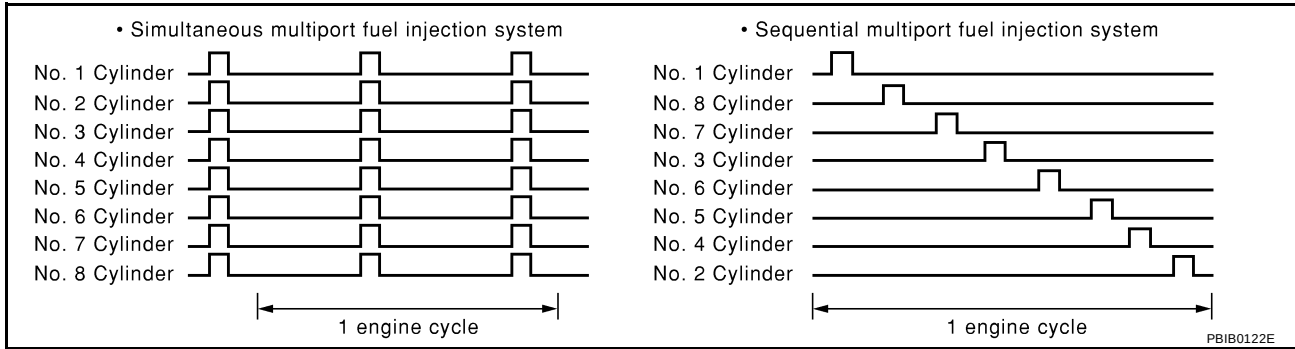
"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from A/F sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

ENGINE CONTROL SYSTEM

FUEL INJECTION TIMING



Two types of systems are used.

Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all eight cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The eight injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Electronic Ignition (EI) System INPUT/OUTPUT SIGNAL CHART

UBS00EMP

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*2		
Wheel sensor*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown.

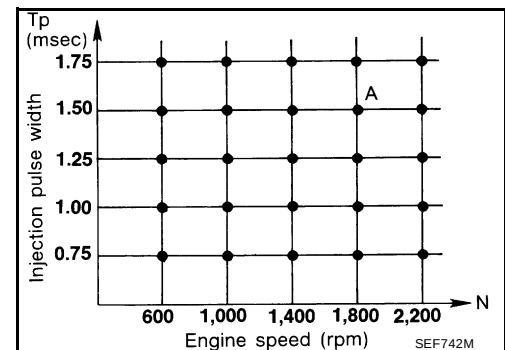
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec

A °BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up



ENGINE CONTROL SYSTEM

- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Nissan Torque Demand (NTD) Control System INPUT/OUTPUT SIGNAL CHART

UBS00EMQ

Sensor	Input signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	NTD control	Electric throttle control actuator and fuel injector
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/Neutral position (PNP) switch	Gear position		
Power steering pressure sensor	Power steering operation		
Battery	Battery voltage		
TCM (CAN communication)	A/T control signal		
Air conditioner switch*1	Air conditioner operation		
ABS actuator and electric unit (control unit)*1	VDC/TCS/ABS operation		
Wheel sensor*1	Vehicle speed		
Electrical load*1	Electrical load signal		

*1: Signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

NTD control system decides the target traction based on the accelerator operation status and the current driving condition. It then selects the engine torque target by correcting running resistance and atmospheric pressure, and controlling the power-train. Using electric throttle control actuator, it achieves the engine torque development target which corresponds linearly to the driver's accelerator operation.

Running resistance correction control compares the engine torque estimate value, measured vehicle acceleration, and running resistance on a flat road, and estimates vehicle weight gain and running resistance variation caused by slopes to correct the engine torque estimate value.

Atmospheric pressure correction control compares the engine torque estimate value from the airflow rate and the target engine torque for the target traction, and estimates variation of atmospheric pressure to correct the target engine torque. This system achieves powerful driving without reducing engine performance in the practical speed range in mountains and high-altitude areas.

ENGINE CONTROL SYSTEM

Air Conditioning Cut Control INPUT/OUTPUT SIGNAL CHART

UBS00EMR

Sensor	Input signal to ECM	ECM function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering pressure sensor	Power steering operation		
Wheel sensor*1	Vehicle speed		

*1: Signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

Fuel Cut Control (at No Load and High Engine Speed) INPUT/OUTPUT SIGNAL CHART

UBS00EMS

Sensor	Input signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Wheel sensor*1	Vehicle speed		

*1: Signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

If the engine speed is above 1,400 rpm under no load (for example, the shift position is neutral and engine speed is over 1,400 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,000 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, [EC-26](#) .

CAN communication
SYSTEM DESCRIPTION

UBS00EMT

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to [LAN-8, "CAN Communication Unit"](#) , about CAN communication for detail.

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BASIC SERVICE PROCEDURE

PFP:00018

Idle Speed and Ignition Timing Check IDLE SPEED

UBS00EMU

With CONSULT-II

Check idle speed in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Check idle speed with GST.

IGNITION TIMING

Any of following two methods may be used.

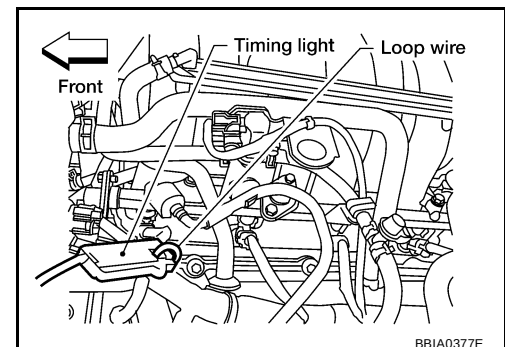
Method A

1. Attach timing light to loop wire near No. 1 ignition coil as shown.

NOTE:

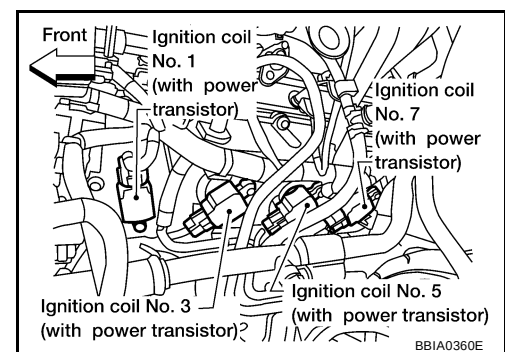
Do not use loop wire located near No. 2 ignition coil.

2. Check ignition timing.



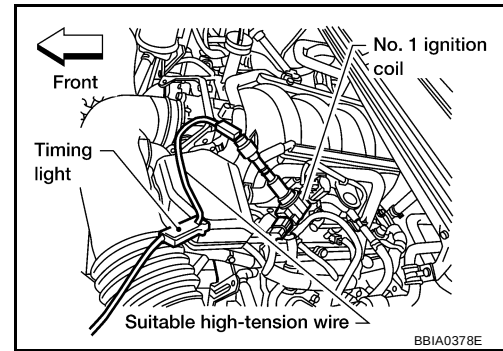
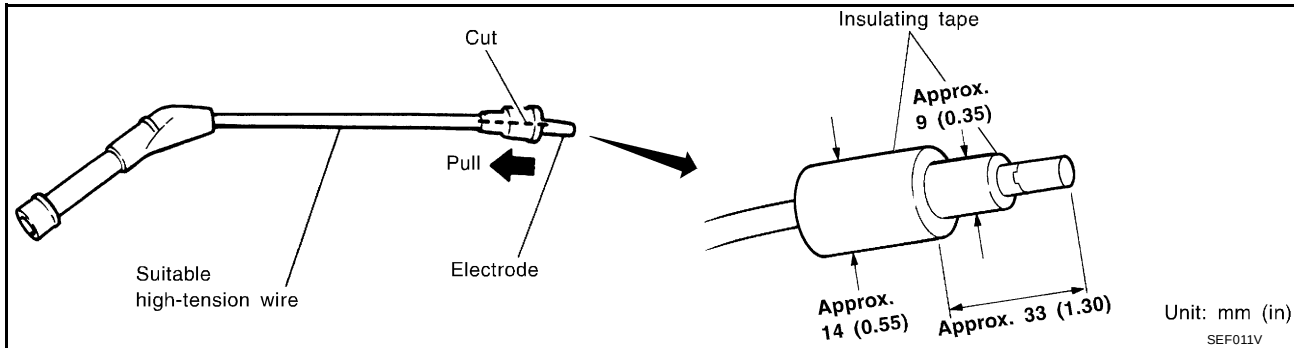
Method B

1. Remove No. 1 ignition coil.

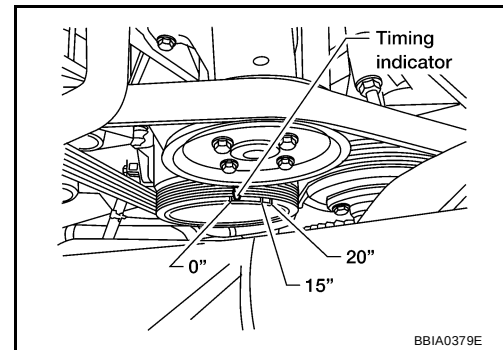


BASIC SERVICE PROCEDURE

2. Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.



3. Check ignition timing.



Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment PREPARATION

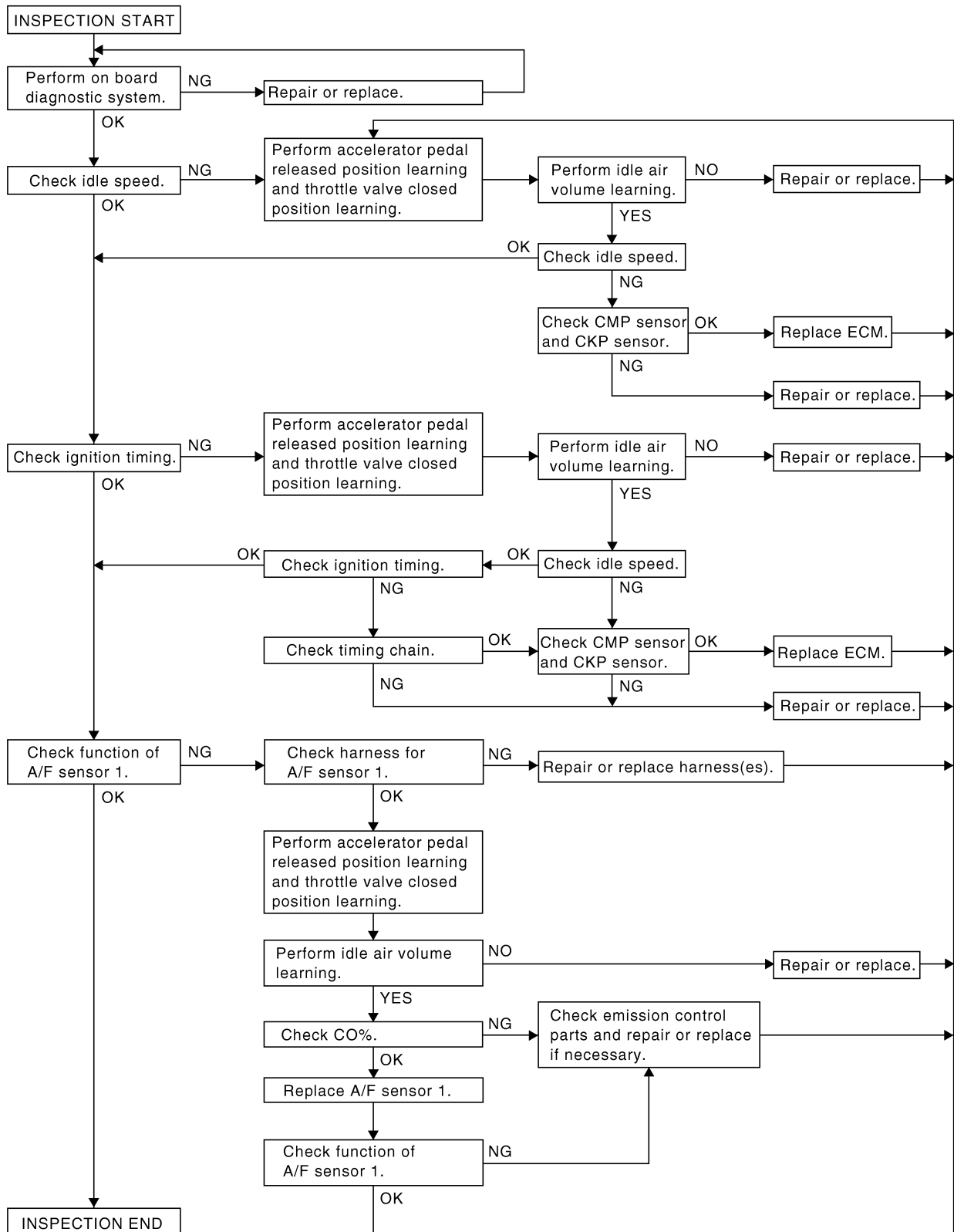
UBS00EMV

1. Make sure that the following parts are in good order.
 - Battery
 - Ignition system
 - Engine oil and coolant levels
 - Fuses
 - ECM harness connector
 - Vacuum hoses
 - Air intake system
(Oil filler cap, oil level gauge, etc.)
 - Fuel pressure
 - Engine compression
 - Throttle valve
 - Evaporative emission system
2. On air conditioner equipped models, checks should be carried out while the air conditioner is OFF.
3. On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in N position.
4. When measuring CO percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn off headlamp, heater blower, rear window defogger.

BASIC SERVICE PROCEDURE

6. Keep front wheels pointed straight ahead.

OVERALL INSPECTION SEQUENCE



NOTE:

If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

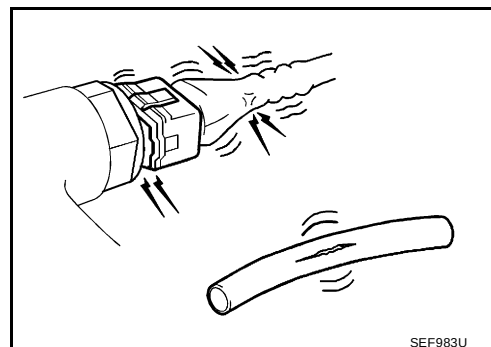
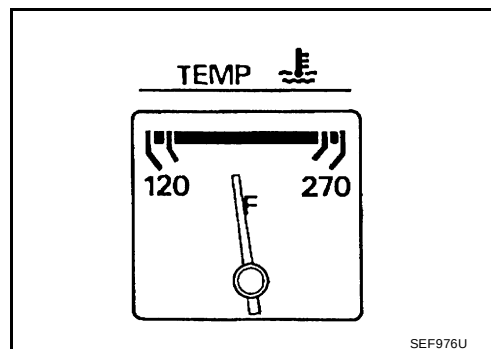
PBIB2061E

BASIC SERVICE PROCEDURE

INSPECTION PROCEDURE

1. INSPECTION START

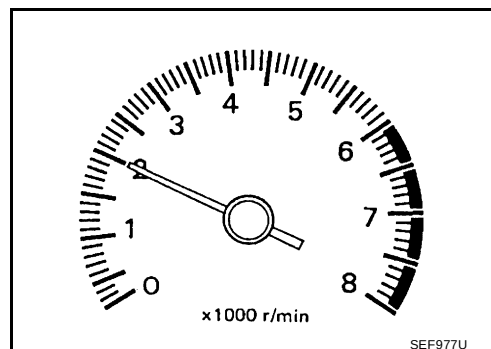
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for splits, kinks and improper connections
 - Hoses and ducts for leaks
 - Air cleaner clogging
 - Gasket
3. Confirm that electrical or mechanical loads are not applied.
 - Headlamp switch is OFF.
 - Air conditioner switch is OFF.
 - Rear window defogger switch is OFF.
 - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

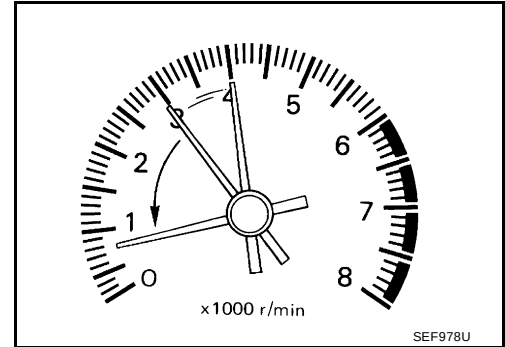
>> GO TO 3.

BASIC SERVICE PROCEDURE

3. CHECK TARGET IDLE SPEED

With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

650 ± 50 rpm (in P or N position)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

650 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.

BASIC SERVICE PROCEDURE

6. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-44, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

650 ± 50 rpm (in P or N position)

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

650 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-260](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-254](#) .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.
2. GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .

>> GO TO 4.

BASIC SERVICE PROCEDURE

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.

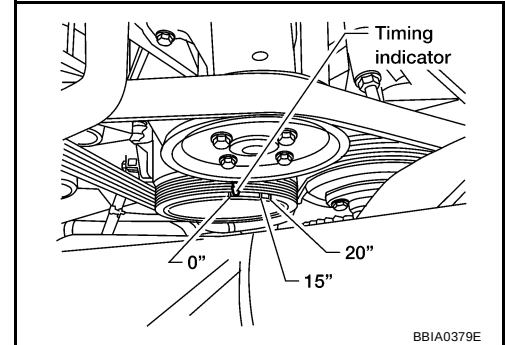
15 ± 5° BTDC (in P or N position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 11.



11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-44, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 14.

No >> 1. Follow the instruction of Idle Air Volume Learning.

2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

📖 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

650 ± 50 rpm (in P or N position)

🚫 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

650 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 15.

NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.

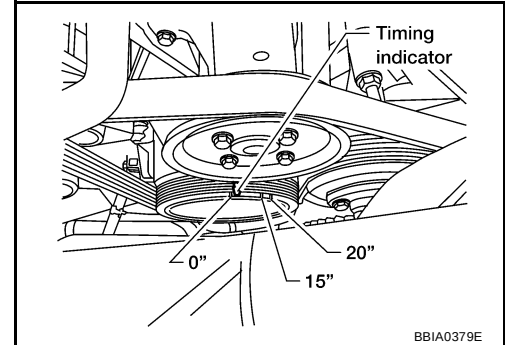
15 ± 5° BTDC (in P or N position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 16.



16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-35, "TIMING CHAIN"](#) .

OK or NG

OK >> GO TO 17.

NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-260](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-254](#) .

OK or NG

OK >> GO TO 18.

NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .

>> GO TO 4.

BASIC SERVICE PROCEDURE

19. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

With CONSULT-II

1. Turn ignition switch OFF and wait at a least 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in D position with "OD" OFF.
NOTE:
Keep the accelerator pedal as steady as possible during the cruising.
4. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).
NOTE:
Never apply brake during releasing the accelerator pedal.
5. Repeat steps 3 to 4 five times.
6. Stop the vehicle and connect CONSULT-II to the vehicle.
7. Make sure that no (1st trip) DTC is displayed in "SELF-DIAG RESULTS" mode.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 21.

20. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

With GST

1. Turn ignition switch OFF and wait at a least 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in D position with "OD" OFF.
NOTE:
Keep the accelerator pedal as steady as possible during the cruising.
4. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).
NOTE:
Never apply brake during releasing the accelerator pedal.
5. Repeat steps 3 to 4 five times.
6. Stop the vehicle and connect GST to the vehicle.
7. Make sure that no (1st trip) DTC is displayed.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 21.

BASIC SERVICE PROCEDURE

21. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HARNESS

1. Turn ignition switch OFF and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Disconnect A/F sensor 1 harness connector.
4. Check harness continuity between the following terminals. Refer to [EC-430, "Wiring Diagram"](#) .

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
4	2	4	24
5	35	5	57
6	56	6	58

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 22.

NG >> 1. Repair open circuit or short to ground or short to power in harness or connectors between ECM and A/F sensor 1.

2. GO TO 4.

22. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Reconnect ECM harness connector.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 23.

23. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 24.

24. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-44, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes (With CONSULT-II)>>GO TO 25.

Yes (Without CONSULT-II)>>GO TO 26.

No >> 1. Follow the instruction of Idle Air Volume Learning.

2. GO TO 4.

BASIC SERVICE PROCEDURE

25. CHECK CO%

With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed.
6. Check CO%.

Idle CO: 3 – 11% and engine runs smoothly.

OK or NG

- OK >> GO TO 28.
NG >> GO TO 27.

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

SEF172Y

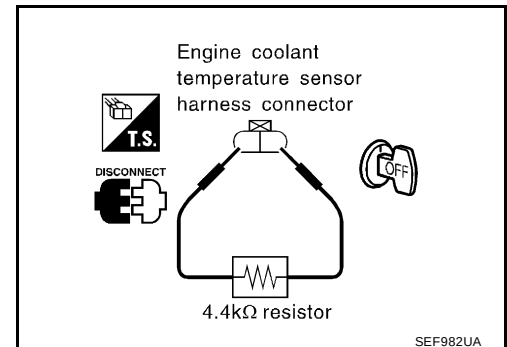
26. CHECK CO%

Without CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed.
6. Check CO%.

Idle CO: 3 – 11% and engine runs smoothly.

7. After checking CO%, turn ignition switch OFF, disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



OK or NG

- OK >> GO TO 28.
NG >> GO TO 27.

27. RECONNECT AIR FUEL RATIO (A/F) SENSOR 1 HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Reconnect A/F sensor 1 harness connector.

>> GO TO 31.

28. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

1. Stop engine.
2. Replace A/F sensor 1 on the malfunctioning bank.

With CONSULT-II>>GO TO 29.
Without CONSULT-II>>GO TO 30.

29. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

With CONSULT-II

1. Turn ignition switch OFF and wait at a least 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in D position with "OD" OFF.

NOTE:

Keep the accelerator pedal as steady as possible during the cruising.

4. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

5. Repeat steps 3 to 4 five times.
6. Stop the vehicle and connect CONSULT-II to the vehicle.
7. Make sure that no (1st trip) DTC is displayed in "SELF-DIAG RESULTS" mode.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 31.

30. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

With GST

1. Turn ignition switch OFF and wait at a least 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in D position with "OD" OFF.

NOTE:

Keep the accelerator pedal as steady as possible during the cruising.

4. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

5. Repeat steps 3 to 4 five times.
6. Stop the vehicle and connect GST to the vehicle.
7. Make sure that no (1st trip) DTC is displayed.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 31.

31. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator, and repair or replace if necessary. Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .
- Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to [EC-145](#) and [EC-153](#) .
- Check injector and its circuit, and repair or replace if necessary. Refer to [EC-575](#) .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to [EC-164](#) and [EC-177](#) .

OK or NG

- OK >> GO TO 33.
NG >> 1. Repair or replace.
 2. GO TO 32.

32. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.

Erase the stored memory in ECM and TCM. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) and [EC-62, "How to Erase DTC"](#) .

>> GO TO 4.

33. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .

>> GO TO 4.

Accelerator Pedal Released Position Learning

UBS00EMW

DESCRIPTION

Accelerator Pedal Released Position Learning is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF wait at least 10 seconds.

Throttle Valve Closed Position Learning

UBS00EMX

DESCRIPTION

Throttle Valve Closed Position Learning is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

UBS00EMY

DESCRIPTION

Idle Air Volume Learning is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)

BASIC SERVICE PROCEDURE

On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started, the headlamp will not be illuminated.

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up

For models with CONSULT-II, drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V.

For models without CONSULT-II, drive vehicle for 10 minutes.

OPERATION PROCEDURE

With CONSULT-II

- Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
- Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
- Start engine and warm it up to normal operating temperature.
- Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
- Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.

SELECT WORK ITEM
XXXXXXXXXX
XXXXXXXXXX
IDLE AIR VOL LEARN
XXXXXXXXXX
XXXXXXXXXX
XXXXXXXXXX

SEF217Z

- Touch "START" and wait 20 seconds.

WORK SUPPORT	
IDLE AIR VOL LEARN	
MONITOR	
ENG SPEED	XXX rpm
START	

SEF454Y

- Make sure that "CMPLT" is displayed on CONSULT-II screen. If "CMPLT" is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the Diagnostic Procedure below.
- Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	650±50 rpm (in P or N position)
Ignition timing	15±5° BTDC (in P or N position)

WORK SUPPORT	
IDLE AIR VOL LEARN	CMPLT
MONITOR	
ENG SPEED	XXX rpm
START	

MBIB0238E

Without CONSULT-II

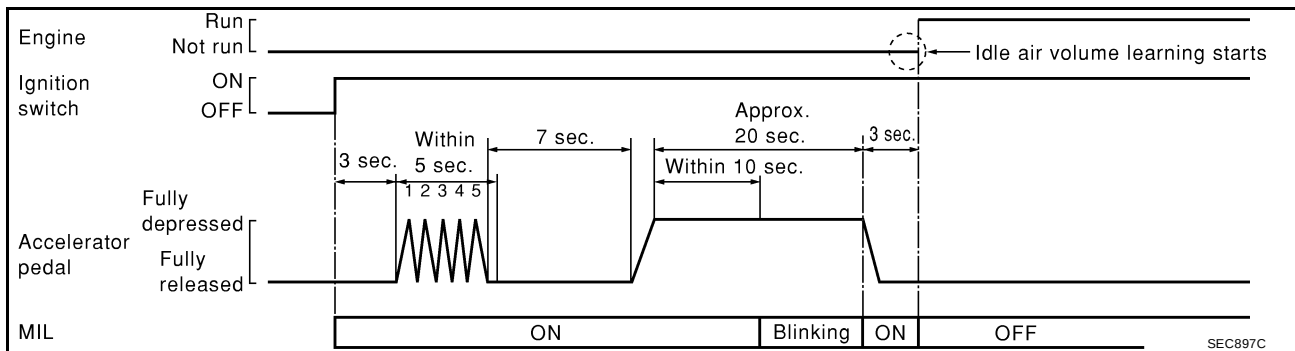
NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.

- Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .

BASIC SERVICE PROCEDURE

2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	650±50 rpm (in P or N position)
Ignition timing	15±5° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.

DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. Check that throttle valve is fully closed.
2. Check PCV valve operation.
3. Check that downstream of throttle valve is free from air leakage.
4. When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.
It is useful to perform [EC-122, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#) .
5. If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle air volume learning all over again:
 - Engine stalls.
 - Erroneous idle.

Fuel Pressure Check FUEL PRESSURE RELEASE

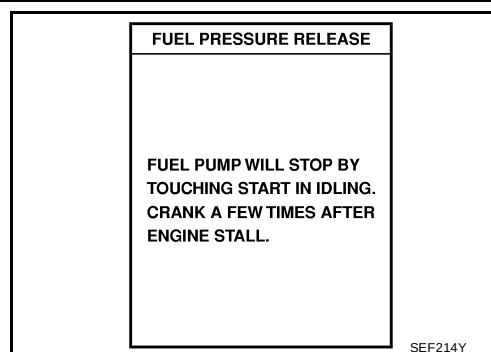
UBS00EMZ

With CONSULT-II

1. Turn ignition switch ON.

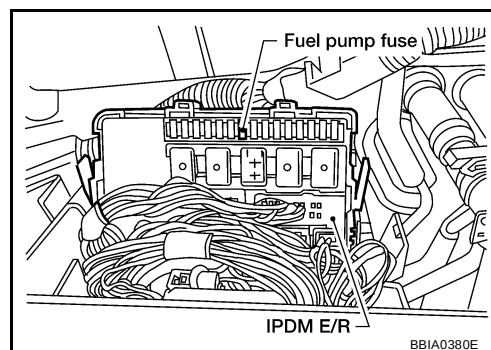
BASIC SERVICE PROCEDURE

2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.



⊗ Without CONSULT-II

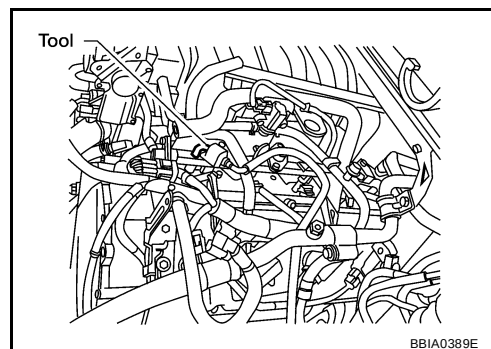
1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.



FUEL PRESSURE CHECK

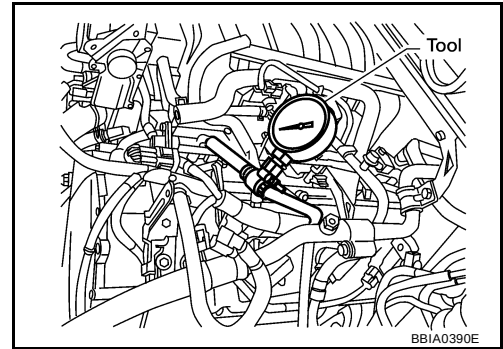
CAUTION:

- Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.
 - Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because A60 models do not have fuel return system.
 - Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains sealability.
 - Use Fuel Pressure Gauge Kit J-44321 and Fuel Pressure Adapter J-44321-6 to check fuel pressure.
 - Do not perform fuel pressure check with electrical system operating (i.e. lights, rear defog, A/C, etc.). Fuel pressure gauge may indicate false readings due to varying engine loads and changes in manifold vacuum.
1. Release fuel pressure to zero. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#).
 2. Remove engine cover.
 3. Remove fuel hose using Quick Connector Release J-45488. Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#).
 - Do not twist or kink fuel hose because it is plastic hose.
 - Do not remove fuel hose from quick connector.
 - Keep fuel hose connections clean.



BASIC SERVICE PROCEDURE

4. Install Fuel Pressure Adapter J-44321-6 and Fuel Pressure Gauge (from kit J-44321) as shown in figure.
 - Do not distort or bend fuel rail tube when installing fuel pressure gauge adapter.
 - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
5. Turn ignition switch ON (reactivate fuel pump), and check for fuel leakage.
6. Start engine and check for fuel leakage.
7. Read the indication of fuel pressure gauge.
 - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.57 kg/cm² , 51 psi)

8. If result is unsatisfactory, go to next step.
9. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.
If NG, repair or replace.
10. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter J-44321-6, release fuel pressure to zero. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#) .

ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

UBS00EN0

Introduction

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Calibration ID	Mode 9 of SAE J1979

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	×	×	×	×	×	—
GST	×	×	×	—	×	×
ECM	×	×*	—	—	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-77, "Fail-safe Chart"](#) .)

Two Trip Detection Logic

UBS00EN1

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The "trip" in the "Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0308 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0308 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-8, "INDEX FOR DTC" .)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.

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The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut

Emission-related Diagnostic Information EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

UBS00EN2

×: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
CAN COMM CIRCUIT	U1000	1000*5	—	—	—	EC-134
CAN COMM CIRCUIT	U1001	1001*5	—	—	×	EC-134
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	—	—
HO2S2 HTR (B1)	P0037	0037	×	×	×	EC-137
HO2S2 HTR (B1)	P0038	0038	×	×	×	EC-137
HO2S2 HTR (B2)	P0057	0057	×	×	×	EC-137
HO2S2 HTR (B2)	P0058	0058	×	×	×	EC-137
MAF SEN/CIRCUIT	P0101	0101	—	—	—	EC-145
MAF SEN/CIRCUIT	P0102	0102	—	—	—	EC-153
MAF SEN/CIRCUIT	P0103	0103	—	—	—	EC-153
IAT SEN/CIRCUIT	P0112	0112	—	—	×	EC-160
IAT SEN/CIRCUIT	P0113	0113	—	—	×	EC-160
ECT SEN/CIRCUIT	P0117	0117	—	—	—	EC-164
ECT SEN/CIRCUIT	P0118	0118	—	—	—	EC-164
TP SEN 2/CIRC	P0122	0122	—	—	—	EC-170
TP SEN 2/CIRC	P0123	0123	—	—	—	EC-170
ECT SENSOR	P0125	0125	—	—	—	EC-177
IAT SENSOR	P0127	0127	—	—	×	EC-180
THERMSTAT FNCTN	P0128	0128	—	—	×	EC-183
HO2S2 (B1)	P0138	0138	—	×	×	EC-185
HO2S2 (B1)	P0139	0139	×	×	×	EC-195
HO2S2 (B2)	P0158	0158	—	×	×	EC-185
HO2S2 (B2)	P0159	0159	×	×	×	EC-195
FUEL SYS-LEAN-B1	P0171	0171	—	—	×	EC-207
FUEL SYS-RICH-B1	P0172	0172	—	—	×	EC-216
FUEL SYS-LEAN-B2	P0174	0174	—	—	×	EC-207
FUEL SYS-RICH-B2	P0175	0175	—	—	×	EC-216
FTT SENSOR	P0181	0181	—	—	×	EC-224
FTT SEN/CIRCUIT	P0182	0182	—	—	×	EC-230
FTT SEN/CIRCUIT	P0183	0183	—	—	×	EC-230
TP SEN 1/CIRC	P0222	0222	—	—	—	EC-235
TP SEN 1/CIRC	P0223	0223	—	—	—	EC-235
MULTI CYL MISFIRE	P0300	0300	—	—	×	EC-242
CYL 1 MISFIRE	P0301	0301	—	—	×	EC-242
CYL 2 MISFIRE	P0302	0302	—	—	×	EC-242

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Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
CYL 3 MISFIRE	P0303	0303	—	—	×	EC-242
CYL 4 MISFIRE	P0304	0304	—	—	×	EC-242
CYL 5 MISFIRE	P0305	0305	—	—	×	EC-242
CYL 6 MISFIRE	P0306	0306	—	—	×	EC-242
CYL 7 MISFIRE	P0307	0307	—	—	×	EC-242
CYL 8 MISFIRE	P0308	0308	—	—	×	EC-242
KNOCK SEN/CIRC-B1	P0327	0327	—	—	×	EC-249
KNOCK SEN/CIRC-B1	P0328	0328	—	—	×	EC-249
KNOCK SEN/CIRC-B2	P0332	0332	—	—	×	EC-249
KNOCK SEN/CIRC-B2	P0333	0333	—	—	×	EC-249
CKP SEN/CIRCUIT	P0335	0335	—	—	×	EC-254
CMP SEN/CIRC-B1	P0340	0340	—	—	×	EC-260
TW CATALYST SYS-B1	P0420	0420	×	×	×	EC-266
TW CATALYST SYS-B2	P0430	0430	×	×	×	EC-266
EVAP PURG FLOW/MON	P0441	0441	×	×	×	EC-270
EVAP SMALL LEAK	P0442	0442	×	×	×	EC-275
PURG VOLUME CONT/V	P0444	0444	—	—	×	EC-284
PURG VOLUME CONT/V	P0445	0445	—	—	×	EC-284
VENT CONTROL VALVE	P0447	0447	—	—	×	EC-291
EVAP SYS PRES SEN	P0451	0451	—	—	×	EC-298
EVAP SYS PRES SEN	P0452	0452	—	—	×	EC-301
EVAP SYS PRES SEN	P0453	0453	—	—	×	EC-307
EVAP GROSS LEAK	P0455	0455	—	×	×	EC-315
EVAP VERY SML LEAK	P0456	0456	×*6	×	×	EC-323
FUEL LEV SEN SLOSH	P0460	0460	—	—	×	EC-333
FUEL LEVEL SENSOR	P0461	0461	—	—	×	EC-335
FUEL LEVL SEN/CIRC	P0462	0462	—	—	×	EC-337
FUEL LEVL SEN/CIRC	P0463	0463	—	—	×	EC-337
VEH SPEED SEN/CIRC*4	P0500	0500	—	—	×	EC-339
ISC SYSTEM	P0506	0506	—	—	×	EC-341
ISC SYSTEM	P0507	0507	—	—	×	EC-343
PW ST P SEN/CIRC	P0550	0550	—	—	×	EC-345
ECM	P0605	0605	—	—	× or —	EC-350
TCM	P0700	0700	—	—	—	AT-111
PNP SW/CIRC	P0705	0705	—	—	×	AT-112
ATF TEMP SEN/CIRC	P0710	0710	—	—	×	AT-133
VEH SPD SEN/CIR AT*4	P0720	0720	—	—	×	AT-115
TCC SOLENOID/CIRC	P0740	0740	—	—	×	AT-120
A/T TCC S/V FNCTN	P0744	0744	—	—	×	AT-123
L/PRESS SOL/CIRC	P0745	0745	—	—	×	AT-126
A/F SEN1 HTR (B1)	P1031	1031	×	×	×	EC-353
A/F SEN1 HTR (B1)	P1032	1032	×	×	×	EC-353

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Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
A/F SEN1 HTR (B2)	P1051	1051	×	×	×	EC-353
A/F SEN1 HTR (B2)	P1052	1052	×	×	×	EC-353
ECM BACK UP/CIRC	P1065	1065	—	—	×	EC-360
ETC ACTR	P1121	1121	—	—	—	EC-364
ETC FUNCTION/CIRC	P1122	1122	—	—	—	EC-366
ETC MOT PWR	P1124	1124	—	—	—	EC-372
ETC MOT PWR	P1126	1126	—	—	—	EC-372
ETC MOT	P1128	1128	—	—	—	EC-377
HO2S2 (B1)	P1146	1146	×	×	×	EC-382
HO2S2 (B1)	P1147	1147	×	×	×	EC-394
CLOSED LOOP-B1	P1148	1148	—	—	—	EC-406
HO2S2 (B2)	P1166	1166	×	×	×	EC-382
HO2S2 (B2)	P1167	1167	×	×	×	EC-394
CLOSED LOOP-B2	P1168	1168	—	—	—	EC-406
TCS C/U FUNCTN	P1211	1211	—	—	×	EC-407
TCS/CIRC	P1212	1212	—	—	×	EC-408
ENG OVER TEMP	P1217	1217	—	—	—	EC-409
CTP LEARNING	P1225	1225	—	—	×	EC-419
CTP LEARNING	P1226	1226	—	—	×	EC-421
SENSOR POWER/CIRC	P1229	1229	—	—	—	EC-423
A/F SENSOR1 (B1)	P1271	1271	—	—	×	EC-428
A/F SENSOR1 (B1)	P1272	1272	—	—	×	EC-436
A/F SENSOR1 (B1)	P1273	1273	—	—	×	EC-444
A/F SENSOR1 (B1)	P1274	1274	—	—	×	EC-453
A/F SENSOR1 (B1)	P1276	1276	—	—	×	EC-462
A/F SENSOR1 (B1)	P1278	1278	×	×	×	EC-471
A/F SENSOR1 (B1)	P1279	1279	×	×	×	EC-483
A/F SENSOR1 (B2)	P1281	1281	—	—	×	EC-428
A/F SENSOR1 (B2)	P1282	1282	—	—	×	EC-436
A/F SENSOR1 (B2)	P1283	1283	—	—	×	EC-444
A/F SENSOR1 (B2)	P1284	1284	—	—	×	EC-453
A/F SENSOR1 (B2)	P1286	1286	—	—	×	EC-462
A/F SENSOR1 (B2)	P1288	1288	×	×	×	EC-471
A/F SENSOR1 (B2)	P1289	1289	×	×	×	EC-483
PURG VOLUME CONT/V	P1444	1444	—	—	×	EC-495
VENT CONTROL VALVE	P1446	1446	—	—	×	EC-503
ASCD SW	P1564	1564	—	—	—	EC-509
ASCD BRAKE SW	P1572	1572	—	—	—	EC-516
ASCD VHL SPD SEN*7	P1574	1574	—	—	—	EC-516
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	—	—	×	BL-136
P-N POS SW/CIRCUIT	P1706	1706	—	—	×	EC-526

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Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
TURBINE REV S/CIRC	P1716	1716	—	—	×	AT-136
A/T INTERLOCK	P1730	1730	—	—	—	AT-141
I/C SOLENOID/CIRC	P1752	1752	—	—	—	AT-147
I/C SOLENOID FNCTN	P1754	1754	—	—	—	AT-150
FR/B SOLENOID/CIRC	P1757	1757	—	—	—	AT-153
FR/B SOLENOID/CIRC	P1759	1759	—	—	—	AT-156
D/C SOLENOID/CIRC	P1762	1762	—	—	—	AT-159
D/C SOLENOID FNCTN	P1764	1764	—	—	—	AT-162
HLR/C SOL/CIRC	P1767	1767	—	—	—	AT-165
HLR/C SOL FNCTN	P1769	1769	—	—	—	AT-168
LC/B SOLENOID/CIRC	P1772	1772	—	—	—	AT-171
LC/B SOLENOID FNCT	P1774	1774	—	—	—	AT-174
BRAKE SW/CIRCUIT	P1805	1805	—	—	×	EC-531
APP SEN 1/CIRC	P2122	2122	—	—	—	EC-536
APP SEN 1/CIRC	P2123	2123	—	—	—	EC-536
APP SEN 2/CIRC	P2127	2127	—	—	—	EC-542
APP SEN 2/CIRC	P2128	2128	—	—	—	EC-542
TP SENSOR	P2135	2135	—	—	—	EC-549
APP SENSOR	P2138	2138	—	—	—	EC-556

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results). This number is controlled by NISSAN.

*4: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

*5: The trouble shooting for this DTC needs CONSULT-II.

*6: SRT code will not be set if the self-diagnostic result is NG.

*7: 2WD models with ASCD

DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-50, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS"](#). These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step II, refer to [EC-72, "WORK FLOW"](#). Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

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How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

 **With CONSULT-II**

 **With GST**

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

 **No Tools**

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 1148, 1706, etc.

These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be [0].

If a 1st trip DTC is stored in the ECM, the time data will be [1t].

DTC display	SELF DIAG RESULTS	
	DTC RESULTS	TIME
	CKP SEN/CIRCUIT [P0335]	0

1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS	TIME
	CKP SEN/CIRCUIT [P0335]	1t

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FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, base fuel schedule and intake air temperature at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see [EC-106, "Freeze Frame Data and 1st Trip Freeze Frame Data"](#).

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0308 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st

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trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in [EC-62, "HOW TO ERASE EMIS-SION-RELATED DIAGNOSTIC INFORMATION"](#) .

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:

If MIL is ON during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

SRT Item

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

Item (CONSULT-II indication)	Performance Priority*1	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420, P0430
EVAPORATIVE SYSTEM	2	EVAP control system purge flow monitoring	P0441
	1	EVAP control system	P0442
	2	EVAP control system	P0456
HO2S	2	A/F sensor 1	P1278, P1288
		A/F sensor 1	P1279, P1289
		Heated oxygen sensor 2	P0139, P0159
		Heated oxygen sensor 2	P1146, P1166
		Heated oxygen sensor 2	P1147, P1167
HO2S HTR	2	A/F sensor 1 heater	P1031, P1032, P1051, P1052
		Heated oxygen sensor 2 heater	P0037, P0038, P0057, P0058

*1: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

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Self-diagnosis result		Example					
		Diagnosis	Ignition cycle				
			← ON →	OFF	← ON →	OFF	
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)	
		P0402	OK (1)	— (1)	— (1)	OK (2)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"	
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)	
		P0402	— (0)	— (0)	OK (1)	— (1)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"	
NG exists	Case 3	P0400	OK	OK	—	—	
		P0402	—	—	—	—	
		P1402	NG	—	NG	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL "ON")	
		SRT of EGR	"INCMP"	"INCMP"	"INCMP"	"CMPLT"	

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

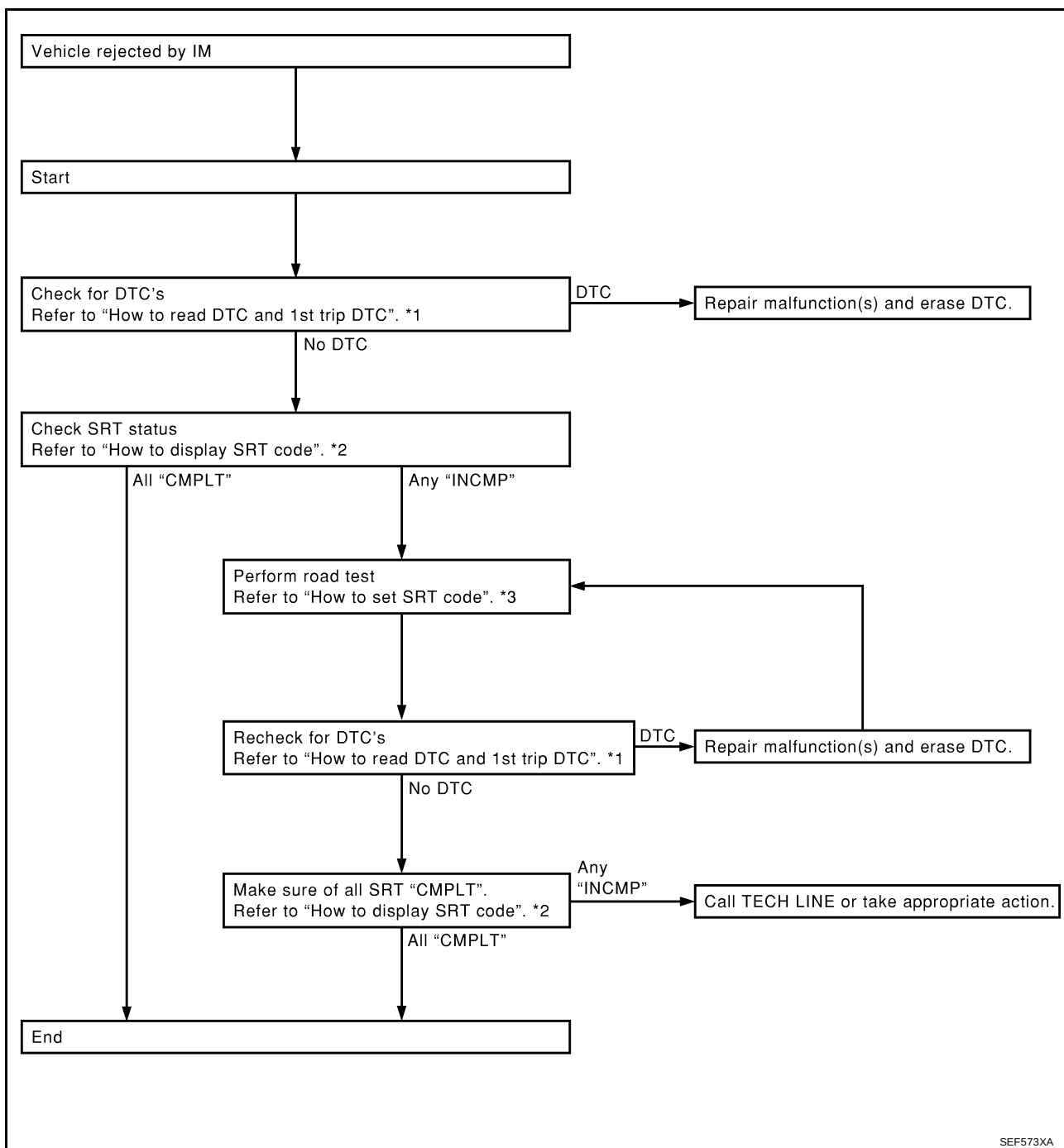
NOTE:

SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence on the next page.

ON BOARD DIAGNOSTIC (OBD) SYSTEM



*1 [EC-54](#)

*2 [EC-57](#)

*3 [EC-58](#)

How to Display SRT Code

WITH CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

A sample of CONSULT-II display for SRT code is shown at right.

"INCMP" means the self-diagnosis is incomplete and SRT is not set.

"CMPLT" means the self-diagnosis is complete and SRT is set.

WITH GST

Selecting MODE 1 with GST (Generic Scan Tool)

SRT STATUS	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	CMPLT

SEF935Z

ON BOARD DIAGNOSTIC (OBD) SYSTEM

How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

WITH CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on [EC-55, "SRT Item"](#) .

WITHOUT CONSULT-II

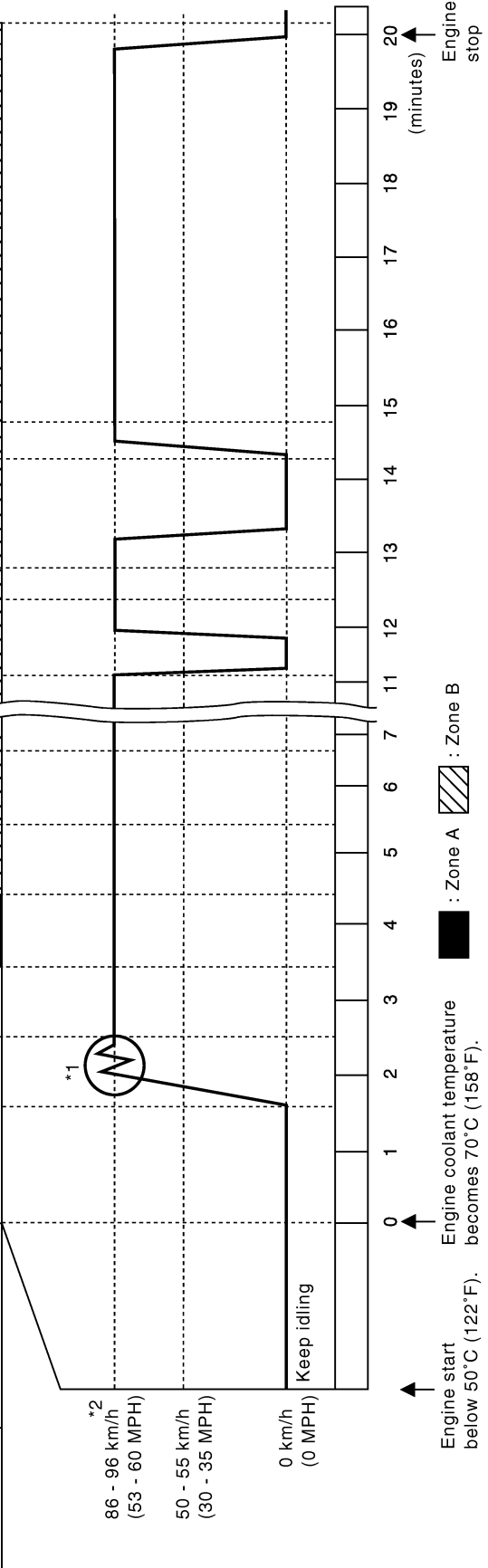
The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Driving Pattern

Driving pattern **Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.**
Self-diagnostic test item (CONSULT-II screen term) **Refer to next page for more information and explanation of chart.**

SRT item (CONSULT-II screen term)	Self-diagnostic test item (CONSULT-II screen term)	Pattern 1	Pattern 2	Pattern 3	Pattern 4
CATALYST	TW CATALYST SYS				
EVAP SYSTEM	EVAP PURGE FLOW/MON				
	EVAP (SMALL LEAK)				
	A/F SEN1				
HO2S	HO2S2				
	A/F SEN1 HTR				
HO2S HTR	HO2S2 HTR				



PBIB2243E

ON BOARD DIAGNOSTIC (OBD) SYSTEM

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 73 and ground is 3.0 - 4.3V).**
- The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 73 and ground is lower than 1.4V).**
- The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 107 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

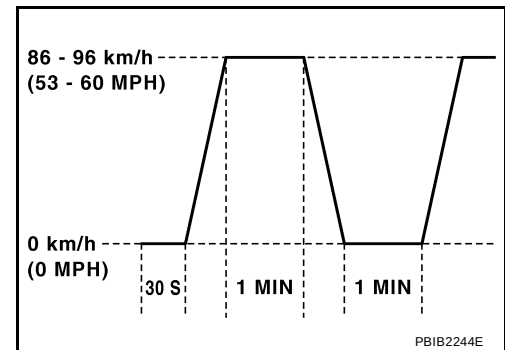
- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during decelerating vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).

Pattern 4:

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

*2: Checking the vehicle speed with GST is advised.



Suggested Transmission Gear Position

Set the selector lever in the D position.

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

The following is the information specified in Mode 6 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

SRT item	Self-diagnostic test item	DTC	Test value (GST display)		Test limit	Conversion
			TID	CID		
CATALYST	Three way catalyst function (Bank 1)	P0420	01H	01H	Max.	1/128
		P0420	02H	81H	Min.	1
	Three way catalyst function (Bank 2)	P0430	03H	02H	Max.	1/128
		P0430	04H	82H	Min.	1

ON BOARD DIAGNOSTIC (OBD) SYSTEM

SRT item	Self-diagnostic test item	DTC	Test value (GST display)		Test limit	Conversion	A
			TID	CID			
EVAPORATIVE SYSTEM	EVAP control system (Small leak)	P0442	05H	03H	Max.	1/128mm ²	EC
	EVAP control system purge flow monitoring	P0441	06H	83H	Min.	20mV	
	EVAP control system (Very small leak)	P0456	07H	03H	Max.	1/128mm ²	
HO2S	A/F sensor 1 (Bank 1)	P1271	41H	8EH	Min.	5 mV	C
		P1272	42H	0EH	Max.	5 mV	
		P1273	43H	0EH	Max.	0.002	D
		P1274	44H	8EH	Min.	0.002	
		P1278	45H	8EH	Min.	0.004	E
		P1276	46H	0EH	Max.	5 mV	
		P1276	47H	8EH	Min.	5 mV	F
		P1279	48H	8EH	Min.	0.004	
	A/F sensor 1 (Bank 2)	P1281	4CH	8FH	Min.	5 mV	G
		P1282	4DH	0FH	Max.	5 mV	
		P1283	4EH	0FH	Max.	0.002	H
		P1284	4FH	8FH	Min.	0.002	
		P1288	50H	8FH	Min.	0.004	I
		P1286	51H	0FH	Max.	5 mV	
		P1286	52H	8FH	Min.	5 mV	J
		P1289	53H	8FH	Min.	0.004	
	Heated oxygen sensor 2 (Bank 1)	P0139	19H	86H	Min.	10mV/500ms	K
		P1147	1AH	86H	Min.	10mV	
		P1146	1BH	06H	Max.	10mV	L
		P0138	1CH	06H	Max.	10mV	
	Heated oxygen sensor 2 (Bank 2)	P0159	21H	87H	Min.	10mV/500ms	M
		P1167	22H	87H	Min.	10mV	
		P1166	23H	07H	Max.	10mV	
		P0158	24H	07H	Max.	10mV	
HO2S HTR	A/F sensor 1 heater (Bank 1)	P1032	57H	10H	Max.	5 mV	
		P1031	58H	90H	Min.	5 mV	
	A/F sensor 1 heater (Bank 2)	P1052	59H	11H	Max.	5 mV	
		P1051	5AH	91H	Min.	5 mV	
	Heated oxygen sensor 2 heater (Bank 1)	P0038	2DH	0AH	Max.	20mV	
		P0037	2EH	8AH	Min.	20mV	
	Heated oxygen sensor 2 heater (Bank 2)	P0058	2FH	0BH	Max.	20mV	
		P0057	30H	8BH	Min.	20mV	

ON BOARD DIAGNOSTIC (OBD) SYSTEM

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

With CONSULT-II

The emission related diagnostic information in the ECM can be erased by selecting “ERASE” in the “SELF-DIAG RESULTS” mode with CONSULT-II.

If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

NOTE:

If the DTC is not for A/T related items (see [EC-8](#)), skip steps 2 through 4.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT-II ON and touch “A/T”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. [The DTC in the TCM (Transmission control module) will be erased.] Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.
7. Touch “ERASE”. (The DTC in the ECM will be erased.)

How to erase DTC (With CONSULT-II)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.

SELECT SYSTEM
A/T
ENGINE

2. Turn CONSULT-II “ON”, and touch “A/T”.

SELECT DIAG MODE
SELF-DIAG RESULTS
DATE MONITOR
CAN DIAG SUPPORT MNTR
DTC WORK SUPPORT
ECU PART NUMBER

3. Touch “SELF-DIAG RESULTS”.

SELF-DIAG RESULTS
DTC RESULTS
TCC SOLENOID/CIRC [P0740]

4. Touch “ERASE”. (The DTC in the TCM will be erased.)

SELECT SYSTEM
A/T
ENGINE

5. Touch “ENGINE”.

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR(SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

6. Touch “SELF-DIAG RESULTS”.

SELF-DIAG RESULTS	
DTC RESULTS	TIME
TCC SOLENOID/CIRC [P0740]	0

7. Touch “ERASE”. (The DTC in the ECM will be erased.)

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With GST

The emission related diagnostic information in the ECM can be erased by selecting MODE 4 with GST.

NOTE:

If the DTC is not for A/T related items (see [EC-8](#)), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

2. Perform [AT-43, "HOW TO ERASE DTC \(WITH GST\)"](#) . (The DTC in the TCM will be erased.)
3. Select MODE 4 with GST. (The DTC in the ECM will be erased.)

No Tools

NOTE:

If the DTC is not for A/T related items (see [EC-8](#)), skip step 3.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once.
 2. Wait at least 10 seconds and then turn it ON (engine stopped) again.
 3. Perform [AT-43, "HOW TO ERASE DTC \(NO TOOLS\)"](#) . (The DTC in the TCM will be erased.)
 4. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to [EC-64, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
- If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.
 - The following data are cleared when the ECM memory is erased.
 - Diagnostic trouble codes
 - 1st trip diagnostic trouble codes
 - Freeze frame data
 - 1st trip freeze frame data
 - System readiness test (SRT) codes
 - Test values
 - Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

NVIS (Nissan Vehicle Immobilizer System — NATS)

UBS00EN3

- If the security indicator lights up with the ignition switch in the ON position or "NATS MALFUNCTION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to [BL-136, "NVIS\(NISSAN Vehicle Immobilizer System-NATS\)"](#) .
- Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching "ERASE" in "SELF-DIAG RESULTS" mode with CONSULT-II.
- When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card.

Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

SEF543X

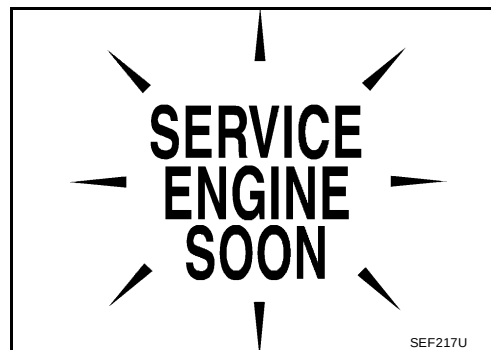
Malfunction Indicator Lamp (MIL)

UBS00EN4

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
If the MIL does not light up, refer to [DI-30, "WARNING LAMPS"](#) , or see [EC-603, "MIL AND DATA LINK CONNECTOR"](#) .
2. When the engine is started, the MIL should go off.
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following 3 functions.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> ● Misfire (Possible three way catalyst damage) ● One trip detection diagnoses
Mode II	Ignition switch in ON position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.

The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

HOW TO SWITCH DIAGNOSTIC TEST MODE

NOTE:

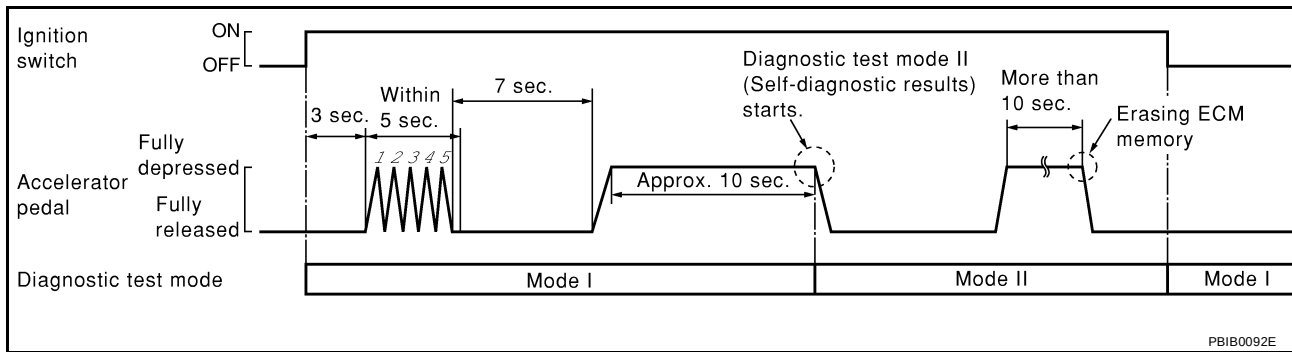
- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.

How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-64, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#).
2. Fully depress the accelerator pedal and keep it for more than 10 seconds. The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [DI-30, "WARNING LAMPS"](#) or see [EC-603, "MIL AND DATA LINK CONNECTOR"](#).

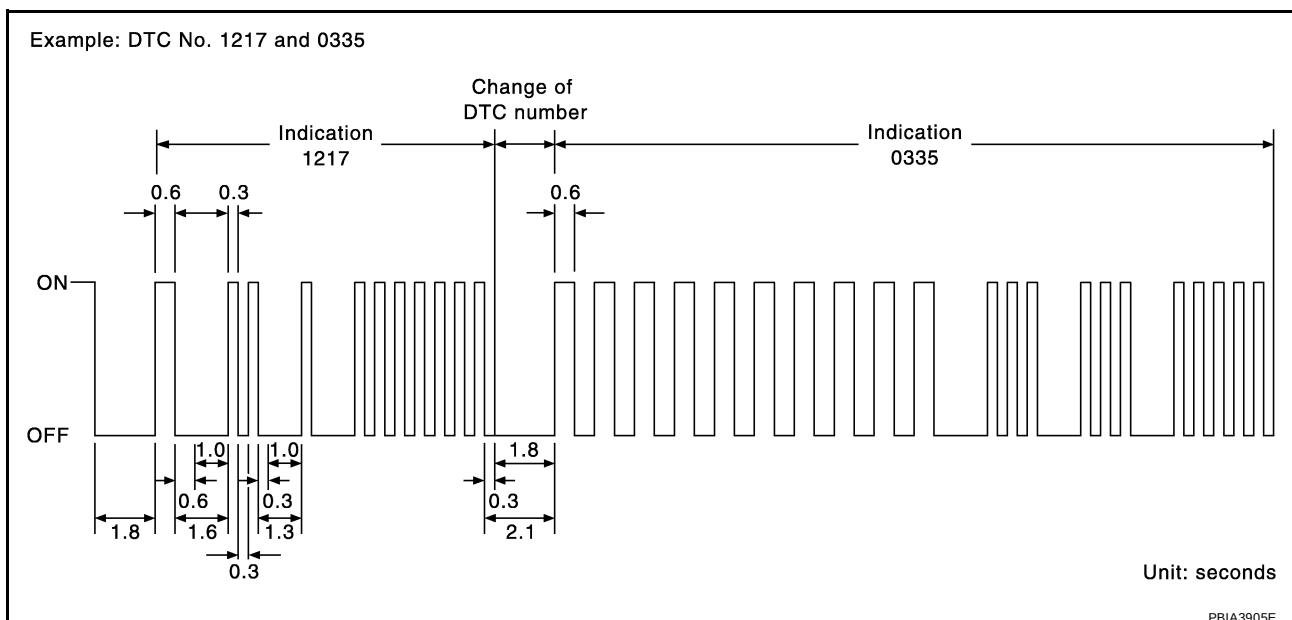
DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-II or GST. A DTC will be used as an example for how to read a code.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

A change from one trouble code to another occurs at an interval of 1.8-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-8, "INDEX FOR DTC"](#))

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to [EC-66, "How to Erase Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .

- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

OBD System Operation Chart

UBS00EN5

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to [EC-49, "Two Trip Detection Logic"](#) .
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns B and C under “Fuel Injection System” and “Misfire”, see [EC-68](#) .

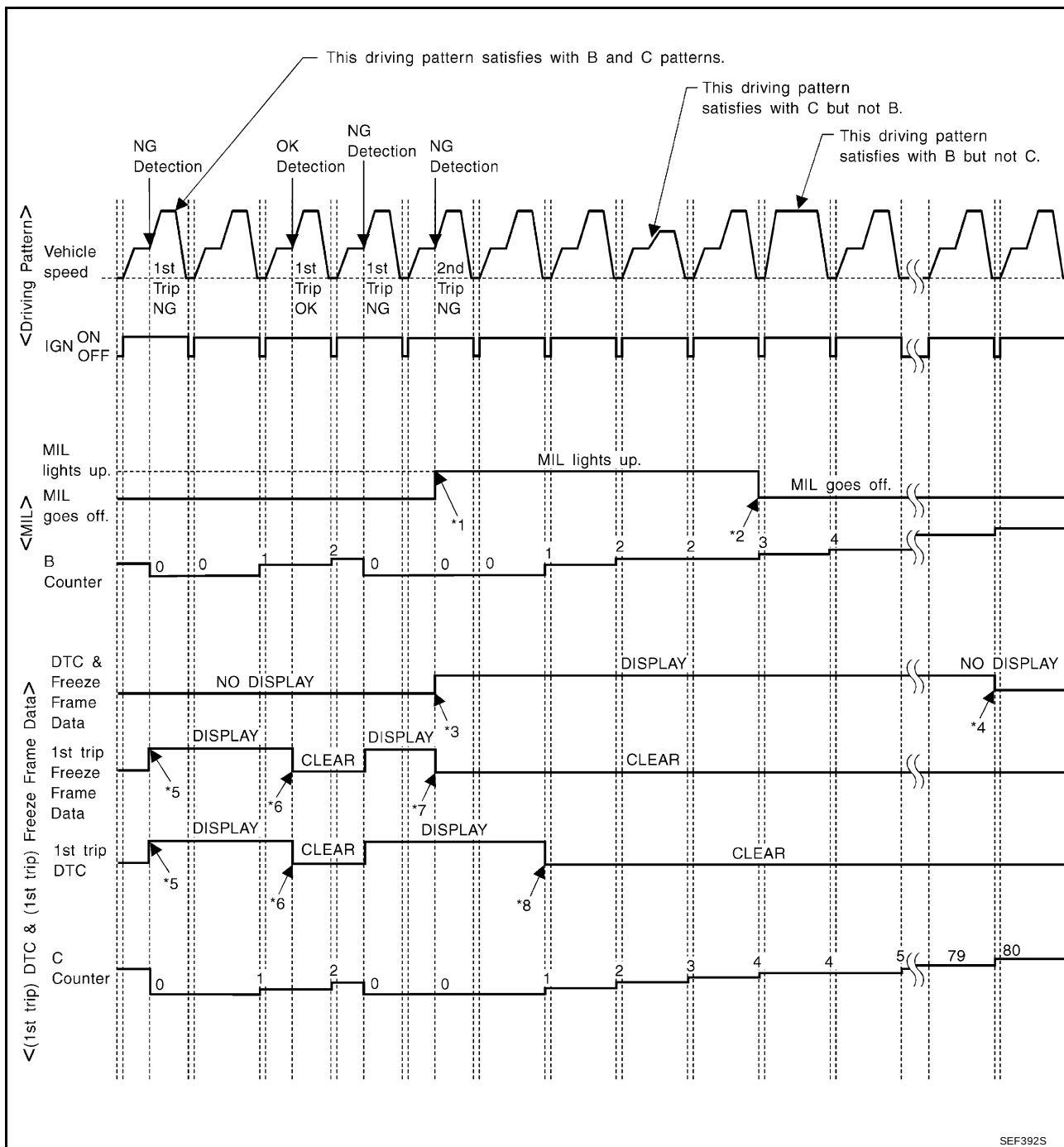
For details about patterns A and B under “Other”, see [EC-70](#) .

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE >EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"



SEF392S

ON BOARD DIAGNOSTIC (OBD) SYSTEM

EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in OBD SYSTEM OPERATION CHART)

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the freeze frame data) $\times (1 \pm 0.1)$ [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

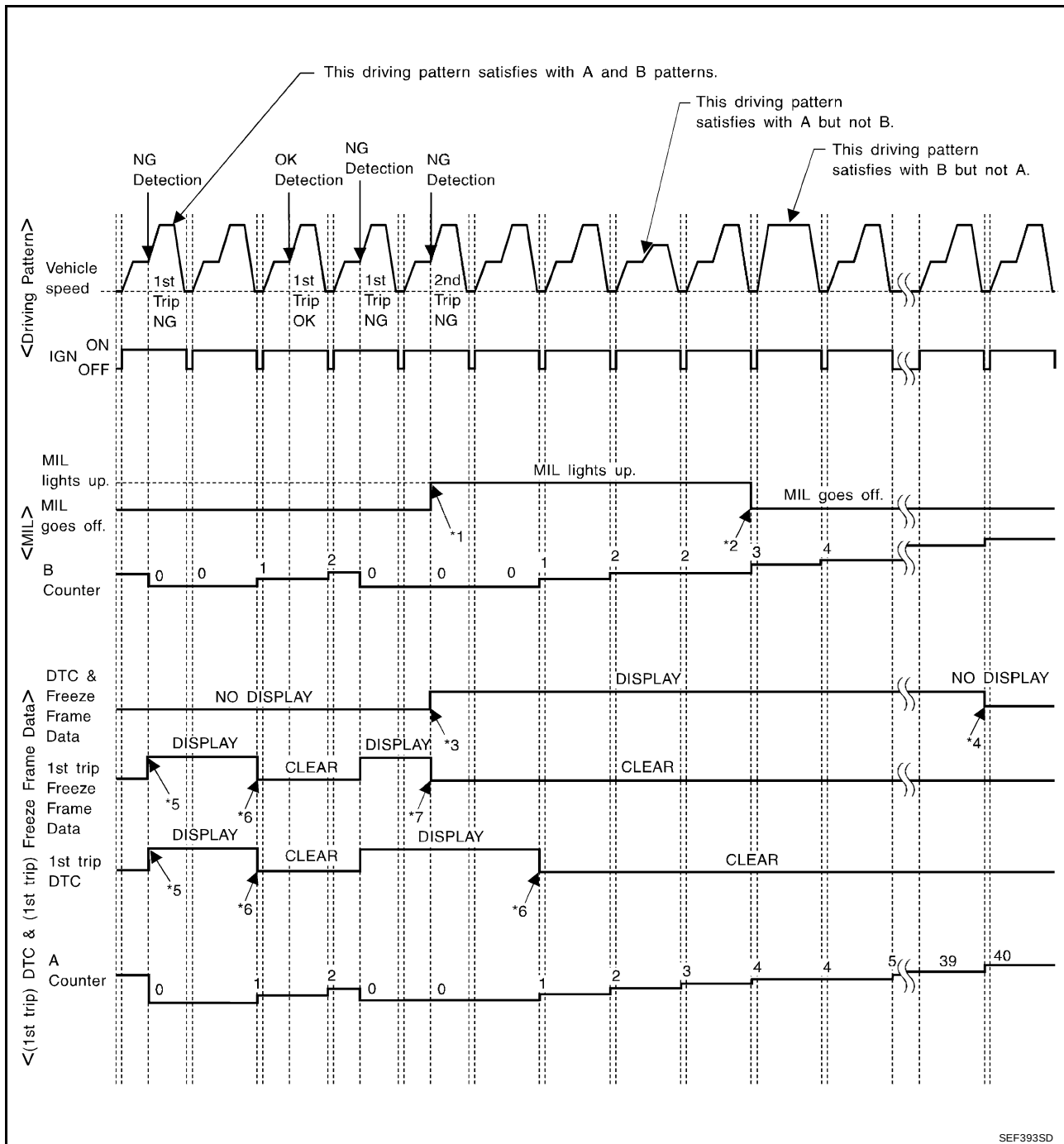
To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

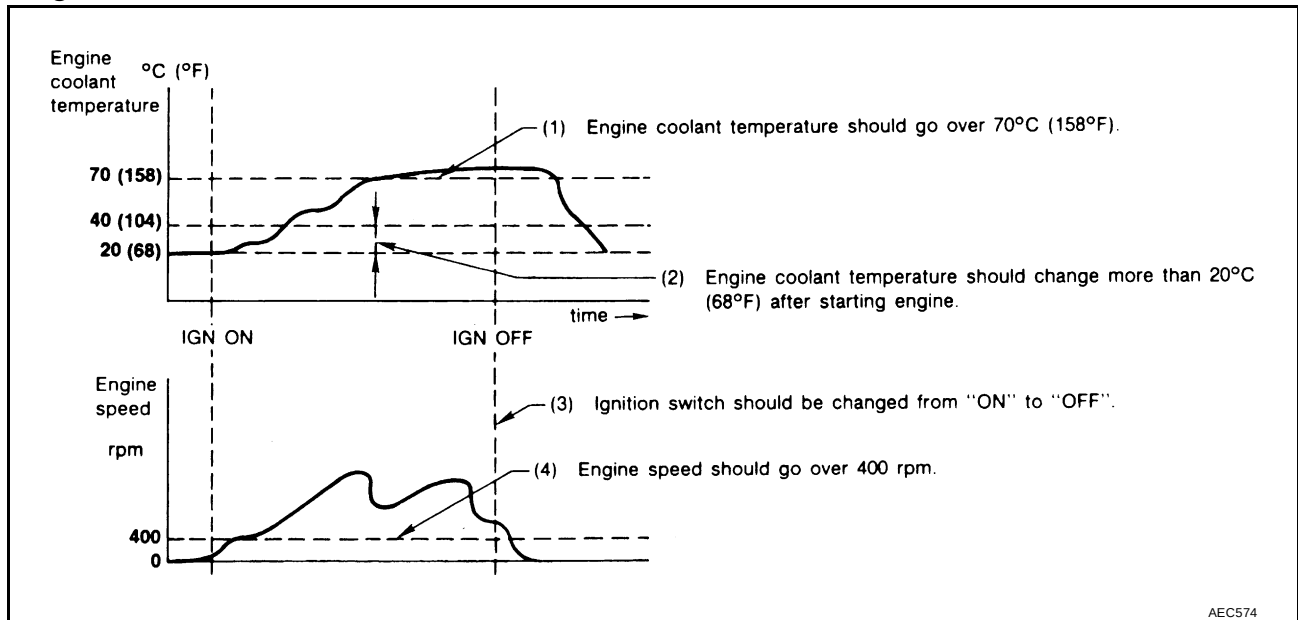
*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

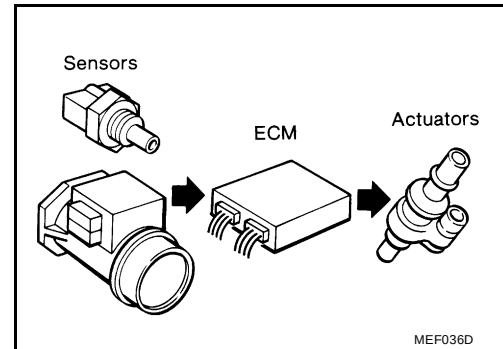
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

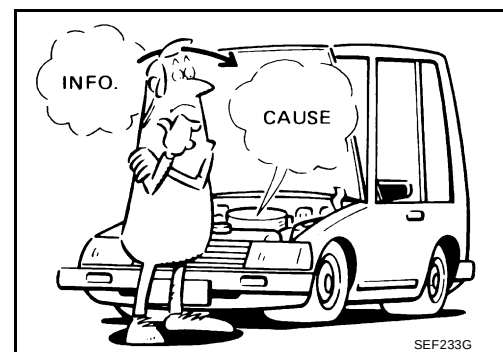
TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction
INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



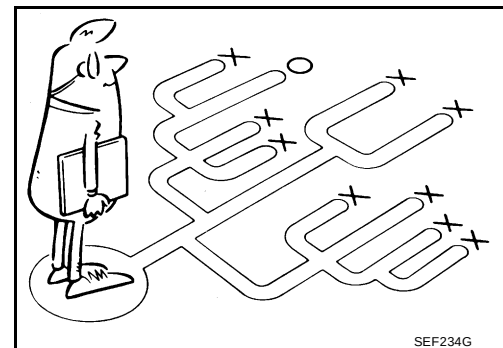
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow [EC-72, "WORK FLOW"](#).

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on [EC-75](#) should be used.

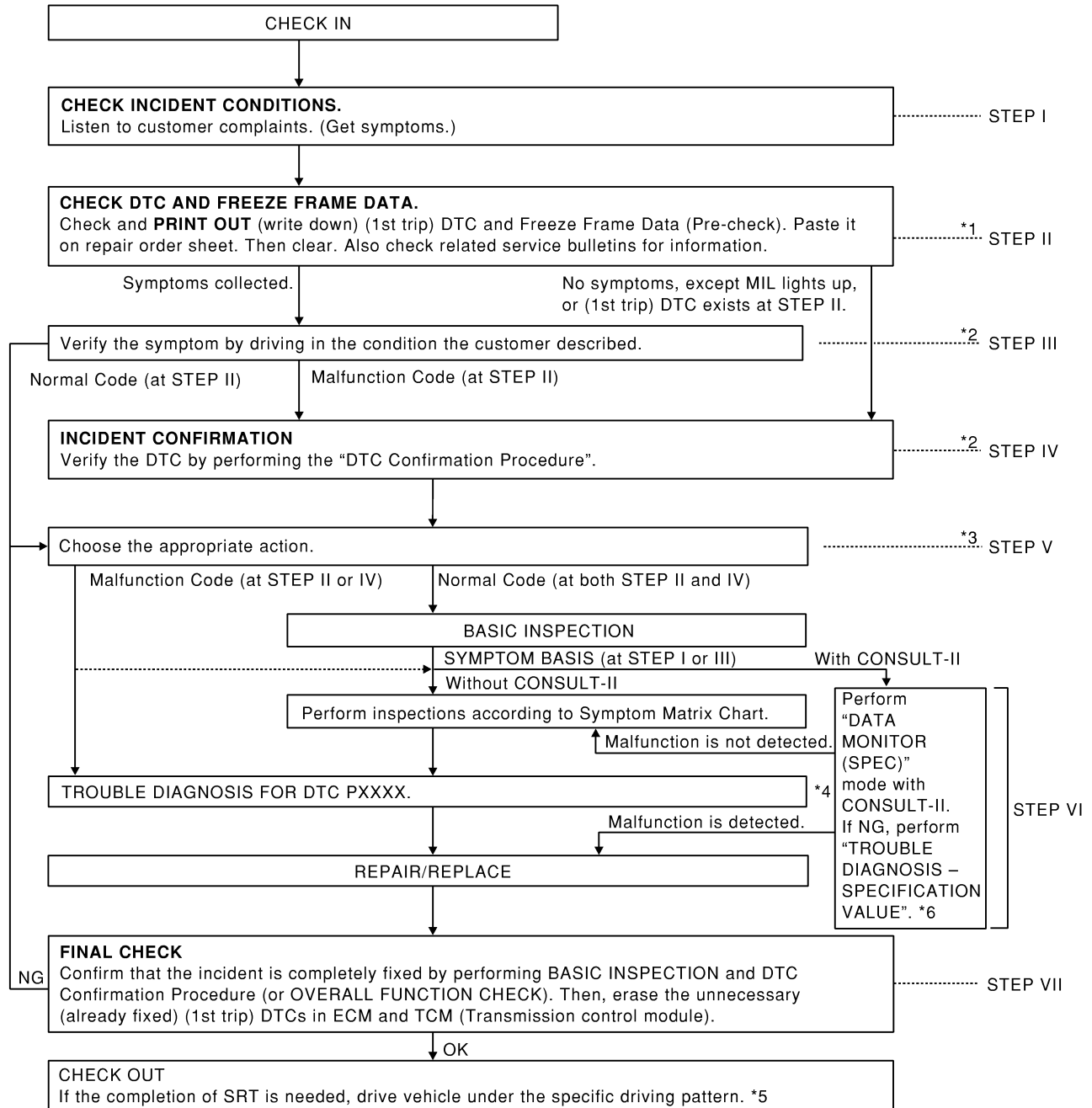
Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.



TROUBLE DIAGNOSIS

WORK FLOW

Flow Chart



PBIB1043E

*1 If time data of "SELF-DIAG RESULTS" is other than [0] or [1t], perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

*4 If malfunctioning part cannot be detected, perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

*2 If the incident cannot be verified, perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

*5 [EC-59, "Driving Pattern"](#)

*3 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to [EC-127, "POWER SUPPLY AND GROUND CIRCUIT"](#) .

*6 [EC-122, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#)

TROUBLE DIAGNOSIS

Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the EC-74, "DIAGNOSTIC WORKSHEET" .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or GST) the (1st trip) DTC and the (1st trip) freeze frame data, then erase the DTC and the data. (Refer to EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The Symptom Matrix Chart will be useful. See EC-84, "Symptom Matrix Chart" .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The DIAGNOSTIC WORK SHEET and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) DTC by driving in (or performing) the DTC Confirmation Procedure. Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or GST. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the DTC Confirmation Procedure is not available, perform the Overall Function Check instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified check is an effective alternative. The NG result of the Overall Function Check is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-79, "Basic Inspection" .) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-84, "Symptom Matrix Chart" .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-96, "ECM Terminals and Reference Value" , EC-117, "CONSULT-II Reference Value in Data Monitor" . The Diagnostic Procedure in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to "Circuit Inspection" in GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident" . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the DTC Confirmation Procedure and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" and AT-42, "HOW TO ERASE DTC" .)

A

EC

C

D

E

F

G

H

I

J

K

L

M

TROUBLE DIAGNOSIS

DIAGNOSTIC WORKSHEET

Description

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

Some conditions may cause the MIL to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

KEY POINTS

WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE..... Road conditions
HOW Operating conditions,
Weather conditions,
Symptoms

SEF907L

A	EC	C	D	E	F	G	H	I	J	K	L	M
---	----	---	---	---	---	---	---	---	---	---	---	---

EC

LEC031A

TROUBLE DIAGNOSIS

DTC Inspection Priority Chart

UBS00EN7

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC U1000 and/or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

Priority	Detected items (DTC)
1	<ul style="list-style-type: none">● U1000 U1001 CAN communication line● P0101 P0102 P0103 Mass air flow sensor● P0112 P0113 P0127 Intake air temperature sensor● P0117 P0118 P0125 Engine coolant temperature sensor● P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor● P0128 Thermostat function● P0181 P0182 P0183 Fuel tank temperature sensor● P0327 P0328 P0332 P0333 Knock sensor● P0335 Crankshaft position sensor (POS)● P0340 Camshaft position sensor (PHASE)● P0460 P0461 P0462 P0463 Fuel level sensor● P0500 Vehicle speed sensor● P0605 ECM● P0705 Park/Neutral position (PNP) switch● P1229 Sensor power supply● P1610 - P1615 NATS● P1706 Park/Neutral position (PNP) switch● P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor

TROUBLE DIAGNOSIS

Priority	Detected items (DTC)
2	<ul style="list-style-type: none"> ● P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater ● P0138 P0139 P0158 P0159 P1146 P1147 P1166 P1167 Heated oxygen sensor 2 ● P0441 EVAP control system purge flow monitoring ● P0444 P0445 P1444 EVAP canister purge volume control solenoid valve ● P0447 P1446 EVAP canister vent control valve ● P0451 P0452 P0453 EVAP control system pressure sensor ● P0550 Power steering pressure sensor ● P0700 P0710 P0720 P0740 P0744 P0745 P1706 P1716 P1730 P1752 P1754 P1757 P1759 P1762 P1764 P1767 P1769 P1772 P1774 A/T related sensors and solenoid valves ● P1031 P1032 P1051 P1052 A/F sensor 1 heater ● P1065 ECM power supply ● P1122 Electric throttle control function ● P1124 P1126 P1128 Electric throttle control actuator ● P1217 Engine over temperature (OVERHEAT) ● P1271 P1272 P1273 P1274 P1276 P1278 P1279 P1281 P1282 P1283 P1284 P1286 P1288 P1289 A/F sensor 1 ● P1805 Brake switch
3	<ul style="list-style-type: none"> ● P0171 P0172 P0174 P0175 Fuel injection system function ● P0300 - P0308 Misfire ● P0420 P0430 Three way catalyst function ● P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0506 P0507 Idle speed control system ● P1121 Electric throttle control actuator ● P1148 P1168 Closed loop control ● P1211 TCS control unit ● P1212 TCS communication line ● P1564 ASCD steering switch ● P1572 ASCD brake switch ● P1574 ASCD vehicle speed sensor

Fail-safe Chart

UBS00EN8

When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0101 P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-II displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-II display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		More than approx. 4 minutes after ignition ON or START	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	

TROUBLE DIAGNOSIS

DTC No.	Detected items	Engine operating condition in fail-safe mode
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm. (When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less. (When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

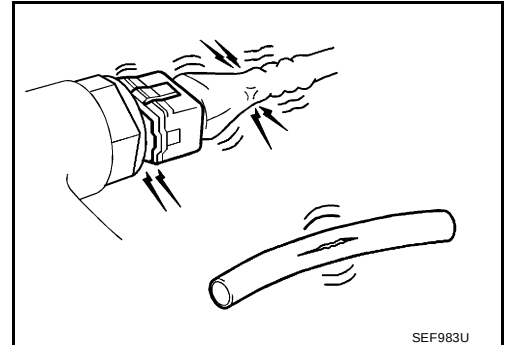
- When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
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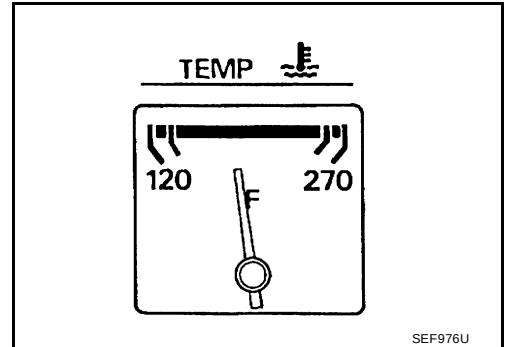
Basic Inspection

1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for splits, kinks and improper connections
 - Hoses and ducts for leaks
 - Air cleaner clogging
 - Gasket
3. Confirm that electrical or mechanical loads are not applied.
 - Head lamp switch is OFF.
 - Air conditioner switch is OFF.
 - Rear window defogger switch is OFF.
 - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



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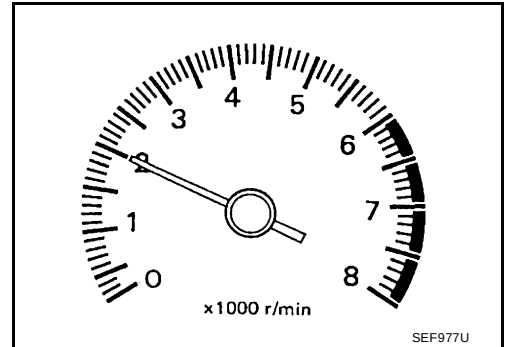


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



SEF977U

2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

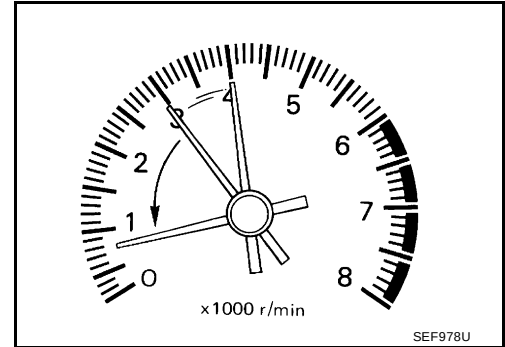
>> GO TO 3.

TROUBLE DIAGNOSIS

3. CHECK TARGET IDLE SPEED

With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

650 ± 50 rpm (in P or N position)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

650 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 9.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.

TROUBLE DIAGNOSIS

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-44, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

650 ± 50 rpm (in P or N position)

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

650 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-260](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-254](#) .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.
2. GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-136, "NVIS\(NISSAN Vehicle Immobilizer System-NATS\)"](#) .

>> GO TO 4.

TROUBLE DIAGNOSIS

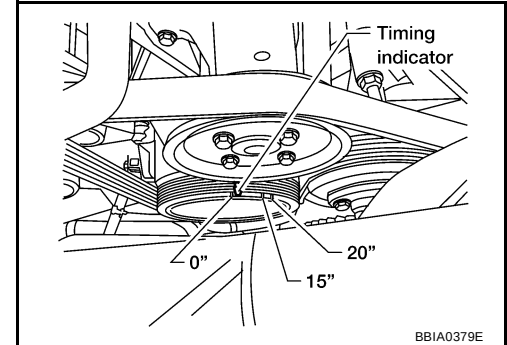
10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.

$15 \pm 5^\circ$ BTDC (in P or N position)

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 11.



11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-44, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

- Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

650 ± 50 rpm (in P or N position)

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

650 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 15.
NG >> GO TO 17.

TROUBLE DIAGNOSIS

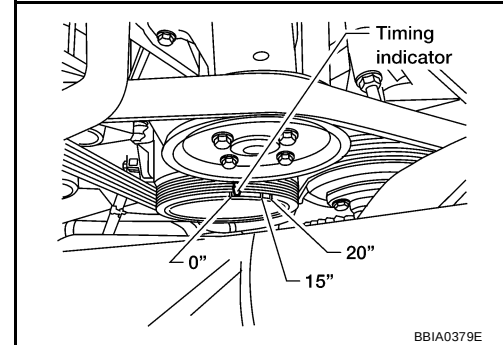
15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.

15 ± 5° BTDC (in P or N position)

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 16.



16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-35, "TIMING CHAIN"](#) .

OK or NG

- OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-260](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-254](#) .

OK or NG

- OK >> GO TO 18.
NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-136, "NVIS\(NISSAN Vehicle Immobilizer System-NATS\)"](#) .

>> GO TO 4.

TROUBLE DIAGNOSIS

Symptom Matrix Chart SYSTEM — BASIC ENGINE CONTROL SYSTEM

UBS00ENA

		SYMPTOM													Reference page											
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)												
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA												
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-581											
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-46											
	Injector circuit	1	1	2	3	2		2	2			2			EC-575											
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-605											
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-617											
	Incorrect idle speed adjustment						1	1	1	1		1			EC-79											
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-364 , EC-366											
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-79											
	Ignition circuit	1	1	2	2	2		2	2			2			EC-563											
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-127											
Mass air flow sensor circuit		1			2										EC-145 , EC-153											
Engine coolant temperature sensor circuit															3		3									
A/F sensor 1 circuit			1	2	3	2		2	2			2			EC-428 , EC-436 , EC-444 , EC-453 , EC-462 , EC-471 , EC-483											
Throttle position sensor circuit																2			2							EC-170 , EC-235 , EC-419 , EC-421 , EC-549
Accelerator pedal position sensor circuit																										3
Knock sensor circuit				2								3			EC-249											
Crankshaft position sensor (POS) circuit		2	2												EC-254											
Camshaft position sensor (PHASE) circuit		3	2												EC-260											

TROUBLE DIAGNOSIS

	SYMPTOM												Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA
Vehicle speed signal circuit		2	3		3						3		EC-339
Power steering pressure sensor circuit		2					3	3					EC-345
ECM	2	2	3	3	3	3	3	3	3	3	3		EC-350 , EC-360
PNP switch circuit			3		3		3	3			3		EC-526
Refrigerant pressure sensor circuit		2				3			3		4		EC-587
Electrical load signal circuit							3						EC-592
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2 MTC-22
ABS actuator and electric unit (control unit)			4										BRC-8 , BRC-97

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

TROUBLE DIAGNOSIS

SYSTEM — ENGINE MECHANICAL & OTHER

		SYMPTOM												Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA
Fuel	Fuel tank	5	5											FL-10
	Fuel piping			5	5	5		5	5			5		FL-3
	Vapor lock													—
	Valve deposit													—
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5		—
Air	Air duct		5	5	5	5	5	5	5	5	5	5	5	EM-14
	Air cleaner													EM-14
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)	5												EM-14
	Electric throttle control actuator													EM-15
	Air leakage from intake manifold/Collector/Gasket													EM-15
Cranking	Battery	1	1	1		1		1	1			1		1
	Generator circuit													
	Starter circuit	3										1		
	Signal plate	6												
	PNP switch	4												
Engine	Cylinder head	5	5	5	5	5		5	5			5		
	Cylinder head gasket										4		3	
	Cylinder block													
	Piston												4	
	Piston ring	6	6	6	6	6		6	6			6		
	Connecting rod													
	Bearing													
	Crankshaft													
Valve mechanism	Timing chain													EM-35
	Camshaft													EM-43
	Intake valve	5	5	5	5	5		5	5			5		
	Exhaust valve												3	EM-59

TROUBLE DIAGNOSIS

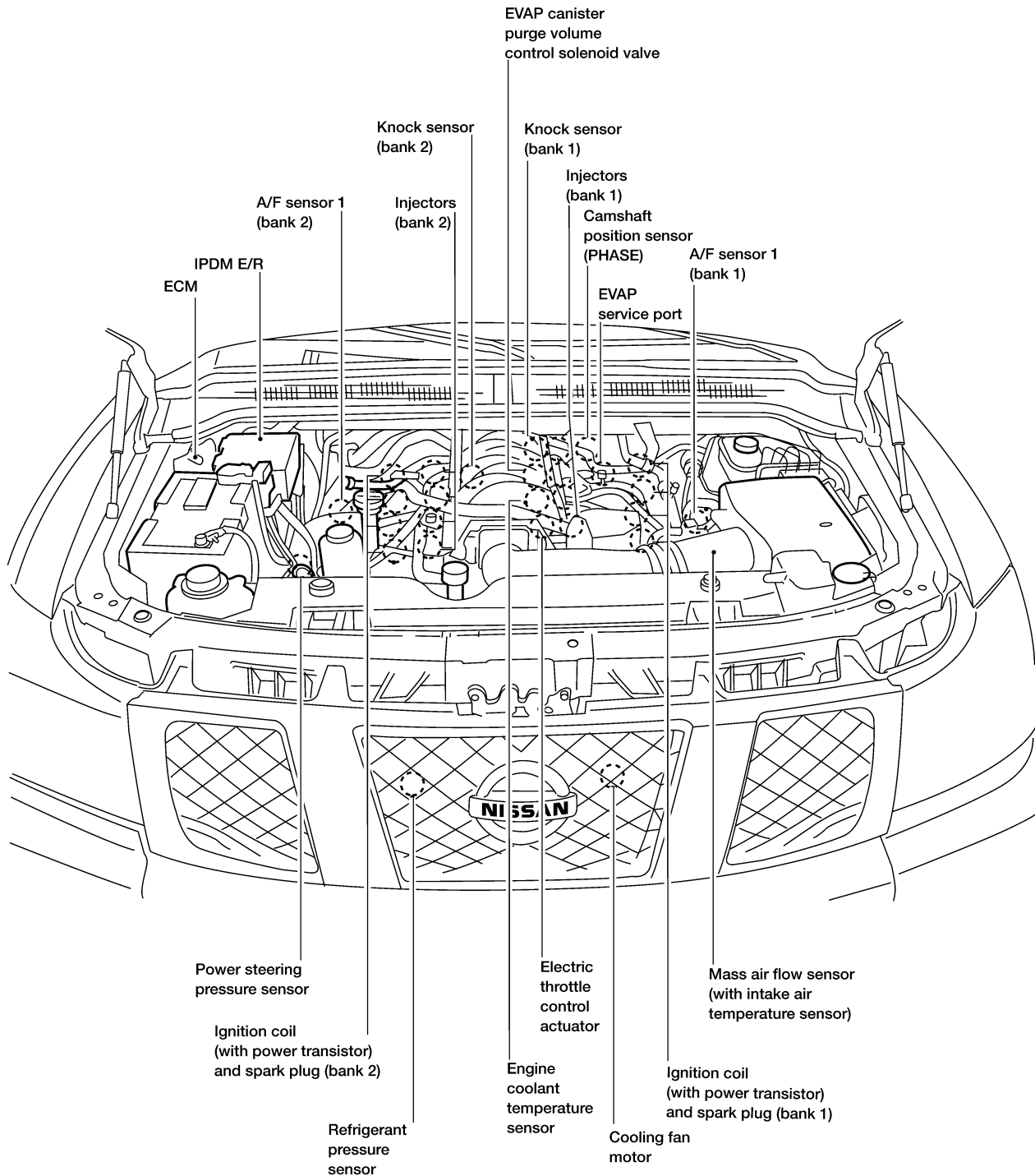
		SYMPTOM												Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5		EM-19 , EX-3
	Three way catalyst													
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5		EM-22 , LU-12 , LU-9 , LU-10
	Oil level (Low)/Filthy oil													LU-7
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5	5	5	5		4	5		CO-10
	Thermostat									5				CO-17
	Water pump													CO-15
	Water gallery													CO-7
	Cooling fan													EC-409
	Coolant level (Low)/Contami- nated coolant									5				CO-9
NVIS (Nissan Vehicle Immobilizer System — NATS)		1	1											EC-63 or BL-136

1 - 6: The numbers refer to the order of inspection.

TROUBLE DIAGNOSIS

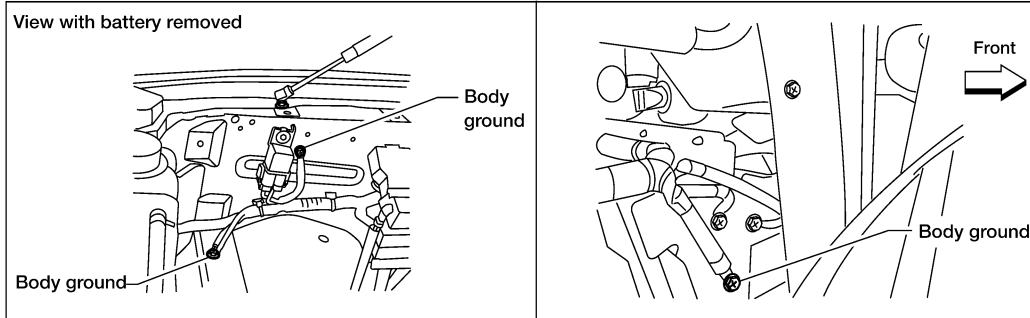
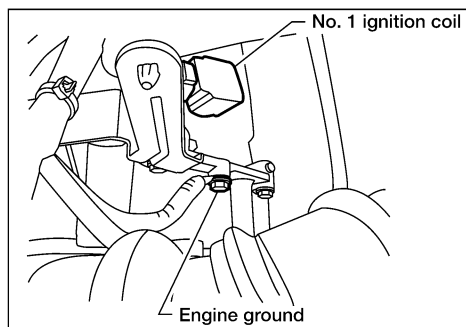
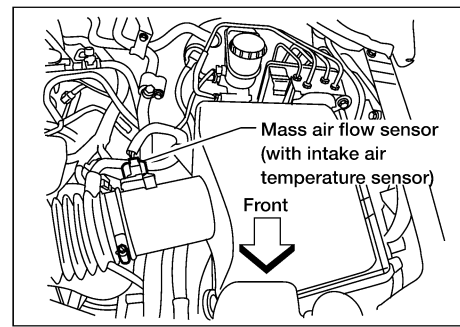
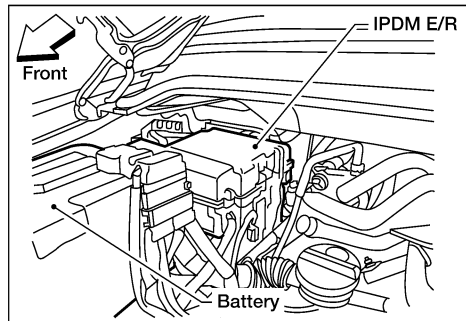
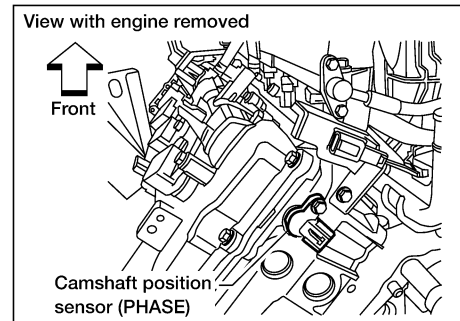
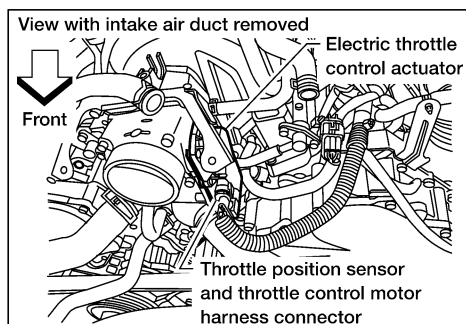
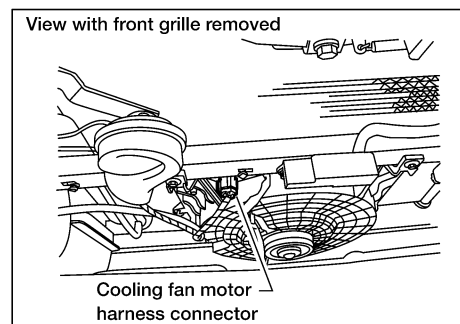
Engine Control Component Parts Location

UBS00ENB



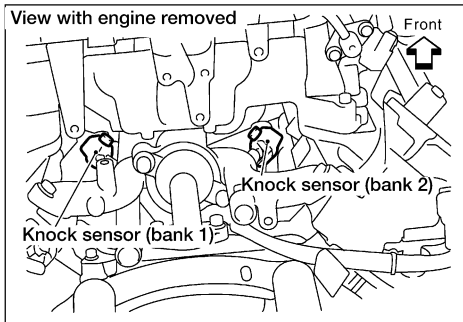
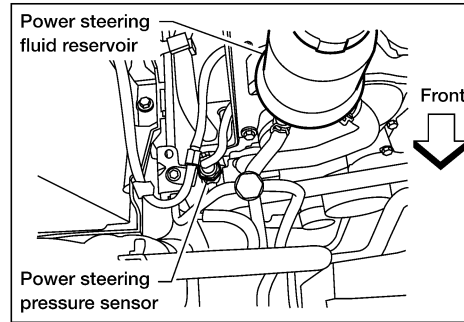
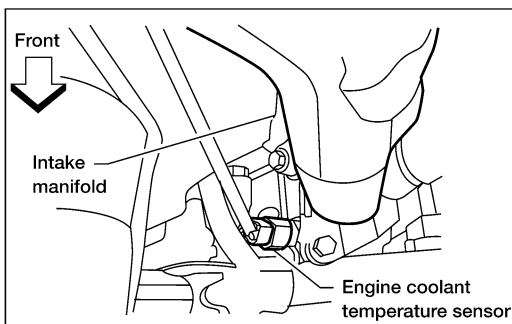
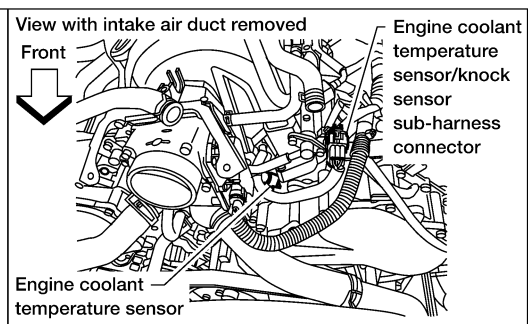
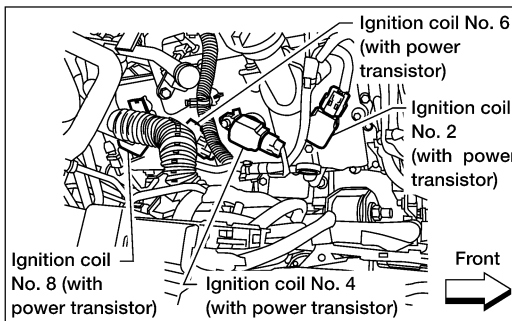
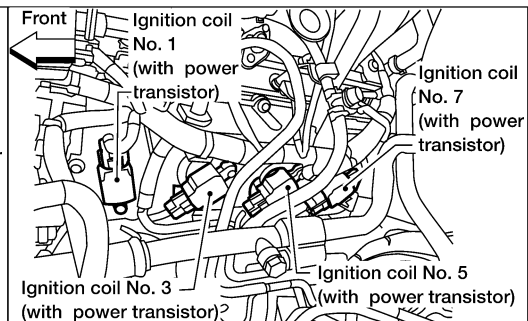
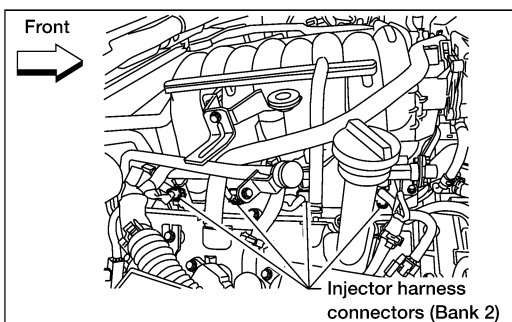
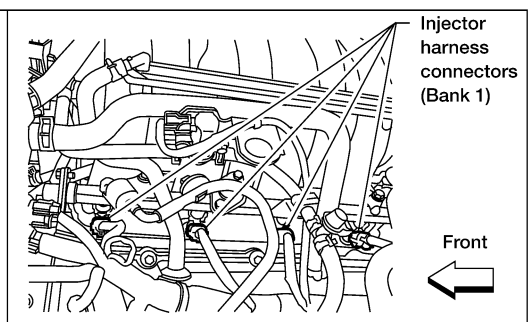
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TROUBLE DIAGNOSIS



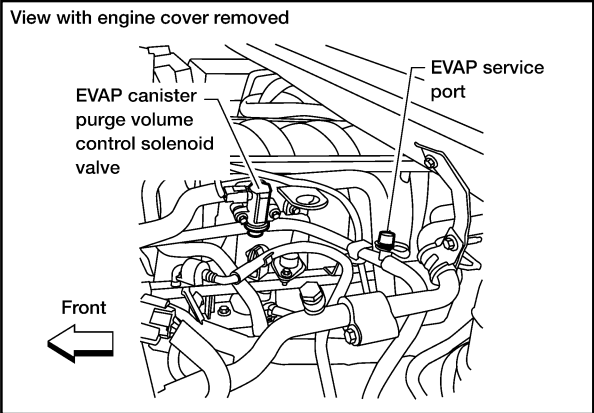
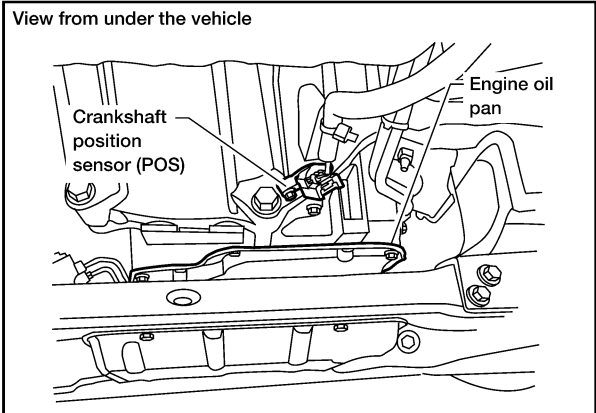
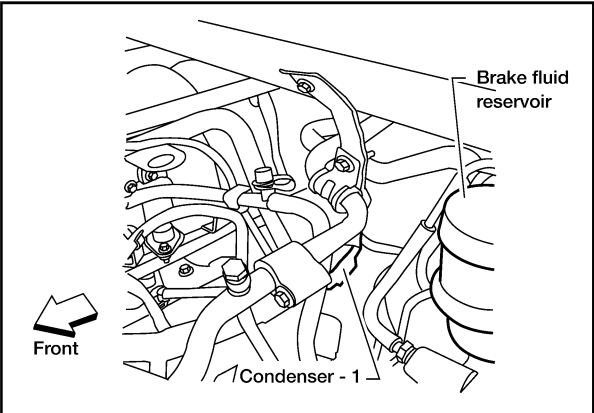
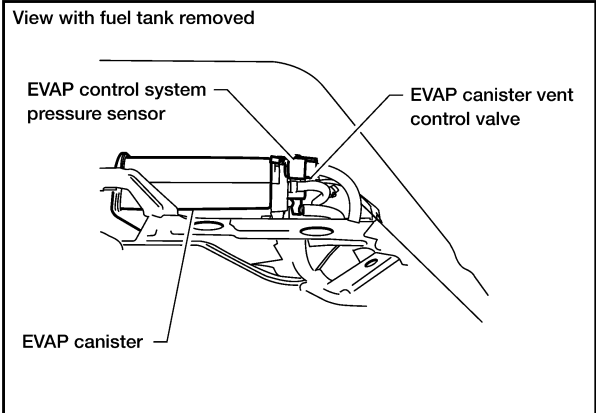
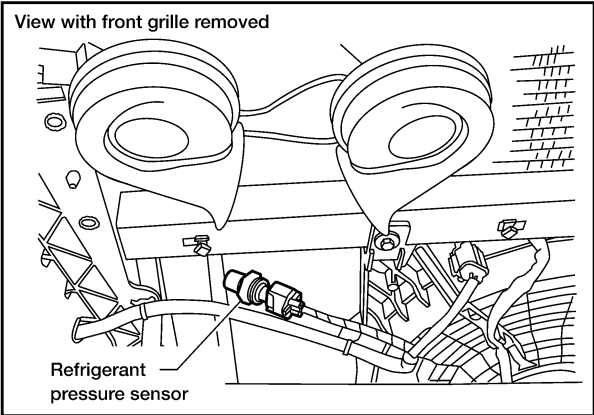
BBIA0381E

TROUBLE DIAGNOSIS



BBIA0382E

TROUBLE DIAGNOSIS



A

EC

C

D

E

F

G

H

I

J

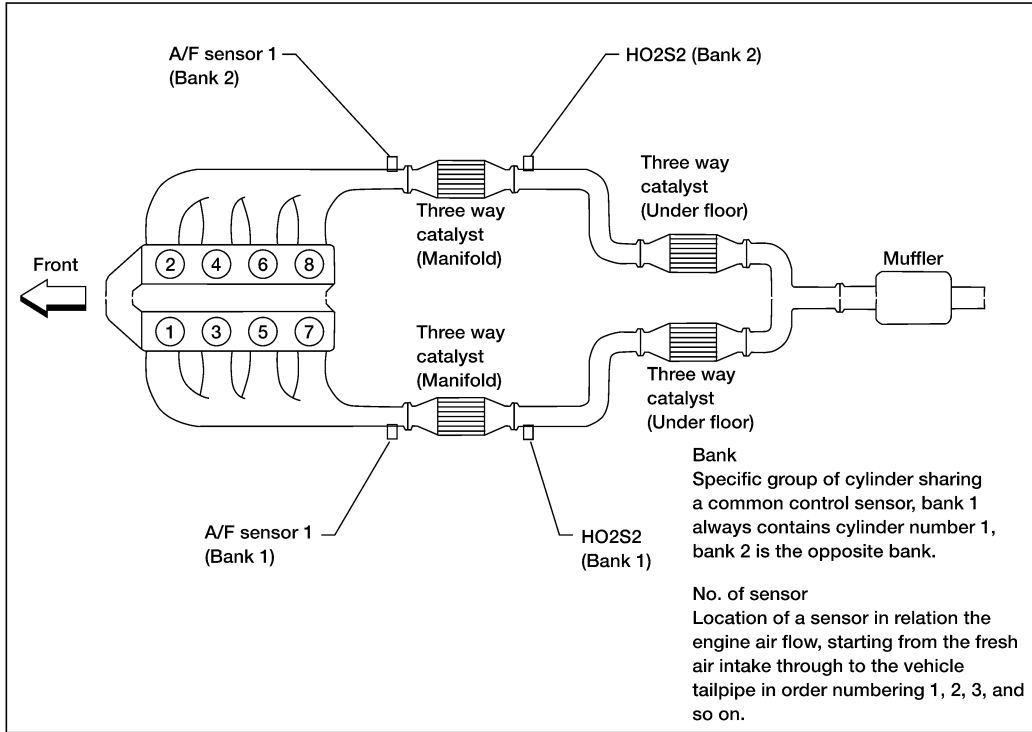
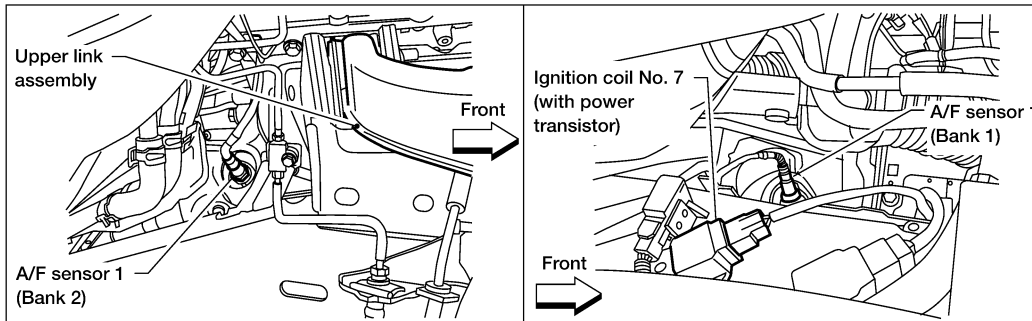
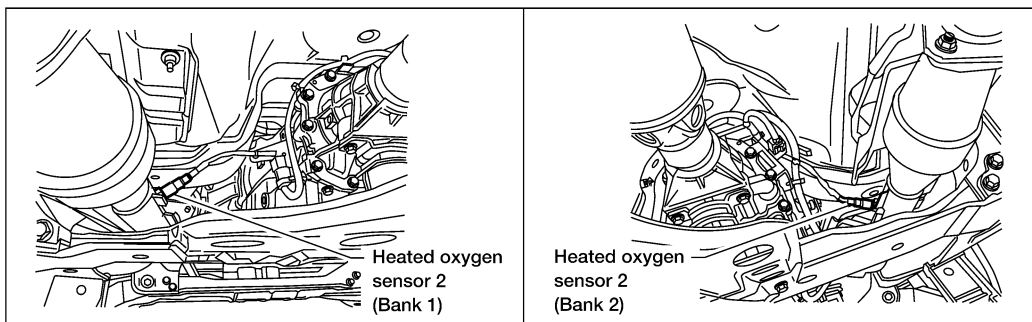
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L

M

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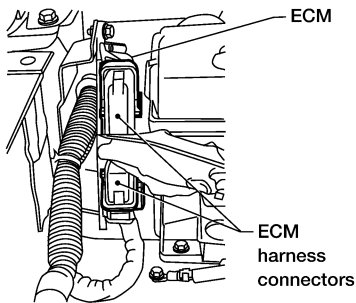
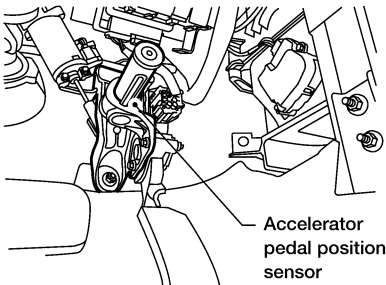
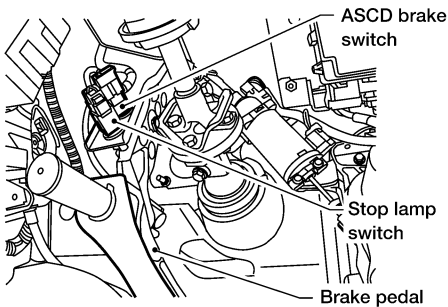
TROUBLE DIAGNOSIS



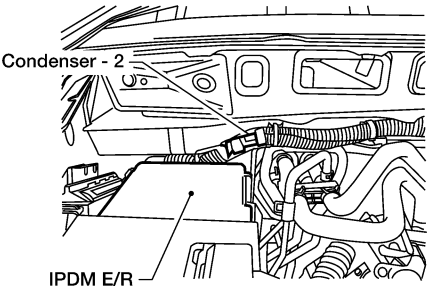
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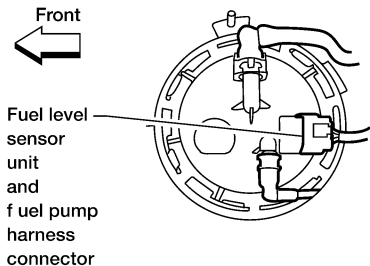
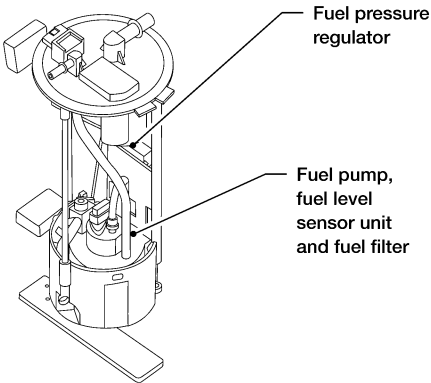
View with battery removed



View with cowl top extension removed



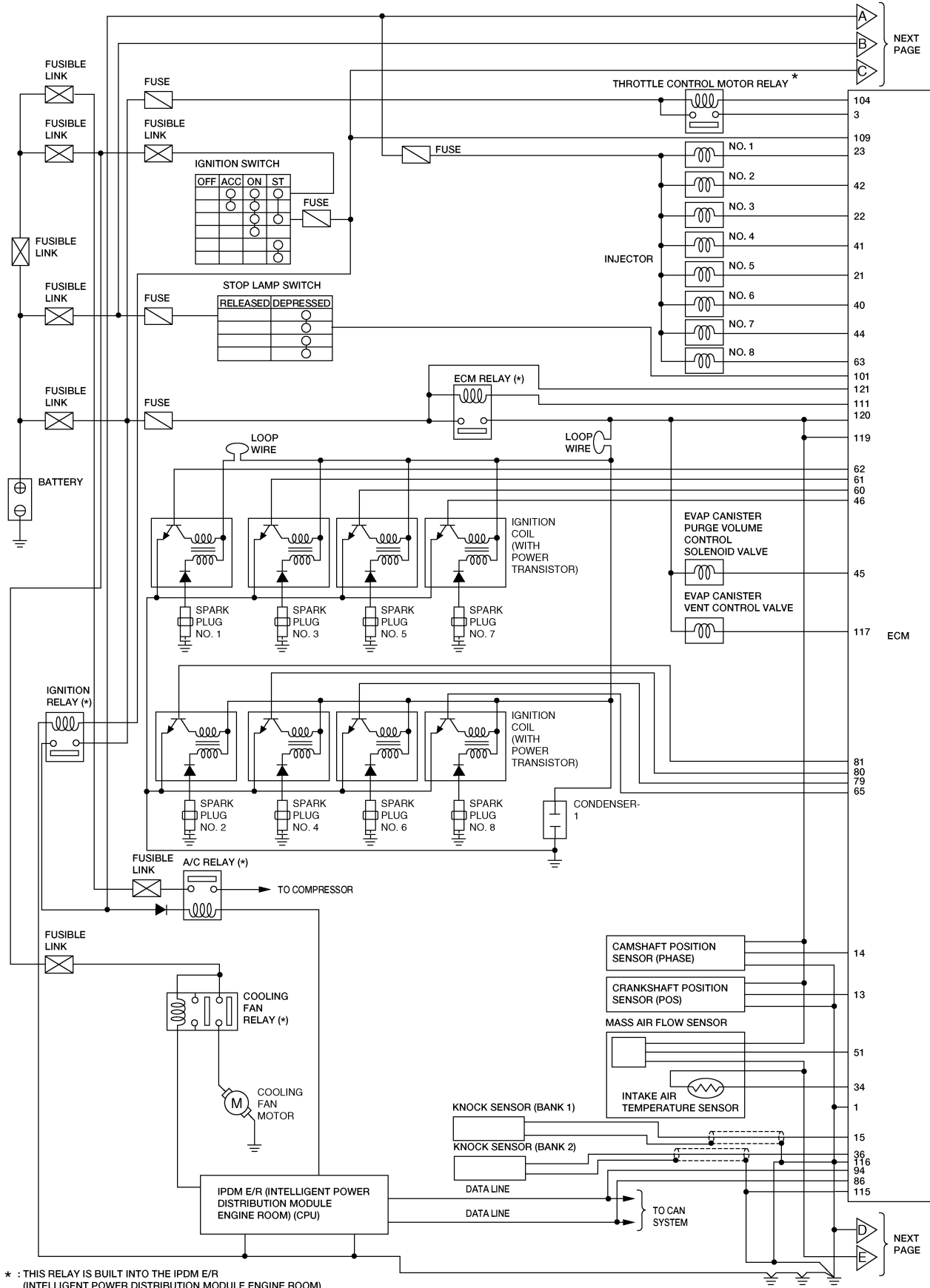
View with fuel tank removed



TROUBLE DIAGNOSIS

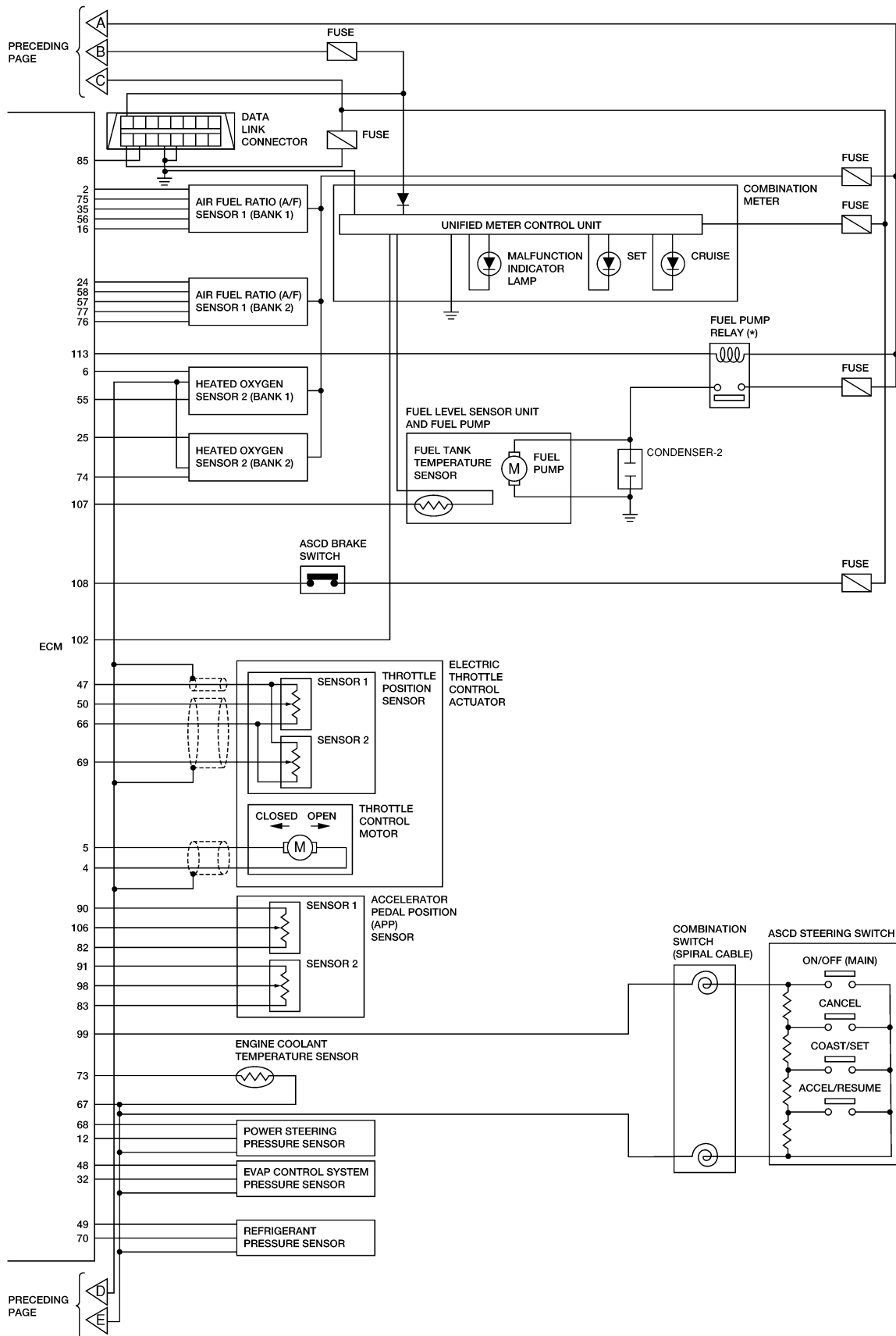
Circuit Diagram

UBS00ENC



BBWA1366E

TROUBLE DIAGNOSIS

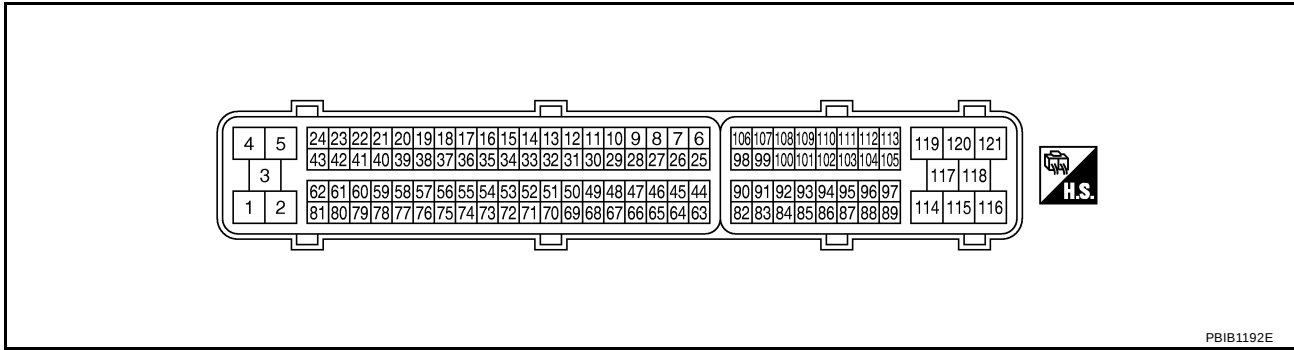


BBWA1367E

TROUBLE DIAGNOSIS

ECM Harness Connector Terminal Layout

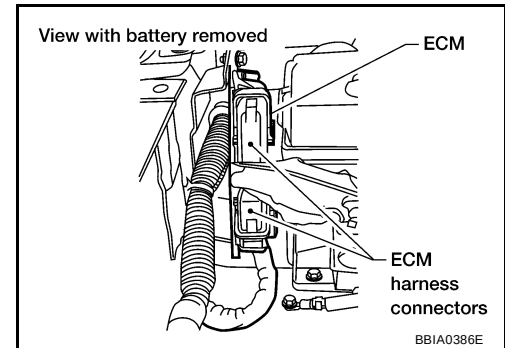
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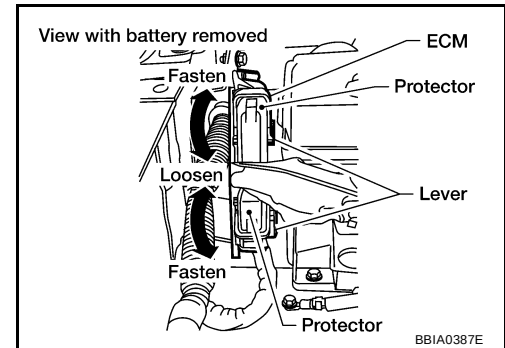
ECM Terminals and Reference Value

UBS00ENE

1. ECM is located in the engine room passenger side behind battery.
2. Remove ECM harness connector.



3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown in the figure.
4. Connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
 - Use extreme care not to touch 2 pins at one time.
 - Data is for comparison and may not be exact.

