

ENGINE CONTROL SYSTEM

SECTION EC

GI
MA
EM
LC

EC

FE

CL

MT

AT

AX

SU

BR

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SC

EL

IDX

CONTENTS

TROUBLE DIAGNOSIS - INDEX	9	Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment	59
Alphabetical Index	9	Accelerator Pedal Released Position Learning	71
DTC No. Index	13	Throttle Valve Closed Position Learning	71
PRECAUTIONS	18	Idle Air Volume Learning	71
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	18	ON BOARD DIAGNOSTIC SYSTEM	
Precautions for On Board Diagnostic (OBD) System of Engine and A/T	18	DESCRIPTION	75
Engine Fuel & Emission Control System	19	Introduction	75
Precautions	20	Two Trip Detection Logic	75
Wiring Diagrams and Trouble Diagnosis	21	Emission-related Diagnostic Information	76
PREPARATION	22	Malfunction Indicator Lamp (MIL)	92
Special Service Tools	22	OBD System Operation Chart	96
Commercial Service Tools	22	CONSULT-II	101
ENGINE AND EMISSION CONTROL OVERALL SYSTEM	24	Generic Scan Tool (GST)	115
Engine Control Component Parts Location	24	TROUBLE DIAGNOSIS - INTRODUCTION	117
Circuit Diagram	28	Introduction	117
System Diagram	29	Work Flow	119
Vacuum Hose Drawing	30	TROUBLE DIAGNOSIS - BASIC INSPECTION	121
System Chart	31	Basic Inspection	121
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION	32	TROUBLE DIAGNOSIS - GENERAL DESCRIPTION	126
Multiport Fuel Injection (MFI) System	32	DTC Inspection Priority Chart	126
Electronic Ignition (EI) System	34	Fail-safe Chart	127
Air Conditioning Cut Control	35	Symptom Matrix Chart	129
Fuel Cut Control (at no load & high engine speed)	36	CONSULT-II Reference Value in Data Monitor Mode	133
Evaporative Emission System	36	Major Sensor Reference Graph in Data Monitor Mode	136
On Board Refueling Vapor Recovery (ORVR)	42	ECM Terminals and Reference Value	139
Positive Crankcase Ventilation	51	TROUBLE DIAGNOSIS - SPECIFICATION VALUE	150
CAN Communication	52	Description	150
Automatic Speed Control Device (ASCD) System	53	Testing Condition	150
BASIC SERVICE PROCEDURE	56	Inspection Procedure	150
Fuel Pressure Release	56	Diagnostic Procedure	151
Fuel Pressure Check	56	TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT	154
Injector	57	Description	154
How to Check Idle Speed and Ignition Timing	58	Diagnostic Procedure	154
		TROUBLE DIAGNOSIS FOR POWER SUPPLY	155

CONTENTS (Cont'd)

Main Power Supply and Ground Circuit.....	155	DTC P0107, P0108 ABSOLUTE PRESSURE	
DTC U1000, U1001 CAN COMMUNICATION LINE	162	SENSOR	199
Description	162	Component Description	199
On Board Diagnosis Logic.....	162	On Board Diagnosis Logic.....	199
DTC Confirmation Procedure	162	DTC Confirmation Procedure	199
Wiring Diagram	163	Diagnostic Procedure	200
Diagnostic Procedure	164	DTC P0112, P0113 IAT SENSOR	201
DTC P0011, P0021 IVT CONTROL	165	Component Description	201
Description	165	On Board Diagnosis Logic.....	201
CONSULT-II Reference Value in Data Monitor		DTC Confirmation Procedure	201
Mode	165	Wiring Diagram	202
On Board Diagnosis Logic.....	166	Diagnostic Procedure	203
DTC Confirmation Procedure	166	DTC P0117, P0118 ECT SENSOR	205
Wiring Diagram	167	Component Description	205
Diagnostic Procedure	170	On Board Diagnosis Logic.....	205
Component Inspection.....	172	DTC Confirmation Procedure	206
DTC P0031, P0032, P0051, P0052 HO2S1		Wiring Diagram	207
HEATER	173	Diagnostic Procedure	208
Description	173	DTC P0121, P0122, P0123	210
CONSULT-II Reference Value in Data Monitor		Description	210
Mode	173	DTC P0125 ECT SENSOR	211
On Board Diagnosis Logic.....	173	Description	211
DTC Confirmation Procedure	174	On Board Diagnosis Logic.....	211
Wiring Diagram	175	DTC Confirmation Procedure	212
Diagnostic Procedure	177	Diagnostic Procedure	212
DTC P0037, P0038, P0057, P0058 HO2S2		DTC P0127 IAT SENSOR	214
HEATER	179	Component Description	214
Description	179	On Board Diagnosis Logic.....	214
CONSULT-II Reference Value in Data Monitor		DTC Confirmation Procedure	214
Mode	179	Diagnostic Procedure	215
On Board Diagnosis Logic.....	179	DTC P0128 THERMOSTAT FUNCTION	216
DTC Confirmation Procedure	180	On Board Diagnosis Logic.....	216
Wiring Diagram	181	DTC Confirmation Procedure	216
Diagnostic Procedure	183	Diagnostic Procedure	217
DTC P0101 MAF SENSOR	186	DTC P0132, P0152 HO2S1	218
Component Description	186	Component Description	218
CONSULT-II Reference Value in Data Monitor		CONSULT-II Reference Value in Data Monitor	
Mode	186	Mode	218
On Board Diagnosis Logic.....	186	On Board Diagnosis Logic.....	218
DTC Confirmation Procedure	187	DTC Confirmation Procedure	219
Overall Function Check	188	Wiring Diagram	220
Wiring Diagram	189	Diagnostic Procedure	222
Diagnostic Procedure	190	DTC P0133, P0153 HO2S1	226
DTC P0102, P0103 MAF SENSOR	193	Component Description	226
Component Description	193	CONSULT-II Reference Value in Data Monitor	
CONSULT-II Reference Value in Data Monitor		Mode	226
Mode	193	On Board Diagnosis Logic.....	226
On Board Diagnosis Logic.....	193	DTC Confirmation Procedure	227
DTC Confirmation Procedure	194	Overall Function Check	228
Wiring Diagram	195	Wiring Diagram	229
Diagnostic Procedure	196	Diagnostic Procedure	231
		DTC P0134, P0154 HO2S1	238

CONTENTS (Cont'd)

Component Description	238	
CONSULT-II Reference Value in Data Monitor Mode	238	
On Board Diagnosis Logic.....	238	
DTC Confirmation Procedure	239	
Overall Function Check	240	
Wiring Diagram	241	
Diagnostic Procedure	243	
DTC P0138, P0158 HO2S2	247	
Component Description	247	
CONSULT-II Reference Value in Data Monitor Mode	247	
On Board Diagnosis Logic.....	247	
DTC Confirmation Procedure	248	
Wiring Diagram	249	
Diagnostic Procedure	251	
DTC P0139, P0159 HO2S2	255	
Component Description	255	
CONSULT-II Reference Value in Data Monitor Mode	255	
On Board Diagnosis Logic.....	255	
DTC Confirmation Procedure	256	
Overall Function Check	256	
Wiring Diagram	258	
Diagnostic Procedure	260	
DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION	265	
On Board Diagnosis Logic.....	265	
DTC Confirmation Procedure	265	
Wiring Diagram	267	
Diagnostic Procedure	269	
DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION	273	
On Board Diagnosis Logic.....	273	
DTC Confirmation Procedure	273	
Wiring Diagram	275	
Diagnostic Procedure	277	
DTC P0181 FTT SENSOR	280	
Component Description	280	
On Board Diagnosis Logic.....	280	
DTC Confirmation Procedure	280	
Diagnostic Procedure	281	
DTC P0182, P0183 FTT SENSOR	283	
Component Description	283	
On Board Diagnosis Logic.....	283	
DTC Confirmation Procedure	283	
Wiring Diagram	285	
Diagnostic Procedure	286	
DTC P0221 TP SENSOR	288	
Component Description	288	
CONSULT-II Reference Value in Data Monitor Mode	288	
On Board Diagnosis Logic.....	288	GI
DTC Confirmation Procedure	289	
Wiring Diagram	290	
Diagnostic Procedure	291	MA
Component Inspection.....	293	
DTC P0222, P0223 TP SENSOR	295	EM
Component Description	295	
CONSULT-II Reference Value in Data Monitor Mode	295	LC
On Board Diagnosis Logic.....	295	
DTC Confirmation Procedure	296	
Wiring Diagram	297	EC
Diagnostic Procedure	298	
Component Inspection.....	300	FE
DTC P0226 APP SENSOR	302	
Component Description	302	
CONSULT-II Reference Value in Data Monitor Mode	302	CL
On Board Diagnosis Logic.....	302	
DTC Confirmation Procedure	303	MT
Wiring Diagram	304	
Diagnostic Procedure	305	AT
Component Inspection.....	307	
DTC P0227, P0228 APP SENSOR	309	
Component Description	309	AX
CONSULT-II Reference Value in Data Monitor Mode	309	
On Board Diagnosis Logic.....	309	SU
DTC Confirmation Procedure	310	
Wiring Diagram	311	BR
Diagnostic Procedure	312	
Component Inspection.....	314	
DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE	315	ST
On Board Diagnosis Logic.....	315	
DTC Confirmation Procedure	316	RS
Diagnostic Procedure	316	
DTC P0327, P0328 KS	323	BT
Component Description	323	
On Board Diagnosis Logic.....	323	HA
DTC Confirmation Procedure	323	
Wiring Diagram	324	
Diagnostic Procedure	325	
DTC P0335 CKP SENSOR (POS)	328	SC
Component Description	328	
CONSULT-II Reference Value in Data Monitor Mode	328	EL
On Board Diagnosis Logic.....	328	
DTC Confirmation Procedure	329	IDX
Wiring Diagram	330	
Diagnostic Procedure	331	
Component Inspection.....	334	

CONTENTS (Cont'd)

DTC P0340, P0345 CMP SENSOR (PHASE)	335	CONSULT-II Reference Value in Data Monitor	
Component Description	335	Mode	394
On Board Diagnosis Logic.....	335	On Board Diagnosis Logic.....	394
DTC Confirmation Procedure	335	DTC Confirmation Procedure	395
Wiring Diagram	337	Wiring Diagram	396
Diagnostic Procedure	340	Diagnostic Procedure	397
Component Inspection.....	343		
DTC P0420, P0430 THREE WAY CATALYST		DTC P0455 EVAP CONTROL SYSTEM (GROSS	
FUNCTION	344	LEAK)	403
On Board Diagnosis Logic.....	344	On Board Diagnosis Logic.....	403
DTC Confirmation Procedure	344	Possible Cause.....	403
Overall Function Check	345	DTC Confirmation Procedure	404
Diagnostic Procedure	345	Diagnostic Procedure	405
DTC P0441 EVAP CONTROL SYSTEM	349	DTC P0456 EVAP CONTROL SYSTEM	415
System Description.....	349	On Board Diagnosis Logic.....	415
On Board Diagnosis Logic.....	349	DTC Confirmation Procedure	416
DTC Confirmation Procedure	350	Overall Function Check	417
Overall Function Check	350	Diagnostic Procedure	417
Diagnostic Procedure	352	DTC P0460 FUEL LEVEL SENSOR	430
DTC P0442 EVAP CONTROL SYSTEM	359	Component Description	430
On Board Diagnosis Logic.....	359	On Board Diagnostic Logic.....	430
DTC Confirmation Procedure	360	DTC Confirmation Procedure	430
Diagnostic Procedure	361	Wiring Diagram	431
DTC P0444, P0445 EVAP CANISTER PURGE		Diagnostic Procedure	432
VOLUME CONTROL SOLENOID VALVE	374	DTC P0461 FUEL LEVEL SENSOR	434
Description	374	Component Description	434
CONSULT-II Reference Value in Data Monitor		On Board Diagnostic Logic.....	434
Mode	374	Overall Function Check	434
On Board Diagnosis Logic.....	375	DTC P0462, P0463 FUEL LEVEL SENSOR	436
DTC Confirmation Procedure	375	Component Description	436
Wiring Diagram	376	On Board Diagnostic Logic.....	436
Diagnostic Procedure	378	DTC Confirmation Procedure	436
DTC P0447 EVAP CANISTER VENT CONTROL		Wiring Diagram	437
VALVE	381	Diagnostic Procedure	438
Component Description	381	DTC P0500 VSS	440
CONSULT-II Reference Value in Data Monitor		Component Description	440
Mode	381	On Board Diagnosis Logic.....	440
On Board Diagnosis Logic.....	381	DTC Confirmation Procedure	440
DTC Confirmation Procedure	381	Overall Function Check	441
Wiring Diagram	383	Wiring Diagram	442
Diagnostic Procedure	384	Diagnostic Procedure	443
DTC P0452 EVAP SYSTEM PRESSURE SENSOR ..	388	DTC P0506 ISC SYSTEM	444
Component Description	388	Description	444
CONSULT-II Reference Value in Data Monitor		On Board Diagnosis Logic.....	444
Mode	388	DTC Confirmation Procedure	444
On Board Diagnosis Logic.....	388	Diagnostic Procedure	445
DTC Confirmation Procedure	388	DTC P0507 ISC SYSTEM	446
Wiring Diagram	390	Description	446
Diagnostic Procedure	391	On Board Diagnosis Logic.....	446
DTC P0453 EVAP SYSTEM PRESSURE SENSOR ..	394	DTC Confirmation Procedure	446
Component Description	394	Diagnostic Procedure	447
		DTC P0550 PSP SENSOR	448
		Component Description	448

CONTENTS (Cont'd)

CONSULT-II Reference Value in Data Monitor Mode	448	
On Board Diagnosis Logic.....	448	
DTC Confirmation Procedure	448	
Wiring Diagram	449	
Diagnostic Procedure	450	
Component Inspection.....	452	
DTC P0605 ECM	453	
Component Description	453	
On Board Diagnosis Logic.....	453	
DTC Confirmation Procedure	453	
Diagnostic Procedure	454	
DTC P0650 MIL (CIRCUIT)	455	
Component Description	455	
On Board Diagnosis Logic.....	455	
DTC Confirmation Procedure	455	
Wiring Diagram	456	
Diagnostic Procedure	457	
DTC P1065 ECM POWER SUPPLY (BACK UP)	459	
Component Description	459	
On Board Diagnosis Logic.....	459	
DTC Confirmation Procedure	459	
Wiring Diagram	460	
Diagnostic Procedure	461	
DTC P1102 MAF SENSOR	463	
Component Description	463	
CONSULT-II Reference Value in Data Monitor Mode	463	
On Board Diagnosis Logic.....	463	
DTC Confirmation Procedure	463	
Wiring Diagram	465	
Diagnostic Procedure	466	
DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR	469	
Component Description	469	
On Board Diagnosis Logic.....	469	
DTC Confirmation Procedure	469	
Diagnostic Procedure	470	
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION	471	
Description	471	
On Board Diagnosis Logic.....	471	
DTC Confirmation Procedure	471	
Wiring Diagram	473	
Diagnostic Procedure	474	
Component Inspection.....	478	
DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY	479	
Component Description	479	
CONSULT-II Reference Value in Data Monitor Mode	479	
On Board Diagnosis Logic.....	479	
DTC Confirmation Procedure	479	GI
Wiring Diagram	481	
Diagnostic Procedure	482	
Component Inspection.....	484	MA
DTC P1128 THROTTLE CONTROL MOTOR	485	
Component Description	485	
On Board Diagnosis Logic.....	485	EM
DTC Confirmation Procedure	485	
Wiring Diagram	486	LC
Diagnostic Procedure	487	
Component Inspection.....	489	
DTC P1143, P1163 HO2S1	490	EC
Component Description	490	
CONSULT-II Reference Value in Data Monitor Mode	490	FE
On Board Diagnosis Logic.....	490	
DTC Confirmation Procedure	491	CL
Overall Function Check	492	
Diagnostic Procedure	492	
DTC P1144, P1164 HO2S1	497	MT
Component Description	497	
CONSULT-II Reference Value in Data Monitor Mode	497	AT
On Board Diagnosis Logic.....	497	
DTC Confirmation Procedure	498	AX
Overall Function Check	499	
Diagnostic Procedure	499	
DTC P1146, P1166 HO2S2	504	SU
Component Description	504	
CONSULT-II Reference Value in Data Monitor Mode	504	BR
On Board Diagnosis Logic.....	504	
DTC Confirmation Procedure	505	ST
Overall Function Check	505	
Wiring Diagram	507	
Diagnostic Procedure	509	RS
DTC P1147, P1167 HO2S2	514	
Component Description	514	BT
CONSULT-II Reference Value in Data Monitor Mode	514	
On Board Diagnosis Logic.....	514	HA
DTC Confirmation Procedure	515	
Overall Function Check	515	SC
Wiring Diagram	517	
Diagnostic Procedure	519	
DTC P1148, P1168 CLOSED LOOP CONTROL	524	
On Board Diagnosis Logic.....	524	EL
DTC Confirmation Procedure	524	
Overall Function Check	525	IDX
Diagnostic Procedure	525	
DTC P1211 ABS/TCS CONTROL UNIT	526	
Description	526	

CONTENTS (Cont'd)

On Board Diagnosis Logic.....	526	DTC Confirmation Procedure	572
DTC Confirmation Procedure	526	Diagnostic Procedure	573
Diagnostic Procedure	527	DTC P1444 EVAP CANISTER PURGE VOLUME	
DTC P1212 ABS/TCS COMMUNICATION LINE	528	CONTROL SOLENOID VALVE	586
Description.....	528	Description.....	586
On Board Diagnosis Logic.....	528	CONSULT-II Reference Value in Data Monitor	
DTC Confirmation Procedure	528	Mode.....	586
Diagnostic Procedure	529	On Board Diagnosis Logic.....	587
DTC P1217 ENGINE OVER TEMPERATURE	530	DTC Confirmation Procedure	587
System Description.....	530	Wiring Diagram.....	589
CONSULT-II Reference Value in Data Monitor		Diagnostic Procedure	591
Mode.....	530	DTC P1446 EVAP CANISTER VENT CONTROL	
On Board Diagnosis Logic.....	531	VALVE	599
Overall Function Check	532	Component Description	599
Wiring Diagram.....	534	CONSULT-II Reference Value in Data Monitor	
Diagnostic Procedure	536	Mode.....	599
Main 12 Causes of Overheating.....	547	On Board Diagnosis Logic.....	599
DTC P1223, P1224 TP SENSOR	548	DTC Confirmation Procedure	599
Component Description	548	Wiring Diagram.....	601
CONSULT-II Reference Value in Data Monitor		Diagnostic Procedure	602
Mode.....	548	DTC P1448 EVAP CANISTER VENT CONTROL	
On Board Diagnosis Logic.....	548	VALVE	607
DTC Confirmation Procedure	549	Component Description	607
Wiring Diagram.....	550	CONSULT-II Reference Value in Data Monitor	
Diagnostic Procedure	551	Mode.....	607
Component Inspection.....	553	On Board Diagnosis Logic.....	607
DTC P1225 TP SENSOR	555	DTC Confirmation Procedure	607
Component Description	555	Overall Function Check	609
On Board Diagnosis Logic.....	555	Wiring Diagram.....	610
DTC Confirmation Procedure	555	Diagnostic Procedure	611
Diagnostic Procedure	556	DTC P1456 EVAP CONTROL SYSTEM	616
DTC P1226 TP SENSOR	557	On Board Diagnosis Logic.....	616
Component Description	557	DTC Confirmation Procedure	617
On Board Diagnosis Logic.....	557	Overall Function Check	618
DTC Confirmation Procedure	557	Diagnostic Procedure	619
Diagnostic Procedure	558	DTC P1464 FUEL LEVEL SENSOR	632
DTC P1227, P1228 APP SENSOR	559	Component Description	632
Component Description	559	On Board Diagnostic Logic.....	632
CONSULT-II Reference Value in Data Monitor		DTC Confirmation Procedure	632
Mode.....	559	Wiring Diagram.....	633
On Board Diagnosis Logic.....	559	Diagnostic Procedure	634
DTC Confirmation Procedure	560	DTC P1490 VACUUM CUT VALVE BYPASS	
Wiring Diagram.....	561	VALVE	635
Diagnostic Procedure	562	Description.....	635
Component Inspection.....	564	CONSULT-II Reference Value in Data Monitor	
DTC P1229 SENSOR POWER SUPPLY	565	Mode.....	635
On Board Diagnosis Logic.....	565	On Board Diagnosis Logic.....	635
DTC Confirmation Procedure	565	DTC Confirmation Procedure	636
Wiring Diagram.....	567	Wiring Diagram.....	637
Diagnostic Procedure	568	Diagnostic Procedure	638
DTC P1442 EVAP CONTROL SYSTEM	571	DTC P1491 VACUUM CUT VALVE BYPASS	
On Board Diagnosis Logic.....	571	VALVE	641

CONTENTS (Cont'd)

Description	641	
CONSULT-II Reference Value in Data Monitor Mode	641	
On Board Diagnosis Logic.....	642	
DTC Confirmation Procedure	642	
Overall Function Check	643	
Wiring Diagram	644	
Diagnostic Procedure	645	
DTC P1564 ASCD STEERING SWITCH	653	
Component Description	653	
CONSULT-II Reference Value in Data Monitor Mode	653	
On Board Diagnosis Procedure.....	653	
DTC Confirmation Procedure	653	
Wiring Diagram	655	
Diagnostic Procedure	657	
Component Inspection.....	659	
DTC P1572 ASCD BRAKE SWITCH	660	
Component Description	660	
CONSULT-II Reference Value in Data Monitor Mode	660	
On Board Diagnosis Procedure.....	660	
DTC Confirmation Procedure	661	
Wiring Diagram	662	
Diagnostic Procedure	664	
Component Inspection.....	674	
DTC P1574 ASCD VEHICLE SPEED SENSOR	675	
Component Description	675	
On Board Diagnosis Procedure.....	675	
DTC Confirmation Procedure	675	
Wiring Diagram	677	
Diagnostic Procedure	678	
DTC P1706 PNP SWITCH	680	
Component Description	680	
CONSULT-II Reference Value in Data Monitor Mode	680	
On Board Diagnosis Logic.....	680	
DTC Confirmation Procedure	680	
Overall Function Check	681	
Wiring Diagram	682	
Diagnostic Procedure	683	
DTC P1800 VIAS CONTROL SOLENOID VALVE	686	
Component Description	686	
CONSULT-II Reference Value in Data Monitor Mode	686	
On Board Diagnosis Logic.....	686	
DTC Confirmation Procedure	686	
Wiring Diagram	688	
Diagnostic Procedure	689	
DTC P1805 BRAKE SWITCH	691	
Description	691	
CONSULT-II Reference Value in Data Monitor Mode	691	GI
On Board Diagnosis Logic.....	691	
DTC Confirmation Procedure	691	MA
Wiring Diagram	692	
Diagnostic Procedure	693	EM
Component Inspection.....	696	
VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)	697	LC
Description	697	
Wiring Diagram	699	
Diagnostic Procedure	700	EC
IGNITION SIGNAL	705	
Component Description	705	FE
Wiring Diagram	706	
Diagnostic Procedure	709	
INJECTOR	716	CL
Component Description	716	
CONSULT-II Reference Value in Data Monitor Mode	716	MT
Wiring Diagram	717	
Diagnostic Procedure	718	AT
START SIGNAL	722	
CONSULT-II Reference Value in Data Monitor Mode	722	AX
Wiring Diagram	723	AX
Diagnostic Procedure	724	
FUEL PUMP	726	SU
System Description.....	726	
Component Description	726	
CONSULT-II Reference Value in Data Monitor Mode	726	BR
Wiring Diagram	727	
Diagnostic Procedure	728	ST
ELECTRONIC CONTROLLED ENGINE MOUNT	733	
System Description.....	733	RS
CONSULT-II Reference Value in Data Monitor Mode	733	
Wiring Diagram	734	BT
Diagnostic Procedure	735	
REFRIGERANT PRESSURE SENSOR	737	HA
Description	737	
Wiring Diagram	738	
Diagnostic Procedure	739	SC
ASCD BRAKE SWITCH	741	
Component Description	741	
CONSULT-II Reference Value in Data Monitor Mode	741	EL
Wiring Diagram	742	
Diagnostic Procedure	744	IDX
ASCD INDICATOR LAMP	754	
Component Description	754	

CONTENTS (Cont'd)

CONSULT-II Reference Value in Data Monitor		Mass Air Flow Sensor.....	762
Mode	754	Engine Coolant Temperature Sensor	762
Wiring Diagram	755	Heated Oxygen Sensor 1 Heater	762
Diagnostic Procedure	756	Fuel Pump	762
ELECTRICAL LOAD SIGNAL	757	Injector	762
Wiring Diagram	757	Calculated Load Value.....	762
Diagnostic Procedure	758	Intake Air Temperature Sensor.....	762
DATA LINK CONNECTORS	761	Heated Oxygen Sensor 2 Heater	763
Wiring Diagram	761	Fuel Tank Temperature Sensor	763
SERVICE DATA AND SPECIFICATIONS (SDS)	762	Throttle Control Motor.....	763
Fuel Pressure Regulator.....	762	Crankshaft Position Sensor (POS).....	763
Idle Speed and Ignition Timing.....	762	Camshaft Position Sensor (PHASE)	763

TROUBLE DIAGNOSIS — INDEX

Alphabetical Index

Alphabetical Index

NFEC0001

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-162.

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
Unable to access ECM	—		EC-127
A/T 1ST GR FNCTN	P0731	0731	AT-132
A/T 2ND GR FNCTN	P0732	0732	AT-138
A/T 3RD GR FNCTN	P0733	0733	AT-144
A/T 4TH GR FNCTN	P0734	0734	AT-158
A/T TCC S/V FNCTN	P0744	0744	AT-158
ABSL PRES SEN/CIRC	P0107	0107	EC-199
ABSL PRES SEN/CIRC	P0108	0108	EC-199
APP SEN 1/CIRC*5	P0227	0227	EC-309
APP SEN 1/CIRC*5	P0228	0228	EC-309
APP SEN 2/CIRC*5	P1227	1227	EC-559
APP SEN 2/CIRC*5	P1228	1228	EC-559
APP SENSOR*5	P0226	0226	EC-302
APP SEN/CIRCUIT*5	P0121	0121	EC-210
ASCD BRAKE SW	P1572	1572	EC-660
ASCD SW	P1564	1564	EC-653
ASCD VHL SPD SEN	P1574	1574	EC-675
ATF TEMP SEN/CIRC	P0710	0710	AT-110
BRAKE SW/CIRCUIT	P1805	1805	EC-691
CAN COMM CIRCUIT	U1000	1000*6	EC-162
CAN COMM CIRCUIT	U1001	1001*6	EC-162
CKP SEN/CIRCUIT	P0335	0335	EC-328
CLOSED LOOP-B1	P1148	1148	EC-524
CLOSED LOOP-B2	P1168	1168	EC-524
CMP SEN/CIRC-B1	P0340	0340	EC-335
CMP SEN/CIRC-B2	P0345	0345	EC-335
CTP LEARNING	P1225	1225	EC-555
CTP LEARNING	P1226	1226	EC-557
CYL 1 MISFIRE	P0301	0301	EC-315
CYL 2 MISFIRE	P0302	0302	EC-315
CYL 3 MISFIRE	P0303	0303	EC-315
CYL 4 MISFIRE	P0304	0304	EC-315
CYL 5 MISFIRE	P0305	0305	EC-315

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS — INDEX

Alphabetical Index (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
CYL 6 MISFIRE	P0306	0306	EC-315
ECM	P0605	0605	EC-453
ECM BACK UP/CIRCUIT	P1065	1065	EC-459
ECT SEN/CIRC*5	P0117	0117	EC-205
ECT SEN/CIRC*5	P0118	0118	EC-205
ECT SENSOR	P0125	0125	EC-211
ENG OVER TEMP	P1217	1217	EC-530
ENGINE SPEED SIG	P0725	0725	AT-121
ETC MOT	P1128	1128	EC-485
ETC MOT PWR	P1124	1124	EC-479
ETC MOT PWR*5	P1126	1126	EC-479
ETC ACTR*5	P1121	1121	EC-469
ETC FUNCTION/CIRC*5	P1122	1122	EC-471
EVAP GROSS LEAK	P0455	0455	EC-403
EVAP VERY SML LEAK	P0456	0456	EC-415
EVAP VERY SML LEAK	P1456	1456	EC-616
EVAP PURG FLOW/MON	P0441	0441	EC-349
EVAP SMALL LEAK	P0442	0442	EC-359
EVAP SMALL LEAK	P1442	1442	EC-571
EVAP SYS PRES SEN	P0452	0452	EC-388
EVAP SYS PRES SEN	P0453	0453	EC-394
FTT SEN/CIRCUIT	P0182	0182	EC-283
FTT SEN/CIRCUIT	P0183	0183	EC-283
FTT SENSOR	P0181	0181	EC-280
FUEL LEV SEN SLOSH	P0460	0460	EC-430
FUEL LEVEL SENSOR	P0461	0461	EC-434
FUEL LEVL SEN/CIRC	P0462	0462	EC-436
FUEL LEVL SEN/CIRC	P0463	0463	EC-436
FUEL LEVL SEN/CIRC	P1464	1464	EC-632
FUEL SYS-LEAN-B1	P0171	0171	EC-265
FUEL SYS-LEAN-B2	P0174	0174	EC-265
FUEL SYS-RICH-B1	P0172	0172	EC-273
FUEL SYS-RICH-B2	P0175	0175	EC-273
HO2S1 (B1)	P0132	0132	EC-218
HO2S1 (B1)	P0133	0133	EC-226
HO2S1 (B1)	P0134	0134	EC-238

TROUBLE DIAGNOSIS — INDEX

Alphabetical Index (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		Reference page	
	CONSULT-II GST*2	ECM*3		
HO2S1 (B1)	P1143	1143	EC-490	GI
HO2S1 (B1)	P1144	1144	EC-497	MA
HO2S1 (B2)	P0152	0152	EC-218	EM
HO2S1 (B2)	P0153	0153	EC-226	
HO2S1 (B2)	P0154	0154	EC-238	LC
HO2S1 (B2)	P1163	1163	EC-490	
HO2S1 (B2)	P1164	1164	EC-497	EC
HO2S1 HTR (B1)	P0031	0031	EC-173	
HO2S1 HTR (B1)	P0032	0032	EC-173	FE
HO2S1 HTR (B2)	P0051	0051	EC-173	
HO2S1 HTR (B2)	P0052	0052	EC-173	CL
HO2S2 (B1)	P0138	0138	EC-247	
HO2S2 (B1)	P0139	0139	EC-255	MT
HO2S2 (B1)	P1146	1146	EC-504	
HO2S2 (B1)	P1147	1147	EC-514	AT
HO2S2 (B2)	P0158	0158	EC-247	
HO2S2 (B2)	P0159	0159	EC-255	AX
HO2S2 (B2)	P1166	1166	EC-504	SU
HO2S2 (B2)	P1167	1167	EC-514	
HO2S2 HTR (B1)	P0037	0037	EC-179	BR
HO2S2 HTR (B1)	P0038	0038	EC-179	
HO2S2 HTR (B2)	P0057	0057	EC-179	ST
HO2S2 HTR (B2)	P0058	0058	EC-179	
IAT SEN/CIRCUIT	P0112	0112	EC-201	RS
IAT SEN/CIRCUIT	P0113	0113	EC-201	
IAT SENSOR	P0127	0127	EC-214	BT
INT/V TIM CONT-B1	P0011	0011	EC-165	
INT/V TIM CONT-B2	P0021	0021	EC-165	HA
ISC SYSTEM	P0506	0506	EC-444	
ISC SYSTEM	P0507	0507	EC-446	SC
KNOCK SEN/CIRC-B1	P0327	0327	EC-323	
KNOCK SEN/CIRC-B1	P0328	0328	EC-323	EL
L/PRESS SOL/CIRC	P0745	0745	AT-168	
MAF SEN/CIRCUIT	P0101	0101	EC-186	IDX
MAF SEN/CIRCUIT*5	P0102	0102	EC-193	
MAF SEN/CIRCUIT*5	P0103	0103	EC-193	

TROUBLE DIAGNOSIS — INDEX

Alphabetical Index (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
MAF SENSOR*5	P1102	1102	EC-463
MIL/CIRC	P0650	0650	EC-455
MULTI CYL MISFIRE	P0300	0300	EC-315
NATS MALFUNCTION	P1610-P1615	1610-1615	EL-356
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*4	EC-93
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—
O/R CLTCH SOL/CIRC	P1760	1760	AT-191
P-N POS SW/CIRCUIT	P1706	1706	EC-680
PNP SW/CIRC	P0705	0705	AT-104
PURG VOLUME CONT/V	P0444	0444	EC-374
PURG VOLUME CONT/V	P0445	0445	EC-374
PURG VOLUME CONT/V	P1444	1444	EC-586
PW ST P SEN/CIRC	P0550	0550	EC-448
SENSOR POWER/CIRC*5	P1229	1229	EC-565
SFT SOL A/CIRC*5	P0750	0750	AT-174
SFT SOL B/CIRC*5	P0755	0755	AT-179
TCC SOLENOID/CIRC	P0740	0740	AT-153
TCS/CIRC	P1212	1212	EC-528
TCS C/U FUNCTN	P1211	1211	EC-526
THERMSTAT FNCTN	P0128	0128	EC-216
TP SEN 1/CIRC*5	P0222	0222	EC-295
TP SEN 1/CIRC*5	P0223	0223	EC-295
TP SEN 2/CIRC*5	P1223	1223	EC-548
TP SEN 2/CIRC*5	P1224	1224	EC-548
TP SENSOR*5	P0221	0221	EC-288
TP SEN/CIRC A/T	P1705	1705	AT-184
TP SEN/CIRCUIT*5	P0122	0122	EC-210
TP SEN/CIRCUIT*5	P0123	0123	EC-210
TW CATALYST SYS-B1	P0420	0420	EC-344
TW CATALYST SYS-B2	P0430	0430	EC-344
VC/V BYPASS/V	P1490	1490	EC-635
VC CUT/V BYPASS/V	P1491	1491	EC-641
VEH SPD SEN/CIR AT*7	P0720	0720	AT-116
VEH SPEED SEN/CIRC*7	P0500	0500	EC-440

TROUBLE DIAGNOSIS — INDEX

Alphabetical Index (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		Reference page	
	CONSULT-II GST*2	ECM*3		
VENT CONTROL VALVE	P0447	0447	EC-381	GI
VENT CONTROL VALVE	P1446	1446	EC-599	MA
VENT CONTROL VALVE	P1448	1448	EC-607	EM
VIAS S/V CIRC	P1800	1800	EC-686	

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

*2: These numbers are prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

*4: When engine is running.

*5: When the fail-safe operation occurs, the MIL illuminates.

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

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

NOTE:

Regarding A33 models, "B1" indicates bank 1, "B2" indicates bank 2.

DTC No. Index

NFEC1408

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-162.

DTC*1		Items (CONSULT-II screen terms)	Reference page	
CONSULT-II GST*2	ECM*3			
—	—	Unable to access ECM	EC-127	AT
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	EC-93	AX
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	SU
U1000	1000*6	CAN COMM CIRCUIT	EC-162	BR
U1001	1001*6	CAN COMM CIRCUIT	EC-162	ST
P0011	0011	INT/V TIM CONT-B1	EC-165	RS
P0021	0021	INT/V TIM CONT-B2	EC-165	BT
P0031	0031	HO2S1 HTR (B1)	EC-173	HA
P0032	0032	HO2S1 HTR (B1)	EC-173	HA
P0037	0037	HO2S2 HTR (B1)	EC-179	HA
P0038	0038	HO2S2 HTR (B1)	EC-179	SC
P0051	0051	HO2S1 HTR (B2)	EC-173	SC
P0052	0052	HO2S1 HTR (B2)	EC-173	EL
P0057	0057	HO2S2 HTR (B2)	EC-179	EL
P0058	0058	HO2S2 HTR (B2)	EC-179	EL
P0101	0101	MAF SEN/CIRCUIT	EC-186	EL
P0102	0102	MAF SEN/CIRCUIT*5	EC-193	EL
P0103	0103	MAF SEN/CIRCUIT*5	EC-193	EL

TROUBLE DIAGNOSIS — INDEX

DTC No. Index (Cont'd)

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0107	0107	ABSL PRES SEN/CIRC	EC-199
P0108	0108	ABSL PRES SEN/CIRC	EC-199
P0112	0112	IAT SEN/CIRCUIT	EC-201
P0113	0113	IAT SEN/CIRCUIT	EC-201
P0117	0117	ECT SEN/CIRC*5	EC-205
P0118	0118	ECT SEN/CIRC*5	EC-205
P0121	0121	APP SEN/CIRCUIT*5	EC-210
P0122	0122	TP SEN/CIRCUIT*5	EC-210
P0123	0123	TP SEN/CIRCUIT*5	EC-210
P0125	0125	ECT SENSOR	EC-211
P0127	0127	IAT SENSOR	EC-214
P0128	0128	THERMSTAT FNCTN	EC-216
P0132	0132	HO2S1 (B1)	EC-218
P0133	0133	HO2S1 (B1)	EC-226
P0134	0134	HO2S1 (B1)	EC-238
P0138	0138	HO2S2 (B1)	EC-247
P0139	0139	HO2S2 (B1)	EC-255
P0152	0152	HO2S1 (B2)	EC-218
P0153	0153	HO2S1 (B2)	EC-226
P0154	0154	HO2S1 (B2)	EC-238
P0158	0158	HO2S2 (B2)	EC-247
P0159	0159	HO2S2 (B2)	EC-255
P0171	0171	FUEL SYS-LEAN-B1	EC-265
P0172	0172	FUEL SYS-RICH-B1	EC-273
P0174	0174	FUEL SYS-LEAN-B2	EC-265
P0175	0175	FUEL SYS-RICH-B2	EC-273
P0181	0181	FTT SENSOR	EC-280
P0182	0182	FTT SEN/CIRCUIT	EC-283
P0183	0183	FTT SEN/CIRCUIT	EC-283
P0221	0221	TP SENSOR*5	EC-288
P0222	0222	TP SEN 1/CIRC*5	EC-295
P0223	0223	TP SEN 1/CIRC*5	EC-295
P0226	0226	APP SENSOR*5	EC-302
P0227	0227	APP SEN 1/CIRC*5	EC-309
P0228	0228	APP SEN 1/CIRC*5	EC-309
P0300	0300	MULTI CYL MISFIRE	EC-315

TROUBLE DIAGNOSIS — INDEX

DTC No. Index (Cont'd)

DTC*1		Items (CONSULT-II screen terms)	Reference page	
CONSULT-II GST*2	ECM*3			
P0301	0301	CYL 1 MISFIRE	EC-315	GI
P0302	0302	CYL 2 MISFIRE	EC-315	MA
P0303	0303	CYL 3 MISFIRE	EC-315	EM
P0304	0304	CYL 4 MISFIRE	EC-315	
P0305	0305	CYL 5 MISFIRE	EC-315	LC
P0306	0306	CYL 6 MISFIRE	EC-315	
P0327	0327	KNOCK SEN/CIRC-B1	EC-323	EC
P0328	0328	KNOCK SEN/CIRC-B1	EC-323	
P0335	0335	CKP SEN/CIRCUIT	EC-328	FE
P0340	0340	CMP SEN/CIRC-B1	EC-335	
P0345	0345	CMP SEN/CIRC-B2	EC-335	CL
P0420	0420	TW CATALYST SYS-B1	EC-344	
P0430	0430	TW CATALYST SYS-B2	EC-344	MT
P0441	0441	EVAP PURG FLOW/MON	EC-349	
P0442	0442	EVAP SMALL LEAK	EC-359	AT
P0444	0444	PURG VOLUME CONT/V	EC-374	
P0445	0445	PURG VOLUME CONT/V	EC-374	AX
P0447	0447	VENT CONTROL VALVE	EC-381	
P0452	0452	EVAP SYS PRES SEN	EC-388	SU
P0453	0453	EVAP SYS PRES SEN	EC-394	
P0455	0455	EVAP GROSS LEAK	EC-403	BR
P0456	0456	EVAP VERY SML LEAK	EC-415	ST
P0460	0460	FUEL LEV SEN SLOSH	EC-430	
P0461	0461	FUEL LEVEL SENSOR	EC-434	RS
P0462	0462	FUEL LEVL SEN/CIRC	EC-436	
P0463	0463	FUEL LEVL SEN/CIRC	EC-436	BT
P0500	0500	VEH SPEED SEN/CIRC*7	EC-440	
P0506	0506	ISC SYSTEM	EC-444	HA
P0507	0507	ISC SYSTEM	EC-446	
P0550	0550	PW ST P SEN/CIRC	EC-448	SC
P0605	0605	ECM	EC-453	
P0650	0650	MIL/CIRC	EC-455	EL
P0705	0705	PNP SW/CIRC	AT-104	
P0710	0710	ATF TEMP SEN/CIRC	AT-110	IDX
P0720	0720	VEH SPD SEN/CIR AT*7	AT-116	
P0725	0725	ENGINE SPEED SIG	AT-121	

TROUBLE DIAGNOSIS — INDEX

DTC No. Index (Cont'd)

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0731	0731	A/T 1ST GR FNCTN	AT-126
P0732	0732	A/T 2ND GR FNCTN	AT-132
P0733	0733	A/T 3RD GR FNCTN	AT-138
P0734	0734	A/T 4TH GR FNCTN	AT-144
P0740	0740	TCC SOLENOID/CIRC	AT-153
P0744	0744	A/T TCC S/V FNCTN	AT-158
P0745	0745	L/PRESS SOL/CIRC	AT-168
P0750	0750	SFT SOL A/CIRC*5	AT-174
P0755	0755	SFT SOL B/CIRC*5	AT-179
P1065	1065	ECM BACK UP/CIRCUIT	EC-459
P1102	1102	MAF SENSOR*5	EC-463
P1121	1121	ETC ACTR*5	EC-469
P1122	1122	ETC FUNCTION/CIRC*5	EC-471
P1124	1124	ETC MOT PWR	EC-479
P1126	1126	ETC MOT PWR*5	EC-479
P1128	1128	ETC MOT	EC-485
P1143	1143	HO2S1 (B1)	EC-490
P1144	1144	HO2S1 (B1)	EC-497
P1146	1146	HO2S2 (B1)	EC-504
P1147	1147	HO2S2 (B1)	EC-514
P1148	1148	CLOSED LOOP-B1	EC-524
P1163	1163	HO2S1 (B2)	EC-490
P1164	1164	HO2S1 (B2)	EC-497
P1166	1166	HO2S2 (B2)	EC-504
P1167	1167	HO2S2 (B2)	EC-514
P1168	1168	CLOSED LOOP-B2	EC-524
P1211	1211	TCS C/U FUNCTN	EC-526
P1212	1212	TCS/CIRC	EC-528
P1217	1217	ENG OVER TEMP	EC-530
P1223	1223	TP SEN 2/CIRC*5	EC-548
P1224	1224	TP SEN 2/CIRC*5	EC-548
P1225	1225	CTP LEARNING	EC-555
P1226	1226	CTP LEARNING	EC-557
P1227	1227	APP SEN 2/CIRC*5	EC-559
P1228	1228	APP SEN 2/CIRC*5	EC-559
P1229	1229	SENSOR POWER/CIRC*5	EC-565

TROUBLE DIAGNOSIS — INDEX

DTC No. Index (Cont'd)

DTC*1		Items (CONSULT-II screen terms)	Reference page	
CONSULT-II GST*2	ECM*3			
P1442	1442	EVAP SMALL LEAK	EC-571	GI
P1444	1444	PURG VOLUME CONT/V	EC-586	MA
P1446	1446	VENT CONTROL VALVE	EC-599	EM
P1448	1448	VENT CONTROL VALVE	EC-607	
P1456	1456	EVAP VERY SML LEAK	EC-616	LC
P1464	1464	FUEL LEVL SEN/CIRC	EC-632	
P1490	1490	VC/V BYPASS/V	EC-635	EC
P1491	1491	VC CUT/V BYPASS/V	EC-641	
P1564	1564	ASCD SW	EC-653	FE
P1572	1572	ASCD BRAKE SW	EC-660	
P1574	1574	ASCD VHL SPD SEN	EC-675	CL
P1610-P1615	1610-1615	NATS MALFUNCTION	EL-356	
P1705	1705	TP SEN/CIRC A/T	AT-184	MT
P1706	1706	P-N POS SW/CIRCUIT	EC-680	
P1760	1760	O/R CLTCH SOL/CIRC	AT-191	AT
P1800	1800	VIAS S/V CIRC	EC-686	
P1805	1805	BRAKE SW/CIRCUIT	EC-691	AX

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

*2: These numbers are prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

*4: When engine is running.

*5: When the fail-safe operation occurs, the MIL illuminates.

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

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

NOTE:

Regarding A33 models, "B1" indicates bank 1, "B2" indicates bank 2.

GI
MA
EM
LC
EC
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MT
AT
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SU
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EL
IDX

PRECAUTIONS

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

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

NFEC0002

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

For a frontal collision

The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.

For a side collision

The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.

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

NFEC0003

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 terminal 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 EL-7, "HARNESS CONNECTOR (SLIDE-LOCKING TYPE)".

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 or TCM (Transmission control module) before returning the vehicle to the customer.

PRECAUTIONS

Engine Fuel & Emission Control System

NFEC0004

BATTERY

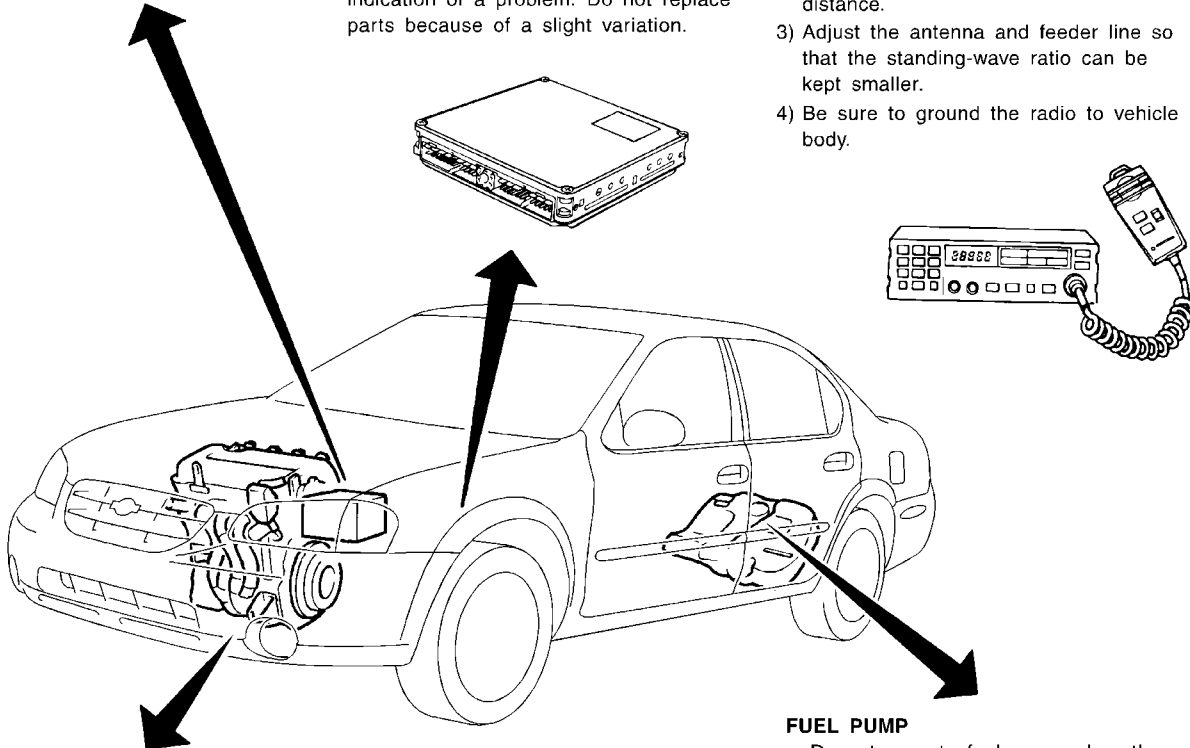
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.

ECM

- Do not disassemble ECM.
- Do not turn diagnosis mode selector forcibly.
- If a battery terminal 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 problem. Do not replace parts because of a slight variation.

WIRELESS EQUIPMENT

- 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 its installation location.
 - 1) Keep the antenna as far away as possible from the ECM.
 - 2) Keep the antenna feeder line more than 20 cm (7.9 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
 - 3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - 4) Be sure to ground the radio to vehicle body.



ENGINE CONTROL PARTS HANDLING

- 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.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor or crankshaft position sensor.



FUEL PUMP

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

ECM HARNESS HANDLING

- 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 (3.9 in) away from adjacent harnesses to prevent an engine control system malfunction due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

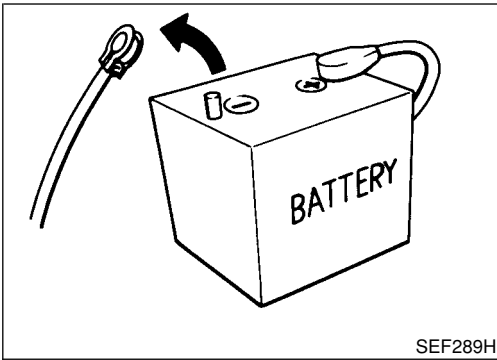
WHEN STARTING

- 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.

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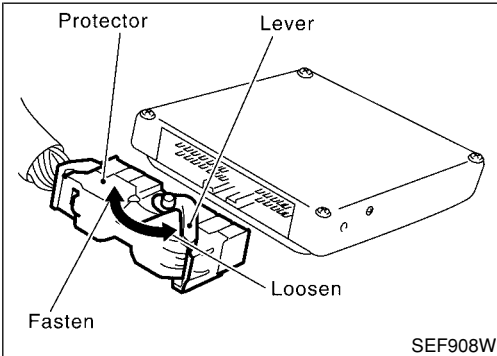
PRECAUTIONS

Precautions

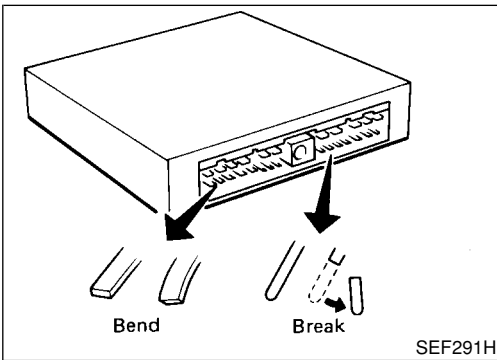


Precautions

Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off. NFEC0005

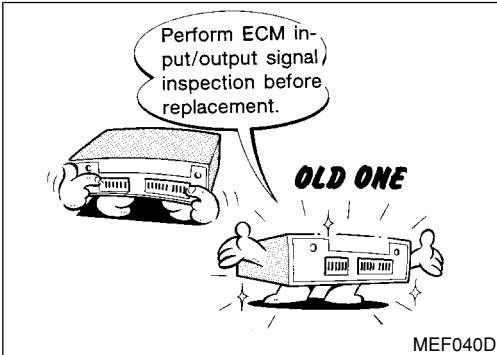


When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at left.



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.



Before replacing ECM, perform "ECM Terminals and Reference Value" inspection and make sure ECM functions properly. Refer to EC-139.

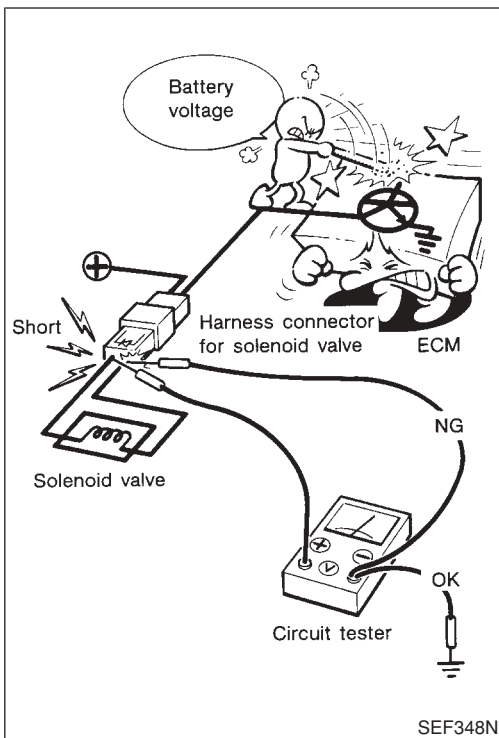


After performing each TROUBLE DIAGNOSIS, perform "DTC Confirmation Procedure" or "Overall Function Check".

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.

PRECAUTIONS

Precautions (Cont'd)



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 the ECM terminals, such as the ground.

GI

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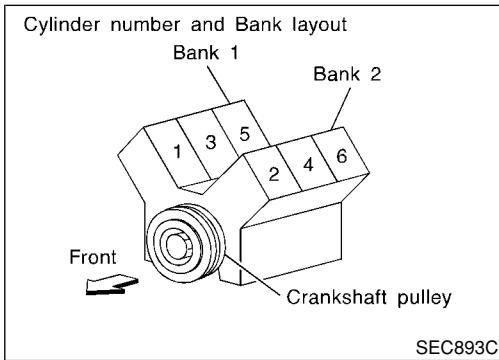
LC

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Regarding model A33, "B1" indicates the bank 1 and "B2" indicates the bank 2 as shown in the figure.

Bank 1 includes No. 1 cylinder.

AT

AX

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BR

Wiring Diagrams and Trouble Diagnosis

NFEC0006

When you read Wiring diagrams, refer to the following:

GI-11, "HOW TO READ WIRING DIAGRAMS"

EL-10, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

GI-24, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"

GI-21, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

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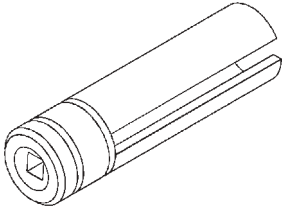
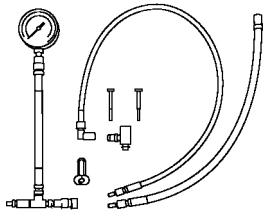
PREPARATION

Special Service Tools

Special Service Tools

NFEC1417

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

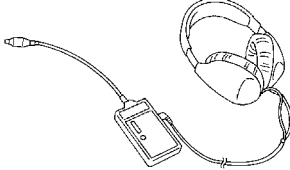
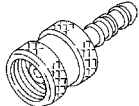
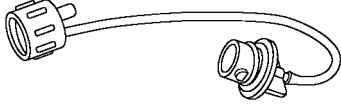
Tool number (Kent-Moore No.) Tool name	Description	
KV10117100 (J36471-A) Heated oxygen sensor wrench		Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
(J44321) Fuel pressure adapter and gauge kit		Checking fuel pressure with pressure gauge

NT379

SEF326Z

Commercial Service Tools

NFEC1418

Tool name (Kent-Moore No.)	Description	
Leak detector ie: (J41416)		Locating the EVAP leak
EVAP service port adapter ie: (J41413-OBD)		Applying positive pressure through EVAP service port
Fuel filler cap adapter ie: (MLR-8382)		Checking fuel tank vacuum relief valve opening pressure

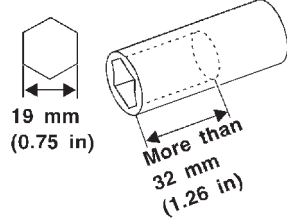
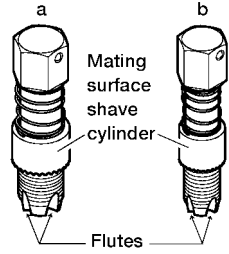
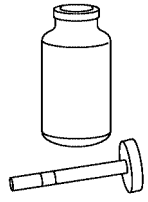
NT703

NT704

NT815

PREPARATION

Commercial Service Tools (Cont'd)

Tool name (Kent-Moore No.)	Description	
Socket wrench	 <p>19 mm (0.75 in)</p> <p>More than 32 mm (1.26 in)</p> <p>NT705</p>	GI MA EM LC
Oxygen sensor thread cleaner ie: (J-43897-18) (J-43897-12)	 <p>a</p> <p>b</p> <p>Mating surface shave cylinder</p> <p>Flutes</p> <p>AEM488</p>	<div style="background-color: black; color: white; padding: 2px; text-align: center; font-weight: bold;">EC</div> FE CL
Anti-seize lubricant ie: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A- 907)	 <p>NT779</p>	MT AT AX SU

Removing and installing engine coolant temperature sensor

Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below.

a: J-43897-18 18 mm diameter with pitch 1.5 mm, for Zirconia Oxygen Sensor
b: J-43897-12 12 mm diameter with pitch 1.25 mm, for Titania Oxygen Sensor

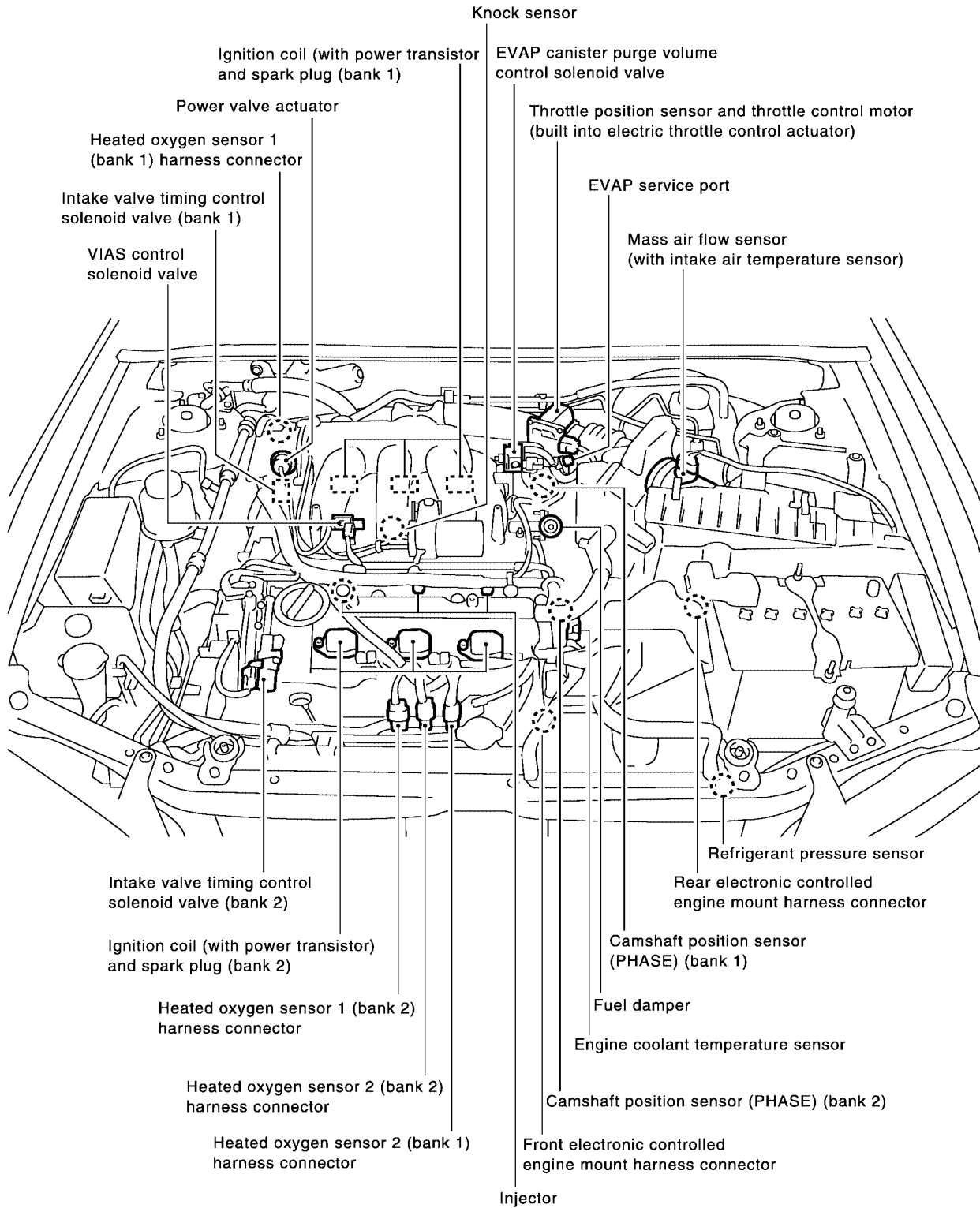
Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location

Engine Control Component Parts Location

NFEC1419

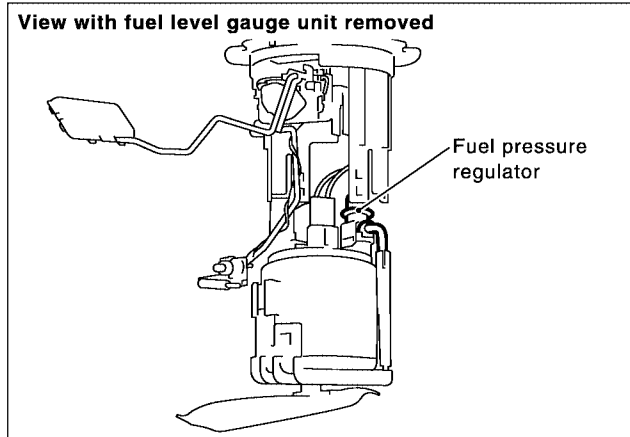
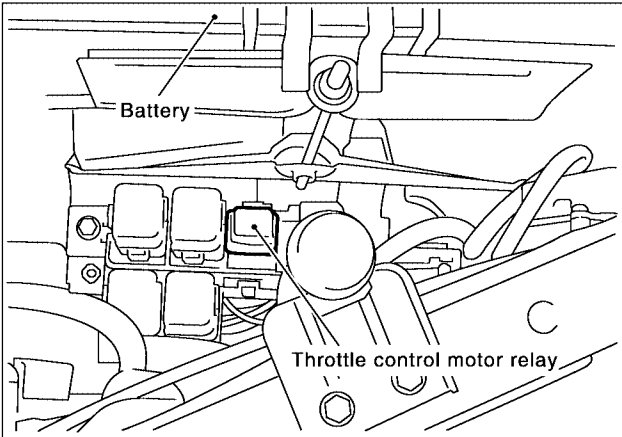
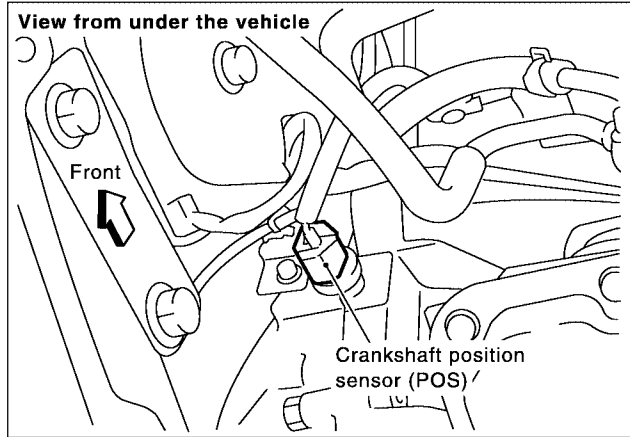
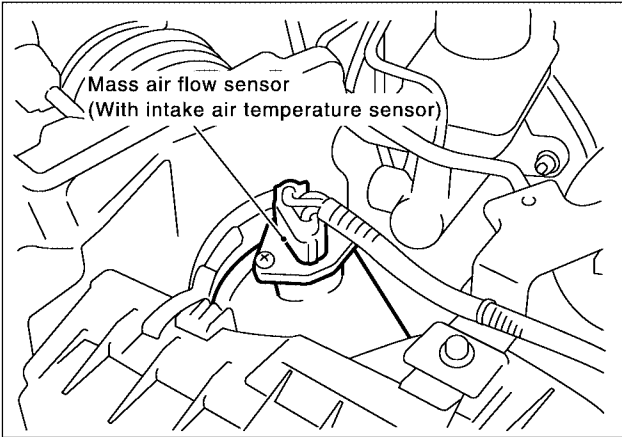
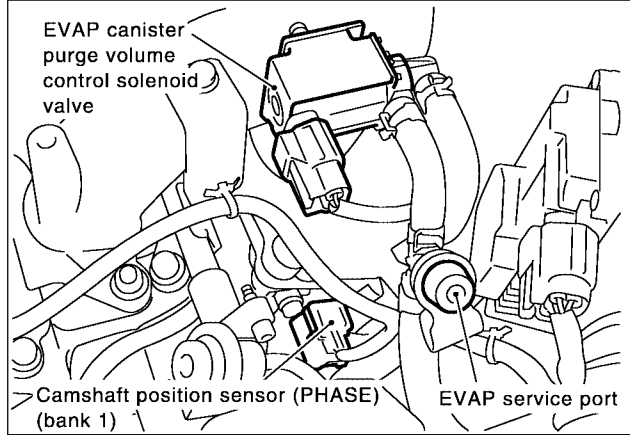
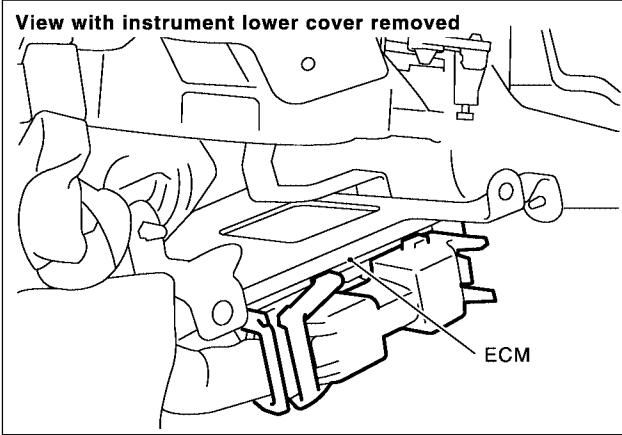


SEC993CA

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)

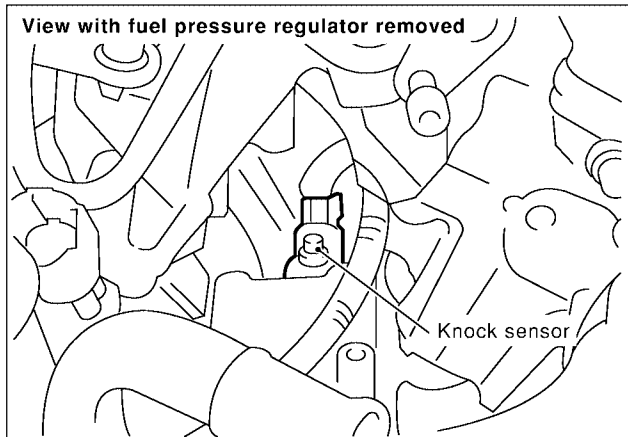
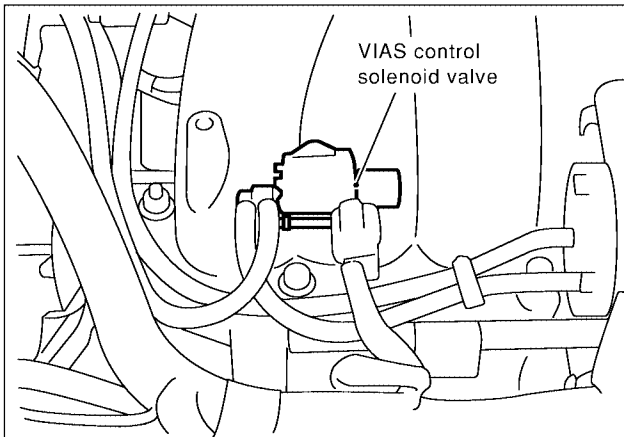
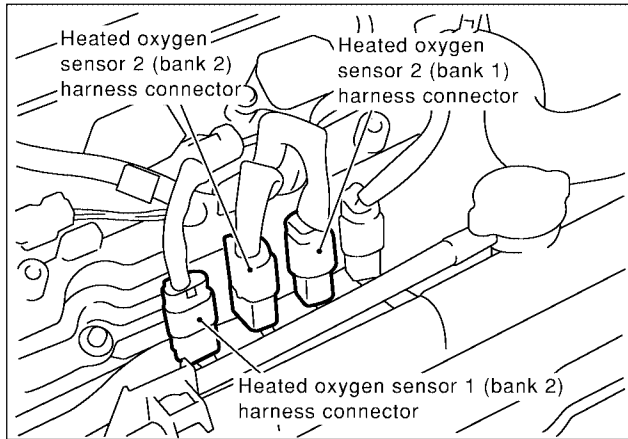
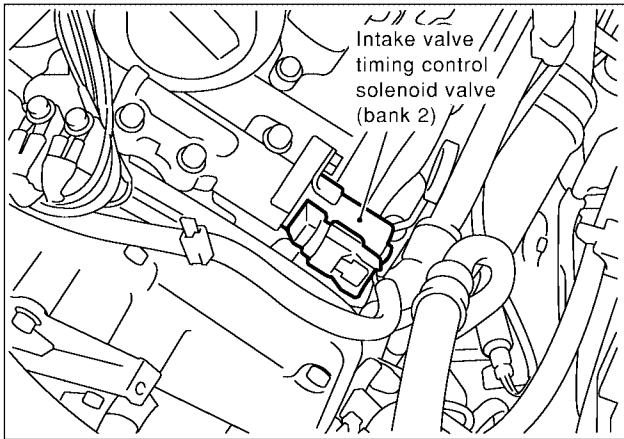
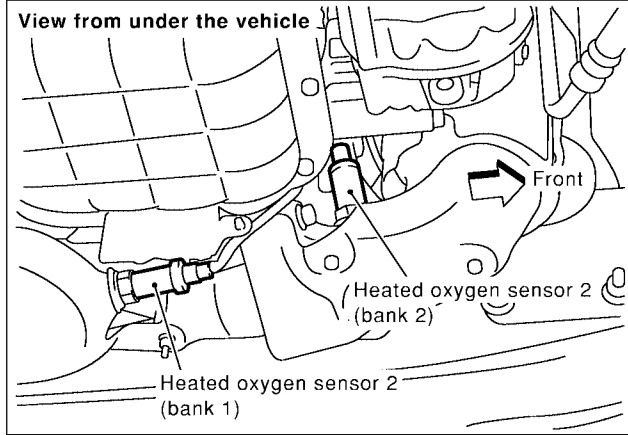
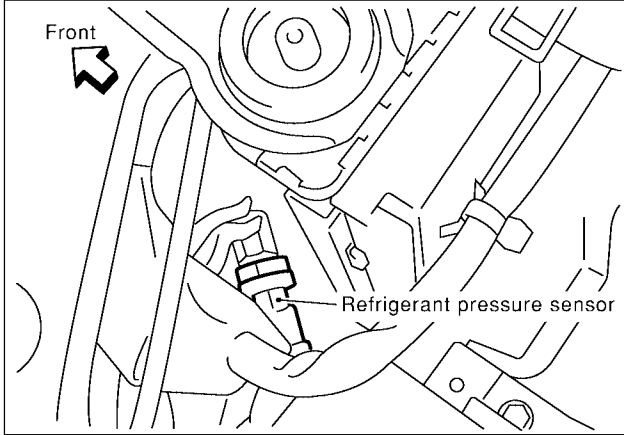
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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)

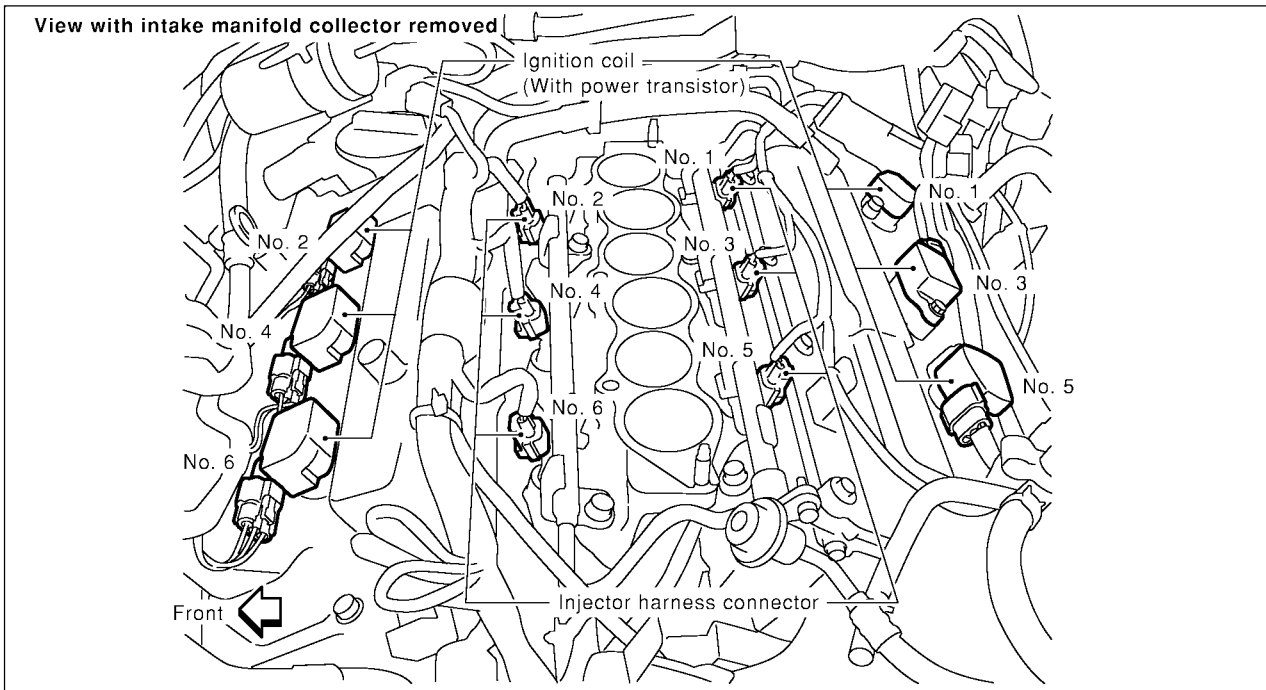
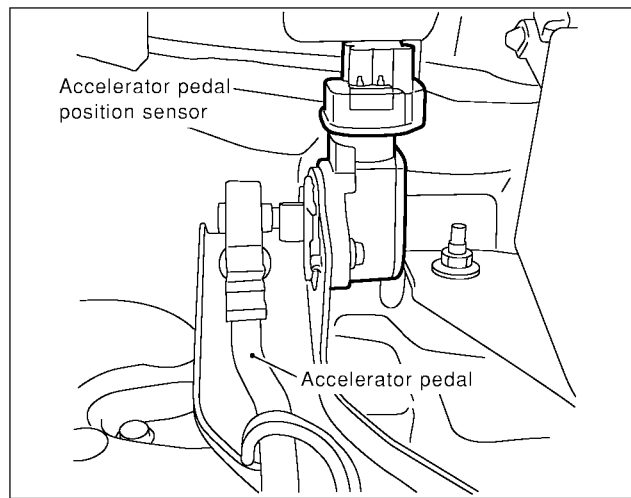
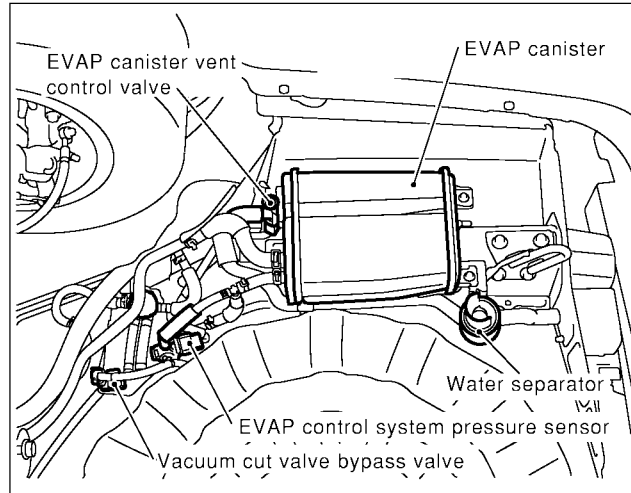
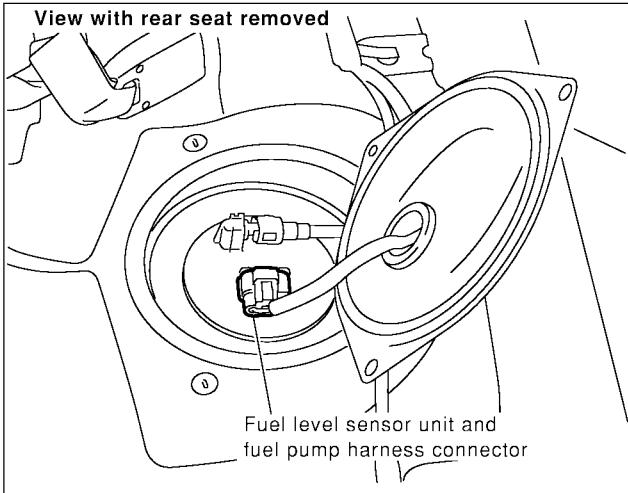


SEC995C

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)

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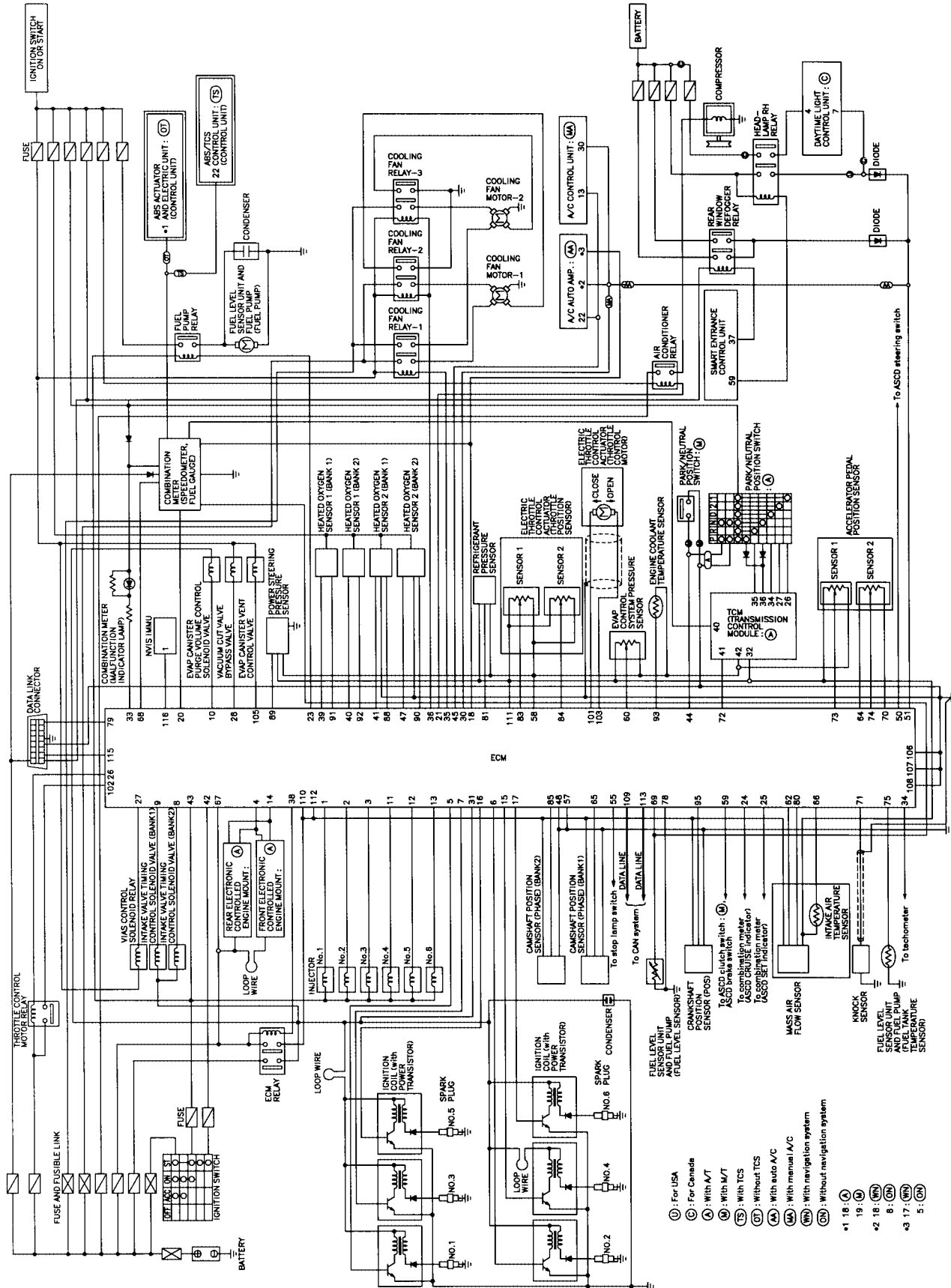
SEC996C

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Circuit Diagram

Circuit Diagram

NFEC0010

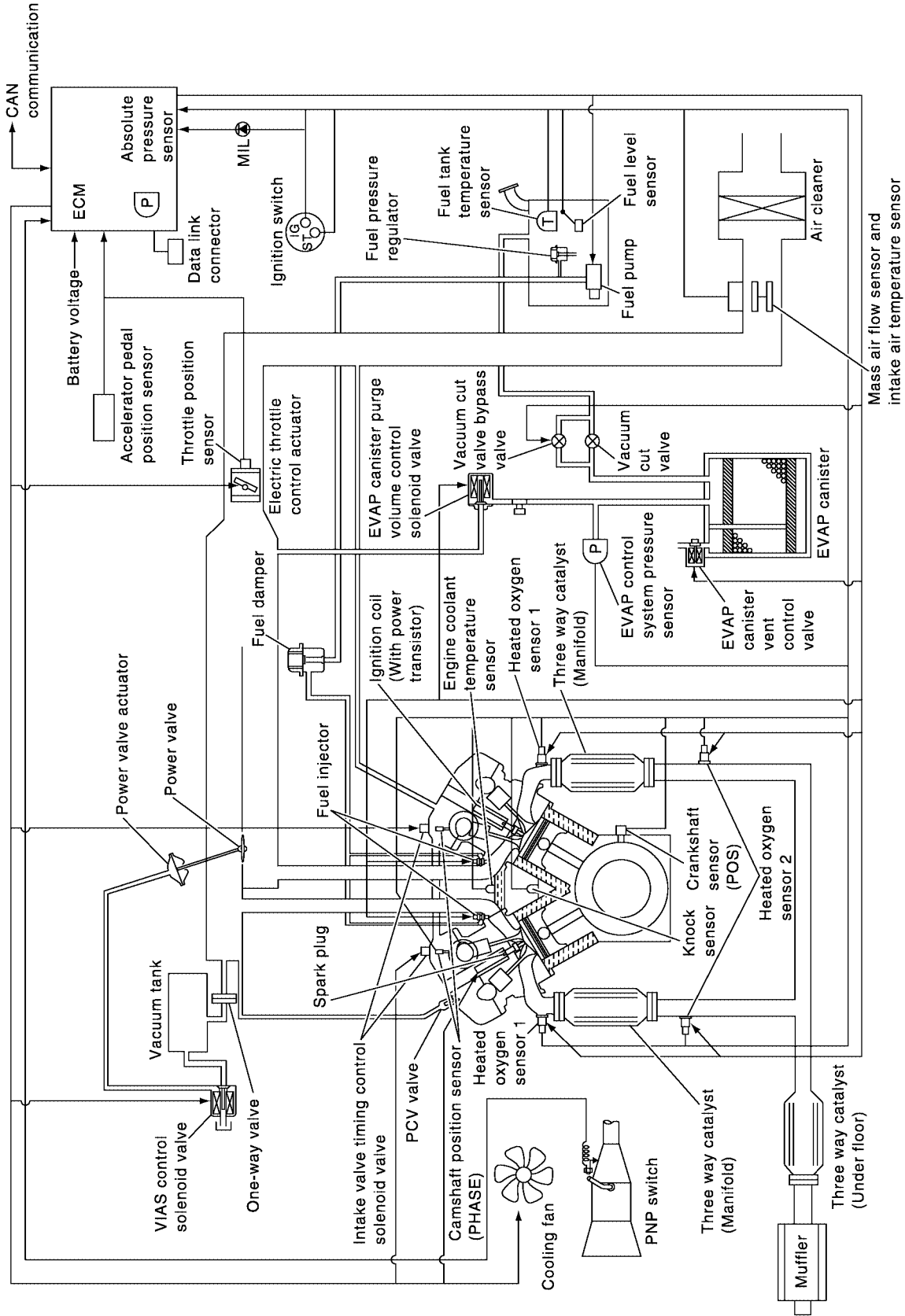


ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Diagram

System Diagram

NFEC0011



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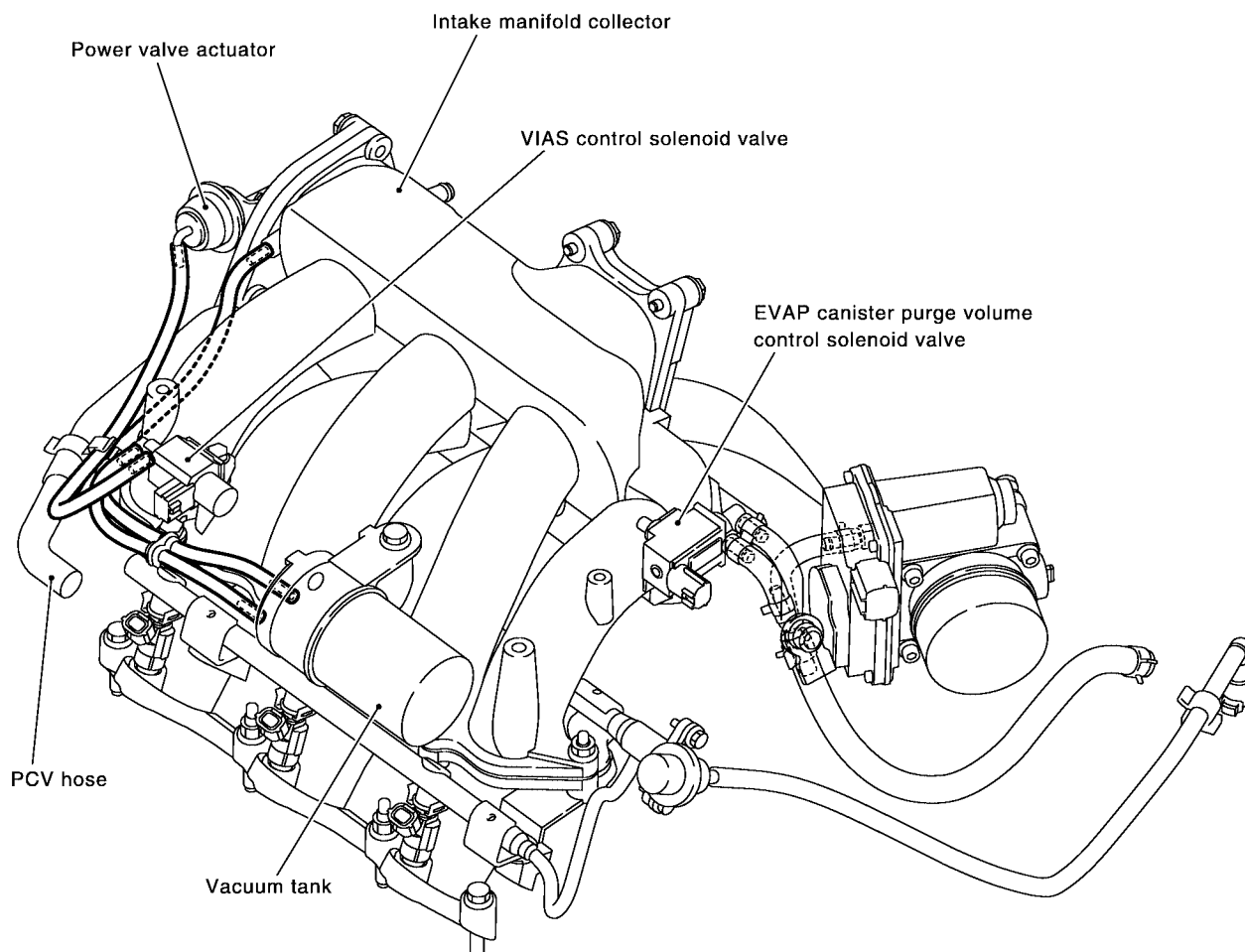
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Vacuum Hose Drawing

Vacuum Hose Drawing

NFEC1420

Refer to "System Diagram", EC-29 for Vacuum control system.