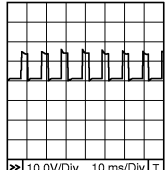


ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

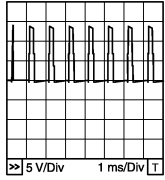
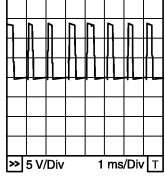
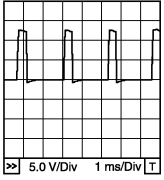
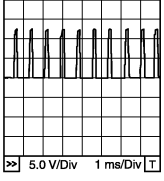
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

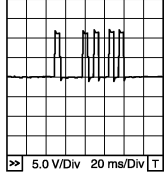
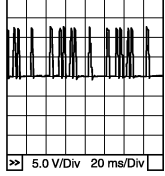
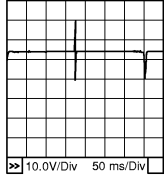
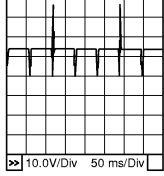
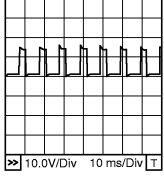
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	[Engine is running] ● Idle speed	Body ground
2	O/B	A/F sensor 1 heater (bank 1)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 5V★ 

PBIB1584E

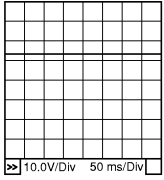
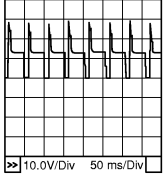
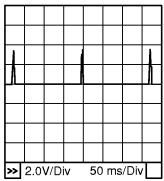
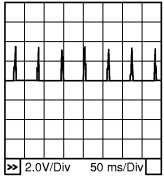
TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
3	L	Throttle control motor relay power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)	A
4	L/W	Throttle control motor (Close)	[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped Shift lever position: D Accelerator pedal: Released 	0 - 14V★  PBIB1104E	EC
5	L/B	Throttle control motor (Open)	[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped Shift lever position: D Accelerator pedal: Fully depressed 	0 - 14V★  PBIB1105E	C
6	GR	Heated oxygen sensor 2 heater (bank 1)	[Engine is running] <ul style="list-style-type: none"> Engine speed is below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 1.0V	D
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)	E
12	R	Power steering pressure sensor	[Engine is running] <ul style="list-style-type: none"> Steering wheel is being turned. 	0.5 - 4.5V	F
			[Engine is running] <ul style="list-style-type: none"> Steering wheel is not being turned. 	0.4 - 0.8V	G
13	O	Crankshaft position sensor (POS)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 2.0V★  PBIB1041E	H
			[Engine is running] <ul style="list-style-type: none"> Engine speed is 2,000 rpm. 	1.0 - 2.0V★  PBIB1042E	I

TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	Y	Camshaft position sensor (PHASE)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  <small>5.0 V/Div 20 ms/Div T</small> PBIB1039E
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	1.0 - 4.0V★  <small>5.0 V/Div 20 ms/Div T</small> PBIB1040E
15	W	Knock sensor 1	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 2.5V
16	BR/R	A/F sensor 1 (bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V
21 22 23 40 41 42 44 63	O/L BR GR/W Y/G P L O G	Injector No. 5 Injector No. 3 Injector No. 1 Injector No. 6 Injector No. 4 Injector No. 2 Injector No. 7 Injector No. 8	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  <small>10.0V/Div 50 ms/Div T</small> PBIB0042E
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	BATTERY VOLTAGE (11 - 14V)★  <small>10.0V/Div 50 ms/Div T</small> PBIB0043E
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 5V★  <small>10.0V/Div 10 ms/Div T</small> PBIB1584E

TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
25	O/G	Heated oxygen sensor 2 heater (bank 2)	[Engine is running] <ul style="list-style-type: none"> Engine speed is below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - 1.0V	EC
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)	C
32	L	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8V	D
34	R/B	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.	E
36	W	Knock sensor 2	[Engine is running] <ul style="list-style-type: none"> Idle speed 	Approximately 2.5V	F
45	L/Y	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> Idle speed Accelerator pedal is not depressed even slightly, after starting engine. 	BATTERY VOLTAGE (11 - 14V)★  10.0V/Div 50 ms/Div PBIB0050E	G
			[Engine is running] <ul style="list-style-type: none"> Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	11 - 14V★  10.0V/Div 50 ms/Div PBIB0051E	H
46 60 61 62 65 79 80 81	L/R GR/R O/W Y/R G/R V/W W/R W/G	Ignition signal No. 7 Ignition signal No. 5 Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 8 Ignition signal No. 6 Ignition signal No. 4 Ignition signal No. 2	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	0 - 0.2V★  2.0V/Div 50 ms/Div PBIB0044E	I
			[Engine is running] <ul style="list-style-type: none"> Warm-up condition Engine speed is 2,000 rpm. 	0.1 - 0.4V★  2.0V/Div 50 ms/Div PBIB0045E	J
47	Y	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5V	K

TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	SB	Sensor power supply (EVAP control system pressure sensor)	[Ignition switch: ON]	Approximately 5V
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5V
50	B	Throttle position sensor 1	[Ignition switch: ON] ● Engine stopped ● Shift lever position: D ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever position: D ● Accelerator pedal: Fully depressed	Less than 4.75V
51	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.4V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.0V
55	R	Heated oxygen sensor 2 (bank 1)	[Engine is running] ● Warm-up condition ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. – After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
57	L/P	A/F sensor 1 (bank 2)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
68	W/L	Sensor power supply (Power steering pressure sensor)	[Ignition switch: ON]	Approximately 5V
69	W	Throttle position sensor 2	[Ignition switch: ON] ● Engine stopped ● Shift lever position: D ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever position: D ● Accelerator pedal: Fully depressed	More than 0.36V

TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
70	B/W	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Both A/C switch and blower switch are ON. (Compressor operates.) 	1.0 - 4.0V	EC
73	Y/B	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.	C
74	L	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. – After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0V	D E F
82	B/R	Sensor ground (APP sensor 1)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V	G
83	G/W	Sensor ground (APP sensor 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V	H
85	G/W	Data link connector	[Ignition switch: ON] <ul style="list-style-type: none"> ● CONSULT-II or GST is disconnected. 	Approximately 5V - Battery voltage (11 - 14V)	I
86	R	CAN communication line	[Ignition switch: ON]	Approximately 1.1 - 2.3V Output voltage varies with the communication status.	J
90	L	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5V	K
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V	L
94	W	CAN communication line	[Ignition switch: ON]	Approximately 2.6 - 3.2V Output voltage varies with the communication status.	M
98	G/R	Accelerator pedal position sensor 2	[Ignition switch: ON] <ul style="list-style-type: none"> ● Engine stopped ● Accelerator pedal: Fully released 	0.15 - 0.60V	
			[Ignition switch: ON] <ul style="list-style-type: none"> ● Engine stopped ● Accelerator pedal: Fully depressed 	1.95 - 2.40V	

TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	G/Y	ASCD steering switch	[Ignition switch: ON] ● ASCD steering switch: OFF	Approximately 4V
			[Ignition switch: ON] ● ON/OFF(MAIN) switch: Pressed	Approximately 0V
			[Ignition switch: ON] ● ON/OFF(MAIN) switch: Released	Approximately 4V
			[Ignition switch: ON] ● CANCEL switch: Pressed	Approximately 1V
			[Ignition switch: ON] ● CANCEL switch: Released	Approximately 4V
			[Ignition switch: ON] ● COAST/SET switch: Pressed	Approximately 2V
			[Ignition switch: ON] ● COAST/SET switch: Released	Approximately 4V
			[Ignition switch: ON] ● ACCEL/RESUME switch: Pressed	Approximately 3V
			[Ignition switch: ON] ● ACCEL/RESUME switch: Released	Approximately 4V
101	R/W	Stop lamp switch	[Ignition switch: OFF] ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Depressed	BATTERY VOLTAGE (11 - 14V)
102	GR/R	PNP switch	[Ignition switch: ON] ● Shift lever position: P or N	Approximately 0V
			[Ignition switch: ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
104	O	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON]	0 - 1.0V
106	BR/W	Accelerator pedal position sensor 1	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	3.9 - 4.7V
107	V/R	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.
108	BR/W	ASCD brake switch	[Ignition switch: ON] ● Brake pedal: Depressed	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14V)
109	L/W	Ignition switch	[Ignition switch: OFF]	0V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] ● For a few seconds after turning ignition switch OFF	0 - 1.5V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
113	GR	Fuel pump relay	[Ignition switch: ON] ● For 1 second after turning ignition switch ON	0 - 1.5V
			[Engine is running] [Ignition switch: ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
115 116	B B/W	ECM ground	[Engine is running] ● Idle speed	Body ground
117	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
121	W	Power supply for ECM (Back-up)	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

CONSULT-II Function FUNCTION

UBS00ENF

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output of the specification for Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECM part number	ECM part number can be read.

*1: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

TROUBLE DIAGNOSIS

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

			DIAGNOSTIC TEST MODE							
			WORK SUP- PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI- TOR	DATA MONI- TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
				DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP- PORT
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	×			
		Camshaft position sensor (PHASE)		×	×	×	×			
		Mass air flow sensor		×		×	×			
		Engine coolant temperature sensor		×	×	×	×	×		
		A/F sensor 1		×		×	×		×	×
		Heated oxygen sensor 2		×		×	×		×	×
		Vehicle speed sensor		×	×	×	×			
		Accelerator pedal position sensor		×		×	×			
		Throttle position sensor		×		×	×			
		Fuel tank temperature sensor		×		×	×	×		
		EVAP control system pressure sensor		×		×	×			
		Intake air temperature sensor		×	×	×	×			
		Knock sensor		×						
		Refrigerant pressure sensor				×	×			
		Closed throttle position switch (accelerator pedal position sensor signal)				×	×			
		Air conditioner switch				×	×			
		Park/neutral position (PNP) switch		×		×	×			
		Stop lamp switch		×		×	×			
		Power steering pressure sensor		×		×	×			
		Battery voltage				×	×			
		Load signal				×	×			
		Fuel level sensor		×		×	×			
		ASCD steering switch		×		×	×			
		ASCD brake switch		×		×	×			
ENGINE CONTROL COMPONENT PARTS	OUTPUT	Injector				×	×	×		
		Power transistor (Ignition timing)				×	×	×		
		Throttle control motor relay		×		×	×			
		Throttle control motor		×						
		EVAP canister purge volume control solenoid valve		×		×	×	×		×
		Air conditioner relay				×	×			
		Fuel pump relay	×			×	×	×		
		Cooling fan relay		×		×	×	×		
		A/F sensor 1 heater		×		×	×		×	
		Heated oxygen sensor 2 heater		×		×	×		×	
		EVAP canister vent control valve	×	×		×	×	×		
		Calculated load value			×	×	×			

TROUBLE DIAGNOSIS

X: Applicable

*1: This item includes 1st trip DTCs.

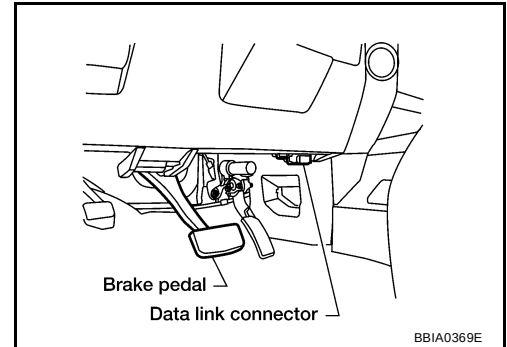
*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to [EC-54, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA"](#) .

INSPECTION PROCEDURE

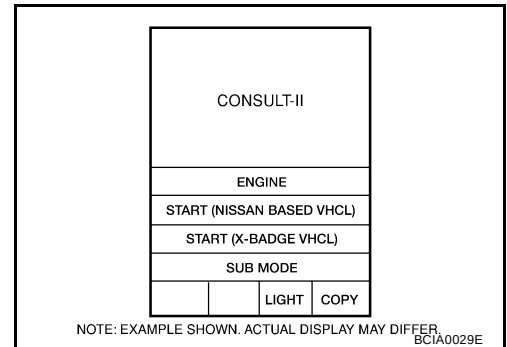
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

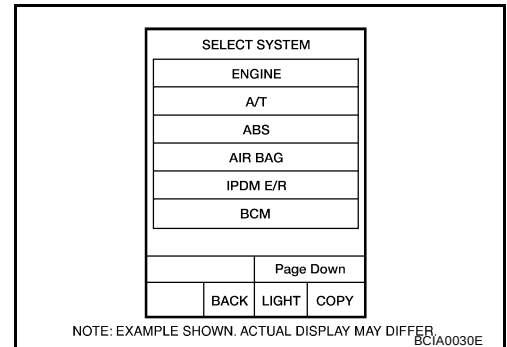
1. Turn ignition switch OFF.
2. Connect "CONSULT-II" and "CONSULT-II CONVERTER" to data link connector, which is located under LH dash panel near the center console.
3. Turn ignition switch ON.



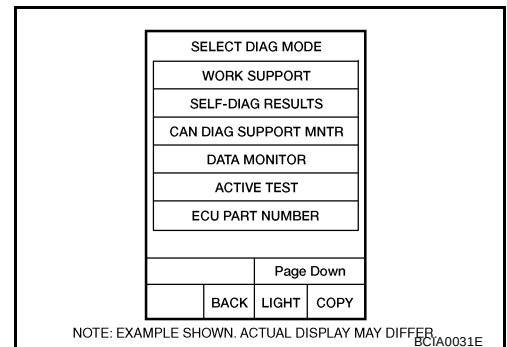
4. Touch "START (NISSAN BASED VHCL)".



5. Touch "ENGINE".
If "ENGINE" is not indicated, go to [GI-38, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#) .



6. Perform each diagnostic test mode according to each service procedure.
For further information, see the CONSULT-II Operation Manual.



TROUBLE DIAGNOSIS

WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. 	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. 	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. 	When clearing the coefficient of self-learning control value
EVAP SYSTEM CLOSE	<p>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> IGN SW ON ENGINE NOT RUNNING AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM FUEL TANK TEMP. IS MORE THAN 0°C (32°F). WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> IDLE CONDITION 	When setting target idle speed
TARGET IGN TIM ADJ*	<ul style="list-style-type: none"> IDLE CONDITION 	When adjusting target ignition timing

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to [EC-8, "INDEX FOR DTC"](#) .)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item* ¹	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to EC-8, "INDEX FOR DTC" .)
FUEL SYS-B1	<ul style="list-style-type: none"> "Fuel injection system status" at the moment a malfunction is detected is displayed.
FUEL SYS-B2	<ul style="list-style-type: none"> One mode in the following is displayed. "Mode2": Open loop due to detected system malfunction "Mode3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "Mode4": Closed loop - using oxygen sensor(s) as feedback for fuel control "Mode5": Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	<ul style="list-style-type: none"> The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature at the moment a malfunction is detected is displayed.

TROUBLE DIAGNOSIS

Freeze frame data item*1	Description
L-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> “Long-term fuel trim” at the moment a malfunction is detected is displayed.
L-FUEL TRM-B2 [%]	<ul style="list-style-type: none"> The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> “Short-term fuel trim” at the moment a malfunction is detected is displayed.
S-FUEL TRM-B2 [%]	<ul style="list-style-type: none"> The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed.

*1: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
ENG SPEED [rpm]	×	×	<ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). 	<ul style="list-style-type: none"> Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]		×	<ul style="list-style-type: none"> “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	
A/F ALPHA-B1 [%]		×	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
A/F ALPHA-B2 [%]		×		<ul style="list-style-type: none"> This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	×	×	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
A/F SEN1 (B1) [V]	×	×	<ul style="list-style-type: none"> The A/F signal computed from the input signal of the A/F sensor 1 is displayed. 	
A/F SEN1 (B2) [V]	×			
HO2S2 (B1) [V]	×		<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. 	
HO2S2 (B2) [V]	×			
HO2S2 MNTR (B1) [RICH/LEAN]	×		<ul style="list-style-type: none"> Display of heated oxygen sensor 2 signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
HO2S2 MNTR (B2) [RICH/LEAN]	×			

TROUBLE DIAGNOSIS

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
VHCL SPEED SE [km/h] or [mph]	×	×	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. 	
BATTERY VOLT [V]	×	×	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 	
ACCEL SEN 1 [V]	×	×	<ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2 [V]	×			
THRTL SEN 1 [V]	×	×	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
THRTL SEN 2 [V]	×			
FUEL T/TEMP SE [°C] or [°F]	×		<ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. 	
INT/A TEMP SE [°C] or [°F]	×	×	<ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. 	
EVAP SYS PRES [V]	×		<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 	
FUEL LEVEL SE [V]	×		<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 	
START SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	×	×	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal. 	
AIR COND SIG [ON/OFF]	×	×	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 	
P/N POSI SW [ON/OFF]	×	×	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. 	
PW/ST SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor signal) is indicated. 	
LOAD SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON ... Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF ... Both rear window defogger switch and lighting switch are OFF. 	
IGNITION SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch signal. 	
HEATER FAN SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. 	
BRAKE SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. 	

TROUBLE DIAGNOSIS

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
INJ PULSE-B1 [msec]		×	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated.
INJ PULSE-B2 [msec]				
IGN TIMING [BTDC]		×	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
CAL/LD VALUE [%]			<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current air flow divided by peak air flow. 	
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor. 	
PURG VOL C/V [%]			<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
AIR COND RLY [ON/OFF]		×	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. 	
FUEL PUMP RLY [ON/OFF]		×	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON ... Closed OFF ... Open 	
THRTL RELAY [ON/OFF]			<ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. 	
COOLING FAN [HI/OFF]			<ul style="list-style-type: none"> The control condition of the cooling fan (determined by ECM according to the input signals) is indicated. ON ... Operating OFF ... Stop 	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. 	
HO2S2 HTR (B2) [ON/OFF]				
I/P PULLY SPD [rpm]			<ul style="list-style-type: none"> Indicates the engine speed computed from the turbine revolution sensor signal. 	
VEHICLE SPEED [km/h] or [MPH]			<ul style="list-style-type: none"> Indicates the vehicle speed computed from the revolution sensor signal. 	
IDL A/V LEARN [YET/CMPLT]			<ul style="list-style-type: none"> Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully. 	

A

EC

C

D

E

F

G

H

I

J

K

L

M

TROUBLE DIAGNOSIS

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
TRVL AFTER MIL [km] or [mile]			<ul style="list-style-type: none"> Distance traveled while MIL is activated. 	
A/F S1 HTR (B1) [%]			<ul style="list-style-type: none"> Indicates A/F sensor 1 heater control value computed by the ECM according to the input signals. 	
A/F S1 HTR (B2) [%]			<ul style="list-style-type: none"> The current flow to the heater becomes larger as the value increases. 	
AC PRESS SEN [V]			<ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. 	
VHCL SPEED SE [km/h] or [mph]			<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. 	
SET VHCL SPD [km/h] or [mph]			<ul style="list-style-type: none"> The preset vehicle speed is displayed. 	
MAIN SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ON/OFF(MAIN) switch signal. 	
CANCEL SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from CAN-CEL switch signal. 	
RESUME/ACC SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ACCEL/RESUME switch signal. 	
SET SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from COAST/SET switch signal. 	
BRAKE SW1 SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal. 	
BRAKE SW2 SW [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. 	
VHCL SPD CUT [NON/CUT]			<ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON ... Vehicle speed is maintained at the ASCD set speed. CUT ... Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off. 	
LOW SPEED CUT [NON/CUT]			<ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON ... Vehicle speed is maintained at the ASCD set speed. CUT ... Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off. 	
AT OD MONITOR [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D according to the input signal from TCM. 	
AT OD CANCEL [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D cancel signal from TCM. 	
CRUISE LAMP [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. 	
SET LAMP [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. 	

TROUBLE DIAGNOSIS

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
Voltage [V]			<ul style="list-style-type: none"> Voltage, frequency, duty cycle or pulse width measured by the probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency [msec], [Hz] or [%]				
DUTY-HI				
DUTY-LOW				
PLS WIDTH-HI				
PLS WIDTH-LOW				

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

DATA MONITOR (SPEC) MODE

Monitored Item

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
ENG SPEED [rpm]	×	×	<ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS). 	
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor specification is displayed. 	<ul style="list-style-type: none"> When engine is running specification range is indicated.
B/FUEL SCHDL [msec]		×	<ul style="list-style-type: none"> “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> When engine is running specification range is indicated.
A/F ALPHA-B1 [%] A/F ALPHA-B2 [%]		×	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When engine is running specification range is indicated. This data also includes the data for the air-fuel ratio learning control.

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Perform Idle Air Volume Learning.
POWER BALANCE	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Shift lever N Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil

TROUBLE DIAGNOSIS

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
COOLING FAN*	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan ON and OFF using CONSULT-II. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connectors Cooling fan motor IPDM E/R
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay ON and OFF using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connectors Fuel pump relay
PURG VOL CONT/V	<ul style="list-style-type: none"> Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> Harness and connectors Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve ON and OFF with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connectors Solenoid valve

*: Leaving cooling fan OFF with CONSULT-II while engine is running may cause the engine to overheat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to [EC-55, "SYSTEM READINESS TEST \(SRT\) CODE"](#) .

SRT Work Support Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

DTC Work Support Mode

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	EC-270
	EVAP SML LEAK P0442/P1442*		EC-275
	EVAP V/S SML LEAK P0456/P1456*		EC-323
	PURG VOL CN/V P1444		EC-495
A/F SEN1	A/F SEN1 (B1) P1276		EC-462
	A/F SEN1 (B2) P1286		EC-462
	A/F SEN1 (B1) P1278/P1279		EC-471 , EC-483
	A/F SEN1 (B2) P1288/1289		EC-471 , EC-483
H02S2	H02S2 (B1) P0139		EC-195
	H02S2 (B1) P1146		EC-382
	H02S2 (B1) P1147		EC-394
	H02S2 (B2) P0159		EC-195
	H02S2 (B2) P1166		EC-382
	H02S2 (B2) P1167		EC-394

*: DTC P1442 and P1456 does not apply to A60 models but appears in DTC Work Support Mode screens.

TROUBLE DIAGNOSIS

REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

Description

CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

1. "AUTO TRIG" (Automatic trigger):

- The malfunction will be identified on the CONSULT-II screen in real time.

In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.

At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at right, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data ... xx%", "REAL-TIME DIAG" screen is also displayed.

The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.

2. "MANU TRIG" (Manual trigger):

- DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.

DATA MONITOR can be performed continuously even though a malfunction is detected.

DATA MONITOR	
Recording Data...11%	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF705Y

SET RECORDING CONDITION
AUTO TRIG
MANU TRIG
TRIGGER POINT
0% 20% 40% 60% 80% 100%
RECORDING SPEED
MIN MAX
/64 /32 /16 /8 /4 /2 FULL

SEF707X

TROUBLE DIAGNOSIS

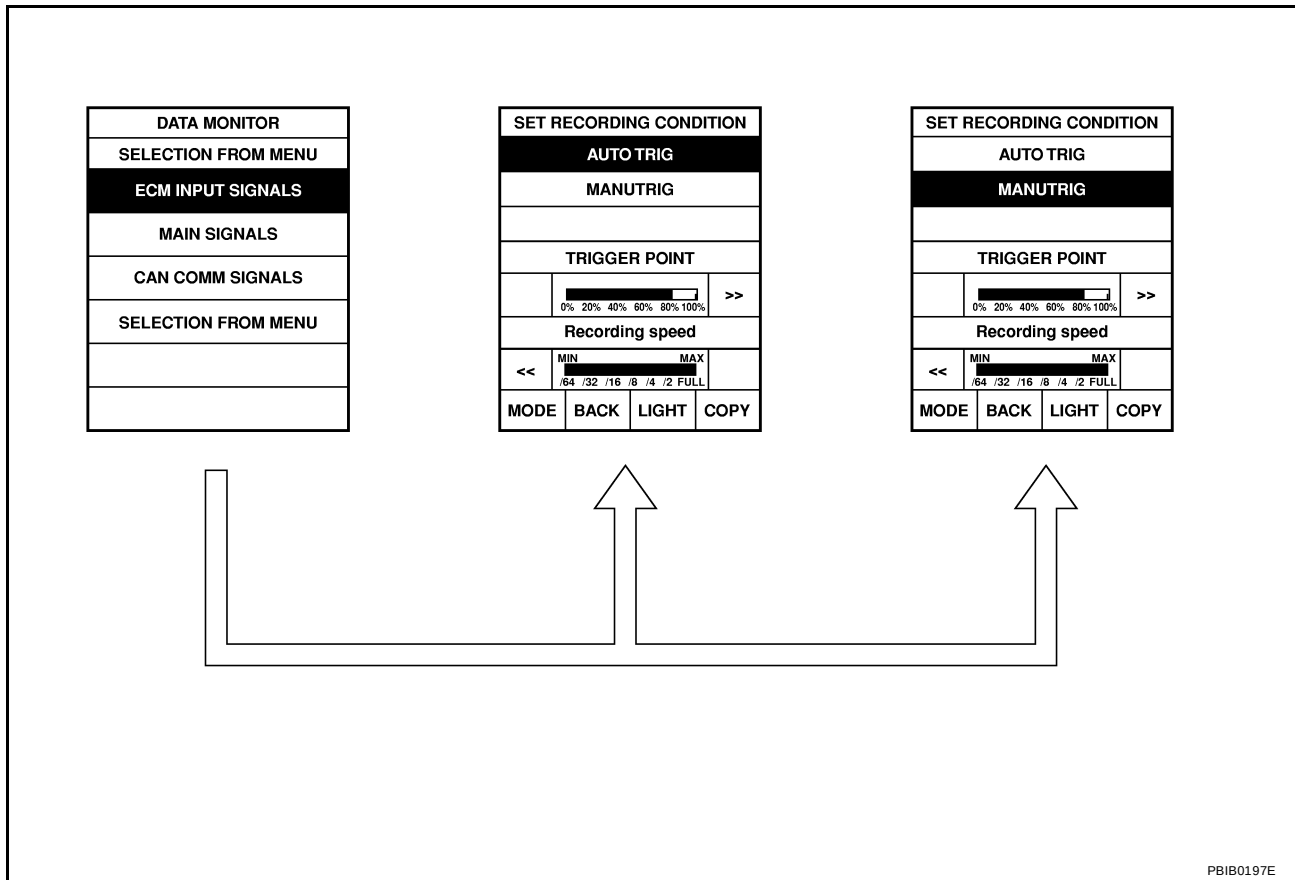
Operation

1. "AUTO TRIG"

- While trying to detect the DTC/1st trip DTC by performing the DTC Confirmation Procedure, be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
- While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent.
When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the DTC Confirmation Procedure, the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to "INCIDENT SIMULATION TESTS" in [GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) .)

2. "MANU TRIG"

- If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



TROUBLE DIAGNOSIS

Generic Scan Tool (GST) Function

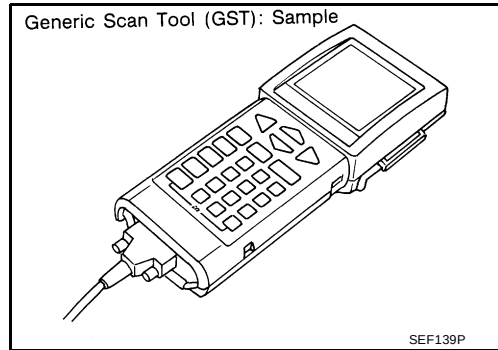
UBS00ENG

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below.

ISO9141 is used as the protocol.

The name "GST" or "Generic Scan Tool" is used in this service manual.



FUNCTION

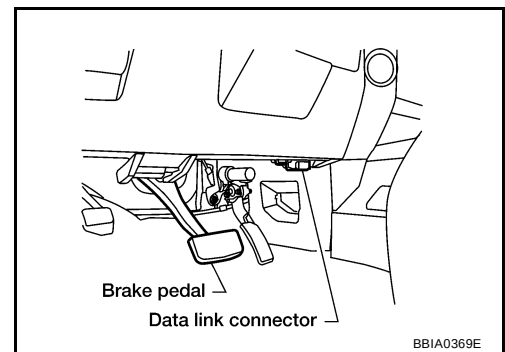
Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-54, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none">● Clear number of diagnostic trouble codes (MODE 1)● Clear diagnostic trouble codes (MODE 3)● Clear trouble code for freeze frame data (MODE 1)● Clear freeze frame data (MODE 2)● Reset status of system monitoring test (MODE 1)● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch ON position (Engine stopped). When this mode is performed, the following parts can be opened or closed. <ul style="list-style-type: none">● EVAP canister vent control valve open In the following conditions, this mode cannot function. <ul style="list-style-type: none">● Low ambient temperature● Low battery voltage● Engine running● Ignition switch OFF● Low fuel temperature● Too much pressure is applied to EVAP system
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

INSPECTION PROCEDURE

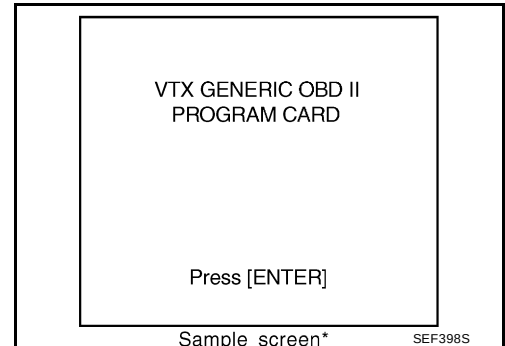
1. Turn ignition switch OFF.

TROUBLE DIAGNOSIS

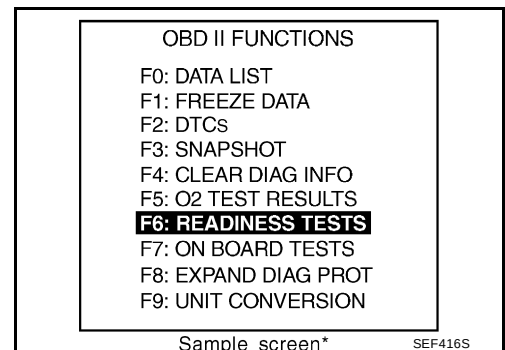
2. Connect GST to data link connector, which is located under LH dash panel near the center console.



3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.
(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.
For further information, see the GST Operation Manual of the tool maker.



TROUBLE DIAGNOSIS

CONSULT-II Reference Value in Data Monitor

UBS00ENH

Remarks:

● Specification data are reference values.

● Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION		SPECIFICATION
ENG SPEED	● Run engine and compare the CONSULT-II value with tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● no load	Idle	Approx. 1.1 - 1.4V
		2,500 rpm	Approx. 1.7 - 2.0V
B/FUEL SCHDL	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● no load	Idle	3.0 - 4.2 msec
		2,000 rpm	3.0 - 4.2 msec
A/F ALPHA-B1 A/F ALPHA-B2	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	54% - 155%
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuated around 1.5V
HO2S2 (B1) HO2S2 (B2)	● Warm-up condition ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	● Warm-up condition ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH
VEH SPEED SE	● Turn drive wheels and compare the CONSULT-II value with speedometer indication.		Almost the same speed as the speedometer indication
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.0 - 4.7V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.3 - 1.2V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
EVAP SYS PRES	● Ignition switch: ON		Approx. 1.8 - 4.8V
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N	ON
		Shift lever: Except above	OFF

TROUBLE DIAGNOSIS

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON
LOAD SIGNAL	<ul style="list-style-type: none"> Ignition switch: ON 	Rear window defogger switch is ON and/or lighting switch is in 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
IGNITION SW	<ul style="list-style-type: none"> Ignition switch: ON → OFF → ON 		ON → OFF → ON
HEATER FAN SW	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Heater fan is operating.	ON
		Heater fan is not operating	OFF
BRAKE SW	<ul style="list-style-type: none"> Ignition switch: ON 	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1 INJ PULSE-B2	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: N no load 	Idle	2.0 - 2.8 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: N no load 	Idle	14° - 18° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: N no load 	Idle	14% - 33%
		2,500 rpm	12% - 25%
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: N no load 	Idle	3.0 - 9.0 g·m/s
		2,500 rpm	9.0 - 28.0 g·m/s
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: N no load 	Idle (Accelerator pedal is not depressed even slightly, after starting engine)	0%
		2,000 rpm	—
AIR COND RLY	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	<ul style="list-style-type: none"> For 1 second after turning ignition switch ON Engine running or cranking 		ON
	<ul style="list-style-type: none"> Except above conditions 		OFF
VENT CONT/V	<ul style="list-style-type: none"> Ignition switch: ON 		OFF
THRTL RELAY	<ul style="list-style-type: none"> Ignition switch: ON 		ON
COOLING FAN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Air conditioner switch: OFF 	Engine coolant temperature is 99°C (210°F) or less	OFF
		Engine coolant temperature is between 100°C (212°F) and 104°C (219°F) at vehicle speed less than 40 km/h (25 MPH)	ON
		Engine coolant temperature is 105°C (221°F) or more	ON

TROUBLE DIAGNOSIS

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 HTR (B1) HO2S2 HTR (B2)	<ul style="list-style-type: none"> Engine speed is below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		ON
	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 		OFF
I/P PULLY SPD	<ul style="list-style-type: none"> Vehicle speed: More than 20 km/h (12 MPH) 		Almost the same speed as the tachometer indication
VEHICLE SPEED	<ul style="list-style-type: none"> Turn drive wheels and compare the CONSULT-II value with speedometer indication. 		Almost the same speed as the speedometer indication
TRVL AFTER MIL	<ul style="list-style-type: none"> Ignition switch: ON 	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 miles)
AC PRESS SEN	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) 		Approx. 0V
	<ul style="list-style-type: none"> Engine: Idle Air conditioner switch: OFF 		1.0 - 4.0V
VEH SPEED SE	<ul style="list-style-type: none"> Turn drive wheels and compare the CONSULT-II value with speedometer indication. 		Almost the same speed as the speedometer indication
SET VHCL SPD	<ul style="list-style-type: none"> Engine: Running 	ASCD: Operating.	The preset vehicle speed is displayed.
MAIN SW	<ul style="list-style-type: none"> Ignition switch: ON 	ON/OFF(MAIN) switch: Pressed	ON
		ON/OFF(MAIN) switch: Released	OFF
CANCEL SW	<ul style="list-style-type: none"> Ignition switch: ON 	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	<ul style="list-style-type: none"> Ignition switch: ON 	ACCEL/RESUME switch: Pressed	ON
		ACCEL/RESUME switch: Released	OFF
SET SW	<ul style="list-style-type: none"> Ignition switch: ON 	COAST/SET switch: Pressed	ON
		COAST/SET switch: Released	OFF
BRAKE SW1	<ul style="list-style-type: none"> Ignition switch: ON 	Brake pedal: Fully released	ON
		Brake pedal: Slightly depressed	OFF
BRAKE SW2	<ul style="list-style-type: none"> Ignition switch: ON 	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	<ul style="list-style-type: none"> Ignition switch: ON 	ON/OFF(MAIN) switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	<ul style="list-style-type: none"> CRUISE switch: ON 	COAST/SET switch: Pressed	ON
	<ul style="list-style-type: none"> When vehicle switch is between 40 km/h (25 MPH) and 144 km/h (89 MPH). 	COAST/SET switch: Released	OFF

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

TROUBLE DIAGNOSIS

UBS00ENI

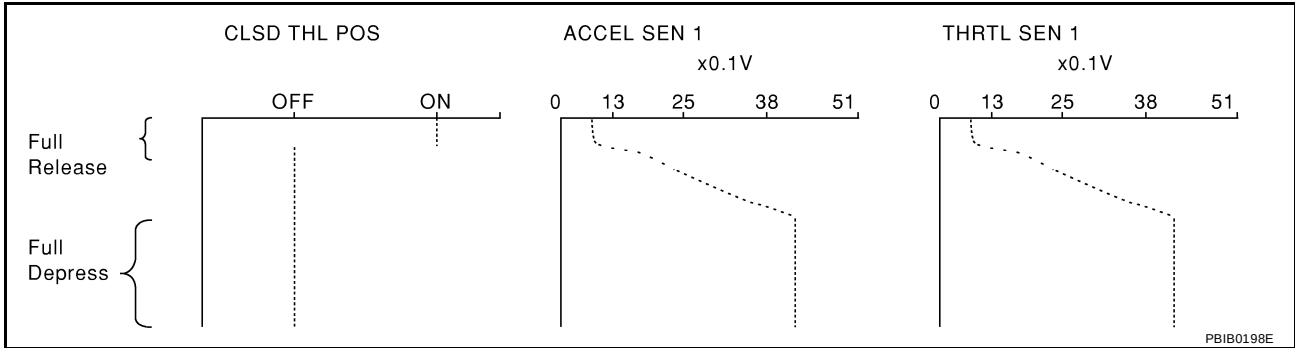
Major Sensor Reference Graph in Data Monitor Mode

The following are the major sensor reference graphs in "DATA MONITOR" mode.

CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

Below is the data for "CLSD THL POS", "ACCEL SEN 1" and "THRTL SEN 1" when depressing the accelerator pedal with the ignition switch ON and with selector lever in D position.

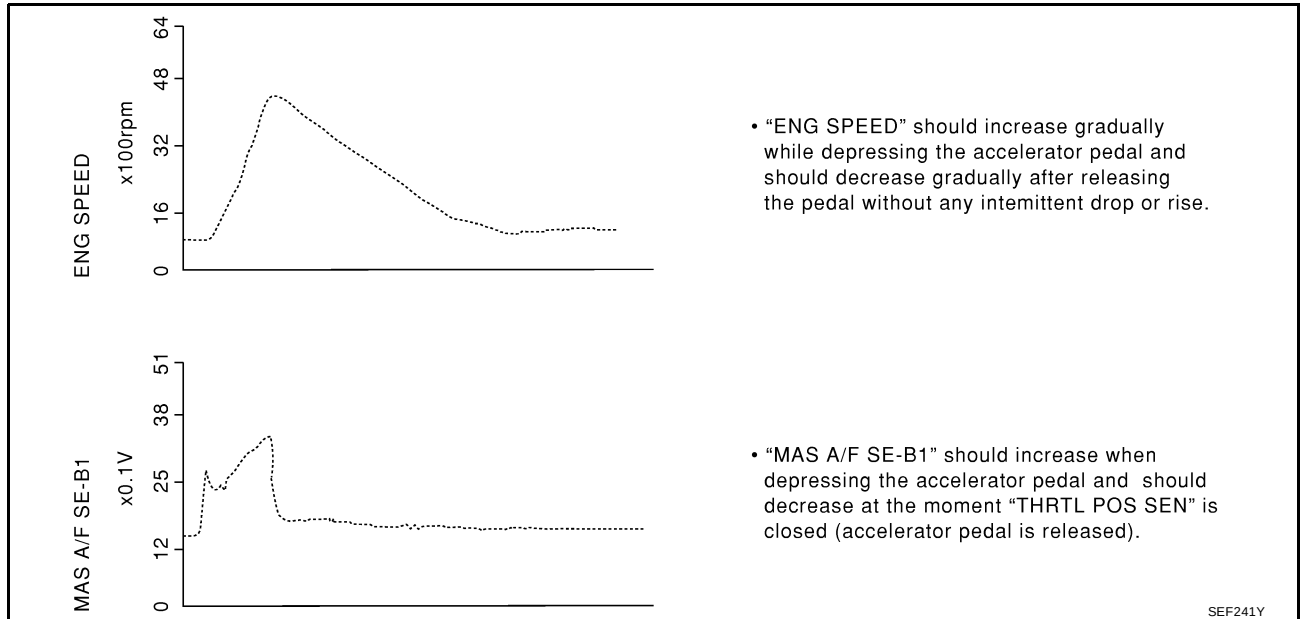
The signal of "ACCEL SEN 1" and "THRTL SEN 1" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".



ENG SPEED, MAS A/F SE-B1, THRTL SEN 1, HO2S2 (B1), INJ PULSE-B1

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL SEN 1", "HO2S2 (B1)", and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

Each value is for reference, the exact value may vary.



TROUBLE DIAGNOSIS

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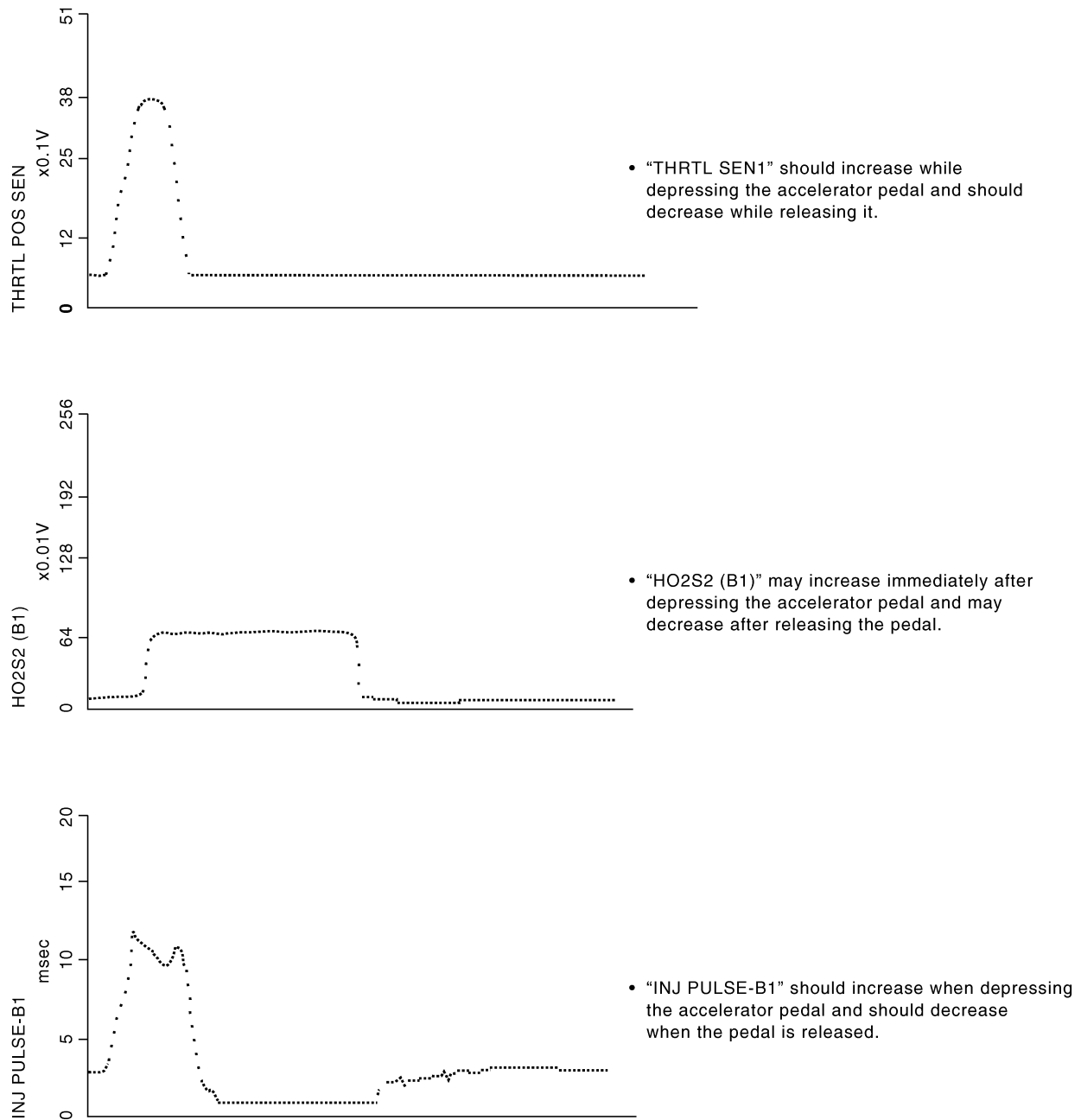
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PBIB1594E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

UBS00ENJ

The specification (SP) value indicates the tolerance of the value that is displayed in "DATA MONITOR (SPEC)" mode of CONSULT-II during normal operation of the Engine Control System. When the value in "DATA MONITOR (SPEC)" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "DATA MONITOR (SPEC)" mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1/B2 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Testing Condition

UBS00ENK

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm² , 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up*¹
- Electrical load: Not applied*²
- Engine speed: Idle

*1: After the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (A/T fluid temperature sensor signal) indicates more than 60°C (140°F).

*2: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

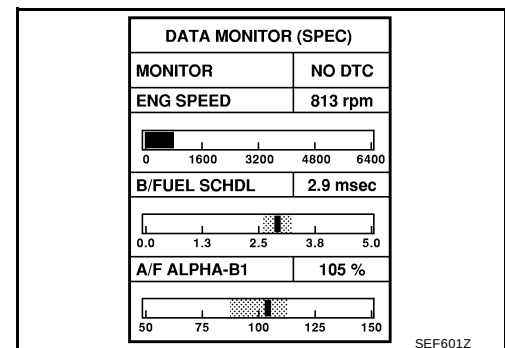
Inspection Procedure

UBS00ENL

NOTE:

Perform "DATA MONITOR (SPEC)" mode in maximum scale display.

1. Perform [EC-79, "Basic Inspection"](#) .
2. Confirm that the testing conditions indicated above are met.
3. Select "B/FUEL SCHDL", "A/F ALPHA-B1", "A/F ALPHA-B2" and "MAS A/F SE-B1" in "DATA MONITOR (SPEC)" mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-123, "Diagnostic Procedure"](#) .



UBS00ENM

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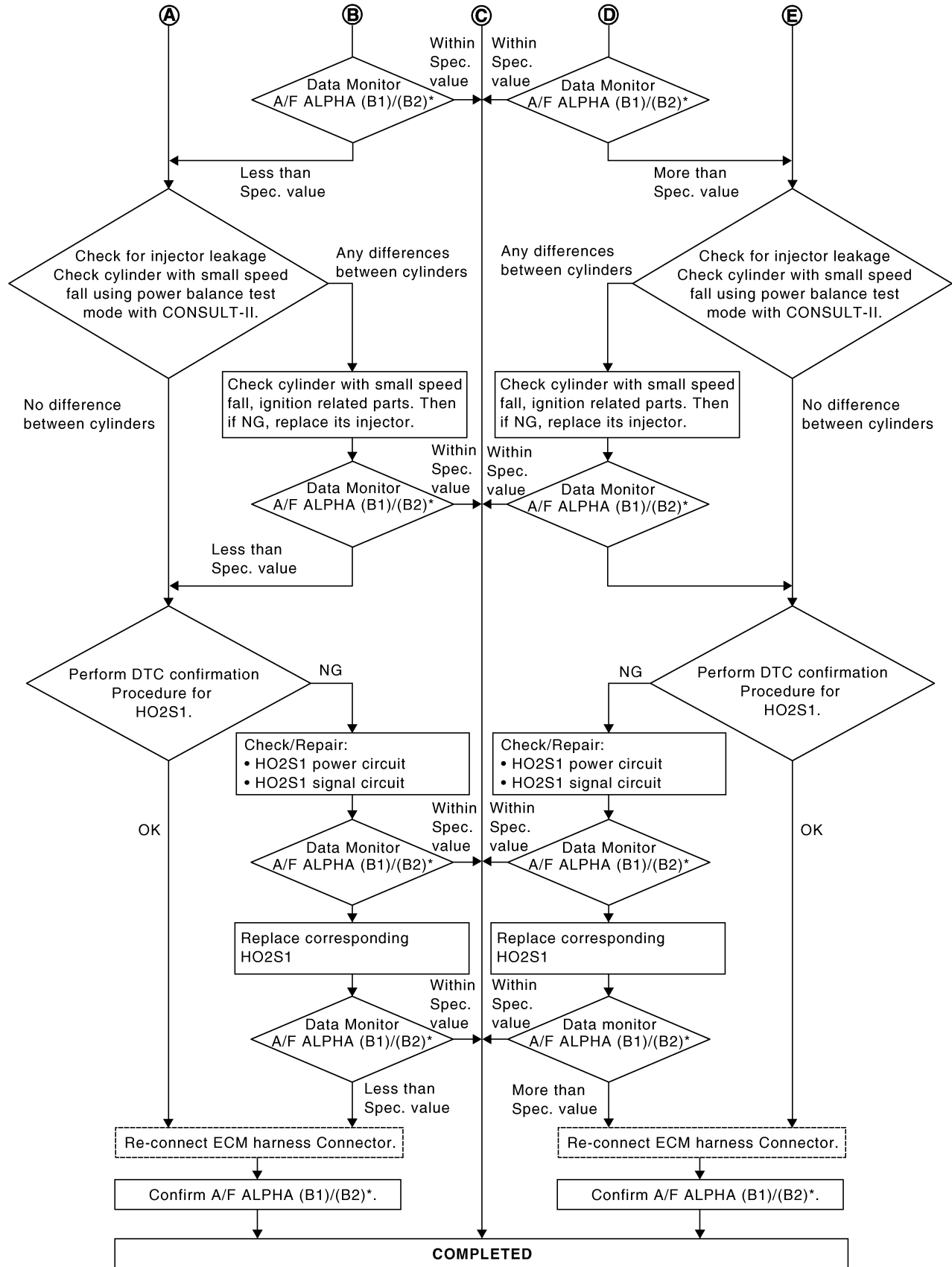
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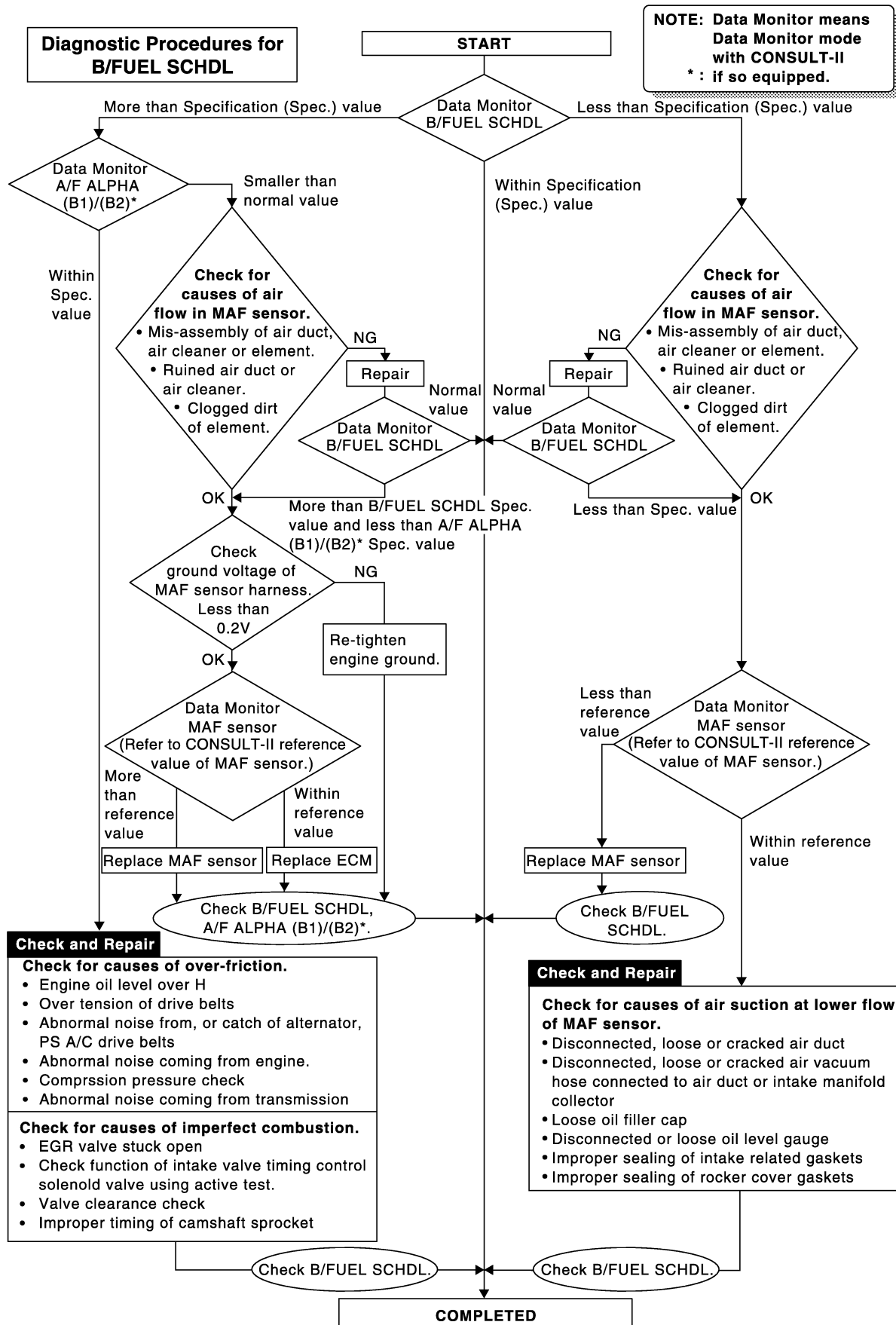
M

TROUBLE DIAGNOSIS - SPECIFICATION VALUE



SEF768Z

TROUBLE DIAGNOSIS - SPECIFICATION VALUE



SEF615ZA

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

UBS00ENN

Intermittent incidents (I/I) may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

Common I/I Report Situations

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than [0] or [1t].
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnostic Procedure

UBS00ENO

1. INSPECTION START

Erase (1st trip) DTCs. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "CIRCUIT INSPECTION", "Ground Inspection".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. SEARCH FOR ELECTRICAL INCIDENT

Perform [GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "INCIDENT SIMULATION TESTS".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

4. CHECK CONNECTOR TERMINALS

Refer to [GI-24, "How to Check Terminal"](#), "HOW TO PROBE CONNECTORS", "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.

POWER SUPPLY AND GROUND CIRCUIT

POWER SUPPLY AND GROUND CIRCUIT

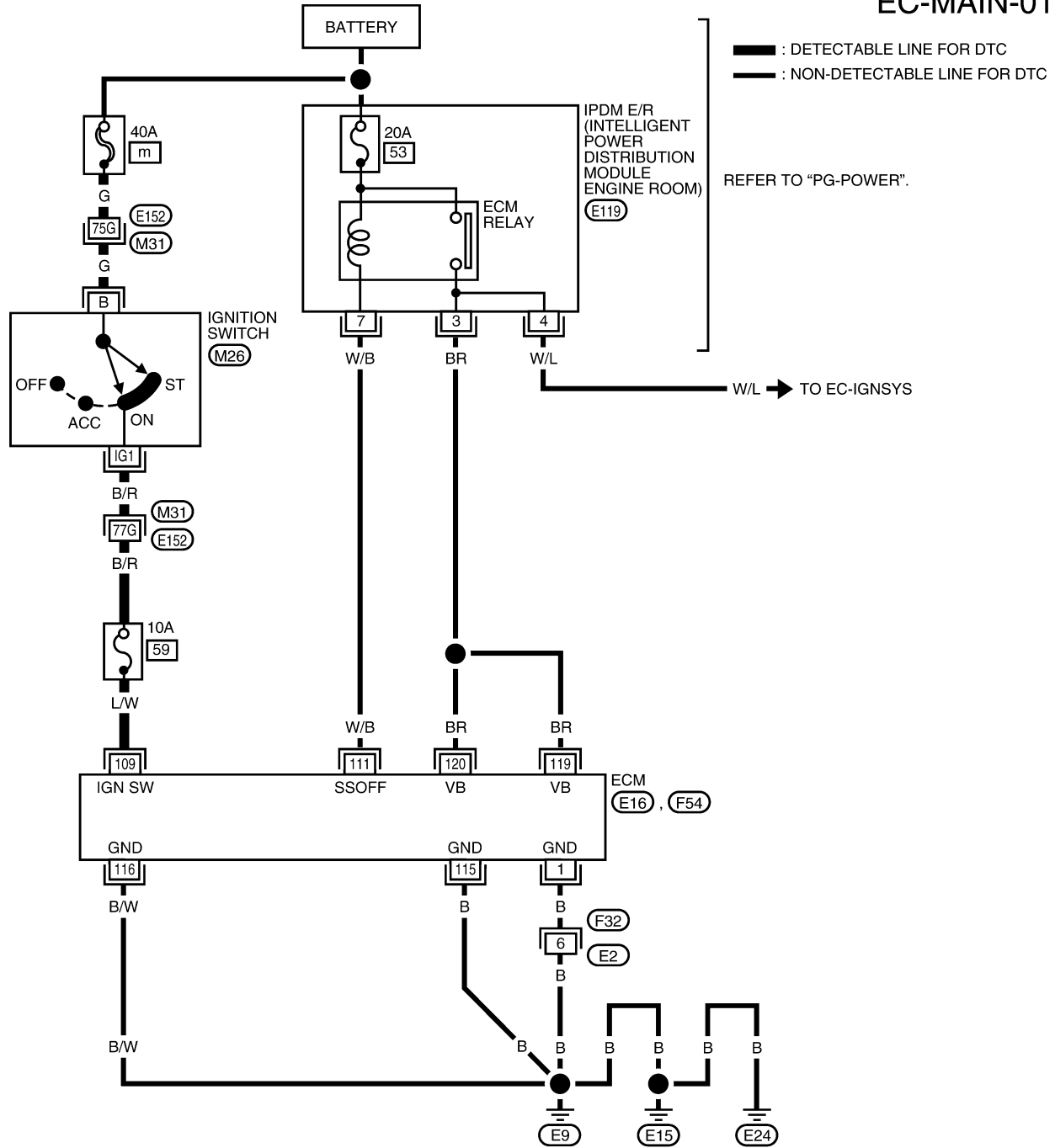
PFP:24110

Wiring Diagram

UBS00ENP

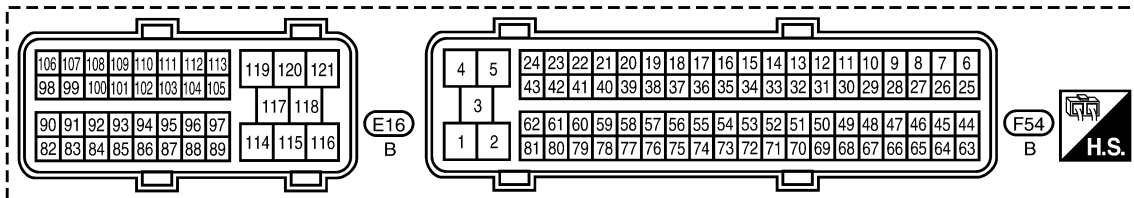
EC-MAIN-01

EC



IG1	ST	B	(M26)	3	4	5		6	7	8	9	(E119)	1	2	3		4	5	6	7	(F32)		
IG2	ACC	R	W	10	11	12	13	14	15	16	17	18	W	8	9	10	11	12	13	14	15	16	W

REFER TO THE FOLLOWING.
(M31) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA1155E

POWER SUPPLY AND GROUND CIRCUIT

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	[Engine is running] ● Idle speed	Body ground
109	L/W	Ignition switch	[Ignition switch: OFF]	0V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] ● For a few seconds after turning ignition switch OFF	0 - 1.5V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
115 116	B B/W	ECM ground	[Engine is running] ● Idle speed	Body ground
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00ENQ

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

Yes >> GO TO 9.

No >> GO TO 2.

2. CHECK 10A FUSE

1. Turn ignition switch OFF.
2. Check 10A fuse (No. 59, located in fuse and relay box).

OK or NG

OK >> Reinstall fuse. GO TO 3.

NG >> ● Repair harness or connectors.
● Replace fuse.

3. CHECK ECM POWER SUPPLY CIRCUIT-I

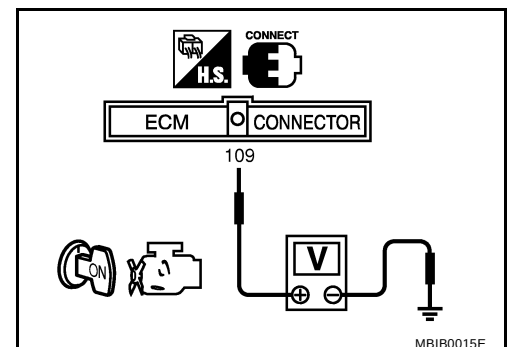
1. Turn ignition switch OFF and then ON.
2. Check voltage between ECM terminal 109 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.



POWER SUPPLY AND GROUND CIRCUIT

4. DETECT MALFUNCTIONING PART

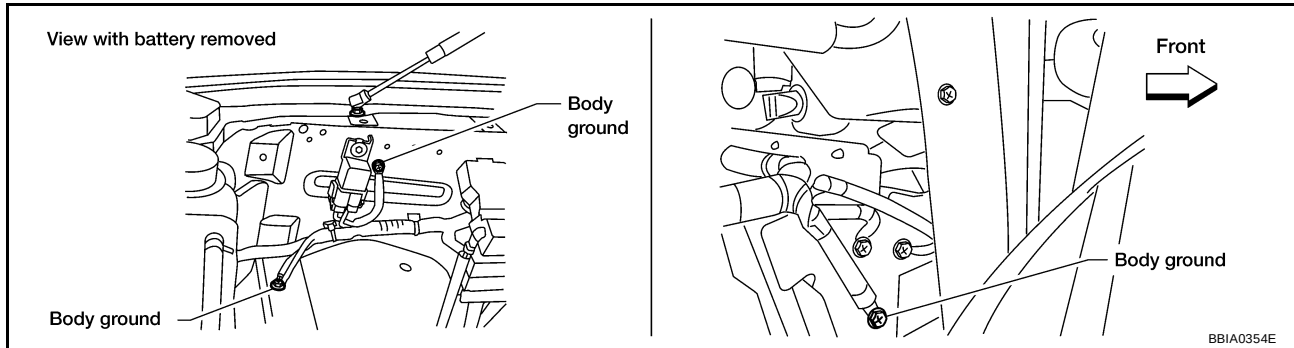
Check the following.

- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

5. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Repair or replace ground connections.

6. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 1, 115, 116 and body ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 8.

NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F32, E2
- Harness for open or short between ECM and body ground

>> Repair open circuit or short to power in harness or connectors.

POWER SUPPLY AND GROUND CIRCUIT

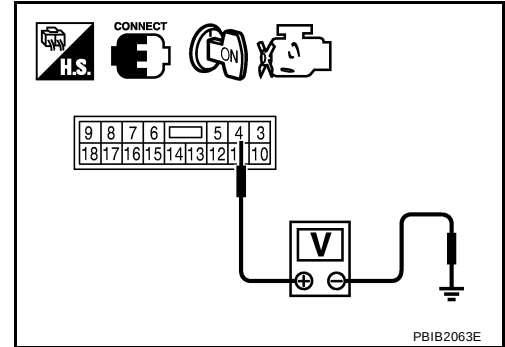
8. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON.
3. Check voltage between IPDM E/R terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> Go to [EC-563, "IGNITION SIGNAL"](#) .
NG >> GO TO 9.



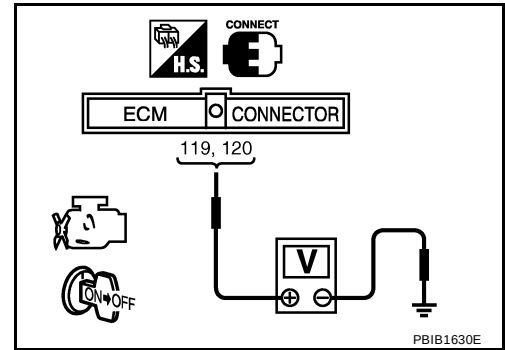
9. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and then OFF.
3. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.

OK or NG

- OK >> GO TO 17.
NG (Battery voltage does not exist.)>>GO TO 10.
NG (Battery voltage exists for more than a few seconds.)>>GO TO 17.



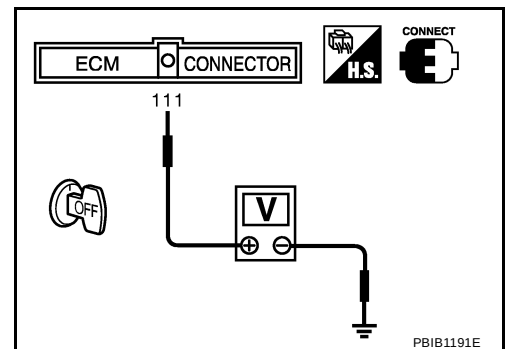
10. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check voltage between ECM terminal 111 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 11.
NG >> GO TO 12.



POWER SUPPLY AND GROUND CIRCUIT

11. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E119.
3. Check harness continuity between ECM terminals 119, 120 and IPDM E/R terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E119.
3. Check harness continuity between ECM terminal 111 and IPDM E/R terminal 7.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20A FUSE

Check 20A fuse (No. 53, located in IPDM E/R).

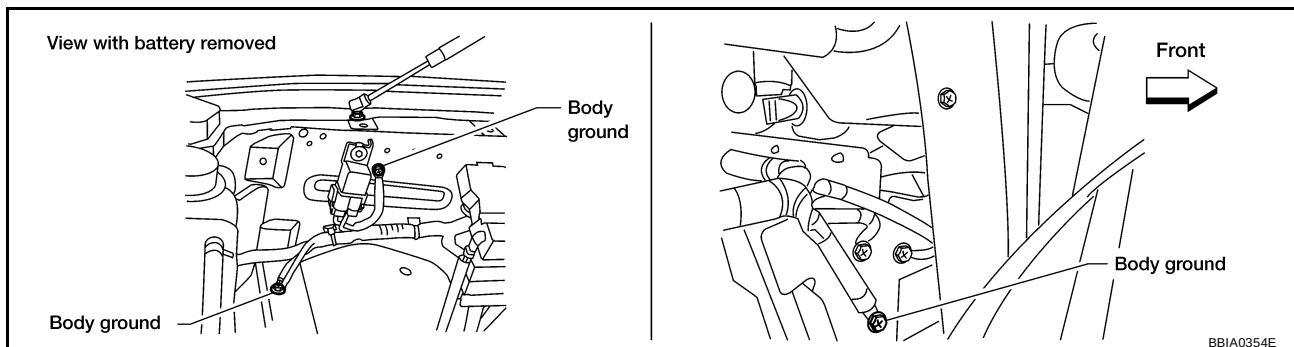
OK or NG

OK >> GO TO 17.

NG >> Replace 20A fuse.

14. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

OK >> GO TO 15.

NG >> Repair or replace ground connections.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 1, 115, 116 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- | | |
|----|--------------|
| OK | >> GO TO 17. |
| NG | >> GO TO 16. |

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F32, E2
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- | | |
|----|--|
| OK | >> Replace IPDM E/R. |
| NG | >> Repair open circuit or short to power in harness or connectors. |

Ground Inspection

UBS00ENR

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.

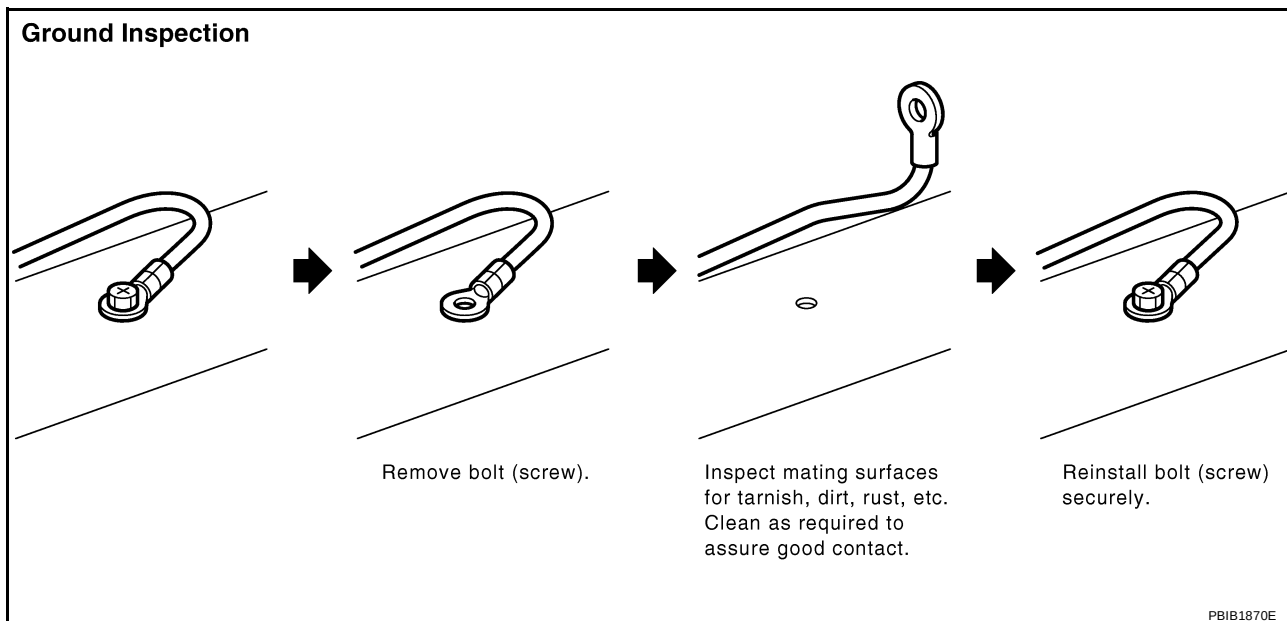
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for "add-on" accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

POWER SUPPLY AND GROUND CIRCUIT

For detailed ground distribution information, refer to [PG-29, "Ground Distribution"](#) .



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DTC U1000, U1001 CAN COMMUNICATION LINE

DTC U1000, U1001 CAN COMMUNICATION LINE

PFP:23710

Description

UBS00ENS

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

UBS00ENT

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000*1 1000*1	CAN communication line	<ul style="list-style-type: none">● ECM cannot communicate to other control units.● ECM cannot communicate for more than the specified time.	<ul style="list-style-type: none">● Harness or connectors (CAN communication line is open or shorted)
U1001*2 1001*2			

*1: This self-diagnosis has the one trip detection logic.

*2: The MIL will not light up for this diagnosis.

DTC Confirmation Procedure

UBS00ENU

1. Turn ignition switch ON and wait at least 3 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-136, "Diagnostic Procedure"](#) .

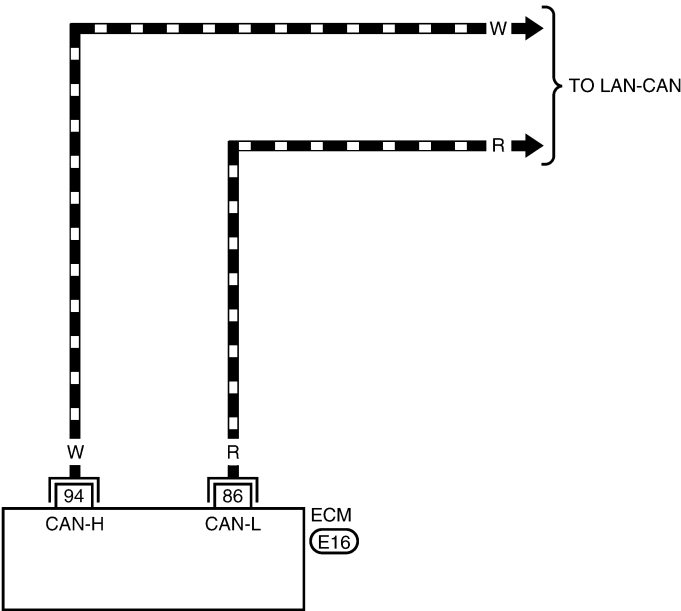
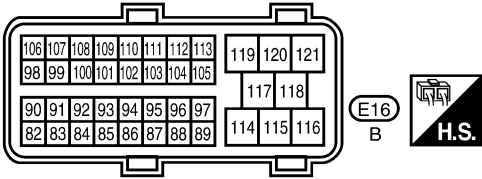
DTC U1000, U1001 CAN COMMUNICATION LINE

Wiring Diagram

UBS00ENV

EC-CAN-01

▬ : DATA LINE



BBWA0873E

DTC U1000, U1001 CAN COMMUNICATION LINE

Diagnostic Procedure

UBS00ENW

Go to [LAN-6, "Precautions When Using CONSULT-II"](#) .

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

PFP:226A0

Description SYSTEM DESCRIPTION

UBS00ENX

Sensor	Input signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON

CONSULT-II Reference Value in Data Monitor Mode

UBS00ENY

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1) HO2S2 HTR (B2)	<ul style="list-style-type: none"> Engine speed is below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON
	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF

On Board Diagnosis Logic

UBS00ENZ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037 (Bank 1)	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) Heater oxygen sensor 2 heater
P0057 0057 (Bank 2)			
P0038 0038 (Bank 1)	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.) Heater oxygen sensor 2 heater
P0058 0058 (Bank 2)			

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

UBS00E00

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:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start the engine and keep the engine speed between 3,500 rpm and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. If 1st trip DTC is detected, go to [EC-142, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

WITH GST

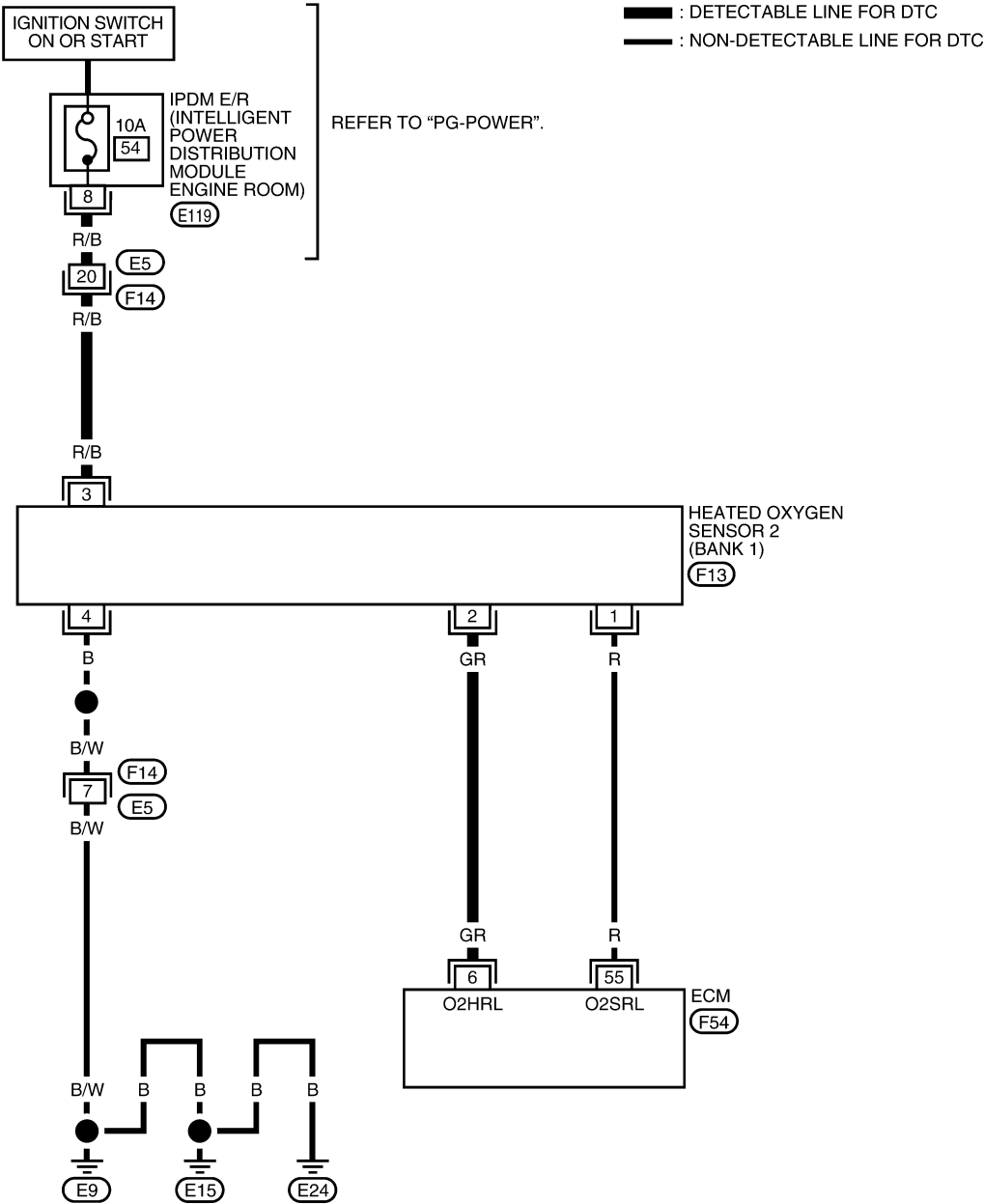
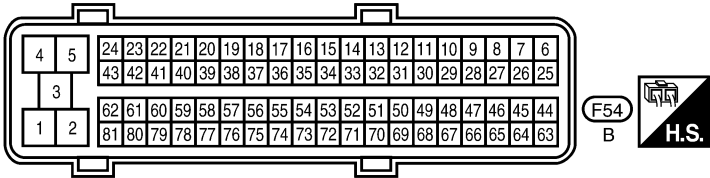
Follow the procedure "WITH CONSULT-II" above.

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Wiring Diagram
BANK 1

UBS00EO1

EC-O2H2B1-01



BBWA1135E

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
6	GR	Heated oxygen sensor 2 heater (bank 1)	[Engine is running] <ul style="list-style-type: none">● Engine speed is below 3,600 rpm after the following conditions are met.<ul style="list-style-type: none">– Engine: after warming up– Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - 1.0V
			[Ignition switch: ON] <ul style="list-style-type: none">● Engine stopped [Engine is running] <ul style="list-style-type: none">● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

BANK 2

EC-O2H2B2-01

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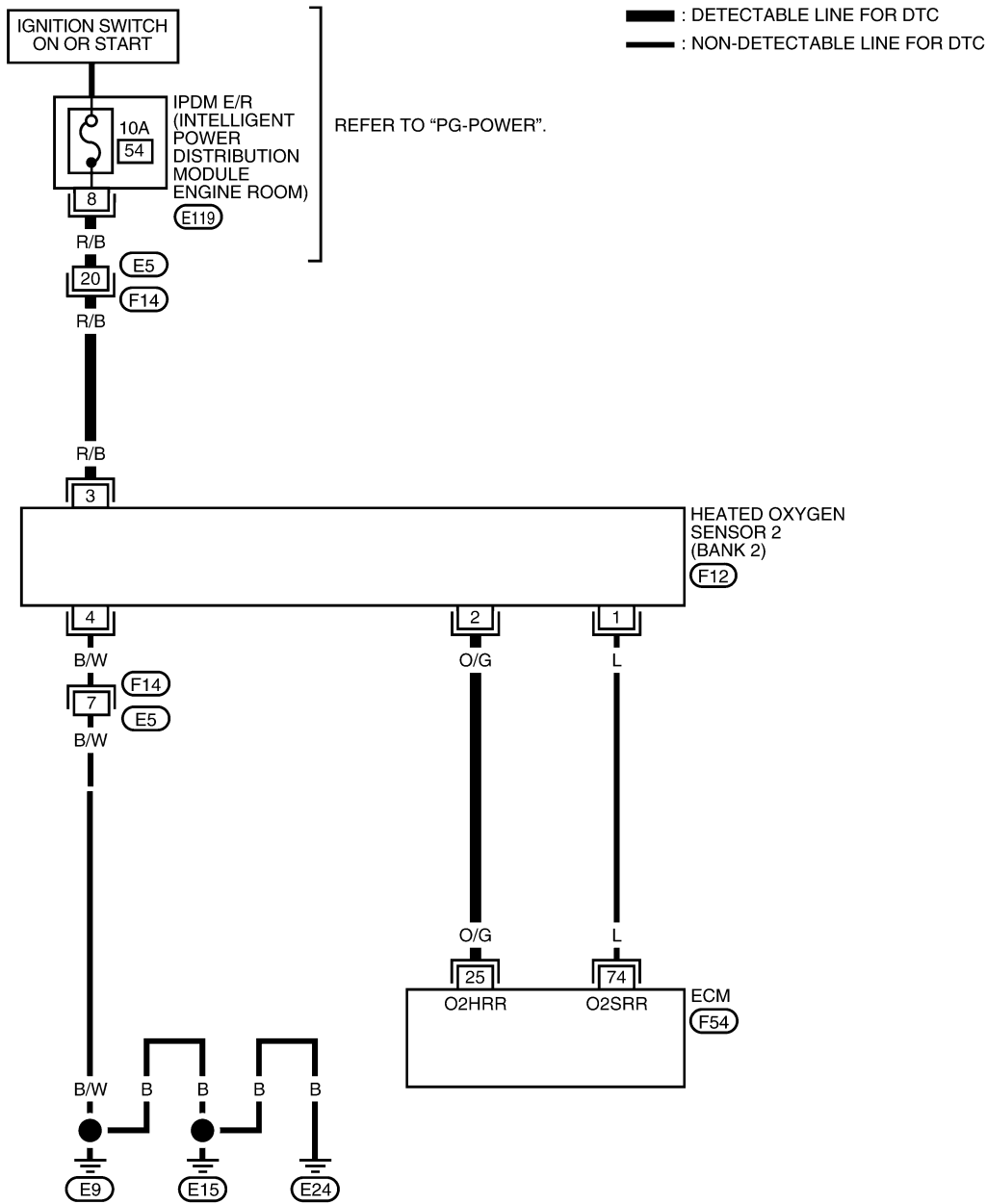
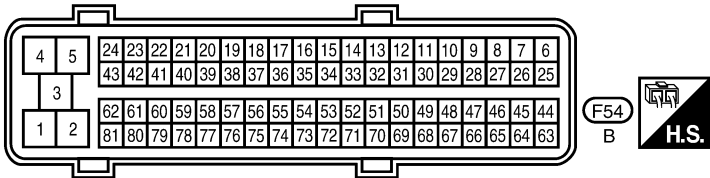
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BBWA0875E

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Specification data are reference values and are 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.

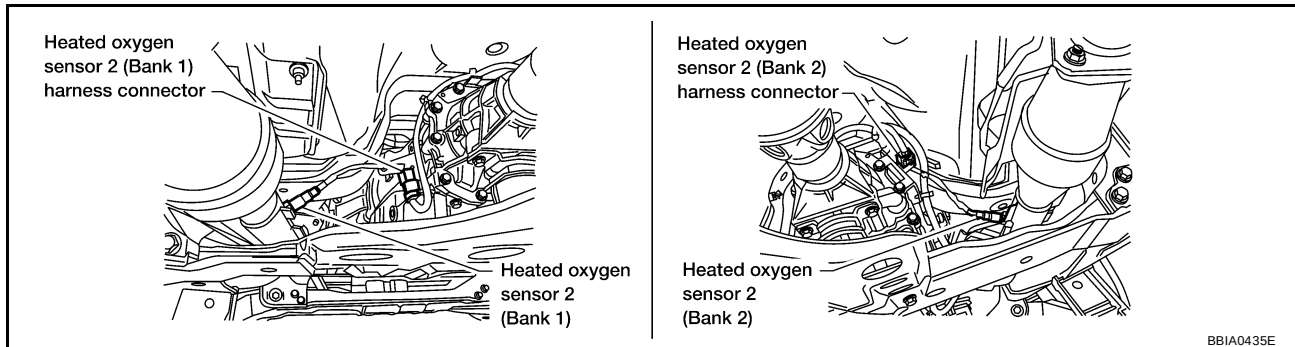
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	O/G	Heated oxygen sensor 2 heater (bank 2)	[Engine is running] <ul style="list-style-type: none"> Engine speed is below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: after warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - 1.0V
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EO2

1. CHECK HO2S2 POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect heated oxygen sensor 2 harness connector.

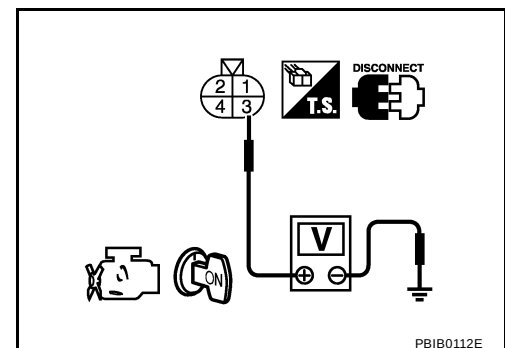


- Turn ignition switch ON.
- Check voltage between HO2S2 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R connector E119
- 10A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair harness or connectors.

3. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0037, P0038	6	2	1
P0057, P0058	25	2	2

Continuity should exist.

4. Also check harness for short to ground and 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.

4. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-144, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace malfunctioning heated oxygen sensor 2.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

UBS00EO3

Component Inspection

HEATED OXYGEN SENSOR 2 HEATER

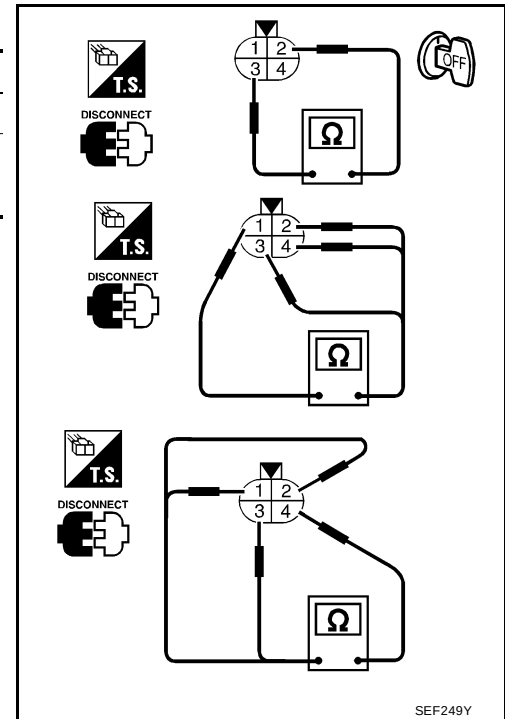
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	5.0 - 7.0 Ω at 25°C (77°F)
1 and 2, 3, 4	$\infty \Omega$
4 and 1, 2, 3	(Continuity should not exist)

2. If NG, replace heated oxygen sensor 2.

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.
- 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.



UBS00EO4

Removal and Installation

HEATED OXYGEN SENSOR 2

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P0101 MAF SENSOR

DTC P0101 MAF SENSOR

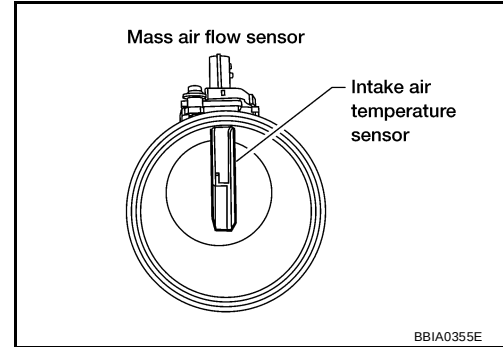
PFP:22680

Component Description

UBS00E05

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the electric current supplied to the hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS00E06

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	Approx. 1.1 - 1.4V
		2,500 rpm	Approx. 1.7 - 2.0V
CAL/LD VALUE	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	14% - 33%
		2,500 rpm	12% - 25%
MASS AIRFLOW	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	3.0 - 9.0 g·m/s
		2,500 rpm	9.0 - 28.0 g·m/s

On Board Diagnosis Logic

UBS00E07

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A)	A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● Mass air flow sensor
		B)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● Intake air leaks● Mass air flow sensor

DTC P0101 MAF SENSOR

UBS00EO8

DTC Confirmation Procedure

Perform **PROCEDURE FOR MALFUNCTION A** first.

If the DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION B**.

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.

PROCEDURE FOR MALFUNCTION A

NOTE:

If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch ON) instead of running engine at idle speed.

With CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and warm it up to normal operating temperature.
4. Run engine for at least 10 seconds at idle speed.
5. If DTC is detected, go to [EC-149, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

With GST

Follow the procedure "With CONSULT-II" above.

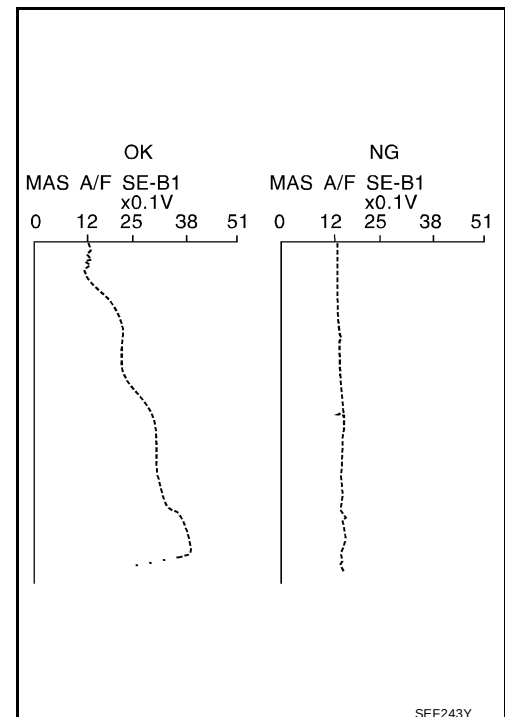
PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

With CONSULT-II

1. Turn ignition switch ON.
2. Start engine and warm it up to normal operating temperature.
If engine cannot be started, go to [EC-149, "Diagnostic Procedure"](#) .
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
5. Increases engine speed to about 4,000 rpm.
6. Monitor the linear voltage rise in response to engine speed increases.
If NG, go to [EC-149, "Diagnostic Procedure"](#) .
If OK, go to following step.



DTC P0101 MAF SENSOR

7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1	More than 3V
THRTL SEN 2	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

8. If DTC is detected, go to [EC-149, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL SEN 1	XXX V
THRTL SEN 2	XXX V

PB1B0199E

Overall Function Check

PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a DTC might not be confirmed.

With GST

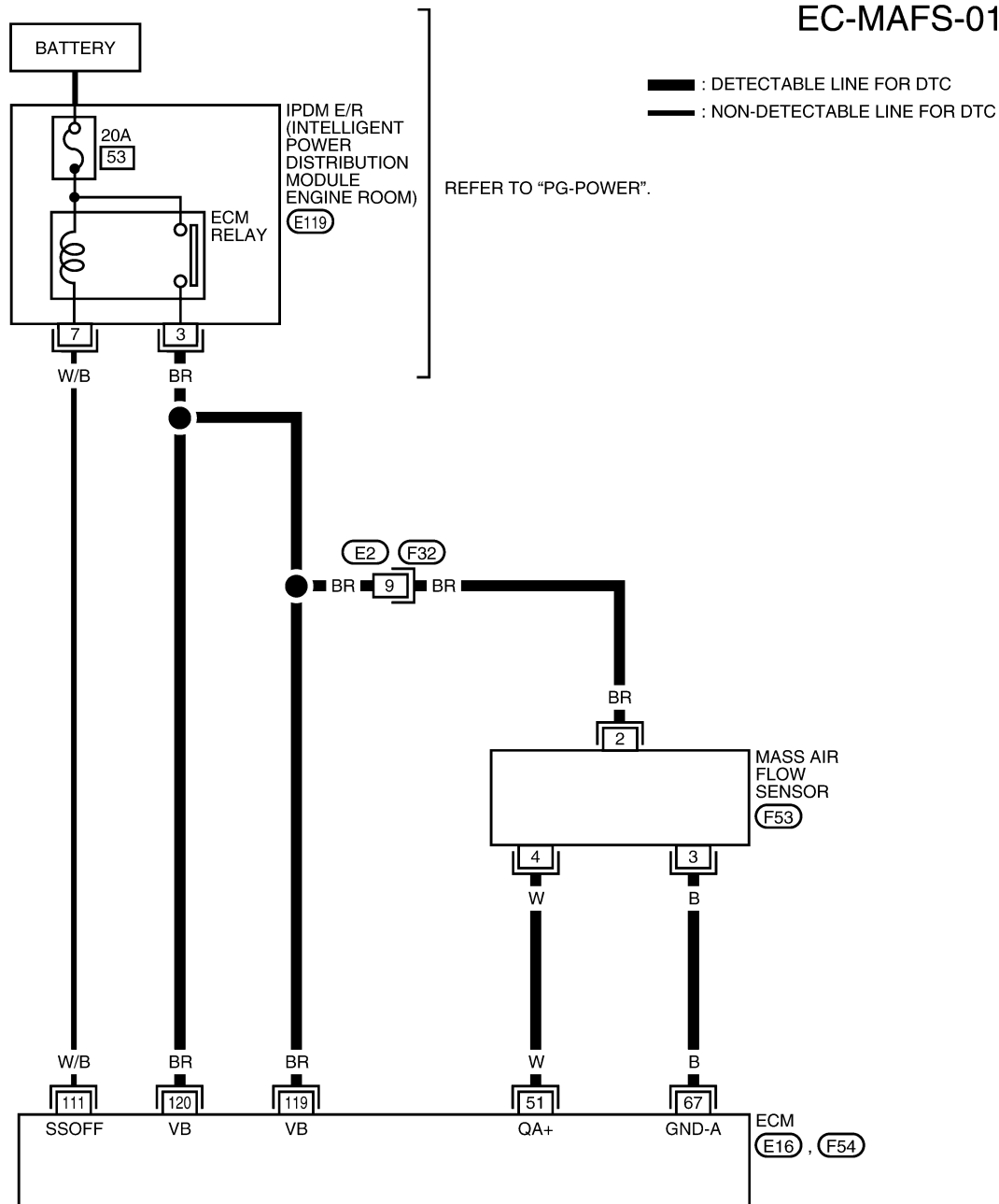
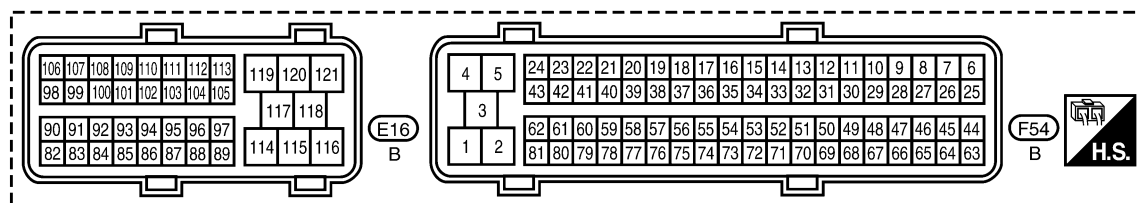
1. Start engine and warm it up to normal operating temperature.
2. Select MODE 1 with GST.
3. Check the mass air flow sensor signal with MODE 1.
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5. If NG, go to [EC-149, "Diagnostic Procedure"](#) .

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
MAF	14.1gm/sec
THROTTLE POS	3%

SEF534P

UBS00EOA

EC-MAFS-01



BBWA1160E

DTC P0101 MAF SENSOR

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.4V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.0V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] ● For a few seconds after turning ignition switch OFF	0 - 1.5V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EOB

1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

A >> GO TO 3.

B >> GO TO 2.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

OK or NG

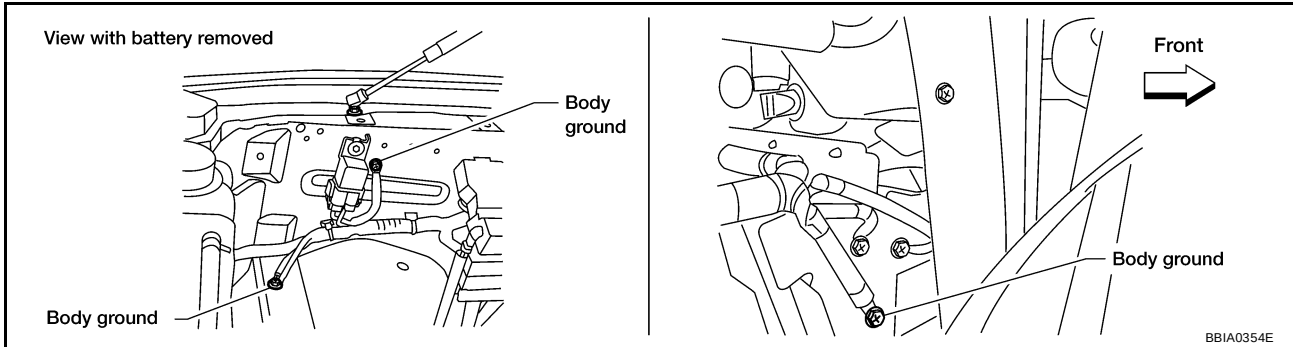
OK >> GO TO 3.

NG >> Reconnect the parts.

DTC P0101 MAF SENSOR

3. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



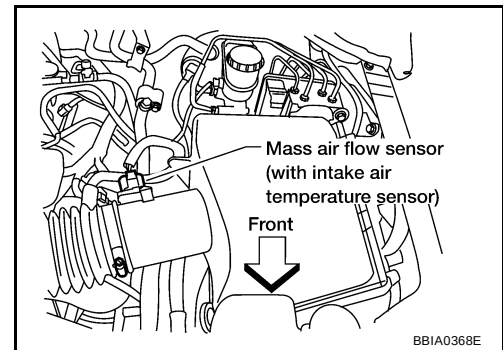
Refer to [EC-132. "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace ground connections.

4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.

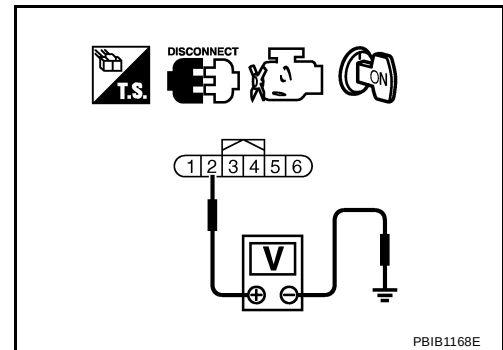


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between IPDM E/R and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair harness or connectors.

DTC P0101 MAF SENSOR

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 67.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 51.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-152, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0101 MAF SENSOR

UBS00EOC

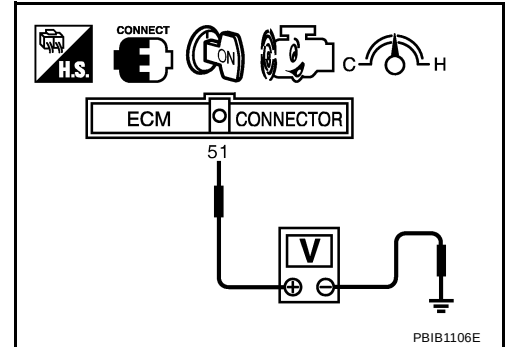
Component Inspection MASS AIR FLOW SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.4
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.0
Idle to about 4,000 rpm*	1.1 - 1.4 to Approx. 4.0

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - Turn ignition switch OFF.
 - Disconnect mass air flow sensor harness connector and reconnect it again.
 - Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot wire for damage or dust.
6. If NG, clean or replace mass air flow sensor.



Removal and Installation MASS AIR FLOW SENSOR

UBS00EOD

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .

DTC P0102, P0103 MAF SENSOR

DTC P0102, P0103 MAF SENSOR

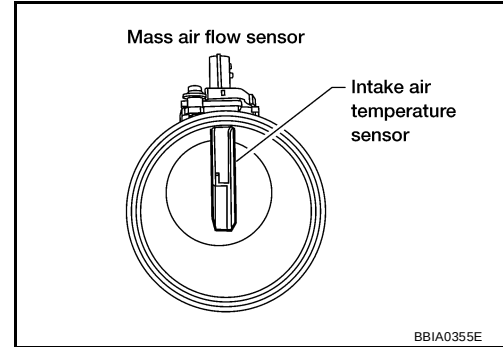
PFP:22680

Component Description

UBS00EOE

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the electric current supplied to the hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EOE

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	Approx. 1.1 - 1.4V
		2,500 rpm	Approx. 1.7 - 2.0V
CAL/LD VALUE	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	14% - 33%
		2,500 rpm	12% - 25%
MASS AIRFLOW	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	3.0 - 9.0 g·m/s
		2,500 rpm	9.0 - 28.0 g·m/s

On Board Diagnosis Logic

UBS00EOG

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● Intake air leaks● Mass air flow sensor
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● Mass air flow sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC P0102, P0103 MAF SENSOR

UBS00EOH

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.

PROCEDURE FOR DTC P0102

With CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to [EC-156, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR DTC P0103

With CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-156, "Diagnostic Procedure"](#) .
If DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to [EC-156, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

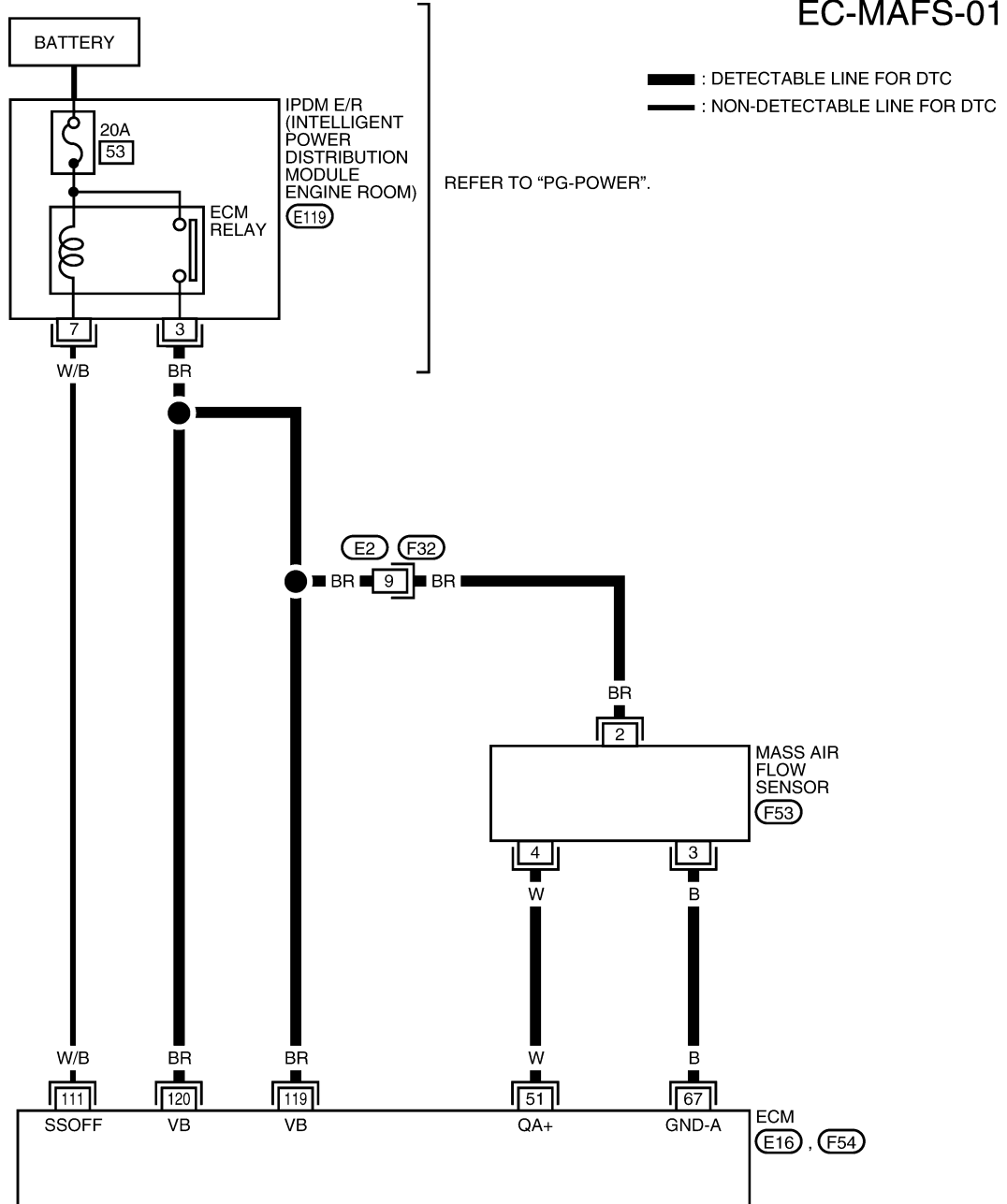
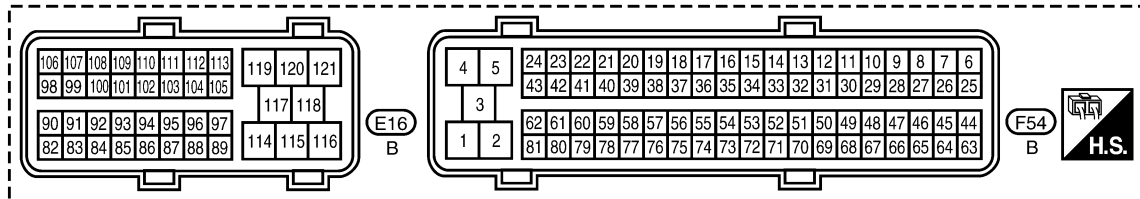
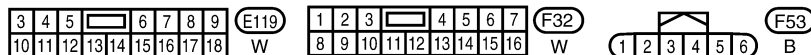
Follow the procedure "With CONSULT-II" above.

DTC P0102, P0103 MAF SENSOR

Wiring Diagram

UBS00E01

EC-MAFS-01



BBWA1160E

DTC P0102, P0103 MAF SENSOR

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.4V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.0V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] ● For a few seconds after turning ignition switch OFF	0 - 1.5V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EOJ

1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

OK or NG

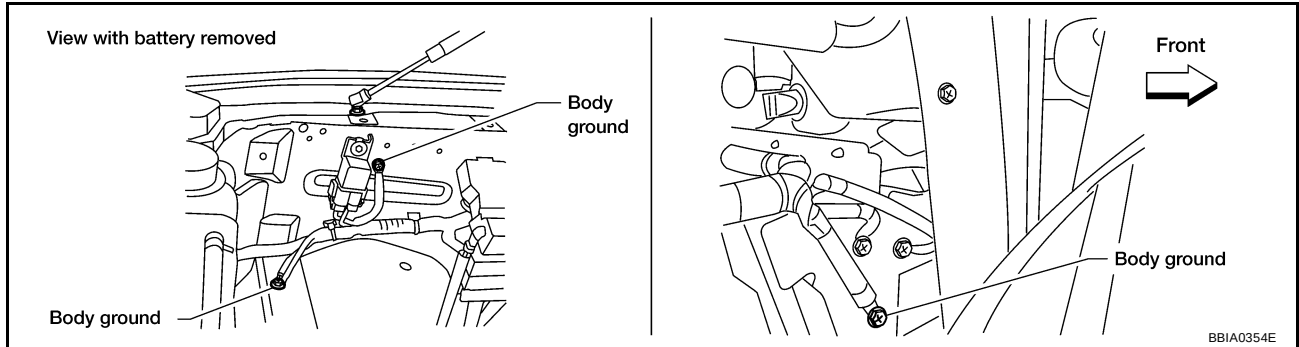
OK >> GO TO 3.

NG >> Reconnect the parts.

DTC P0102, P0103 MAF SENSOR

3. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



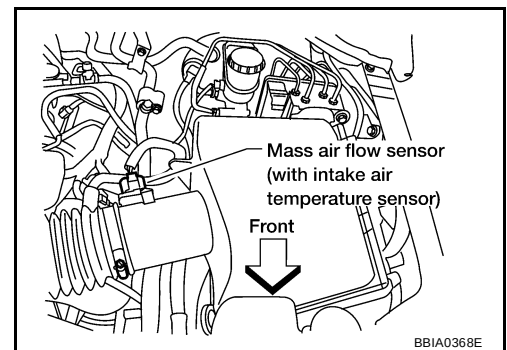
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace ground connections.

4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.

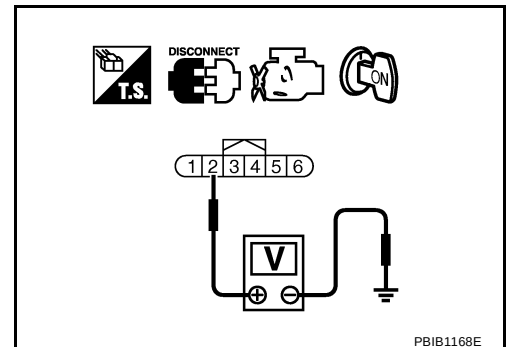


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between IPDM E/R and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair harness or connectors.

DTC P0102, P0103 MAF SENSOR

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 67.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 51.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-159, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0102, P0103 MAF SENSOR

Component Inspection MASS AIR FLOW SENSOR

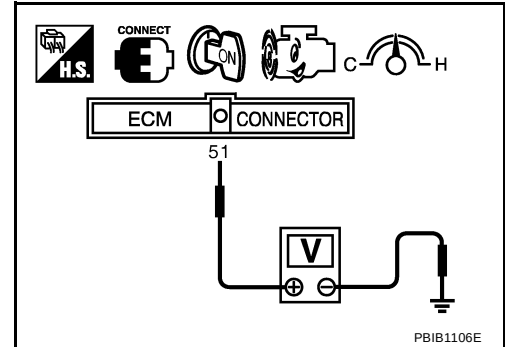
UBS00EOK

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.4
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.0
Idle to about 4,000 rpm*	1.1 - 1.4 to Approx. 4.0

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - Turn ignition switch OFF.
 - Disconnect mass air flow sensor harness connector and reconnect it again.
 - Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot wire for damage or dust.
6. If NG, clean or replace mass air flow sensor.



Removal and Installation MASS AIR FLOW SENSOR

UBS00EOL

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .

DTC P0112, P0113 IAT SENSOR

DTC P0112, P0113 IAT SENSOR

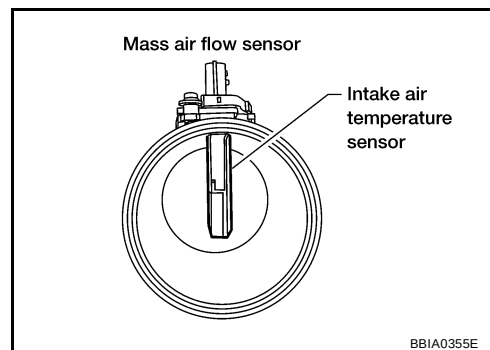
PFP:22630

Component Description

UBS00EOM

The intake air temperature sensor is built-into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



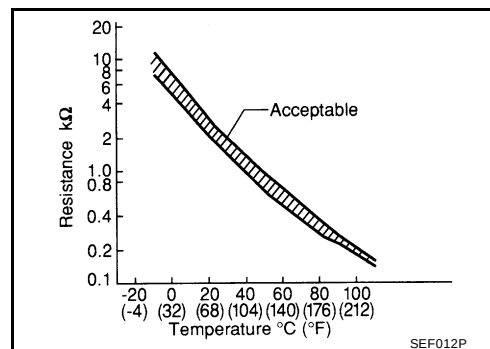
<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: This data is reference value and is measured between ECM terminal 34 (Intake air temperature sensor) 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.



On Board Diagnosis Logic

UBS00EON

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS00EOO

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-162. "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

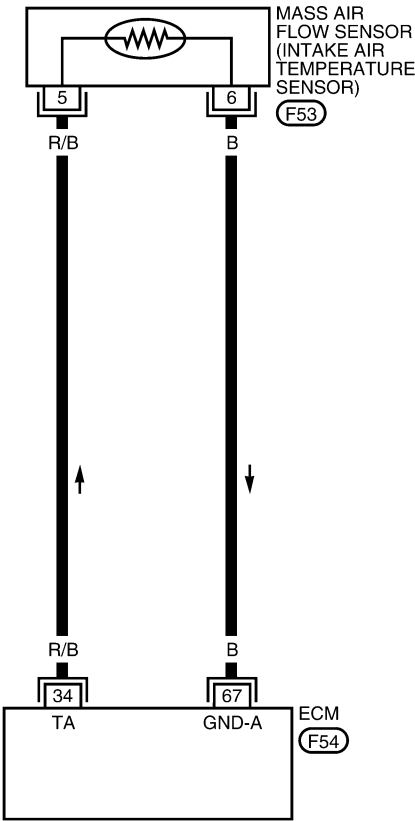
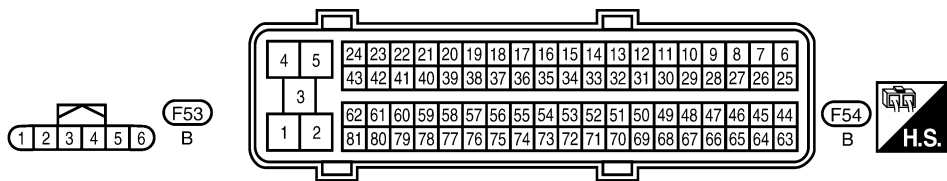
DTC P0112, P0113 IAT SENSOR

Wiring Diagram

UBS00EOP

EC-IATS-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



BBWA0879E

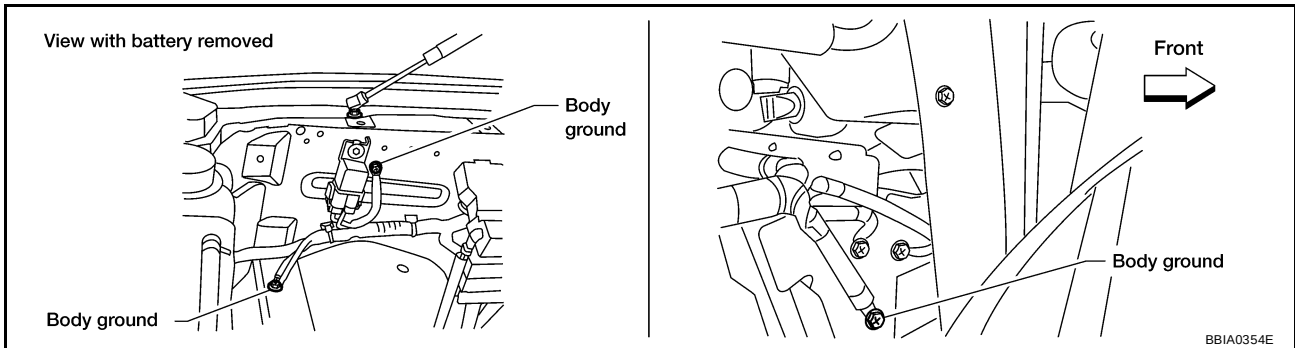
DTC P0112, P0113 IAT SENSOR

UBS00EQ

Diagnostic Procedure

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



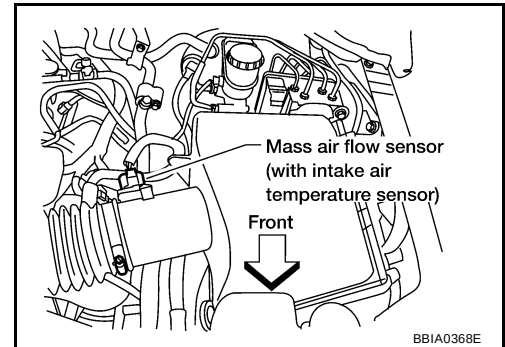
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (intake air temperature sensor is built-into) harness connector.
2. Turn ignition switch ON.

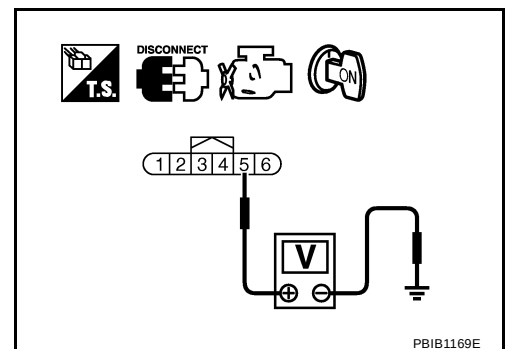


3. Check voltage between mass air flow sensor terminal 5 and ground.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
NG >> Repair harness or connectors.



DTC P0112, P0113 IAT SENSOR

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between mass air flow sensor terminal 6 and ECM terminal 67.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and 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.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-163, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace mass air flow sensor (with intake air temperature sensor).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

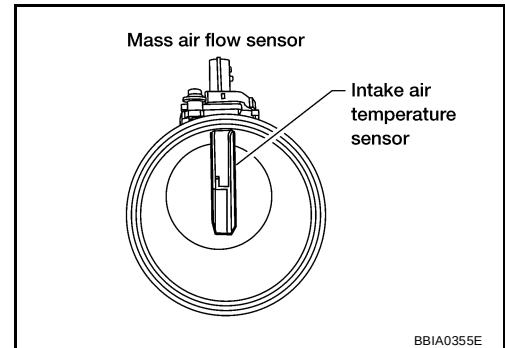
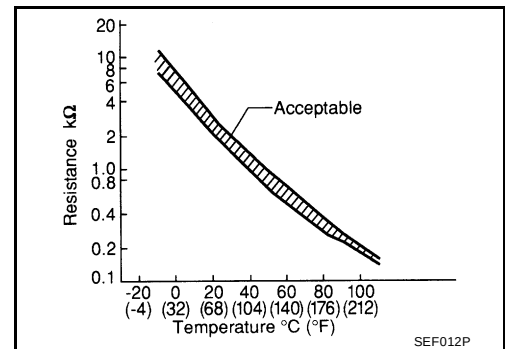
>> INSPECTION END

Component Inspection INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor terminals 5 and 6 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



Removal and Installation MASS AIR FLOW SENSOR

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .

DTC P0117, P0118 ECT SENSOR

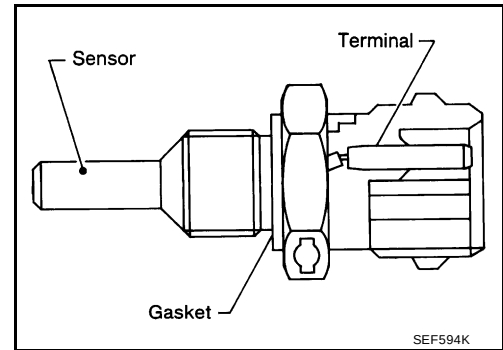
DTC P0117, P0118 ECT SENSOR

PFP:22630

Component Description

UBS00EOT

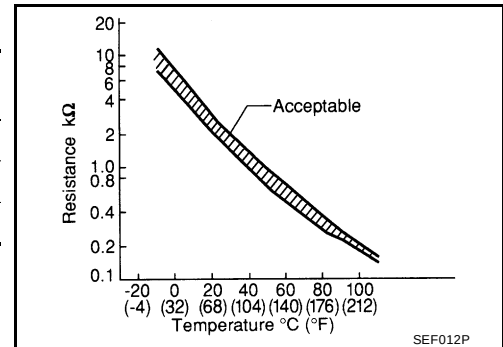
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminal 73 (Engine coolant temperature sensor) 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.

On Board Diagnosis Logic

UBS00EOU

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or START	40°C (104°F)
	More than approx. 4 minutes after ignition ON or START	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.		

DTC P0117, P0118 ECT SENSOR

DTC Confirmation Procedure

UBS00EOV

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-167, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

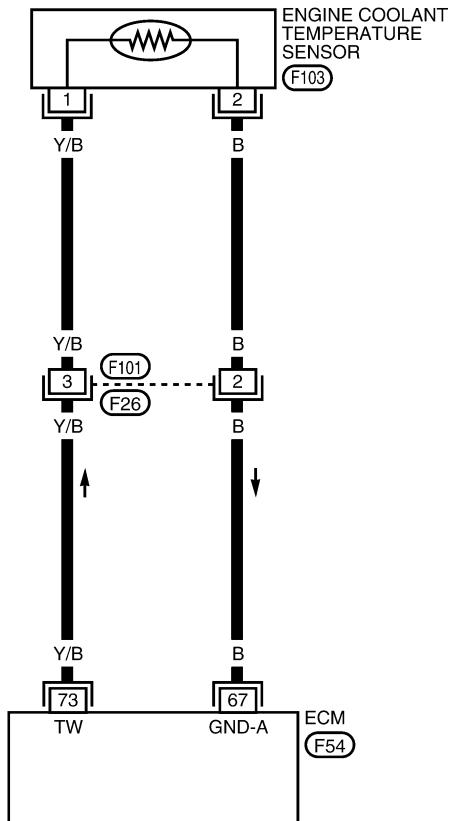
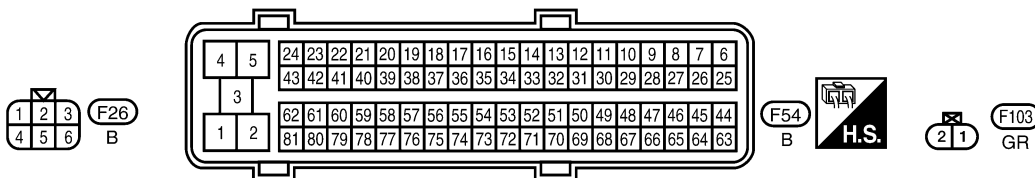
DTC P0117, P0118 ECT SENSOR

Wiring Diagram

UBS00EOW

EC-ECTS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1161E

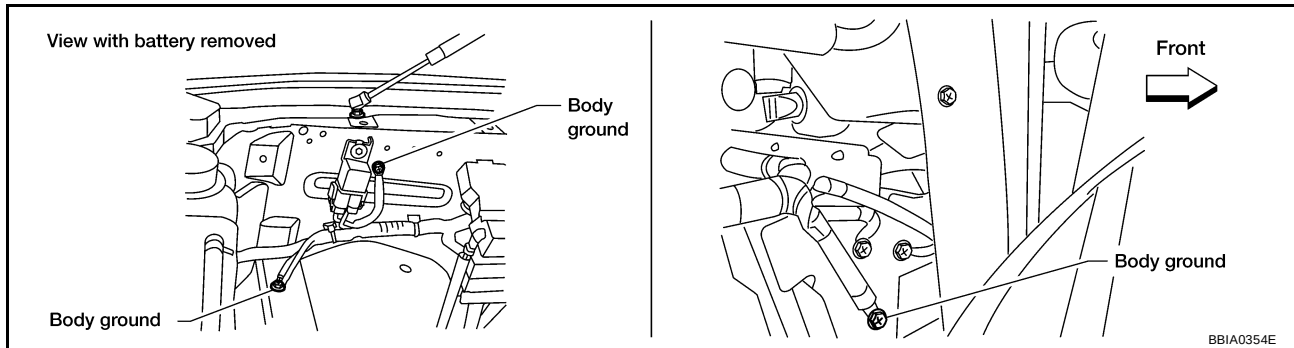
DTC P0117, P0118 ECT SENSOR

UBS00EOX

Diagnostic Procedure

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



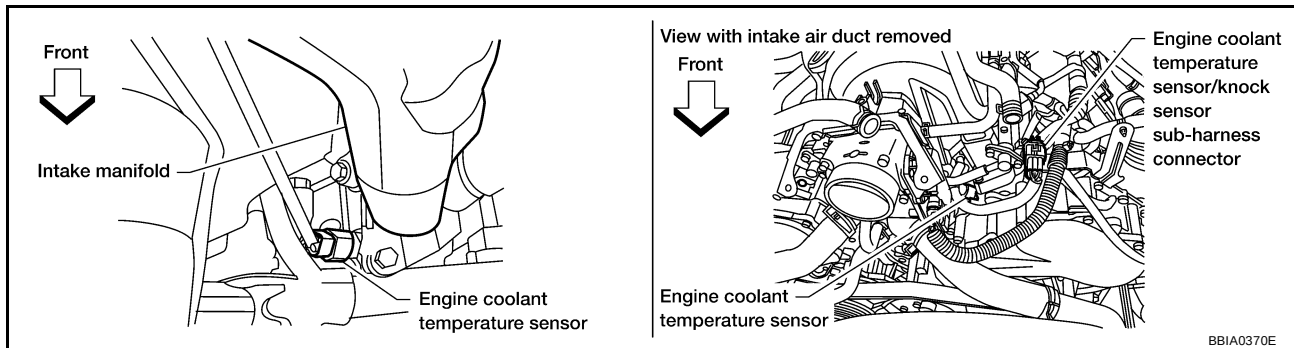
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.

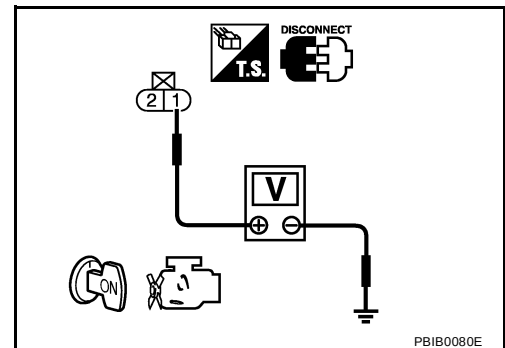


2. Turn ignition switch ON.
3. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector F26, F101
- Harness for open or short between ECM and engine coolant temperature sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0117, P0118 ECT SENSOR

4. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECT sensor terminal 2 and ECM terminal 67.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector F26, F101
- Harness for open and short between ECT sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-168, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace engine coolant temperature sensor.