NOTE:

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

SEC895CA

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Chart

System Chart

NFEC0013

Input (Sensor)	ECM Function	Output (Actuator)	
Camshaft position sensor (PHASE)	Fuel injection & mixture ratio control	Injectors	GI
Mass air flow sensor	Electronic ignition system	Power transistor	MA
Engine coolant temperature sensor			
Heated oxygen sensor 1	Fuel pump control	Fuel pump relay	EM
Ignition switch			
Throttle position sensor	On board diagnostic system	MIL (On the instrument panel)	LC
Accelerator pedal position sensor			
Park/neutral position (PNP) switch	ASCD vehicle speed control	Electric throttle control actuator	EC
Air conditioner switch			
Knock sensor	Cooling fan control	Cooling fan relays	FE
Intake air temperature sensor			
Absolute pressure sensor	Power valve control	VIAS control solenoid valve	CL
EVAP control system pressure sensor*1			
Battery voltage	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater	MT
Power steering pressure sensor			
Vehicle speed (From combination meter)	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater	AT
Fuel tank temperature sensor*1			
Crankshaft position sensor (POS)	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	AX
Heated oxygen sensor 2*2			
TCM (Transmission control module)*3	Air conditioning cut control	Air conditioner relay	SU
Refrigerant pressure sensor			
Electrical load	ON BOARD DIAGNOSIS for EVAP system	EVAP canister vent control valve Vacuum cut valve bypass valve	BR
Fuel level sensor*1			
ASCD steering switch			ST
ASCD brake switch			
ASCD clutch switch (MT models)			
Stop lamp switch			

*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

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

*3: The signals are sent to the ECM through CAN communication line.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System

Multiport Fuel Injection (MFI) System

DESCRIPTION

NFEC0014

Input/Output Signal Chart

NFEC0014S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed Piston position	Fuel injection & mixture ratio control	Injectors
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen 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		
Vehicle speed (From combination meter)	Vehicle speed		
Ignition switch	Start signal		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Battery	Battery voltage		
Absolute pressure sensor	Ambient air barometric pressure		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 2*	Density of oxygen in exhaust gas		

*: Under normal conditions, this sensor is not for engine control operation.

Basic Multiport Fuel Injection System

NFEC0014S02

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 and the mass air flow sensor.

Various Fuel Injection Increase/Decrease Compensation

NFEC0014S03

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

<Fuel increase>

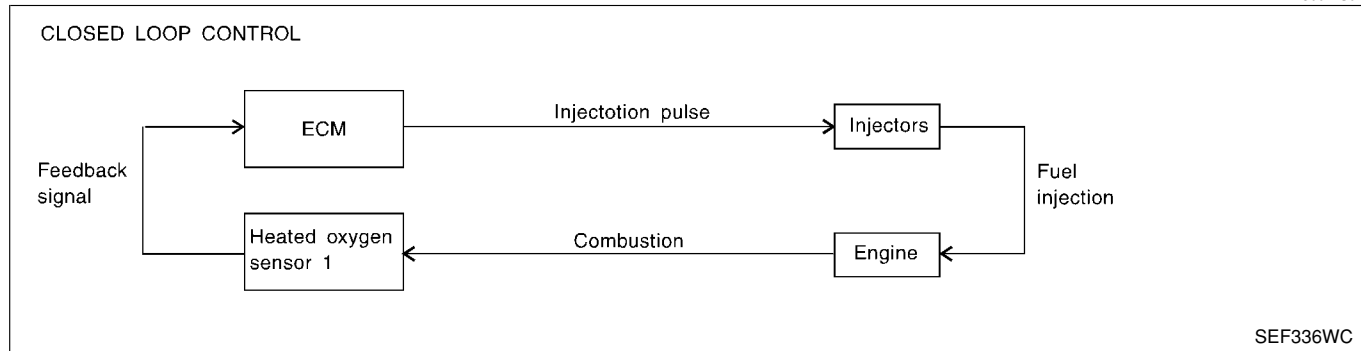
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D"
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

Mixture Ratio Feedback Control (Closed loop control)

NFEC0014S04



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The warm-up three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a heated oxygen sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the heated oxygen sensor 1, refer to EC-238. 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 the heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2.

Open Loop Control

NFEC0014S05

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 heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen 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

NFEC0014S06

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen 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 the heated oxygen 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.

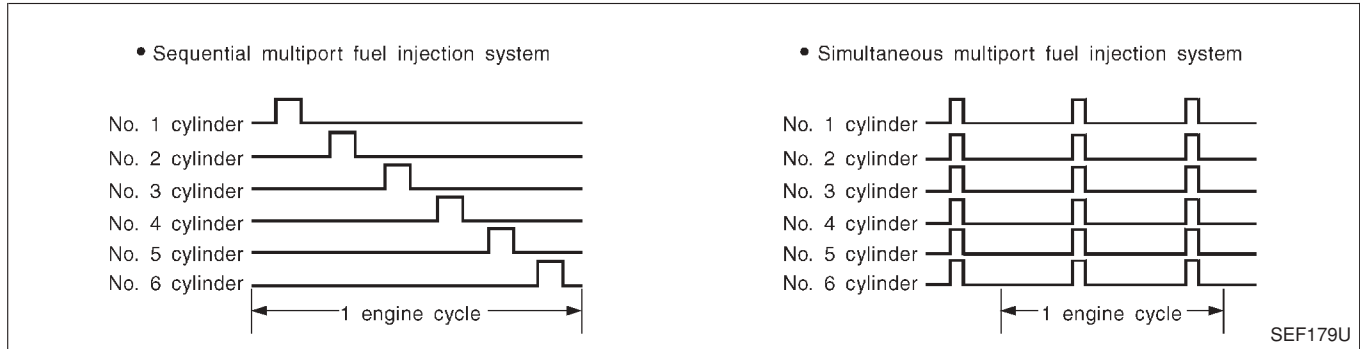
"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System (Cont'd)

Fuel Injection Timing

NFEC0014S07



SEF179U

Two types of systems are used.

Sequential Multiport Fuel Injection System

NFEC0014S0701

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

NFEC0014S0702

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

The six 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

NFEC0014S08

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

Electronic Ignition (EI) System

DESCRIPTION

Input/Output Signal Chart

NFEC0015

NFEC0015S01

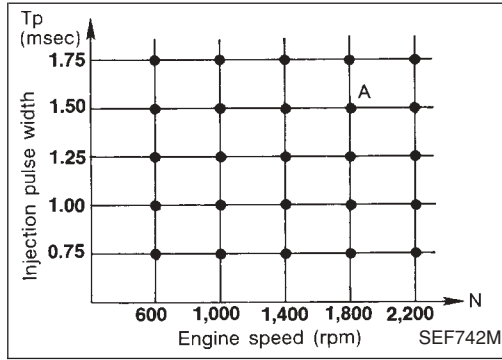
Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle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

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Electronic Ignition (EI) System (Cont'd)

System Description

NFEC0015S02



GI
MA
EM
LC

EC

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

FE

CL

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
- At idle
- At low battery voltage
- During acceleration

MT

AT

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.

AX

SU

Air Conditioning Cut Control

DESCRIPTION

Input/Output Signal Chart

NFEC0016

NFEC0016S01

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle valve opening angle		
Crankshaft position sensor (POS)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Vehicle speed (From combination meter)	Vehicle speed		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering pressure sensor	Power steering operation		

BR

ST

RS

BT

HA

SC

System Description

NFEC0016S02

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.

IDX

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Air Conditioning Cut Control (Cont'd)

When engine speed is excessively low.

When refrigerant pressure is excessively low or high.

Fuel Cut Control (at no load & high engine speed)

DESCRIPTION

Input/Output Signal Chart

NFEC0017

NFEC0017S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed (From combination meter)	Vehicle speed	Fuel cut control	Injectors
Park/neutral position (PNP) switch	Neutral position		
Throttle position sensor	Throttle position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS)	Engine speed		

If the engine speed is above 1,800 rpm with no load (for example, in neutral and engine speed over 1,800 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 operate until the engine speed reaches 1,500 rpm, then fuel cut is cancelled.

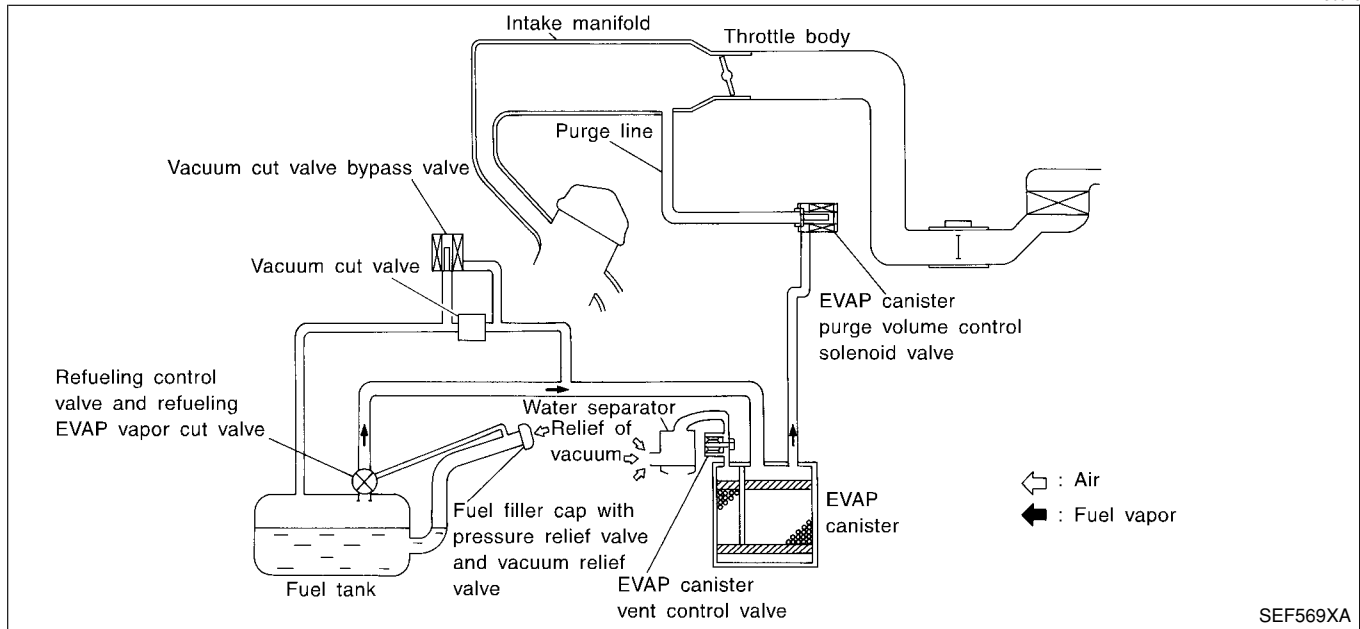
NOTE:

This function is different from deceleration control listed under "Multiport Fuel Injection (MFI) System", EC-32.

Evaporative Emission System

DESCRIPTION

NFEC0018



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.

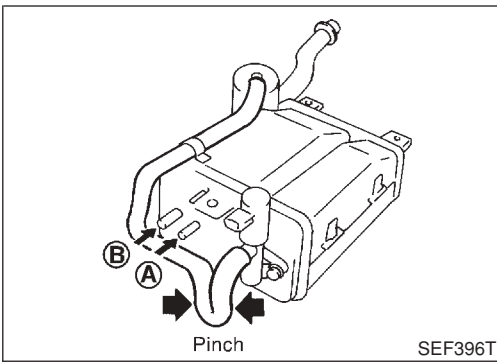
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

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.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)



INSPECTION

EVAP Canister

NFEC0019

NFEC0019S01

Check EVAP canister as follows:

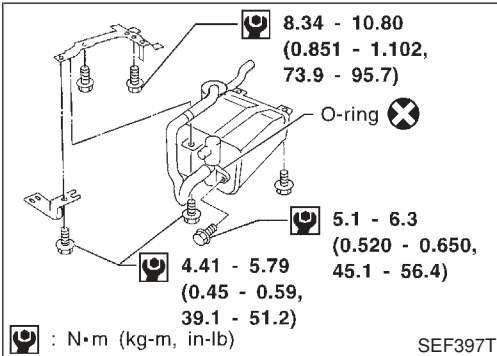
1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B**.

GI

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Tightening Torque

NFEC0019S02

Tighten EVAP canister as shown in the figure.

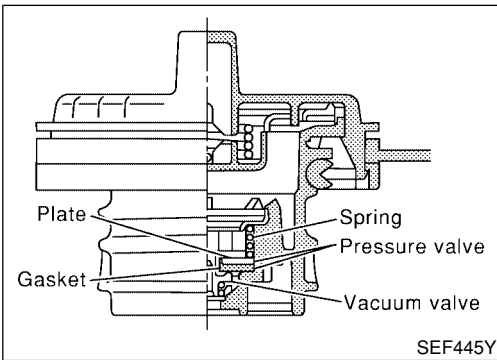
Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.

EC

FE

CL

MT



Fuel Tank Vacuum Relief Valve (Built into fuel filler cap)

NFEC0019S03

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.

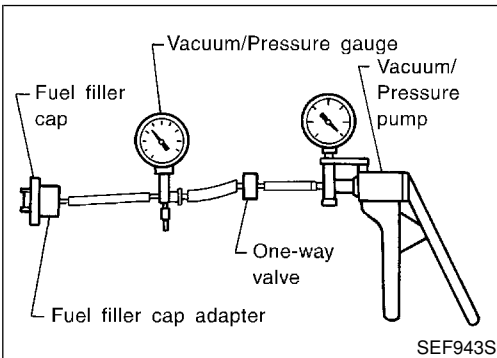
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Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

NFEC0019S04

Refer to EC-641.

EVAP Canister Purge Volume Control Solenoid Valve

NFEC0019S05

Refer to EC-374.

Fuel Tank Temperature Sensor

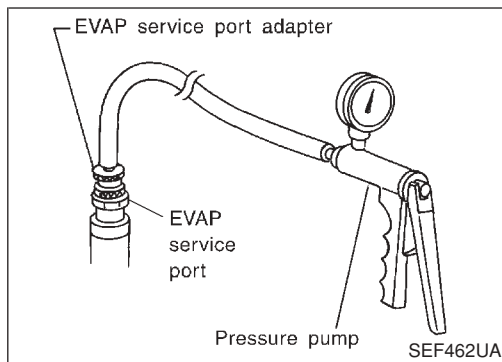
NFEC0019S06

Refer to EC-283.

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

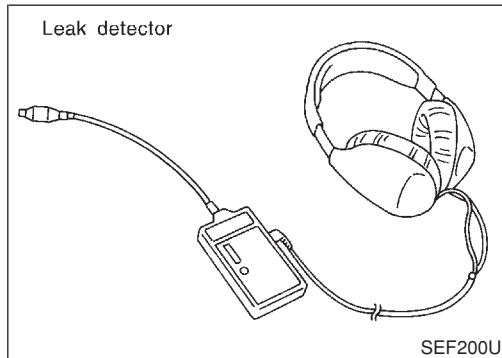
Evaporative Emission System (Cont'd)



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.

NFEC0019S07



How to Detect Fuel Vapor Leakage

CAUTION:

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 EVAP system.

NFEC0019S08

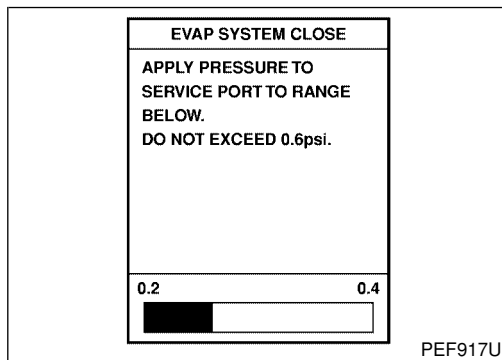
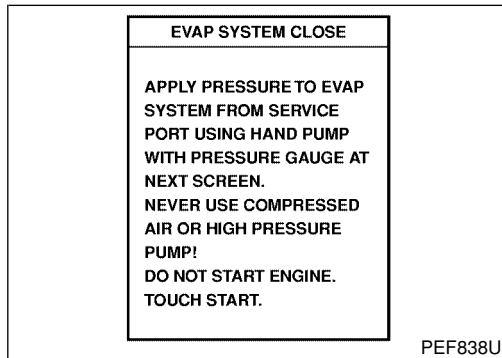
NOTE:

Do not start engine. Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

With CONSULT-II

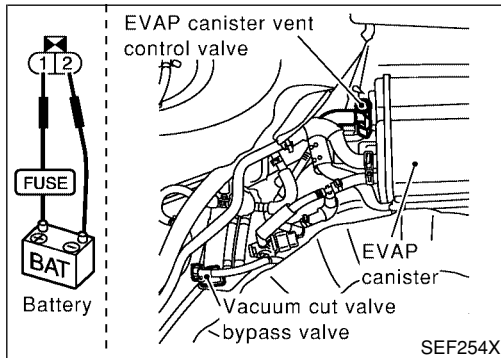
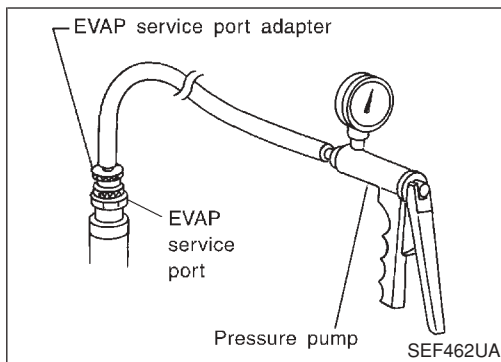
NFEC0019S0801

- 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 "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)



⊗ Without CONSULT-II

NFEC0019S0802

- 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.
- 3) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass 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 "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

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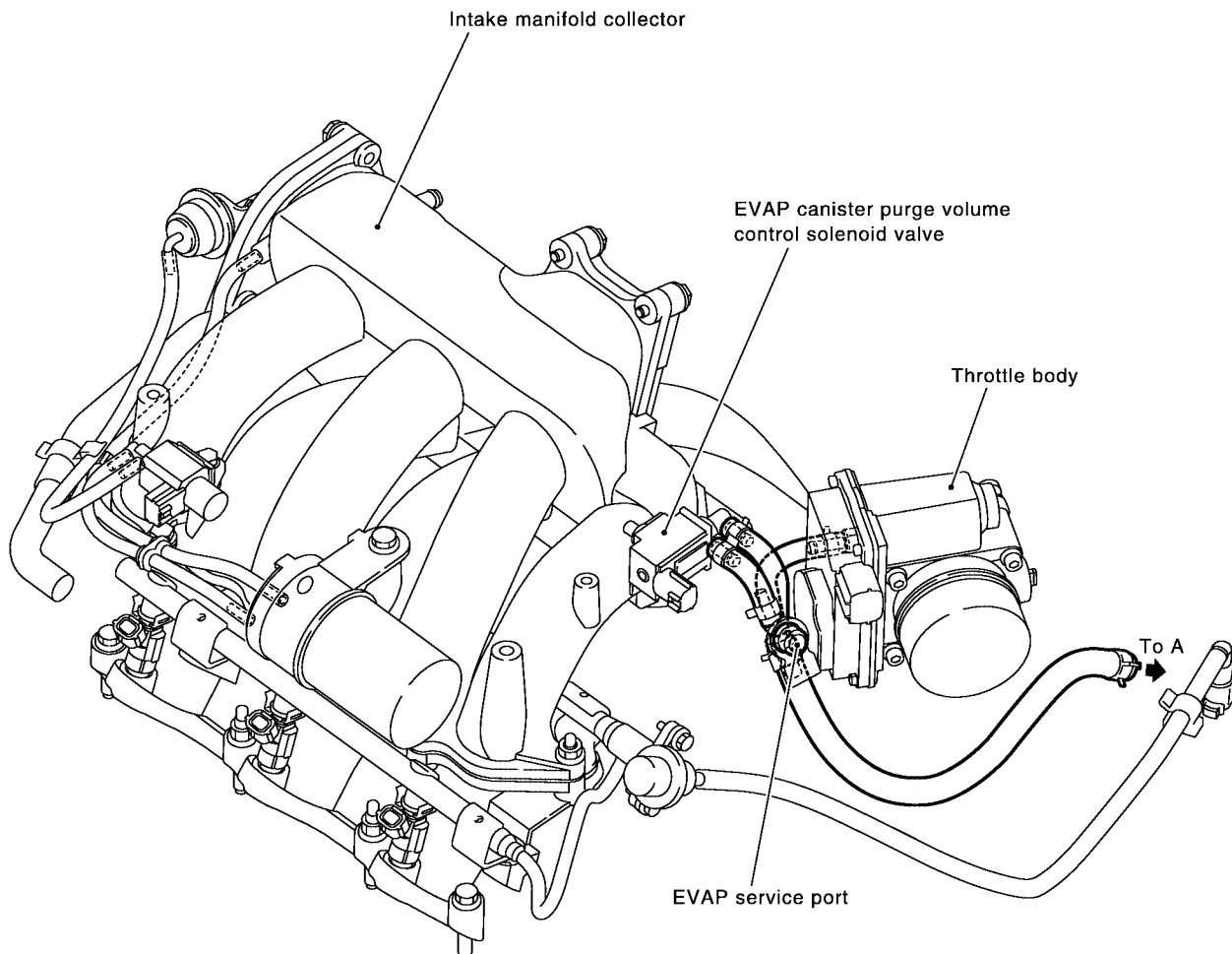
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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

EVAPORATIVE EMISSION LINE DRAWING

NFEC1421



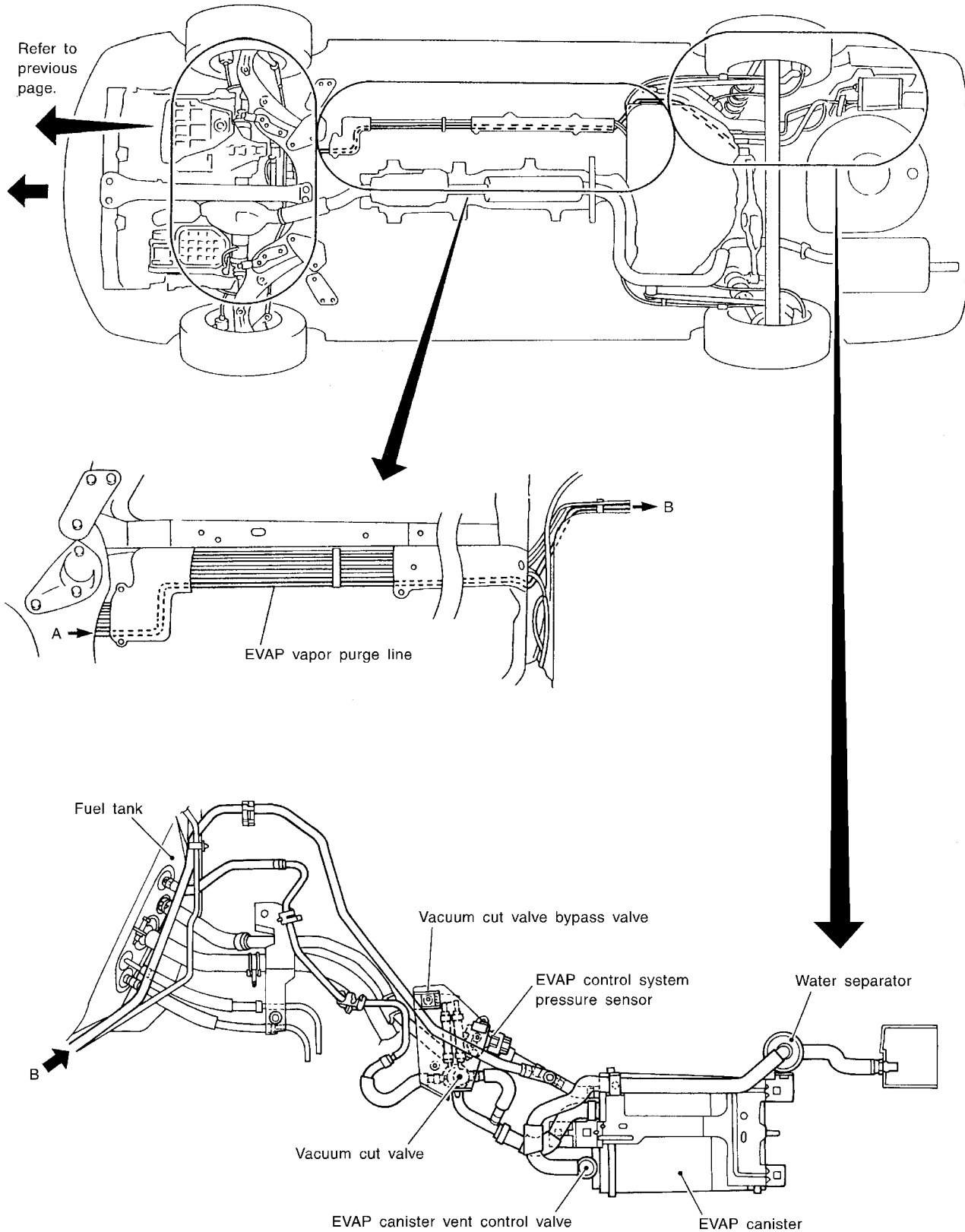
NOTE:

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

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)



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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

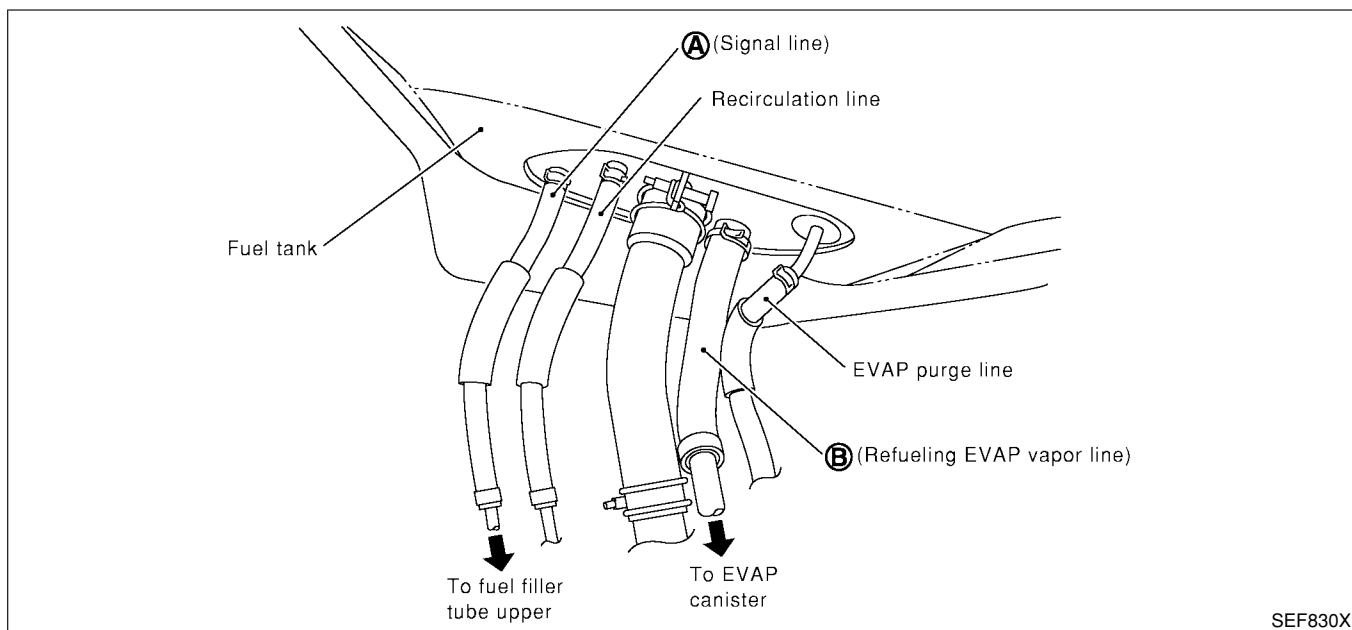
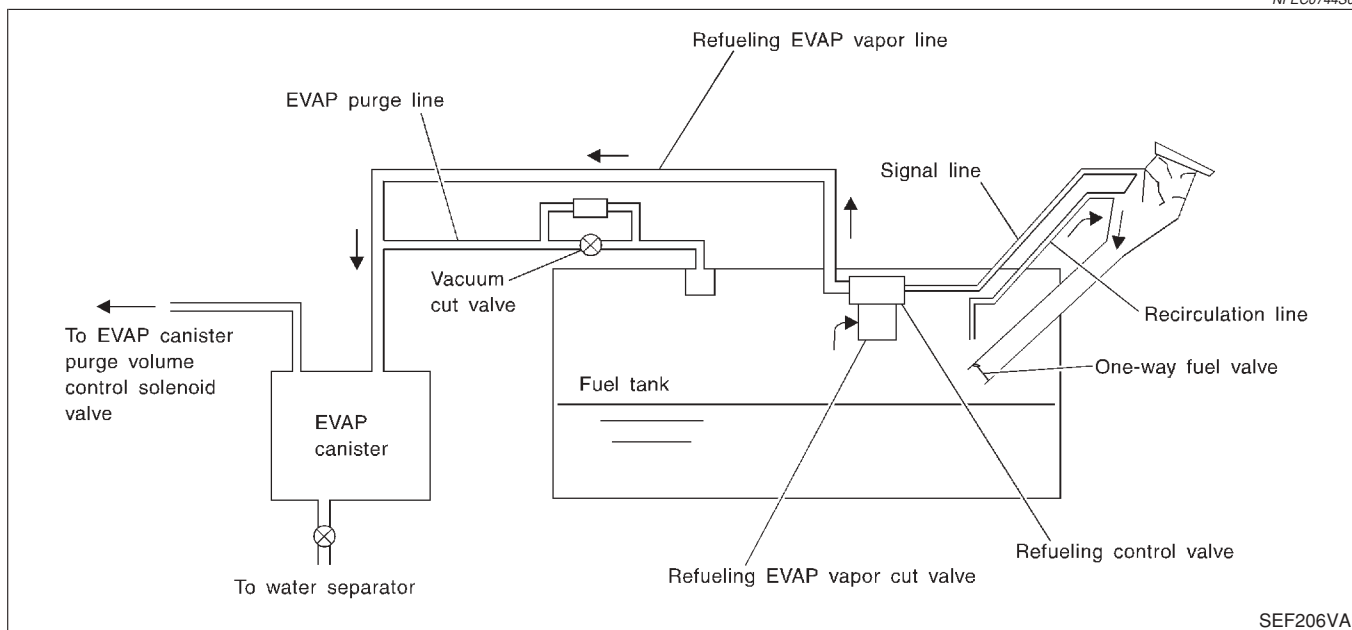
On Board Refueling Vapor Recovery (ORVR)

On Board Refueling Vapor Recovery (ORVR)

NFEC0744

SYSTEM DESCRIPTION

NFEC0744S01



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor 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.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

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.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

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 "Fuel Pressure Release", EC-56.
- 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.

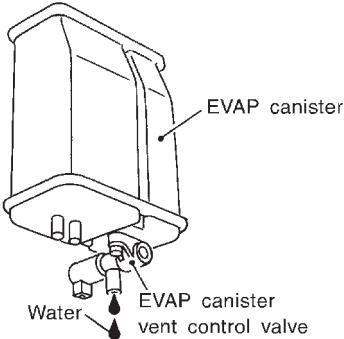
DIAGNOSTIC PROCEDURE

Symptom: Fuel Odor from EVAP Canister Is Strong.

NFEC0744S02

NFEC0744S0201

1	CHECK EVAP CANISTER	
	1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 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 (With CONSULT-II)	GO TO 6.
	No (Without CONSULT-II)	GO TO 7.

3	REPLACE EVAP CANISTER	
	Replace EVAP canister with a new one.	
		GO TO 4.

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

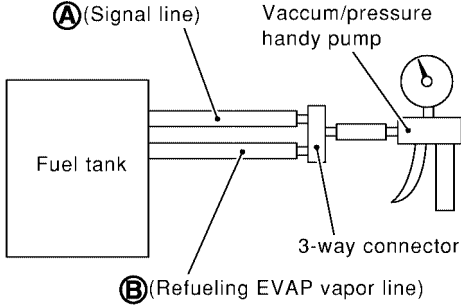
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;"> <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">PBIB1032E</p>	
<p>5. In case of NG in items 2 - 4, replace the parts. NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	Replace water separator.

5	DETECT MALFUNCTIONING PART
<p>Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.</p>	
	Repair or replace EVAP hose.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

6	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> 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 hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel gauge retainer with fuel gauge unit. <p>Always replace O-ring with new one.</p> <ol style="list-style-type: none"> c. Put fuel tank upside down. d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable. <div style="text-align: center;">  <p>The diagram illustrates the test setup. On the left is a rectangular box labeled 'Fuel tank'. Two horizontal lines represent hoses extending from the tank to the right. The top line is labeled 'A (Signal line)'. The bottom line is labeled 'B (Refueling EVAP vapor line)'. At the end of these lines is a '3-way connector'. A 'Vaccum/pressure handy pump' (note the typo in the original) is connected to the 3-way connector. The pump has a circular gauge with a needle and a handle.</p> </div> <p style="text-align: right;">SEF968X</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	Replace refueling EVAP vapor cut valve with fuel tank.

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

7	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel gauge retainer. b. Drain fuel from the tank using a hand 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 hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel gauge retainer with fuel gauge unit. <p>Always replace O-ring with new one.</p> <ol style="list-style-type: none"> c. Put fuel tank upside down. d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable. <div data-bbox="581 625 1039 924" style="text-align: center;"> <p style="text-align: center;">OK or NG</p> </div> <p style="text-align: right;">SEF968X</p>	
OK	GO TO 8.
NG	Replace refueling EVAP vapor cut valve with fuel tank.

8	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. <div data-bbox="581 1381 1039 1680" style="text-align: center;"> <p style="text-align: center;">OK or NG</p> </div> <p style="text-align: right;">SEF968X</p>	
OK	INSPECTION END
NG	Replace refueling control valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

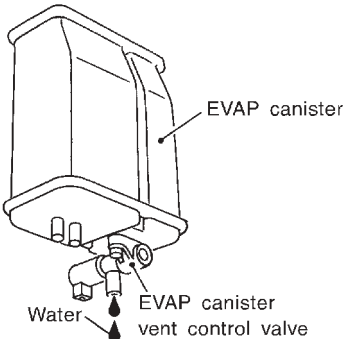
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

NFEC0744S0202

1	CHECK EVAP CANISTER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	GO TO 2.	
NG	GO TO 3.	

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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 6.	

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3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
	GO TO 4.	

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p>	
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
PBIB1032E	
<p>5. In case of NG in items 2 - 4, replace the parts. NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	Replace water separator.

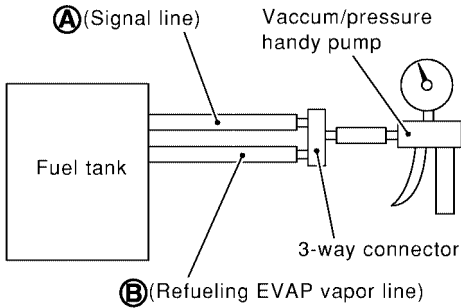
5	DETECT MALFUNCTIONING PART
Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.	
	Repair or replace EVAP hose.

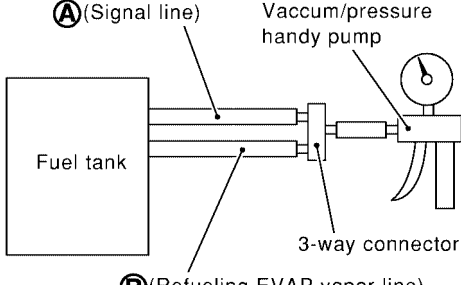
6	CHECK VENT HOSES AND VENT TUBES
Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.	
OK or NG	
OK	GO TO 7.
NG	Repair or replace hoses and tubes.

7	CHECK FILLER NECK TUBE
Check signal line and recirculation line for clogging, dents and cracks.	
OK or NG	
OK	GO TO 8.
NG	Replace filler neck tube.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

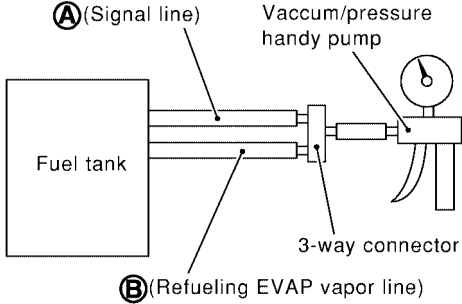
8	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
	
SEF968X	
OK or NG	
OK (With CONSULT-II)	GO TO 9.
OK (Without CONSULT-II)	GO TO 10.
NG	Replace refueling control valve with fuel tank.

9	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>ⓑ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> 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. 3. 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 hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. 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 both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable. 	
	
SEF968X	
OK or NG	
OK	GO TO 11.
NG	Replace refueling EVAP vapor cut valve with fuel tank.

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

10	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel gauge retainer. b. Drain fuel from the tank using a hand 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 hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel gauge retainer with fuel gauge unit. <p>Always replace O-ring with new one.</p> <ol style="list-style-type: none"> c. Put fuel tank upside down. d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable. <div style="text-align: center;">  </div> <p style="text-align: right;">SEF968X</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 11.
NG	Replace refueling EVAP vapor cut valve with fuel tank.

11	CHECK FUEL FILLER TUBE
<p>Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 12.
NG	Replace fuel filler tube.

12	CHECK ONE-WAY FUEL VALVE-I
<p>Check one-way valve for clogging.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 13.
NG	Repair or replace one-way fuel valve with fuel tank.

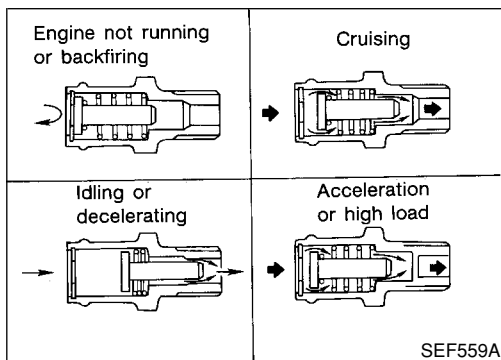
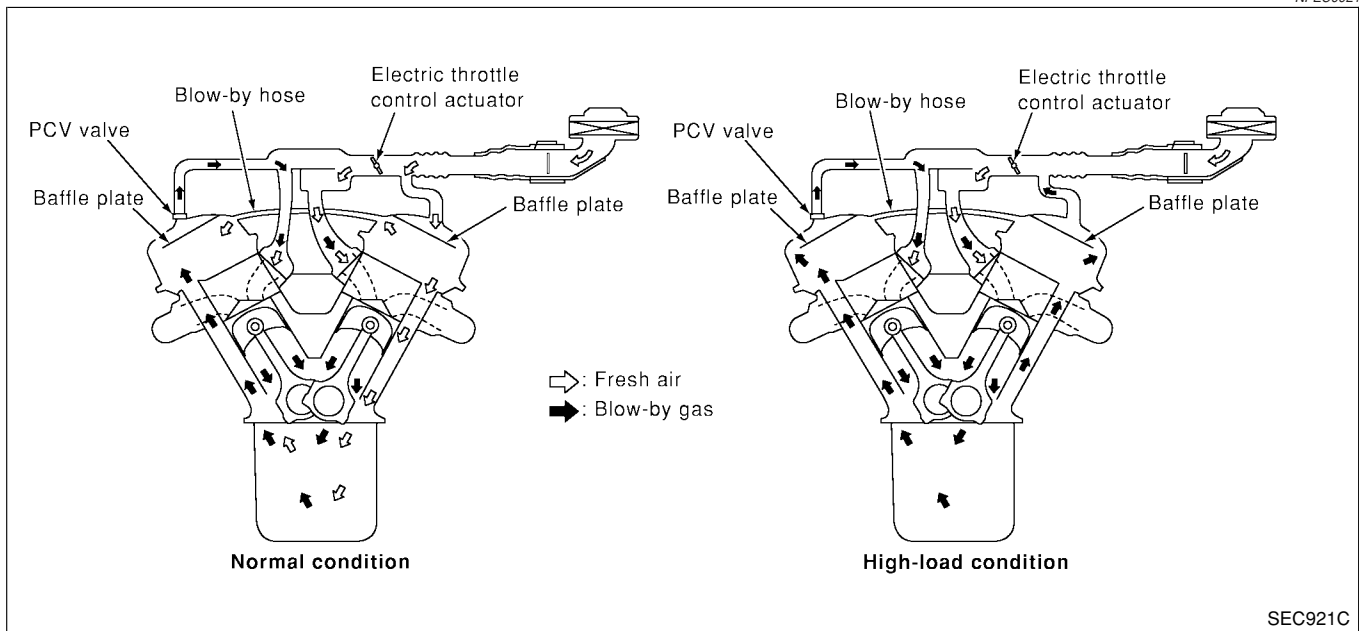
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

13	CHECK ONE-WAY FUEL VALVE-II
<p>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.</p> <p style="text-align: center;">After removing filler tube</p> <div style="text-align: center;"> <p style="text-align: center;">One-way fuel valve</p> <p style="text-align: center;">Fuel tank</p> </div> <p style="text-align: right;">SEF665U</p> <p>Do not drop any material into the tank.</p> <p style="text-align: center;">OK or NG</p>	
OK	INSPECTION END
NG	Replace fuel filler tube or replace one-way fuel valve with fuel tank.

Positive Crankcase Ventilation DESCRIPTION

NFEC0021



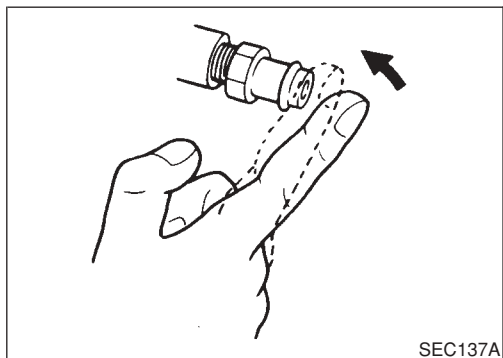
This system returns blow-by gas to the intake manifold. The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity 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

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Positive Crankcase Ventilation (Cont'd)

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.



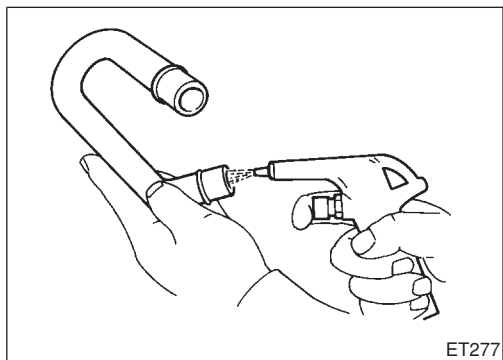
INSPECTION

PCV (Positive Crankcase Ventilation) Valve

NFEC0022

NFEC0022S01

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



PCV Valve Ventilation Hose

NFEC0022S02

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.

SYSTEM DESCRIPTION

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.

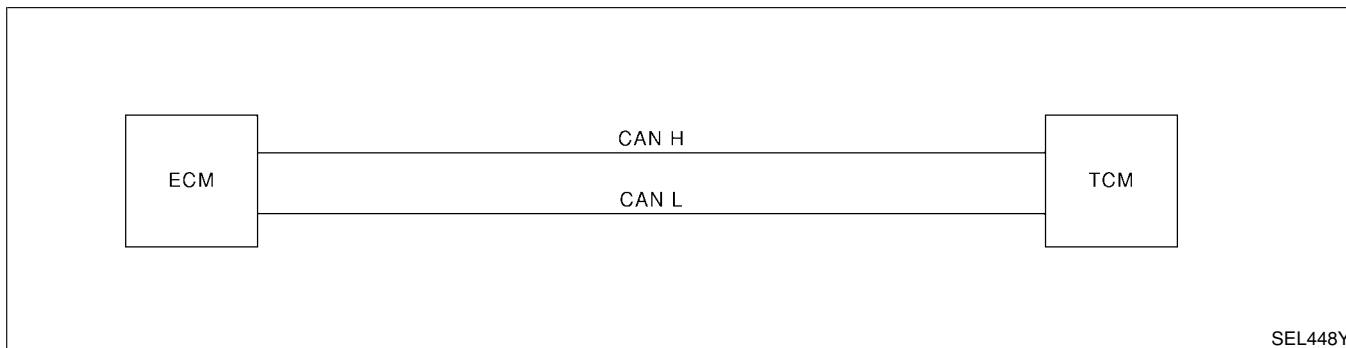
NFEC1183

NFEC1183S01

For A/T Models

System Diagram

NFEC1183S0101



ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

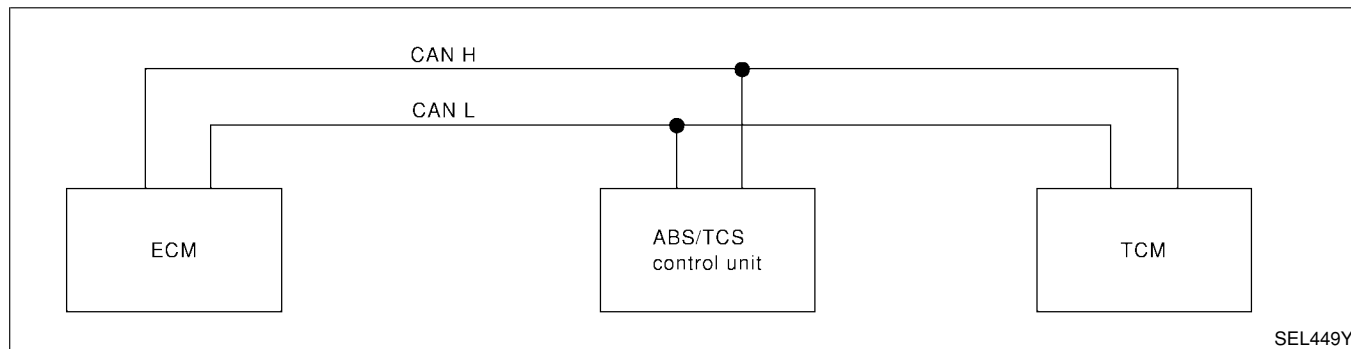
CAN Communication (Cont'd)

Input/Output Signal Chart T: Transmit R: Receive

Signals	ECM	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T

For TCS Models System Diagram

NFEC1183S0102



SEL449Y

INPUT/OUTPUT SIGNAL CHART

T: Transmit R: Receive

NFEC1183S02

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position signal	T	R	R
Output shaft revolution signal	R		T
TCS self-diagnostic signal	R	T	
ABS self-diagnostic signal	R	T	

Automatic Speed Control Device (ASCD) System

DESCRIPTION

Input/Output Signal Chart

NFEC1184

NFEC1184S01

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 clutch switch (MT models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch (AT models)	Gear position		
Combination meter	Vehicle speed		
TCM	Power train revolution		

Basic ASCD System

NFEC1184S02

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 depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Automatic Speed Control Device (ASCD) System (Cont'd)

ECM controls throttle valve operating 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 ASCD CRUISE switch (Main switch). (Then 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 SET switch. (Then SET indicator in combination meter illuminates.)

NFEC1184S03

Accel Operation

If the RESUME/ACCEL switch is depressed 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.

NFEC1184S04

Cancel Operation

When any of following conditions exist, cruise operation will be canceled.

NFEC1184S05

CANCEL switch is depressed.

Brake pedal is depressed.

Clutch pedal is depressed (M/T models).

A/T selector lever is shifted to P or N position (A/T models).

If MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

Coast Operation

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

NFEC1184S06

Resume Operation

When the RESUME/ACCEL switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

NFEC1184S07

Brake pedal is released.

Clutch pedal is released (M/T models).

A/T selector lever is in other than P and N position (A/T models).

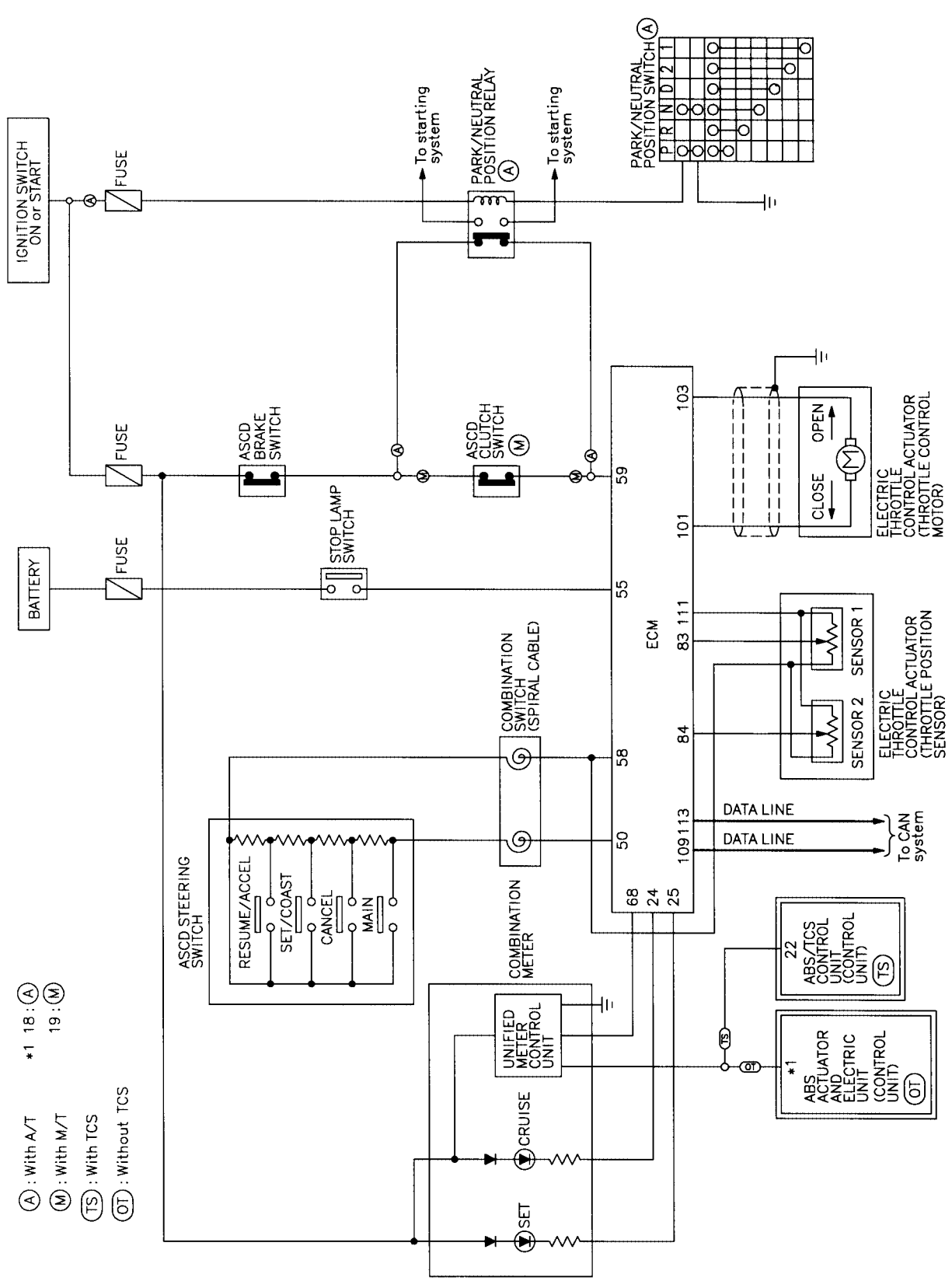
Vehicle speed is greater than 40 km/h (25 MPH) and 144 km/h (89 MPH).

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Automatic Speed Control Device (ASCD) System (Cont'd)

SYSTEM DIAGRAM

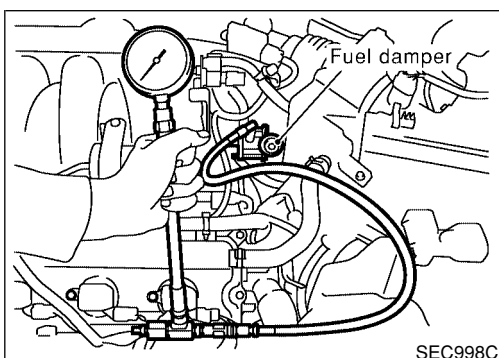
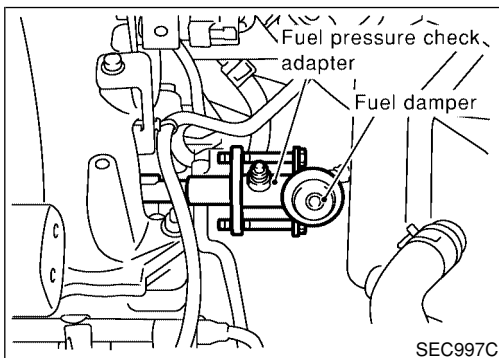
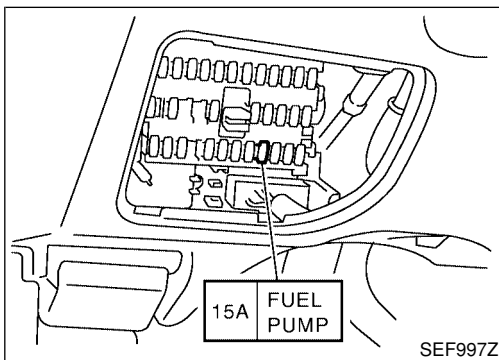
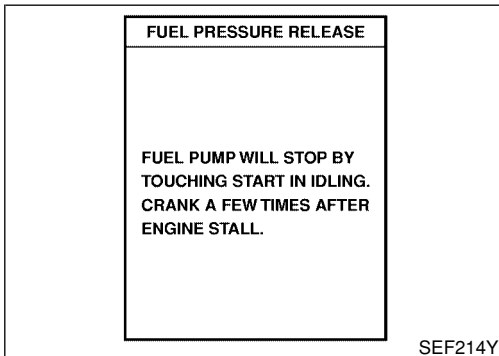
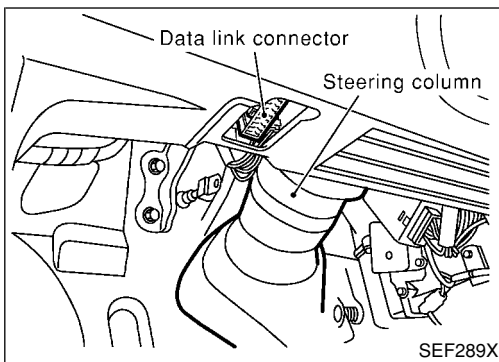
NFEC1185



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BASIC SERVICE PROCEDURE

Fuel Pressure Release



Fuel Pressure Release

NFEC0023

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

WITH CONSULT-II

NFEC0023S01

1. Turn ignition switch "ON".
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

NFEC0023S02

1. Remove fuel pump fuse located in fuse box.
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

NFEC0024

When reconnecting fuel line, always use new clamps.

Make sure that clamp screw does not contact adjacent parts.

Use a torque driver to tighten clamps.

Use Pressure Gauge to check fuel pressure.

1. Release fuel pressure to zero.
2. Disconnect fuel tube joint between fuel damper and injector tube and set fuel pressure check adapter (J44321).
3. Install pressure gauge to the fuel pressure check adapter as shown in the figure.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.
At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)
6. If results are unsatisfactory, go to next step.
7. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump

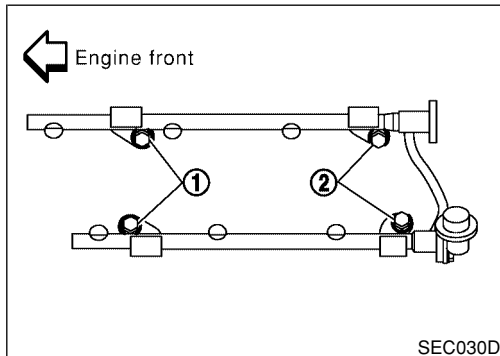
Fuel pressure regulator for clogging
 If OK, replace fuel pressure regulator.
 If NG, repair or replace.

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Injector

REMOVAL AND INSTALLATION

NFEC0026

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1. Release fuel pressure to zero.
2. Remove intake manifold collector. Refer to EM-21, "TIMING CHAIN".
3. Remove fuel tube assemblies in numerical sequence as shown in the figure at left.
4. Expand and remove clips securing fuel injectors.
5. Extract fuel injectors straight from fuel tubes.

Be careful not to damage injector nozzles during removal. Do not bump or drop fuel injectors.

6. Carefully install O-rings.

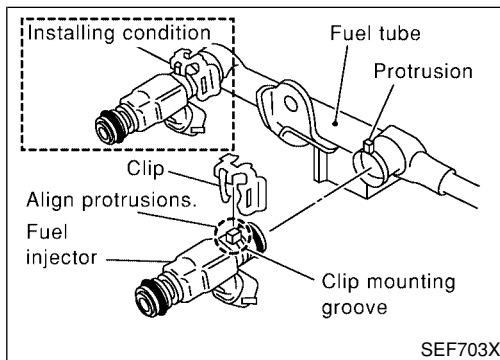
Lubricate O-rings with a smear of engine oil.

Be careful not to damage O-rings with service tools, finger nails or clips. Do not expand or twist O-rings.

Discard old clips; replace with new ones.

7. Position clips in grooves on fuel injectors.

Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.



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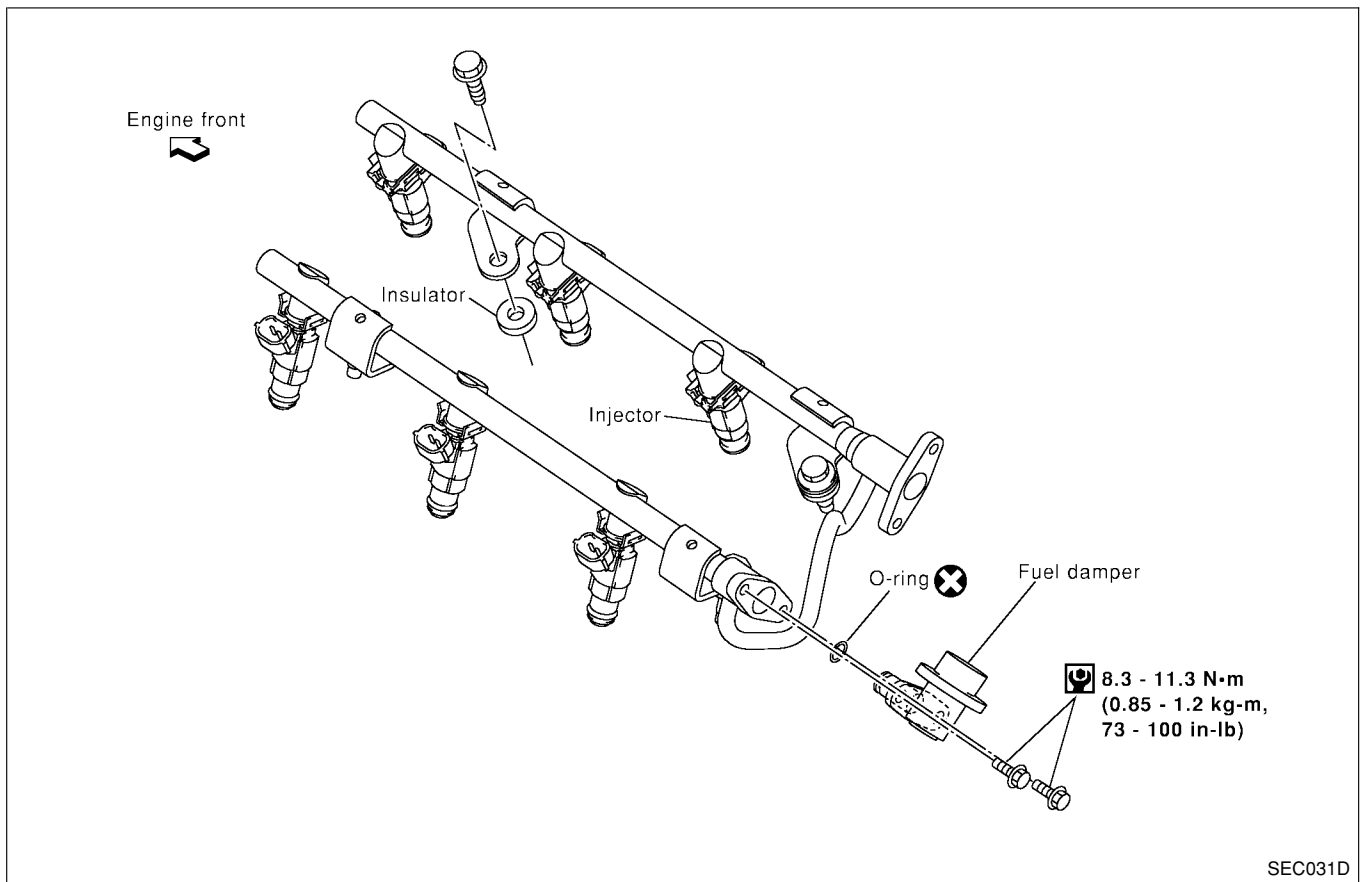
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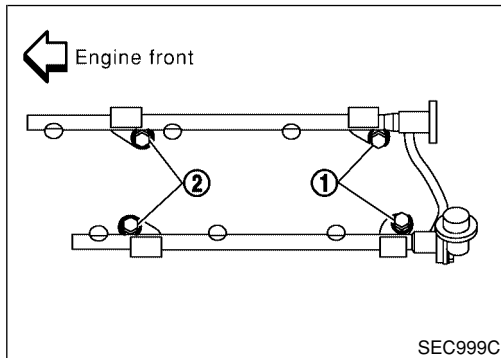
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BASIC SERVICE PROCEDURE

Injector (Cont'd)



8. Align protrusions of fuel tubes with those of fuel injectors. Insert fuel injectors straight into fuel tubes.
9. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.



10. Tighten fuel tube assembly mounting nuts in numerical sequence (indicated in the figure at left) and in two stages.

⊗ : Tightening torque N·m (kg-m, ft-lb)

1st stage:

9.3 - 10.8 (1.0 - 1.1, 6.9 - 7.9)

2nd stage:

20.6 - 26.5 (2.1 - 2.7, 16 - 19)

11. Install all parts removed in reverse order of removal.

CAUTION:

After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.

How to Check Idle Speed and Ignition Timing

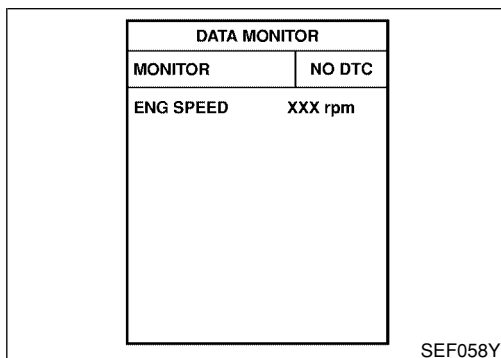
NFEC1422

IDLE SPEED

NFEC1422S01

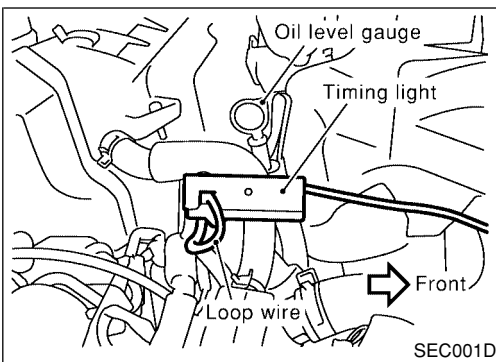
Using CONSULT-II

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



BASIC SERVICE PROCEDURE

How to Check Idle Speed and Ignition Timing (Cont'd)



IGNITION TIMING

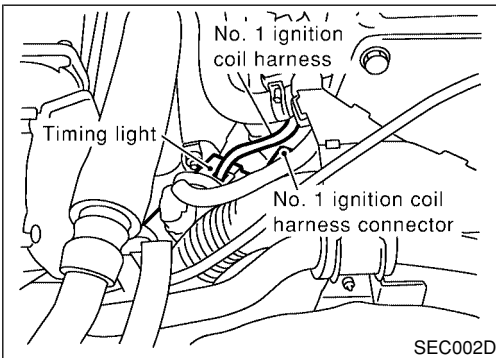
Any of following two methods may be used.

Method A

- Attach timing light to loop wire as shown.
- Check ignition timing.

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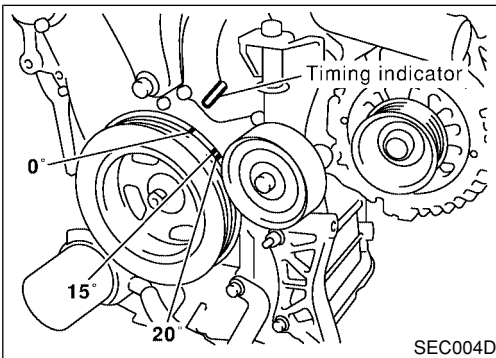
Method B

- Attach timing light to No. 1 ignition coil harness as shown.

EC

- Check ignition timing.

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Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

NFEC0028

NFEC0028S01

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PREPARATION

- 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
- On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
- 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.
- When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
- Turn off headlamps, heater blower, rear defogger.

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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

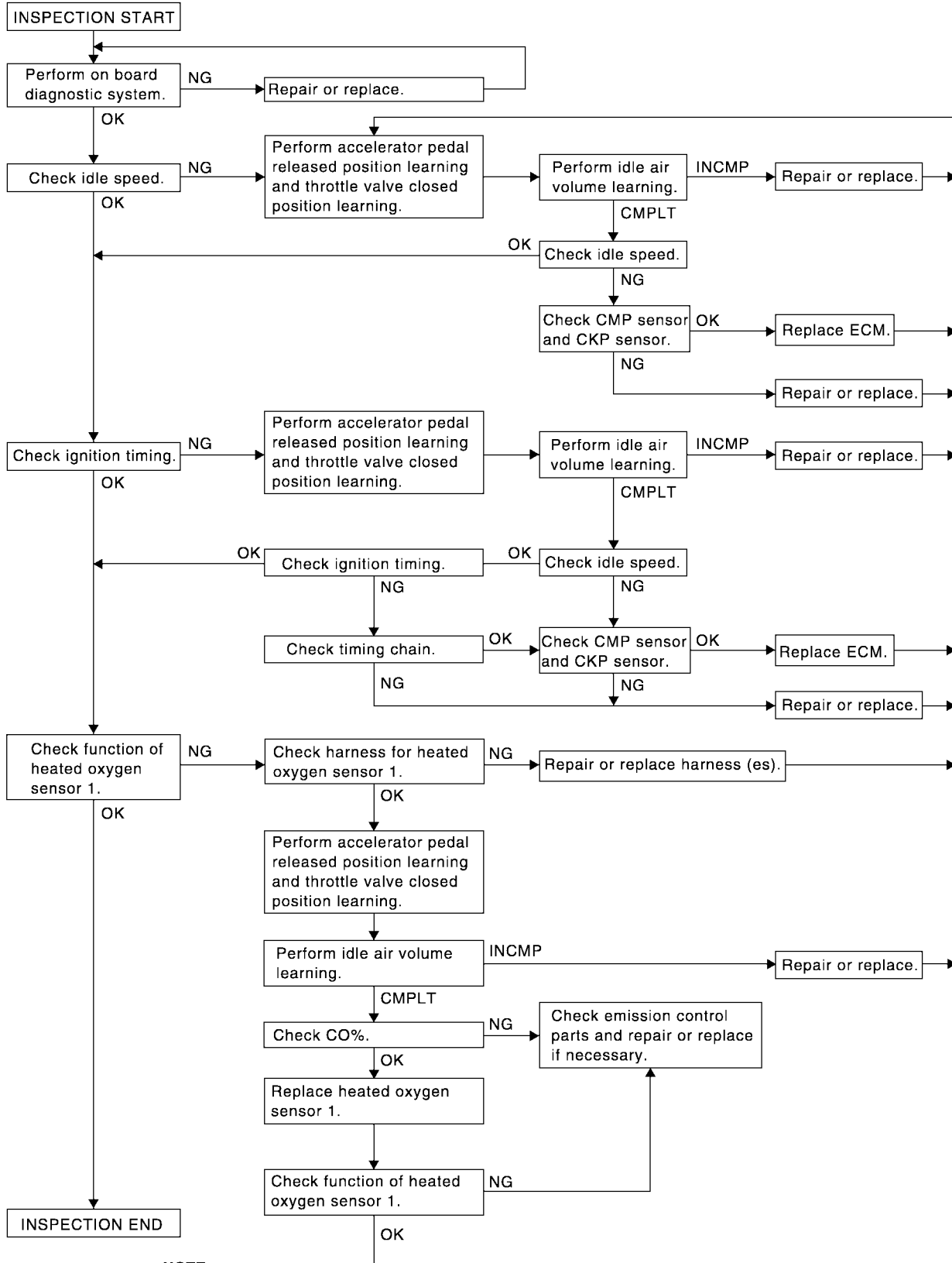
- 6) Keep front wheels pointed straight ahead.
- 7) Make the check after the cooling fan has stopped.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

Overall Inspection Sequence

NFEC0028S0101



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.

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BASIC SERVICE PROCEDURE

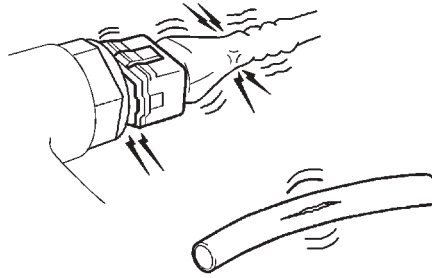
Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

INSPECTION PROCEDURE

=NFEC0028S02

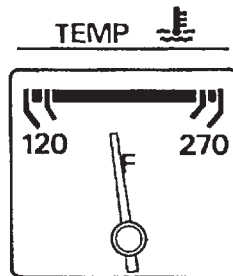
1 INSPECTION START

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



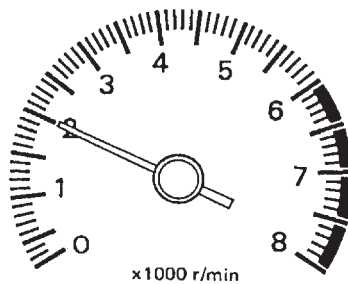
SEF983U

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.



SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no-load.



SEF977U

6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

OK	GO TO 3.
NG	GO TO 2.


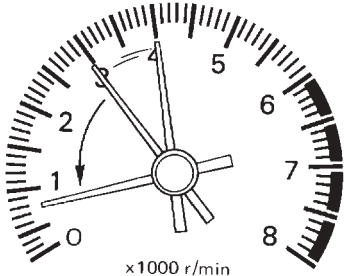

2 REPAIR OR REPLACE

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

GO TO 3.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

3	CHECK TARGET IDLE SPEED						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Run engine at about 2,000 rpm for about 2 minutes under no-load. 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. 							
 <p style="text-align: center;">x1000 r/min</p>							
<p>3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.</p>							
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> </tbody> </table>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR							
MONITOR	NO DTC						
ENG SPEED	XXX rpm						
SEF978U							
<p>M/T: 625±50 rpm A/T: 675±50 rpm (in "P" or "N" position)</p>							
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Run engine at about 2,000 rpm for about 2 minutes under no-load. 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. Check idle speed. <p>M/T: 625±50 rpm A/T: 675±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 9.						
NG	GO TO 4.						

4	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING
<ol style="list-style-type: none"> Stop engine. Perform "Accelerator Pedal Released Position Learning", EC-71. 	
	GO TO 5.

5	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
	GO TO 6.

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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

6	PERFORM IDLE AIR VOLUME LEARNING
Perform "Idle Air Volume Learning", EC-71. Is Idle Air Volume Learning carried out successfully?	
Yes or No	
Yes	GO TO 7.
No	1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 4.

7	CHECK TARGET IDLE SPEED AGAIN
<input type="checkbox"/> 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. M/T: 625±50 rpm A/T: 675±50 rpm (in "P" or "N" position)	
<input checked="" type="checkbox"/> Without CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Check idle speed. M/T: 625±50 rpm A/T: 675±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 "DTC P0340, P0345 CMP SENSOR (PHASE)", EC-335. Check crankshaft position sensor (POS) and circuit. Refer to "DTC P0335 CKP SENSOR (POS)", EC-328.	
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 the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.	
	GO TO 4.

10	CHECK IGNITION TIMING
1. Run engine at idle. 2. Check ignition timing with a timing light. M/T: 15°±5° BTDC A/T: 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.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

11	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING
1. Stop engine. 2. Perform "Accelerator Pedal Released Position Learning", EC-71.	
	GO TO 12.

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12	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
	GO TO 13.

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13	PERFORM IDLE AIR VOLUME LEARNING
Perform "Idle Air Volume Learning", EC-71.	
Is Idle Air Volume Learning carried out successfully?	
Yes or No	
Yes	GO TO 14.
No	1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 4.

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14	CHECK TARGET IDLE SPEED AGAIN
<input type="checkbox"/> 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. M/T: 625±50 rpm A/T: 675±50 rpm (in "P" or "N" position)	
<input checked="" type="checkbox"/> Without CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Check idle speed. M/T: 625±50 rpm A/T: 675±50 rpm (in "P" or "N" position)	
OK or NG	
OK	GO TO 15.
NG	GO TO 17.

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15	CHECK IGNITION TIMING AGAIN
1. Run engine at idle. 2. Check ignition timing with a timing light. M/T: 15°±5° BTDC A/T: 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.

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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

16	CHECK TIMING CHAIN INSTALLATION
Check timing chain installation. Refer to EM-21, "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 "DTC P0340, P0345 CMP SENSOR (PHASE)", EC-335. Check crankshaft position sensor (POS) and circuit. Refer to "DTC P0335 CKP SENSOR (POS)", EC-328.	
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 the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.	
GO TO 4.	

19	CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL										
<p> With CONSULT-II</p> <p>1. Run engine at about 2,000 rpm for about 2 minutes under no-load. 2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.</p>											
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="text-align: center;">MONITOR</th> <th style="text-align: center;">NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>RICH</td> </tr> </tbody> </table>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	RICH
DATA MONITOR											
MONITOR	NO DTC										
ENG SPEED	XXX rpm										
HO2S1 MNTR (B1)	LEAN										
HO2S1 MNTR (B2)	RICH										
PBIB0120E											
<p>1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH</p> <p style="text-align: center;">OK or NG</p>											
OK	GO TO 21.										
NG (Monitor does not fluctuate.)	GO TO 23.										
NG (Monitor fluctuates less than 5 times.)	GO TO 30.										

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

20	CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODE", EC-94. 2. Start engine and run it at about 2,000 rpm for about 2 minutes under no-load. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 22.
NG (MIL does not come on)	GO TO 23.
NG (MIL comes on less than 5 times)	GO TO 30.

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21	CHECK HEATED OXYGEN SENSOR 1 (BANK 2) SIGNAL										
<p><input type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 1. See "HO2S1 MNTR (B2)" in "DATA MONITOR" mode. 2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds. 											
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>RICH</td> </tr> </tbody> </table>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	RICH
DATA MONITOR											
MONITOR	NO DTC										
ENG SPEED	XXX rpm										
HO2S1 MNTR (B1)	LEAN										
HO2S1 MNTR (B2)	RICH										
PBIB0120E											
<p>1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH</p> <p style="text-align: center;">OK or NG</p>											
OK	INSPECTION END										
NG (Monitor does not fluctuate.)	GO TO 24.										
NG (Monitor fluctuates less than 5 times.)	GO TO 31.										

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22	CHECK HEATED OXYGEN SENSOR 1 (BANK 2) SIGNAL
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Switch the monitored sensor from bank 1 to bank 2. Refer to "How to Switch Monitored Sensor from Bank 1 to Bank 2 or Vice Versa", EC-94. 2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds. <p style="text-align: center;">OK or NG</p>	
OK	INSPECTION END
NG (MIL does not come on)	GO TO 24.
NG (MIL comes on less than 5 times)	GO TO 31.

HA
SC
EL
IDX

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

23	CHECK HEATED OXYGEN SENSOR 1 (BANK 1) HARNESS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (bank 1) harness connector. 4. Check harness continuity between ECM terminal 91 and heated oxygen sensor 1 (bank 1) terminal 1. Refer to "Wiring Diagram", EC-241 Continuity should exist. 5. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		
OK		GO TO 25.
NG		<ol style="list-style-type: none"> 1. Repair or replace harness between ECM and heated oxygen sensor 1 (bank 1). 2. GO TO 4.

24	CHECK HEATED OXYGEN SENSOR 1 (BANK 2) HARNESS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (bank 2) harness connector. 4. Check harness continuity between ECM terminal 92 and heated oxygen sensor 1 (bank 2) terminal 1. Refer to "Wiring Diagram", EC-242. Continuity should exist. 5. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		
OK		GO TO 25.
NG		<ol style="list-style-type: none"> 1. Repair or replace harness between ECM and heated oxygen sensor 1 (bank 2). 2. GO TO 4.


25	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING	
<ol style="list-style-type: none"> 1. Reconnect ECM harness connector. 2. Perform "Accelerator pedal released position learning", EC-71. 		
		GO TO 26.

26	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	
Perform "Throttle Valve Closed Position Learning", EC-71.		
		GO TO 27.


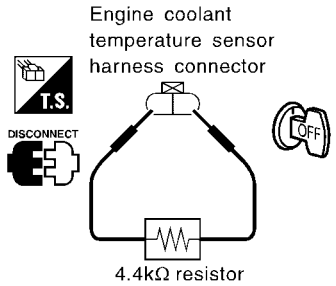
27	PERFORM IDLE AIR VOLUME LEARNING	
Perform "Idle Air Volume Learning", EC-71.		
Is Idle Air Volume Learning carried out successfully?		
Yes or No		
Yes (With CONSULT-II)		GO TO 28.
Yes (Without CONSULT-II)		GO TO 29.
No		<ol style="list-style-type: none"> 1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 4.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

28	CHECK "CO" %																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up until engine coolant temperature indicator points to 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" %. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>ENG COOLANT TEMP</td><td>XXX °C</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>INJ PULSE-B1</td><td>XXX msec</td></tr> <tr><td>IGN TIMING</td><td>XXX BTDC</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		ENG COOLANT TEMP	XXX °C	MONITOR		ENG SPEED	XXX rpm	INJ PULSE-B1	XXX msec	IGN TIMING	XXX BTDC								
ACTIVE TEST																					
ENG COOLANT TEMP	XXX °C																				
MONITOR																					
ENG SPEED	XXX rpm																				
INJ PULSE-B1	XXX msec																				
IGN TIMING	XXX BTDC																				
<p>Idle CO: 0.7 - 9.9 % and engine runs smoothly.</p> <p>OK or NG</p>																					
OK	GO TO 31.																				
NG	GO TO 30.																				

SEF172Y

29	CHECK "CO" %
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 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" %. <p>Idle CO: 0.7 - 9.9 % and engine runs smoothly.</p> <ol style="list-style-type: none"> 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. 	
 <p style="text-align: center;">Engine coolant temperature sensor harness connector</p> <p style="text-align: center;">4.4kΩ resistor</p>	
<p>OK or NG</p>	
OK	GO TO 31.
NG	GO TO 30.

SEF982UA


30	RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect heated oxygen sensor 1 harness connector. 	
	GO TO 34.


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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

31	REPLACE HEATED OXYGEN SENSOR 1
<ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 on the malfunctioning bank. 	
With CONSULT-II	GO TO 32.
Without CONSULT-II	GO TO 33.

32	CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2) SIGNAL
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. 2. See "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds. 1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	GO TO 34.

33	CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2) SIGNAL
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to "How to Switch Diagnostic Test Mode", EC-94. 2. Switch the monitored sensor to the malfunctioning bank. Refer to "How to Switch Monitored Sensor from Bank 1 to Bank 2 or Vice Versa", EC-94. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	GO TO 34.

34	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to EC-193. Check injector and its circuit, and repair or replace if necessary. Refer to EC-716. Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to EC-205. Check fuel pressure and repair or replace if necessary. Refer to EC-56. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 36.
NG	<ol style="list-style-type: none"> 1. Repair or replace. 2. GO TO 35.

35	ERASE UNNECESSARY DTC
<p>After this inspection, unnecessary DTC might be displayed. Erase the stored memory in ECM and TCM. Refer to "How to Erase Emission-related Diagnostic Information", EC-76 and AT-38.</p>	
	GO TO 4.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

36	CHECK ECM FUNCTION
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is the rarely the case.)	
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS", EC-92.	
	GO TO 4.

GI

MA

EM

Accelerator Pedal Released Position Learning

NFEC1186

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.

NFEC1186S01

LC

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.

NFEC1186S02

EC

FE

CL

Throttle Valve Closed Position Learning

NFEC1187

DESCRIPTION

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

NFEC1187S01

MT

AT

OPERATION PROCEDURE

1. Turn ignition switch "ON".
2. Turn ignition switch "OFF" wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

NFEC1187S02

AX

SU

BR

Idle Air Volume Learning

NFEC1188

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:

NFEC1188S01

ST

RS

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

BT

PREPARATION

Before performing "Idle Air Volume Learning", make sure that all of the following conditions are satisfied.

NFEC1188S02

HA

Learning will be cancelled if any of the following conditions are missed for even a moment.

SC

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 99°C (158 - 210°F)
- PNP switch: ON
- Electric load switch: OFF

EL

(Air conditioner, headlamp, rear window defogger)

IDX

On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.

Steering wheel: Neutral (Straight-ahead position)

BASIC SERVICE PROCEDURE

Idle Air Volume Learning (Cont'd)

Vehicle speed: Stopped

Transmission: Warmed-up

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

For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

OPERATION PROCEDURE

With CONSULT-II

NFEC1188S03

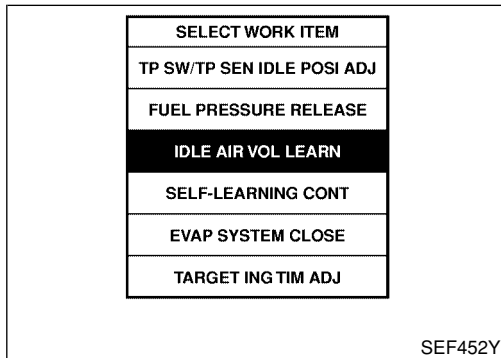
NFEC1188S0301

NOTE:

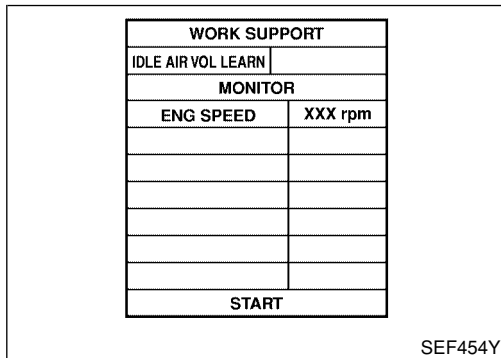
Before perform "Idle Air Volume Learning", make sure that "Accelerator Pedal Released Position Learning" and "Throttle Valve Closed Position Learning" are completed.

If not, perform "Accelerator Pedal Released Position Learning", EC-71 and "Throttle Valve Closed Position Learning", EC-71.

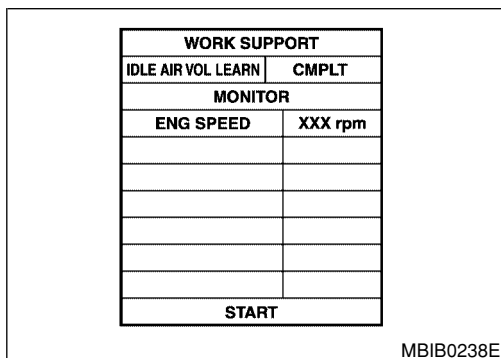
1. Start engine and warm it up to normal operating temperature.
2. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.



3. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.



4. Touch "START" and wait 20 seconds.



5. 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.
6. 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	MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)

BASIC SERVICE PROCEDURE

Idle Air Volume Learning (Cont'd)

Ignition timing	MT: 15±5° BTDC AT: 15±5° BTDC (in "P" or "N" position)
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⊗ Without CONSULT-II

NFEC1188S0302

NOTE:

It is better to count the time accurately with a clock.

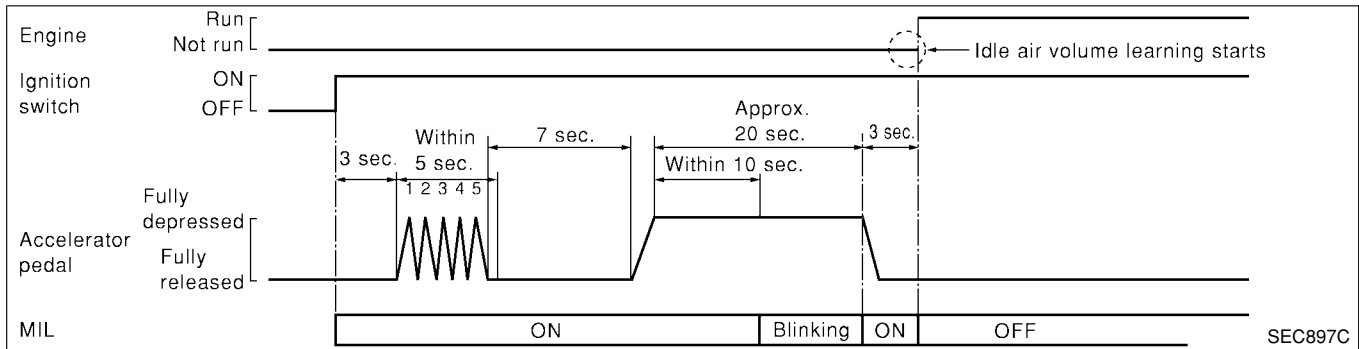
It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.

NOTE:

Before perform "Idle Air Volume Learning", make sure that "Accelerator Pedal Released Position Learning" and "Throttle Valve Closed Position Learning" are completed.

If not, perform "Accelerator Pedal Released Position Learning", EC-71 and "Throttle Valve Closed Position Learning", EC-71.

1. Start engine and warm it up to normal operating temperature.
2. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
5. Repeat the following procedure quickly five times within 5 seconds.
 - 1) Fully depress the accelerator pedal.
 - 2) Fully release the accelerator pedal.
6. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL goes off.
7. Fully release the accelerator pedal within 3 seconds after the MIL goes off.
8. Start engine and let it idle.
9. Wait 20 seconds.



10. 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	MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)
Ignition timing	MT: 15±5° BTDC AT: 15±5° BTDC (in "P" or "N" position)

11. If idle speed and ignition timing are not within the specification, the result will be incomplete. In this case, find the cause of the incident by referring to the "Diagnostic Procedure" below.

BASIC SERVICE PROCEDURE

Idle Air Volume Learning (Cont'd)

DIAGNOSTIC PROCEDURE

NFEC1188S04

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-150, "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.

Introduction

NFEC1423

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.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	X	X	X	X	X	—
GST	X	X*1	X	—	X	X
ECM	X	X*2	—	—	—	—

*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

*2: 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-127.)

Two Trip Detection Logic

NFEC1424

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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Two Trip Detection Logic (Cont'd)

X: Applicable —: Not Exit

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 - P0306 is being detected	X	—	—	—	—	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected	—	—	X	—	—	X	—	—
Throttle control motor — DTC: P1128	—	X	—	—	X	—	—	—
Closed loop control — DTC: P1148, P1168	—	X	—	—	X	—	—	—
Fail-safe items (Refer to EC-127.)	—	X	—	—	X*1	—	X*1	—
Except above	—	—	—	X	—	X	X	—

*1: Except "ECM"

Emission-related Diagnostic Information

NFEC0031

DTC AND 1ST TRIP DTC

NFEC0031S01

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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-86. 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-119. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

NFEC0031S0101

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: P0117, P0340, P1065, 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: 0117, 0340, 1065, etc.

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II does 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		1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS			DTC RESULTS	
	TIME			TIME	
	MAF SEN/CIRCUIT [P0101]	0		MAF SEN/CIRCUIT [P0101]	1t

SEC745C

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 and absolute pressure 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-105.

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 - P0306 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 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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.

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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

SRT Item

=NFE0031S0310

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

SRT item (CONSULT-II indication)	Performance Priority*	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420, P0430
EVAP SYSTEM	1	EVAP control system	P0442, P1442
	2	EVAP control system	P0456, P1456
	2	EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0132, P0152
		Heated oxygen sensor 1	P0133, P0153
		Heated oxygen sensor 1	P0134, P0154
		Heated oxygen sensor 1	P1143, P1163
		Heated oxygen sensor 1	P1144, P1164
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
		Heated oxygen sensor 2	P1146, P1166
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032, P0051, P0052
		Heated oxygen sensor 2 heater	P0037, P0038, P0057, P0058

*: 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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

SRT Set Timing

=NFEC0031S0311

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.

Self-diagnosis result		Example							
		Diagnosis	Ignition cycle						
			+ ON ,	OFF	+ 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 of 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".

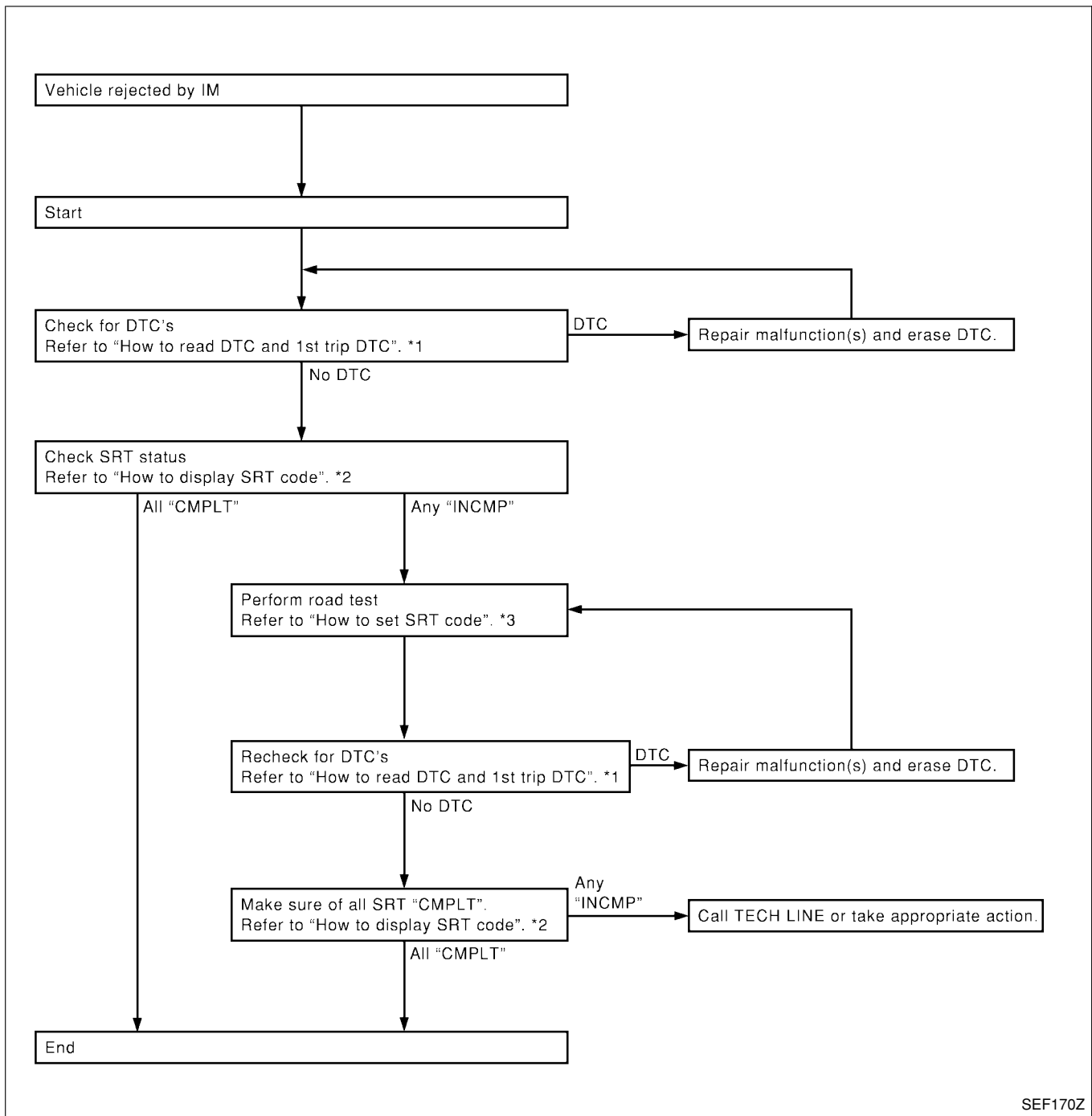
SRT Service Procedure

=NFEC0031S0312

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 SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)



*1 EC-76

*2 EC-81

*3 EC-82

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.

With GST

Selecting Mode 1 with GST (Generic Scan Tool)

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

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

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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

SEF949Z

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. NFEC0031S0302

With CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on EC-79.

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 SYSTEM DESCRIPTION

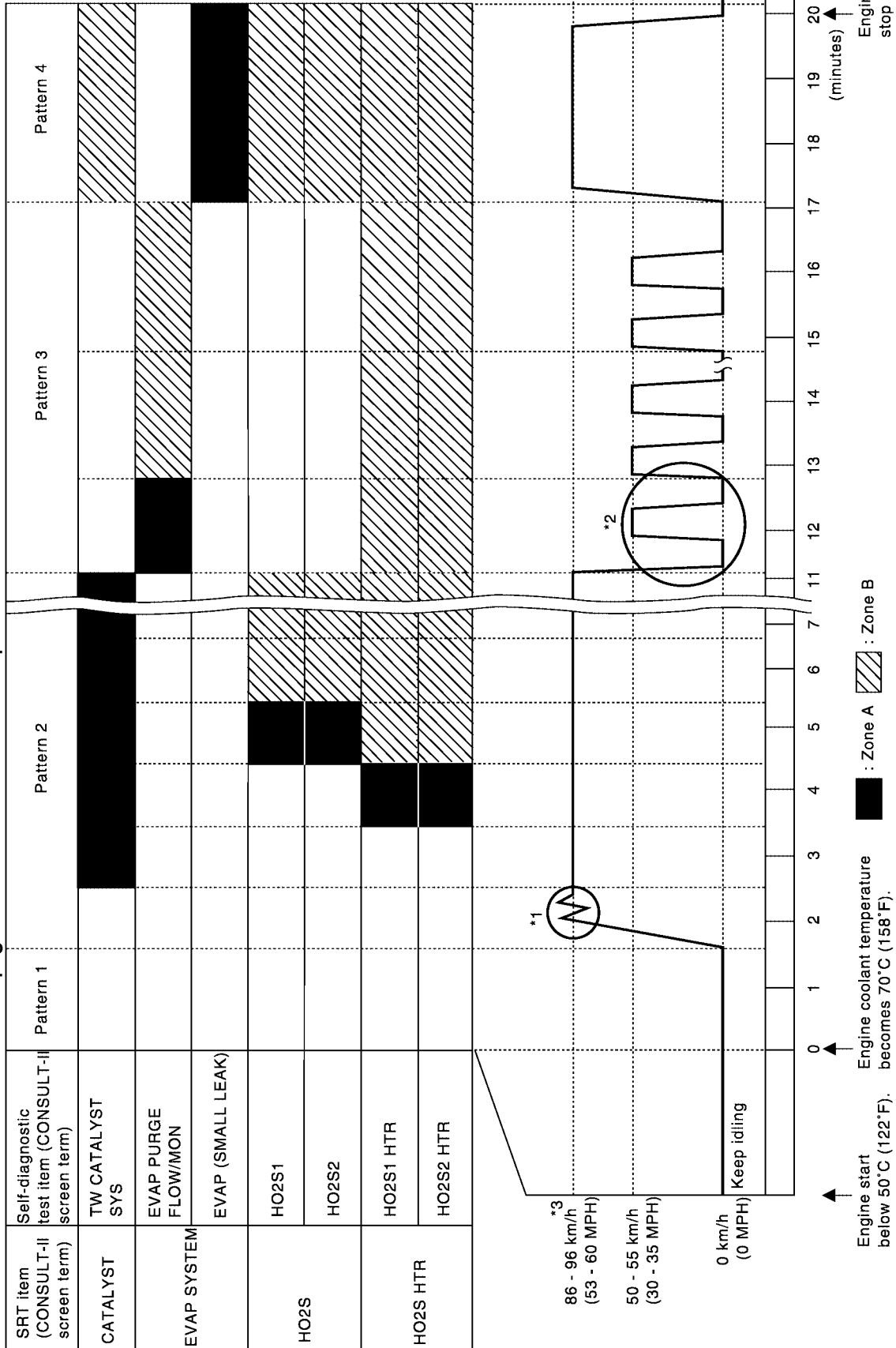
Emission-related Diagnostic Information (Cont'd)

Driving Pattern

NFEC0031S0303

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.

Driving pattern



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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 93 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 93 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 75 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:

The driving pattern outlined in *2 must be repeated at least 3 times.

Pattern 4:

Tests are performed after the engine has been operated for at least 17 minutes.

The accelerator pedal must be held very steady during steady-state driving.

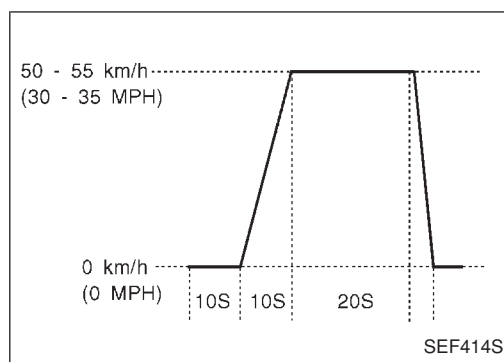
If the accelerator pedal is moved, the test must be conducted all over again.

*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: Operate the vehicle in the following driving pattern.

- 1) Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
- 2) Repeat driving pattern shown below at least 10 times.

During acceleration, hold the accelerator pedal as steady as possible.



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

Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Gear change	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:		For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)	km/h (MPH)
1st to 2nd	21 (13)	21 (13)	24 (15)
2nd to 3rd	37 (23)	26 (16)	40 (25)
3rd to 4th	53 (33)	44 (27)	64 (40)
4th to 5th	63 (39)	58 (36)	72 (45)
6th	80 (50)	80 (50)	80 (50)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate. Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	65 (40)
2nd	105 (65)
3rd	—
4th	—
5th	—
6th	—

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

NFEC0031S04

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.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (30 test items).

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.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function (Bank 1)	01H	01H	Max.	X
	Three way catalyst function (Bank 2)	03H	02H	Max.	X
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	X
	EVAP control system purge flow monitoring	06H	83H	Min.	X

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
HO2S	Heated oxygen sensor 1 (bank 1)	09H	04H	Max.	X
		0AH	84H	Min.	X
		0BH	04H	Max.	X
		0CH	04H	Max.	X
		0DH	04H	Max.	X
	Heated oxygen sensor 1 (bank 2)	11H	05H	Max.	X
		12H	85H	Min.	X
		13H	05H	Max.	X
		14H	05H	Max.	X
		15H	05H	Max.	X
	Heated oxygen sensor 2 (bank 1)	19H	86H	Min.	X
		1AH	86H	Min.	X
		1BH	06H	Max.	X
		1CH	06H	Max.	X
	Heated oxygen sensor 2 (bank 2)	21H	87H	Min.	X
		22H	87H	Min.	X
23H		07H	Max.	X	
24H		07H	Max.	X	
HO2S HTR	Heated oxygen sensor 1 heater (bank 1)	29H	08H	Max.	X
		2AH	88H	Min.	X
	Heated oxygen sensor 1 heater (bank 2)	2BH	09H	Max.	X
		2CH	89H	Min.	X
	Heated oxygen sensor 2 heater (bank 1)	2DH	0AH	Max.	X
		2EH	8AH	Min.	X
	Heated oxygen sensor 2 heater (bank 2)	2FH	0BH	Max.	X
		30H	8BH	Min.	X

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

X: Applicable —: Not applicable NFEC0031S05

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
CAN COMM CIRCUIT	U1000	1000*6	—	—	—	EC-162
CAN COMM CIRCUIT	U1001	1001*6	—	—	X	EC-162
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	—	—
INT/V TIM CONT-B1	P0011	0011	—	—	X	EC-165
INT/V TIM CONT-B2	P0021	0021	—	—	X	EC-165

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page	
	CONSULT-II GST*2	ECM*3					
HO2S1 HTR (B1)	P0031	0031	X	X	X*5	EC-173	GI
HO2S1 HTR (B1)	P0032	0032	X	X	X*5	EC-173	MA
HO2S2 HTR (B1)	P0037	0037	X	X	X*5	EC-179	EM
HO2S2 HTR (B1)	P0038	0038	X	X	X*5	EC-179	
HO2S1 HTR (B2)	P0051	0051	X	X	X*5	EC-173	LC
HO2S1 HTR (B2)	P0052	0052	X	X	X*5	EC-173	
HO2S2 HTR (B2)	P0057	0057	X	X	X*5	EC-179	EC
HO2S2 HTR (B2)	P0058	0058	X	X	X*5	EC-179	
MAF SEN/CIRCUIT	P0101	0101	—	—	—	EC-186	FE
MAF SEN/CIRCUIT*8	P0102	0102	—	—	—	EC-193	
MAF SEN/CIRCUIT*8	P0103	0103	—	—	—	EC-193	CL
ABSL PRES SEN/CIRC	P0107	0107	—	—	X	EC-199	
ABSL PRES SEN/CIRC	P0108	0108	—	—	X	EC-199	MT
IAT SEN/CIRCUIT	P0112	0112	—	—	X	EC-201	AT
IAT SEN/CIRCUIT	P0113	0113	—	—	X	EC-201	
ECT SEN/CIRC*8	P0117	0117	—	—	—	EC-205	AX
ECT SEN/CIRC*8	P0118	0118	—	—	—	EC-205	
APP SEN/CIRCUIT*8	P0121	0121	—	—	—	EC-210	SU
TP SEN/CIRCUIT*8	P0122	0122	—	—	—	EC-210	
TP SEN/CIRCUIT*8	P0123	0123	—	—	—	EC-210	BR
ECT SENSOR	P0125	0125	—	—	X	EC-211	
IAT SENSOR	P0127	0127	—	—	X	EC-214	ST
THERMSTAT FNCTN	P0128	0128	—	—	X	EC-216	
HO2S1 (B1)	P0132	0132	X	X	X*5	EC-218	RS
HO2S1 (B1)	P0133	0133	X	X	X*5	EC-226	
HO2S1 (B1)	P0134	0134	X	X	X*5	EC-238	BT
HO2S2 (B1)	P0138	0138	X	X	X*5	EC-247	
HO2S2 (B1)	P0139	0139	X	X	X*5	EC-255	HA
HO2S1 (B2)	P0152	0152	X	X	X*5	EC-218	
HO2S1 (B2)	P0153	0153	X	X	X*5	EC-226	SC
HO2S1 (B2)	P0154	0154	X	X	X*5	EC-238	
HO2S2 (B2)	P0158	0158	X	X	X*5	EC-247	EL
HO2S2 (B2)	P0159	0159	X	X	X*5	EC-255	
FUEL SYS-LEAN-B1	P0171	0171	—	—	X	EC-265	IDX
FUEL SYS-RICH-B1	P0172	0172	—	—	X	EC-273	
FUEL SYS-LEAN-B2	P0174	0174	—	—	X	EC-265	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
FUEL SYS-RICH-B2	P0175	0175	—	—	X	EC-273
FTT SENSOR	P0181	0181	—	—	X	EC-280
FTT SEN/CIRCUIT	P0182	0182	—	—	X	EC-283
FTT SEN/CIRCUIT	P0183	0183	—	—	X	EC-283
TP SENSOR*8	P0221	0221	—	—	—	EC-288
TP SEN 1/CIRC*8	P0222	0222	—	—	—	EC-295
TP SEN 1/CIRC*8	P0223	0223	—	—	—	EC-295
APP SENSOR*8	P0226	0226	—	—	—	EC-302
APP SEN 1/CIRC*8	P0227	0227	—	—	—	EC-309
APP SEN 1/CIRC*8	P0228	0228	—	—	—	EC-309
MULTI CYL MISFIRE	P0300	0300	—	—	X	EC-315
CYL 1 MISFIRE	P0301	0301	—	—	X	EC-315
CYL 2 MISFIRE	P0302	0302	—	—	X	EC-315
CYL 3 MISFIRE	P0303	0303	—	—	X	EC-315
CYL 4 MISFIRE	P0304	0304	—	—	X	EC-315
CYL 5 MISFIRE	P0305	0305	—	—	X	EC-315
CYL 6 MISFIRE	P0306	0306	—	—	X	EC-315
KNOCK SEN/CIRC-B1	P0327	0327	—	—	X	EC-323
KNOCK SEN/CIRC-B1	P0328	0328	—	—	X	EC-323
CKP SEN/CIRCUIT	P0335	0335	—	—	X	EC-328
CMP SEN/CIRCUIT	P0340	0340	—	—	X	EC-335
CMP SEN/CIRC-B2	P0345	0345	—	—	X	EC-335
TW CATALYST SYS-B1	P0420	0420	X	X	X*5	EC-344
TW CATALYST SYS-B2	P0430	0430	X	X	X*5	EC-344
EVAP PURG FLOW/MON	P0441	0441	X	X	X*5	EC-349
EVAP SMALL LEAK	P0442	0442	X	X	X*5	EC-359
PURG VOLUME CONT/V	P0444	0444	—	—	X	EC-374
PURG VOLUME CONT/V	P0445	0445	—	—	X	EC-374
VENT CONTROL VALVE	P0447	0447	—	—	X	EC-381
EVAP SYS PRES SEN	P0452	0452	—	—	X	EC-388
EVAP SYS PRES SEN	P0453	0453	—	—	X	EC-394
EVAP GROSS LEAK	P0455	0455	—	X	X*5	EC-403
EVAP VERY SML LEAK	P0456	0456	X*4	X	X*5	EC-415
FUEL LEV SEN SLOSH	P0460	0460	—	—	X	EC-430
FUEL LEVEL SENSOR	P0461	0461	—	—	X	EC-434
FUEL LEVL SEN/CIRC	P0462	0462	—	—	X	EC-436

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page	
	CONSULT-II GST*2	ECM*3					
FUEL LEVL SEN/CIRC	P0463	0463	—	—	X	EC-436	GI
VEH SPEED SEN/CIRC*7	P0500	0500	—	—	X	EC-440	MA
ISC SYSTEM	P0506	0506	—	—	X	EC-444	EM
ISC SYSTEM	P0507	0507	—	—	X	EC-446	
PW ST P SEN/CIRC	P0550	0550	—	—	X	EC-448	LC
ECM	P0605	0605	—	—	X	EC-453	
MIL/CIRC	P0650	0650	—	—	X	EC-455	EC
PNP SW/CIRC	P0705	0705	—	—	X	AT-104	
ATF TEMP SEN/CIRC	P0710	0710	—	—	X	AT-110	FE
VEH SPD SEN/CIR AT*7	P0720	0720	—	—	X	AT-116	
ENGINE SPEED SIG	P0725	0725	—	—	X	AT-121	CL
A/T 1ST GR FNCTN	P0731	0731	—	—	X	AT-126	
A/T 2ND GR FNCTN	P0732	0732	—	—	X	AT-132	MT
A/T 3RD GR FNCTN	P0733	0733	—	—	X	AT-138	
A/T 4TH GR FNCTN	P0734	0734	—	—	X	AT-144	AT
TCC SOLENOID/CIRC	P0740	0740	—	—	X	AT-153	
A/T TCC S/V FNCTN	P0744	0744	—	—	X	AT-158	AX
L/PRESS SOL/CIRC	P0745	0745	—	—	X	AT-168	
SFT SOL A/CIRC*8	P0750	0750	—	—	—	AT-174	SU
SFT SOL B/CIRC*8	P0755	0755	—	—	—	AT-179	BR
ECM BACK UP/CIRCUIT	P1065	1065	—	—	X	EC-459	
MAF SENSOR*8	P1102	1102	—	—	—	EC-463	ST
ETC ACTR*8	P1121	1121	—	—	—	EC-469	
ETC FUNCTION/CIRC*8	P1122	1122	—	—	—	EC-471	RS
ETC MOT PWR	P1124	1124	—	—	—	EC-479	
ETC MOT PWR*8	P1126	1126	—	—	—	EC-479	BT
ETC MOT	P1128	1128	—	—	—	EC-485	
HO2S1 (B1)	P1143	1143	X	X	X*5	EC-490	HA
HO2S1 (B1)	P1144	1144	X	X	X*5	EC-497	
HO2S2 (B1)	P1146	1146	X	X	X*5	EC-504	SC
HO2S2 (B1)	P1147	1147	X	X	X*5	EC-514	
CLOSED LOOP-B1	P1148	1148	—	—	—	EC-524	EL
HO2S1 (B2)	P1163	1163	X	X	X*5	EC-490	
HO2S1 (B2)	P1164	1164	X	X	X*5	EC-497	IDX
HO2S2 (B2)	P1166	1166	X	X	X*5	EC-504	
HO2S2 (B2)	P1167	1167	X	X	X*5	EC-514	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
CLOSED LOOP-B2	P1168	1168	—	—	—	EC-524
TCS C/U FUNCTN	P1211	1211	—	—	X	EC-526
TCS/CIRC	P1212	1212	—	—	X	EC-528
ENG OVER TEMP	P1217	1217	—	—	—	EC-530
TP SEN 2/CIRC*8	P1223	1223	—	—	—	EC-548
TP SEN 2/CIRC*8	P1224	1224	—	—	—	EC-548
CTP LEARNING	P1225	1225	—	—	X	EC-555
CTP LEARNING	P1226	1226	—	—	X	EC-557
APP SEN 2/CIRC*8	P1227	1227	—	—	—	EC-559
APP SEN 2/CIRC*8	P1228	1228	—	—	—	EC-559
SENSOR POWER/CIRC*8	P1229	1229	—	—	—	EC-565
EVAP SMALL LEAK	P1442	1442	X	X	X*5	EC-571
PURG VOLUME CONT/V	P1444	1444	—	—	X	EC-586
VENT CONTROL VALVE	P1446	1446	—	—	X	EC-599
VENT CONTROL VALVE	P1448	1448	—	—	X	EC-607
EVAP VERY SML LEAK	P1456	1456	X*4	X	X*5	EC-616
FUEL LEVL SEN/CIRC	P1464	1464	—	—	X	EC-632
VC/V BYPASS/V	P1490	1490	—	—	X	EC-635
VC CUT/V BYPASS/V	P1491	1491	—	—	X	EC-641
ASCD SW	P1564	1564	—	—	—	EC-653
ASCD BRAKE SW	P1572	1572	—	—	—	EC-660
ASCD VHL SPD SEN	P1574	1574	—	—	—	EC-675
NATS MALFUNCTION	P1610- P1615	1610-1615	—	—	X	EL-356
TP SEN/CIRC A/T	P1705	1705	—	—	—	AT-184
P-N POS SW/CIRCUIT	P1706	1706	—	—	X	EC-680
O/R CLTCH SOL/CIRC	P1760	1760	—	—	X	AT-191
VIAS S/V CIRC	P1800	1800	—	—	X	EC-686
BRAKE SW/CIRCUIT	P1805	1805	—	—	X	EC-691

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

*2: These numbers are prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

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

*5: These are not displayed with GST.

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

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

*8: When the fail-safe operation occurs, the MIL illuminates.

NOTE:

Regarding A33 models, “-B1” indicates bank 1 and “-B2” indicates bank 2.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

NFEC0031S06

How to Erase DTC (Ⓜ With CONSULT-II)

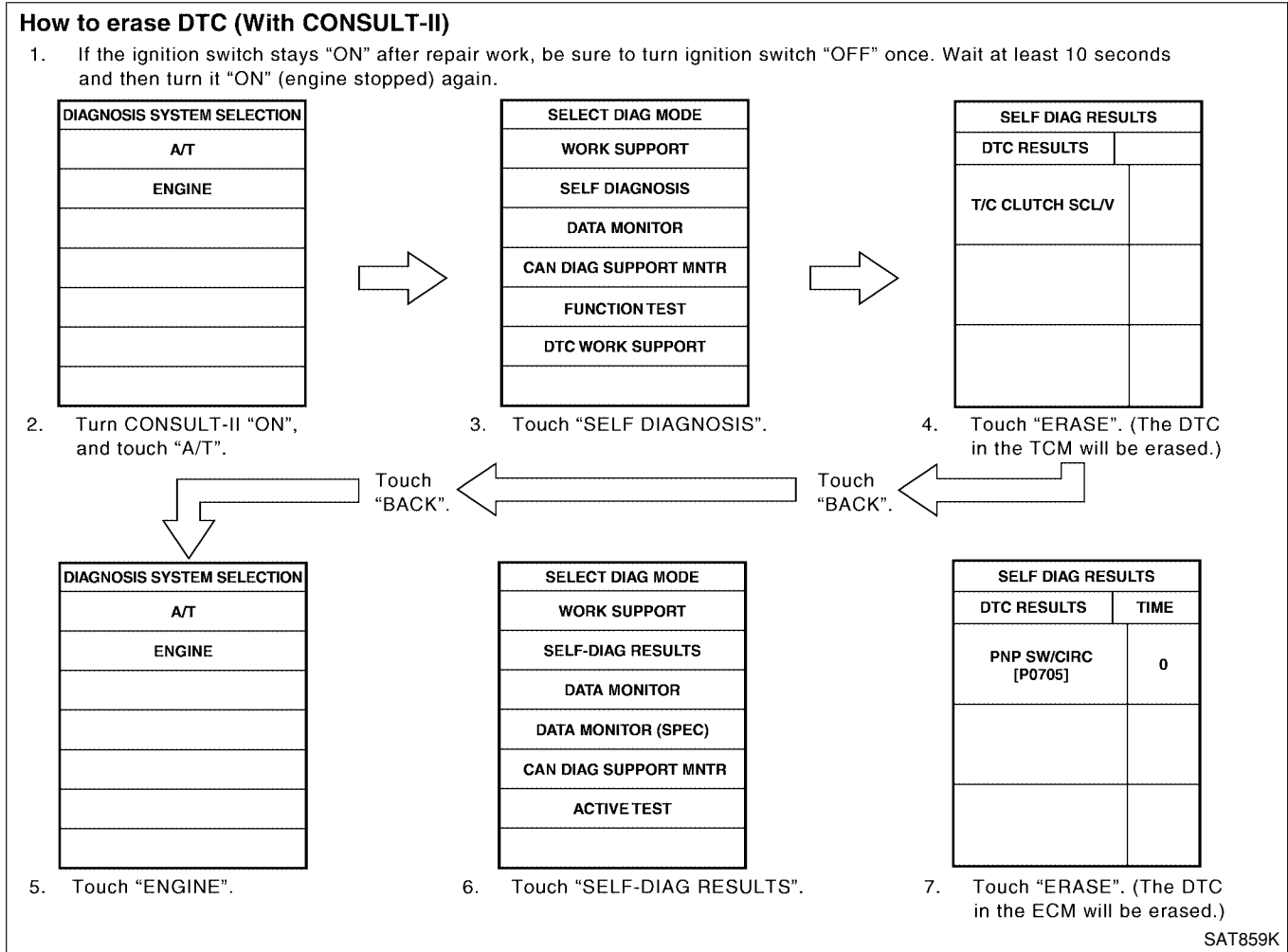
NFEC0031S0601

NOTE:

If the DTC is not for A/T related items (see EC-9), 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.)

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).



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).

How to Erase DTC (Ⓜ With GST)

NFEC0031S0602

NOTE:

If the DTC is not for A/T related items (see EC-9), 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 SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

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

If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.

The following data are cleared when the ECM memory is erased.

- 1) Diagnostic trouble codes
- 2) 1st trip diagnostic trouble codes
- 3) Freeze frame data
- 4) 1st trip freeze frame data
- 5) System readiness test (SRT) codes
- 6) Test values
- 7) 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)

NFEC0031S08

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

SEF515Y

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 "NVIS (Nissan Vehicle Immobilizer System — NATS)" EL-356.

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.

Malfunction Indicator Lamp (MIL)

NFEC1189

DESCRIPTION

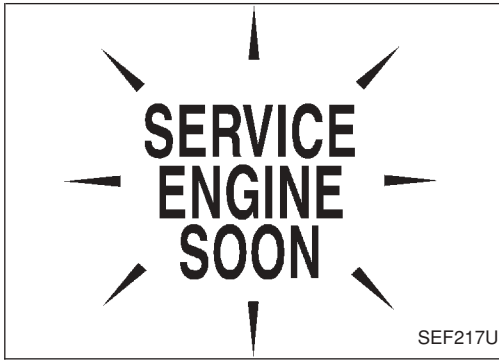
NFEC1189S01

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 "WARNING LAMPS", EL-136 or see DTC P0650 MIL (CIRCUIT), EC-455.
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 DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)









GI
MA
EM
LC

ON BOARD DIAGNOSTIC SYSTEM FUNCTION

NFEC1189S02

EC

The on board diagnostic system has the following four functions.

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. "Misfire (Possible three way catalyst damage)" "Throttle control motor" "Closed loop control" Fail-safe mode
Mode II	Ignition switch in "ON" position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running 	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

FE
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AT
AX
SU
BR
ST
RS
BT
HA

MIL Flashing without DTC

NFEC1189S0201

SC

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. How to Switch Diagnostic Test Mode.

How to switch the diagnostic test (function) modes, and details of the above functions are described later. How to Switch Diagnostic Test Mode.

EL

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

1. Diagnostic trouble codes
2. 1st trip diagnostic trouble codes
3. Freeze frame data
4. 1st trip freeze frame data
5. System readiness test (SRT) codes

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

6. Test values
7. Others

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.

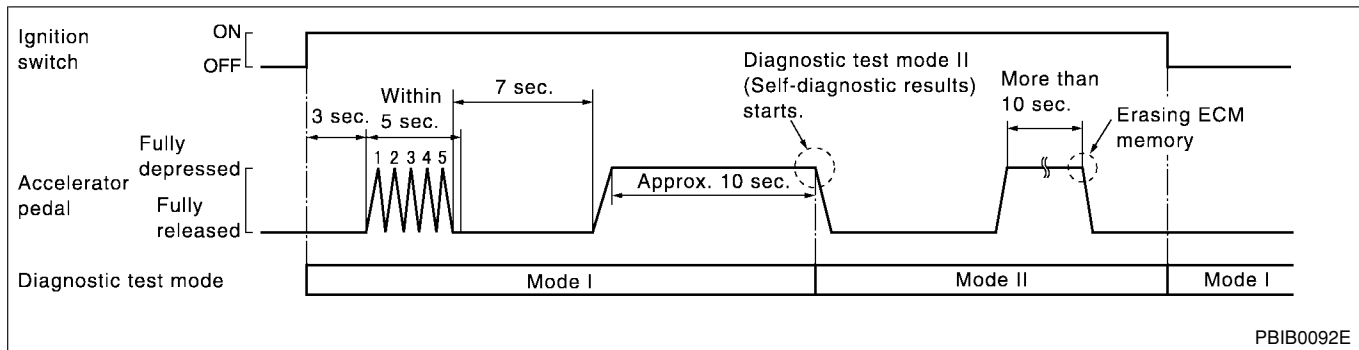
Always ECM returns to Diagnostic Test Mode I after ignition switch is turned "OFF".

NFEC1189S03

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

NFEC1189S0301

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.
 - 1) Fully depress the accelerator pedal.
 - 2) 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.
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

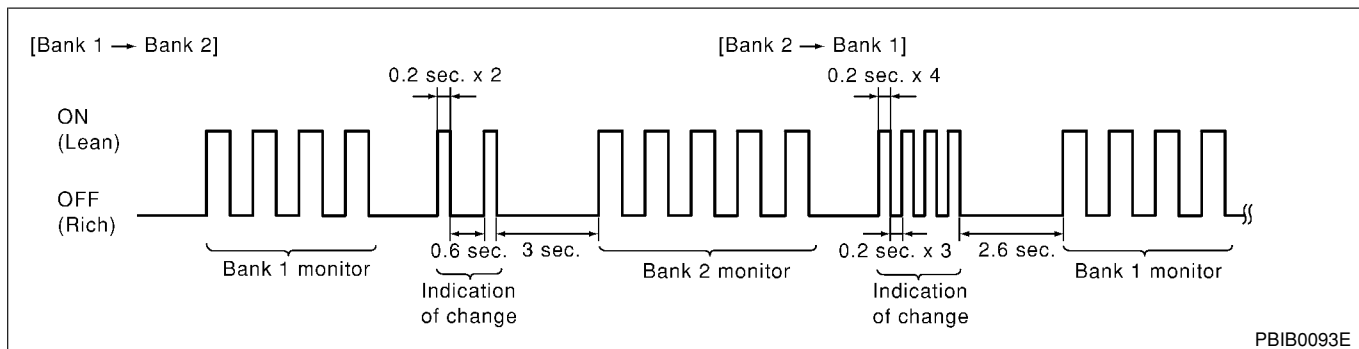
NFEC1189S0302

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to How to Set Diagnostic Test Mode II (Self-diagnostic Results).
2. Start Engine.
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).
ECM will start heated oxygen sensor 1 monitoring from the bank 1 sensor.

How to Set Diagnostic Switch Monitored Sensor from Bank 1 to Bank 2 or Vice versa

NFEC1189S0303

1. Fully depress the accelerator pedal quickly and then release it immediately.
2. Make sure that monitoring sensor has changed by MIL blinking as follows.



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

NFEC1189S0304

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to 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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

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 "WARNING LAMPS", EL-136 or see DTC P0650 MIL (CIRCUIT), EC-455.

NFEC1189S04

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

NFEC1189S05

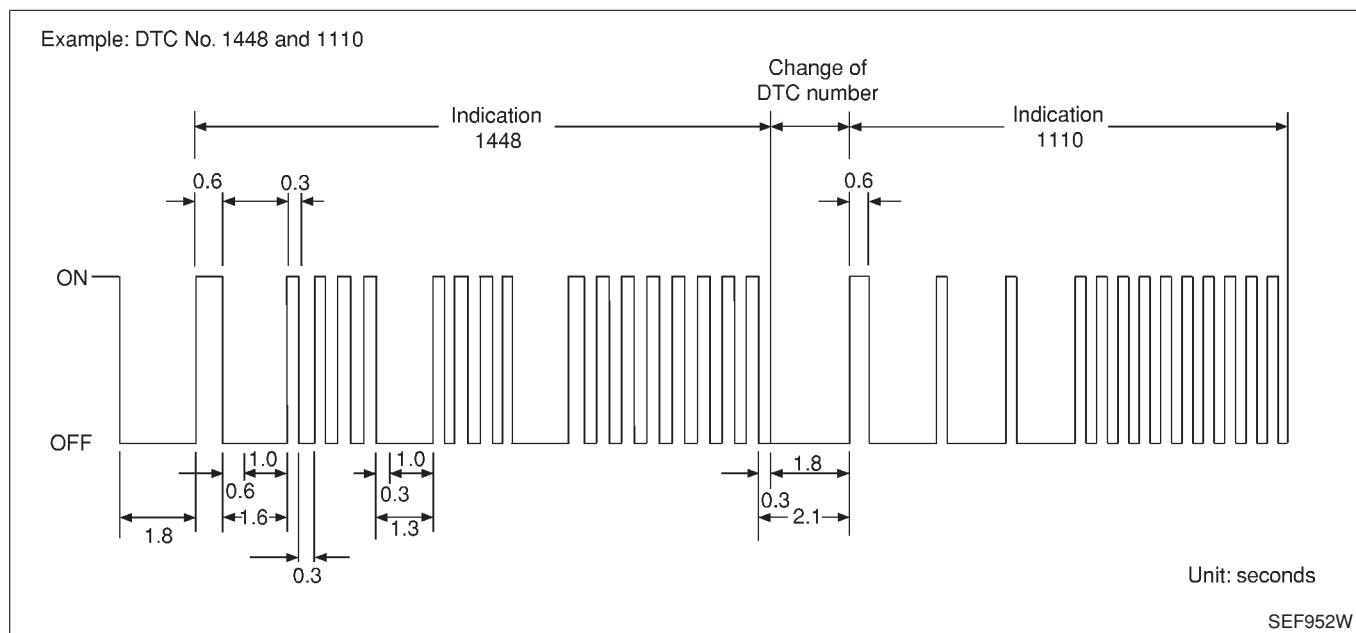
MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

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

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

NFEC1189S06

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.



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 "TROUBLE DIAGNOSIS — INDEX", EC-9.)

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

NFEC1189S0601

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to How to Switch Diagnostic Test Mode.

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

NFEC1189S07

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.

Next run engine at about 2,000 rpm for about 2 minutes under no-load conditions. Then make sure that the MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no-load.

OBD System Operation Chart

NFEC0033

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

NFEC0033S01

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 “Two Trip Detection Logic” on EC-75.

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

NFEC0033S02

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-98.

For details about patterns “A” and “B” under “Other”, see EC-100.

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

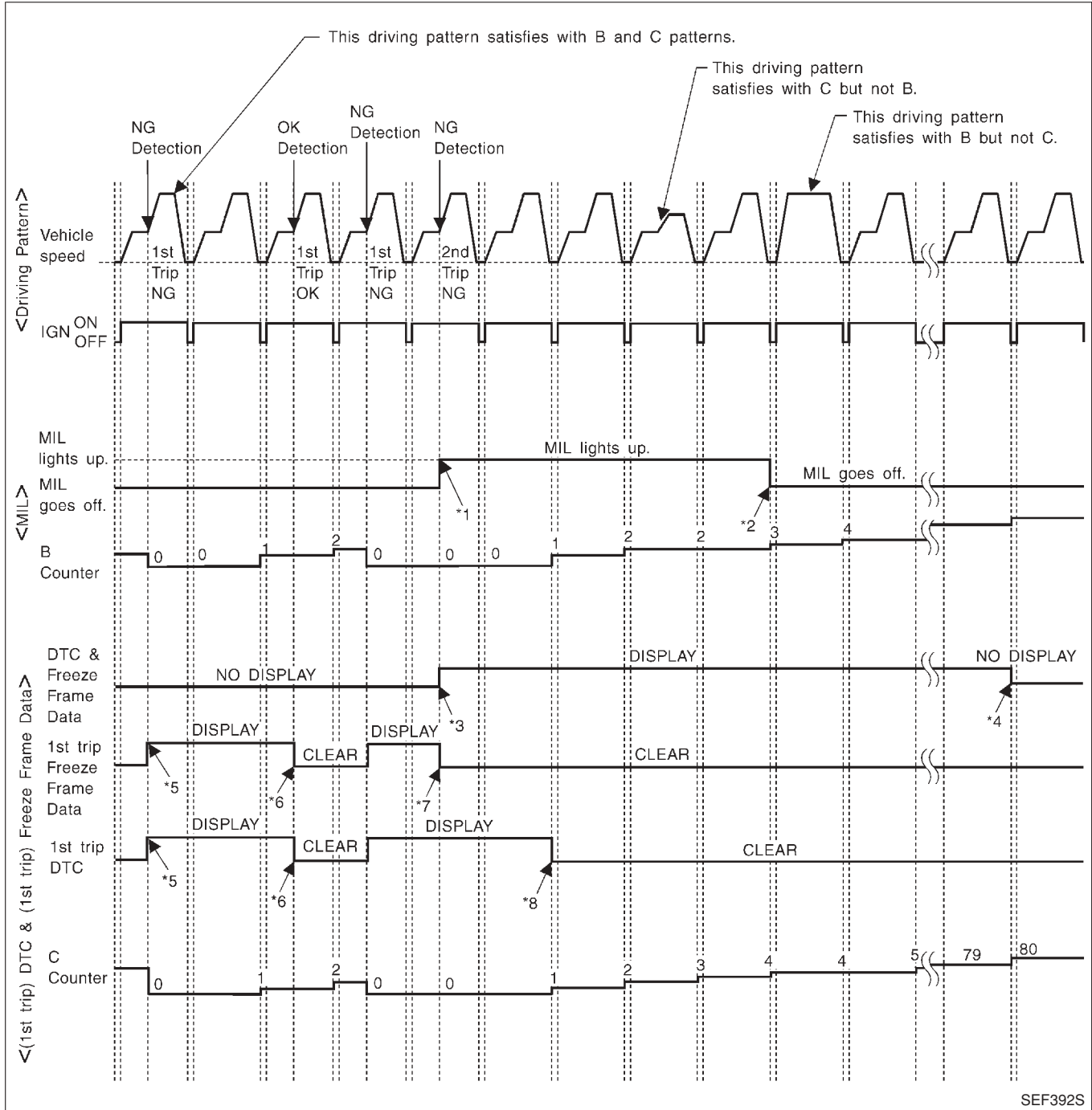
*2: Clear timing is when the same malfunction is detected in the 2nd trip.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

=NFEC0033S03



- *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 80 times (pattern C) 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: The 1st trip DTC and the 1st trip

- freeze frame data will be cleared at the moment OK is detected.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.
- *8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

NFEC0033S04

<Driving Pattern B>

NFEC0033S0401

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>

NFEC0033S0402

Driving pattern C means the vehicle operation as follows:

1) 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 (1).

The C counter will be counted up when (1) is satisfied without the same malfunction.

The DTC will not be displayed after C counter reaches 80.

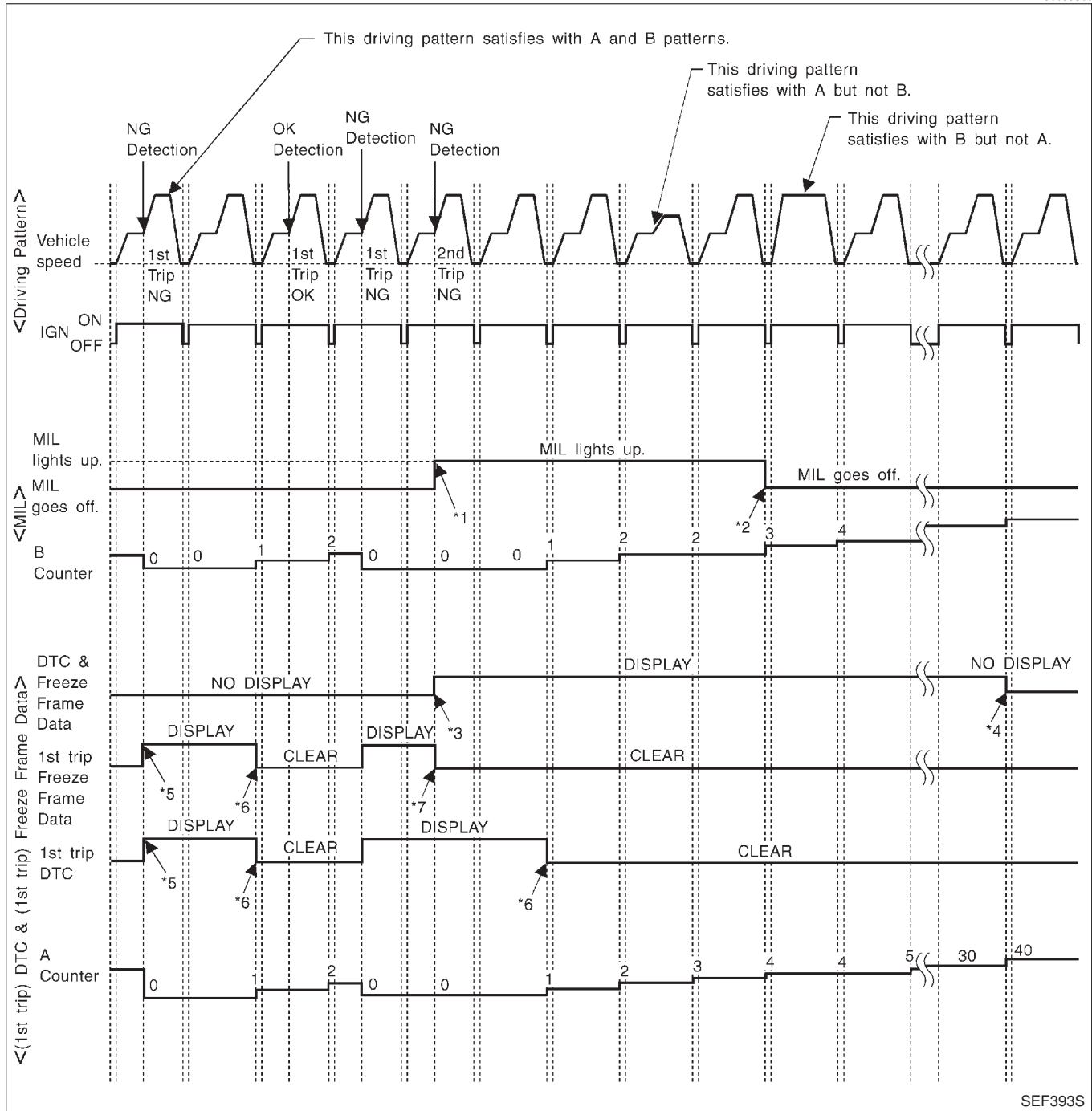
The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

NFEC0033S05



SEF393S

- *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 SYSTEM DESCRIPTION

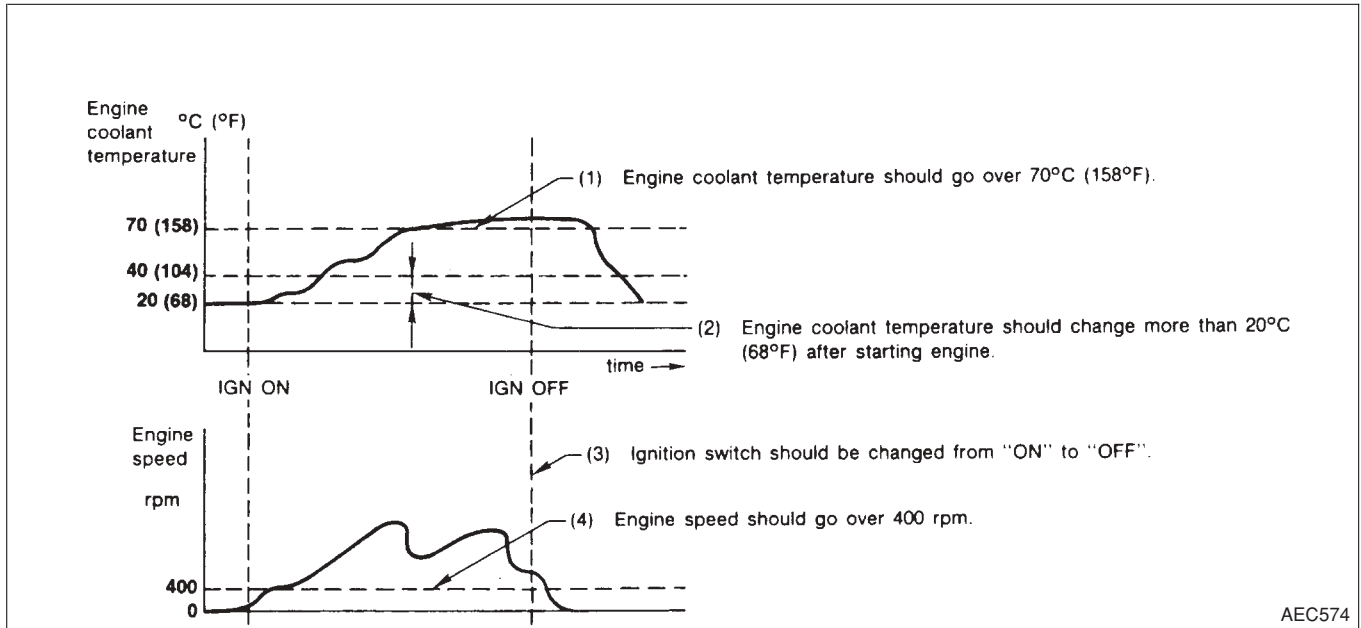
OBD System Operation Chart (Cont'd)

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

NFEC0033S06

<Driving Pattern A>

NFEC0033S0601



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>

NFEC0033S0602

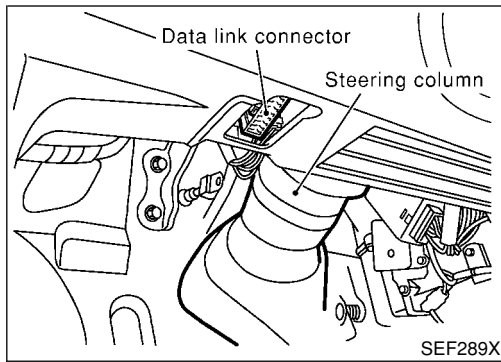
Driving pattern B means the vehicle operation as follows:

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", EC-96).



CONSULT-II

CONSULT-II INSPECTION PROCEDURE

=NFEC0034

NFEC0034S01

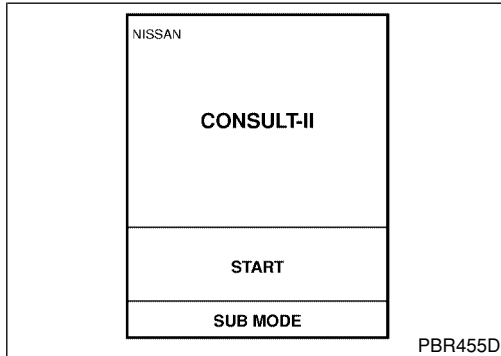
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under LH dash panel near the fuse box cover.

GI

MA

EM

LC



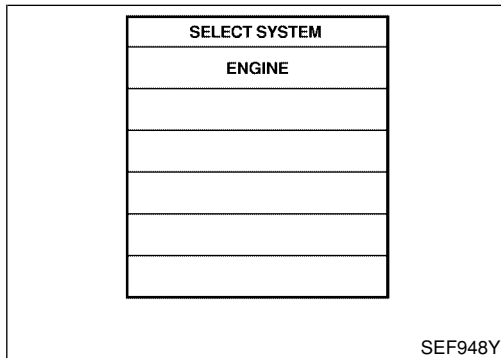
3. Turn ignition switch ON.
4. Touch "START".

EC

FE

CL

MT



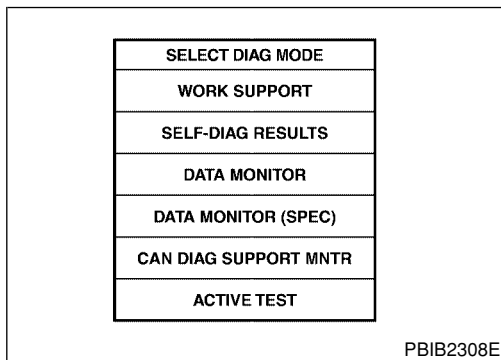
5. Touch "ENGINE".

AT

AX

SU

BR



6. Perform each diagnostic test mode according to each service procedure.

ST

For further information, see the CONSULT-II Operation Manual.

RS

BT

HA

SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NFEC0034S02

Item		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)		X	X	X	X			
	Camshaft position sensor (PHASE)		X						
	Mass air flow sensor		X		X	X			
	Engine coolant temperature sensor		X	X	X	X	X		
	Heated oxygen sensor 1		X		X	X		X	X
	Heated oxygen sensor 2		X		X	X		X	X
	Vehicle speed sensor		X	X	X	X			
	Accelerator pedal position sensor		X		X	X			
	Throttle position sensor		X		X	X			
	Fuel tank temperature sensor		X		X	X	X		
	EVAP control system pressure sensor		X		X	X			
	Absolute pressure sensor		X		X	X			
	Intake air temperature sensor		X		X	X			
	Knock sensor		X						
	Refrigerant pressure sensor				X	X			
	Ignition switch (start signal)				X	X			
	Closed throttle position switch (accelerator pedal position sensor signal)				X	X			
	Air conditioner switch				X	X			
	Park/neutral position (PNP) switch		X		X	X			
	Power steering pressure sensor		X		X	X			
	Battery voltage				X	X			
	Load signal				X	X			
	Fuel level sensor		X		X	X			
	ASCD steering switch		X		X	X			
ASCD brake switch		X		X	X				

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item		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	OUTPUT									
	Injectors				X	X	X			GI
	Power transistor (Ignition timing)				X	X	X			MA
	Throttle control motor relay		X		X	X				EM
	EVAP canister purge volume control solenoid valve		X		X	X	X		X	EC
	Air conditioner relay				X	X				FE
	Fuel pump relay	X			X	X	X			CL
	Heated oxygen sensor 1 heater		X		X	X		X		CL
	Heated oxygen sensor 2 heater		X		X	X		X		MT
	EVAP canister vent control valve	X	X		X	X	X			AT
	Vacuum cut valve bypass valve	X	X		X	X	X		X	AX
	VIAS control solenoid valve		X		X	X	X			SU
	Intake valve timing control solenoid valve		X		X	X	X			
	Electronic controlled engine mount				X	X	X			
Calculated load value			X	X	X					

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-77.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

FUNCTION	
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-DIAG 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 specification of the 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.
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".
DTC & SRT CONFIRMATION	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECM PART NUMBER	ECM part number can be read.

=NFEC0034S03

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

- 1) Diagnostic trouble codes
- 2) 1st trip diagnostic trouble codes
- 3) Freeze frame data
- 4) 1st trip freeze frame data
- 5) System readiness test (SRT) codes
- 6) Test values
- 7) Others

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

WORK SUPPORT MODE

=NFEC0034S04

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	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	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	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	OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS. IGN SW "ON" ENGINE NOT RUNNING AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM TANK FUEL 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. NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.	When detecting EVAP vapor leak point of EVAP system
TARGET IGN TIM ADJ*	IDLE CONDITION	When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light. If once the "TARGET IDLE RPM ADJ" has been done, the Idle Air Volume Learning procedure will not be completed.
TARGET IDLE RPM ADJ*	IDLE CONDITION	When setting target idle speed

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

SELF-DIAGNOSTIC MODE

NFEC0034S05

DTC and 1st Trip DTC

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-9.)

NFEC0034S0501

Freeze Frame Data and 1st Trip Freeze Frame Data

NFEC0034S0502

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-9.)

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Freeze frame data item*1	Description
FUEL SYS-B1*2	<p>“Fuel injection system status” at the moment a malfunction is detected is displayed. One mode in the following is displayed.</p> <p>“MODE 2”: Open loop due to detected system malfunction</p>
FUEL SYS-B2*2	<p>“MODE 3”: Open loop due to driving conditions (power enrichment, deceleration enrichment) “MODE 4”: Closed loop - using oxygen sensor(s) as feedback for fuel control “MODE 5”: Open loop - has not yet satisfied condition to go to closed loop</p>
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B1 [%]	<p>“Short-term fuel trim” at the moment a malfunction is detected is displayed. The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</p>
S-FUEL TRIM-B2 [%]	
L-FUEL TRIM-B1 [%]	<p>“Long-term fuel trim” at the moment a malfunction is detected is displayed. The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.</p>
L-FUEL TRIM-B2 [%]	
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.
VHCL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	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.

*2: Regarding A33, “B1” indicates bank 1 and “B2” indicates bank 2.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

DATA MONITOR MODE

=NFECC0034S06

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks	
ENG SPEED [rpm]			Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE)	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.	GI MA EM
MAS A/F SE-B1 [V]			The signal voltage of the mass air flow sensor is displayed.	When the engine is stopped, a certain value is indicated.	LC
COOLAN TEMP/S [°C] or [°F]			The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	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.	EC FE
HO2S1 (B1) [V]			The signal voltage of the heated oxygen sensor 1 is displayed.		CL
HO2S1 (B2) [V]					
HO2S2 (B1) [V]			The signal voltage of the heated oxygen sensor 2 is displayed.		MT
HO2S2 (B2) [V]					
HO2S1 MNTR (B1) [RICH/LEAN]			Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture.	After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.	AT AX
HO2S1 MNTR (B2) [RICH/LEAN]					
HO2S2 MNTR (B1) [RICH/LEAN]			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.	When the engine is stopped, a certain value is indicated.	BR ST
HO2S2 MNTR (B2) [RICH/LEAN]					
VHCL SPEED SE [km/h] or [mph]			The vehicle speed computed from the vehicle speed sensor signal is displayed.		RS
BATTERY VOLT [V]			The power supply voltage of ECM is displayed.		BT
ACCEL SEN 1 [V]			The accelerator pedal position sensor signal voltage is displayed.		HA
ACCEL SEN 2 [V]					
THRTL SEN 1 [V]			The throttle position sensor signal voltage is displayed.		SC
THRTL SEN 2 [V]					
FUEL T/TMP SE [°C] or [°F]			The fuel temperature judged from the fuel tank temperature sensor signal voltage is displayed.		EL
INT/A TEMP SE [°C] or [°F]			The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated.		IDX
EVAP SYS PRES [V]			The signal voltage of EVAP control system pressure sensor is displayed.		

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
ABSOL PRES/SE [V]			The signal voltage of the absolute pressure sensor is displayed.	
FUEL LEVEL SE [V]			The signal voltage of the fuel level sensor is displayed.	
START SIGNAL [ON/OFF]			Indicates [ON/OFF] condition from the starter signal.	After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]			Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG [ON/OFF]			Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW [ON/OFF]			Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL [ON/OFF]			[ON/OFF] condition of the power steering system (determined by the power steering pressure sensor signal) is indicated.	
LOAD SIGNAL [ON/OFF]			Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch. ON ... rear defogger is operating and/or lighting switch is on. OFF ... rear defogger is not operating and lighting switch is not on.	
IGNITION SW [ON/OFF]			Indicates [ON/OFF] condition from ignition switch.	
BRAKE SW [ON/OFF]			Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1 [msec]			Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	When the engine is stopped, a certain computed value is indicated.
INJ PULSE-B2 [msec]				
B/FUEL SCHDL [msec]			"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	
IGN TIMING [BTDC]			Indicates the ignition timing computed by ECM according to the input signals.	When the engine is stopped, a certain value is indicated.
PURG VOL C/V [%]			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.	
A/F ALPHA-B1 [%]			The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	When the engine is stopped, a certain value is indicated.
A/F ALPHA-B2 [%]				This data also includes the data for the air-fuel ratio learning control.
AIR COND RLY [ON/OFF]			The air conditioner relay control condition (determined by ECM according to the input signal) is indicated.	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks	
FUEL PUMP RLY [ON/OFF]			Indicates the fuel pump relay control condition determined by ECM according to the input signals.		GI MA
VENT CONT/V [ON/OFF]			The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated. ON ... Closed OFF ... Open		EM LC
HO2S1 HTR (B1) [ON/OFF]			Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.		EC
HO2S1 HTR (B2) [ON/OFF]				FE	
HO2S2 HTR (B1) [ON/OFF]			Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.		CL
HO2S2 HTR (B2) [ON/OFF]				MT	
VC/V BYPASS/V [ON/OFF]			The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated. ON ... Open OFF ... Closed		AT
CAL/LD VALUE [%]			"Calculated load value" indicates the value of the current airflow divided by peak airflow.		AX
MASS AIRFLOW [g·m/s]			Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor.		SU
INT/V TIM (B1) [°CA]			Indicate [°CA] of intake camshaft advanced angle.		BR
INT/V TIM (B2) [°CA]				ST	
INT/V SOL (B1) [%]			The control condition of the intake valve timing control solenoid valve is indicated.		RS
INT/V SOL (B2) [%]				BT	
TRVL AFTER MIL [km] or [Mile]			Distance traveled while MIL is activated		HA
VIAS S/V [ON/OFF]			The control condition of the VIAS control solenoid valve (determined by ECM according to the input signal) is indicated. OFF ... VIAS control solenoid valve is not operating. ON ... VIAS control solenoid valve is operating.		SC
IDL A/V LEARN			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. INCOMP ... Idle air volume learning has not been performed successfully.		EL IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
ENGINE MOUNT [IDLE/TRVL]			The control condition of the electronic controlled engine mount (computed by ECM according to the input signals) is indicated. IDLE ... Idle condition TRVL ... Driving condition	
COOLING FAN [HI/LOW/OFF]			Indicates the control condition of the cooling fan (determined by ECM according to the input signal). HIGH ... High speed operation LOW ... Low speed operation OFF ... Stop	
THRTL RELAY [ON/OFF]			Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
AC PRESS SEN [V]			The signal voltage from the refrigerant pressure sensor is displayed.	
BRAKE SW 1 [ON/OFF]			Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models) or park/neutral position relay signal (A/T models).	
BRAKE SW 2 [ON/OFF]			Indicates [ON/OFF] condition of stop lamp switch signal.	
MAIN SW [ON/OFF]			Indicates [ON/OFF] condition from CRUISE switch signal.	
CANCEL SW [ON/OFF]			Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW [ON/OFF]			Indicates [ON/OFF] condition from ACCEL/RES switch signal.	
SET SW [ON/OFF]			Indicates [ON/OFF] condition from COAST/SET switch signal.	
VHCL SPEED SE [km/h] or [mph]			The present vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD [km/h] or [mph]			The preset vehicle speed is displayed.	
VHCL SPD CUT [NON/CUT]			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.	
LO SPEED CUT [NON/CUT]			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]			Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
AT OD CANCEL [ON/OFF]			Indicates [ON/OFF] condition of A/T OD cancel signal sent from the TCM.	
CRUISE LAMP [ON/OFF]			Indicates [ON/OFF] condition CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP [ON/OFF]			Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	
Voltage [V]			Voltage, frequency, duty cycle or pulse width measured by the probe.	Pulse width, frequency or duty cycle measured by the pulse probe. 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.
 Regarding A33 model, "B1" indicates bank 1 and "B2" indicates bank 2.
 Bank 1 (B1) includes No. 1 cylinder.

DATA MONITOR (SPEC) MODE

NFEC0034S11

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
MAS A/F SE-B1 [V]			The signal voltage of the mass air flow sensor specification is displayed.	When the engine is running, specification range is indicated.
B/FUEL SCHDL [msec]			"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	When the engine is running, specification range is indicated.
A/F ALPHA-B1 [%]			Indicates the mean value of the air-fuel ratio feedback correction factor per cycle.	When the engine is running, specification range is indicated.
A/F ALPHA-B2 [%]				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.
 Regarding A33 model, "B1" indicates bank 1 and "B2" indicates bank 2.

ACTIVE TEST MODE

NFEC0034S07

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	Harness and connector Fuel injectors Heated oxygen sensor
IGNITION TIMING	Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	Adjust initial ignition timing

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BAL- ANCE	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.	Harness and connector Compression Injectors Power transistor Spark plugs Ignition coils
COOLING FAN	Ignition switch: ON Turn the cooling fan "ON" and "OFF" using CONSULT-II.	Cooling fan moves and stops.	Harness and connector Cooling fan motor Cooling fan relay
ENG COOLANT TEMP	Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	Harness and connector Engine coolant temperature sensor Fuel injectors
FUEL PUMP RELAY	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.	Harness and connector Fuel pump relay
VIAS SOL VALVE	Ignition switch: ON Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound.	Solenoid valve makes an operating sound.	Harness and connector Solenoid valve
ENGINE MOUNT- ING	Engine: After warming up, run engine at idle speed. Gear position: "D" range (Vehicle stopped) Turn electronic controlled engine mount "IDLE" and "TRVL" with the CONSULT-II.	Body vibration changes according to the electronic controlled engine mount condition.	Harness and connector Electronic controlled engine mount
PURG VOL CONT/V	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.	Harness and connector Solenoid valve
FUEL/T TEMP SEN	Change the fuel tank temperature using CONSULT-II.		
VENT CONTROL/V	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.	Harness and connector Solenoid valve
VC/V BYPASS/V	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.	Harness and connector Solenoid valve
V/T ASSIGN ANGLE	Engine: After warming up, hold engine speed at 2,500 rpm. Change the intake valve timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	Harness and connector Intake valve timing control solenoid valve

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-77.

NFEC0034S08

NFEC0034S0801

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

SRT Work Support Mode

NFEC0034S0803

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

DTC Work Support Mode

NFEC0034S0802

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	EC-349
	EVP SML LEAK P0442/P1442		EC-359
	EVP V/S LEAK P0456/P1456		EC-415
	PURG VOL CN/V P1444		EC-586
	VC CUT/V BP/V P1491		EC-641
HO2S1	HO2S1 (B1) P0133		EC-226
	HO2S1 (B1) P0134		EC-238
	HO2S1 (B1) P1143		EC-490
	HO2S1 (B1) P1144		EC-497
	HO2S1 (B2) P0153		EC-226
	HO2S1 (B2) P0154		EC-238
	HO2S1 (B2) P1163		EC-490
	HO2S1 (B2) P1164		EC-497
HO2S2	HO2S2 (B1) P0139		EC-255
	HO2S2 (B1) P1146		EC-504
	HO2S2 (B1) P1147	EC-514	
	HO2S2 (B2) P0159	EC-255	
	HO2S2 (B2) P1166	EC-504	
	HO2S2 (B2) P1167	EC-514	

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

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

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

NFEC0034S10

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 left, 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

ST

RS

BT

HA

SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

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.

Use these triggers as follows:

1) "AUTO TRIG"

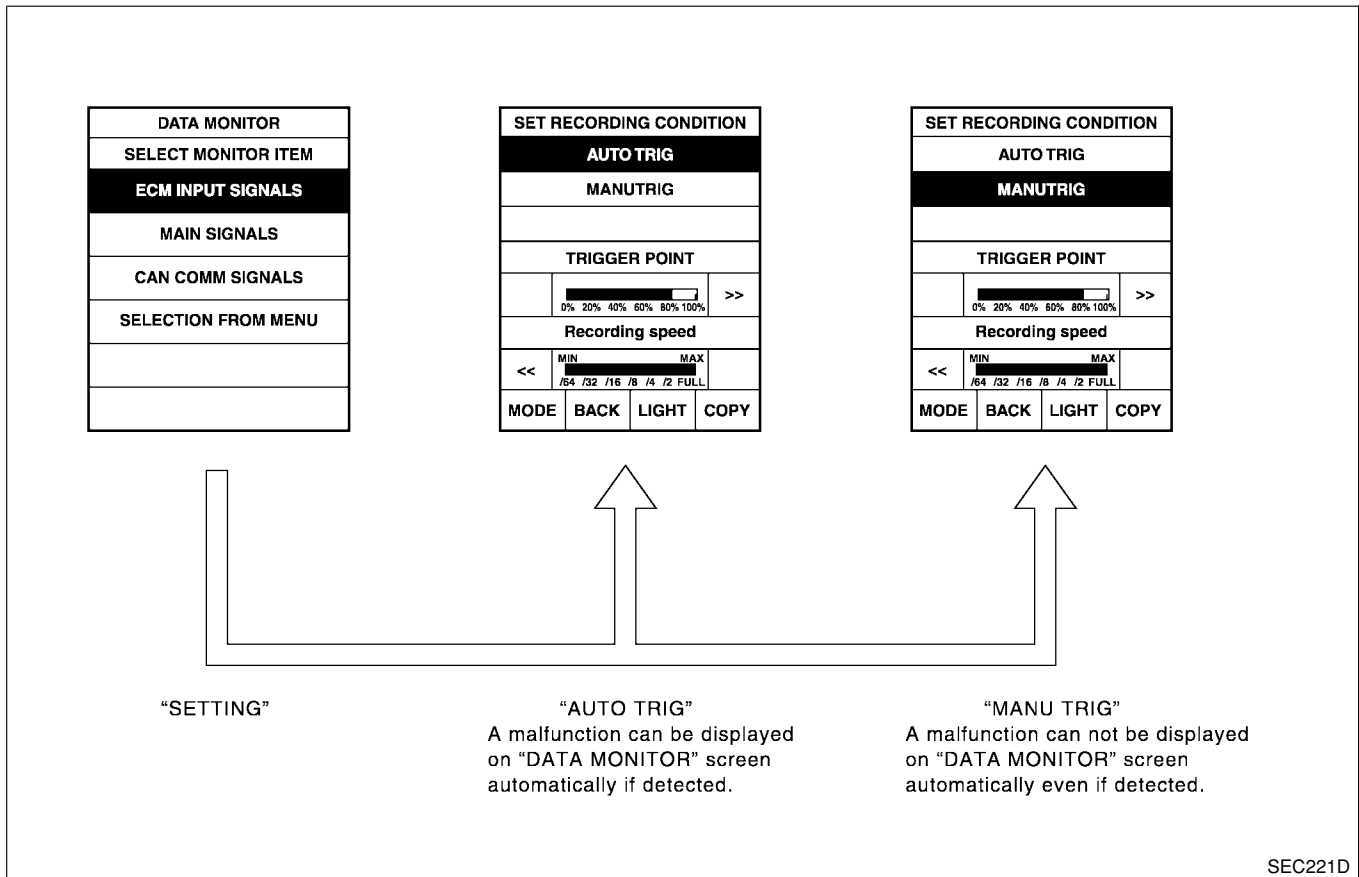
While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.

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 GI-21, "Incident Simulation Tests".)

2) "MANU TRIG"

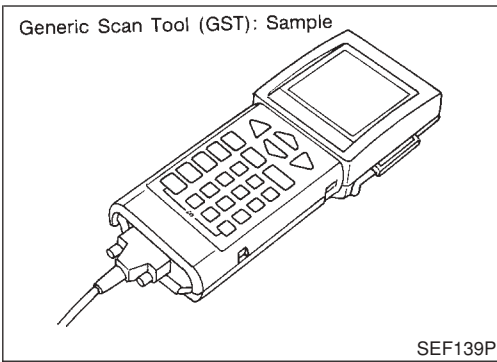
If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



SEC221D

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Generic Scan Tool (GST)

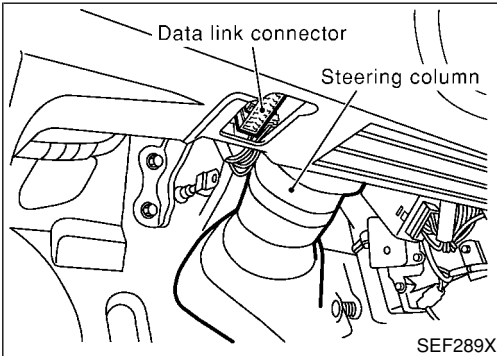


Generic Scan Tool (GST)

=NFEC0035

DESCRIPTION

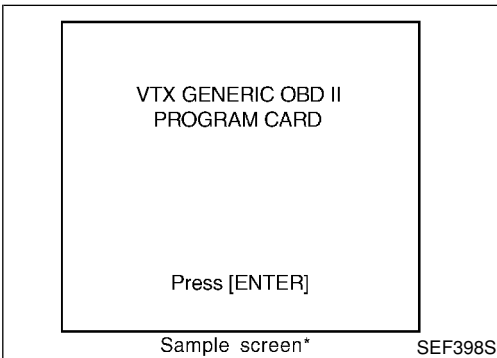
Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained on the next page. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.



GST INSPECTION PROCEDURE

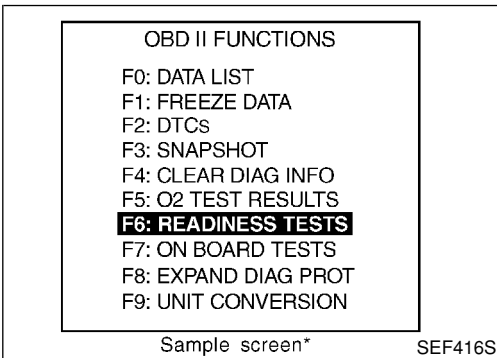
NFEC0035S02

1. Turn ignition switch OFF.
2. Connect GST to data link connector, which is located under LH dash panel near the fuse box cover.



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.

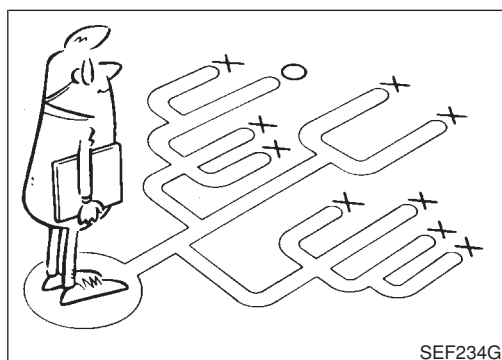
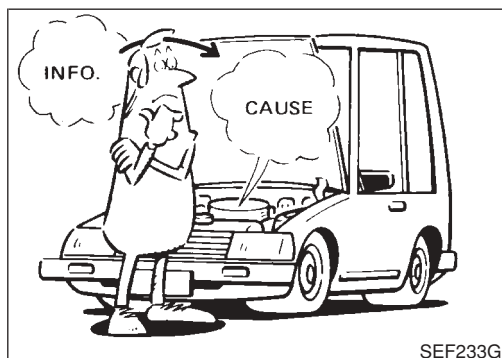
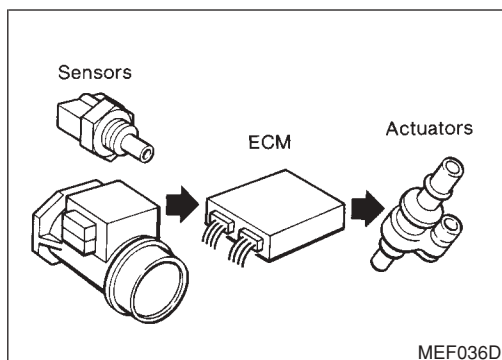
For further information, see the GST Operation Manual of the tool maker.

GI
MA
EM
LC
EC
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BT
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SC
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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Generic Scan Tool (GST) (Cont'd)

FUNCTION		<small>NFEC0035S03</small>
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 "Freeze Frame Data" (EC-105).]
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: 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. EVAP canister vent control valve open Vacuum cut valve bypass valve closed In the following conditions, this mode cannot function. 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.



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

SEF907L

Introduction

NFEC0036

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 the "Work Flow" on EC-119.

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 next page should be used.

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

DIAGNOSTIC WORKSHEET

NFEC0036S01

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trouble-shooting 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.

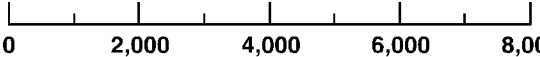
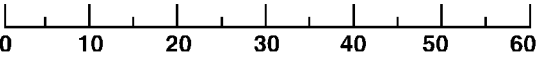
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TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

Worksheet Sample

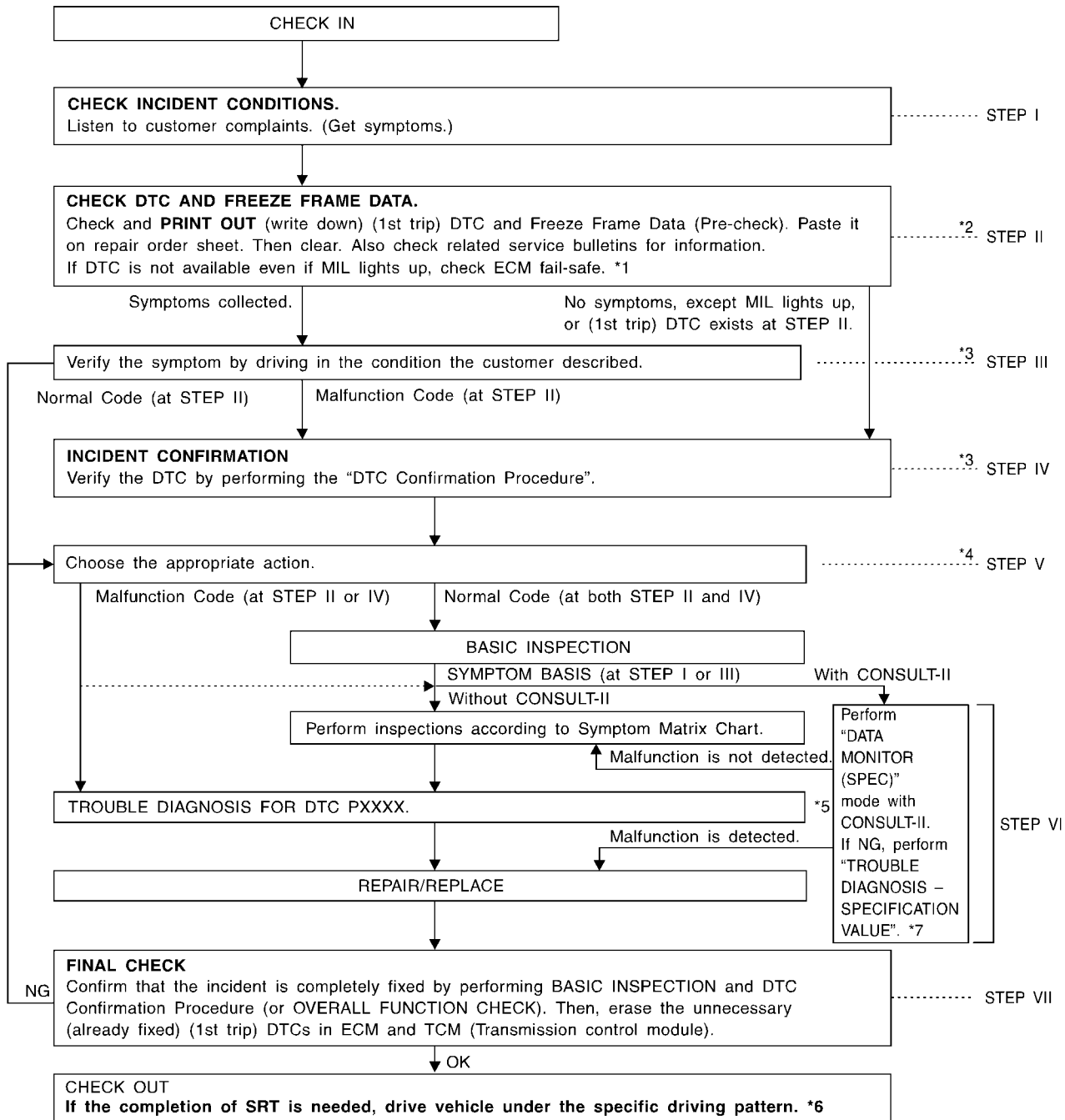
NFE0036S0101

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Fuel and fuel filler cap		<input type="checkbox"/> Vehicle ran out of fuel causing misfire <input type="checkbox"/> Fuel filler cap was left off or incorrectly screwed on.	
Symptoms	<input type="checkbox"/> Startability	<input type="checkbox"/> Impossible to start <input type="checkbox"/> No combustion <input type="checkbox"/> Partial combustion <input type="checkbox"/> Partial combustion affected by throttle position <input type="checkbox"/> Partial combustion NOT affected by throttle position <input type="checkbox"/> Possible but hard to start <input type="checkbox"/> Others []	
	<input type="checkbox"/> Idling	<input type="checkbox"/> No fast idle <input type="checkbox"/> Unstable <input type="checkbox"/> High idle <input type="checkbox"/> Low idle <input type="checkbox"/> Others []	
	<input type="checkbox"/> Driveability	<input type="checkbox"/> Stumble <input type="checkbox"/> Surge <input type="checkbox"/> Knock <input type="checkbox"/> Lack of power <input type="checkbox"/> Intake backfire <input type="checkbox"/> Exhaust backfire <input type="checkbox"/> Others []	
	<input type="checkbox"/> Engine stall	<input type="checkbox"/> At the time of start <input type="checkbox"/> While idling <input type="checkbox"/> While accelerating <input type="checkbox"/> While decelerating <input type="checkbox"/> Just after stopping <input type="checkbox"/> While loading	
Incident occurrence		<input type="checkbox"/> Just after delivery <input type="checkbox"/> Recently <input type="checkbox"/> In the morning <input type="checkbox"/> At night <input type="checkbox"/> In the daytime	
Frequency		<input type="checkbox"/> All the time <input type="checkbox"/> Under certain conditions <input type="checkbox"/> Sometimes	
Weather conditions		<input type="checkbox"/> Not affected	
Weather		<input type="checkbox"/> Fine <input type="checkbox"/> Raining <input type="checkbox"/> Snowing <input type="checkbox"/> Others []	
Temperature		<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold <input type="checkbox"/> Humid °F	
Engine conditions		<input type="checkbox"/> Cold <input type="checkbox"/> During warm-up <input type="checkbox"/> After warm-up Engine speed 	
Road conditions		<input type="checkbox"/> In town <input type="checkbox"/> In suburbs <input type="checkbox"/> Highway <input type="checkbox"/> Off road (up/down)	
Driving conditions		<input type="checkbox"/> Not affected <input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> At racing <input type="checkbox"/> While accelerating <input type="checkbox"/> While cruising <input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (RH/LH)	
		Vehicle speed 	
Malfunction indicator lamp		<input type="checkbox"/> Turned on <input type="checkbox"/> Not turned on	

MTBL0017

Work Flow

NFEC0037



*1 EC-127

*2 If time data of "SELF-DIAG RESULTS" is other than "0" or "[1t]", perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

*3 If the incident cannot be verified, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

*4 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-155.