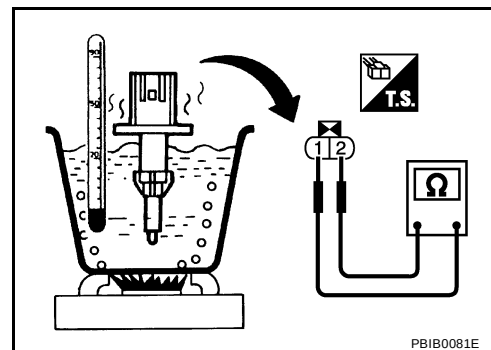
7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



DTC P0117, P0118 ECT SENSOR

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

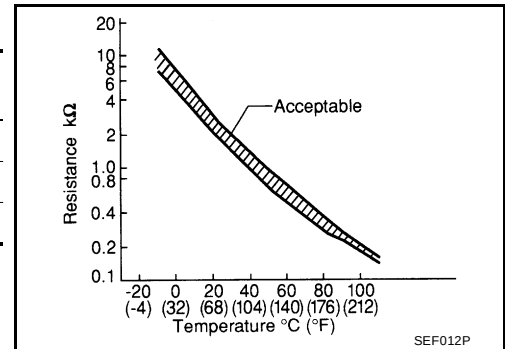
*: This data is reference value and is measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.

- If NG, replace engine coolant temperature sensor.

Removal and Installation

ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EM-59, "CYLINDER HEAD"](#) .



UBS00EOZ

DTC P0122, P0123 TP SENSOR

DTC P0122, P0123 TP SENSOR

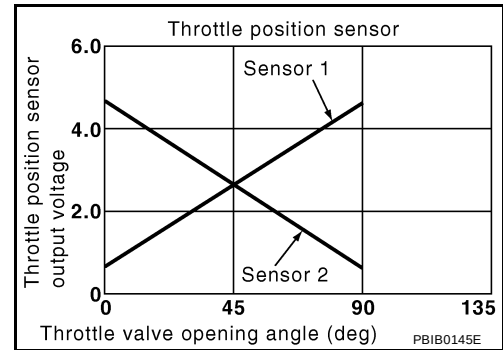
PFP:161119

Component Description

UBS00EP0

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EP1

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS00EP2

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	● Harness or connectors (TP sensor 2 circuit is open or shorted.) (APP sensor 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 2) ● Accelerator pedal position sensor
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC P0122, P0123 TP SENSOR

UBS00EP3

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:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-173, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

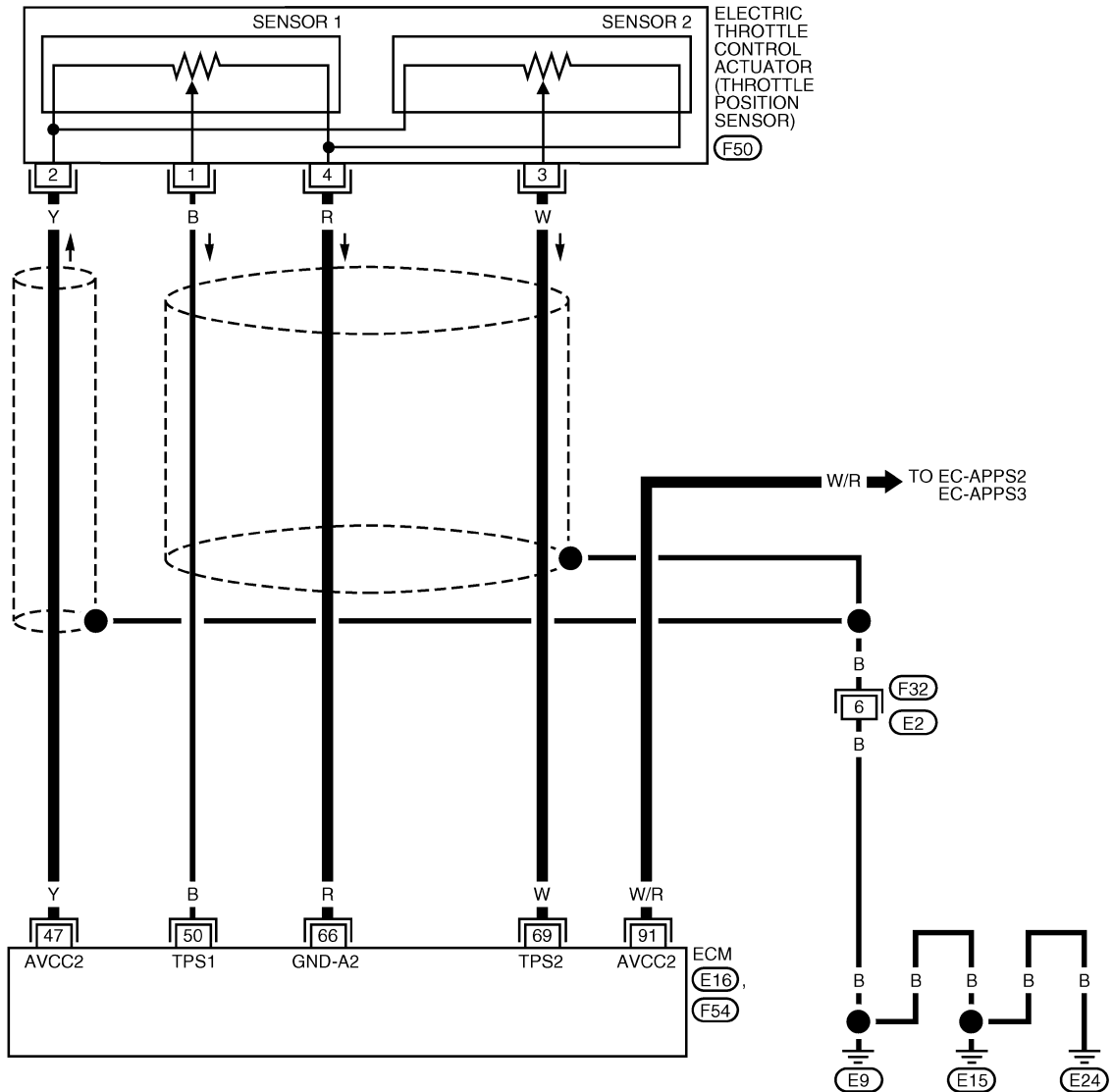
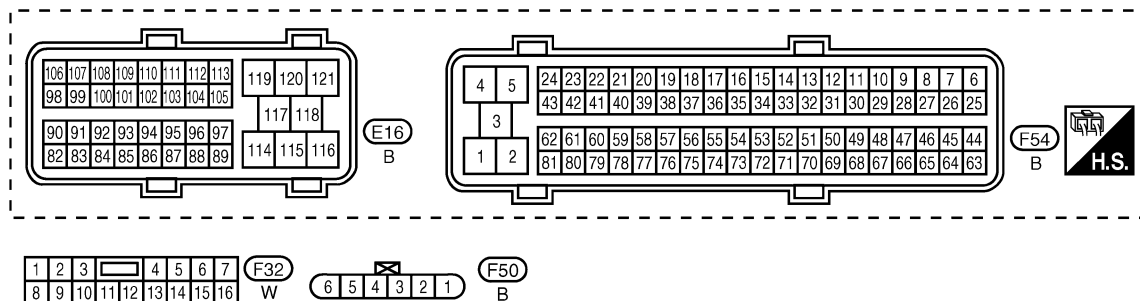
DTC P0122, P0123 TP SENSOR

Wiring Diagram

UBS00EP4

EC-TPS2-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1167E

DTC P0122, P0123 TP SENSOR

Specification data are reference values and are 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.

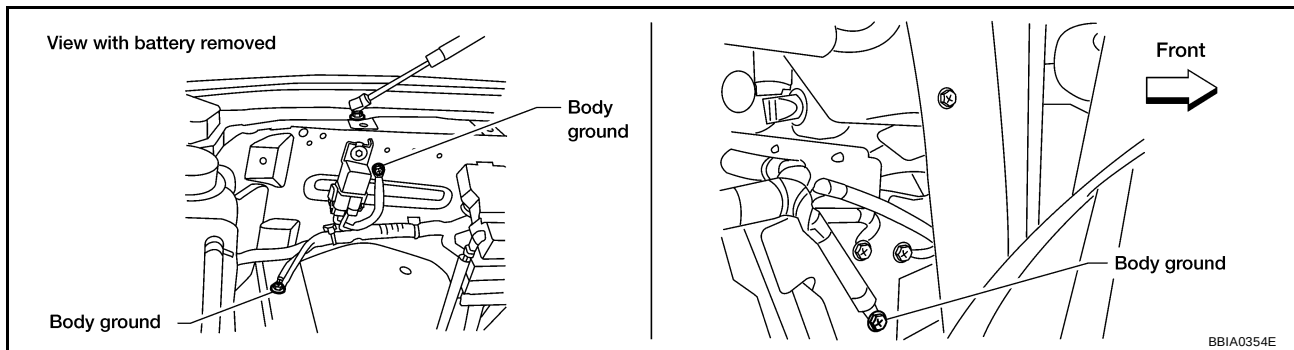
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	Y	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5V
50	B	Throttle position sensor 1	[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully depressed	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
69	W	Throttle position sensor 2	[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully depressed	More than 0.36V
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V

Diagnostic Procedure

UBS00EP5

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

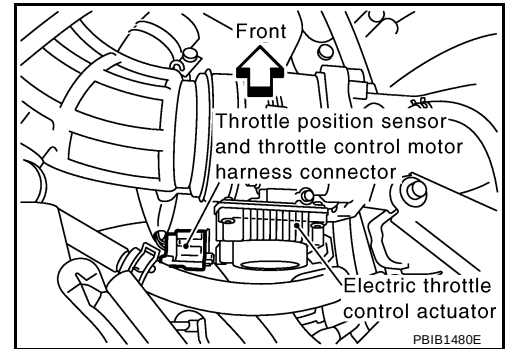
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P0122, P0123 TP SENSOR

2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

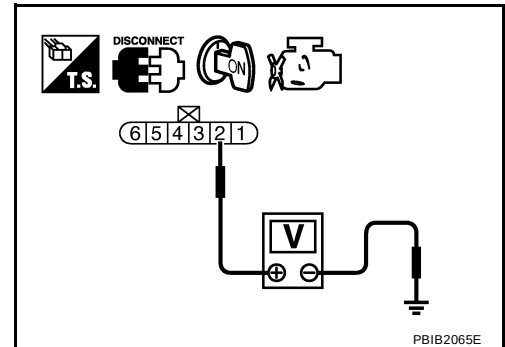


3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 2 and ECM terminal 47. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 2	EC-172
91	APP sensor terminal 7	EC-544

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [EC-548, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> GO TO 6.

DTC P0122, P0123 TP SENSOR

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 66.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 69 and electric throttle control actuator terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE POSITION SENSOR

Refer to [EC-176, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0122, P0123 TP SENSOR

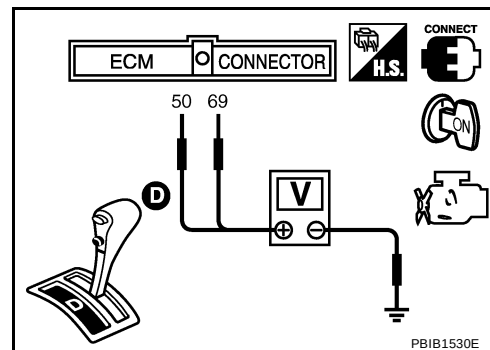
UBS00EP6

Component Inspection THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch ON
4. Set selector lever to D position.
5. Check voltage between ECM terminals 50 (TP sensor 1signal), 69 (TP sensor 2signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-44, "Idle Air Volume Learning"](#) .



Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

UBS00EP7

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

DTC P0125 ECT SENSOR

DTC P0125 ECT SENSOR

PFP:22630

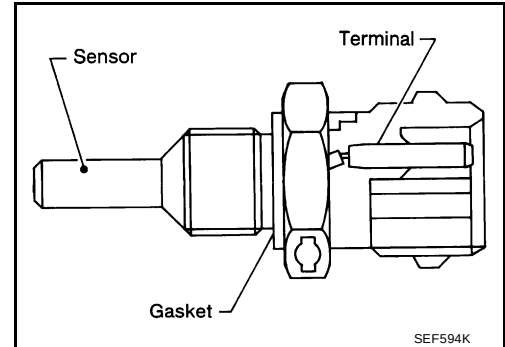
Component Description

UBS00EP8

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-164, "DTC P0117, P0118 ECT SENSOR"](#).

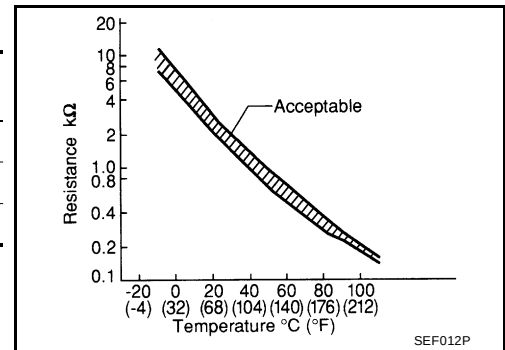
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminal 73 (Engine coolant temperature sensor) 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.

On Board Diagnosis Logic

UBS00EP9

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none">● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.● Engine coolant temperature is insufficient for closed loop fuel control.	<ul style="list-style-type: none">● Harness or connectors (High resistance in the circuit)● Engine coolant temperature sensor● Thermostat

DTC P0125 ECT SENSOR

UBS00EPA

DTC Confirmation Procedure

CAUTION:

Be careful not to overheat engine.

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check that "COOLAN TEMP/S" is above 10°C (50°F).
If it is above 10°C (50°F), the test result will be OK.
If it is below 10°C (50°F), go to following step.
4. Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
5. If 1st trip DTC is detected, go to [EC-178, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

WITH GST

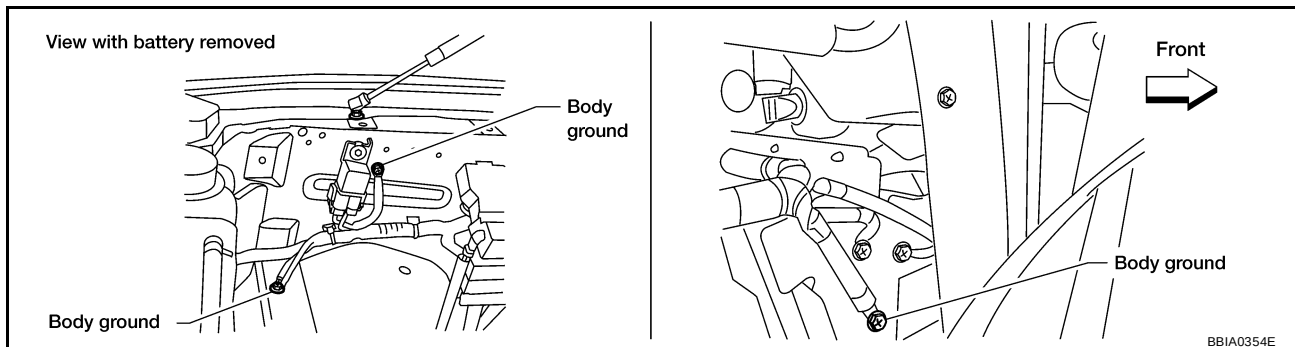
Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00EPB

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-179, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
NG >> Replace engine coolant temperature sensor.

DTC P0125 ECT SENSOR

3. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace thermostat. Refer to [CO-17, "THERMOSTAT AND WATER PIPING"](#) .

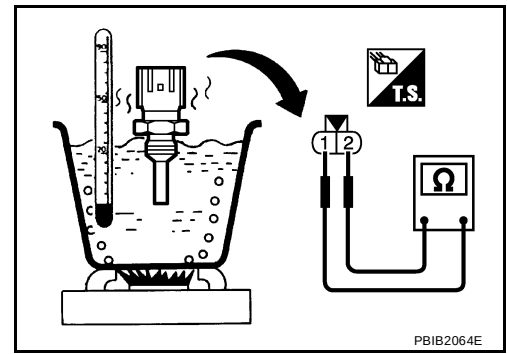
4. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.

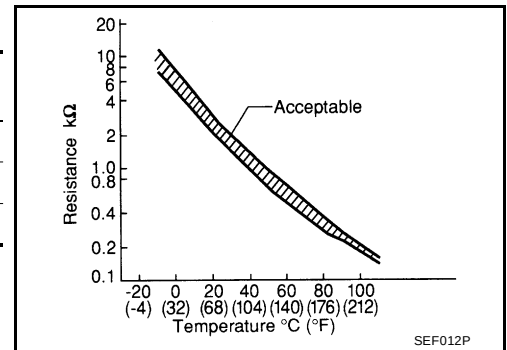


<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.

2. If NG, replace engine coolant temperature sensor.



Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-17, "THERMOSTAT AND WATER PIPING"](#) .

DTC P0127 IAT SENSOR

DTC P0127 IAT SENSOR

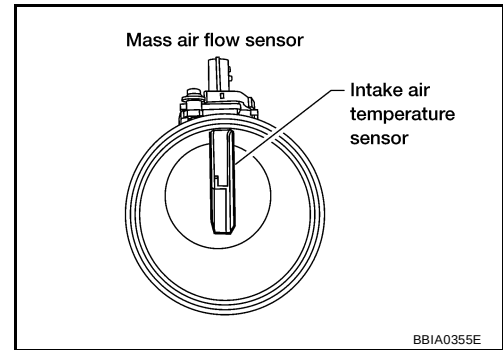
PFP:22630

Component Description

UBS00EPE

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

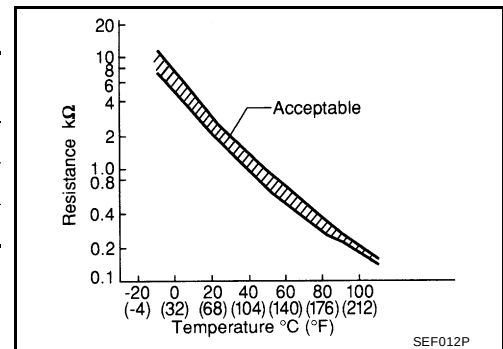
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: This data is reference value and is measured between ECM terminal 34 (Intake air temperature sensor) 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.

On Board Diagnosis Logic

UBS00EPF

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted)● Intake air temperature sensor

DTC Confirmation Procedure

UBS00EPG

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.

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

⑧ WITH CONSULT-II

1. Wait until engine coolant temperature is less than 90°C (194°F)
 - a. Turn ignition switch ON.

DTC P0127 IAT SENSOR

- b. Select "DATA MONITOR" mode with CONSULT-II.
- c. Check the engine coolant temperature.
- d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-181, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

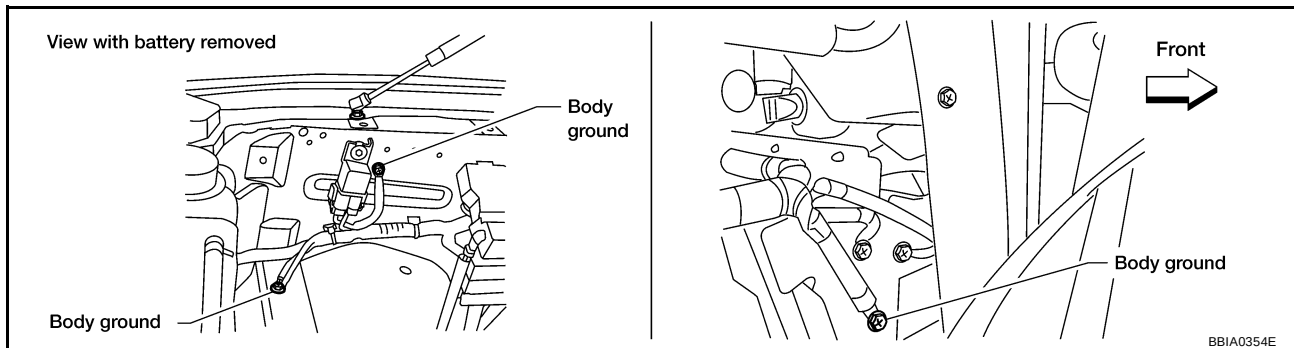
WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#).

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-182, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace mass air flow sensor (with intake air temperature sensor).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

DTC P0127 IAT SENSOR

UBS00EPI

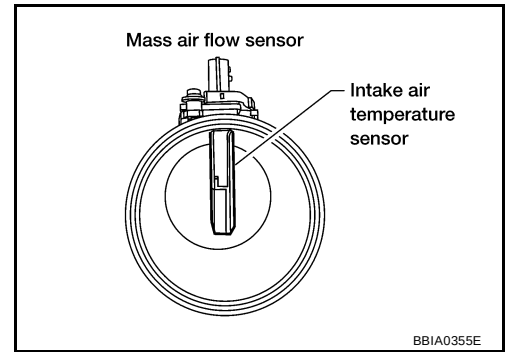
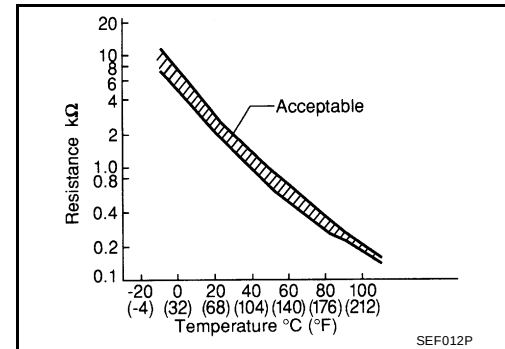
Component Inspection

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor terminals 5 and 6 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



Removal and Installation

MASS AIR FLOW SENSOR

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .

UBS00EPJ

DTC P0128 THERMOSTAT FUNCTION

DTC P0128 THERMOSTAT FUNCTION

PFP:21200

On Board Diagnosis Logic

UBS00EPK

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none">● Thermostat● Leakage from sealing portion of thermostat● Engine coolant temperature sensor

DTC Confirmation Procedure

UBS00EPL

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:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 60°C (140°F).

WITH CONSULT-II

1. Replace thermostat with new one. Refer to [CO-17, "THERMOSTAT AND WATER PIPING"](#) . Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch ON.
3. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
4. Check that the "COOLAN TEMP/S" is above 60°C (140°F).
If it is below 60°C (140°F), go to following step.
If it is above 60°C (140°F), cool down the engine to less than 60°C (140°F), then retry from step 1.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

If 1st trip DTC is detected, go to [EC-183, "Diagnostic Procedure"](#) .

WITH GST

1. Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00EPM

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-183, "Component Inspection"](#) .

OK or NG

OK >> INSPECTION END

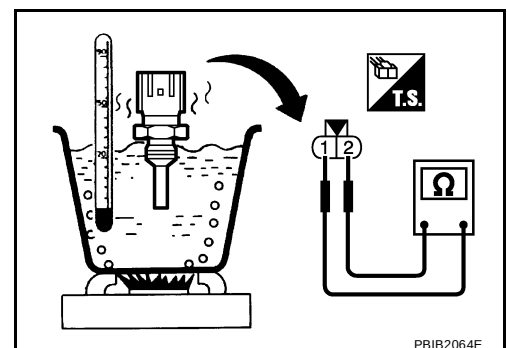
NG >> Replace engine coolant temperature sensor.

Component Inspection

ENGINE COOLANT TEMPERATURE SENSOR

Check resistance as shown in the figure.

UBS00EPN

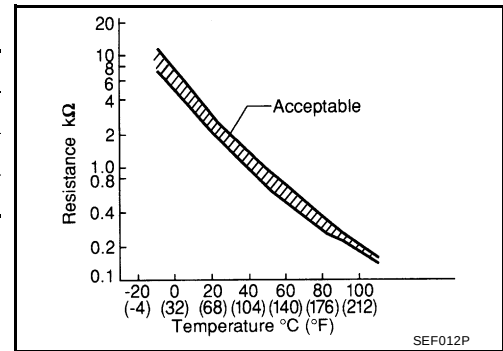


DTC P0128 THERMOSTAT FUNCTION

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



UBS00EPO

Removal and Installation

ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-17, "THERMOSTAT AND WATER PIPING"](#) .

DTC P0138, P0158 HO2S2

PFP:226A0

Component Description

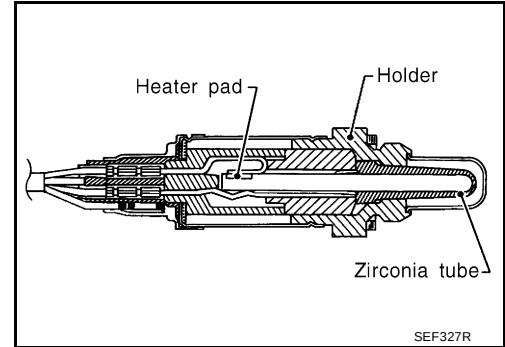
UBS00EPP

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

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

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EPQ

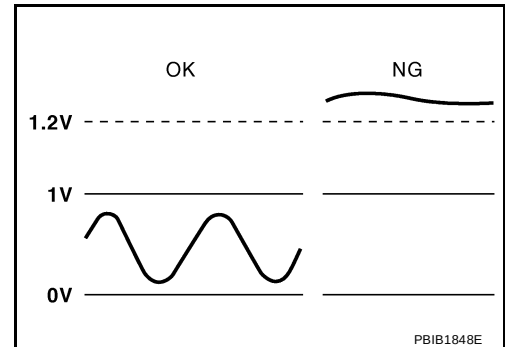
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> Warm-up condition After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ↔ RICH

On Board Diagnosis Logic

UBS00EPR

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138 (Bank 1)	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Heated oxygen sensor 2
P0158 0158 (Bank 2)			

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

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.

④ WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. If 1st trip DTC is detected, go to [EC-190, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

④ WITH GST

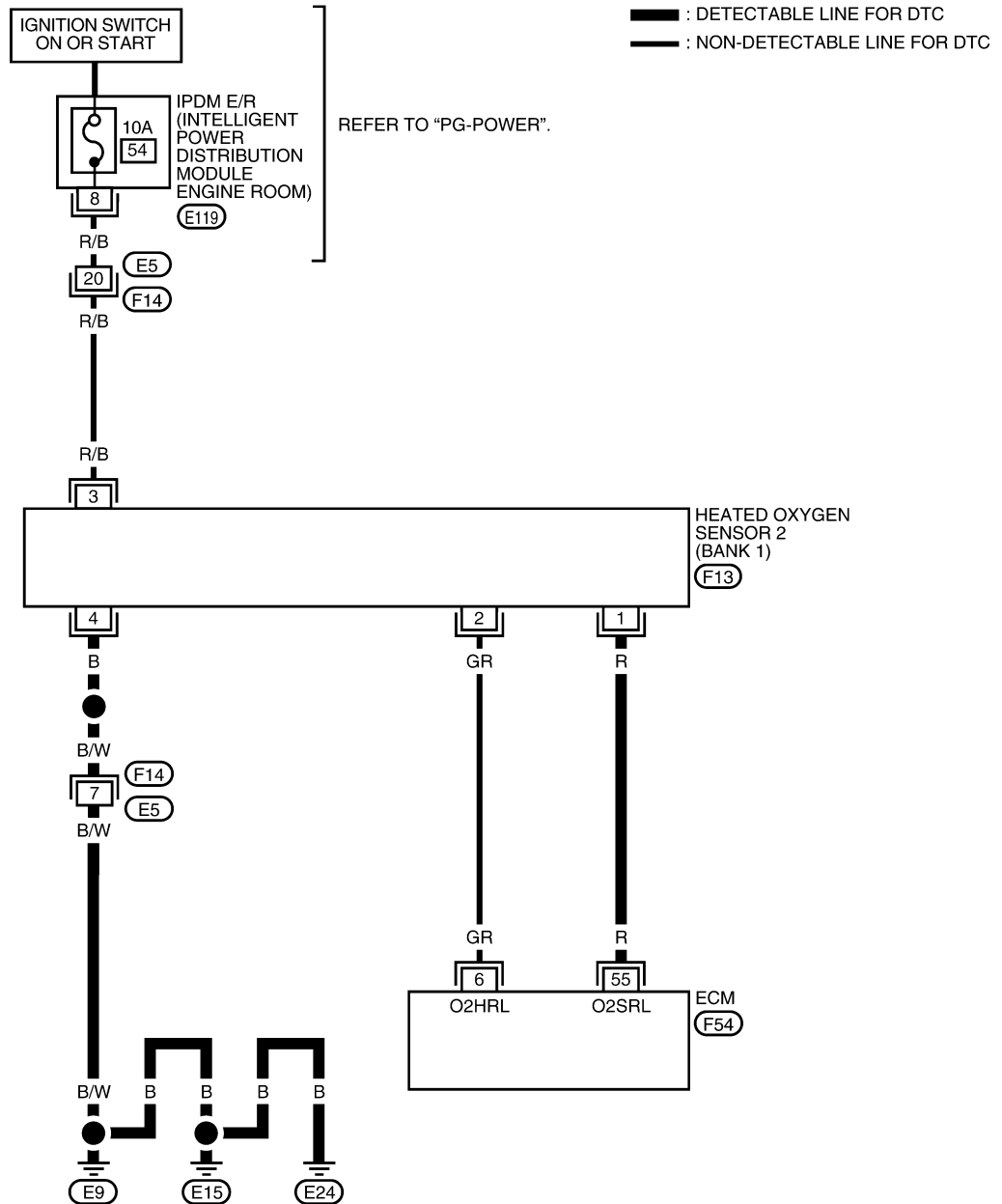
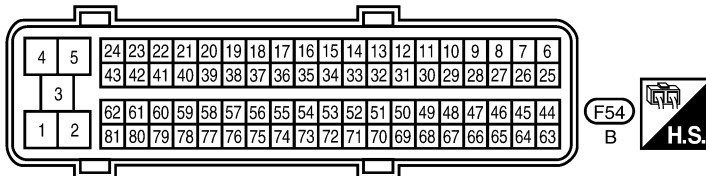
Follow the procedure "WITH CONSULT-II" above.

DTC P0138, P0158 HO2S2

Wiring Diagram BANK 1

UBS00EPT

EC-O2S2B1-01



BBWA1136E

DTC P0138, P0158 HO2S2

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

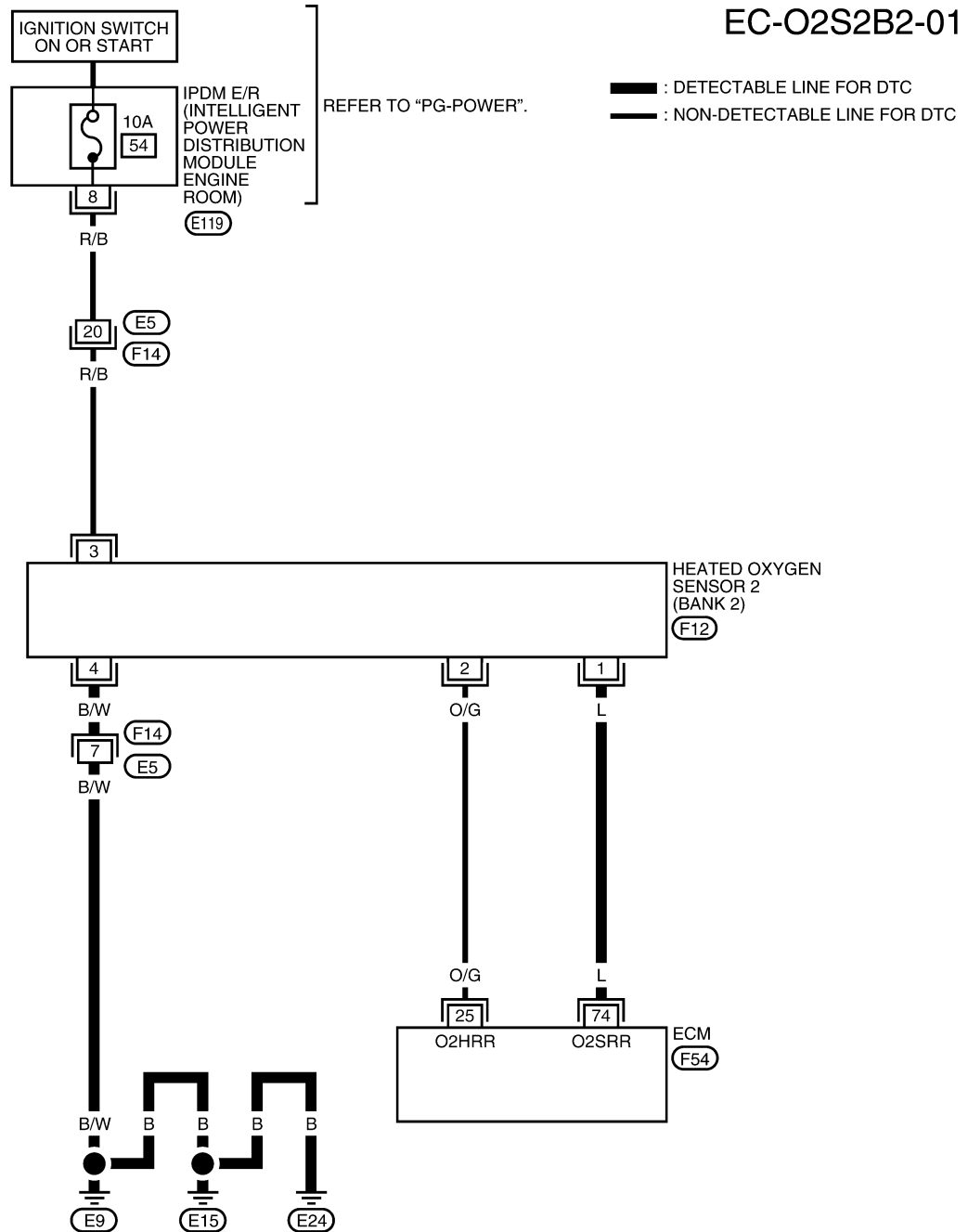
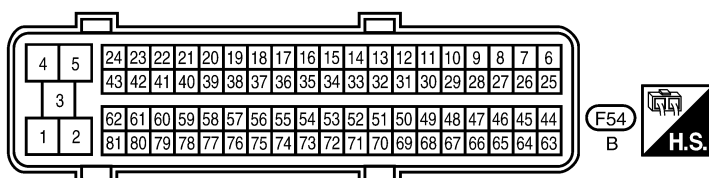
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

DTC P0138, P0158 HO2S2

BANK 2

EC-O2S2B2-01



BBWA1159E

DTC P0138, P0158 HO2S2

Specification data are reference values and are 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.

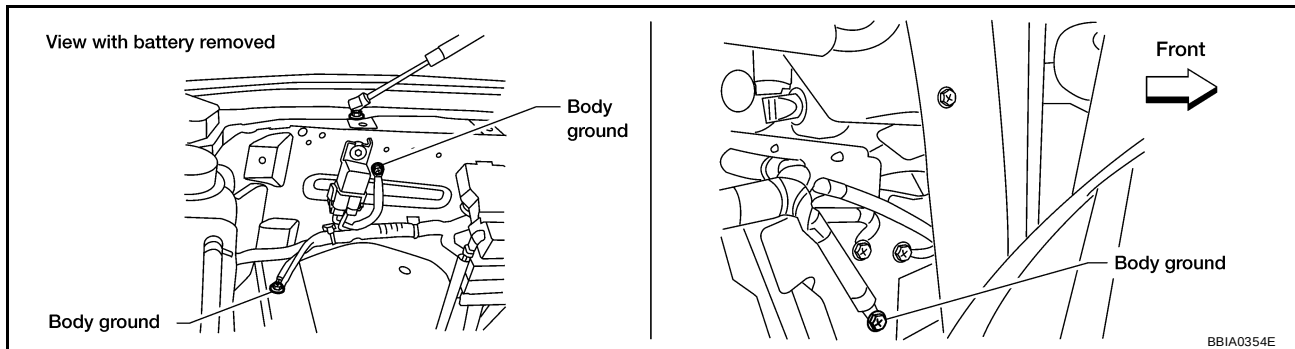
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	L	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">- After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

Diagnostic Procedure

UBS00EPU

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



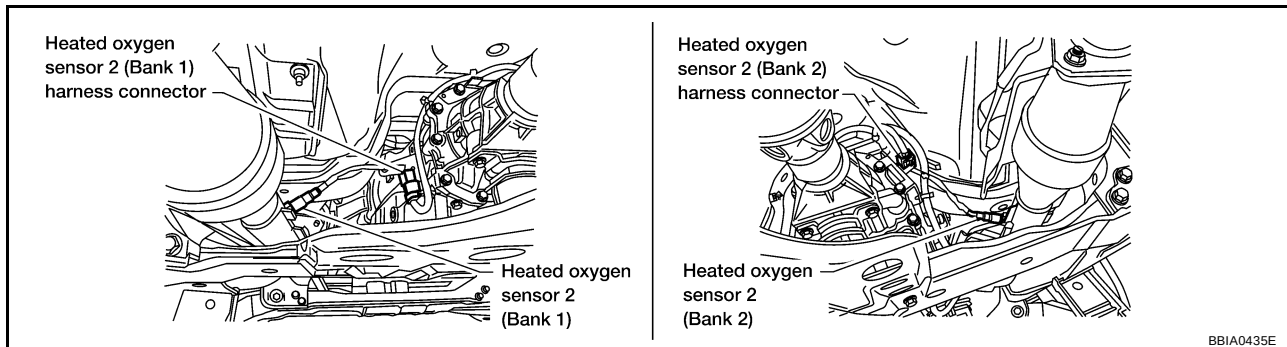
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.



2. Check harness continuity between HO2S2 terminal 4 and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- Harness for open or short between heated oxygen sensor 2 and body ground

>> Repair open circuit or short to power in harness or connectors.

DTC P0138, P0158 HO2S2

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	55	1	1
P0158	74	1	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	55	1	1
P0158	74	1	2

Continuity should not exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HO2S2 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 6.

NG >> Repair or replace harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-193, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning heated oxygen sensor 2.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

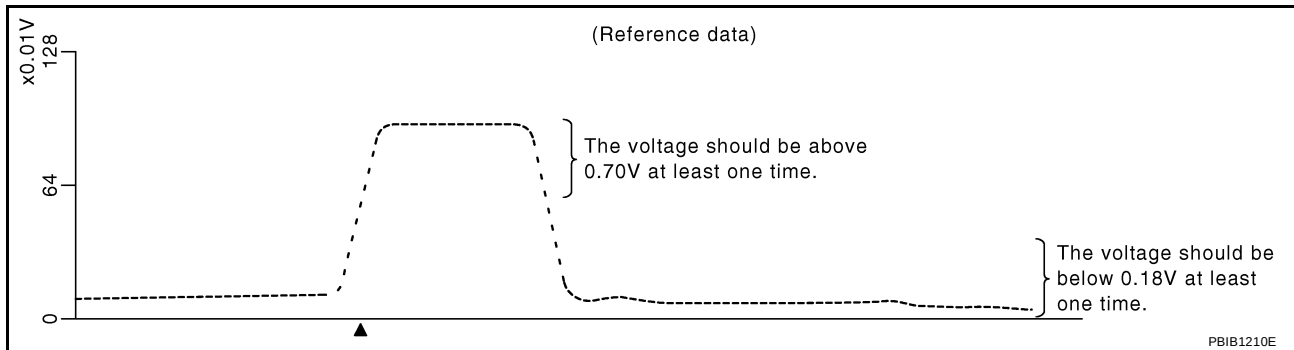
SEF174Y

6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S2 (B1)	XXX V
HO2S2 (B2)	XXX V

PBIB1672E

7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)/(B2)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

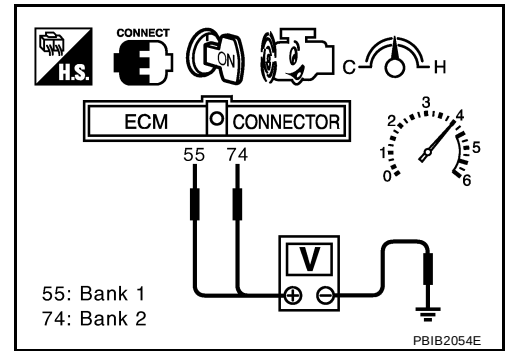
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.

DTC P0138, P0158 HO2S2

6. 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.)
The voltage should be above 0.70V at least once during this procedure.
If the voltage is above 0.70V at step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
The voltage should be below 0.18V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



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.
- 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.

Removal and Installation HEATED OXYGEN SENSOR 2

UBS00EPW

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P0139, P0159 HO2S2

PFP:226A0

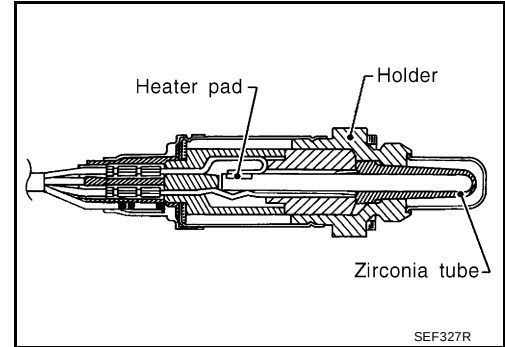
Component Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

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

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



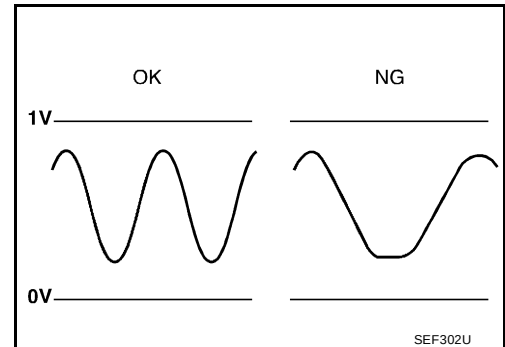
CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> Warm-up condition After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ↔ RICH

On Board Diagnosis Logic

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139 (Bank 1)	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Heated oxygen sensor 2
P0159 0159 (Bank 2)			<ul style="list-style-type: none"> Fuel pressure Injector Intake air leaks

DTC P0139, P0159 HO2S2

UBS00EQ0

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.

⑧ WITH CONSULT-II

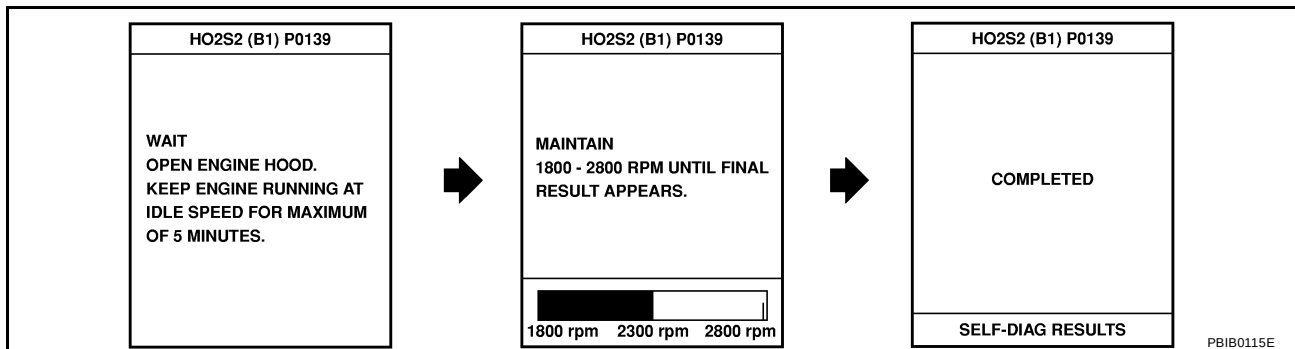
TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).
7. Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
8. Start engine and following the instruction of CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y



9. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, refer to [EC-201, "Diagnostic Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

Overall Function Check

UBS00EQ1

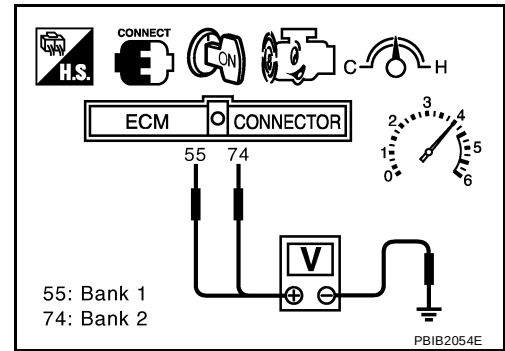
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

⑧ WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.

DTC P0139, P0159 HO2S2

6. 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.)
A change of voltage should be more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. 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.
A change of voltage should be more than 0.06V for 1 second during this procedure.
8. If NG, go to [EC-201, "Diagnostic Procedure"](#) .

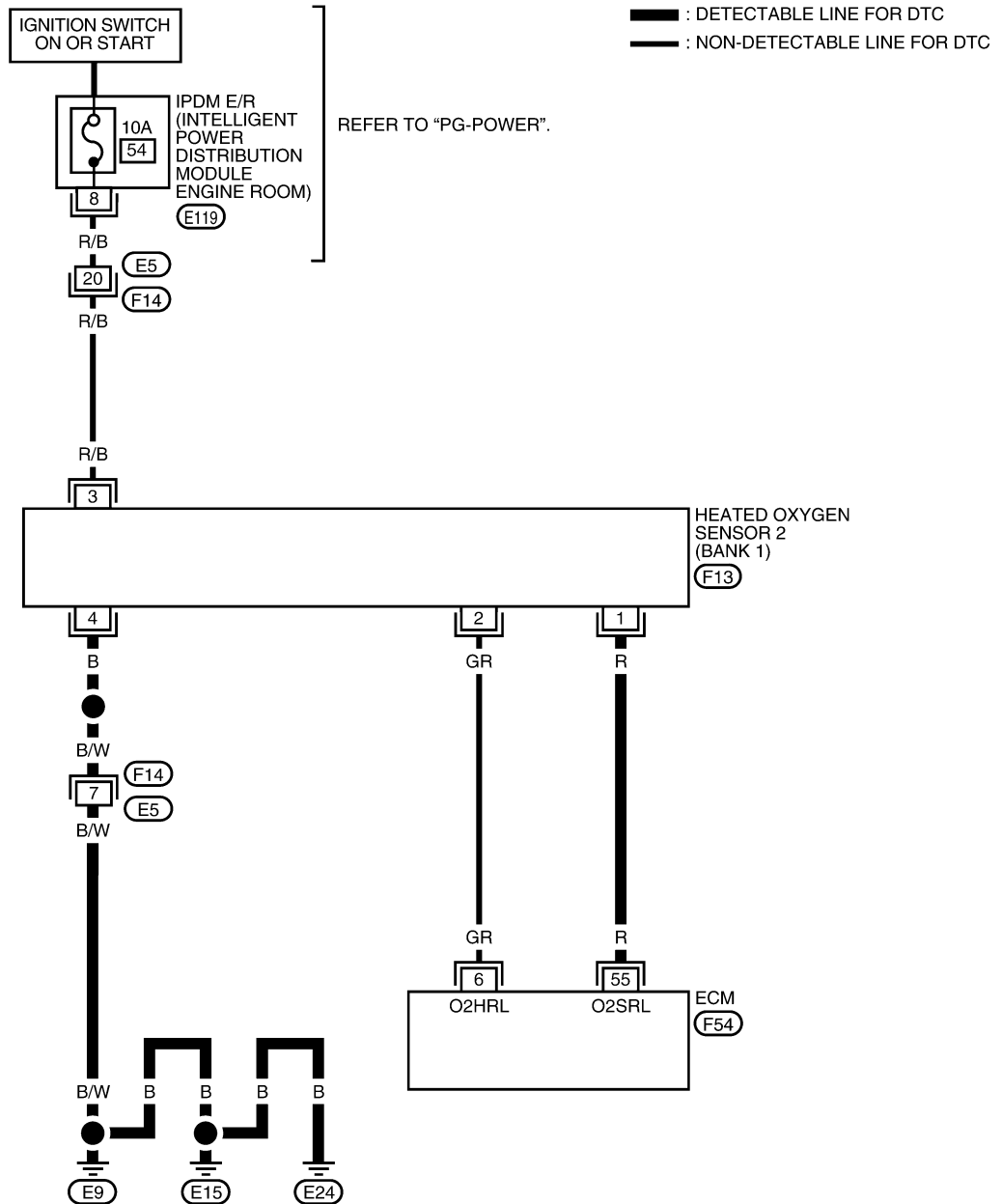
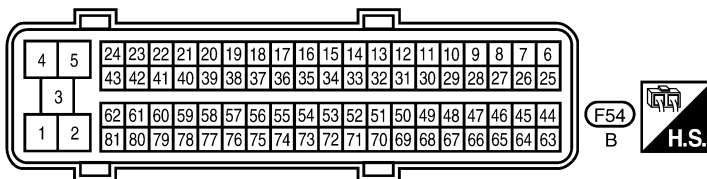


DTC P0139, P0159 HO2S2

Wiring Diagram BANK 1

UBS00EQ2

EC-O2S2B1-01



BBWA1136E

DTC P0139, P0159 HO2S2

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

A

EC

C

D

E

F

G

H

I

J

K

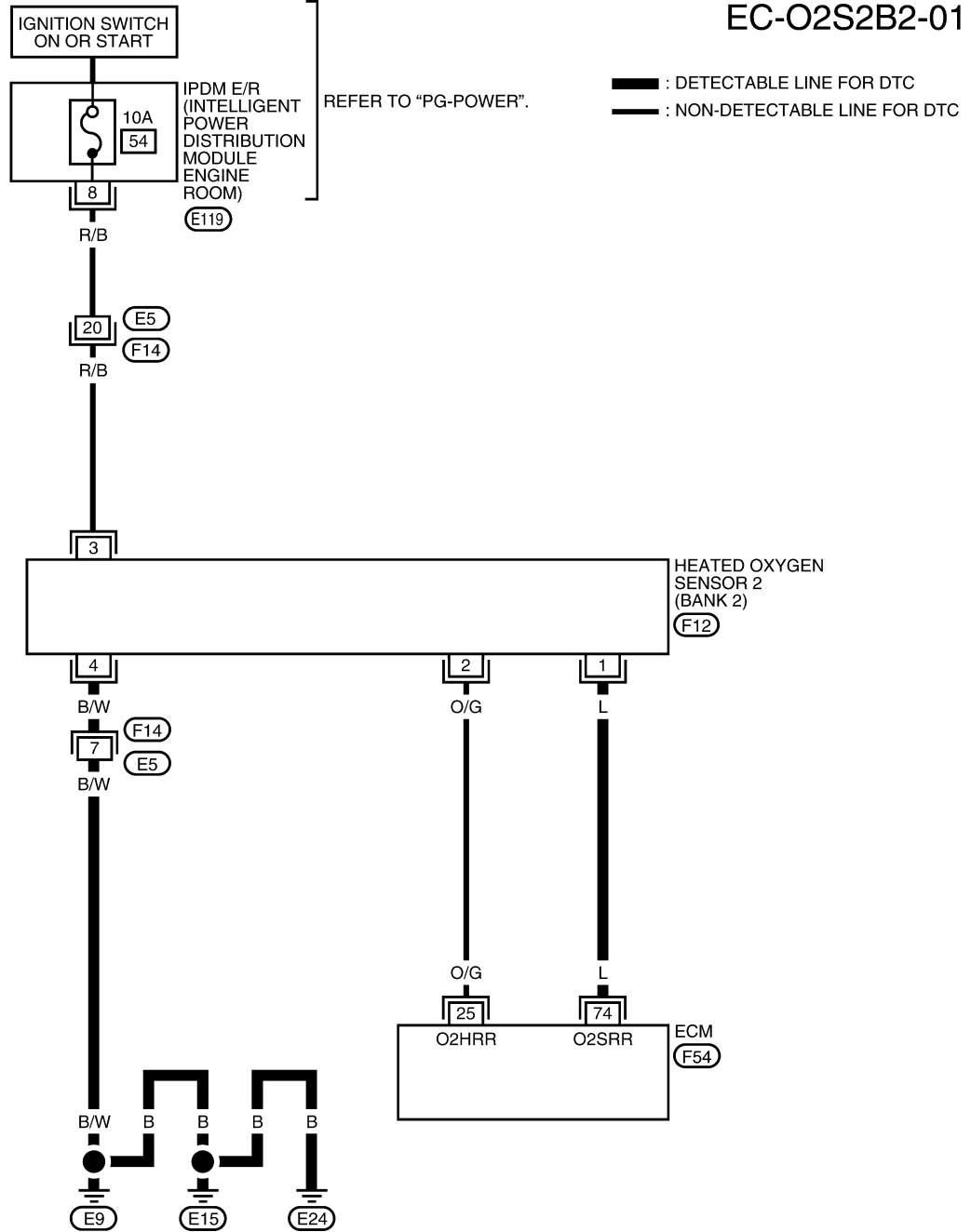
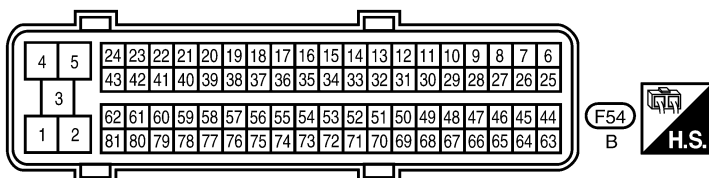
L

M

DTC P0139, P0159 HO2S2

BANK 2

EC-O2S2B2-01



BBWA1159E

DTC P0139, P0159 HO2S2

Specification data are reference values and are 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.

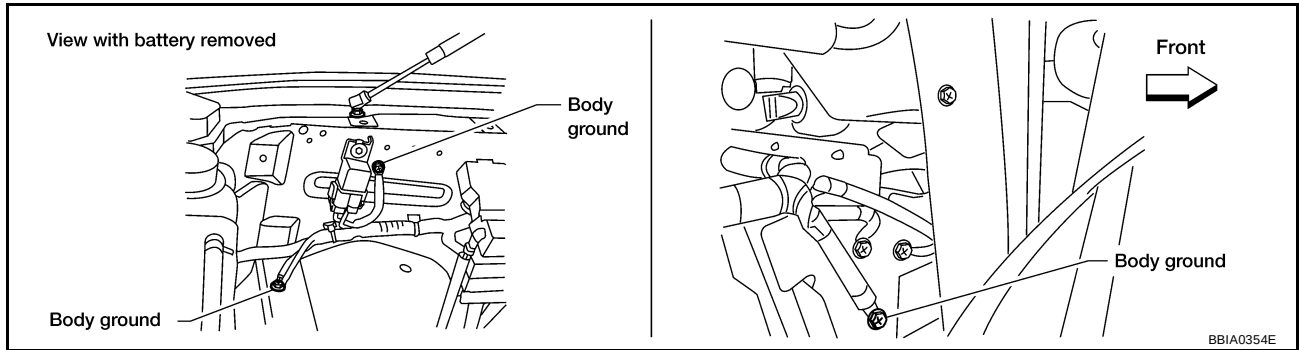
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	L	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none">• Warm-up condition• Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

Diagnostic Procedure

UBS00EQ3

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

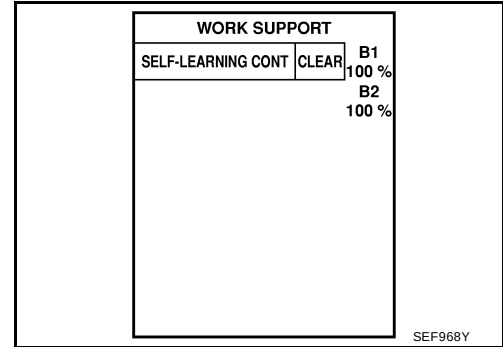
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

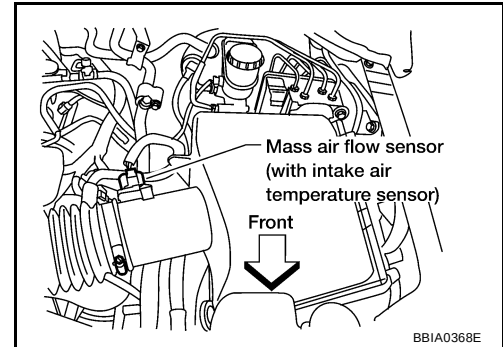
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
Is it difficult to start engine?

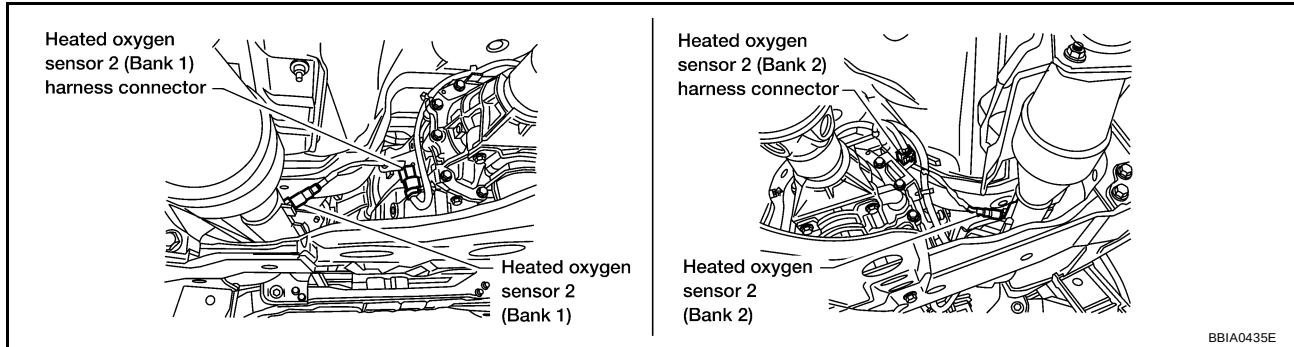


Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-207](#) or [EC-216](#)
- No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.



3. Check harness continuity between HO2S2 terminal 4 and body ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- Harness for open or short between heated oxygen sensor 2 and body ground

>> Repair open circuit or short to power in harness or connectors.

DTC P0139, P0159 HO2S2

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0139	55	1	1
P0159	74	1	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0139	55	1	1
P0159	74	1	2

Continuity should not exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-204, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning heated oxygen sensor 2.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 2

UBS00EQ4

With CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

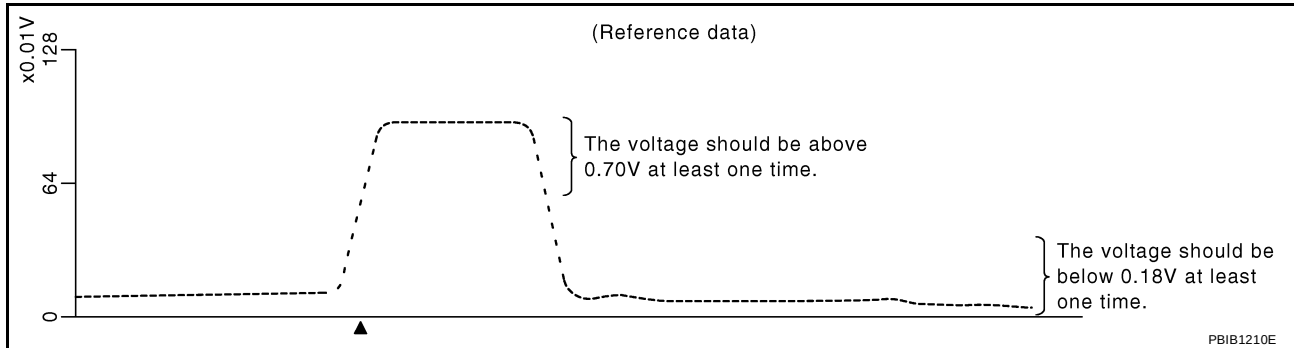
DTC P0139, P0159 HO2S2

6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S2 (B1)	XXX V
HO2S2 (B2)	XXX V

PBIB1672E

7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



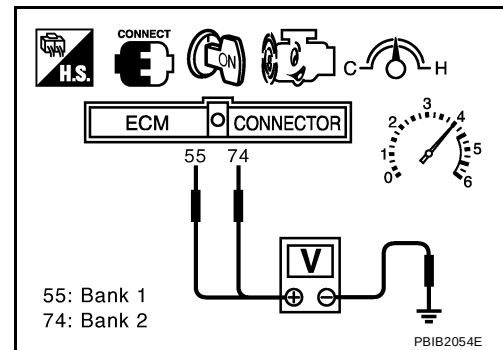
"HO2S2 (B1)/(B2)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

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.
- 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.

⊗ Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.
6. 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.)
The voltage should be above 0.70V at least once during this procedure.
If the voltage is above 0.70V at step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
The voltage should be below 0.18V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



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.
- 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.

Removal and Installation
HEATED OXYGEN SENSOR 2

UBS00EQ5

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

PDF:16600

On Board Diagnosis Logic

UBS00EQ6

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the A/F sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (the actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171 0171 (Bank 1)	Fuel injection system too lean	<ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	<ul style="list-style-type: none">Intake air leaksA/F sensor 1InjectorExhaust gas leaksIncorrect fuel pressureLack of fuelMass air flow sensorIncorrect PCV hose connection
P0174 0174 (Bank 2)			

DTC Confirmation Procedure

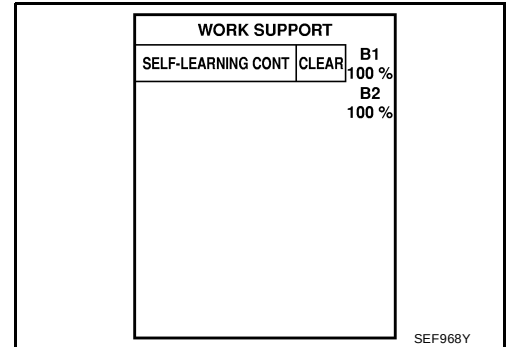
UBS00EQ7

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.

④ WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes.
The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to [EC-211, "Diagnostic Procedure"](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- Crank engine while depressing accelerator pedal. If engine starts, go to [EC-211, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.

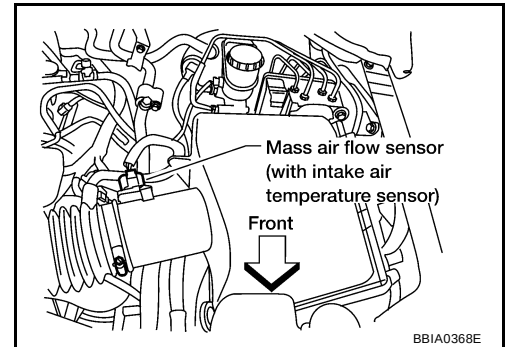


DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION



WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select MODE 3 with GST. Make sure DTC P0102 is detected.
6. Select MODE 4 with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select MODE 7 with GST. The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to [EC-211, "Diagnostic Procedure"](#) .
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-211, "Diagnostic Procedure"](#) . If engine does not start, check exhaust and intake air leak visually.

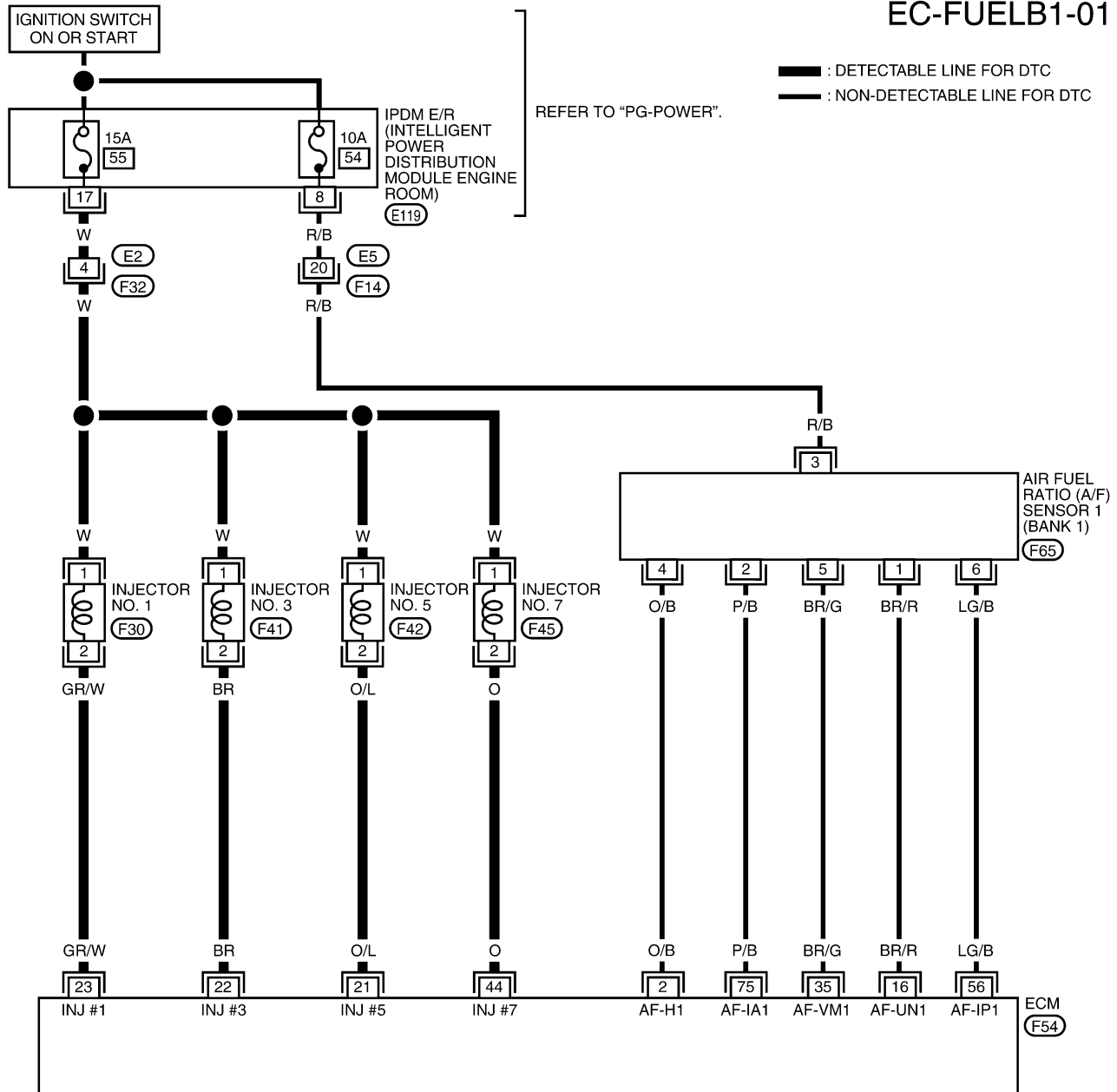
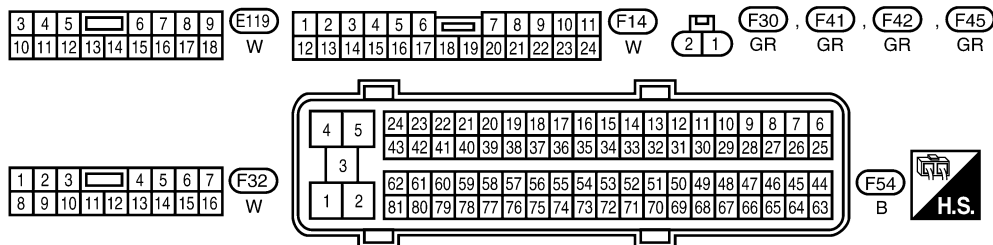


DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

Wiring Diagram BANK 1

UBS00EQ8

EC-FUELB1-01

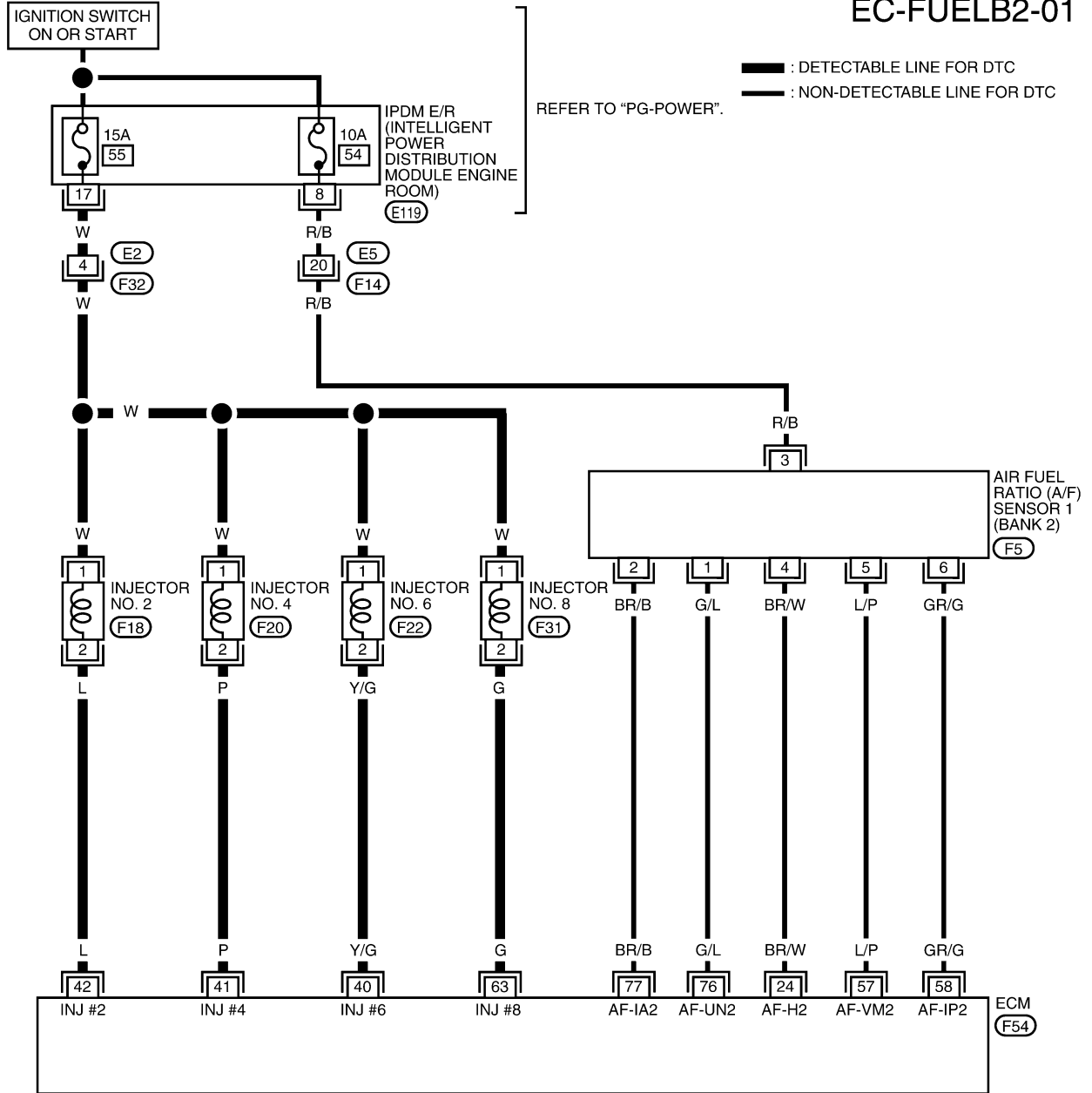
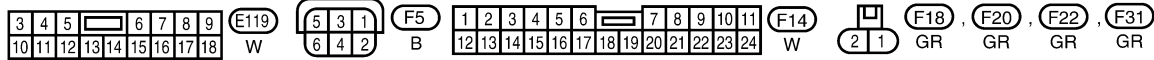
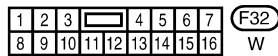
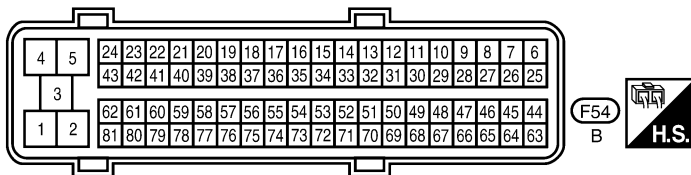


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DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

BANK 2

EC-FUELB2-01



BBWA0882E

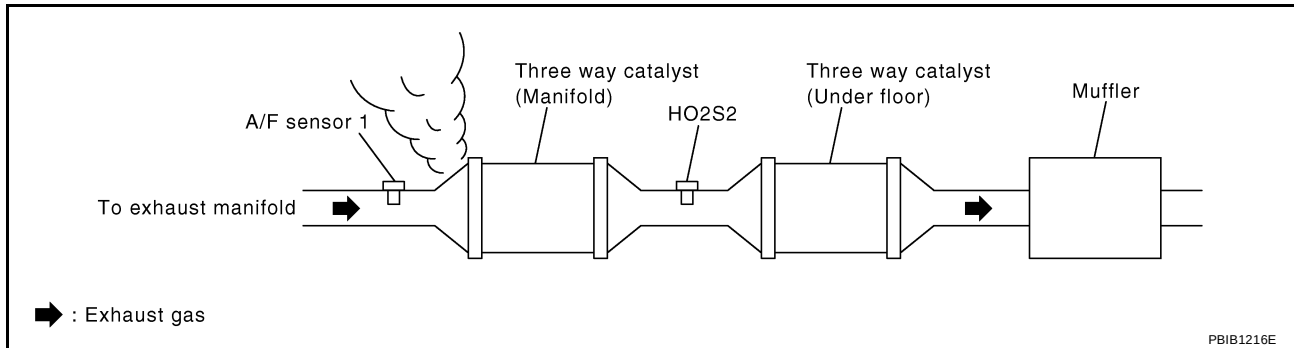
DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

Diagnostic Procedure

UBS00EQ9

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

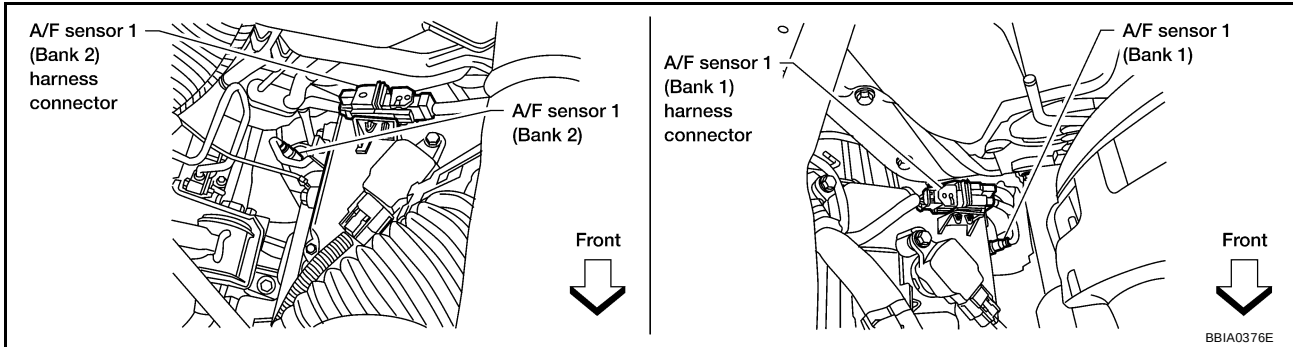
OK or NG

- OK >> GO TO 3.
NG >> Repair or replace.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding A/F sensor 1 harness connector.



3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

5. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

6. 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.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .

At idling: 350 kPa (3.57 kg/cm² , 51 psi)

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-581, "FUEL PUMP CIRCUIT"](#) .)
- Fuel pressure regulator (Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .)
- Fuel lines
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

3.0 - 9.0 g·m/sec: at idling

9.0 - 28.0 g·m/sec: at 2,500 rpm

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

3.0 - 9.0 g·m/sec: at idling

9.0 - 28.0 g·m/sec: at 2,500 rpm

OK or NG

- OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-145, "DTC P0101 MAF SENSOR"](#) .

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

7. CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

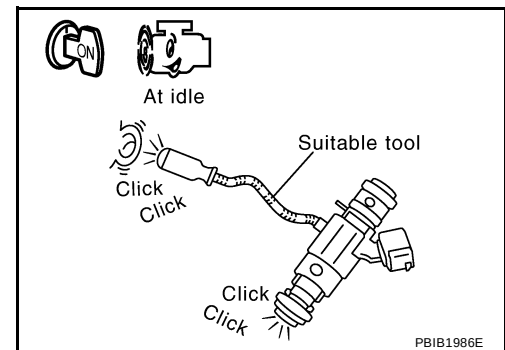
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-575, "INJECTOR CIRCUIT"](#) .

8. CHECK INJECTOR

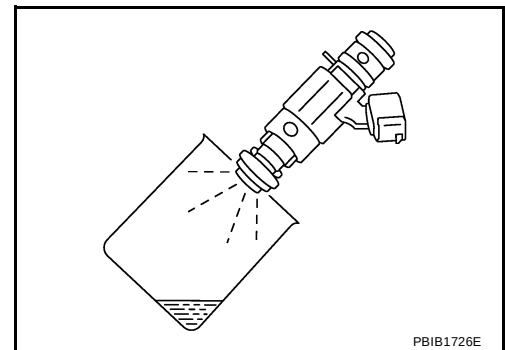
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Disconnect all injector harness connectors.
4. Remove injector gallery assembly. Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .
Keep fuel hose and all injectors connected to injector gallery.
5. For DTC P0171, reconnect injector harness connectors on bank 1.
For DTC P0174, reconnect injector harness connectors on bank 2.
6. Disconnect all ignition coil harness connectors.
7. Prepare pans or saucers under each injector.
8. Crank engine for about 3 seconds.
For DTC P0171, make sure that fuel sprays out from injectors on bank 1.
For DTC P0174, make sure that fuel sprays out from injectors on bank 2.

Fuel should be sprayed evenly for each injector.

OK or NG

OK >> GO TO 9.

NG >> Replace injectors from which fuel does not spray out.
Always replace O-ring with new ones.



DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

A

EC

C

D

E

F

G

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I

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L

M

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

UBS00EQA

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the A/F sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (the actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172 0172 (Bank 1)	Fuel injection system too rich	<ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	<ul style="list-style-type: none">A/F sensor 1InjectorExhaust gas leaksIncorrect fuel pressureMass air flow sensor
P0175 0175 (Bank 2)			

DTC Confirmation Procedure

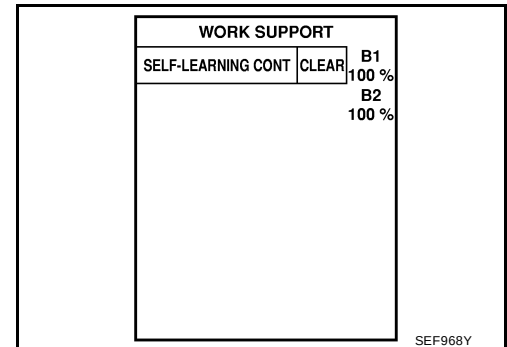
UBS00EQB

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.

④ WITH CONSULT-II

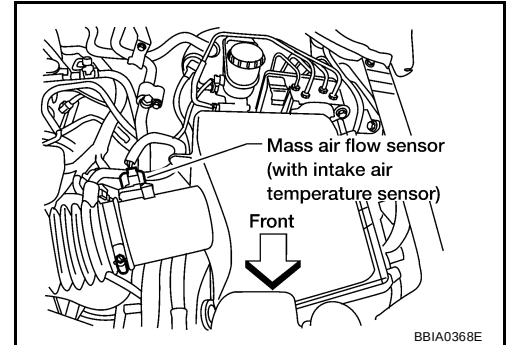
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes.
The 1st trip DTC P0172, P0175 should be detected at this stage, if a malfunction exists. If so, go to [EC-220, "Diagnostic Procedure"](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- Crank engine while depressing accelerator pedal.
If engine starts, go to [EC-220, "Diagnostic Procedure"](#).
If engine does not start, remove spark plugs and check for fouling, etc.



DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select MODE 3 with GST. Make sure DTC P0102 is detected.
6. Select MODE 4 with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select MODE 7 with GST. The 1st trip DTC P0172 or P0175 should be detected at this stage, if a malfunction exists. If so, go to [EC-220, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal.
If engine starts, go to [EC-220, "Diagnostic Procedure"](#). If engine does not start, remove spark plugs and check for fouling, etc.

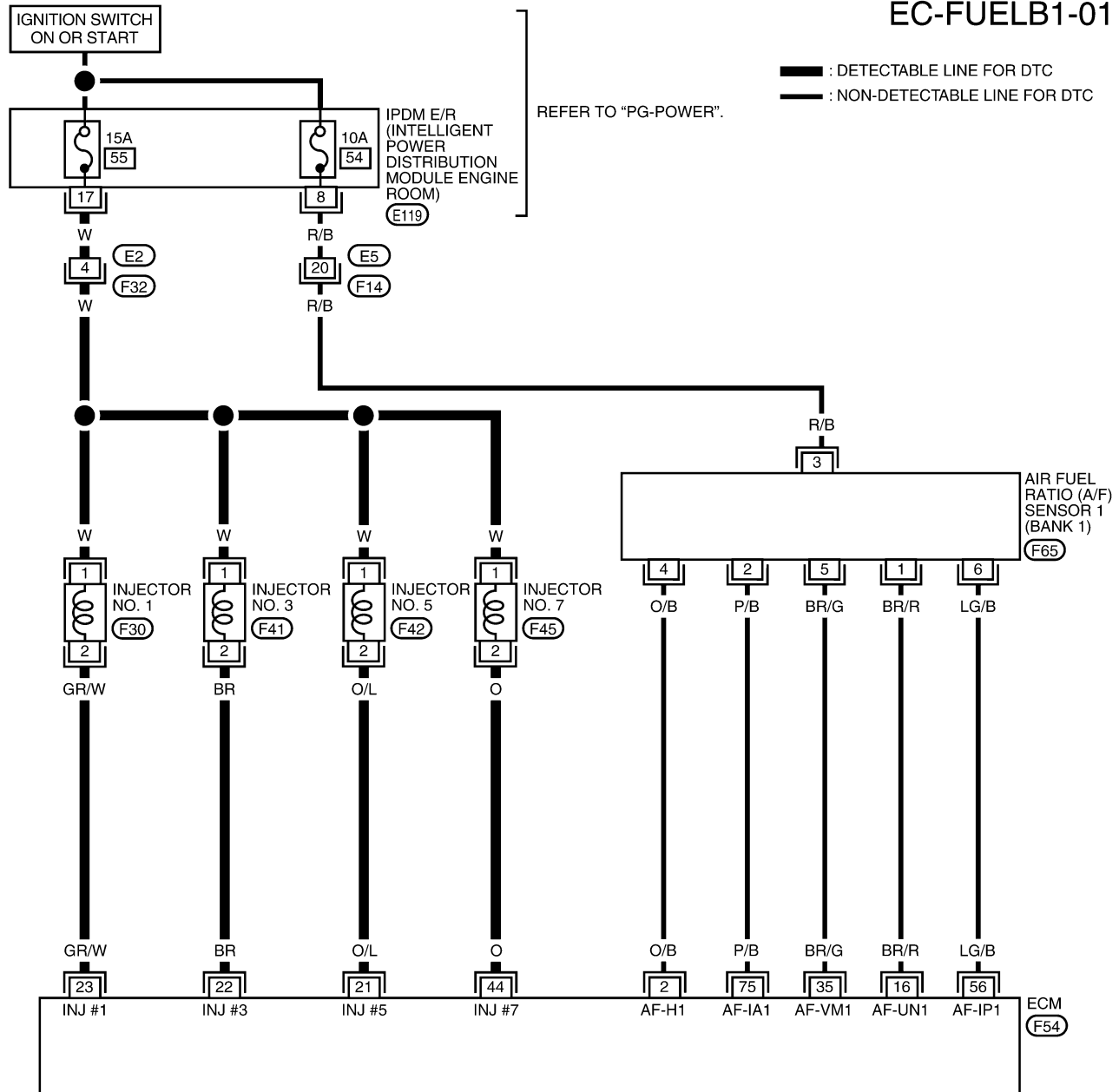


DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

UBS00EQC

Wiring Diagram BANK 1

EC-FUELB1-01

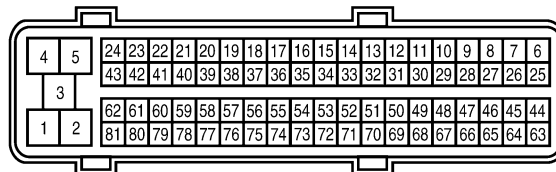


3	4	5	6	7	8	9	E119
10	11	12	13	14	15	16	W

1	2	3	4	5	6	7	8	9	10	11	F14
12	13	14	15	16	17	18	19	20	21	22	W

2	1	F30	F41	F42	F45
GR	GR	GR	GR		

1	2	3	4	5	6	7	F32
8	9	10	11	12	13	14	W



F54	B
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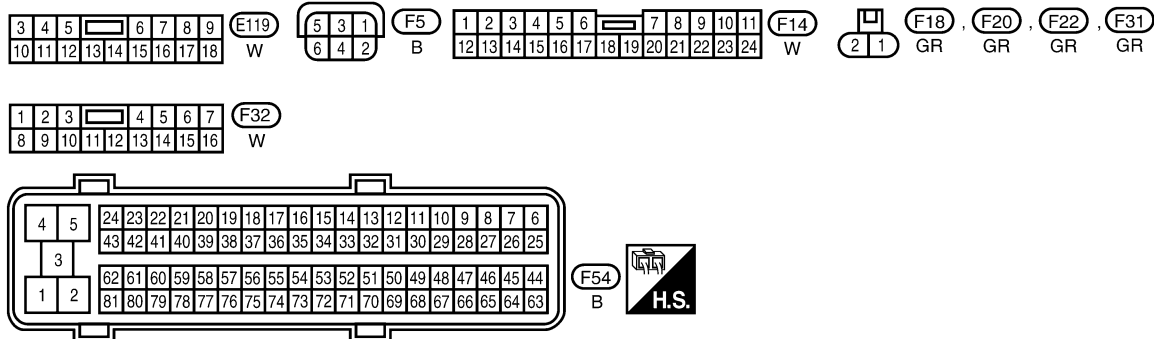


5	3	1	F65
6	4	2	B

BBWA1162E

A	EC	C	D	E	F	G	H	I	J	K	L	M
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EC



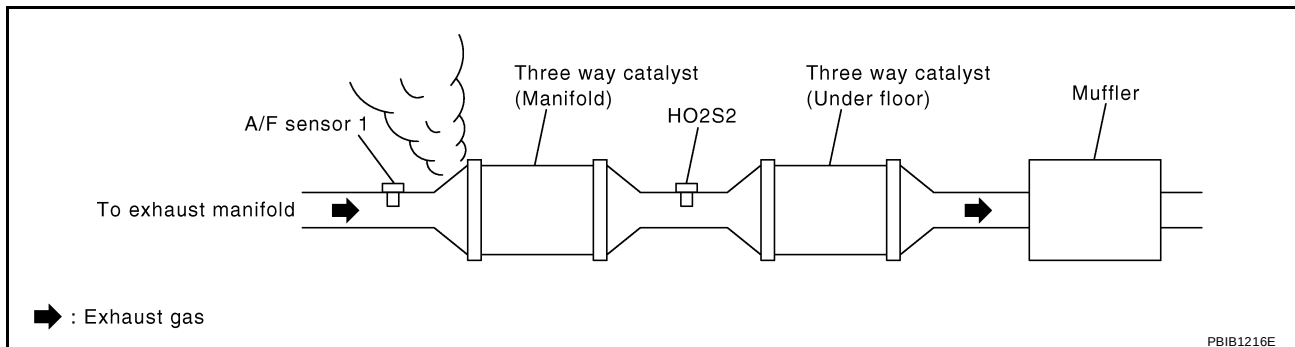
DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

Diagnostic Procedure

UBS00EQD

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

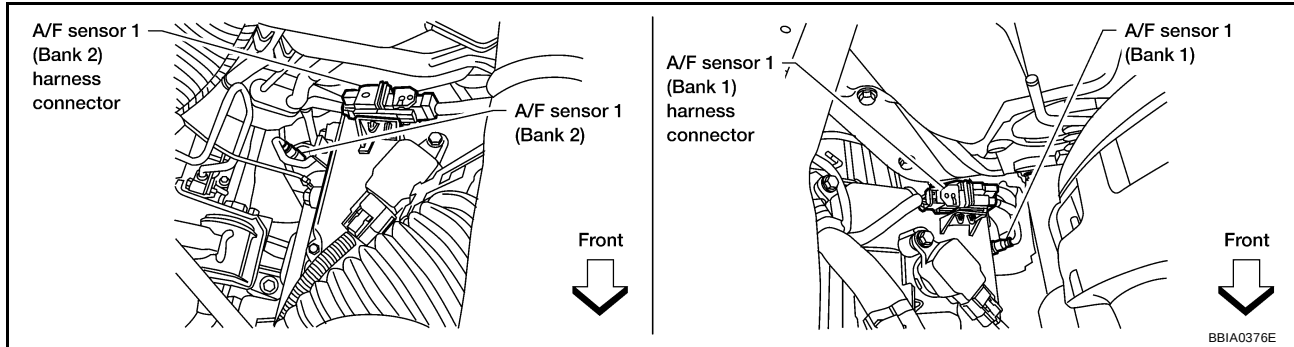
OK or NG

- OK >> GO TO 3.
NG >> Repair or replace.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding A/F sensor 1 harness connector.



3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

5. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

6. 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.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .

At idling: 350 kPa (3.57 kg/cm² , 51 psi)

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to, [EC-581, "FUEL PUMP CIRCUIT"](#) .)
- Fuel pressure regulator (Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .)

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

3.0 - 9.0 g·m/sec: at idling

9.0 - 28.0 g·m/sec: at 2,500 rpm

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

3.0 - 9.0 g·m/sec: at idling

9.0 - 28.0 g·m/sec: at 2,500 rpm

OK or NG

- OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-145, "DTC P0101 MAF SENSOR"](#) .

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

7. CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

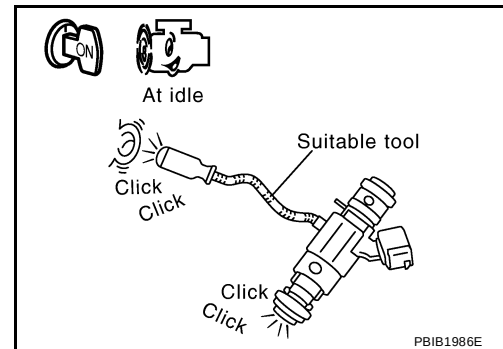
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

- OK >> GO TO 8.
NG >> Perform trouble diagnosis for [EC-575, "INJECTOR CIRCUIT"](#) .

8. CHECK INJECTOR

1. Remove injector assembly. Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .
Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from injector.

OK or NG

- OK (Does not drip.)>>GO TO 9.
NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0181 FTT SENSOR

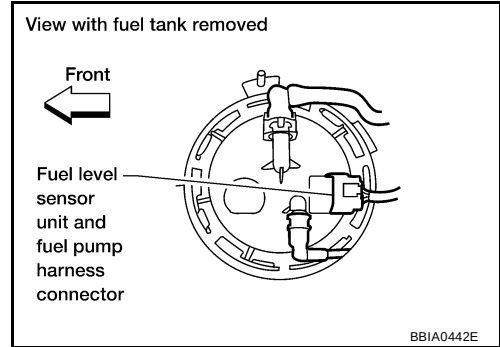
DTC P0181 FTT SENSOR

PFP:22630

Component Description

UBS00EQE

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



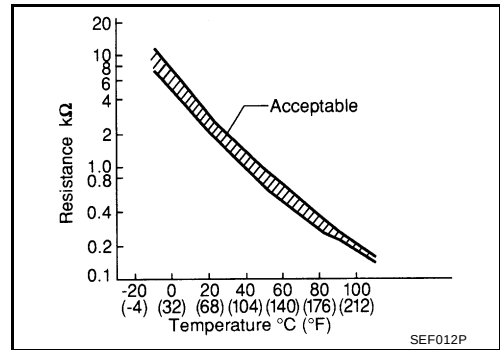
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference value and is measured between ECM terminal 107 (Fuel tank temperature sensor) 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.



On Board Diagnosis Logic

UBS00EQF

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted)● Fuel tank temperature sensor

DTC Confirmation Procedure

UBS00EQG

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
If the result is NG, go to [EC-227, "Diagnostic Procedure"](#) .
If the result is OK, go to following step.
4. Check "COOLAN TEMP/S" value.
If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-227, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC P0181 FTT SENSOR



WITH GST

Follow the procedure "WITH CONSULT-II" above.

A

EC

C

D

E

F

G

H

I

J

K

L

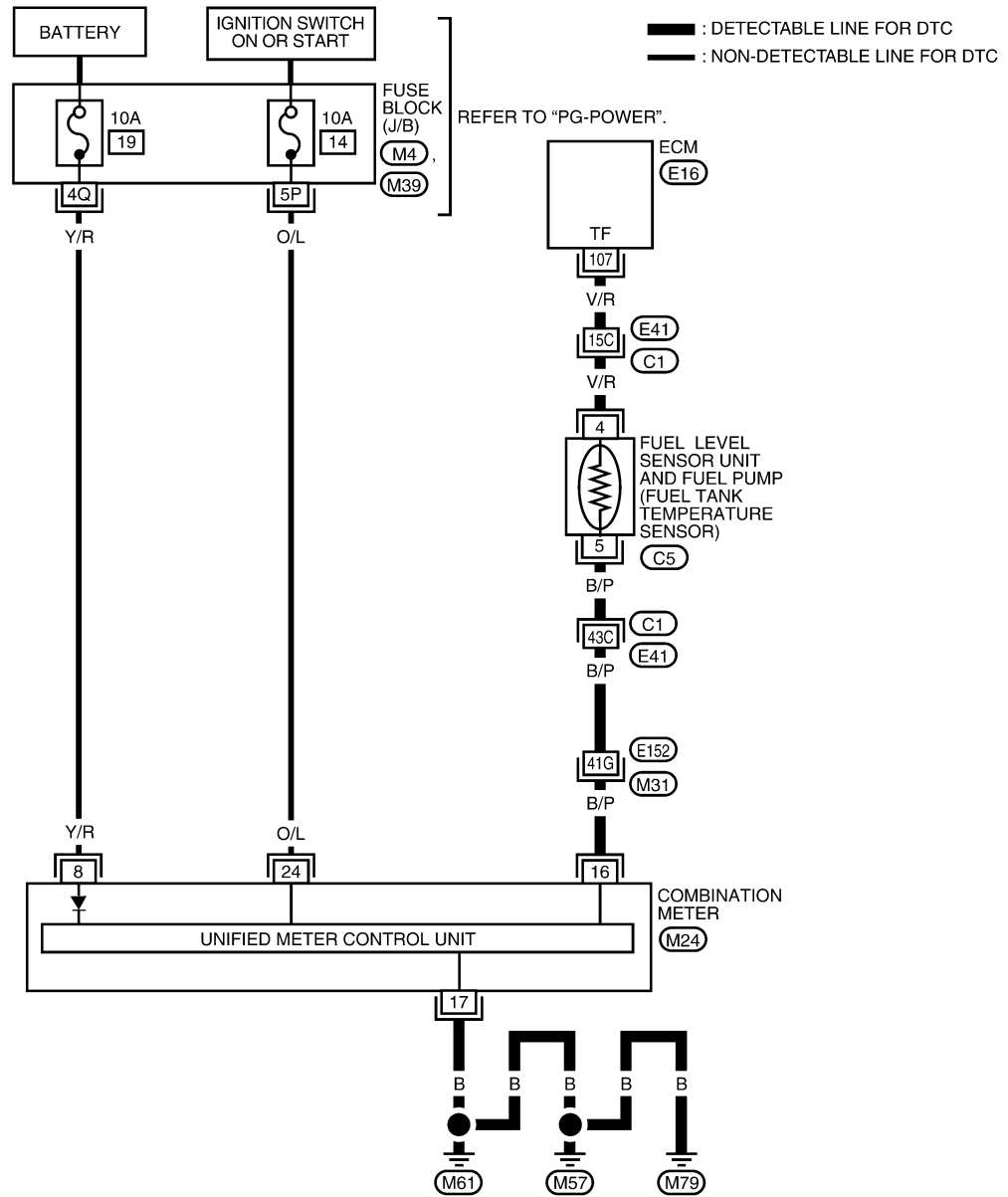
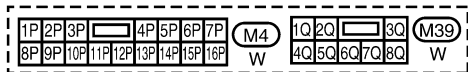
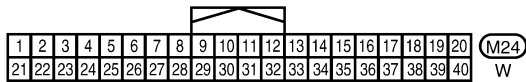
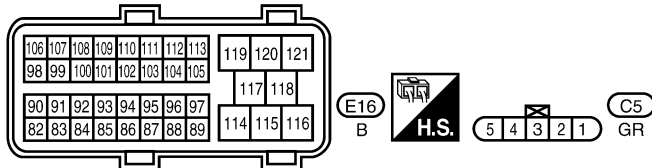
M

DTC P0181 FTT SENSOR

Wiring Diagram

UBS00EQH

EC-FTTS-01



REFER TO THE FOLLOWING.
(M31), (C1) - SUPER MULTIPLE JUNCTION (SMJ)

BBWA1164E

DTC P0181 FTT SENSOR

UBS00EQI

Diagnostic Procedure

1. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

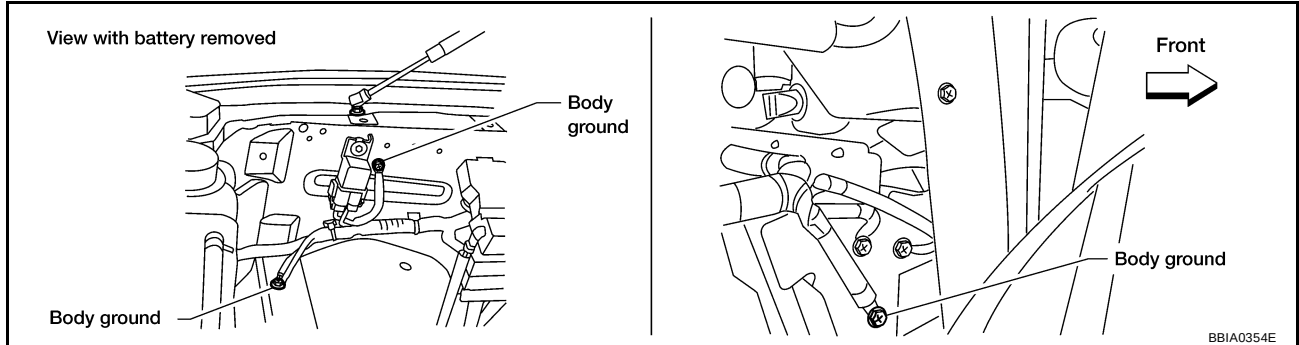
OK or NG

OK >> GO TO 2.

NG >> Go to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

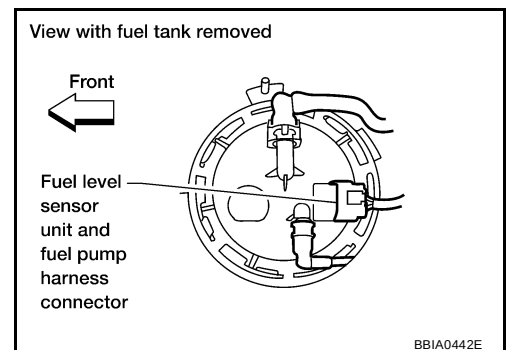
OK or NG

OK >> GO TO 3.

NG >> Repair or replace ground connections.

3. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Turn ignition switch ON.



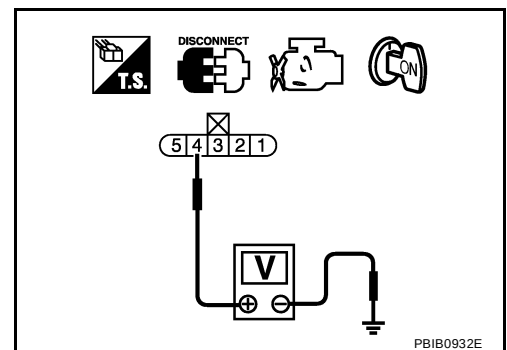
3. Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.



DTC P0181 FTT SENSOR

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness for open or short between ECM and “fuel level sensor unit and fuel pump”

>> Repair harness or connector.

5. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector.
3. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 5 and combination meter terminal 16. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E152, M31
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter

>> Repair open circuit or short to ground or short to power in harness or connector.

7. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-228, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Replace fuel level sensor unit.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection FUEL TANK TEMPERATURE SENSOR

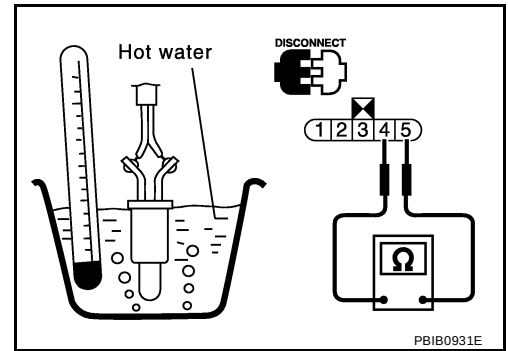
UBS00EQJ

1. Remove fuel level sensor unit.

DTC P0181 FTT SENSOR

2. Check resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



Removal and Installation FUEL TANK TEMPERATURE SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0182, P0183 FTT SENSOR

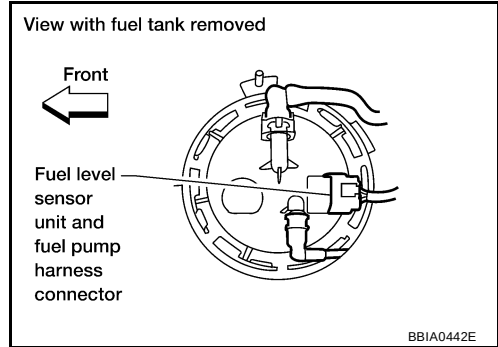
DTC P0182, P0183 FTT SENSOR

PFP:22630

Component Description

UBS00EQL

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



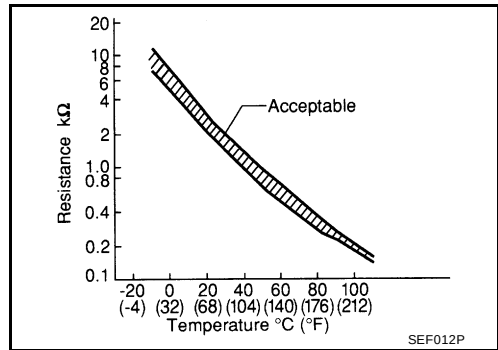
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 107 (Fuel tank temperature sensor) 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.



On Board Diagnosis Logic

UBS00EQM

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS00EQN

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-232, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

WITH GST

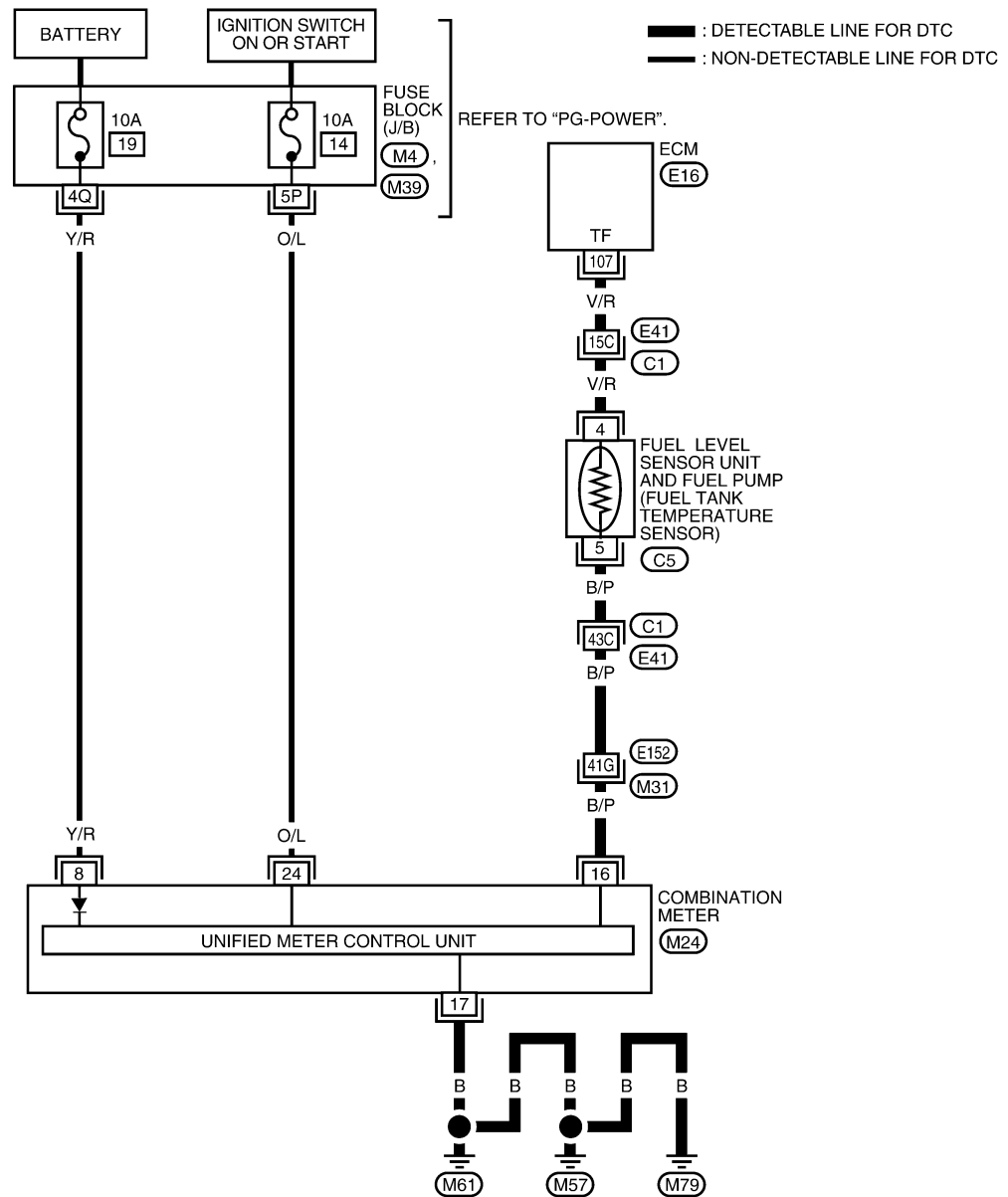
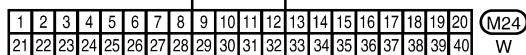
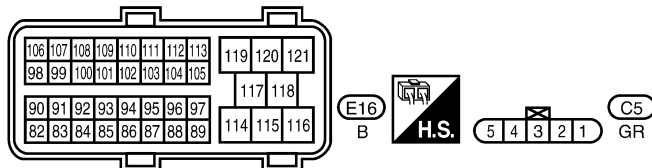
Follow the procedure "WITH CONSULT-II" above.

DTC P0182, P0183 FTT SENSOR

Wiring Diagram

UBS00EQO

EC-FTTS-01



REFER TO THE FOLLOWING.
(M31), (C1) - SUPER MULTIPLE JUNCTION (SMJ)

BBWA1164E

DTC P0182, P0183 FTT SENSOR

UBS00EQP

Diagnostic Procedure

1. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

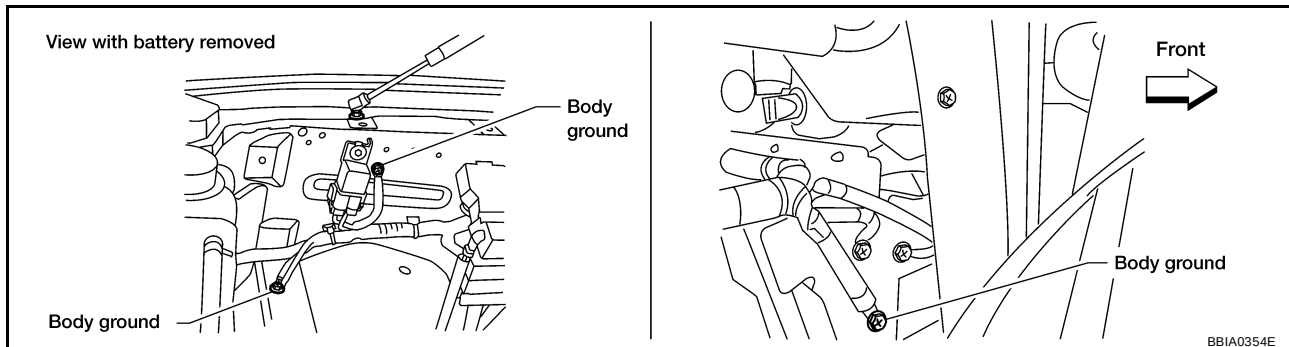
OK or NG

OK >> GO TO 2.

NG >> Go to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

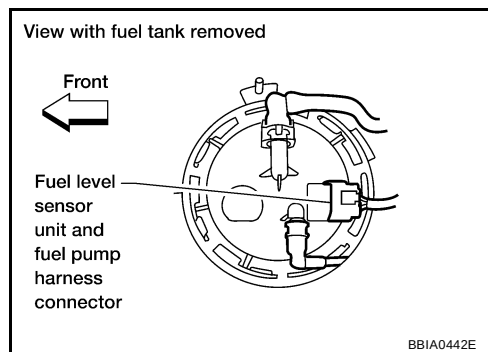
OK or NG

OK >> GO TO 3.

NG >> Repair or replace ground connections.

3. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Turn ignition switch ON.



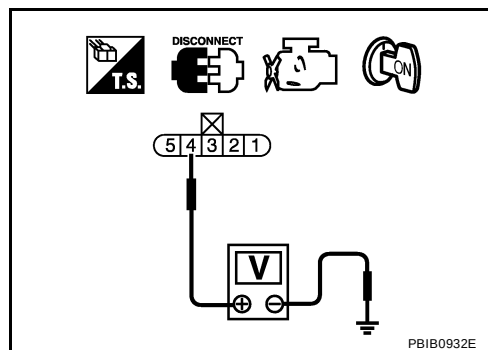
3. Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.



DTC P0182, P0183 FTT SENSOR

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness for open or short between ECM and “fuel level sensor unit and fuel pump”

>> Repair harness or connector.

5. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector.
3. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 5 and combination meter terminal 16. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E152, M31
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter

>> Repair open circuit or short to ground or short to power in harness or connector.

7. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace fuel level sensor unit.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection

FUEL TANK TEMPERATURE SENSOR

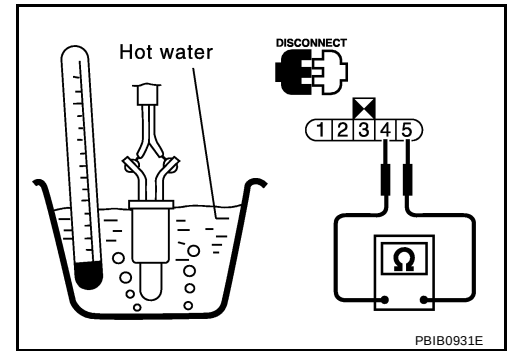
UBS00EQQ

1. Remove fuel level sensor unit.

DTC P0182, P0183 FTT SENSOR

2. Check resistance between “fuel level sensor unit and fuel pump” terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



UBS00EQR

Removal and Installation FUEL TANK TEMPERATURE SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0222, P0223 TP SENSOR

DTC P0222, P0223 TP SENSOR

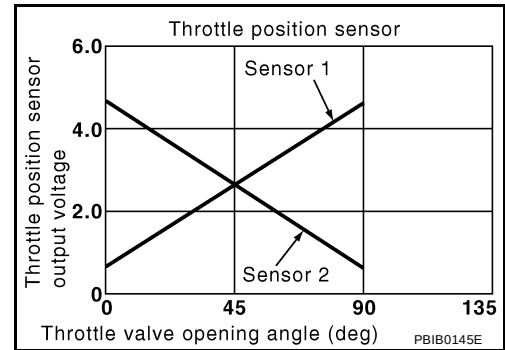
PFP:16119

Component Description

UBS00EQS

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EQT

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS00EQU

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	● Harness or connectors (TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 1) ● Accelerator pedal position sensor
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sen- sor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC P0222, P0223 TP SENSOR

DTC Confirmation Procedure

UBS00EQV

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:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-238, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
SEF058Y	

WITH GST

Follow the procedure "WITH CONSULT-II" above.

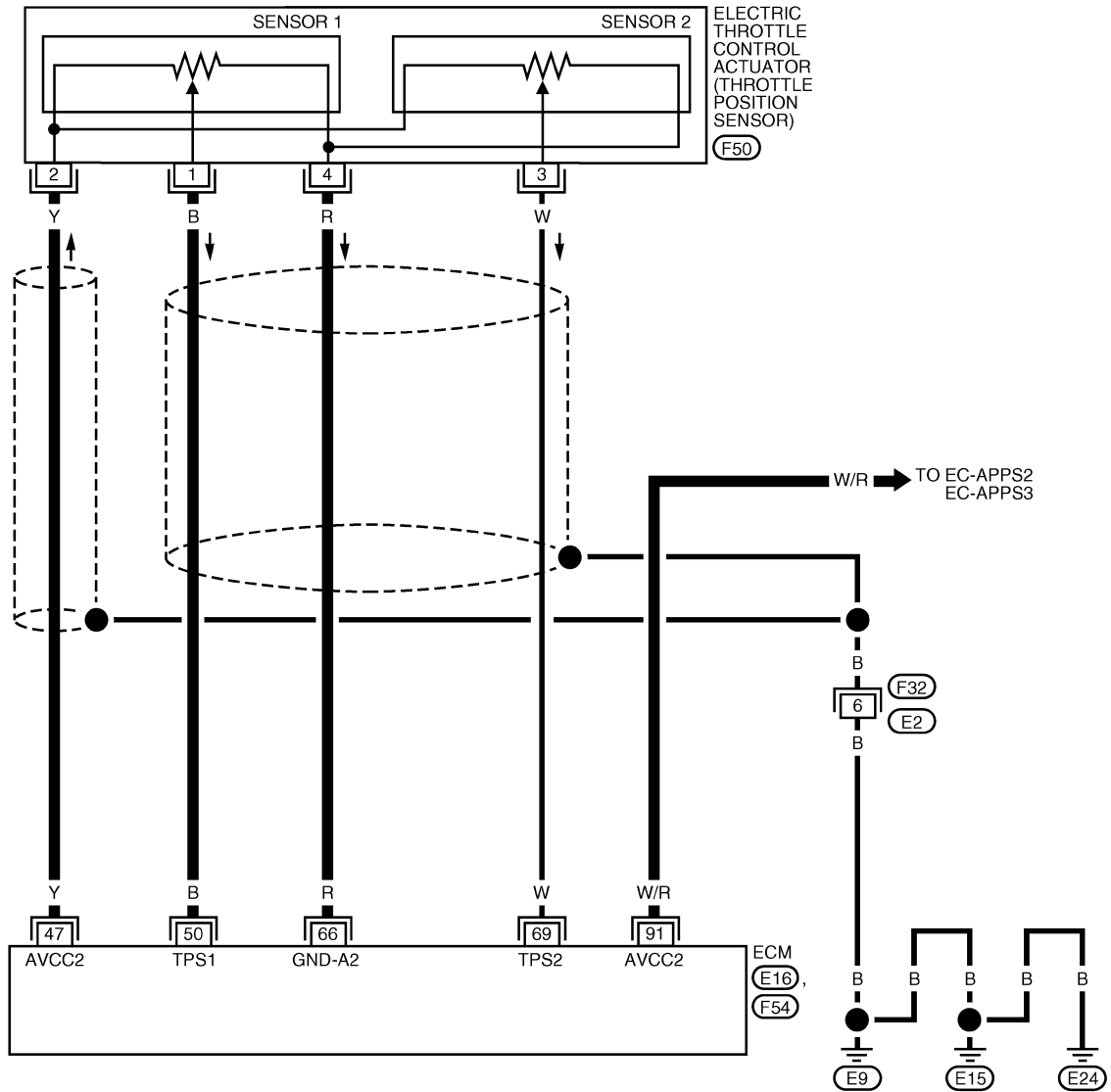
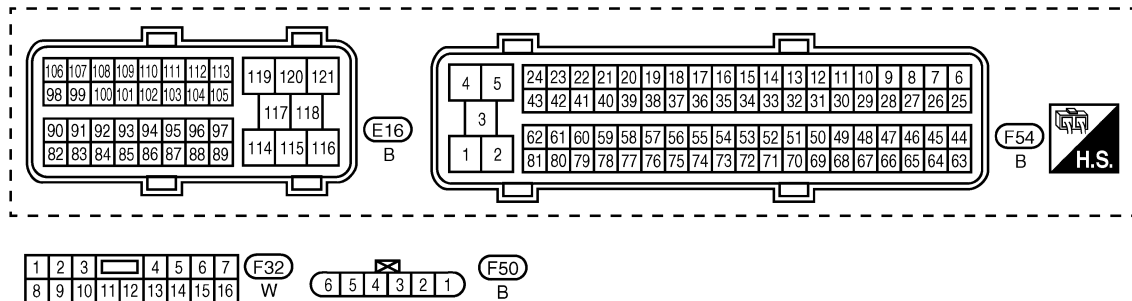
DTC P0222, P0223 TP SENSOR

Wiring Diagram

UBS00EQW

EC-TPS1-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1166E

DTC P0222, P0223 TP SENSOR

Specification data are reference values and are 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.

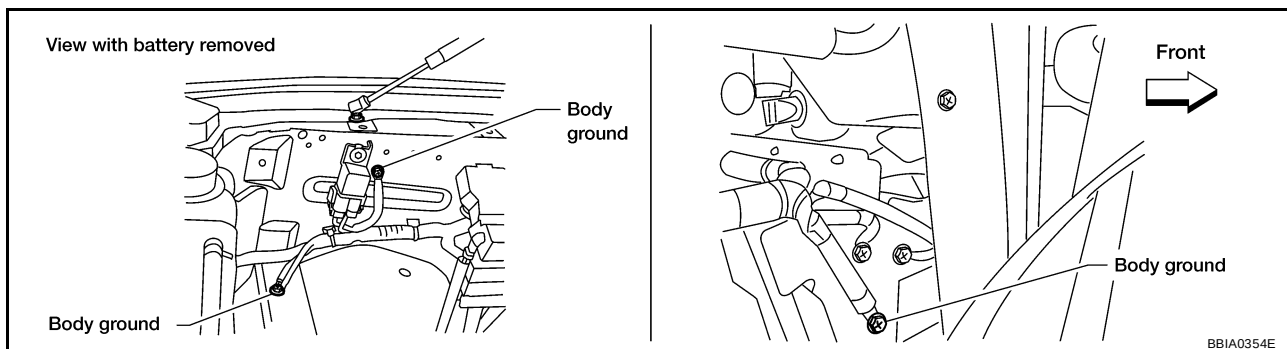
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	Y	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5V
50	B	Throttle position sensor 1	[Ignition switch: ON] <ul style="list-style-type: none">● Engine stopped● Shift lever: D● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] <ul style="list-style-type: none">● Engine stopped● Shift lever: D● Accelerator pedal: Fully depressed	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 0V
69	W	Throttle position sensor 2	[Ignition switch: ON] <ul style="list-style-type: none">● Engine stopped● Shift lever: D● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] <ul style="list-style-type: none">● Engine stopped● Shift lever: D● Accelerator pedal: Fully depressed	More than 0.36V
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V

Diagnostic Procedure

UBS00EQX

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

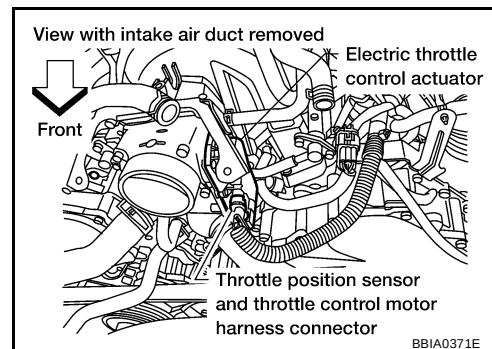
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

DTC P0222, P0223 TP SENSOR

2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

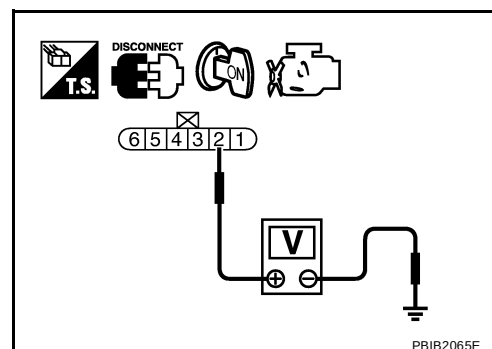


3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 2 and ECM terminal 47. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 2	EC-237
91	APP sensor terminal 7	EC-544

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [EC-548, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> GO TO 6.

DTC P0222, P0223 TP SENSOR

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 66.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE POSITION SENSOR

Refer to [EC-241, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0222, P0223 TP SENSOR

Component Inspection THROTTLE POSITION SENSOR

UBS00EQY

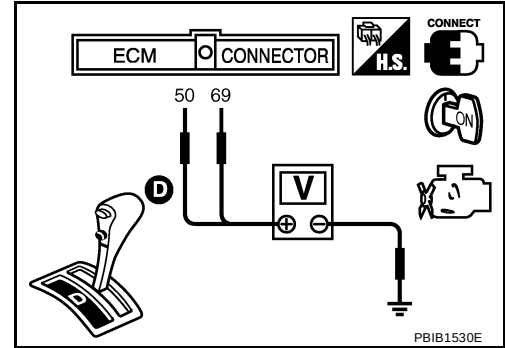
1. Reconnect all harness connectors disconnected.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch ON.
4. Set selector lever to D position.
5. Check voltage between ECM terminals 50 (TP sensor 1signal), 69 (TP sensor 2signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-44, "Idle Air Volume Learning"](#) .

Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-15, "INTAKE MANIFOLD"](#) .



DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

PFP:00000

On Board Diagnosis Logic

UBS00ER0

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)

On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.

If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.

If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.

2. Two Trip Detection Logic (Exhaust quality deterioration)

For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	<ul style="list-style-type: none">● Improper spark plug● Insufficient compression● Incorrect fuel pressure● The injector circuit is open or shorted● Fuel injector● Intake air leak● The ignition signal circuit is open or shorted● Lack of fuel● Signal plate● Air fuel ratio (A/F) sensor 1● Incorrect PCV hose connection
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	
P0305 0305	No. 5 cylinder misfire detected	No. 5 cylinder misfires.	
P0306 0306	No. 6 cylinder misfire detected	No. 6 cylinder misfires.	
P0307 0307	No. 7 cylinder misfire detected	No. 7 cylinder misfires.	
P0308 0308	No. 8 cylinder misfire detected	No. 8 cylinder misfires.	

DTC Confirmation Procedure

UBS00ER1

CAUTION:

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

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.

DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

WITH CONSULT-II

1. Turn ignition switch ON, and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Restart engine and let it idle for about 15 minutes.
5. If 1st trip DTC is detected, go to [EC-243, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data $\pm$ 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data $\pm$ 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

The time to driving varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00ER2

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

OK >> GO TO 2.

NG >> Discover air leak location and repair.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace it.

DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

3. PERFORM POWER BALANCE TEST

With CONSULT-II

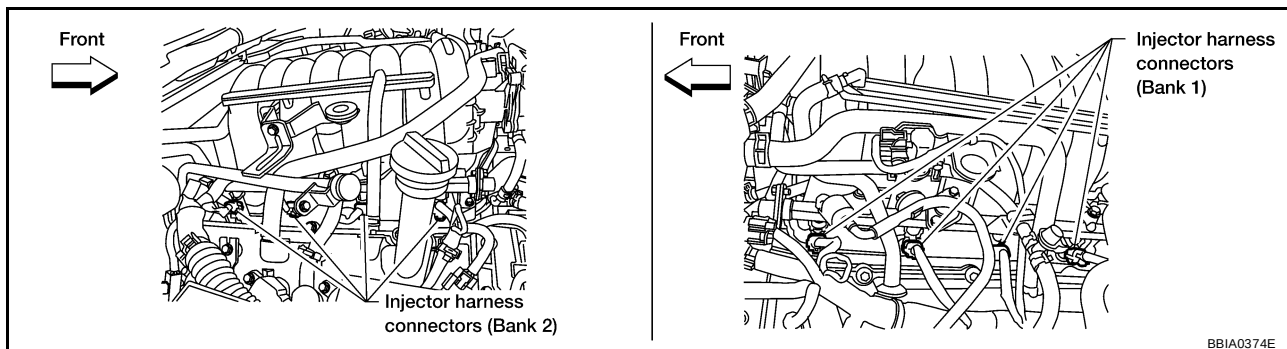
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



BBIA0374E

Yes or No

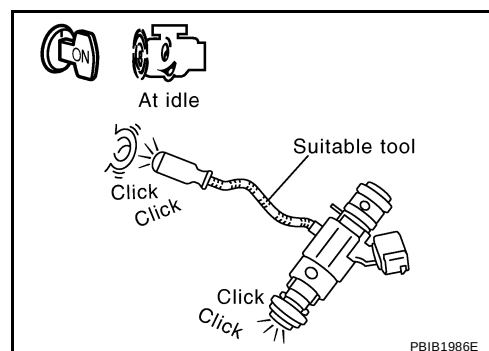
- Yes >> GO TO 4.
No >> GO TO 7.

4. CHECK INJECTOR

Does each injector make an operating sound at idle?

Yes or No

- Yes >> GO TO 5.
No >> Check injector(s) and circuit(s). Refer to [EC-575](#),
["INJECTOR CIRCUIT"](#).



PBIB1986E

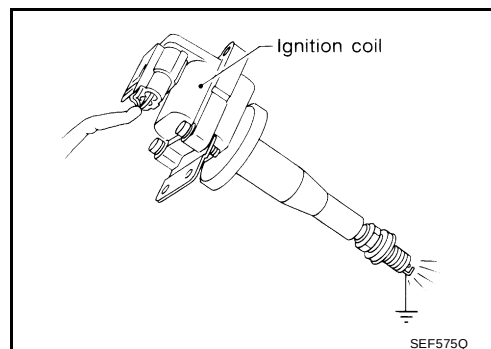
DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

5. CHECK IGNITION SPARK

1. Turn ignition switch OFF.
2. Remove ignition coil assembly from rocker cover.
3. Remove spark plug from ignition coil assembly.
4. Connect a known-good spark plug to the ignition coil.
5. Disconnect all injector harness connectors.
6. Place end of spark plug against a suitable ground and crank engine.
7. Check for spark.