*5 If malfunctioning part cannot be

detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

*6 EC-83
*7 EC-150

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TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow (Cont'd)

DESCRIPTION FOR WORK FLOW

NFEC0037S01

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-118.
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-91.) 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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. 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-129.) 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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. 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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. 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-121.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE", EC-150. (If malfunction is detected, proceed to "REPAIR REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-129.)
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-133, 139. 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 GI-22, "Circuit Inspection". Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.
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 different method 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-91.)

Basic Inspection

NFEC0038

Precaution:

Perform Basic Inspection without electrical or mechanical loads applied;

Headlamp switch is OFF,

Air conditioner switch is OFF,

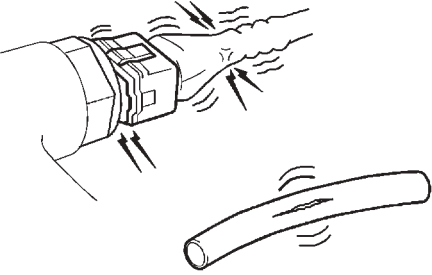
Rear window defogger switch is OFF,

Steering wheel is in the straight-ahead position, etc.

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1	INSPECTION START
<p>1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.</p> <p>2. Open engine hood and check the following:</p> <ul style="list-style-type: none"> Harness connectors for improper connections Vacuum hoses for splits, kinks and improper connections Wiring for improper connections, pinches and cuts Air cleaner clogging Hoses and ducts for leaks 	
	
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GO TO 2.	

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2	REPAIR OR REPLACE
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".	
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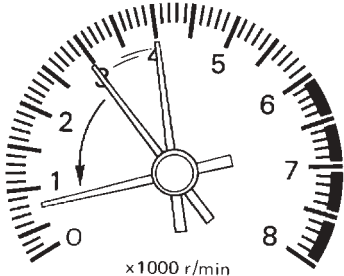
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TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

3	CHECK TARGET IDLE SPEED						
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 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. <div style="text-align: center; margin: 10px 0;">  </div> <ol style="list-style-type: none"> 3. Read idle speed in "DATA MONITOR" mode with CONSULT-II. <ul style="list-style-type: none"> MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position) <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; height: 150px;"> <thead> <tr> <th colspan="2" style="text-align: center; padding: 2px;">DATA MONITOR</th> </tr> <tr> <th style="text-align: center; padding: 2px;">MONITOR</th> <th style="text-align: center; padding: 2px;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">ENG SPEED</td> <td style="text-align: center; padding: 2px;">XXX rpm</td> </tr> </tbody> </table> </div>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR							
MONITOR	NO DTC						
ENG SPEED	XXX rpm						
SEF978U							
SEF058Y							
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 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. <ul style="list-style-type: none"> MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position) <p style="text-align: center; margin-top: 10px;">OK or NG</p>							
OK	GO TO 9.						
NG	GO TO 4.						

4	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING
<ol style="list-style-type: none"> 1. Stop engine. 2. Perform "Accelerator Pedal Released Position Learning", EC-71. 	
	GO TO 5.

5	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
	GO TO 6.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

6	PERFORM IDLE AIR VOLUME LEARNING
Refer to "Idle Air Volume Learning", EC-71. Is Idle Air Volume Learning carried out successfully?	
Yes or No	
Yes	GO TO 7.
No	1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 4.

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7	CHECK TARGET IDLE SPEED AGAIN
<input type="checkbox"/> 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. MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)	
<input checked="" type="checkbox"/> Without CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Check idle speed. MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)	
OK or NG	
OK	GO TO 10.
NG	GO TO 8.

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8	DETECT MALFUNCTIONING PART
Check the following. Check camshaft position sensor (PHASE) and circuit. Refer to EC-335. Check crankshaft position sensor (POS) and circuit. Refer to EC-328.	
OK or NG	
OK	GO TO 9.
NG	1. Repair or replace. 2. GO TO 4.

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9	CHECK ECM FUNCTION
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a malfunction, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.	
	GO TO 4.

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10	CHECK IGNITION TIMING
1. Run engine at idle. 2. Check ignition timing with a timing light. MT: 15°±5° BTDC AT: 15°±5° BTDC (in "P" or "N" position)	
OK or NG	
OK	INSPECTION END
NG	GO TO 11.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

11	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING
1. Stop engine. 2. Perform "Accelerator Pedal Released Position Learning", EC-71.	
GO TO 12.	

12	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
GO TO 13.	

13	PERFORM IDLE AIR VOLUME LEARNING
Refer to "Idle Air Volume Learning", EC-71.	
Is Idle Air Volume Learning carried out successfully?	
Yes or No	
Yes	GO TO 14.
No	1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 4.

14	CHECK TARGET IDLE SPEED AGAIN
<input type="checkbox"/> 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. MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)	
<input checked="" type="checkbox"/> Without CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Check idle speed. MT: 625±50 rpm AT: 675±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. MT: 15°±5° BTDC AT: 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-21, "TIMING CHAIN".	
OK or NG	
OK	GO TO 17.
NG	1. Repair the timing chain installation. 2. GO TO 4.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

17	DETECT MALFUNCTIONING PART	
Check the following. Check camshaft position sensor (PHASE) and circuit. Refer to EC-335. Check crankshaft position sensor (POS) and circuit. Refer to EC-328.		
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 a malfunction, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.		
	GO TO 4.	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

DTC Inspection Priority Chart

DTC Inspection Priority Chart

NFEC0039

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

Priority	Detected items (DTC)
1	U1000, U1001 CAN communication line P0101, P0102, P0103, P1102 MAF sensor P0112, P0113, P0127 IAT sensor P0117, P0118, P0125 ECT sensor P0121, P0226, P0227, P0228, P1227, P1228 Accelerator pedal position sensor P0128 Thermostat function P0122, P0123, P0221, P0222, P0223, P1223, P1224, P1225, P1226, P1229 Throttle position sensor P0181, P0182, P0183 FTT sensor P0327, P0328 KS P0335 CKP sensor (POS) P0340, P0345 CMP sensor (PHASE) P0460, P0461, P0462, P0463, P1464 Fuel level sensor P0500 VSS P0605 ECM P0705 Park/Neutral position switch P1706 PNP switch
2	P0031, P0032, P0051, P0052 HO2S1 heater P0037, P0038, P0057, P0058 HO2S2 heater P0107, P0108 Absolute pressure sensor P0132-P0134, P1143, P1144 and P0152-P0154, P1163, P1164 HO2S1 P0138, P0139, P1146, P1147 and P0158, P0159, P1166, P1167 HO2S2 P0441 EVAP control system purge flow monitoring P0444, P0445, P1444 EVAP canister purge volume control solenoid valve P0447, P1446, P1448 EVAP canister vent control valve P0452, P0453 EVAP control system pressure sensor P0550 Power steering pressure sensor P0650 MIL P0710, P0720, P0725, P0740, P0745, P0750, P1705, P1760 A/T related sensors, solenoid valves and switches P1065 ECM power supply P1122 Electric throttle control function P1217 Engine overtemperature (OVERHEAT) P1490, P1491 Vacuum cut valve bypass valve P1800 VIAS control solenoid valve P1805 Brake switch
3	P0011, P0021 Intake valve timing control P0171, P0172 and P0174, P0175 Fuel injection system function P0300-P0306 Misfire P0420, P0430 Three way catalyst function P0442/P1442, P0456/P1456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) P0455 EVAP control system (GROSS LEAK) P0506, P0507 ISC system P0731-P0734, P0744 A/T function P1121 Electric throttle control actuator P1124, P1126 Throttle control motor relay P1128 Throttle control motor P1148, P1168 Closed loop control P1211 ABS/TCS control unit P1212 ABS/TCS communication line P1564 ASCD steering switch P1572 ASCD brake switch P1574 ASCD Vehicle speed sensor

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Fail-safe Chart

Fail-safe Chart

=NFEC1425

The ECM enters fail-safe mode, if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode								
P0102, P0103, P1102	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.								
		<table border="1"> <thead> <tr> <th>Condition</th> <th>Engine coolant temperature decided (CONSULT-II display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or Start</td> <td>40°C (104°F)</td> </tr> <tr> <td>More than approx. 4 minutes after ignition ON or Start</td> <td>80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td>40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table>	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)
		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.										
P0221, P0222, P0223, P1223, P1224	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 an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.								
P0226, P0227, P0228, P1227, P1228	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 an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.								
P1121	Electric throttle control actuator (ECM detect 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.								
P1126	Throttle control relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1129	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.								

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Fail-safe Chart (Cont'd)

DTC No.	Detected items	Engine operating condition in fail-safe mode	
Unable to access ECM	ECM	<p>ECM fail-safe activating condition The computing function of the ECM was judged to be malfunctioning. When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver. However it is not possible to access ECM and DTC cannot be confirmed.</p> <p>Engine control with fail-safe When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and cooling fan operation are controlled under certain limitations.</p>	
		ECM fail-safe operation	
		Engine speed	Engine speed will not rise more than 3,000 rpm
		Fuel injection	Simultaneous multiport fuel injection system
		Ignition timing	Ignition timing is fixed at the preset valve
		Cooling fans	Cooling fan relay is "ON" (High speed condition) when engine is running, and "OFF" when engine stalls.
		Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls
		Replace ECM, if ECM fail-safe condition is confirmed.	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart

Symptom Matrix Chart SYSTEM — BASIC ENGINE CONTROL SYSTEM

NFEC0041
NFEC0041S01

		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-726	
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-56	
	Injector circuit	1	1	2	3	2		2	2			2			EC-716	
	Evaporative emission system														EC-36	
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-51	
	Incorrect idle speed adjustment						1	1	1	1		1			EC-121	
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-469, 471, 479, 485	
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-121	
	Ignition circuit	1	1	2	2	2		2	2			2			EC-705	
Main power supply and ground circuit											2				EC-155	
Air conditioner circuit		2	2	3	3	3		3	3			3		2	HA section	
ABS/TCS control unit				4											EC-526, 528	

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

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

		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	
Engine control	Crankshaft position sensor (POS) circuit	2	2												EC-328
	Camshaft position sensor (PHASE) circuit	3	2												EC-335
	Mass air flow sensor circuit	1			2										EC-186, 193, 463
	Heated oxygen sensor 1 circuit														EC-218, 226, 238, 490, 497
	Engine coolant temperature sensor circuit	1	1	2	3	2		2	2			2			EC-205, 211
	Throttle position sensor circuit						2				2				EC-288, 295, 548, 555, 557
	Accelerator pedal position sensor circuit			3		1	1	1	1	1					EC-302, 309, 559
	Vehicle speed sensor circuit		2	3		3									EC-440
	Knock sensor circuit			2								3			EC-323
	ECM	2	2	3	3	3	3	3	3	3	3				EC-453, 127
	Start signal circuit	2													EC-722
	Park/Neutral position switch circuit			3		3						3			EC-680
	Power steering pressure sensor circuit		2					3	3						EC-448
	Electrical load signal circuit														EC-757

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

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

SYSTEM — ENGINE MECHANICAL & OTHER

NFEC0041S02

		SYMPTOM													Reference section	
		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 tank	5	5												FE section	—
	Fuel piping			5	5	5		5	5		5					
	Vapor lock															
	Valve deposit															
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5		5					
Air	Air duct		5												—	—
	Air cleaner															
	Air leakage from air duct (Mass air flow sensor — throttle body)	5		5	5	5	5	5	5	5	5					
	Air leakage from intake manifold/Collector/Gasket															
Cranking	Battery	1	1	1		1		1	1			1		1	EL section	—
	Alternator circuit															
	Starter circuit	3														
	Flywheel/Drive plate	6														
	PNP switch	4														

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

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

		SYMPTOM													Reference section
		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	
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM section
	Cylinder head gasket										4	5	3		
	Cylinder block												4		
	Piston														
	Piston ring	6	6	6	6	6		6	6			6			
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain														EM section
	Camshaft														
	Intake valve timing control	5	5	5	5	5		5	5		5				
	Intake valve												3		
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5	5	5		5					FE section
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			MA, EM, LC section
	Oil level (Low)/Filthy oil														LC section
Cooling	Radiator/Hose/Radiator filler cap														MA section
	Thermostat									5					
	Water pump	5	5	5	5	5		5	5		4	5			
	Water gallery														
	Coolant level (low)/Contaminated coolant														

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

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

	SYMPTOM													Reference section
	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	
NVIS (NISSAN Vehicle Immobilizer System — NATS)	1	1												EC-92 or EL section

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

CONSULT-II Reference Value in Data Monitor Mode

NFEC1426

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	Tachometer: Connect Run engine and compare tachometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle 1.1 - 1.5V
		2,500 rpm 1.7 - 2.4V
COOLAN TEMP/S	Engine: After warming up	More than 70°C (158°F)
HO2S1 (B1) HO2S1 (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm 0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)		LEAN + , RICH Changes more than 5 times during 10 seconds.
HO2S2 (B1) HO2S2 (B2)	Warm-up condition After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.	Revsing engine from idle to 3,000 rpm quickly. 0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)		LEAN + , RICH
VHCL SPEED SE	Turn drive wheels and compare speedometer indication with the CONSULT-II value	Almost the same speed as the CONSULT-II value
BATTERY VOLT	Ignition switch: ON (Engine stopped)	11 - 14V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN 1	Ignition switch: ON (Engine stopped) Shift lever: "D"	Accelerator pedal: Released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN 2	Ignition switch: ON (Engine stopped) Shift lever: "D"	Accelerator pedal: Released	0.15 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.5V
THRTL SEN 1 THRTL SEN 2	Ignition switch: ON (Engine stopped) Shift lever: "D"	Accelerator pedal: Released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
START SIGNAL	Ignition switch: ON , START , ON		OFF , ON , OFF
CLSD THL POS	Ignition switch: ON Shift lever: "D"	Accelerator pedal: 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
		Except above	OFF
PW/ST SIGNAL	Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is turned	ON
IGNITION SW	Ignition switch: ON , OFF , ON		ON , OFF , ON
INJ PULSE-B1 INJ PULSE-B2	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
B/FUEL SCHDL	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	2.3 - 2.9 msec
		2,000 rpm	2.3 - 2.9 msec
IGN TIMING	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	13 - 18° BTDC
		2,000 rpm	25 - 45° BTDC
LOAD SIGNAL	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
PURG VOL C/V	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	0 %
		2,000 rpm	—
A/F ALPHA-B1 A/F ALPHA-B2	Engine: After warming up	Maintaining engine speed at 2,000 rpm	54 - 155%
EVAP SYS PRES	Ignition switch: ON		Approx. 3.4V
AIR COND RLY	Air conditioner switch: OFF , ON		OFF , ON
FUEL PUMP RLY	Ignition switch is turned to ON (Operates for 1 seconds) Engine running or cranking		ON
	Except as shown above		OFF

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION	
VENT CONT/V	Ignition switch: ON		OFF	GI
HO2S1 HTR (B1) HO2S1 HTR (B2)	Engine: After warming up Engine speed: Below 3,600 rpm		ON	MA
	Engine speed: Above 3,600 rpm		OFF	
HO2S2 HTR (B1) HO2S2 HTR (B2)	Engine speed is below 3,600 rpm after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load		ON	EM
	Engine speed: Above 3,600 rpm		OFF	LC
VC/V BYPASS/V	Ignition switch: ON		OFF	EC
CAL/LD VALUE	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	10 - 35%	FE
		2,500 rpm	10 - 35%	
BRAKE SW	Ignition switch: ON	Brake pedal: Released	OFF	CL
		Brake pedal: Slightly depressed	ON	
MASS AIRFLOW	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	2.0 - 6.0 g·m/s	MT
		2,500 rpm	7.0 - 20.0 g·m/s	AT
ABSOL PRES/SE	Ignition switch: ON		Approx. 4.4V	
VIAS S/V	Engine: After warming up	1,800 - 3,600 rpm	ON	AX
		Except above conditions	OFF	
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)	SU
AC PRESS SEN	Ignition switch: ON (Engine stopped)		Approx. 0V	BR
	Engine: Idle Air conditioner switch: OFF		1.0 - 4.0V	
INT/V TIM (B1) INT/V TIM (B2)	Engine: After warming up Shift lever "N" Quickly depressed accelerator pedal No-load	Idle	-5 - 5° CA	ST
		2,000 rpm	Approximately 0 - 30° CA	RS
INT/V SOL (B1) INT/V SOL (B2)	Engine: After warming up Shift lever "N" Quickly depressed accelerator pedal No-load	Idle	0 - 2%	BT
		2,000 rpm	Approximately 25 - 50%	HA
ENGINE MOUNT	Engine: Running	Idle	"IDLE"	SC
		2,000 rpm	"TRVL"	
COOLING FAN	After warming up engine, idle the engine. After conditioner switch: "OFF"	Engine coolant temperature is 94°C (201°F) or less.	OFF	EL
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F).	LOW	IDX
		Engine coolant temperature is 100°C (212°F) or more.	HIGH	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
VHCL SPEED SE	Turn drive wheels and compare speedometer indication with the CONSULT-II value.		Almost the same speed as the CONSULT-II value
SET VHCL SPD	ASCDC set condition.		The preset vehicle speed is displayed.
MAIN SW	Ignition switch: ON	CRUISE switch is pressed.	ON
		CRUISE switch is released.	OFF
CANCEL SW	Ignition switch: ON	CANCEL switch is pressed.	ON
		CANCEL switch is released.	OFF
RESUME/ACC SW	Ignition switch: ON	ACCEL RES switch is pressed.	ON
		ACCEL RES switch is released.	OFF
SET SW	Ignition switch: ON	SET switch is pressed.	ON
		SET switch is released.	OFF
BRAKE SW1	Ignition switch: ON	Brake pedal is depressed.	OFF
		Brake pedal is released.	ON
BRAKE SW2	Ignition switch: ON	Brake pedal is depressed.	ON
		Brake pedal is released.	OFF
CRUISE LAMP	Ignition switch: ON	CRUISE lamp is indicated.	ON
		CRUISE lamp is not indicated.	OFF
SET LAMP	Ignition switch: ON	SET lamp is indicated.	ON
		SET lamp is not indicated.	OFF

Major Sensor Reference Graph in Data Monitor Mode

NFEC1427

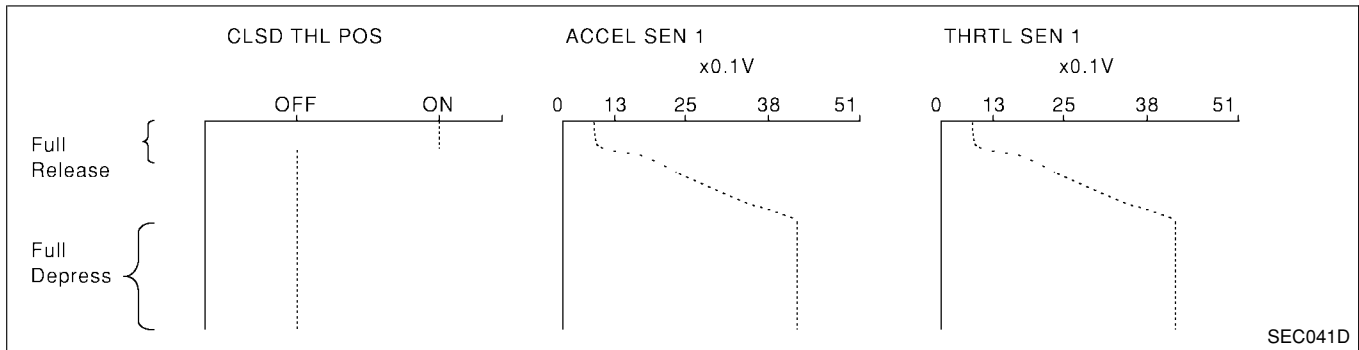
The following are the major sensor reference graphs in "DATA MONITOR" mode.

CLSD THL POS, ACCEL SEN1, THRTL SEN1

NFEC1427S01

Below is the data for "CLSD THL POS", "ACCEL SEN1" and "THRTL SEN1" when depressing the accelerator pedal with the ignition switch "ON" and with selector lever in "D" position (AT models) or with shift lever in "1st" position (MT models).

The signal of "ACCEL SEN1" and "THRTL SEN1" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".



SEC041D

ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

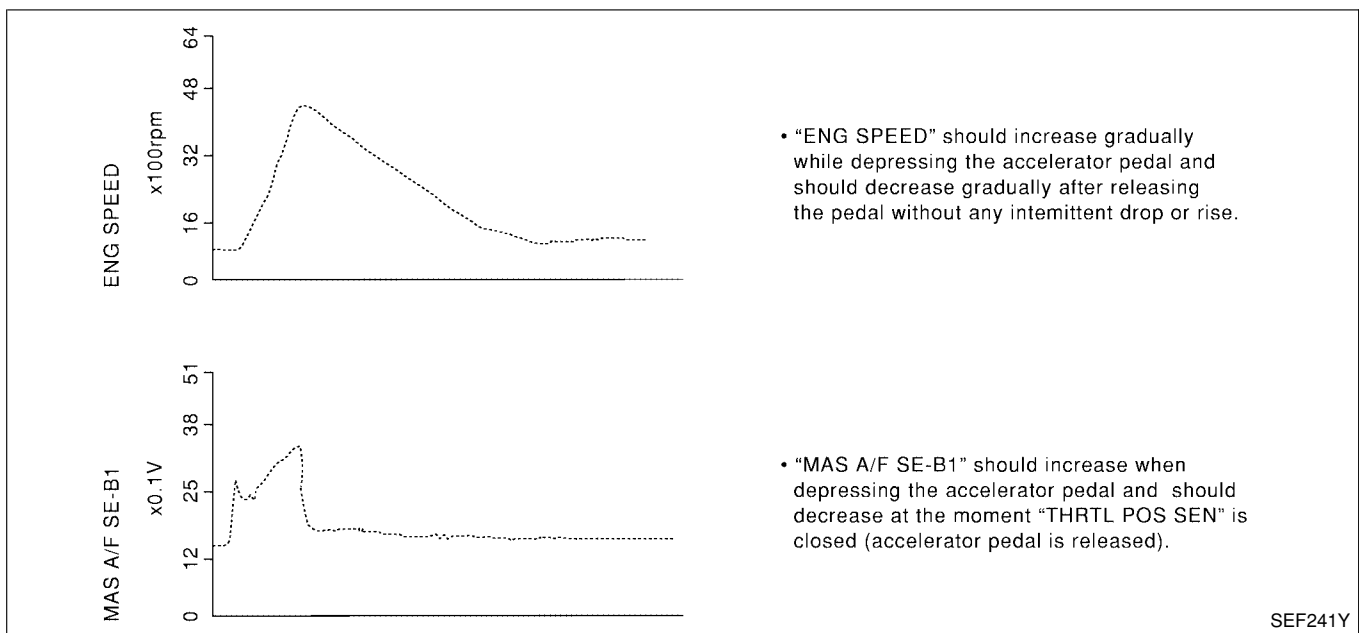
NFEC1427S02

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1)", "HO2S1 (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 — GENERAL DESCRIPTION

Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

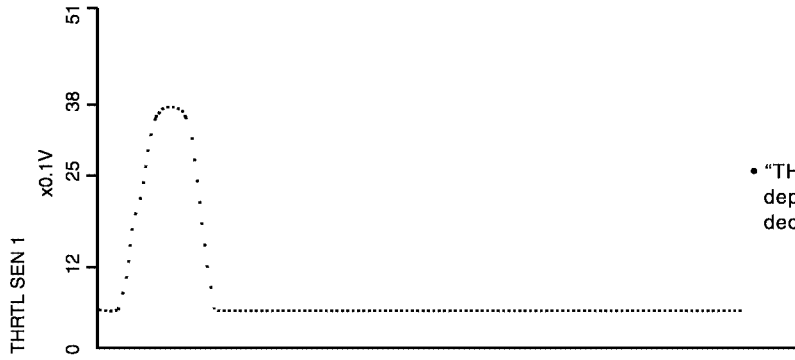
SC

EL

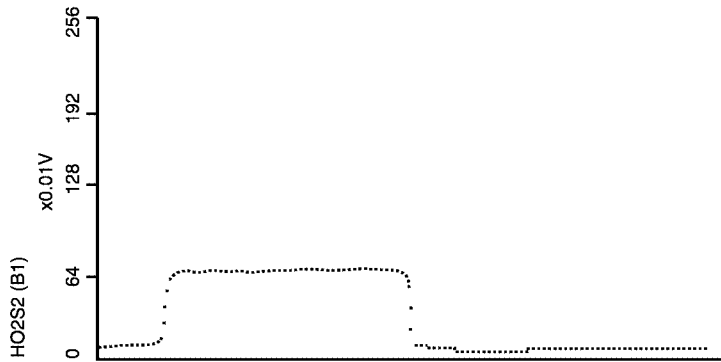
IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

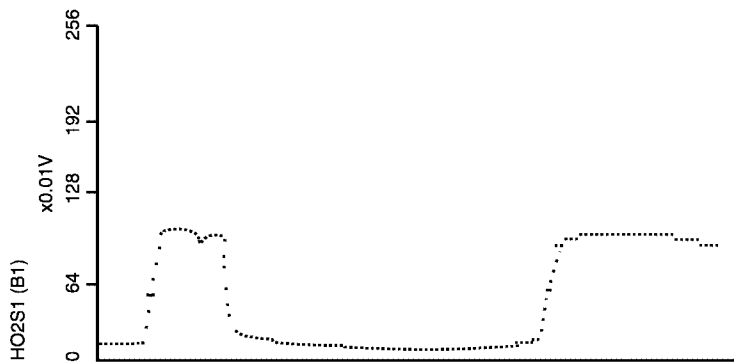
Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



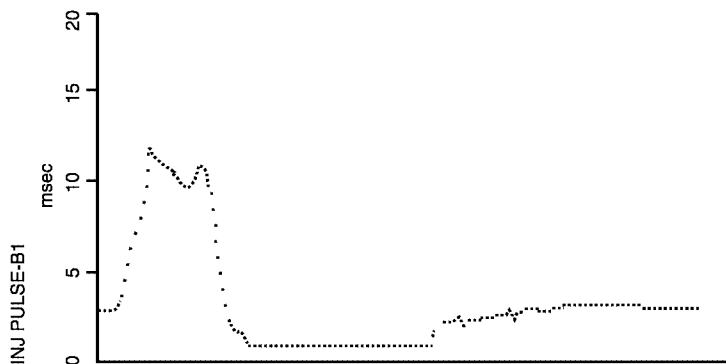
- "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.

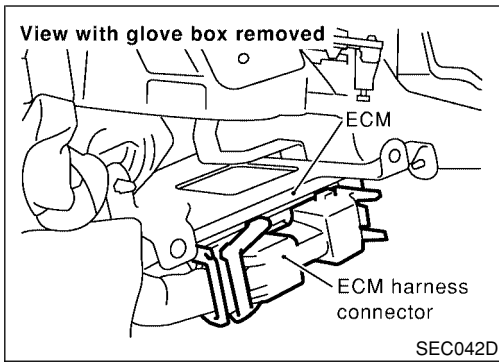


- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

PBIB0668E

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value



ECM Terminals and Reference Value

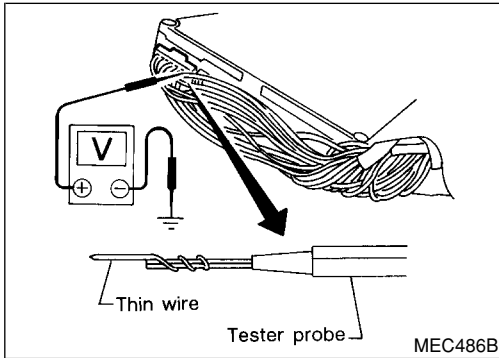
NFEC0044

PREPARATION

NFEC0044S01

1. ECM is located behind the instrument lower cover. For this inspection, remove instrument lower cover.

2. Remove ECM harness protector.



3. Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily. Open harness securing clip to make testing easier. Use extreme care not to touch 2 pins at one time. Data is for comparison and may not be exact.

ECM HARNESS CONNECTOR TERMINAL LAYOUT

NFEC0044S02

101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110							
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	

SEF970W

ECM INSPECTION TABLE

NFEC0044S03

Specification data are reference values and are measured between each terminal and ground.

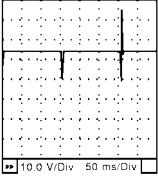
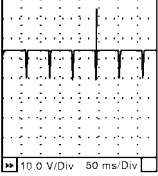
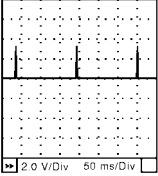
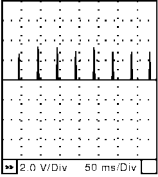
Pulse signal is measured by CONSULT-II.

CAUTION:

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

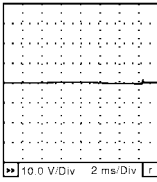
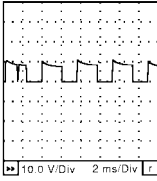
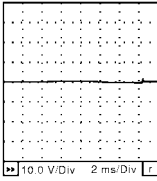
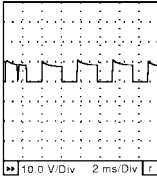
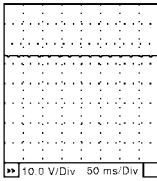
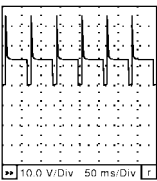
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1 2 3 11 12 13	R/B R/W R/Y R/L L/W PU/R	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4 Injector No. 5 Injector No. 6	[Engine is running] Warm-up condition Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC984C
			[Engine is running] Warm-up condition Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)★  SEC985C
4	W	Electronic controlled engine mount-1	[Engine is running] Idle speed	0 - 1V
			[Engine is running] Except the above	BATTERY VOLTAGE (11 - 14V)
5 6 7 15 16 17	Y/R G/R L/R G/Y PU/W GY/R	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4 Ignition signal No. 5 Ignition signal No. 6	[Engine is running] Warm-up condition Idle speed	0 - 0.2V★  SEC986C
			[Engine is running] Warm-up condition Engine speed is 2,500 rpm.	0.1 - 0.3V★  SEC987C

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
8	G	Intake valve timing control solenoid valve (bank 2)	<p>[Engine is running] Warm-up condition Idle speed</p>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right;">SEC988C</p>	GI MA EM LC
			<p>[Engine is running] Warm-up condition Engine speed is 2,500 rpm.</p>	<p>7 - 12V★</p>  <p style="text-align: right;">SEC989C</p>	EC FE CL
9	L/W	Intake valve timing control solenoid valve (bank 1)	<p>[Engine is running] Warm-up condition Idle speed</p>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right;">SEC988C</p>	MT AT AX SU
			<p>[Engine is running] Warm-up condition Engine speed is 2,500 rpm.</p>	<p>7 - 12V★</p>  <p style="text-align: right;">SEC989C</p>	BR ST RS
10	PU/R	EVAP canister purge volume control sole- noid valve	<p>[Engine is running] Idle speed</p>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right;">SEC990C</p>	BT HA SC
			<p>[Engine is running] Engine speed is 2,000 rpm (More than 100 sec- onds after starting engine).</p>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right;">SEC991C</p>	EL IDX

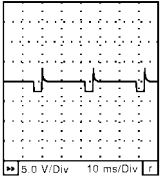
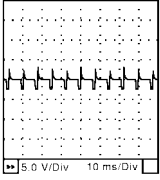
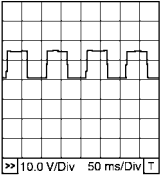
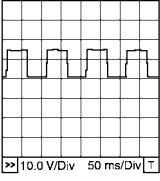
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	W/R	Electronic controlled engine mount-2	[Engine is running] Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] Except the above	0 - 1V
18	PU/W	Engine coolant temperature sensor signal output	[Engine is running] Idle speed	0 - 12V Output voltage varies with engine coolant temperature.
21	B/R	Air conditioner relay	[Engine is running] Both A/C switch and blower switch are "ON" (Compressor is operating).	0 - 1.0V
			[Engine is running] A/C switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
23	B/P	Fuel pump relay	[Ignition switch "ON"] For 1 second after turning ignition switch "ON"	0 - 1.5V
			[Engine is running] More than 1 second after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
24	Y	ASCD CRUISE lamp	[Ignition switch "ON"] CRUISE switch is "ON".	0V
			[Ignition switch "ON"] CRUISE switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
25	R	ASCD SET lamp	[Engine is running] SET switch is "ON". ASCD control is operating.	0V
			[Engine is running] SET or CRUISE switch is "OFF". ASCD control is not operating.	BATTERY VOLTAGE (11 - 14V)
26	O/R	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
27	Y/G	VIAS control solenoid valve	[Engine is running] Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] Engine speed is between 1,800 and 3,600 rpm.	0 - 1.0V
28	OR/G	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
30	PU	A/C cut signal	[Engine is running] Air conditioner is operating.	0 - 0.5V
31	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
33	LG/B	MIL	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] Idle speed	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
34	W/G	Tachometer	[Engine is running] Warm-up condition Idle speed	7 - 8V★  SEC992C	GI MA EM LC
			[Engine is running] Warm-up condition Engine speed is 2,500 rpm.	7 - 8V★  SEC032D	EC FE CL
35	BR/R	Cooling fan relay (LOW)	[Engine is running] Cooling fan is operating.	0 - 1.0V	MT
			[Engine is running] Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)	AT
36	LG	Cooling fan relay (HIGH)	[Engine is running] Cooling fan is operating at high speed.	0 - 1.0V	AX
			[Engine is running] Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)	SU
38	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "ON"] For a few seconds after turning ignition switch "OFF"	0 - 1.5V	BR
			[Ignition switch "ON"] A few seconds after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)	ST
39	OR/L	Heated oxygen sensor 1 heater (bank 1)	[Engine is running] Warm-up condition Engine speed is below 3,600 rpm.	Approximately 7V★  PBIB0519E	RS BT HA
			[Engine is running] Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)	SC
40	R/L	Heated oxygen sensor 1 heater (bank 2)	[Engine is running] Warm-up condition Engine speed is below 3,600 rpm.	Approximately 7V★  PBIB0519E	EL IDX
			[Engine is running] Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)	

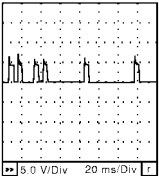
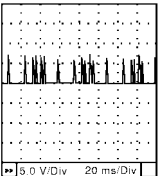
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
41	P/B	Heated oxygen sensor 2 heater (bank 1)	[Engine is running] Warm-up condition Engine speed is below 3,600 rpm. After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute	0 - 1.0V
			[Ignition switch "ON"] Engine stopped [Engine is running] Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
42	BR/W	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 12V
43	R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
44	G/OR	PNP switch	[Ignition switch "ON"] General position is "P" or "N".	Approximately 0V
			[Ignition switch "ON"] Except the above gear position	BATTERY VOLTAGE (11 - 14V)
45	G/B	Air conditioner switch signal	[Engine is running] Both A/C switch and blower switch are "ON".	Approximately 0V
			[Engine is running] A/C switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
47	R/L	Heated oxygen sensor 2 heater (bank 2)	[Engine is running] Warm-up condition Engine speed is below 3,600 rpm. After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute	0 - 1.0V
			[Ignition switch "ON"] Engine stopped [Engine is running] Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
48	B	ECM ground	[Engine is running] Idle speed	Engine ground
50	G/Y	ASCDC steering switch	[Ignition switch "ON"] ASCDC steering switch is "OFF".	Approximately 4.0V
			[Ignition switch "ON"] CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] CANCEL switch is "ON".	Approximately 1.0V
			[Ignition switch "ON"] ACCEL RES switch is "ON".	Approximately 3.0V
			[Ignition switch "ON"] COAST/SET switch is "ON".	Approximately 2.0V

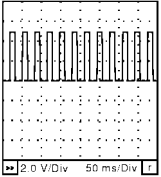
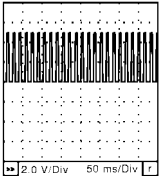
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
51	W/G	Electrical load signal	[Engine is running] Rear window defogger: ON Hi-beam headlamp: ON	BATTERY VOLTAGE (11 - 14V)	GI MA
			[Engine is running] Electrical load: OFF	0V	EM
55	R/G	Stop lamp switch	Brake pedal is depressed.	BATTERY VOLTAGE (11 - 14V)	LC
			Brake pedal is released.	0V	
57	B	ECM ground	[Engine is running] Idle speed	Engine ground	EC
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V	FE
59	G/B	ASCD brake switch	[Ignition switch "ON"] Gear position is except "P" or "N" (A/T models). Brake pedal is depressed. Clutch pedal is depressed (M/T models).	0V	CL MT
			[Ignition switch "ON"] Gear position is except "P" or "N" (A/T models). Brake pedal is released. Clutch pedal is released (M/T models).	BATTERY VOLTAGE (11 - 14V)	AT
60	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 3.4V	AX
62	W	Mass air flow sensor	[Engine is running] Warm-up condition Idle speed	1.1 - 1.5V	SU
			[Engine is running] Warm-up condition Engine speed is 2,500 rpm.	1.7 - 2.4V	BR
64	OR	Accelerator pedal posi- tion sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V	ST
65	Y	Camshaft position sen- sor (PHASE) (bank 1)	[Engine is running] Warm-up condition Idle speed	1.0 - 4.0V★  SEC033D	RS BT HA
			[Engine is running] Engine speed is 2,000 rpm.	1.0 - 4.0V★  SEC034D	SC EL IDX

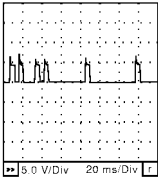
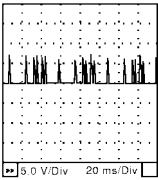
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
66	Y/G	Mass air flow sensor (Intake air temperature sensor)	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
67	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
68	P/L	Vehicle speed sensor	[Engine is running] Jack-up front wheels In 1st gear position 10 km/h (6 MPH)	Approximately 2.5V★  SEC039D
			[Engine is running] Jack-up front wheels In 2nd gear position 30 km/h (19 MPH)	Approximately 2.5V★  SEC040D
69	G	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
70	B/P	Accelerator pedal posi- tion sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
71	W	Knock sensor	[Engine is running] Idle speed	Approximately 2.5V
72	W	Accelerator pedal posi- tion sensor signal out- put	[Engine is running] Warm-up condition Accelerator pedal fully released	Approximately 0.6V
			[Ignition switch "ON"] Accelerator pedal fully depressed	Approximately 4.0V
73	W	Accelerator pedal posi- tion sensor 1	[Ignition switch "ON"] Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal posi- tion sensor 2	[Ignition switch "ON"] Accelerator pedal fully released	0.08 - 0.48V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 1.8V
75	P/L	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.
78	B	Fuel level sensor ground	[Engine is running] Idle speed	Approximately 0V
80	B	Mass air flow sensor ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V

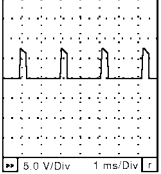
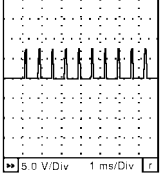
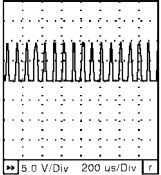
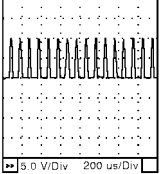
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
81	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	GI MA
83	W	Throttle position sensor 1	[Ignition switch "ON"] Gear position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully released	More than 0.36V	EM LC
			[Ignition switch "ON"] Gear position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	Less than 4.75V	EC
84	L	Throttle position sensor 2	[Ignition switch "ON"] Gear position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully released	Less than 4.75V	FE CL
			[Ignition switch "ON"] Gear position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	More than 0.36V	MT
85	R	Camshaft position sensor (PHASE) (bank 2)	[Engine is running] Warm-up condition Idle speed	1.0 - 4.0V★ 	AT AX SU
			[Engine is running] Engine speed is 2,000 rpm.	1.0 - 4.0V★ 	BR ST RS
88	W	Heated oxygen sensor 2 (bank 1)	[Engine is running] Warm-up condition Revs engine from idle up to 3,000 rpm quickly after the following conditions are met. After keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	0 - Approximately 1.0V	BT HA SC
89	G	Power steering pressure sensor	[Engine is running] Steering wheel is being turned.	0.5 - 4.0V	EL
			[Engine is running] Steering wheel is not being turned.	0.4 - 0.8V	IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
90	W	Heated oxygen sensor 2 (bank 2)	[Engine is running] Warm-up condition Revvng engine from idle up to 3,000 rpm quickly after the following conditions are met. After keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	0 - Approximately 1.0V
91	W	Heated oxygen sensor 1 (bank 1)	[Engine is running] Warm-up condition Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
92	W	Heated oxygen sensor 1 (bank 2)	[Engine is running] Warm-up condition Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
93	Y	Engine coolant tem- perature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
95	W	Crankshaft position sensor (POS)	[Engine is running] Idle speed	Approximately 2.4V★  SEC035D
			[Engine is running] Engine speed is 2,000 rpm.	Approximately 2.3V★  SEC036D
101	Y	Throttle control motor (Open)	[Ignition switch "ON"] Engine stopped Gear position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressing	0 - 14V★  SEC037D
102	R	Throttle control motor relay	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "OFF"]	0 - 1.0V
103	BR	Throttle control motor (Close)	[Ignition switch "ON"] Engine stopped Gear position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully releasing	0 - 14V★  SEC038D

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
105	OR/L	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	GI
106 108	B B	ECM ground	[Engine is running] Idle speed	Engine ground	MA
107	B	Throttle control motor ground	[Ignition switch "ON"]	Approximately 0V	EM
109	L	CAN communication line	[Ignition switch "ON"]	Approximately 2.6 - 3.2V Output voltage varies with the communication status.	LC
110 112	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	EC
111	R	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V	FE
113	R	CAN communication line	[Ignition switch "ON"]	Approximately 1.7 - 2.3V Output voltage varies with the communication status.	CL
115	OR	Data link connector	[Ignition switch "ON"] CONSULT-II or GST is disconnected.	BATTERY VOLTAGE (11 - 14V)	MT

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

GI
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TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Description

Description

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

Vehicle driven distance: More than 5,000 km (3,107 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

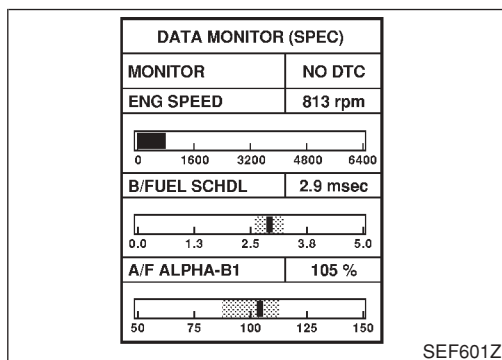
Electrical load: Not applied*2

Engine speed: Idle

NFEC0718

*1: For A/T models, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates less than 0.9V. For M/T models, drive vehicle for 10 minutes after the engine is warmed up to normal operating temperature.

*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Cooling fans are not operating. Steering wheel is straight ahead.



Inspection Procedure

NFEC0719

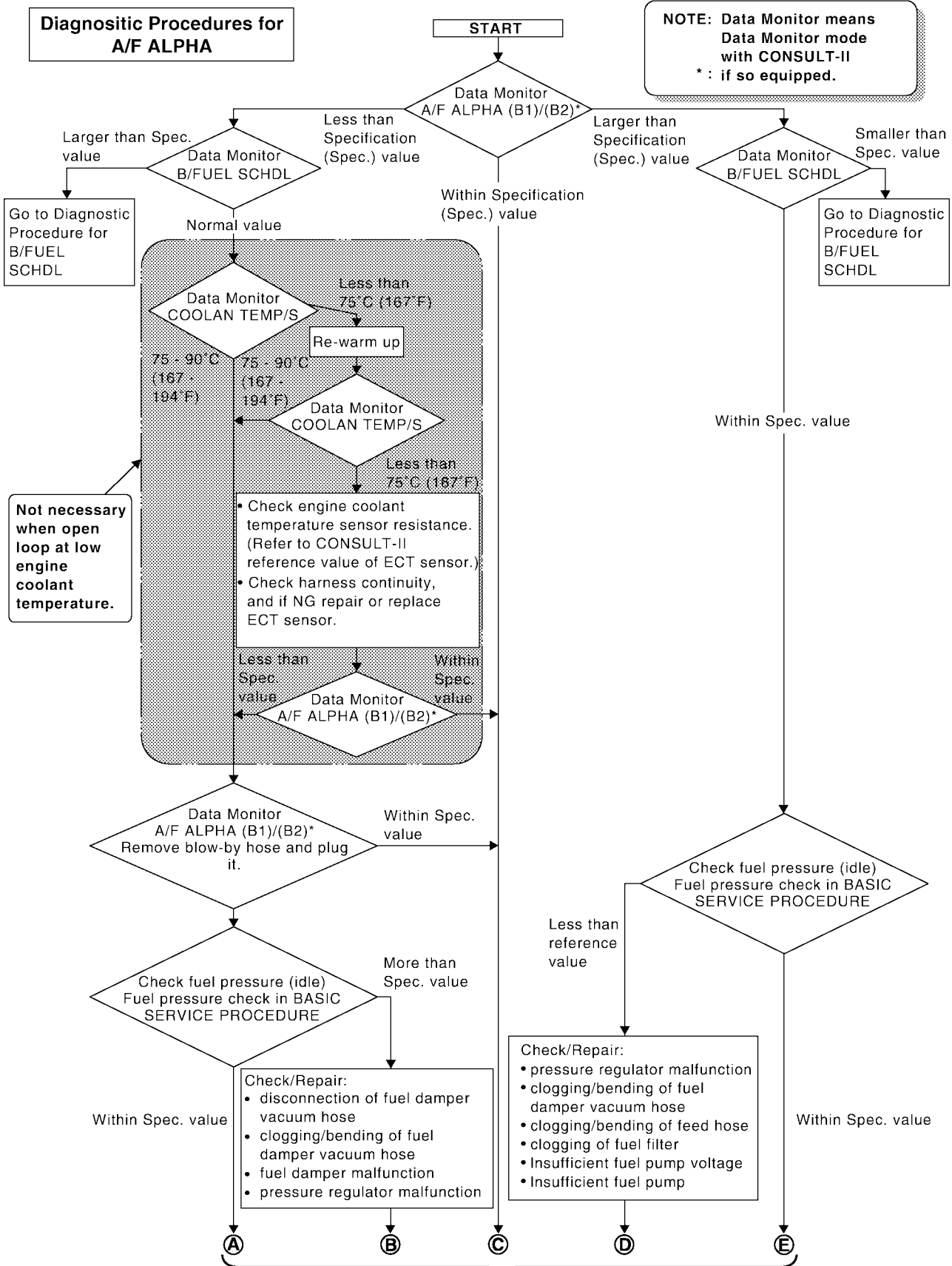
NOTE:

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

1. Perform “Basic Inspection”, EC-121.
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 “Diagnostic Procedure”, EC-151.

Diagnostic Procedure

NFE0720



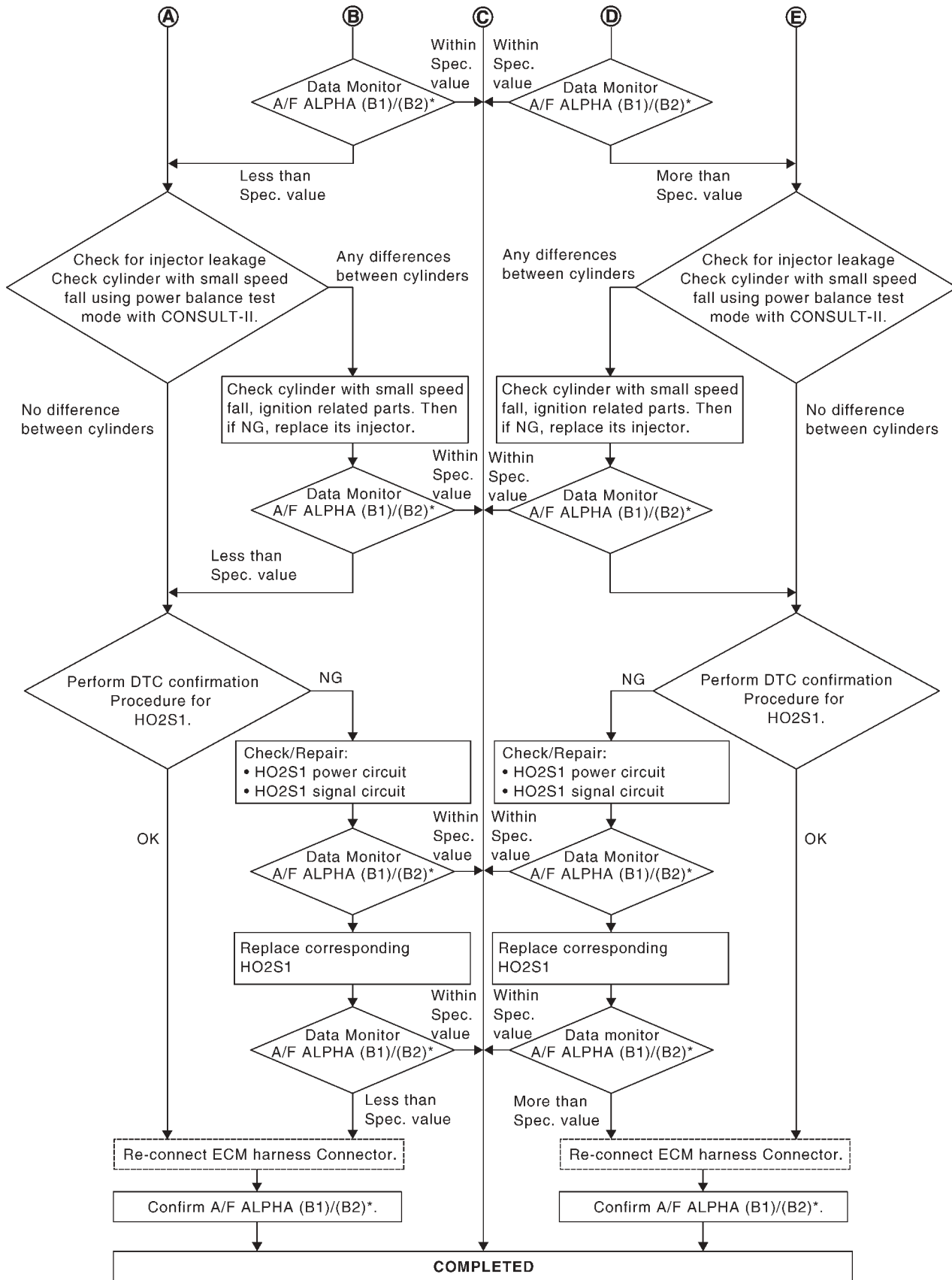
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SEF613ZD

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

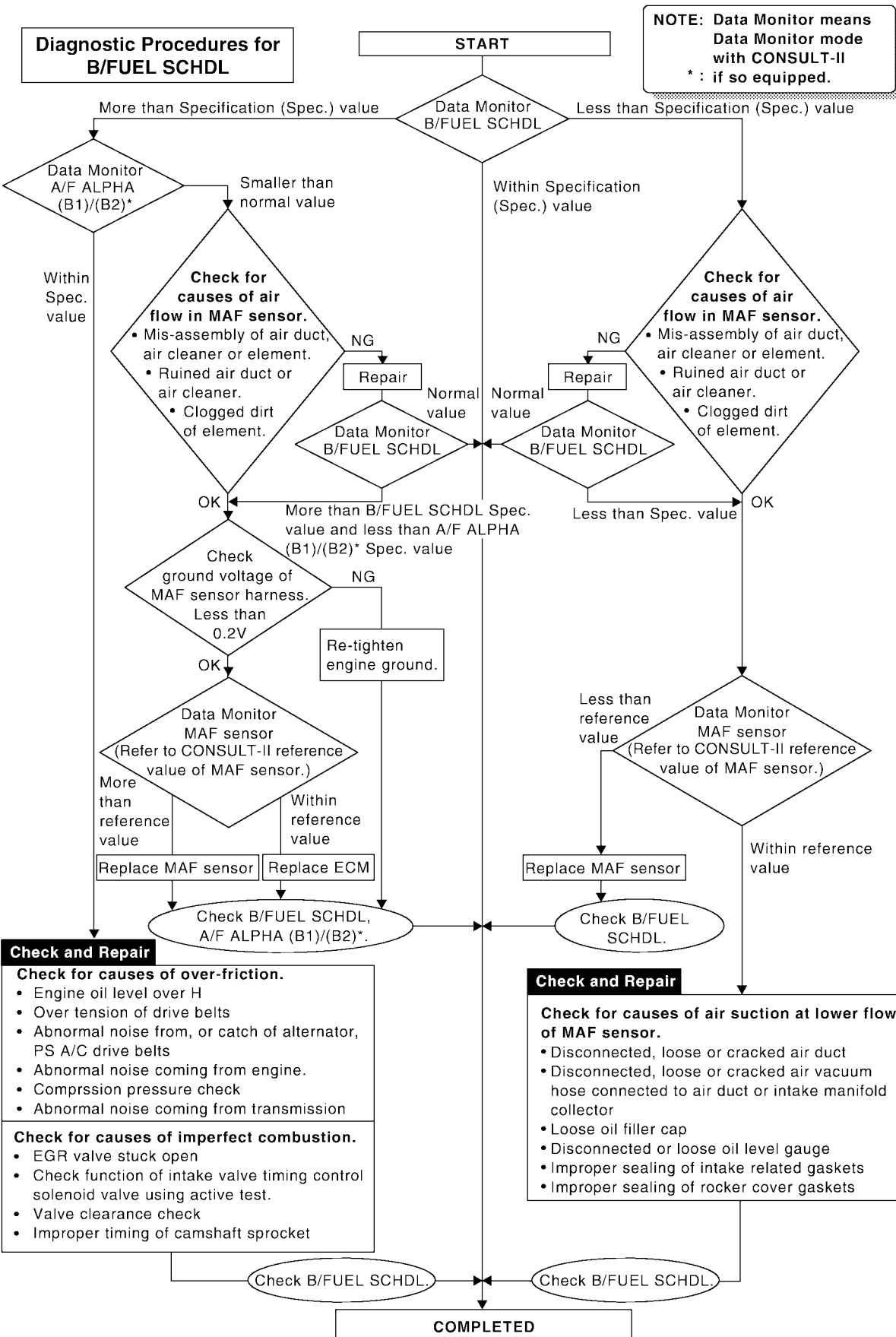
Diagnostic Procedure (Cont'd)



SEF768Z

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Diagnostic Procedure (Cont'd)



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SEF615ZA

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

Description

NFEC0045

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 problem area.

COMMON I/I REPORT SITUATIONS

NFEC0045S01

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 problem area.

Diagnostic Procedure

NFEC0046

1	INSPECTION START
Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION — RELATED INFORMATION", EC-91.	
	GO TO 2.

2	CHECK GROUND TERMINALS
Check ground terminals for corroding or loose connection. Refer to GI-30, "GROUND INSPECTION".	
OK or NG	
OK	GO TO 3.
NG	Repair or replace.

3	SEARCH FOR ELECTRICAL INCIDENT
Perform GI-25, "Incident Simulation Tests".	
OK or NG	
OK	GO TO 4.
NG	Repair or replace.

4	CHECK CONNECTOR TERMINALS
Refer to GI-22, "How to Check Enlarged Contact Spring of Terminal".	
OK or NG	
OK	INSPECTION END
NG	Repair or replace connector.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

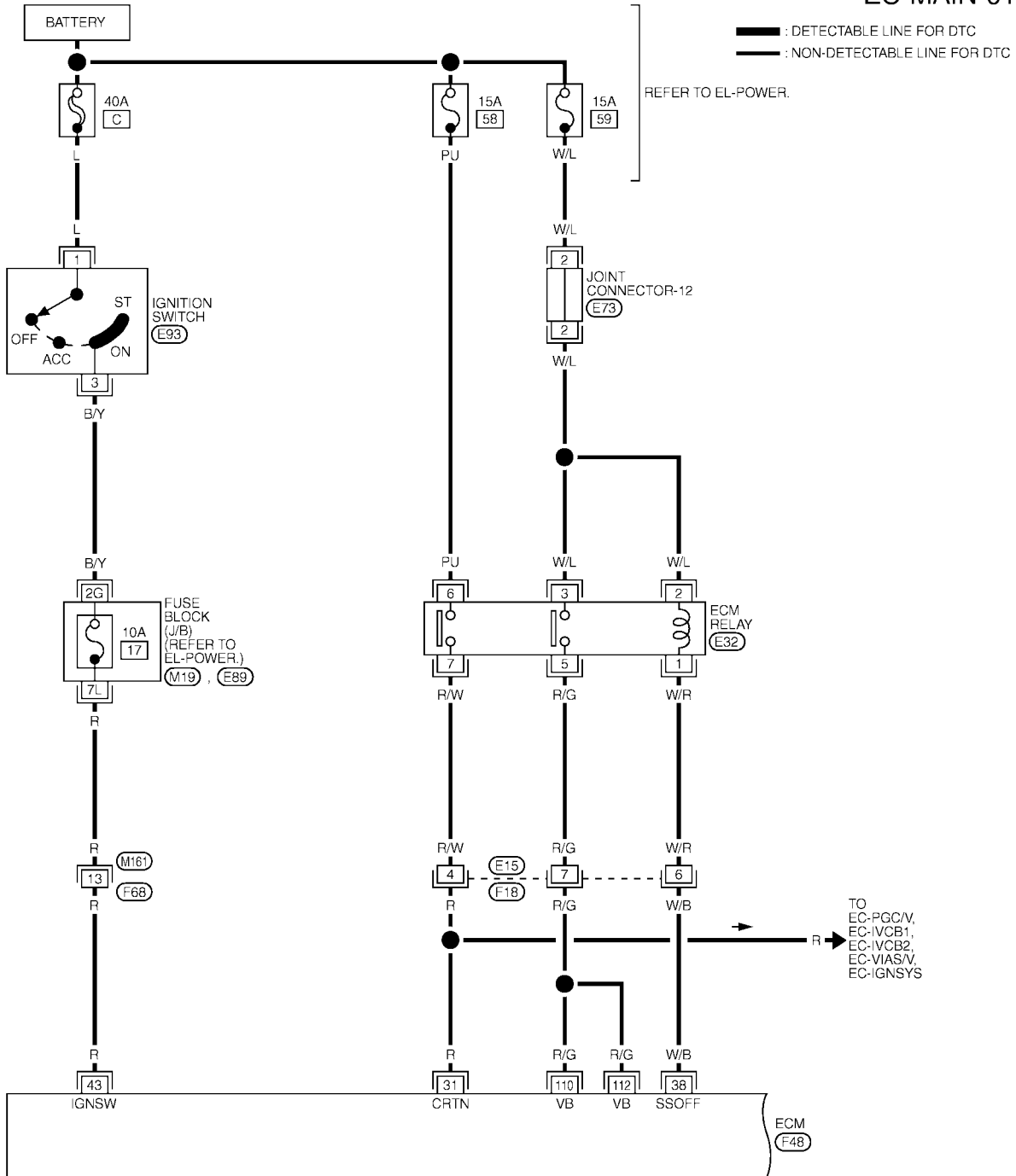
Main Power Supply and Ground Circuit

Main Power Supply and Ground Circuit

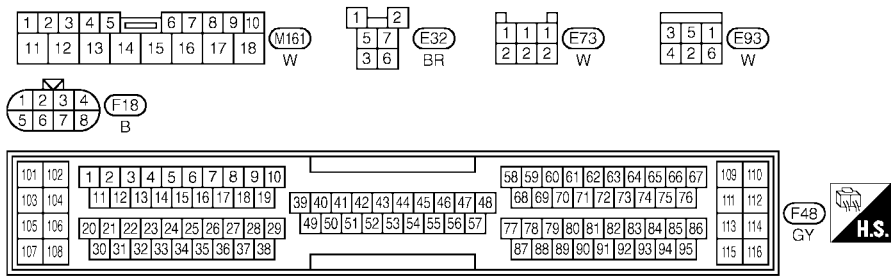
WIRING DIAGRAM

EC-MAIN-01

NFEC0047



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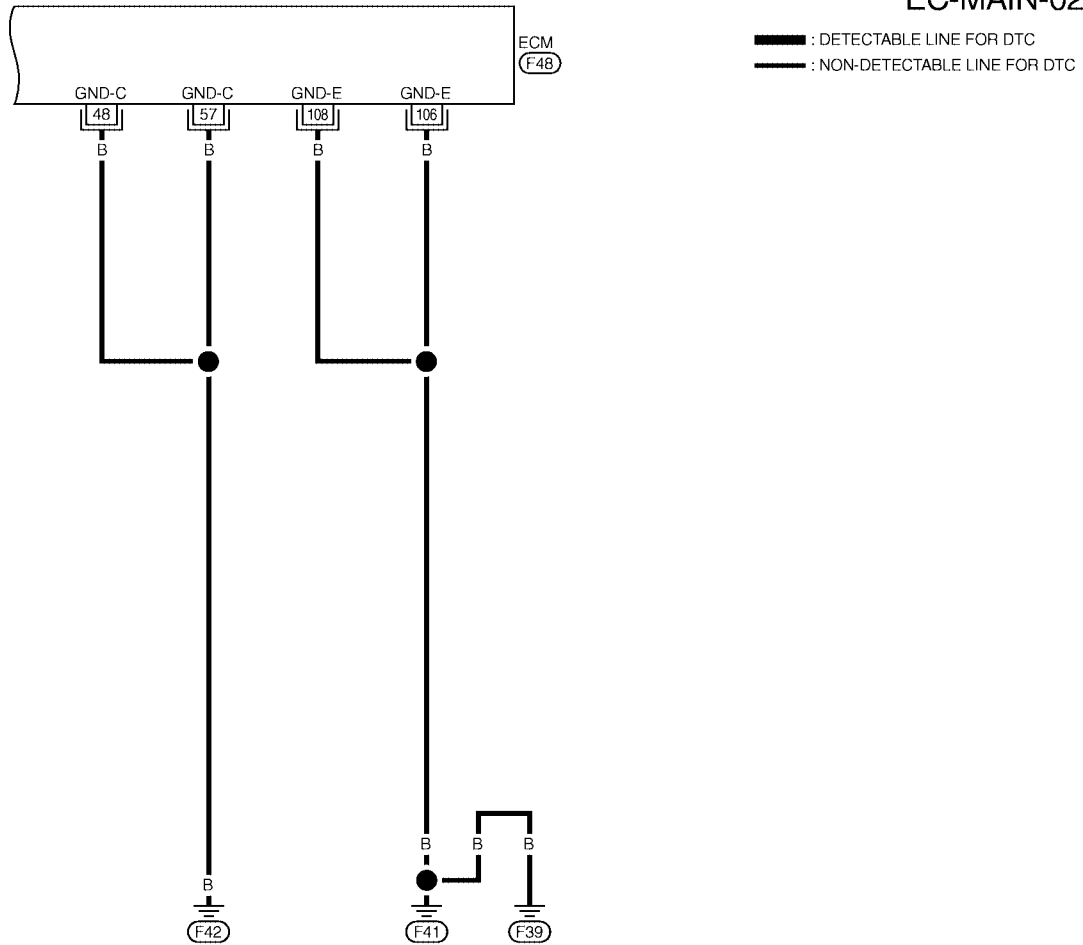


REFER TO THE FOLLOWING.
 (M19), (E89) - FUSE BLOCK-JUNCTION BOX (J/B)

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

EC-MAIN-02



101	102	1	2	3	4	5	6	7	8	9	10							58	59	60	61	62	63	64	65	66	67	109	110				
103	104	11	12	13	14	15	16	17	18	19		39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57		77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38												87	88	89	90	91	92	93	94	95	115	116	



MEC472D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
31	R	COUNTER CURRENT RETURN	IGN ON	BATTERY VOLTAGE
38	W/B	ECM RELAY (SELF-SHUTOFF)	ENGINE RUNNING FOR A FEW SECONDS AFTER TURNING IGN OFF	0 - 1.5V
			A FEW SECONDS PASSED AFTER TURNING IGN OFF	BATTERY VOLTAGE
43	R	IGN	IGN OFF	0V
			IGN ON	BATTERY VOLTAGE
48	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
57	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
106	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
108	B		ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
110	R/G	POWER SUPPLY FOR ECM	IGN ON	BATTERY VOLTAGE
112	R/G		IGN ON	BATTERY VOLTAGE

SEC043D

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

DIAGNOSTIC PROCEDURE

NFEC0049

1	INSPECTION START
Start engine. Is engine running?	
Yes or No	
Yes	GO TO 9.
No	GO TO 2.

GI
MA
EM

2	CHECK ECM POWER SUPPLY CIRCUIT-I
1. Turn ignition switch "OFF" and then "ON". 2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.	
SEF291X	
OK	GO TO 4.
NG	GO TO 3.

LC
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CL
MT

3	DETECT MALFUNCTIONING PART
Check the following.	
10A fuse Harness connectors M161, F68 Fuse block (J/B) connectors M19, E89 Harness for open or short between ECM and ignition switch	
Repair harness or connectors.	

SU
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ST

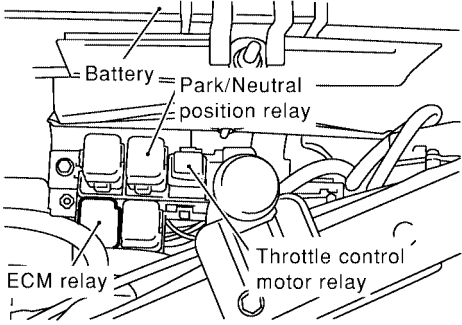
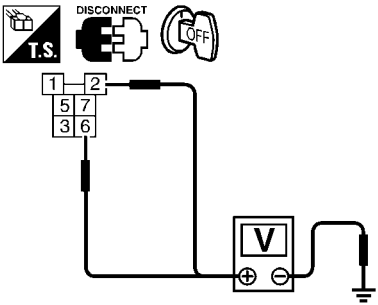
4	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to WIRING DIAGRAM. Continuity should exist. 4. Also check harness for short to power.	
OK or NG	
OK	GO TO 5.
NG	Repair open circuit or short to power in harness or connectors.

RS
BT
HA
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TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

5	CHECK POWER SUPPLY-II
<p>1. Disconnect ECM relay.</p> <div style="text-align: center;">  </div>	
<p>2. Check voltage between ECM relay terminals 2, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> </div>	
SEC044D	
SEF292X	
OK	GO TO 7.
NG	GO TO 6.

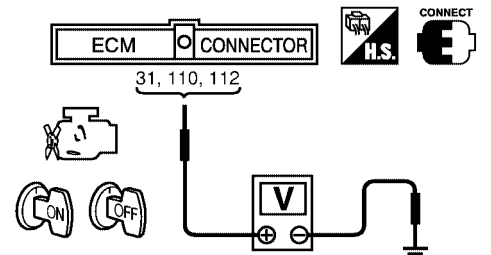
6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> 15A fuses Joint connector-12 Harness for open or short between ECM relay and battery 	
Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Check harness continuity between ECM terminal 38 and ECM relay terminal 1. Refer to WIRING DIAGRAM. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	Go to "IGNITION SIGNAL", EC-705.
NG	GO TO 8.

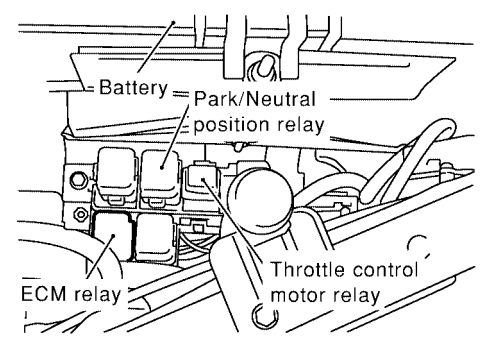
8	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E15, F18 Harness for open or short between ECM relay and ECM 	
Repair open circuit or short to ground or short to power in harness or connectors.	

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

9	CHECK ECM POWER SUPPLY CIRCUIT-II
<p>1. Turn ignition switch "ON" and then "OFF". 2. Check voltage between ECM terminals 31, 110, 112 and ground with CONSULT-II or tester.</p>	
	
SEC899C	
<p>Voltage: After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.</p>	
OK or NG	
OK	GO TO 15.
NG (Battery voltage does not exist.)	GO TO 10.
NG (Battery voltage exists for more than a few seconds.)	GO TO 12.

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10	CHECK ECM POWER SUPPLY CIRCUIT-III
<p>1. Disconnect ECM relay.</p>	
	
SEC044D	
<p>2. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.</p>	
<p>Voltage: Battery voltage</p>	
OK or NG	
OK	GO TO 12.
NG	GO TO 11.

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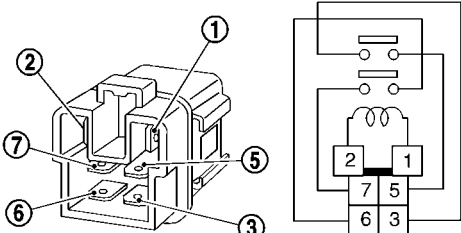
TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

11	DETECT MALFUNCTIONING PART
Check the following. Joint connector-12 Harness for open or short between ECM relay and 15A fuse	
Repair open circuit or short to ground or short to power in harness or connectors.	

12	CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM FOR OPEN AND SHORT						
1. Check harness continuity between ECM terminals and ECM relay terminals as follows. Refer to WIRING DIAGRAM.							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">ECM relay terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">31</td> <td style="text-align: center; padding: 5px;">7</td> </tr> <tr> <td style="text-align: center; padding: 5px;">110, 112</td> <td style="text-align: center; padding: 5px;">5</td> </tr> </tbody> </table>		ECM terminal	ECM relay terminal	31	7	110, 112	5
ECM terminal	ECM relay terminal						
31	7						
110, 112	5						
MTBL1139							
Continuity should exist. 2. Also check harness for short to ground and short to power.							
OK or NG							
OK	GO TO 14.						
NG	GO TO 13.						

13	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E15, F18 Harness for open or short between ECM and ECM relay	
Repair open circuit or short to ground or short to power in harness or connectors.	

14	CHECK ECM RELAY						
1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between relay terminals 3 and 5, 6 and 7.							
							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Condition</th> <th style="padding: 5px;">Continuity</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center; padding: 5px;">Yes</td> </tr> <tr> <td style="padding: 5px;">OFF</td> <td style="text-align: center; padding: 5px;">No</td> </tr> </tbody> </table>		Condition	Continuity	12V direct current supply between terminals 1 and 2	Yes	OFF	No
Condition	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
OFF	No						
SEF296X							
OK or NG							
OK	GO TO 15.						
NG	Replace ECM relay.						

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

15	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II	
	1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to WIRING DIAGRAM. Continuity should exist. 4. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
	OK	GO TO 16.
	NG	Repair open circuit or short to ground or short to power in harness or connectors.

GI

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16	CHECK INTERMITTENT INCIDENT	
	Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END	

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DTC U1000, U1001 CAN COMMUNICATION LINE

Description

Description

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.

NFEC1245

On Board Diagnosis Logic

NFEC1246

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000 U1001 1001	CAN communication line	ECM cannot communicate to other control unit. ECM cannot communicate for more than the specified time.	Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

NFEC1247

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 "Diagnostic Procedure" EC-164.

DTC U1000, U1001 CAN COMMUNICATION LINE

Wiring Diagram

Wiring Diagram

NFEC1248

EC-CAN-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- - - : DATA LINE

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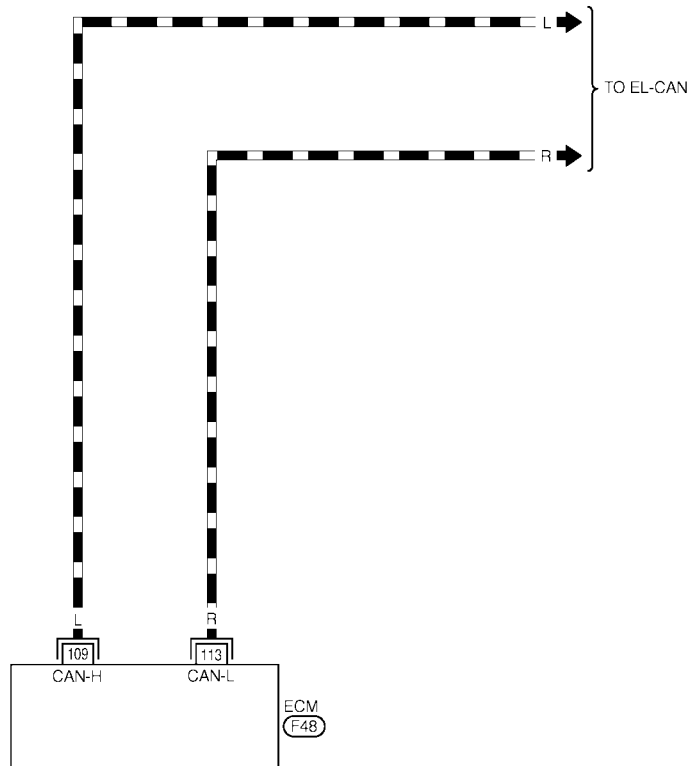
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101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19			39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29		49	50	51	52	53	54	55	56	57		77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38													87	88	89	90	91	92	93	94	95	115	116	

F48 GY 

MEC923D

DTC U1000, U1001 CAN COMMUNICATION LINE

Diagnostic Procedure

Diagnostic Procedure

Go to EL-436 (With TCS models) or EL-430 (Without TCS models),
“CAN SYSTEM”. NFEC1249

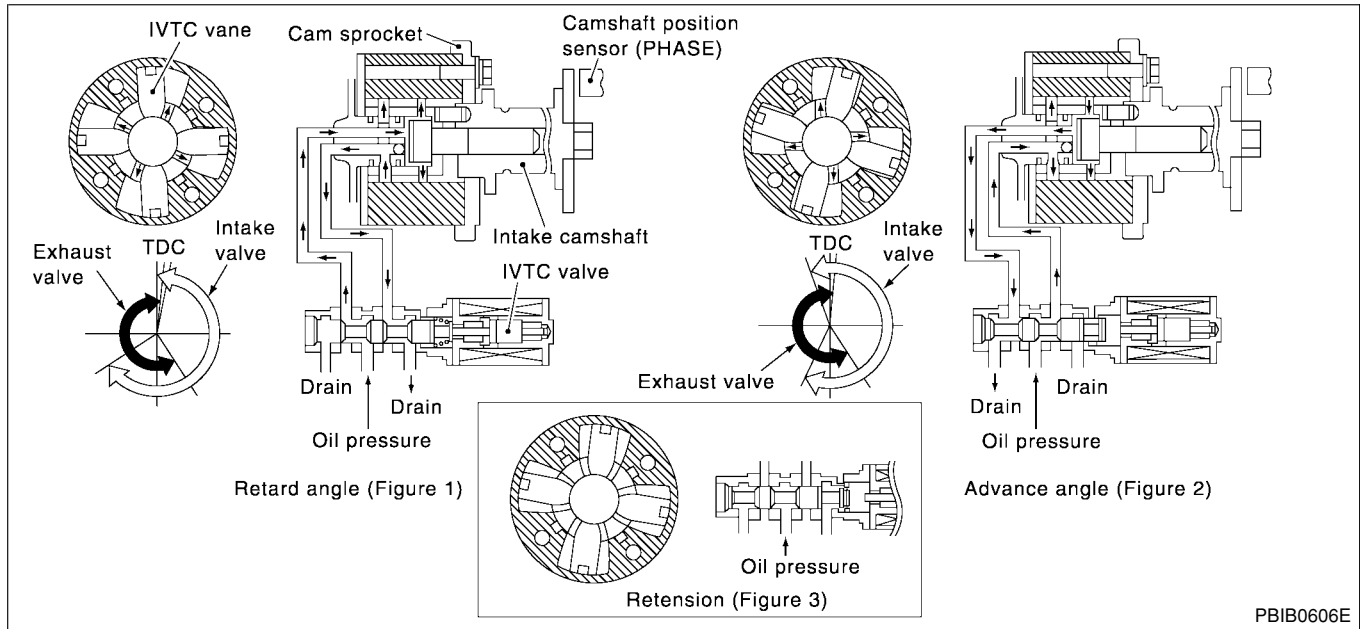
Description

NFEC0821

NFEC0821S01

SYSTEM DESCRIPTION

Sensor	Input signal to ECM function	ECM	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed sensor	Vehicle speed		



PBIB0606E

This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the camshaft timing control valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0822

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1) INT/V TIM (B2)	Engine: After warming up Shift lever "N" Quickly depressed accelerator pedal No-load Idle	-5 - 5° CA
	2,000 rpm	Approximately 0 - 30° CA
INT/V SOL (B1) INT/V SOL (B2)	Engine: After warming up Shift lever "N" Quickly depressed accelerator pedal No-load Idle	0 - 2%
	2,000 rpm	Approximately 25 - 50%

DTC P0011, P0021 IVT CONTROL

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC0824

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0011 0011 (Bank 1) P0021 0021 (Bank 2)	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) Intake valve timing control solenoid valve Crankshaft position sensor (POS) Camshaft position sensor (PHASE) Accumulation of debris to the signal pick-up portion of the camshaft

FAIL-SAFE MODE

NFEC0824S01

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

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function.

DTC Confirmation Procedure

NFEC0825

CAUTION:

Always drive 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.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLANTENP/S	XXX °C
VHCL SPEED SE	XXX km/h
INT/V TIM (B1)	XXX °CA
INT/V TIM (B2)	XXX °CA
INT/V SOL (B1)	XXX %
INT/V SOL (B2)	XXX %

SEF353Z

WITH CONSULT-II

NFEC0825S03

- 1) Turn ignition switch “ON”.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	2,000 - 3,000 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 90°C (158 - 194°F)
Selector lever	1st position (A/T or M/T)
Driving location	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

- 4) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-170.

WITH GST

NFEC0825S04

Follow the procedure “WITH CONSULT-II” above.

DTC P0011, P0021 IVT CONTROL

Wiring Diagram

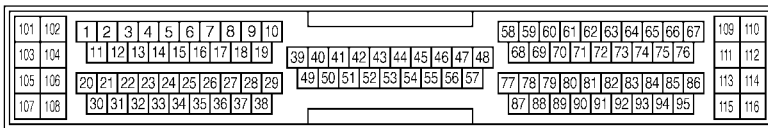
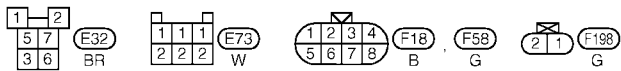
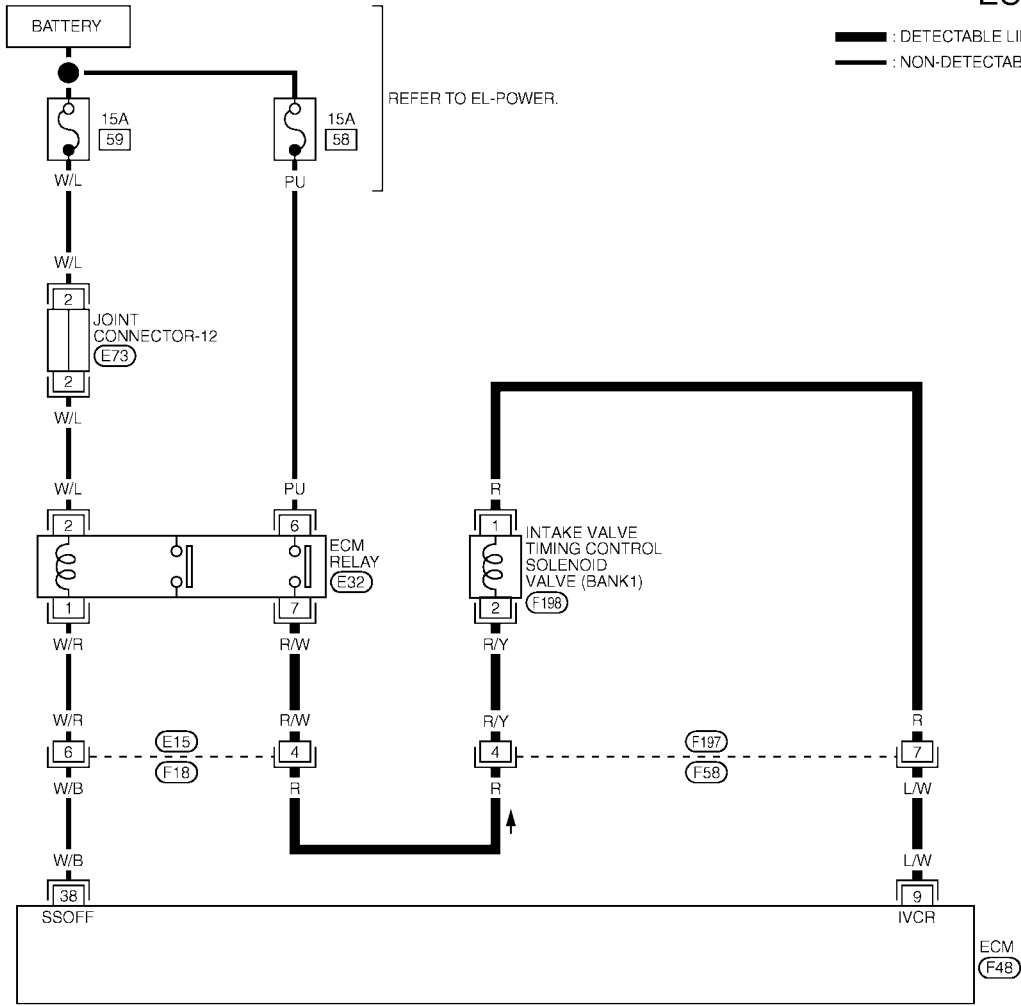
Wiring Diagram

=NFEC1409

BANK 1

EC-IVCB1-01

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



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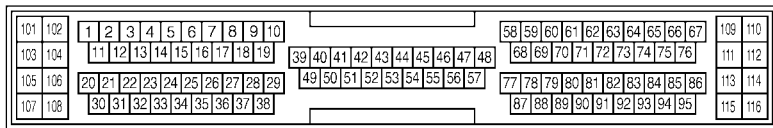
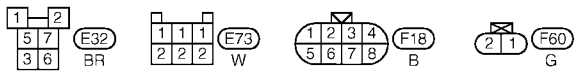
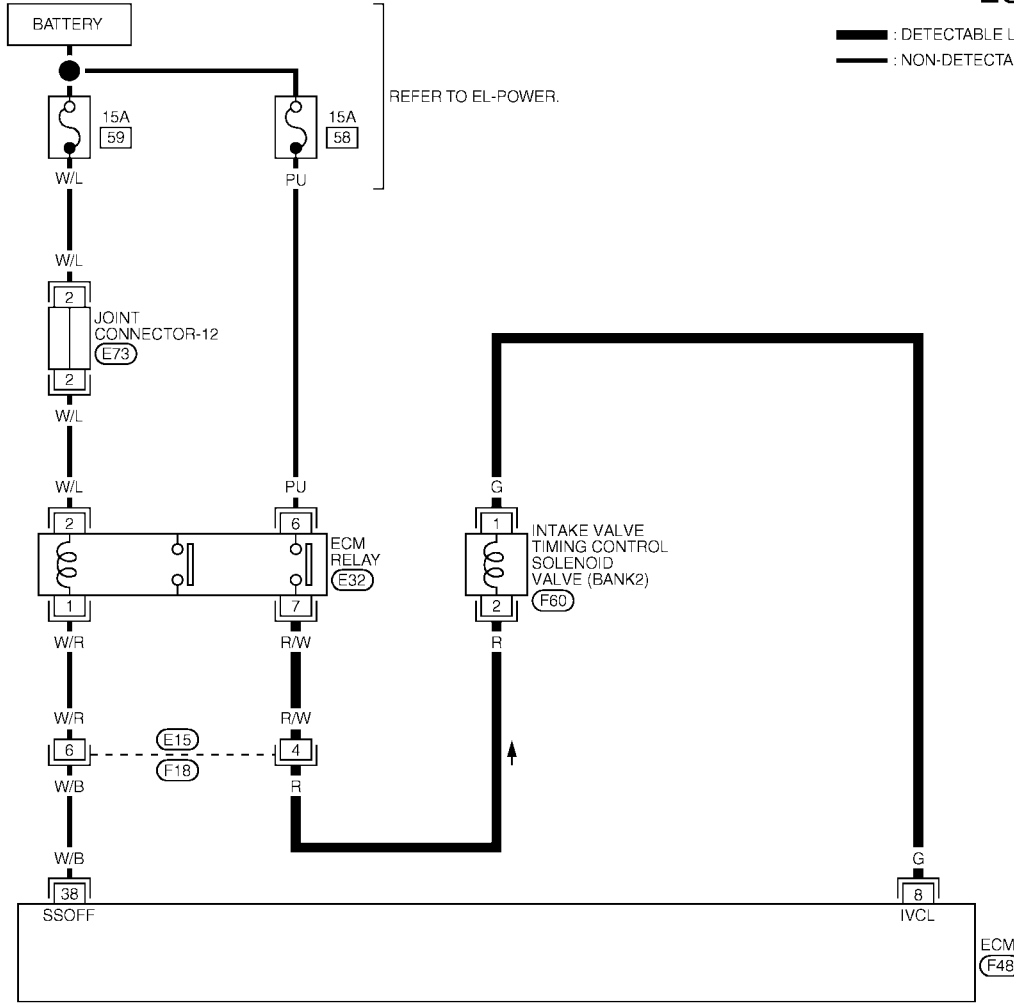
DTC P0011, P0021 IVT CONTROL

Wiring Diagram (Cont'd)

BANK 2

EC-IVCB2-01

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



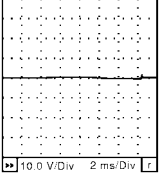
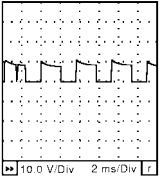
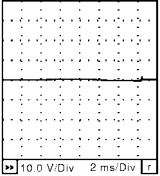
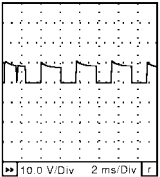
DTC P0011, P0021 IVT CONTROL

Wiring Diagram (Cont'd)

Specification data are reference values, and are measured between each terminal and ground.