OK or NG

- OK >> GO TO 6.
NG >> Check ignition coil, power transistor and their circuits.
Refer to [EC-563, "IGNITION SIGNAL"](#) .

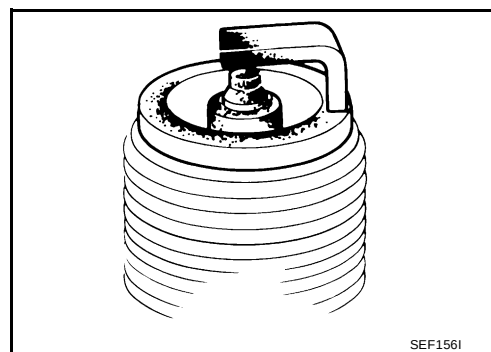


6. CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.

OK or NG

- OK >> GO TO 7.
NG >> Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to, [MA-18, "Changing Spark Plugs"](#) .



7. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-59, "CHECKING COMPRESSION PRESSURE"](#) .

Standard:	1,520 kPa (15.5 kg/cm² , 200 psi)/200 rpm
Minimum:	1,324 kPa (13.5 kg/cm² , 192 psi)/200 rpm
Difference between each cylinder:	98 kPa (1.0 kg/cm² , 14 psi)/200 rpm

OK or NG

- OK >> GO TO 8.
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

8. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#) .
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .

At idle: Approx. 350 kPa (3.57 kg/cm² , 51 psi)

OK or NG

- OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-581, "FUEL PUMP CIRCUIT"](#) .)
- Fuel pressure regulator (Refer to [EC-47, "FUEL PRESSURE CHECK"](#) .)
- Fuel lines
- Fuel filter for clogging

>> Repair or replace.

10. CHECK IGNITION TIMING

Check the following items. Refer to [EC-79, "Basic Inspection"](#) .

Items	Specifications
Target idle speed	650 ± 50 rpm (in P or N position)
Ignition timing	15 ± 5° BTDC (in P or N position)

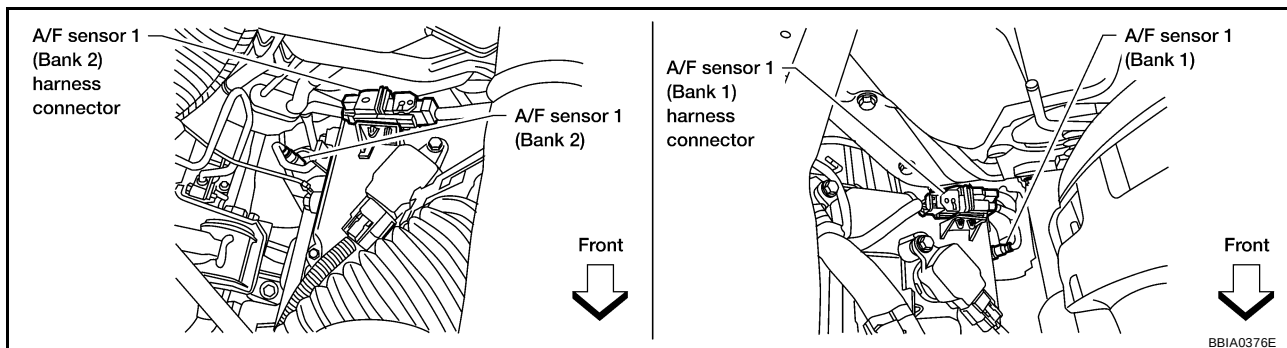
OK or NG

- OK >> GO TO 11.
NG >> Follow the [EC-79, "Basic Inspection"](#) .

DTC P0300 - P0308 MULTIPLE CYLINDER MISFIRE, NO. 1 - 8 CYLINDER MISFIRE

11. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.



3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram, [EC-430, "Wiring Diagram"](#) .

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

5. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK >> GO TO 12.

NG >> Repair open circuit or short to ground or short to power in harness or connectors between ECM and A/F sensor 1.

12. CHECK A/F SENSOR 1 HEATER (BANK 1)/(BANK 2)

Refer to [EC-359, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> Replace (malfunctioning) A/F sensor 1.

13. CHECK MASS AIR FLOW SENSOR

 With CONSULT-II

Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-II.

3.0 - 9.0 g·m/sec: at idling
9.0 - 28.0 g·m/sec: at 2,500 rpm

 With GST

Check mass air flow sensor signal in MODE 1 with GST.

3.0 - 9.0 g·m/sec: at idling
9.0 - 28.0 g·m/sec: at 2,500 rpm

OK or NG

OK >> GO TO 14.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-145, "DTC P0101 MAF SENSOR"](#) .

14. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-84, "Symptom Matrix Chart"](#) .

OK or NG

OK >> GO TO 15.

NG >> Repair or replace.

15. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 16.

16. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0327, P0328, P0332, P0333 KS

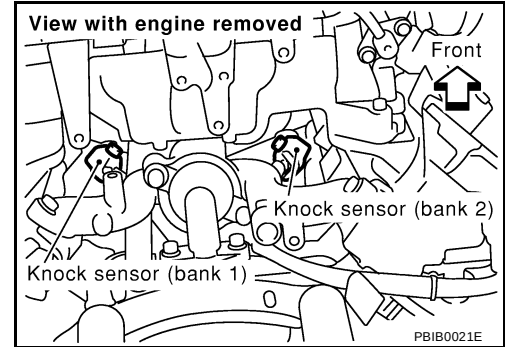
DTC P0327, P0328, P0332, P0333 KS

PFP:22060

Component Description

UBS00ER3

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



On Board Diagnosis Logic

UBS00ER4

The MIL will not light up for these diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0327 0327 (bank 1)	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● Knock sensor
P0332 0332 (bank 2)			
P0328 0328 (bank 1)	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	
P0333 0333 (bank 2)			

DTC Confirmation Procedure

UBS00ER5

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:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-251, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

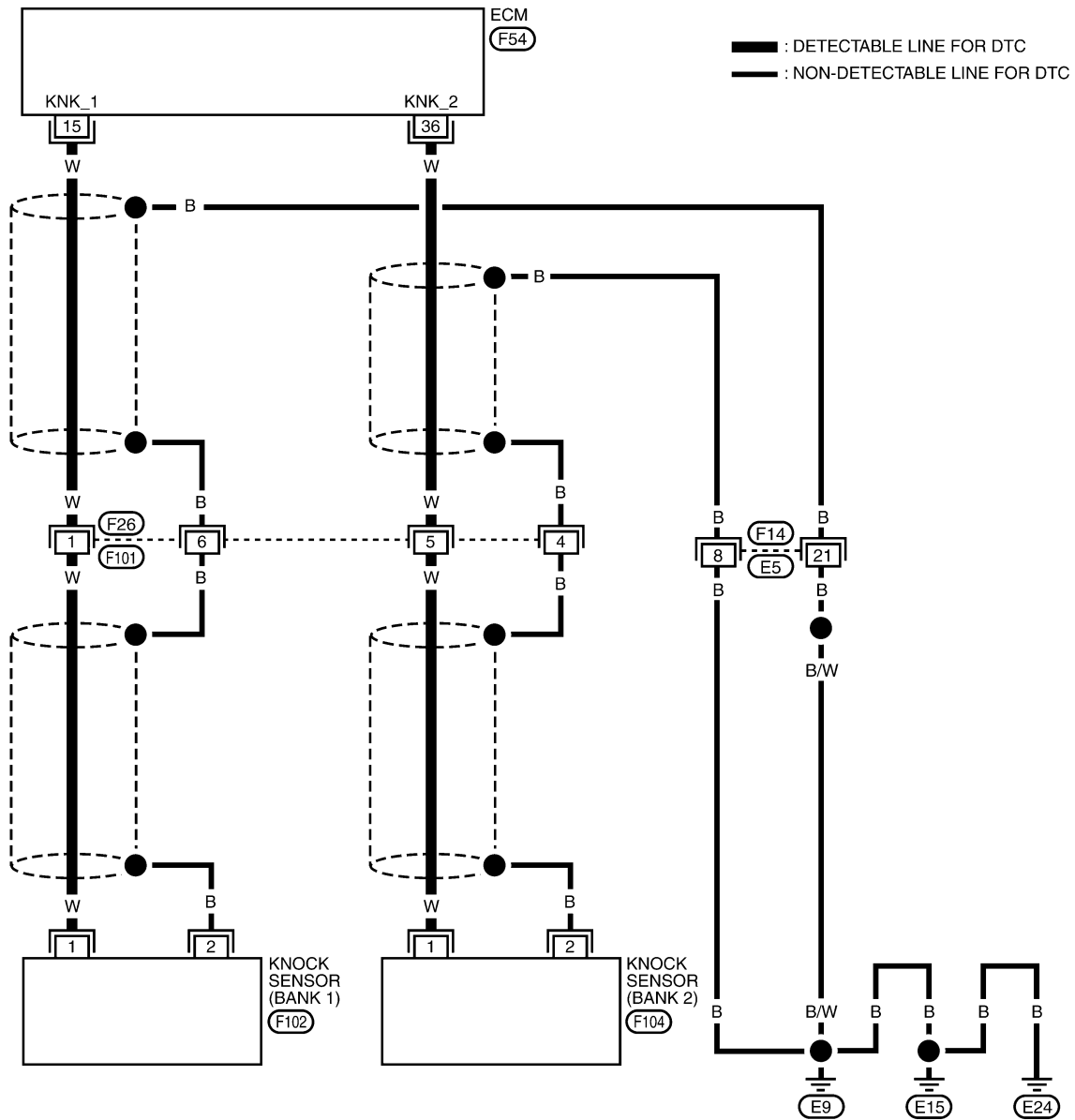
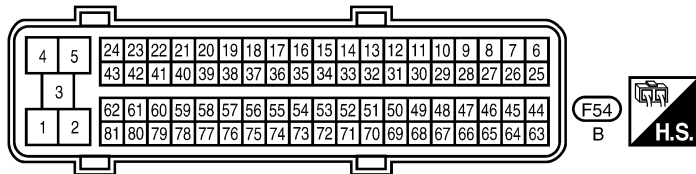
Follow the procedure "WITH CONSULT-II" above.

DTC P0327, P0328, P0332, P0333 KS

Wiring Diagram

UBS00ER6

EC-KS-01



BBWA1171E

DTC P0327, P0328, P0332, P0333 KS

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15 36	W W	Knock sensor (bank 1) Knock sensor (bank 2)	[Engine is running] ● Idle speed	Approximately 2.5V

Diagnostic Procedure

UBS00ER7

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminals 15, 36 and body ground. Refer to Wiring Diagram.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 M Ω .

Resistance: Approximately 532 - 588 k Ω [at 20°C (68°F)]

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

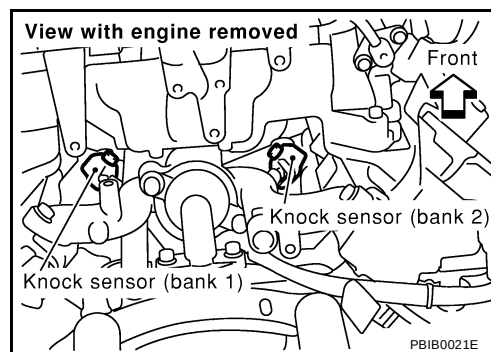
1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 15 and knock sensor (bank1) terminal 1, ECM terminal 36 and knock sensor (bank 2) terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F26, F101
- Harness for open or short between ECM and knock sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK KNOCK SENSOR

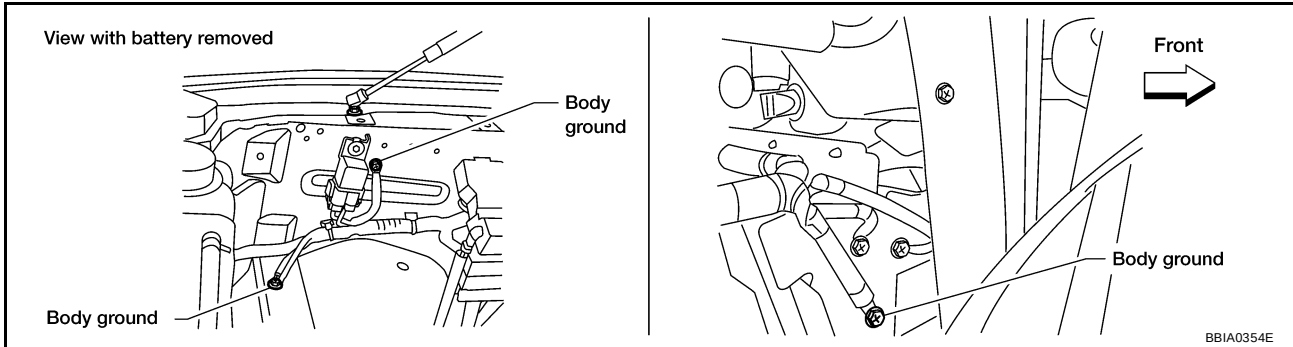
Refer to [EC-253, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Replace knock sensor.

5. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace ground connections.

6. CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check harness continuity between knock sensor terminal 2 and body ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F26, F101
- Harness connectors F14, E5
- Harness for open or short between knock sensor terminal 2 and body ground

>> Repair open circuit or short power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Component Inspection

KNOCK SENSOR

UBS00ER8

Check resistance between knock sensor terminal 1 and ground.

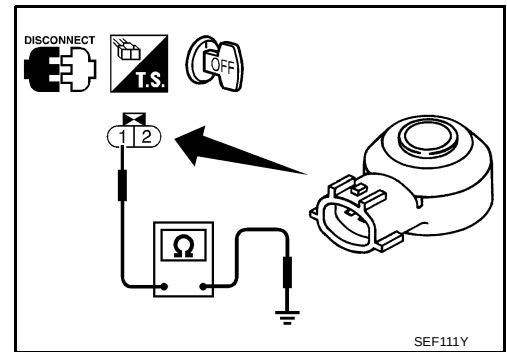
NOTE:

It is necessary to use an ohmmeter which can measure more than 10 M Ω .

Resistance: Approximately 532 - 588 k Ω [at 20°C (68°F)]

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



UBS00ER9

Removal and Installation

KNOCK SENSOR

Refer to [EM-74, "CYLINDER BLOCK"](#) .

DTC P0335 CKP SENSOR (POS)

DTC P0335 CKP SENSOR (POS)

PFP:23731

Component Description

UBS00ERA

The crankshaft position sensor (POS) is located on the A/T assembly facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.

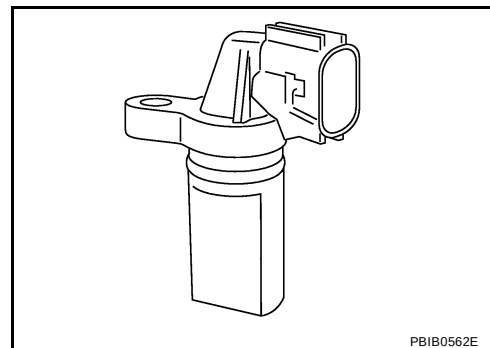
The sensor consists of a permanent magnet and Hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.



PB1B0562E

CONSULT-II Reference Value in Data Monitor Mode

UBS00ERB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

UBS00ERC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none">● The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.● The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.● The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted)● Crankshaft position sensor (POS)● Signal plate

DTC Confirmation Procedure

UBS00ERD

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:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-256, "Diagnostic Procedure"](#)

A diagram of the CONSULT-II Data Monitor screen. It shows a rectangular display area with a title bar "DATA MONITOR". Below the title bar, there are two columns: "MONITOR" and "NO DTC". Under "MONITOR", it displays "ENG SPEED" and "XXX rpm". The "NO DTC" column is empty.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

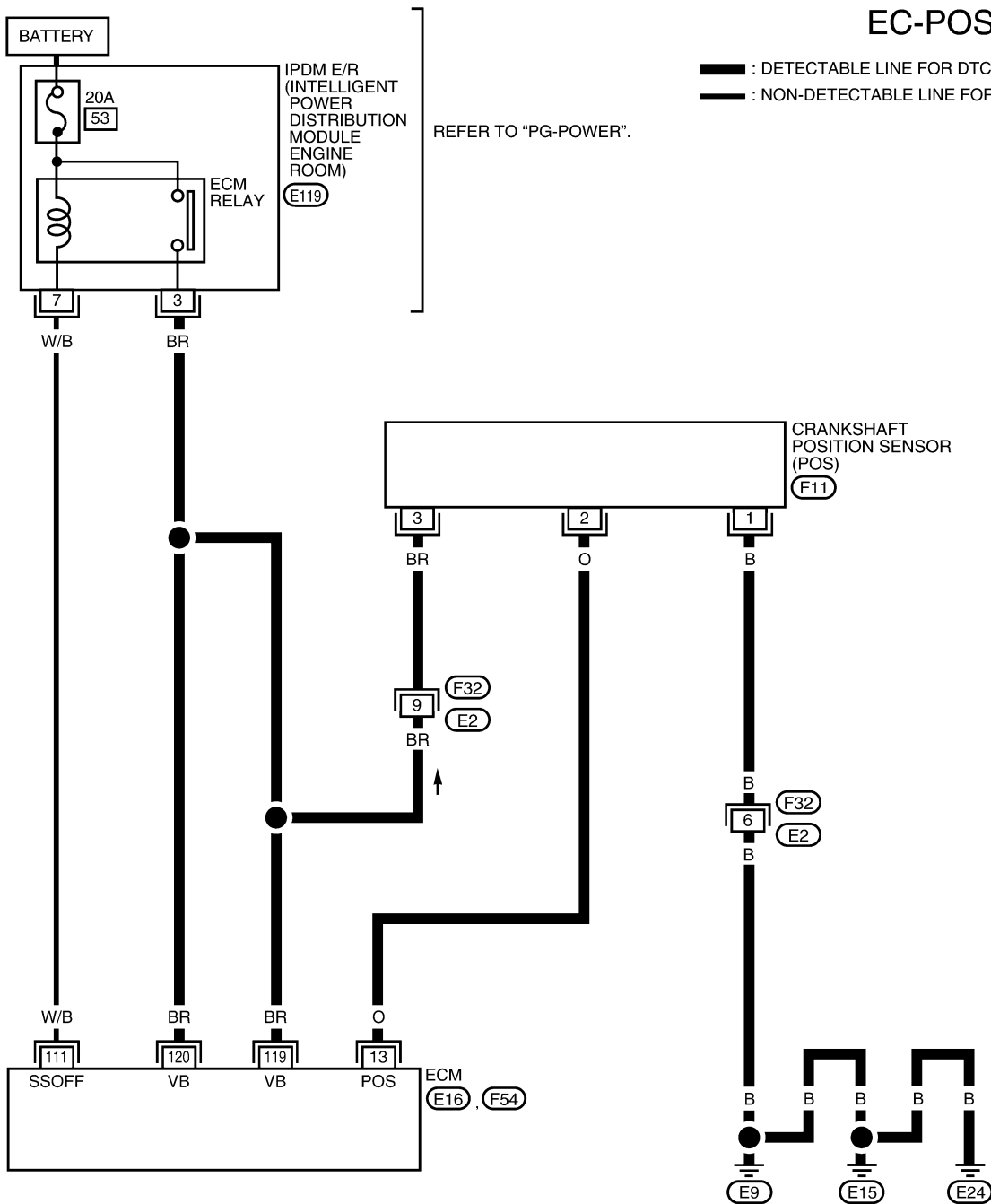
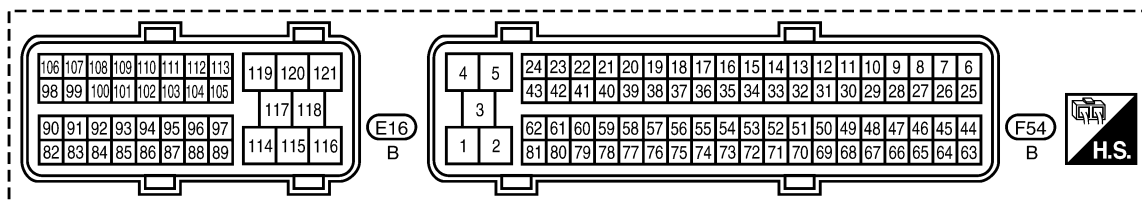
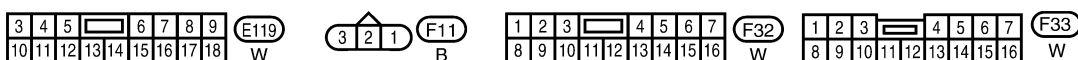
DTC P0335 CKP SENSOR (POS)

Wiring Diagram

UBS00ERE

EC-POS-01

 : DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



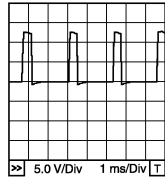
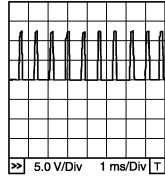
BBWA1173F

DTC P0335 CKP SENSOR (POS)

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	O	Crankshaft position sensor (POS)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 2.0V ★  PBIB1041E
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	1.0 - 2.0V ★  PBIB1042E

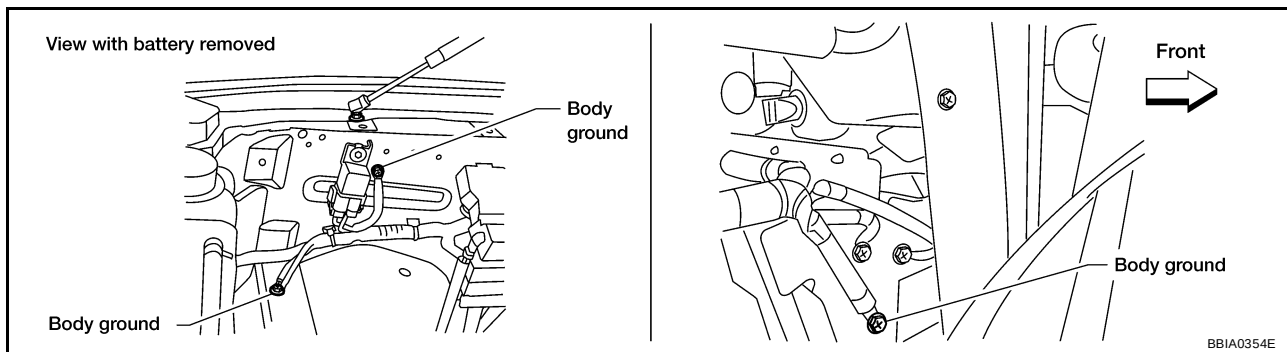
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS00ERF

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

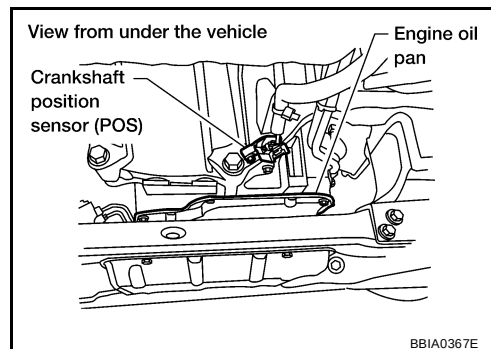
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P0335 CKP SENSOR (POS)

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.



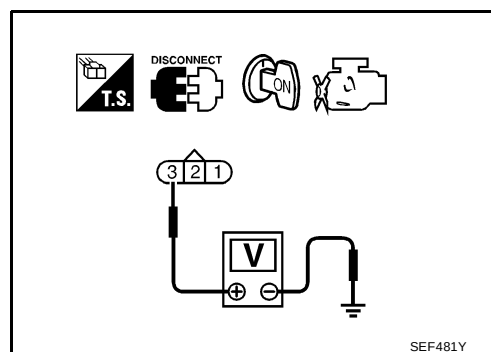
3. Check voltage between CKP sensor (POS) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F32, E2
- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between CKP sensor (POS) terminal 1 and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F32, E2
- Harness for open or short between crankshaft position sensor (POS) and ground

>> Repair open circuit or short to power in harness or connectors.

DTC P0335 CKP SENSOR (POS)

6. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 13 and CKP sensor (POS) terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-259, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace crankshaft position sensor (POS).

8. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 9.

NG >> Replace the signal plate.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0335 CKP SENSOR (POS)

Component Inspection CRANKSHAFT POSITION SENSOR (POS)

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Removal and Installation CRANKSHAFT POSITION SENSOR (POS)

Refer to [AT-269, "TRANSMISSION ASSEMBLY"](#) .

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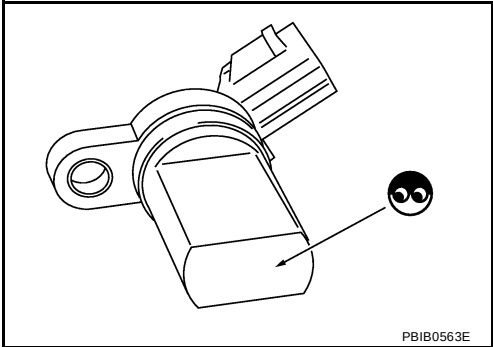
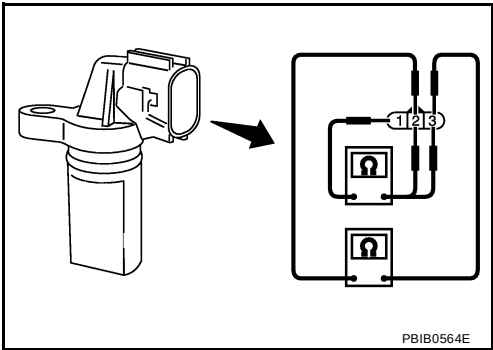
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UBS00ERH

DTC P0340 CAMSHAFT POSITION (CMP) SENSOR (PHASE)

DTC P0340 CAMSHAFT POSITION (CMP) SENSOR (PHASE)

PFP:23731

Component Description

UBS00ERI

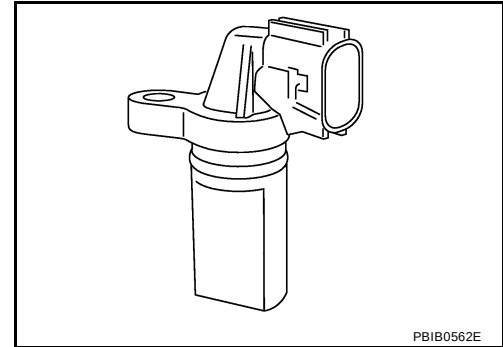
The camshaft position sensor (PHASE) senses the protrusion of exhaust valve cam sprocket to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position. When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



On Board Diagnosis Logic

UBS00ERJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none">● The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.● The cylinder No. signal is not sent to ECM during engine running.● The cylinder No. signal is not in the normal pattern during engine running.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted)● Camshaft position sensor (PHASE)● Camshaft (Exhaust)● Starter motor (Refer to SC-10, "STARTING SYSTEM" .)● Starting system circuit (Refer to SC-10, "STARTING SYSTEM" .)● Dead (Weak) battery

DTC Confirmation Procedure

UBS00ERK

NOTE:

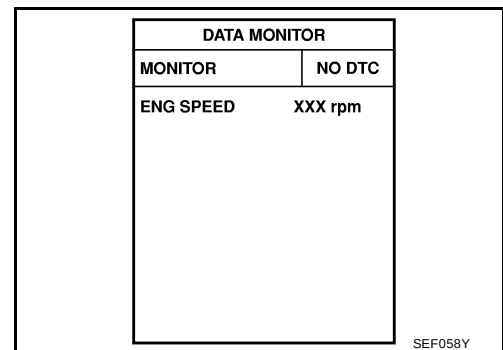
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to [EC-262, "Diagnostic Procedure"](#).
If 1st trip DTC is not detected, go to next step.
5. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to [EC-262, "Diagnostic Procedure"](#).

A screenshot of a vehicle's data monitor screen. The screen is titled "DATA MONITOR" and has two columns: "MONITOR" and "NO DTC". Under "MONITOR", it displays "ENG SPEED". Under "NO DTC", it displays "XXX rpm". The screen is labeled with the part number SEF058Y in the bottom right corner.

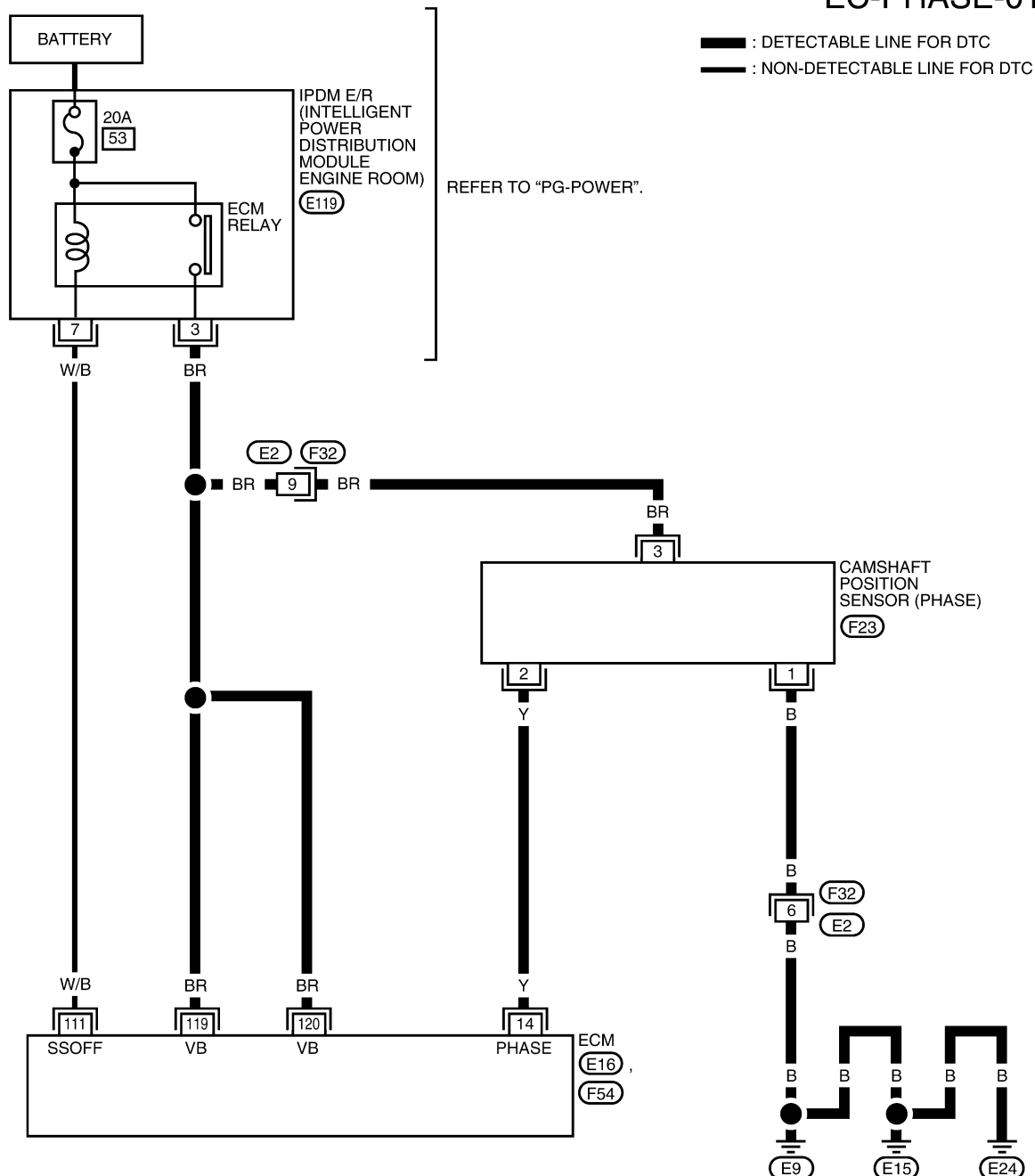
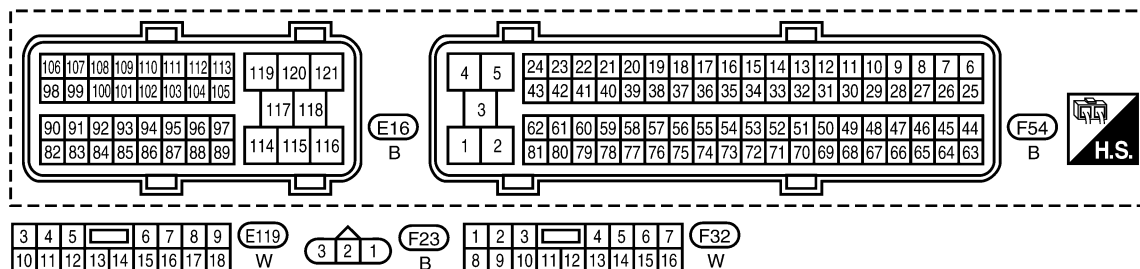
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

WITH GST

Follow the procedure "WITH CONSULT-II" above.

LIBS000ERI

EC-PHASE-01



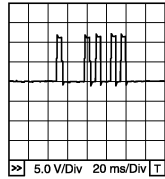
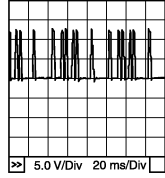
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DTC P0340 CAMSHAFT POSITION (CMP) SENSOR (PHASE)

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	Y	Camshaft position sensor (PHASE)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V ★  PBIB1039E
			[Engine is running] <ul style="list-style-type: none">● Engine speed is 2,000 rpm.	1.0 - 4.0V ★  PBIB1040E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS00ERM

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

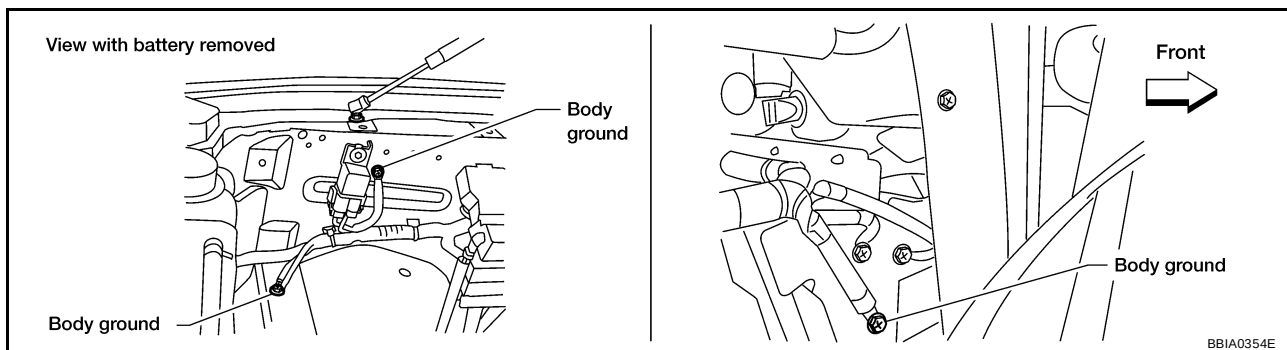
Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-10, "STARTING SYSTEM"](#) .)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

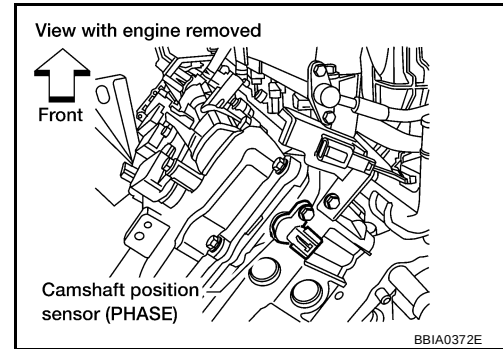
OK >> GO TO 3.

NG >> Repair or replace ground connections.

DTC P0340 CAMSHAFT POSITION (CMP) SENSOR (PHASE)

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.



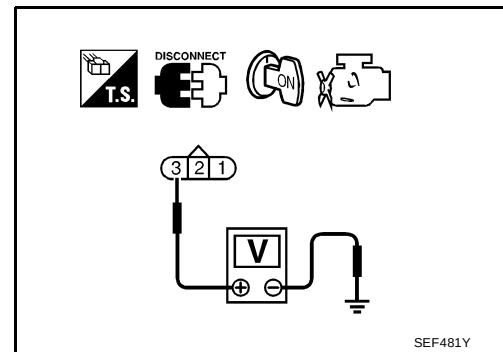
3. Check voltage between CMP sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F32, E2
- Harness for open or short between camshaft position sensor (PHASE) and ECM
- Harness for open or short between camshaft position sensor (PHASE) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between CMP sensor (PHASE) terminal 1 and body ground.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F32, E2
- Harness for open or short between CMP sensor (PHASE) and body ground

>> Repair open circuit or short to power in harness or connectors.

DTC P0340 CAMSHAFT POSITION (CMP) SENSOR (PHASE)

7. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 14 and CMP sensor (PHASE) terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-265, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace camshaft position sensor (PHASE).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0340 CAMSHAFT POSITION (CMP) SENSOR (PHASE)

Component Inspection

CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

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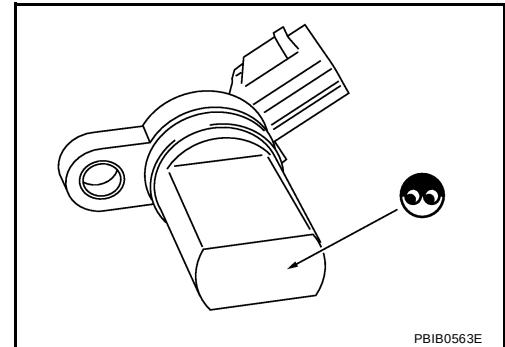
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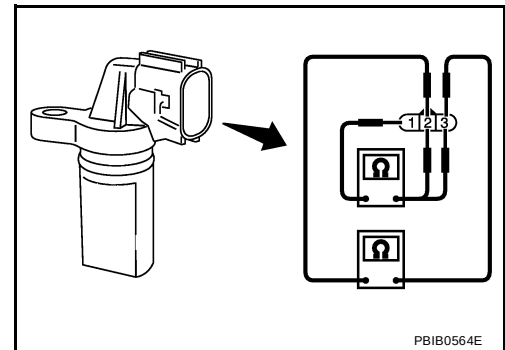
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5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3(+) - 1 (-)	Except 0 or ∞
2 (+) - 1 (-)	
3 (+) - 2 (-)	



UBS00ERO

Removal and Installation

CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EM-43, "CAMSHAFT"](#) .

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

PFP:20905

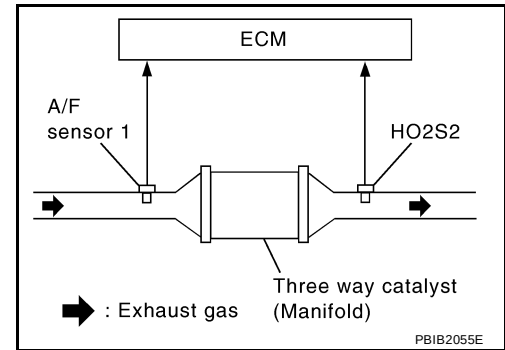
On Board Diagnosis Logic

UBS00ERP

The ECM monitors the switching frequency ratio of air fuel sensor (A/F) sensor 1 and heated oxygen sensor 2.

A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420 (Bank 1)	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> Three way catalyst (manifold) does not operate properly. Three way catalyst (manifold) does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> Three way catalyst (manifold) Exhaust tube Intake air leaks Fuel injector Fuel injector leaks Spark plug Improper ignition timing
P0430 0430 (Bank 2)			

DTC Confirmation Procedure

UBS00ERQ

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.

WITH CONSULT-II

TESTING CONDITION:

Do not hold engine speed for more than the specified minutes below.

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).
7. Open engine hood.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

8. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
If "INCMP" of "CATALYST" changed to "CMPLT", go to step 12.
10. Wait 5 seconds at idle.

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
A/F SEN1 (B1)	XXX V

PBIB1784E

11. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
A/F SEN1 (B1)	XXX V

PBIB1785E

12. Select "SELF-DIAG RESULTS" mode with CONSULT-II.
13. Confirm that the 1st trip DTC is not detected.
If the 1st trip DTC is detected, go to [EC-268, "Diagnostic Procedure"](#).

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

Overall Function Check

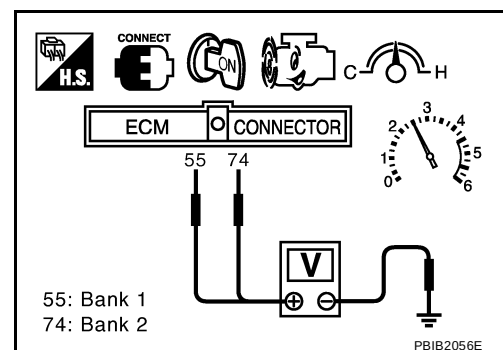
UBS00ERR

Use this procedure to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Open engine hood.
6. Set voltmeter probe between ECM terminals ECM terminals 74 [HO2S2 (bank 1) signal], 55 [HO2S2 (bank 2) signal] and ground.
7. Keep engine speed at 2,500 rpm constant under no load.
8. Make sure that the voltage does not vary for more than 5 seconds.
If the voltage fluctuation cycle takes less than 5 seconds, go to [EC-268, "Diagnostic Procedure"](#).

- 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0



DTC P0420, P0430 THREE WAY CATALYST FUNCTION

UBS00ERS

Diagnostic Procedure

1. CHECK EXHAUST SYSTEM

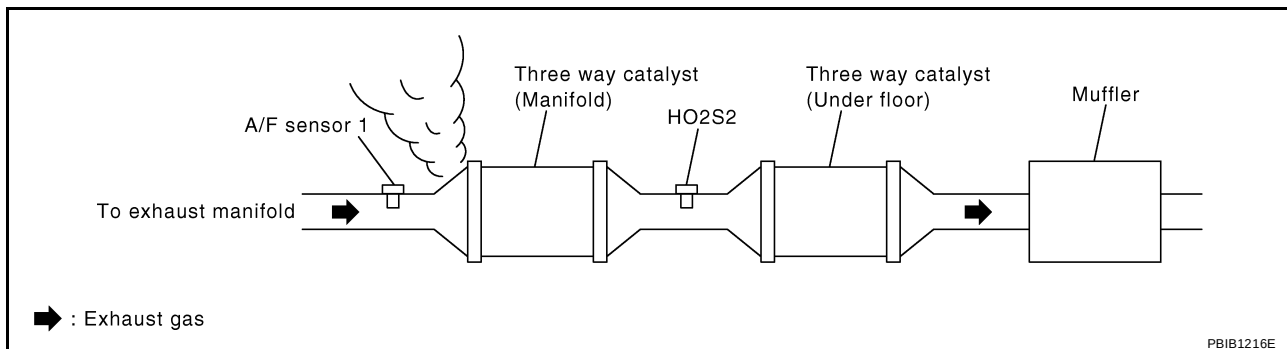
Visually check exhaust tubes and muffler for dent.

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

- OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK IGNITION TIMING

Check the following items. Refer to [EC-79, "Basic Inspection"](#) .

Items	Specifications
Target idle speed	650 ± 50 rpm (in P or N position)
Ignition timing	15 ± 5° BTDC (in P or N position)

OK or NG

- OK >> GO TO 5.
NG >> Follow the [EC-79, "Basic Inspection"](#) .

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

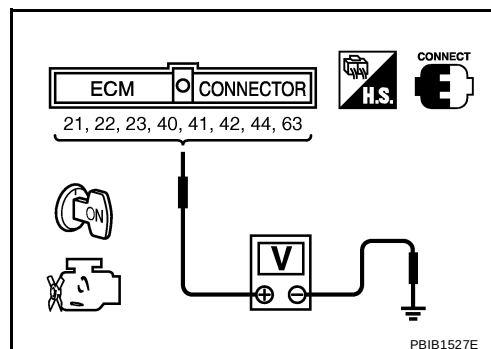
5. CHECK INJECTORS

1. Stop engine and then turn ignition switch ON.
2. Check voltage between ECM terminals 21, 22, 23, 40, 41, 42, 44, 63 and ground with CONSULT-II or tester.
Refer to Wiring Diagram for Injectors, [EC-576](#) .

Battery voltage should exist.

OK or NG

- OK >> GO TO 6.
NG >> Perform [EC-577, "Diagnostic Procedure"](#) .

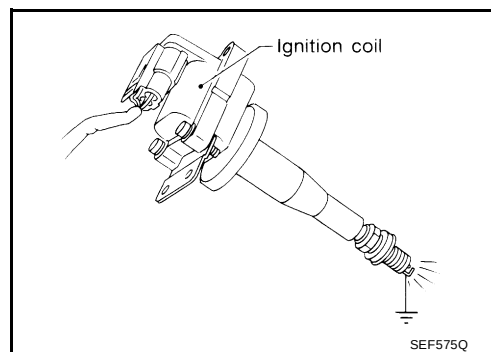


6. CHECK IGNITION SPARK

1. Turn ignition switch OFF.
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known-good spark plug to the ignition coil assembly.
4. Disconnect all injector harness connectors.
5. Place end of spark plug against a suitable ground and crank engine.
6. Check for spark.

OK or NG

- OK >> GO TO 7.
NG >> Check ignition coil with power transistor and their circuit.
Refer to [EC-563, "IGNITION SIGNAL"](#) .



7. CHECK INJECTOR

1. Turn ignition switch OFF.
2. Remove injector assembly.
Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .
Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect all ignition coil harness connectors.
4. Reconnect injector harness connector.
5. Turn ignition switch ON.
Make sure fuel does not drip from injector.

OK or NG

- OK (Does not drip.)>>GO TO 8.
NG (Drips.)>>Replace the injector(s) from which fuel is dripping.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Trouble is fixed.>>**INSPECTION END**

Trouble is not fixed.>>Replace three way catalyst assembly.

DTC P0441 EVAP CONTROL SYSTEM

DTC P0441 EVAP CONTROL SYSTEM

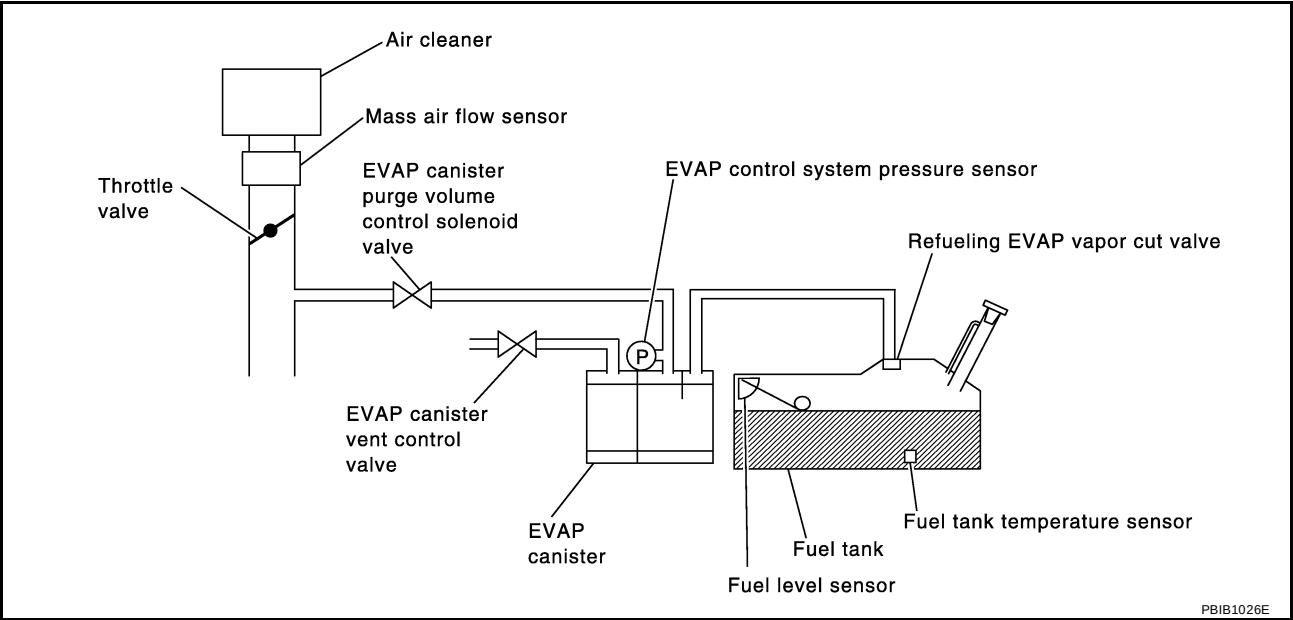
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System Description

UBS00ERT

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trouble diagnosis for other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

UBS00ERU

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	<ul style="list-style-type: none">● EVAP canister purge volume control solenoid valve stuck closed● EVAP control system pressure sensor and the circuit● Loose, disconnected or improper connection of rubber tube● Blocked rubber tube● Cracked EVAP canister● EVAP canister purge volume control solenoid valve circuit● Accelerator pedal position sensor● Blocked purge port● EVAP canister vent control valve

DTC Confirmation Procedure

UBS00ERV

CAUTION:

Always drive vehicle at a safe speed.

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:

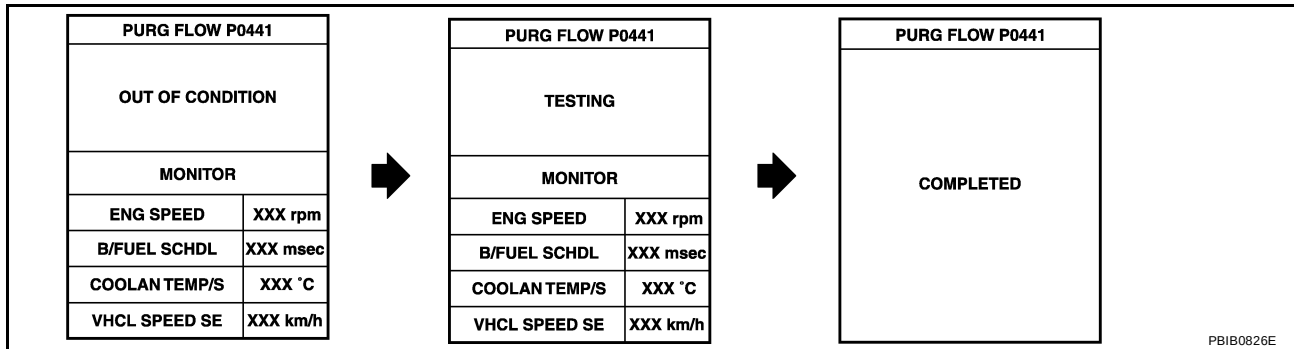
Always perform test at a temperature of 5°C (41°F) or more.

DTC P0441 EVAP CONTROL SYSTEM

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. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.
5. Touch "START".
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,000 rpm
B/FUEL SCHDL	1.0 - 12.0 msec
Engine coolant temperature	70 - 100°C (158 - 212°F)



If "TESTING" is not changed for a long time, retry from step 2.

7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-272, "Diagnostic Procedure"](#).

Overall Function Check

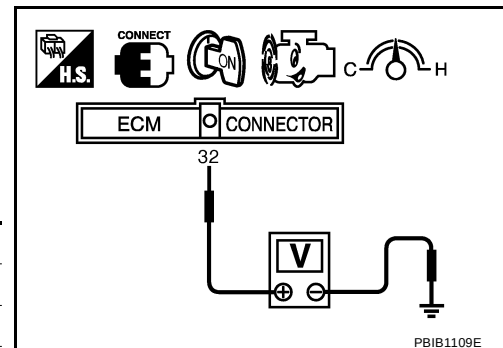
UBS00ERW

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine (VDC switch OFF) and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 32 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than P, N or R



8. Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.

DTC P0441 EVAP CONTROL SYSTEM

9. If NG, go to [EC-272, "Diagnostic Procedure"](#) .

Diagnostic Procedure

UBS00ERX

1. CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

OK or NG

- OK (With CONSULT-II)>>GO TO 2.
OK (Without CONSULT-II)>>GO TO 3.
NG >> Replace EVAP canister.

2. CHECK PURGE FLOW

Ⓟ With CONSULT-II

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .
2. Start engine and let it idle.
3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	Vacuum
100%	Should exist.
0%	Should not exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

3. CHECK PURGE FLOW

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .
4. Start engine and let it idle.
Do not depress accelerator pedal even slightly.
5. Check vacuum gauge indication before 60 seconds passed after starting engine.

Vacuum should not exist.

6. Revving engine up to 2,000 rpm after 100 seconds passed after starting engine.

Vacuum should exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

DTC P0441 EVAP CONTROL SYSTEM

4. CHECK EVAP PURGE LINE

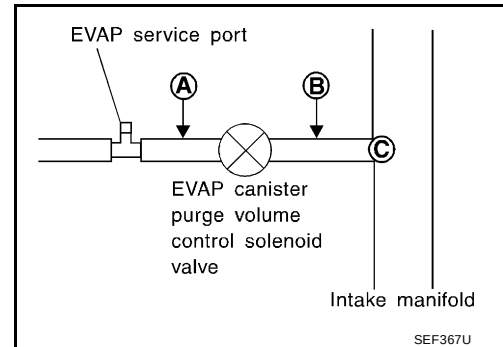
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

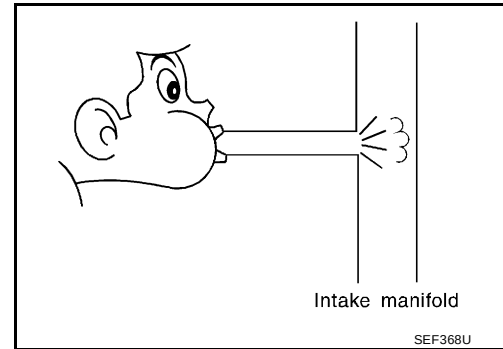
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B** .
2. Blow air into each hose and EVAP purge port **C** .



3. Check that air flows freely.

OK or NG

- OK (With CONSULT-II)>>GO TO 6.
OK (Without CONSULT-II)>>GO TO 7.
NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-289, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve.

DTC P0441 EVAP CONTROL SYSTEM

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to DTC Confirmation Procedure for DTC P0452 [EC-301](#) , P0453 [EC-307](#) .

OK or NG

- OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor.

10. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 11.
NG >> Clean the rubber tube using an air blower.

11. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-296, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
NG >> Replace EVAP canister vent control valve.

12. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 13.
NG >> Replace it.

13. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

14. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

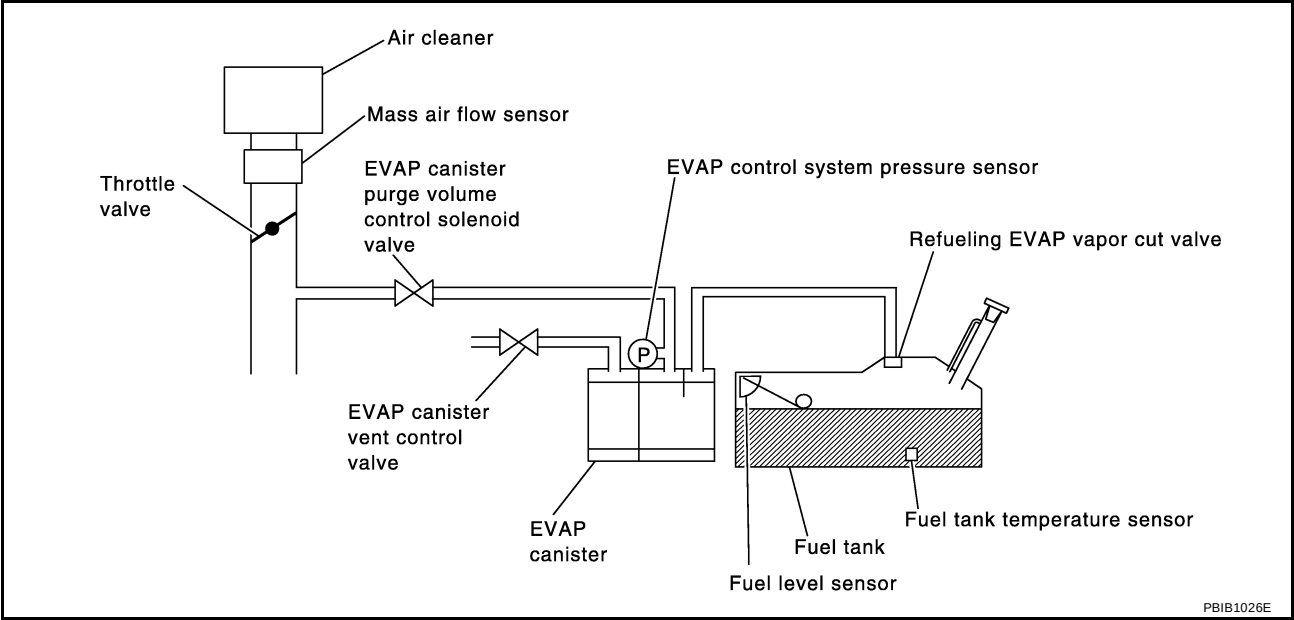
DTC P0442 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

UBS00ERY

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions. The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate prop- erly.	<ul style="list-style-type: none">● Incorrect fuel tank vacuum relief valve● Incorrect fuel filler cap used● Fuel filler cap remains open or fails to close.● Foreign matter caught in fuel filler cap.● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.● Foreign matter caught in EVAP canister vent control valve.● EVAP canister or fuel tank leaks● EVAP purge line (pipe and rubber tube) leaks● EVAP purge line rubber tube bent● Loose or disconnected rubber tube● EVAP canister vent control valve and the circuit● EVAP canister purge volume control solenoid valve and the circuit● Fuel tank temperature sensor● O-ring of EVAP canister vent control valve is missing or damaged● EVAP canister is saturated with water● EVAP control system pressure sensor● Fuel level sensor and the circuit● Refueling EVAP vapor cut valve● ORVR system leaks

DTC P0442 EVAP CONTROL SYSTEM

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC Confirmation Procedure

UBS00ERZ

NOTE:

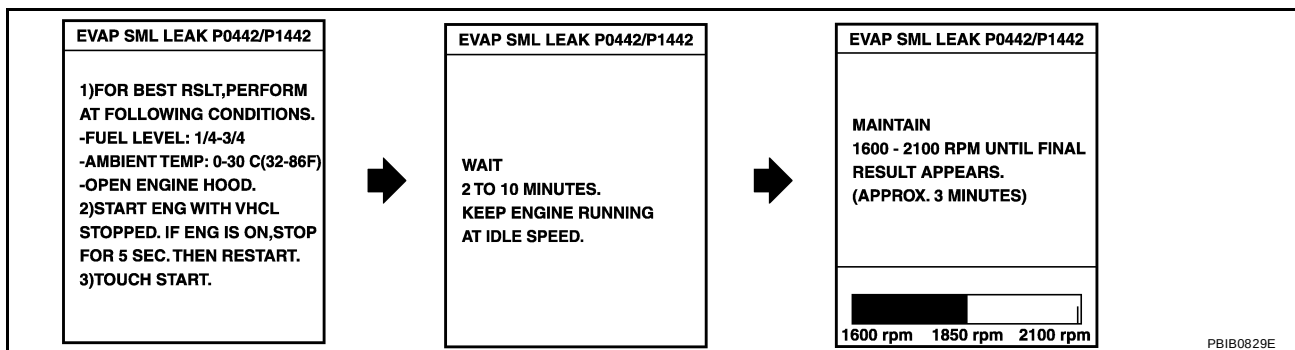
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
4. Make sure that the following conditions are met.
COOLANT TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.



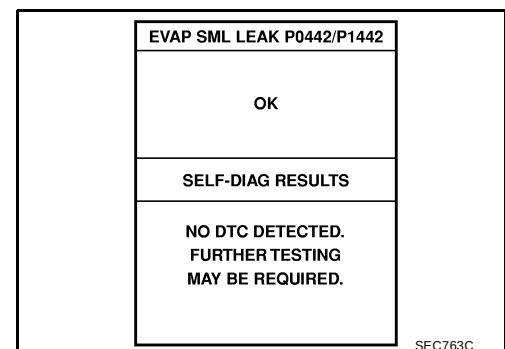
NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-79, "Basic Inspection"](#) .

6. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-277, "Diagnostic Procedure"](#) .

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.



WITH GST

NOTE:

Be sure to read the explanation of [EC-59, "Driving Pattern"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to [EC-59, "Driving Pattern"](#) .

DTC P0442 EVAP CONTROL SYSTEM

3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Select MODE 7 with GST.
 - If P0442 is displayed on the screen, go to [EC-277, "Diagnostic Procedure"](#) .
 - If P0441 is displayed on the screen, go to [EC-272, "Diagnostic Procedure"](#) .

Diagnostic Procedure

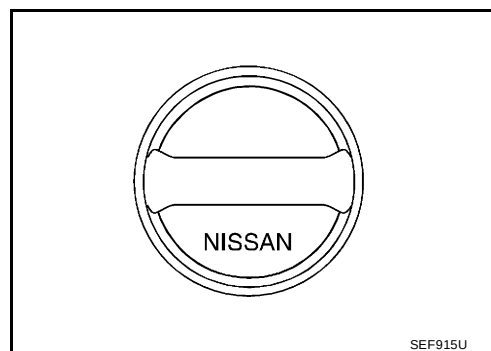
UBS00ES0

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until ratcheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-608, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

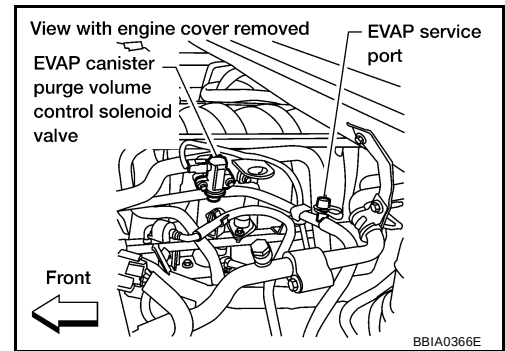
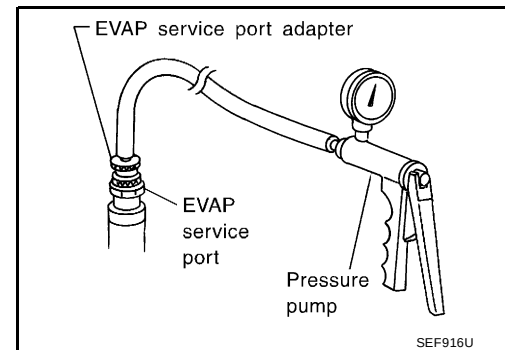
OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

DTC P0442 EVAP CONTROL SYSTEM

5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port, refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .



NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

With CONSULT-II>>GO TO 6.

Without CONSULT-II>>GO TO 7.

DTC P0442 EVAP CONTROL SYSTEM

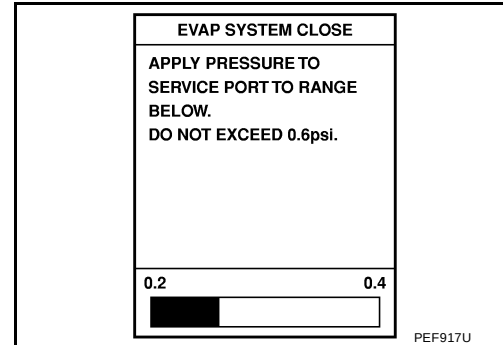
6. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

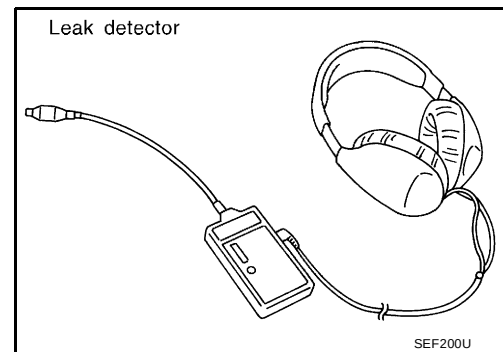
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.

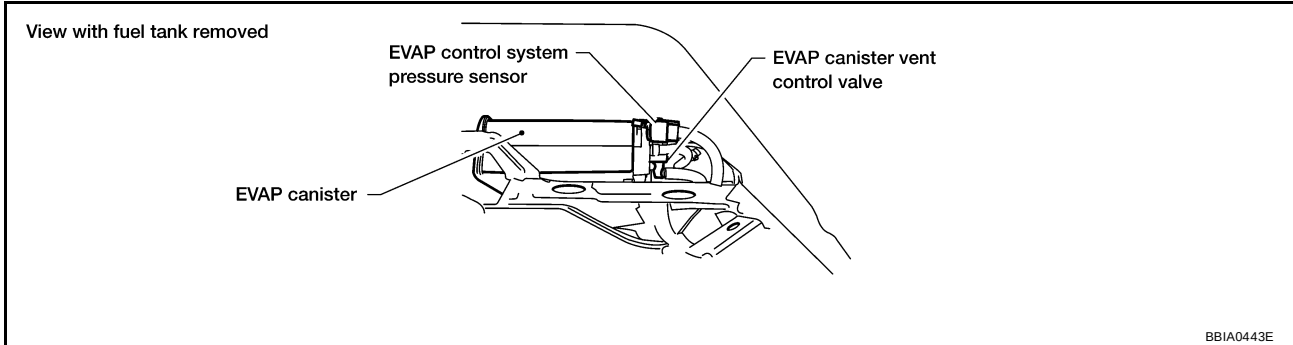


DTC P0442 EVAP CONTROL SYSTEM

7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

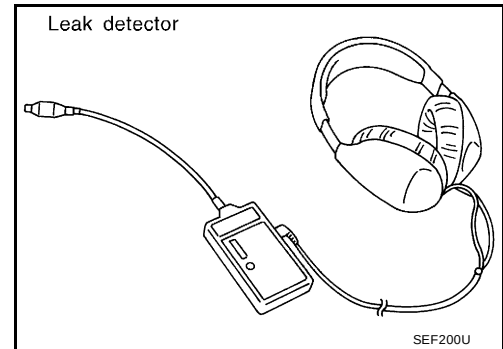
NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



8. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.
Refer to [EC-609, "Removal and Installation"](#) .
- EVAP canister vent control valve.
Refer to [EC-296, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
NG >> Repair or replace EVAP canister vent control valve and O-ring.

DTC P0442 EVAP CONTROL SYSTEM

9. CHECK IF EVAP CANISTER SATURATED WITH WATER

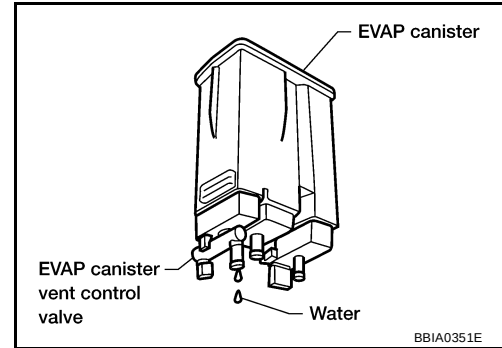
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 10.

No (With CONSULT-II)>>GO TO 12.

No (Without CONSULT-II)>>GO TO 13.



10. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.2 kg (4.9 lb).

OK or NG

OK (With CONSULT-II)>>GO TO 12.

OK (Without CONSULT-II)>>GO TO 13.

NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓜ With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

OK >> GO TO 15.

NG >> GO TO 14.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

DTC P0442 EVAP CONTROL SYSTEM

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

- OK >> GO TO 16.
NG >> GO TO 14.

14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-24, "Vacuum Hose Drawing"](#) .

OK or NG

- OK >> GO TO 15.
NG >> Repair or reconnect the hose.

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-289, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.
NG >> Replace EVAP canister purge volume control solenoid valve.

16. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-228, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
NG >> Replace fuel level sensor unit.

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-300, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
NG >> Replace EVAP control system pressure sensor.

18. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 19.
NG >> Repair or reconnect the hose.

19. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

DTC P0442 EVAP CONTROL SYSTEM

20. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-612, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 21.

NG >> Repair or replace hoses and tubes.

21. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hose, tube or filler neck tube.

22. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-615, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

23. CHECK FUEL LEVEL SENSOR

Refer to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

24. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PF0:14920

Description SYSTEM DESCRIPTION

UBS00ES1

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge vol- ume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Wheel sensor*2	Vehicle speed		

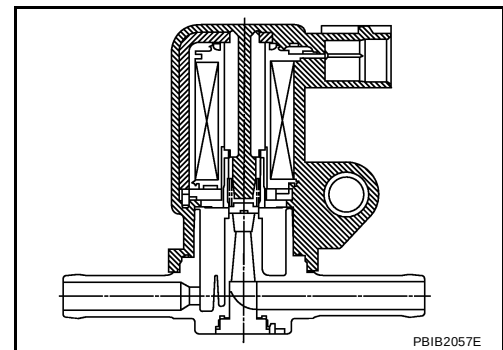
*1:ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-II Reference Value in Data Monitor Mode

UBS00ES2

Specification data are reference values.

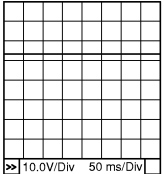
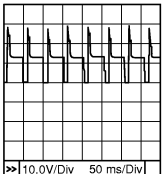
MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle (Accelerator pedal is not depressed even slightly, after starting engine)	0%
		2,000 rpm	—

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	L/Y	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed ● Accelerator pedal is not depressed even slightly, after starting engine. 	BATTERY VOLTAGE (11 - 14V) ★  <small>10.0V/Div 50 ms/Div</small> PBIB0050E
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	11 - 14V ★  <small>10.0V/Div 50 ms/Div</small> PBIB0051E
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> ● For a few seconds after turning ignition switch OFF 	0 - 1.5V
			[Ignition switch: OFF] <ul style="list-style-type: none"> ● More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14V)
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

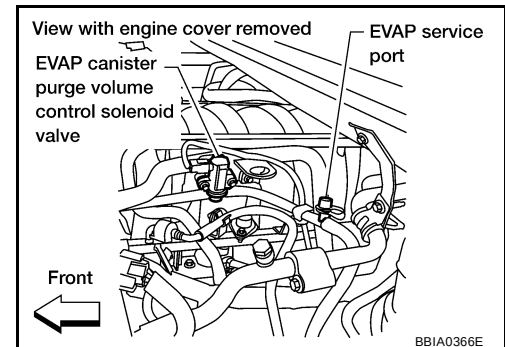
DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS00ES6

Diagnostic Procedure

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.

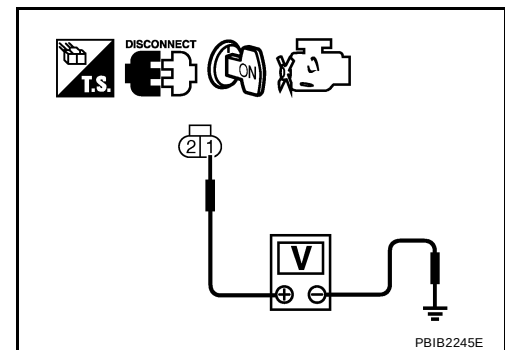


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK (With CONSULT-II)>>GO TO 4.
OK (Without CONSULT-II)>>GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PB1B1678E

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-289, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
NG >> Replace EVAP canister purge volume control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

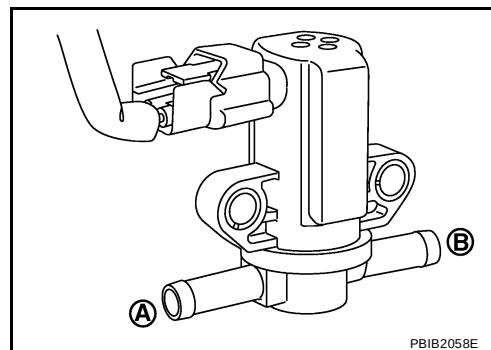
Component Inspection EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS00E57

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

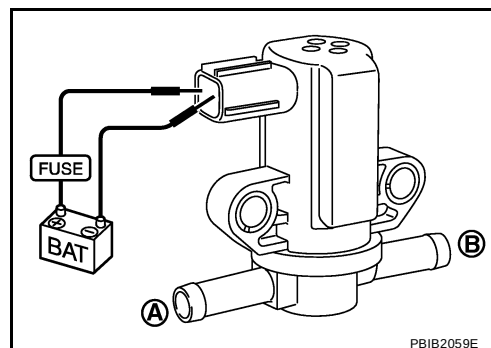
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Removal and Installation

UBS00ES8

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

PDF:14935

Component Description

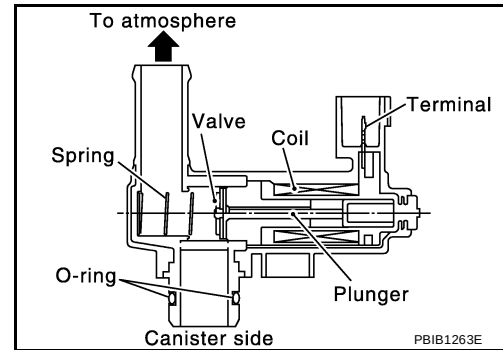
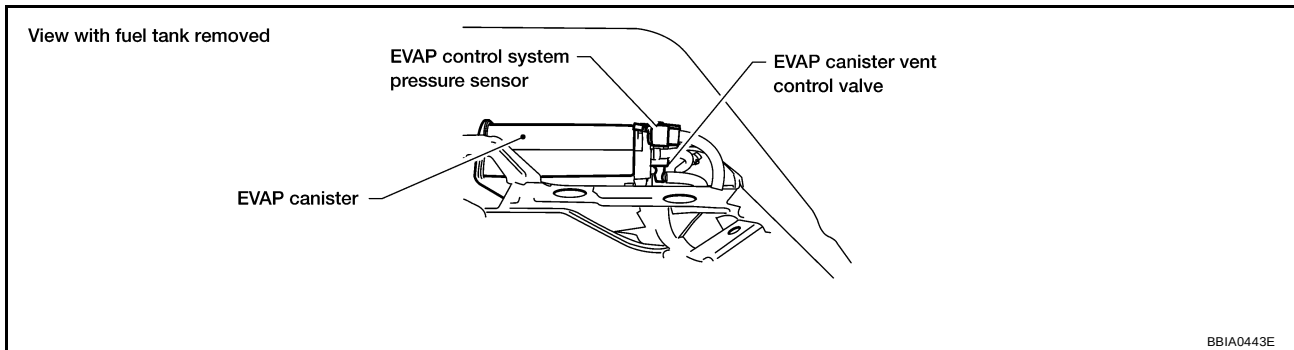
UBS00ES9

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS00ESA

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS00ESB

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	● Harness or connectors (The valve circuit is open or shorted.) ● EVAP canister vent control valve

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

UBS00ESC

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:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to [EC-294, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

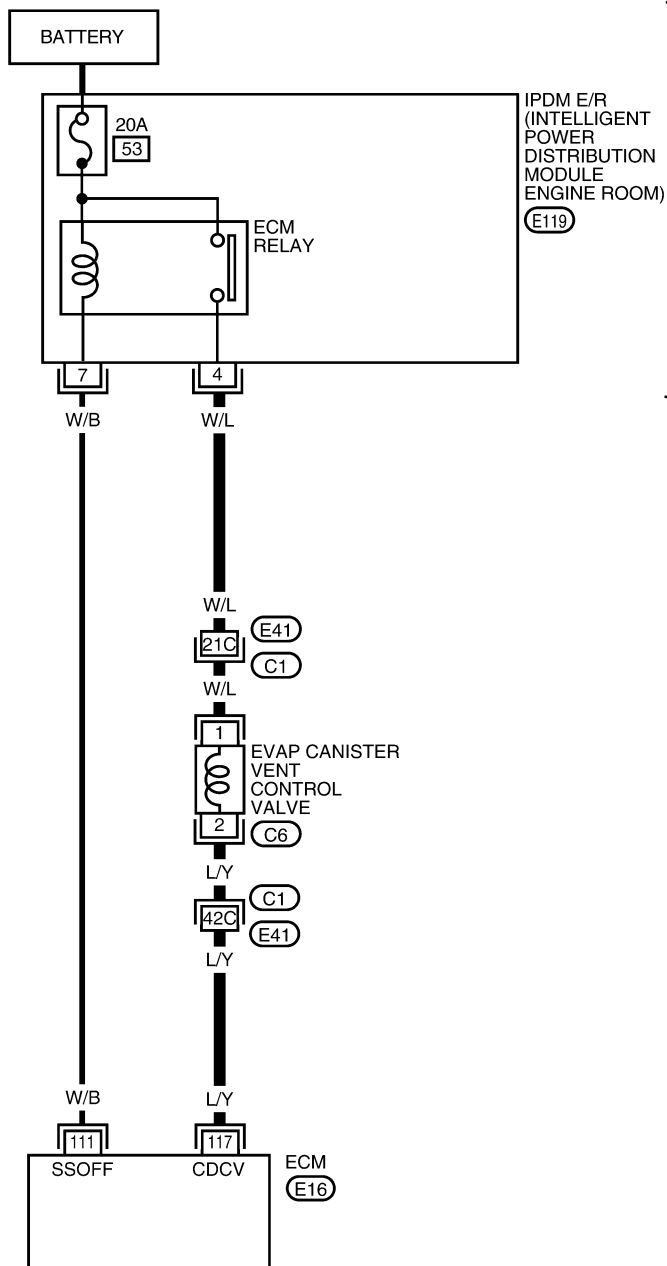
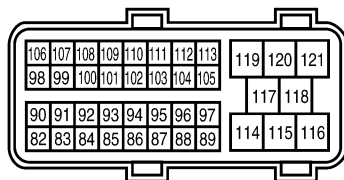
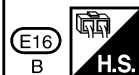
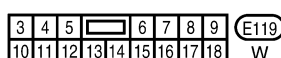
Wiring Diagram

UBS00ESD

EC-VENT/V-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



REFER TO THE FOLLOWING
 (C1) - SUPER MULTIPLE JUNCTION (SMJ)

BBWA0893E

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
117	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00ESE

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

With CONSULT-II

- Turn ignition switch OFF and then turn ON.
- Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.
- Touch "ON/OFF" on CONSULT-II screen.
- Check for operating sound of the valve.
Clicking noise should be heard.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.

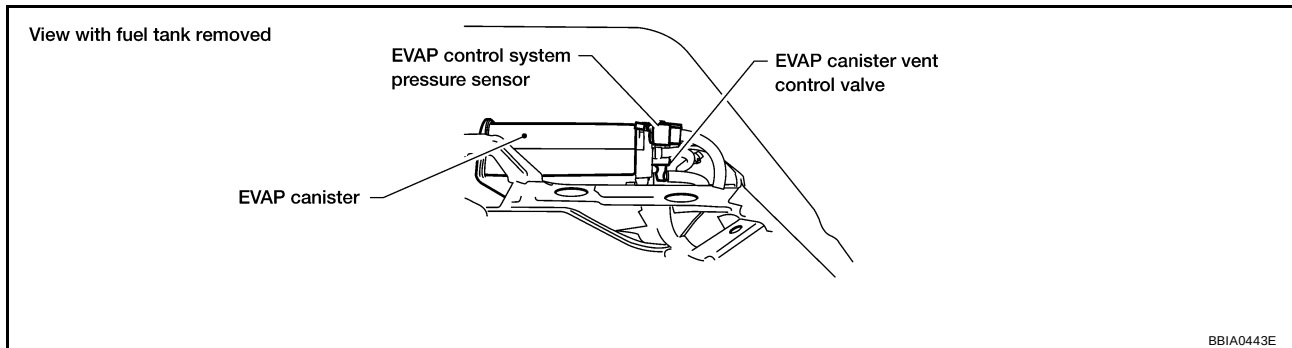
ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB1679E

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve harness connector.

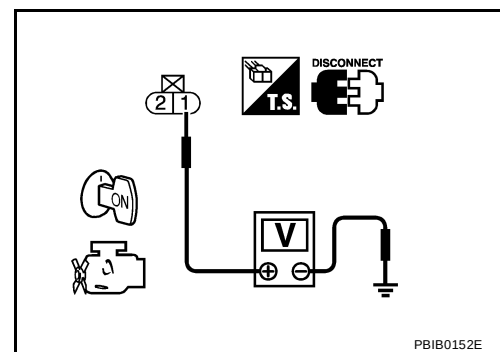


3. Turn ignition switch ON.
4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E41, C1
- IPDM E/R harness connector E119
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair harness or connectors.

5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 117 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E41, C1
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 8.

NG >> Clean the rubber tube using an air blower.

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-296, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP canister vent control valve.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

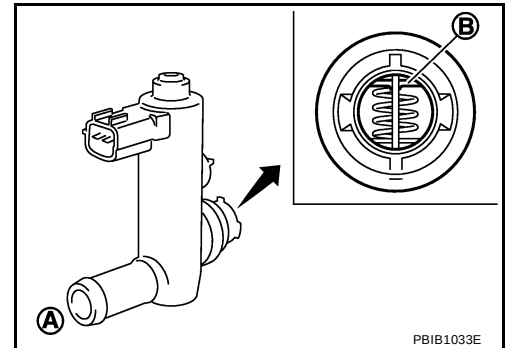
>> INSPECTION END

Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS00ESF

With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve.
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Make sure new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve.

If OK, go to next step.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

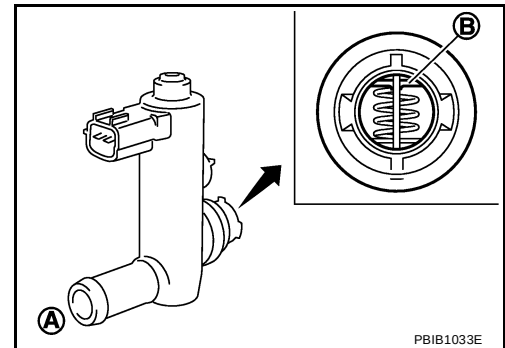
PBIB1679E

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

7. Clean the air passage (portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

⊗ Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

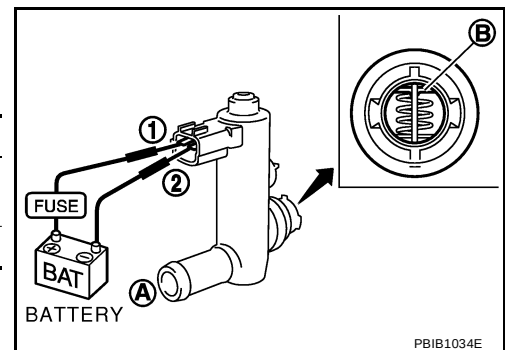
Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve.

If OK, go to next step.

4. Clean the air passage (portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.



DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

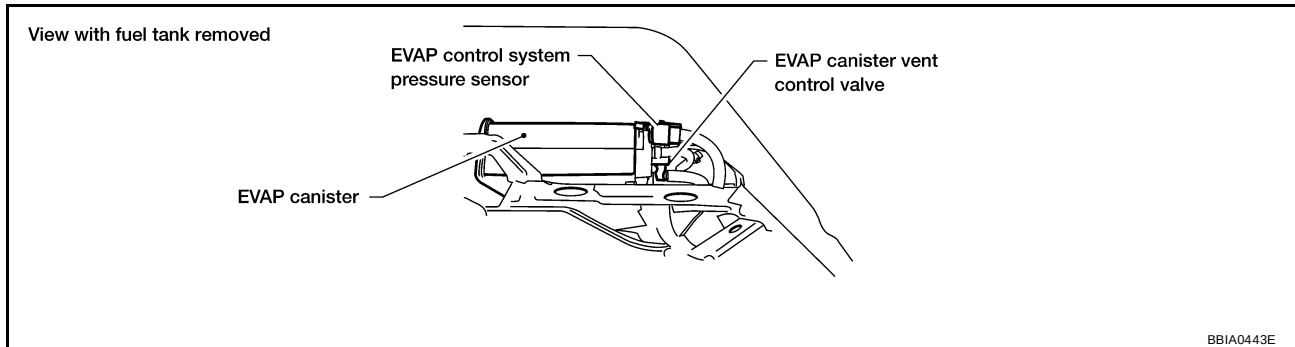
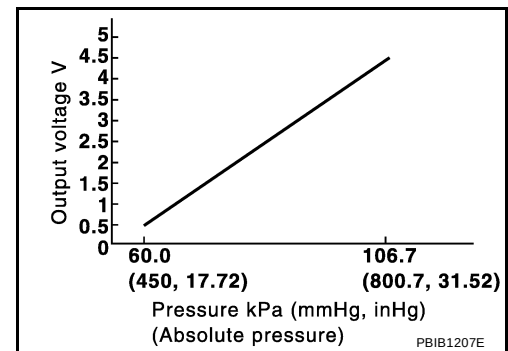
DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFP:22365

Component Description

UBS00ESG

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



CONSULT-II Reference Value in Data Monitor Mode

UBS00ESI

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

UBS00ESI

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451 0451	EVAP control system pressure sensor performance	ECM detects a sloshing signal from the EVAP control system pressure sensor	● Harness or connectors ● EVAP control system pressure sensor

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Confirmation Procedure

UBS00ESJ

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.

① WITH CONSULT-II

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 40 seconds.

NOTE:

Do not depress accelerator pedal even slightly.

If 1st trip DTC is detected, go to [EC-299, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

② WITH GST

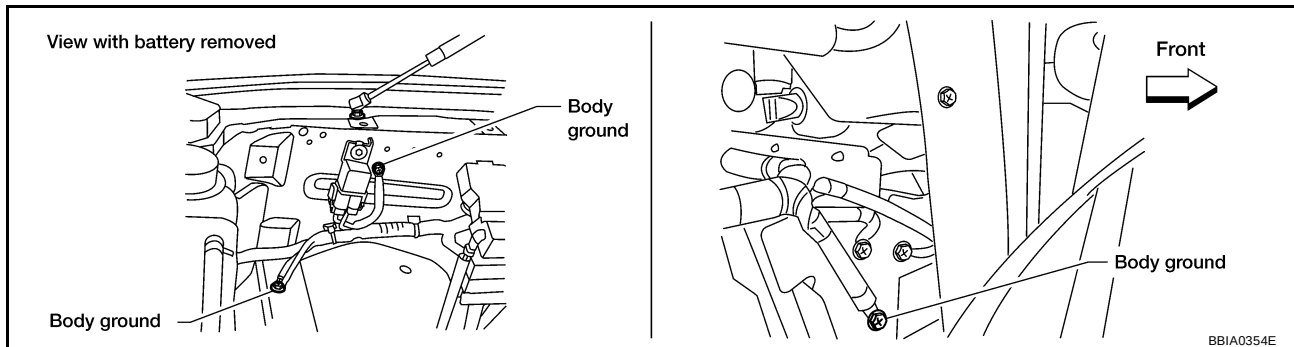
Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00ESK

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

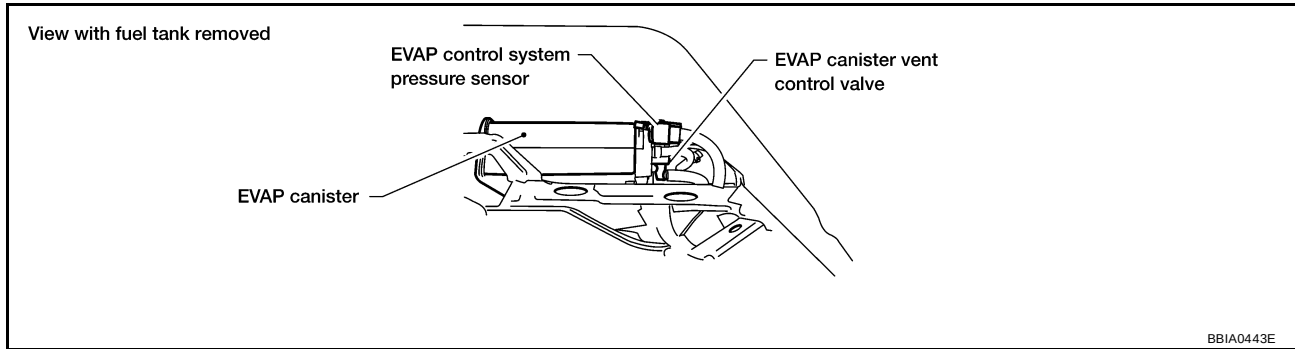
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-300, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Replace EVAP control system pressure sensor.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .
For wiring diagram, refer to [EC-303, "Wiring Diagram"](#) .

>> INSPECTION END

Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS00ESL

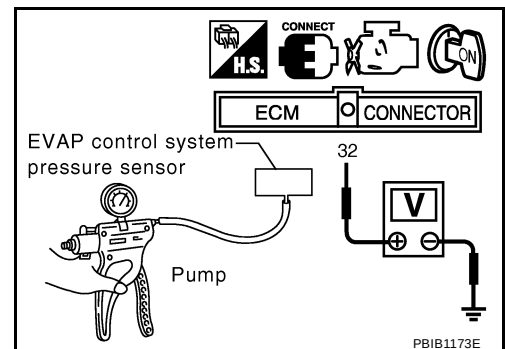
1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

4. If NG, replace EVAP control system pressure sensor.



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

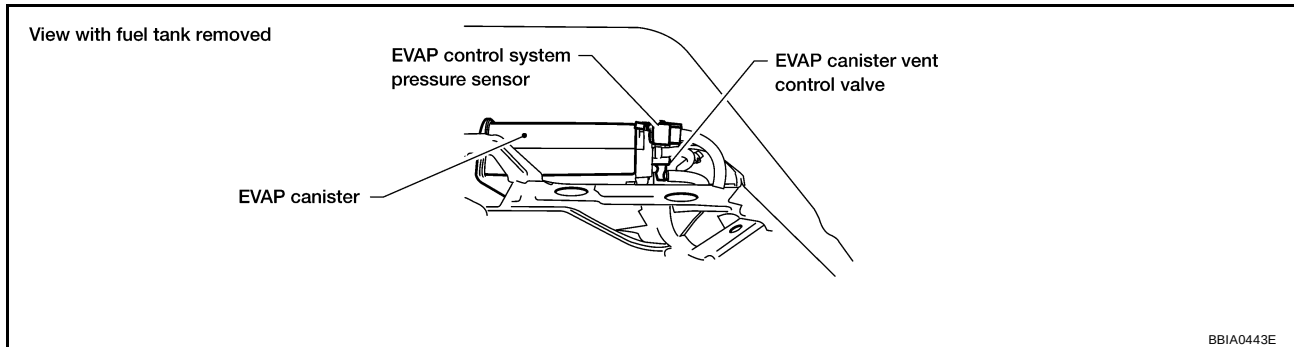
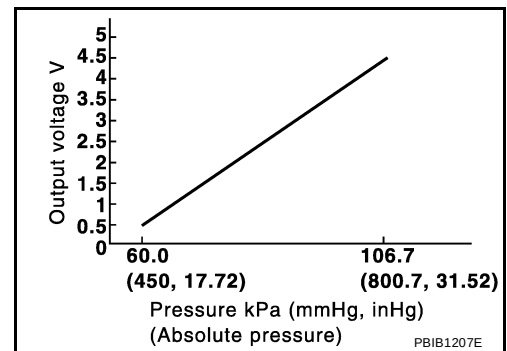
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFP:25085

Component Description

UBS00ESM

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



CONSULT-II Reference Value in Data Monitor Mode

UBS00ESN

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

UBS00ESO

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● EVAP control system pressure sensor

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS00ESP

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:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

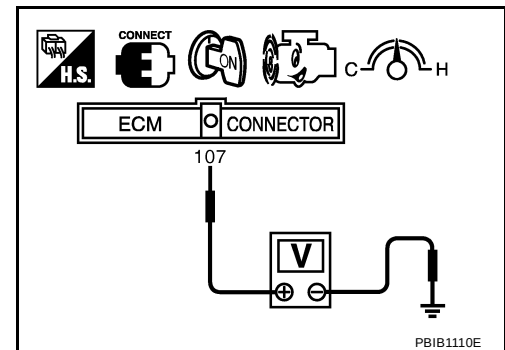
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
If 1st trip DTC is detected, go to [EC-304, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select MODE 7 with GST.
If 1st trip DTC is detected, go to [EC-304, "Diagnostic Procedure"](#)



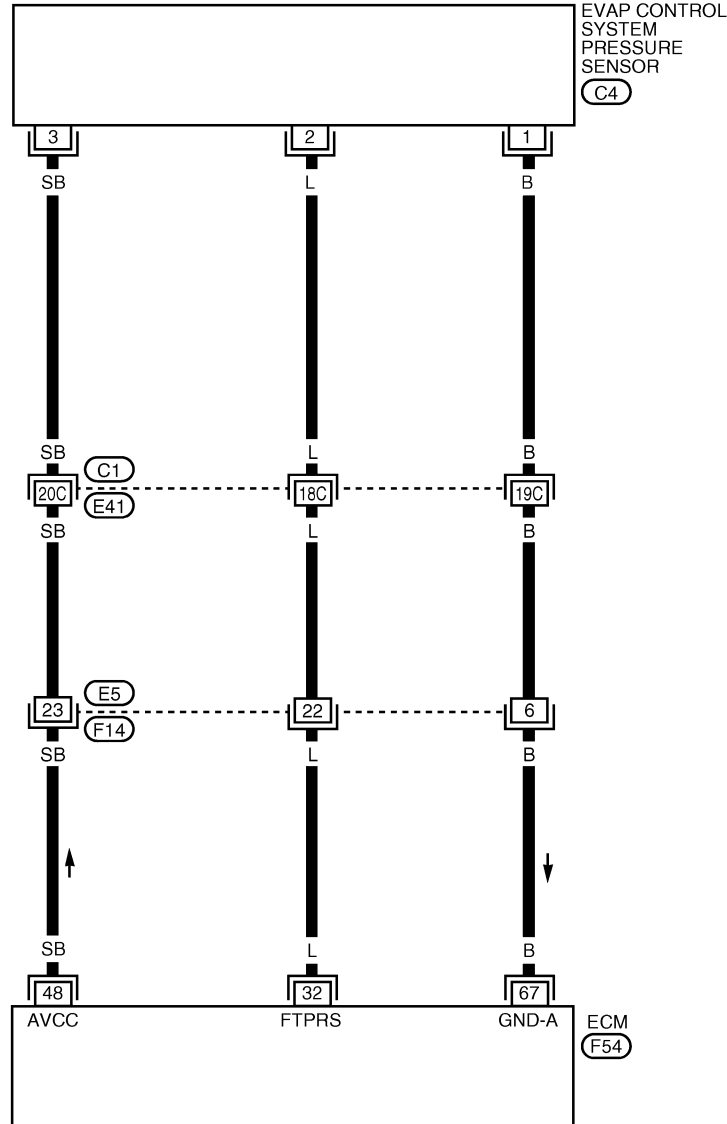
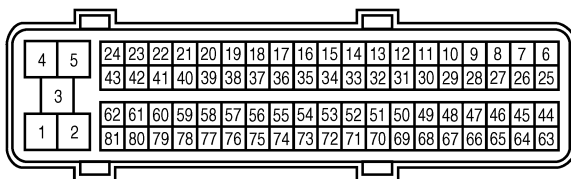
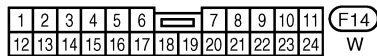
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Wiring Diagram

UBS00ESQ

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (C1) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA1175E

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Specification data are reference values and are 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.

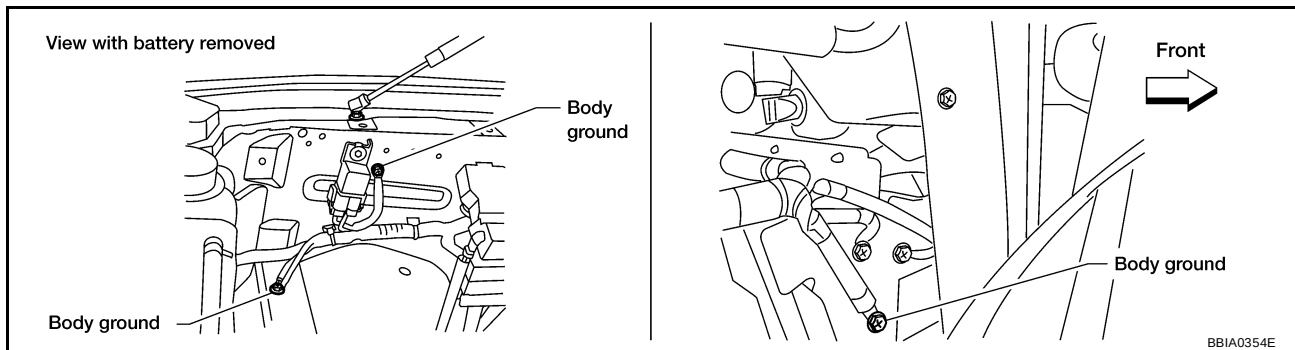
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8V
48	SB	Sensor power supply (EVAP control system pressure sensor)	[Ignition switch: ON]	Approximately 5V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS00ESR

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

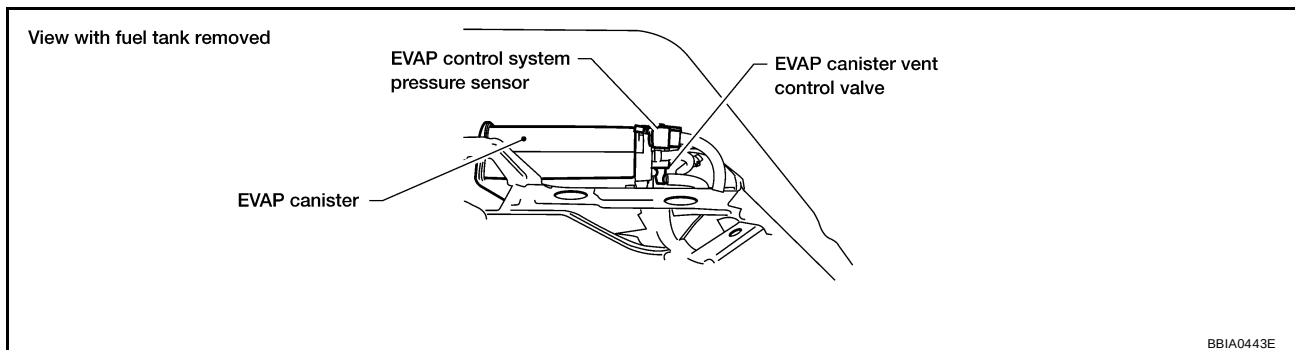
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness connector.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

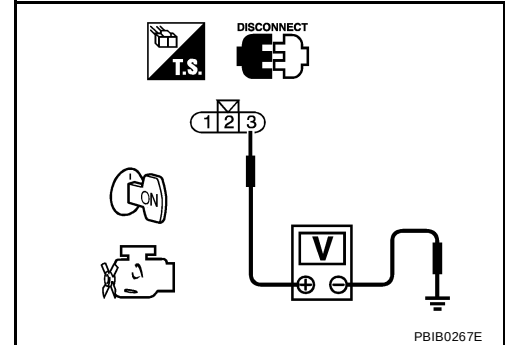
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E5, F14
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 67.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E5, F14
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E5, F14
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-306, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

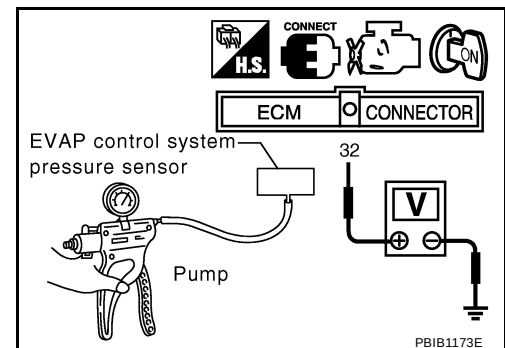
UBS00ESS

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
4. If NG, replace EVAP control system pressure sensor.



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

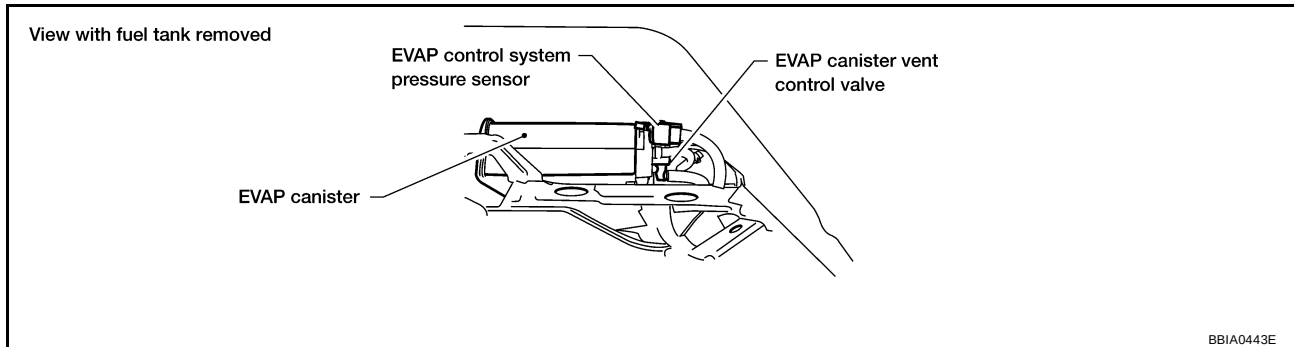
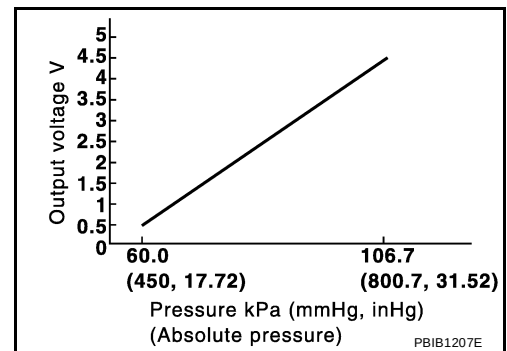
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFP:25085

Component Description

UBS00EST

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



CONSULT-II Reference Value in Data Monitor Mode

UBS00ESU

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

UBS00ESV

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● EVAP control system pressure sensor● EVAP canister vent control valve● EVAP canister● Rubber hose from EVAP canister vent control valve to vehicle frame

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS00ESW

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:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

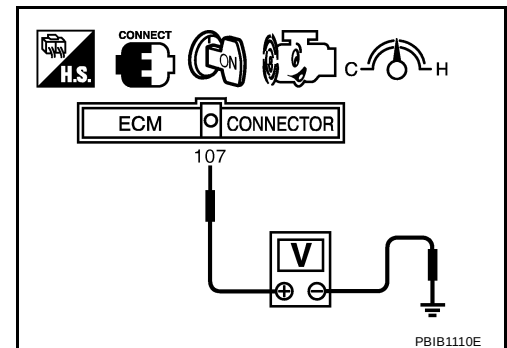
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. If 1st trip DTC is detected, go to [EC-310, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select MODE 7 with GST.
If 1st trip DTC is detected, go to [EC-310, "Diagnostic Procedure"](#)



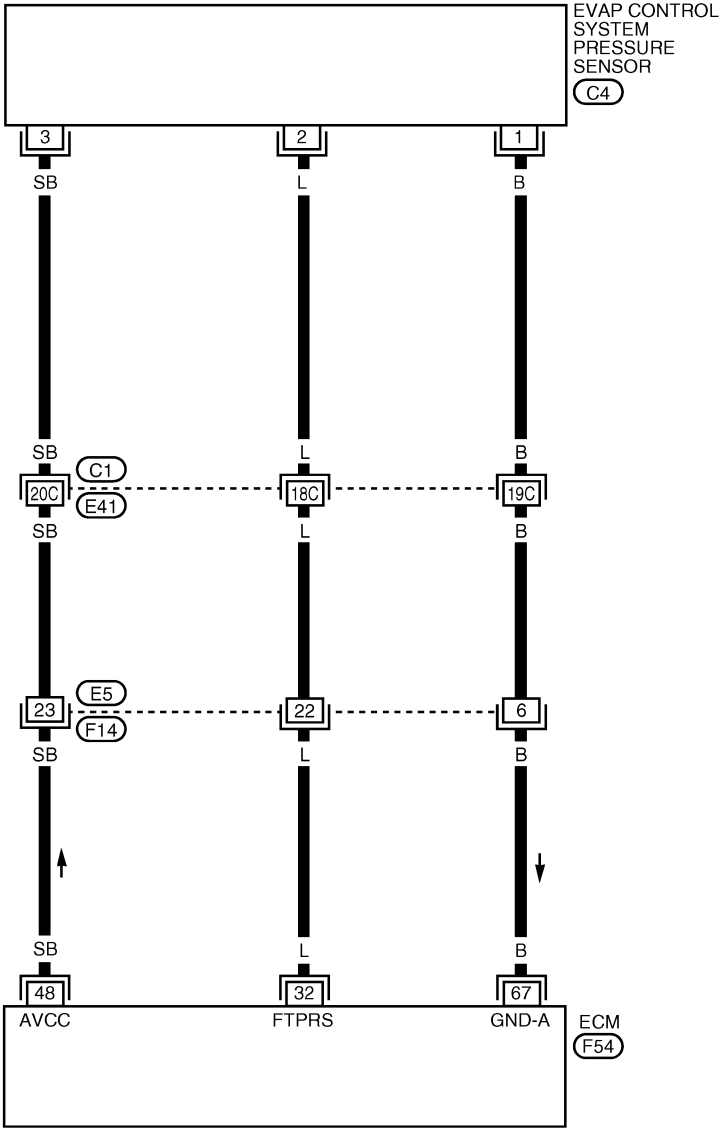
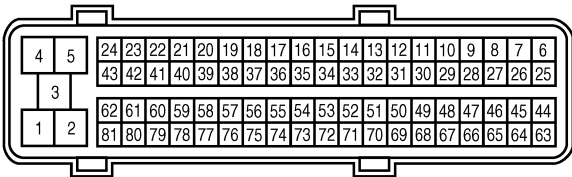
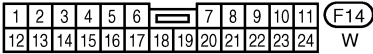
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Wiring Diagram

UBS00ESX

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
(C1) - SUPER MULTIPLE JUNCTION (SMJ)

BBWA1175E

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Specification data are reference values and are 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.

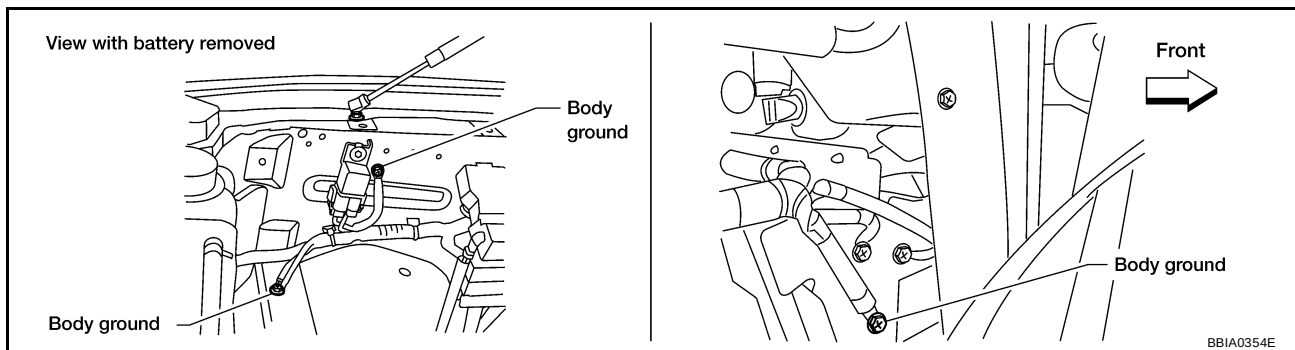
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8V
48	SB	Sensor power supply (EVAP control system pressure sensor)	[Ignition switch: ON]	Approximately 5V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS00ESY

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

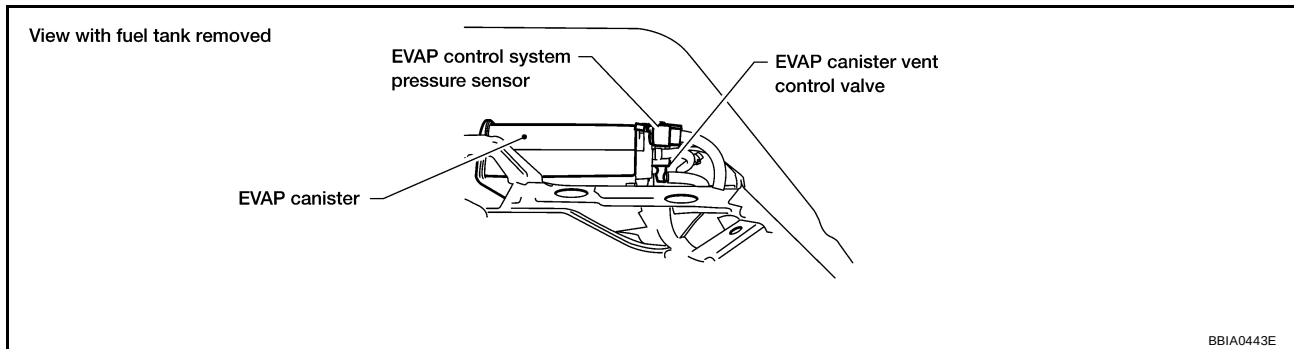
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace harness connector.

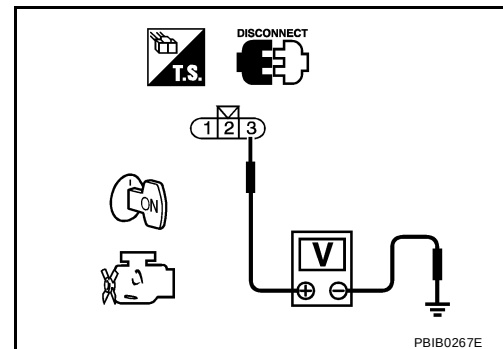
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E5, F14
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 67.

Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E5, F14
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2.

Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors C1, E41
- Harness connectors E5, F14
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging, vent or kinked.

OK or NG

- OK >> GO TO 10.
NG >> Clean the rubber tube using an air blower, repair or replace rubber tube.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-296, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve.

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-314, "Component Inspection"](#) .

OK or NG

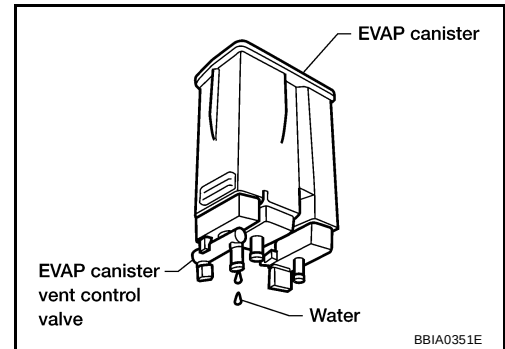
- OK >> GO TO 12.
NG >> Replace EVAP control system pressure sensor.

12. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 13.
No >> GO TO 15.



13. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.2 kg (4.9 lb).

OK or NG

- OK >> GO TO 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS00ESZ

Component Inspection

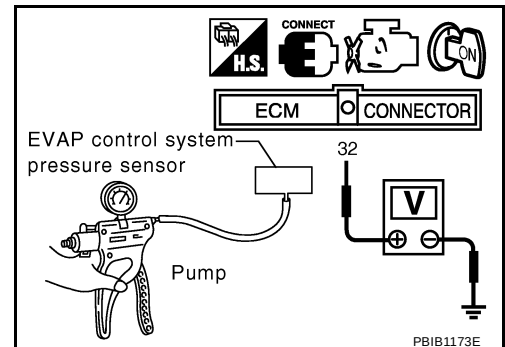
EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
4. If NG, replace EVAP control system pressure sensor.



DTC P0455 EVAP CONTROL SYSTEM

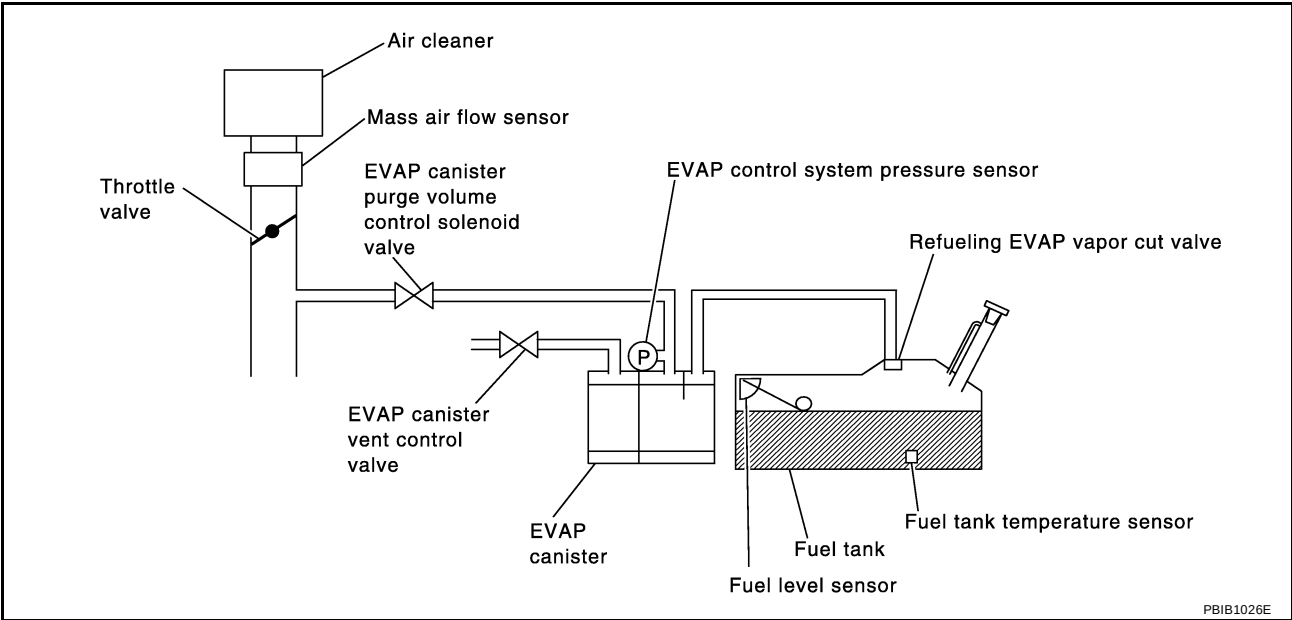
DTC P0455 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

UBS00ET0

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.	<ul style="list-style-type: none">● Fuel filler cap remains open or fails to close.● Incorrect fuel tank vacuum relief valve● Incorrect fuel filler cap used● Foreign matter caught in fuel filler cap.● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.● Foreign matter caught in EVAP canister vent control valve.● EVAP canister or fuel tank leaks● EVAP purge line (pipe and rubber tube) leaks● EVAP purge line rubber tube bent.● Loose or disconnected rubber tube● EVAP canister vent control valve and the circuit● EVAP canister purge volume control solenoid valve and the circuit● Fuel tank temperature sensor● O-ring of EVAP canister vent control valve is missing or damaged.● EVAP control system pressure sensor● Refueling EVAP vapor cut valve● ORVR system leaks

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC P0455 EVAP CONTROL SYSTEM

UBS00ET1

DTC Confirmation Procedure

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:

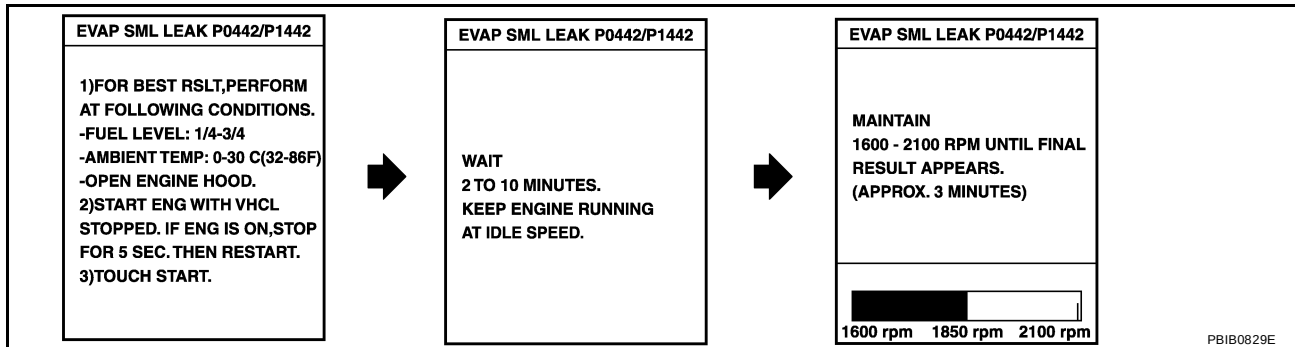
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedures.

WITH CONSULT-II

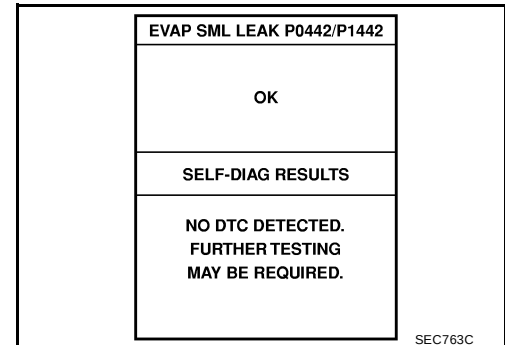
1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that the following conditions are met.
COOLANT TEMP/S: 0 - 70°C (32 - 158°F)
INTAKE TEMP SE: 0 - 60°C (32 - 140°F)
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.



NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-79, "Basic Inspection"](#).

7. Make sure that "OK" is displayed.
If "NG" is displayed, select "SELF-DIAG RESULTS" mode and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to [EC-317, "Diagnostic Procedure"](#).
If P0442 is displayed, perform Diagnostic Procedure for DTC P0442 [EC-277, "Diagnostic Procedure"](#).



DTC P0455 EVAP CONTROL SYSTEM

WITH GST

NOTE:

Be sure to read the explanation of [EC-59, "Driving Pattern"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to [EC-59, "Driving Pattern"](#) .
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Select MODE 7 with GST.
 - If P0455 is displayed on the screen, go to [EC-317, "Diagnostic Procedure"](#) .
 - If P0442 is displayed on the screen, go to [EC-277, "Diagnostic Procedure"](#) .
 - If P0441 is displayed on the screen, go to [EC-272, "Diagnostic Procedure"](#) .

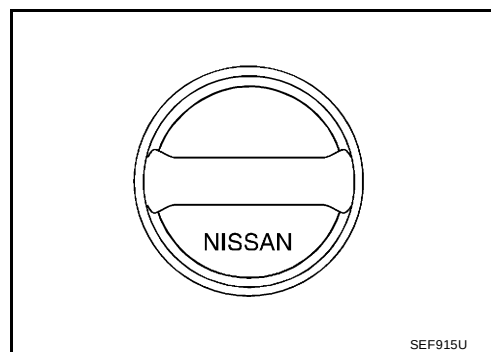
Diagnostic Procedure

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until ratcheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-608, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

DTC P0455 EVAP CONTROL SYSTEM

5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 6.

NG >> Repair or reconnect the hose.

6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.
Refer to [EC-609, "Removal and Installation"](#) .
- EVAP canister vent control valve.
Refer to [EC-296, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

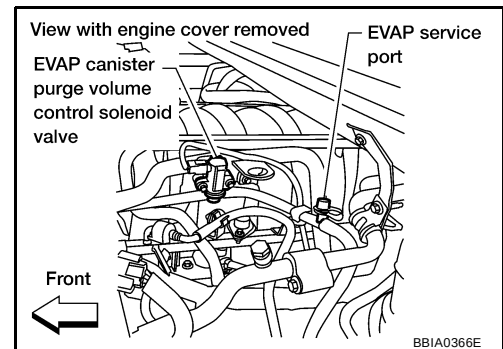
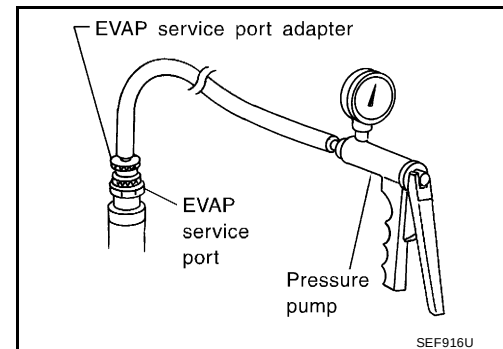
NG >> Repair or replace EVAP canister vent control valve and O-ring.

8. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-II>>GO TO 9.

Without CONSULT-II>>GO TO 10.

DTC P0455 EVAP CONTROL SYSTEM

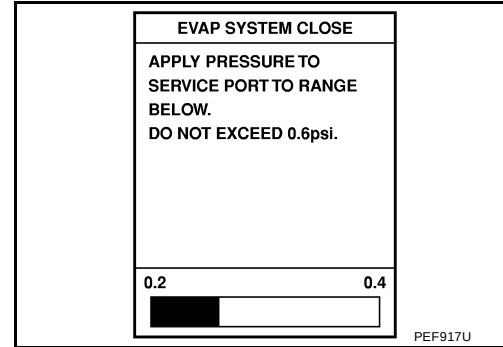
9. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

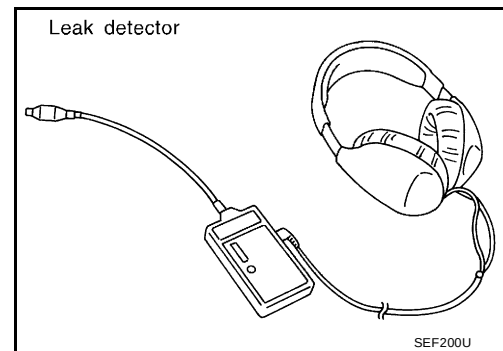
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

- OK >> GO TO 11.
NG >> Repair or replace.

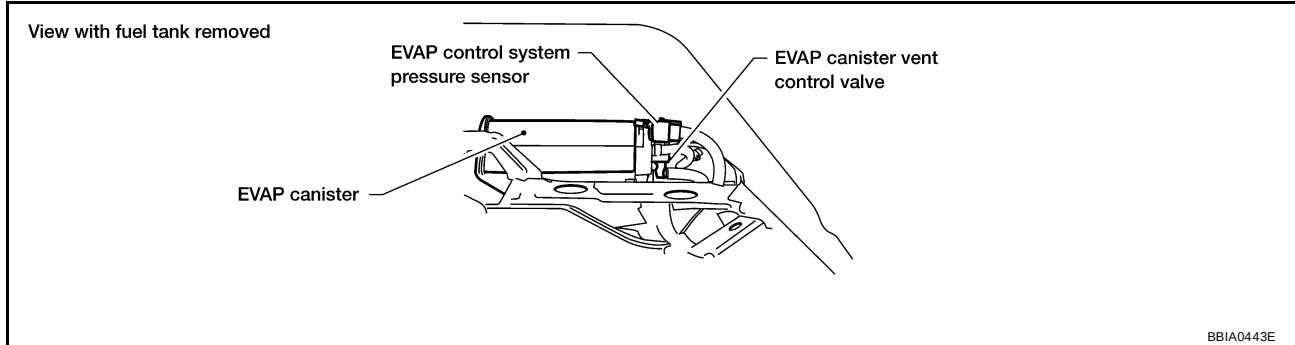


DTC P0455 EVAP CONTROL SYSTEM

10. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

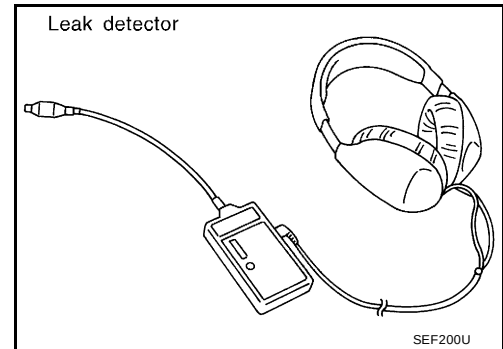
NOTE:

- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 12.
NG >> Repair or replace.



11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓢ With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 14.
NG >> GO TO 13.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

- OK >> GO TO 15.
NG >> GO TO 13.

13. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-24, "Vacuum Hose Drawing"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 14.
OK (Without CONSULT-II)>>GO TO 15.
NG >> Repair or reconnect the hose.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**📱 With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 16.
NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-289, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.
NG >> Replace EVAP canister purge volume control solenoid valve.

16. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-228, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
NG >> Replace fuel level sensor unit.

DTC P0455 EVAP CONTROL SYSTEM

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-300, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

18. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-612, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or replace hoses and tubes.

19. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 20.

NG >> Repair or replace hose, tube or filler neck tube.

20. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-615, "Component Inspection"](#) .