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	G	Intake valve timing control solenoid valves (Bank 2)	[Engine is running] Warm-up condition Idle speed	Battery voltage (11 - 14V)★  SEC988C
			[Engine is running] Warm-up condition Engine speed is 2,500 rpm.	7 - 12V★  SEC989C
9	L/W	Intake valve timing control solenoid valves (Bank 1)	[Engine is running] Warm-up condition Idle speed	Battery voltage (11 - 14V)★  SEC988C
			[Engine is running] Warm-up condition Engine speed is 2,500 rpm.	7 - 12V★  SEC989C

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

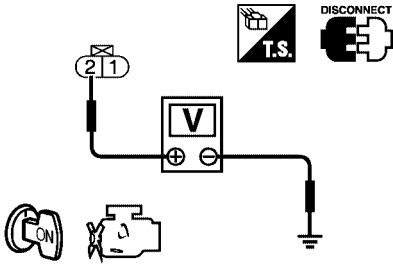
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DTC P0011, P0021 IVT CONTROL

Diagnostic Procedure

Diagnostic Procedure

NFEC1410

1	CHECK POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect intake valve timing control solenoid valve harness connector. 3. Turn ignition switch "ON". 4. Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester. 	
	
<p>Voltage: Battery voltage</p> <p>OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

PBIB0192E

2	DETECT MALFUNCTION PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E15, F18 Harness connectors F58, F197 Harness for open or short between intake valve timing control solenoid valve and ECM relay 	
<p>Repair harness or connectors.</p>	

3	CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 9 (bank 1) or 8 (bank 2) and intake valve timing control solenoid valve terminal 1. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power. 	
<p>OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following</p> <ul style="list-style-type: none"> Harness connectors F58, F197 Harness for open or short between intake valve timing control solenoid valve and ECM 	
<p>Repair open circuit or short to ground or short to power in harness or connectors.</p>	

DTC P0011, P0021 IVT CONTROL

Diagnostic Procedure (Cont'd)

5	CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE
Refer to "Component Inspection", EC-172.	
OK or NG	
OK	GO TO 6.
NG	Replace intake valve timing control solenoid valve.

GI

MA

EM

6	CHECK CRANKSHAFT POSITION SENSOR (POS)
Refer to "Component Inspection", EC-334.	
OK or NG	
OK	GO TO 7.
NG	Replace crankshaft position sensor (POS).

LC

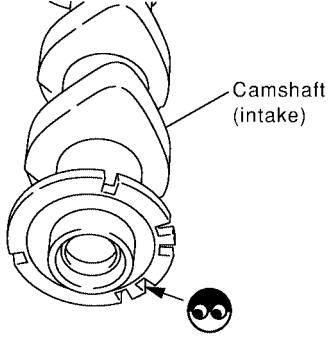
EC

7	CHECK CAMSHAFT POSITION SENSOR (PHASE)
Refer to "Component Inspection", EC-343.	
OK or NG	
OK	GO TO 8.
NG	Replace.

FE

CL

MT

8	CHECK CAMSHAFT (INTAKE)
Visually check for chipped signal plate at camshaft rear.	
	
SEC905C	
OK or NG	
OK	GO TO 9.
NG	Replace camshaft.

AT

AX

SU

BR

ST

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9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
OK or NG	
INSPECTION END	

HA

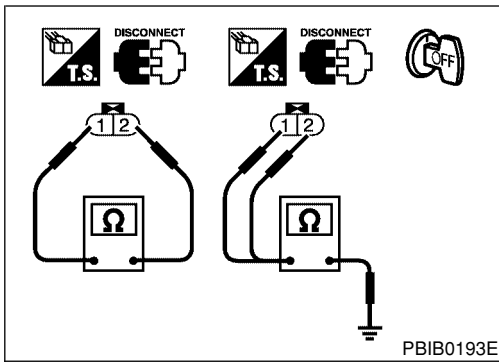
SC

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DTC P0011, P0021 IVT CONTROL

Component Inspection



Component Inspection

NFEC1411

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance
1 and 2	7.0 - 7.5 Ω at 20°C (68°F)
1 or 2 and ground	$\infty\Omega$ (Continuity should not exist)

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

Description

Description

SYSTEM DESCRIPTION

NFEC0826

NFEC0826S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heaters
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF control of the heated oxygen sensor 1 heaters corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

OPERATION

NFEC0826S02

Engine speed rpm	Heated oxygen sensor 1 heaters
Above 3,600	OFF
Below 3,600 after warming up	ON

CONSULT-II Reference Value in Data Monitor Mode

NFEC0827

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1) HO2S1 HTR (B2)	Engine: After warming up Engine speed: Below 3,600 rpm	ON
	Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

NFEC0829

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0031 0031 (Bank 1) P0051 0051 (Bank 2)	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) Heated oxygen sensor 1 heater
P0032 0032 (Bank 1) P0052 0052 (Bank 2)	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) Heated oxygen sensor 1 heater

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

DTC Confirmation Procedure

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NFEC0830

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

NFEC0830S01

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 6 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-177.

WITH GST

NFEC0830S02

- 1) Start engine and run it for at least 6 seconds at idle speed.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and run it for at least 6 seconds at idle speed.
- 4) Select "MODE 3" with GST.
- 5) If DTC is detected, go to "Diagnostic Procedure", EC-177.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

Wiring Diagram

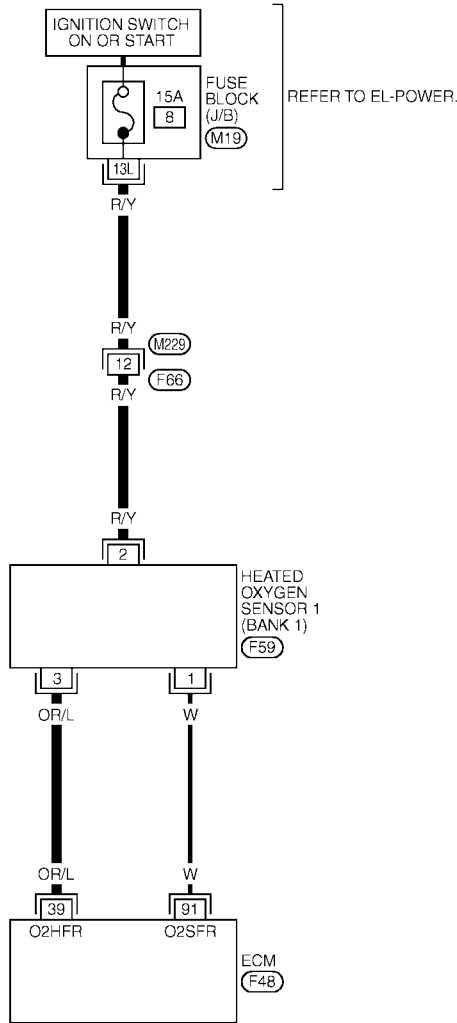
Wiring Diagram

BANK 1

NFEC0831

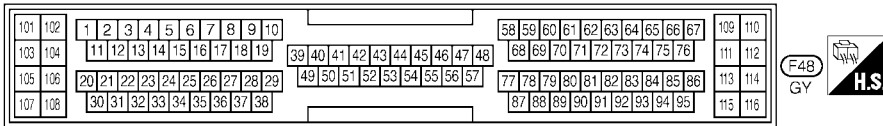
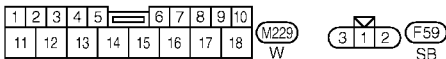
NFEC0831S01

EC-O2H1B1-01



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

REFER TO EL-POWER.



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC539D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
39	OR/L	HEATED OXYGEN SENSOR 1 HEATER (BANK 1)	[ENGINE IS RUNNING] • WARM-UP CONDITION • ENGINE SPEED IS BELOW 3,600 RPM.	Approximately 7V ★ <small>20 10.0 V/Div 50 ms/Div</small>
			[ENGINE IS RUNNING] • ENGINE SPEED IS ABOVE 3,600 RPM.	BATTERY VOLTAGE (11 - 14V)

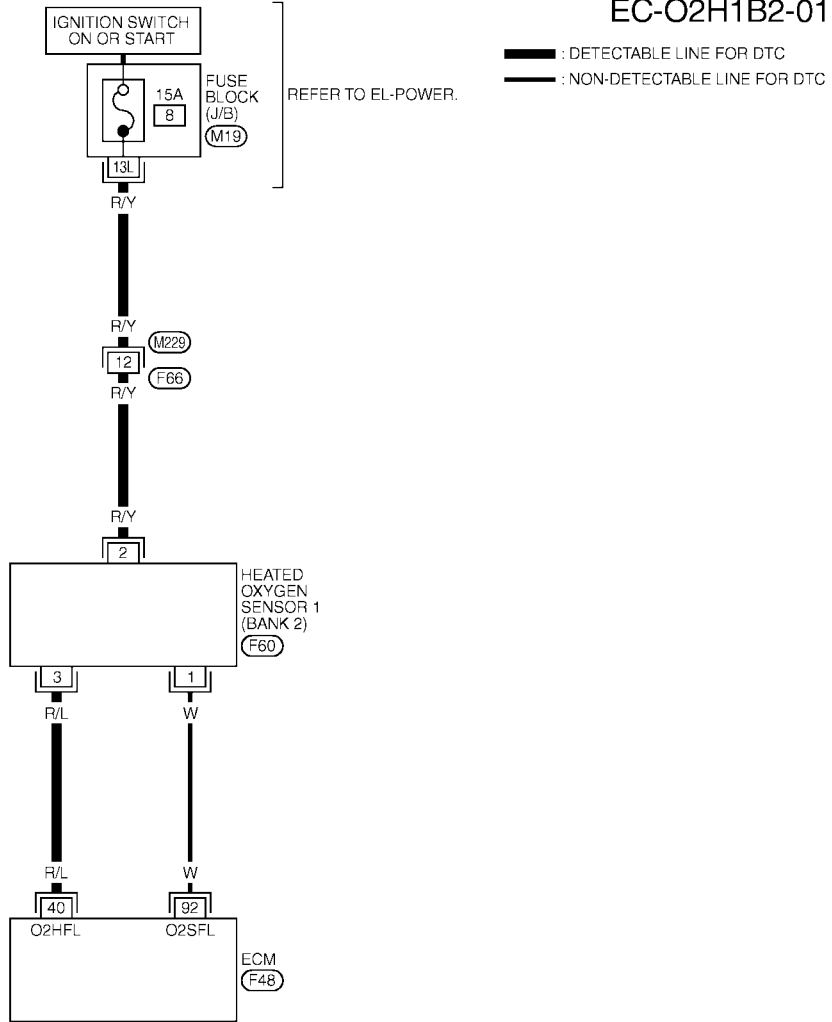
SEC657D

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

Wiring Diagram (Cont'd)

BANK 2

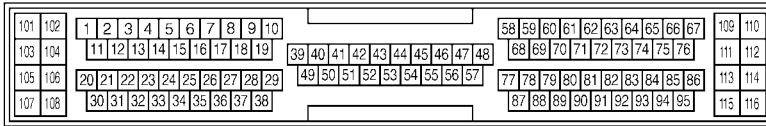
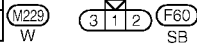
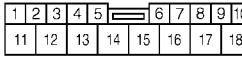
NFEC0831S02



EC-O2H1B2-01

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

REFER TO EL-POWER.



REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC540D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

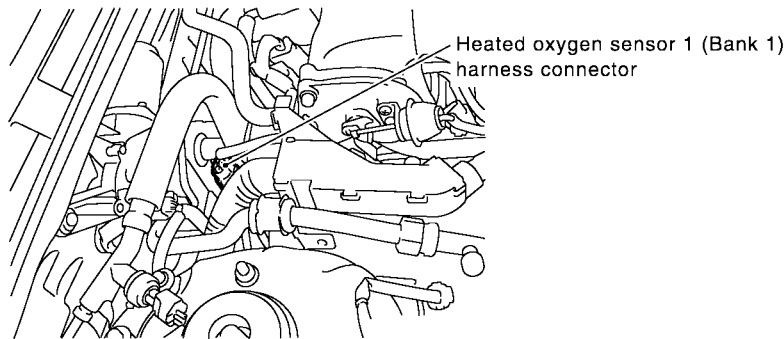
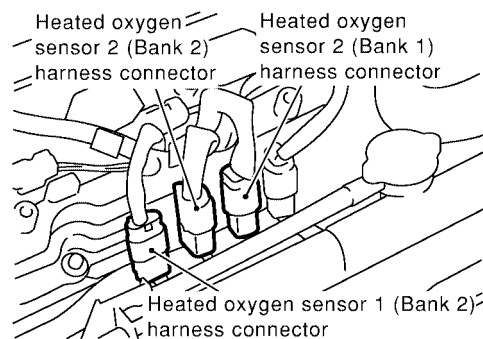
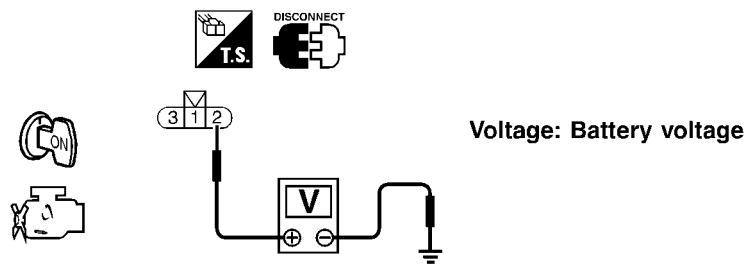
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	R/L	HEATED OXYGEN SENSOR 1 HEATER (BANK 2)	[ENGINE IS RUNNING] • WARM-UP CONDITION • ENGINE SPEED IS BELOW 3,600 RPM.	Approximately 7V ★
			[ENGINE IS RUNNING] • ENGINE SPEED IS ABOVE 3,600 RPM.	BATTERY VOLTAGE (11 - 14V)

SEC658D

Diagnostic Procedure

NFEC0832

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

1	CHECK HO2S1 POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect corresponding heated oxygen sensor 1 harness connector.</p>  <p style="text-align: right;">Heated oxygen sensor 1 (Bank 1) harness connector</p>  <p style="text-align: center;">Heated oxygen sensor 2 (Bank 2) harness connector Heated oxygen sensor 2 (Bank 1) harness connector</p> <p style="text-align: center;">Heated oxygen sensor 1 (Bank 2) harness connector</p> <p>3. Turn ignition switch "ON". 4. Check voltage between HO2S1 terminal 2 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
SEC099D	
SEC134D	
SEF311X	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors M161, F68 Fuse block (J/B) connector M19 15A fuse Harness for open or short between heated oxygen sensor 1 and fuse</p>	
Repair harness or connectors.	

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

Diagnostic Procedure (Cont'd)

3	CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT														
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0031, P0032</td> <td style="text-align: center;">39</td> <td style="text-align: center;">3</td> <td style="text-align: center;">Bank 1</td> </tr> <tr> <td>P0051, P0052</td> <td style="text-align: center;">40</td> <td style="text-align: center;">3</td> <td style="text-align: center;">Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM	Sensor	P0031, P0032	39	3	Bank 1	P0051, P0052	40	3	Bank 2
DTC	Terminals		Bank												
	ECM	Sensor													
P0031, P0032	39	3	Bank 1												
P0051, P0052	40	3	Bank 2												
MTBL1140															
<p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>															
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 1 HEATER						
<p>Check resistance between HO2S1 terminals as follows.</p>							
SEF310X							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Terminals</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2 and 3</td> <td style="text-align: center;">2.3 - 4.3Ω at 25°C (77°F)</td> </tr> <tr> <td style="text-align: center;">1 and 2 1 and 3</td> <td style="text-align: center;">∞Ω (Continuity should not exist.)</td> </tr> </tbody> </table>		Terminals	Resistance	2 and 3	2.3 - 4.3Ω at 25°C (77°F)	1 and 2 1 and 3	∞Ω (Continuity should not exist.)
Terminals	Resistance						
2 and 3	2.3 - 4.3Ω at 25°C (77°F)						
1 and 2 1 and 3	∞Ω (Continuity should not exist.)						
<p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 5.						
NG	Replace malfunctioning heated oxygen sensor.						

5	CHECK INTERMITTENT INCIDENT
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.</p>	
INSPECTION END	

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Description

Description

NFEC0833

SYSTEM DESCRIPTION

NFEC0833S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor heater 2 control	Heated oxygen sensor 2 heaters
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 heaters corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

NFEC0833S02

Engine speed rpm	Heated oxygen sensor 2 heaters
Above 3,600	OFF
Below 3,600 (After the following conditions are met.) After warming up After keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	ON

CONSULT-II Reference Value in Data Monitor Mode

NFEC0834

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1) HO2S2 HTR (B2)	Ignition switch: ON (Engine stopped) Engine is running above 3,600 rpm.	OFF
	Engine speed: Below 3,600 rpm after the following conditions are met. After warming up After keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	ON

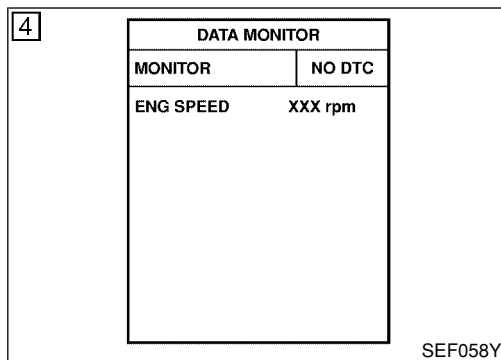
On Board Diagnosis Logic

NFEC0836

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0037 0037 (Bank 1) P0057 0057 (Bank 2)	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.)	Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) Heated oxygen sensor 2 heater
P0038 0038 (Bank 1) P0058 0058 (Bank 2)	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.)	Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.) Heated oxygen sensor 2 heater

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

DTC Confirmation Procedure



DTC Confirmation Procedure

NFEC0837

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 11.0V and 16V at idle.

WITH CONSULT-II

NFEC0837S01

- 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 one minute under no load.
- 5) Let engine idle for one minute.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-183.

WITH GST

NFEC0837S02

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds.
- 6) Start engine and keep the engine speed at between 3,500 to 4,000 rpm for at least one minute under no load.
- 7) Let engine idle for one minute.
- 8) Select "MODE 3" with GST.
- 9) If DTC is detected, go to "Diagnostic Procedure", EC-183.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

Wiring Diagram

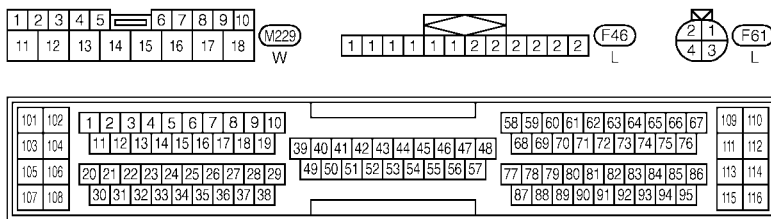
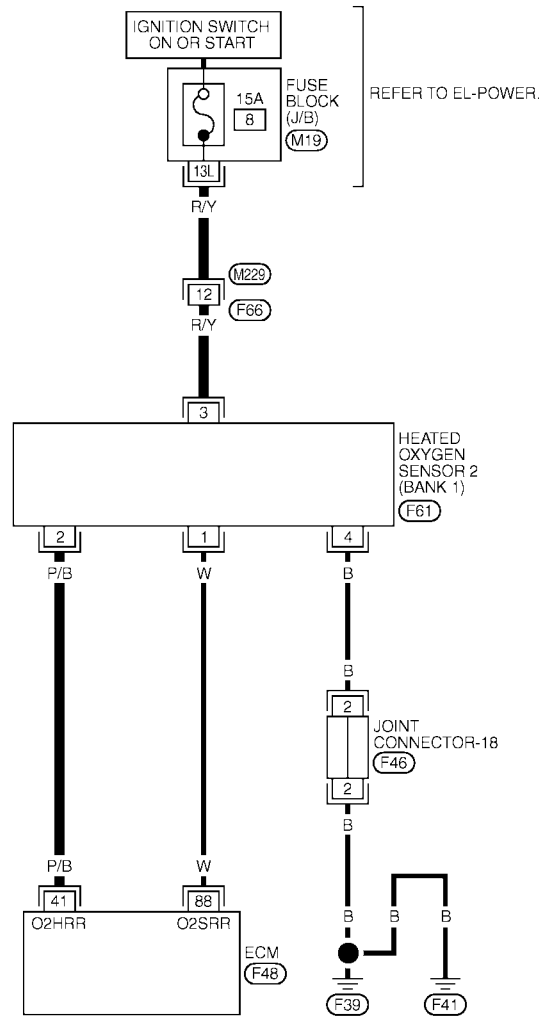
BANK 1

=NFEC0838

NFEC0838S01

EC-O2H2B1-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC543D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
41	P/B	HEATED OXYGEN SENSOR 2 HEATER (BANK 1)	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			<ul style="list-style-type: none"> ENGINE SPEED: BELOW 3,600 RPM AFTER THE FOLLOWING CONDITIONS ARE MET ENGINE: AFTER WARMING UP KEEP ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD 	0 - 1.0V

SEC659D

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

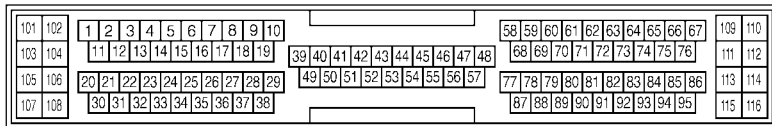
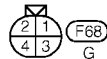
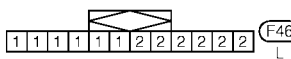
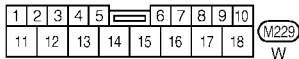
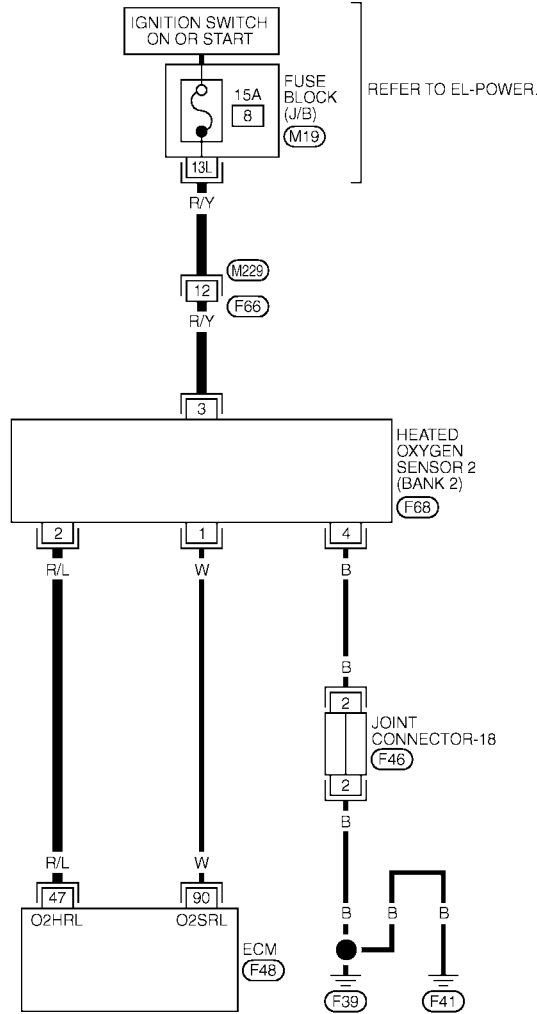
Wiring Diagram (Cont'd)

BANK 2

NFEC0838S02

EC-O2H2B2-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC544D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

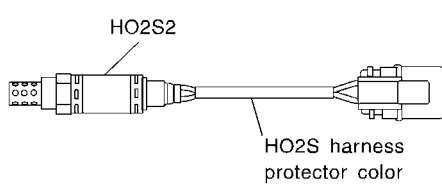
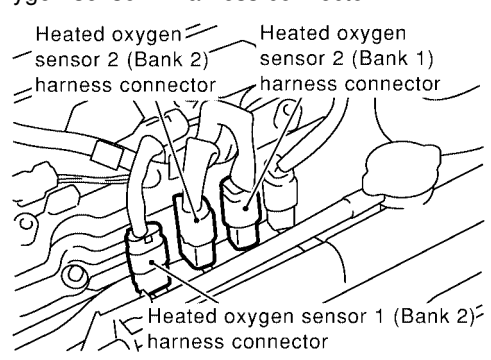
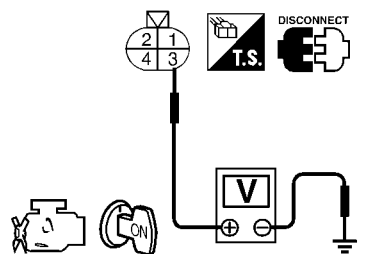
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
47	R/L	HEATED OXYGEN SENSOR 2 HEATER (BANK 1)	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			<ul style="list-style-type: none"> ENGINE SPEED: BELOW 3,600 RPM AFTER THE FOLLOWING CONDITIONS ARE MET ENGINE: AFTER WARMING UP KEEP ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD 	0 - 1.0V

SEC660D

Diagnostic Procedure

NFEC0839

1	CHECK HO2S2 POWER SUPPLY CIRCUIT	GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA
1. Turn ignition switch "OFF". 2. Check heated oxygen sensor harness 2 protector color.		
 <p>HO2S2 (bank 1): White or Gray HO2S2 (bank 2): Red or Red/Brown</p>		SEF372ZB
3. Disconnect corresponding heated oxygen sensor 2 harness connector.		
		SEC134D
4. Turn ignition switch "ON". 5. Check voltage between HO2S2 terminal 3 and ground.		
 <p>Voltage: Battery voltage</p>		SEF314X
OK or NG		
OK	GO TO 3.	
NG	GO TO 2.	

2	DETECT MALFUNCTIONING PART	SC EL IDX
Check the following. Harness connectors M161, F68 Fuse block (J/B) connector M19 15A fuse Harness for open or short between heated oxygen sensor 2 and fuse		
Repair harness or connectors.		

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Diagnostic Procedure (Cont'd)

3	CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT														
<p>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.</p>															
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0037, P0038</td> <td style="text-align: center;">41</td> <td style="text-align: center;">2</td> <td style="text-align: center;">Bank 1</td> </tr> <tr> <td>P0057, P0058</td> <td style="text-align: center;">47</td> <td style="text-align: center;">2</td> <td style="text-align: center;">Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM	Sensor	P0037, P0038	41	2	Bank 1	P0057, P0058	47	2	Bank 2
DTC	Terminals		Bank												
	ECM	Sensor													
P0037, P0038	41	2	Bank 1												
P0057, P0058	47	2	Bank 2												
MTBL1141															
<p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>															
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								
<p>Check the resistance between HO2S2 terminals as follows.</p>									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Terminal No.</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2 and 3</td> <td style="text-align: center;">2.3 - 4.3Ω at 25°C (77°F)</td> </tr> <tr> <td style="text-align: center;">1 and 2, 3, 4</td> <td style="text-align: center;">∞ Ω</td> </tr> <tr> <td style="text-align: center;">4 and 1, 2, 3</td> <td style="text-align: center;">(Continuity should not exist.)</td> </tr> </tbody> </table>		Terminal No.	Resistance	2 and 3	2.3 - 4.3Ω at 25°C (77°F)	1 and 2, 3, 4	∞ Ω	4 and 1, 2, 3	(Continuity should not exist.)
Terminal No.	Resistance								
2 and 3	2.3 - 4.3Ω at 25°C (77°F)								
1 and 2, 3, 4	∞ Ω								
4 and 1, 2, 3	(Continuity should not exist.)								
SEF315X									
<p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p>									
OK	GO TO 6.								
NG	GO TO 5.								

5	REPLACE HEATED OXYGEN SENSOR 2
<p>Check rear heated oxygen sensor harness protector color.</p>	
<p>HO2S2 (bank 1): White or Gray HO2S2 (bank 2): Red or Red/Brown</p>	
SEF372ZB	
<p>CAUTION: Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
<p>Replace malfunctioning heated oxygen sensor 2.</p>	

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Diagnostic Procedure (Cont'd)

6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

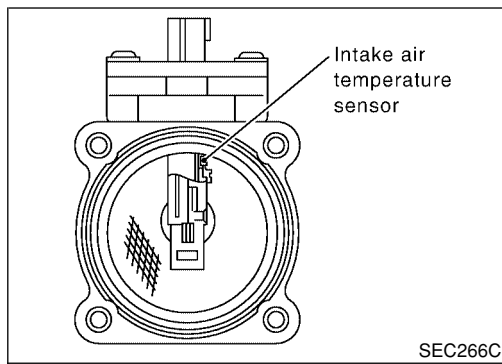
SC

EL

IDX

DTC P0101 MAF SENSOR

Component Description



Component Description

NFEC0840

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. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0841

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

NFEC1428

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.	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.	Harness or connectors (The sensor circuit is open or shorted.) Intake air leaks Mass air flow sensor

DTC Confirmation Procedure

NFEC0844

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.

GI

MA

EM

LC

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

SEF174Y

PROCEDURE FOR MALFUNCTION A

NFEC0844S01

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.

EC

FE

With CONSULT-II

NFEC0844S0101

- 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 "Diagnostic Procedure", EC-190.

CL

MT

With GST

NFEC0844S0102

Follow the procedure "With CONSULT-II" above.

AT

AX

SU

BR

ST

RS

BT

HA

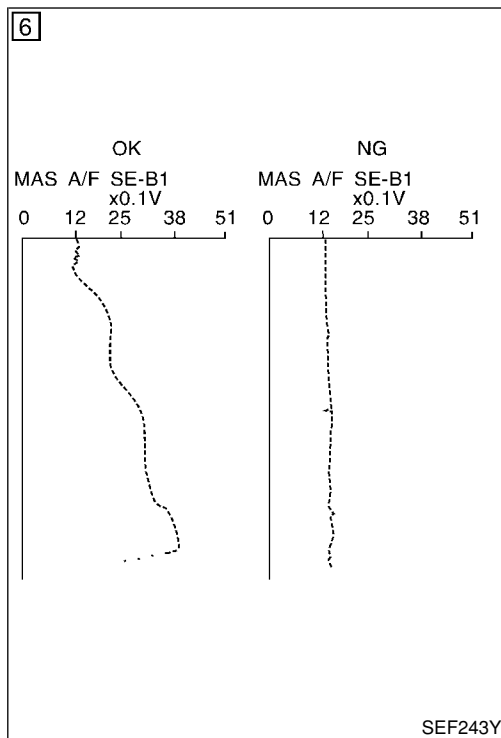
SC

EL

IDX

DTC P0101 MAF SENSOR

DTC Confirmation Procedure (Cont'd)



PROCEDURE FOR MALFUNCTION B

NFEC0844S02

CAUTION:

Always drive vehicle at a safe speed.

With CONSULT-II

NFEC0844S0201

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature. **If engine cannot be started, go to "Diagnostic Procedure", EC-190.**
- 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 "Diagnostic Procedure", EC-190.
If OK, go to following step.
- 7) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1 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 "Diagnostic Procedure", EC-190.

7

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

PBIB0199E

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

Overall Function Check

NFEC0845

PROCEDURE FOR MALFUNCTION B

NFEC0845S01

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

NFEC0845S0101

- 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 "Diagnostic Procedure", EC-190.

DTC P0101 MAF SENSOR

Wiring Diagram

Wiring Diagram

NFEC0846

EC-MAFS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

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ST

RS

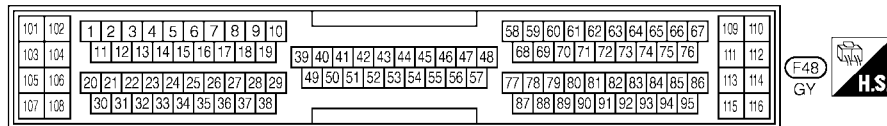
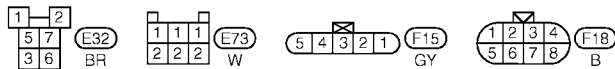
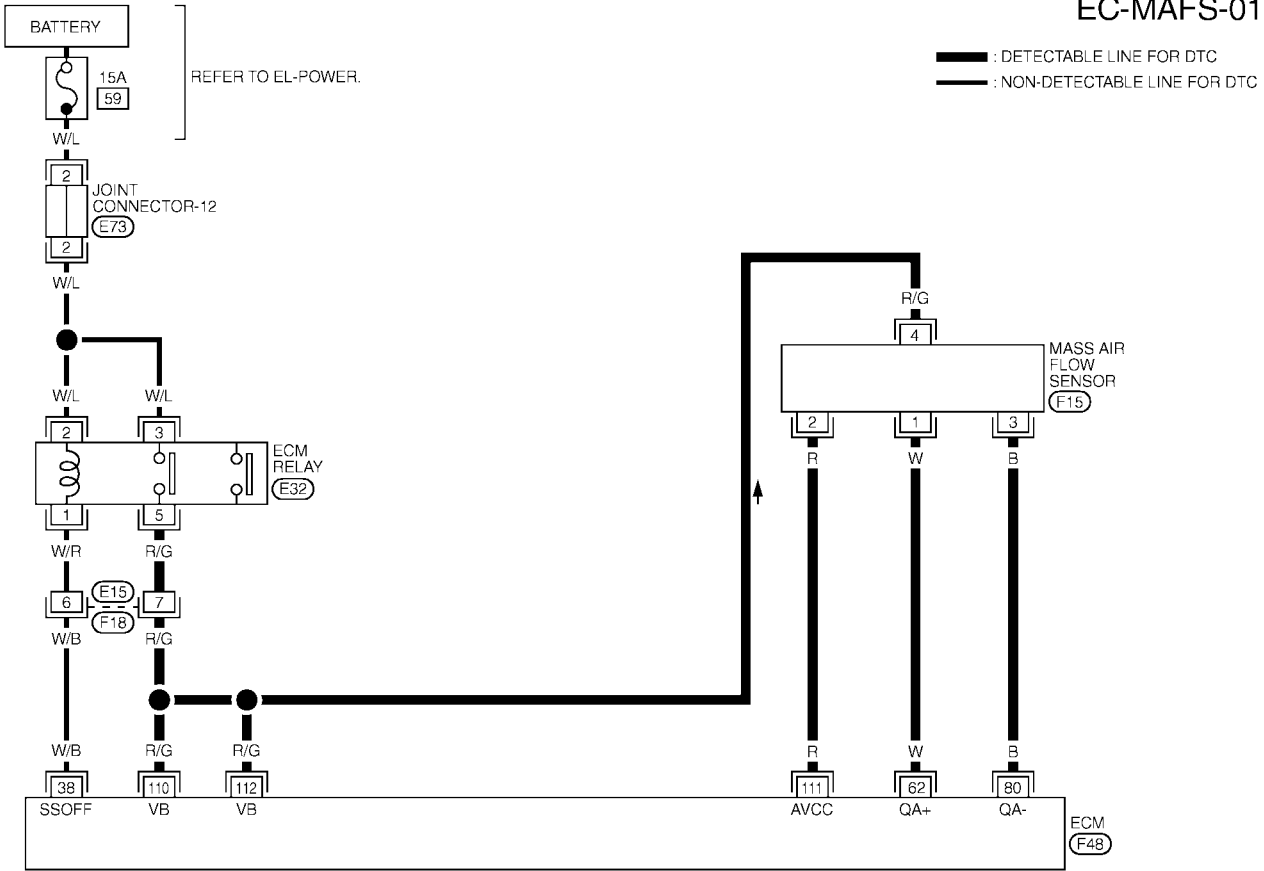
BT

MEC473D HA

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ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.1 - 1.5V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.7 - 2.4V
80	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF650XC

DTC P0101 MAF SENSOR

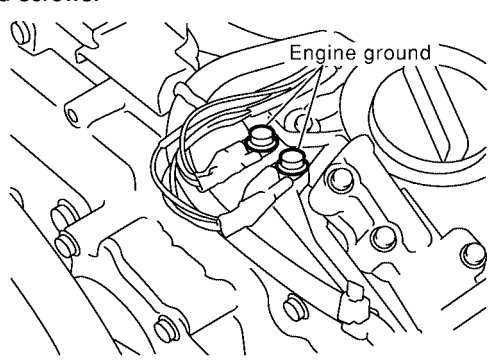
Diagnostic Procedure

Diagnostic Procedure

NFEC0847

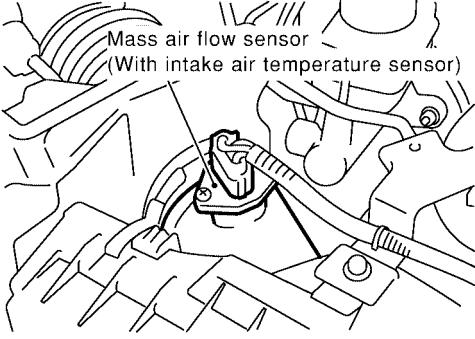
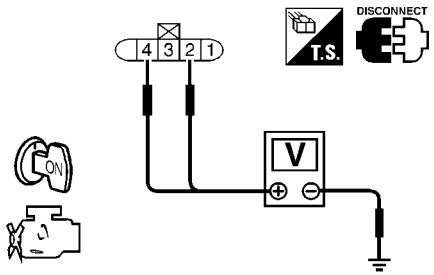
1	INSPECTION START						
Which malfunction (A, B) is duplicated?							
<table border="1"><thead><tr><th>MALFUNCTION</th><th>Type</th></tr></thead><tbody><tr><td>A</td><td>I</td></tr><tr><td>B</td><td>II</td></tr></tbody></table>		MALFUNCTION	Type	A	I	B	II
MALFUNCTION	Type						
A	I						
B	II						
MTBL1142							
Type I or Type II							
Type I	GO TO 3.						
Type II	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 collector	
OK or NG	
OK	GO TO 3.
NG	Reconnect the parts.

3	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
 A technical line drawing of an engine's ground screw area. It shows several screws of varying sizes and shapes, some with washers, mounted on a metal surface. A label 'Engine ground' with a leader line points to one of the screws. The drawing is a perspective view from above and slightly to the side.	
SEC047D	
GO TO 4.	

DTC P0101 MAF SENSOR

Diagnostic Procedure (Cont'd)

4	CHECK MAF SENSOR POWER SUPPLY CIRCUIT	<p>1. Disconnect mass air flow (MAF) sensor harness connector.</p> <div style="text-align: center;">  <p>Mass air flow sensor (With intake air temperature sensor)</p> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center;">  <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Terminal</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-right: 20px;">SEC055D</p> <p style="text-align: center; margin-top: 20px;">OK or NG</p> <p style="text-align: right; margin-right: 20px;">SEF297X</p>	Terminal	Voltage	2	Approximately 5	4	Battery voltage	GI MA EM LC EC FE CL MT AT AX SU
Terminal	Voltage								
2	Approximately 5								
4	Battery voltage								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td style="width: 75%;">GO TO 6.</td> </tr> <tr> <td>NG</td> <td>GO TO 5.</td> </tr> </table>	OK	GO TO 6.	NG	GO TO 5.			
OK	GO TO 6.								
NG	GO TO 5.								

5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E15, F18 Harness for open or short between ECM relay and mass air flow sensor Harness for open or short between mass air flow sensor and ECM <p style="text-align: right; margin-right: 20px;">Repair harness or connectors.</p>	BR ST RS
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6	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center; margin-top: 20px;">OK or NG</p>	BT HA SC EL IDX				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td style="width: 75%;">GO TO 7.</td> </tr> <tr> <td>NG</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	GO TO 7.	NG	Repair open circuit or short to power in harness or connectors.	
OK	GO TO 7.						
NG	Repair open circuit or short to power in harness or connectors.						

DTC P0101 MAF SENSOR

Diagnostic Procedure (Cont'd)

7	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

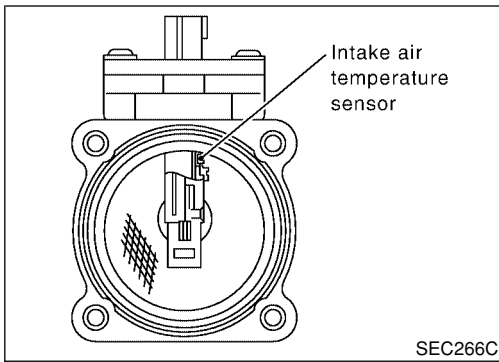
8	CHECK MASS AIR FLOW SENSOR										
<p>1. Reconnect harness connectors disconnected.</p> <p>2. Start engine and warm it up to normal operating temperature.</p> <p>3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.</p>											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Voltage V</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON" (Engine stopped.)</td> <td style="text-align: center;">Approx. 1.0</td> </tr> <tr> <td>Idle (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.1 - 1.5</td> </tr> <tr> <td>2,500 rpm (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.7 - 2.4</td> </tr> <tr> <td>Idle to about 4,000 rpm*</td> <td style="text-align: center;">1.1 - 1.5 to Approx. 4.0</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.</p>		Condition	Voltage V	Ignition switch "ON" (Engine stopped.)	Approx. 1.0	Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4	Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0
Condition	Voltage V										
Ignition switch "ON" (Engine stopped.)	Approx. 1.0										
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5										
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4										
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0										
<p>4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again. Then repeat above check.</p> <p style="text-align: center;">OK or NG</p>											
OK	GO TO 9.										
NG	Replace mass air flow sensor.										

SEC103D

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P0102, P0103 MAF SENSOR

Component Description



Component Description

NFEC0746

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. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0747

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

NFEC1429

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 when engine is running.	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.	Harness or connectors (The sensor circuit is open or shorted.) Mass air flow sensor

FAIL-SAFE MODE

NFEC1429S01

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

DTC Confirmation Procedure

NFEC1430

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.

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR DTC P0103

NFEC1430S01

With CONSULT-II

NFEC1430S0101

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-196.

With GST

NFEC1430S0102

Follow the procedure "With CONSULT-II" above.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR DTC P0102

NFEC1430S02

With CONSULT-II

NFEC1430S0201

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait 5 seconds at most.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-196.

With GST

NFEC1430S0202

Follow the procedure "With CONSULT-II" above.

DTC P0102, P0103 MAF SENSOR

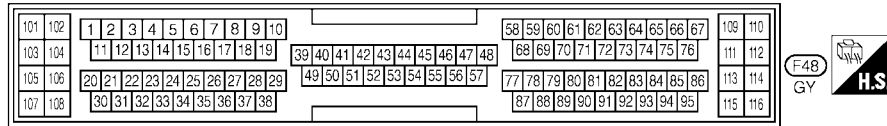
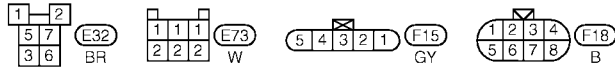
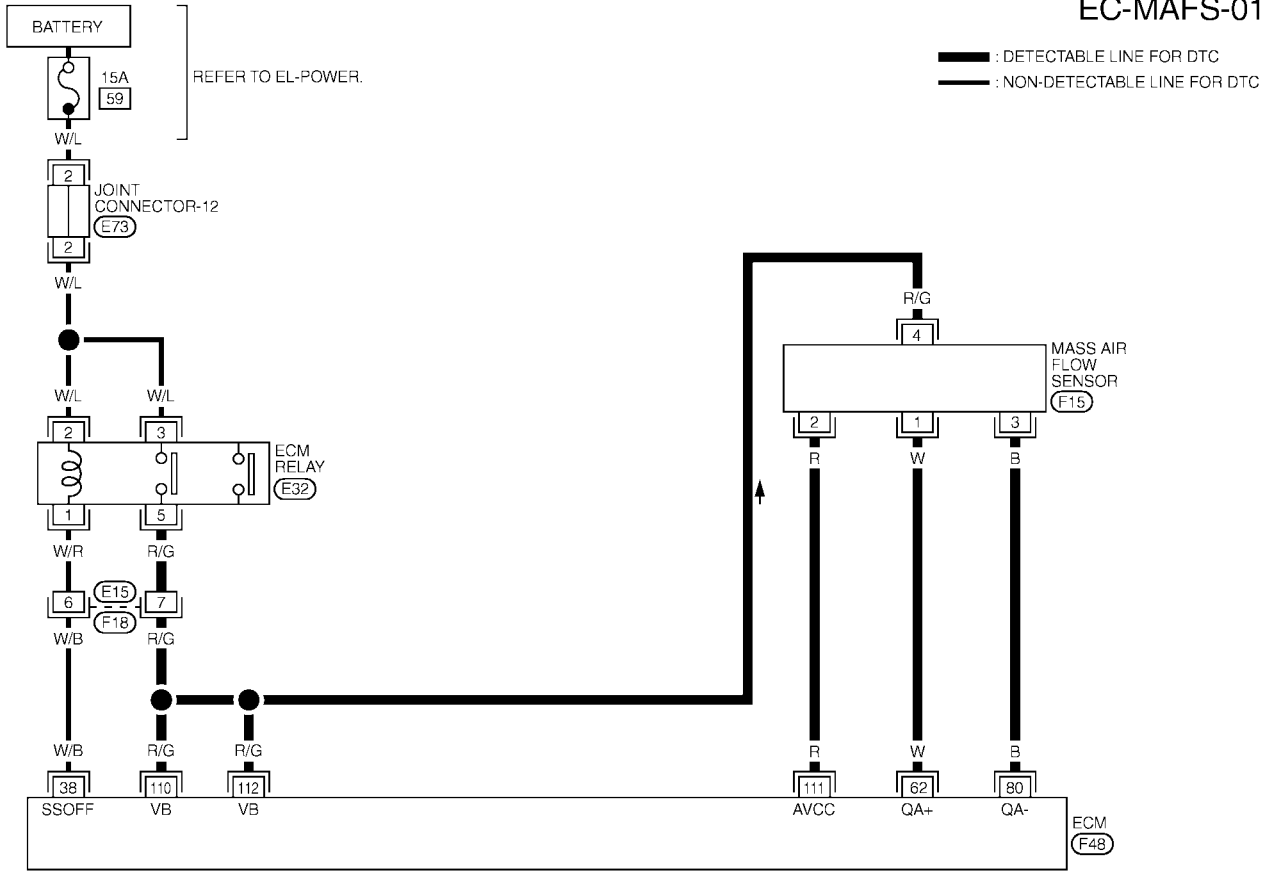
Wiring Diagram

Wiring Diagram

NFEC0753

EC-MAFS-01

GI
MA
EM
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EC
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ST
RS
BT
HA
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IDX



MEC473D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.1 - 1.5V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.7 - 2.4V
80	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF650XC

DTC P0102, P0103 MAF SENSOR

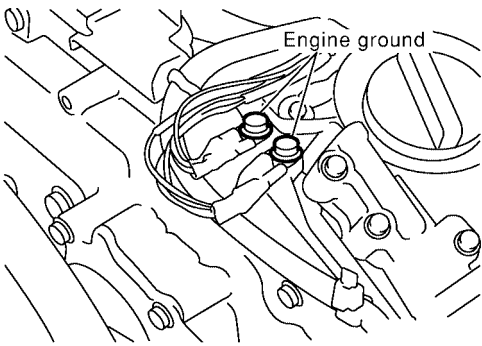
Diagnostic Procedure

Diagnostic Procedure

NFEC0754

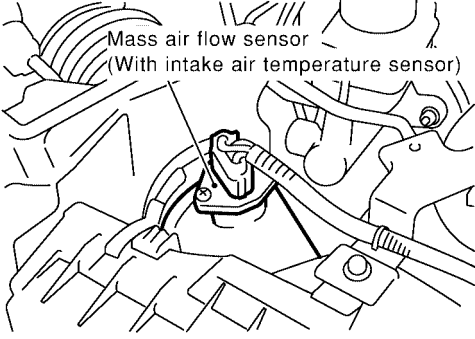
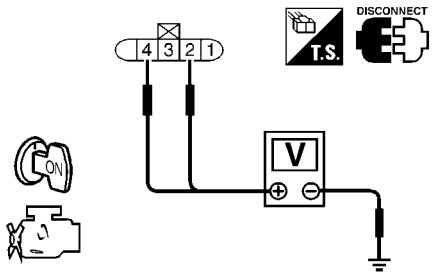
1	INSPECTION START
Which malfunction (P0102 or P0103) is duplicated?	
P0102 or P0103	
P0103	GO TO 3.
P0102	GO TO 2.

2	CHECK INTAKE SYSTEM
Check the following for connection. Air duct Vacuum hoses Intake air passage between air duct to intake manifold collector	
OK or NG	
OK	GO TO 3.
NG	Reconnect the parts.

3	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
 A technical line drawing of an engine block showing several ground screws. One screw is highlighted with a circle and labeled "Engine ground". The diagram shows the engine's internal components and the location of the ground screws.	
SEC047D	
GO TO 4.	

DTC P0102, P0103 MAF SENSOR

Diagnostic Procedure (Cont'd)

4	CHECK MAF SENSOR POWER SUPPLY CIRCUIT	<p>1. Disconnect mass air flow (MAF) sensor harness connector.</p> <div style="text-align: center;">  <p>Mass air flow sensor (With intake air temperature sensor)</p> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center; margin-top: 20px;">  <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Terminal</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-top: 10px;">SEC055D</p> <p style="text-align: center; margin-top: 20px;">OK or NG</p>	Terminal	Voltage	2	Approximately 5	4	Battery voltage	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
Terminal	Voltage								
2	Approximately 5								
4	Battery voltage								
<p>OK</p>	<p>GO TO 6.</p>								
<p>NG</p>	<p>GO TO 5.</p>								

5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E15, F18 Harness for open or short between ECM relay and mass air flow sensor Harness for open or short between mass air flow sensor and ECM <p style="text-align: right; margin-top: 10px;">Repair harness or connectors.</p>	<p>BR</p> <p>ST</p> <p>RS</p>
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6	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	<p>BT</p> <p>HA</p> <p>SC</p>
<p>OK</p>	<p>GO TO 7.</p>		
<p>NG</p>	<p>Repair open circuit or short to power in harness or connectors.</p>		

GI

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IDX

DTC P0102, P0103 MAF SENSOR

Diagnostic Procedure (Cont'd)

7	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
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
<p>1. Reconnect harness connectors disconnected.</p> <p>2. Start engine and warm it up to normal operating temperature.</p> <p>3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.</p>	
SEC103D	
<p>4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again. Then repeat above check.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	Replace mass air flow sensor.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

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

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P0107, P0108 ABSOLUTE PRESSURE SENSOR

Component Description

Component Description

The absolute pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.

NFEC0848

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On Board Diagnosis Logic

NFEC0849

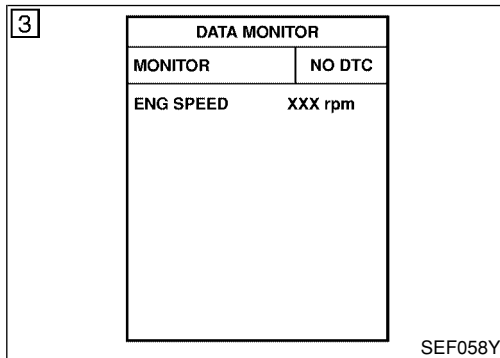
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0107 0107	Absolute pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.) Absolute pressure sensor
P0108 0108	Absolute pressure sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

NFEC0850

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 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-200.

With GST



Follow the procedure "With CONSULT-II".

DTC P0107, P0108 ABSOLUTE PRESSURE SENSOR

Diagnostic Procedure

Diagnostic Procedure

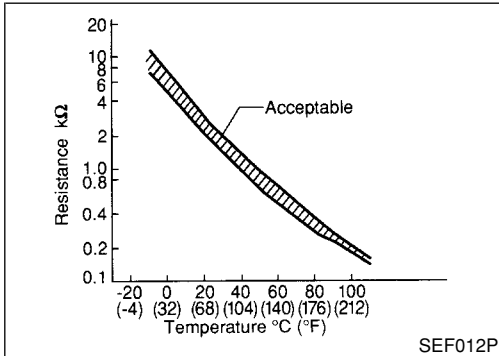
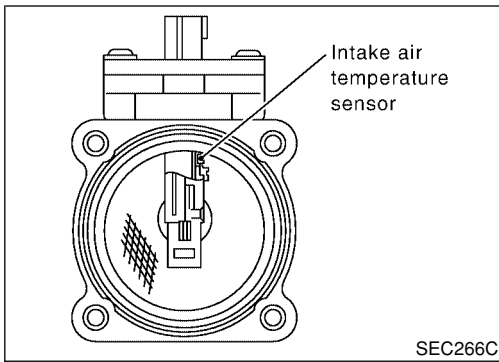
NFEC0851

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-199. 5. Is the 1st trip DTC P0107 or P0108 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-199. 5. Is the 1st trip DTC P0107 or P0108 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 "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-92. 3. Perform "Accelerator Pedal Released Position Learning", EC-71. 4. Perform "Throttle Valve Closed Position Learning", EC-71. 5. Perform "Idle Air Volume Learning", EC-71.	
	INSPECTION END

DTC P0112, P0113 IAT SENSOR

Component Description



Component Description

NFEC0852

The intake air temperature sensor is mounted to the air duct housing. 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

*: These data are reference values and are measured between ECM terminal 66 (Intake air temperature sensor) and body 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

NFEC0853

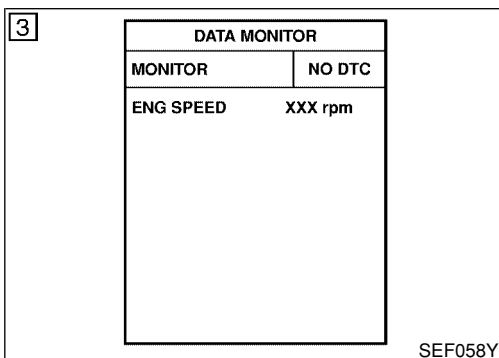
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.) Intake air temperature sensor
P0113 0113	Intake air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

DTC Confirmation Procedure

NFEC0854

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

NFEC0854S01

- 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 "Diagnostic Procedure", EC-203.

WITH GST

NFEC0854S02

Follow the procedure "With CONSULT-II" above.

DTC P0112, P0113 IAT SENSOR

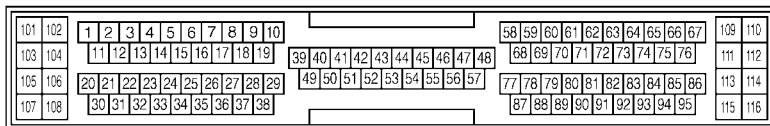
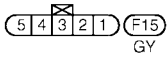
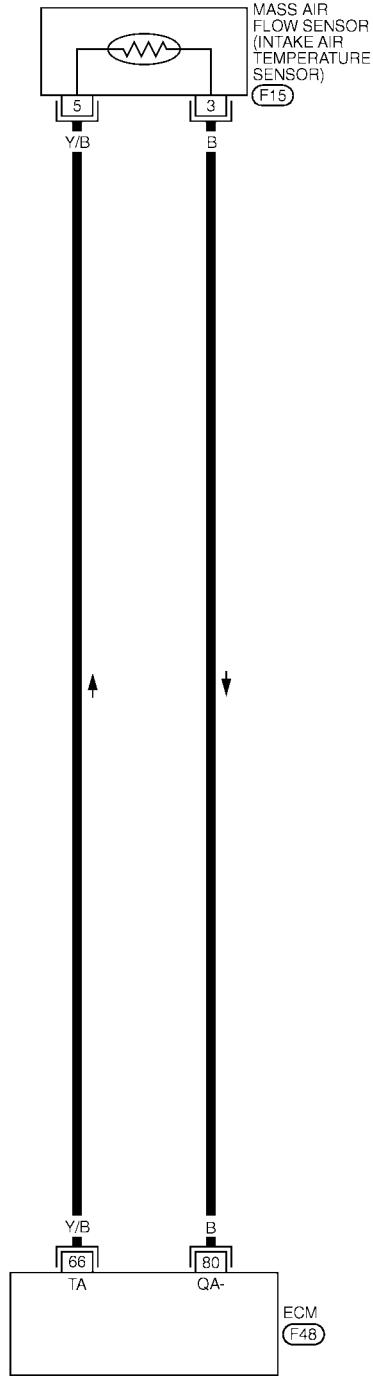
Wiring Diagram

Wiring Diagram

NFEC0855

EC-IATS-01

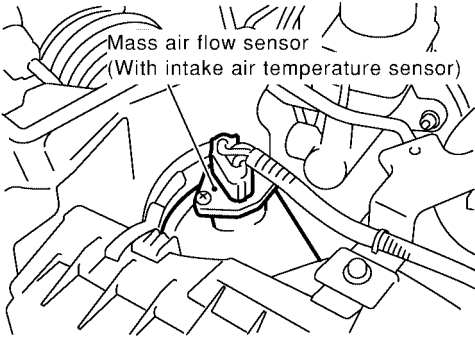
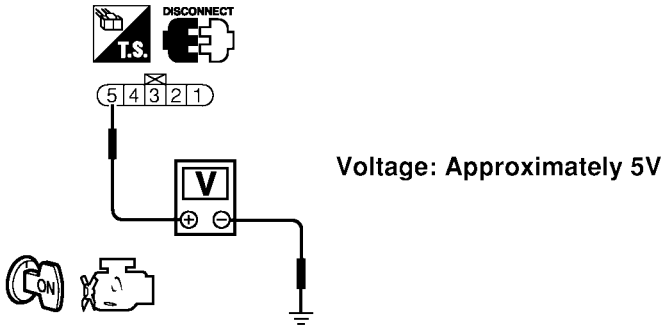
— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



MEC474D

Diagnostic Procedure

NFEC0856

1	CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect intake air temperature sensor harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 1 and ground.</p> <div style="text-align: center;">  </div>	
OK	GO TO 3.
NG	GO TO 2.

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2	DETECT MALFUNCTIONING PART
Check harness for open or short between ECM and intake air temperature sensor.	
Repair harness or connectors.	

3	CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between sensor terminal 3 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
Check harness for open between ECM and intake air temperature sensor.	
Repair open circuit or short to power in harness or connectors.	

DTC P0112, P0113 IAT SENSOR

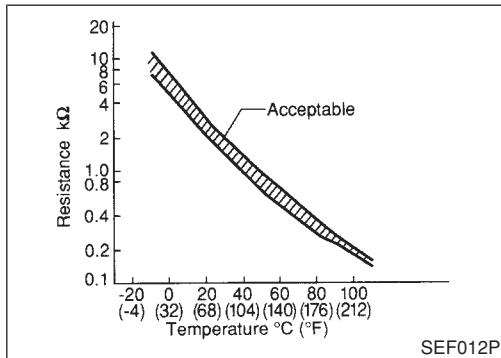
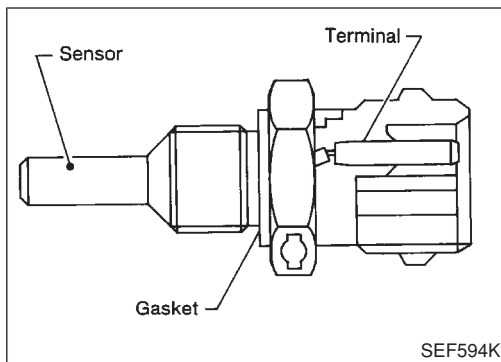
Diagnostic Procedure (Cont'd)

5	CHECK INTAKE AIR TEMPERATURE SENSOR					
Check resistance between intake air temperature sensor terminals 3 and 5 as shown in the figure.						
<table border="1" style="margin: auto;"> <thead> <tr> <th style="text-align: center;">Temperature °C (°F)</th> <th style="text-align: center;">Resistance kΩ</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25 (77)</td> <td style="text-align: center;">1.9 - 2.1</td> </tr> </tbody> </table>			Temperature °C (°F)	Resistance kΩ	25 (77)	1.9 - 2.1
Temperature °C (°F)	Resistance kΩ					
25 (77)	1.9 - 2.1					
MTBL1143						
SEF012P						
OK or NG						
OK	GO TO 6.					
NG	Replace intake air temperature sensor.					

6	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.		
INSPECTION END		

DTC P0117, P0118 ECT SENSOR

Component Description



Component Description

NFEC0857

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
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 93 (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

NFEC1431

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.	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

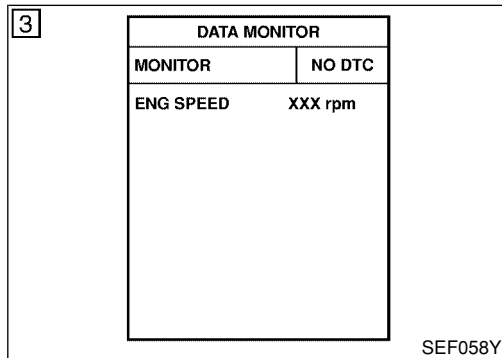
When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

NFEC1431S01

DTC P0117, P0118 ECT SENSOR

On Board Diagnosis Logic (Cont'd)

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 Confirmation Procedure

NFEC1432

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

NFEC1432S01

- 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 "Diagnostic Procedure", EC-208.

WITH GST

NFEC1432S02

Follow the procedure "WITH CONSULT-II" above.




DTC P0117, P0118 ECT SENSOR

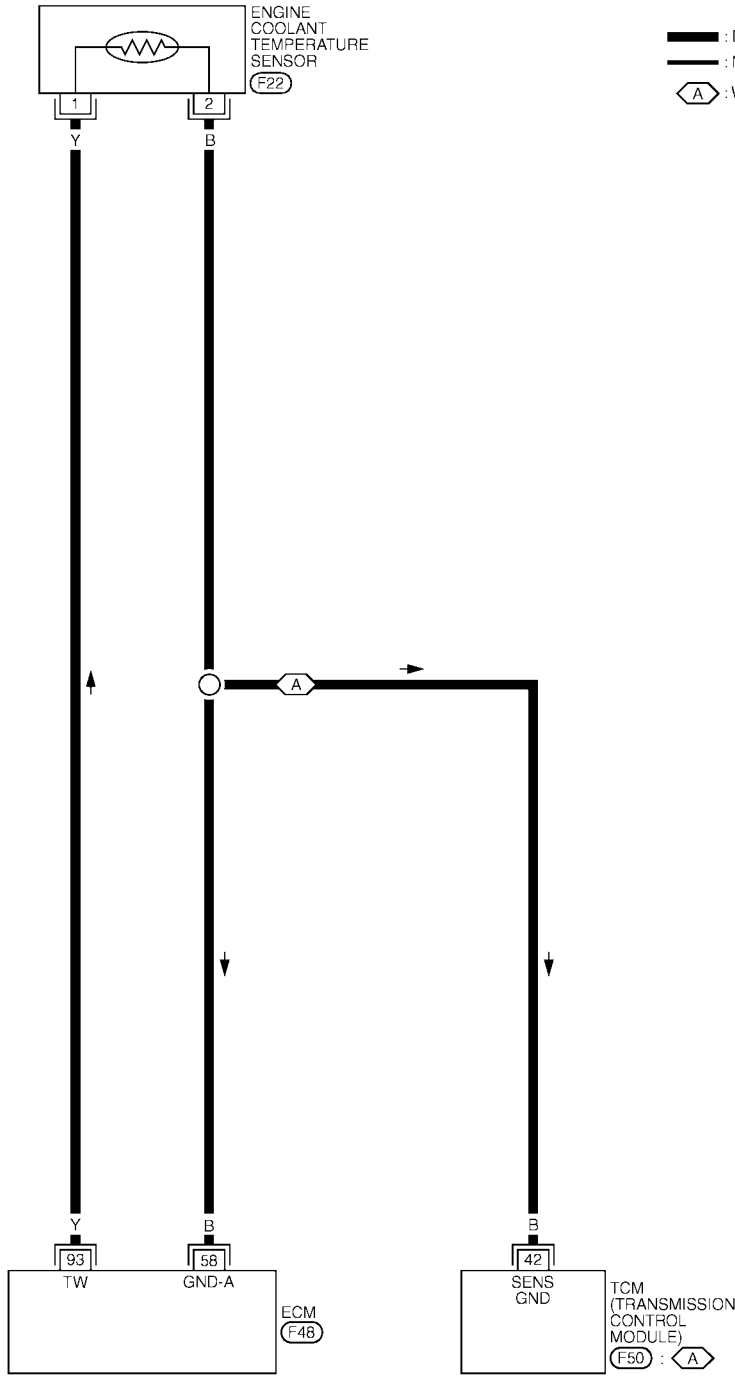
Wiring Diagram

Wiring Diagram

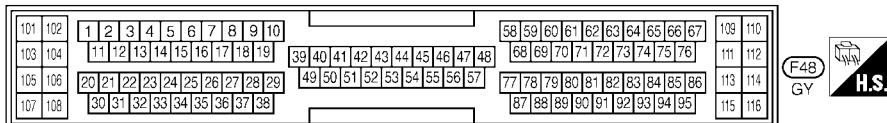
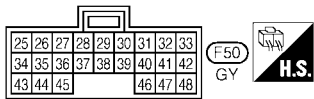
NFEC0860

EC-ECTS-01

 : DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC
 : WITH A/T



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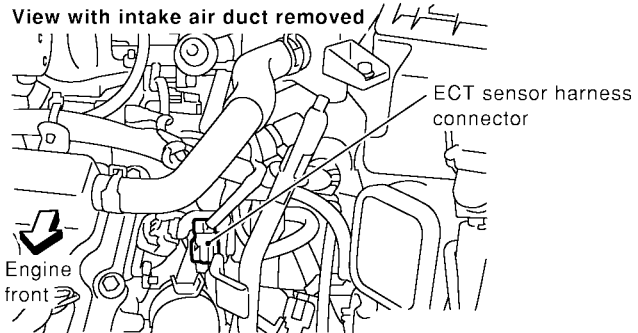
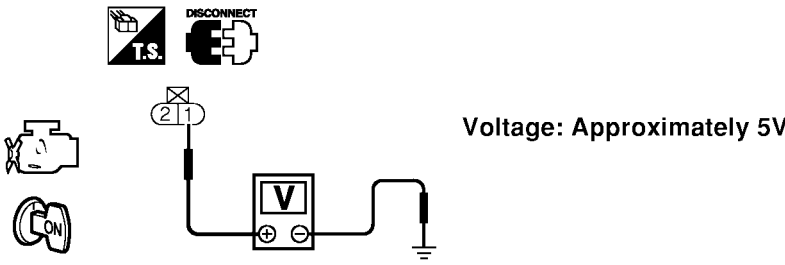
MEC475D

DTC P0117, P0118 ECT SENSOR

Diagnostic Procedure

Diagnostic Procedure

NFEC0861

1	CHECK ECT SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect engine coolant temperature (ECT) sensor harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC105D</p> <p>3. Turn ignition switch "ON". 4. Check voltage between ECT sensor harness connector terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Approximately 5V</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEC106D</p> </div>	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
Check harness for open or short between ECM and engine coolant temperature sensor.	
Repair harness or connectors.	

3	CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between ECT sensor terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
Check the following.	
Harness for open between ECM and engine coolant temperature sensor Harness for open between TCM (Transmission Control Module) and engine coolant temperature sensor	
Repair open circuit or short to power in harness or connectors.	

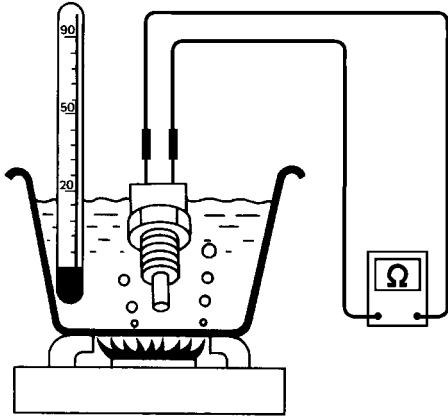
DTC P0117, P0118 ECT SENSOR

Diagnostic Procedure (Cont'd)

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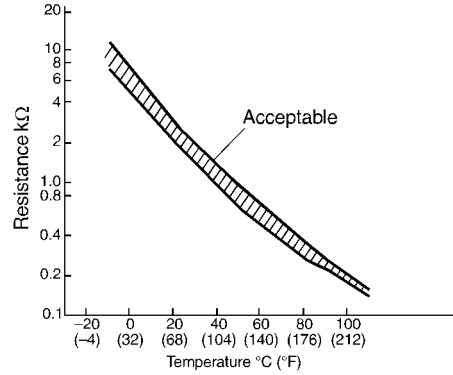
5 CHECK ENGINE COOLANT TEMPERATURE SENSOR

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



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

OK	GO TO 6.
NG	Replace engine coolant temperature sensor.

6 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

INSPECTION END

DTC P0121, P0122, P0123

Description

Description

DTC P0121, P0122 or P0123 is displayed with other DTC.
First perform the trouble diagnosis for displayed other DTC.

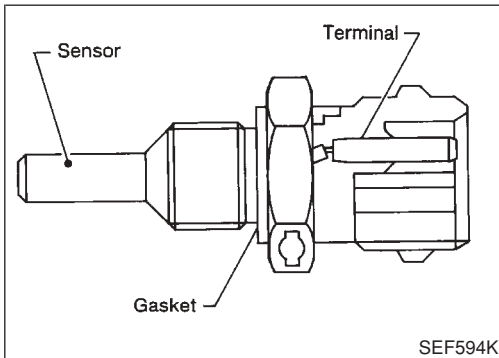
NFEC1412

Description

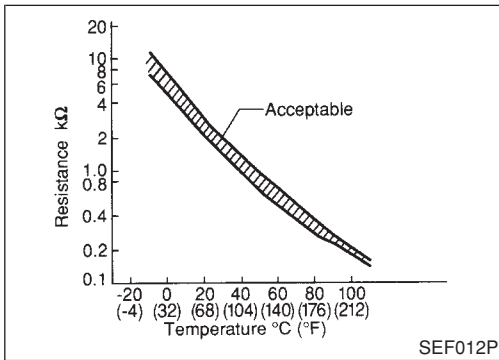
NFEC0869

NOTE:

If DTC P0125 is displayed with P0117, P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to EC-205.



SEF594K



SEF012P

COMPONENT DESCRIPTION

NFEC0869S01

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
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 93 (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

NFEC0870

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	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.	Harness or connectors (The sensor circuit is open or shorted.) Engine coolant temperature sensor Thermostat

DTC P0125 ECT SENSOR

DTC Confirmation Procedure

4

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

SEF174Y

DTC Confirmation Procedure

NFEC0871

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

NFEC0871S01

- 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 "Diagnostic Procedure", EC-212.

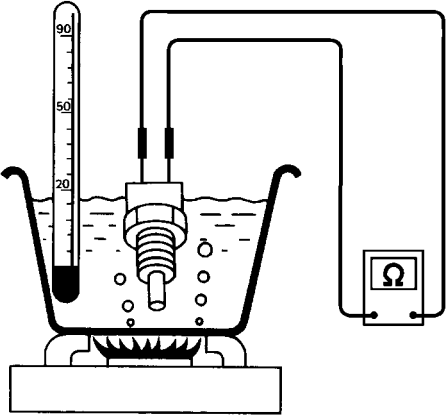
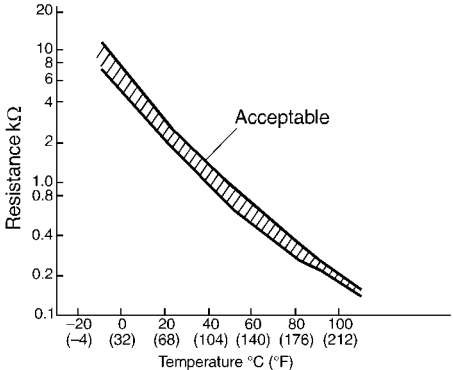
WITH GST

NFEC0871S02

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

NFEC0872

1	CHECK ENGINE COOLANT TEMPERATURE SENSOR								
Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.									
	<p><Reference data></p> <table border="1"> <thead> <tr> <th>Temperature °C (°F)</th> <th>Resistance kΩ</th> </tr> </thead> <tbody> <tr> <td>20 (68)</td> <td>2.1 - 2.9</td> </tr> <tr> <td>50 (122)</td> <td>0.68 - 1.00</td> </tr> <tr> <td>90 (194)</td> <td>0.236 - 0.260</td> </tr> </tbody> </table> 	Temperature °C (°F)	Resistance kΩ	20 (68)	2.1 - 2.9	50 (122)	0.68 - 1.00	90 (194)	0.236 - 0.260
Temperature °C (°F)	Resistance kΩ								
20 (68)	2.1 - 2.9								
50 (122)	0.68 - 1.00								
90 (194)	0.236 - 0.260								
OK or NG									
OK	GO TO 2.								
NG	Replace engine coolant temperature sensor.								

SEF304X

DTC P0125 ECT SENSOR

Diagnostic Procedure (Cont'd)

2	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 3.
NG	Repair or replace thermostat. Refer to LC-18, "Thermostat".

3	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. Refer to Wiring Diagram, EC-207.	
	INSPECTION END

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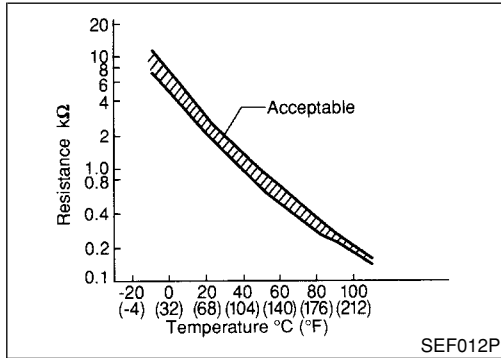
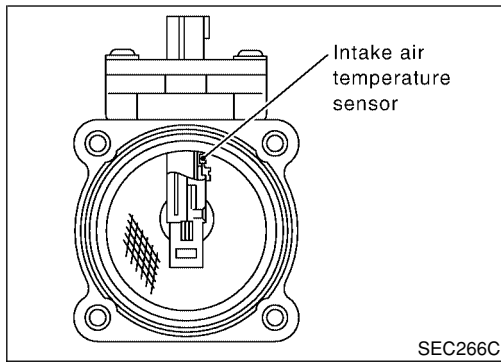
SC

EL

IDX

DTC P0127 IAT SENSOR

Component Description



Component Description

NFEC0767

The intake air temperature sensor is mounted to the air duct housing. 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

*: These data are reference values and are measured between ECM terminal 66 (Intake air temperature sensor) and body 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

NFEC0768

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.	Harness or connectors (The sensor circuit is open or shorted.) Intake air temperature sensor

DTC Confirmation Procedure

NFEC0770

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.

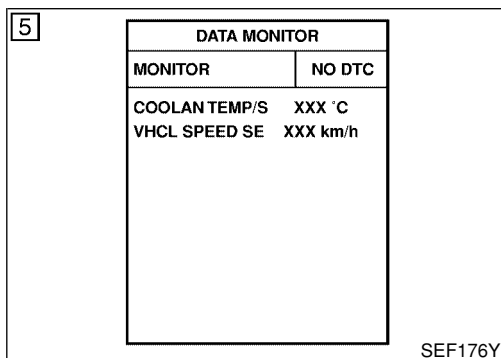
TESTING CONDITION:

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.

④ WITH CONSULT-II

NFEC0770S03

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



DTC P0127 IAT SENSOR

DTC Confirmation Procedure (Cont'd)

- 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 "Diagnostic Procedure", EC-215.

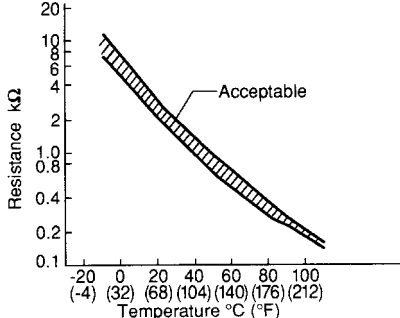
 **WITH GST**

Follow the procedure "With CONSULT-II" above.

NFEC0770S04

Diagnostic Procedure

NFEC0772

1	CHECK INTAKE AIR TEMPERATURE SENSOR				
Check resistance between intake air temperature sensor terminals 3 and 5 as shown in the figure.					
<table border="1" style="margin: auto;"> <thead> <tr> <th style="width: 50%;">Temperature °C (°F)</th> <th style="width: 50%;">Resistance kΩ</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25 (77)</td> <td style="text-align: center;">1.9 - 2.1</td> </tr> </tbody> </table>		Temperature °C (°F)	Resistance kΩ	25 (77)	1.9 - 2.1
Temperature °C (°F)	Resistance kΩ				
25 (77)	1.9 - 2.1				
					
MTBL1143					
SEF012P					
OK or NG					
OK	GO TO 2.				
NG	Replace intake air temperature sensor.				

2	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. Refer to wiring diagram, EC-202.	
INSPECTION END	

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DTC P0128 THERMOSTAT FUNCTION

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC1289

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 open stuck.

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.	Thermostat malfunction Leakage from sealing portion of thermostat Engine coolant temperature sensor

DTC Confirmation Procedure

NFEC1291

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

NFEC1291S01

- 1) Replace thermostat with new one. Refer to LC-18, "Thermostat". 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), stop engine and 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 "Diagnostic Procedure", EC-217.

WITH GST

NFEC1291S02

- 1) Follow the procedure "WITH CONSULT-II" above.

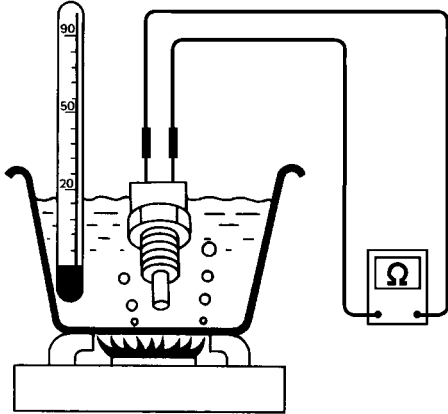
Diagnostic Procedure

NFEC1292

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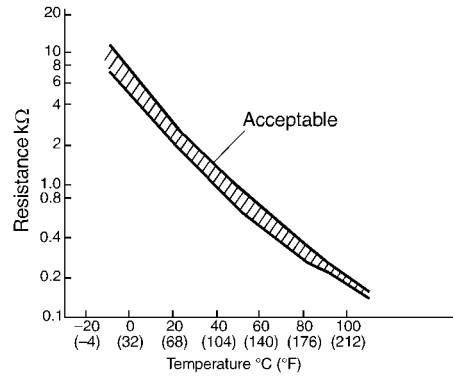
1 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

OK

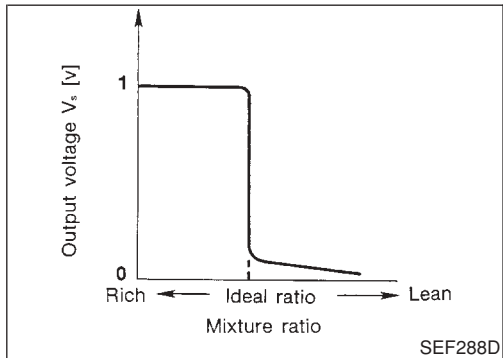
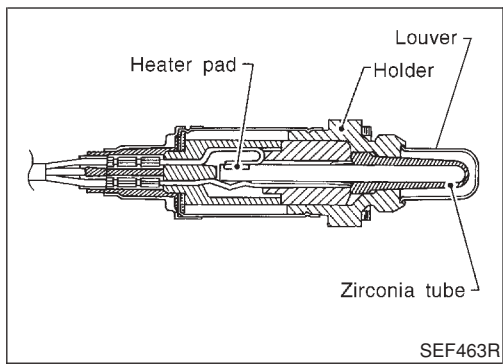
INSPECTION END

NG

Replace engine coolant temperature sensor.

DTC P0132, P0152 HO2S1

Component Description



Component Description

NFEC0873

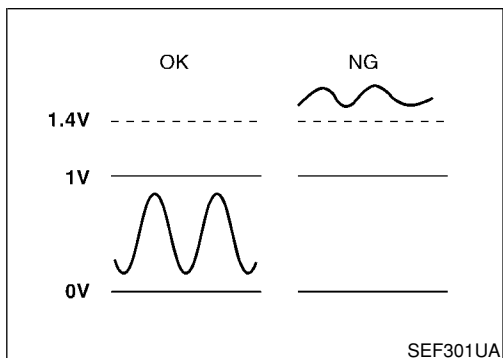
The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0874

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)			0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN + , RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC0876

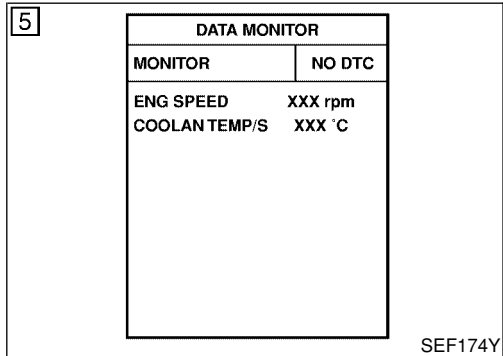
To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.

DTC P0132, P0152 HO2S1

On Board Diagnosis Logic (Cont'd)

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0132 0132 (Bank 1) P0152 0152 (Bank 2)	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1

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DTC Confirmation Procedure

NFEC0877

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

NFEC0877S01

- 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) Restart engine and let it idle for 25 seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-222.

Ⓜ WITH GST

NFEC0877S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Restart engine and let it idle for 25 seconds.
- 4) Turn ignition switch "OFF" and wait at least 10 seconds.
- 5) Restart engine and let it idle for 25 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-222.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

DTC P0132, P0152 HO2S1

Wiring Diagram

Wiring Diagram

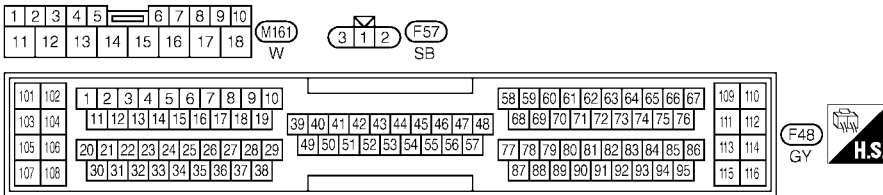
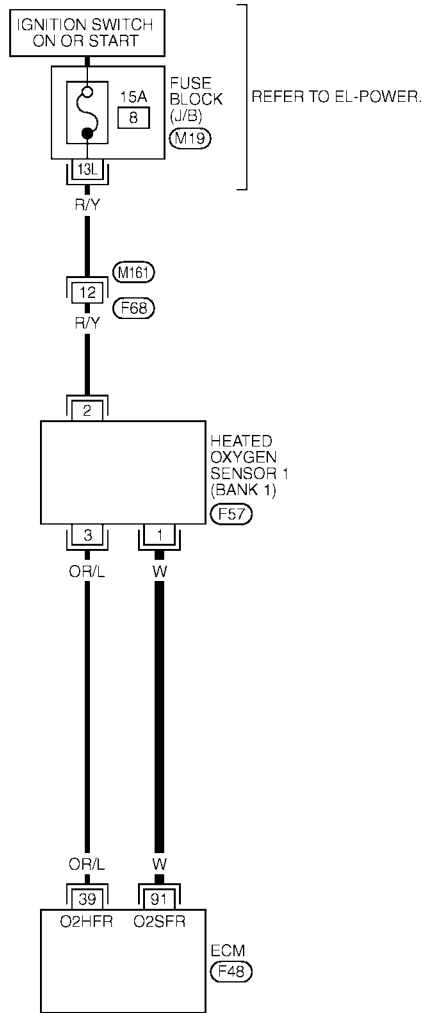
NFEC0878

NFEC0878S01

BANK 1

EC-O2S1B1-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC479D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	W	HEATED OXYGEN SENSOR 1 (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

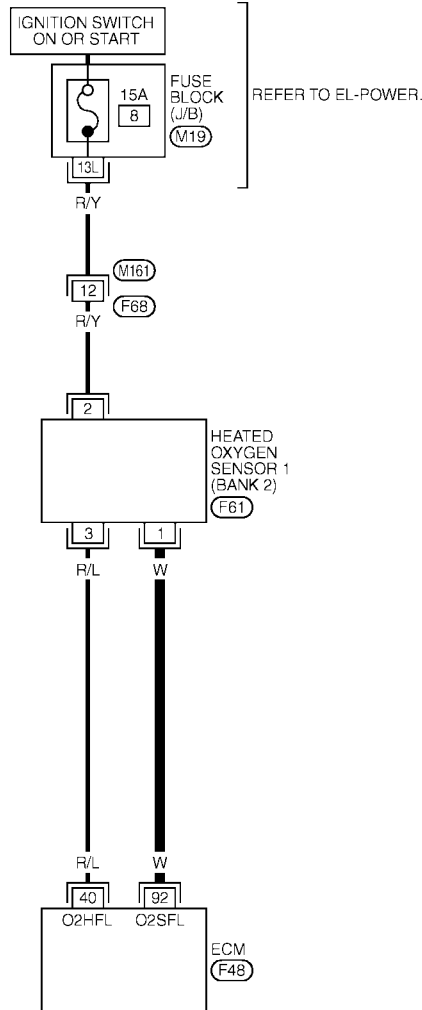
SEC107D

DTC P0132, P0152 HO2S1

Wiring Diagram (Cont'd)

BANK 2

NFEC0878S02



EC-O2S1B2-01

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

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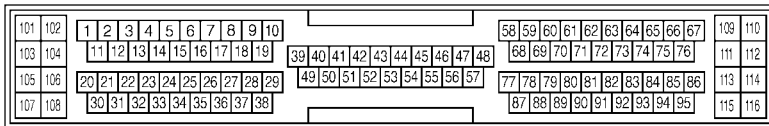
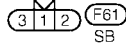
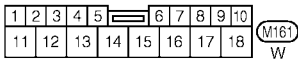
BT

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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC480D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
92	W	HEATED OXYGEN SENSOR 1 (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

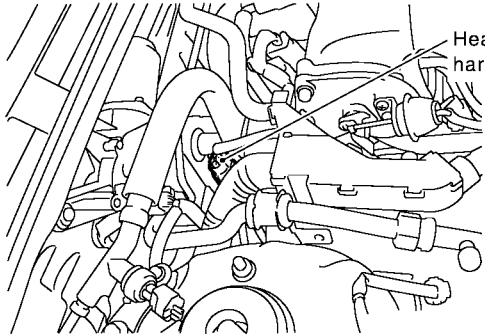
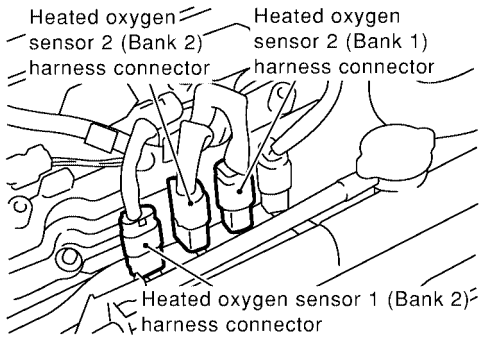
SEC108D

DTC P0132, P0152 HO2S1

Diagnostic Procedure

Diagnostic Procedure

NFEC0879

1	INSPECTION START
<p>1. Turn ignition switch "OFF". 2. Disconnect corresponding heated oxygen sensor 1 harness connector.</p> <div data-bbox="506 310 1284 642"><p>Heated oxygen sensor 1 (Bank 1) harness connector</p></div> <div data-bbox="574 667 1049 1003"><p>Heated oxygen sensor 2 (Bank 2) harness connector Heated oxygen sensor 2 (Bank 1) harness connector</p><p>Heated oxygen sensor 1 (Bank 2) harness connector</p></div> <p style="text-align: right;">SEC099D</p> <p style="text-align: right;">SEC134D</p>	
GO TO 2.	

2	RETIGHTEN HEATED OXYGEN SENSOR 1
<p>Loosen and retighten corresponding heated oxygen sensor 1.</p> <p>Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
GO TO 3.	

DTC P0132, P0152 HO2S1

Diagnostic Procedure (Cont'd)

3	CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																												
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0132</td> <td>91</td> <td>1</td> <td>Bank 1</td> </tr> <tr> <td>P0152</td> <td>92</td> <td>1</td> <td>Bank 2</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1144</p> <p>Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Ground</th> </tr> </thead> <tbody> <tr> <td>P0132</td> <td>91 or 1</td> <td>Ground</td> <td>Bank 1</td> </tr> <tr> <td>P0152</td> <td>92 or 1</td> <td>Ground</td> <td>Bank 2</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1145</p> <p>Continuity should not exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		DTC	Terminals		Bank	ECM	Sensor	P0132	91	1	Bank 1	P0152	92	1	Bank 2	DTC	Terminals		Bank	ECM or Sensor	Ground	P0132	91 or 1	Ground	Bank 1	P0152	92 or 1	Ground	Bank 2
DTC	Terminals		Bank																										
	ECM	Sensor																											
P0132	91	1	Bank 1																										
P0152	92	1	Bank 2																										
DTC	Terminals		Bank																										
	ECM or Sensor	Ground																											
P0132	91 or 1	Ground	Bank 1																										
P0152	92 or 1	Ground	Bank 2																										
OK	GO TO 4.																												
NG	Repair open circuit or short to ground or short to power in harness or connectors.																												

4	CHECK HO2S1 CONNECTOR FOR WATER
<p>1. Disconnect heated oxygen sensor 1 harness connector. 2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>	
OK (With CONSULT-II)	GO TO 5.
OK (Without CONSULT-II)	GO TO 6.
NG	Repair or replace harness or connectors.

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DTC P0132, P0152 HO2S1

Diagnostic Procedure (Cont'd)

5 CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

"HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown left:

Bank 1
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

Bank 2
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
 MNTR (B1)/(B2) indicates RICH
 L means HO2S1
 MNTR (B1)/(B2) indicates LEAN

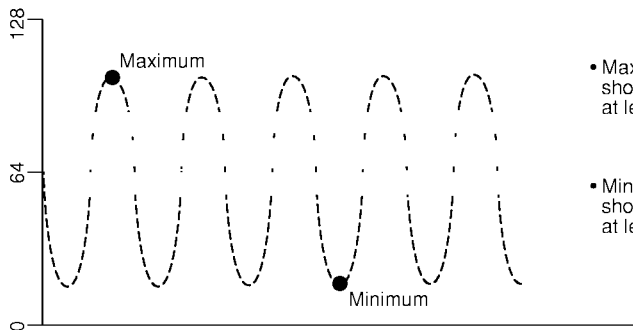
SEF647Y

"HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.

"HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.

"HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.

- Minimum voltage should be below 0.30V at least one time.

SEF648Y

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.

OK or NG

OK

GO TO 7.

NG

Replace malfunctioning heated oxygen sensor 1.

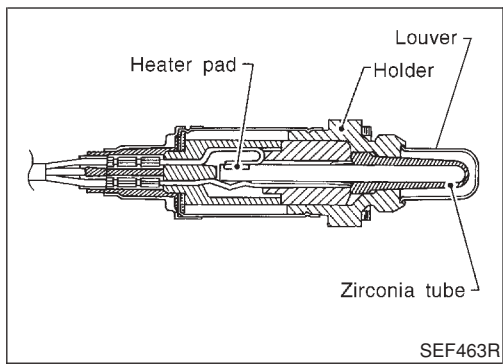
6	CHECK HEATED OXYGEN SENSOR 1
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground. Check the following with engine speed held at 2,000 rpm constant under no load. 	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>91: Bank 1 92: Bank 2</p> </div> <div style="width: 50%;"> <ul style="list-style-type: none"> The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. The maximum voltage is over 0.6V at least one time. The minimum voltage is below 0.3V at least one time. The voltage never exceeds 1.0V. <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> </div> </div>	
SEC109D	
<p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
OK or NG	
OK	GO TO 7.
NG	Replace malfunctioning heated oxygen sensor 1.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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DTC P0133, P0153 HO2S1

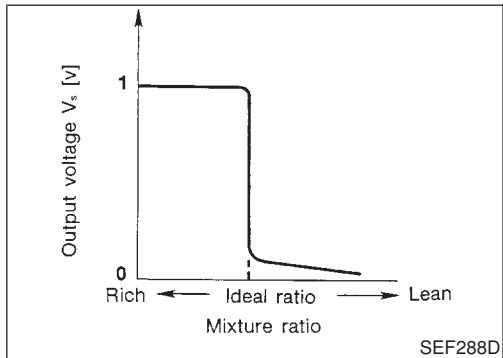
Component Description



Component Description

The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NFEC0880

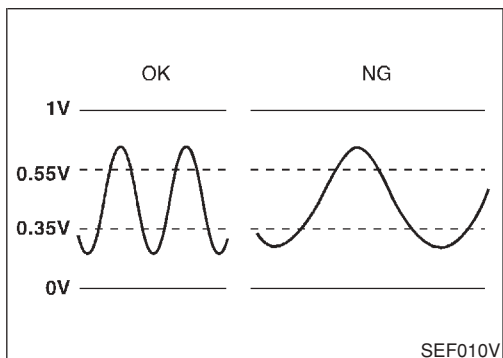


CONSULT-II Reference Value in Data Monitor Mode

NFEC0881

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)			0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN + , RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time [heated oxygen sensor 1 cycling time index] is inordinately long or not.

NFEC0883

DTC P0133, P0153 HO2S1

On Board Diagnosis Logic (Cont'd)

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0133 0133 (Bank 1) P0153 0153 (Bank 2)	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 Heated oxygen sensor 1 heater Fuel pressure Injectors Intake air leaks Exhaust gas leaks PCV valve Mass air flow sensor

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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:

Always perform at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

NFEC0884

DTC P0133, P0153 HO2S1

DTC Confirmation Procedure (Cont'd)

6

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF338Z

6

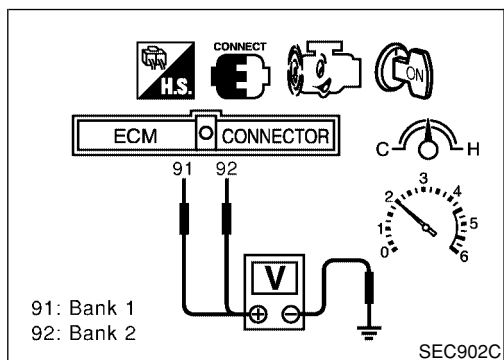
HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF339Z

6

HO2S1 (B1) P0133	
COMPLETED	

SEF658Y



WITH CONSULT-II

NFEC0884S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "HO2S1 (B1)/(B2) P0133/P0153" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 4) Touch "START".
- 5) Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 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 approximately 40 to 50 seconds.)

ENG SPEED	1,200 - 3,100 rpm
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	2.5 - 12 msec
Selector lever	Suitable position

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 "Diagnostic Procedure", EC-231.

Overall Function Check

NFEC0885

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NFEC0885S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.

The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

- 4) If NG, go to "Diagnostic Procedure", EC-231.

Wiring Diagram

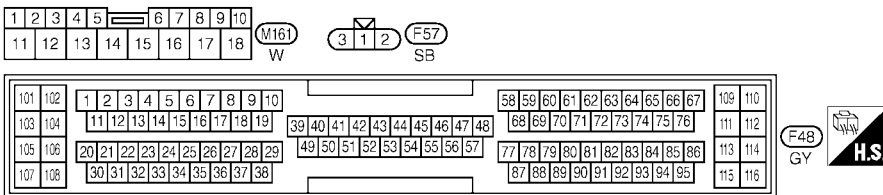
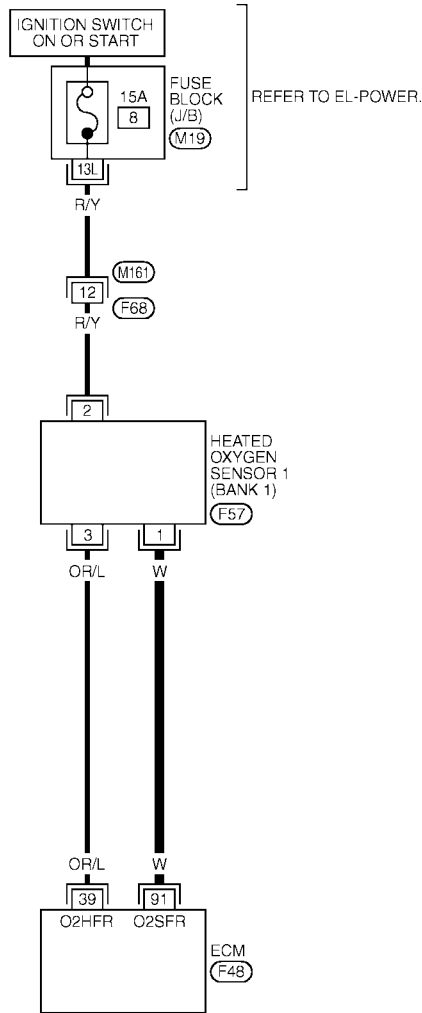
BANK 1

NFEC0886

NFEC0886S01

EC-O2S1B1-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC479D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	W	HEATED OXYGEN SENSOR 1 (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

SEC107D



DTC P0133, P0153 HO2S1

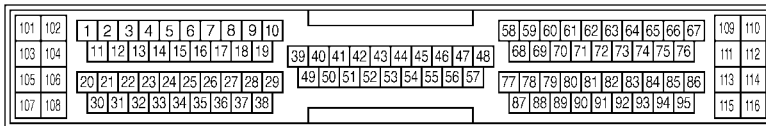
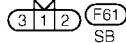
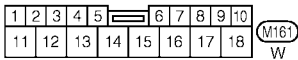
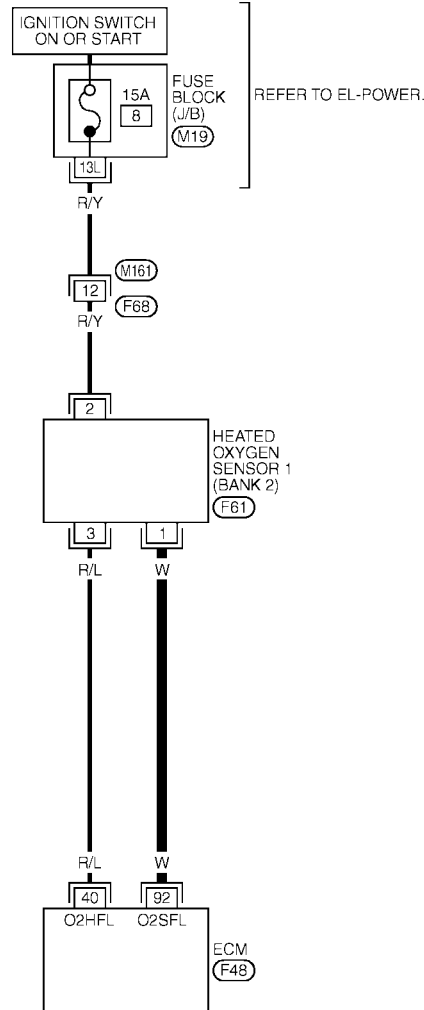
Wiring Diagram (Cont'd)

BANK 2

NFEC0886S02

EC-O2S1B2-01

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



REFER TO THE FOLLOWING.

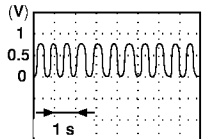
(M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC480D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

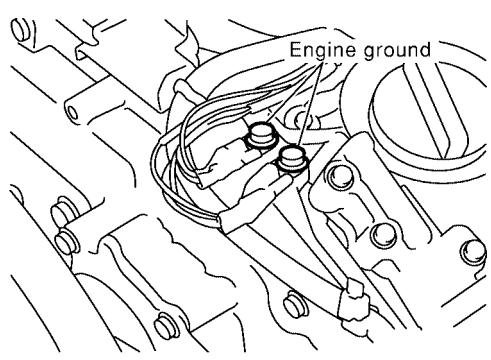
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
92	W	HEATED OXYGEN SENSOR 1 (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

SEC108D

Diagnostic Procedure

NFEC0887

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
 <p>The diagram shows a close-up of the engine block with several ground screws. One screw is highlighted with a label 'Engine ground' and an arrow pointing to it. The screws are used to secure the engine to the chassis for grounding.</p>	
SEC047D	
GO TO 2.	

GI

MA

EM

LC

EC

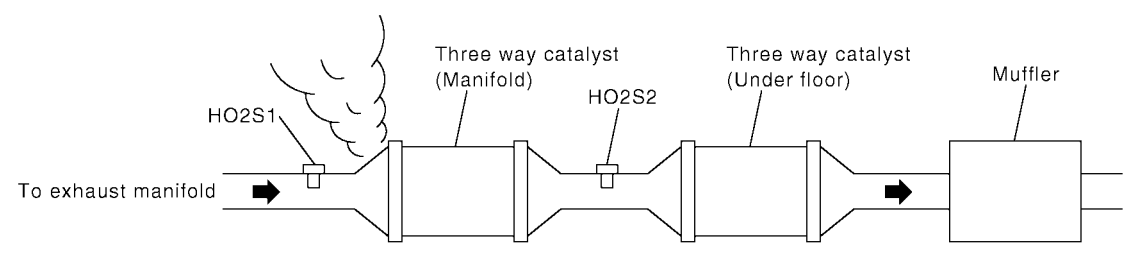
FE

CL

2	RETIGHTEN HEATED OXYGEN SENSOR 1
<p>Loosen and retighten corresponding heated oxygen sensor 1.</p> <p>Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
GO TO 3.	

MT

AT

3	CHECK FOR EXHAUST GAS LEAK
<p>1. Start engine and run it at idle. 2. Listen for an exhaust gas leak before three way catalyst (manifold).</p>	
 <p>The diagram shows the exhaust system layout. It starts with 'To exhaust manifold' on the left, leading to 'HO2S1'. The exhaust then passes through a 'Three way catalyst (Manifold)', followed by 'HO2S2', then another 'Three way catalyst (Under floor)', and finally a 'Muffler'. Arrows indicate the direction of exhaust gas flow from left to right. A legend below the diagram shows a black arrow pointing right, labeled ': Exhaust gas'.</p>	
SEC502D	
OK or NG	
OK	GO TO 4.
NG	Repair or replace.

AX

SU

BR

ST

RS

BT

HA

4	CHECK FOR INTAKE AIR LEAK
<p>Listen for an intake air leak after the mass air flow sensor.</p>	
OK or NG	
OK	GO TO 5.
NG	Repair or replace.

SC

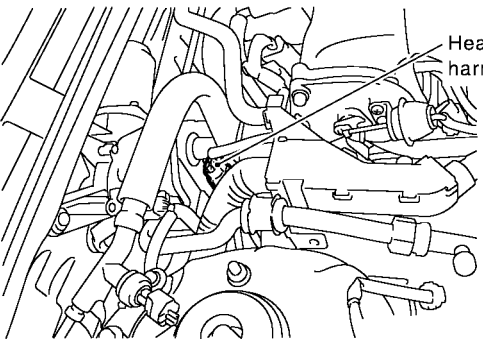
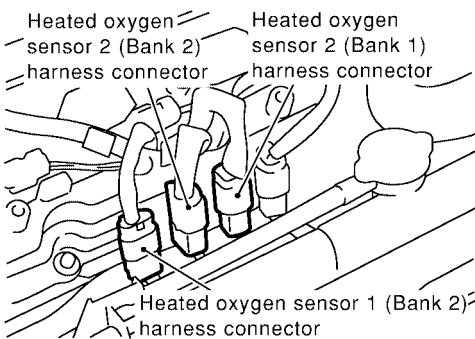
EL

IDX

DTC P0133, P0153 HO2S1

Diagnostic Procedure (Cont'd)

5	CLEAR THE SELF-LEARNING DATA									
<p><input type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 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". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <tr> <th colspan="3" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">CLEAR</td> <td style="padding: 2px;">B1 100 %</td> </tr> <tr> <td colspan="2"></td> <td style="padding: 2px;">B2 100 %</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF968Y</p> <ol style="list-style-type: none"> 4. Run engine for at least 10 minutes at idle speed. <p>Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?</p>		WORK SUPPORT			SELF-LEARNING CONT	CLEAR	B1 100 %			B2 100 %
WORK SUPPORT										
SELF-LEARNING CONT	CLEAR	B1 100 %								
		B2 100 %								
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. <p>Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?</p> <p style="text-align: center;">Yes or No</p>										
Yes	Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to EC-265, EC-273.									
No	GO TO 6.									

6	DISCONNECT HO2S1 HARNESS CONNECTOR
<p>1. Turn ignition switch "OFF". 2. Disconnect corresponding heated oxygen sensor 1 harness connector.</p>	
	
	
SEC099D SEC134D	
GO TO 7.	

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

7	CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT														
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0133</td> <td style="text-align: center;">91</td> <td style="text-align: center;">1</td> <td style="text-align: center;">Bank 1</td> </tr> <tr> <td>P0153</td> <td style="text-align: center;">92</td> <td style="text-align: center;">1</td> <td style="text-align: center;">Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM	Sensor	P0133	91	1	Bank 1	P0153	92	1	Bank 2
DTC	Terminals		Bank												
	ECM	Sensor													
P0133	91	1	Bank 1												
P0153	92	1	Bank 2												
MTBL1146															
<p>Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Ground</th> </tr> </thead> <tbody> <tr> <td>P0133</td> <td style="text-align: center;">91 or 1</td> <td style="text-align: center;">Ground</td> <td style="text-align: center;">Bank 1</td> </tr> <tr> <td>P0153</td> <td style="text-align: center;">92 or 1</td> <td style="text-align: center;">Ground</td> <td style="text-align: center;">Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM or Sensor	Ground	P0133	91 or 1	Ground	Bank 1	P0153	92 or 1	Ground	Bank 2
DTC	Terminals		Bank												
	ECM or Sensor	Ground													
P0133	91 or 1	Ground	Bank 1												
P0153	92 or 1	Ground	Bank 2												
MTBL1147															
<p>Continuity should not exist.</p> <p>4. Also check harness for short to power.</p>															
OK or NG															
OK	GO TO 8.														
NG	Repair open circuit or short to ground or short to power in harness or connectors.														

DTC P0133, P0153 HO2S1

Diagnostic Procedure (Cont'd)

8	CHECK HEATED OXYGEN SENSOR 1 HEATER						
<p>Check resistance between HO2S1 terminals as follows.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Terminals</th> <th style="text-align: center;">Resistance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2 and 3</td> <td style="text-align: center;">2.3 - 4.3Ω at 25°C (77°F)</td> </tr> <tr> <td style="text-align: center;">1 and 2 1 and 3</td> <td style="text-align: center;">∞Ω (Continuity should not exist.)</td> </tr> </tbody> </table> </div> </div>		Terminals	Resistance	2 and 3	2.3 - 4.3Ω at 25°C (77°F)	1 and 2 1 and 3	∞Ω (Continuity should not exist.)
Terminals	Resistance						
2 and 3	2.3 - 4.3Ω at 25°C (77°F)						
1 and 2 1 and 3	∞Ω (Continuity should not exist.)						
SEF310X							
<p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 9.						
NG	GO TO 13.						

9	CHECK MASS AIR FLOW SENSOR										
<ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Start engine and warm it up to normal operating temperature. 3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground. 											
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON" (Engine stopped.)</td> <td style="text-align: center;">Approx. 1.0</td> </tr> <tr> <td>Idle (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.1 - 1.5</td> </tr> <tr> <td>2,500 rpm (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.7 - 2.4</td> </tr> <tr> <td>Idle to about 4,000 rpm*</td> <td style="text-align: center;">1.1 - 1.5 to Approx. 4.0</td> </tr> </tbody> </table> </div> </div>		Condition	Voltage V	Ignition switch "ON" (Engine stopped.)	Approx. 1.0	Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4	Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0
Condition	Voltage V										
Ignition switch "ON" (Engine stopped.)	Approx. 1.0										
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5										
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4										
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0										
SEC103D											
<p>4. If the voltage is out of specification, disconnect mass air flow sensor harness connector and connect it again. Then repeat above check.</p> <p style="text-align: center;">OK or NG</p>											
OK	GO TO 10.										
NG	Replace mass air flow sensor.										

10	CHECK PCV VALVE	
<p>1. Install all removed parts. 2. Start engine and let it idle. 3. Remove PCV valve from rocker cover. 4. Make sure that 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.</p> <div data-bbox="649 357 974 672" style="text-align: center;"> </div> <p style="text-align: right;">SEC137A</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	GO TO 11.	
OK (Without CONSULT-II)	GO TO 12.	
NG	Replace PCV valve.	

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
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 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0133, P0153 HO2S1

Diagnostic Procedure (Cont'd)

11 CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

"HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below.

Bank 1
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

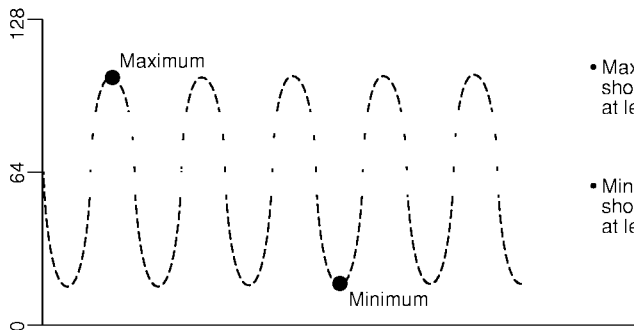
Bank 2
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
 MNTR (B1)/(B2) indicates RICH
 L means HO2S1
 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.
- Minimum voltage should be below 0.30V at least one time.

SEF648Y

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.

OK or NG

OK

GO TO 13.

NG

Replace malfunctioning heated oxygen sensor 1.

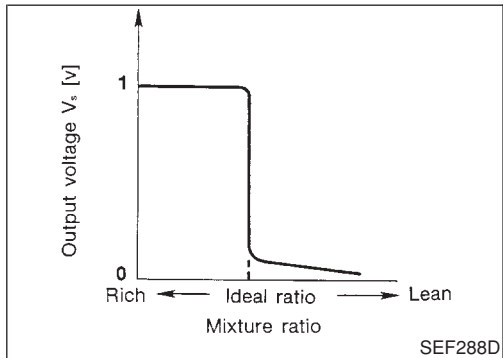
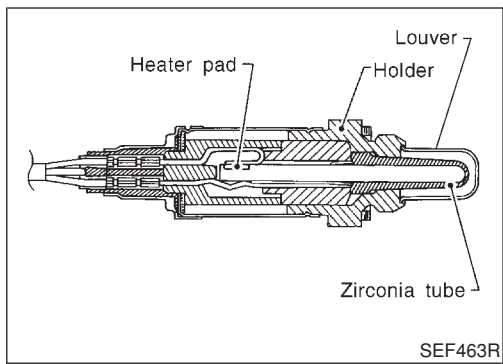
12	CHECK HEATED OXYGEN SENSOR 1
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground. Check the following with engine speed held at 2,000 rpm constant under no load. 	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>91: Bank 1 92: Bank 2</p> </div> <div style="width: 50%;"> <ul style="list-style-type: none"> • The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least one time. • The minimum voltage is below 0.3V at least one time. • The voltage never exceeds 1.0V. <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> </div> </div>	
SEC109D	
<p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
OK or NG	
OK	GO TO 13.
NG	Replace malfunctioning heated oxygen sensor 1.

13	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

GI
MA
EM
LC
EC
FE
CL
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DTC P0134, P0154 HO2S1

Component Description



Component Description

NFEC0888

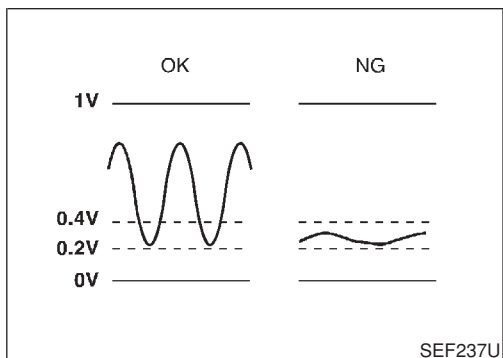
The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0889

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)			0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN + , RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC0891

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0134 0134 (Bank 1) P0154 0154 (Bank 2)	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1

GI

MA

EM

LC

5

HO2S1 (B1) P0134	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0544E

DTC Confirmation Procedure

NFEC1433

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.

EC

FE

CL

MT

5

HO2S1 (B1) P0134	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0545E

WITH CONSULT-II

NFEC1433S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "HO2S1 (B1)/(B2) P0134/P0154" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 3) Touch "START".
- 4) Let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.

- 5) 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 approximately 10 to 60 seconds.)

AT

AX

SU

BR

ST

ENG SPEED	1,400 - 2,600 rpm
Vehicle speed	More than 70 km/h (43 MPH)
B/FUEL SCHDL	2 - 12 msec
Selector lever	Suitable position

RS

BT

If "TESTING" is not displayed after 5 minutes, retry from step 2.

HA

- 6) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-243.

SC

During this test, P1148 and P1168 may be stored in ECM.

EL

IDX

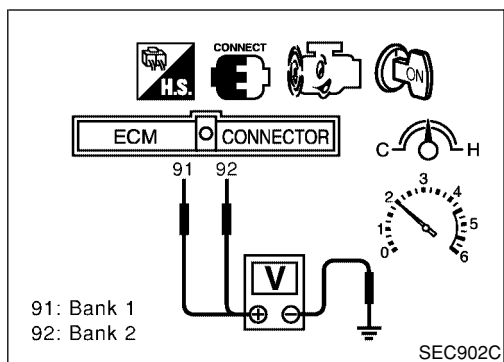
5

HO2S1 (B1) P0134	
COMPLETED	

SEC750C

DTC P0134, P0154 HO2S1

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed. NFEC0893

WITH GST

- 1) Start engine and warm it up to normal operating temperature. NFEC0893S01
- 2) Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.

The voltage does not remain in the range of 0.2 - 0.4V.

- 4) If NG, go to "Diagnostic Procedure", EC-243.

Wiring Diagram

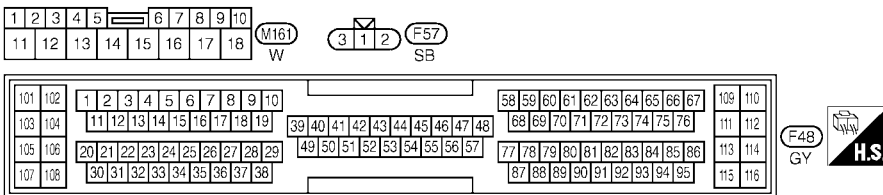
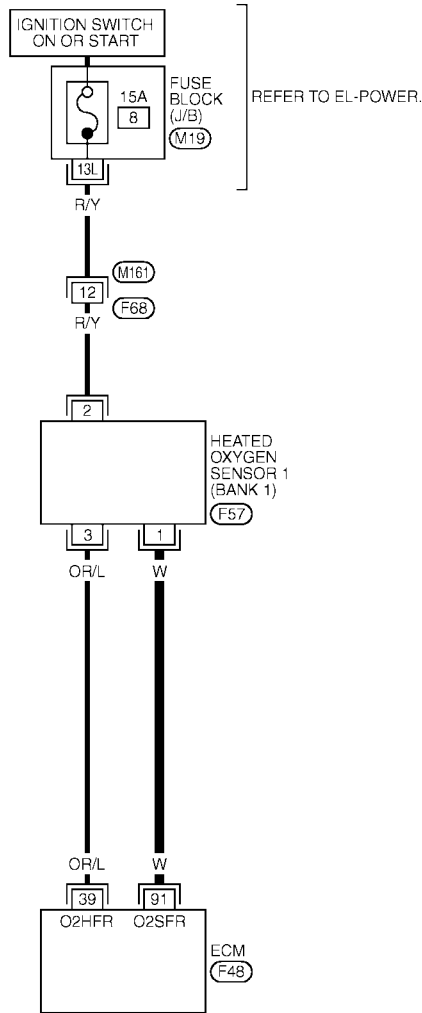
BANK 1

=NFEC0894

NFEC0894S01

EC-O2S1B1-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK- JUNCTION BOX (J/B)

MEC479D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	W	HEATED OXYGEN SENSOR 1 (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

SEC107D

DTC P0134, P0154 HO2S1

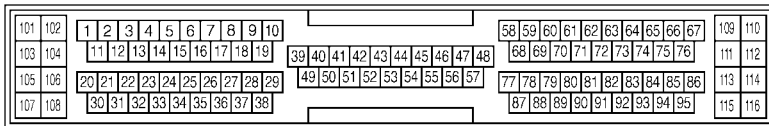
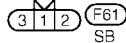
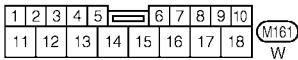
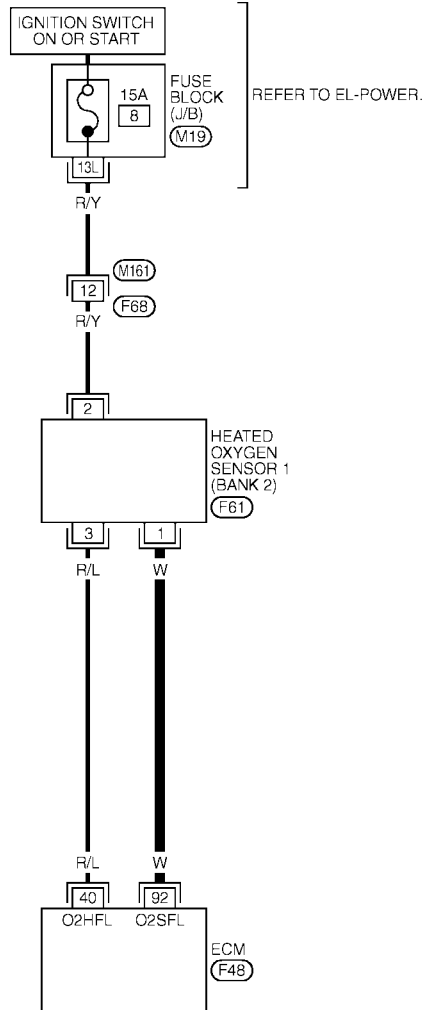
Wiring Diagram (Cont'd)

BANK 2

NFEC0894S02

EC-O2S1B2-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC480D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
92	W	HEATED OXYGEN SENSOR 1 (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

SEC108D

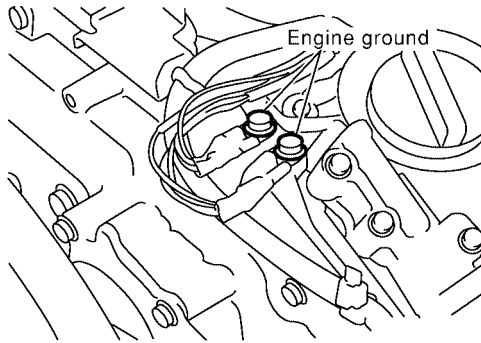
Diagnostic Procedure

NFEC0895

GI
MA
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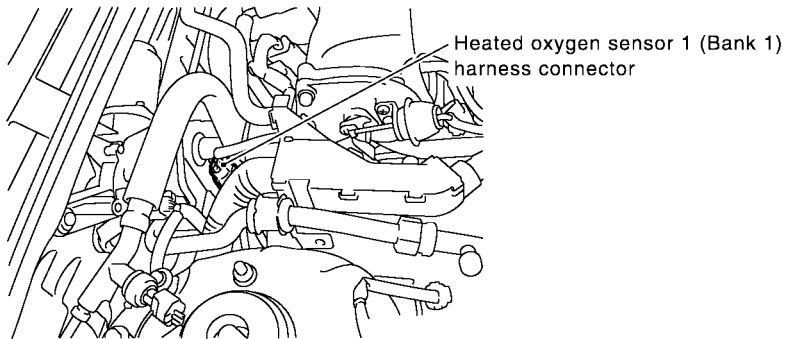
1 INSPECTION START

- 1. Turn ignition switch "OFF".
- 2. Loosen and retighten engine ground screws.

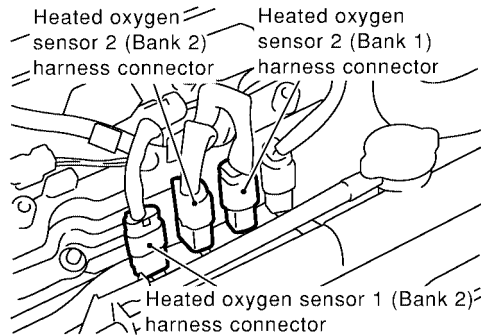


- 3. Disconnect corresponding heated oxygen sensor 1 harness connector.

SEC047D



SEC099D



SEC134D

GO TO 2.

DTC P0134, P0154 HO2S1

Diagnostic Procedure (Cont'd)

2	CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT															
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 15%;">DTC</th> <th colspan="2" style="width: 40%;">Terminals</th> <th rowspan="2" style="width: 15%;">Bank</th> </tr> <tr> <th style="width: 15%;">ECM</th> <th style="width: 10%;">Sensor</th> </tr> </thead> <tbody> <tr> <td>P0134</td> <td style="text-align: center;">91</td> <td style="text-align: center;">1</td> <td style="text-align: center;">Bank 1</td> </tr> <tr> <td>P0154</td> <td style="text-align: center;">92</td> <td style="text-align: center;">1</td> <td style="text-align: center;">Bank 2</td> </tr> </tbody> </table>			DTC	Terminals		Bank	ECM	Sensor	P0134	91	1	Bank 1	P0154	92	1	Bank 2
DTC	Terminals			Bank												
	ECM	Sensor														
P0134	91	1	Bank 1													
P0154	92	1	Bank 2													
MTBL1148																
<p>Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 15%;">DTC</th> <th colspan="2" style="width: 40%;">Terminals</th> <th rowspan="2" style="width: 15%;">Bank</th> </tr> <tr> <th style="width: 15%;">ECM or Sensor</th> <th style="width: 10%;">Ground</th> </tr> </thead> <tbody> <tr> <td>P0134</td> <td style="text-align: center;">91 or 1</td> <td style="text-align: center;">Ground</td> <td style="text-align: center;">Bank 1</td> </tr> <tr> <td>P0154</td> <td style="text-align: center;">92 or 1</td> <td style="text-align: center;">Ground</td> <td style="text-align: center;">Bank 2</td> </tr> </tbody> </table>			DTC	Terminals		Bank	ECM or Sensor	Ground	P0134	91 or 1	Ground	Bank 1	P0154	92 or 1	Ground	Bank 2
DTC	Terminals			Bank												
	ECM or Sensor	Ground														
P0134	91 or 1	Ground	Bank 1													
P0154	92 or 1	Ground	Bank 2													
MTBL1149																
<p>Continuity should not exist.</p> <p>4. Also check harness for short to power.</p>																
OK or NG																
OK (With CONSULT-II)	GO TO 3.															
OK (Without CONSULT-II)	GO TO 4.															
NG	Repair open circuit or short to ground or short to power in harness or connectors.															

GI
 MA
 EM
 LC
EC
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 MT
 AT
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 BR
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 RS
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 HA
 SC
 EL
 IDX

3 CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.
 "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
 5 times (cycles) are counted as shown below.

Bank 1
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

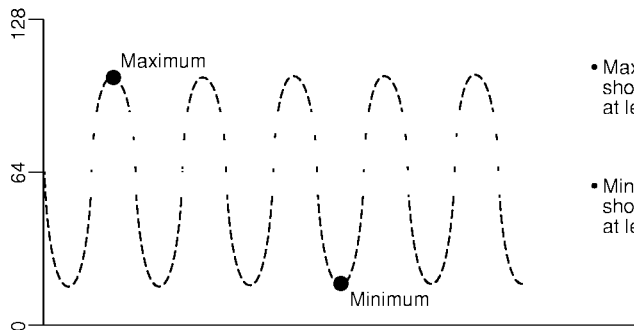
Bank 2
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
 MNTR (B1)/(B2) indicates RICH
 L means HO2S1
 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.
- Minimum voltage should be below 0.30V at least one time.

SEF648Y

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.

OK or NG

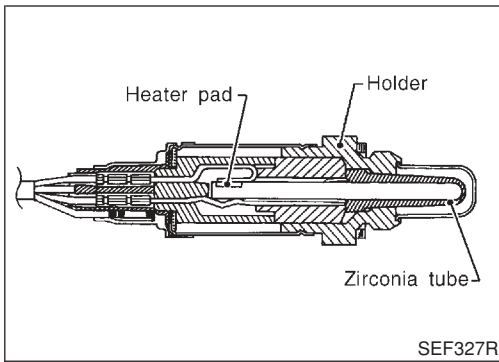
OK	GO TO 5.
NG	Replace malfunctioning heated oxygen sensor 1.

DTC P0134, P0154 HO2S1

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 1
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground. Check the following with engine speed held at 2,000 rpm constant under no load. 	
<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> <p>91: Bank 1 92: Bank 2</p> </div> <div style="flex: 2;"> <ul style="list-style-type: none"> • The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. • The maximum voltage is over 0.6V at least one time. • The minimum voltage is below 0.3V at least one time. • The voltage never exceeds 1.0V. <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> </div> </div>	
SEC109D	
<p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
OK or NG	
OK	GO TO 5.
NG	Replace malfunctioning heated oxygen sensor 1.

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	



Component Description

NFEC0896

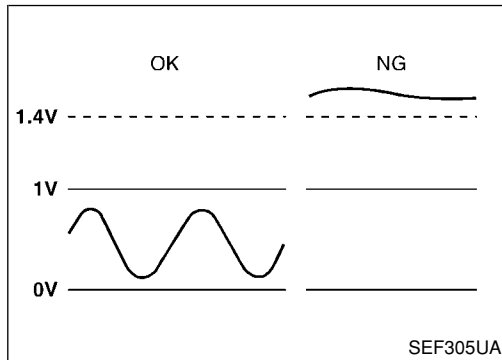
The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor 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

NFEC0897

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	Revvng engine from idle up 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

NFEC0899

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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) P0158 0158 (Bank 2)	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2

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

SEF189Y

DTC Confirmation Procedure

NFEC0900

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.

CONSULT-II WITH CONSULT-II

NFEC0900S01

- 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 one minute under no load.
- 5) Let engine idle for two minutes.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-251.

GST WITH GST

NFEC0900S02

- 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 one minute under no load.
- 4) Let engine idle for two minutes.
- 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 at least one minute under no load.
- 7) Let engine idle for two minutes.
- 8) Select "Mode 3" with GST.
- 9) If DTC is detected, go to EC-251, "Diagnostic Procedure".

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

Wiring Diagram

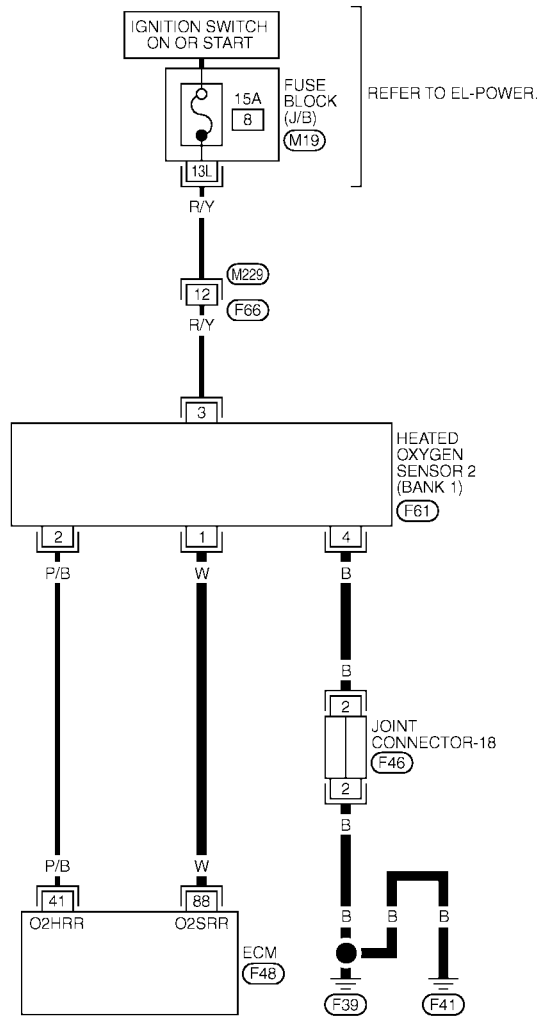
BANK 1

=NFEC0902

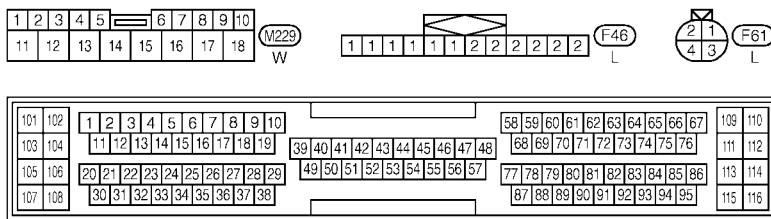
NFEC0902S01

EC-O2S2B1-01

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



GI
 MA
 EM
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EC
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 CL
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REFER TO THE FOLLOWING.
 (M19) -FUSE BLOCK-JUNCTION BOX (J/B)

MEC541D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (BANK 1)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

SEC661D

DTC P0138, P0158 HO2S2

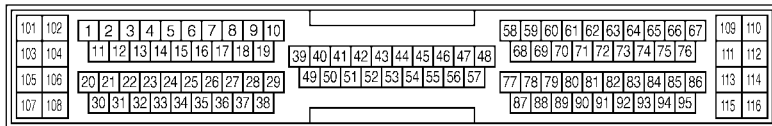
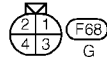
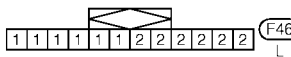
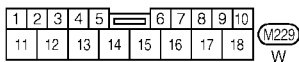
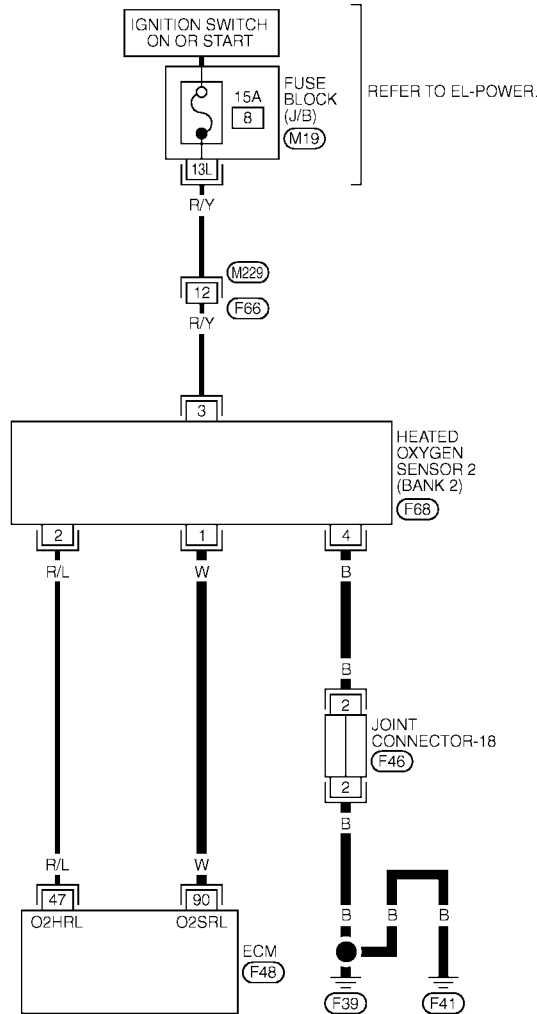
Wiring Diagram (Cont'd)

BANK 2

NFEC0902S02

EC-O2S2B2-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC542D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (BANK 2)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

SEC662D

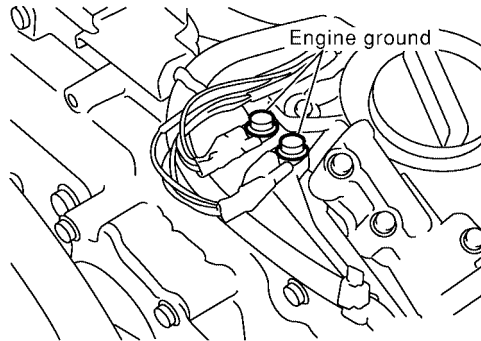
Diagnostic Procedure

NFEC0903

GI
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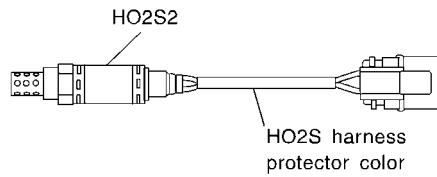
1 INSPECTION START

- 1. Turn ignition switch "OFF".
- 2. Loosen and retighten engine ground screws.



- 3. Check heated oxygen sensor 2 harness protector color.

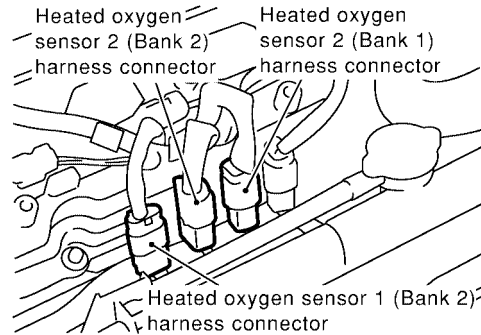
SEC047D



HO2S2 (bank 1): White or Gray
 HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

- 4. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

- 5. Disconnect ECM harness connector.

GO TO 2.

DTC P0138, P0158 HO2S2

Diagnostic Procedure (Cont'd)

2	CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																													
<p>1. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0138</td> <td style="text-align: center;">88</td> <td style="text-align: center;">1</td> <td>Bank 1</td> </tr> <tr> <td>P0158</td> <td style="text-align: center;">90</td> <td style="text-align: center;">1</td> <td>Bank 2</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1150</p> <p style="color: blue; font-weight: bold;">Continuity should exist.</p> <p>2. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Ground</th> </tr> </thead> <tbody> <tr> <td>P0138</td> <td style="text-align: center;">88 or 1</td> <td style="text-align: center;">Ground</td> <td>Bank 1</td> </tr> <tr> <td>P0158</td> <td style="text-align: center;">90 or 1</td> <td style="text-align: center;">Ground</td> <td>Bank 2</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1151</p> <p style="color: blue; font-weight: bold;">Continuity should not exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>			DTC	Terminals		Bank	ECM	Sensor	P0138	88	1	Bank 1	P0158	90	1	Bank 2	DTC	Terminals		Bank	ECM or Sensor	Ground	P0138	88 or 1	Ground	Bank 1	P0158	90 or 1	Ground	Bank 2
DTC	Terminals			Bank																										
	ECM	Sensor																												
P0138	88	1	Bank 1																											
P0158	90	1	Bank 2																											
DTC	Terminals		Bank																											
	ECM or Sensor	Ground																												
P0138	88 or 1	Ground	Bank 1																											
P0158	90 or 1	Ground	Bank 2																											
OK	GO TO 3.																													
NG	Repair open circuit or short to ground or short to power in harness or connectors.																													

3	CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram.</p> <p style="color: blue; font-weight: bold;">Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 5.	
NG	GO TO 4.	

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <p style="padding-left: 20px;">Joint connector-18</p> <p style="padding-left: 20px;">Harness for open and short between HO2S2 and engine ground</p>		
	Repair open circuit or short to power in harness or connectors.	

5	CHECK HO2S2 CONNECTORS FOR WATER	
<p>Check heated oxygen sensor connector 2 and harness connector for water.</p> <p style="color: blue; font-weight: bold;">Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	GO TO 6.	
OK (Without CONSULT-II)	GO TO 7.	
NG	Repair or replace harness or connectors.	

6	CHECK HEATED OXYGEN SENSOR 2
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II. 6. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$. 	
(Reference data)	
<p>"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: right;">SEF066YA</p>	
OK or NG	
OK	GO TO 10.
NG	GO TO 9.

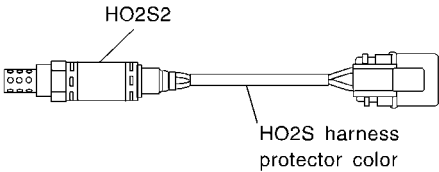
7	CHECK HEATED OXYGEN SENSOR 2-I
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine 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.) 	
<p>The voltage should be above 0.63V at least once during this procedure.</p> <p style="text-align: right;">SEC114D</p>	
OK or NG	
OK	GO TO 10.
NG	GO TO 8.

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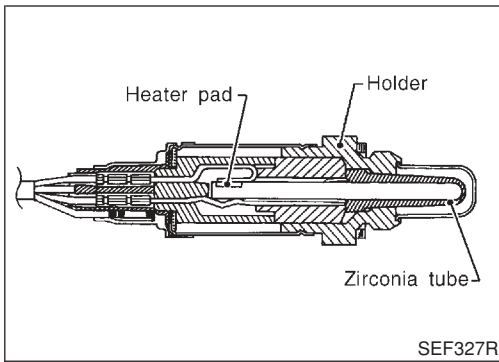
DTC P0138, P0158 HO2S2

Diagnostic Procedure (Cont'd)

8	CHECK HEATED OXYGEN SENSOR 2-II
<p>Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T). The voltage should go below 0.48V at least once during this procedure.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	GO TO 9.

9	REPLACE HEATED OXYGEN SENSOR 2
<p>1. Stop vehicle and turn ignition switch "OFF". 2. Check heated oxygen sensor 2 harness protector color.</p> <div style="text-align: center;">  <p style="margin-left: 150px;">HO2S2 (bank 1): White or Gray HO2S2 (bank 2): Red or Red/Brown</p> </div> <p style="text-align: right;">SEF372ZB</p> <p>CAUTION: Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
Replace malfunctioning heated oxygen sensor 2.	

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	



Component Description

NFEC0904

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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.

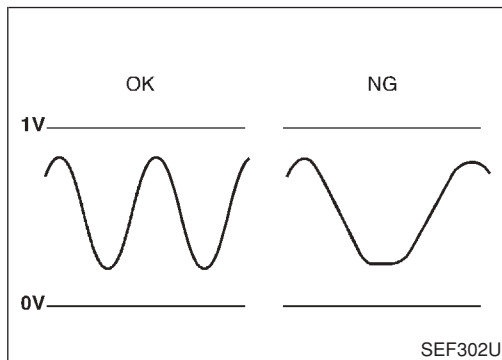
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0905

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	Reving engine from idle up 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

NFEC0907

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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) P0159 0159 (Bank 2)	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 Fuel pressure Injectors Intake air leaks

DTC P0139, P0159 HO2S2

DTC Confirmation Procedure

6

HO2S2 (B1) P0139

WAIT
OPEN ENGINE HOOD.
KEEP ENGINE RUNNING AT
IDLE SPEED FOR MAXIMUM
OF 5 MINUTES.

SEF666Y

8

HO2S2 (B1) P0139

MAINTAIN
1800 - 2800 RPM UNTIL FINAL
RESULT APPEARS.

1800 rpm 2300 rpm 2800 rpm

SEF667Y

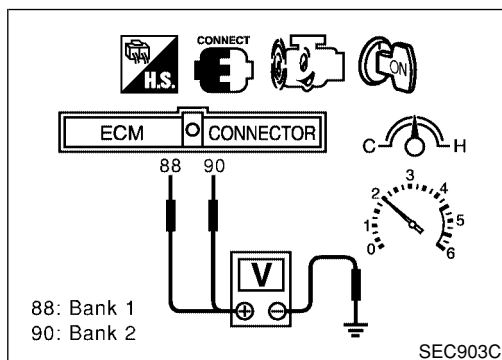
8

HO2S2 (B1) P0139

COMPLETED

SELF-DIAG RESULTS

SEF668Y



DTC Confirmation Procedure

NFEC0908

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

NFEC0908S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" or "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Follow the instruction of CONSULT-II.
- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to EC-260, "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) Turn ignition switch "ON" and select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- c) Start engine and warm it up while monitoring "COOLAN TEMP/S" indication on CONSULT-II.
- d) When "COOLAN TEMP/S" indication reaches to 70°C (158°F), go to step 3.

Overall Function Check

NFEC0909

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

NFEC0909S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
- 6) Check the voltage when racing up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 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)

DTC P0139, P0159 HO2S2

Overall Function Check (Cont'd)

in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
The voltage should change at more than 0.06V for 1 second during this procedure.

- 8) If NG, go to "Diagnostic Procedure", EC-260.

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DTC P0139, P0159 HO2S2

Wiring Diagram

Wiring Diagram

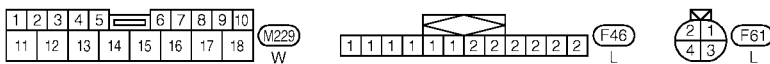
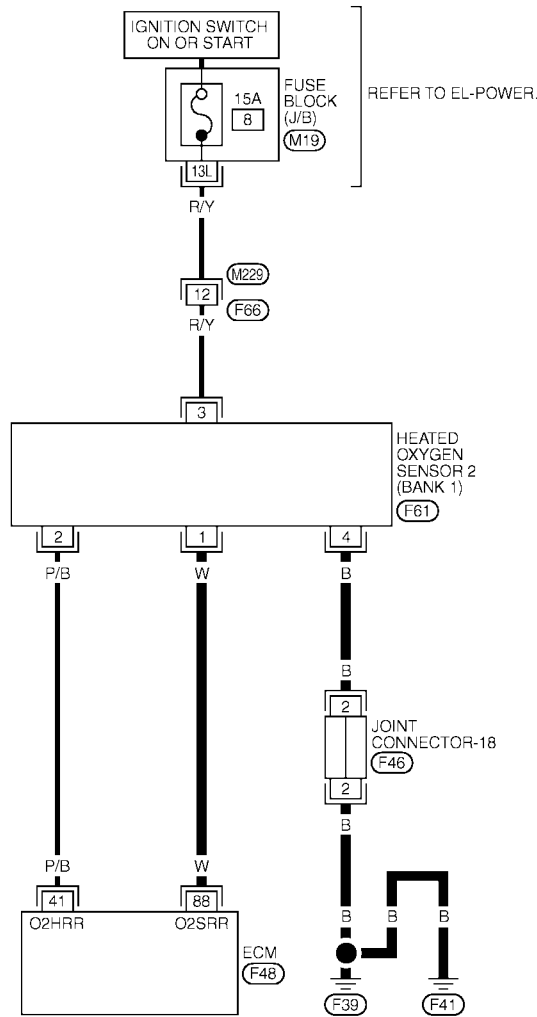
=NFEC0910

NFEC0910S01

BANK 1

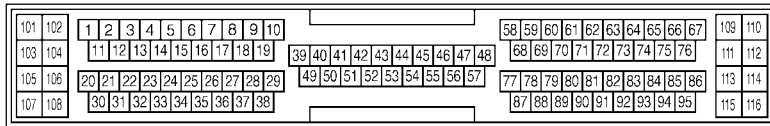
EC-O2S2B1-01

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



REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)



MEC541D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (BANK 1)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

SEC661D

DTC P0139, P0159 HO2S2

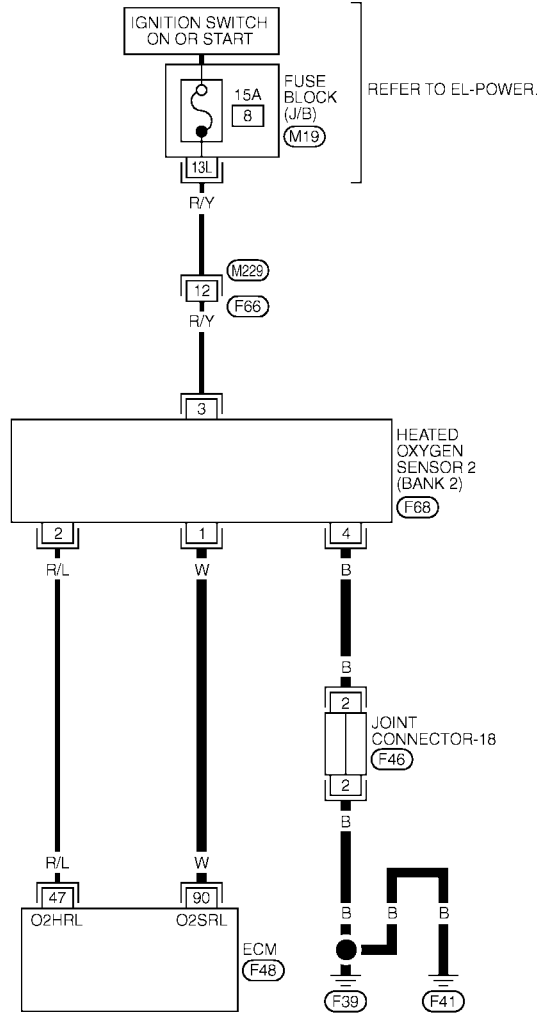
Wiring Diagram (Cont'd)

BANK 2

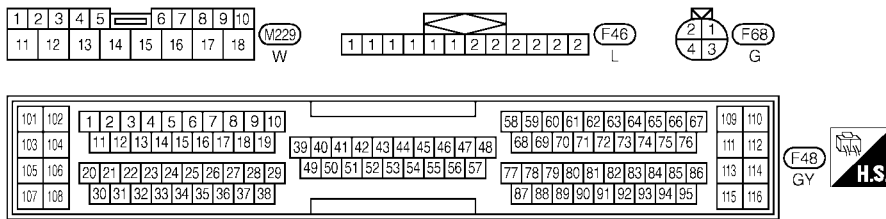
NFEC0910S02

EC-O2S2B2-01

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



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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC542D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (BANK 2)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

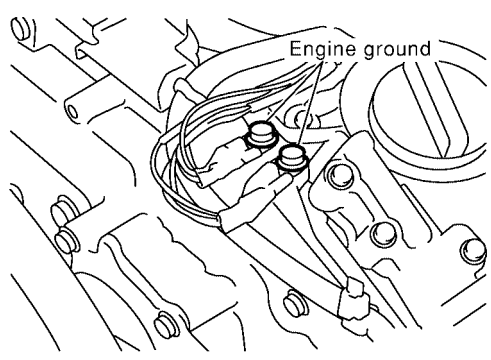
SEC662D



DTC P0139, P0159 HO2S2

Diagnostic Procedure

Diagnostic Procedure

NFEC0911

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

2	CLEAR THE SELF-LEARNING DATA									
<p> With CONSULT-II</p> <p>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".</p>										
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="3" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">CLEAR</td> <td style="padding: 2px;">B1 100 %</td> </tr> <tr> <td colspan="2"></td> <td style="padding: 2px;">B2 100 %</td> </tr> </table>		WORK SUPPORT			SELF-LEARNING CONT	CLEAR	B1 100 %			B2 100 %
WORK SUPPORT										
SELF-LEARNING CONT	CLEAR	B1 100 %								
		B2 100 %								
<p>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?</p>										
<p> Without CONSULT-II</p> <p>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 1st trip DTC No. P0102 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91. 7. Make sure DTC No. 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?</p>										
Yes or No										
Yes	Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to EC-265, 273.									
No	GO TO 3.									

SEF968Y

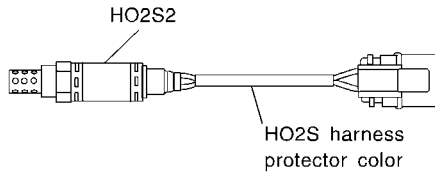
DTC P0139, P0159 HO2S2

Diagnostic Procedure (Cont'd)

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3 CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

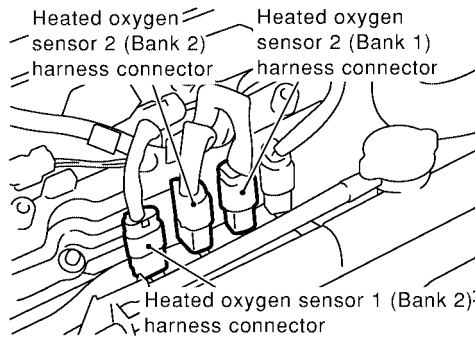
- Turn ignition switch "OFF".
- Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

- Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

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

DTC	Terminals		Bank
	ECM	Sensor	
P0139	88	1	Bank 1
P0159	90	1	Bank 2

MTBL1152

Continuity should exist.

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

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0139	88 or 1	Ground	Bank 1
P0159	90 or 1	Ground	Bank 2

MTBL1153

Continuity should not exist.

- Also check harness for short to power.

OK or NG


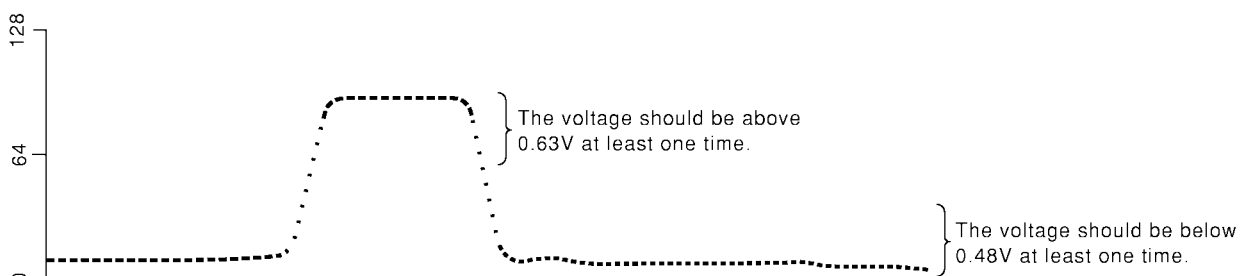
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0139, P0159 HO2S2

Diagnostic Procedure (Cont'd)

4	CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	GO TO 6.	
OK (Without CONSULT-II)	GO TO 7.	
NG	GO TO 5.	

5	DETECT MALFUNCTIONING PART	
<p>Check the following. Joint connector-18 Harness for open and short between HO2S2 and engine ground</p>		
		Repair open circuit or short to power in harness or connectors.

6	CHECK HEATED OXYGEN SENSOR 2	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II. 6. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$. 		
(Reference data)		
		
SEF066YA		
<p>"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 10.	
NG	GO TO 9.	

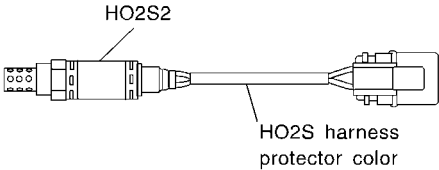
7	CHECK HEATED OXYGEN SENSOR 2-I
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine 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.) 	
<p>The voltage should be above 0.63V at least once during this procedure.</p>	
SEC114D	
OK or NG	
OK	GO TO 10.
NG	GO TO 8.

8	CHECK HEATED OXYGEN SENSOR 2-II
<p>Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).</p> <p>The voltage should go below 0.48V at least once during this procedure.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p>	
OK or NG	
OK	GO TO 10.
NG	GO TO 9.

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DTC P0139, P0159 HO2S2

Diagnostic Procedure (Cont'd)

9	REPLACE HEATED OXYGEN SENSOR 2
<p>1. Stop vehicle and turn ignition switch "OFF". 2. Check heated oxygen sensor 2 harness protector color.</p> <div style="text-align: center;"><p>The diagram shows a heated oxygen sensor (HO2S2) on the left, connected to a harness protector on the right. A label 'HO2S2' points to the sensor, and a label 'HO2S harness protector color' points to the harness protector.</p></div> <p>HO2S2 (bank 1): White or Gray HO2S2 (bank 2): Red or Red/Brown</p> <p style="text-align: right;">SEF372ZB</p> <p>CAUTION: Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
	Replace malfunctioning heated oxygen sensor 2.

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

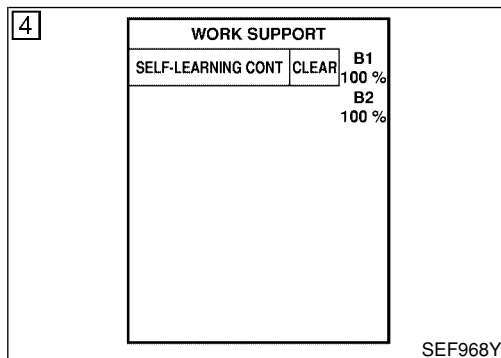
On Board Diagnosis Logic

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 heated oxygen 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 light up the MIL (2 trip detection logic).

NFEC0912

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	Injectors

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0171 0171 (Bank 1) P0174 0174 (Bank 2)	Fuel injection system too lean	Fuel injection system does not operate Properly, the amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	Intake air leaks Heated oxygen sensor 1 Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor Incorrect PCV hose connection



DTC Confirmation Procedure

NFEC0913

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.

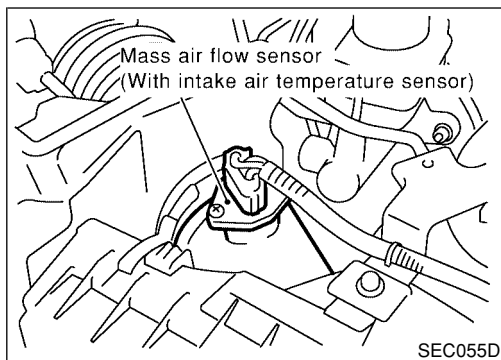
WITH CONSULT-II

NFEC0913S01

- 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-LEARN CONTROL" in "WORK SUPPORT" mode with CONSULT-II.
- 4) Clear the self-learning control coefficient by touching "CLEAR".
- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) 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 "Diagnostic Procedure", EC-269.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- 8) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-269. If engine does not start, check exhaust and intake air leak visually.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

DTC Confirmation Procedure (Cont'd)



WITH GST

NFEC0913S02

- 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 7" 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 "Diagnostic Procedure", EC-269.
- 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 "Diagnostic Procedure", EC-269. If engine does not start, check exhaust and intake air leak visually.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

Wiring Diagram

Wiring Diagram

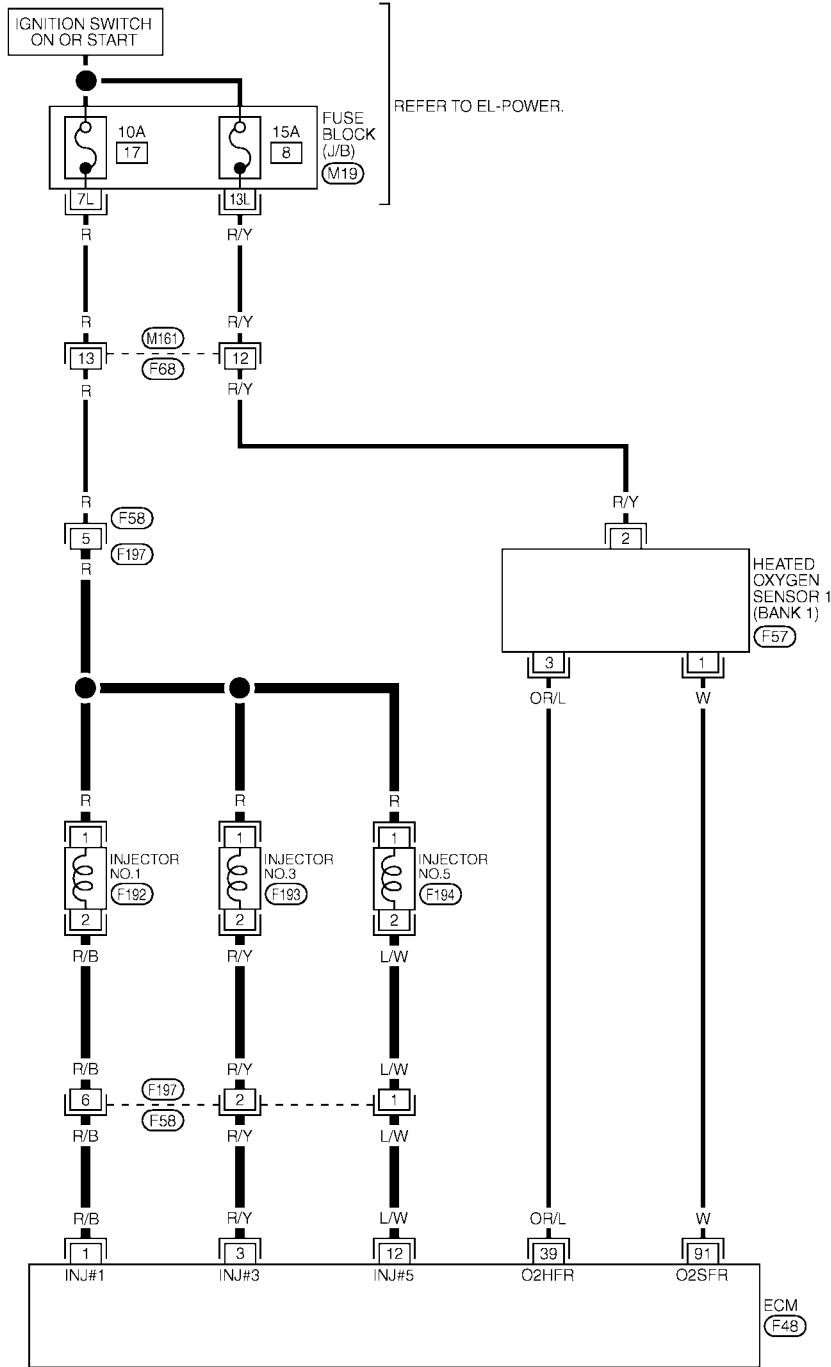
BANK 1

NFEC0914

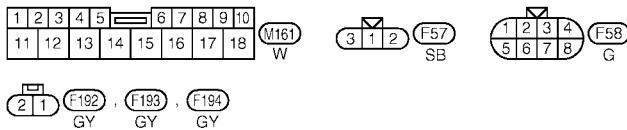
NFEC0914S01

EC-FUEL B1-01

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

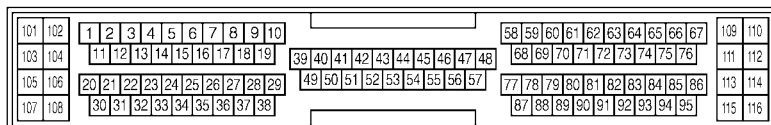


GI
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REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)



MEC487D

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

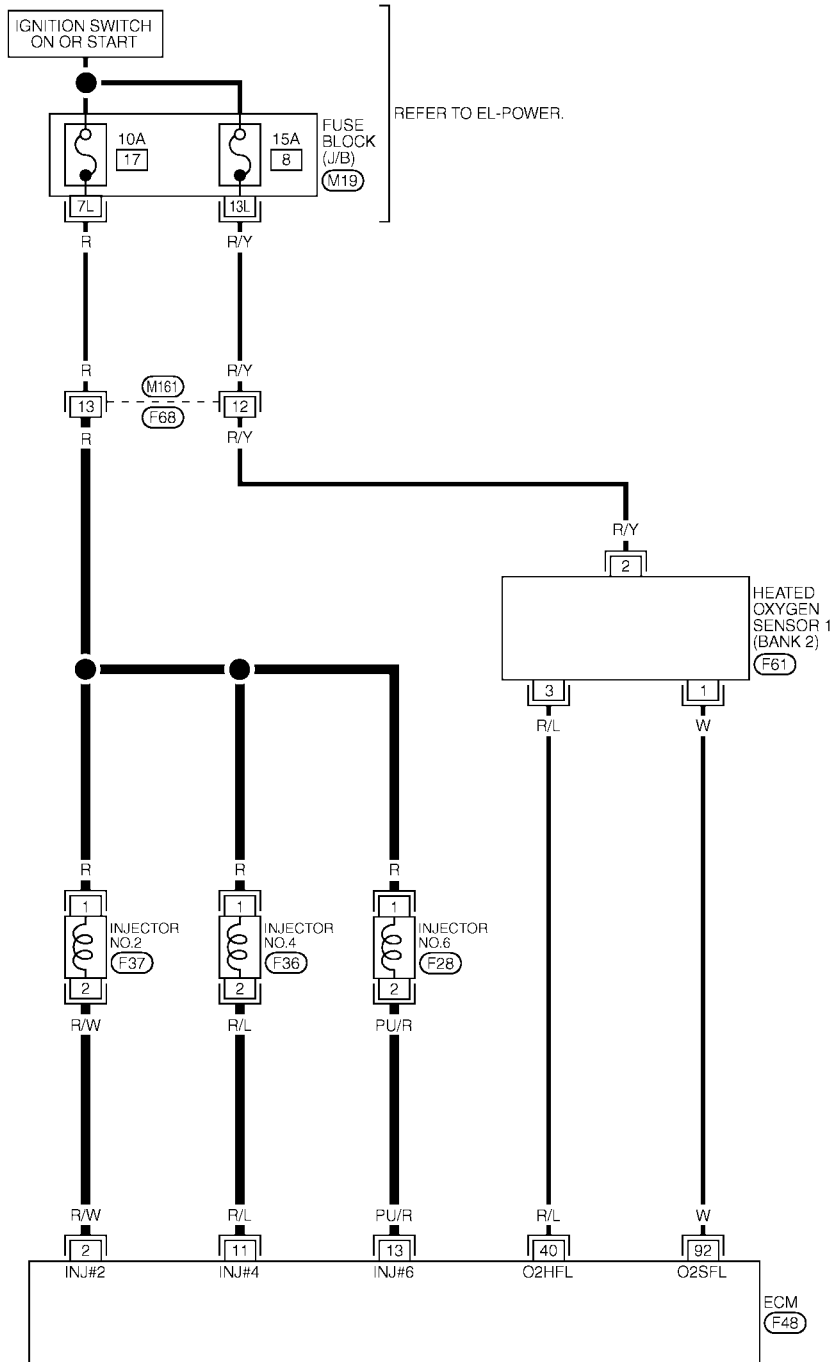
Wiring Diagram (Cont'd)

BANK 2

NFEC0914S02

EC-FUEL2-01

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



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

(M161)
W

(2 1)

(F28)
GY

(F36)
GY

(F37)
GY

(3 1 2)

(F61)
SB

REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)

101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38																					115	116

(F48)
GY



MEC488D

Diagnostic Procedure

NFEC0915

1	CHECK EXHAUST GAS LEAK
<p>1. Start engine and run it at idle. 2. Listen for an exhaust gas leak before three way catalyst (manifold).</p>	
<p>➡ : Exhaust gas</p>	
SEC502D	
OK or NG	
OK	GO TO 2.
NG	Repair or replace.



2	CHECK FOR INTAKE AIR LEAK
<p>1. Listen for an intake air leak after the mass air flow sensor. 2. Check PCV hose connection.</p>	
OK or NG	
OK	GO TO 3.
NG	Repair or replace.

3	CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT														
<p>1. Turn ignition switch "OFF". 2. Disconnect corresponding heated oxygen sensor 1 harness connector. 3. Disconnect ECM harness connector. 4. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0171</td> <td>91</td> <td>1</td> <td>Bank 1</td> </tr> <tr> <td>P0174</td> <td>92</td> <td>1</td> <td>Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM	Sensor	P0171	91	1	Bank 1	P0174	92	1	Bank 2
DTC	Terminals		Bank												
	ECM	Sensor													
P0171	91	1	Bank 1												
P0174	92	1	Bank 2												
MTBL1154															
<p>Continuity should exist.</p> <p>5. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Ground</th> </tr> </thead> <tbody> <tr> <td>P0171</td> <td>91 or 1</td> <td>Ground</td> <td>Bank 1</td> </tr> <tr> <td>P0174</td> <td>92 or 1</td> <td>Ground</td> <td>Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM or Sensor	Ground	P0171	91 or 1	Ground	Bank 1	P0174	92 or 1	Ground	Bank 2
DTC	Terminals		Bank												
	ECM or Sensor	Ground													
P0171	91 or 1	Ground	Bank 1												
P0174	92 or 1	Ground	Bank 2												
MTBL1155															
<p>Continuity should not exist.</p> <p>6. Also check harness for short to power.</p>															
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

Diagnostic Procedure (Cont'd)

4	CHECK FUEL PRESSURE
1. Release fuel pressure to zero. Refer to EC-56. 2. Install fuel pressure gauge and check fuel pressure. Refer to EC-56. At idling: Approximately 350 kPa (3.7 kg/cm², 51 psi)	
OK or NG	
OK	GO TO 5.
NG	Follow the construction of "Fuel Pressure Check", EC-56.

5	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. 2.0 - 6.0 g·m/sec: at idling 7.0 - 20.0 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. 2.0 - 6.0 g·m/sec: at idling 7.0 - 20.0 g·m/sec: at 2,500 rpm	
OK or NG	
OK	GO TO 6.
NG	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-196.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

Diagnostic Procedure (Cont'd)

6 CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

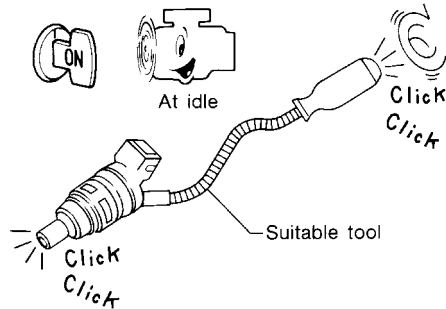
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS AIF SE-B1	XXX V

SEC136D

3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK

GO TO 7.

NG

Perform trouble diagnosis for "INJECTORS", EC-716.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

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EL

IDX

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

Diagnostic Procedure (Cont'd)

7	CHECK INJECTOR
<p>1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.</p> <p>2. Turn ignition switch "OFF".</p> <p>3. Disconnect injector harness connectors on bank 2 (for DTC P0171), bank 1 (for DTC P0174).</p> <p>4. Remove injector gallery assembly. Refer to EC-57. Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors on bank 1 (for DTC P0171), bank 2 (for DTC P0174) should remain connected.</p> <p>5. Disconnect all ignition coil harness connectors.</p> <p>6. Prepare pans or saucers under each injector.</p> <p>7. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.</p> <div data-bbox="649 483 966 787" data-label="Image">A technical drawing showing a fuel injector nozzle positioned above a shallow pan. Dashed lines radiate from the nozzle tip, indicating the spray pattern of the fuel. The pan contains a small amount of liquid at the bottom.</div> <p data-bbox="1380 793 1469 819">SEF595Q</p> <p data-bbox="219 823 771 850">Fuel should be sprayed evenly for each injector.</p> <p data-bbox="755 865 868 892">OK or NG</p>	
OK	GO TO 8.
NG	Replace injectors from which fuel does not spray out. Always replace O-ring with new ones.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

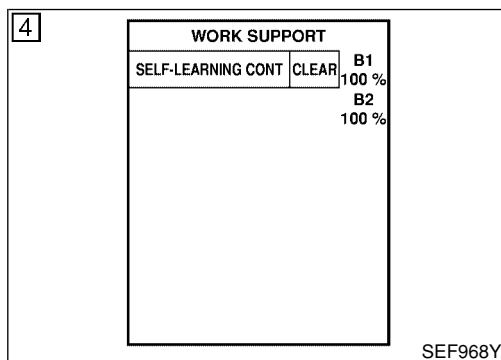
On Board Diagnosis Logic

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 heated oxygen 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 light up the MIL (2 trip detection logic).

NFEC0916

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	Injectors

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0172 0172 (Bank 1) P0175 0175 (Bank 2)	Fuel injection system too rich	Fuel injection system does not operate properly, the amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	Heated oxygen sensor 1 Injectors Exhaust gas leaks Incorrect fuel pressure Mass air flow sensor



DTC Confirmation Procedure

NFEC0917

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.