OK or NG

OK >> GO TO 21.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

21. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0456 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

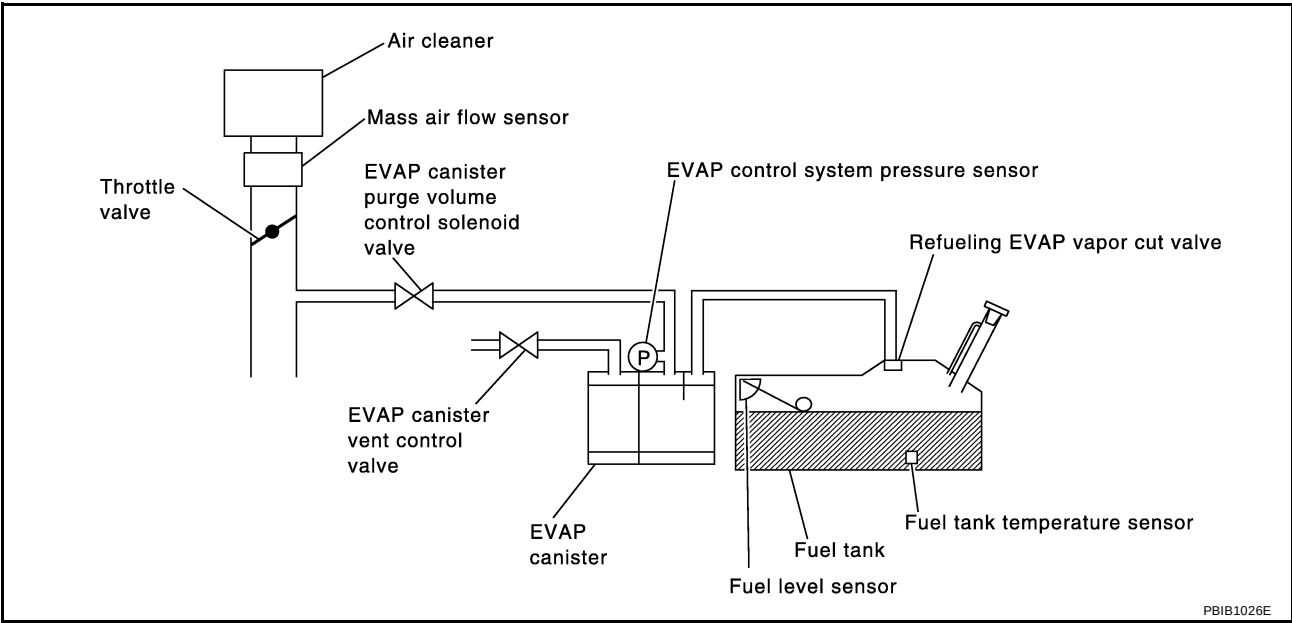
UBS00ET3

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none">● EVAP system has a very small leak.● EVAP system does not operate properly.	<ul style="list-style-type: none">● Incorrect fuel tank vacuum relief valve● Incorrect fuel filler cap used● Fuel filler cap remains open or fails to close.● Foreign matter caught in fuel filler cap.● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.● Foreign matter caught in EVAP canister vent control valve.● EVAP canister or fuel tank leaks● EVAP purge line (pipe and rubber tube) leaks● EVAP purge line rubber tube bent● Loose or disconnected rubber tube● EVAP canister vent control valve and the circuit● EVAP canister purge volume control solenoid valve and the circuit● Fuel tank temperature sensor● O-ring of EVAP canister vent control valve is missing or damaged● EVAP canister is saturated with water● EVAP control system pressure sensor● Refueling EVAP vapor cut valve● ORVR system leaks● Fuel level sensor and the circuit● Foreign matter caught in EVAP canister purge volume control solenoid valve

DTC P0456 EVAP CONTROL SYSTEM

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC Confirmation Procedure

UBS00ET4

NOTE:

- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- 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.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Fuel is refilled or drained.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

④ WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Make sure the following conditions are met.

FUEL LEVEL SE: 0.25 - 1.4V

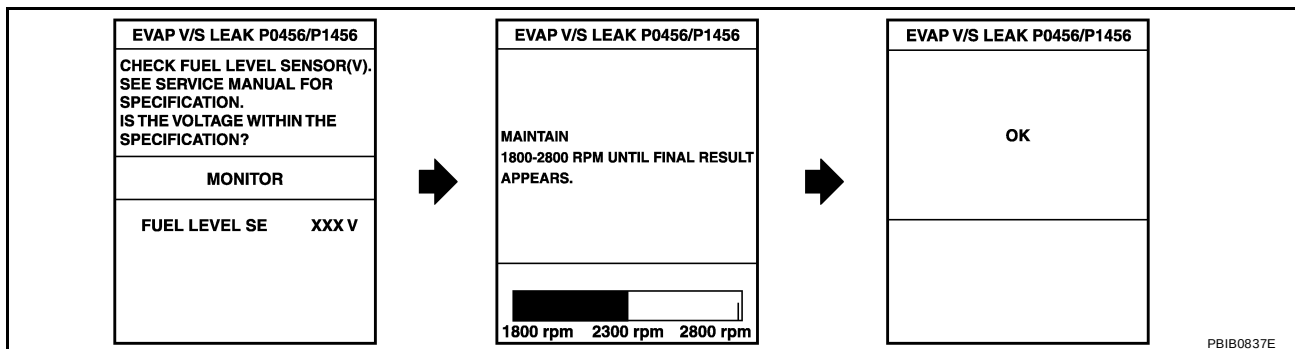
COOLAN TEMP/S: 0 - 32°C (32 - 90°F)

FUEL T/TMP SE: 0 - 35°C (32 - 95°F)

INT A/TEMP SE: More than 0°C (32°F)

If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).

3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.



5. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-326, "Diagnostic Procedure"](#) .

NOTE:

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-79, "Basic Inspection"](#) .
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

DTC P0456 EVAP CONTROL SYSTEM

UBS00ET5

Overall Function Check

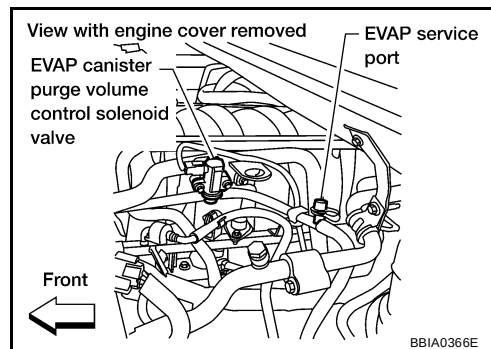
WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

- Do not use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm² , 0.6 psi).

1. Attach the EVAP service port adapter securely to the EVAP service port.



2. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch ON.
5. Connect GST and select MODE 8.
6. Using mode 8 control the EVAP canister vent control valve (close).
7. Apply pressure and make sure the following conditions are satisfied.

Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)

Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).

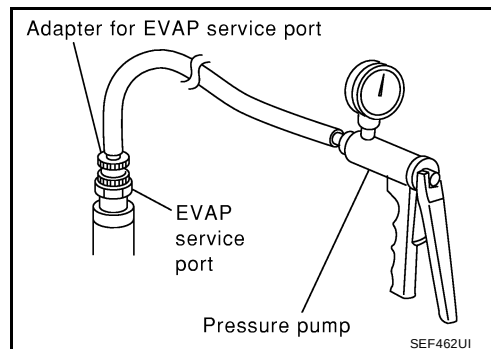
If NG, go to [EC-326, "Diagnostic Procedure"](#) .

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch OFF.

NOTE:

For more information, refer to GST instruction manual.



DTC P0456 EVAP CONTROL SYSTEM

UBS00ET6

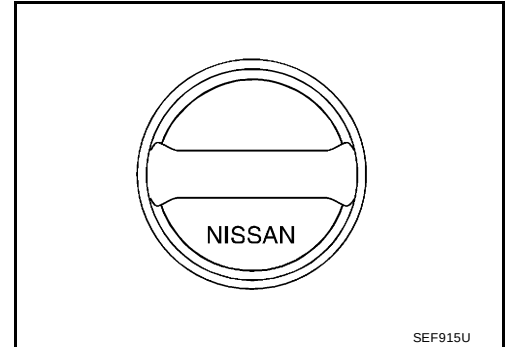
Diagnostic Procedure

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until ratcheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-608, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

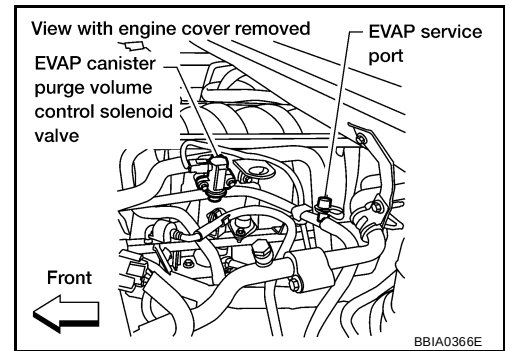
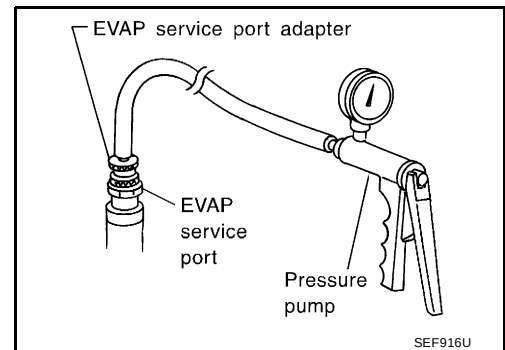
OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

DTC P0456 EVAP CONTROL SYSTEM

5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port, refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .



NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

With CONSULT-II>>GO TO 6.

Without CONSULT-II>>GO TO 7.

DTC P0456 EVAP CONTROL SYSTEM

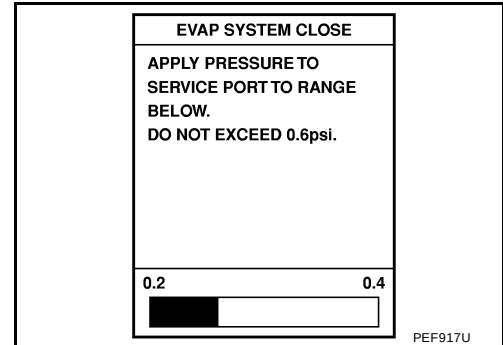
6. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

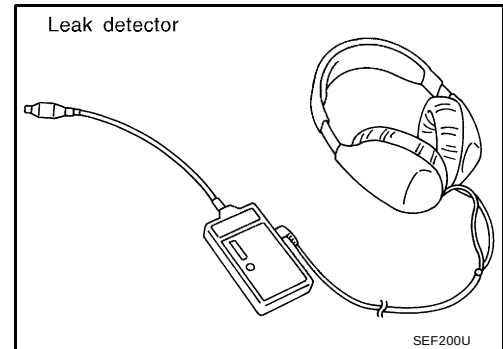
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.

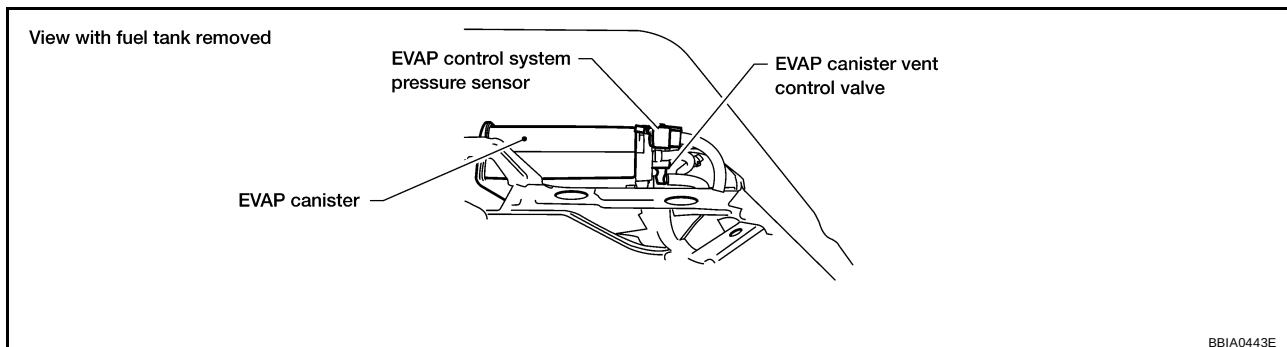


DTC P0456 EVAP CONTROL SYSTEM

7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

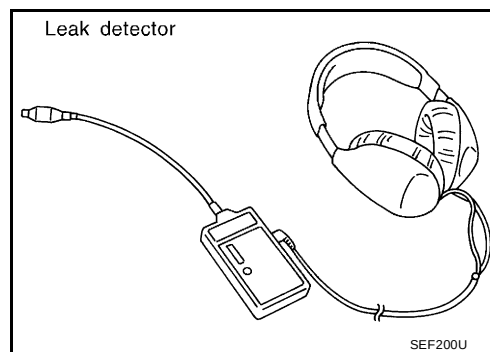
NOTE:

- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



8. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.
Refer to [EC-609, "Removal and Installation"](#) .
- EVAP canister vent control valve.
Refer to [EC-296, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace EVAP canister vent control valve and O-ring.

DTC P0456 EVAP CONTROL SYSTEM

9. CHECK IF EVAP CANISTER SATURATED WITH WATER

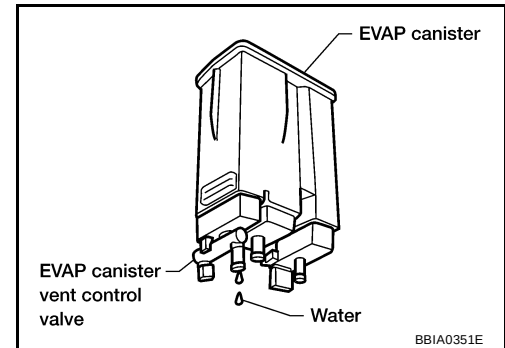
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 10.

No (With CONSULT-II)>>GO TO 12.

No (Without CONSULT-II)>>GO TO 13.



10. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.2 kg (4.9 lb).

OK or NG

OK (With CONSULT-II)>>GO TO 12.

OK (Without CONSULT-II)>>GO TO 13.

NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

OK >> GO TO 15.

NG >> GO TO 14.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.

NG >> GO TO 14.

14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-24, "Vacuum Hose Drawing"](#) .

OK or NG

OK >> GO TO 15.

NG >> Repair or reconnect the hose.

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-289, "Component Inspection"](#) .

OK or NG

OK >> GO TO 16.

NG >> Replace EVAP canister purge volume control solenoid valve.

16. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-228, "Component Inspection"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace fuel level sensor unit.

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-300, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

18. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or reconnect the hose.

19. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

DTC P0456 EVAP CONTROL SYSTEM

20. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-612, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 21.

NG >> Repair or replace hoses and tubes.

21. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hose, tube or filler neck tube.

22. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-615, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

23. CHECK FUEL LEVEL SENSOR

Refer to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

24. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0460 FUEL LEVEL SENSOR

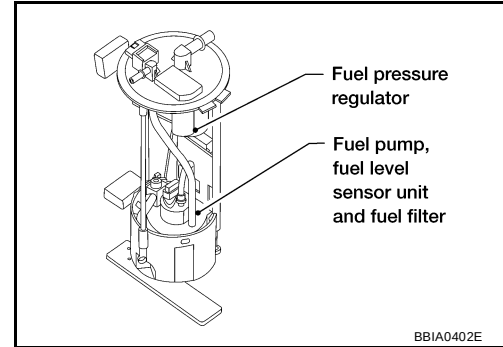
DTC P0460 FUEL LEVEL SENSOR

PFP:25060

Component Description

UBS00ET7

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



UBS00ET8

On Board Diagnosis Logic

NOTE:

If DTC P0460 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none">● Harness or connectors (The CAN communication line is open or shorted)● Harness or connectors (The sensor circuit is open or shorted)● Combination meter● Fuel level sensor

DTC Confirmation Procedure

UBS00ET9

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to [EC-334, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0460 FUEL LEVEL SENSOR

Diagnostic Procedure

UBS00ETA

1. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

OK or NG

OK >> GO TO 2.

NG >> Go to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

2. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Removal and Installation FUEL LEVEL SENSOR

UBS00ETB

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0461 FUEL LEVEL SENSOR

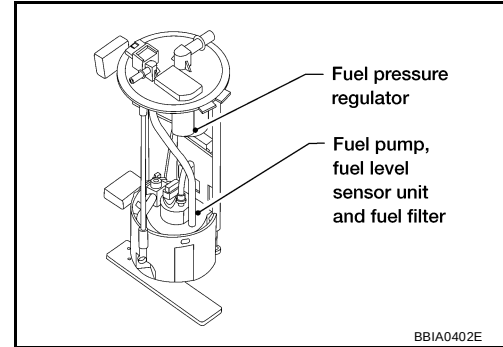
DTC P0461 FUEL LEVEL SENSOR

PFP:25060

UBS00ETC

Component Description

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



UBS00ETD

On Board Diagnosis Logic

NOTE:

If DTC P0461 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	<ul style="list-style-type: none">● Harness or connectors (The CAN communication line is open or shorted)● Harness or connectors (The sensor circuit is open or shorted)● Combination meter● Fuel level sensor

Overall Function Check

UBS00ETE

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-10, "FUEL TANK"](#).

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

WITH CONSULT-II

NOTE:

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-46, "FUEL PRESSURE RELEASE"](#).
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch OFF and wait at least 10 seconds then turn ON.
6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.

DTC P0461 FUEL LEVEL SENSOR

7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Check "FUEL LEVEL SE" output voltage and note it.
11. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
12. Check "FUEL LEVEL SE" output voltage and note it.
13. Confirm whether the voltage changes more than 0.03V during step 7 to 10 and 10 to 12.
If NG, go to [EC-336, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

NOTE:

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#) .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch ON.
6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
7. Confirm that the fuel gauge indication varies.
8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
9. Confirm that the fuel gauge indication varies.
10. If NG, go to [EC-336, "Diagnostic Procedure"](#) .

Diagnostic Procedure

UBS00ETF

1. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

OK or NG

OK >> GO TO 2.

NG >> Go to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

2. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Removal and Installation FUEL LEVEL SENSOR

UBS00ETG

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0462, P0463 FUEL LEVEL SENSOR CIRCUIT

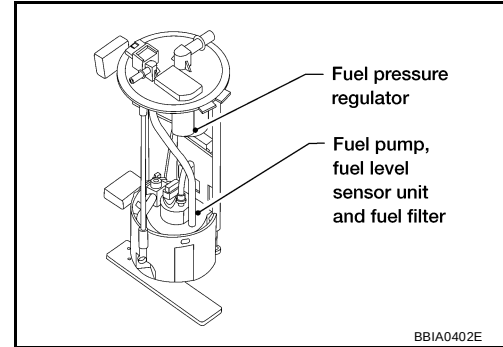
DTC P0462, P0463 FUEL LEVEL SENSOR CIRCUIT

PFP:25060

Component Description

UBS00ETH

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



BBIA0402E

UBS00ETI

On Board Diagnosis Logic

NOTE:

If DTC P0462 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The CAN communication line is open or shorted)● Harness or connectors (The sensor circuit is open or shorted)● Combination meter● Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS00ETJ

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:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-338, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0462, P0463 FUEL LEVEL SENSOR CIRCUIT

Diagnostic Procedure

UBS00ETK

1. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

OK or NG

OK >> GO TO 2.

NG >> Go to [DI-22, "Fuel Level Sensor Unit Inspection"](#) .

2. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Removal and Installation FUEL LEVEL SENSOR

UBS00ETL

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0500 VSS

PFP:32702

Description

UBS00ETM

NOTE:

If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

The vehicle speed signal is sent to the combination meter from the "ABS actuator and electric unit (control unit)" by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

On Board Diagnosis Logic

UBS00ETN

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	<ul style="list-style-type: none"> ● Harness or connectors (The CAN communication line is open or shorted) ● Harness or connectors (The vehicle speed signal circuit is open or shorted) ● Wheel sensor ● Combination meter ● ABS actuator and electric unit (control unit)

DTC Confirmation Procedure

UBS00ETO

CAUTION:

Always drive vehicle at a safe speed.

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:

Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

 WITH CONSULT-II

1. Start engine (VDC switch OFF).
2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
If NG, go to [EC-340, "Diagnostic Procedure"](#).
If OK, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,600 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 6.9 msec
Selector lever	Except P or N position
PW/ST SIGNAL	OFF

6. If 1st trip DTC is detected, go to [EC-340, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

Overall Function Check

UBS00ETP

Use this procedure to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

1. Lift up drive wheels.

DTC P0500 VSS

-
2. Start engine.
 3. Read vehicle speed sensor signal in MODE 1 with GST.
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
 4. If NG, go to [EC-340, "Diagnostic Procedure"](#) .

Diagnostic Procedure

UBS00ETQ

1. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Refer to [BRC-11, "TROUBLE DIAGNOSIS"](#) or [BRC-101, "TROUBLE DIAGNOSIS"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

>> INSPECTION END

DTC P0506 ISC SYSTEM

PFP:23781

Description

UBS00ETR

NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

UBS00ETS

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none">● Electric throttle control actuator● Intake air leak

DTC Confirmation Procedure

UBS00ETT

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.
- If the target idle speed is out of the specified value, perform [EC-44, "Idle Air Volume Learning"](#) , before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-621, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

 WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-342, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

 WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00ETU

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 2.
- NG >> Discover air leak location and repair.

2. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .
4. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
5. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
6. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

DTC P0507 ISC SYSTEM

Description

UBS00ETV

NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

UBS00ETW

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none"> Electric throttle control actuator Intake air leak PCV system

DTC Confirmation Procedure

UBS00ETX

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.
- If the target idle speed is out of the specified value, perform [EC-44, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-621, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

 WITH CONSULT-II

- Open engine hood.
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON again and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and run it for at least 1 minute at idle speed.
- If 1st trip DTC is detected, go to [EC-344, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

 WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00ETY

1. CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

OK or NG

OK >> GO TO 2.

NG >> Repair or replace.

2. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.

NG >> Discover air leak location and repair.

3. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .
4. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
5. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
6. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

DTC P0550 PSP SENSOR

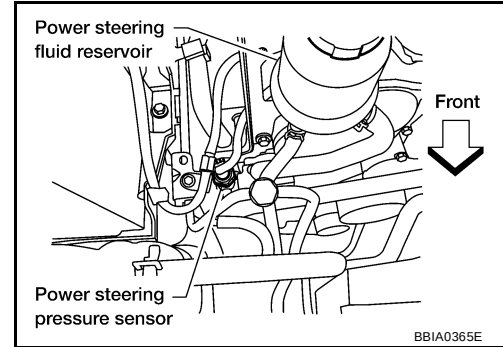
DTC P0550 PSP SENSOR

PFP:49763

Component Description

UBS00ETZ

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load. This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EU0

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

On Board Diagnosis Logic

UBS00EU1

The MIL will not light up for this diagnosis.

NOTE:

If DTC P0550 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-423, "DTC P1229 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550 0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted) ● Power steering pressure sensor

DTC Confirmation Procedure

UBS00EU2

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-347, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

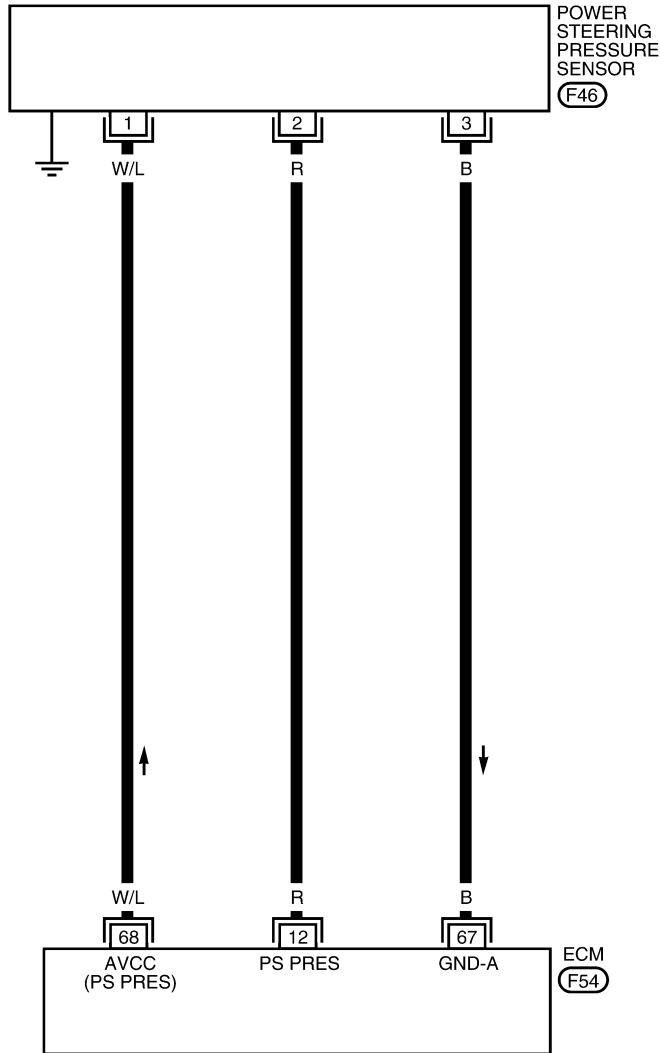
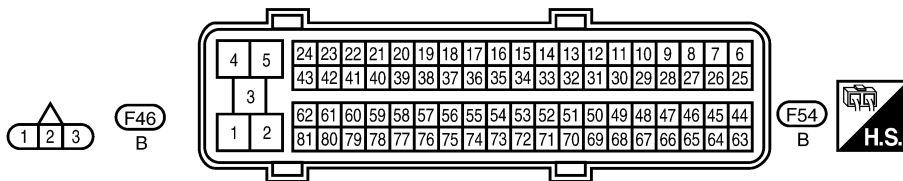
DTC P0550 PSP SENSOR

Wiring Diagram

UBS00EU3

EC-PS/SEN-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BBWA1176E

DTC P0550 PSP SENSOR

Specification data are reference values and are 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.

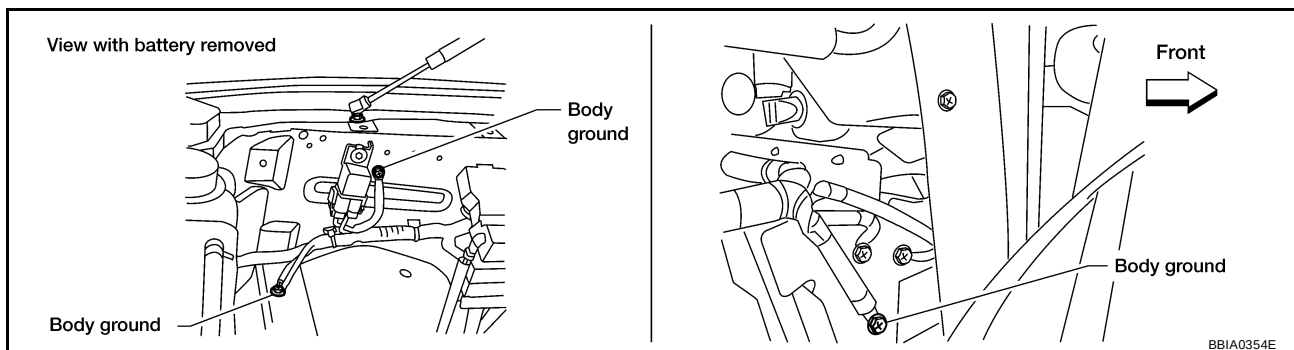
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	R	Power steering pressure sensor	[Engine is running] ● Steering wheel is being turned.	0.5 - 4.5V
			[Engine is running] ● Steering wheel is not being turned.	0.4 - 0.8V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
68	W/L	Sensor power supply (Power steering pressure sensor)	[Ignition switch: ON]	Approximately 5V

Diagnostic Procedure

UBS00EU4

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

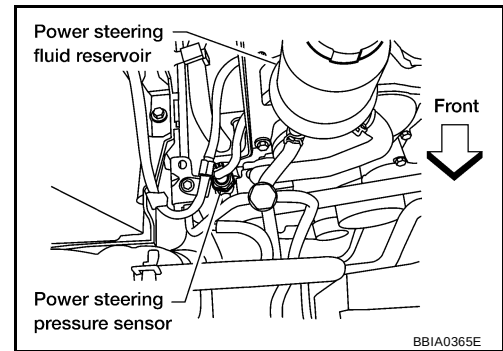
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P0550 PSP SENSOR

2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect PSP sensor harness connector.
2. Turn ignition switch ON.

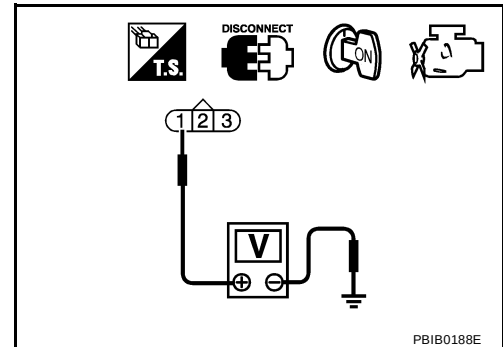


3. Check voltage between PSP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
NG >> Repair harness or connectors.



3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between PSP sensor terminal 3 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or 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.

4. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 12 and PSP sensor terminal 2.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK PSP SENSOR

Refer to [EC-349, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
NG >> Replace PSP sensor.

DTC P0550 PSP SENSOR

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

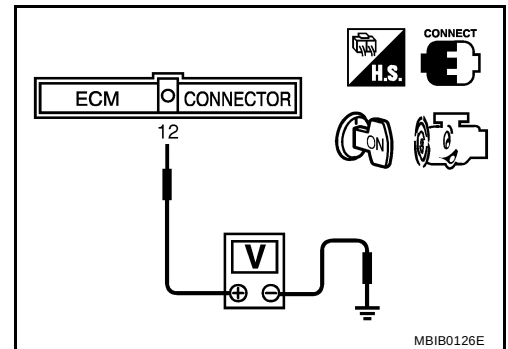
>> INSPECTION END

Component Inspection POWER STEERING PRESSURE SENSOR

UBS00EU5

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check voltage between ECM terminal 12 and ground under the following conditions.

Condition	Voltage
Steering wheel is being turned.	0.5 - 4.5V
Steering wheel is not being turned.	0.4 - 0.8V



UBS00EU6

Removal and Installation POWER STEERING PRESSURE SENSOR

Refer to [PS-32, "HYDRAULIC LINE"](#) .

DTC P0605 ECM

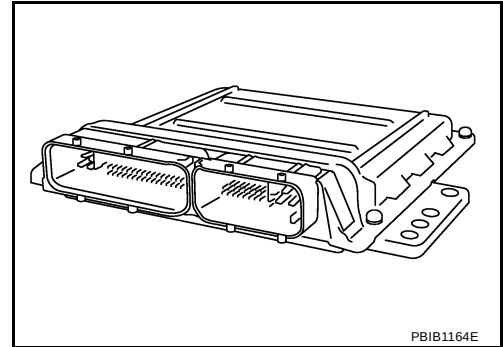
DTC P0605 ECM

PFP:23710

Component Description

UBS00EU7

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



PB1B1164E

On Board Diagnosis Logic

UBS00EU8

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when the malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	● ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
	● ECM deactivates ASCD operation.

DTC Confirmation Procedure

UBS00EU9

Perform **PROCEDURE FOR MALFUNCTION A** first. If the 1st trip DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION B**. If there is no malfunction on **PROCEDURE FOR MALFUNCTION B**, perform **PROCEDURE FOR MALFUNCTION C**.

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.

PROCEDURE FOR MALFUNCTION A

① With CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-351, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

② With GST

Follow the procedure "With CONSULT-II" above.

DTC P0605 ECM

PROCEDURE FOR MALFUNCTION B

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. If 1st trip DTC is detected, go to [EC-351, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Repeat step 3 for 32 times.
5. If 1st trip DTC is detected, go to [EC-351, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

1. INSPECTION START

With CONSULT-II

1. Turn ignition switch ON.
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform DTC Confirmation Procedure.**
See [EC-350, "DTC Confirmation Procedure"](#).
5. Is the 1st trip DTC P0605 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform DTC Confirmation Procedure.**
See [EC-350, "DTC Confirmation Procedure"](#).
5. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END**

2. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .
3. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

PFP:22693

Description SYSTEM DESCRIPTION

UBS00EUB

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the A/F sensor 1 heater corresponding to the engine operating condition to keep the temperature of A/F sensor 1 element at the specified range.

CONSULT-II Reference Value in Data Monitor Mode

UBS00EUC

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F S1 HTR (B1) A/F S1 HTR (B2)	● Engine: After warming up, idle the engine	0 - 100%

On Board Diagnosis Logic

UBS00EUD

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1031 1031 (Bank 1) P1051 1051 (Bank 2)	Air fuel ratio (A/F) sensor 1 heater control circuit low	The current amperage in the heated air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated air fuel ratio (A/F) sensor 1 heater.)	● Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.) ● A/F sensor 1 heater
P1032 1032 (Bank 1) P1052 1052 (Bank 2)			
	Air fuel ratio (A/F) sensor 1 heater control circuit high	The current amperage in the heated air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated air fuel ratio (A/F) sensor 1 heater.)	● Harness or connectors (The A/F sensor 1 heater circuit is shorted.) ● A/F sensor 1 heater

DTC Confirmation Procedure

UBS00EUE

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:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

WITH CONSULT-II

- Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and let it idle for at least 10 seconds.
- If 1st trip DTC is detected, go to [EC-357, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

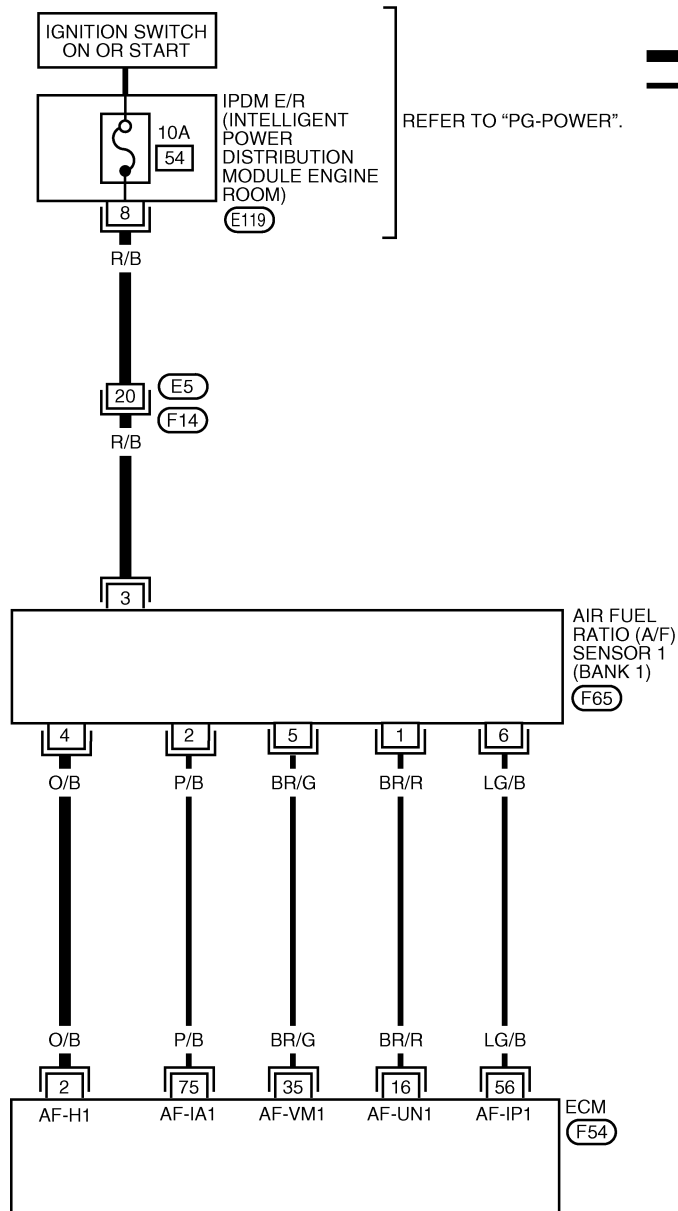
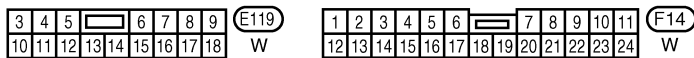
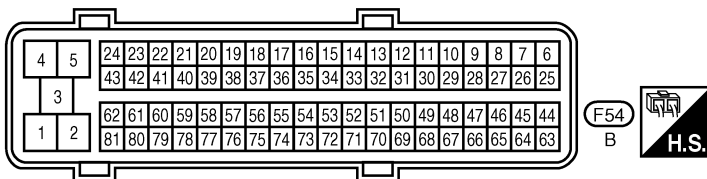
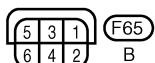
DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

UBS00EUF

Wiring Diagram BANK 1

EC-AF1HB1-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



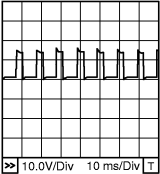
BBWA1370E

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

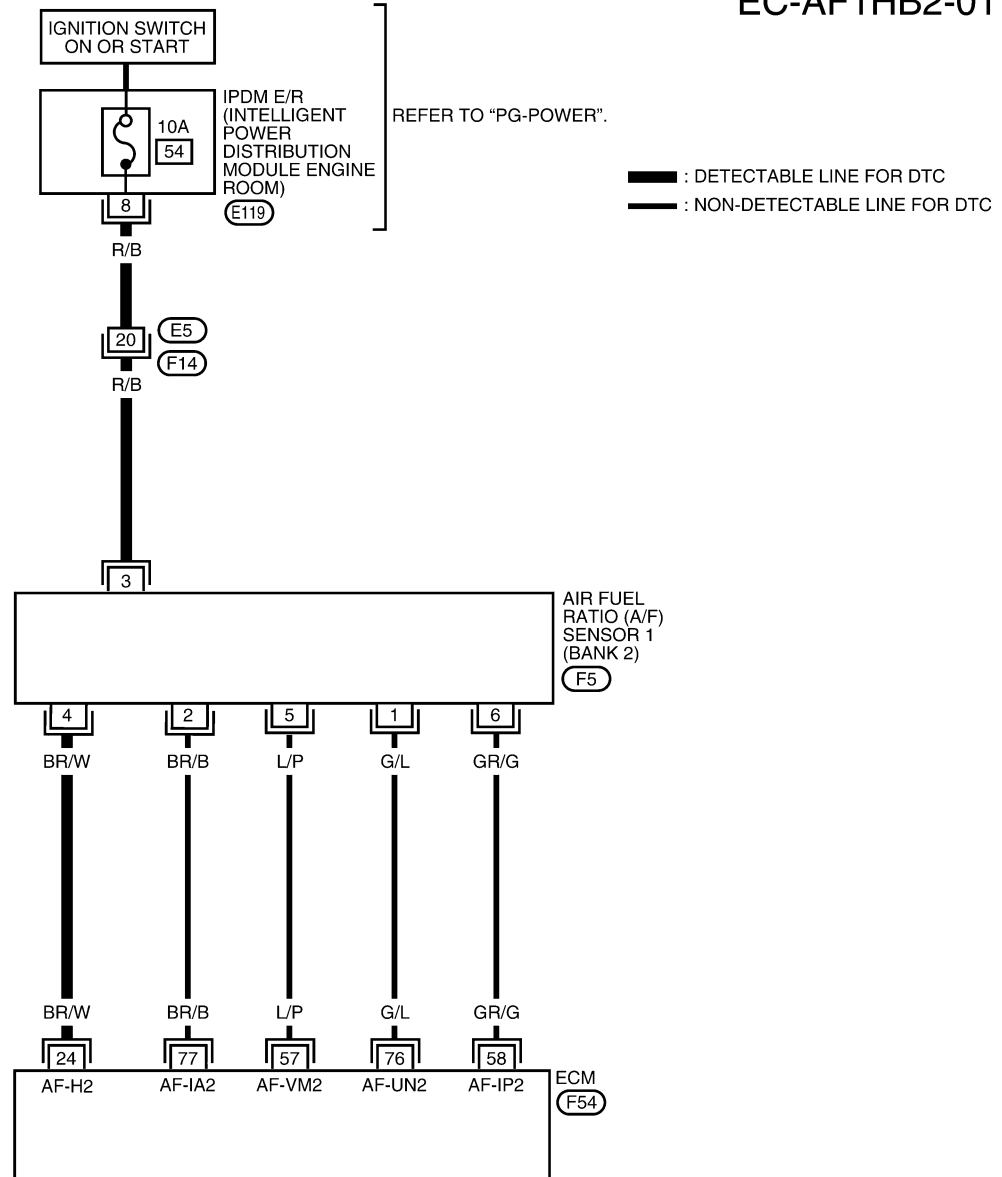
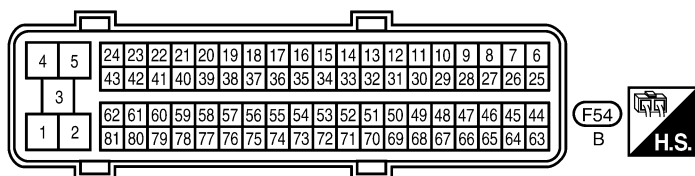
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	O/B	A/F sensor 1 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>Approximately 5V★</p>  <p>PBIB1584E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

BANK 2

EC-AF1HB2-01



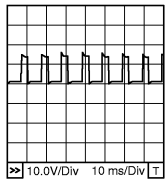
BBWA1201E

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

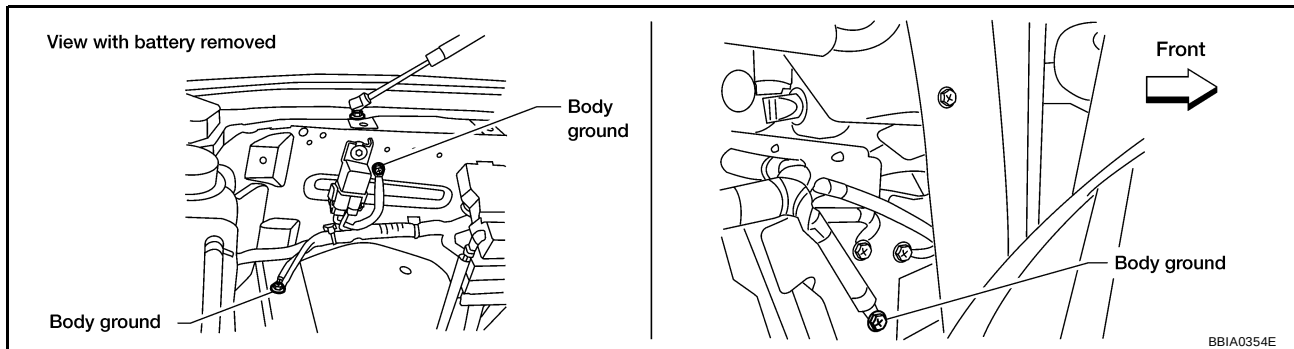
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	BR/W	A/F sensor 1 heater (Bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 5V★  <small>PBIB1584E</small>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

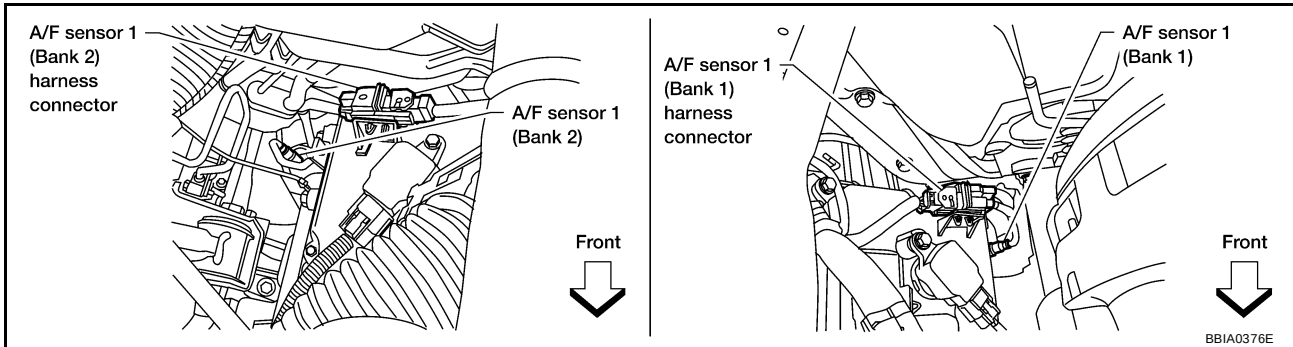
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect air fuel ratio (A/F) sensor 1 harness connector.

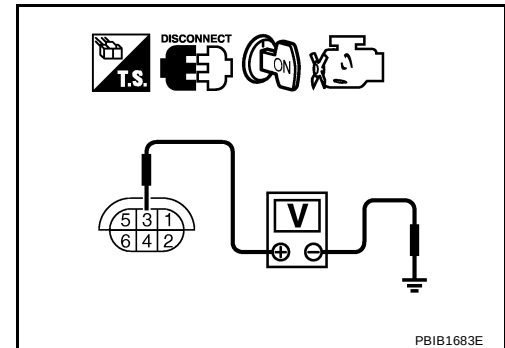


2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 2 (bank 1) or 24 (bank 2) and A/F sensor 1 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-359, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
NG >> Replace A/F sensor 1.

DTC P1031, P1032, P1051, P1052 A/F SENSOR 1 HEATER

6. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Component Inspection

AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Check resistance between terminals 3 and 4.

Resistance: 2.3 - 4.3Ω at 25°C (77°F)

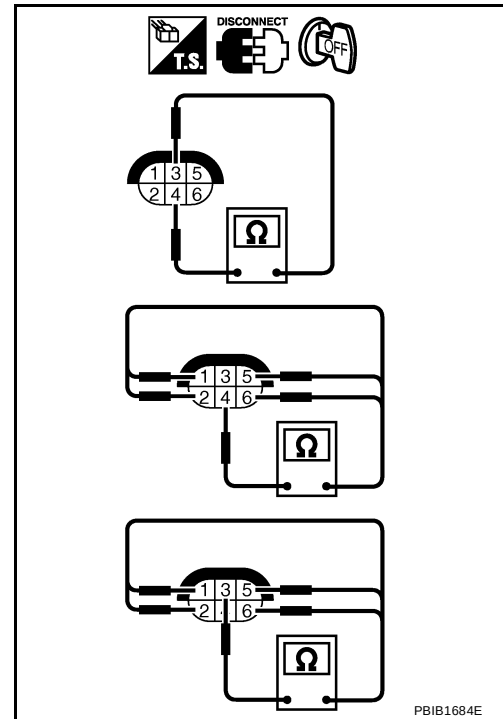
Check continuity between terminals 3 and 1, 2, 5, 6, terminals 4 and 1, 2, 5, 6.

Continuity should not exist.

If NG, replace the A/F sensor 1.

CAUTION:

- Discard any A/F 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.
- Before installing new A/F sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Removal and Installation

AIR FUEL RATIO (A/F) SENSOR 1

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P1065 ECM POWER SUPPLY

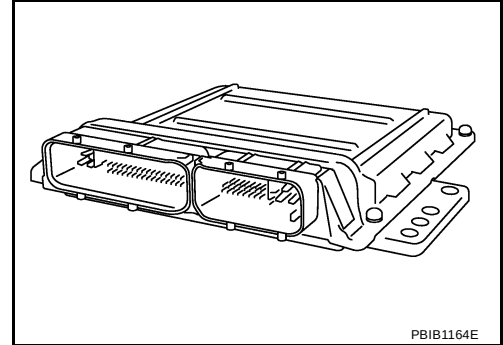
DTC P1065 ECM POWER SUPPLY

PFP:23710

Component Description

UBS00EIJ

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.



On Board Diagnosis Logic

UBS00EUK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none">● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.]● ECM

DTC Confirmation Procedure

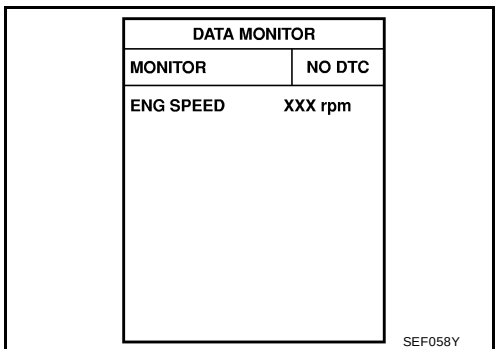
UBS00EUL

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.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Repeat steps 3 and 4 for 4 times.
6. If 1st trip DTC is detected, go to [EC-362, "Diagnostic Procedure"](#)



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

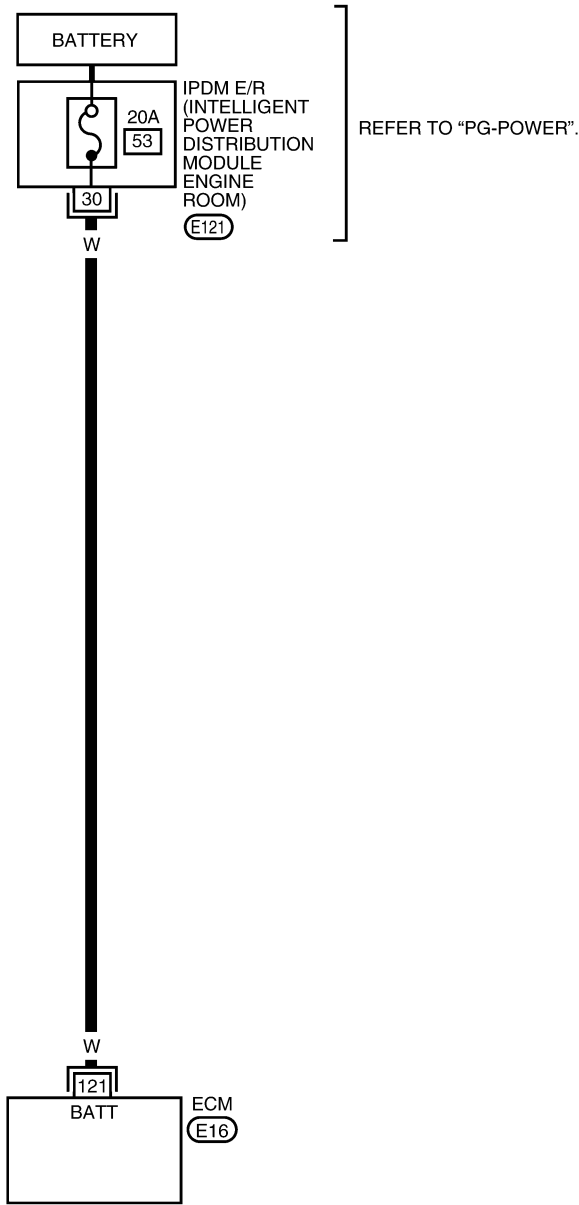
DTC P1065 ECM POWER SUPPLY

Wiring Diagram

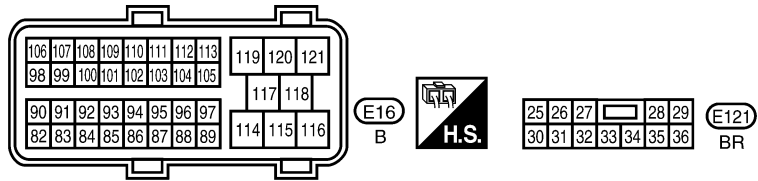
UBS00EUM

EC-ECM/PW-01

- A
- EC
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M



— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



BBWA1177E

DTC P1065 ECM POWER SUPPLY

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
121	W	Power supply for ECM (Back-up)	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EUN

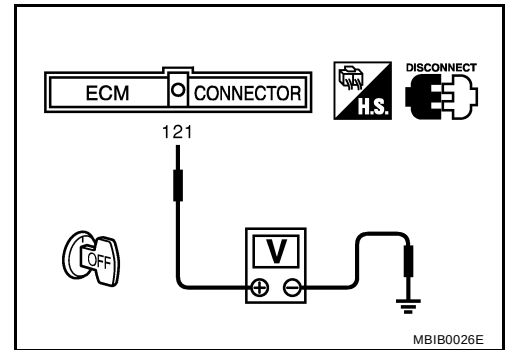
1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R connector E121
- 20A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace harness or connectors.

DTC P1065 ECM POWER SUPPLY

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-II

1. Turn ignition switch ON.
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform DTC Confirmation Procedure.**
See [EC-360, "DTC Confirmation Procedure"](#) .
5. Is the 1st trip DTC P1065 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform DTC Confirmation Procedure.**
See [EC-360, "DTC Confirmation Procedure"](#) .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes >> GO TO 5.

No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-138, "ECM Re-communicating Function"](#) .
3. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

Component Description

UBS00EU0

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

UBS00EUP

This self-diagnosis has one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	● Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

UBS00EUQ

NOTE:

- Perform **PROCEDURE FOR MALFUNCTION A AND B** first. If the DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION C**.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to D position and wait at least 2 seconds.
4. Shift selector lever to P position.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Turn ignition switch ON and wait at least 1 second.
7. Shift selector lever to D position and wait at least 2 seconds.
8. Shift selector lever to P position.
9. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
10. If DTC is detected, go to [EC-365, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to D position and wait at least 2 seconds.
4. Shift selector lever to N, P position.
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to [EC-365, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

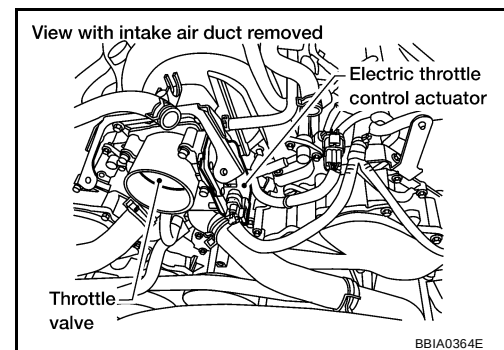
UBS00EUR

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

Description

UBS00EUS

NOTE:

If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to [EC-364](#) or [EC-372](#) .

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.

The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

UBS00EUT

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	<ul style="list-style-type: none">● Harness or connectors (Throttle control motor circuit is open or shorted)● Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

UBS00EUU

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:

Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

④ WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-368, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

UBS00EUV

EC-ETC1-01

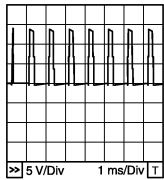
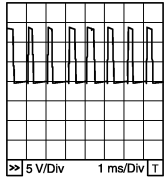


DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	L	Throttle control motor relay power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
4	L/W	Throttle control motor (Close)	[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Released	0 - 14V★  PBIB1104E
5	L/B	Throttle control motor (Open)	[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB1105E
104	O	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON]	0 - 1.0V

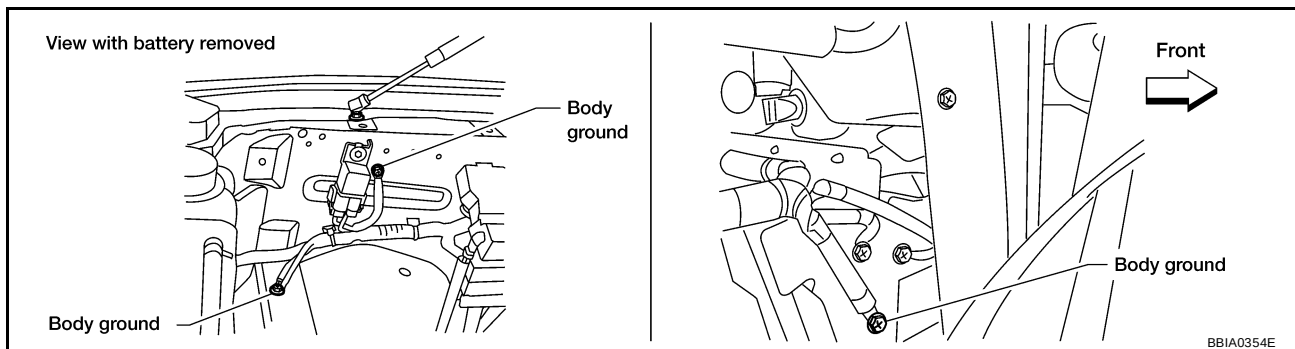
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS00EUW

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

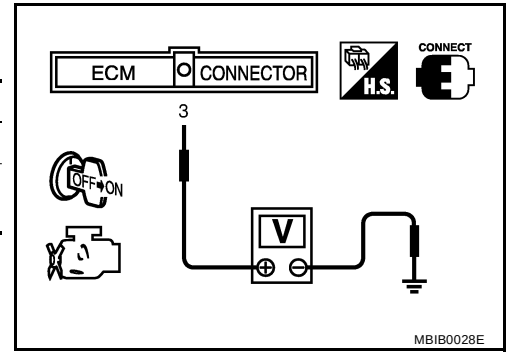
2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

OK or NG

- OK >> GO TO 9.
NG >> GO TO 3.



3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E119.
4. Check harness continuity between ECM terminal 3 and IPDM E/R terminal 6. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

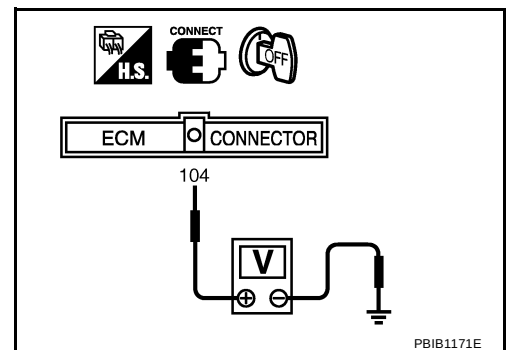
5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch OFF.
3. Check voltage between ECM terminal 104 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
NG >> GO TO 6.



DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E122.
3. Check harness continuity between ECM terminal 104 and IPDM E/R terminal 47.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUSE

1. Disconnect 20A fuse.
2. Check 20A fuse for blown.

OK or NG

OK >> GO TO 8.

NG >> Replace 20A fuse.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-16, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness or connectors.

9. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

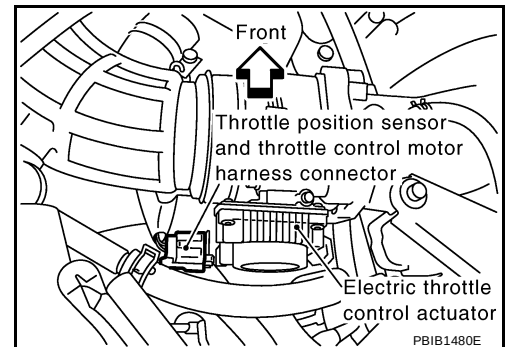
Electric throttle control actuator terminal	ECM terminal	Continuity
5	5	Should not exist
	4	Should exist
6	5	Should exist
	4	Should not exist

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace.



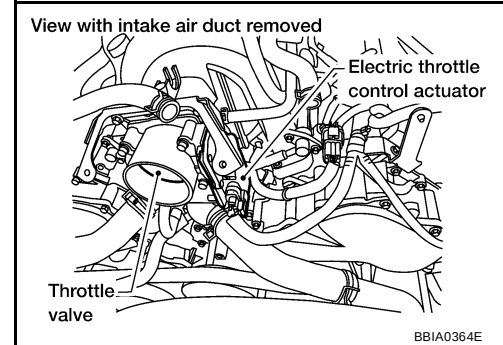
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

10. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 11.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



11. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-371, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
NG >> GO TO 13.

12. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 13.
NG >> Repair or replace harness or connectors.

13. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

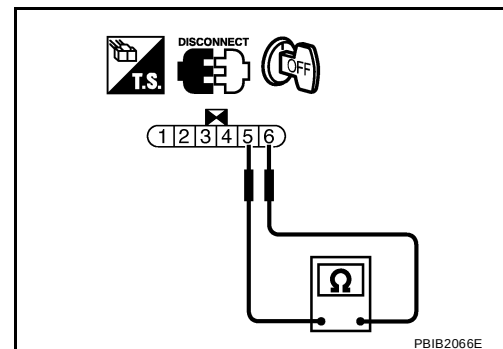
>> INSPECTION END

Component Inspection THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-44, "Idle Air Volume Learning"](#) .



Remove and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PDF:16119

Component Description

UBS00EUZ

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-II Reference Value in Data Monitor Mode

UBS00EV0

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

UBS00EV1

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	● Harness or connectors (Throttle control motor relay circuit is shorted) ● Throttle control motor relay
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	● Harness or connectors (Throttle control motor relay circuit is open) ● Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

UBS00EV2

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.

PROCEDURE FOR DTC P1124

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V when engine is running.

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If DTC is detected, go to [EC-375, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PROCEDURE FOR DTC P1126

With CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-375, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

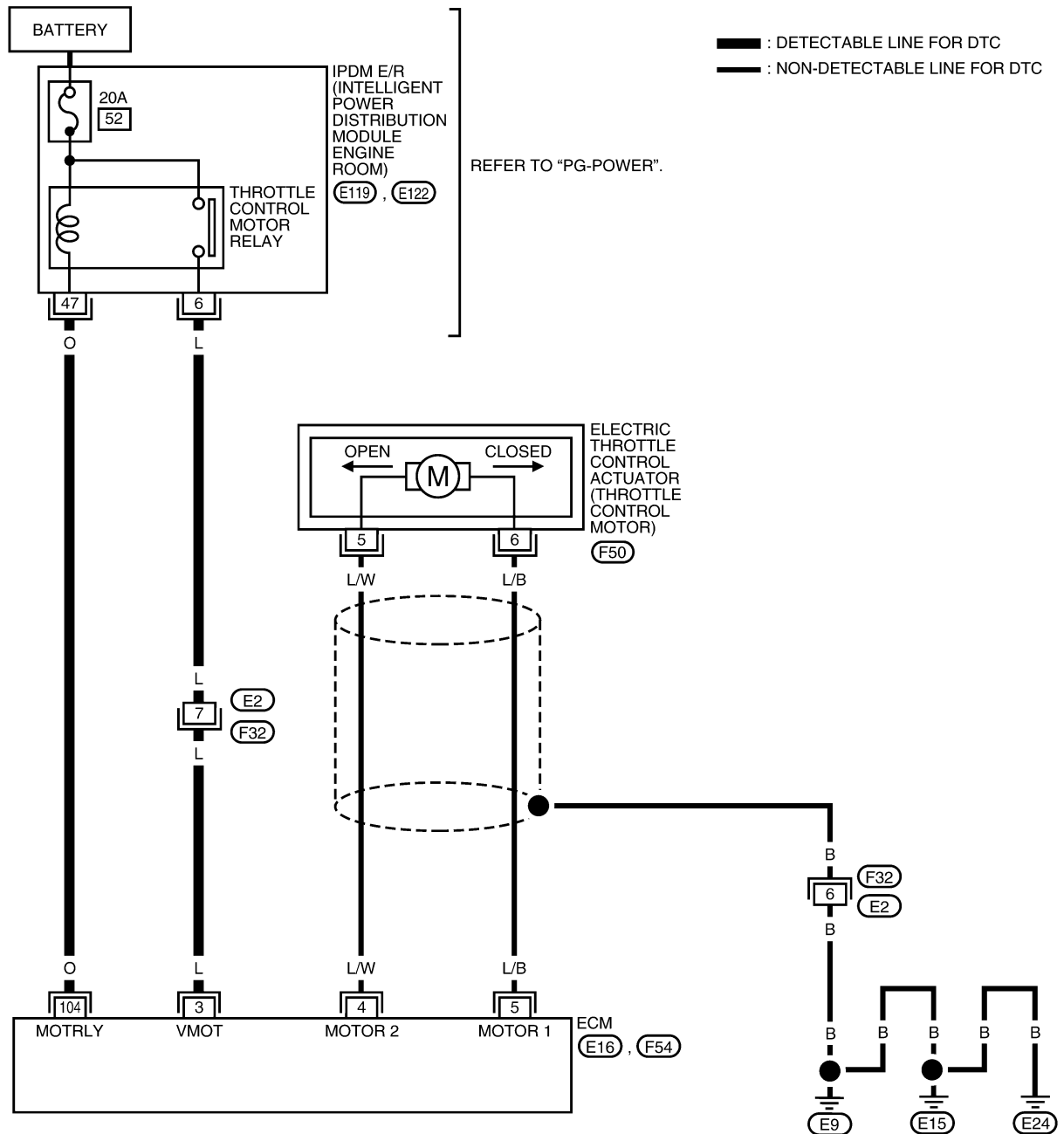
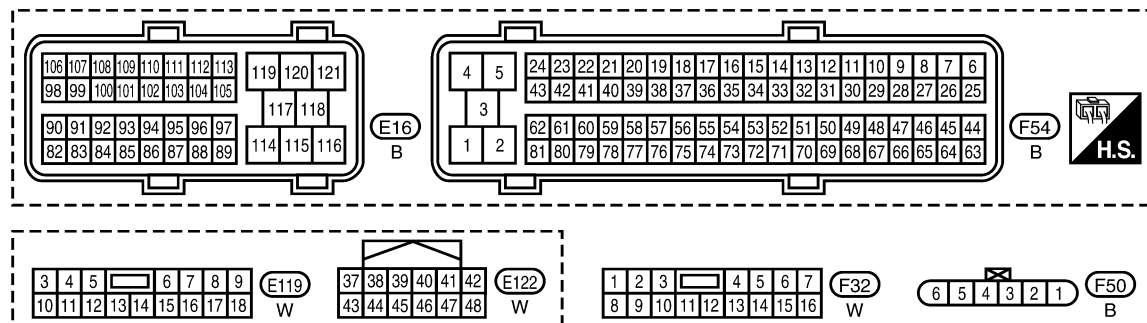
Follow the procedure "With CONSULT-II" above.

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Wiring Diagram

UBS00EV3

EC-ETC2-01



BBWA1179E

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	L	Throttle control motor relay power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
104	O	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON]	0 - 1.0V

Diagnostic Procedure

UBS00EV4

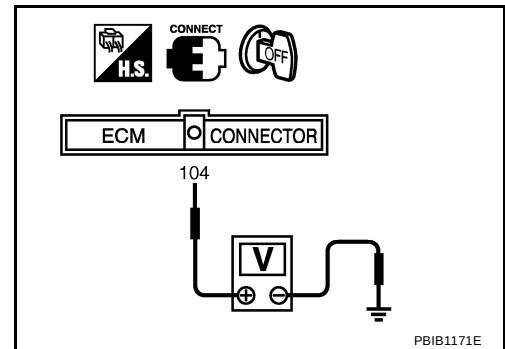
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 104 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E122.
3. Check continuity between ECM terminal 104 and IPDM E/R terminal 47. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUSE

1. Disconnect 20A fuse.
2. Check 20A fuse for blown.

OK or NG

- OK >> GO TO 7.
NG >> Replace 20A fuse.

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

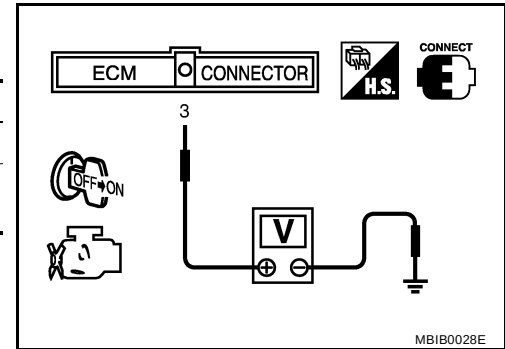
4. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

OK or NG

- OK >> GO TO 7.
NG >> GO TO 5.



5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E119.
4. Check continuity between ECM terminal 3 and IPDM E/R terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-16, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
NG >> Repair or replace harness or connectors.

DTC P1128 THROTTLE CONTROL MOTOR

DTC P1128 THROTTLE CONTROL MOTOR

PFP:16119

Component Description

UBS00EV5

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

UBS00EV6

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none">● Harness or connectors (Throttle control motor circuit is shorted.)● Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

UBS00EV7

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.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-379, "Diagnostic Procedure"](#) .

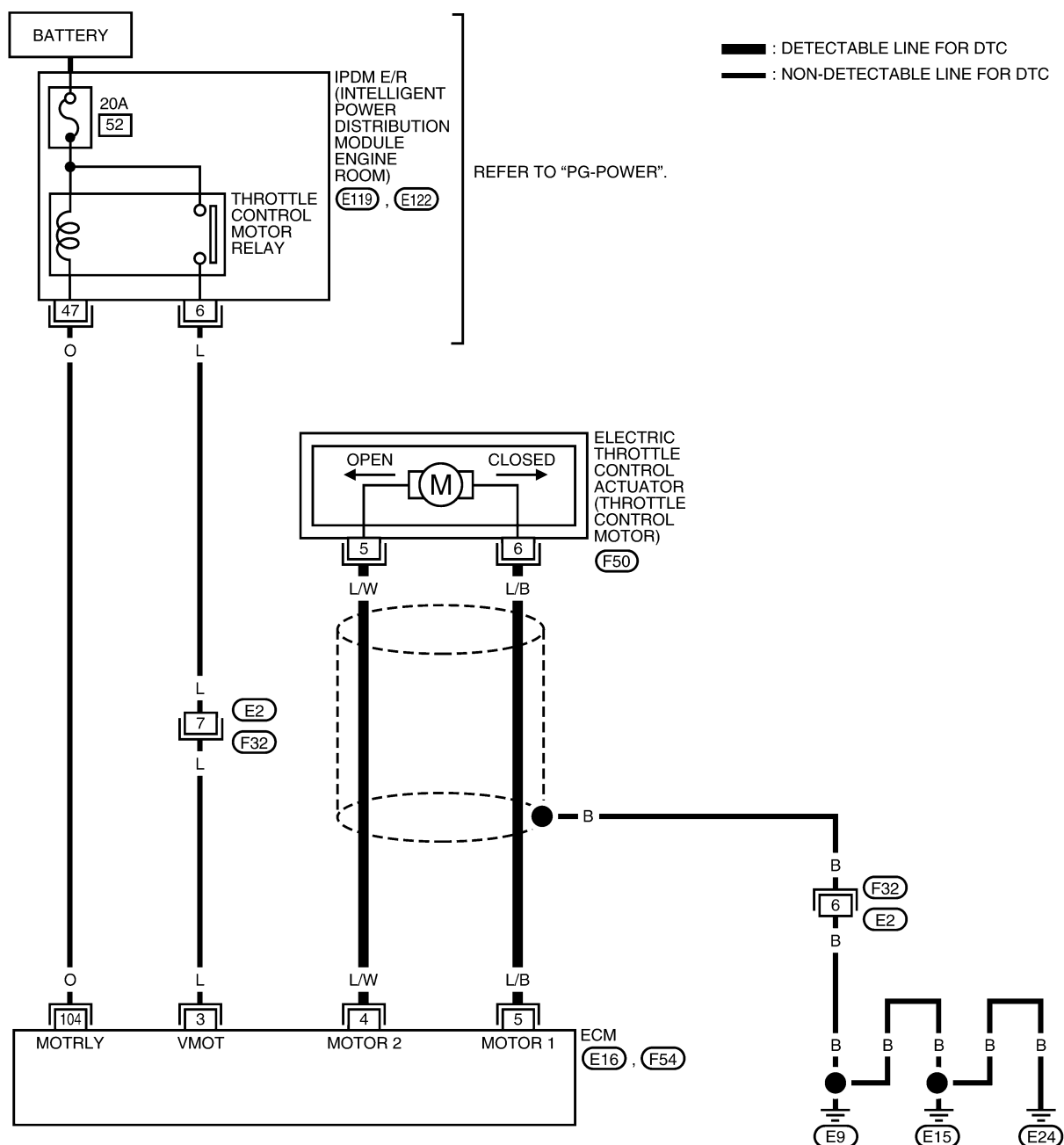
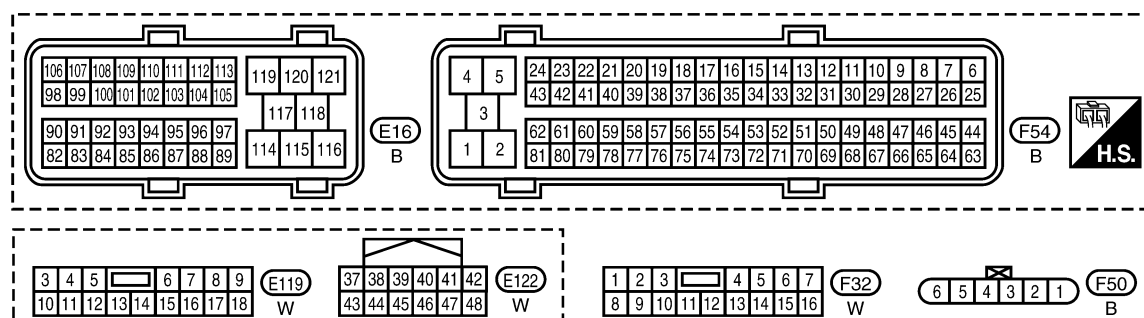
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
SEF058Y	

WITH GST

Follow the procedure "WITH CONSULT-II" above.

UBS00EV8

EC-ETC3-01



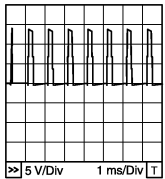
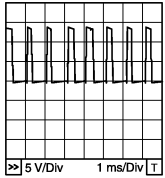
BBWA1180F

DTC P1128 THROTTLE CONTROL MOTOR

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	L/W	Throttle control motor (Close)	[Ignition switch: ON] <ul style="list-style-type: none"> ● Engine stopped ● Shift lever: D ● Accelerator pedal: Released 	0 - 14V★  <small>PBIB1104E</small>
5	L/B	Throttle control motor (Open)	[Ignition switch: ON] <ul style="list-style-type: none"> ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully depressed 	0 - 14V★  <small>PBIB1105E</small>

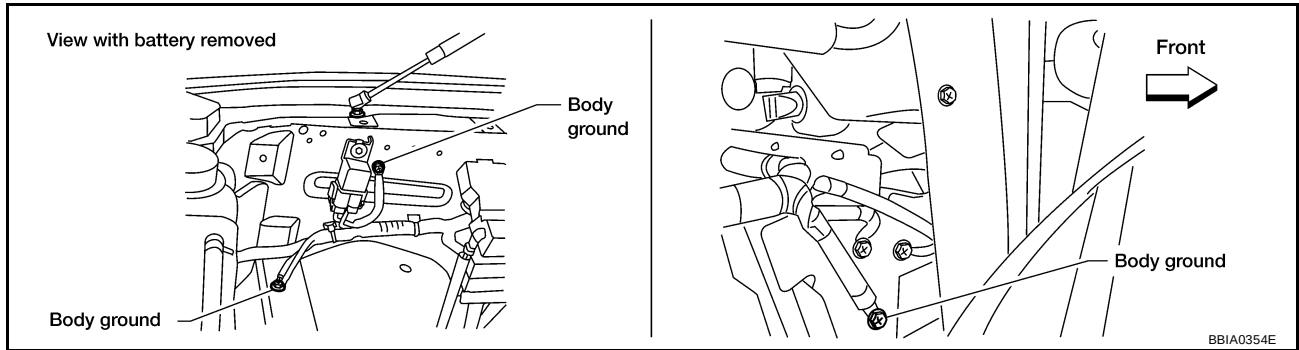
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS00EV9

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

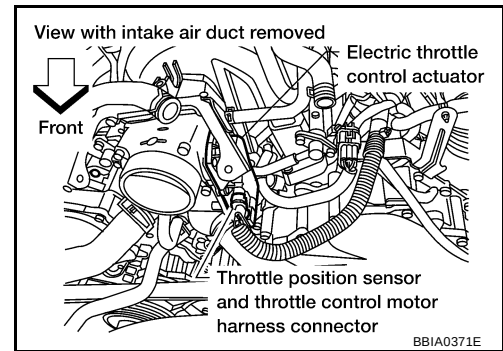
- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1128 THROTTLE CONTROL MOTOR

2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect electric throttle control actuator harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
5	5	Should not exist
	4	Should exist
6	5	Should exist
	4	Should not exist



4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-380, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

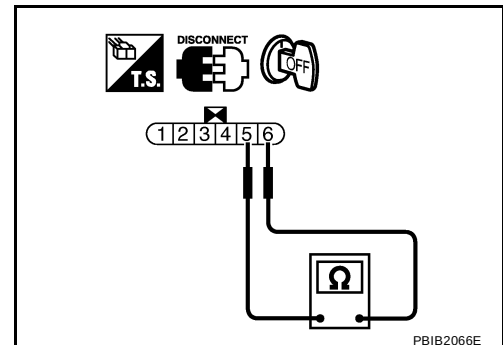
Component Inspection THROTTLE CONTROL MOTOR

UBS00EVA

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-44, "Idle Air Volume Learning"](#) .



DTC P1128 THROTTLE CONTROL MOTOR

Removal and Installation

ELECTRIC THROTTLE CONTROL ACTUATOR

UBS00EVB

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

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DTC P1146, P1166 HO2S2

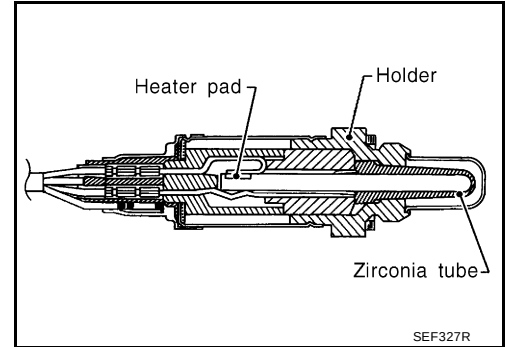
Component Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

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

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



UBS00EVC

CONSULT-II Reference Value in Data Monitor Mode

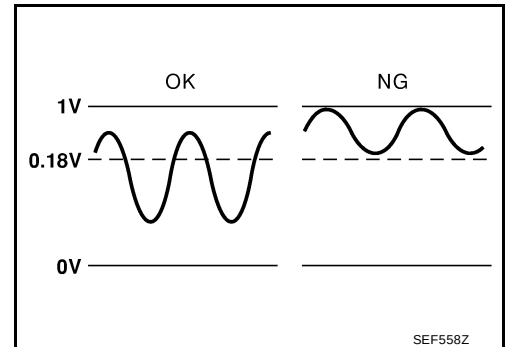
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> Warm-up condition After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ↔ RICH

UBS00EVD

On Board Diagnosis Logic

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



UBS00EVE

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146 1146 (Bank 1)	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted)
P1166 1166 (Bank 2)			<ul style="list-style-type: none"> Heated oxygen sensor 2 Fuel pressure Injectors

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.

WITH CONSULT-II

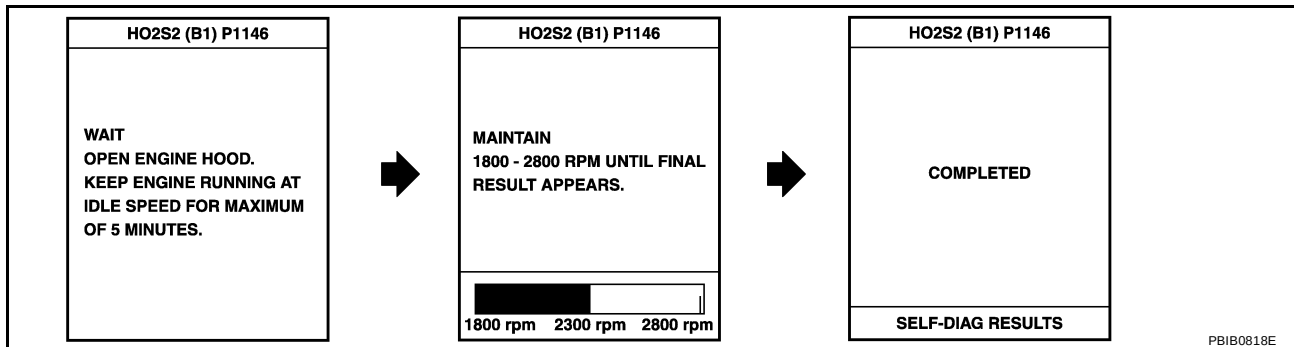
TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" or "HO2S2 (B2) P1166" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y



10. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, refer to [EC-388, "Diagnostic Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

Overall Function Check

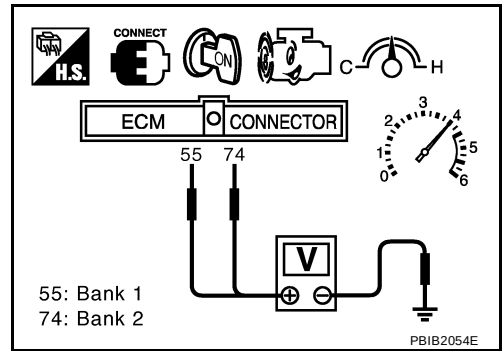
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.

DTC P1146, P1166 HO2S2

6. 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.)
The voltage should be below 0.18V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. 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.
The voltage should be below 0.18V at least once during this procedure.
8. If NG, go to [EC-388, "Diagnostic Procedure"](#) .

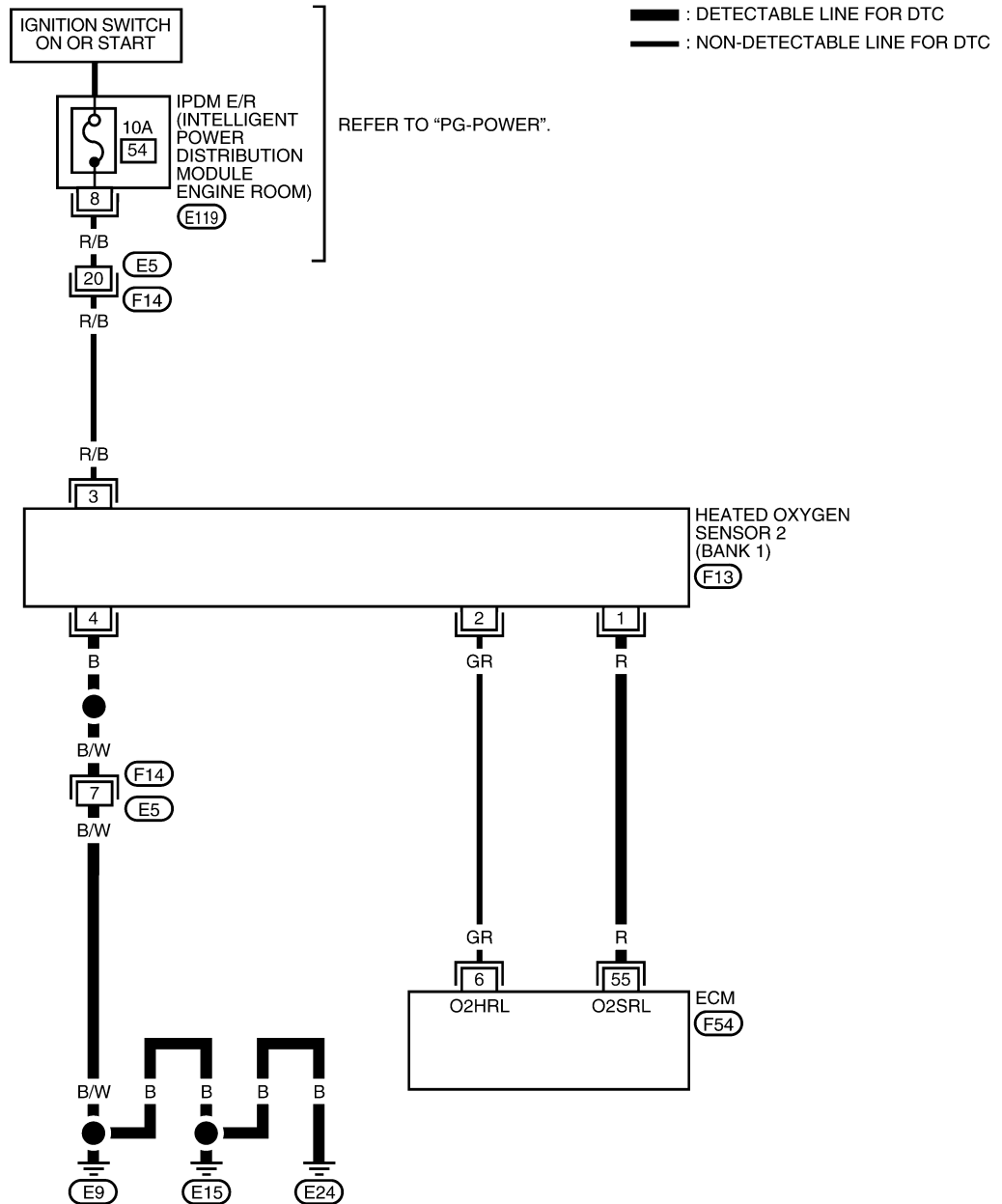
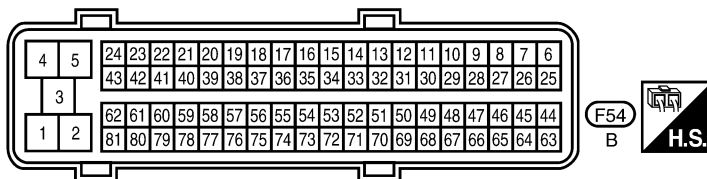


DTC P1146, P1166 HO2S2

Wiring Diagram BANK 1

UBS00EVH

EC-O2S2B1-01



BBWA1136E

DTC P1146, P1166 HO2S2

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

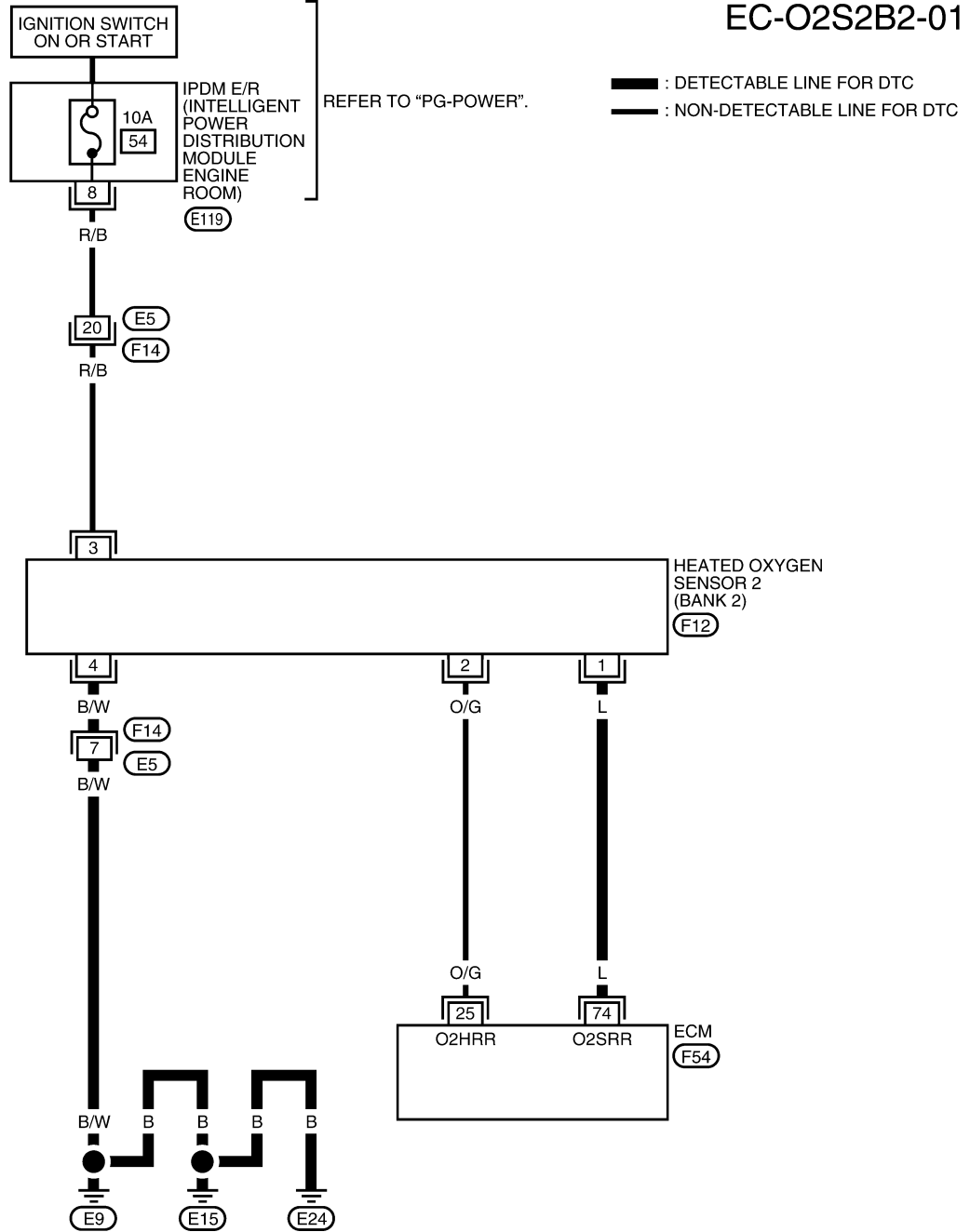
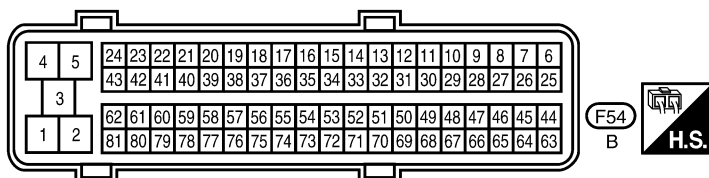
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

DTC P1146, P1166 HO2S2

BANK 2

EC-O2S2B2-01



BBWA1159E

DTC P1146, P1166 HO2S2

Specification data are reference values and are 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.

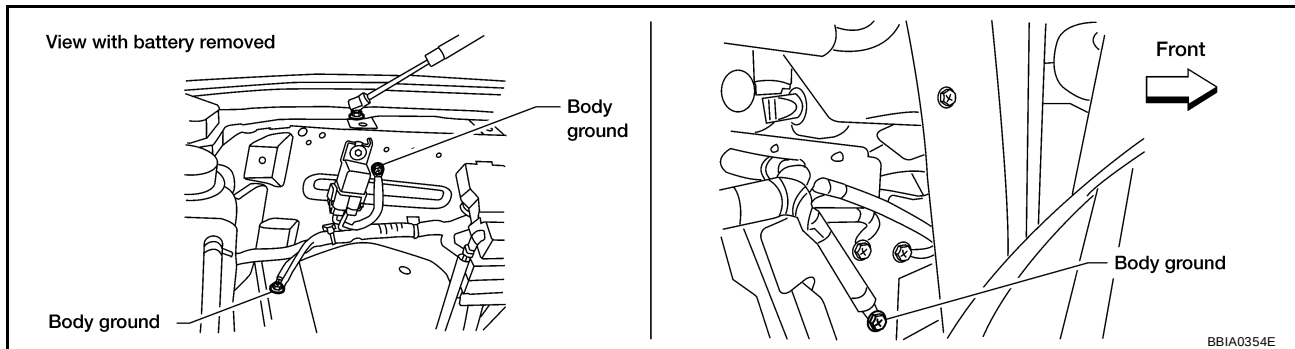
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	L	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

Diagnostic Procedure

UBS00EVI

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

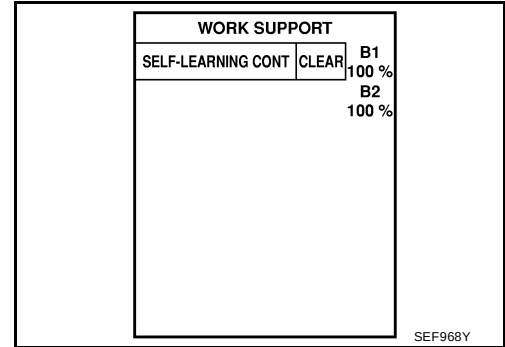
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

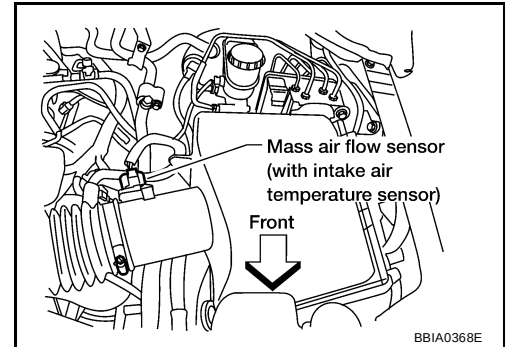
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 or P0175 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 or P0175 detected?
Is it difficult to start engine?



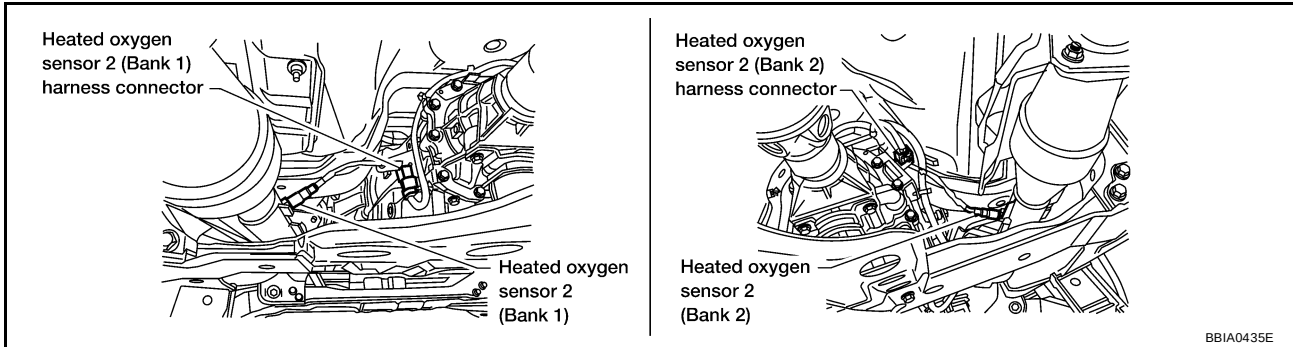
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172, P0175. Refer to [EC-216](#).
- No >> GO TO 3.

DTC P1146, P1166 HO2S2

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.



3. Check harness continuity between HO2S2 terminal 4 and body ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F14, E5
- Harness for open or short between HO2S2 and body ground

>> Repair open circuit or short to power in harness or connectors.

DTC P1146, P1166 HO2S2

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1146	55	1	1
P1166	74	1	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1146	55	1	1
P1166	74	1	2

Continuity should not exist.

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-391, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning heated oxygen sensor 2.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 2

UBS00EVJ

With CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

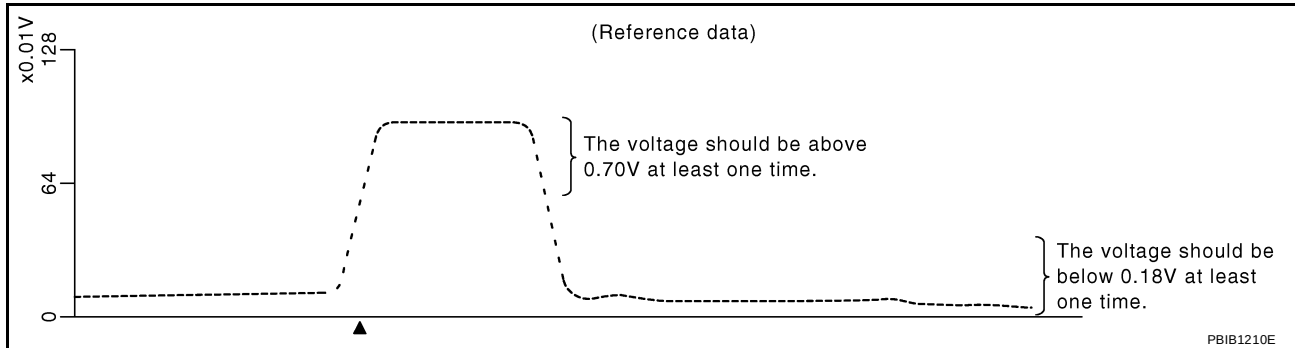
DTC P1146, P1166 HO2S2

6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S2 (B1)	XXX V
HO2S2 (B2)	XXX V

PBIB1672E

7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)/(B2)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.

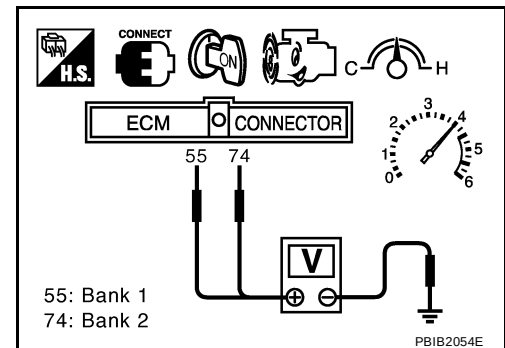
"HO2S2 (B1)/(B2)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

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.
- 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.

⊗ Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.
6. 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.)
The voltage should be above 0.70V at least once during this procedure.
If the voltage is above 0.70V at step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
The voltage should be below 0.18V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



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.
- 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.

Removal and Installation
HEATED OXYGEN SENSOR 2

UBS00EVK

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

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DTC P1147, P1167 HO2S2

PFP:226A0

Component Description

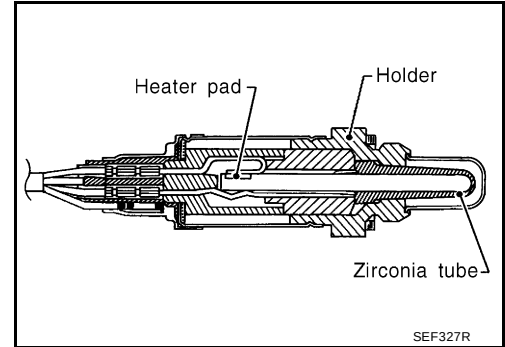
UBS00EVL

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

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

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EVM

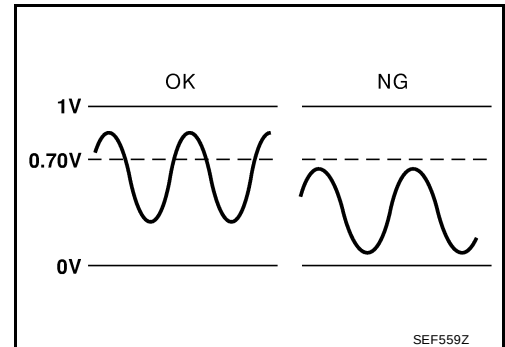
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> Warm-up condition After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V $\longleftrightarrow$ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN $\longleftrightarrow$ RICH

On Board Diagnosis Logic

UBS00EVM

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147 1147 (Bank 1)	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Heated oxygen sensor 2 Fuel pressure Injectors Intake air leaks
P1167 1167 (Bank 2)			

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.

WITH CONSULT-II

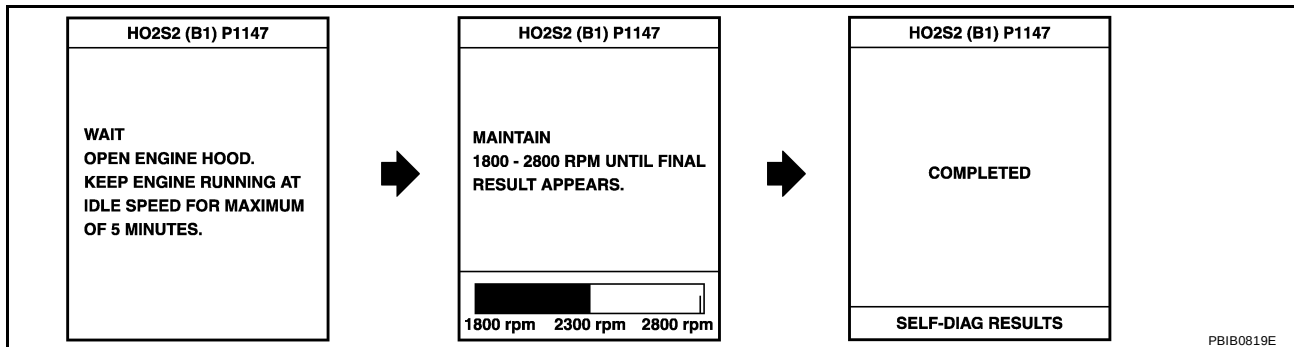
TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" or "HO2S2 (B2) P1167" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y



10. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, refer to [EC-400, "Diagnostic Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

Overall Function Check

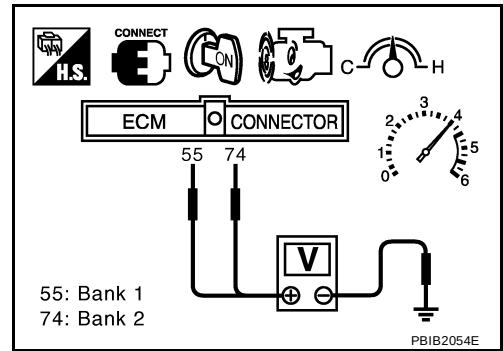
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.

DTC P1147, P1167 HO2S2

6. 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.)
The voltage should be above 0.70V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. 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.
The voltage should be above 0.70V at least once during this procedure.
8. If NG, go to [EC-400, "Diagnostic Procedure"](#) .

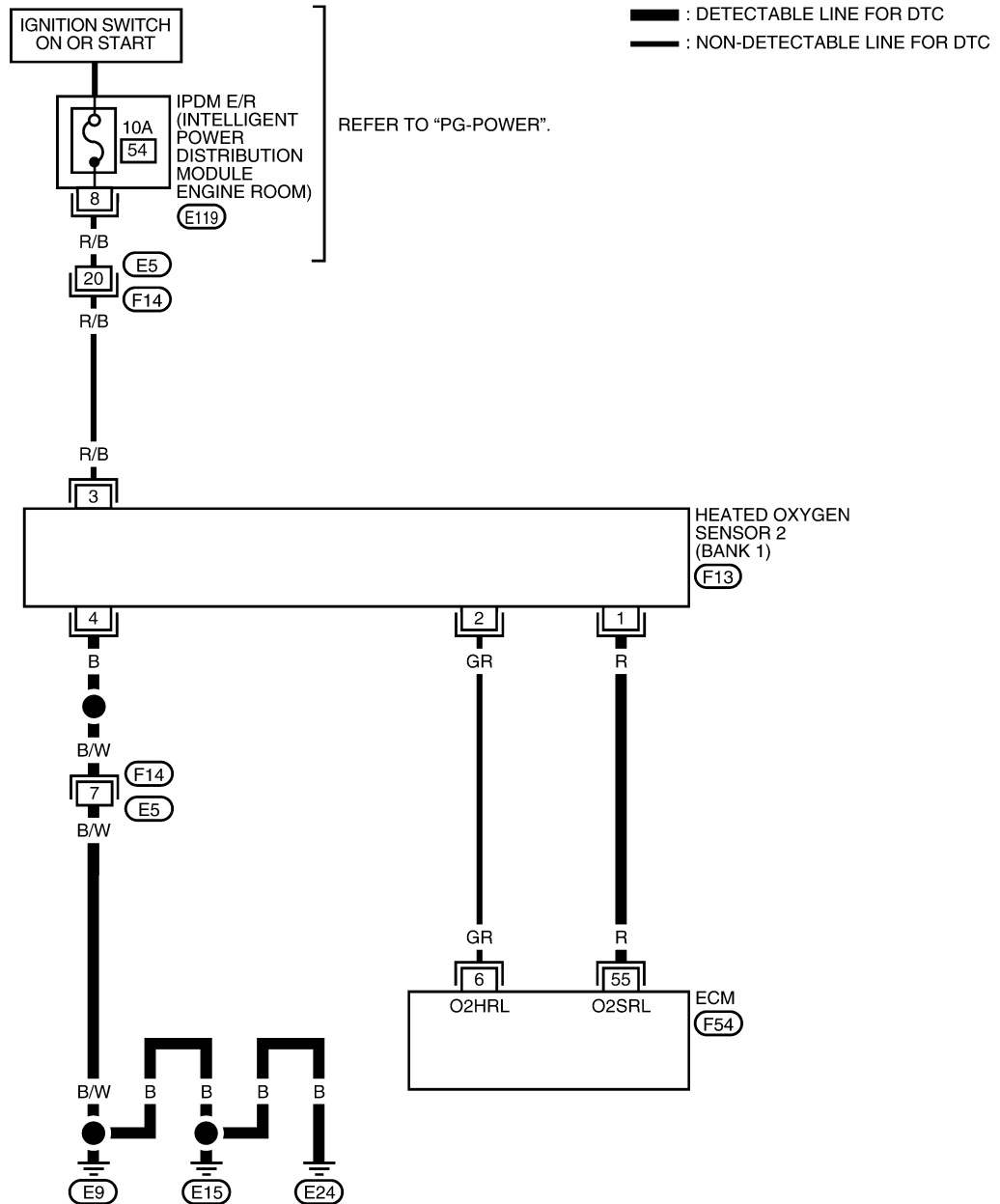
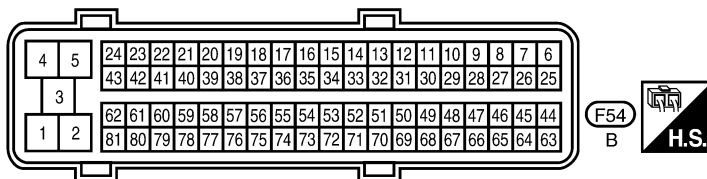


DTC P1147, P1167 HO2S2

Wiring Diagram BANK 1

UBS00EVQ

EC-O2S2B1-01



BBWA1136E

DTC P1147, P1167 HO2S2

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

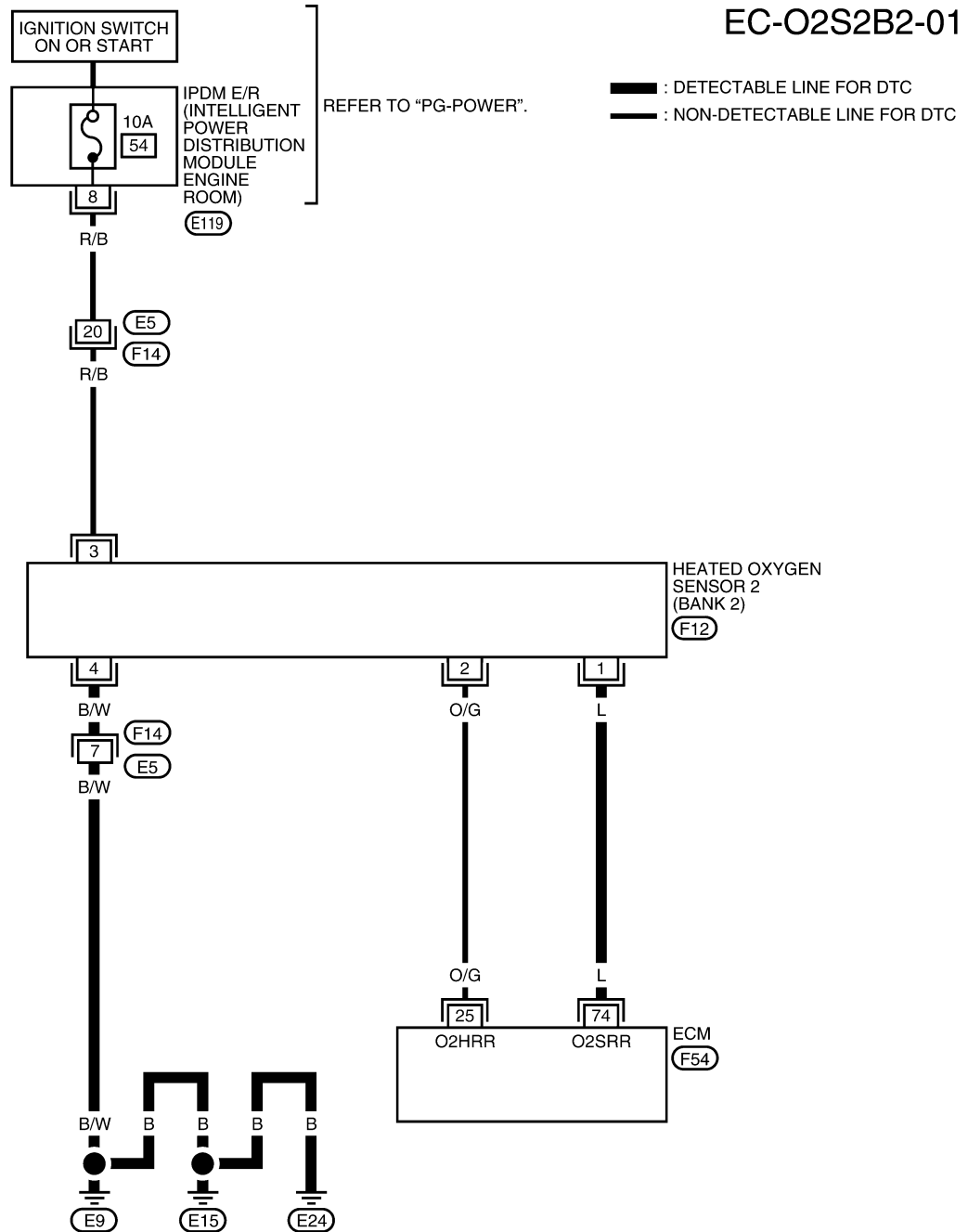
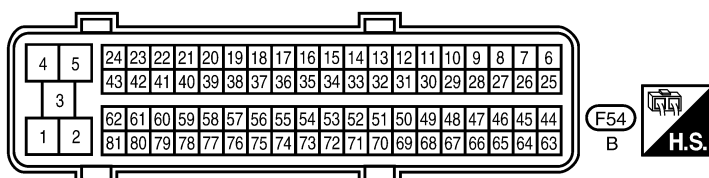
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

DTC P1147, P1167 HO2S2

BANK 2

EC-O2S2B2-01



BBWA1159E

DTC P1147, P1167 HO2S2

Specification data are reference values and are 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.

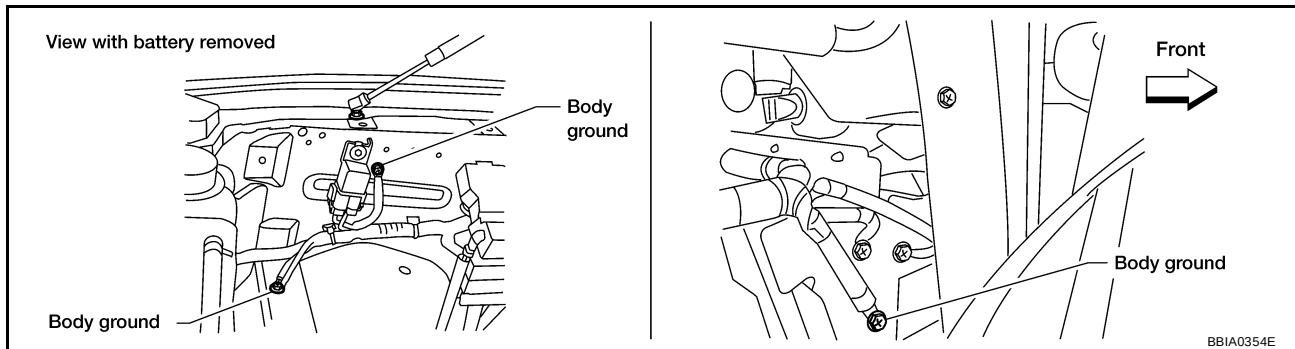
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	L	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Revving engine from idle to 3,000 rpm quickly after the following conditions are met<ul style="list-style-type: none">– After keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V

Diagnostic Procedure

UBS00EVR

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

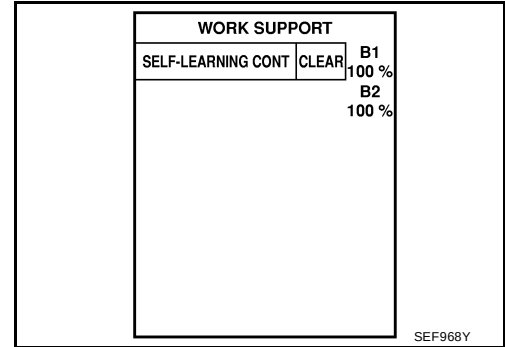
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

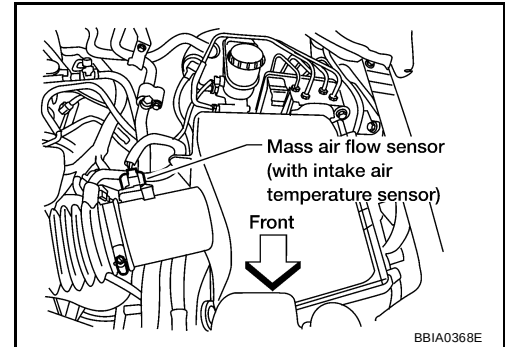
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. 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?



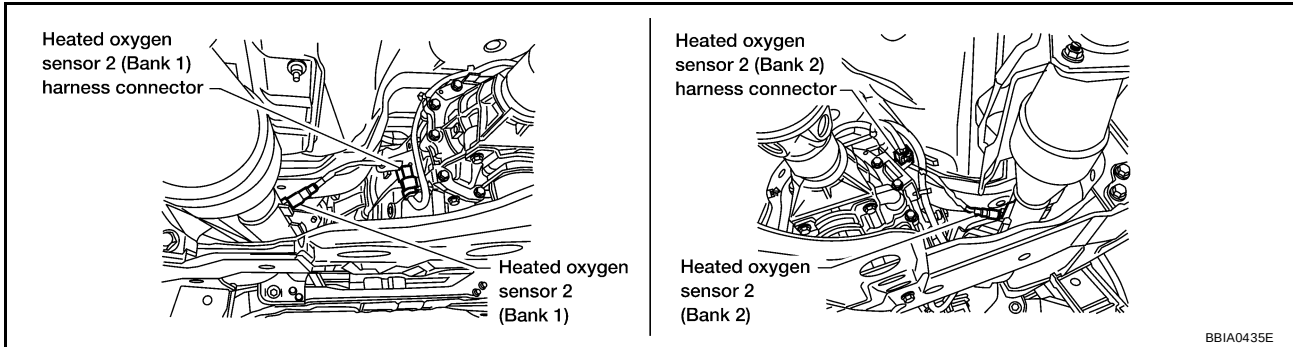
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0174. Refer to [EC-207](#).
- No >> GO TO 3.

DTC P1147, P1167 HO2S2

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.



3. Check harness continuity between HO2S2 terminal 4 and body ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F14, E5
- Harness for open or short between HO2S2 and body ground

>> Repair open circuit or short to power in harness or connectors.

DTC P1147, P1167 HO2S2

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1147	55	1	1
P1167	74	1	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1147	55	1	1
P1167	74	1	2

Continuity should not exist.

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-403, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning heated oxygen sensor 2.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 2

UBS00EVS

With CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

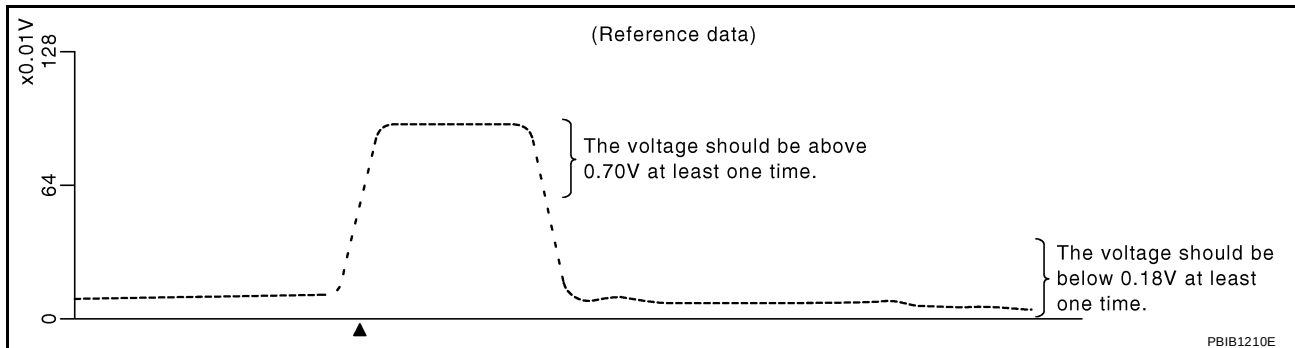
DTC P1147, P1167 HO2S2

6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S2 (B1)	XXX V
HO2S2 (B2)	XXX V

PBIB1672E

7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)/(B2)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.

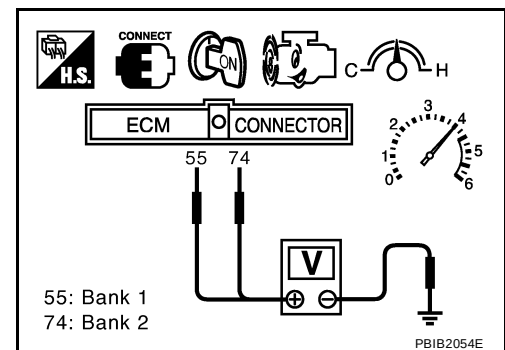
"HO2S2 (B1)/(B2)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

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.
- 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.

⊗ Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 55 [HO2S2 (B1) signal] or 74 [HO2S2 (B2) signal] and ground.
6. 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.)
The voltage should be above 0.70V at least once during this procedure.
If the voltage is above 0.70V at step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
The voltage should be below 0.18V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



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.
- 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.

Removal and Installation
HEATED OXYGEN SENSOR 2

UBS00EVT

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

EC

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DTC P1148, P1168 CLOSED LOOP CONTROL

DTC P1148, P1168 CLOSED LOOP CONTROL

PFP:22690

On Board Diagnosis Logic

UBS00EVU

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148 (Bank 1)	Closed loop control function	The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none">● Harness or connectors [The air fuel ratio (A/F) sensor 1 circuit is open or shorted.]● Air fuel ratio (A/F) sensor 1● Air fuel ratio (A/F) sensor 1 heater
P1168 1168 (Bank 2)		The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition.	

DTC P1148 or P1168 is displayed with another DTC for air fuel ratio (A/F) sensor 1.

Perform the trouble diagnosis for the corresponding DTC.

DTC P1211 TCS CONTROL UNIT

DTC P1211 TCS CONTROL UNIT

PFP:47850

Description

UBS00EVV

The malfunction information related to TCS is transferred through the CAN communication line from "ABS actuator and electric unit (control unit)" to ECM.

Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

On Board Diagnosis Logic

UBS00EVV

Freeze frame data is not stored in the ECM for this self-diagnosis. The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	TCS control unit	ECM receives a malfunction information from "ABS actuator electric unit (control unit)"	<ul style="list-style-type: none">● ABS actuator and electric unit (control unit)● TCS related parts

DTC Confirmation Procedure

UBS00EVX

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

① WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 60 seconds.
4. If 1st trip DTC is detected, go to [EC-407, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

② WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00EVV

Go to [BRC-101, "TROUBLE DIAGNOSIS"](#) .

DTC P1212 TCS COMMUNICATION LINE

DTC P1212 TCS COMMUNICATION LINE

PFP:47850

Description

UBS00EVZ

NOTE:

If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and "ABS actuator and electric unit (control unit)".

Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

On Board Diagnosis Logic

UBS00EW0

Freeze frame data is not stored in the ECM for this self-diagnosis.

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from "ABS actuator and electric unit (control unit)" continuously.	<ul style="list-style-type: none">● Harness or connectors (The CAN communication line is open or shorted.)● ABS actuator and electric unit (control unit)● Dead (Weak) battery

DTC Confirmation Procedure

UBS00EW1

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

Ⓟ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. If a 1st trip DTC is detected, go to [EC-408, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

Ⓢ WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00EW2

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) FUNCTION

Refer to [BRC-101, "TROUBLE DIAGNOSIS"](#) .

>> INSPECTION END

DTC P1217 ENGINE OVER TEMPERATURE

DTC P1217 ENGINE OVER TEMPERATURE

PFP:00000

Description SYSTEM DESCRIPTION

UBS00EW3

NOTE:

If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

Cooling Fan Control

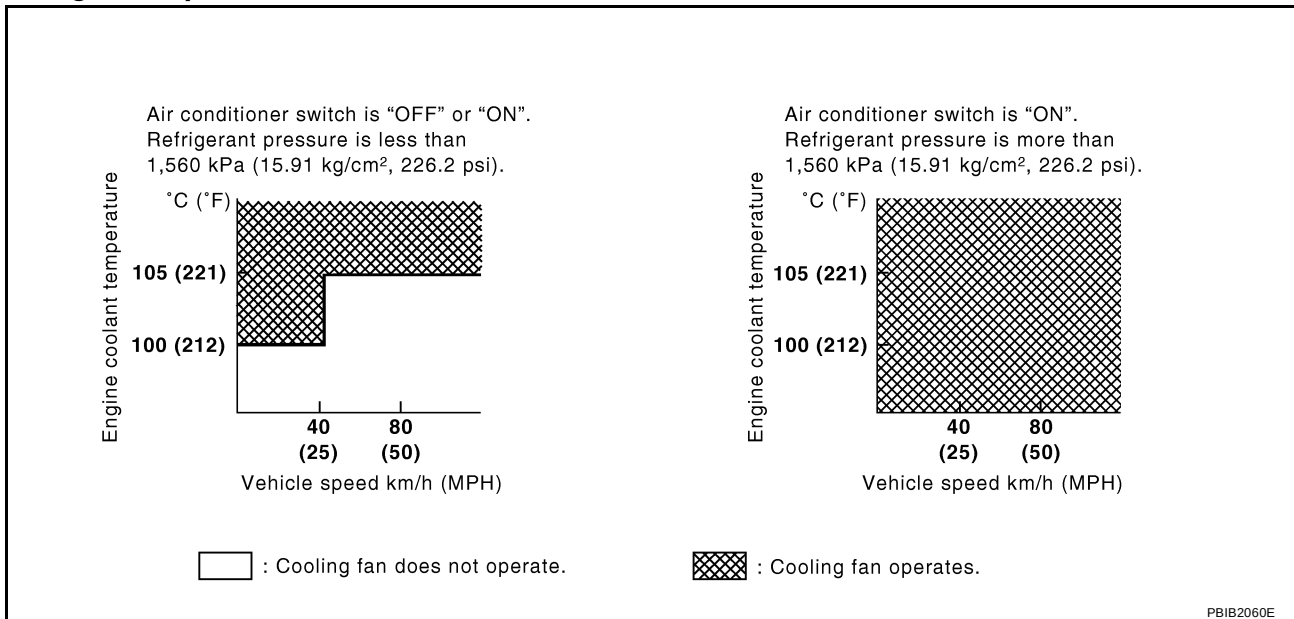
Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R (Cooling fan relay)
Battery	Battery voltage*1		
Wheel sensor*2	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 2-step control [ON/OFF].

Cooling Fan Operation



CONSULT-II Reference Value in Data Monitor Mode

UBS00EW4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	● Engine: After warming up, idle the engine	Engine coolant temperature is 99°C (210°F) or less	OFF
		Engine coolant temperature is 100°C (212°F) or more	ON

DTC P1217 ENGINE OVER TEMPERATURE

On Board Diagnosis Logic

UBS00EW5

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none">● Cooling fan does not operate properly (Overheat).● Cooling fan system does not operate properly (Overheat).● Engine coolant was not added to the system using the proper filling method.● Engine coolant is not within the specified range.	<ul style="list-style-type: none">● Harness or connectors (The cooling fan circuit is open or shorted.)● Cooling fan● Radiator hose● Radiator● Radiator cap● Water pump● Thermostat <p>For more information, refer to EC-417, "Main 12 Causes of Overheating" .</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-9, "Changing Engine Coolant"](#) . Also, replace the engine oil. Refer to [LU-8, "Changing Engine Oil"](#) .

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-12, "ANTI-FREEZE COOLANT MIXTURE RATIO"](#) .
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

UBS00EW6

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

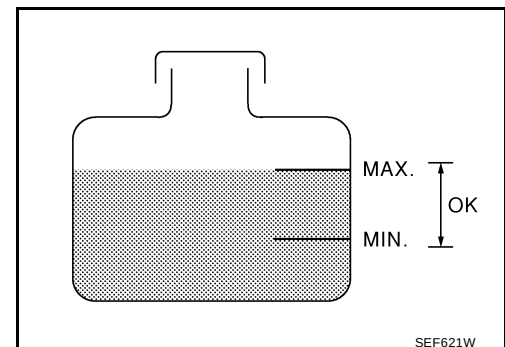
WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

WITH CONSULT-II

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-414, "Diagnostic Procedure"](#) .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-414, "Diagnostic Procedure"](#) .
3. Turn ignition switch ON.



DTC P1217 ENGINE OVER TEMPERATURE

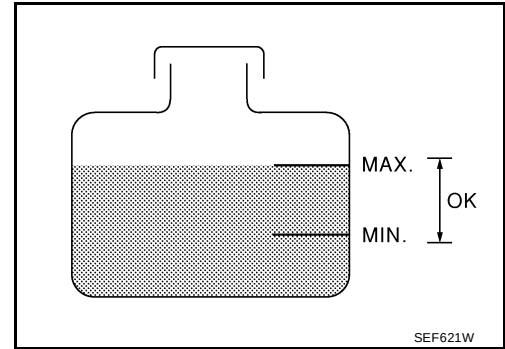
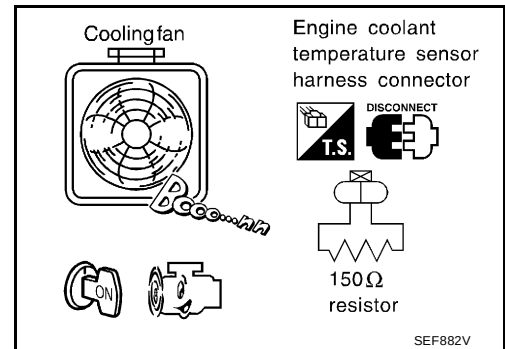
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to [EC-414, "Diagnostic Procedure"](#) .

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

SEF646X

WITH GST

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
 If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-414, "Diagnostic Procedure"](#) .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-414, "Diagnostic Procedure"](#) .
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Start engine and make sure that cooling fan operates at higher speed than low speed.
Be careful not to overheat engine.
6. If NG, go to [EC-414, "Diagnostic Procedure"](#) .