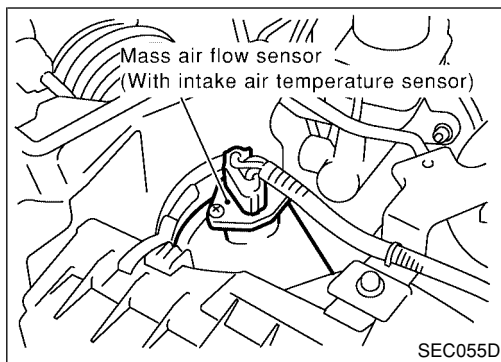
WITH CONSULT-II

NFEC0917S01

- 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-LEARN CONTROL" in "WORK SUPPORT" mode with CONSULT-II.
- 4) Clear the self-learning control coefficient by touching "CLEAR".
- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) 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 "Diagnostic Procedure", EC-277.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- 8) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-277. If engine does not start, remove ignition plugs and check for fouling, etc.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

DTC Confirmation Procedure (Cont'd)



WITH GST

NFEC0917S02

- 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 7" 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 "Diagnostic Procedure", EC-277.
- 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 "Diagnostic Procedure", EC-277. If engine does not start, check exhaust and intake air leak visually.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

Wiring Diagram

Wiring Diagram

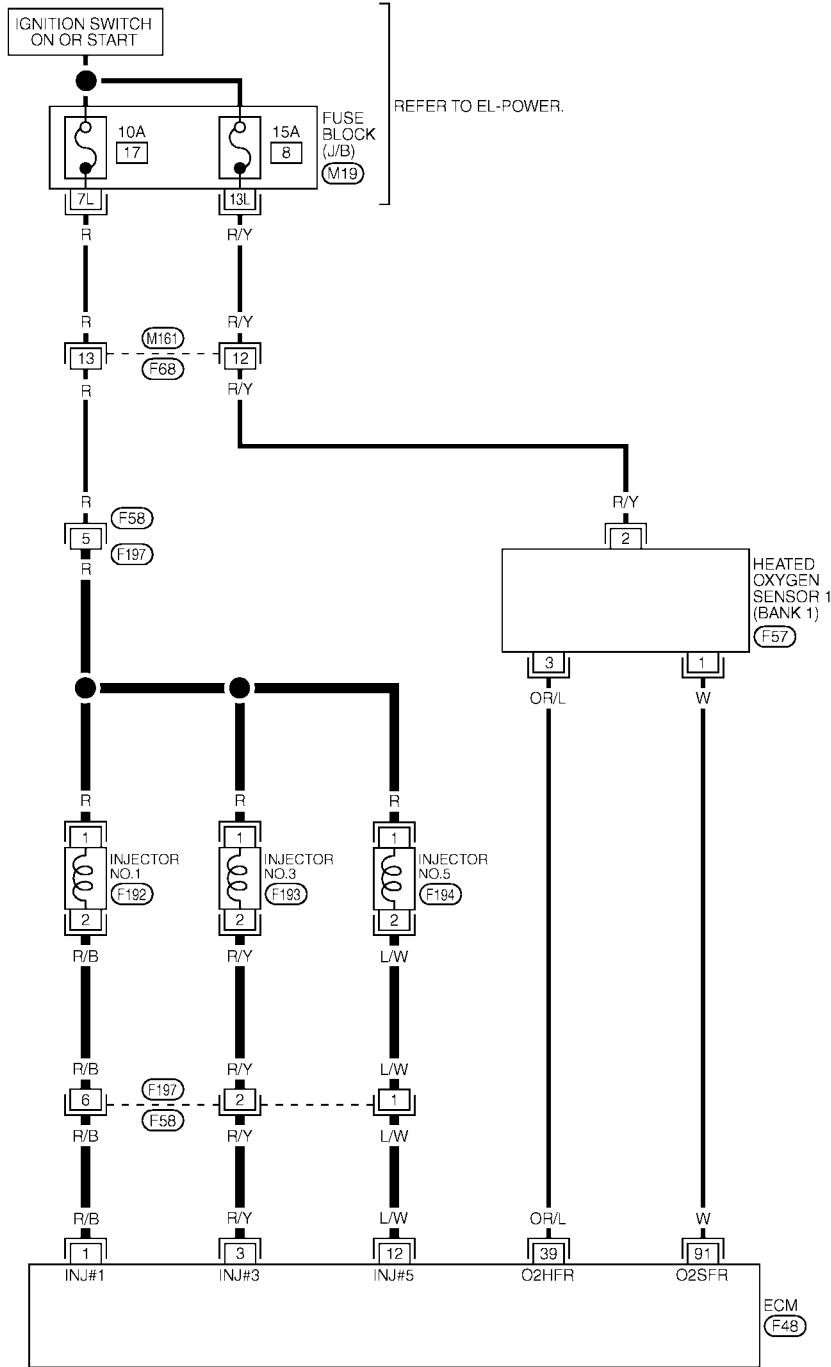
BANK 1

NFEC0918

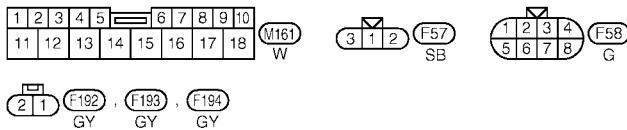
NFEC0918S01

EC-FUEL B1-01

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

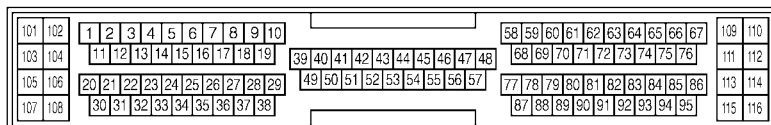


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REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)



MEC487D

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

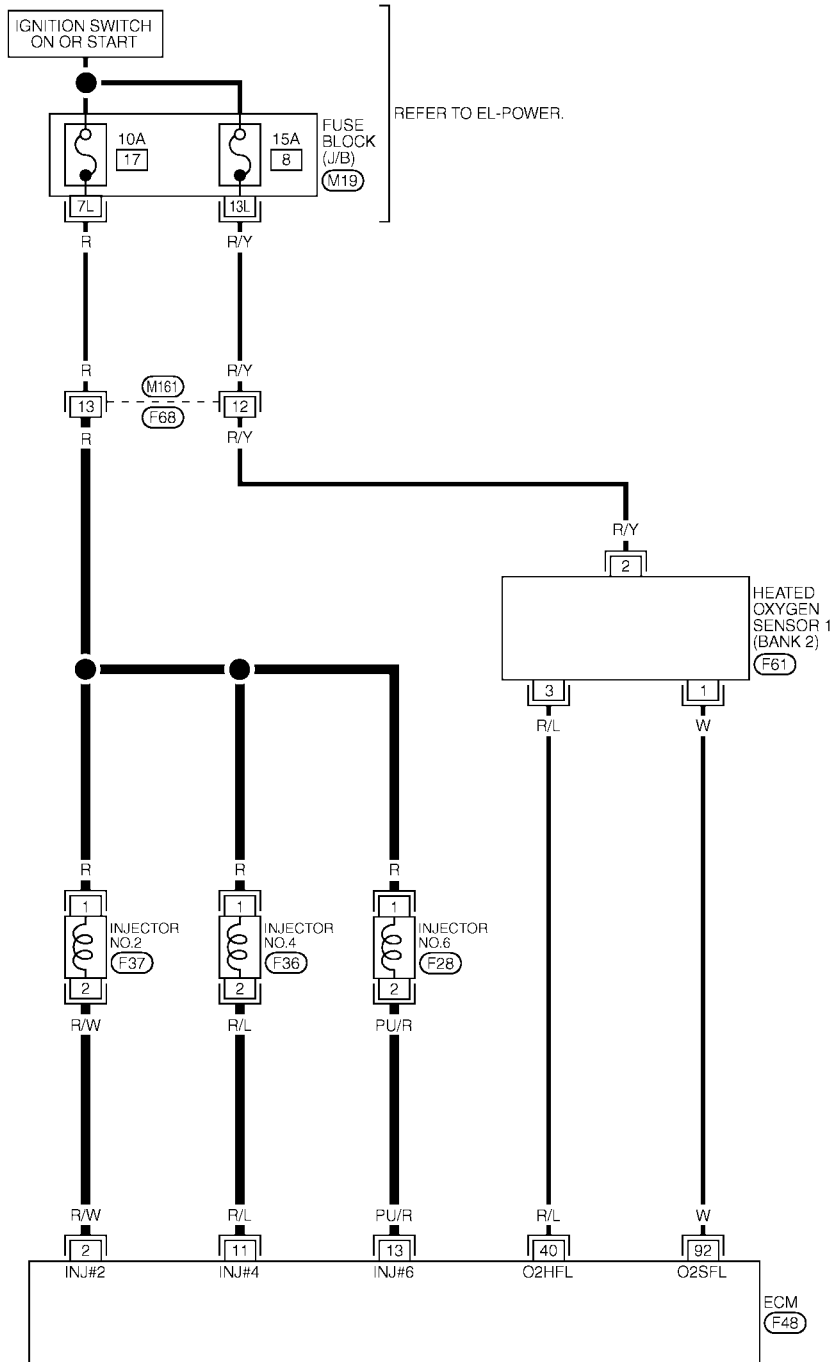
Wiring Diagram (Cont'd)

BANK 2

NFEC0918S02

EC-FUEL2-01

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



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

(M161)
W

(2 1)

(F28)
GY

(F36)
GY

(F37)
GY

(3 1 2)

(F61)
SB

REFER TO THE FOLLOWING.

(M19) -FUSE BLOCK-JUNCTION BOX (J/B)

101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110										
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112		
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114	
107	108	30	31	32	33	34	35	36	37	38																						115	116

(F48)
GY



MEC488D

Diagnostic Procedure

NFEC0919

1	CHECK EXHAUST GAS LEAK
<p>1. Start engine and run it at idle. 2. Listen for an exhaust gas leak before three way catalyst (manifold).</p>	
SEC502D	
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.

3	CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT														
<p>1. Turn ignition switch "OFF". 2. Disconnect corresponding heated oxygen sensor 1 harness connector. 3. Disconnect ECM harness connector. 4. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0172</td> <td>91</td> <td>1</td> <td>Bank 1</td> </tr> <tr> <td>P0175</td> <td>92</td> <td>1</td> <td>Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM	Sensor	P0172	91	1	Bank 1	P0175	92	1	Bank 2
DTC	Terminals		Bank												
	ECM	Sensor													
P0172	91	1	Bank 1												
P0175	92	1	Bank 2												
MTBL1156															
<p>Continuity should exist.</p> <p>5. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.</p>															
<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Ground</th> </tr> </thead> <tbody> <tr> <td>P0172</td> <td>91 or 1</td> <td>Ground</td> <td>Bank 1</td> </tr> <tr> <td>P0175</td> <td>92 or 1</td> <td>Ground</td> <td>Bank 2</td> </tr> </tbody> </table>		DTC	Terminals		Bank	ECM or Sensor	Ground	P0172	91 or 1	Ground	Bank 1	P0175	92 or 1	Ground	Bank 2
DTC	Terminals		Bank												
	ECM or Sensor	Ground													
P0172	91 or 1	Ground	Bank 1												
P0175	92 or 1	Ground	Bank 2												
MTBL1157															
<p>Continuity should not exist.</p> <p>6. Also check harness for short to power.</p>															
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

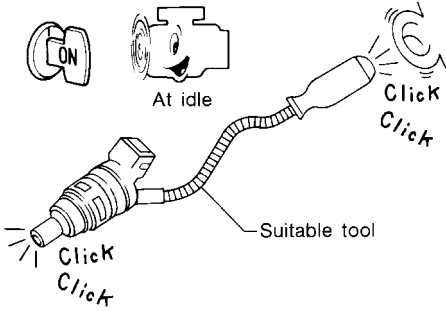
Diagnostic Procedure (Cont'd)

4	CHECK FUEL PRESSURE
1. Release fuel pressure to zero. Refer to EC-56. 2. Install fuel pressure gauge and check fuel pressure. Refer to EC-56. At idling: Approximately 350 kPa (3.7 kg/cm², 51 psi)	
OK or NG	
OK	GO TO 5.
NG	Follow the construction of "Fuel Pressure Check", EC-56.

5	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. 2.0 - 6.0 g·m/sec: at idling 7.0 - 20.0 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. 2.0 - 6.0 g·m/sec: at idling 7.0 - 20.0 g·m/sec: at 2,500 rpm	
OK or NG	
OK	GO TO 6.
NG	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-196.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

Diagnostic Procedure (Cont'd)

6	CHECK FUNCTION OF INJECTORS																								
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 																									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>POWER BALANCE</th> <th></th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>MAS AIF SE-B1</th> <th>XXX V</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS AIF SE-B1	XXX V														
ACTIVE TEST																									
POWER BALANCE																									
MONITOR																									
ENG SPEED	XXX rpm																								
MAS AIF SE-B1	XXX V																								
<p>3. Make sure that each circuit produces a momentary engine speed drop.</p>																									
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Listen to each injector operating sound. 																									
																									
<p>Clicking noise should be heard.</p>																									
<p>OK or NG</p>																									
OK	GO TO 7.																								
NG	Perform trouble diagnosis for "INJECTORS", EC-716.																								

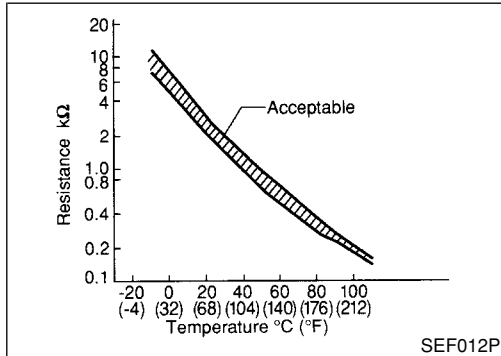
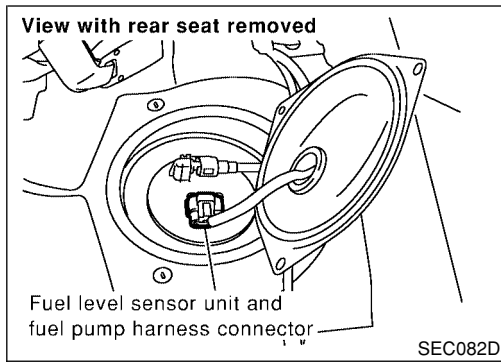
7	CHECK INJECTOR
<ol style="list-style-type: none"> Remove injector assembly. Refer to EC-57. Keep fuel hose and all injectors connected to injector gallery. Confirm that the engine is cooled down and there are no fire hazards near the vehicle. Disconnect injector harness connectors bank 2 (for DTC P0172), bank 1 (for P0175). The injector harness connectors on bank 1 (for P0172), bank 2 (for P0175) should remain connected. Disconnect all ignition coil harness connectors. Prepare pans or saucers under each injectors. Crank engine for about 3 seconds. Make sure fuel does not drip from injector. 	
<p>OK or NG</p>	
OK (Does not drip.)	GO TO 8.
NG (Drips.)	Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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DTC P0181 FTT SENSOR

Component Description



Component Description

NFEC0773

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>

Fuel 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 75 (Fuel tank temperature sensor) and body 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

NFEC0774

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.	Harness or connectors (The sensor circuit is open or shorted.) Fuel tank temperature sensor

DTC Confirmation Procedure

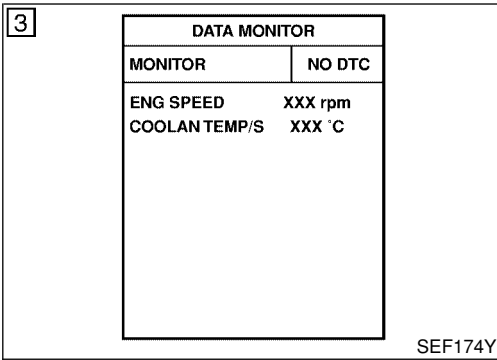
NFEC0776

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 P0181 FTT SENSOR

DTC Confirmation Procedure (Cont'd)



WITH CONSULT-II

NFEC0776S01

- 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 "Diagnostic Procedure", EC-281.
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 "Diagnostic Procedure", EC-281.

GI

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EM

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EC

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MT

WITH GST

Follow the procedure "With CONSULT-II" above.

NFEC0776S02

AT

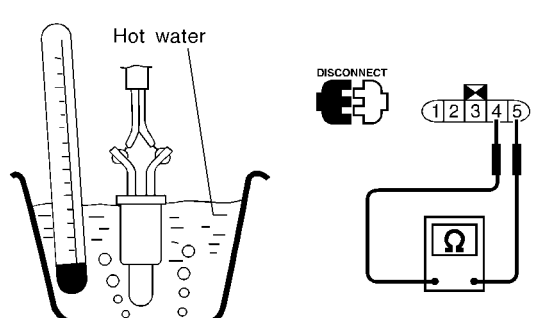
AX

SU

BR

Diagnostic Procedure

NFEC0778

1	CHECK FUEL TANK TEMPERATURE SENSOR						
<p>1. Remove fuel level sensor unit. 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.</p>							
							
<table border="1"> <thead> <tr> <th>Temperature °C (°F)</th> <th>Resistance kΩ</th> </tr> </thead> <tbody> <tr> <td>20 (68)</td> <td>2.3 - 2.7</td> </tr> <tr> <td>50 (122)</td> <td>0.79 - 0.90</td> </tr> </tbody> </table>		Temperature °C (°F)	Resistance kΩ	20 (68)	2.3 - 2.7	50 (122)	0.79 - 0.90
Temperature °C (°F)	Resistance kΩ						
20 (68)	2.3 - 2.7						
50 (122)	0.79 - 0.90						
<p>OK or NG</p>							
OK	GO TO 2.						
NG	Replace fuel level sensor unit.						

SEF587X

ST

RS

BT

HA

SC

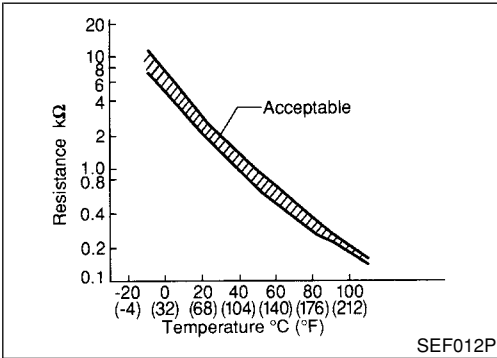
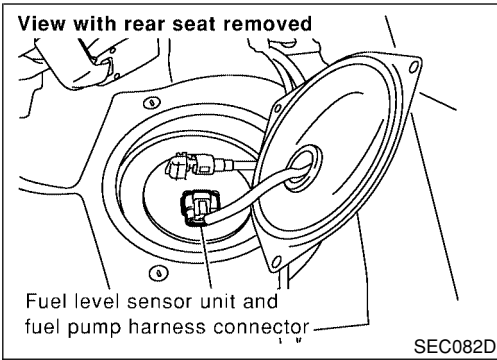
EL

IDX

DTC P0181 FTT SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. Refer to Wiring Diagram, EC-285.	
	INSPECTION END



Component Description

NFEC0920

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>

Fuel 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 75 (Fuel tank temperature sensor) and body 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

NFEC0921

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

NFEC0922

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 P0182, P0183 FTT SENSOR

DTC Confirmation Procedure (Cont'd)

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

SEF174Y

WITH CONSULT-II

NFEC0922S01

- 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 "Diagnostic Procedure", EC-286.
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 "Diagnostic Procedure", EC-286.

WITH GST

NFEC0922S02

Follow the procedure "With CONSULT-II" above.

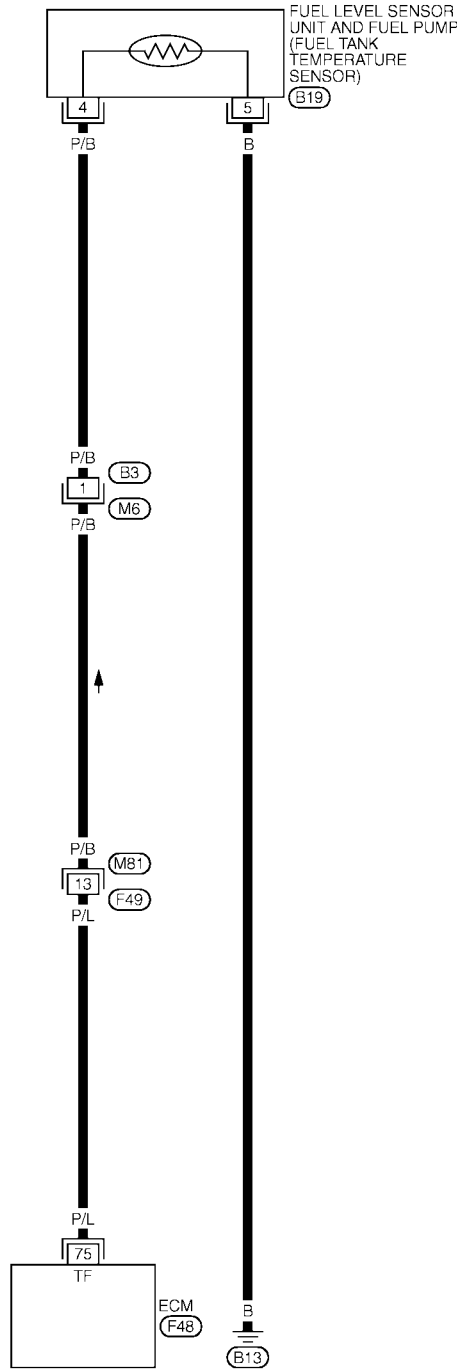
DTC P0182, P0183 FTT SENSOR

Wiring Diagram

Wiring Diagram

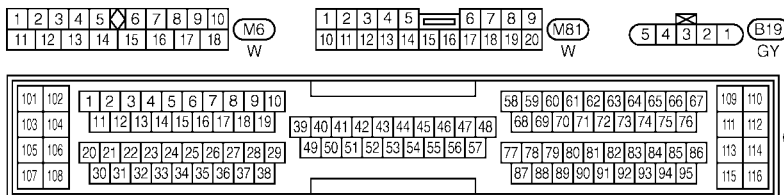
NFEC0923

EC-FTTS-01



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

- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



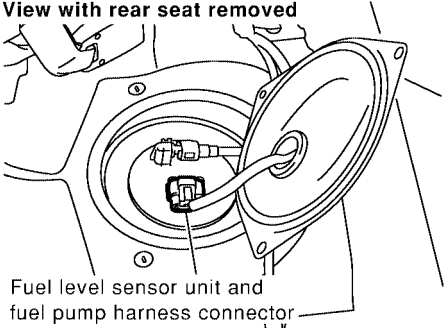
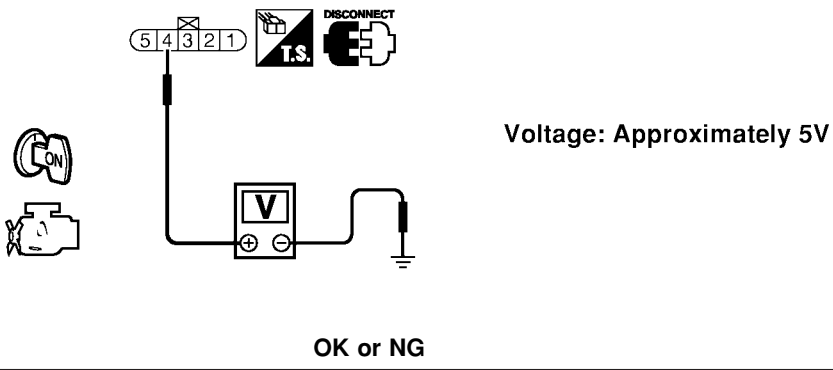
MEC489D

DTC P0182, P0183 FTT SENSOR

Diagnostic Procedure

Diagnostic Procedure

NFEC0924

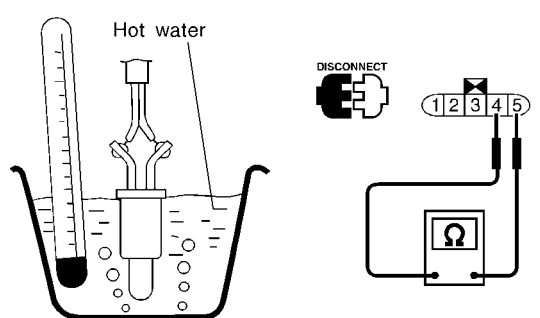
1	CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector.</p> <div style="text-align: center;"> <p>View with rear seat removed</p>  <p>Fuel level sensor unit and fuel pump harness connector</p> </div> <p style="text-align: right;">SEC082D</p> <p>3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit terminal 4 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">SEC116D</p> </div>	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors B3, M6 Harness connectors M81, F49 Harness for open or short between ECM and fuel level sensor unit and fuel pump 	
	Repair harness or connector.

3	CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	Repair open circuit or short to power in harness or connectors.

DTC P0182, P0183 FTT SENSOR

Diagnostic Procedure (Cont'd)

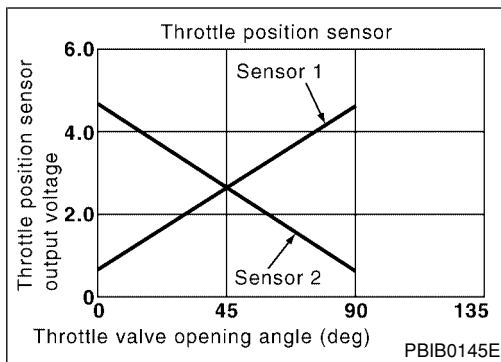
4	CHECK FUEL TANK TEMPERATURE SENSOR	
<p>1. Remove fuel level sensor unit. 2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.</p>		
		
SEF587X		
OK or NG		
OK	GO TO 5.	
NG	Replace fuel level sensor unit.	

5	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.		
INSPECTION END		

GI
 MA
 EM
 LC
EC
 FE
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 MT
 AT
 AX
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 BR
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 IDX

DTC P0221 TP SENSOR

Component Description



Component Description

NFEC1365

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

NFEC1366

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2	Ignition switch: ON (Engine stopped) Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

On Board Diagnosis Logic

NFEC1434

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0221 0221	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.	Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

NFEC1434S01

When the malfunction is detected, the ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

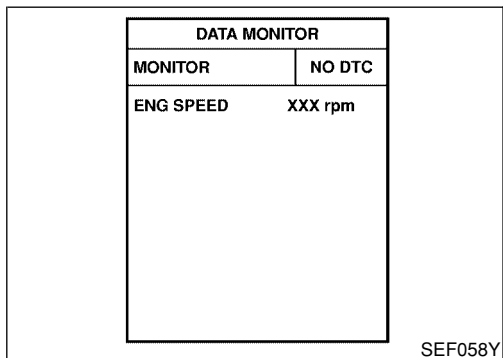
NFEC1435

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. Start engine and let it idle for 1 second.
4. If DTC is detected, go to "Diagnostic Procedure", EC-291.

With GST

Follow the procedure "WITH CONSULT-II" above.

GI

MA

EM

LC

EC

FE

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MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0221 TP SENSOR

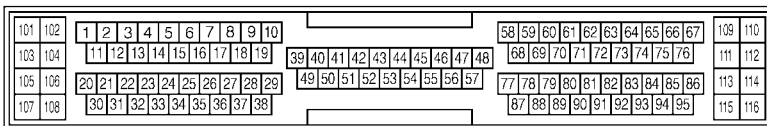
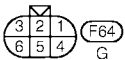
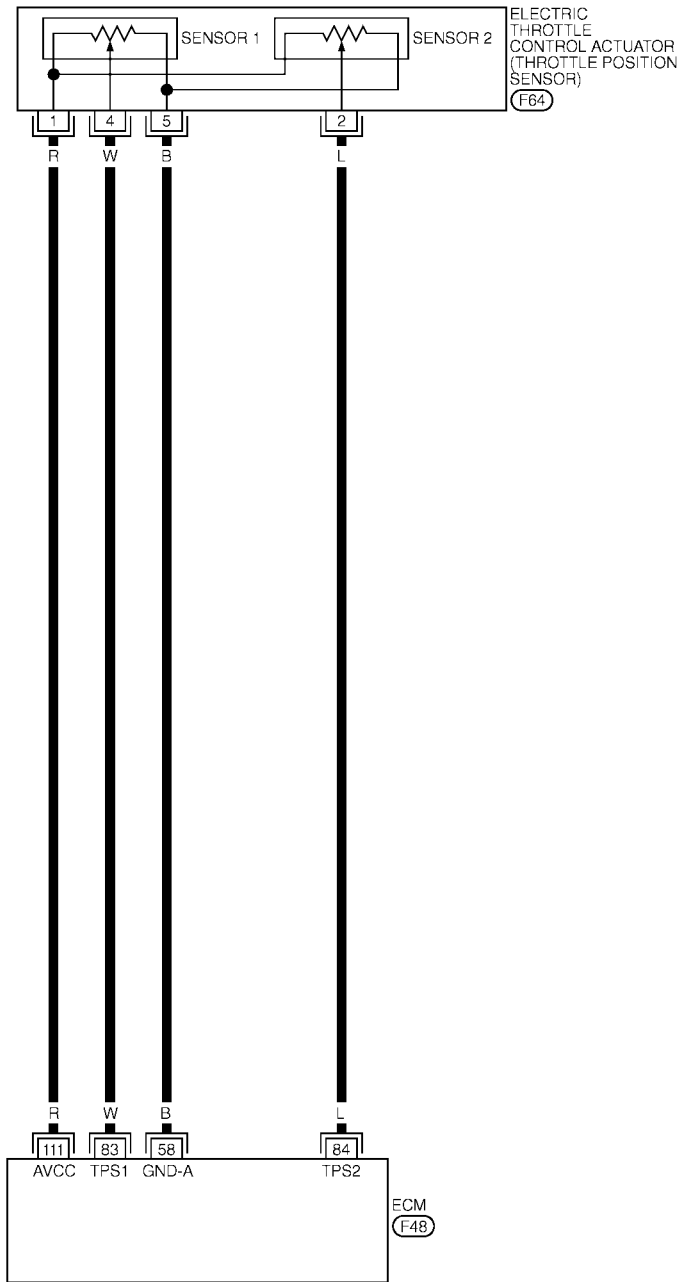
Wiring Diagram

Wiring Diagram

NFEC1369

EC-TPS3-01

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



MEC476D

DTC P0221 TP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

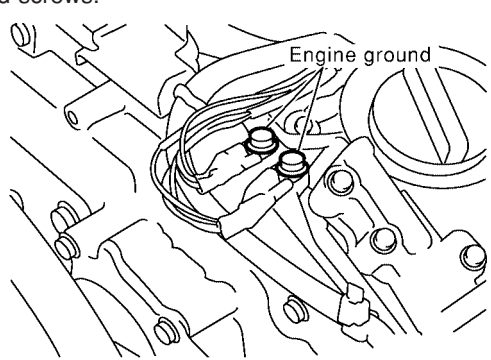
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal released	More than 0.36V
			[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal released	Less than 4.75V
			[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	More than 0.36V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

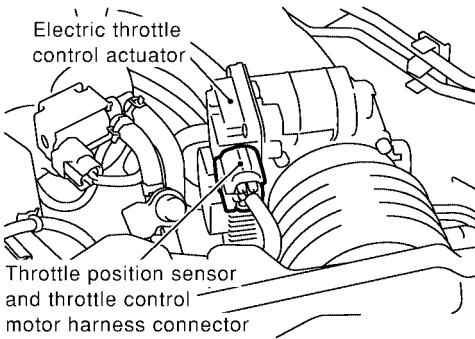
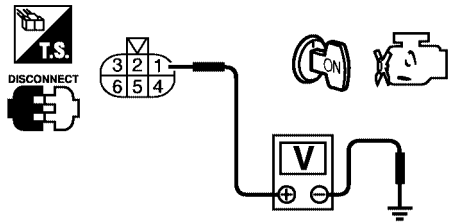
Diagnostic Procedure

NFEC1370

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

DTC P0221 TP SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT
<p>1. Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch "ON".</p> <div style="text-align: center;">  </div> <p>3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="color: blue;">Voltage: Approximately 5V</p> <p style="text-align: center;">OK or NG</p>	
SEC054D	
PBIB0082E	
OK	GO TO 3.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram. <b style="color: blue;">Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following. Harness for open or short between electric throttle control actuator and ECM</p>	
	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0221 TP SENSOR

Diagnostic Procedure (Cont'd)

5	CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and electric throttle control actuator terminal 4, ECM terminal 84 and electric throttle control actuator terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA
EM
LC

6	CHECK THROTTLE POSITION SENSOR
Refer to "Component Inspection", EC-293. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

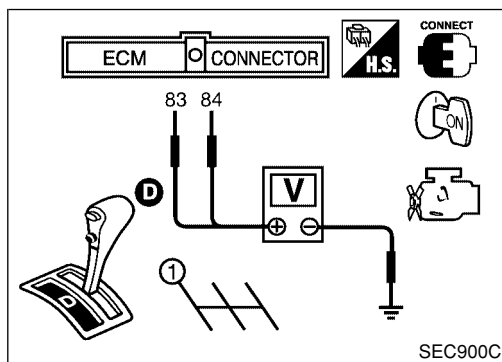
EC
FE
CL

7	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71. <p style="text-align: center;">INSPECTION END</p>	

MT
AT

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. <p style="text-align: center;">INSPECTION END</p>	

AX
SU



Component Inspection THROTTLE POSITION SENSOR

NFEC1371

1. Reconnect all harness connectors disconnected.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1), 84 (TP sensor 2) and engine ground under the following conditions.

ST
RS

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (Throttle position sensor 2)	Released	Less than 4.75V
	Fully depressed	More than 0.36V

BT
HA

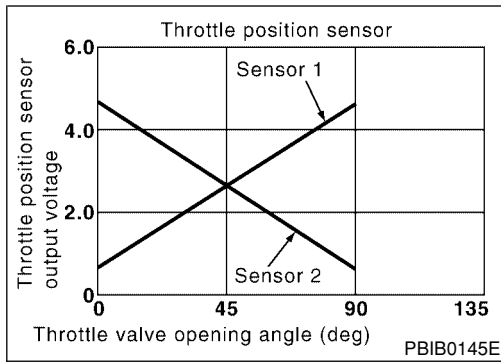
6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform "Throttle Valve Closed Position Learning", EC-71.

SC
EL
IDX

DTC P0221 TP SENSOR

Component Inspection (Cont'd)

8. Perform "Idle Air Volume Learning", EC-71.



Component Description

NFEC1372

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.

GI
MA
EM
LC

EC

FE

CL

MT

CONSULT-II Reference Value in Data Monitor Mode

NFEC1373

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1	Ignition switch: ON (Engine stopped) Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

AX

SU

BR

On Board Diagnosis Logic

NFEC1436

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 (The TP sensor 1 circuit is open or shorted.) Electric throttle control actuator (TP sensor 1)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

ST

RS

BT

HA

FAIL-SAFE MODE

NFEC1436S01

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

SC

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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

EL

IDX

DTC P0222, P0223 TP SENSOR

DTC Confirmation Procedure

DTC Confirmation Procedure

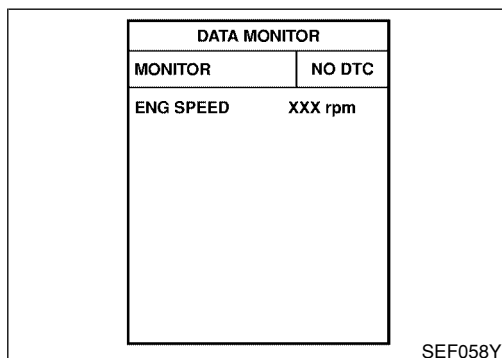
NFEC1437

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.



SEF058Y

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 "Diagnostic Procedure", EC-298.

With GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0222, P0223 TP SENSOR

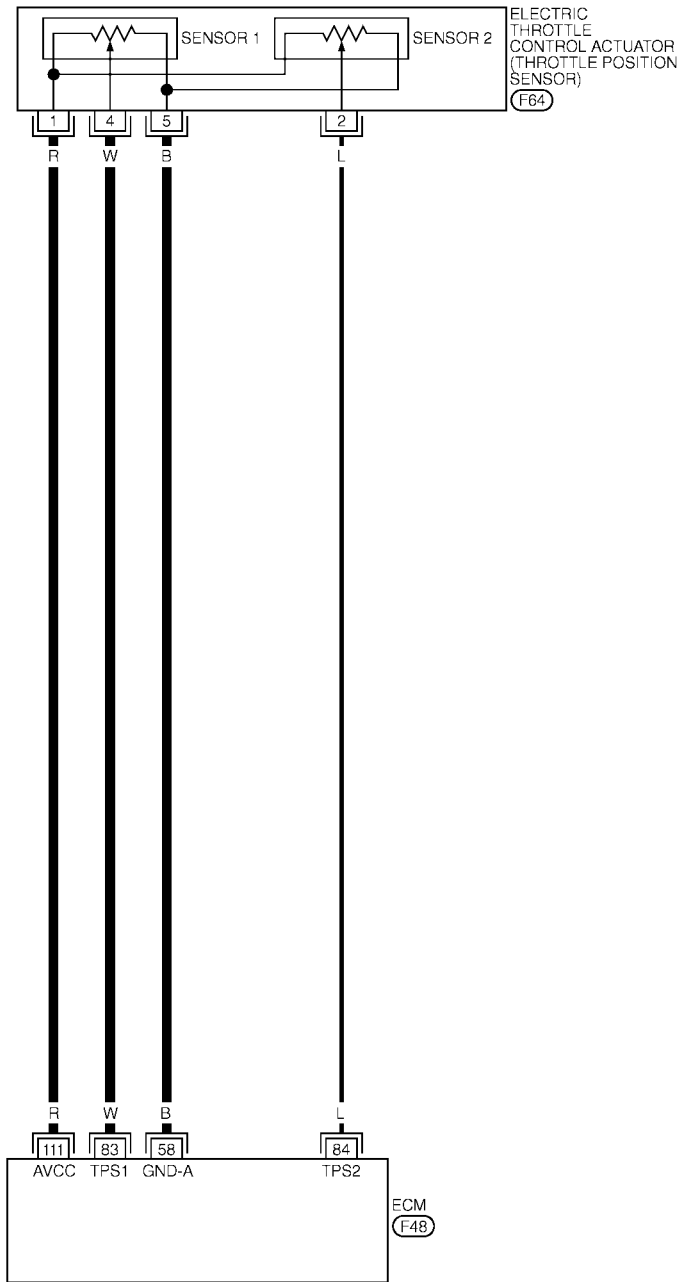
Wiring Diagram

Wiring Diagram

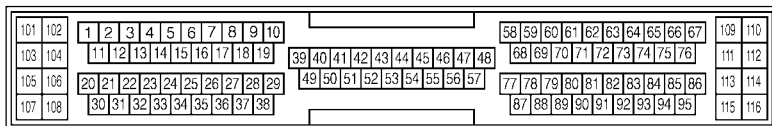
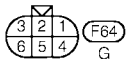
NFEC1376

EC-TPS1-01

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



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



MEC700D

DTC P0222, P0223 TP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

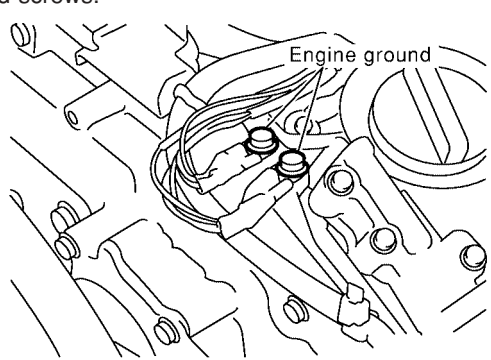
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal released	More than 0.36V
			[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal released	Less than 4.75V
			[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	More than 0.36V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

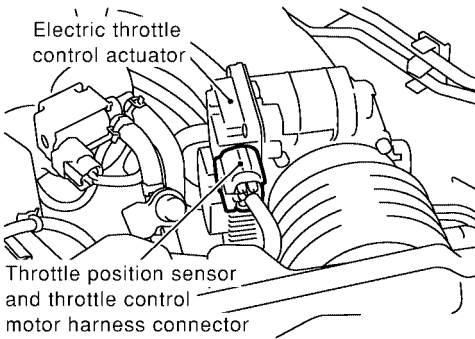
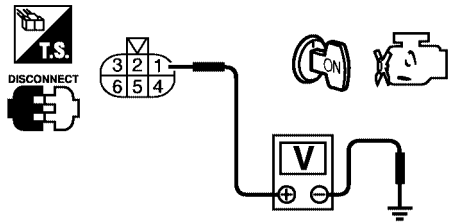
Diagnostic Procedure

NFEC1377

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

DTC P0222, P0223 TP SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT				
<p>1. Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch "ON".</p> <div style="text-align: center;">  </div> <p>3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p>Voltage: Approximately 5V</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		OK	GO TO 3.	NG	Repair open circuit or short to ground or short to power in harness or connectors.
OK	GO TO 3.				
NG	Repair open circuit or short to ground or short to power in harness or connectors.				

SEC054D

PBIB0082E

3	CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT				
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>GO TO 4.</td> </tr> </table>		OK	GO TO 5.	NG	GO TO 4.
OK	GO TO 5.				
NG	GO TO 4.				

4	DETECT MALFUNCTIONING PART		
<p>Check the following. Harness for open or short between electric throttle control actuator and ECM</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>			Repair open circuit or short to ground or short to power in harness or connectors.
	Repair open circuit or short to ground or short to power in harness or connectors.		

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DTC P0222, P0223 TP SENSOR

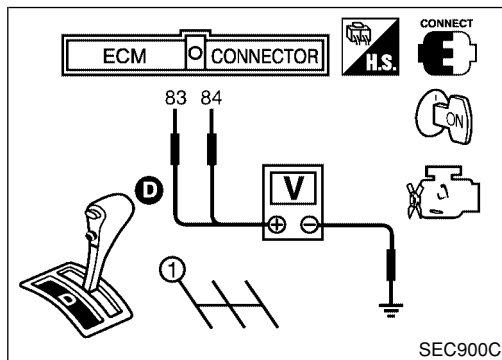
Diagnostic Procedure (Cont'd)

5	CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and electric throttle control actuator terminal 4. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK THROTTLE POSITION SENSOR
Refer to "Component Inspection", EC-300. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

7	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71. <p style="text-align: center;">INSPECTION END</p>	

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. <p style="text-align: center;">INSPECTION END</p>	



Component Inspection THROTTLE POSITION SENSOR

NFEC1378

1. Reconnect all harness connectors disconnected.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1), 84 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (Throttle position sensor 2)	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 "Throttle Valve Closed Position Learning", EC-71.

DTC P0222, P0223 TP SENSOR

Component Inspection (Cont'd)

8. Perform "Idle Air Volume Learning", EC-71.

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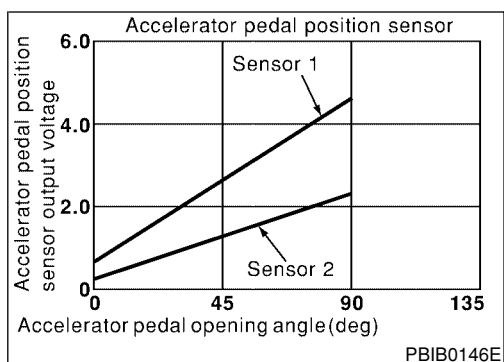
SC

EL

IDX

DTC P0226 APP SENSOR

Component Description



Component Description

NFEC1379

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

NFEC1380

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	Ignition switch: ON (engine stopped)	Accelerator pedal: Released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN2	Ignition switch: ON (engine stopped)	Accelerator pedal: Released	0.15 - 0.97V
		Accelerator pedal: Fully depressed	More than 3.5V
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

NFEC1438

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0226 0226	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.	Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

NFEC1438S01

When the malfunction is detected, ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

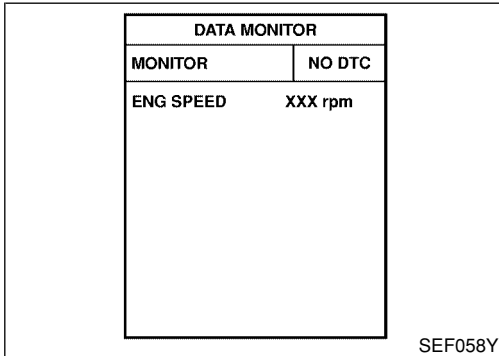
NFEC1439

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. Start engine and let it idle for 1 second.
4. If DTC is detected, go to "Diagnostic Procedure", EC-305.

With GST

Follow the procedure "WITH CONSULT-II" above.

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DTC P0226 APP SENSOR

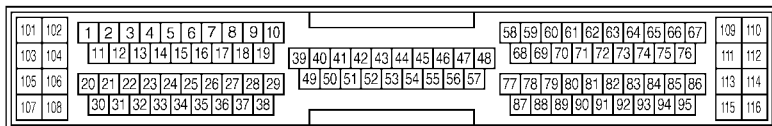
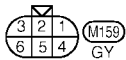
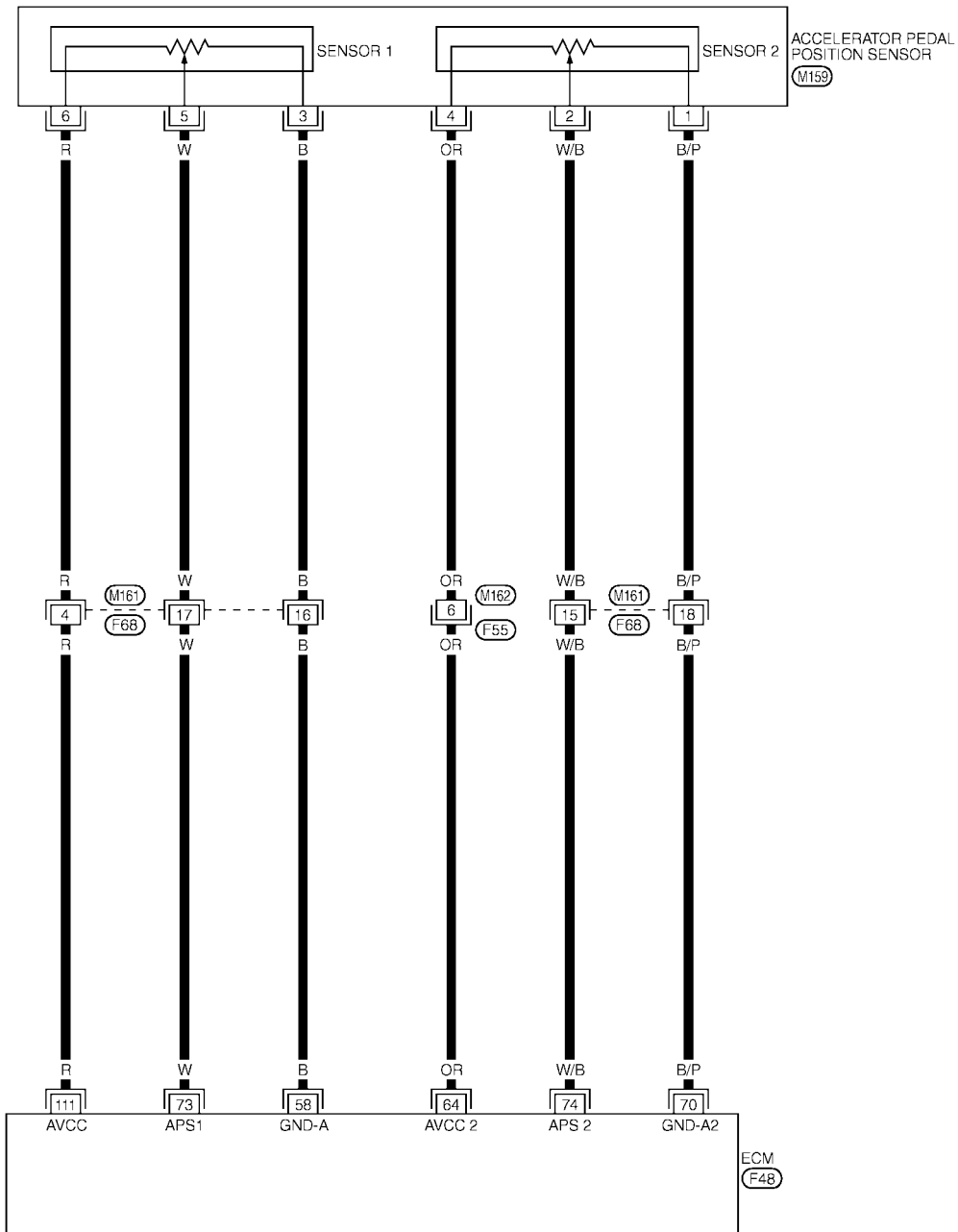
Wiring Diagram

Wiring Diagram

NFEC1383

EC-APPS3-01

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



MEC925D

DTC P0226 APP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

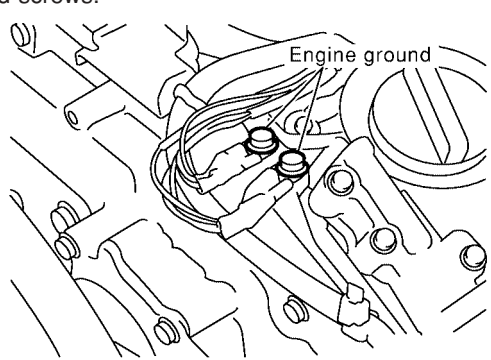
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
70	B/P	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] Accelerator pedal released	0.41 - 0.71V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] Accelerator pedal released	0.08 - 0.48V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 1.8V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

Diagnostic Procedure

NFEC1384

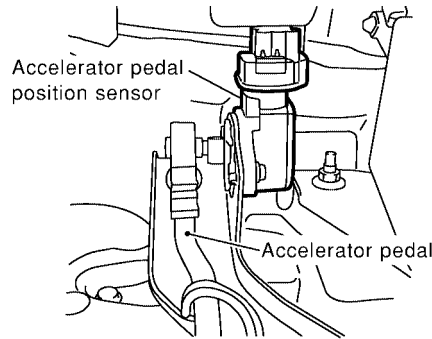
1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

DTC P0226 APP SENSOR

Diagnostic Procedure (Cont'd)

2 CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

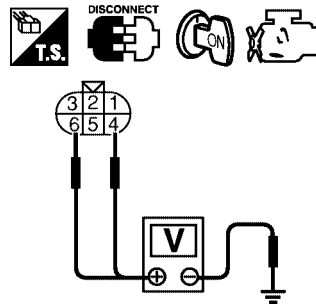


SEC081D

3. Check voltage between APP sensor terminals 4, 6 and ground with CONSULT-II or tester.

APP sensor terminal	Voltage (V)
4	Approximately 2.5
6	Approximately 5

MTBL1167



SEC092D

OK or NG

OK	GO TO 4.
NG	GO TO 3.

3 DETECT MALFUNCTIONING PART

- Check the following.
- Harness connectors M161, F68
 - Harness connectors M162, F55
 - Harness for open or short between ECM and accelerator pedal position sensor

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

4 CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminals 1, 3 and engine 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 6.
NG	GO TO 5.

DTC P0226 APP SENSOR

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor	
Repair open circuit or short to ground or short to power in harness or connectors.	

GI
MA

6	CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 73 and APP sensor terminal 5, ECM terminal 74 and APP sensor 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 8.
NG	GO TO 7.

EM
LC
EC

7	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor	
Repair open circuit or short to ground or short to power in harness or connectors.	

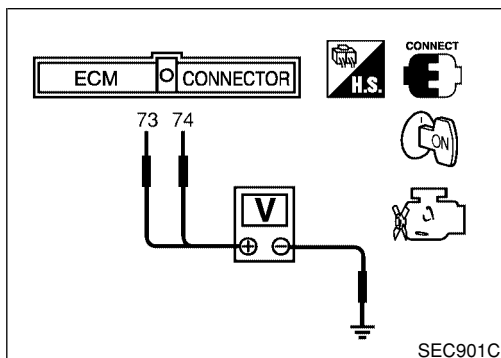
FE
CL
MT
AT

8	CHECK APP SENSOR
Refer to "Component Inspection", EC-307.	
OK or NG	
OK	GO TO 9.
NG	Replace accelerator pedal assembly.

AX
SU
BR

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

ST
RS



Component Inspection

ACCELERATOR PEDAL POSITION SENSOR

NFEC1385

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

BT
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DTC P0226 APP SENSOR

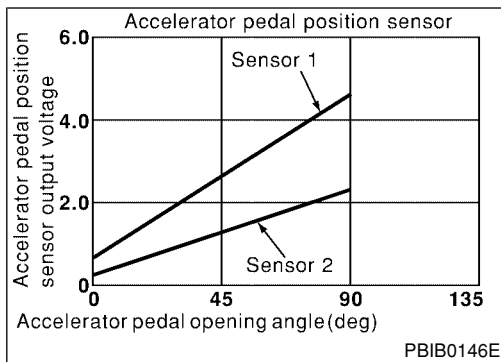
Component Inspection (Cont'd)

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Released	0.41 - 0.71V
	Fully depressed	More than 3.7V
74 (Accelerator pedal position sensor 2)	Released	0.08 - 0.48V
	Fully depressed	More than 1.8V

4. If NG, replace accelerator pedal assembly.
5. Perform "Accelerator Pedal Released Position Learning", EC-71.
6. Perform "Throttle Valve Closed Position Learning", EC-71.
7. Perform "Idle Air Volume Learning", EC-71.

DTC P0227, P0228 APP SENSOR

Component Description



Component Description

NFEC1386

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.

GI
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CONSULT-II Reference Value in Data Monitor Mode

NFEC1387

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	Ignition switch: ON (engine stopped)	Accelerator pedal: Released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN2	Ignition switch: ON (engine stopped)	Accelerator pedal: Released	0.15 - 0.97V
		Accelerator pedal: Fully depressed	More than 3.5V
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Released	ON
		Accelerator pedal: Slightly depressed	OFF

AX
SU
BR
ST
RS

On Board Diagnosis Logic

NFEC1440

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0227 0227	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)
P0228 0228	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

BT
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DTC P0227, P0228 APP SENSOR

On Board Diagnosis Logic (Cont'd)

FAIL-SAFE MODE

=NFEC1440S01

When the malfunction is detected, ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

NFEC1441

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.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

Ⓜ 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 "Diagnostic Procedure", EC-312.

Ⓜ With GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0227, P0228 APP SENSOR

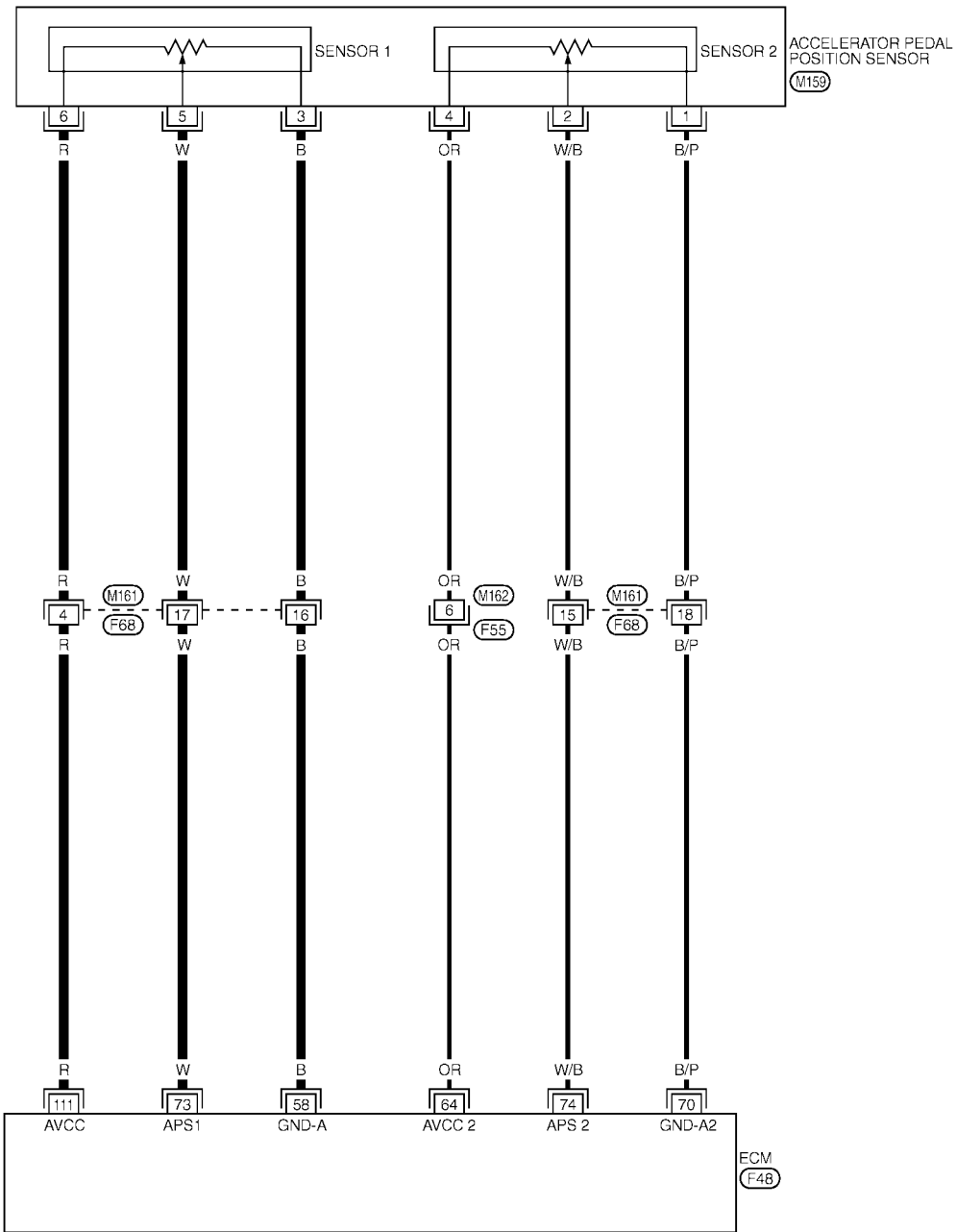
Wiring Diagram

Wiring Diagram

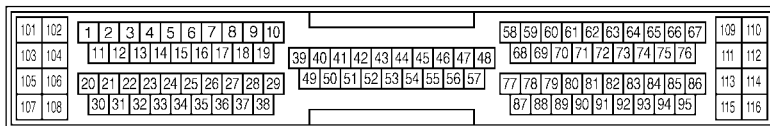
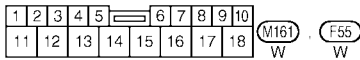
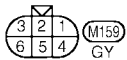
NFEC1390

EC-APPS1-01

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



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MEC926D

DTC P0227, P0228 APP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

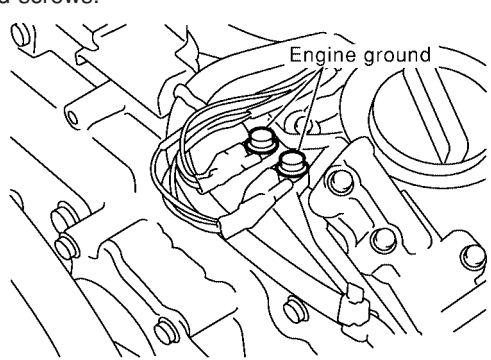
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
70	B/P	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] Accelerator pedal released	0.41 - 0.71V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] Accelerator pedal released	0.08 - 0.48V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 1.8V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

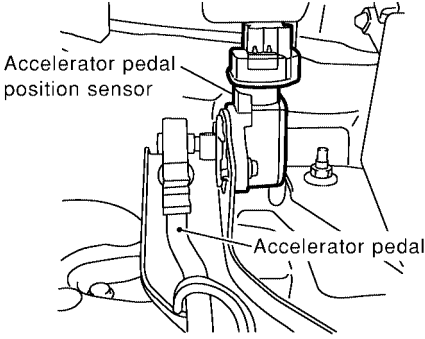
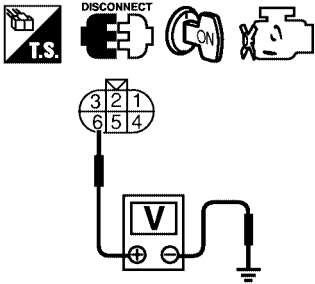
Diagnostic Procedure

NFEC1391

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
 <p>The diagram shows a close-up of the engine block with several ground screws. One screw is highlighted with a circle and labeled 'Engine ground'. The screws are used to secure the engine to the chassis for grounding.</p>	
SEC047D	
GO TO 2.	

DTC P0227, P0228 APP SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT	
<ol style="list-style-type: none"> 1. Disconnect accelerator pedal position (APP) sensor harness connector. 2. Turn ignition switch "ON". 		GI MA EM LC
		EC
<ol style="list-style-type: none"> 3. Check voltage between APP sensor terminals 6 and ground with CONSULT-II or tester. 		SEC081D
		FE CL MT AT
<p>Voltage: Approximately 5V</p> <p>OK or NG</p>		SEC093D AX
OK	GO TO 4.	SU
NG	GO TO 3.	BR

3	DETECT MALFUNCTIONING PART	
Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor		ST
Repair open circuit or short to ground or short to power in harness or connectors.		RS

4	CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check harness continuity between APP sensor terminal 3 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. 		BT HA
<p>OK or NG</p>		SC
OK	GO TO 6.	EL
NG	GO TO 5.	EL

5	DETECT MALFUNCTIONING PART	
Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor		IDX
Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P0227, P0228 APP SENSOR

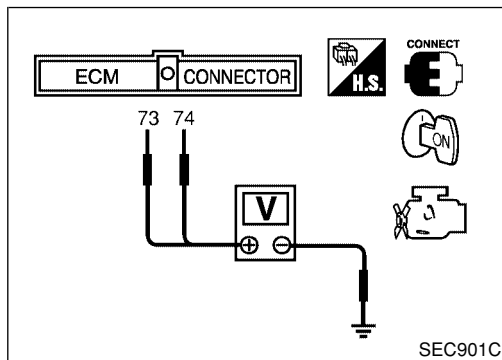
Diagnostic Procedure (Cont'd)

6	CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 73 and APP sensor terminal 5. Refer to Wiring Diagram Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor	
	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK APP SENSOR
Refer to "Component Inspection", EC-314.	
OK or NG	
OK	GO TO 9.
NG	Replace accelerator pedal assembly.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END



Component Inspection

ACCELERATOR PEDAL POSITION SENSOR

NFEC1442

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Released	0.41 - 0.71V
	Fully depressed	More than 3.7V
74 (Accelerator pedal position sensor 2)	Released	0.08 - 0.48V
	Fully depressed	More than 1.8V

4. If NG, replace accelerator pedal assembly.
5. Perform "Accelerator Pedal Released Position Learning", EC-71.
6. Perform "Throttle Valve Closed Position Learning", EC-71.
7. Perform "Idle Air Volume Learning", EC-71.

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

On Board Diagnosis Logic

On Board Diagnosis Logic

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the CKP sensor signal to vary, ECM can determine that a misfire is occurring.

NFEC0929

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 cylinders misfire, No. 1 cylinder misfires, No. 2 cylinder misfires, No. 3 cylinder misfires, No. 4 cylinder misfires, No. 5 cylinder misfires and No. 6 cylinder misfires.	Improper spark plug Insufficient compression Incorrect fuel pressure The injector circuit is open or shorted Injectors Intake air leak The ignition secondary circuit is open or shorted Lack of fuel Drive plate or flywheel Heated oxygen sensor 1 Incorrect PCV hose connection
P0301 0301	No. 1 cylinder misfire detected		
P0302 0302	No. 2 cylinder misfire detected		
P0303 0303	No. 3 cylinder misfire detected		
P0304 0304	No. 4 cylinder misfire detected		
P0305 0305	No. 5 cylinder misfire detected		
P0306 0306	No. 6 cylinder misfire detected		

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

DTC Confirmation Procedure

4	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 Confirmation Procedure

NFEC0930

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.

WITH CONSULT-II

NFEC0930S01

- 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) Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.

Hold the accelerator pedal as steady as possible.

NOTE:

Refer to the freeze frame data for the test driving conditions.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-316.

WITH GST

NFEC0930S02

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

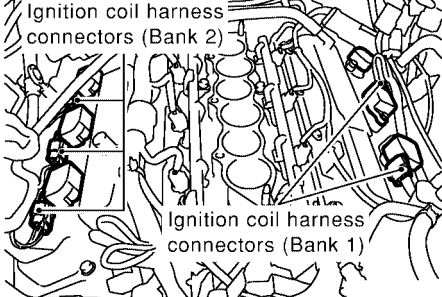
NFEC0931

1	CHECK FOR INTAKE AIR LEAK	
<ol style="list-style-type: none"> 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	
<ol style="list-style-type: none"> 1. 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 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

3	PERFORM POWER BALANCE TEST																						
<p>With CONSULT-II</p> <p>1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS AIF SE-B1</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> <p style="text-align: right;">SEC136D</p> <p>2. Is there any cylinder which does not produce a momentary engine speed drop?</p>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS AIF SE-B1	XXX V												
ACTIVE TEST																							
POWER BALANCE																							
MONITOR																							
ENG SPEED	XXX rpm																						
MAS AIF SE-B1	XXX V																						
<p>Without CONSULT-II</p> <p>When disconnecting each ignition coil harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?</p> <p style="text-align: center;">View with intake manifold collector removed</p>  <p style="text-align: right;">SEC120D</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Yes</td> <td>GO TO 5.</td> </tr> <tr> <td>No</td> <td>GO TO 4.</td> </tr> </table>		Yes	GO TO 5.	No	GO TO 4.																		
Yes	GO TO 5.																						
No	GO TO 4.																						

GI

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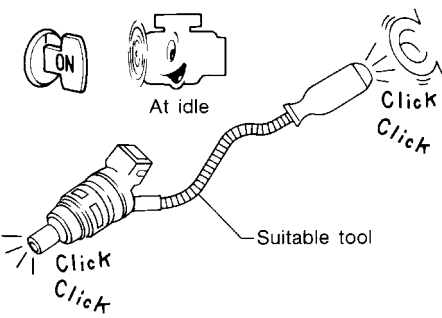
MT

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BR

4	CHECK INJECTOR				
<p>Does each injector make an operating sound at idle?</p>  <p style="text-align: right;">MEC703B</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Yes</td> <td>GO TO 5.</td> </tr> <tr> <td>No</td> <td>Check injector(s) and circuit(s). Refer to EC-716.</td> </tr> </table>		Yes	GO TO 5.	No	Check injector(s) and circuit(s). Refer to EC-716.
Yes	GO TO 5.				
No	Check injector(s) and circuit(s). Refer to EC-716.				

ST

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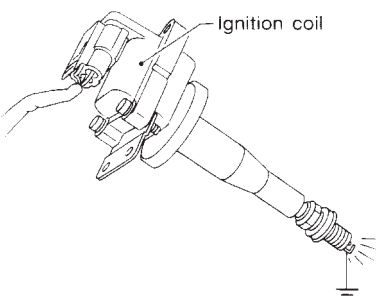
SC

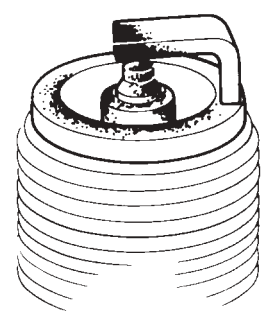
EL

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DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

5	CHECK IGNITION SPARK
<ol style="list-style-type: none"> 1. Disconnect ignition wire from spark plug. 2. Connect a known good spark plug to the ignition wire. 3. Place end of spark plug against a suitable ground and crank engine. 4. Check for spark. 	
	
SEF575Q	
OK or NG	
OK	GO TO 6.
NG	Check ignition coil, power transistor and their circuits. Refer to "IGNITION SIGNAL", EC-705.

6	CHECK SPARK PLUGS
Remove the spark plugs and check for fouling, etc.	
	
SEF156I	
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-17, "Changing Spark Plugs".

7	CHECK COMPRESSION PRESSURE
Check compression pressure. Refer to EM-13, "Measurement of Compression Pressure".	
<p>Standard: 1,275 kPa (13.0 kg/cm², 185 psi)/300 rpm</p> <p>Minimum: 981 kPa (10.0 kg/cm², 142 psi)/300 rpm</p> <p>Difference between each cylinder: 98 kPa (1.0 kg/cm², 14 psi)/300 rpm</p>	
OK or NG	
OK	GO TO 8.
NG	Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

8	CHECK FUEL PRESSURE	
<p>1. Install all removed parts.</p> <p>2. Release fuel pressure to zero. Refer to EC-56.</p> <p>3. Install fuel pressure gauge and check fuel pressure. Refer to EC-56.</p> <p style="margin-left: 20px;">At idle: Approx. 350 kPa (3.7 kg/cm², 51 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 9.	
NG	Follow the construction of "Fuel Pressure Check", EC-56.	

GI
MA
EM
LC

9	CHECK IGNITION TIMING							
<p>Check the following items. Refer to "Basic Inspection", EC-121.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Items</th> <th style="width: 70%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>15° ± 5° BTDC</td> </tr> <tr> <td>Target idle speed</td> <td>M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">MTBL1186</p> <p style="text-align: center;">OK or NG</p>			Items	Specifications	Ignition timing	15° ± 5° BTDC	Target idle speed	M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)
Items	Specifications							
Ignition timing	15° ± 5° BTDC							
Target idle speed	M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)							
OK (With CONSULT-II)	GO TO 10.							
OK (Without CONSULT-II)	GO TO 11.							
NG	Follow the "Basic Inspection".							

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DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

10 CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and "HI SPEED" in "DATA MONITOR" mode with CONSULT-II, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
3. Hold engine speed at 2,000 rpm under no load during the following steps.
4. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

5. Check the following.
"HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown left:

Bank 1
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

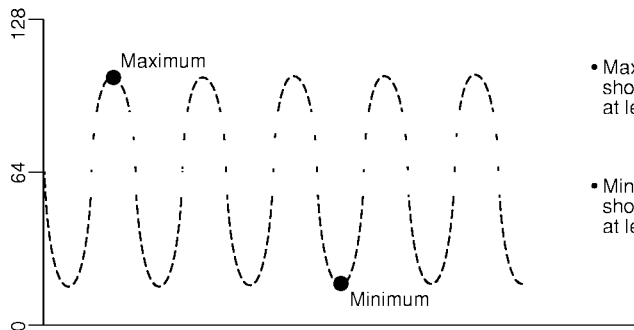
Bank 2
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
 MNTR (B1)/(B2) indicates RICH
 L means HO2S1
 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.
- Minimum voltage should be below 0.30V at least one time.

SEF648Y

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.

OK or NG

OK

GO TO 12.

NG

Replace malfunctioning heated oxygen sensor 1.

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

11	CHECK HEATED OXYGEN SENSOR 1
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground. Check the following with engine speed held at 2,000 rpm constant under no load. 	
<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> <p>91: Bank 1 92: Bank 2</p> </div> <div style="flex: 2;"> <ul style="list-style-type: none"> The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. The maximum voltage is over 0.6V at least one time. The minimum voltage is below 0.3V at least one time. The voltage never exceeds 1.0V. <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> </div> </div>	
SEC109D	
CAUTION:	
<p>Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p>Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
OK or NG	
OK	GO TO 12.
NG	Replace malfunctioning heated oxygen sensor 1.

12	CHECK MASS AIR FLOW SENSOR
<p>Ⓟ With CONSULT-II</p> <p>Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-II.</p> <p>2.0 - 6.0 g·m/sec: at idling 7.0 - 20.0 g·m/sec: at 2,500 rpm</p>	
<p>Ⓢ With GST</p> <p>Check mass air flow sensor signal in MODE 1 with GST.</p> <p>2.0 - 6.0 g·m/sec: at idling 7.0 - 20.0 g·m/sec: at 2,500 rpm</p>	
OK or NG	
OK	GO TO 13.
NG	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-193.

13	CHECK SYMPTOM MATRIX CHART
<p>Check items on the rough idle symptom in "Symptom Matrix Chart", EC-129.</p>	
OK or NG	
OK	GO TO 14.
NG	Repair or replace.

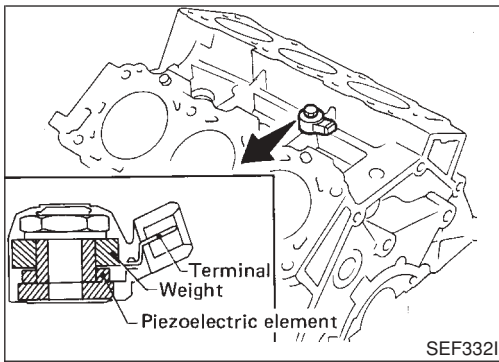
14	ERASE THE 1ST TRIP DTC
<p>Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-91. Some tests may cause a 1st trip DTC to be set.</p>	
	GO TO 15.

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DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

15	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END



Component Description

NFEC0932

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. **Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction.**

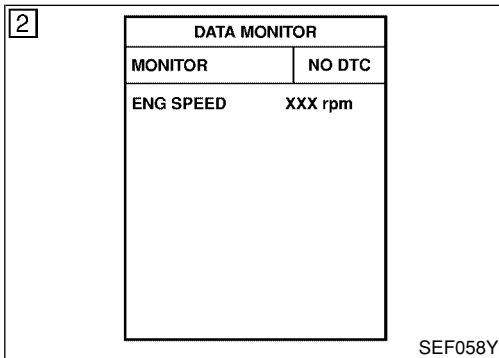
GI
MA
EM
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On Board Diagnosis Logic

NFEC0934

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0327 0327	Knock 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.) Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

EC
FE
CL



DTC Confirmation Procedure

NFEC0935

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.

AT
AX

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

SU

WITH CONSULT-II

NFEC0935S01

- 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 "Diagnostic Procedure", EC-325.

BR
ST

WITH GST

NFEC0935S03

Follow the procedure "With CONSULT-II" above.

RS
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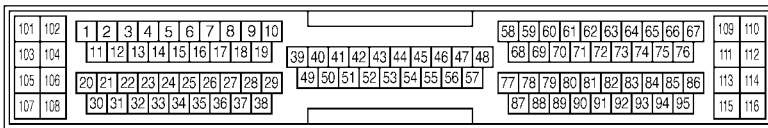
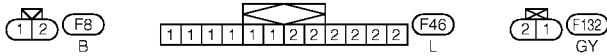
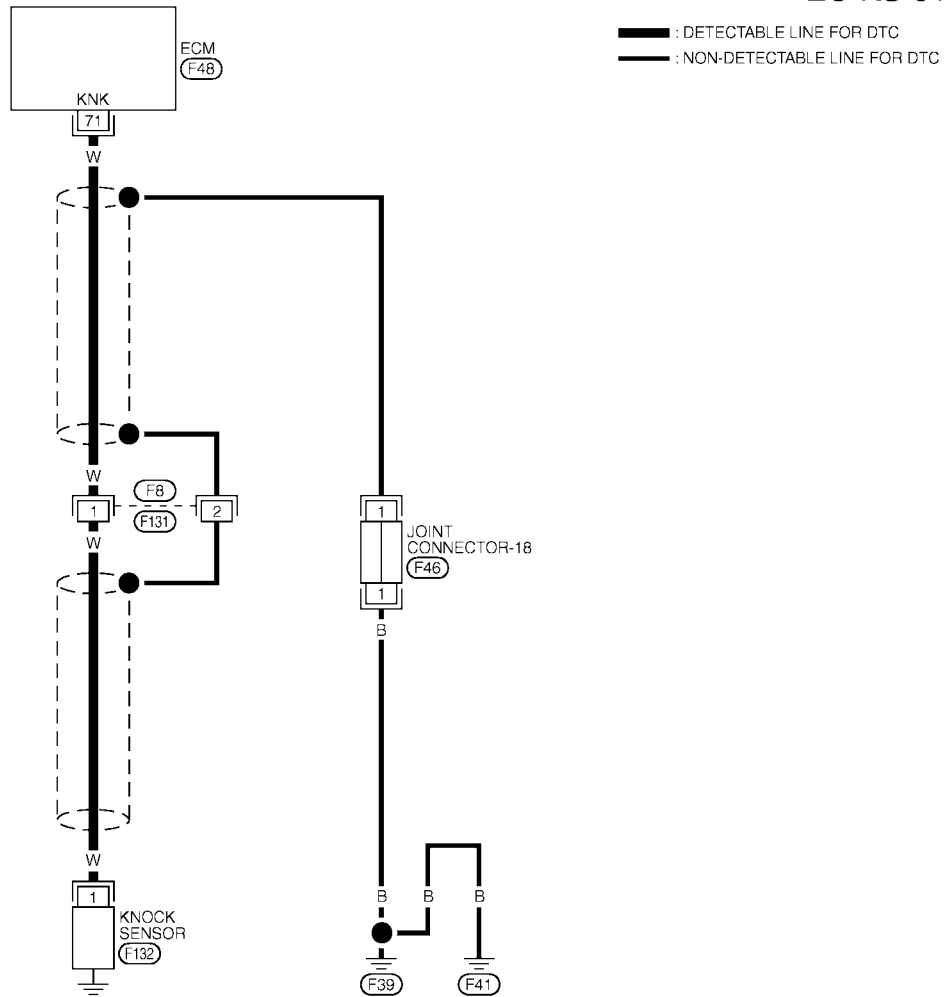
DTC P0327, P0328 KS

Wiring Diagram

Wiring Diagram

NFEC0936

EC-KS-01



MEC492D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:


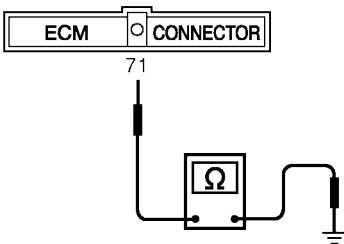
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
71	W	KNOCK SENSOR	ENGINE RUNNING AT IDLE SPEED	APPROX. 2.5V

SEC117D

Diagnostic Procedure

NFEC0937

1	CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check resistance between ECM terminal 71 and engine ground.</p> <p>NOTE: It is necessary to use an ohmmeter which can measure more than 10 MΩ.</p> <div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Resistance: Approximately 500 - 620 kΩ [at 25°C (77°F)]</p> </div> </div> <p style="text-align: right;">SEC118D</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 5.	
NG	GO TO 2.	

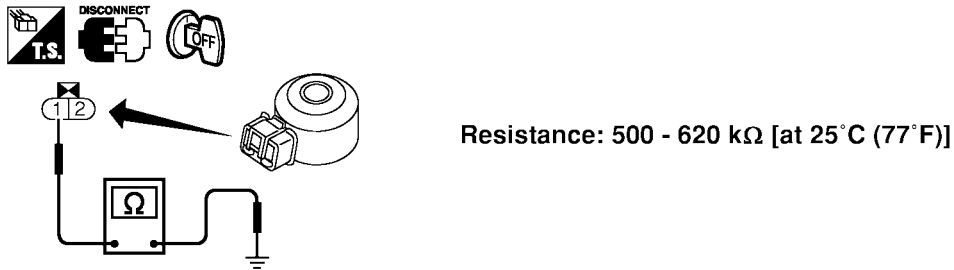
2	CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II	
<p>1. Disconnect knock sensor harness connector. 2. Check harness continuity between ECM terminal 71 and knock sensor terminal 1. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 4.	
NG	GO TO 3.	

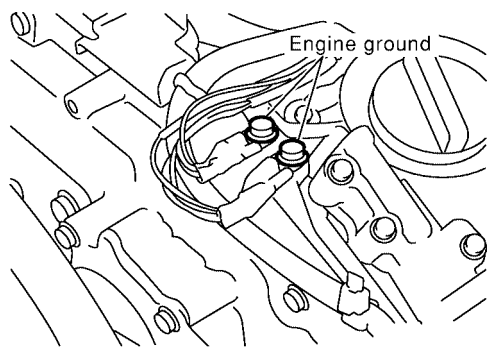
3	DETECT MALFUNCTIONING PART	
<p>Check the following. Harness connectors F8, F131 Harness for open or short between ECM and knock sensor</p>		
	Repair open circuit or short to ground or short to power in harness or connectors.	

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DTC P0327, P0328 KS

Diagnostic Procedure (Cont'd)

4	CHECK KNOCK SENSOR
<p>Check resistance between knock sensor terminal 1 and ground.</p> <p>NOTE: It is necessary to use an ohmmeter which can measure more than 10 MΩ.</p>	
	
SEC119D	
<p>CAUTION: Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	Replace knock sensor.

5	RETIGHTEN GROUND SCREWS
<p>Loose and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 6.	

6	CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Disconnect harness connectors F8, F131. 2. Check harness continuity between harness connector F8 terminal 2 and engine ground. 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
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors F8, F131 Joint connector-18 Harness for open or short between harness connector F8 and engine ground 	
Repair open circuit or short to power in harness or connectors.	

DTC P0327, P0328 KS

Diagnostic Procedure (Cont'd)

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

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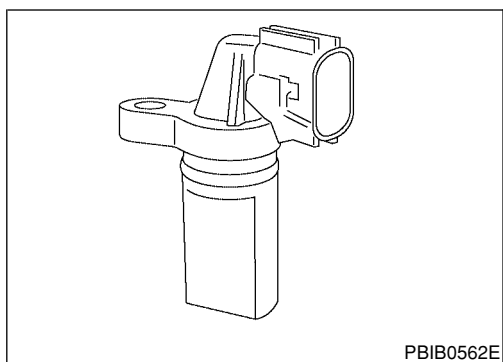
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DTC P0335 CKP SENSOR (POS)

Component Description



PBIB0562E

Component Description

NFEC0938

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. 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 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.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0939

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	Tachometer: Connect Run engine and compare tachometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value.

On Board Diagnosis Logic

NFEC0941

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0335 0335	Crankshaft position sensor (POS) circuit	The crankshaft position sensor 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 signal is not in the normal pattern during engine running.	Harness or connectors [The crankshaft position sensor (POS) circuit is open or shorted.] Crankshaft position sensor (POS) Signal plate

DTC P0335 CKP SENSOR (POS)

DTC Confirmation Procedure

=NFEC0942

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

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 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 "Diagnostic Procedure", EC-331.
If 1st trip DTC is not detected, go to next step.
- 4) Maintaining engine speed at more than 1,000 rpm for at least 5 seconds.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-331

With GST

Follow the procedure "With CONSULT-II" above.

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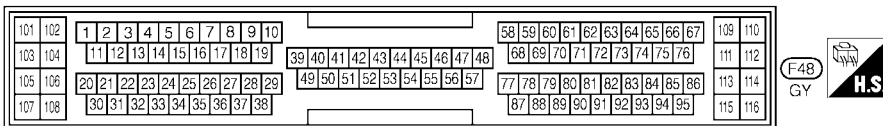
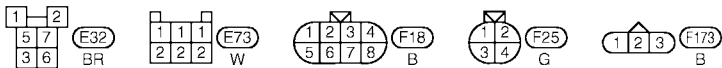
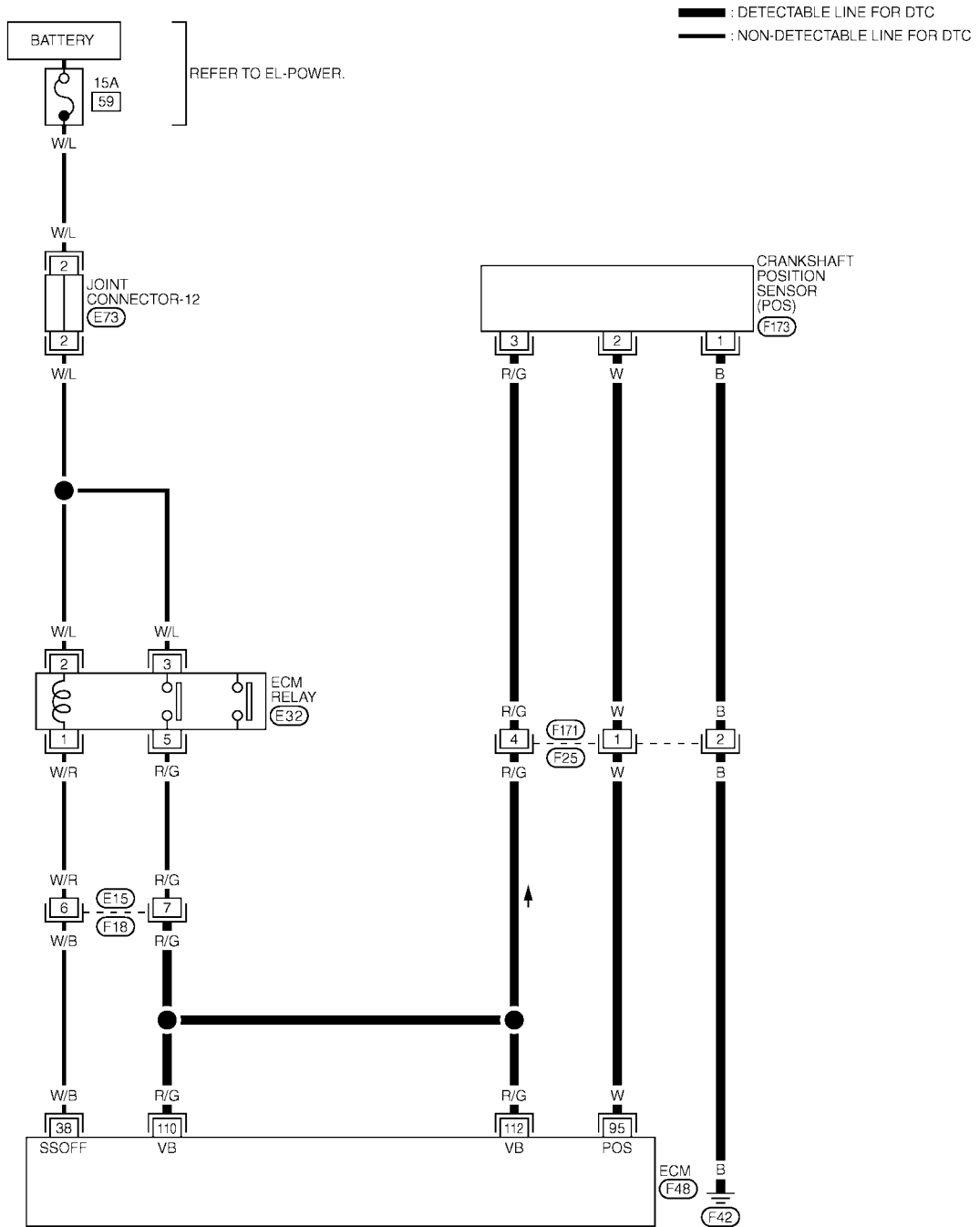
DTC P0335 CKP SENSOR (POS)

Wiring Diagram

Wiring Diagram

NFEC0943

EC-POS-01



MEC493D

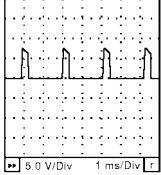
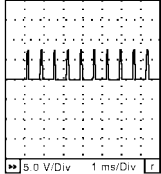
DTC P0335 CKP SENSOR (POS)

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

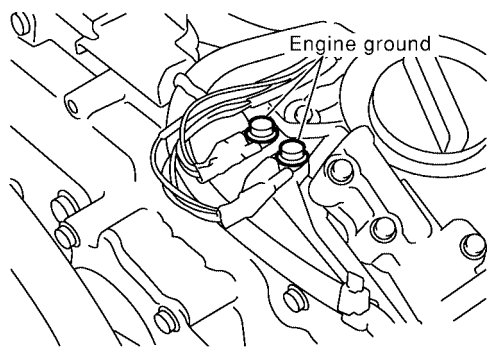
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Crankshaft position sensor (POS)	[Engine is running] Idle speed	Approximately 2.4V★  SEC035D
			[Engine is running] Engine speed is 2,000 rpm.	Approximately 2.3V★  SEC036D

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

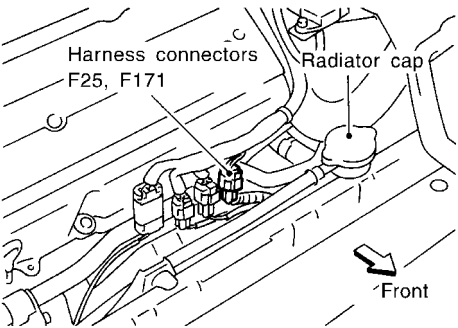
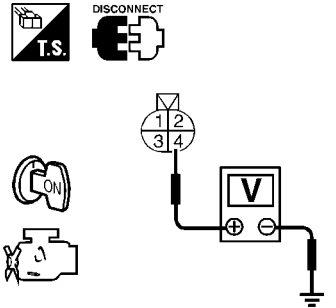
Diagnostic Procedure

NFEC0944

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> 	
SEC047D	
GO TO 2.	