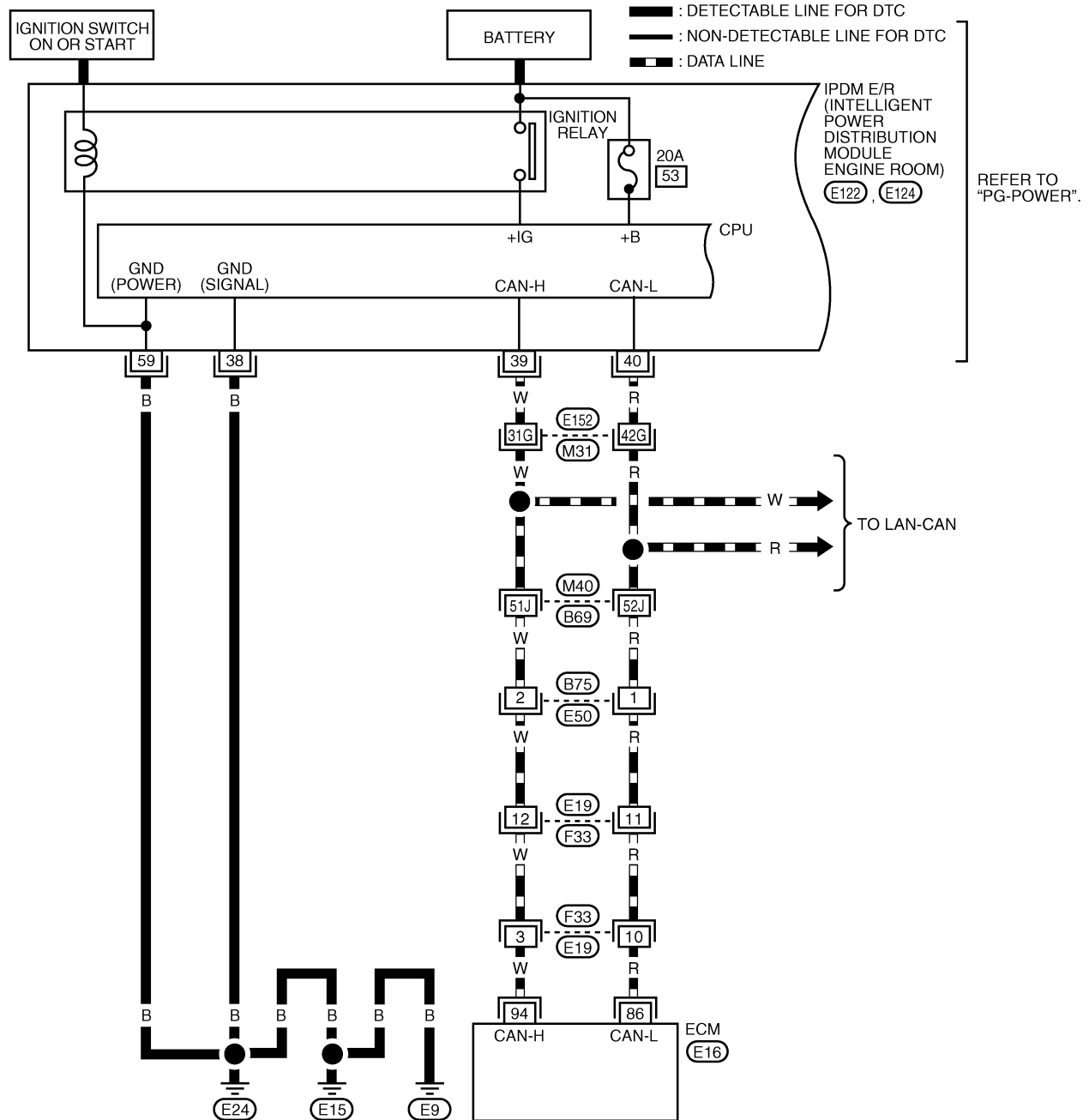
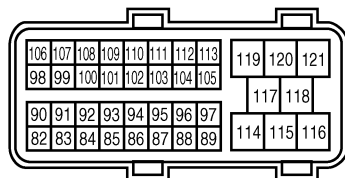
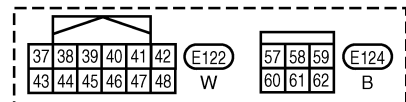
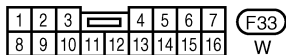


DTC P1217 ENGINE OVER TEMPERATURE

UBS00EW7

Wiring Diagram

EC-COOL/F-01



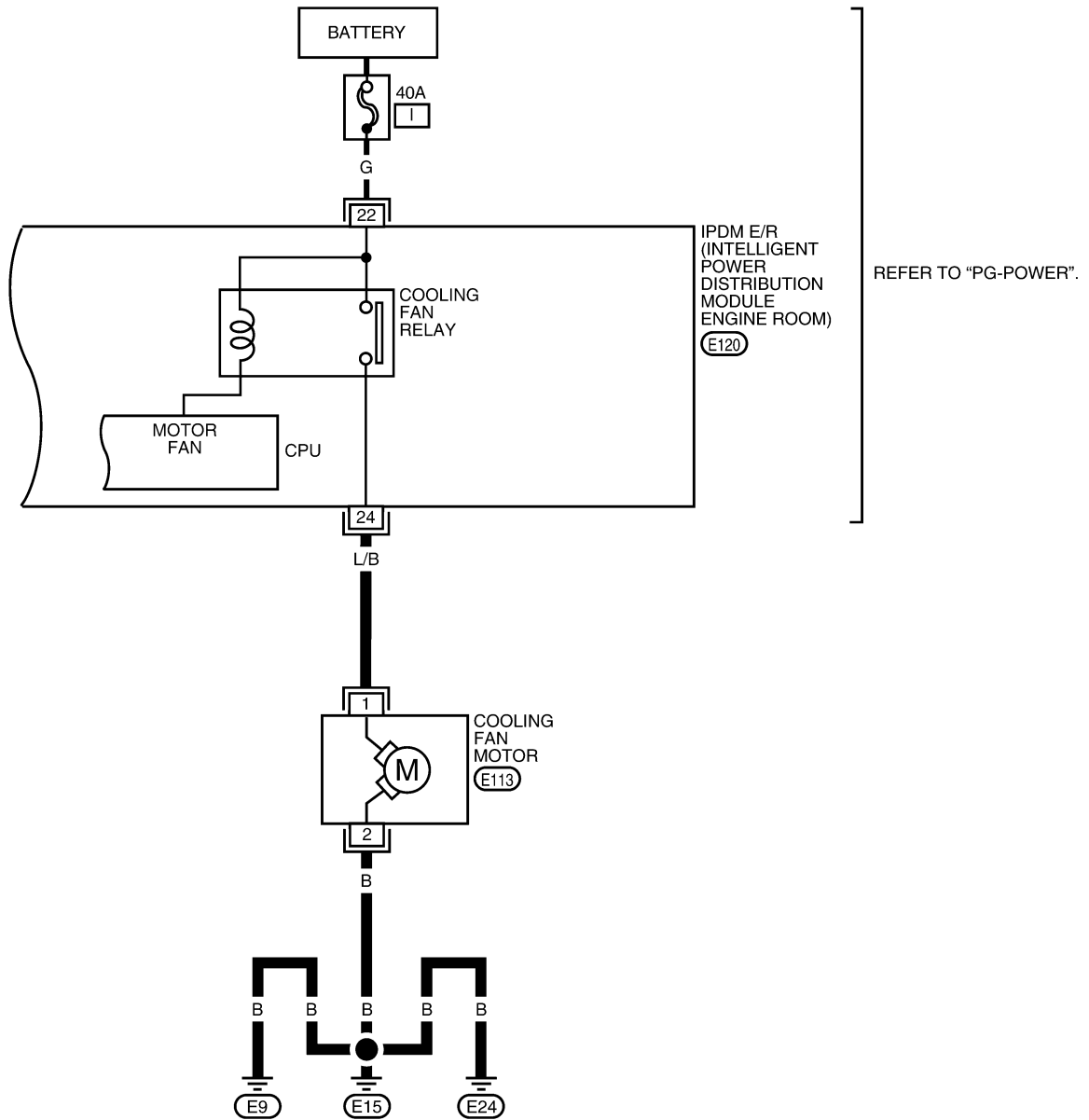
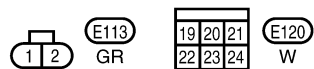
REFER TO THE FOLLOWING.
(M31), **(M40)** - SUPER
 MULTIPLE JUNCTION (SMJ)

BBWA1374E

DTC P1217 ENGINE OVER TEMPERATURE

EC-COOL/F-02

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BBWA1182E

DTC P1217 ENGINE OVER TEMPERATURE

UBS00EW8

Diagnostic Procedure

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK COOLING FAN MOTOR OPERATION

With CONSULT-II

1. Start engine and let it idle.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that cooling fan operates.

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Go to [EC-416, "PROCEDURE A"](#) .)

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

SEF646X

3. CHECK COOLING FAN MOTOR OPERATION

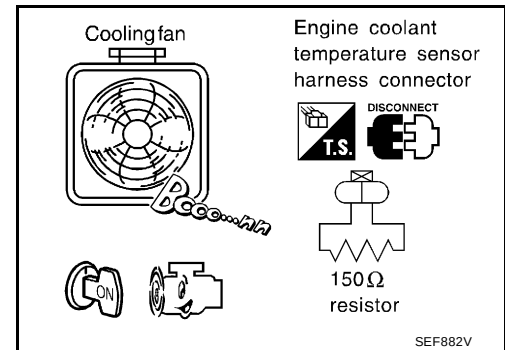
Without CONSULT-II

1. Disconnect engine coolant temperature sensor harness connector.
2. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
3. Start engine and let it idle.
4. Make sure that cooling fan operates.

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Go to [EC-416, "PROCEDURE A"](#) .)



DTC P1217 ENGINE OVER TEMPERATURE

4. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.6 kg/cm² , 23 psi)

CAUTION:

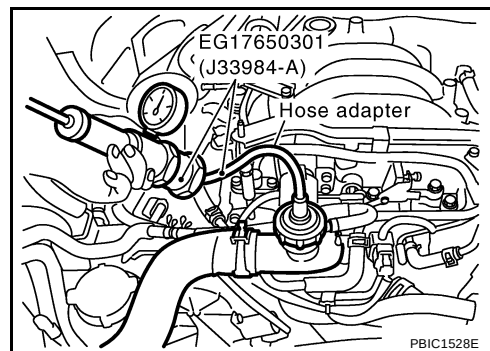
Higher than the specified pressure may cause radiator damage. Pressure should not drop.

OK or NG

OK >> GO TO 5.

NG >> Check the following for leak. Refer to [CO-9, "CHECKING COOLING SYSTEM FOR LEAKS"](#) .

- Hose
- Radiator
- Water pump



5. CHECK RADIATOR CAP

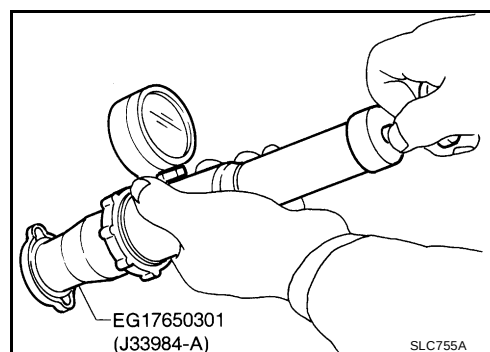
Apply pressure to cap with a tester.

Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm² , 9 - 14 psi)

OK or NG

OK >> GO TO 6.

NG >> Replace radiator cap.



6. CHECK THERMOSTAT

1. Check valve seating condition at normal room temperatures.

It should seat tightly.

2. Check valve opening temperature and valve lift.

Valve opening temperature: 82°C (180°F) [standard]

Valve lift: More than 10.0 mm/95°C (0.394 in/203°F)

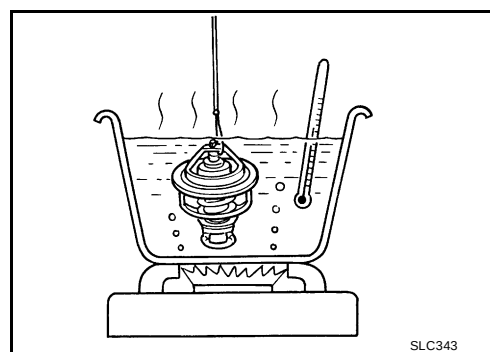
3. Check if valve is closed at 5°C (9°F) below valve opening temperature.

For details, refer to [CO-17, "THERMOSTAT AND WATER PIPING"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace thermostat



7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-168, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace engine coolant temperature sensor.

DTC P1217 ENGINE OVER TEMPERATURE

8. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to [EC-417, "Main 12 Causes of Overheating"](#) .

>> INSPECTION END

PROCEDURE A

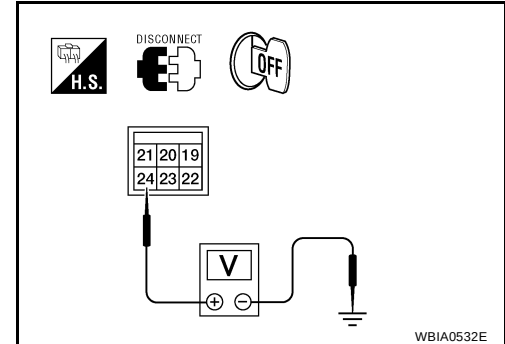
1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E120.
3. Check voltage between IPDM E/R terminal 24 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible link
- Harness for open or short between IPDM E/R and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN OR SHORT

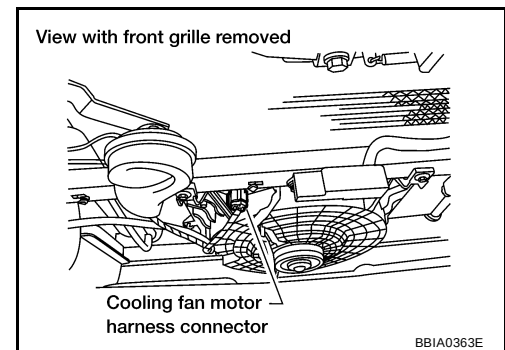
1. Disconnect cooling fan motor harness connector.
2. Check harness continuity between cooling fan motor terminal 1 and IPDM E/R terminal 24, cooling fan motor terminal 2 and body ground.
Refer to wiring diagram.

Continuity should exist.

3. Also check harness for short to ground and 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.



4. CHECK COOLING FAN MOTOR

Refer to [EC-418, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Replace cooling fan motor.

DTC P1217 ENGINE OVER TEMPERATURE

5. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-16, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness connectors.

Main 12 Causes of Overheating

UBS00EW9

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper 	<ul style="list-style-type: none"> Visual 	No blocking	—
	2	<ul style="list-style-type: none"> Coolant mixture 	<ul style="list-style-type: none"> Coolant tester 	50 - 50% coolant mixture	MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS"
	3	<ul style="list-style-type: none"> Coolant level 	<ul style="list-style-type: none"> Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-9, "Changing Engine Coolant"
	4	<ul style="list-style-type: none"> Radiator cap 	<ul style="list-style-type: none"> Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	CO-12, "Checking Reservoir Cap"
ON*2	5	<ul style="list-style-type: none"> Coolant leaks 	<ul style="list-style-type: none"> Visual 	No leaks	CO-9, "CHECKING COOLING SYSTEM FOR LEAKS"
ON*2	6	<ul style="list-style-type: none"> Thermostat 	<ul style="list-style-type: none"> Touch the upper and lower radiator hoses 	Both hoses should be hot	CO-17, "THERMOSTAT AND WATER PIPING"
ON*1	7	<ul style="list-style-type: none"> Cooling fan 	<ul style="list-style-type: none"> CONSULT-II 	Operating	See trouble diagnosis for DTC P1217 (EC-409).
OFF	8	<ul style="list-style-type: none"> Combustion gas leak 	<ul style="list-style-type: none"> Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> Coolant temperature gauge 	<ul style="list-style-type: none"> Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> Visual 	No overflow during driving and idling	CO-9, "Changing Engine Coolant"
OFF*4	10	<ul style="list-style-type: none"> Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> Visual 	Should be initial level in reservoir tank	CO-9, "Changing Engine Coolant"
OFF	11	<ul style="list-style-type: none"> Cylinder head 	<ul style="list-style-type: none"> Straight gauge feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	EM-64, "Inspection After Disassembly"
	12	<ul style="list-style-type: none"> Cylinder block and pistons 	<ul style="list-style-type: none"> Visual 	No scuffing on cylinder walls or piston	EM-90, "Inspection After Disassembly"

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to [CO-5, "OVERHEATING CAUSE ANALYSIS"](#) .

DTC P1217 ENGINE OVER TEMPERATURE

UBS00EWA

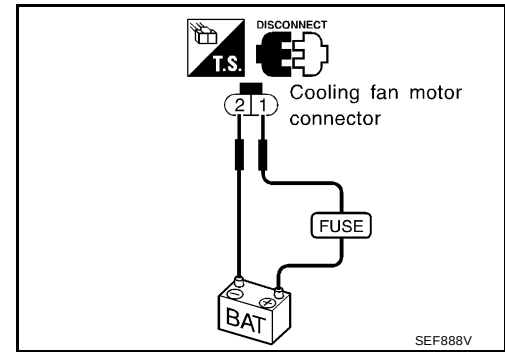
Component Inspection

COOLING FAN MOTOR

1. Disconnect cooling fan motor harness connector.
2. Supply cooling fan motor terminals with battery voltage and check operation.

Cooling fan motor should operate.

If NG, replace cooling fan motor.



DTC P1225 TP SENSOR

DTC P1225 TP SENSOR

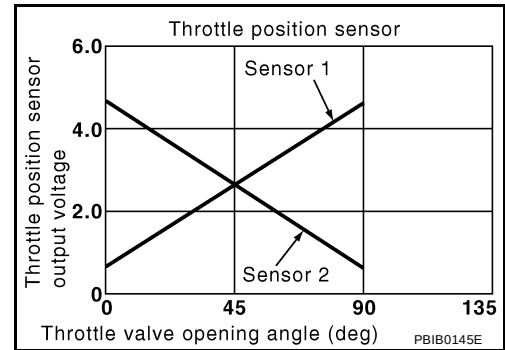
PFP:16119

Component Description

UBS00EWB

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

UBS00EWC

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	● Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

UBS00EWD

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:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. If 1st trip DTC is detected, go to [EC-420, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1225 TP SENSOR

Diagnostic Procedure

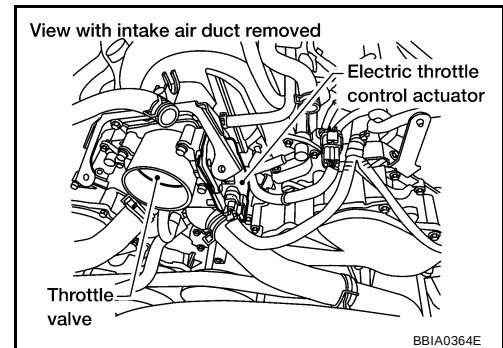
UBS00EWE

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

UBS00EWF

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

DTC P1226 TP SENSOR

DTC P1226 TP SENSOR

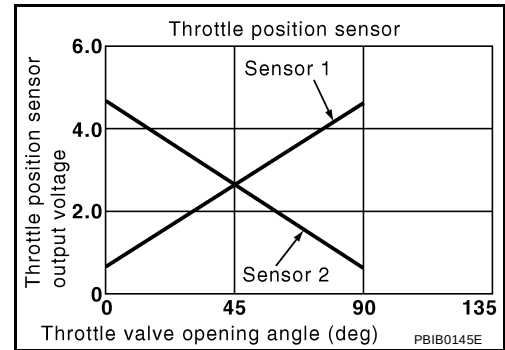
PFP:16119

Component Description

UBS00EWG

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

UBS00EWH

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	● Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

UBS00EWI

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:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Repeat steps 3 and 4 for 32 times.
6. If 1st trip DTC is detected, go to [EC-422, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1226 TP SENSOR

UBS00EWJ

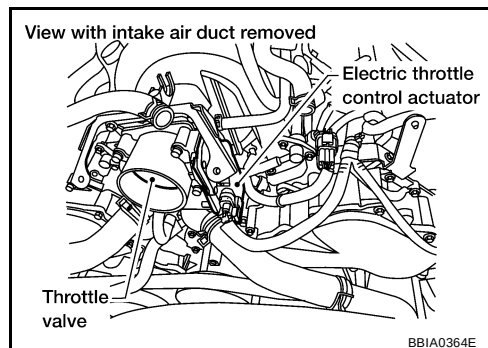
Diagnostic Procedure

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

Removal and Installation

ELECTRIC THROTTLE CONTROL ACTUATOR

UBS00EWK

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

DTC P1229 SENSOR POWER SUPPLY

DTC P1229 SENSOR POWER SUPPLY

PFP:16119

On Board Diagnosis Logic

UBS00EWL

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none">● Harness or connectors (APP sensor 1 circuit is shorted.) (PSP sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.)● Accelerator pedal position sensor● Power steering pressure sensor● Refrigerant pressure sensor● EVAP control system pressure sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

UBS00EWM

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:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-425, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

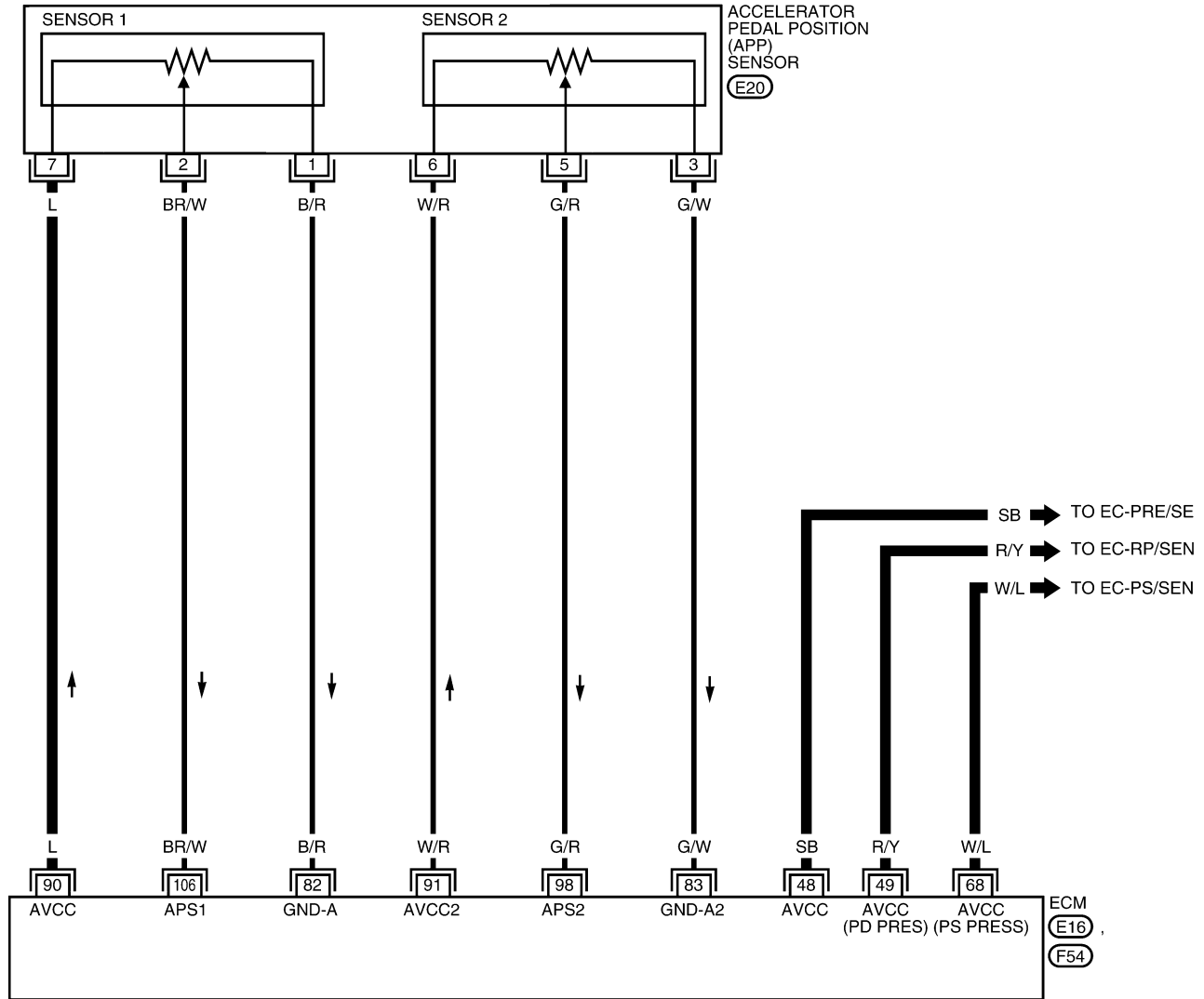
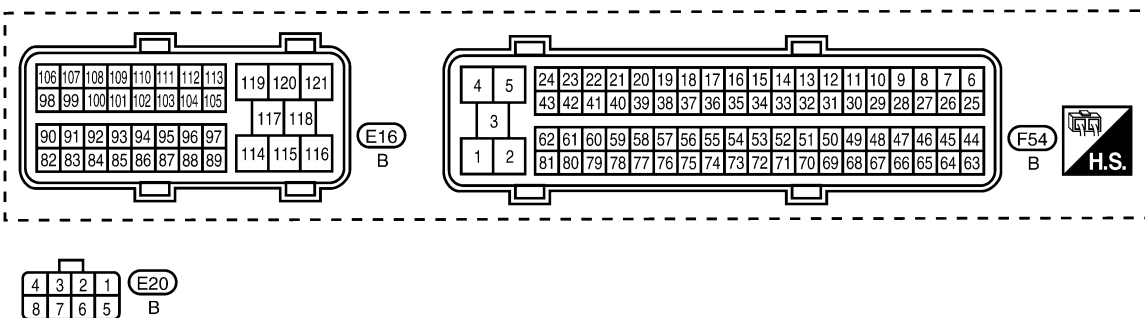
DTC P1229 SENSOR POWER SUPPLY

Wiring Diagram

UBS00EWN

EC-SEN/PW-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1183E

DTC P1229 SENSOR POWER SUPPLY

Specification data are reference values and are 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.

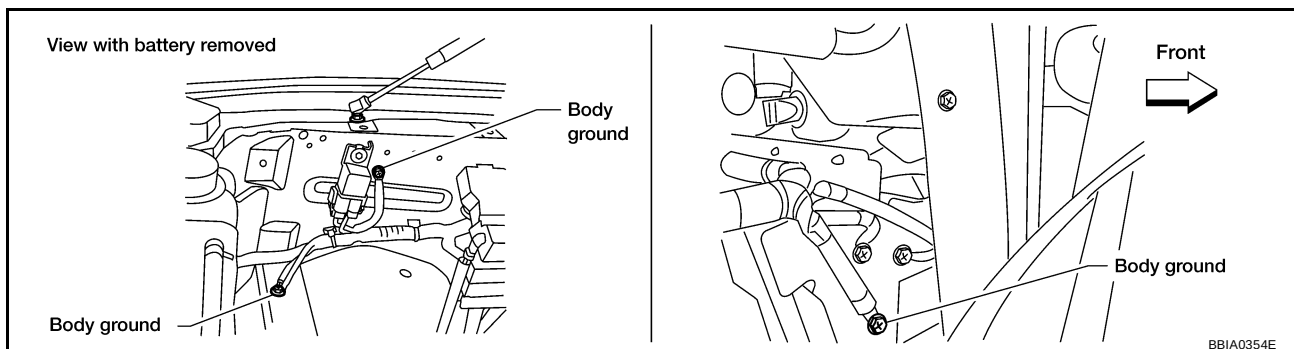
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	SB	Sensor power supply (EVAP control system pressure sensor)	[Ignition switch: ON]	Approximately 5V
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5V
68	W/L	Sensor power supply (Power steering pressure sensor)	[Ignition switch: ON]	Approximately 5V
90	L	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5V

Diagnostic Procedure

UBS00EWO

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

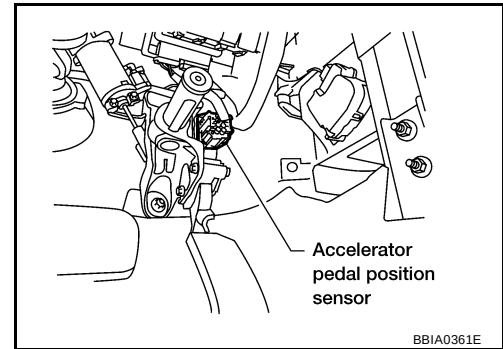
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1229 SENSOR POWER SUPPLY

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

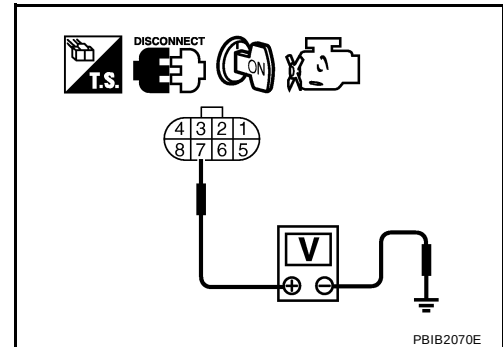


3. Check voltage between APP sensor terminal 7 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 5.
NG >> GO TO 3.



3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check the following.

- Harness for short to power and short to ground, between the following terminals

ECM terminal	Sensor terminal	Reference Wiring Diagram
48	EVAP control system pressure sensor terminal 3	EC-303
49	Refrigerant pressure sensor terminal 1	EC-588
68	Power steering pressure sensor terminal 1	EC-346
90	APP sensor terminal 7	EC-424

OK or NG

- OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK COMPONENTS

Check the following.

- EVAP control system pressure sensor (Refer to [EC-306, "Component Inspection"](#) .)
- Power steering pressure sensor (Refer to [EC-349, "Component Inspection"](#) .)
- Refrigerant pressure sensor (Refer to [MTC-78, "COMPONENT INSPECTION"](#) .)

OK or NG

- OK >> GO TO 7.
NG >> Replace malfunctioning components.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [EC-562, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

DTC P1229 SENSOR POWER SUPPLY

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal position assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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DTC P1271, P1281 A/F SENSOR 1

DTC P1271, P1281 A/F SENSOR 1

PFP:22693

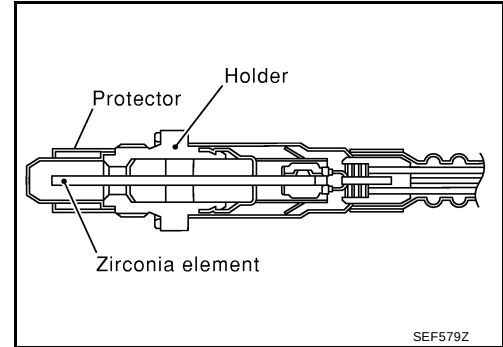
Component Description

UBS00EWP

The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

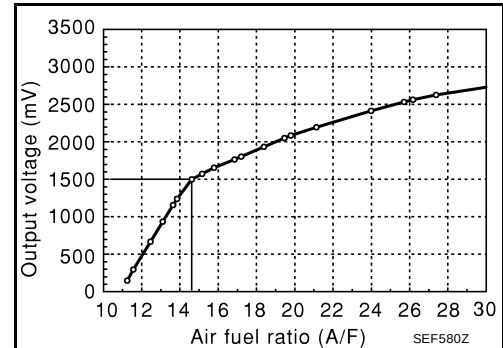
The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



SEF579Z

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



SEF580Z

CONSULT-II Reference Value in Data Monitor Mode

UBS00EWP

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00EWR

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1271 1271 (Bank 1) P1281 1281 (Bank 2)	Air fuel ratio (A/F) sensor 1 circuit no activity detected	● The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0V.	● Harness or connectors (The A/F sensor 1 circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

UBS00EWS

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:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

④ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT-II.

DTC P1271, P1281 A/F SENSOR 1

3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.
If the indication is constantly approx. 0V, go to [EC-433, "Diagnostic Procedure"](#) .
If the indication is not constantly approx. 0V, go to next step.
4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 20 consecutive seconds.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 40 km/h (25 MPH)
B/FUEL SCHDL	1.5 - 9.0 msec
Gear position	Suitable position

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.

7. If 1st trip DTC is displayed, go to [EC-433, "Diagnostic Procedure"](#) .

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C
A/F SEN1 (B1)	XXX V

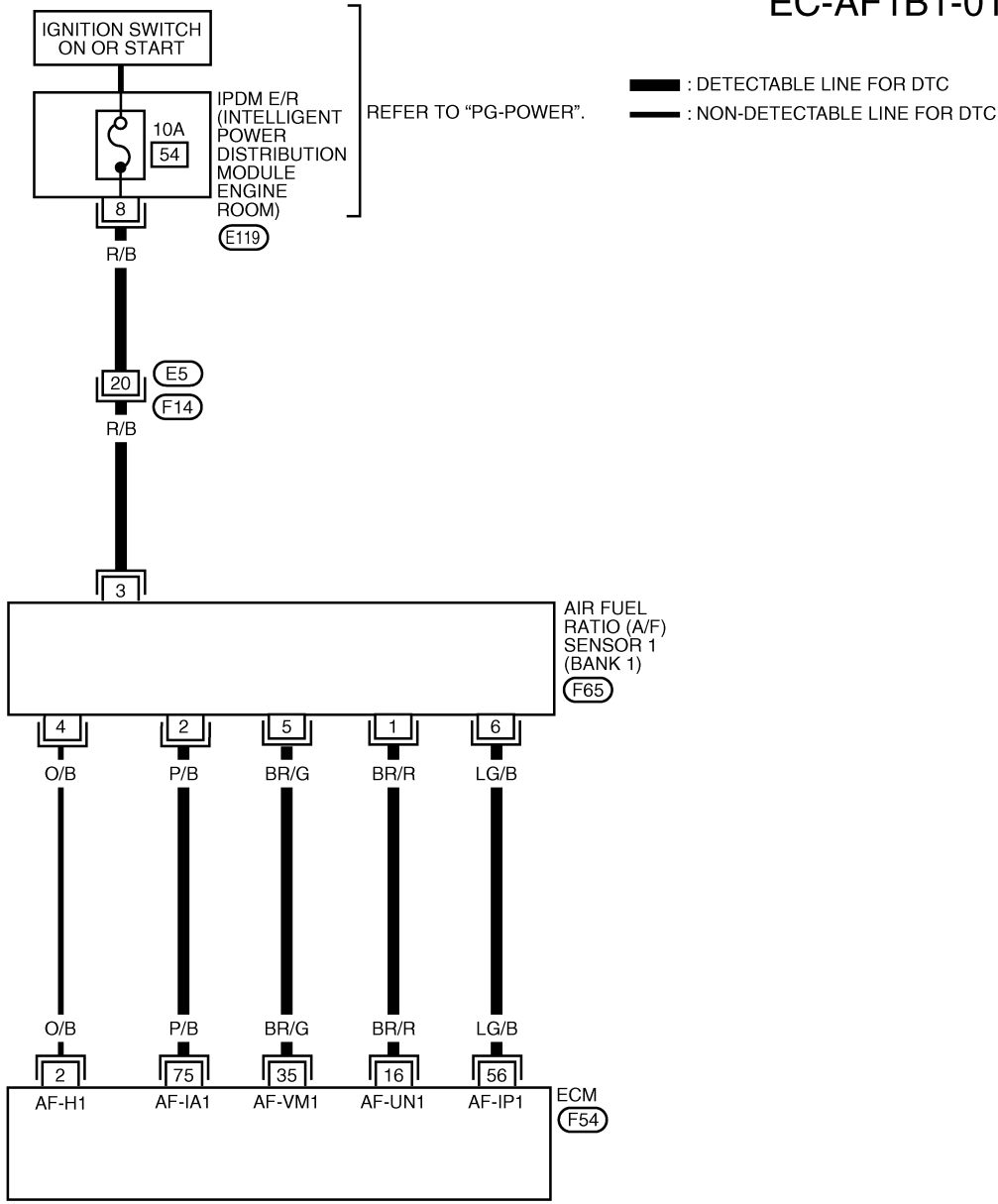
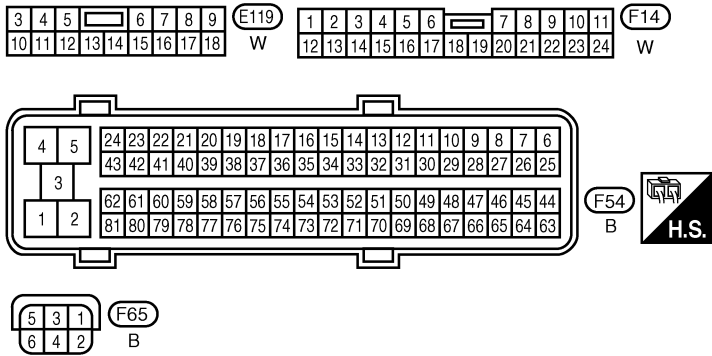
SEF581Z

DTC P1271, P1281 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EWT

EC-AF1B1-01



BBWA1369E

DTC P1271, P1281 A/F SENSOR 1

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

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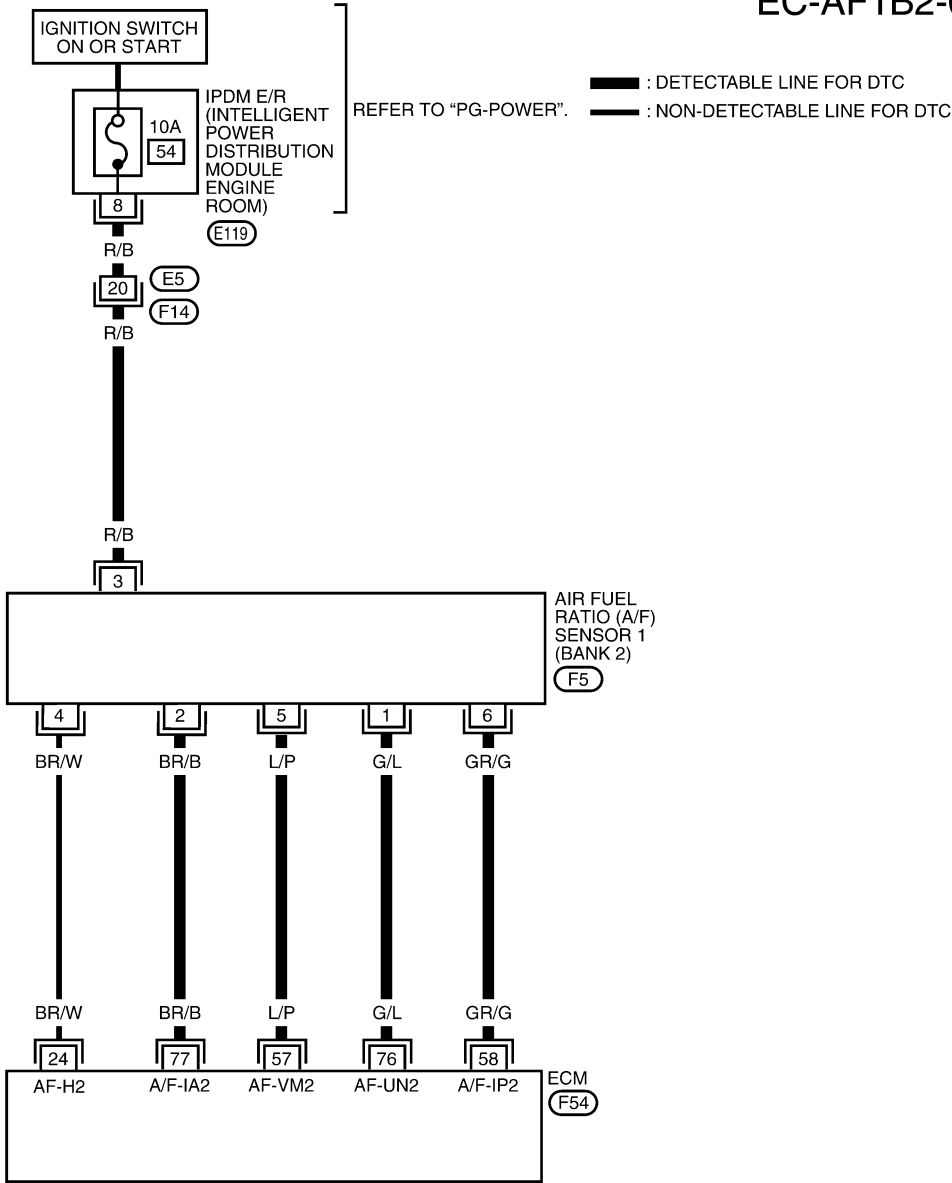
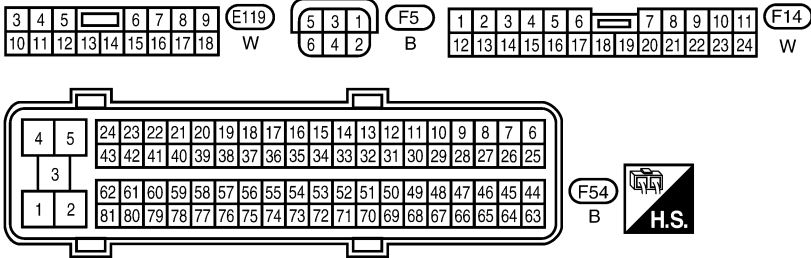
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M

DTC P1271, P1281 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1271, P1281 A/F SENSOR 1

Specification data are reference values and are 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.

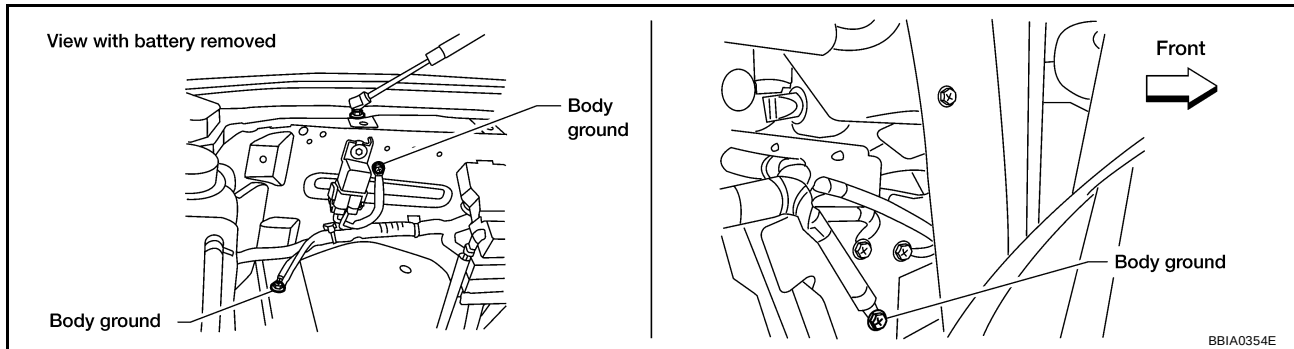
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EWU

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

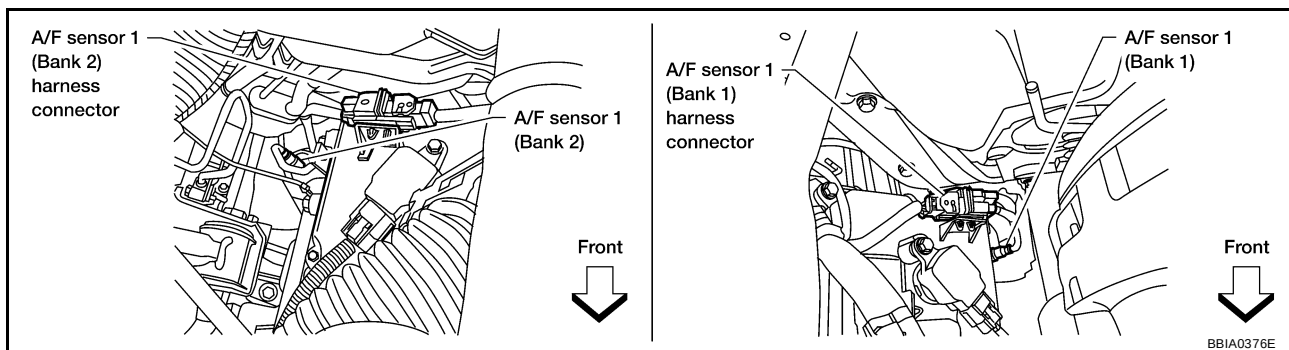
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1271, P1281 A/F SENSOR 1

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector.

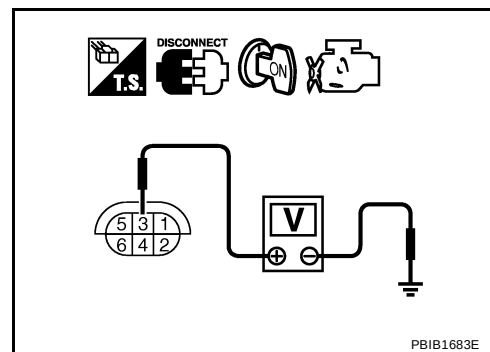


2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1271, P1281 A/F SENSOR 1

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

UBS00EWV

DTC P1272, P1282 A/F SENSOR 1

DTC P1272, P1282 A/F SENSOR 1

PF2:22693

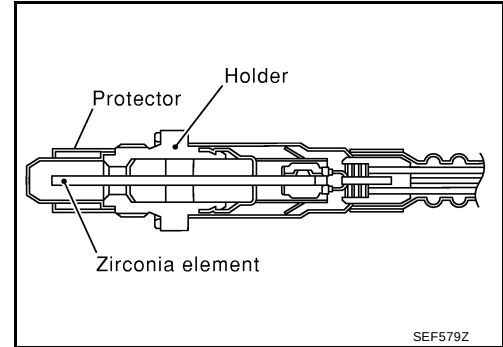
Component Description

UBS00EWW

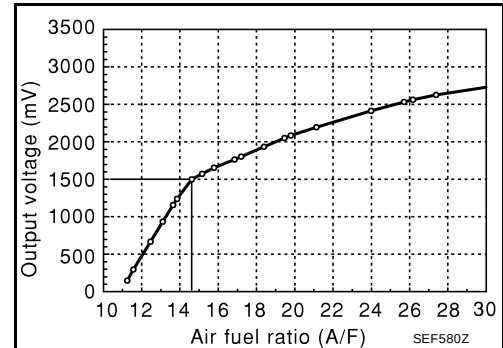
The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS00EWW

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00EWW

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1272 1272 (Bank 1) P1282 1282 (Bank 2)	Air fuel ratio (A/F) sensor 1 circuit no activity detected	● The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5V.	● Harness or connectors (The A/F sensor 1 circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

UBS00EWW

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:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT-II.

DTC P1272, P1282 A/F SENSOR 1

3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.
If the indication is constantly approx. 5V, go to [EC-441, "Diagnostic Procedure"](#) .
If the indication is not constantly approx. 5V, go to next step.
4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 20 consecutive seconds.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 40 km/h (25 MPH)
B/FUEL SCHDL	1.5 - 9.0 msec
Gear position	Suitable position

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.

7. If 1st trip DTC is displayed, go to [EC-441, "Diagnostic Procedure"](#) .

 WITH GST

Follow the procedure "WITH CONSULT-II" above.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C
A/F SEN1 (B1)	XXX V

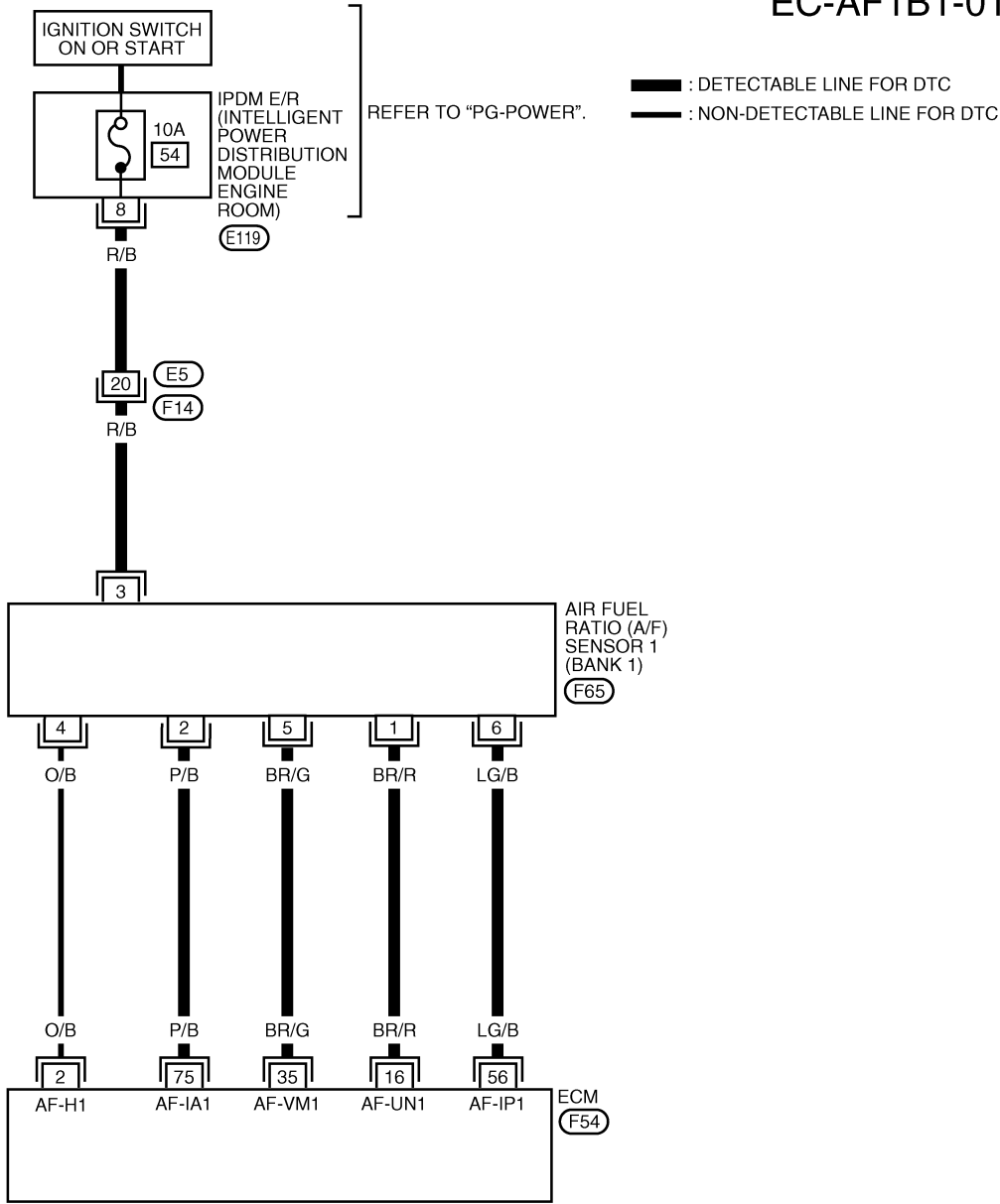
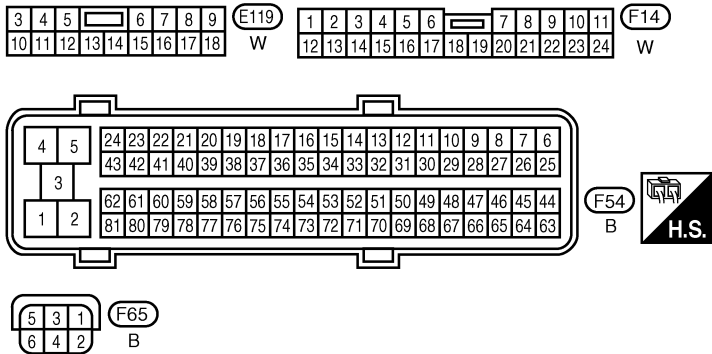
SEF581Z

DTC P1272, P1282 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EX0

EC-AF1B1-01



BBWA1369E

DTC P1272, P1282 A/F SENSOR 1

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

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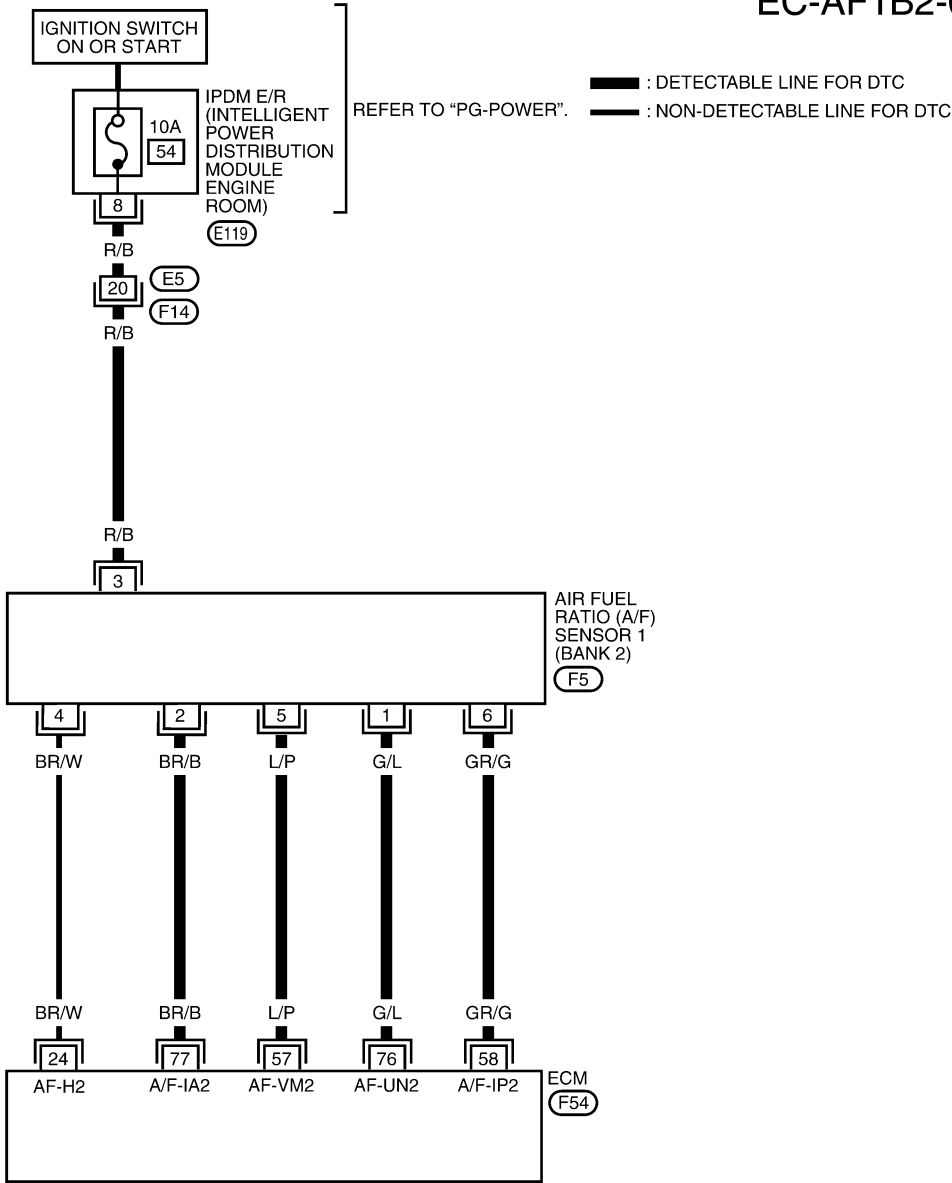
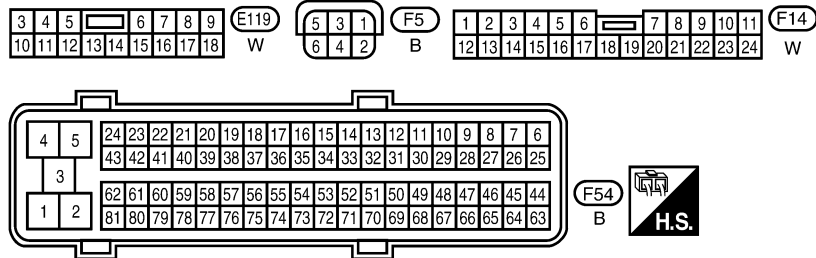
L

M

DTC P1272, P1282 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1272, P1282 A/F SENSOR 1

Specification data are reference values and are 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.

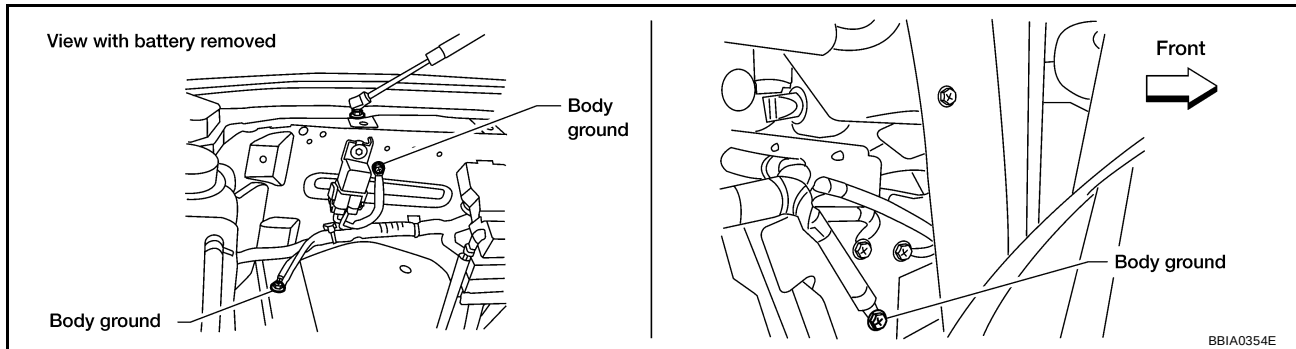
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EX1

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

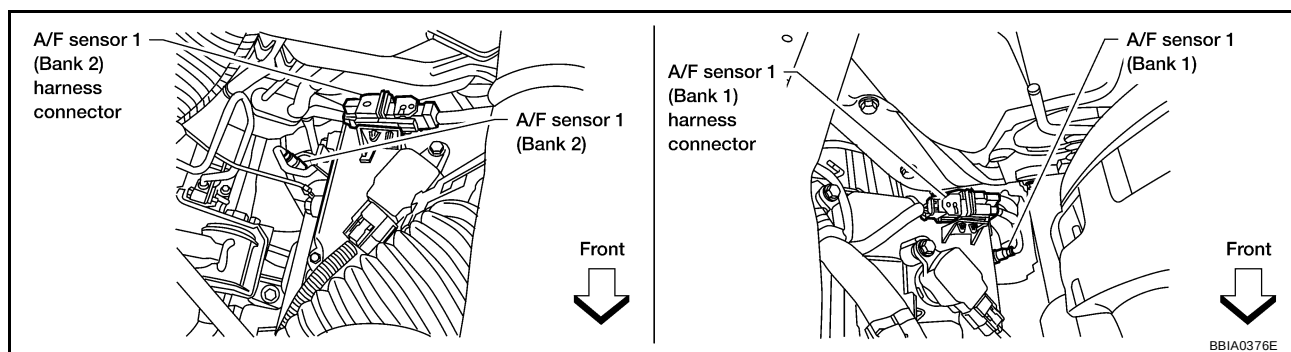
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1272, P1282 A/F SENSOR 1

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector.

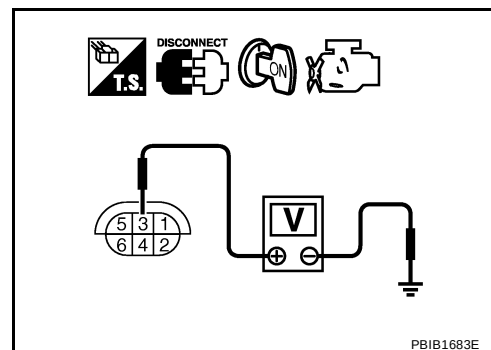


2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1272, P1282 A/F SENSOR 1

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

UBS00EX2

DTC P1273, P1283 A/F SENSOR 1

DTC P1273, P1283 A/F SENSOR 1

PFP:22693

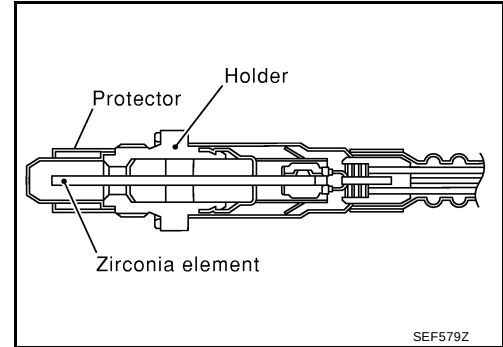
Component Description

UBS00EX3

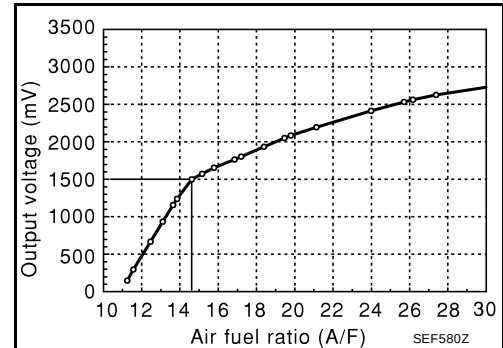
The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS00EX4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00EX5

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted LEAN side or RICH side.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1273 1273 (Bank 1) P1283 1283 (Bank 2)	Air fuel ratio (A/F) sensor 1 lean shift monitoring	● The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period.	● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor 1 heater ● Fuel pressure ● Injector ● Intake air leaks

DTC Confirmation Procedure

UBS00EX6

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:

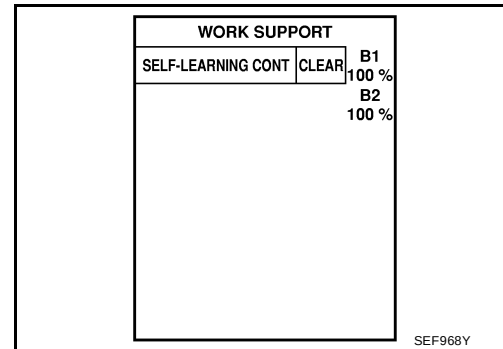
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

④ 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 and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.

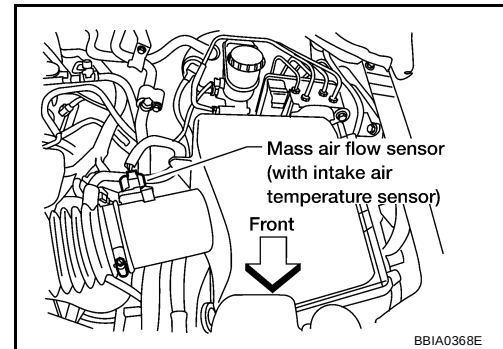
DTC P1273, P1283 A/F SENSOR 1

4. Clear the self-learning coefficient by touching "CLEAR".
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
7. Let engine idle for 1 minute.
8. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
9. If 1st trip DTC is detected, go to [EC-449, "Diagnostic Procedure"](#).



WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector.
4. Start engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select "MODE 3" with GST and make sure that DTC P0102 is detected.
7. Select "MODE 4" with GST and erase the DTC P0102.
8. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
9. Let engine idle for 1 minute.
10. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
11. Select "MODE 7" with GST.
If 1st trip DTC is detected, go to [EC-449, "Diagnostic Procedure"](#).

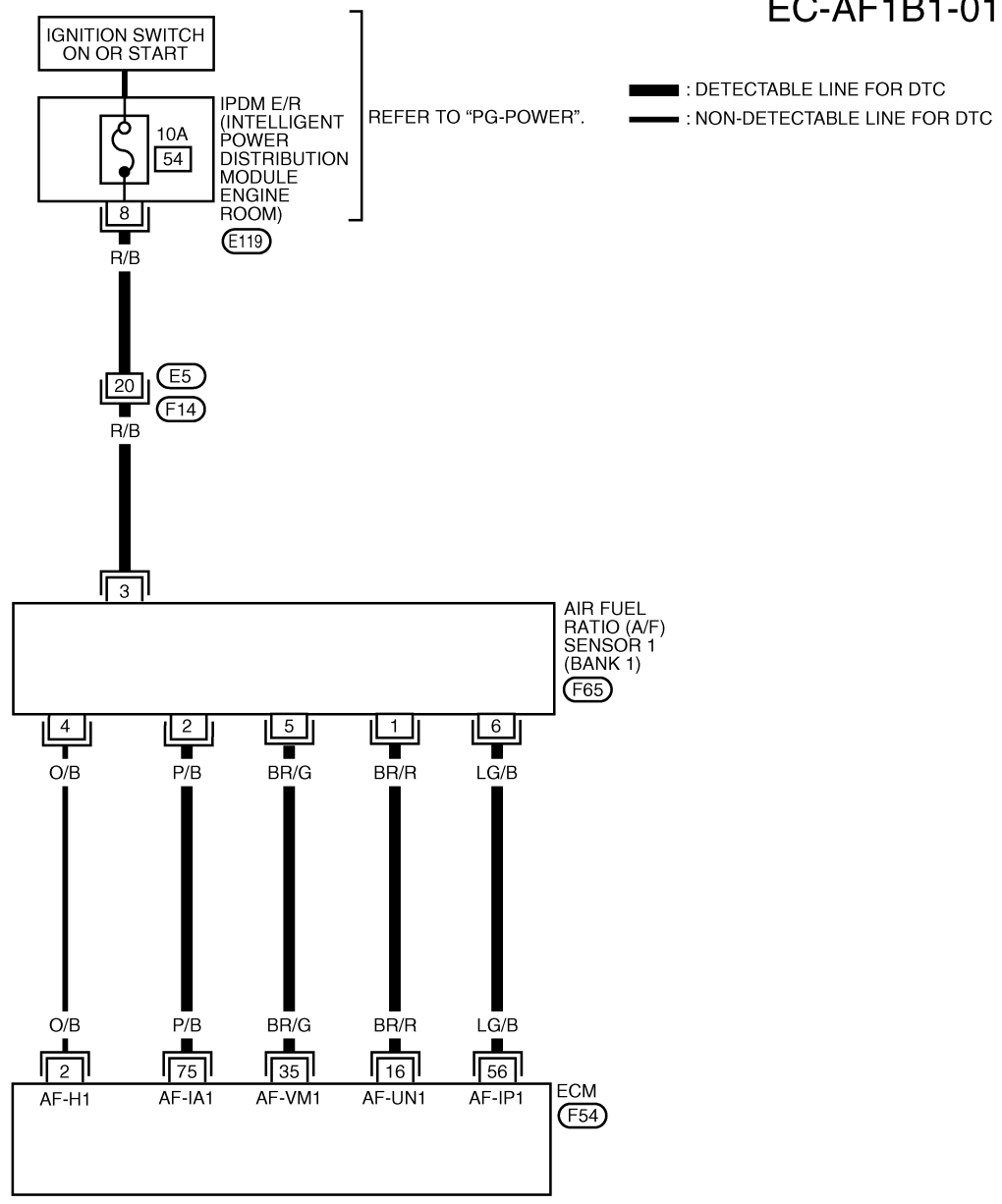
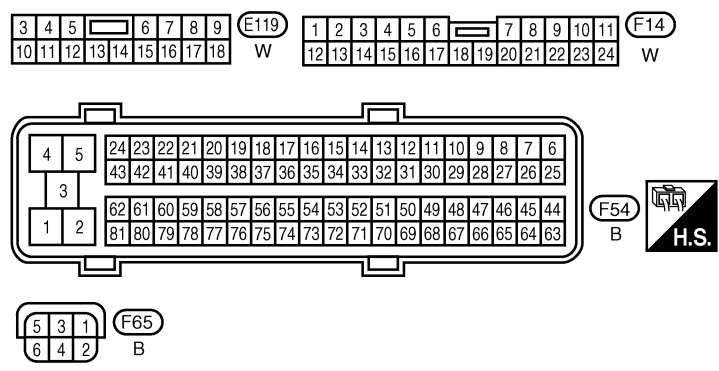


DTC P1273, P1283 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EX7

EC-AF1B1-01



BBWA1369E

DTC P1273, P1283 A/F SENSOR 1

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

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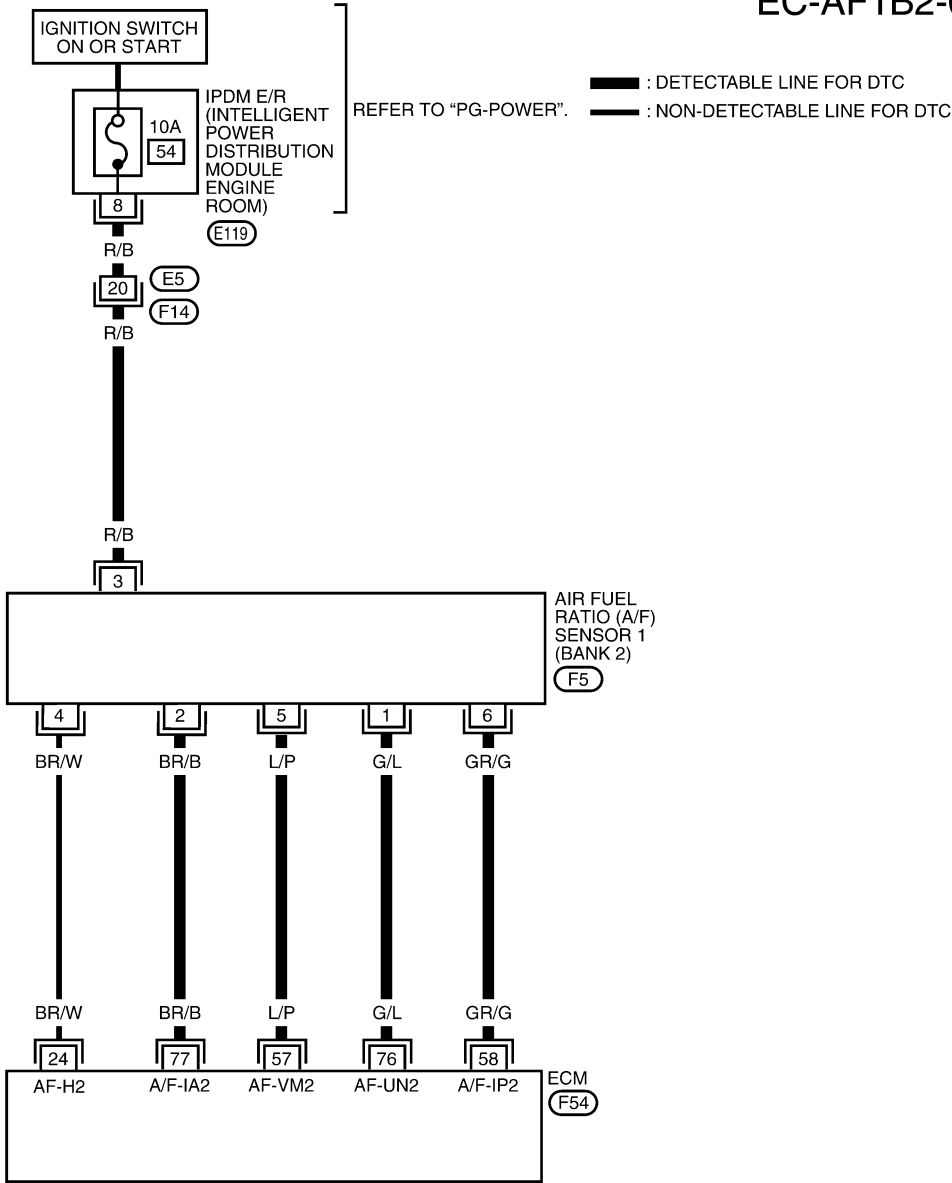
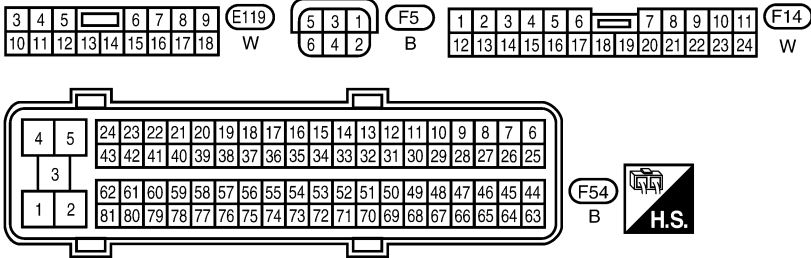
L

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DTC P1273, P1283 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1273, P1283 A/F SENSOR 1

Specification data are reference values and are 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.

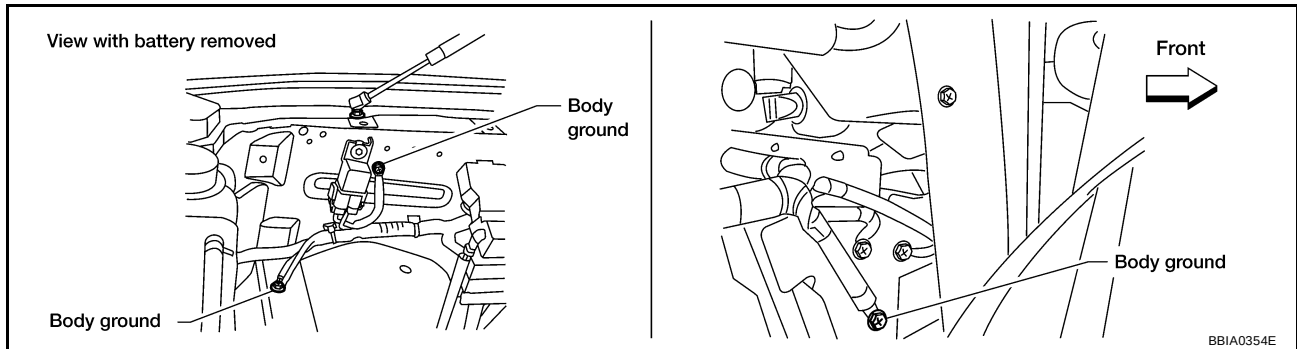
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EX8

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



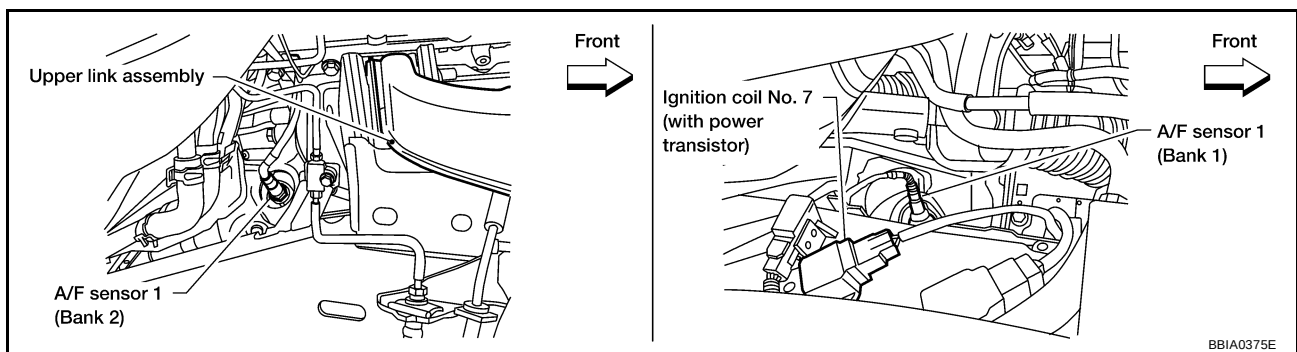
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1.



Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

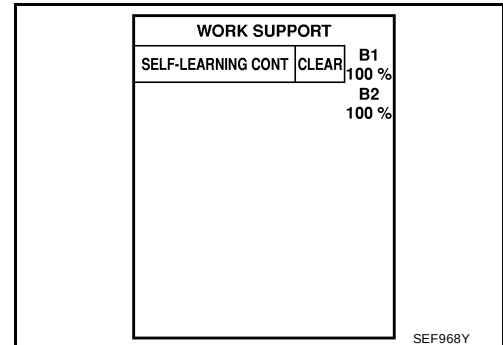
DTC P1273, P1283 A/F SENSOR 1

3. CLEAR THE SELF-LEARNING DATA

With CONSULT-II

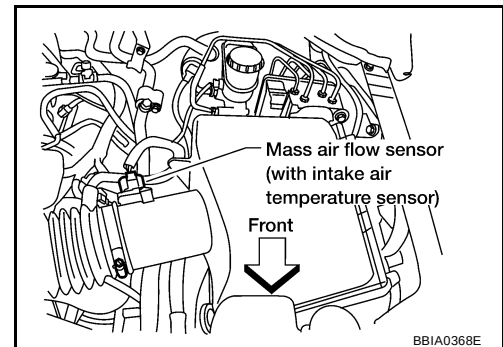
1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0174 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch OFF.
 3. Disconnect mass air flow sensor harness connector.
 4. Restart engine and let it idle for at least 5 seconds.
 5. Stop engine and reconnect mass air flow sensor harness connector.
 6. Make sure DTC P0102 is displayed.
 7. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .
 8. Make sure DTC P0000 is displayed.
 9. 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?



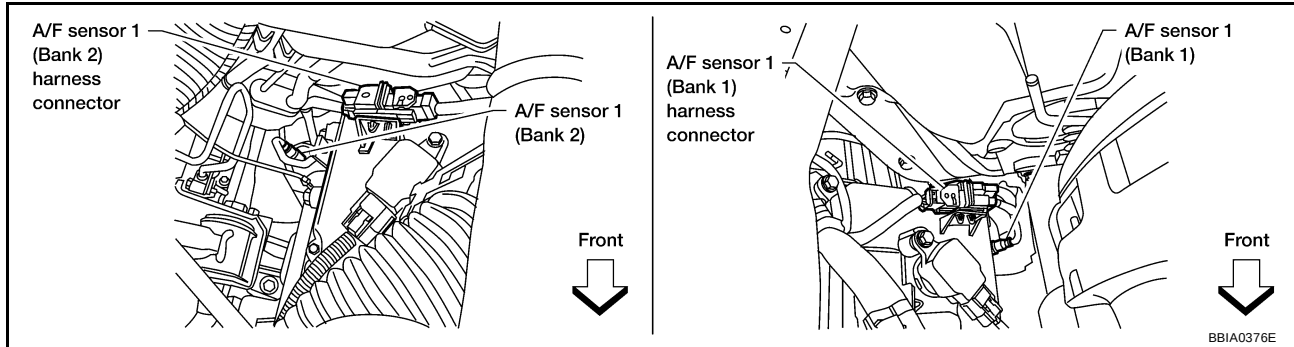
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0174. Refer to [EC-207](#) .
- No >> GO TO 4.

DTC P1273, P1283 A/F SENSOR 1

4. CHECK A/F SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.

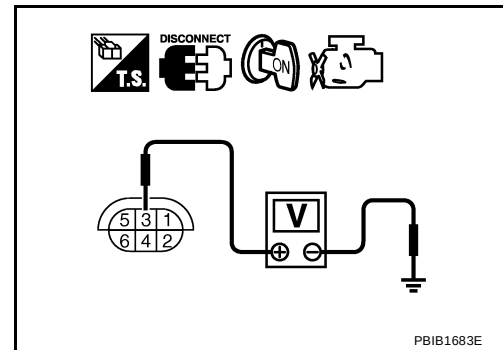


3. Turn ignition switch ON.
4. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1273, P1283 A/F SENSOR 1

6. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK A/F SENSOR 1 HEATER

Refer to [EC-359, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace A/F sensor 1.

8. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

UBS00EX9

DTC P1274, P1284 A/F SENSOR 1

DTC P1274, P1284 A/F SENSOR 1

PFP:22693

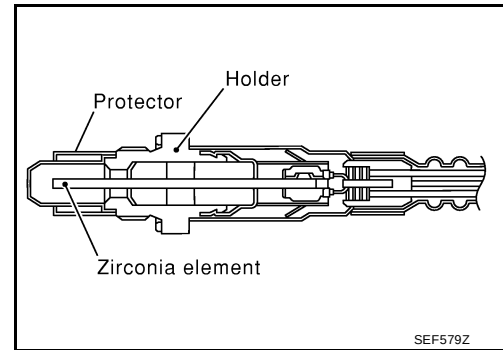
Component Description

UBS00EXA

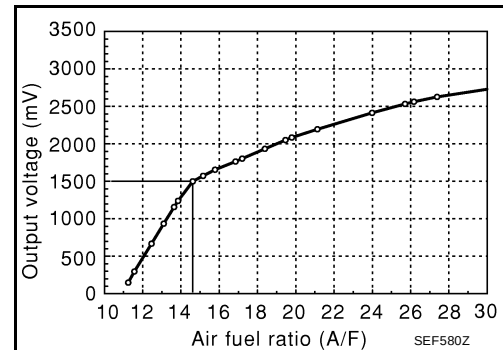
The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS00EXB

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00EXC

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to the LEAN side or RICH side.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1274 1274 (Bank 1) P1284 1244 (Bank 2)	Air fuel ratio (A/F) sensor 1 rich shift monitoring	● The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.	● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor 1 heater ● Fuel pressure ● Injector

DTC Confirmation Procedure

UBS00EXD

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:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

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 and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.

DTC P1274, P1284 A/F SENSOR 1

4. Clear the self-learning coefficient by touching "CLEAR".
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
7. Let engine idle for 1 minute.
8. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
9. If 1st trip DTC is detected, go to [EC-458, "Diagnostic Procedure"](#).

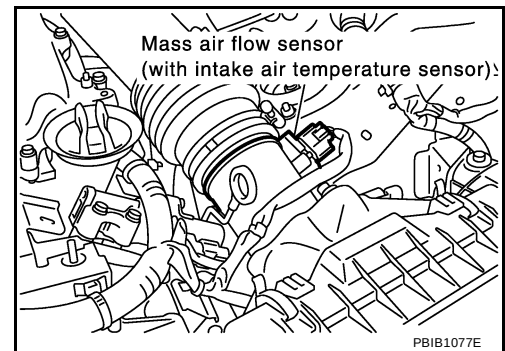
WORK SUPPORT		
SELF-LEARNING CONT	CLEAR	B1 100 %
		B2 100 %

SEF968Y



WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector.
4. Start engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select "MODE 3" with GST and make sure that DTC P0102 is detected.
7. Select "MODE 4" with GST and erase the DTC P0102.
8. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
9. Let engine idle for 1 minute.
10. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
11. Select "MODE 7" with GST.
If 1st trip DTC is detected, go to [EC-458, "Diagnostic Procedure"](#).



DTC P1274, P1284 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EXE

EC-AF1B1-01

A

EC

C

D

E

F

G

H

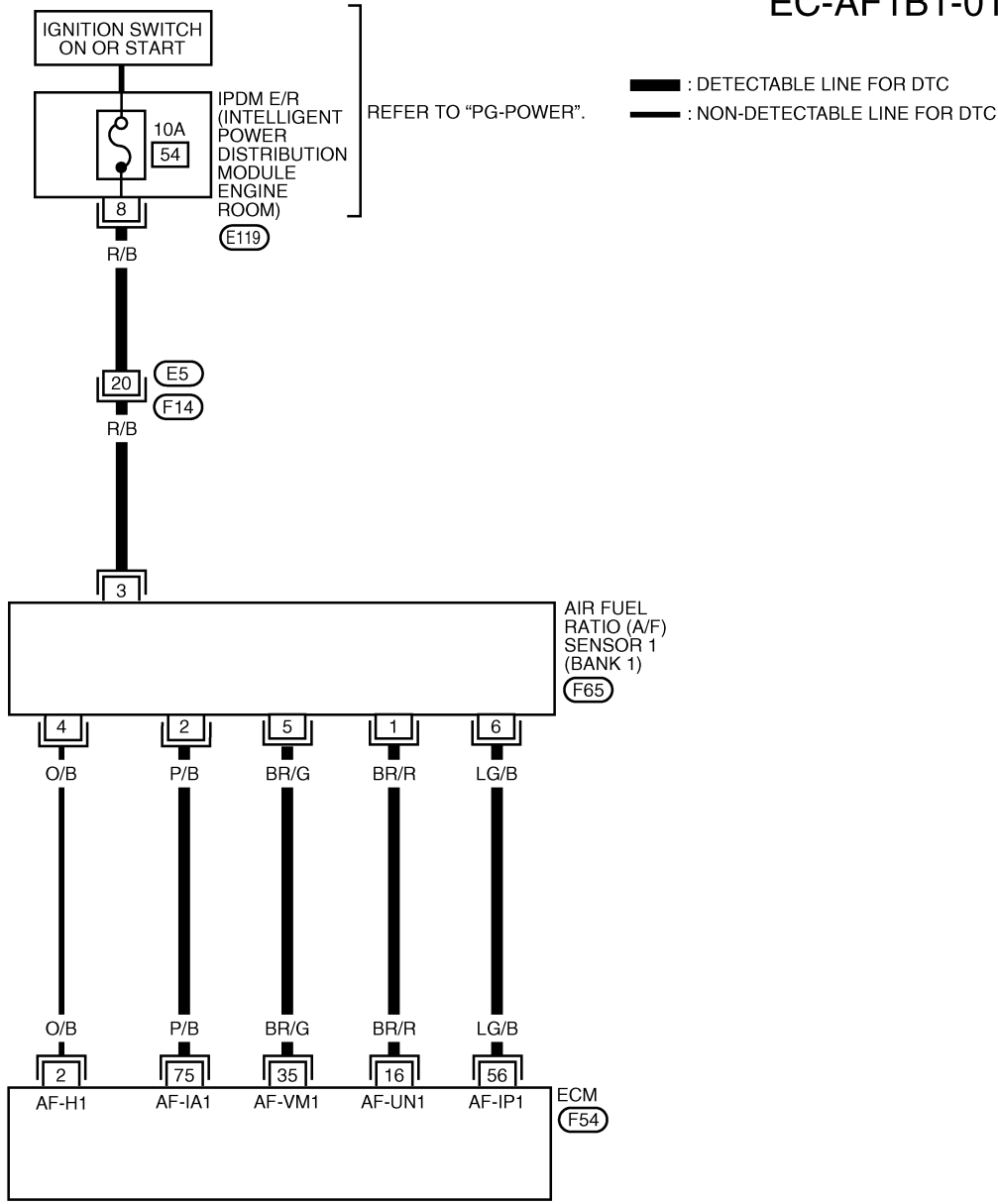
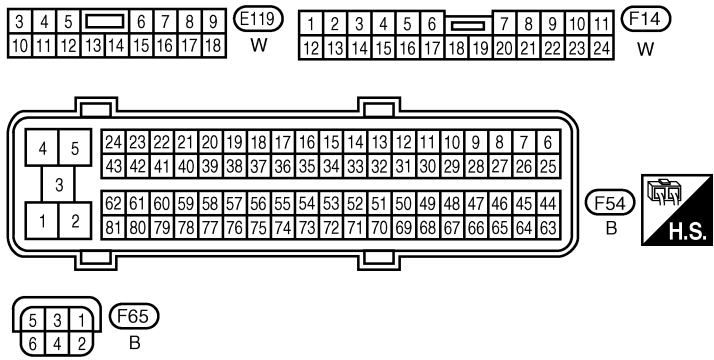
I

J

K

L

M



DTC P1274, P1284 A/F SENSOR 1

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

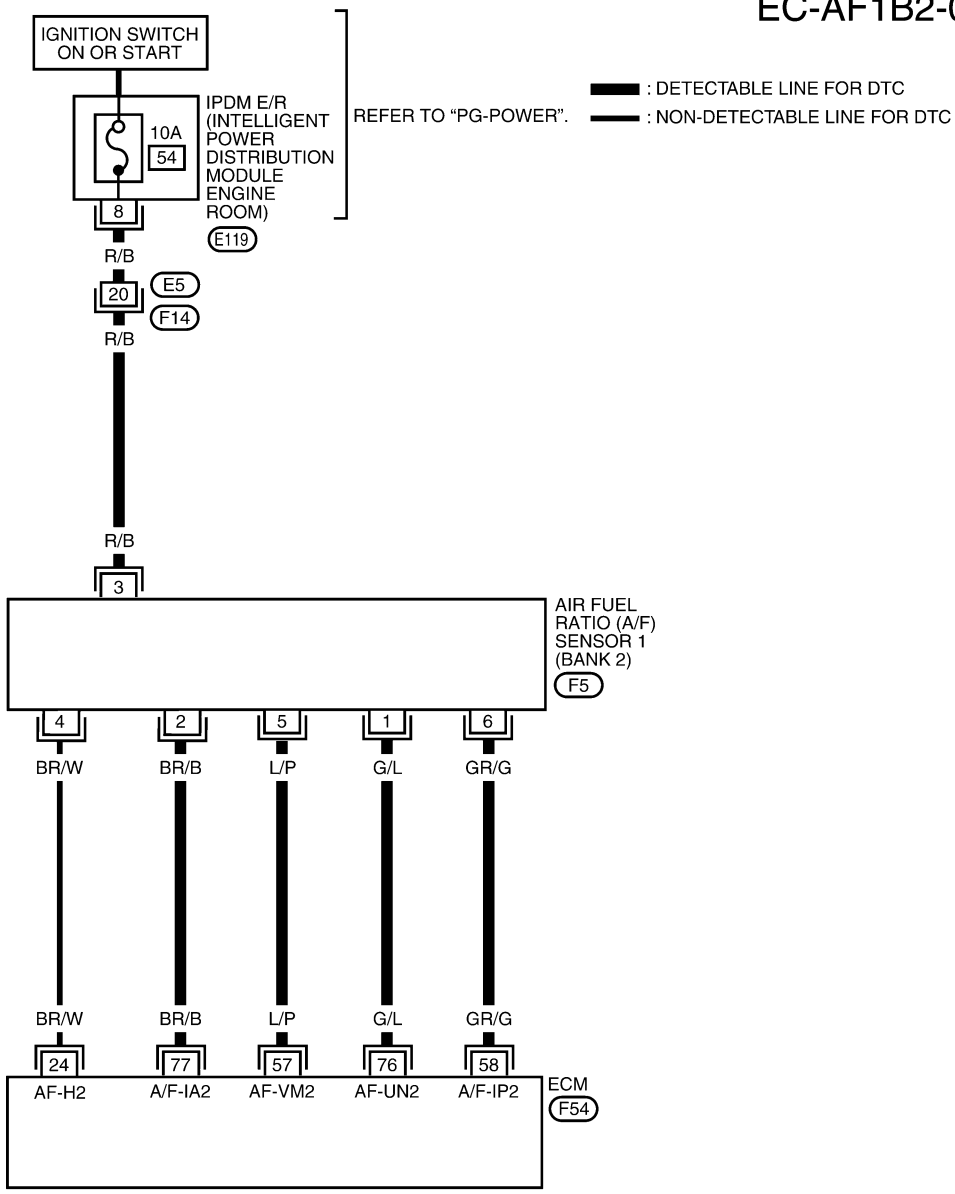
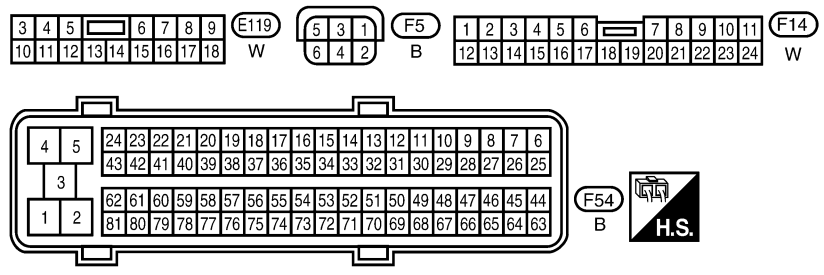
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

DTC P1274, P1284 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1274, P1284 A/F SENSOR 1

Specification data are reference values and are 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.

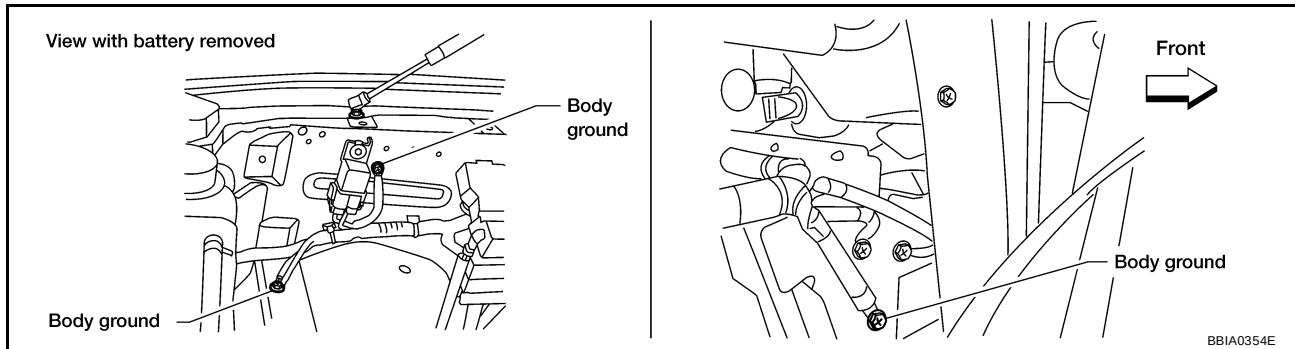
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EXF

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



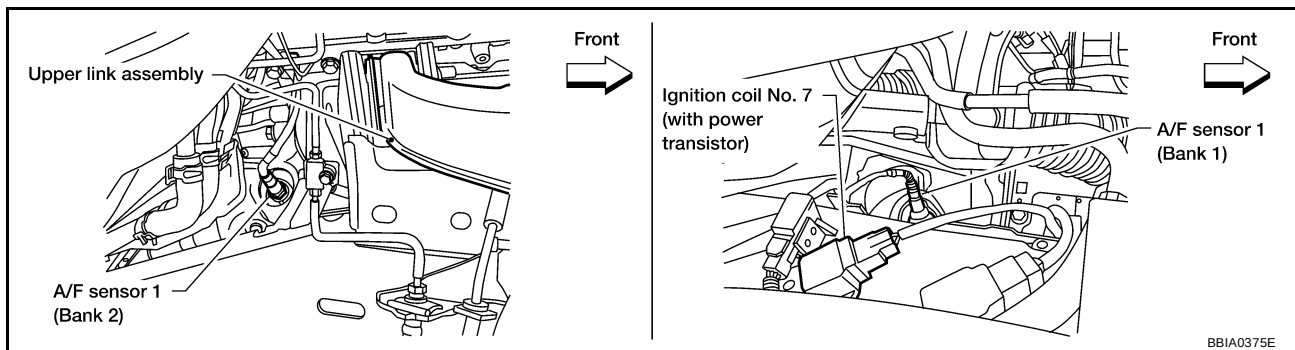
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1.



Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

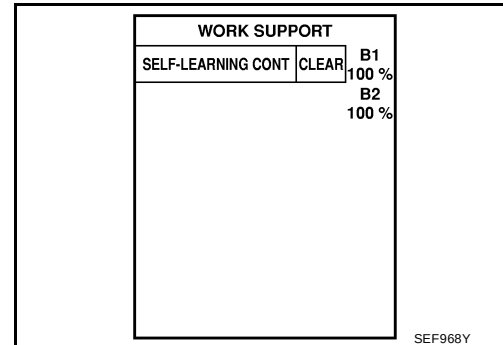
>> GO TO 3.

DTC P1274, P1284 A/F SENSOR 1

3. CLEAR THE SELF-LEARNING DATA.

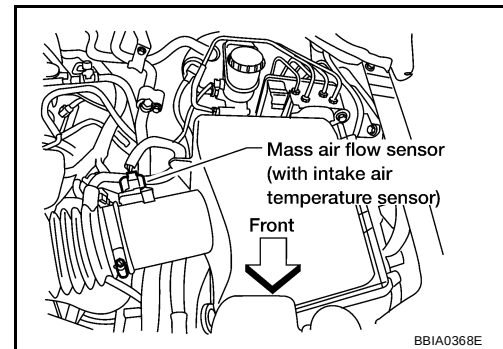
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 or P0175 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .
8. Make sure DTC P0000 is displayed.
9. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 or P0175 detected?
Is it difficult to start engine?



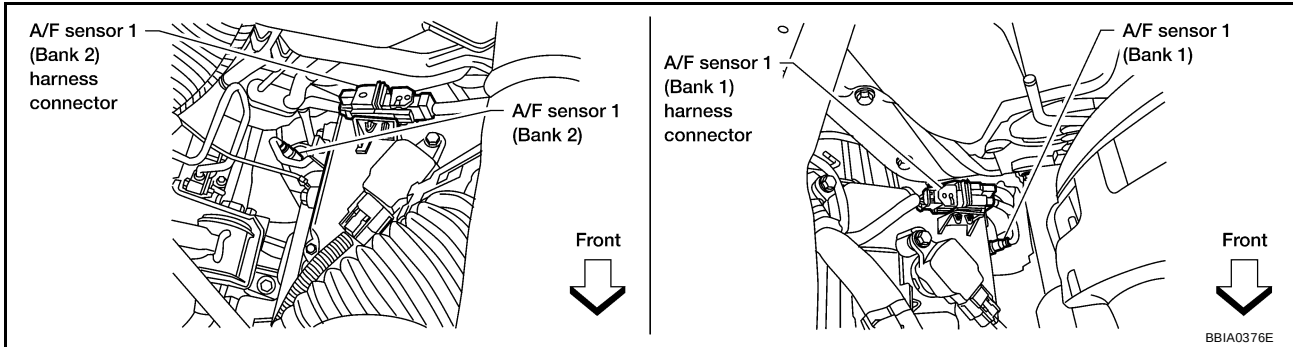
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172 or P0175. Refer to [EC-216](#) .
No >> GO TO 4.

DTC P1274, P1284 A/F SENSOR 1

4. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.



3. Check harness connector for water.
Water should not exit.

OK or NG

- OK >> GO TO 5.
NG >> Repair or replace harness connector.

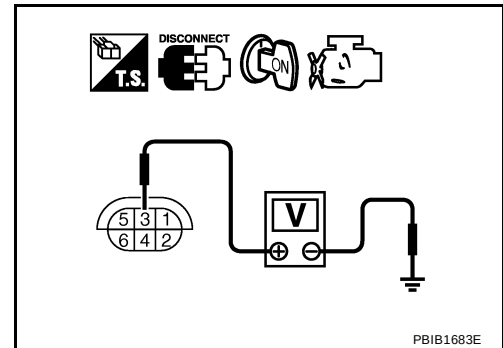
5. CHECK A/F SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.



6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1274, P1284 A/F SENSOR 1

7. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK A/F SENSOR 1 HEATER

Refer to [EC-359, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace A/F sensor 1.

9. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

UBS00EXG

DTC P1276, P1286 A/F SENSOR 1

DTC P1276, P1286 A/F SENSOR 1

PFP:22693

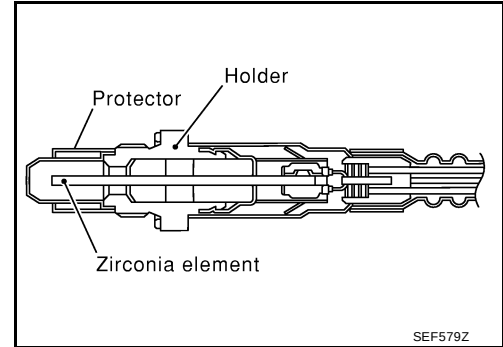
Component Description

UBS00EXH

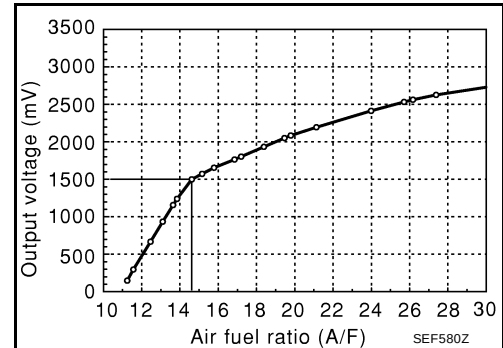
The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS00EXI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00EXJ

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1276 1276 (Bank 1) P1286 1286 (Bank 2)	Air fuel ratio (A/F) sensor 1 circuit high voltage	● The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 1.5V.	● Harness or connectors (The A/F sensor 1 circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

UBS00EXK

CAUTION:

Always drive vehicle at a safe speed.

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:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT-II.
3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

DTC P1276, P1286 A/F SENSOR 1

If the indication is constantly approx. 1.5V and does not fluctuates, go to [EC-468, "Diagnostic Procedure"](#)

If the indication fluctuates around 1.5V, go to next step.

4. Select "A/F SEN1 (B1) P1276" or "A/F SEN1 (B2) P1286" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-II.
5. Touch "START".
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	850 - 3,200 rpm
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	D position with "OD" ON

If "TESTING" is not displayed after 20 seconds, retry from step 2.

A/F SEN1 (B1) P1276	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLANT TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

SEF576Z

7. Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

A/F SEN1 (B1) P1276	
TESTING	
SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLANT TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

SEF577Z

8. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
9. Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".
If "NG" is displayed, go to [EC-468, "Diagnostic Procedure"](#) .

A/F SEN1 (B1) P1276	
COMPLETED	

SEF578Z

Overall Function Check

UBS00EXL

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set 5th position, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.

DTC P1276, P1286 A/F SENSOR 1

7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.
If the DTC is displayed, go to [EC-468, "Diagnostic Procedure"](#) .

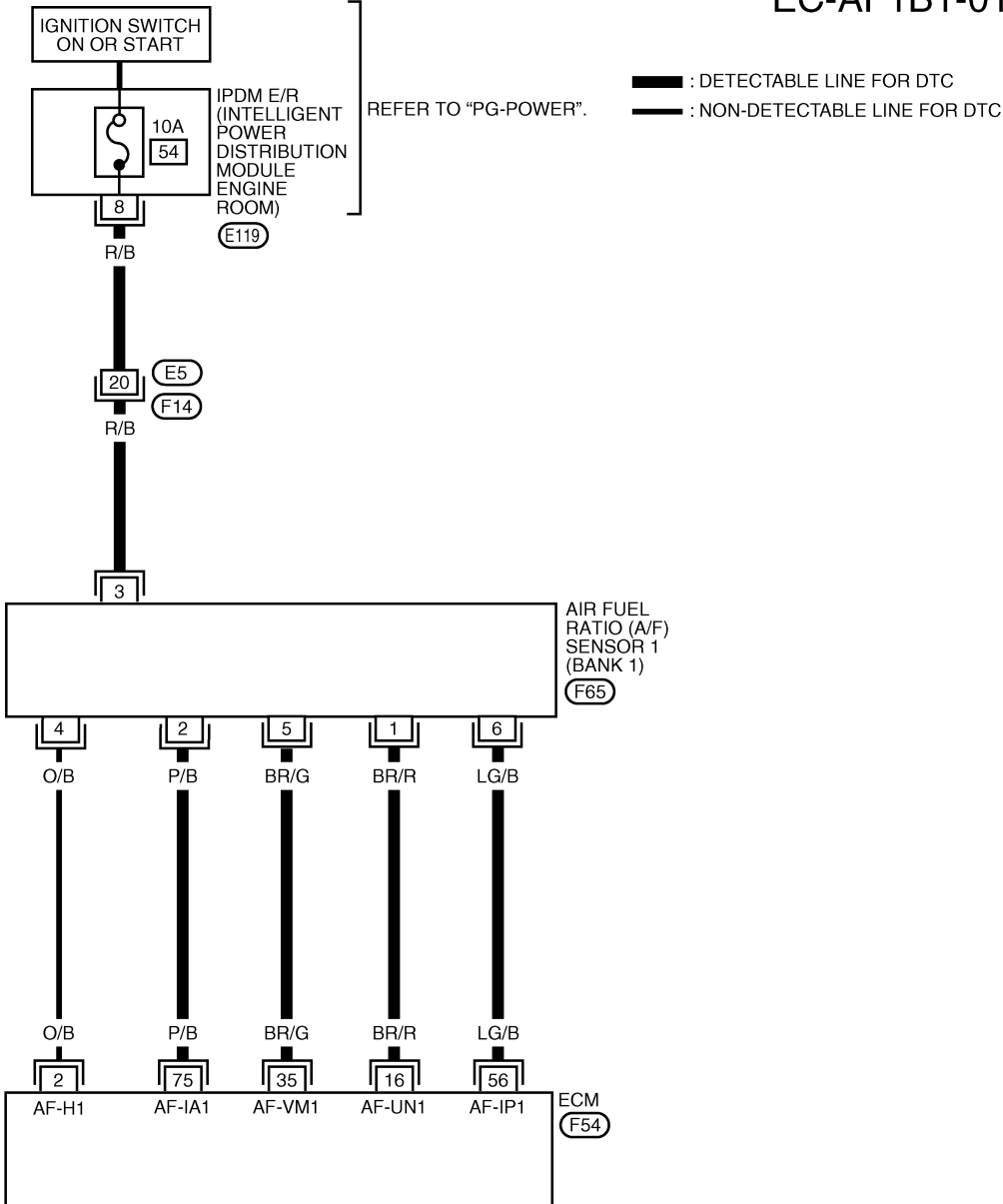
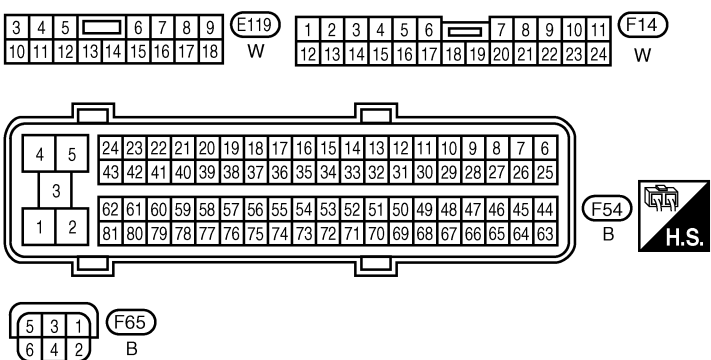
DTC P1276, P1286 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EXM

EC-AF1B1-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



DTC P1276, P1286 A/F SENSOR 1

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

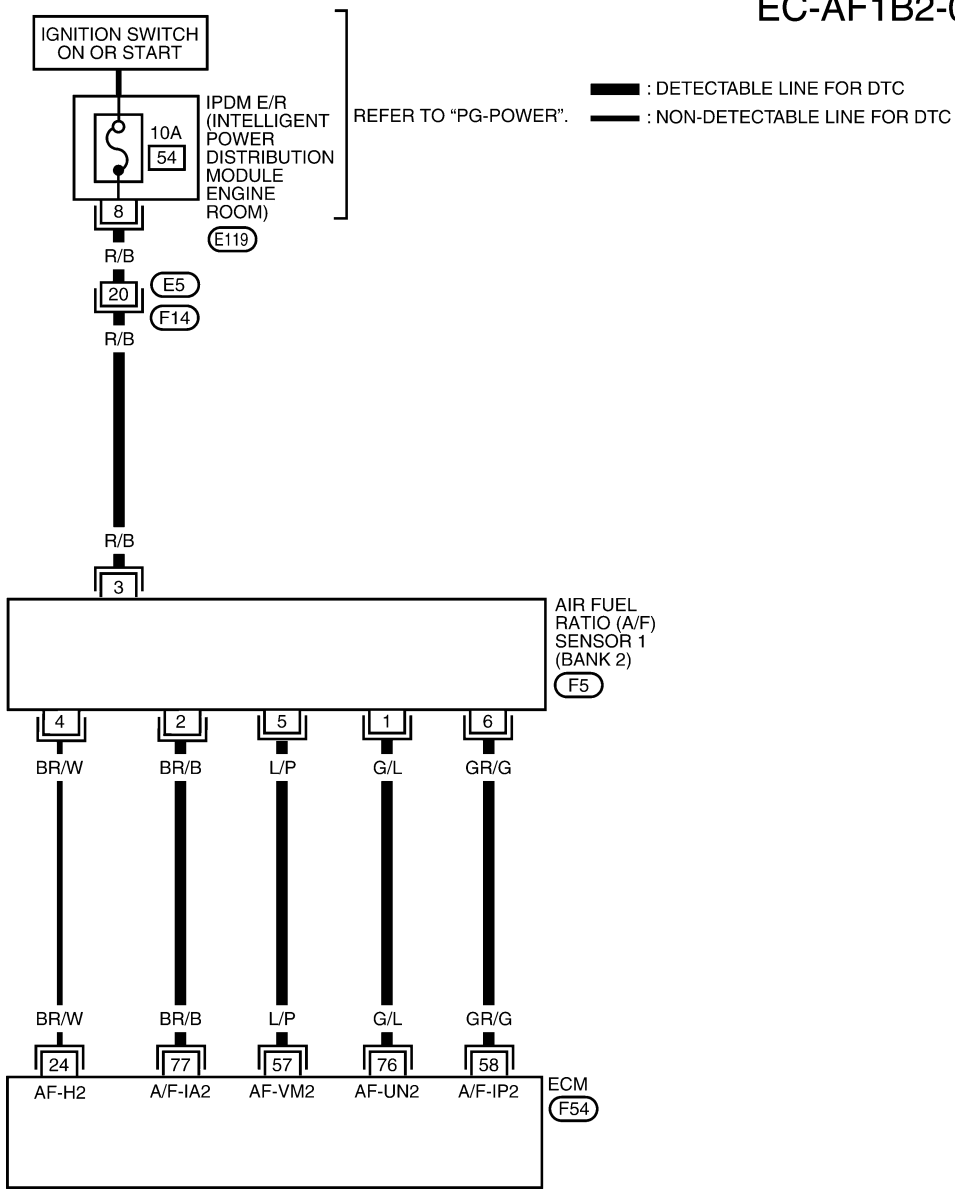
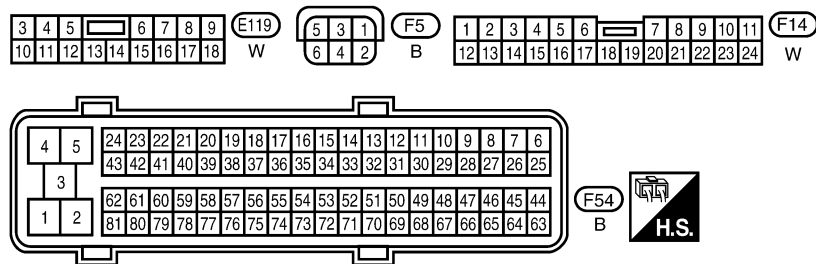
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

DTC P1276, P1286 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1276, P1286 A/F SENSOR 1

Specification data are reference values and are 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.

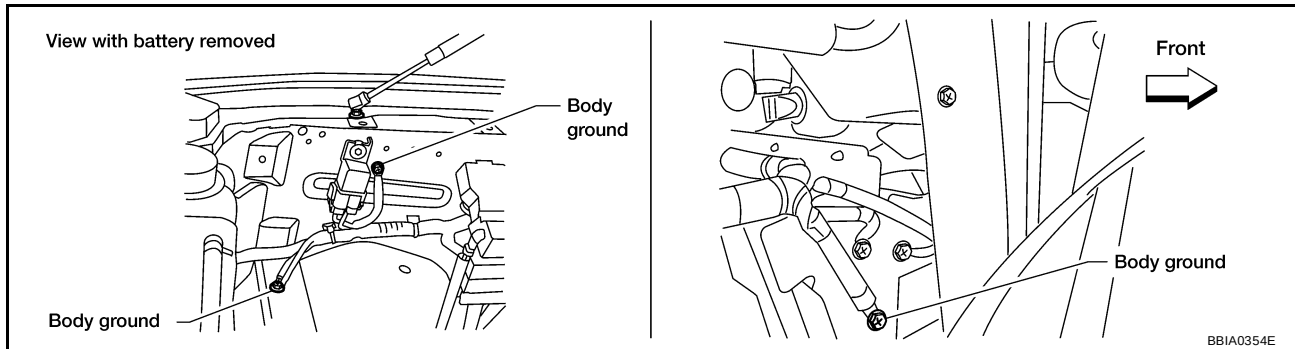
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EXN

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



BBIA0354E

Refer to [EC-132, "Ground Inspection"](#) .

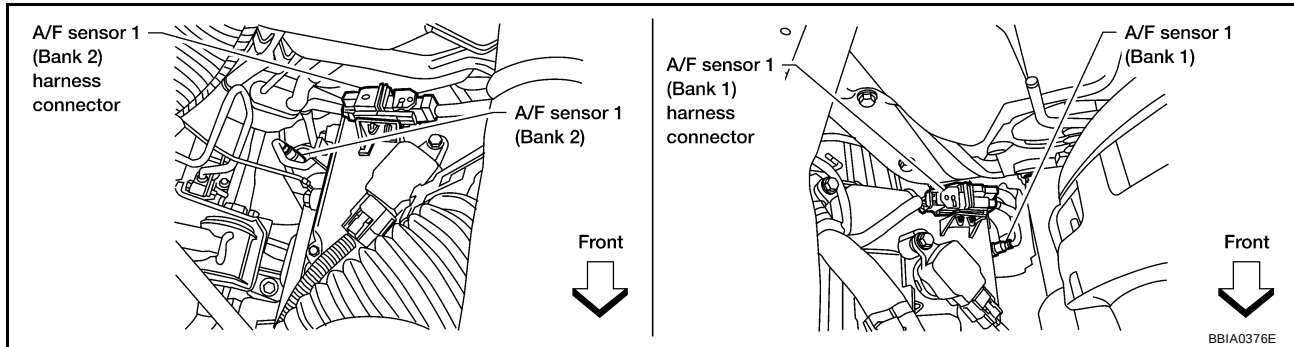
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P1276, P1286 A/F SENSOR 1

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector.

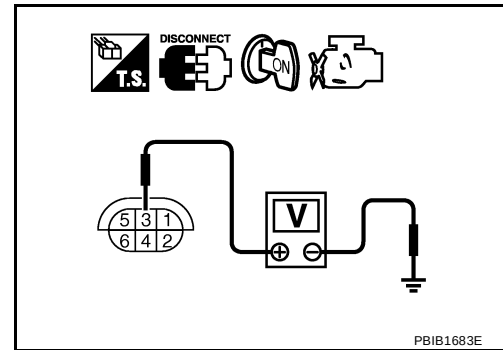


2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1276, P1286 A/F SENSOR 1

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

UBS00EXO

DTC P1278, P1288 A/F SENSOR 1

DTC P1278, P1288 A/F SENSOR 1

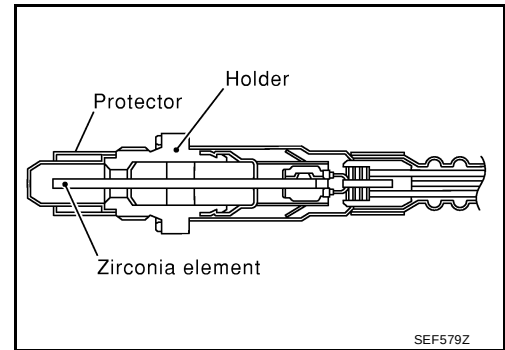
PFP:22693

Component Description

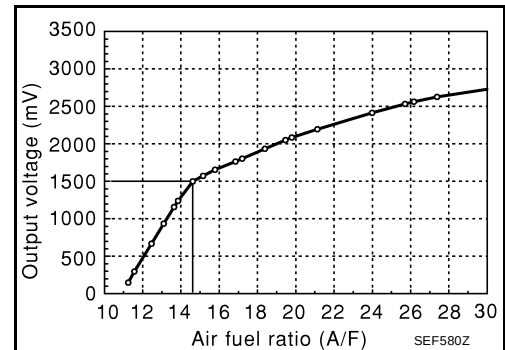
The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

To judge the malfunction of A/F sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the A/F sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the A/F sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1278 1278 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit slow response	● The response (from RICH to LEAN) of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time.	● Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
P1288 1288 (Bank 2)			● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor 1 heater ● Fuel pressure ● Injector ● Intake air leaks ● Exhaust gas leaks ● PCV ● Mass air flow sensor

DTC P1278, P1288 A/F SENSOR 1

UBS00EXS

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:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

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. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select "A/F SEN1(B1) P1278/P1279" or "A/F SEN1(B1) P1288/P1289" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-II.
6. Touch "START".
If "COMPLETED" appears on CONSULT-II screen, go to step 10.
If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.

A/F SEN1 (B1) P1278/P1279	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0756E

7. After perform the following procedure, "TESTING" will be displayed on the CONSULT-II screen.
 - a. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
 - b. Fully release accelerator pedal and then let engine idle for about 10 seconds.
If "TESTING" is not displayed after 10 seconds, refer to [EC-122, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#) .
8. Wait for about 20 seconds at idle at under the condition that "TESTING" is displayed on the CONSULT-II screen.

A/F SEN1 (B1) P1278/P1279	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB1925E

9. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", refer to [EC-122, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#) .
10. Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".
If "NG" is displayed, go to [EC-477, "Diagnostic Procedure"](#) .

A/F SEN1 (B1) P1278/P1279	
COMPLETED	

PBIB0758E

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Select "MODE 1" with GST.
3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.
Make sure that the total percentage should be within $\pm 15\%$.
If OK, go to the following step.
If NG, check the following.

DTC P1278, P1288 A/F SENSOR 1

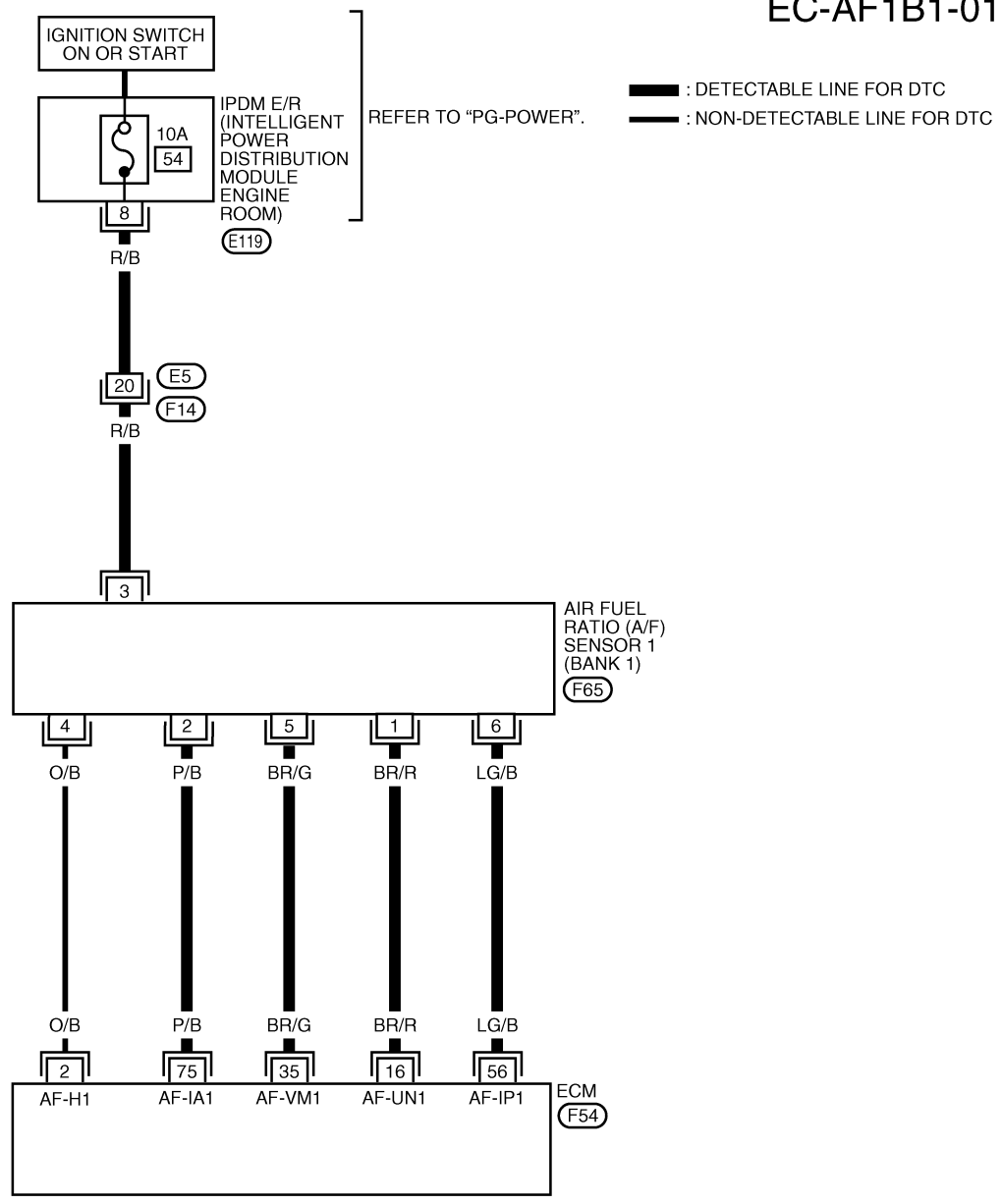
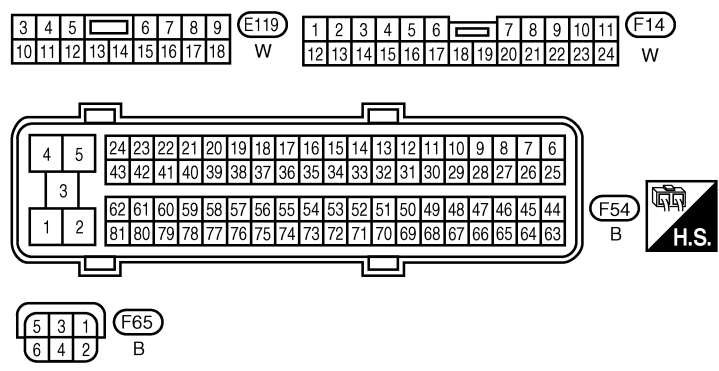
<hr/>	
● Intake air leaks	A
● Exhaust gas leaks	
● Incorrect fuel pressure	
● Lack of fuel	EC
● Injectors	
● Incorrect PCV hose connection	
● PCV valve	C
● Mass air flow sensor	
4. Turn ignition switch OFF and wait at least 10 seconds.	
5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1minute under no load.	D
6. Let engine idle for 1 minute.	
7. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.	
8. Fully release accelerator pedal and then let engine idle for about 1 minute.	E
9. Select "MODE 7" with GST.	
If the 1st trip DTC is displayed, go to EC-477, "Diagnostic Procedure" .	
	F
	G
	H
	I
	J
	K
	L
	M

DTC P1278, P1288 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EXT

EC-AF1B1-01



BBWA1369E

DTC P1278, P1288 A/F SENSOR 1

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

A

EC

C

D

E

F

G

H

I

J

K

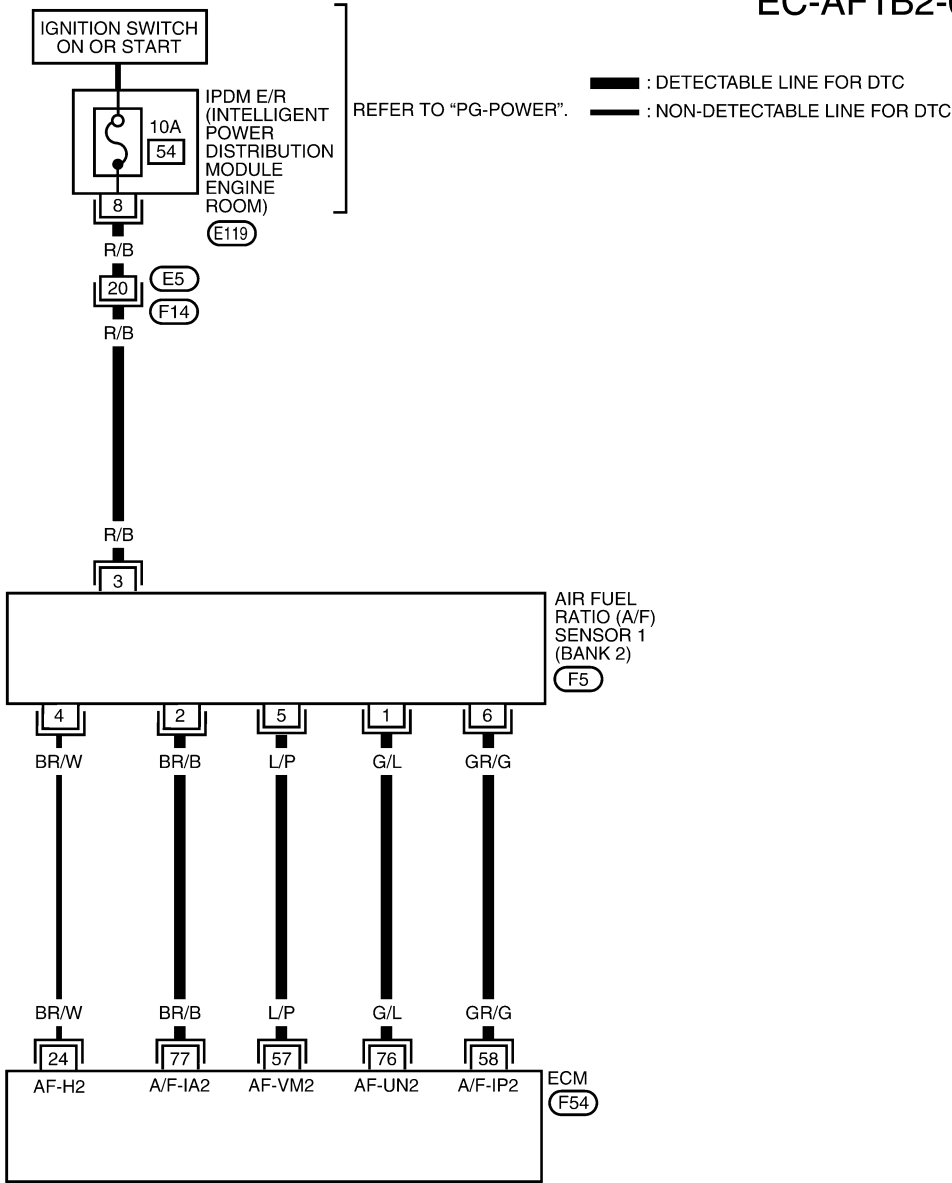
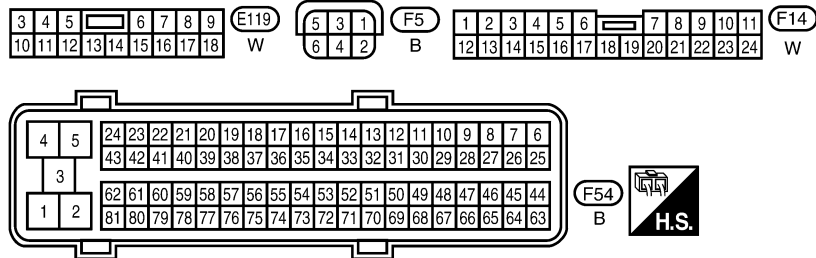
L

M

DTC P1278, P1288 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1278, P1288 A/F SENSOR 1

Specification data are reference values and are 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.

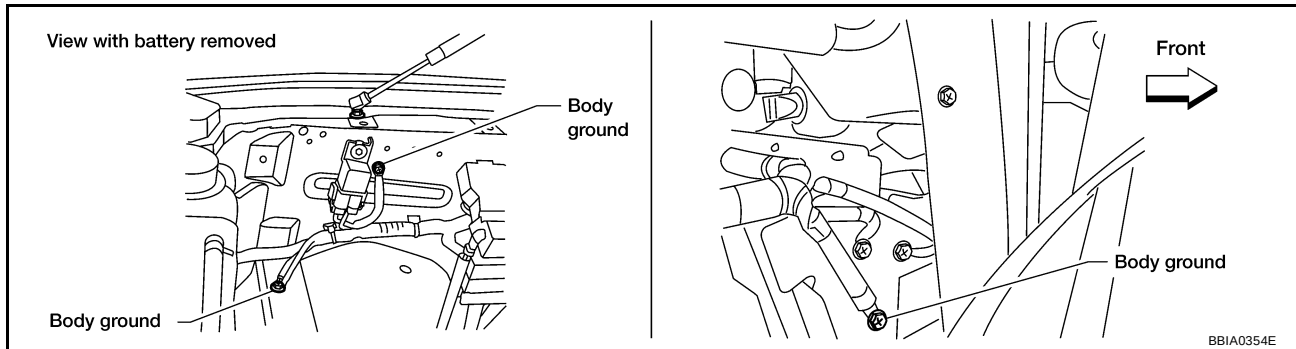
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EXU

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



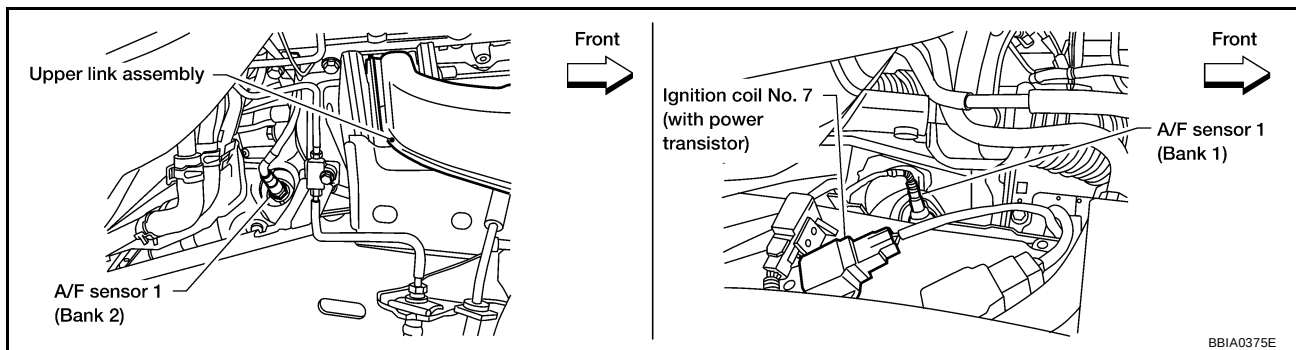
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1.



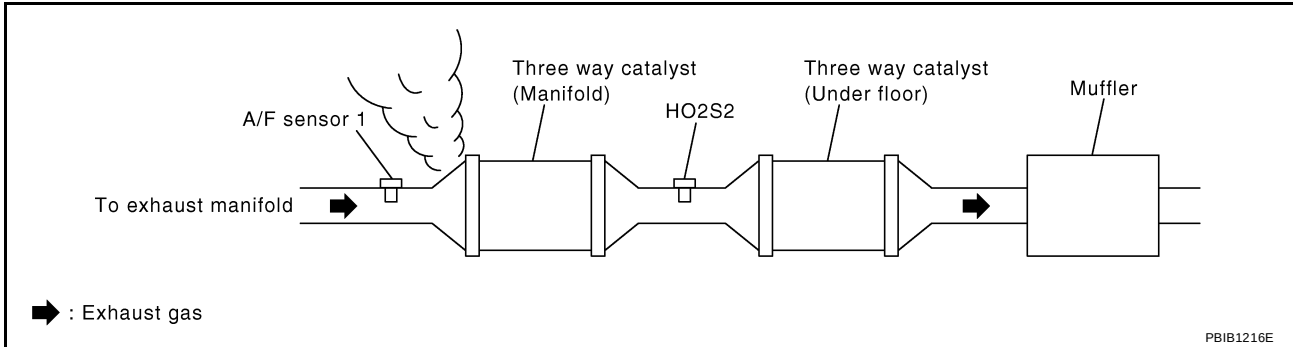
Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

DTC P1278, P1288 A/F SENSOR 1

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

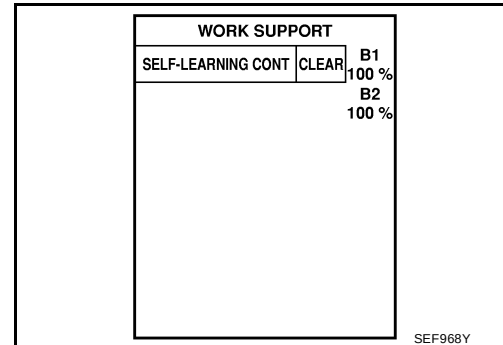
- OK >> GO TO 5.
- NG >> Repair or replace.

DTC P1278, P1288 A/F SENSOR 1

5. CLEAR THE SELF-LEARNING DATA

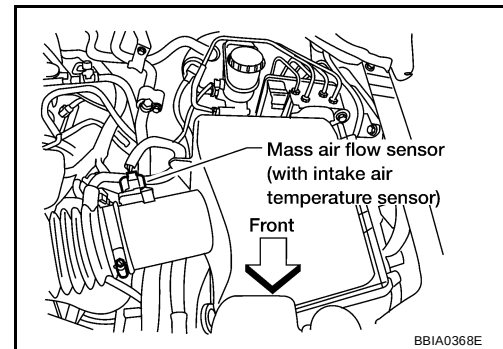
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P172, P0174 or P0175 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
8. Make sure DTC P0000 is displayed.
9. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
Is it difficult to start engine?



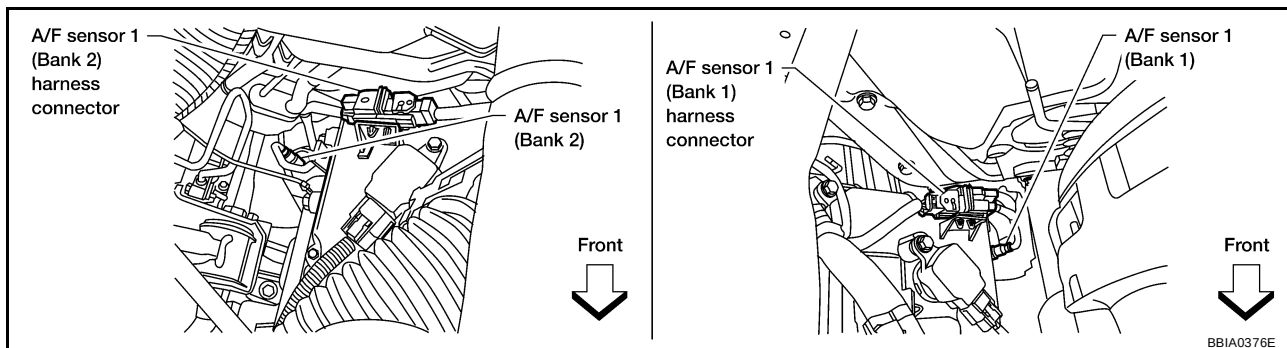
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-207](#) or [EC-216](#)
- No >> GO TO 6.

DTC P1278, P1288 A/F SENSOR 1

6. CHECK A/F SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.

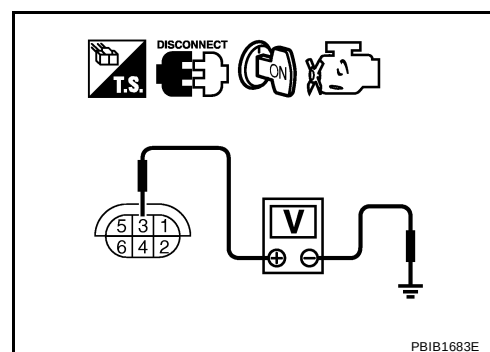


3. Turn ignition switch ON.
4. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1278, P1288 A/F SENSOR 1

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-359, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace A/F sensor 1.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-152, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace mass air flow sensor.

DTC P1278, P1288 A/F SENSOR 1

11. CHECK PCV VALVE

Refer to [EC-617, "POSITIVE CRANKCASE VENTILATION"](#) .

OK or NG

OK >> GO TO 12.

NG >> Repair or replace PCV valve.

12. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

UBS00EXV

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P1279, P1289 A/F SENSOR 1

DTC P1279, P1289 A/F SENSOR 1

PFP:22693

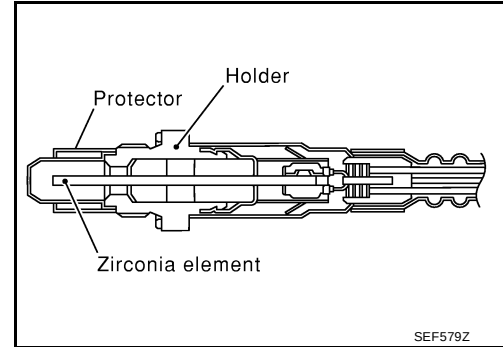
UBS00EXW

Component Description

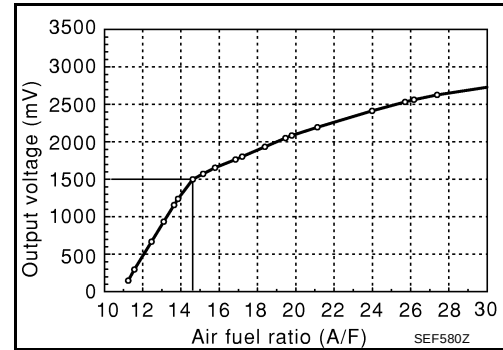
The air fuel ratio (A/F) sensor 1 is a planar dual-cell limit current sensor. The sensor element of the A/F sensor 1 is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.



An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor 1 is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS00EXX

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1) A/F SEN1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00EXY

To judge the malfunction of A/F sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the air fuel ration A/F sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the A/F sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1279 1279 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit slow response	● The response (from LEAN to RICH) of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time.	● Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
P1289 1289 (Bank 2)			● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor 1 heater ● Fuel pressure ● Injector ● Intake air leaks ● Exhaust gas leaks ● PCV ● Mass air flow sensor

DTC P1279, P1289 A/F SENSOR 1

UBS00EXZ

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:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

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. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select "A/F SEN1(B1) P1278/P1279" or "A/F SEN1(B1) P1288/P1289" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-II.
6. Touch "START".
If "COMPLETED" appears on CONSULT-II screen, go to step 10.
If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.

A/F SEN1 (B1) P1278/P1279	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0756E

7. After perform the following procedure, "TESTING" will be displayed on the CONSULT-II screen.
 - a. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
 - b. Fully release accelerator pedal and then let engine idle for about 10 seconds.
If "TESTING" is not displayed after 10 seconds, refer to [EC-122, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#) .
8. Wait for about 20 seconds at idle at under the condition that "TESTING" is displayed on the CONSULT-II screen.

A/F SEN1 (B1) P1278/P1279	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB1925E

9. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", refer to [EC-122, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#) .
10. Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".
If "NG" is displayed, go to [EC-489, "Diagnostic Procedure"](#) .

A/F SEN1 (B1) P1278/P1279	
COMPLETED	

PBIB0758E

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Select "MODE 1" with GST.
3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.
Make sure that the total percentage should be within $\pm 15\%$.
If OK, go to the following step.
If NG, check the following.

DTC P1279, P1289 A/F SENSOR 1

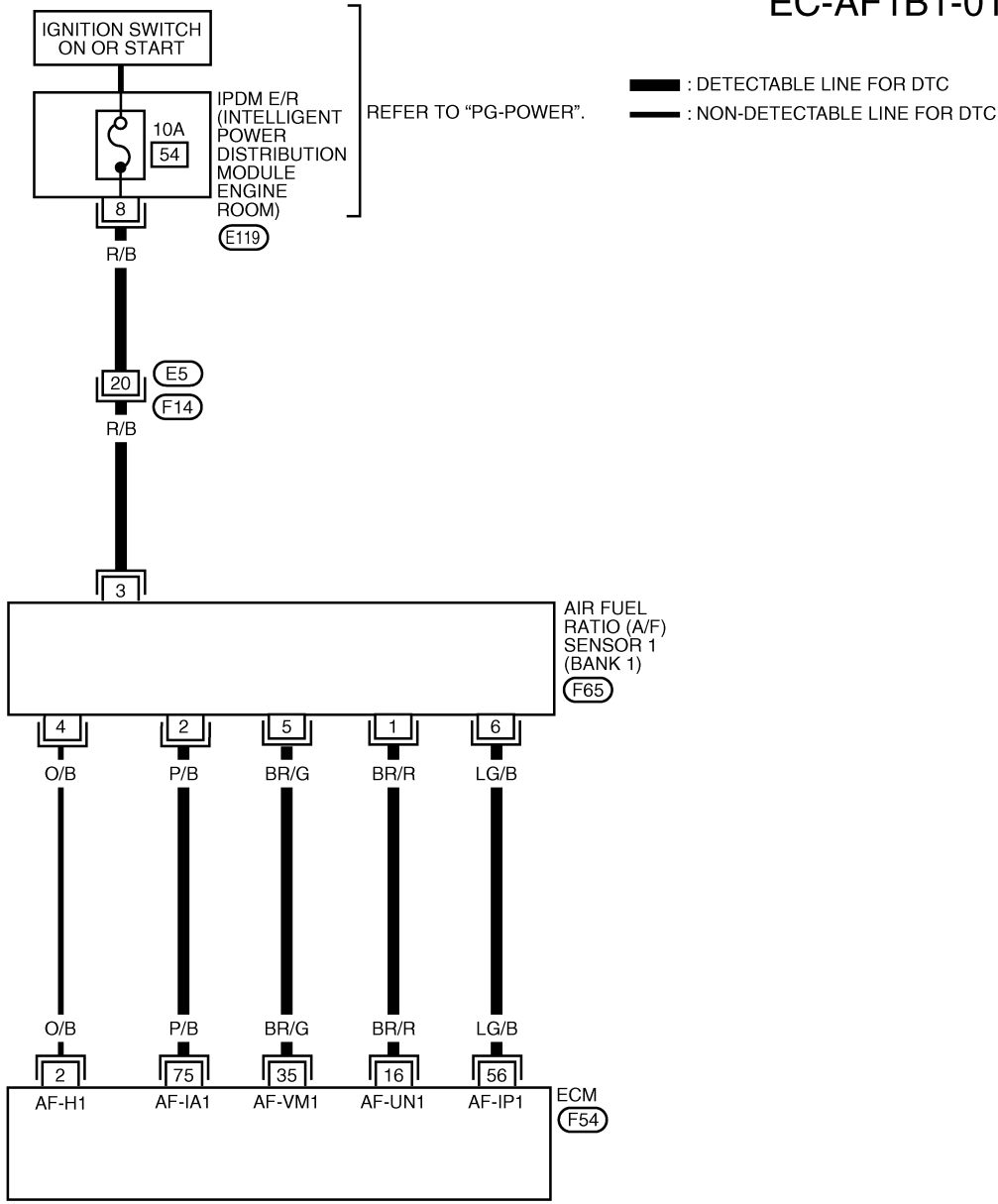
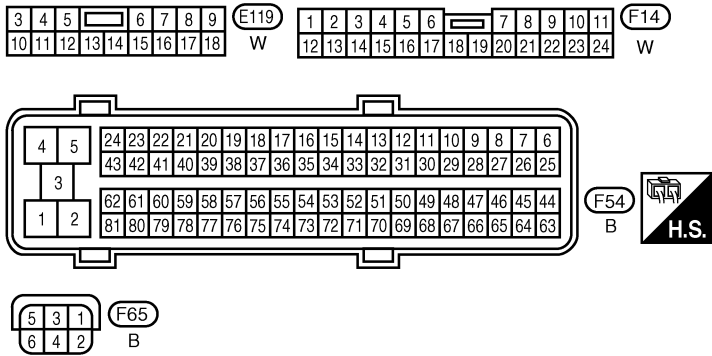
<hr/>	
● Intake air leaks	A
● Exhaust gas leaks	
● Incorrect fuel pressure	
● Lack of fuel	EC
● Injectors	
● Incorrect PCV hose connection	
● PCV valve	C
● Mass air flow sensor	
4. Turn ignition switch OFF and wait at least 10 seconds.	
5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1minute under no load.	D
6. Let engine idle for 1 minute.	
7. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.	E
8. Fully release accelerator pedal and then let engine idle for about 1 minute.	
9. Select "MODE 7" with GST.	
If the 1st trip DTC is displayed, go to EC-489, "Diagnostic Procedure" .	
	F
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DTC P1279, P1289 A/F SENSOR 1

Wiring Diagram
BANK 1

UBS00EY0

EC-AF1B1-01



BBWA1369E

DTC P1279, P1289 A/F SENSOR 1

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

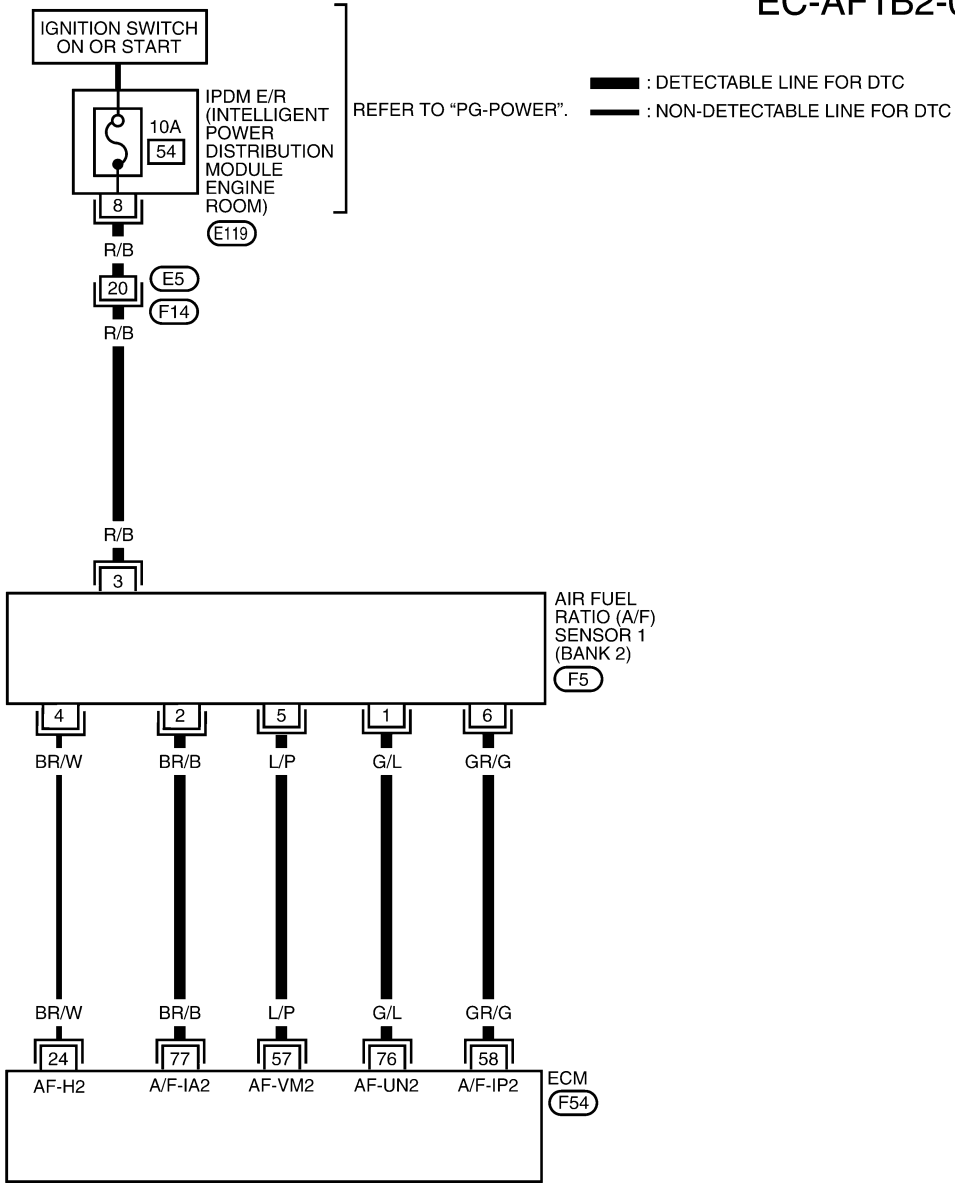
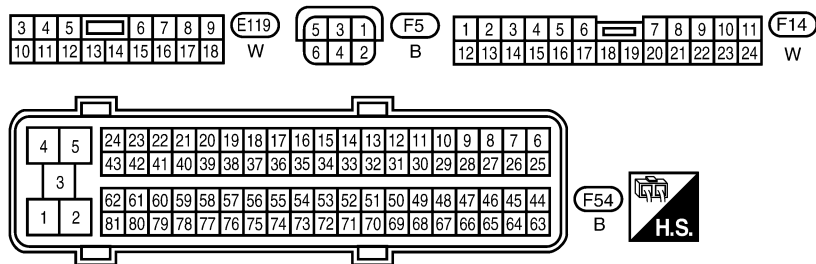
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	BR/R	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 3.1V
35	BR/G			Approximately 2.6V
56	LG/B			Approximately 2.3V
75	P/B			Approximately 2.3V

DTC P1279, P1289 A/F SENSOR 1

BANK 2

EC-AF1B2-01



DTC P1279, P1289 A/F SENSOR 1

Specification data are reference values and are 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.

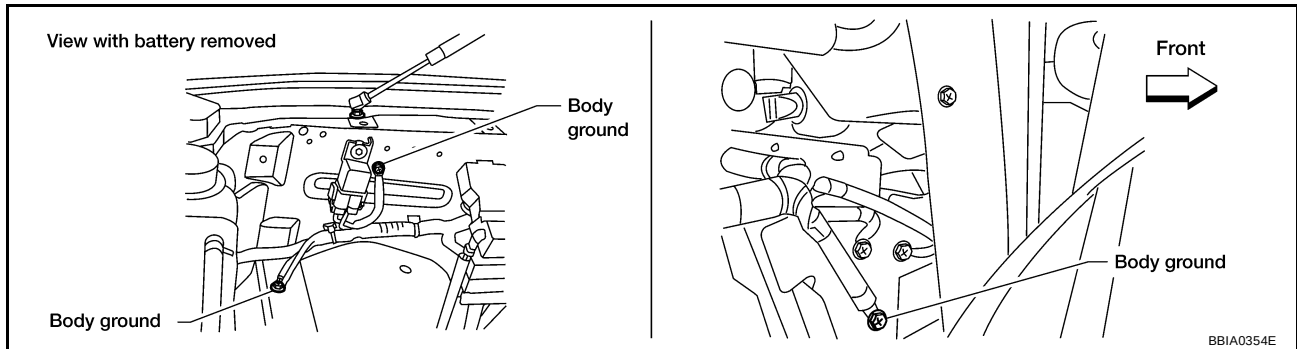
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	L/P	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed	Approximately 2.6V
58	GR/G			Approximately 2.3V
76	G/L			Approximately 3.1V
77	BR/B			Approximately 2.3V

Diagnostic Procedure

UBS00EY1

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



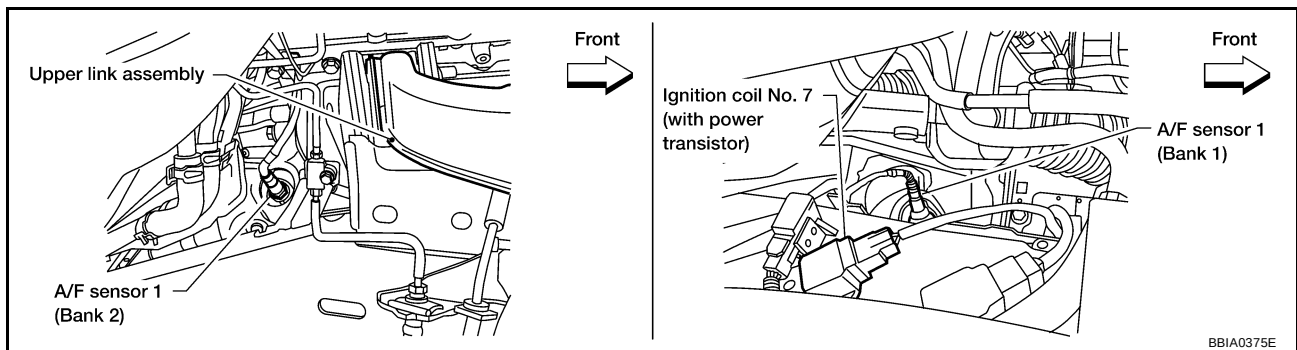
Refer to [EC-132, "Ground Inspection"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1.



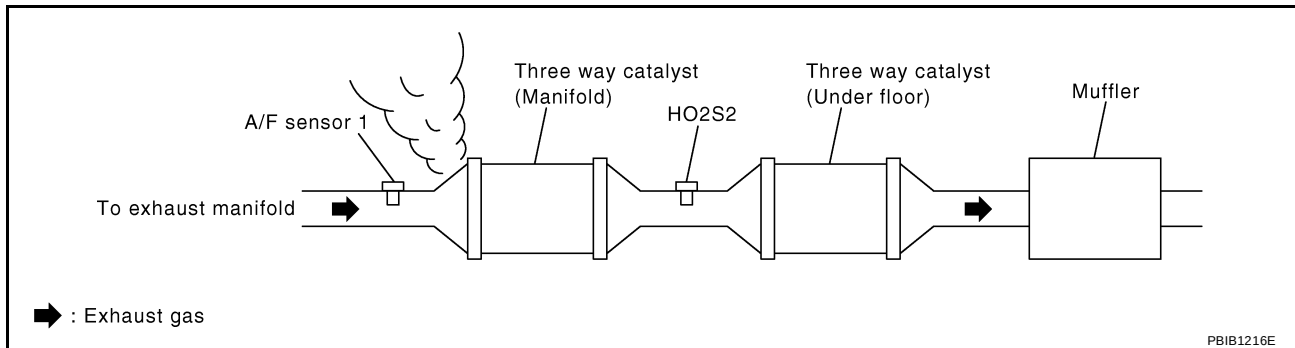
Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

DTC P1279, P1289 A/F SENSOR 1

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (Manifold).



OK or NG

- OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

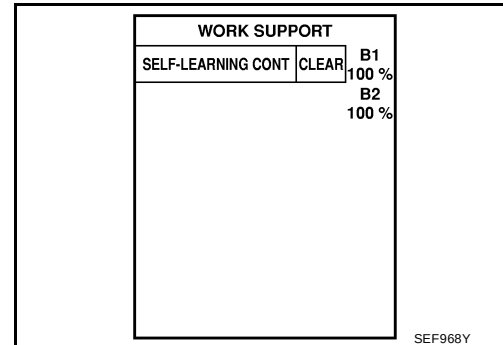
- OK >> GO TO 5.
NG >> Repair or replace.

DTC P1279, P1289 A/F SENSOR 1

5. CLEAR THE SELF-LEARNING DATA

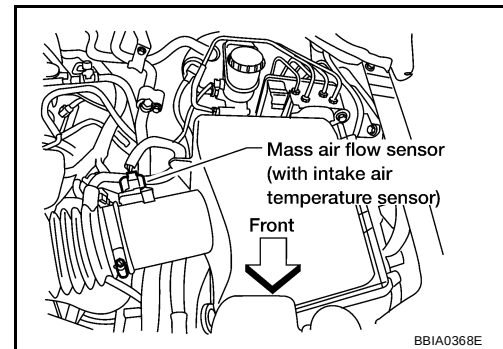
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P172, P0174 or P0175 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-62, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .
8. Make sure DTC P0000 is displayed.
9. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
Is it difficult to start engine?



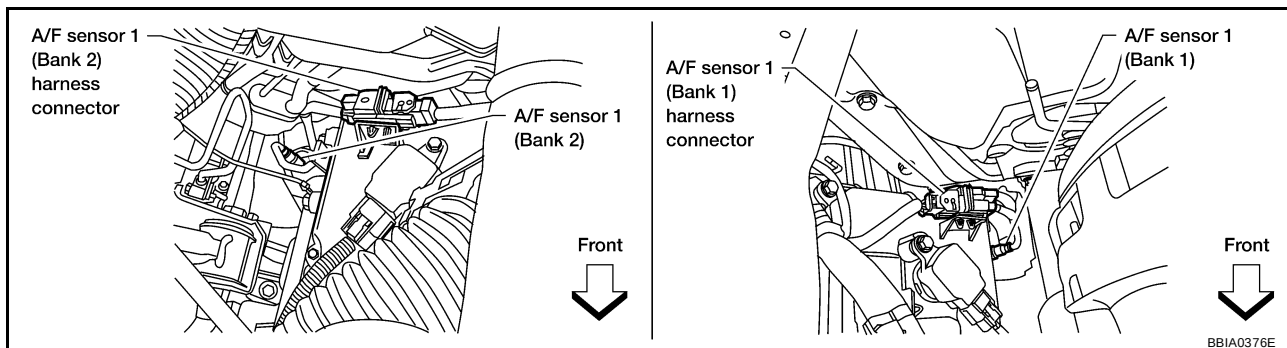
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-207](#) or [EC-216](#)
- No >> GO TO 6.

DTC P1279, P1289 A/F SENSOR 1

6. CHECK A/F SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.

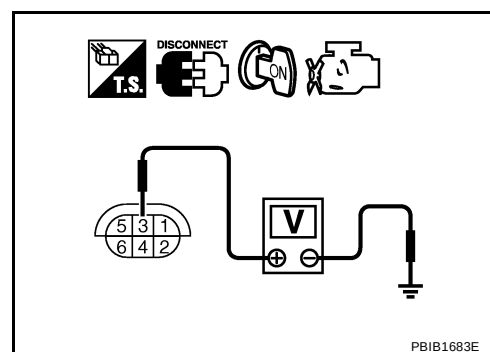


3. Turn ignition switch ON.
4. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- IPDM E/R harness connector E119
- 10A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

DTC P1279, P1289 A/F SENSOR 1

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between A/F sensor 1 terminal and ECM terminal as follows.
Refer to Wiring Diagram.

	A/F sensor 1 terminal	ECM terminal
Bank1	1	16
	2	75
	5	35
	6	56
Bank 2	1	76
	2	77
	5	57
	6	58

Continuity should exist.

4. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor 1 terminal	ECM terminal	A/F sensor 1 terminal	ECM terminal
1	16	1	76
2	75	2	77
5	35	5	57
6	56	6	58

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-359, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace A/F sensor 1.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-152, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace mass air flow sensor.

DTC P1279, P1289 A/F SENSOR 1

11. CHECK PCV VALVE

Refer to [EC-617, "POSITIVE CRANKCASE VENTILATION"](#) .

OK or NG

OK >> GO TO 12.

NG >> Repair or replace PCV valve.

12. CHECK INTERMITTENT INCIDENT

Perform [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

Removal and Installation AIR FUEL RATIO (A/F) SENSOR 1

UBS00EY2

Refer to [EM-19, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

UBS00EY3

Description SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* ¹	EVAP canister purge flow control	EVAP canister purge vol- ume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage* ¹		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Wheel sensor* ²	Vehicle speed		

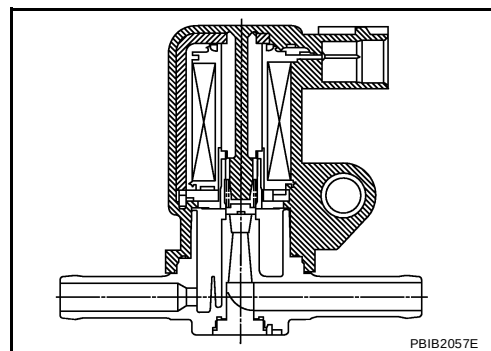
*1:ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EY4

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: N No load 	Idle (Accelerator pedal is not depressed even slightly, after starting engine)
		2,000 rpm
		0%
		—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

On Board Diagnosis Logic

UBS00EY5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"> ● EVAP control system pressure sensor ● EVAP canister purge volume control solenoid valve (The valve is stuck open.) ● EVAP canister vent control valve ● EVAP canister ● Hoses (Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

UBS00EY6

NOTE:

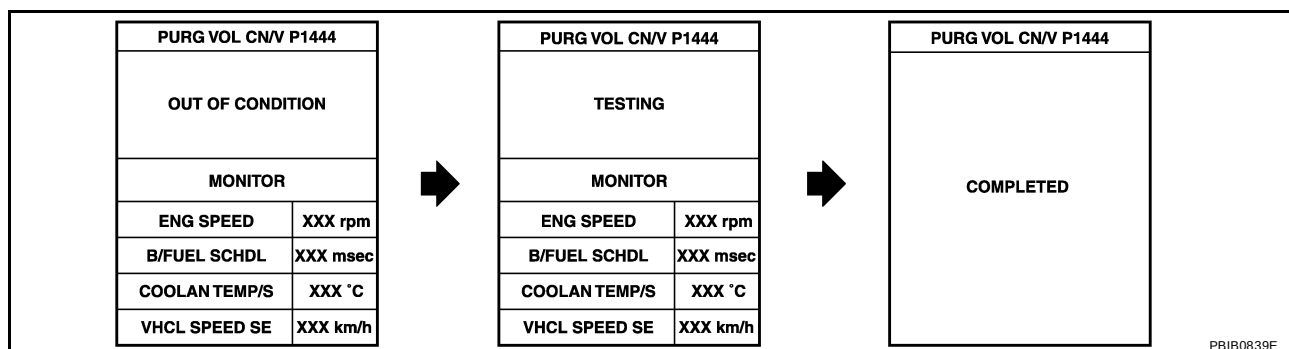
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

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 "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
5. Touch "START".



6. Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take approximately 10 seconds.)
If "TESTING" is not displayed after 5 minutes, retry from step 2.
7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-499, "Diagnostic Procedure"](#).

WITH GST

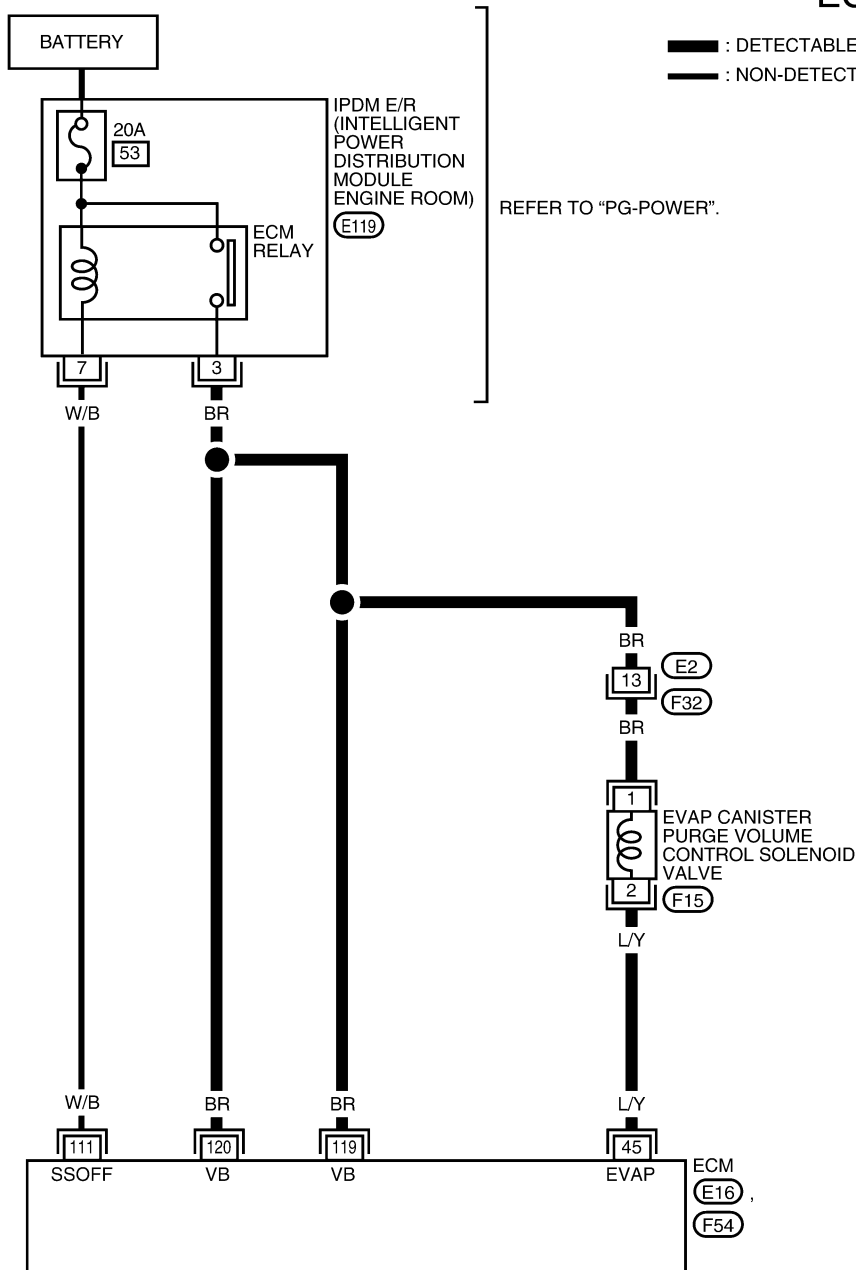
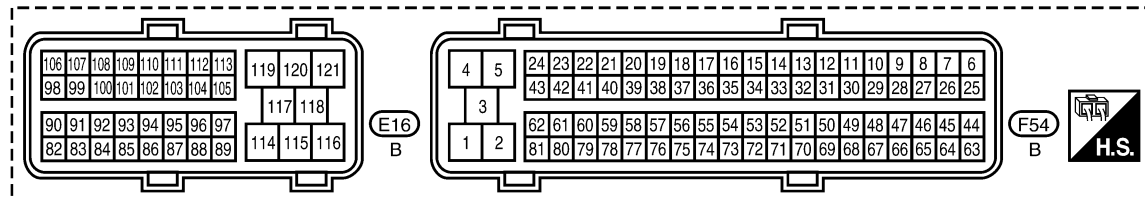
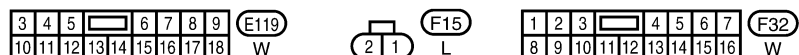
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select MODE 7 with GST.
5. If 1st trip DTC is detected, go to [EC-499, "Diagnostic Procedure"](#).

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Wiring Diagram

UBS00EY7

EC-PGC/V-01



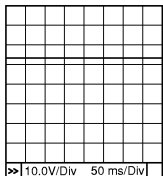
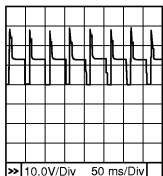
BBWA1172E

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	L/Y	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed ● Accelerator pedal is not depressed even slightly, after starting engine 	BATTERY VOLTAGE (11 - 14V)★  <small>10.0V/Div 50 ms/Div</small> PBIB0050E
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	11 - 14V★  <small>10.0V/Div 50 ms/Div</small> PBIB0051E
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> ● For a few seconds after turning ignition switch OFF 	0 - 1.5V
			[Ignition switch: OFF] <ul style="list-style-type: none"> ● More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14V)
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

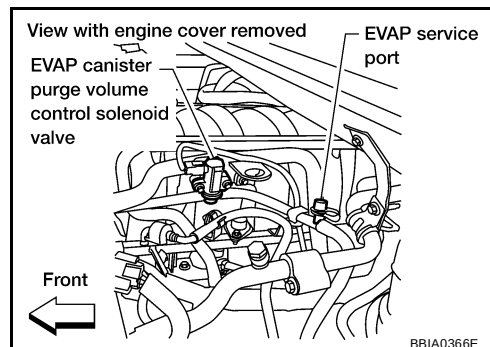
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure

UBS00EY8

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.

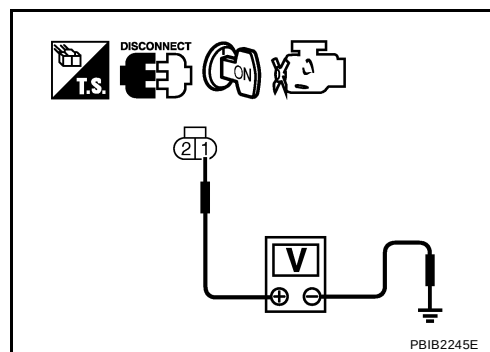


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- IPDM E/R harness connector E119
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and 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.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 5.
NG >> Replace EVAP control system pressure sensor.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-300, "Component Inspection"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 6.
OK (Without CONSULT-II)>>GO TO 7.
NG >> Replace EVAP control system pressure sensor.

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-II**

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %

PBIB1678E

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-502, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve.

8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 9.
NG >> Clean the rubber tube using an air blower.

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-296, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
NG >> Replace EVAP canister vent control valve.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

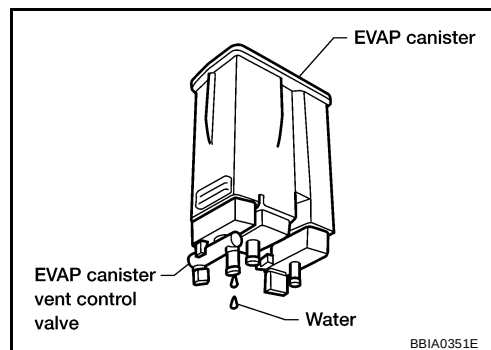
10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Yes or No

Yes >> GO TO 11.

No >> GO TO 13.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.2 kg (4.9 lb).

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS00EY9

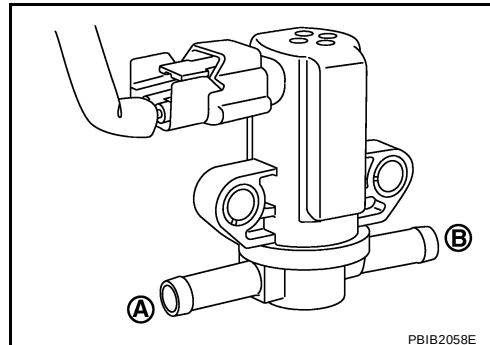
Component Inspection

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

🔧 With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

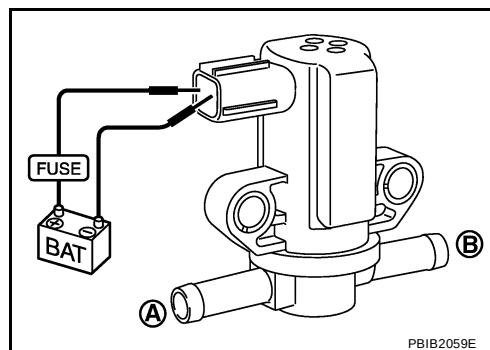
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



⊗ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



UBS00EYA

Removal and Installation

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EM-15, "INTAKE MANIFOLD"](#) .

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PFP:14935

Component Description

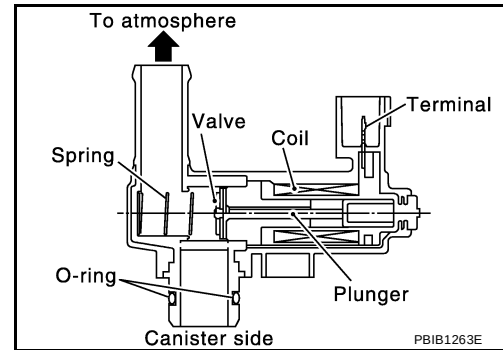
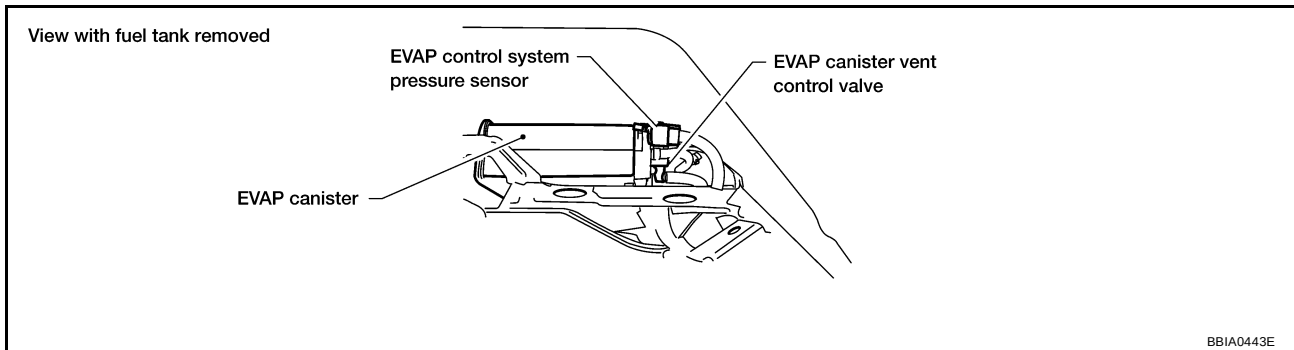
UBS00EYB

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows EVAP Control System diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EYC

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS00EYD

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none">● EVAP canister vent control valve● EVAP control system pressure sensor and the circuit● Blocked rubber tube to EVAP canister vent control valve● EVAP canister is saturated with water

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

UBS00EYE

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.

⑧ WITH CONSULT-II

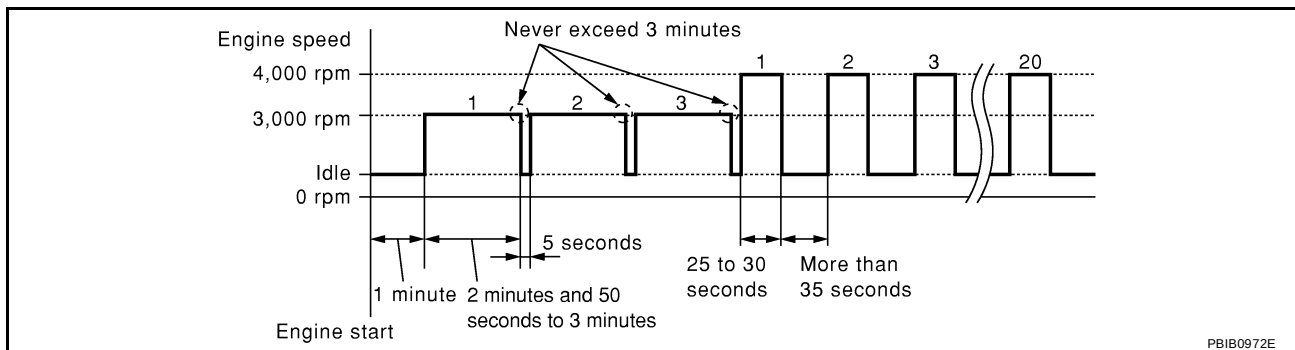
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures 3 times.
 - a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.
Never exceed 3 minutes.
 - b. Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. If 1st trip DTC is detected, go to [EC-506, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

If 1st trip DTC is not detected, go to the next step.

7. Repeat next procedure 20 times.
 - a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
 - b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



8. If 1st trip DTC is detected, go to [EC-506, "Diagnostic Procedure"](#).

⑧ WITH GST

Follow the procedure "WITH CONSULT-II" above.

UBS00EYF

A



DTC P1446 EVAP CANISTER VENT CONTROL VALVE

Specification data are reference values and are 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.

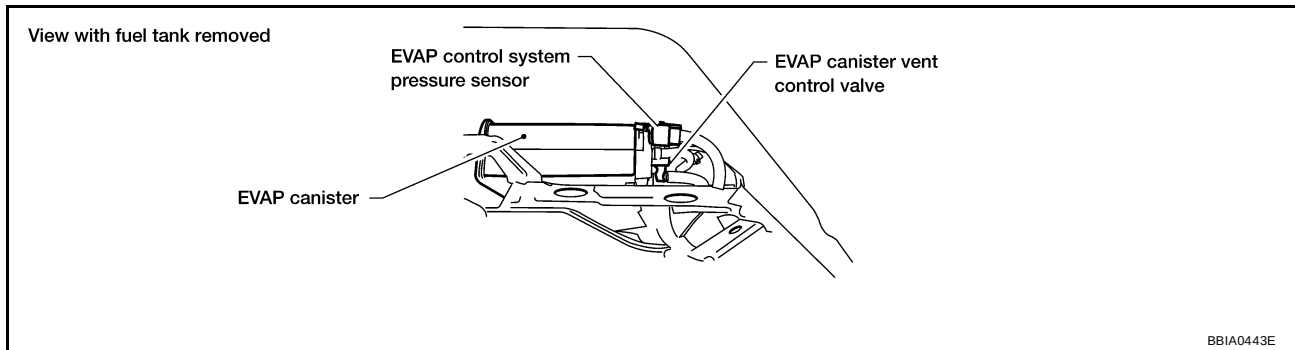
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
117	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EYG

1. CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-507, "Component Inspection"](#) .

OK or NG

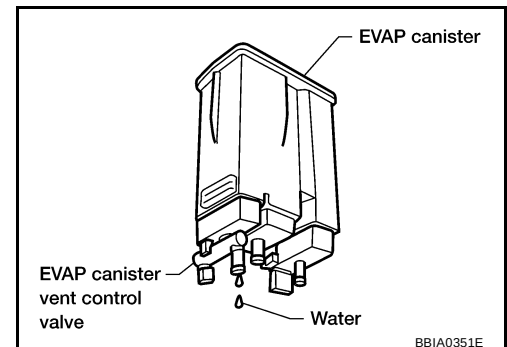
- OK >> GO TO 3.
- NG >> Replace EVAP canister vent control valve.

3. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 4.
- No >> GO TO 6.



DTC P1446 EVAP CANISTER VENT CONTROL VALVE

4. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.2 kg (4.9 lb).

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 7.
- NG >> Replace EVAP control system pressure sensor.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-300, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP control system pressure sensor.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

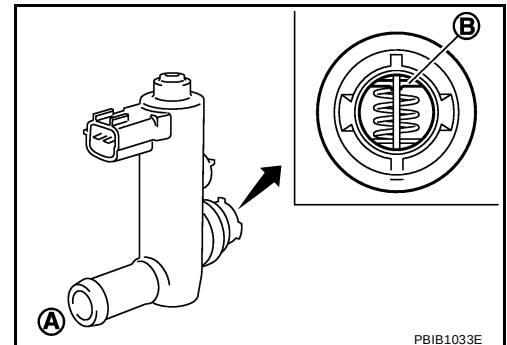
>> INSPECTION END

Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS00EYH

With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve.
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



DTC P1446 EVAP CANISTER VENT CONTROL VALVE

5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Make sure that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve.

If OK, go to next step.

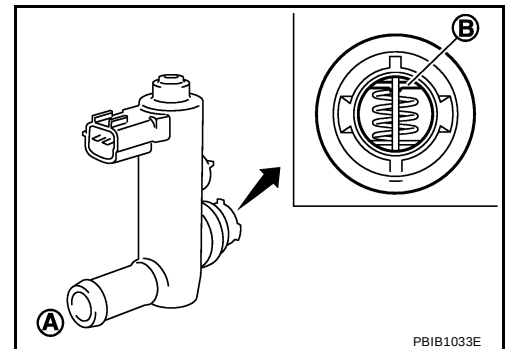
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

⊗ **Without CONSULT-II**

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB1679E



PBIB1033E

3. Check air passage continuity and operation delay time under the following conditions.
Make sure that new O-ring is installed properly.

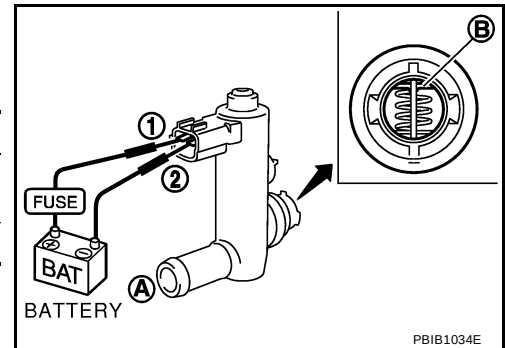
Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve.

If OK, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.



PBIB1034E

DTC P1564 ASCD STEERING SWITCH

DTC P1564 ASCD STEERING SWITCH

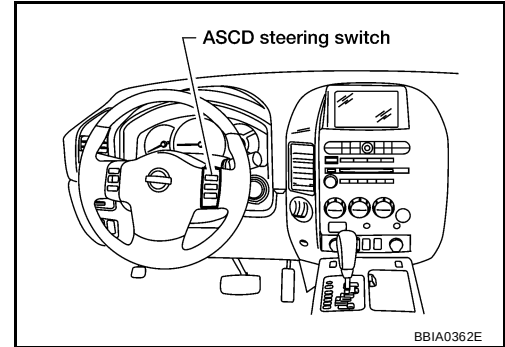
PFP:25551

Component Description

UBS00EYI

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

Refer to [EC-619, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EYJ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	ON/OFF(MAIN) switch: Pressed	ON
		ON/OFF(MAIN) switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RESUME switch: Pressed	ON
		ACCEL/RESUME switch: Released	OFF
SET SW	● Ignition switch: ON	COAST/SET switch: Pressed	ON
		COAST/SET switch: Released	OFF

On Board Diagnosis Logic

UBS00EYK

This self-diagnosis has the one trip detection logic.

The MIL will not light up for this diagnosis.

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-350, "DTC P0605 ECM"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none">● An excessively high voltage signal from the ASCD steering switch is sent to ECM.● ECM detects that input signal from the ASCD steering switch is out of the specified range.● ECM detects that the ASCD steering switch is stuck ON.	<ul style="list-style-type: none">● Harness or connectors (The switch circuit is open or shorted.)● ASCD steering switch● ECM

DTC P1564 ASCD STEERING SWITCH

UBS00EYL

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.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press ON/OFF(MAIN) switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press ACCEL/RESUME switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press COAST/SET switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If DTC is detected, go to [EC-513, "Diagnostic Procedure"](#) .

WITH GST

Follow the procedure "WITH CONSULT-II" above.

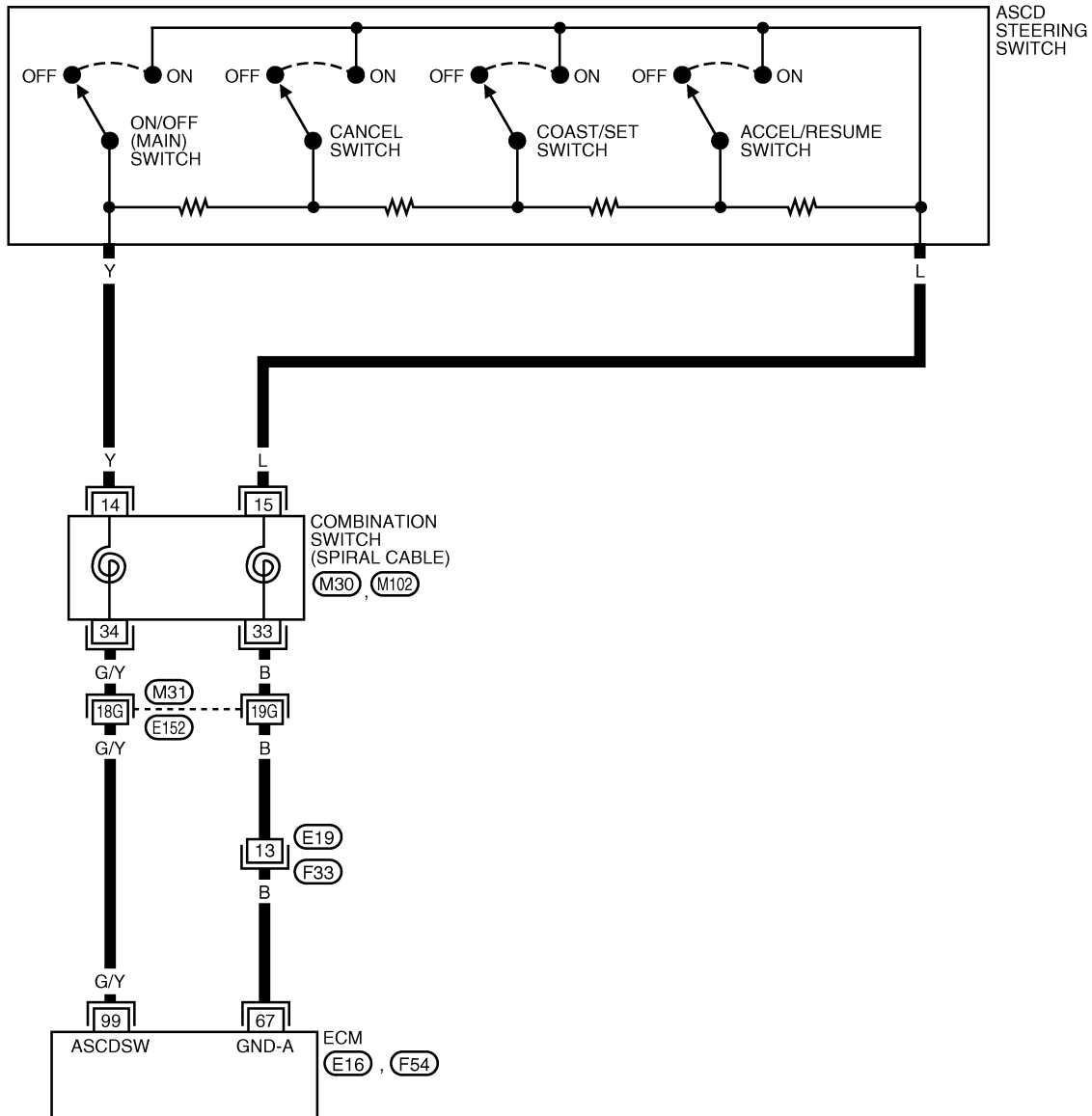
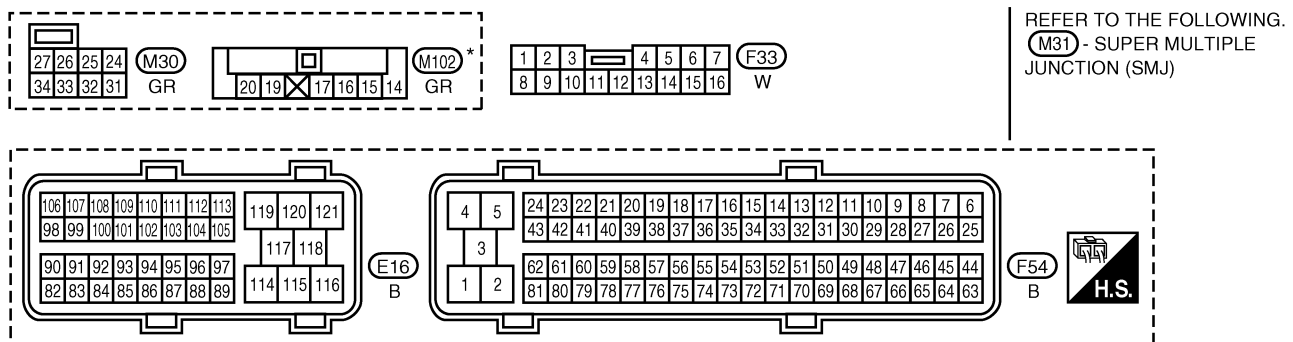
DTC P1564 ASCD STEERING SWITCH

Wiring Diagram

UBS00EYM

EC-ASC/SW-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



★ : This connector is not shown in "HARNESS LAYOUT" of PG section.

BBWA1368E

DTC P1564 ASCD STEERING SWITCH

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
67	B	Sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
99	G/Y	ASCD steering switch	[Ignition switch: ON] <ul style="list-style-type: none"> ● ASCD steering switch: OFF. 	Approximately 4V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● ON/OFF(MAIN) switch: Pressed 	Approximately 0V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● ON/OFF(MAIN) switch: Released 	Approximately 4V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● CANCEL switch: Pressed 	Approximately 1V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● CANCEL switch: Released 	Approximately 4V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● COAST/SET switch: Pressed 	Approximately 2V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● COAST/SET switch: Released 	Approximately 4V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● ACCEL/RESUME switch: Pressed 	Approximately 3V
			[Ignition switch: ON] <ul style="list-style-type: none"> ● ACCEL/RESUME switch: Released 	Approximately 4V

DTC P1564 ASCD STEERING SWITCH

UBS00EYN

Diagnostic Procedure

1. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-II

- Turn ignition switch ON.
- Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.
- Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
ON/OFF(MAIN) switch	MAIN SW	Pressed	ON
		Released	OFF
ACCEL/RESUME switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
COAST/SET switch	SET SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF

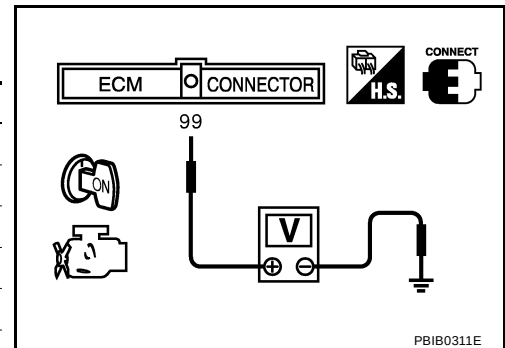
DATA MONITOR	
MONITOR	NO DTC
MAIN SW	OFF
CANCEL SW	OFF
RESUME/ACC SW	OFF
SET SW	OFF

SEC006D

Without CONSULT-II

- Turn ignition switch ON.
- Check voltage between ECM terminal 99 and ground with pressing each button.

Switch	Condition	Voltage [V]
ON/OFF(MAIN) switch	Pressed	Approx. 0
	Released	Approx. 4
ACCEL/RESUME switch	Pressed	Approx. 3
	Released	Approx. 4
COAST/SET switch	Pressed	Approx. 2
	Released	Approx. 4
CANCEL switch	Pressed	Approx. 1
	Released	Approx. 4



OK or NG

- OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

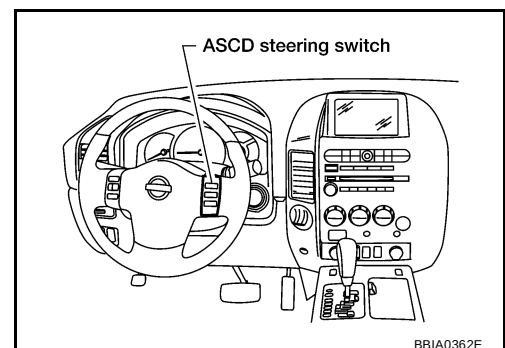
- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Disconnect combination switch harness connector.
- Check harness continuity between combination switch terminal 15 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



DTC P1564 ASCD STEERING SWITCH

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Harness connectors E19, F33
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 99 and combination switch terminal 14.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD STEERING SWITCH

Refer to [EC-515, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.
NG >> Replace ASCD steering switch.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

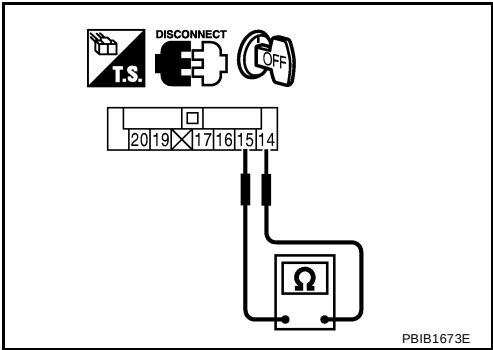
DTC P1564 ASCD STEERING SWITCH

Component Inspection
ASCD STEERING SWITCH

UBS00EYO

- 1. Disconnect combination switch (spiral cable).
- 2. Check continuity between ASCD steering switch terminals 14 and 15 with pushing each switch.

Switch	Condition	Resistance [Ω]
ON/OFF(MAIN) switch	Pressed	Approx. 0
	Released	Approx. 4,000
COAST/SET switch	Pressed	Approx. 660
	Released	Approx. 4,000
ACCEL/RESUME switch	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL switch	Pressed	Approx. 250
	Released	Approx. 4,000



DTC P1572 ASCD BRAKE SWITCH

DTC P1572 ASCD BRAKE SWITCH

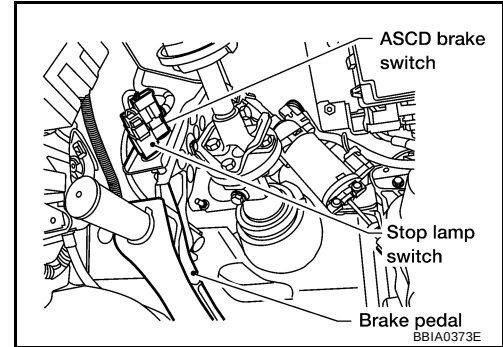
PFP:25320

Component Description

UBS00EYP

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to [EC-619, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EYQ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal: Fully released	ON
		● Brake pedal: Slightly depressed	OFF
BRAKE SW 2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal: Fully released	OFF
		● Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

UBS00EYR

This self-diagnosis has the one trip detection logic.

The MIL will not light up for this diagnosis.

NOTE:

If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-350, "DTC P0605 ECM"](#)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1572 1572	ASCD brake switch	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	<ul style="list-style-type: none">● Harness or connectors (The stop lamp switch circuit is open or shorted.)● Harness or connectors (The ASCD brake switch circuit is open or shorted.)● Stop lamp switch● ASCD brake switch● Incorrect stop lamp switch installation● Incorrect ASCD brake switch installation● ECM

DTC P1572 ASCD BRAKE SWITCH

UBS00EYS

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

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:

Steps 3 and 4 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

⑧ WITH CONSULT-II

1. Start engine (VDC switch OFF).
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

If DTC is detected, go to [EC-519, "Diagnostic Procedure"](#) .

If DTC is not detected, go to the following step.

4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned condition.

5. If DTC is detected, go to [EC-519, "Diagnostic Procedure"](#) .

⑧ WITH GST

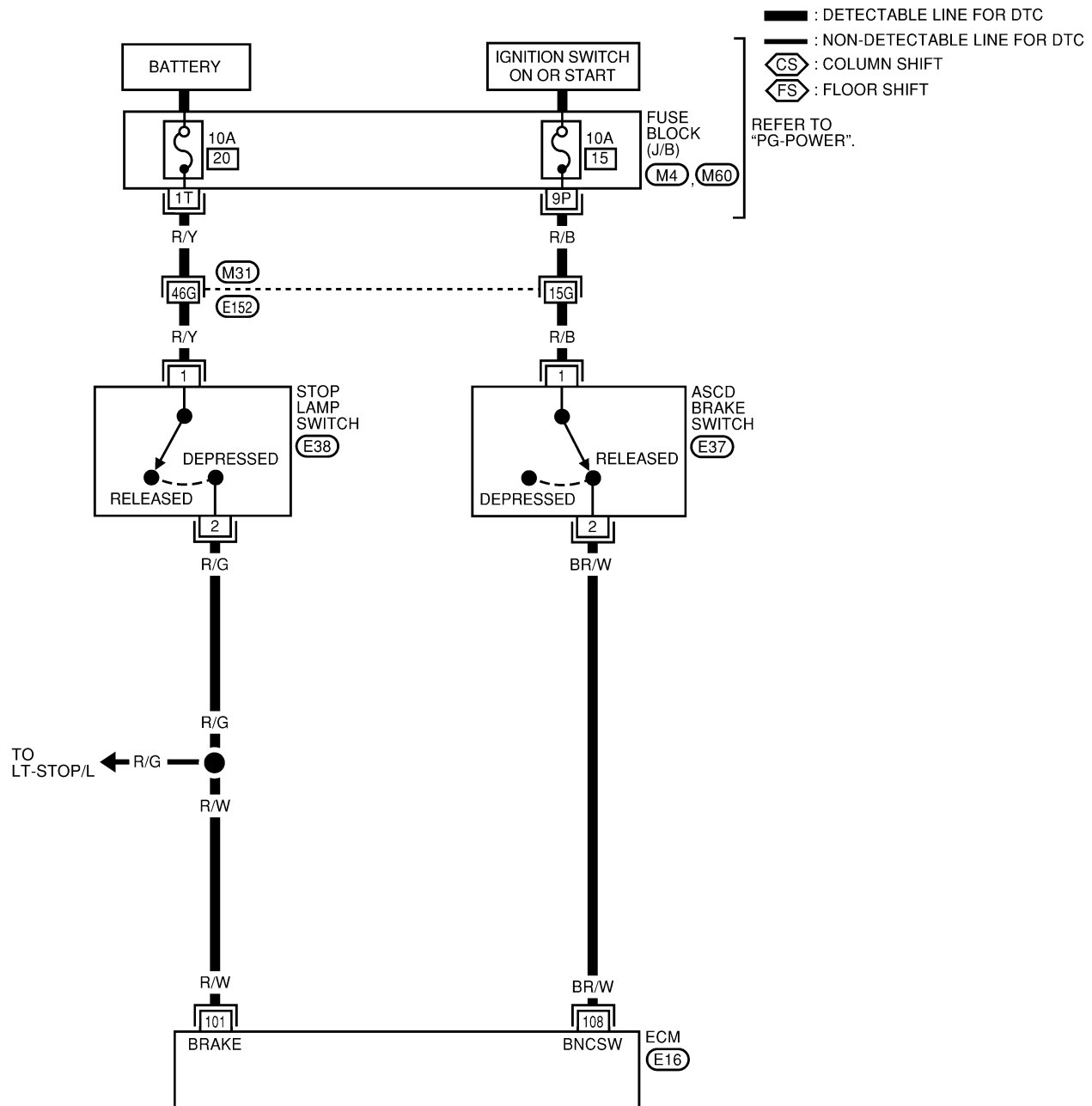
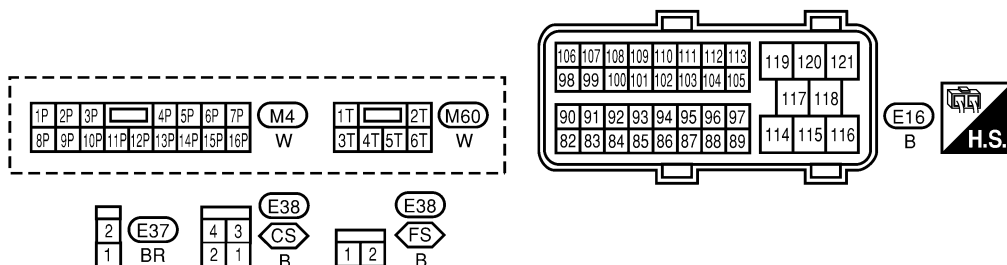
Follow the procedure "WITH CONSULT-II" above.

DTC P1572 ASCD BRAKE SWITCH

Wiring Diagram

UBS00EYT

EC-ASC/BS-01



REFER TO THE FOLLOWING.

M31 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA1375E

DTC P1572 ASCD BRAKE SWITCH

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/W	Stop lamp switch	[Ignition switch: OFF] ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
108	BR/W	ASCD brake switch	[Ignition switch: ON] ● Brake pedal: Slightly depressed	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14V)

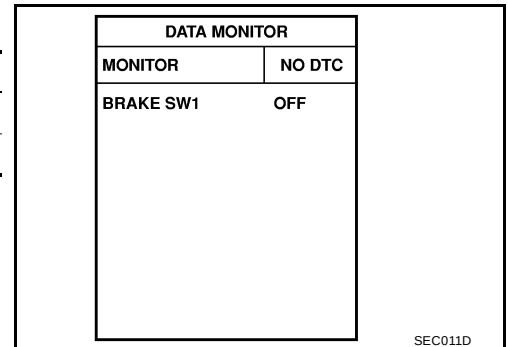
Diagnostic Procedure

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

- Turn ignition switch ON.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.

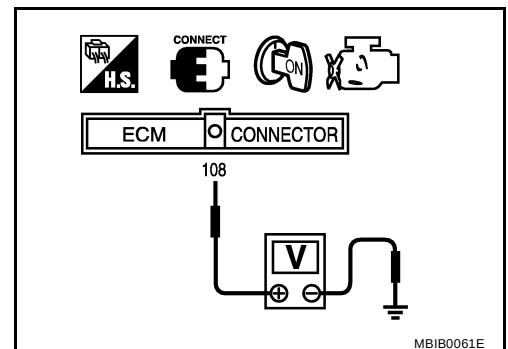
CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



Without CONSULT-II

- Turn ignition switch ON.
- Check voltage between ECM terminal 108 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
NG >> GO TO 3.

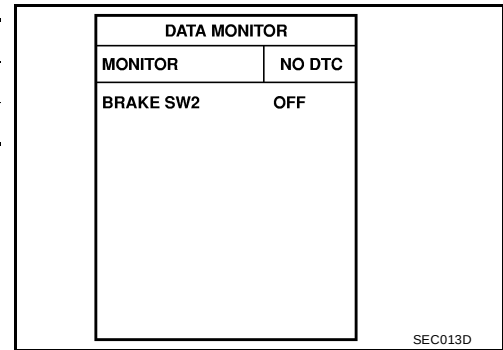
DTC P1572 ASCD BRAKE SWITCH

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

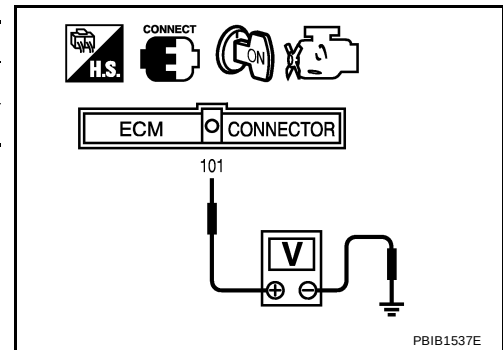
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage



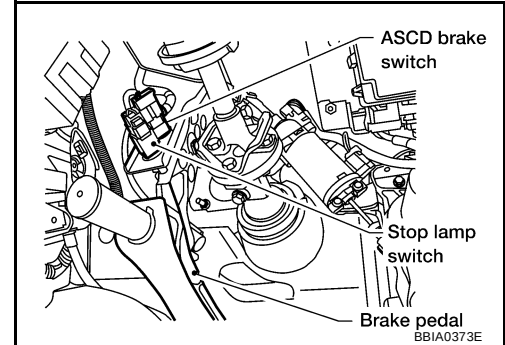
OK or NG

- OK >> GO TO 11.
- NG >> GO TO 7.

DTC P1572 ASCD BRAKE SWITCH

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.

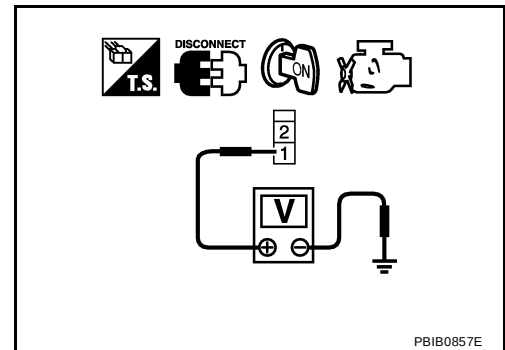


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH

Refer to [EC-523, "Component Inspection"](#) .

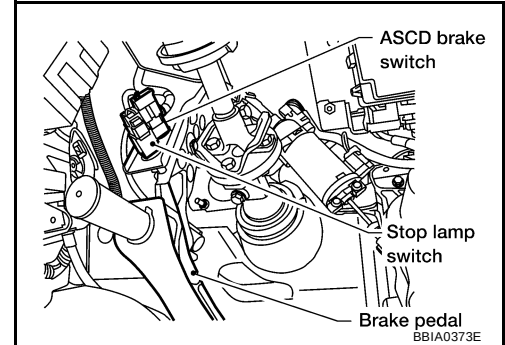
OK or NG

- OK >> GO TO 11.
NG >> Replace ASCD brake switch.

DTC P1572 ASCD BRAKE SWITCH

7. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

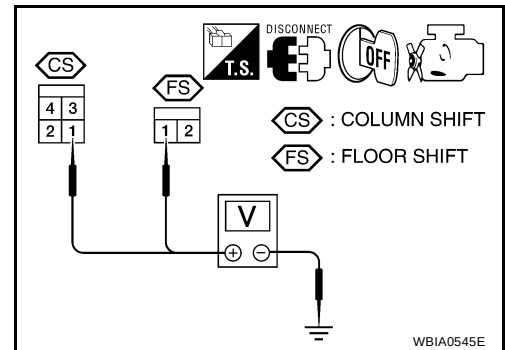


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 9.
NG >> GO TO 8.



8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Fuse block (J/B) connector M60
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK STOP LAMP SWITCH

Refer to [EC-523, "Component Inspection"](#)

OK or NG

- OK >> GO TO 11.
NG >> Replace stop lamp switch.

DTC P1572 ASCD BRAKE SWITCH

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

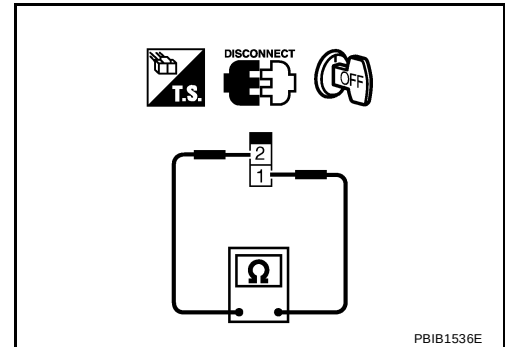
Component Inspection ASC D BRAKE SWITCH

UBS00EYV

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-6, "BRAKE PEDAL"](#) , and perform step 3 again.

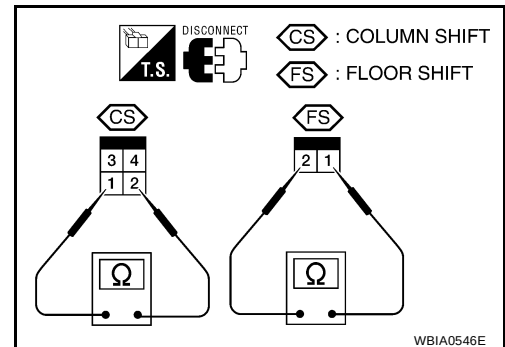


STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check harness continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-6, "BRAKE PEDAL"](#) , and perform step 3 again.



DTC P1574 ASCD VEHICLE SPEED SENSOR

DTC P1574 ASCD VEHICLE SPEED SENSOR

PFP:31036

Component Description

UBS00F1S

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to [EC-619, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

On Board Diagnosis Logic

UBS00F1T

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-339, "DTC P0500 VSS"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-350, "DTC P0605 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none">● Harness or connectors (The CAN communication line is open or shorted.)● Combination meter● ABS actuator and electric unit (control unit)● Wheel sensor● TCM● ECM

DTC Confirmation Procedure

UBS00F1U

CAUTION:

Always drive vehicle at a safe speed.

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:

Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine (VDC switch OFF).
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle at more than 40 km/h (25 MPH).
4. If DTC is detected, go to [EC-525, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1574 ASCD VEHICLE SPEED SENSOR

Diagnostic Procedure

UBS00F1V

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [AT-41, "OBD-II Diagnostic Trouble Code \(DTC\)"](#) .

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

2. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Refer to [BRC-11, "TROUBLE DIAGNOSIS"](#) or [BRC-101, "TROUBLE DIAGNOSIS"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-5, "COMBINATION METERS"](#) .

>> INSPECTION END

A

EC

C

D

E

F

G

H

I

J

K

L

M

DTC P1706 PNP SWITCH

DTC P1706 PNP SWITCH

PFP:32006

Component Description

UBS00EYW

When the gear position is P or N, park/neutral position (PNP) switch is ON.
TCM detects the position because the continuity of the line (the ON signal) exists.
Then the TCM sends the PNP switch signal to the ECM via combination meter.

CONSULT-II Reference Value in Data Monitor Mode

UBS00EYX

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N	ON
		Shift lever: Except above	OFF

On Board Diagnosis Logic

UBS00EYY

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	<ul style="list-style-type: none">● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.]● Park/neutral position (PNP) switch● Combination meter● TCM

DTC Confirmation Procedure

UBS00EYZ

CAUTION:

Always drive vehicle at a safe speed.

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.

⑧ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-II. Then check the "P/N POSI SW" signal under the following conditions.

Position (Selector lever)	Known-good signal
N or P position	ON
Except the above position	OFF

If NG, go to [EC-529, "Diagnostic Procedure"](#) .

If OK, go to following step.

3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 2.0 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

6. If 1st trip DTC is detected, go to [EC-529, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

DTC P1706 PNP SWITCH

UBS00EZ0

Overall Function Check

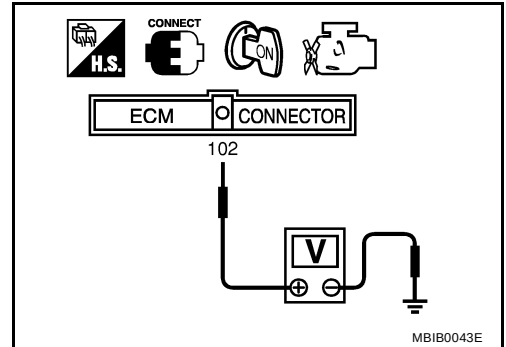
Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 (PNP switch signal) and ground under the following conditions.

Condition (Gear position)	Voltage V (Known good data)
P or N position	Approx. 0
Except the above position	BATTERY VOLTAGE (11 - 14V)

3. If NG, go to [EC-529, "Diagnostic Procedure"](#) .

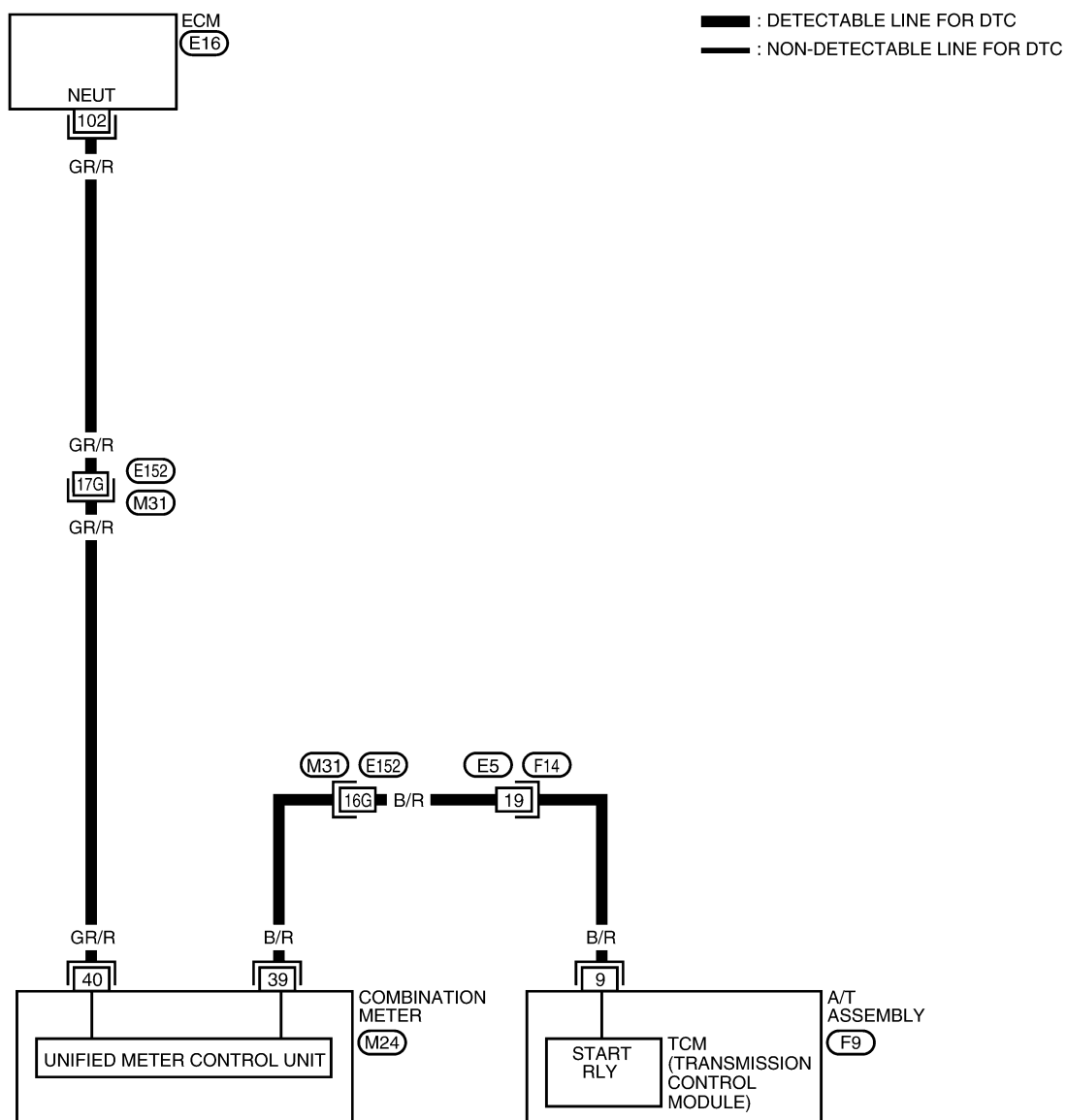
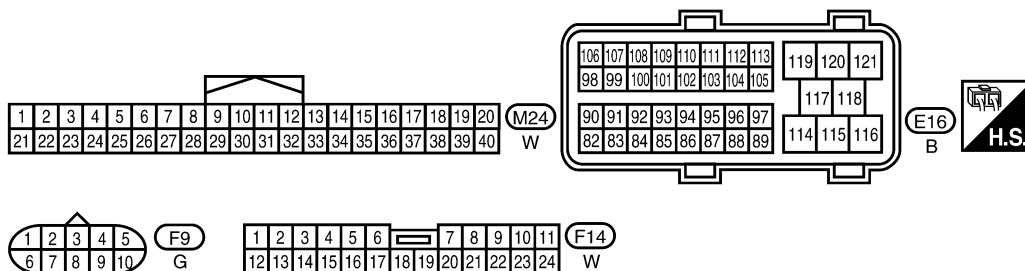


DTC P1706 PNP SWITCH

Wiring Diagram

UBS00EZ1

EC-PNP/SW-01



REFER TO THE FOLLOWING.

(M31) - SUPER MULTIPLE
JUNCTION (SMJ)

BBWA1185E

DTC P1706 PNP SWITCH

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	GR/R	PNP switch	[Ignition switch: ON] ● Shift lever: P or N	Approximately 0V
			[Ignition switch: ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EZ2

1. CHECK DTC WITH TCM

Refer to [AT-41, "OBD-II Diagnostic Trouble Code \(DTC\)"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK STARTING SYSTEM

Turn ignition switch OFF, then turn it to START.

Does starter motor operate?

Yes or No

- Yes >> GO TO 3.
No >> Refer to [SC-10, "STARTING SYSTEM"](#) .

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect TCM harness connector.
3. Disconnect combination meter harness connector.
4. Check harness continuity between TCM terminal 9 and combination meter terminal 39.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F14, E5
- Harness connectors E152, M31
- Harness for open or short between TCM and combination meter

>> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P1706 PNP SWITCH

5. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 102 and combination meter terminal 40.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- | | |
|----|-------------|
| OK | >> GO TO 7. |
| NG | >> GO TO 6. |

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Harness for open or short between ECM and combination meter

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- | | |
|----|-----------------------|
| OK | >> GO TO 8. |
| NG | >> Repair or replace. |

8. REPLACE COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

>> **INSPECTION END**

DTC P1805 BRAKE SWITCH

DTC P1805 BRAKE SWITCH

PFP:25320

Description

UBS00EZ3

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

CONSULT-II Reference Value in Data Monitor Mode

UBS00EZ4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

UBS00EZ5

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an extremely long time while the vehicle is driving.	<ul style="list-style-type: none">● Harness or connectors (Stop lamp switch circuit is open or shorted.)● Stop lamp switch

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode.

Engine operating condition in fail-safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
Vehicle condition	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

DTC Confirmation Procedure

UBS00EZ6

WITH CONSULT-II

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. If 1st trip DTC is detected, go to [EC-533, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

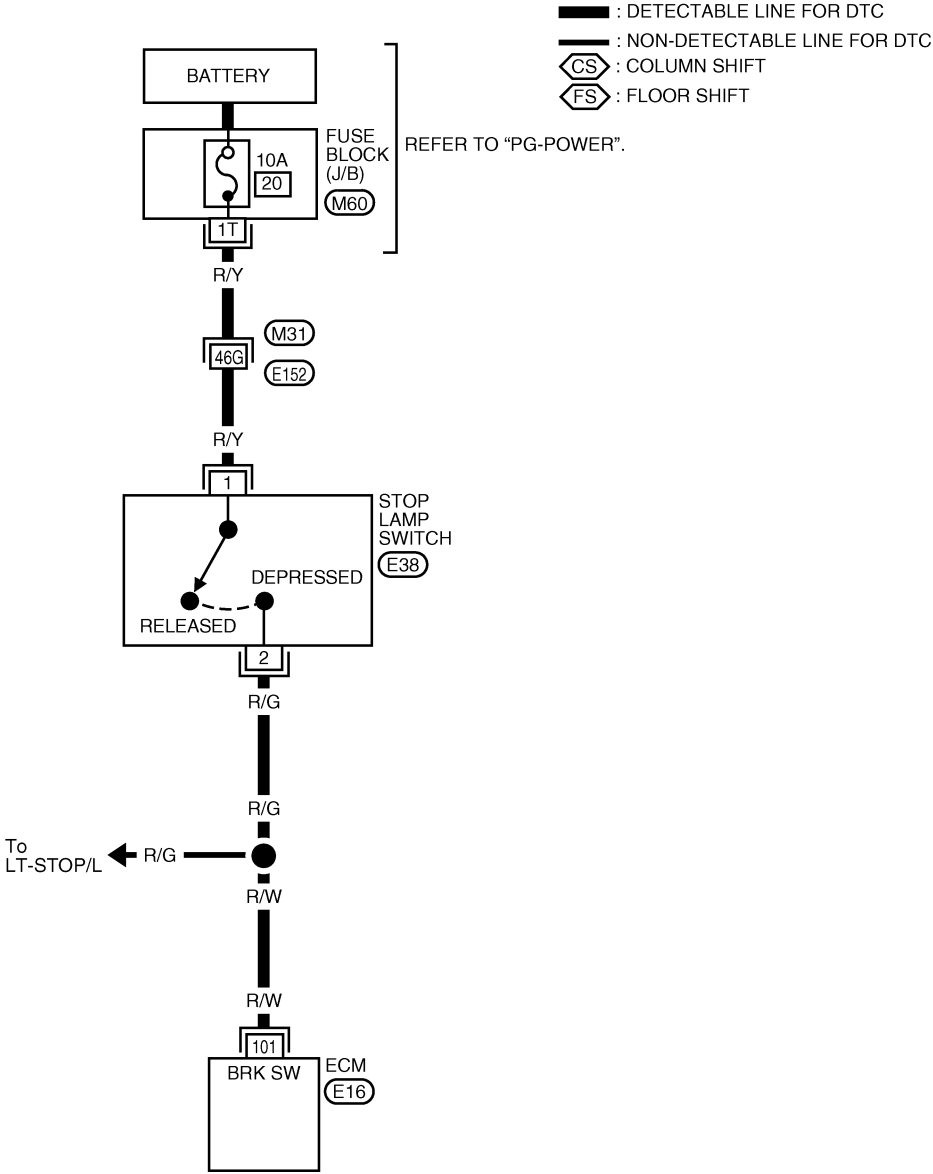
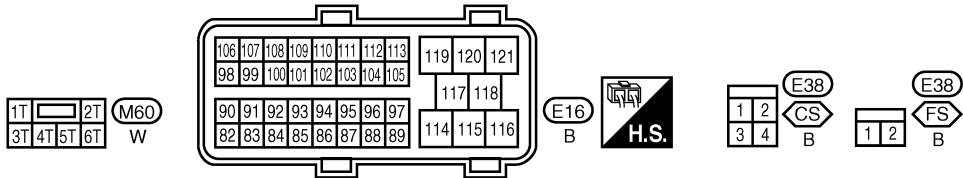
Follow the procedure "WITH CONSULT-II" above.

DTC P1805 BRAKE SWITCH

Wiring Diagram

UBS00EZ7

EC-BRK/SW-01



REFER TO THE FOLLOWING.
(M31) - SUPER MULTIPLE JUNCTION (SMJ)

BBWA1376E

DTC P1805 BRAKE SWITCH

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/W	Stop lamp switch	[Ignition switch: OFF] ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00EZ8

1. CHECK STOP LAMP SWITCH CIRCUIT

- Turn ignition switch OFF.
- Check the stop lamp when depressing and releasing the brake pedal.

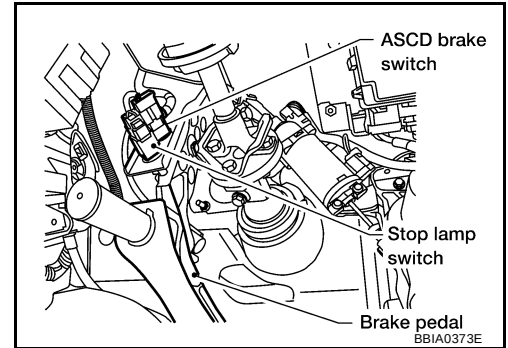
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

- OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- Disconnect stop lamp switch harness connector.

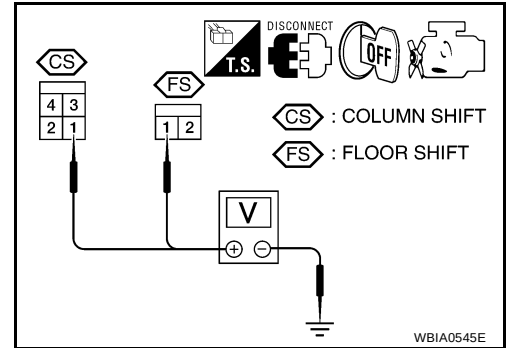


- Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



DTC P1805 BRAKE SWITCH

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Fuse block (J/B) connector M60
- 10A fuse
- Harness for open and short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK STOP LAMP SWITCH

Refer to [EC-535, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace stop lamp switch.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

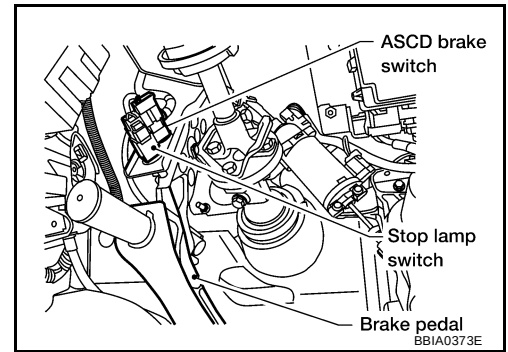
>> **INSPECTION END**

DTC P1805 BRAKE SWITCH

UBS00EZ9

Component Inspection STOP LAMP SWITCH

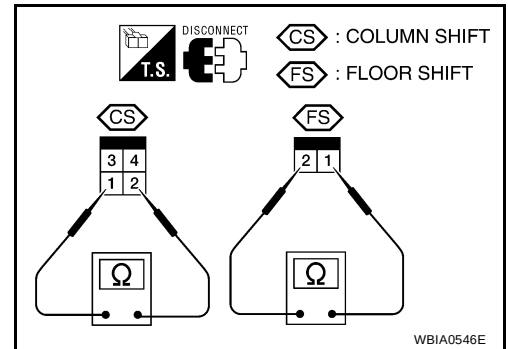
1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

3. If NG, adjust stop lamp switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 2 again.



DTC P2122, P2123 APP SENSOR

DTC P2122, P2123 APP SENSOR

PFP:18002

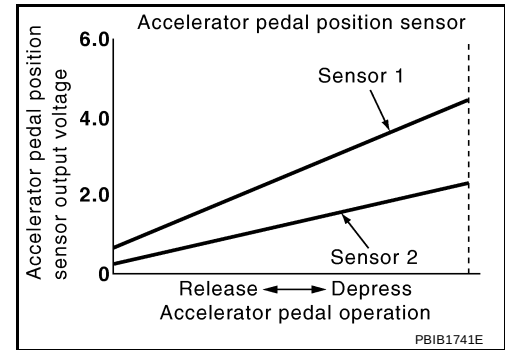
Component Description

UBS00EZA

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EZB

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

UBS00EYC

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-423, "DTC P1229 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC P2122, P2123 APP SENSOR

DTC Confirmation Procedure

UBS00EZD

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:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-539, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
SEF058Y	

WITH GST

Follow the procedure "WITH CONSULT-II" above.

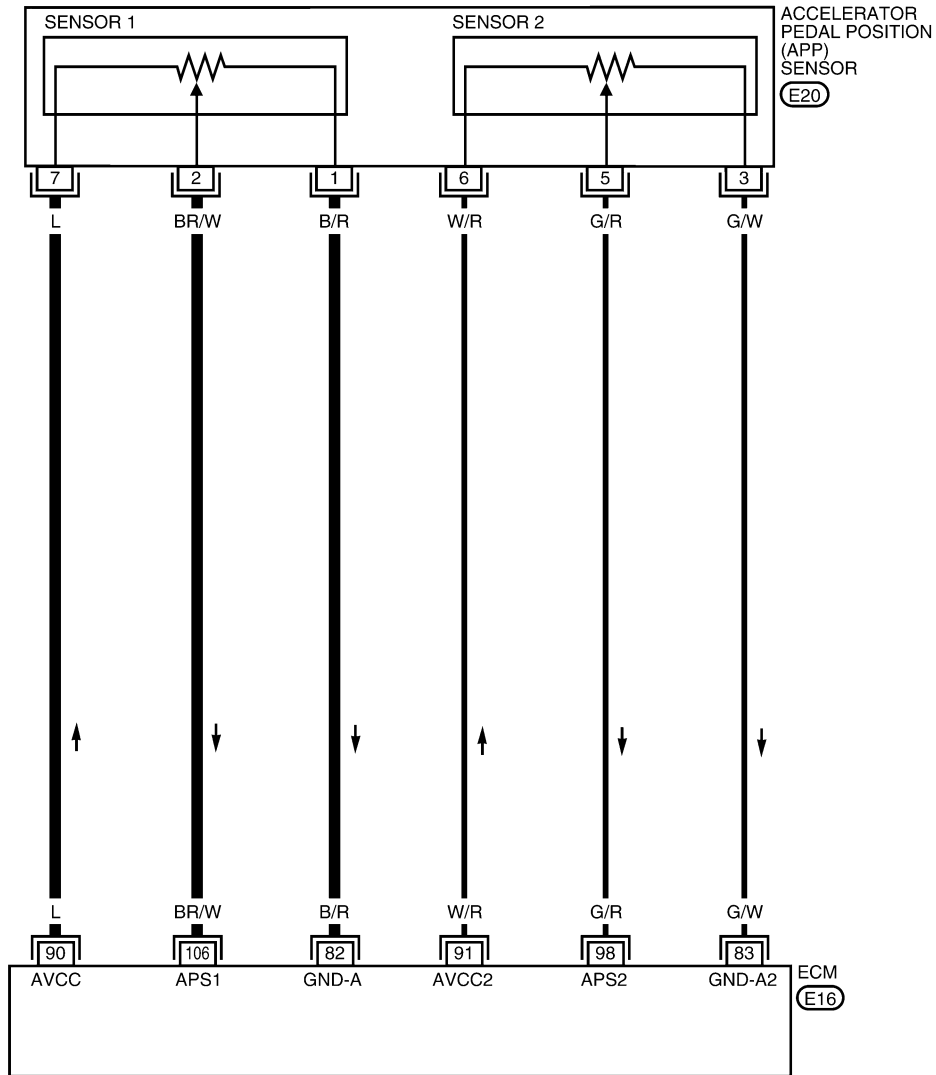
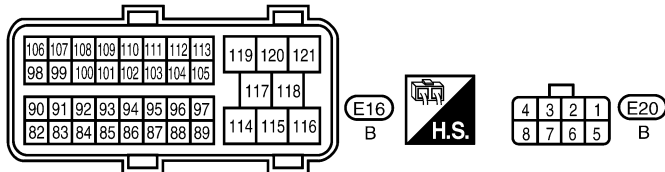
DTC P2122, P2123 APP SENSOR

Wiring Diagram

UBS00EZE

EC-APPS1-01

 : DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BBWA1168E

DTC P2122, P2123 APP SENSOR

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

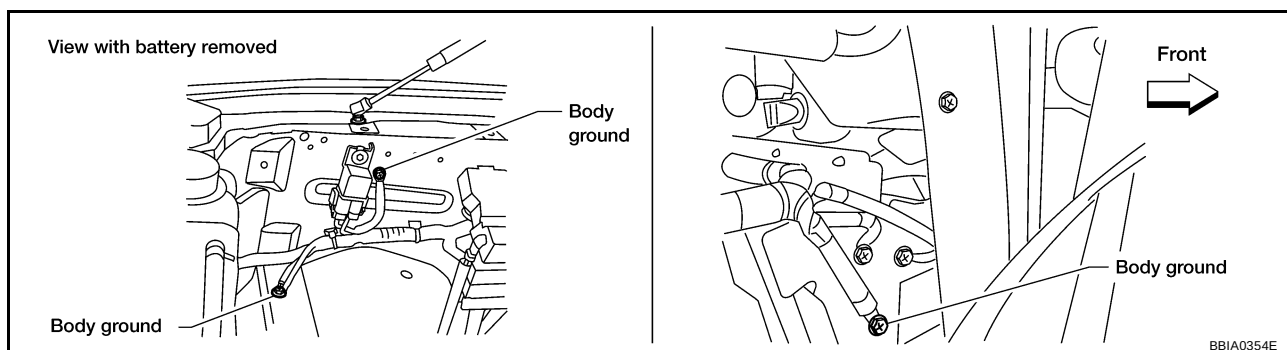
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B/R	Sensor ground (APP sensor 1)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
83	G/W	Sensor ground (APP sensor 2)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
90	L	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5V
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V
98	G/R	Accelerator pedal position sensor 2	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.25 - 0.50V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	2.0 - 2.5V
106	BR/W	Accelerator pedal position sensor 1	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	4.2 - 4.8V

Diagnostic Procedure

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

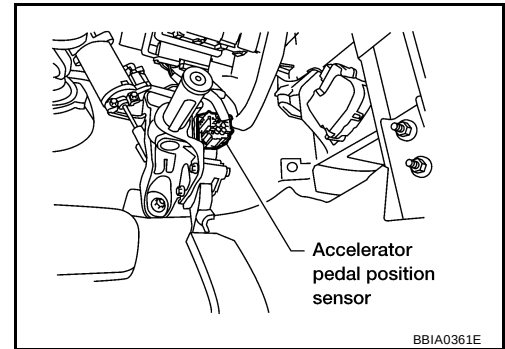
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P2122, P2123 APP SENSOR

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

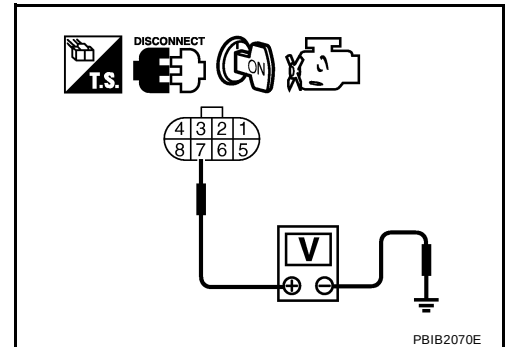


3. Check voltage between APP sensor terminal 7 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and 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.

4. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to [EC-541, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

DTC P2122, P2123 APP SENSOR

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and ground under the following conditions.

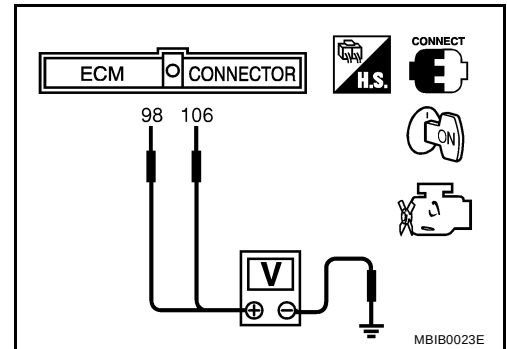
Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 4.8V
98 (Accelerator pedal position sensor 2)	Fully released	0.25 - 0.5V
	Fully depressed	2.0 - 2.5V

4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-44, "Idle Air Volume Learning"](#) .

Removal and Installation

ACCELERATOR PEDAL

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .



DTC P2127, P2128 APP SENSOR

DTC P2127, P2128 APP SENSOR

PDF:18002

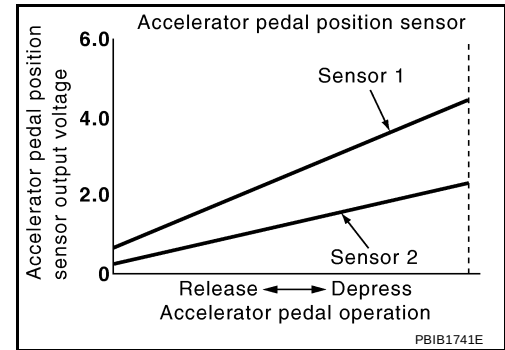
Component Description

UBS00EZI

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EZJ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

UBS00EZK

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (APP sensor 2 circuit is open or shorted.) (TP sensor circuit is shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2) ● Electric throttle control actuator (TP sensor)
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC P2127, P2128 APP SENSOR

UBS00EZL

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:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-545, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

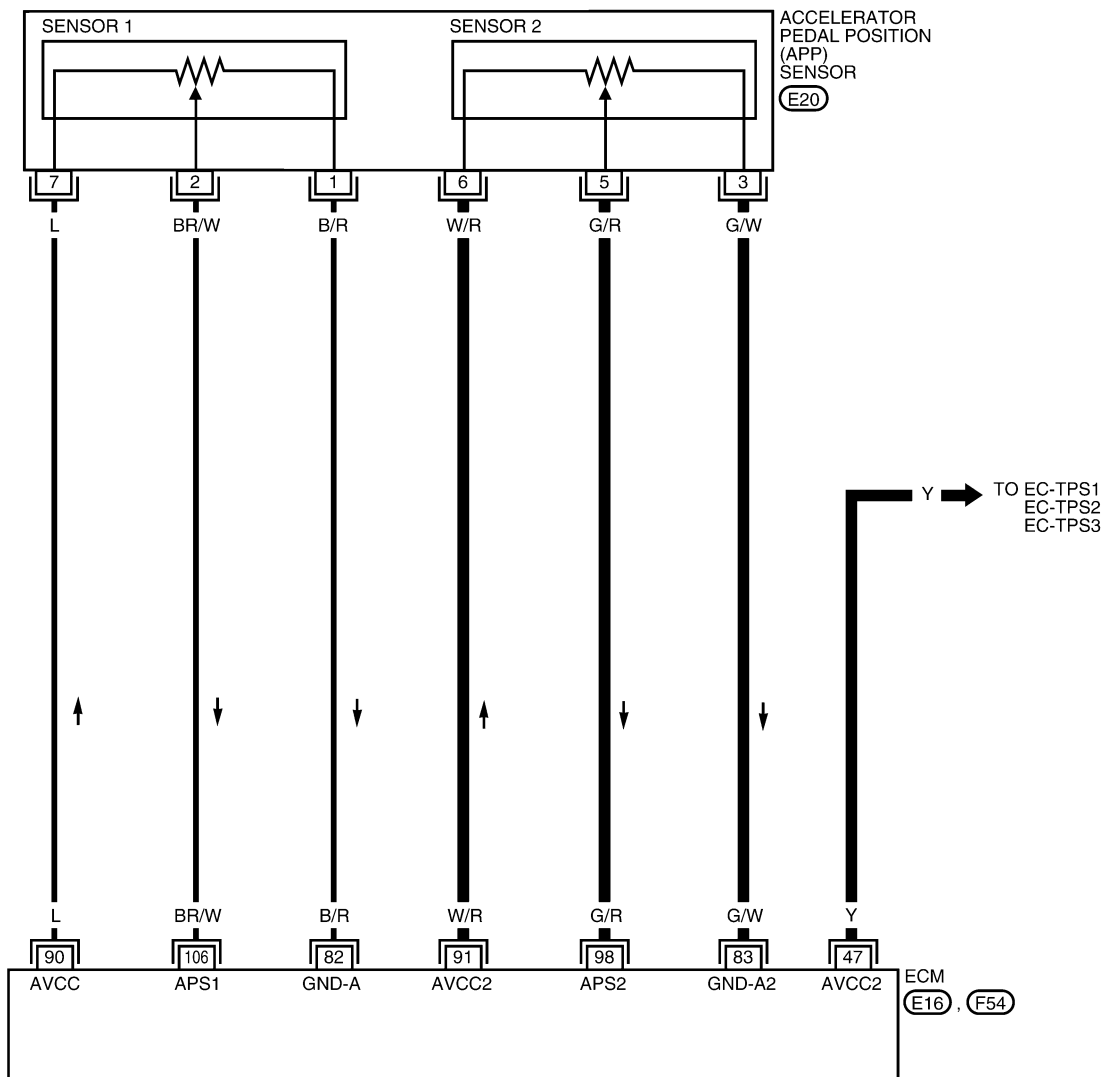
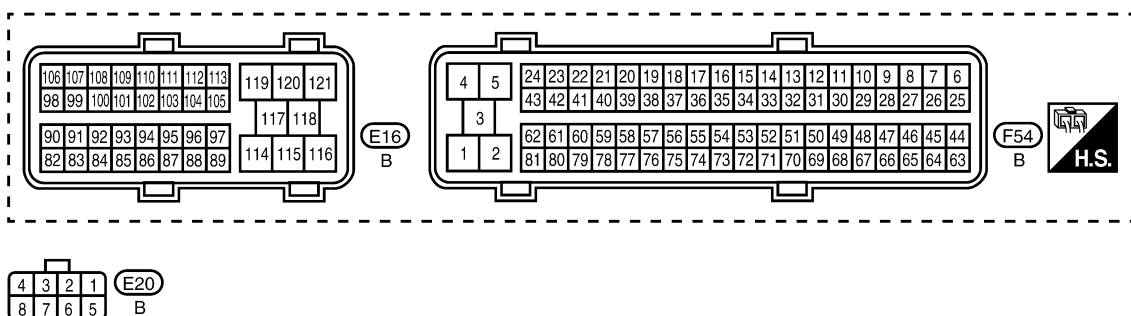
DTC P2127, P2128 APP SENSOR

Wiring Diagram

UBS00EZM

EC-APPS2-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1169E

DTC P2127, P2128 APP SENSOR

Specification data are reference values and are 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.

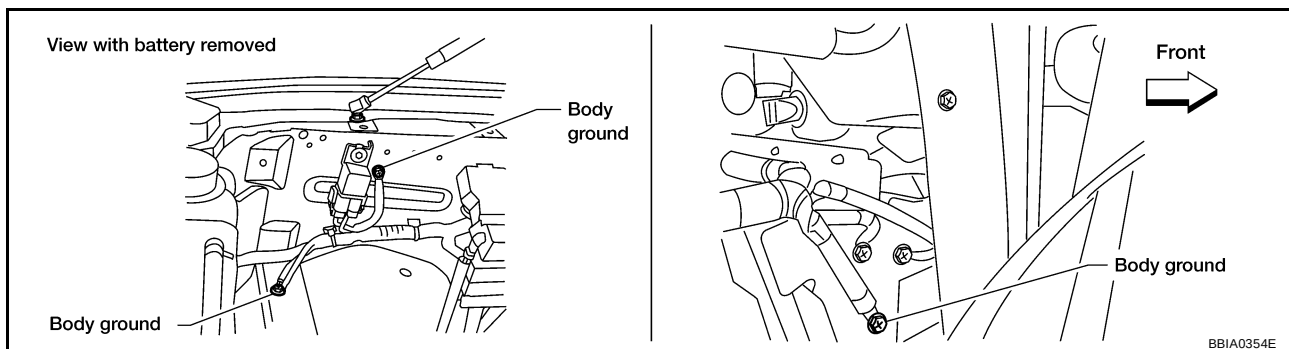
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	Y	Sensor power supply (TP sensor)	[Ignition switch: ON]	Approximately 5V
82	B/R	Sensor ground (APP sensor 1)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
83	G/W	Sensor ground (APP sensor 2)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
90	L	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5V
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V
98	G/R	Accelerator pedal position sensor 2	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.25 - 0.50V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	2.0 - 2.5V
106	BR/W	Accelerator pedal position sensor 1	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	4.2 - 4.8V

Diagnostic Procedure

UBS00EZN

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

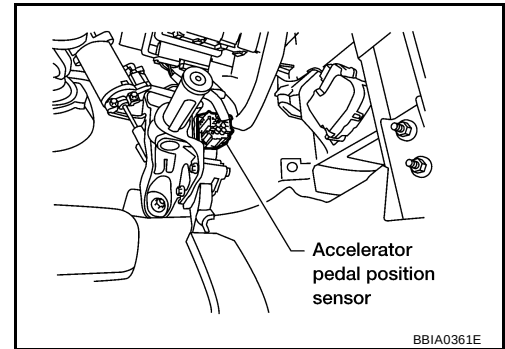
OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

DTC P2127, P2128 APP SENSOR

2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

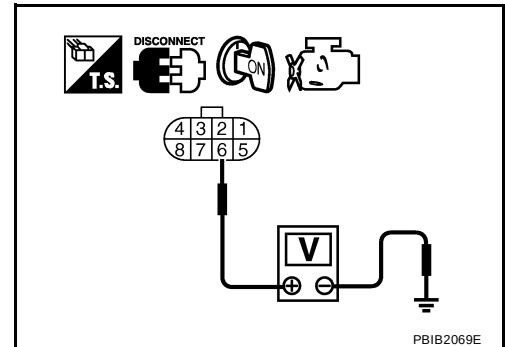


3. Check voltage between APP sensor terminal 6 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 6 and ECM terminal 91. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

Check the following.

- Harness for short to power and short to ground, between the following terminals

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 2	EC-551
91	APP sensor terminal 6	EC-544

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-555, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> GO TO 6.

DTC P2127, P2128 APP SENSOR

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 83 and APP sensor terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 98 and APP sensor terminal 5.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR

Refer to [EC-541, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P2127, P2128 APP SENSOR

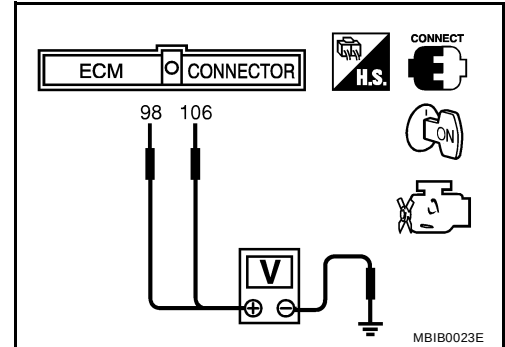
UBS00EZO

Component Inspection

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 4.8V
98 (Accelerator pedal position sensor 2)	Fully released	0.25 - 0.5V
	Fully depressed	2.0 - 2.5V



MB1B0023E

4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-44, "Idle Air Volume Learning"](#) .

Removal and Installation

ACCELERATOR PEDAL

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

UBS00EZP

DTC P2135 TP SENSOR

DTC P2135 TP SENSOR

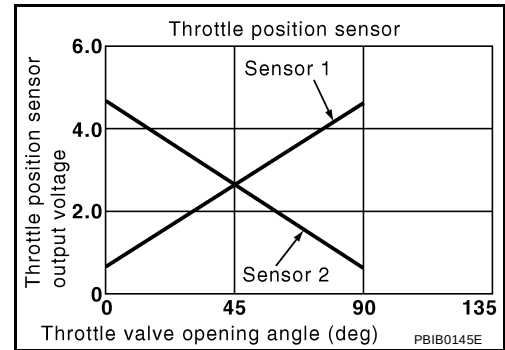
PFP:16119

Component Description

UBS00EZQ

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EZR

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS00EZR

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none">● Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) (APP sensor 2 circuit is shorted.)● Electric throttle control actuator (TP sensor 1 and 2)● Accelerator pedal position sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC P2135 TP SENSOR

UBS00EZT

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:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-552, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
SEF058Y	

WITH GST

Follow the procedure "WITH CONSULT-II" above.

UBS00EZU

A

C

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H

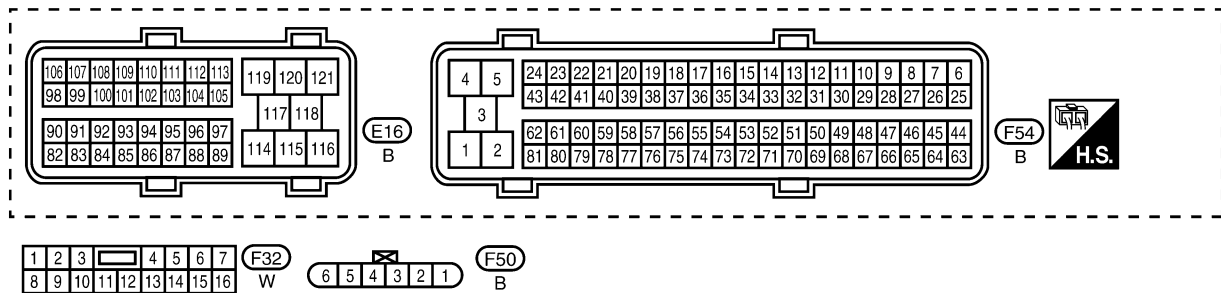
1

J

K

L

M



DTC P2135 TP SENSOR

Specification data are reference values and are 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.

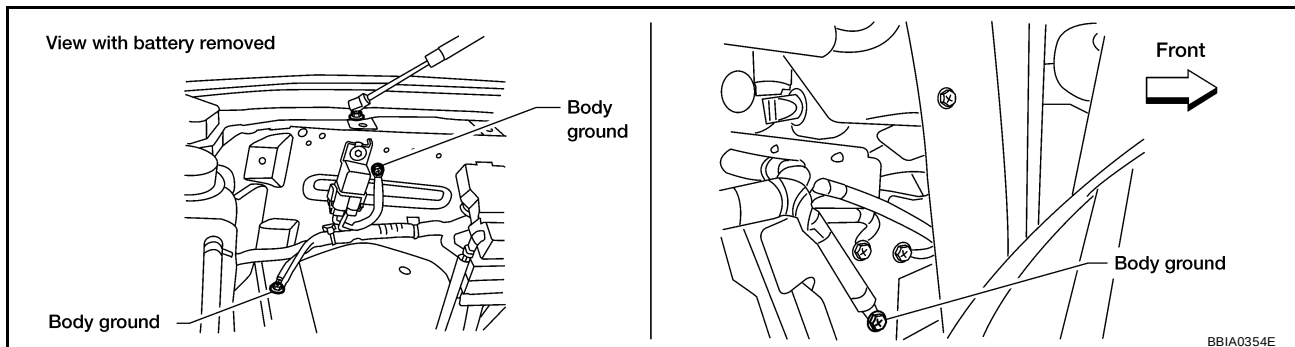
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	Y	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5V
50	B	Throttle position sensor 1	[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully depressed	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
69	W	Throttle position sensor 2	[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D ● Accelerator pedal: Fully depressed	More than 0.36V
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V

Diagnostic Procedure

UBS00EZV

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

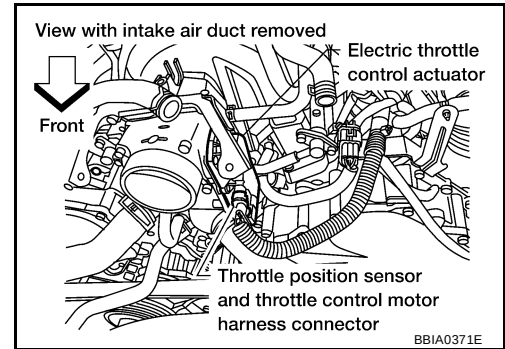
OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

DTC P2135 TP SENSOR

2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

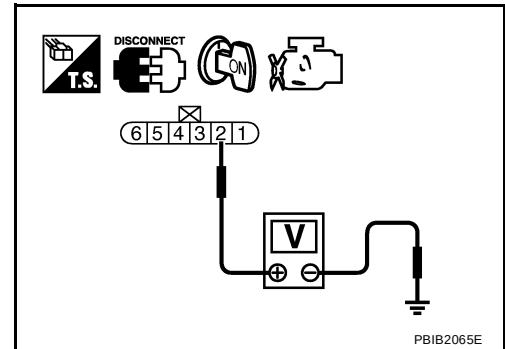


3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 2 and ECM terminal 47. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 2	EC-551
91	APP sensor terminal 7	EC-544

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [EC-548, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> GO TO 6.

DTC P2135 TP SENSOR

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 66.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal14, ECM terminal 69 and electric throttle control actuator terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE POSITION SENSOR

Refer to [EC-555, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P2135 TP SENSOR

Component Inspection THROTTLE POSITION SENSOR

UBS00EZV

1. Reconnect all harness connectors disconnected.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch ON.
4. Set selector lever to D position.
5. Check voltage between ECM terminals 50 (TP sensor 1signal), 69 (TP sensor 2signal) and ground under the following conditions.

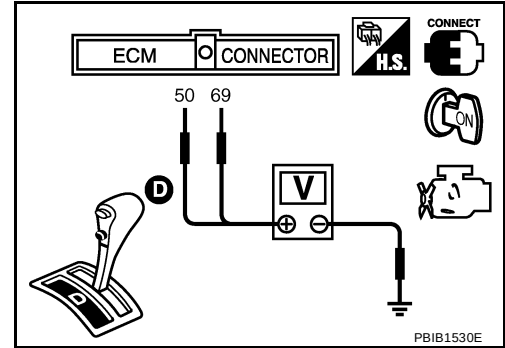
Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-44, "Idle Air Volume Learning"](#) .

Removal and Installation

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-15, "INTAKE MANIFOLD"](#) .



DTC P2138 APP SENSOR

DTC P2138 APP SENSOR

PF0:18002

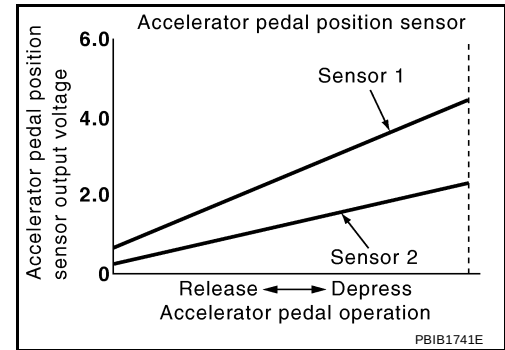
Component Description

UBS00EZU

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

UBS00EZZ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.2 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

UBS00F00

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-423, "DTC P1229 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none">● Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) (TP sensor circuit is shorted.)● Accelerator pedal position sensor 1 and 2● Electric throttle control actuator (TP sensor)● ECM pin terminal

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC P2138 APP SENSOR

UBS00F01

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:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-559, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

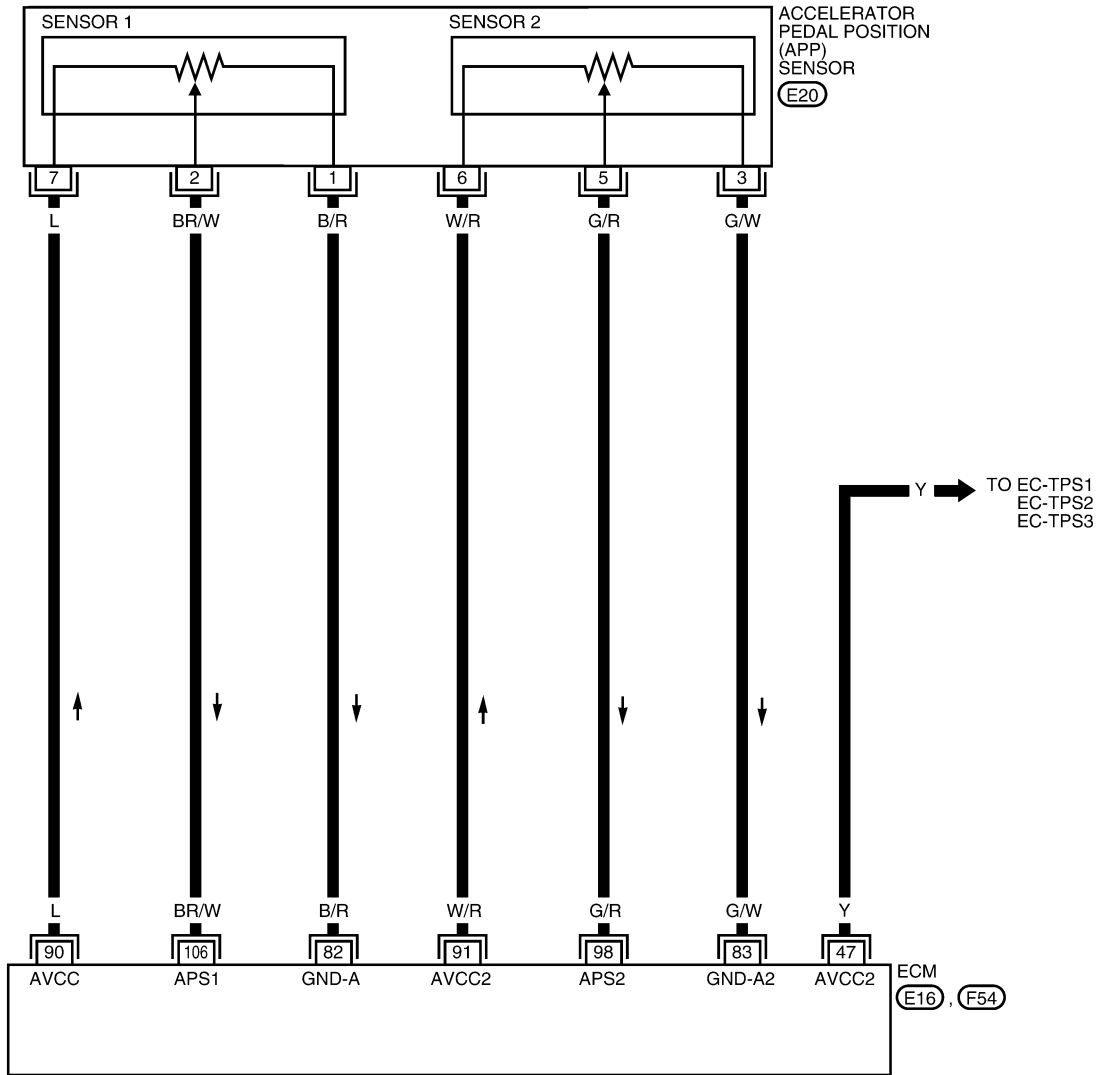
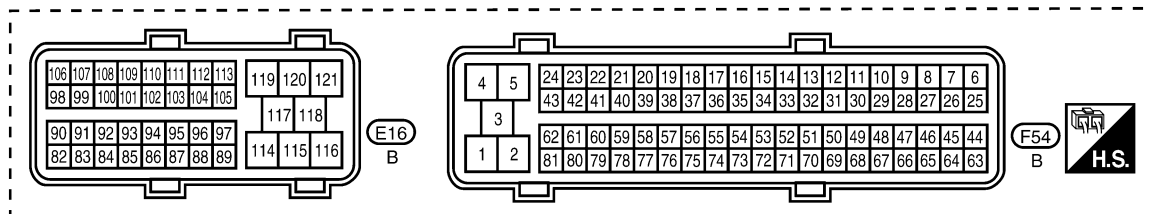
DTC P2138 APP SENSOR

Wiring Diagram

UBS00F02

EC-APPS3-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1170E

DTC P2138 APP SENSOR

Specification data are reference values and are 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.

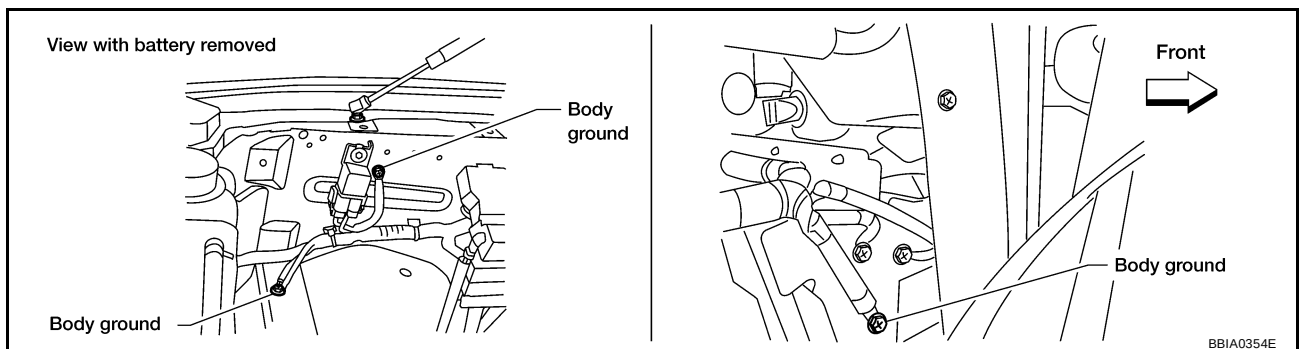
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	Y	Sensor power supply (TP sensor)	[Ignition switch: ON]	Approximately 5V
82	B/R	Sensor ground (APP sensor 1)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
83	G/W	Sensor ground (APP sensor 2)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
90	L	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5V
91	W/R	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5V
98	G/R	Accelerator pedal position sensor 2	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.25 - 0.50V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	2.0 - 2.5V
106	BR/W	Accelerator pedal position sensor 1	[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	4.2 - 4.8V

Diagnostic Procedure

UBS00F03

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.



Refer to [EC-132, "Ground Inspection"](#) .

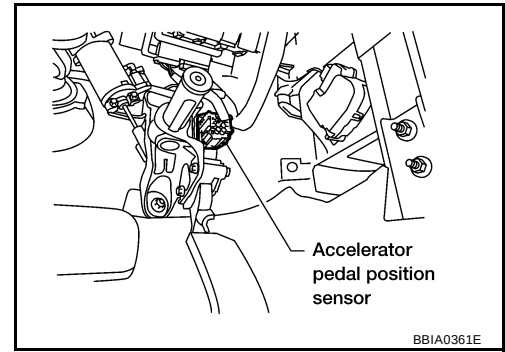
OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

DTC P2138 APP SENSOR

2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

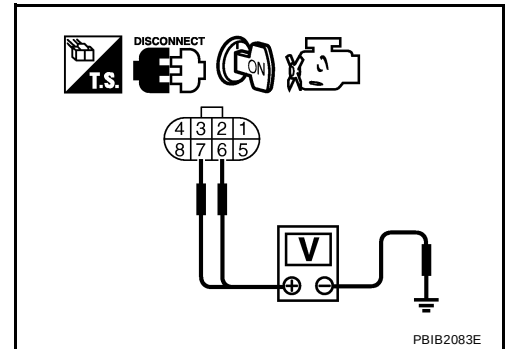


3. Check voltage between APP sensor terminals 6, 7 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 7 and ECM terminal 91. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit.

4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

Check the following.

- Harness for short to power and short to ground, between the following terminals

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 2	EC-551
91	APP sensor terminal 6	EC-558

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-555, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 1, ECM terminal 83 and APP sensor terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 2, ECM terminal 98 and APP sensor terminal 5.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [EC-541, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-44, "Idle Air Volume Learning"](#) .

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P2138 APP SENSOR

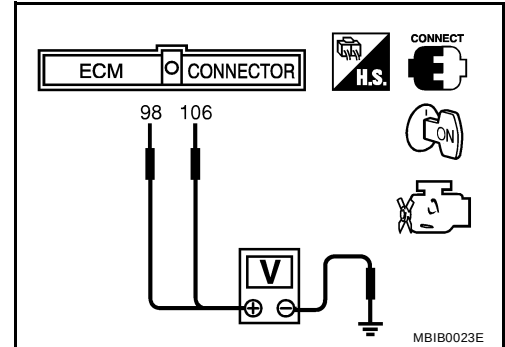
UBS00F04

Component Inspection

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 4.8V
98 (Accelerator pedal position sensor 2)	Fully released	0.25 - 0.5V
	Fully depressed	2.0 - 2.5V



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4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-44, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-44, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-44, "Idle Air Volume Learning"](#) .

Removal and Installation

ACCELERATOR PEDAL

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

UBS00F05

IGNITION SIGNAL

IGNITION SIGNAL

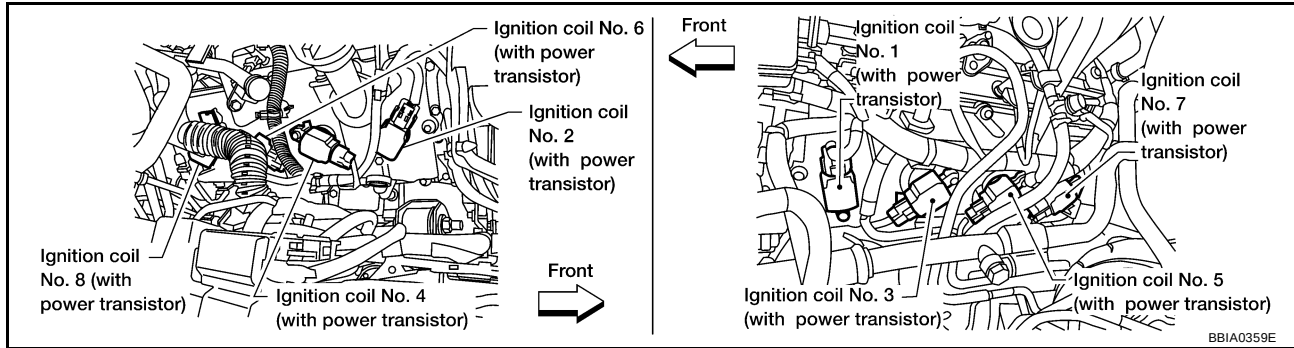
PFP:22448

Component Description

UBS00F06

IGNITION COIL & POWER TRANSISTOR

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.



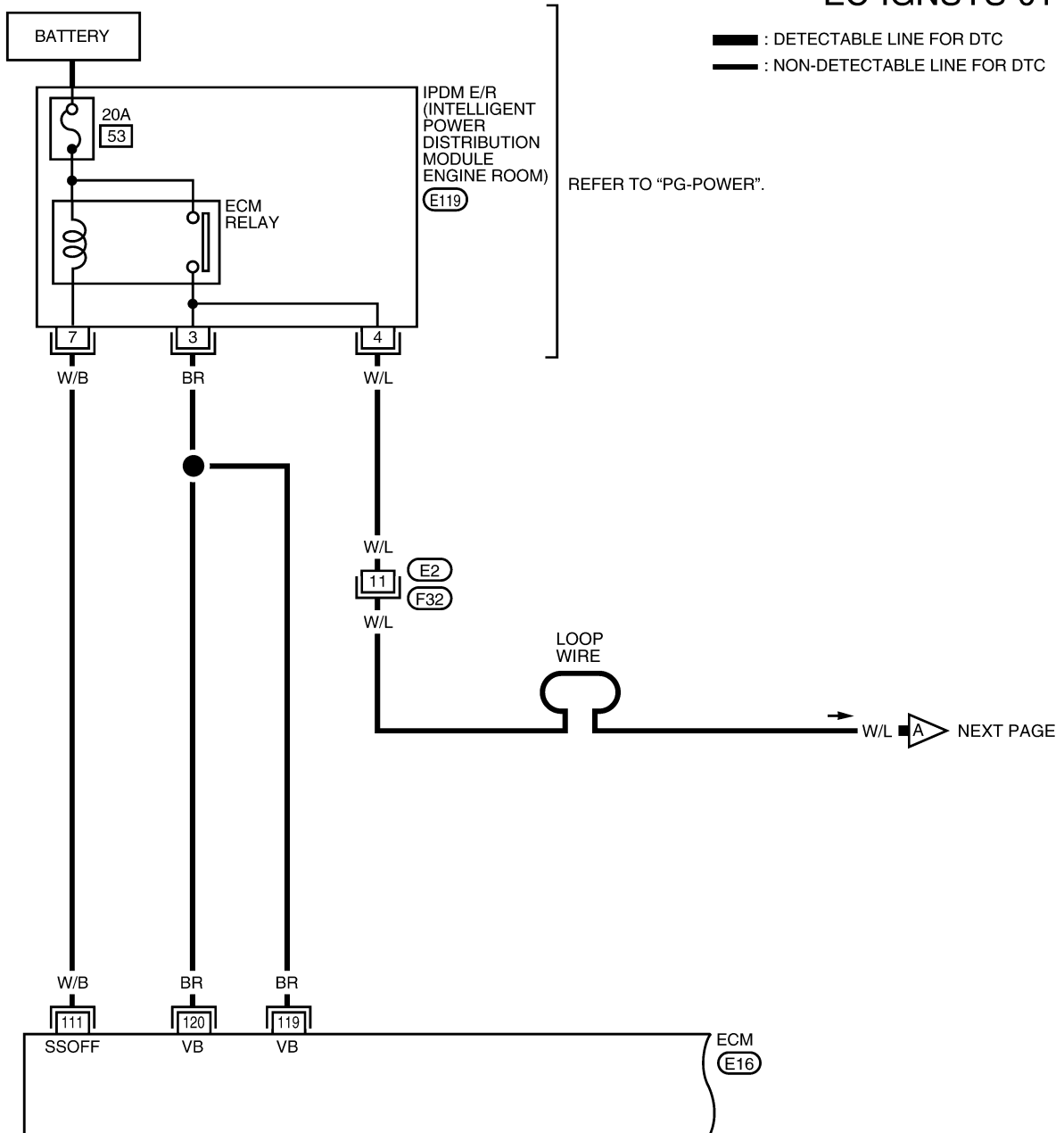
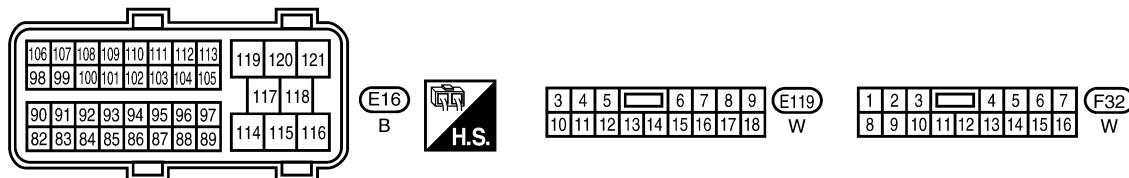
IGNITION SIGNAL

Wiring Diagram

UBS00F07

EC-IGNSYS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1187E

IGNITION SIGNAL

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

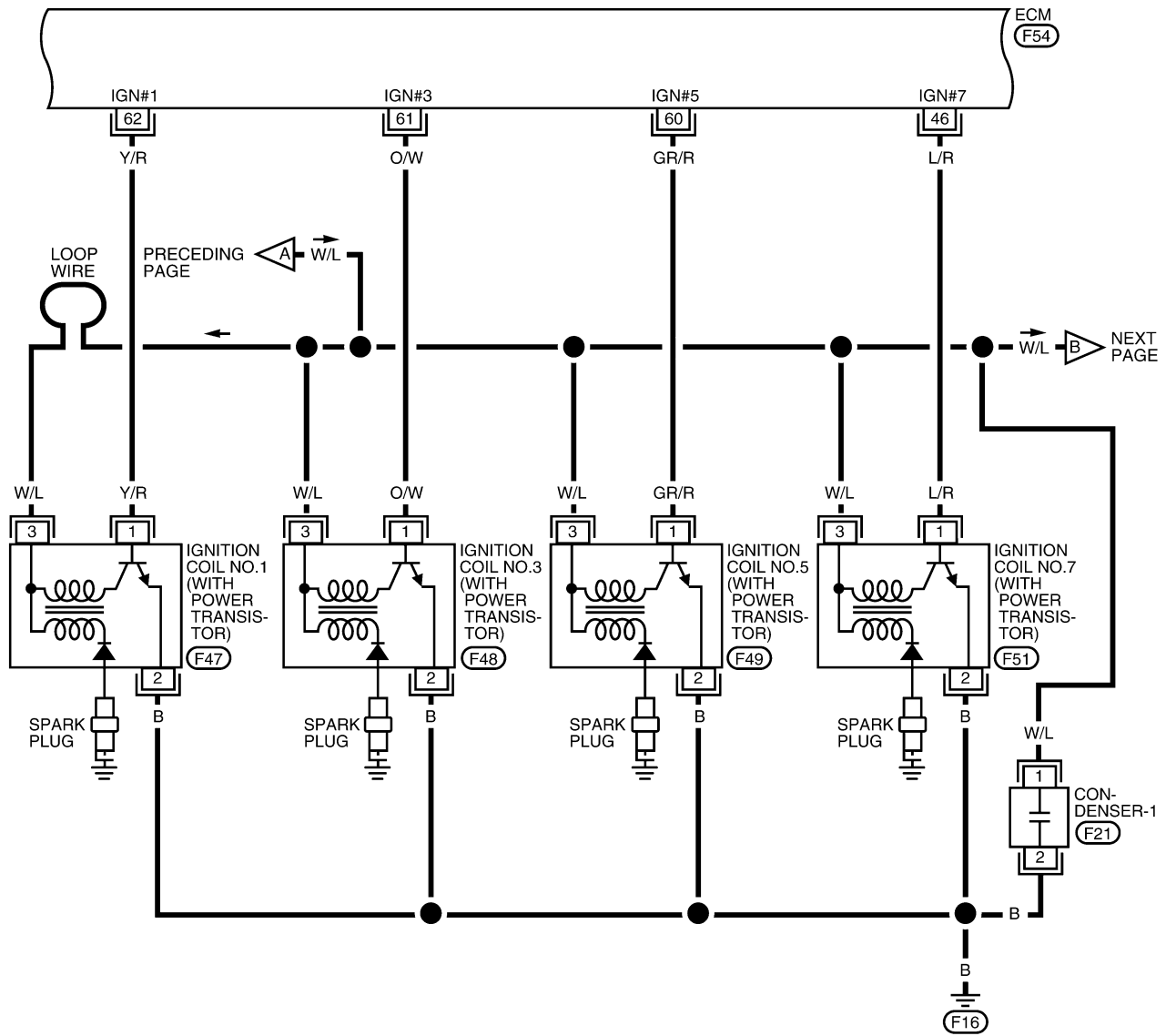
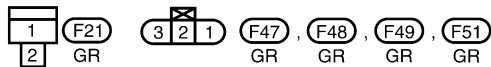
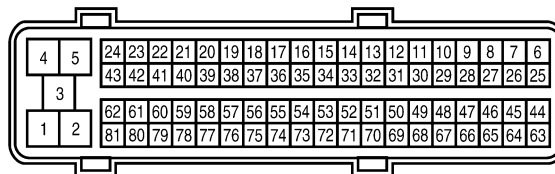
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none">For a few seconds after turning ignition switch OFF	0 - 1.5V
			[Ignition switch: OFF] <ul style="list-style-type: none">More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	BR BR	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)

IGNITION SIGNAL

EC-IGNSYS-02

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



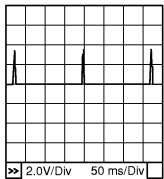
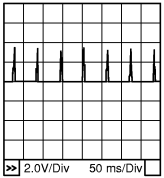
BBWA1188E

IGNITION SIGNAL

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

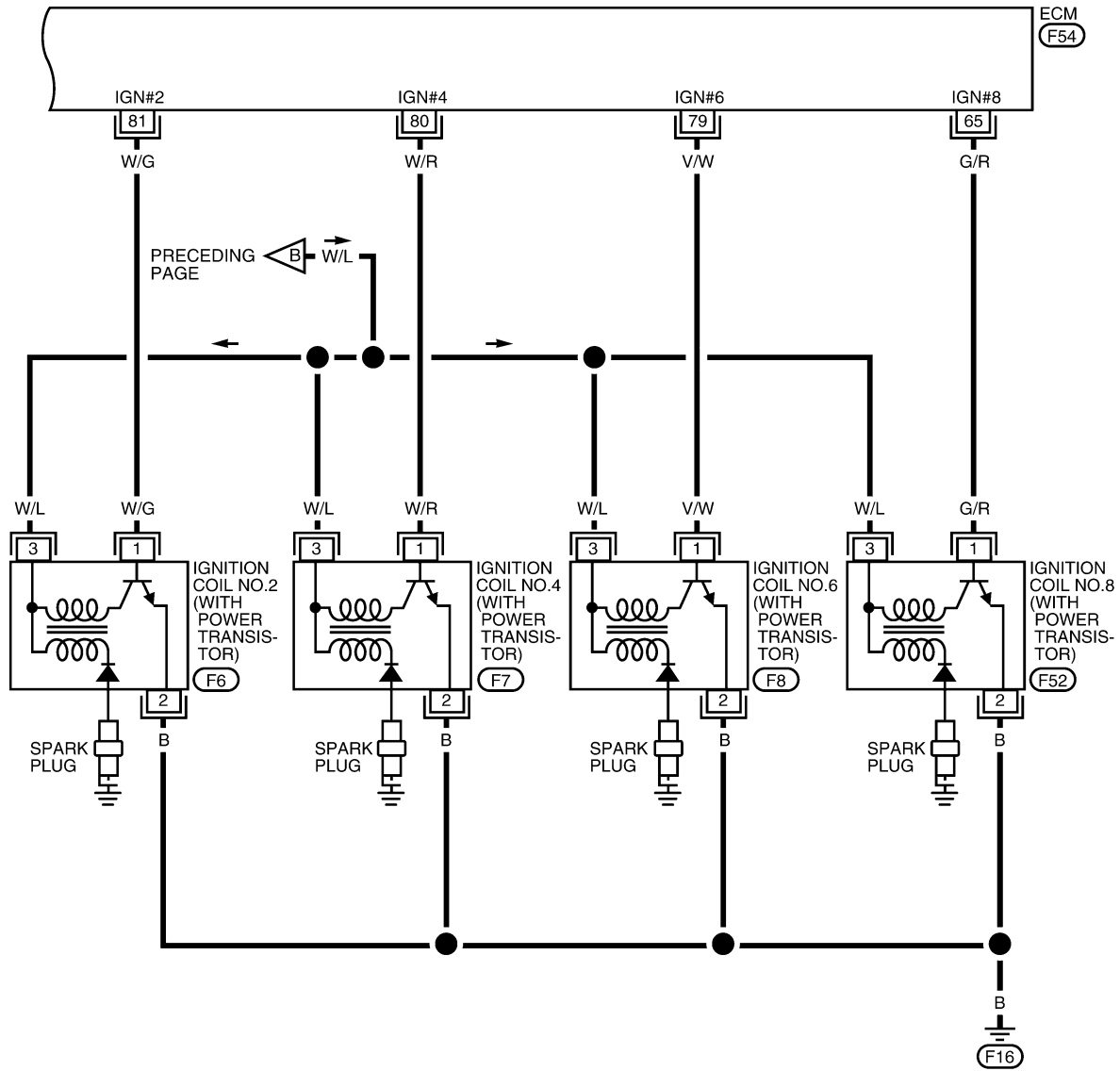
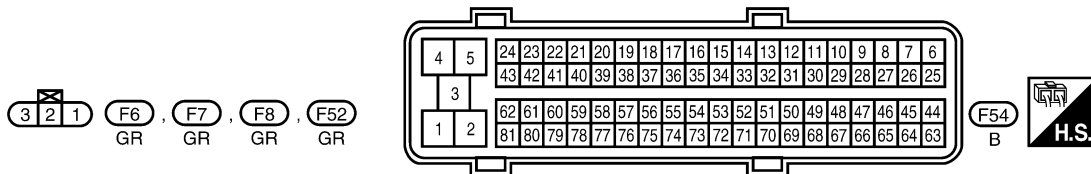
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
46	L/R	Ignition signal No. 7	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	0 - 0.2V★  PBIB0044E
60	GR/R	Ignition signal No. 5		
61	O/W	Ignition signal No. 3		
62	Y/R	Ignition signal No. 1		0.1 - 0.4V★  PBIB0045E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

IGNITION SIGNAL

EC-IGNSYS-03

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



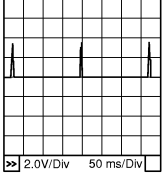
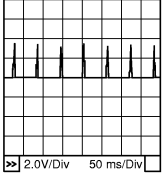
BBWA1189E

IGNITION SIGNAL

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	G/R	Ignition signal No. 8	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	0 - 0.2V★  PBIB0044E
79	V/W	Ignition signal No. 6		0.1 - 0.4V★  PBIB0045E
80	W/R	Ignition signal No. 4		
81	W/G	Ignition signal No. 2		

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS00F08

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.

Is engine running?

Yes or No

Yes (With CONSULT-II)>>GO TO 2.

Yes (Without CONSULT-II)>>GO TO 3.

No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-II

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
2. Make sure that each circuit produces a momentary engine speed drop.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 10.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

IGNITION SIGNAL

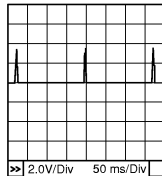
3. CHECK OVERALL FUNCTION

⊗ Without CONSULT-II

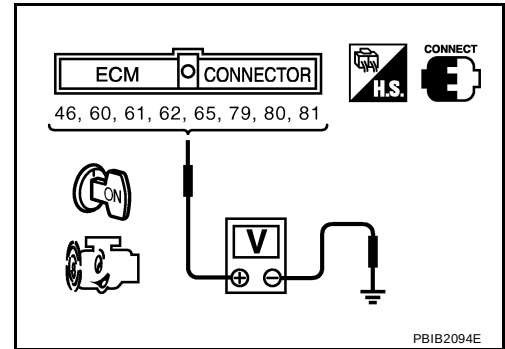
1. Let engine idle.
2. Read the voltage signal between ECM terminals 46, 60, 61, 62, 65, 79, 80, 81 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.

NOTE:

The pulse cycle changes depending on rpm at idle.



PBIB0044E



OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 10.

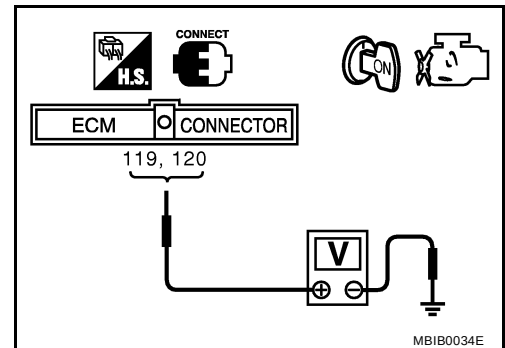
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

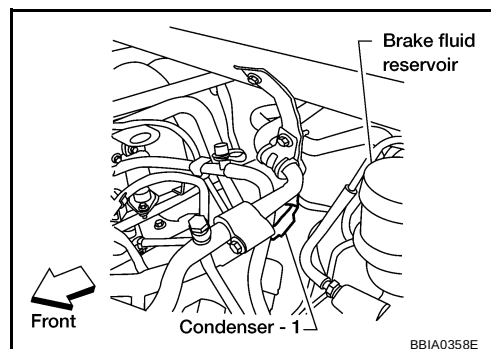
- OK >> GO TO 5.
NG >> Go to EC-127, "POWER SUPPLY AND GROUND CIRCUIT" .



IGNITION SIGNAL

5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.

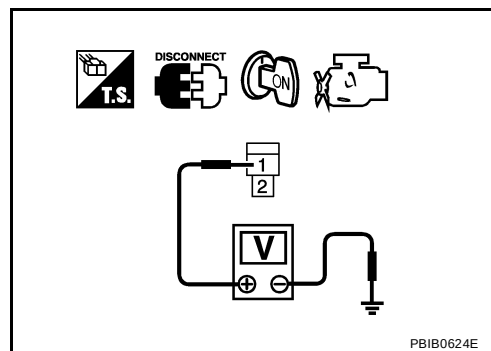


4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
NG >> GO TO 6.



6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector E119.
3. Check harness continuity between IPDM E/R terminal 4 and condenser terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> Go to [EC-127, "POWER SUPPLY AND GROUND CIRCUIT"](#) .
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between ignition coil and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

IGNITION SIGNAL

8. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser terminal 2 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to power in harness or connectors.

9. CHECK CONDENSER

Refer to [EC-573, "Component Inspection"](#) .

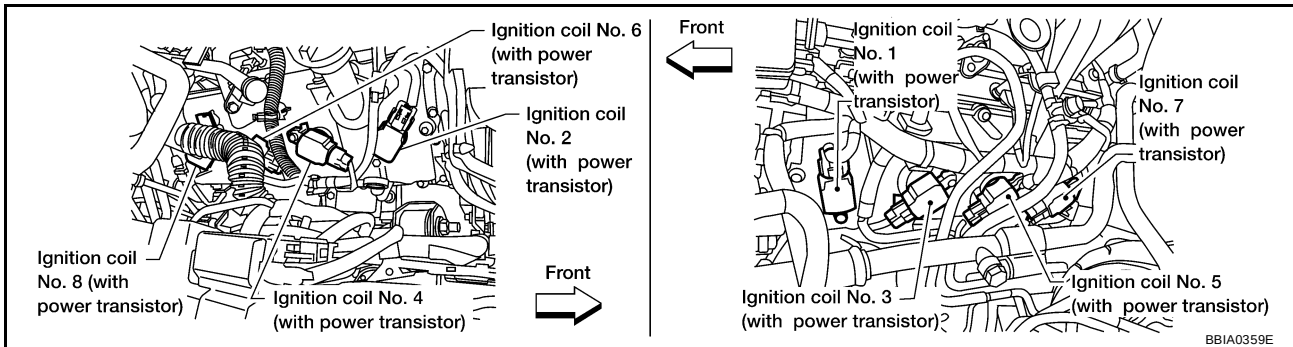
OK or NG

OK >> GO TO 10.

NG >> Replace condenser.

10. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.



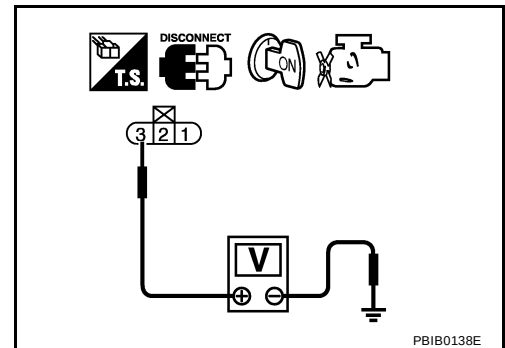
4. Turn ignition switch ON.
5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.



11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- Harness for open or short between ignition coil and harness connector F32

>> Repair or replace harness or connectors.

IGNITION SIGNAL

12. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 13.

NG >> Repair open circuit or short to power in harness or connectors.

13. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 46, 60, 61, 62, 65, 79, 80, 81 and ignition coil terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-573, "Component Inspection"](#) .

OK or NG

OK >> GO TO 15.

NG >> Replace ignition coil with power transistor.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

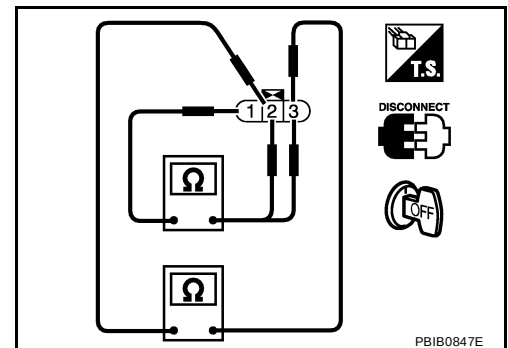
>> INSPECTION END

Component Inspection IGNITION COIL WITH POWER TRANSISTOR

UBS00F09

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	



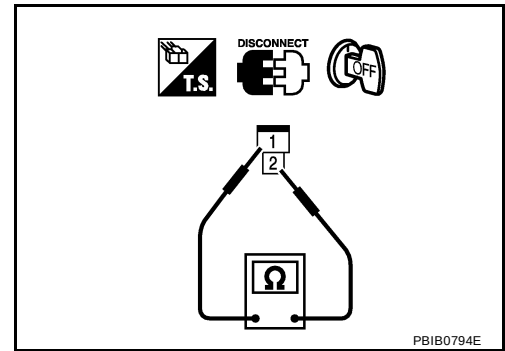
CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

IGNITION SIGNAL

3. Check resistance between condenser terminals 1 and 2.

Resistance	Above 1 M Ω at 25°C (77°F)
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UBS00F0A

Removal and Installation IGNITION COIL WITH POWER TRANSISTOR

Refer to [EM-26, "IGNITION COIL"](#) .

INJECTOR CIRCUIT

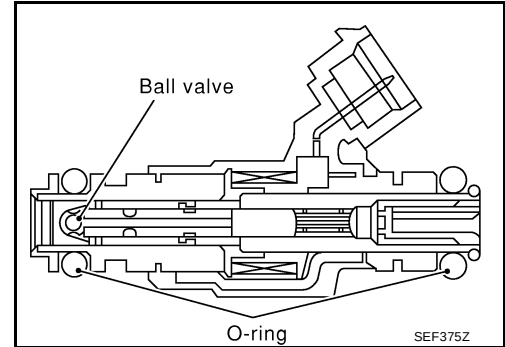
INJECTOR CIRCUIT

PFP:16600

Component Description

UBS00F0B

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



CONSULT-II Reference Value in Data Monitor Mode

UBS00F0C

Specification data are reference values.

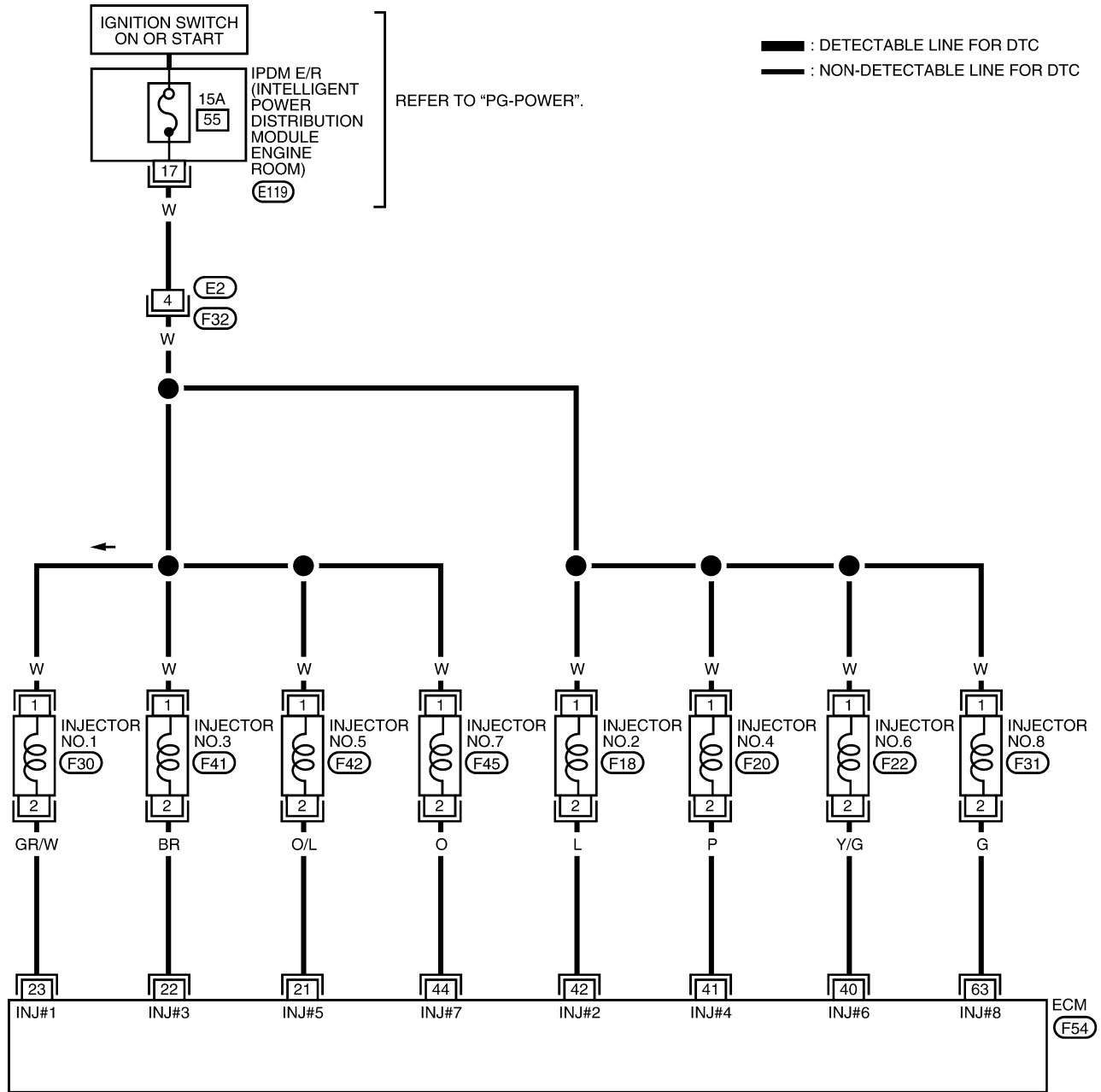
MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	3.0 - 4.2 msec
		2,000 rpm	3.0 - 4.2 msec
INJ PULSE-B1 INJ PULSE-B2	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: N● No load	Idle	2.0 - 2.8 msec
		2,000 rpm	1.9 - 2.9 msec

INJECTOR CIRCUIT

Wiring Diagram

UBS00F0D

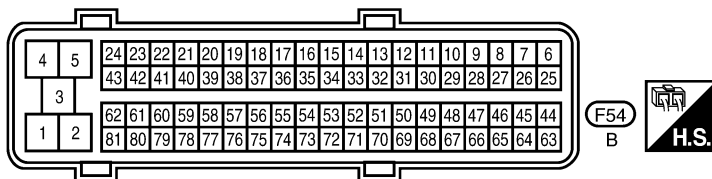
EC-INJECT-01



3	4	5	6	7	8	9	(E119)
10	11	12	13	14	15	16	17

2	1	(F18)	(F20)	(F22)	(F30)	(F31)	(F41)	(F42)	(F45)
GR	GR	GR	GR	GR	GR	GR	GR	GR	GR

1	2	3	4	5	6	7	(F32)
8	9	10	11	12	13	14	15



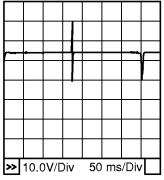
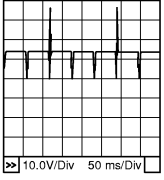
BBWA1190E

INJECTOR CIRCUIT

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
21	O/L	Injector No. 5	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0042E
22	BR	Injector No. 3		
23	GR/W	Injector No. 1	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	BATTERY VOLTAGE (11 - 14V)★  PBIB0043E
40	Y/G	Injector No. 6		
41	P	Injector No. 4		
42	L	Injector No. 2		
44	O	Injector No. 7		
63	G	Injector No. 8		

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

INJECTOR CIRCUIT

2. CHECK OVERALL FUNCTION

① With CONSULT-II

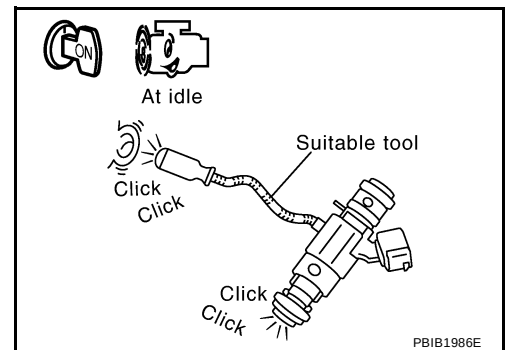
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

⊗ Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.
Clicking noise should be heard.



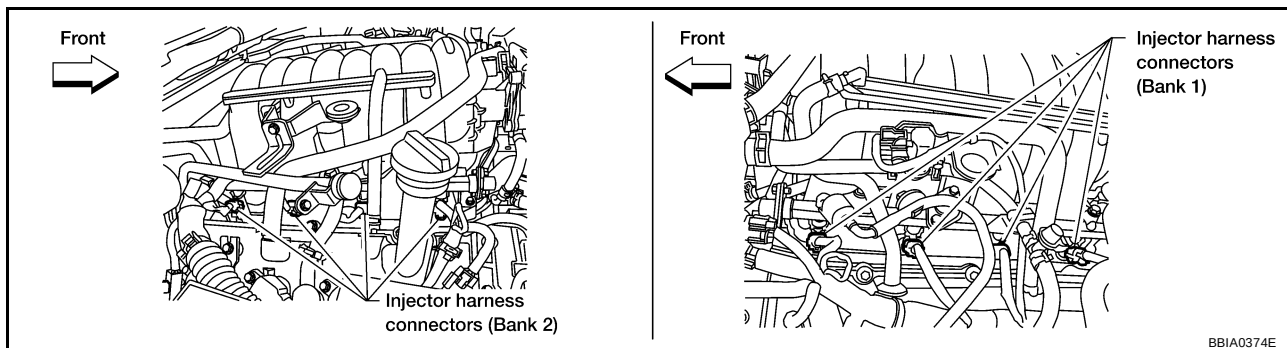
OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 3.

INJECTOR CIRCUIT

3. CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect injector harness connector.

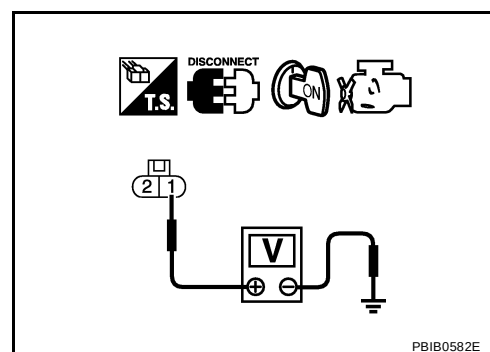


3. Turn ignition switch ON.
4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E2, F32
- IPDM E/R connector E119
- 15A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between injector terminal 2 and ECM terminals 21, 22, 23, 40, 41, 42, 44, 63. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

INJECTOR CIRCUIT

6. CHECK INJECTOR

Refer to [EC-580, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace injector.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

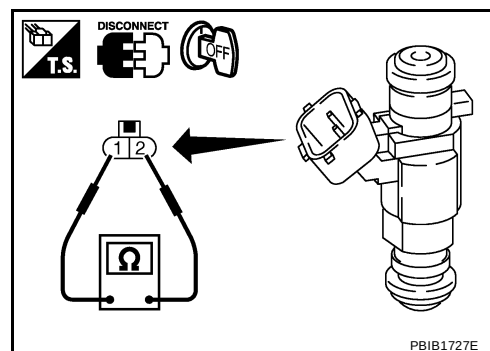
>> INSPECTION END

Component Inspection INJECTOR

UBS00F0F

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 11.1 - 14.5Ω [at 10 - 60°C (50 - 140°F)]



UBS00F0G

Removal and Installation INJECTOR

Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .

FUEL PUMP CIRCUIT

FUEL PUMP CIRCUIT

PFP:17042

Description SYSTEM DESCRIPTION

UBS00F0H

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

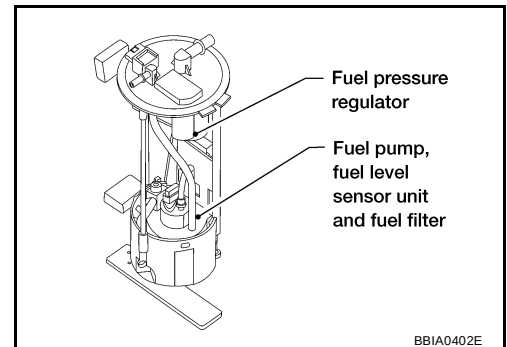
*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine startability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



CONSULT-II Reference Value in Data Monitor Mode

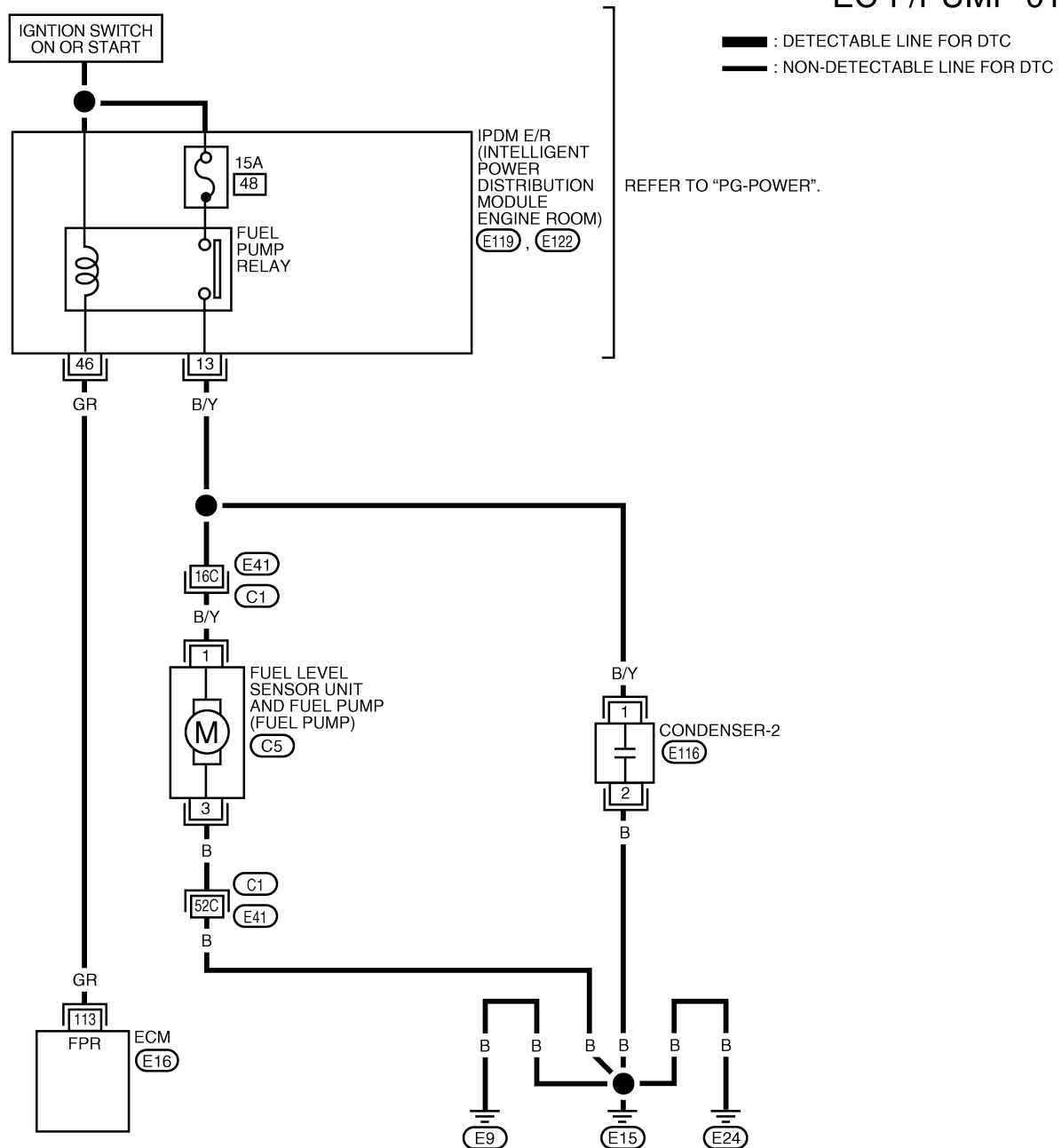
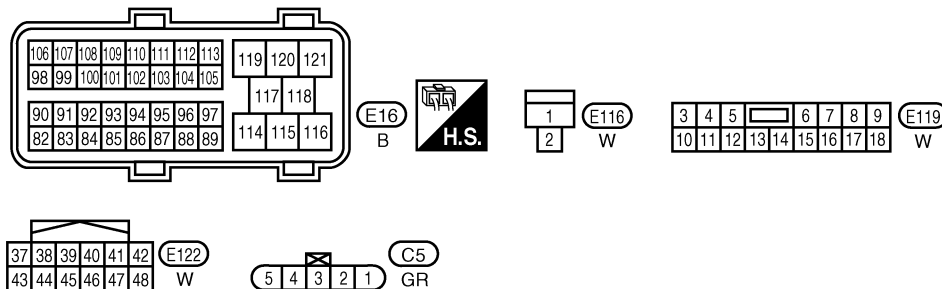
UBS00F0I

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking	ON
	● Except above conditions	OFF

UBS00F0J

EC-F/PUMP-01



REFER TO THE FOLLOWING
C1 - SUPER MULTIPLE
 JUNCTION (SMJ)

FUEL PUMP CIRCUIT

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	GR	Fuel pump relay	[Ignition switch: ON] ● For 1 second after turning ignition switch ON	0 - 1.5V
			[Engine is running] [Ignition switch: ON] ● More than 1 second after turning ignition switch ON.	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

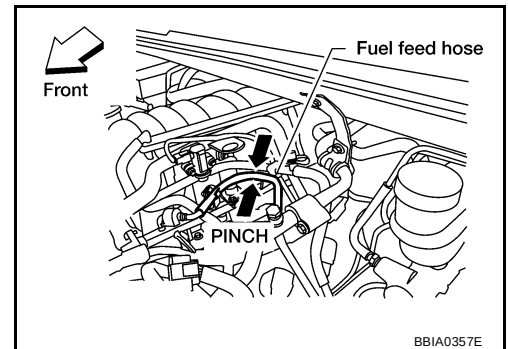
UBS00F0K

1. CHECK OVERALL FUNCTION

- Turn ignition switch ON.
- Pinch fuel feed hose with two fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 2.



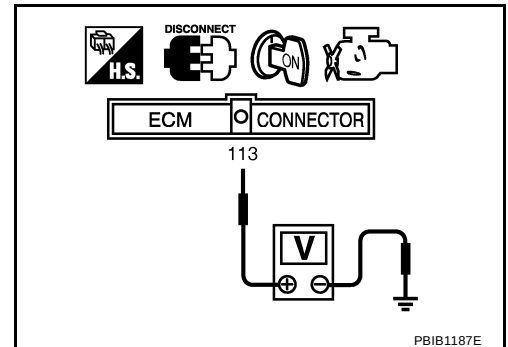
2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Turn ignition switch ON.
- Check voltage between ECM terminal 113 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 3.



FUEL PUMP CIRCUIT

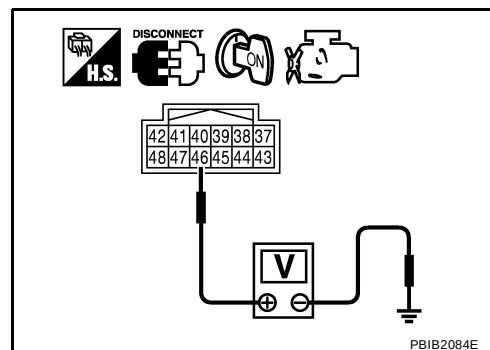
3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E122.
3. Turn ignition switch ON.
4. Check voltage between IPDM E/R terminal 46 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 12.



4. DETECT MALFUNCTIONING PART

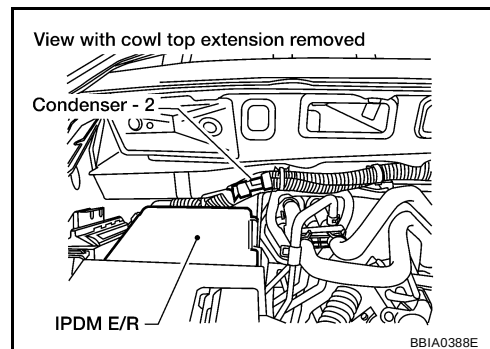
Check the following.

- Harness for open or short between IPDM E/R and ECM

>> Repair harness or connectors.

5. CHECK CONDENSER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect condenser harness connector.
4. Turn ignition switch ON.



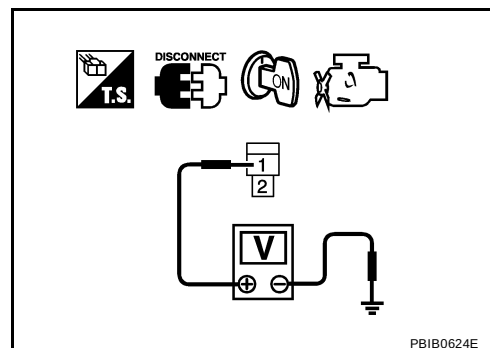
5. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage should exist for 1 second after ignition switch is turned ON.

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 6.



FUEL PUMP CIRCUIT

6. CHECK 15A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15A fuse.
3. Check 15A fuse.

OK or NG

- OK >> GO TO 7.
NG >> Replace fuse.

7. CHECK CONDENSER POWER SUPPLY CIRCUIT-II FOR OPEN AND SHORT

1. Disconnect IPDM E/R harness connector E119.
2. Check harness continuity between IPDM E/R terminal 13 and condenser terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between condenser terminal 1 and ground.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to power.

OK or NG

- OK >> GO TO 9.
NG >> Repair open circuit or short to power in harness or connectors.

9. CHECK CONDENSER

Refer to [EC-586, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
NG >> Replace condenser.

10. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

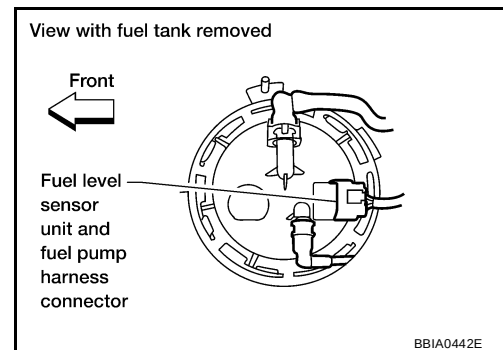
1. Turn ignition switch OFF.
2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
3. Disconnect IPDM E/R harness connector E119.
4. Check harness continuity between IPDM E/R terminal 13 and "fuel level sensor unit and fuel pump" terminal 1, "fuel level sensor unit and fuel pump" terminal 3 and ground.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 12.
NG >> GO TO 11.



FUEL PUMP CIRCUIT

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E41, C1
- Harness for open or short between fuel pump and IPDM E/R
- Harness for open or short between fuel pump and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R.

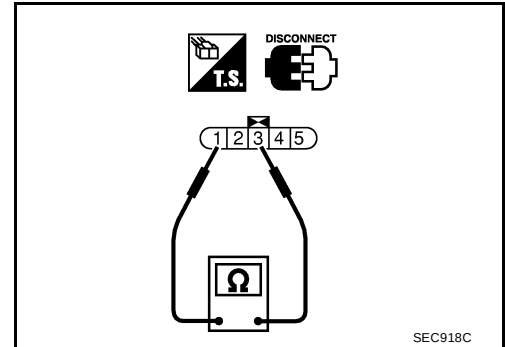
NG >> Repair or replace harness or connectors.

Component Inspection

UBS00F0L

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Check resistance between fuel level sensor unit and fuel pump terminals 1 and 3.

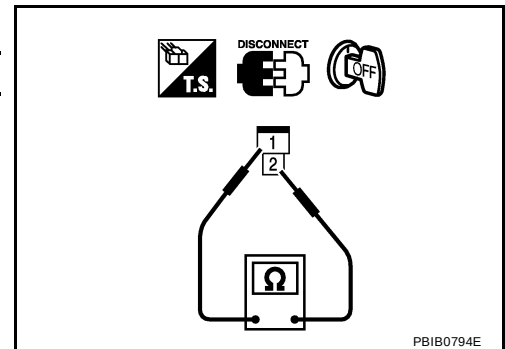
Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]



CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals as 1 and 2.

Resistance	Above 1 MΩ at 25°C (77°F)
------------	---------------------------



Removal and Installation

FUEL PUMP

UBS00F0M

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

REFRIGERANT PRESSURE SENSOR

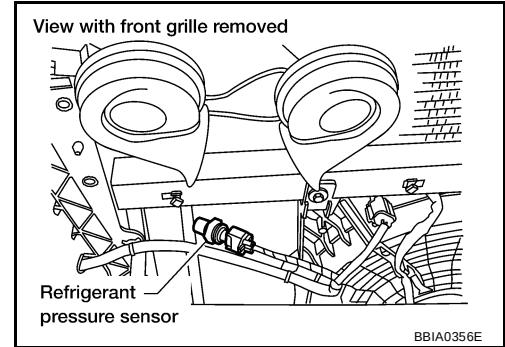
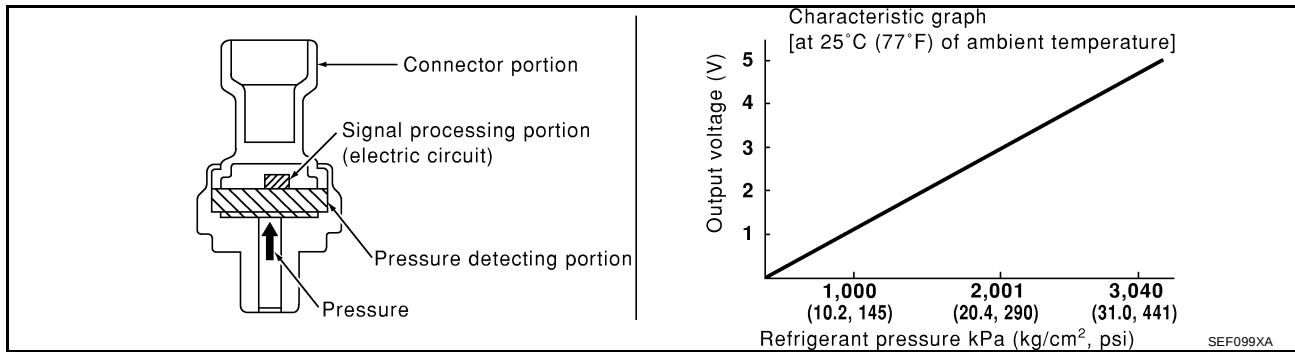
REFRIGERANT PRESSURE SENSOR

PFP:92136

Component Description

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

UBS00F0N



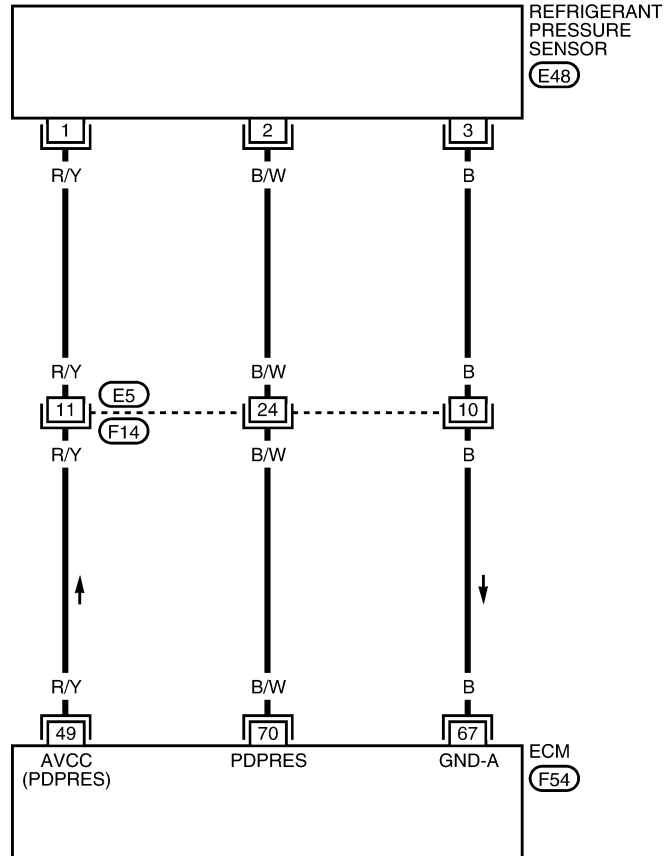
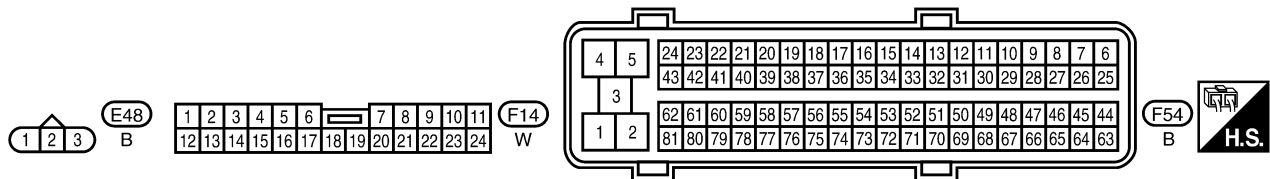
REFRIGERANT PRESSURE SENSOR

Wiring Diagram

UBS00F00

EC-RP/SEN-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA1192E

REFRIGERANT PRESSURE SENSOR

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
70	B/W	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are ON. (Compressor operates.)	1.0 - 4.0V

Diagnostic Procedure

UBS00F0P

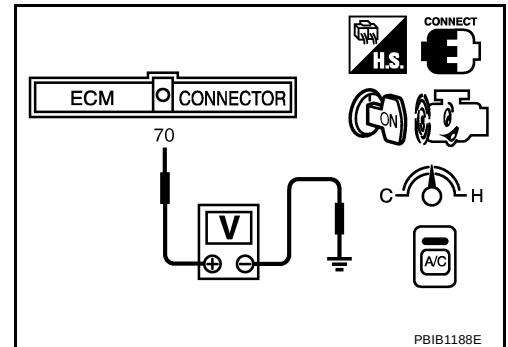
1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch ON.
3. Check voltage between ECM terminal 70 and ground with CONSULT-II or tester.

Voltage: 1.0 - 4.0V

OK or NG

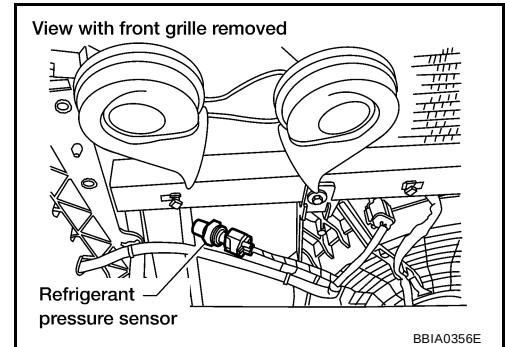
OK >> **INSPECTION END**
NG >> GO TO 2.



REFRIGERANT PRESSURE SENSOR

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch OFF.
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch ON.

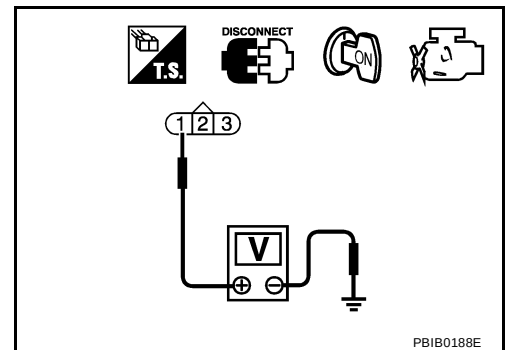


5. Check voltage between refrigerant pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 3 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

REFRIGERANT PRESSURE SENSOR

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 70 and refrigerant pressure sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E5, F14
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace refrigerant pressure sensor.
NG >> Repair or replace.

Removal and Installation REFRIGERANT PRESSURE SENSOR

Refer to [MTC-119, "Removal and Installation for Refrigerant Pressure Sensor"](#) .

UBS00F0Q

ELECTRICAL LOAD SIGNAL

ELECTRICAL LOAD SIGNAL

PFP:25350

Description

UBS00F0R

The electrical load signal (Headlamp switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

CONSULT-II Reference Value in Data Monitor Mode

UBS00F0S

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Lighting switch is in 2nd.	ON
		Lighting switch is OFF.	OFF

Diagnostic Procedure

UBS00F0T

1. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Connect CONSULT-II and select "DATA MONITOR" mode.
3. Select "LOAD SIGNAL" and check indication under the following conditions.

Condition	Indication
Lighting switch ON at 2nd position	ON
Lighting switch OFF	OFF

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 2.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

2. CHECK HEADLAMP SYSTEM

Refer to [LT-5, "HEADLAMP \(FOR USA\)"](#) , or [LT-32, "HEADLAMP \(FOR CANADA\) - DAYTIME LIGHT SYSTEM -"](#) .

>> **INSPECTION END**

ASCD BRAKE SWITCH

ASCD BRAKE SWITCH

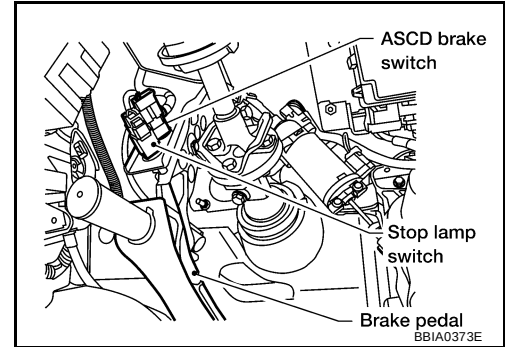
PFP:25320

UBS00F0U

Component Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to [EC-619, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



UBS00F0V

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

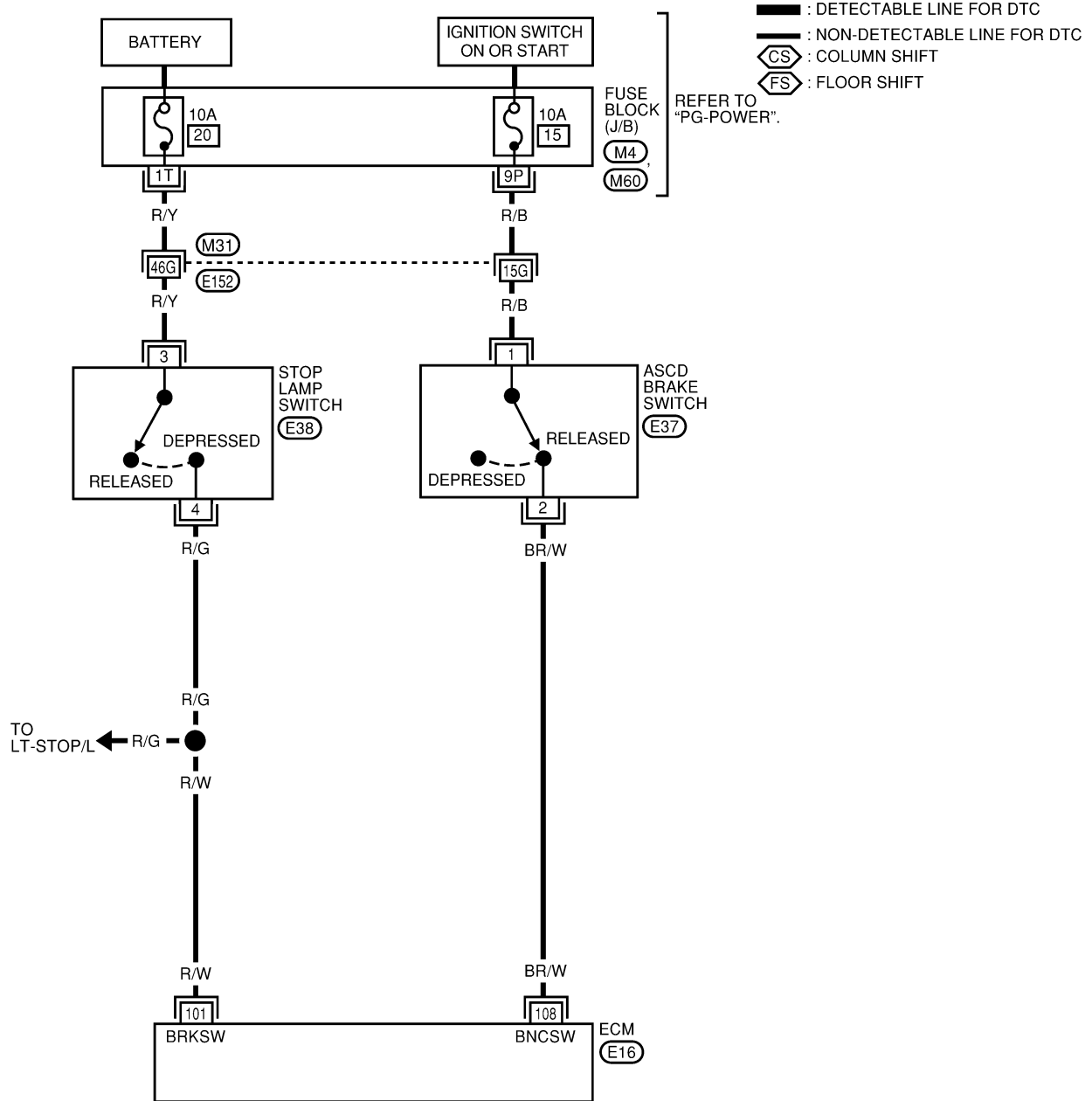
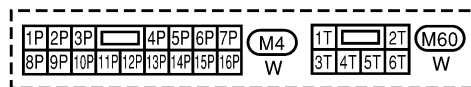
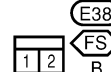
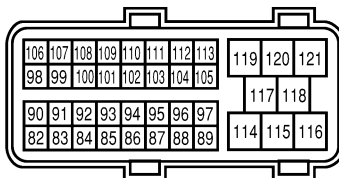
MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal: Fully released	ON
		● Brake pedal: Slightly depressed	OFF
BRAKE SW 2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal: Fully released	OFF
		● Brake pedal: Slightly depressed	ON

ASCD BRAKE SWITCH

Wiring Diagram

UBS00F0W

EC-ASCBOF-01



REFER TO THE FOLLOWING.

(M31) - SUPER MULTIPLE JUNCTION (SMJ)

BBWA1377E

ASCD BRAKE SWITCH

Specification data are reference values and are 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.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/W	Stop lamp switch	[Ignition switch: ON] ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
108	BR/W	ASCD brake switch	[Ignition switch: ON] ● Brake pedal: Slightly depressed	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

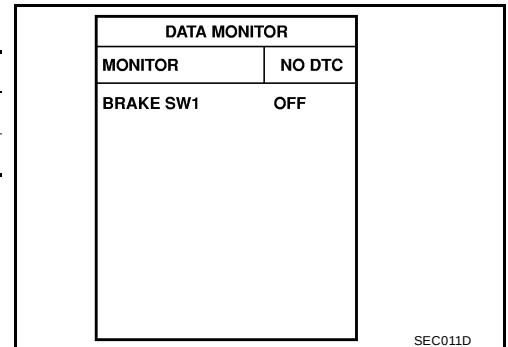
UBS00F0X

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

- Turn ignition switch ON.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.

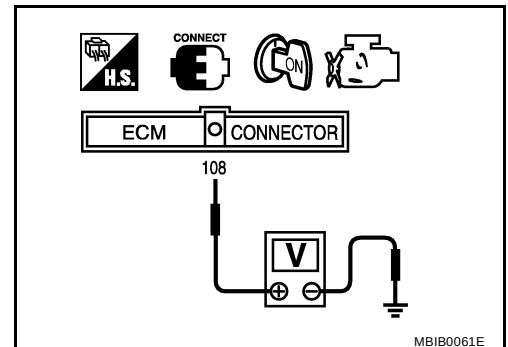
CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



Without CONSULT-II

- Turn ignition switch ON.
- Check voltage between ECM terminal 108 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
NG >> GO TO 3.

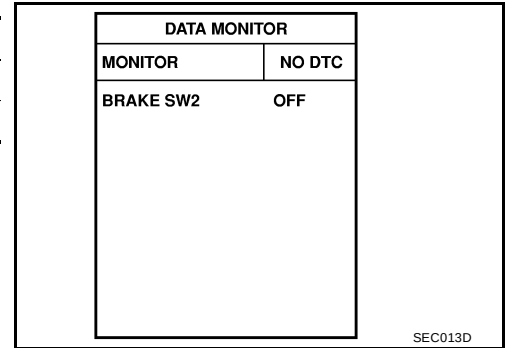
ASCD BRAKE SWITCH

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

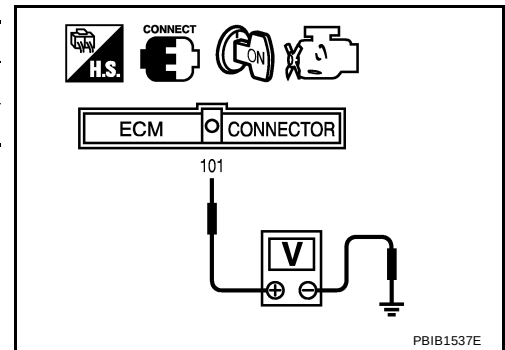
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage



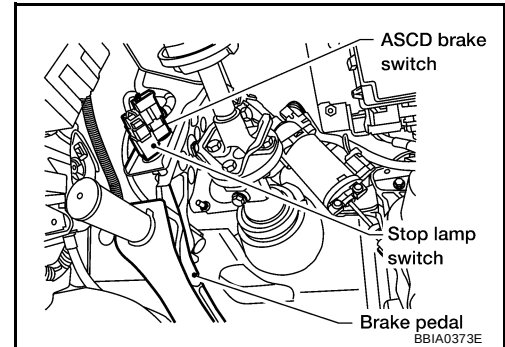
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

ASCD BRAKE SWITCH

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.

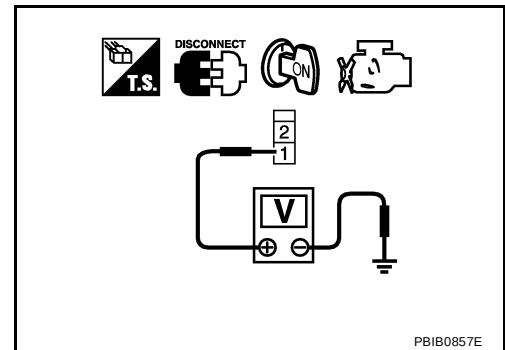


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, 152
- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH

Refer to [EC-599, "Component Inspection"](#)

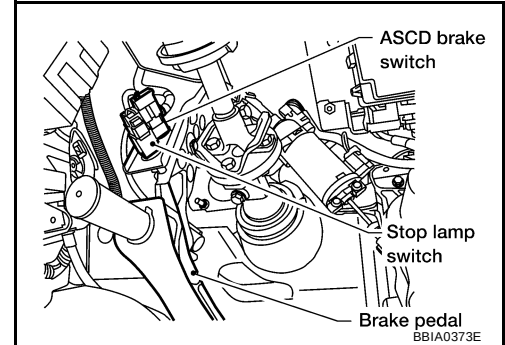
OK or NG

- OK >> GO TO 11.
NG >> Replace ASCD brake switch.

ASCD BRAKE SWITCH

7. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

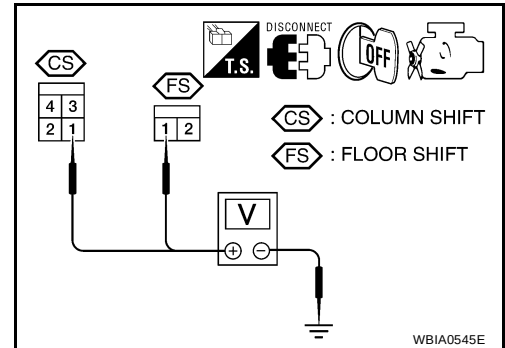


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.



8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M31, E152
- Fuse block (J/B) connector M60
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK STOP LAMP SWITCH

Refer to [EC-599, "Component Inspection"](#)

OK or NG

- OK >> GO TO 11.
- NG >> Replace stop lamp switch.

ASCD BRAKE SWITCH

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

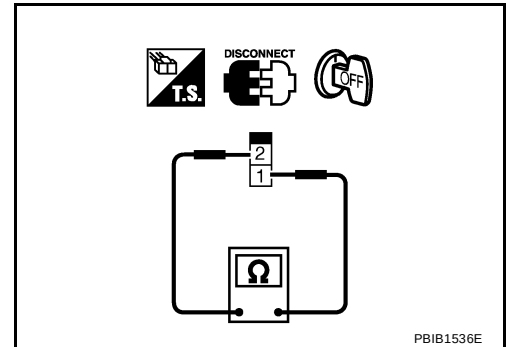
Component Inspection ASCD BRAKE SWITCH

UBS00F0Y

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-6, "BRAKE PEDAL"](#) , and perform step 3 again.

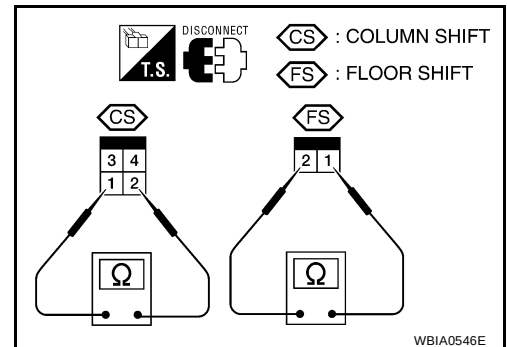


STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check harness continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-6, "BRAKE PEDAL"](#) , and perform step 3 again.



ASCD INDICATOR

ASCD INDICATOR

PFP:24814

Component Description

UBS00F0Z

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when ON/OFF switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.

Refer to [EC-619, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

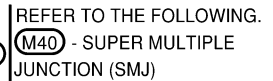
UBS00F10

Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● ON/OFF(MAIN) switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	● ON/OFF switch: ON	● COAST/SET switch: Pressed	ON
	● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● COAST/SET switch: Released	OFF

UBS00F11

EC-ASCIND-01



ASCD INDICATOR

Diagnostic Procedure

UBS00F12

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● ON/OFF(MAIN) switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	● ON/OFF(MAIN) switch: ON	● COAST/SET switch: Pressed	ON
	● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● COAST/SET switch: Released	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

2. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

OK or NG

OK >> GO TO 3.

NG >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-134, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

3. CHECK DTC WITH COMBINATION METER

Refer to [DI-5, "COMBINATION METERS"](#) .

OK or NG

OK >> GO TO 4.

NG >> Go to [DI-5, "COMBINATION METERS"](#) .

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-126, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

MIL AND DATA LINK CONNECTOR

MIL AND DATA LINK CONNECTOR

PFP:24814

Wiring Diagram

UBS00F13

EC-MIL/DL-01

EC

C

D

E

F

G

H

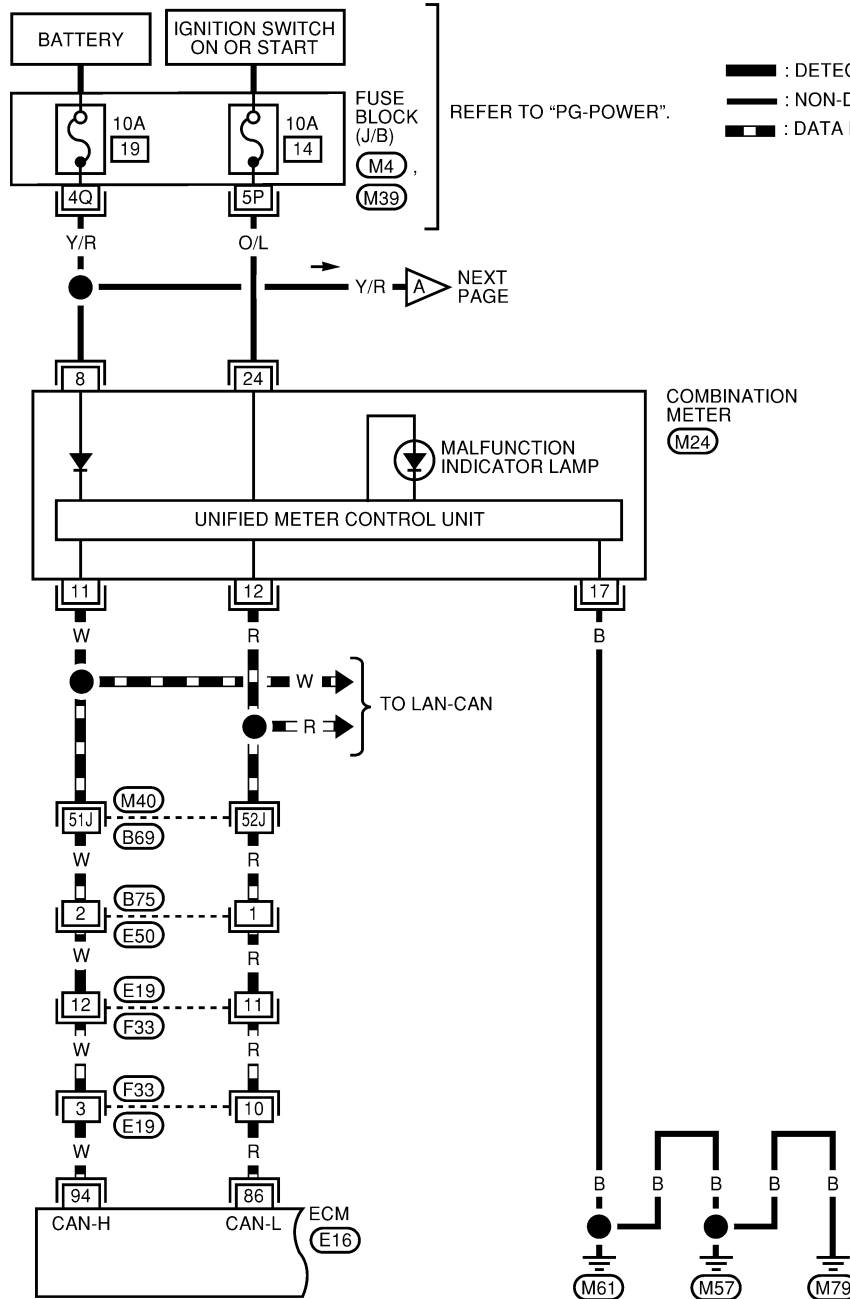
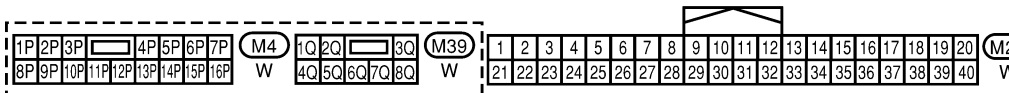
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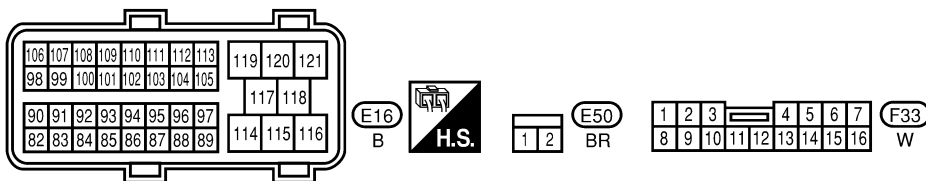
L

M



REFER TO THE FOLLOWING

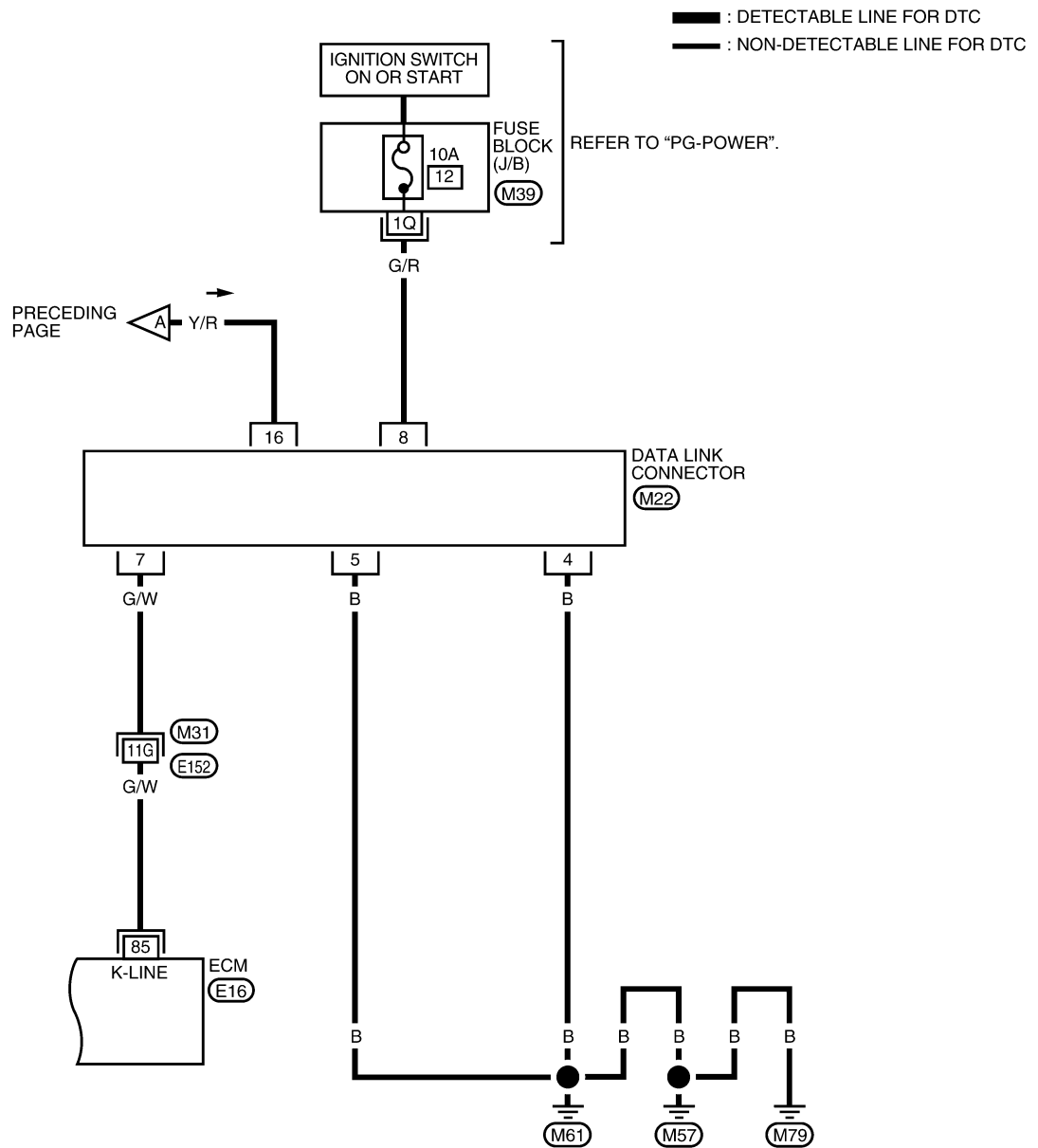
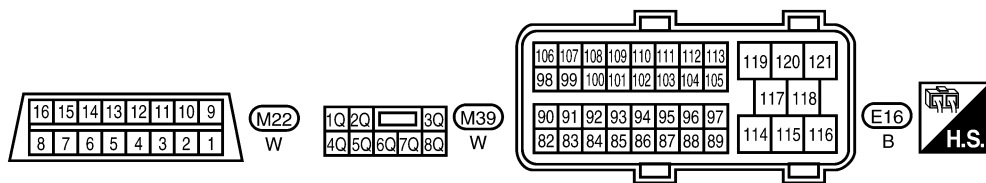
(M40) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA1379E

MIL AND DATA LINK CONNECTOR

EC-MIL/DL-02



REFER TO THE FOLLOWING.
 M31 - SUPER MULTIPLE
 JUNCTION (SMJ)

BBWA1197E

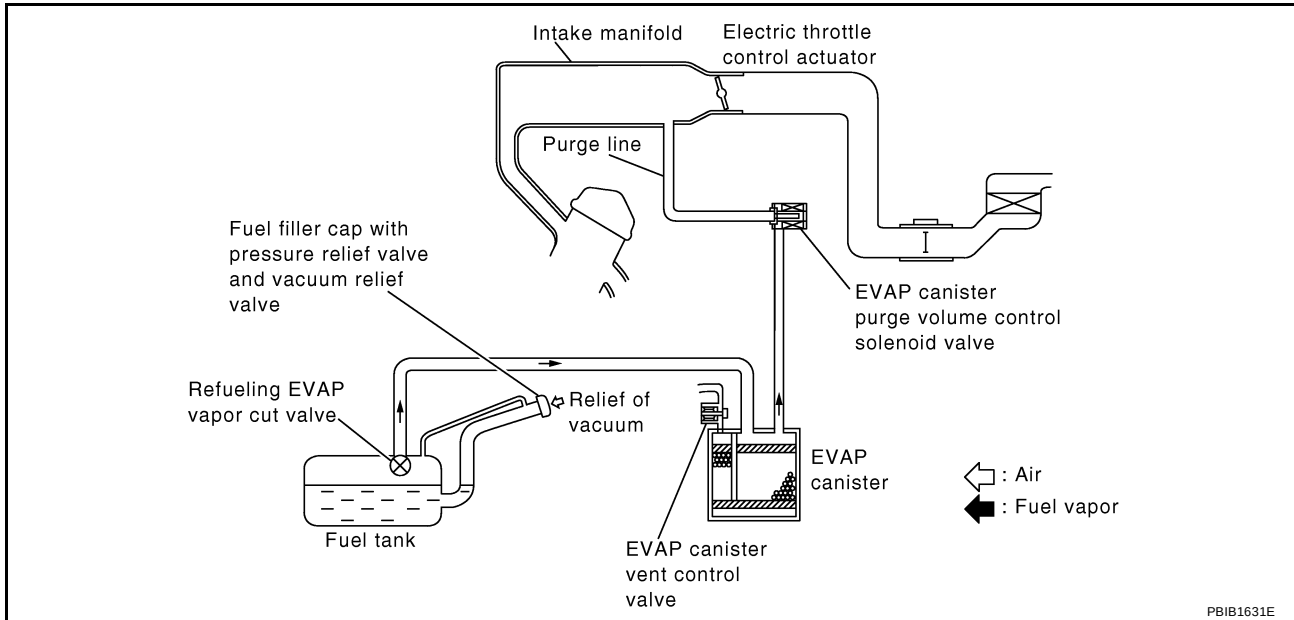
EVAPORATIVE EMISSION SYSTEM

EVAPORATIVE EMISSION SYSTEM

PFP:14950

Description SYSTEM DESCRIPTION

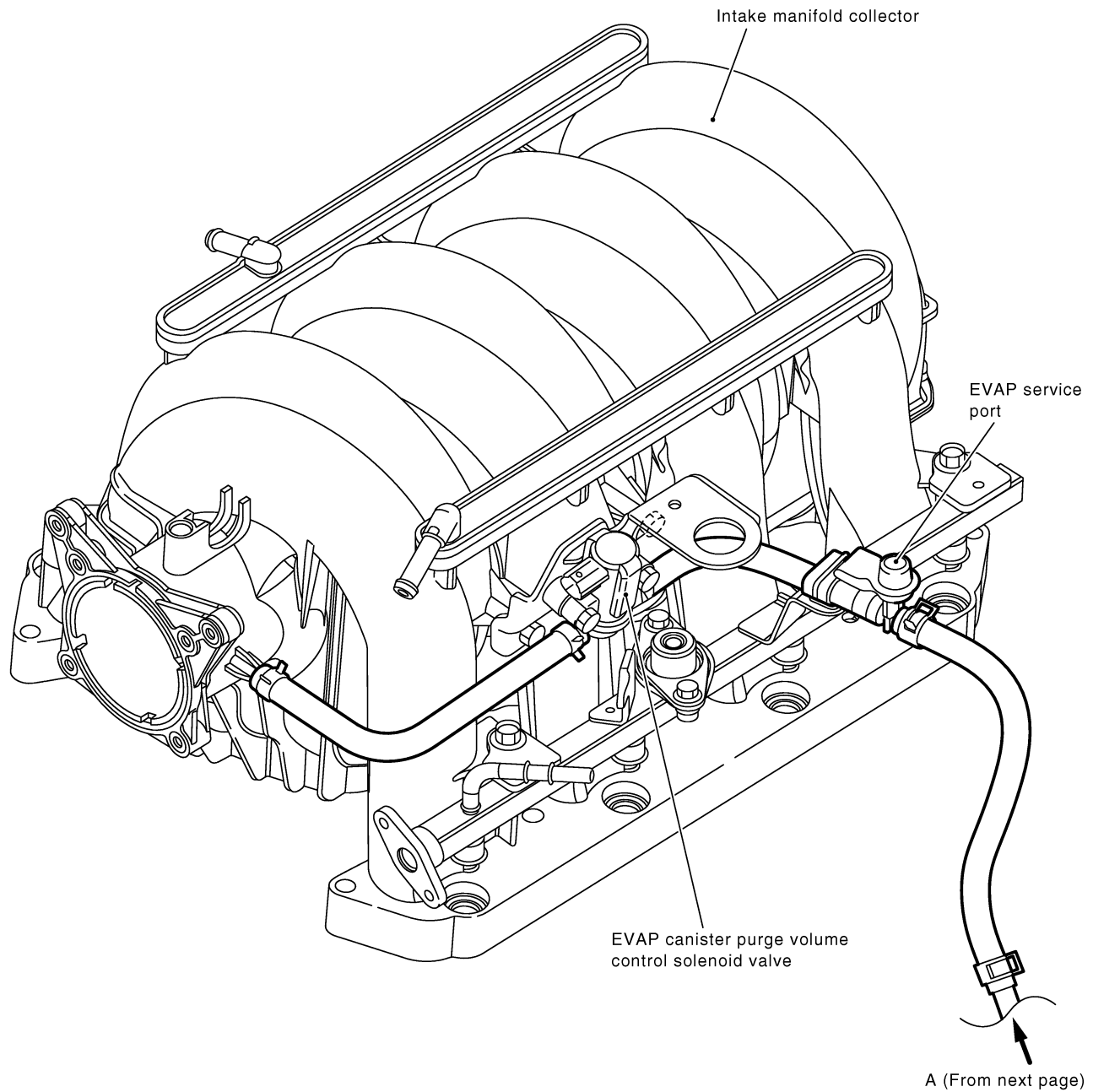
UBS00F14



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases. EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

EVAPORATIVE EMISSION SYSTEM

EVAPORATIVE EMISSION LINE DRAWING

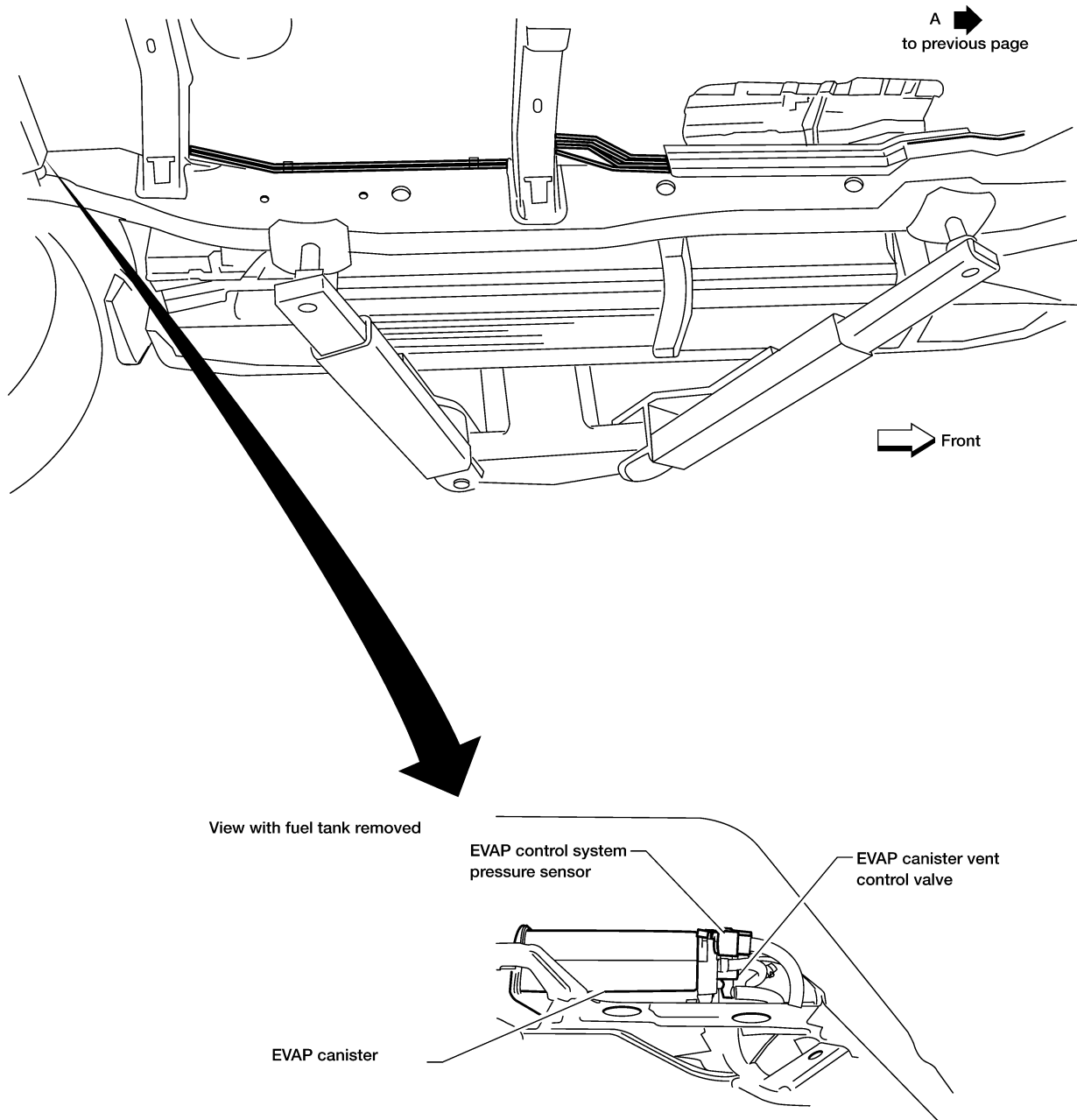


NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

PBIB2053E

EVAPORATIVE EMISSION SYSTEM



A

EC

C

D

E

F

G

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I

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L

M

BBIA0444E

EVAPORATIVE EMISSION SYSTEM

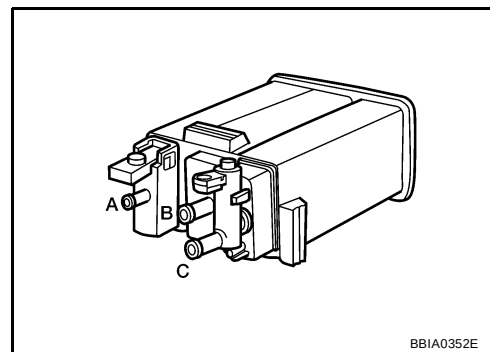
UBS00F15

Component Inspection

EVAP CANISTER

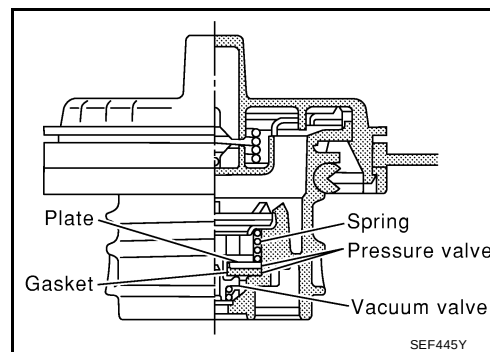
Check EVAP canister as follows:

1. Block port **B** .
2. Blow air into port **A** and check that it flows freely out of port **C** .
3. Release blocked port **B** .
4. Apply vacuum pressure to port **B** and check that vacuum pressure exists at the ports **A** and **C** .
5. Block port **A** and **B** .
6. Apply pressure to port **C** and check that there is no leakage.



FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FULLER CAP)

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

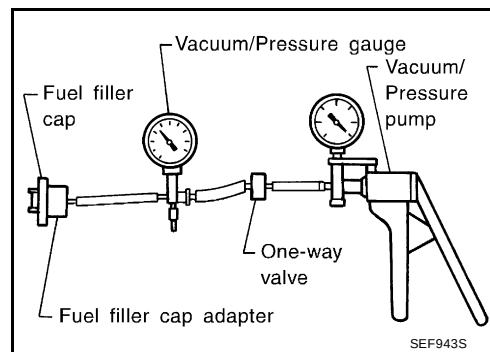
Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm² , 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm² , -0.87 to -0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-284](#) .

FUEL TANK TEMPERATURE SENSOR

Refer to [EC-224](#) .

EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-291](#) .

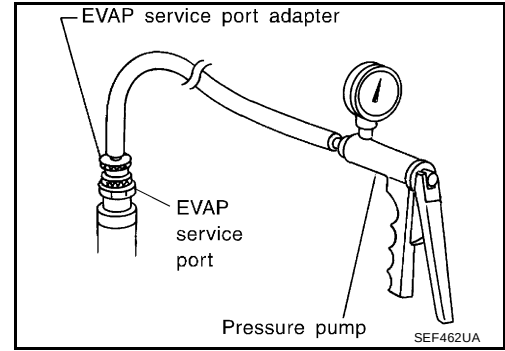
EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-298](#) .

EVAPORATIVE EMISSION SYSTEM

EVAP SERVICE PORT

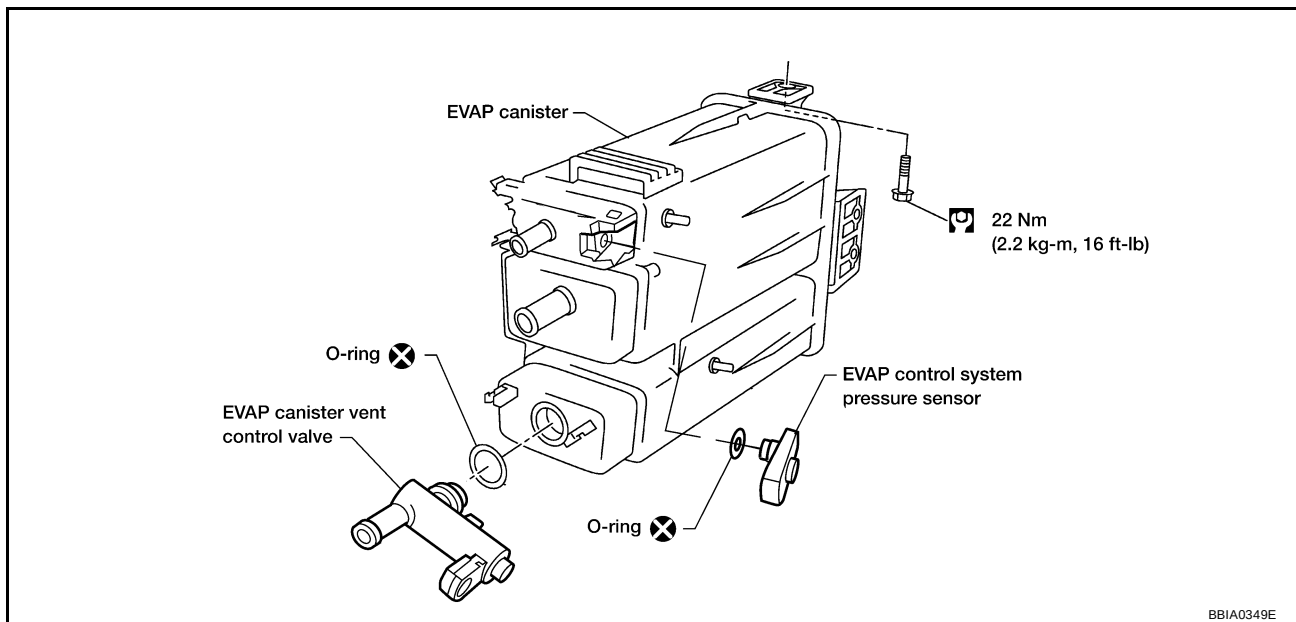
Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



UBS00F16

Removal and Installation EVAP CANISTER

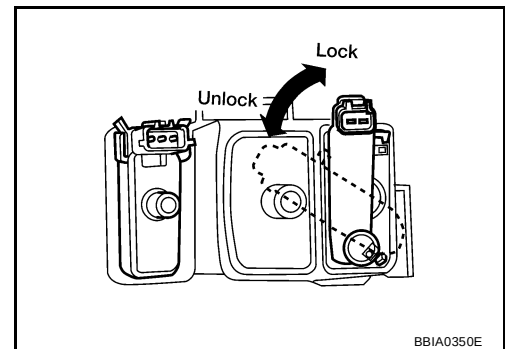
Tighten EVAP canister as shown in the figure.



EVAP CANISTER VENT CONTROL VALVE

1. Turn EVAP canister vent control valve counterclockwise.
2. Remove the EVAP canister vent control valve.

Always replace O-ring with a new one.



How to Detect Fuel Vapor Leakage

CAUTION:

- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in EVAP system.

NOTE:

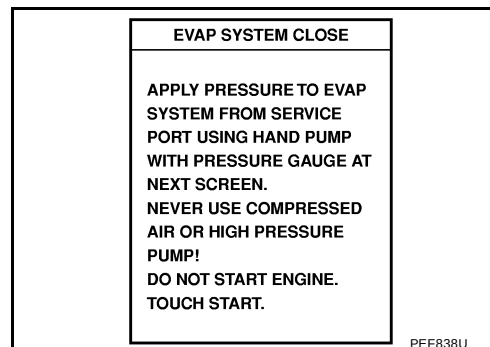
- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

UBS00F17

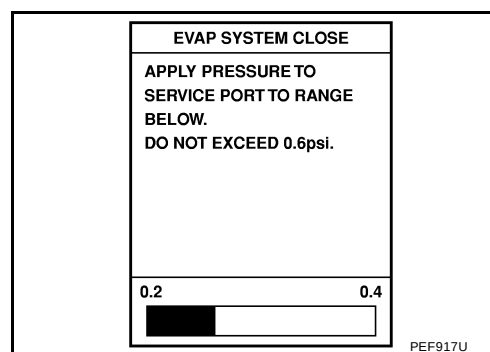
EVAPORATIVE EMISSION SYSTEM

Ⓜ WITH CONSULT-II

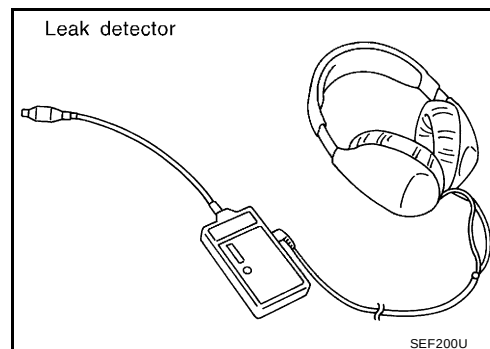
1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump and hose to the EVAP service port adapter.
3. Turn ignition switch ON.
4. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.



6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.

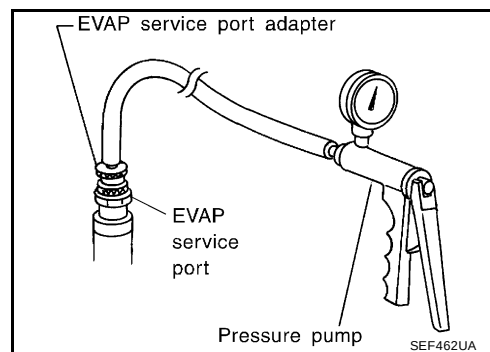


8. Locate the leak using a leak detector. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#).



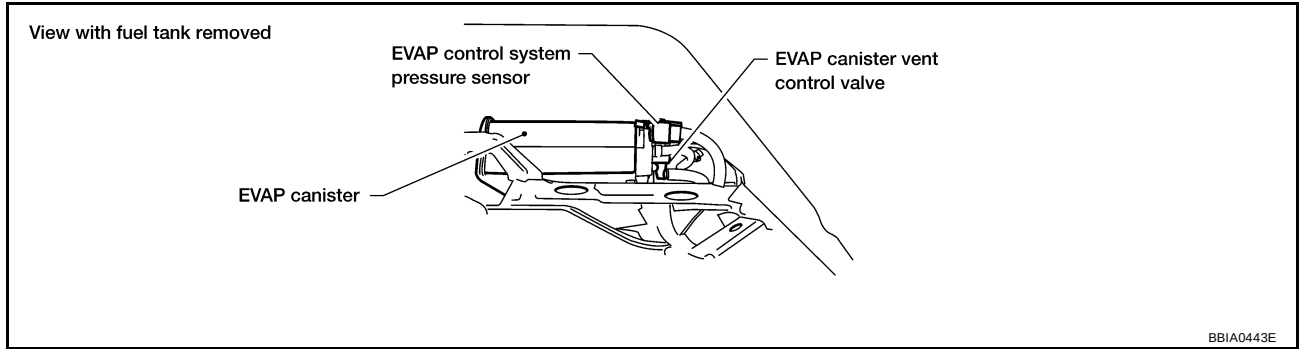
ⓧ WITHOUT CONSULT-II

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



EVAPORATIVE EMISSION SYSTEM

3. Apply battery voltage to between the terminals of EVAP canister vent control valve to make a closed EVAP system.



4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm² , 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-606, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

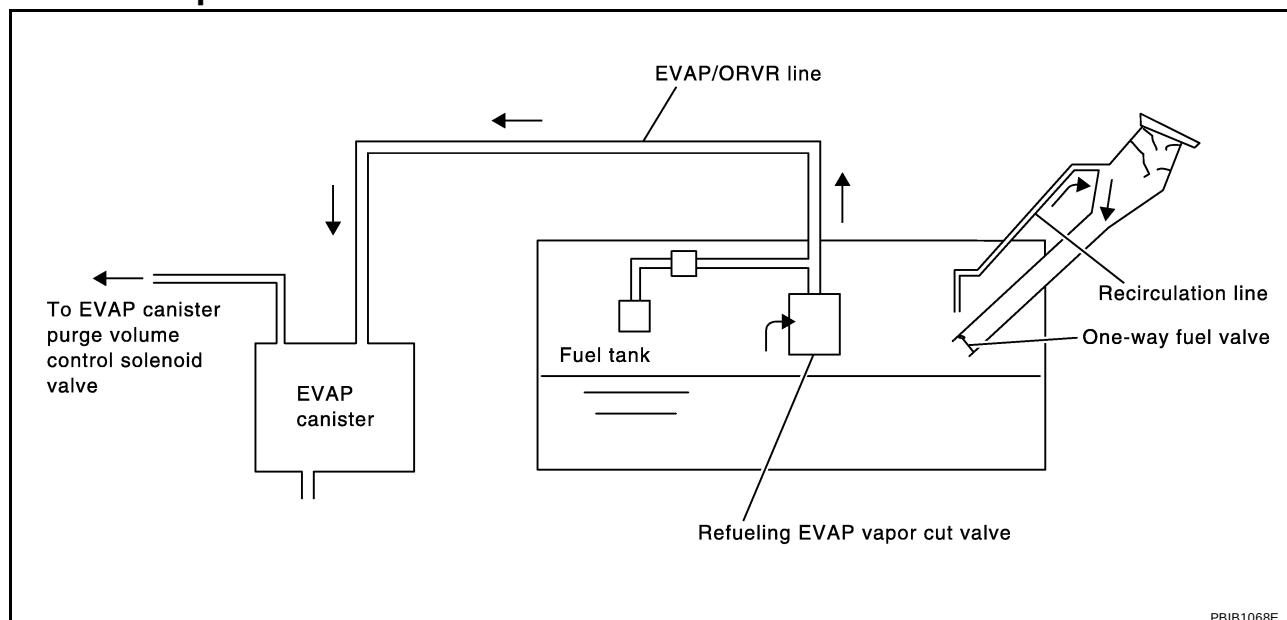
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00032

System Description

UBS00F18



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: INFLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - Put drained fuel in an explosion-proof container and put lid on securely.
 - Release fuel pressure from fuel line. Refer to [EC-46, "FUEL PRESSURE RELEASE"](#) .
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

Diagnostic Procedure

UBS00F19

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
The weight should be less than 2.2 kg (4.9 lb).

OK or NG

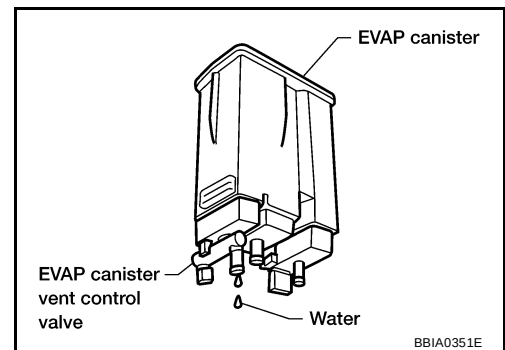
- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
No >> GO TO 5.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

5. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-615, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
The weight should be less than 2.2 kg (4.9 lb).

OK or NG

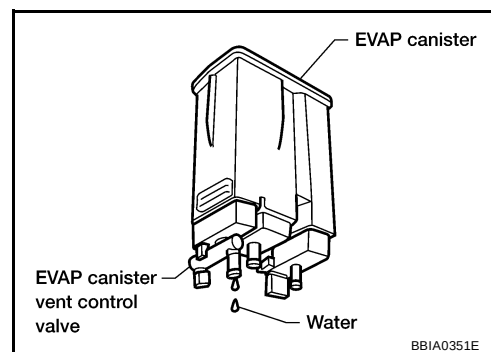
- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
No >> GO TO 5.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

5. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace hoses and tubes.

6. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 7.
NG >> Replace filler neck tube.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

7. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-615, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

8. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK >> GO TO 9.

NG >> Replace fuel filler tube.

9. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace one-way fuel valve with fuel tank.

10. CHECK ONE-WAY FUEL VALVE-II

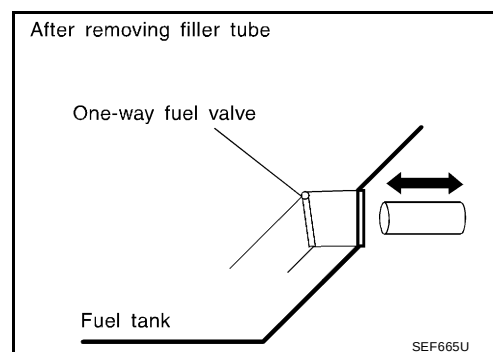
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

Do not drop any material into the tank.

OK or NG

OK >> **INSPECTION END**

NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



UBS00F1A

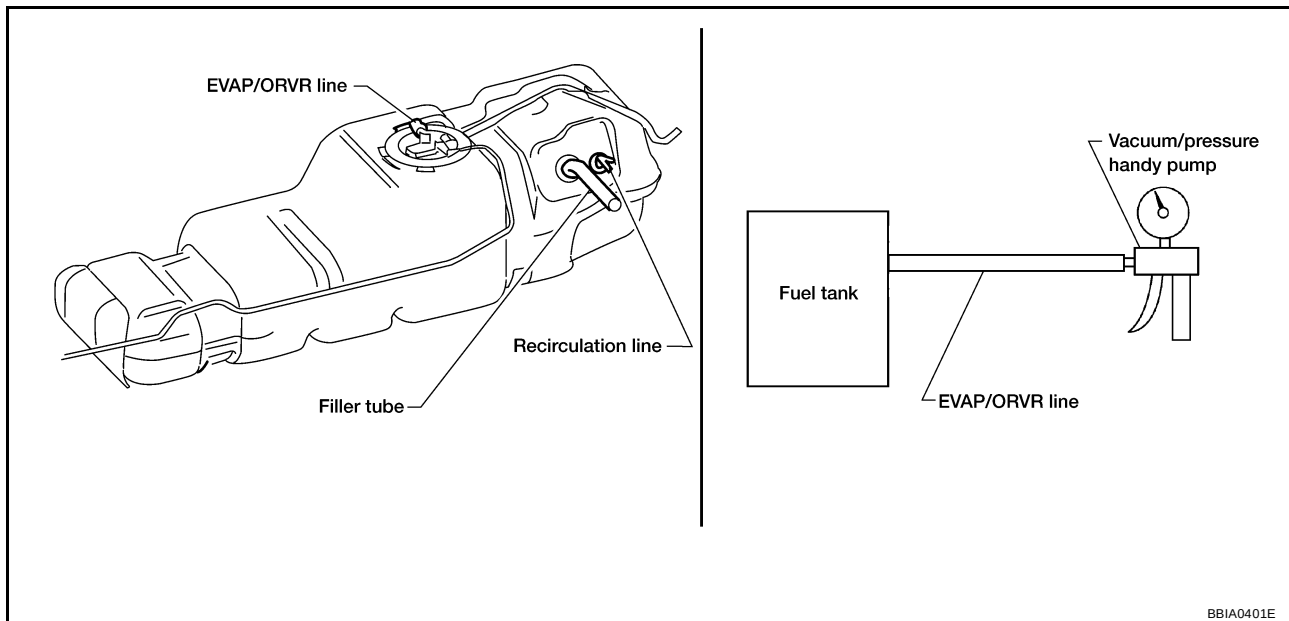
Component Inspection REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to [FL-10, "FUEL TANK"](#) .
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel gauge retainer.
 - b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.

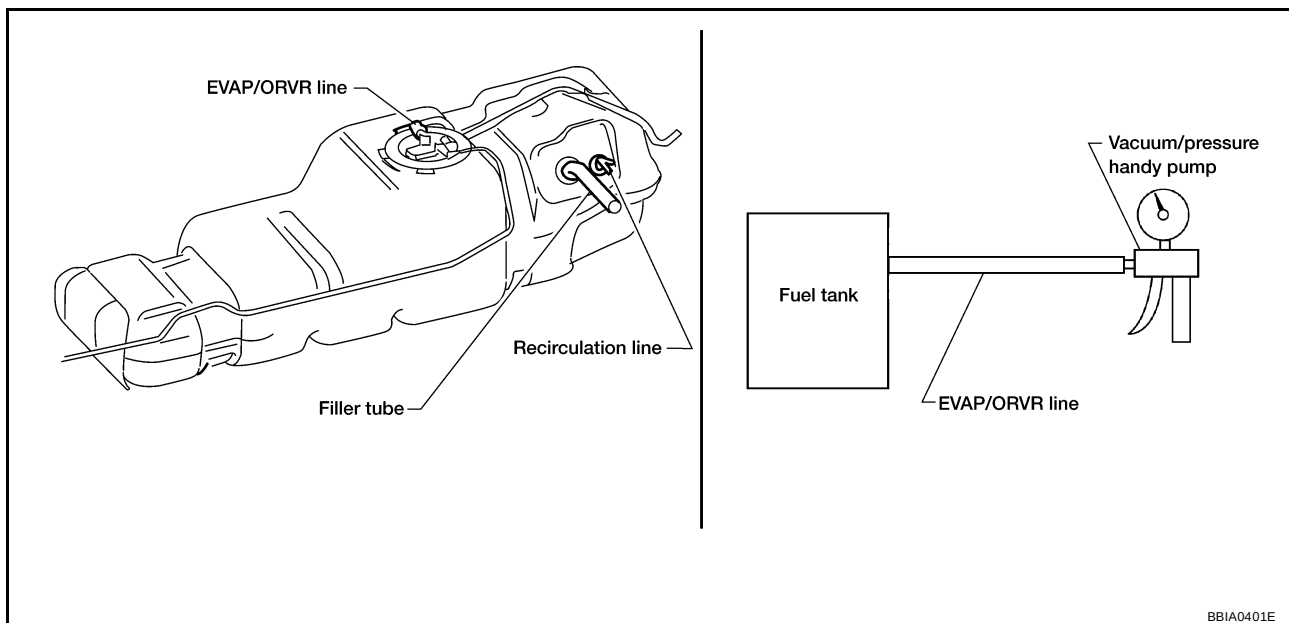
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

- d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



⊗ Without CONSULT-II

1. Remove fuel tank. Refer to [FL-10, "FUEL TANK"](#) .
2. Drain fuel from the tank as follows:
 - a. Remove fuel gauge retainer.
 - b. Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
- d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



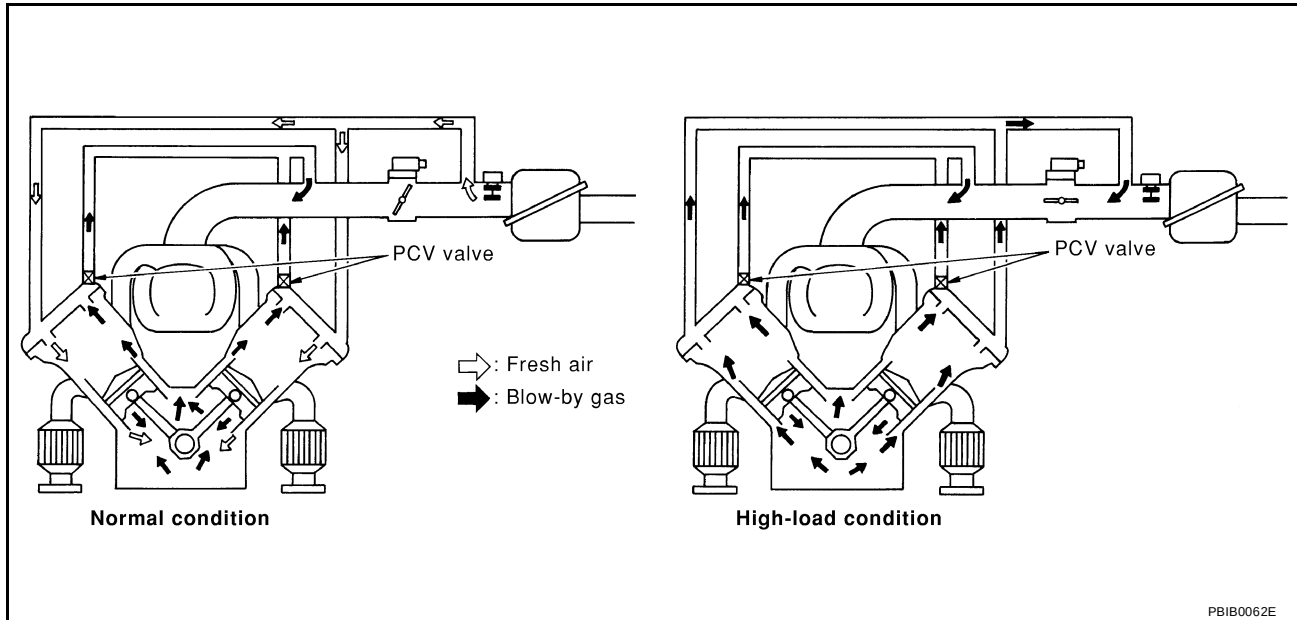
POSITIVE CRANKCASE VENTILATION

POSITIVE CRANKCASE VENTILATION

PFP:11810

Description SYSTEM DESCRIPTION

UBS00F1B



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

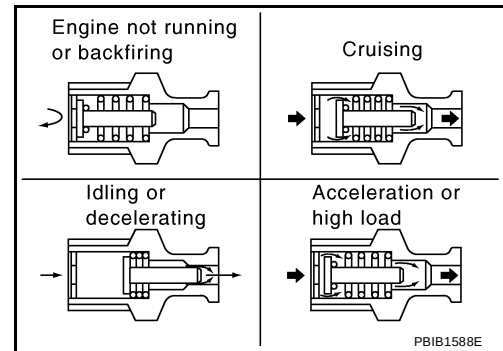
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

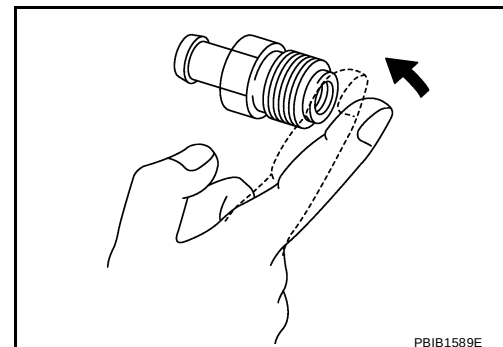
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



Component Inspection

PCV (POSITIVE CRANKCASE VENTILATION) VALVE

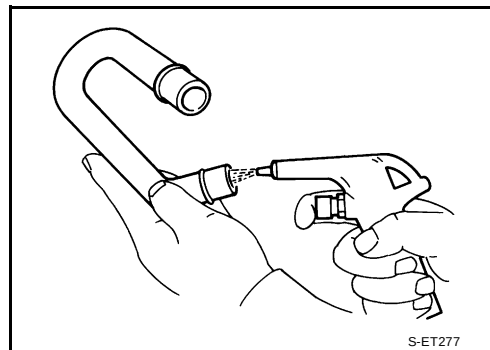
With engine running at idle, remove PCV valve ventilation hose from PCV valve; if the valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.



POSITIVE CRANKCASE VENTILATION

PCV VALVE VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PFP:18930

System Description INPUT/OUTPUT SIGNAL CHART

UBS00F1D

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch	Gear position		
Combination meter*	Vehicle speed		
TCM*	Powertrain revolution		

This signal is sent to the ECM through CAN communication line.

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without pressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle angle of electric throttle control actuator to regulate engine speed.

Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

SET OPERATION

Press ON/OFF(MAIN) switch. (The CRUISE indicator in combination meter illuminates.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press COAST/SET switch. (Then SET indicator in combination meter illuminates.)

ACCEL OPERATION

If the ACCEL/RESUME switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will keep the new set speed.

CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.

- CANCEL switch is pressed
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Selector lever is changed to N, P, R position
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- VDC/TCS system is operated

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing COAST/SET switch or ACCEL/RESUME switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If ON/OFF(MAIN) switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the COAST/SET switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

RESUME OPERATION

When the ACCEL/RESUME switch is pressed after cancel operation other than pressing ON/OFF(MAIN) switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released
- A/T selector lever is in other than P and N positions
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

Component Description

UBS00F1E

ASCD STEERING SWITCH

Refer to [EC-509](#) .

ASCD BRAKE SWITCH

Refer to [EC-516](#) , and [EC-593](#) .

STOP LAMP SWITCH

Refer to [EC-516](#) , [EC-531](#) and [EC-593](#) .

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-364](#) , [EC-366](#) , [EC-372](#) and [EC-377](#) .

ASCD INDICATOR

Refer to [EC-600](#) .

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Fuel Pressure

UBS00F1F

Fuel pressure at idling kPa (kg/cm ² , psi)	Approximately 350 (3.57, 51)
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Idle Speed and Ignition Timing

UBS00F1G

Target idle speed	No-load* ¹ (in P or N position)	650±50 rpm
Air conditioner: ON	In P or N position	700 rpm or more
Ignition timing	In P or N position	15° ± 5° BTDC

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights and heater fan)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

UBS00F1H

Condition	Calculated load value % (Using CONSULT-II or GST)
At idle	14.0 - 33.0
At 2,500 rpm	12.0 - 25.0

Mass Air Flow Sensor

UBS00F1I

Supply voltage	Battery voltage (11 - 14V)
Output voltage at idle	1.1 - 1.4V*
Mass air flow (Using CONSULT-II or GST)	3.0 - 9.0 g·m/sec at idle* 9.0 - 28.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no-load.

Intake Air Temperature Sensor

UBS00F1J

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1
80 (176)	0.31 - 0.37

Engine Coolant Temperature Sensor

UBS00F1K

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

A/F Sensor 1 Heater

UBS00F1L

Resistance [at 25°C (77°F)]	3.3 - 4.3Ω
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Heated Oxygen sensor 2 Heater

UBS00F1M

Resistance [at 25°C (77°F)]	5.0 - 7.0Ω
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Crankshaft Position Sensor (POS)

UBS00F1N

Refer to [EC-259, "Component Inspection"](#) .

Camshaft Position Sensor (PHASE)

UBS00F1O

Refer to [EC-265, "Component Inspection"](#) .

Throttle Control Motor

UBS00F1P

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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SERVICE DATA AND SPECIFICATIONS (SDS)

Injector

UBS00F1Q

Resistance [at 10 - 60°C (50 - 140°F)]	11.1 - 14.5Ω
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Fuel Pump

UBS00F1R

Resistance [at 25°C (77°F)]	0.2 - 5.0Ω
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