DTC P0335 CKP SENSOR (POS)

Diagnostic Procedure (Cont'd)

2	CHECK CKP SENSOR (POS) POWER SUPPLY CIRCUIT
<p>1. Disconnect harness connectors F25, F171.</p> <div style="text-align: center;">  </div>	
SEF511WB	
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between harness connector F25 terminal 4 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 150px;">Voltage: Battery voltage</p> </div>	
SEF323X	
<p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	GO TO 3.

3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors F25, F171 and E15, F18 Harness for open or short between ECM and harness connector F25 Harness for open or short between ECM relay and harness connector F25 	
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
<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between harness connector F25 terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	GO TO 5.

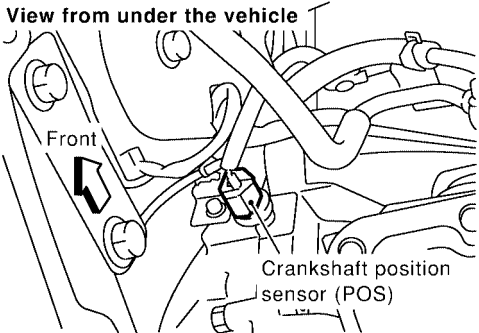
5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors F25, F171 Harness for open between harness connector F25 and ground 	
Repair open circuit or short to power in harness or connectors.	

DTC P0335 CKP SENSOR (POS)

Diagnostic Procedure (Cont'd)

6	CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 95 and harness connector F25 terminal 1. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F25, F171 Harness for open or short between ECM and harness connector F25	
	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK CKP SENSOR (POS) SUB-HARNESS CIRCUIT FOR OPEN AND SHORT								
1. Disconnect CKP sensor (POS) harness connector. <div style="text-align: center;">  </div>									
2. Check harness continuity between CKP sensor (POS) terminals and harness connector F171 terminals as follows.									
<table border="1"> <thead> <tr> <th>CKP sensor (POS) terminal</th> <th>Harness connector F171 terminal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>2</td> <td>1</td> </tr> <tr> <td>3</td> <td>4</td> </tr> </tbody> </table>		CKP sensor (POS) terminal	Harness connector F171 terminal	1	2	2	1	3	4
CKP sensor (POS) terminal	Harness connector F171 terminal								
1	2								
2	1								
3	4								
Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>									
OK	GO TO 9.								
NG	Repair open circuit or short to ground or short to power in harness or connectors.								

9	CHECK CRANKSHAFT POSITION SENSOR (POS)
Refer to "Component Inspection", EC-334. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	Replace crankshaft position sensor (POS).

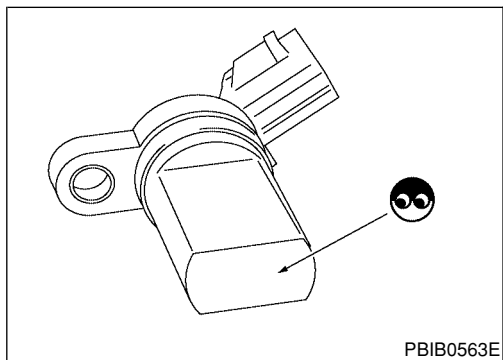
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DTC P0335 CKP SENSOR (POS)

Diagnostic Procedure (Cont'd)

10	CHECK GEAR TOOTH
Visually check for chipping signal plate gear tooth.	
OK or NG	
OK	GO TO 11.
NG	Replace the signal plate.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

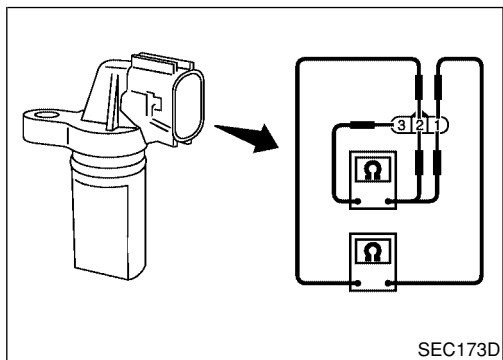


Component Inspection CRANKSHAFT POSITION SENSOR (POS)

NFEC1415

NFEC1415S01

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.

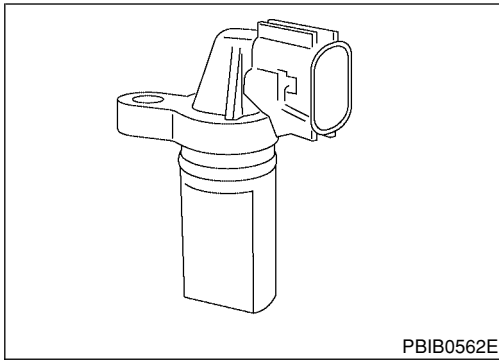


5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	

DTC P0340, P0345 CMP SENSOR (PHASE)

Component Description



Component Description

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The crankshaft position sensor (POS) 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.

NFEC0945

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On Board Diagnosis Logic

NFEC0947

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0340 0340 (Bank 1) P0345 0345 (Bank 2)	Camshaft position sensor circuit	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.	Harness or connectors [The camshaft position sensor (PHASE) circuit is open or shorted.] Camshaft position sensor (PHASE) Camshaft (Intake) Starter motor (Refer to SC section.) Starting system circuit (Refer to SC section.) Dead (Weak) battery

AT
AX
SU
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DTC Confirmation Procedure

NFEC0948

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".

IDX

DTC P0340, P0345 CMP SENSOR (PHASE)

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S	XXX °C

SEF013Y

WITH CONSULT-II

NFEC0948S03

- 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 "Diagnostic Procedure", EC-340. If 1st trip DTC is not detected, go to next step.
- 5) Maintaining engine speed at more than 1,000 rpm for at least 5 seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-340.

WITH GST

NFEC0948S04

Follow the procedure "With CONSULT-II" above.

DTC P0340, P0345 CMP SENSOR (PHASE)

Wiring Diagram

Wiring Diagram

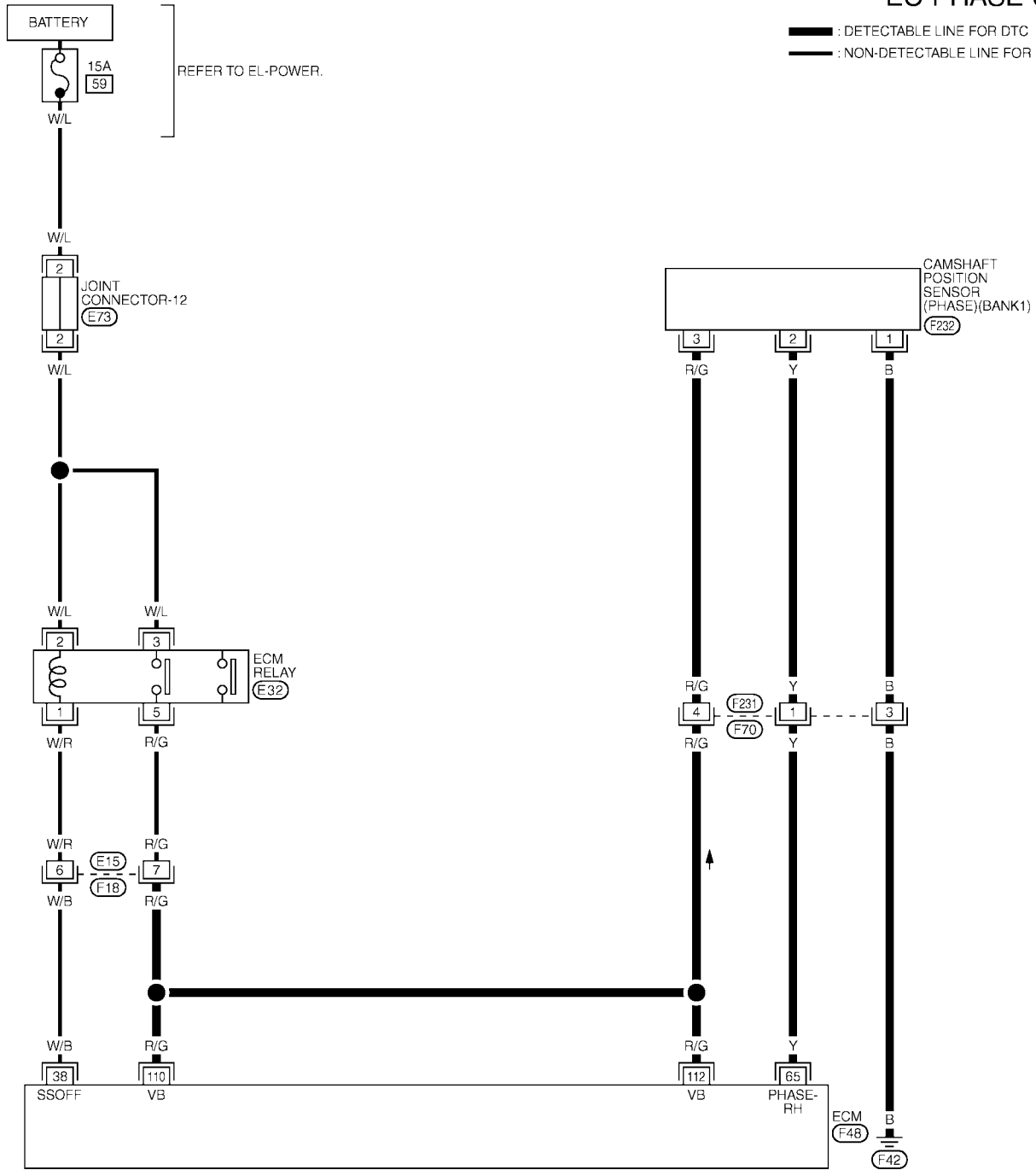
NFEC0949

NFEC0949S01

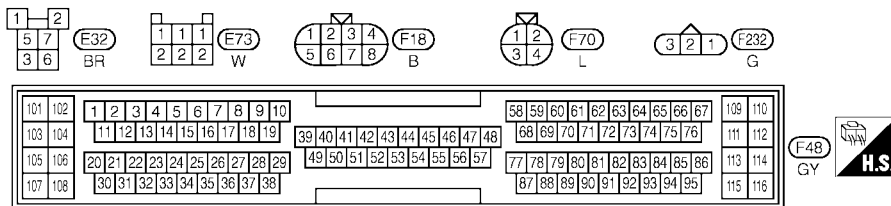
BANK 1

EC-PHASE-01

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



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MEC507D

DTC P0340, P0345 CMP SENSOR (PHASE)

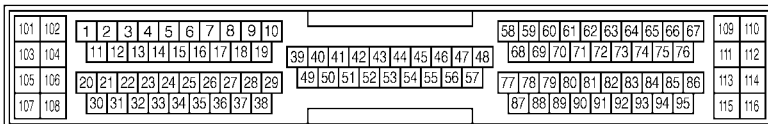
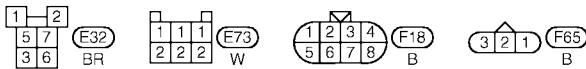
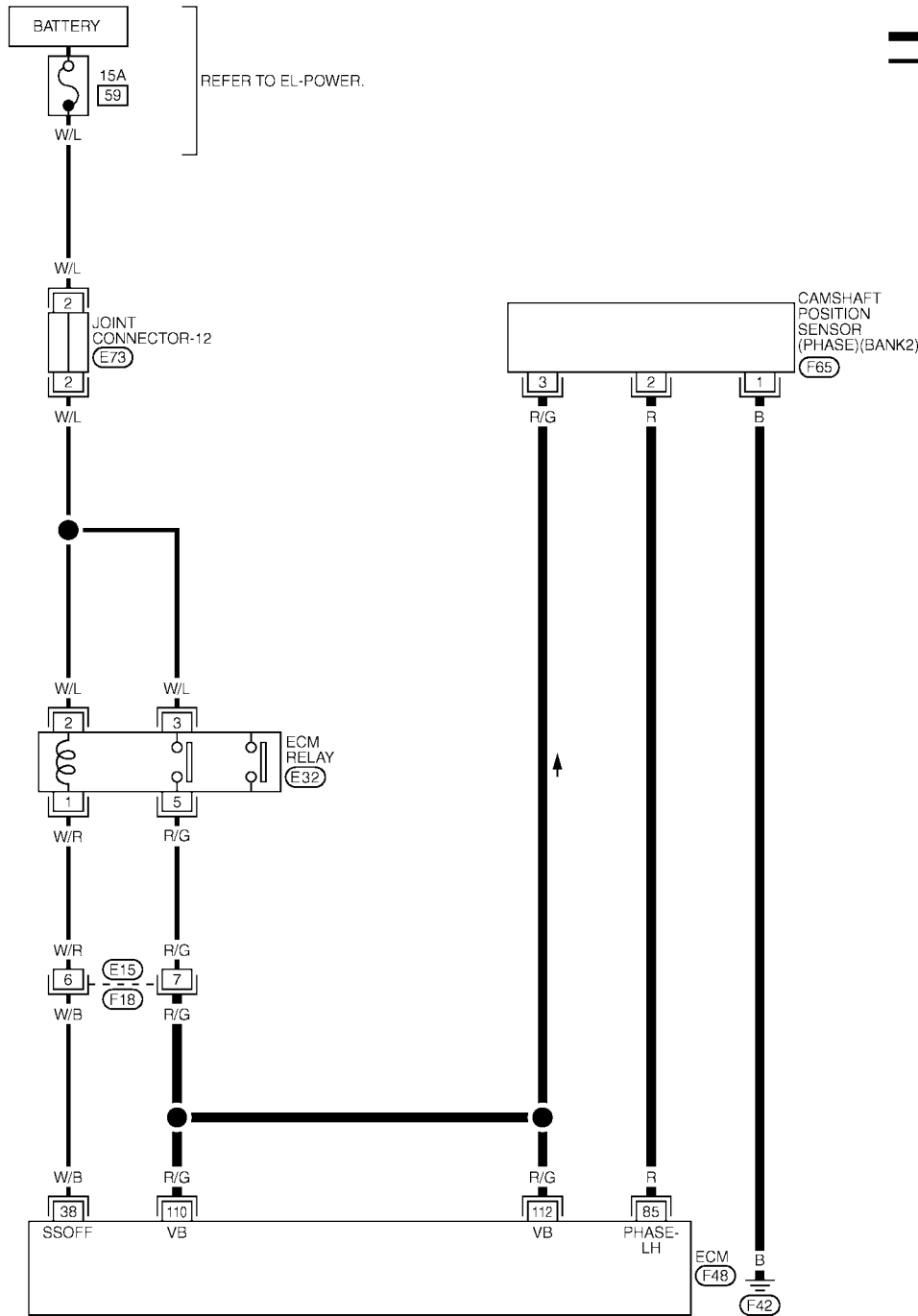
Wiring Diagram (Cont'd)

NFEC0949S02

BANK 2

EC-PHASE-02

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



MEC506D

DTC P0340, P0345 CMP SENSOR (PHASE)

Wiring Diagram (Cont'd)

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	Y	Camshaft position sensor (PHASE) (Bank 1)	[Engine is running] Warm-up condition Idle speed	BATTERY VOLTAGE (11 - 14V)★ SEC033D
			[Engine is running] Warm-up condition Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)★ SEC034D
85	R	Camshaft position sensor (PHASE) (Bank 2)	[Engine is running] Warm-up condition Idle speed	BATTERY VOLTAGE (11 - 14V)★ SEC033D
			[Engine is running] Warm-up condition Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)★ SEC034D

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

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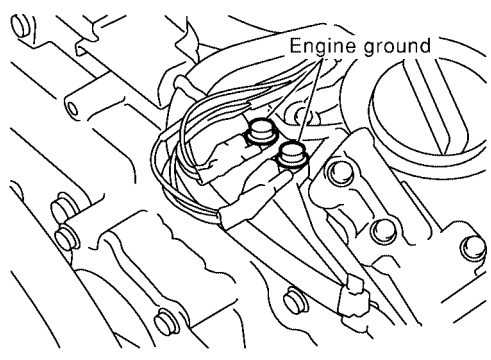
DTC P0340, P0345 CMP SENSOR (PHASE)

Diagnostic Procedure

Diagnostic Procedure

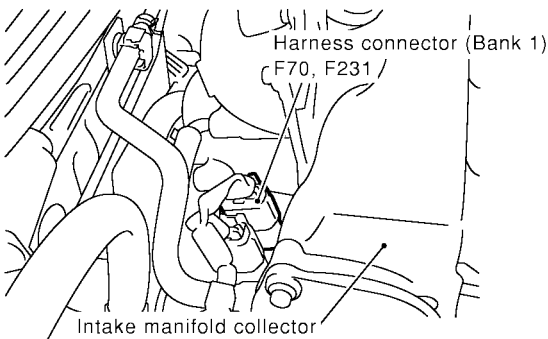
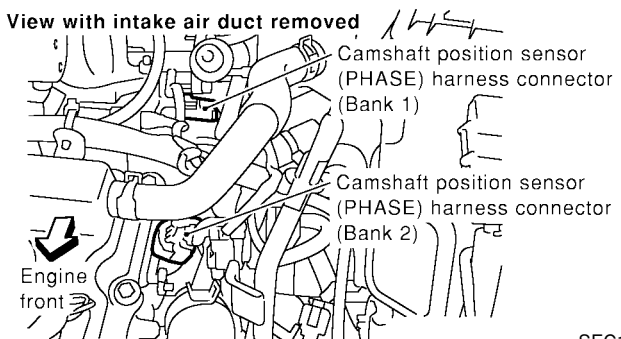
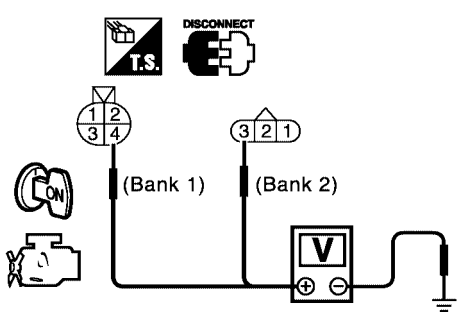
NFEC0950

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	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
 A technical line drawing of an engine block showing several ground screws. A label "Engine ground" with a pointer indicates one of the screws. The drawing shows the engine block with various components like the cylinder head, intake manifold, and ground screws. The screws are shown in a perspective view, with some having nuts and washers. The label "Engine ground" is positioned above the screws, with a line pointing to one of them.	
SEC047D	
	GO TO 3.

DTC P0340, P0345 CMP SENSOR (PHASE)

Diagnostic Procedure (Cont'd)

3	CHECK CMP SENSOR (PHASE) POWER SUPPLY CIRCUIT
<p>1. Disconnect CMP sensor (PHASE) harness connector (bank 2) or harness connectors F70, F231 (bank 1).</p>	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Harness connector (Bank 1) F70, F231 /</p> <p>Intake manifold collector</p> </div> <div style="text-align: center;">  <p>View with intake air duct removed</p> <p>Camshaft position sensor (PHASE) harness connector (Bank 1)</p> <p>Camshaft position sensor (PHASE) harness connector (Bank 2)</p> <p>Engine front</p> </div> </div>	
SEC122D	
<p>2. Check voltage between CMP sensor (PHASE) harness connector (bank 2) terminal 3 or harness connector F70 (bank 1) terminal 4 and ground with CONSULT-II or tester.</p>	
	
SEC206D	
<p>Voltage: Battery voltage</p> <p>3. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors F70, F231 (bank 1) Harness connectors E15, F18 Harness for open or short between ECM and camshaft position sensor (PHASE) or harness connector F70 Harness for open or short between ECM relay and camshaft position sensor (PHASE) or harness connector F70 	
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
<p>1. Check harness continuity between harness connector F70 terminal 3 and engine ground (bank 1). Refer to Wiring Diagram.</p> <p>2. Check CMP sensor (PHASE) harness connector terminal 1 and engine ground (bank 2). Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to power.</p>	
OK or NG	
OK	GO TO 7.
NG	GO TO 6.

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DTC P0340, P0345 CMP SENSOR (PHASE)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F70, F231 (bank 1) Harness for open between camshaft position sensor (PHASE) or harness connector F70 and ground	
Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 65 and harness connector F70 terminal 1. 3. Check harness continuity between ECM terminal 85 and CMP sensor (PHASE) harness connector 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 (DTC P0340)	GO TO 9.
OK (DTC P0345)	GO TO 10.
NG	GO TO 8.

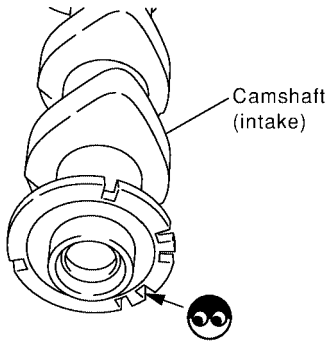
8	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F70, F231 (bank 1) Harness for open or short between ECM and camshaft position sensor (PHASE) or harness connector F70	
Repair open circuit or short to ground or short to power in harness or connectors.	

9	CHECK CMP SENSOR (PHASE) SUB-HARNESS CIRCUIT FOR OPEN AND SHORT								
1. Disconnect CMP sensor (PHASE) harness connector. 2. Check harness continuity between CMP sensor (PHASE) terminals and harness connector F231 terminals as follows.									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">CMP sensor (PHASE) terminal</th> <th style="padding: 5px;">Harness connector F231 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="text-align: center; padding: 5px;">4</td> </tr> </tbody> </table>		CMP sensor (PHASE) terminal	Harness connector F231 terminal	1	3	2	1	3	4
CMP sensor (PHASE) terminal	Harness connector F231 terminal								
1	3								
2	1								
3	4								
MTBL1192									
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 CAMSHAFT POSITION SENSOR (PHASE)
Refer to "Component Inspection", EC-343.	
OK or NG	
OK	GO TO 11.
NG	Replace camshaft position sensor (PHASE).

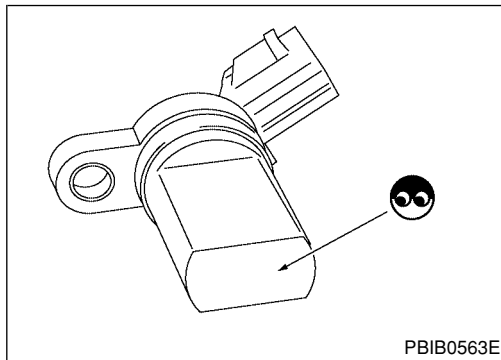
DTC P0340, P0345 CMP SENSOR (PHASE)

Diagnostic Procedure (Cont'd)

11	CHECK CAMSHAFT (INTAKE)
Visually check for chipped signal plate at camshaft rear.	
 <p>Camshaft (intake)</p> <p>OK or NG</p>	
SEC905C	
OK	GO TO 12.
NG	Replace camshaft.

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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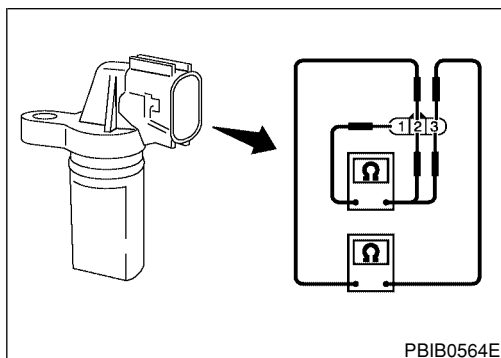


Component Inspection CAMSHAFT POSITION SENSOR (PHASE)

NFEC1416

NFEC1416S01

- Loosen the fixing bolt of the sensor.
- Disconnect camshaft position sensor (PHASE) harness connector.
- Remove the sensor.
- Visually check the sensor for chipping.

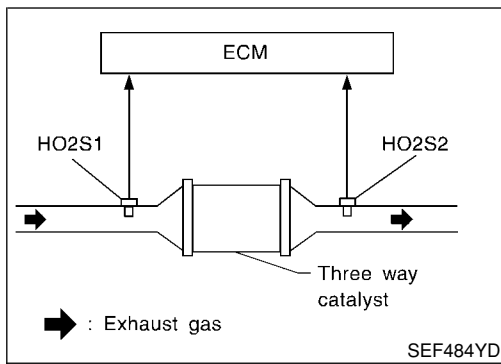


- Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

On Board Diagnosis Logic



On Board Diagnosis Logic

NFEC1443

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 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 heated oxygen sensors 1 and 2 approaches a specified limit value, the warm-up three way catalyst malfunction is diagnosed.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0420 0420 (Bank 1) P0430 0430 (Bank 2)	Catalyst system efficiency below threshold	Three way catalyst (manifold) does not operate properly, three way catalyst (manifold) does not have enough oxygen storage capacity.	Warm-up three way catalyst Exhaust tube Intake air leaks Injectors Injector leaks Spark plug Improper ignition timing

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

SEC138D

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

SEC139D

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF560X

DTC Confirmation Procedure

NFEC0952

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

NFEC0952S01

TESTING CONDITION:

Open engine hood before conducting the following procedure.

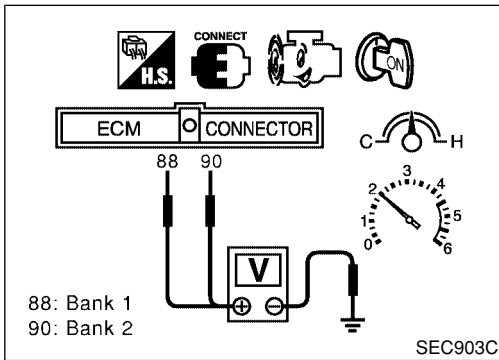
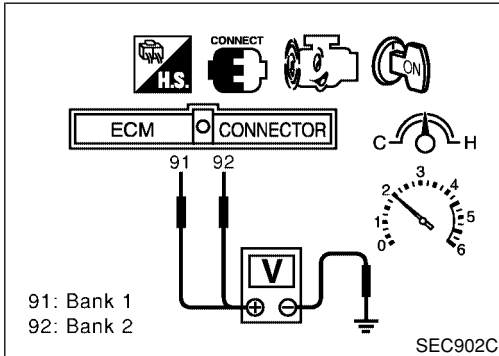
Do not hold engine speed for more than the specified minutes below.

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Open engine hood.
- 6) Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
- 7) 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 "COMPLT", go to step 10.
- 8) Wait 5 seconds at idle.
- 9) Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "COMPLT" (It will take approximately 5 minutes). If not "COMPLT", perform the following.
 - a) Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
 - b) Turn ignition switch "ON" and select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
 - c) Start engine and warm it up while monitoring "COOLAN

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

DTC Confirmation Procedure (Cont'd)

- TEMP/S" indication on CONSULT-II.
- d) When "COOLAN TEMP/S" indication reaches to 70°C (158°F), go to step 3.
- 10) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
- 11) Confirm that the 1st trip DTC is not detected.
If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-345.



Overall Function Check

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.

CAUTION:
Always drive vehicle at a safe speed.

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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Set voltmeters probes between ECM terminals 91 [heated oxygen sensor 1 bank 1 signal], 92 [heated oxygen sensor 1 bank 2 signal] and engine ground, and ECM terminals 74 [heated oxygen sensor 2 bank 1 signal], 55 [heated oxygen sensor 2 bank 2 signal] and engine ground.
- 6) Keep engine speed at 2,000 rpm constant under no load.
- 7) Make sure that the voltage switching frequency (high & low) between ECM terminals 88 and engine ground, or 90 and engine ground is very less than that of ECM terminals 91 and engine ground, or 92 and engine ground.

Switching frequency ratio = A/B

A: Heated oxygen sensor 2 voltage switching frequency

B: Heated oxygen sensor 1 voltage switching frequency

This ratio should be less than 0.75.

If the ratio is greater than above, it means warm-up three way catalyst does not operate properly. Go to "Diagnostic Procedure", EC-345.

NOTE:

If the voltage at terminal 92 or 91 does not switch periodically more than 5 times within 10 seconds at step 5, perform trouble diagnosis for "DTC P0133, P0153" first. (See EC-226.)

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.

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

2	CHECK EXHAUST GAS LEAK
<p>1. Start engine and run it at idle. 2. Listen for an exhaust gas leak before the three way catalyst (manifold).</p>	
<p style="text-align: center;"> HO2S1 Three way catalyst (Manifold) HO2S2 Three way catalyst (Under floor) Muffler </p> <p style="text-align: center;"> To exhaust manifold → </p> <p> ➡ : Exhaust gas </p>	
SEC502D	
OK or NG	
OK	GO TO 3.
NG	Repair or replace.

3	CHECK INTAKE AIR LEAK
<p>Listen for an intake air leak after the mass air flow sensor.</p>	
OK or NG	
OK	GO TO 4.
NG	Repair or replace.

4	CHECK IGNITION TIMING						
<p>Check the following items. Refer to "Basic Inspection", EC-121.</p>							
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 40%;">Items</th> <th style="width: 60%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>15° ± 5° BTDC</td> </tr> <tr> <td>Target idle speed</td> <td>M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>		Items	Specifications	Ignition timing	15° ± 5° BTDC	Target idle speed	M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)
Items	Specifications						
Ignition timing	15° ± 5° BTDC						
Target idle speed	M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)						
MTBL1186							
OK or NG							
OK	GO TO 5.						
NG	Follow the "Basic Inspection".						

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

5	CHECK INJECTORS		
		<ol style="list-style-type: none"> 1. Refer to WIRING DIAGRAM for Injectors, EC-717. 2. Stop engine and then turn ignition switch "ON". 3. Check voltage between ECM terminals 1, 2, 3, 11, 12, 13 and ground with CONSULT-II or tester. 	GI MA EM LC
			EC FE
		SEC124D	
	OK	GO TO 6.	CL
	NG	Perform "Diagnostic Procedure", "INJECTOR", EC-718.	

6	CHECK IGNITION SPARK		
		<ol style="list-style-type: none"> 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. Place end of spark plug against a suitable ground and crank engine. 5. Check for spark. 	MT AT AX SU BR ST
			RS
		SEF575Q	
	OK	GO TO 7.	BT
	NG	Check ignition coil with power transistor and their circuit. Refer to EC-705.	

7	CHECK INJECTOR		
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove injector assembly. Refer to EC-57. Keep fuel hose and all injectors connected to injector gallery. 3. Disconnect all ignition coil harness connectors. 4. Turn ignition switch "ON". Make sure fuel does not drip from injector. 	HA SC EL
		OK or NG	IDX
	OK (Does not drip.)	GO TO 8.	
	NG (Drips.)	Replace the injector(s) from which fuel is dripping.	

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

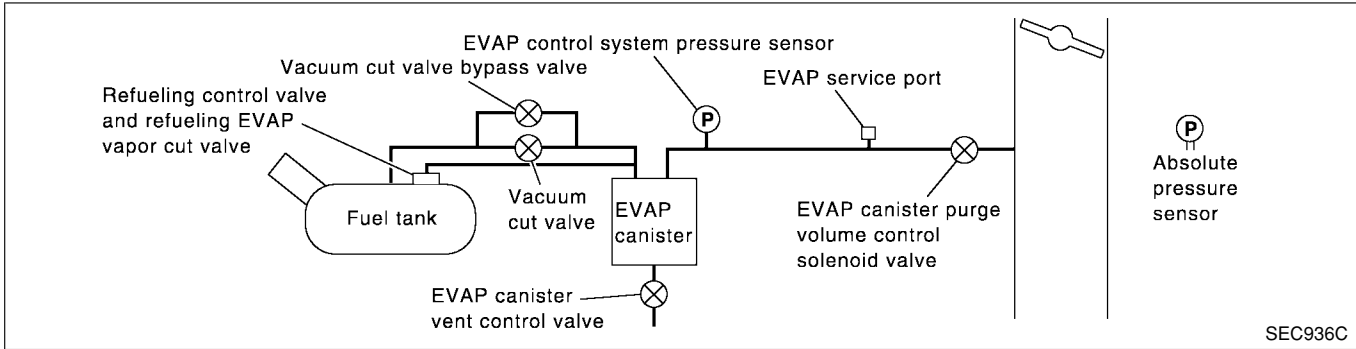
8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
Trouble is fixed.	INSPECTION END
Trouble is not fixed.	Replace warm-up three way catalyst.

System Description

NFEC0955

NOTE:

If DTC P0441 is displayed with P0121, P0122, P0123, P0226, P0227, P0228, P1227 or P1228, 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

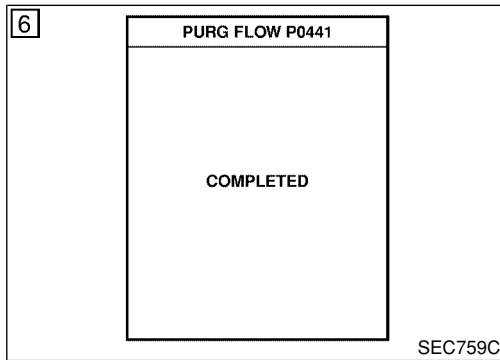
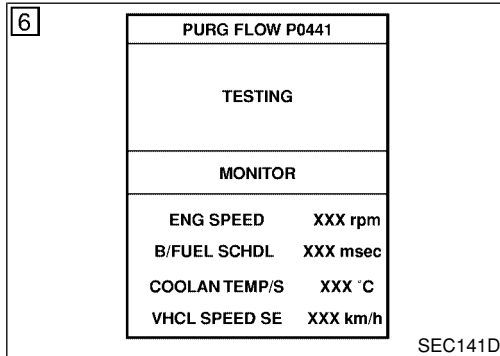
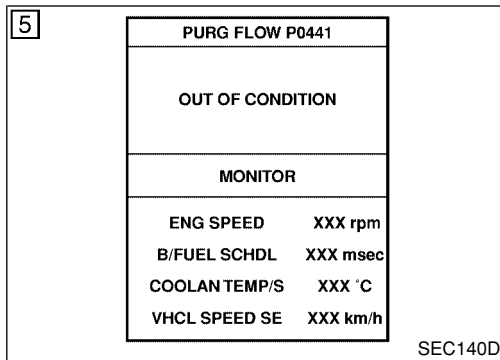
NFEC0956

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault 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.	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 Blocked purge port EVAP canister vent control valve

DTC P0441 EVAP CONTROL SYSTEM

DTC Confirmation Procedure



DTC Confirmation Procedure

NFEC0957

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.

WITH CONSULT-II

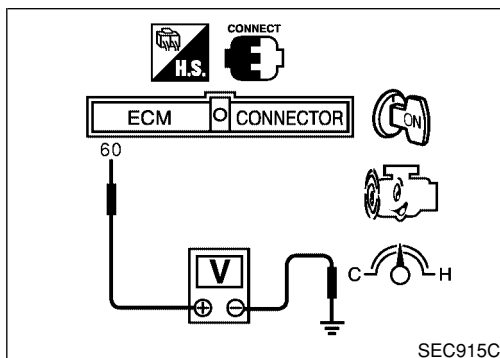
NFEC0957S01

- 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	1.3 - 8.1 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 "Diagnostic Procedure", EC-352.



Overall Function Check

NFEC0958

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

NFEC0958S01

- 1) Lift up drive wheels.
- 2) Start engine (TCS 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.

DTC P0441 EVAP CONTROL SYSTEM

Overall Function Check (Cont'd)

- 5) Set voltmeter probes to ECM terminals 60 (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.
- 9) If NG, go to "Diagnostic Procedure", EC-352.

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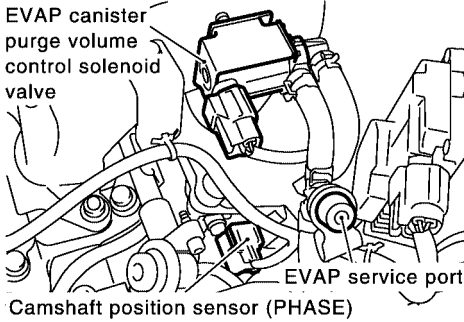
DTC P0441 EVAP CONTROL SYSTEM

Diagnostic Procedure

Diagnostic Procedure

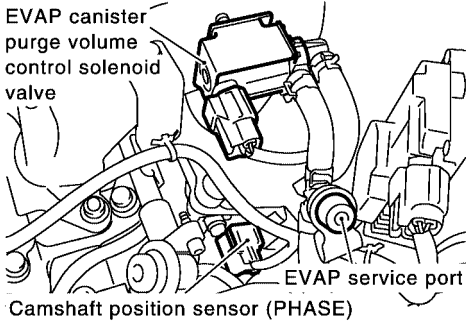
=NFEC0959

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																					
(P) With CONSULT-II 1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.																						
 <p style="text-align: center;">EVAP canister purge volume control solenoid valve</p> <p style="text-align: center;">EVAP service port</p> <p style="text-align: center;">Camshaft position sensor (PHASE)</p>																						
SEC929C																						
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.																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																						
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A/F ALPHA-B2	XXX %																					
HO2S1 MNTR (B1)	RICH																					
HO2S1 MNTR (B2)	RICH																					
SEC142D																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>PURG VOL CONT/V</th> <th>VACUUM</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">100.0%</td> <td style="text-align: center;">Should exist</td> </tr> <tr> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">Should not exist</td> </tr> </tbody> </table>			PURG VOL CONT/V	VACUUM	100.0%	Should exist	0.0%	Should not exist														
PURG VOL CONT/V	VACUUM																					
100.0%	Should exist																					
0.0%	Should not exist																					
MTBL1158																						
OK or NG																						
OK	GO TO 7.																					
NG	GO TO 4.																					

DTC P0441 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

3	CHECK PURGE FLOW
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 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. <div style="text-align: center;">  <p>EVAP canister purge volume control solenoid valve</p> <p>EVAP service port</p> <p>Camshaft position sensor (PHASE)</p> </div> <p style="text-align: right;">SEC929C</p> <ol style="list-style-type: none"> 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum gauge indication when revving engine up to 2,000 rpm. Vacuum should exist. 6. Release the accelerator pedal fully and let idle. Vacuum should not exist. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	GO TO 4.

4	CHECK EVAP PURGE LINE
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check EVAP purge line for improper connection or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	Repair it.

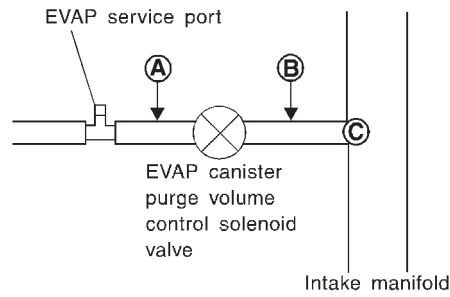
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DTC P0441 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

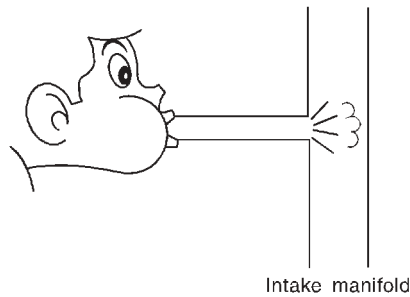
5 CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.



SEF367U

2. Blow air into each hose and EVAP purge port **C**.
3. Check that air flows freely.



SEF368U

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.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

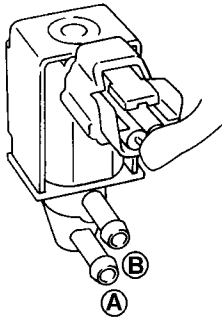
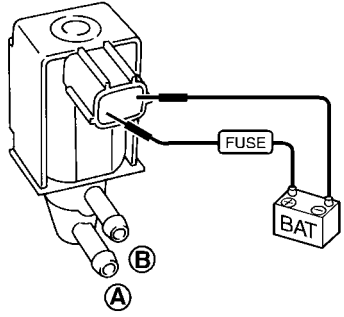
SEC142D

OK or NG

OK	GO TO 8.
NG	GO TO 7.

DTC P0441 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

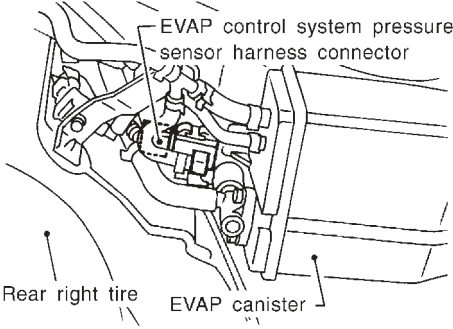
7	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE						
<p>Ⓟ With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition PURG VOL CONT/V value</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">100.0%</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>	Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B						
100.0%	Yes						
0.0%	No						
SEF334X							
<p>ⓧ Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
SEF335X							
OK or NG							
OK	GO TO 8.						
NG	Replace EVAP canister purge volume control solenoid valve.						

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
<p>1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p>	
OK or NG	
OK	GO TO 9.
NG	Repair it.

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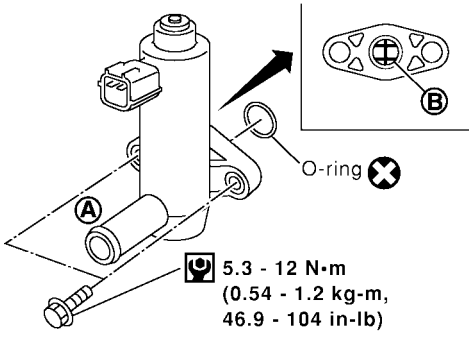
DTC P0441 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;">  <p>EVAP control system pressure sensor harness connector</p> <p>Rear right tire</p> <p>EVAP canister</p> </div>		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: right;">SEF495R</p>		
OK or NG		
OK	GO TO 10.	
NG	Replace EVAP control system pressure sensor.	

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION	
<p>Refer to "DTC Confirmation Procedure" for DTC P0452, EC-388 and P0453, EC-395.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 11.	
NG	Replace EVAP control system pressure sensor.	

11	CHECK RUBBER TUBE FOR CLOGGING	
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve.</p> <p>2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 12.	
NG	Clean the rubber tube using an air blower.	

12	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
<p>1. Remove EVAP canister vent control valve from EVAP canister.</p> <p>2. Check portion B of EVAP canister vent control valve for being rusted.</p> <div style="text-align: center;">  <p>O-ring</p> <p>A</p> <p>B</p> <p>5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p> </div> <p style="text-align: right;">SEF376Z</p>		
OK or NG		
OK	GO TO 13.	
NG	Replace EVAP canister vent control valve.	

DTC P0441 EVAP CONTROL SYSTEM

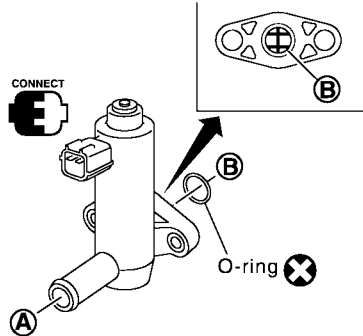
Diagnostic Procedure (Cont'd)

13 CHECK EVAP CANISTER VENT CONTROL VALVE-II

Ⓜ With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



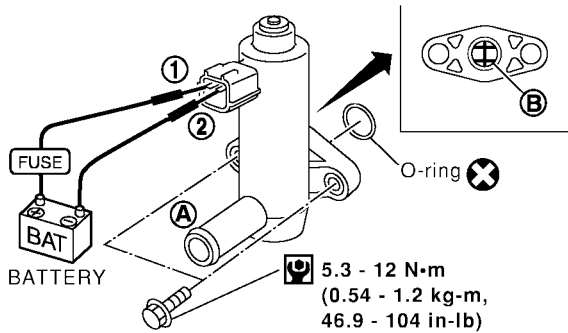
Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

SEC158D

⊗ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



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.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	GO TO 15.
NG	GO TO 14.

14 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 13 again.

OK or NG

OK	GO TO 15.
NG	Replace EVAP canister vent control valve.

15 CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

OK or NG

OK	GO TO 16.
NG	Replace it.

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DTC P0441 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

16	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	GO TO 17.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC0960

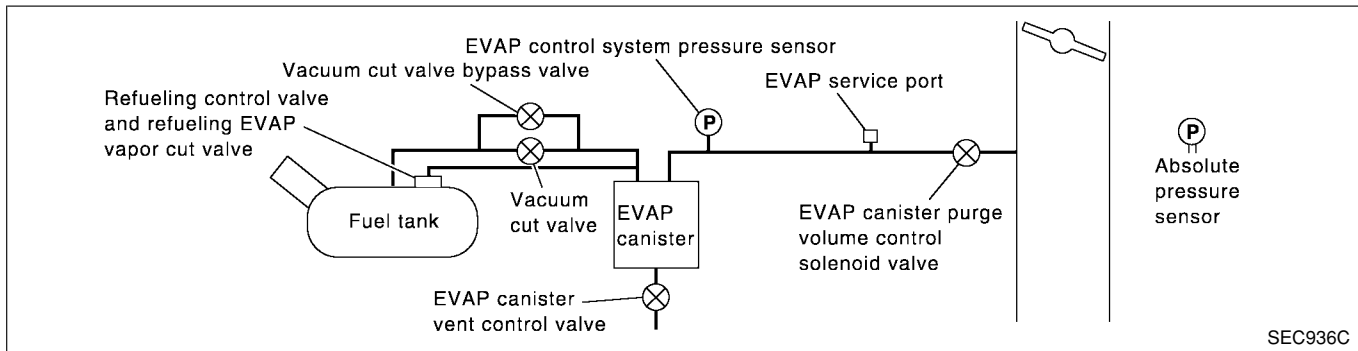
NOTE:

If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-607.)

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 vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is 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 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 Blocked or bent rubber tube to EVAP control system pressure sensor Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Absolute pressure sensor Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. Water separator EVAP canister is saturated with water. EVAP control system pressure sensor Fuel level sensor and the circuit Refueling control valve ORVR system leaks

DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic (Cont'd)

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.

5

EVAP SML LEAK P0442/P1442
1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS. -FUEL LEVEL: 1/4-3/4 -AMBIENT TEMP: 0-30 C(32-86F) -OPEN ENGINE HOOD. 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART. 3)TOUCH START.


SEC760C

5

EVAP SML LEAK P0442/P1442
WAIT 2 TO 10 MINUTES. KEEP ENGINE RUNNING AT IDLE SPEED.

SEC761C

5

EVAP SML LEAK P0442/P1442
MAINTAIN 1600 - 2100 RPM UNTIL FINAL RESULT APPEARS. (APPROX. 3 MINUTES)
 1600 rpm 1850 rpm 2100 rpm

SEC762C

5

EVAP SML LEAK P0442/P1442
OK
SELF-DIAG RESULTS
NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.

SEC763C

DTC Confirmation Procedure

NFEC1444

NOTE:

If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first (see EC-607).

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

TESTING CONDITION:

Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 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).

Open engine hood before conducting the following procedure.

WITH CONSULT-II

NFEC1444S01

- 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.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
- 5) Select “EVP 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 “Basic Inspection”, EC-121.

- 6) Make sure that “OK” is displayed.

If “NG” is displayed, refer to “Diagnostic Procedure”, EC-361.

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

WITH GST

NFEC1444S02

NOTE:

Be sure to read the explanation of “Driving Pattern” on EC-83 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-83.

DTC P0442 EVAP CONTROL SYSTEM

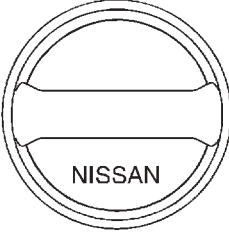
DTC Confirmation Procedure (Cont'd)

- 3) Stop vehicle.
- 4) Select "MODE 1" with GST.
If SRT of EVAP system is not set yet, go to the following step.
If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds.
- 6) Start engine.
It is not necessary to cool engine down before driving.
- 7) Drive vehicle again according to the "Driving Pattern", EC-83.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
If P0442 is displayed on the screen, go to "Diagnostic Procedure", EC-361.
If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, EC-352.
If P0441 and P0442 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
If SRT of EVAP system is set, the result will be OK.
If SRT of EVAP system is not set, go to step 6.

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Diagnostic Procedure

NFEC0962

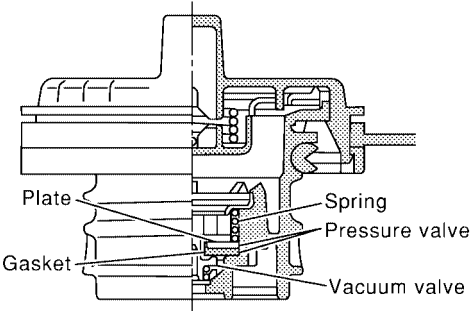
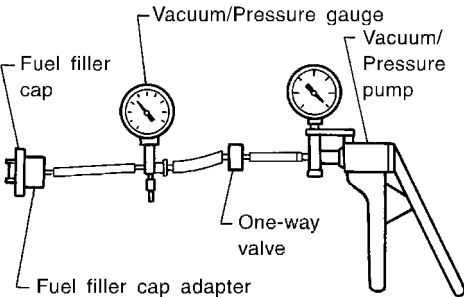
1	CHECK FUEL FILLER CAP DESIGN	
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF915U</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 2.	
NG	Replace with genuine NISSAN fuel filler cap.	

2	CHECK FUEL FILLER CAP INSTALLATION	
<p>Check that the cap is tightened properly by rotating the cap clockwise.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 3.	
NG	Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Retighten until ratcheting sound is heard.	

DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

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.

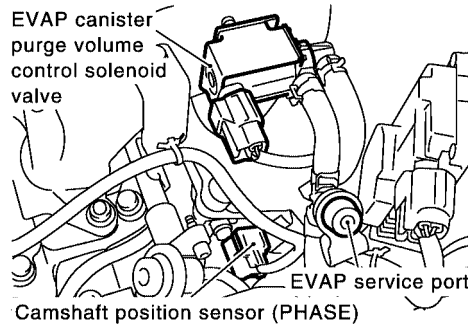
4	CHECK FUEL TANK VACUUM RELIEF VALVE
<ol style="list-style-type: none"> 1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum. 	
	
SEF445Y	
	
SEF943S	
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>	
OK or NG	
OK	GO TO 5.
NG	Replace fuel filler cap with a genuine one.

DTC P0442 EVAP CONTROL SYSTEM

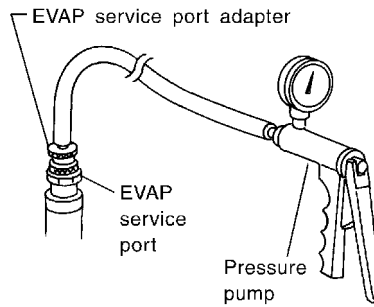
Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II	GO TO 6.
Models without CONSULT-II	GO TO 7.

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DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

6 CHECK FOR EVAP LEAK

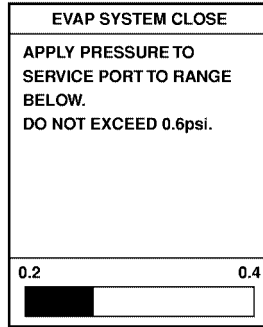
Ⓟ With CONSULT-II

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.

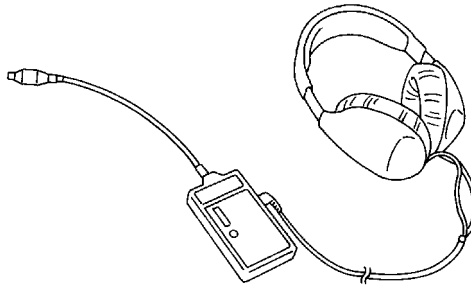
Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

OK or NG

OK

GO TO 8.

NG

Repair or replace.

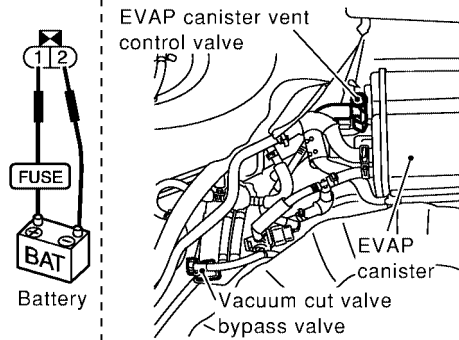
DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

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. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

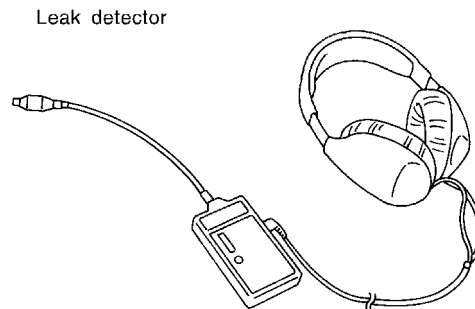
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

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.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

OK or NG

OK	GO TO 8.
NG	Repair or replace.

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DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
PBIB1032E	
<ol style="list-style-type: none"> 5. In case of NG in items 2 - 4, replace the parts. <p>NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-607.	
OK or NG	
OK	GO TO 10.
NG	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER
<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister? 	
Yes or No	
Yes	GO TO 11.
No (With CONSULT-II)	GO TO 13.
No (Without CONSULT-II)	GO TO 14.

SEF596U

DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK (With CONSULT-II)	GO TO 13.	
OK (Without CONSULT-II)	GO TO 14.	
NG	GO TO 12.	

12	DETECT MALFUNCTIONING PART	
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection		
		Repair hose or replace EVAP canister.

13	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 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td style="text-align: center;">0.0%</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td style="text-align: center;">XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td style="text-align: center;">XXX %</td></tr> <tr><td>A/F ALPHA-B2</td><td style="text-align: center;">XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td style="text-align: center;">RICH</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td style="text-align: center;">RICH</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																						
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HO2S1 MNTR (B1)	RICH																					
HO2S1 MNTR (B2)	RICH																					
Vacuum should exist. SEC142D																						
OK or NG																						
OK	GO TO 16.																					
NG	GO TO 15.																					


14	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 17.	
NG	GO TO 15.	

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DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

15	CHECK VACUUM HOSE
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.	
OK or NG	
OK (With CONSULT-II)	GO TO 16.
OK (Without CONSULT-II)	GO TO 17.
NG	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
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OK or NG																					
OK	GO TO 18.																				
NG	GO TO 17.																				

DTC P0442 EVAP CONTROL SYSTEM

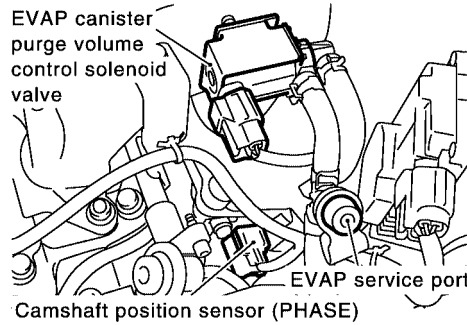
Diagnostic Procedure (Cont'd)

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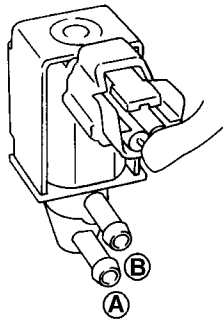
17 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

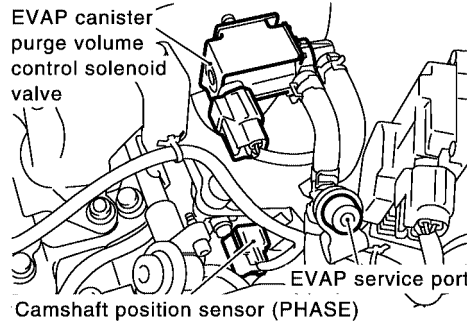


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

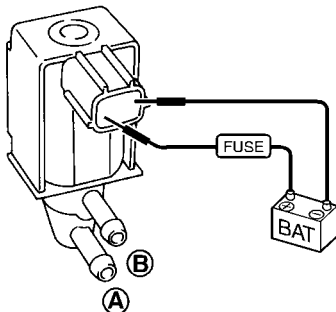
SEF334X

ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

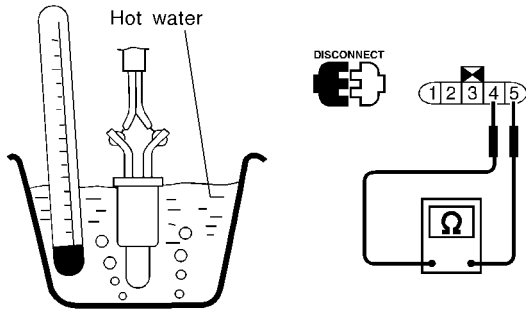
OK	GO TO 18.
NG	Replace EVAP canister purge volume control solenoid valve.

DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

18 CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
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

SEF587X

OK or NG

OK

GO TO 19.

NG

Replace fuel level sensor unit.

DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

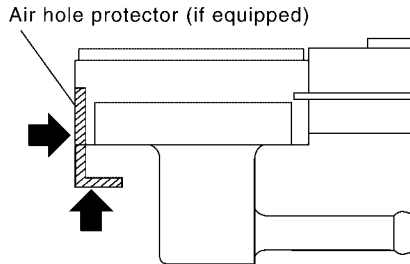
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19 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

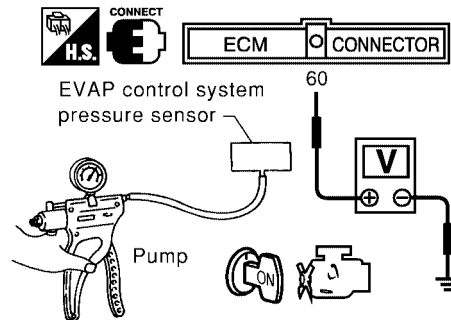
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK GO TO 20.

NG Replace EVAP control system pressure sensor.

20 CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-36.

OK or NG

OK GO TO 21.

NG Repair or reconnect the hose.

SC
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DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	GO TO 22.

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-42.	
OK or NG	
OK	GO TO 23.
NG	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK	GO TO 24.
NG	Repair or replace hoses, tubes or filler neck tube.

24	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> Remove fuel filler cap. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. Blow air into hose end A and check there is no leakage. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
<p style="text-align: right;">SEF830X</p>	
OK or NG	
OK	GO TO 25.
NG	Replace refueling control valve with fuel tank.

DTC P0442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

25	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	GO TO 26.
NG	Replace fuel level sensor unit.

GI

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26	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

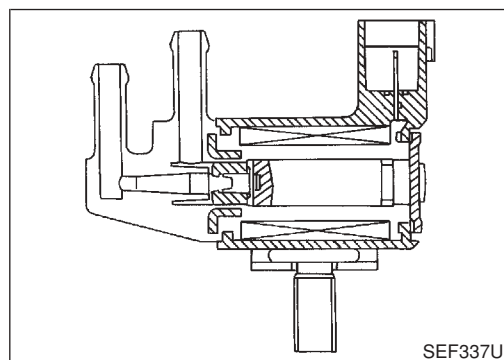
Description SYSTEM DESCRIPTION

NFEC0963

NFEC0963S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

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

NFEC0963S02

The EVAP canister purge volume control solenoid valve uses an 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

NFEC0964

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	Engine: After warming up Air conditioner switch "OFF" Shift lever: "N" No-load	Idle (Vehicle stopped) 0%
		2,000 rpm —

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC0966

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve.	Harness or connectors (The solenoid valve circuit is open or shorted.) EVAP canister purge volume control solenoid valve
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve.	Harness or connectors (The solenoid valve circuit is shorted.) EVAP canister purge volume control solenoid valve

GI

MA

EM

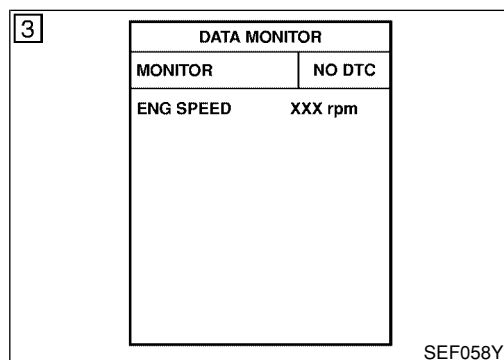
LC

EC

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DTC Confirmation Procedure

NFEC0967

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

NFEC0967S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 13 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-378.

WITH GST

NFEC0967S02

Follow the procedure "WITH CONSULT-II" above.

AT

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IDX

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

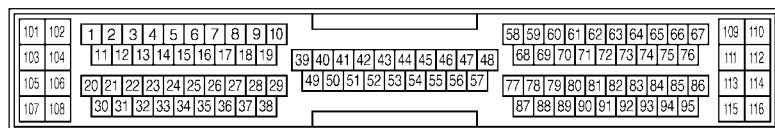
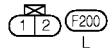
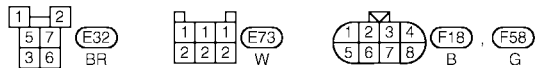
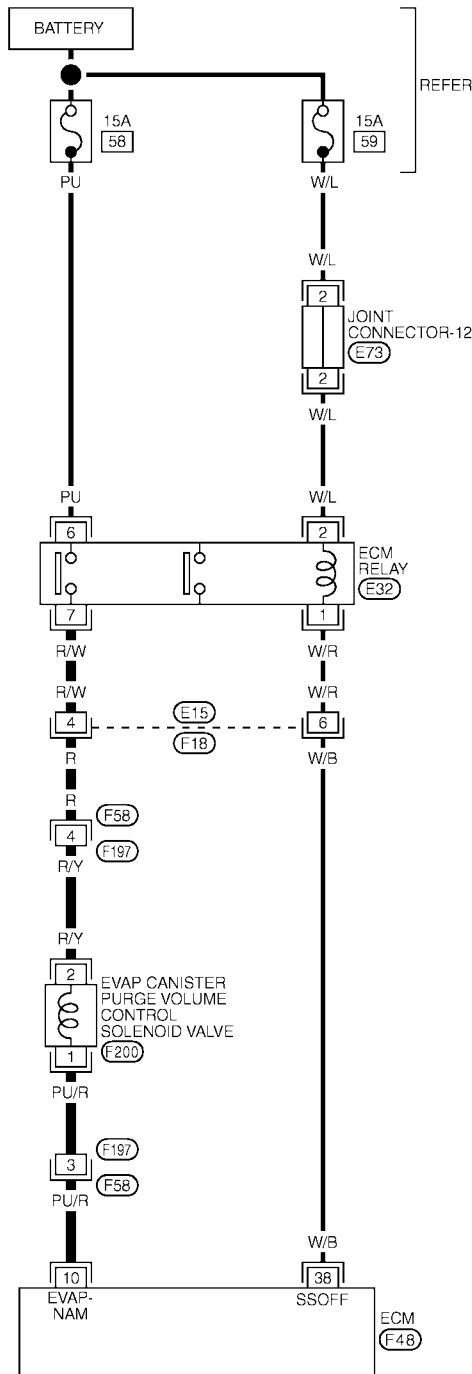
Wiring Diagram

Wiring Diagram

NFEC0968

EC-PGC/V-01

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



MEC494D

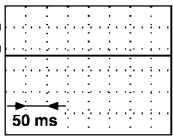
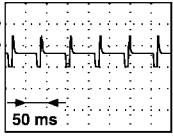
DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Wiring Diagram (Cont'd)

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	PU/R	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE★ (11 - 14) (V) 
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE★ (11 - 14) (V) 

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

SEC219D

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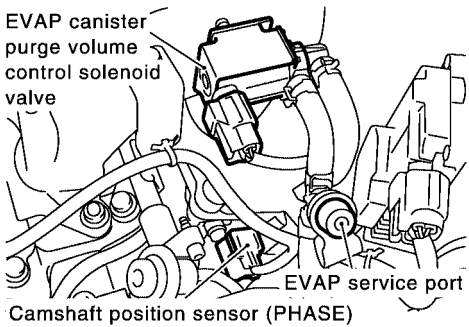
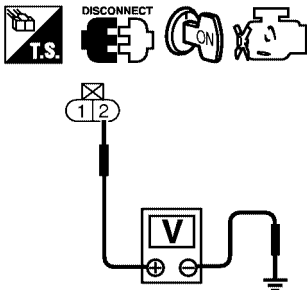
IDX

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure

Diagnostic Procedure

NFEC0969

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC929C</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 2 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC062D</p> <p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors E15, F18 Harness connectors F58, F197 Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay</p>	
	Repair harness or connectors.

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE


Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 10 and EVAP canister purge volume control solenoid valve terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)		GO TO 5.
OK (Without CONSULT-II)		GO TO 6.
NG		GO TO 4.

GI
MA
EM
LC
EC

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <p>Harness connectors F197, F58</p> <p>Harness for open or short between EVAP canister purge volume control solenoid valve and ECM</p>		
		Repair harness or connectors.

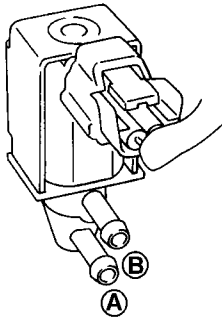
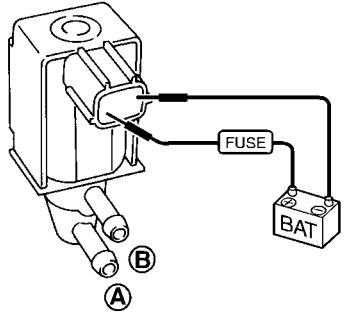
FE
CL
MT

5	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
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PURG VOL CONT/V	0.0%																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
A/F ALPHA-B2	XXX %																					
HO2S1 MNTR (B1)	RICH																					
HO2S1 MNTR (B2)	RICH																					
SEC142D																						
OK or NG																						
OK		GO TO 7.																				
NG		GO TO 6.																				

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DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

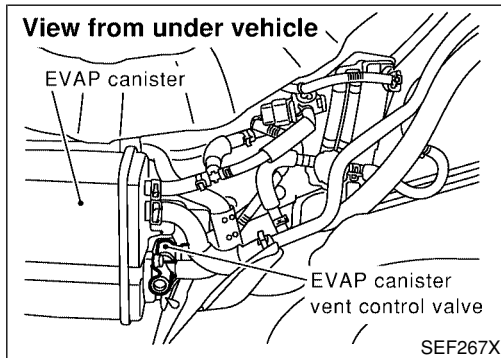
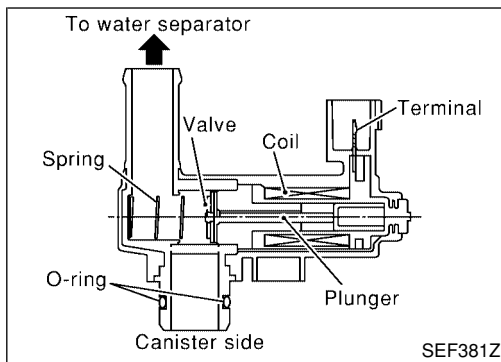
Diagnostic Procedure (Cont'd)

6	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
<p>Ⓟ With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>	
	
SEF334X	
<p>ⓧ Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>	
	
SEF335X	
OK or NG	
OK	GO TO 7.
NG	Replace EVAP canister purge volume control solenoid valve.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Component Description



Component Description

NFEC0970

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 (Small Leak)" diagnosis.

GI
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CONSULT-II Reference Value in Data Monitor Mode

NFEC0971

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	Ignition switch: ON	OFF

AX
SU

On Board Diagnosis Logic

NFEC0973

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

BR
ST
RS

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HA

SC

DTC Confirmation Procedure

NFEC0974

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.

EL

IDX

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

DTC Confirmation Procedure (Cont'd)

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NFEC0974S01

- 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 "Diagnostic Procedure", EC-384.

WITH GST

NFEC0974S02

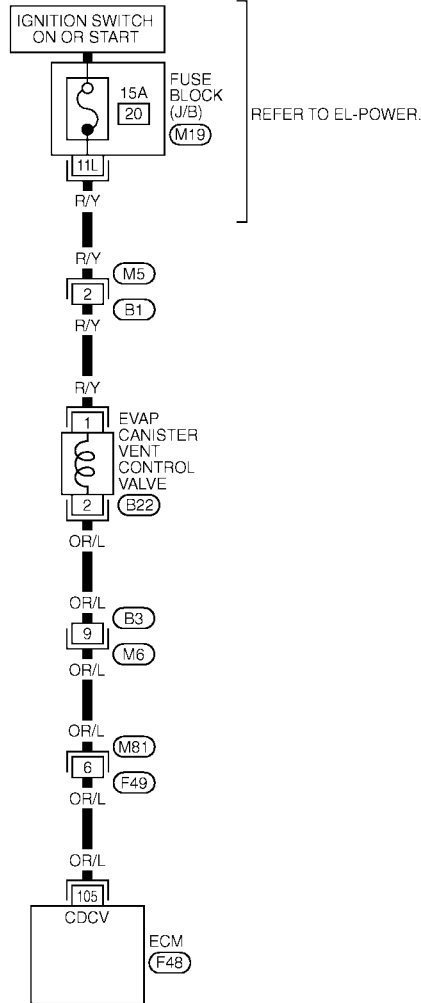
Follow the procedure "WITH CONSULT-II" above.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Wiring Diagram

Wiring Diagram

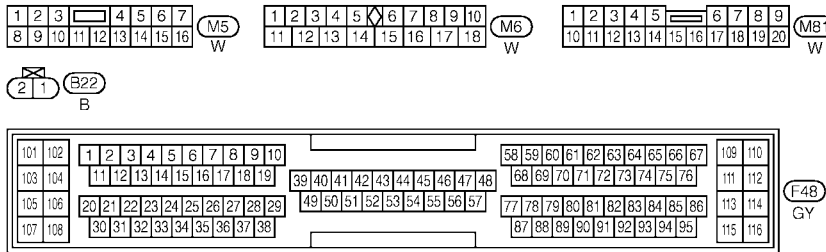
=NFEC0975



EC-VENT/V-01
— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC

REFER TO EL-POWER.

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REFER TO THE FOLLOWING.
(M19) -FUSE BLOCK-JUNCTION BOX (J/B)

MEC495D

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
105	OR/L	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE


DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure

Diagnostic Procedure

NFEC0976

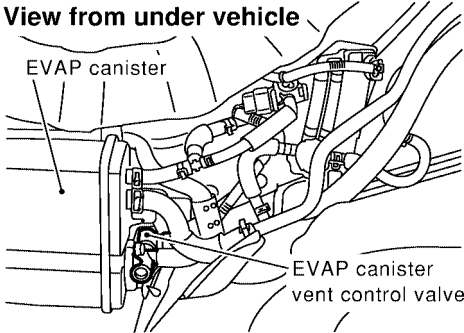
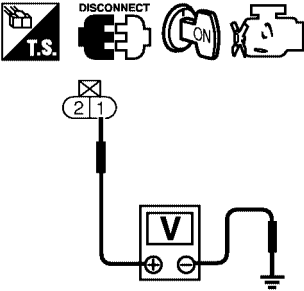
1	INSPECTION START
1. Do you have CONSULT-II?	
Yes or No	
Yes	GO TO 2.
No	GO TO 3.

2	CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and then turn "ON". 2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II. 3. Touch "ON/OFF" on CONSULT-II screen. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B2)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 (B1)	XXX V	HO2S1 (B2)	XXX V				
ACTIVE TEST																					
VENT CONTROL/V	OFF																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
A/F ALPHA-B2	XXX %																				
HO2S1 (B1)	XXX V																				
HO2S1 (B2)	XXX V																				
<p>4. Check for operating sound of the valve. Clicking noise should be heard.</p> <p style="text-align: center;">OK or NG</p>																					
OK	GO TO 7.																				
NG	GO TO 3.																				

PBIB0151E

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister vent control valve harness connector.</p> <div style="text-align: center;"> <p>View from under vehicle</p>  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
SEF267X	
SEC061D	
OK	GO TO 5.
NG	GO TO 4.

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4	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors M5, B1 Fuse block (J/B) connector M19 15A fuse Harness for open or short between EVAP canister vent control valve and fuse</p>	
Repair harness or connectors.	

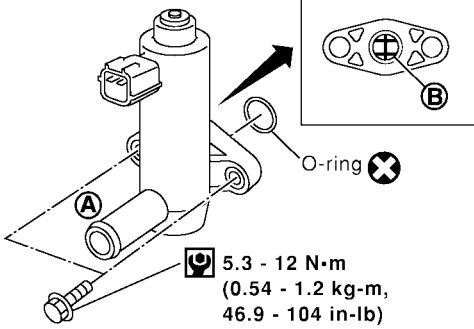
5	CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 105 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	GO TO 6.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

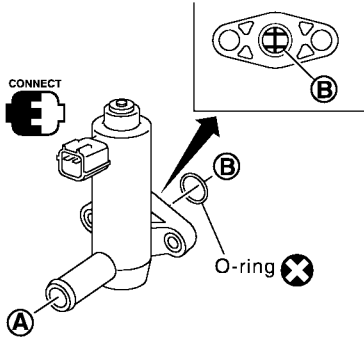
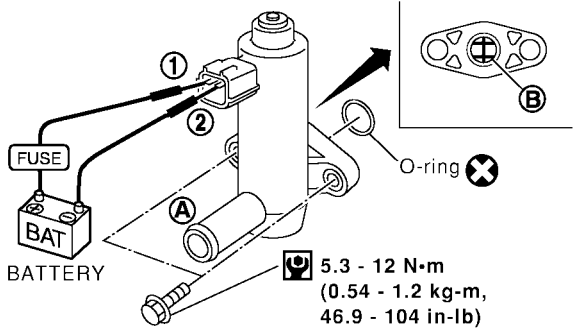
6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors B3, M6 Harness connectors M81, F49 Harness for open or short between EVAP canister vent control valve and ECM 	
Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK RUBBER TUBE FOR CLOGGING
<ol style="list-style-type: none"> 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-I
<ol style="list-style-type: none"> 1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted. 	
 <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	Replace EVAP canister vent control valve.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CANISTER VENT CONTROL VALVE-II																											
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B2)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN						<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																												
VENT CONTROL/V	OFF																											
MONITOR																												
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A/F ALPHA-B2	XXX %																											
HO2S1 MNTR (B1)	LEAN																											
HO2S1 MNTR (B2)	LEAN																											
Condition	Air passage continuity between A and B																											
VENT CONTROL/V ON	No																											
VENT CONTROL/V OFF	Yes																											
SEC158D																												
<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes	<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>																				
Condition	Air passage continuity between A and B																											
12V direct current supply between terminals 1 and 2	No																											
OFF	Yes																											
SEF378Z																												
OK	GO TO 11.																											
NG	GO TO 10.																											

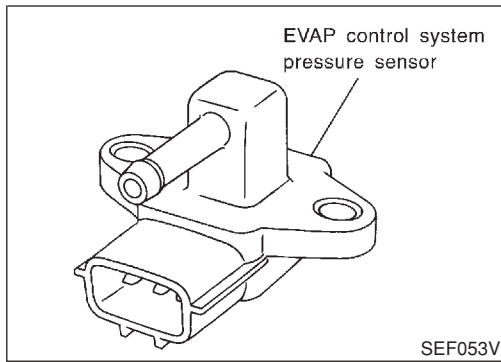
10	CHECK EVAP CANISTER VENT CONTROL VALVE-III
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 9 again. 	
OK or NG	
OK	GO TO 11.
NG	Replace EVAP canister vent control valve.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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DTC P0452 EVAP SYSTEM PRESSURE SENSOR

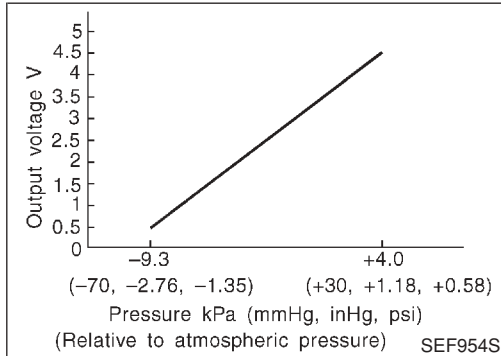
Component Description



Component Description

NFEC0779

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

NFEC0780

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	Ignition switch: ON	Approx. 3.4V

On Board Diagnosis Logic

NFEC0782

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.	Harness or connectors (The sensor circuit is open or shorted.) EVAP control system pressure sensor

DTC Confirmation Procedure

NFEC0784

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.

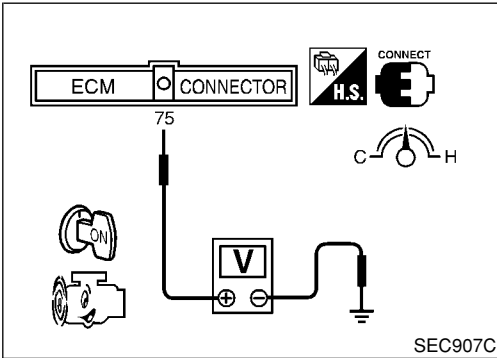
DTC P0452 EVAP SYSTEM PRESSURE SENSOR

DTC Confirmation Procedure (Cont'd)

6

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y



WITH CONSULT-II

NFEC0784S01

- 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 "Diagnostic Procedure", EC-391.
If 1st trip DTC is not detected, go to next step.
- 8) Stop engine and install EVAP service port adapter and pressure pump to EVAP service port securely.
- 9) Pressurize the EVAP line using pressure pump.
- 10) Confirm the pressure does not go up.
- 11) If pressure go up, go to "Diagnostic Procedure", EC-391.

WITH GST

NFEC0784S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 75 (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.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-391.

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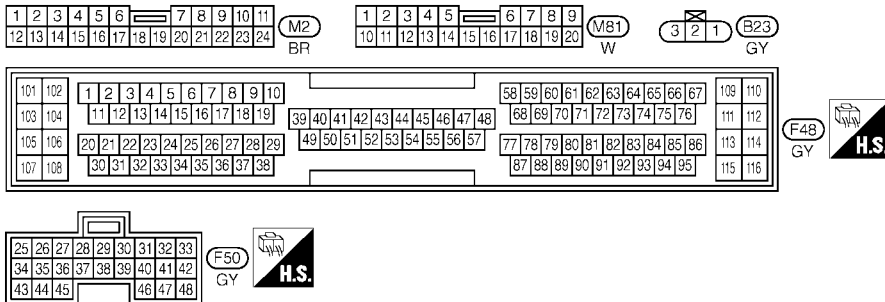
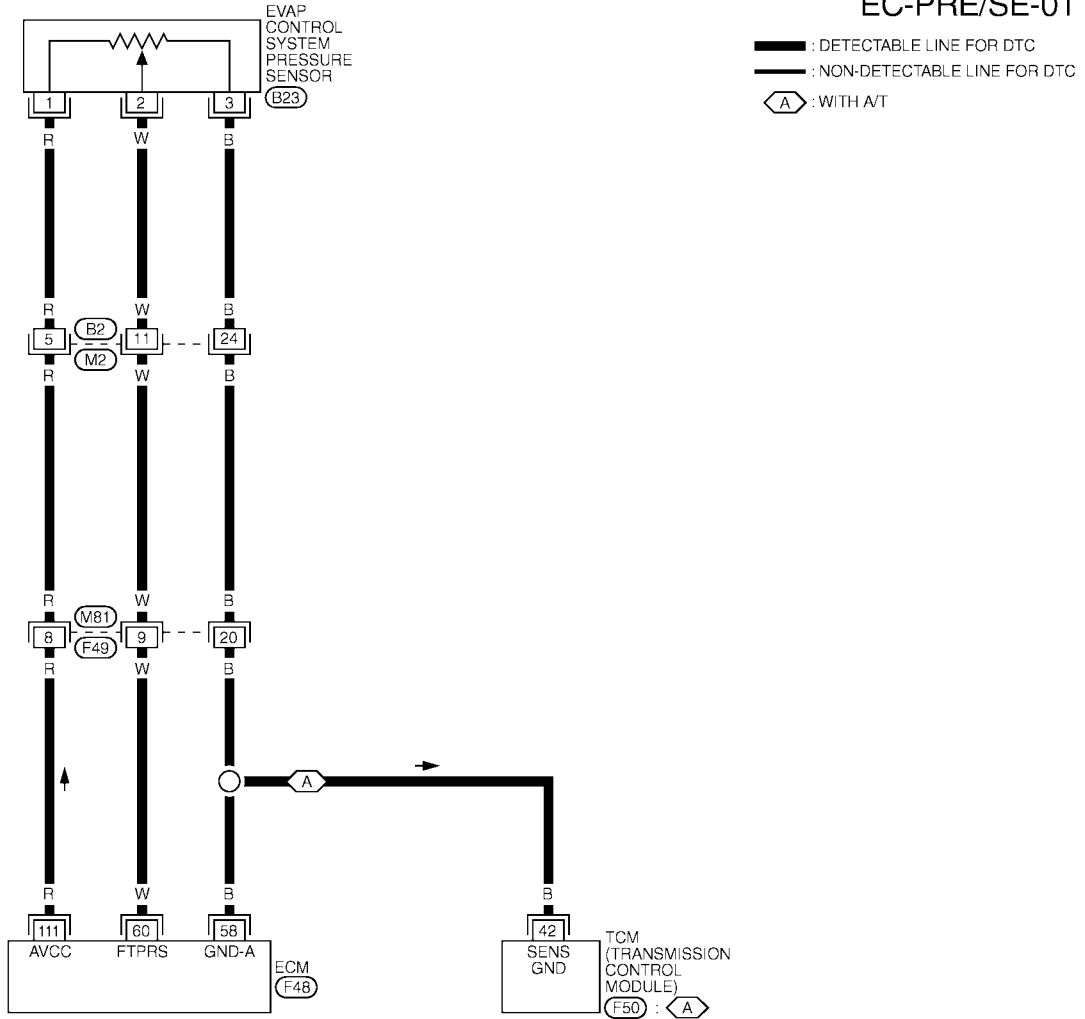
DTC P0452 EVAP SYSTEM PRESSURE SENSOR

Wiring Diagram

Wiring Diagram

NFEC0785

EC-PRE/SE-01



MEC496D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

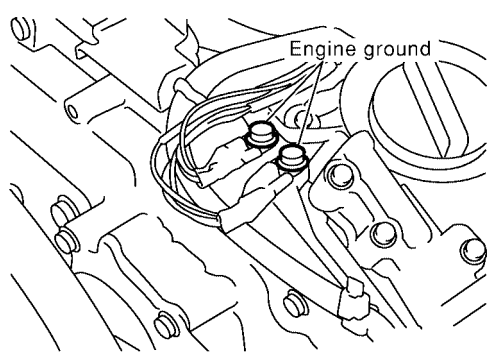
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSORS' GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
60	W	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF623XC

Diagnostic Procedure

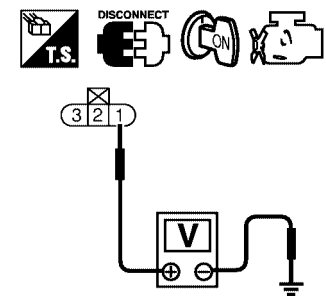
NFEC0786

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

GI
MA
EM
LC
EC

2	CHECK CONNECTOR
<p>1. Disconnect EVAP control system pressure sensor harness connector. 2. Check sensor harness connector for water. Water should not exist.</p>	
OK or NG	
OK	GO TO 3.
NG	Repair or replace harness connector.

FE
CL
MT
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AX

3	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "ON". 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p>	
	
<p>Voltage: Approximately 5V</p>	
OK or NG	
OK	GO TO 5.
NG	GO TO 4.

SU
BR
ST
RS
BT
HA

4	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors B2, M2 Harness connectors M81, F49 Harness for open or short between EVAP control system pressure sensor and ECM</p>	
Repair harness or connectors.	

SC
EL
IDX

DTC P0452 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram. 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 B2, M2 Harness connectors M81, F49 Harness for open between EVAP control system pressure sensor and ECM Harness for open between EVAP control system pressure sensor and TCM (Transmission Control Module)	
Repair open circuit or short to power in harness or connectors.	

7	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 60 and EVAP control system pressure sensor 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 9.
NG	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following. Harness connectors B2, M2 Harness connectors M81, F49 Harness for open or short between ECM and EVAP control system pressure sensor	
Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0452 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

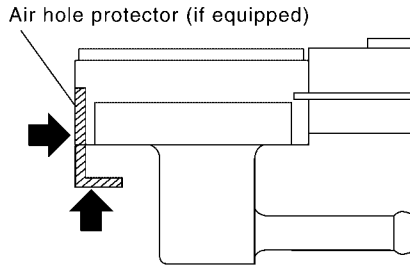
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9 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



Never apply force.

SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

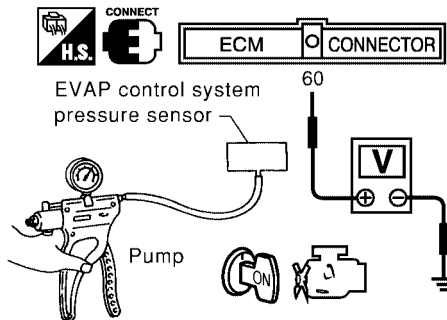
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK

GO TO 10.

NG

Replace EVAP control system pressure sensor.

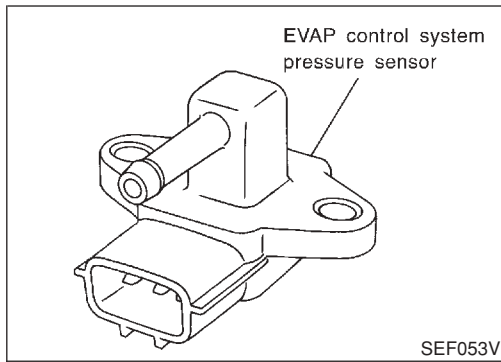
10 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

INSPECTION END

DTC P0453 EVAP SYSTEM PRESSURE SENSOR

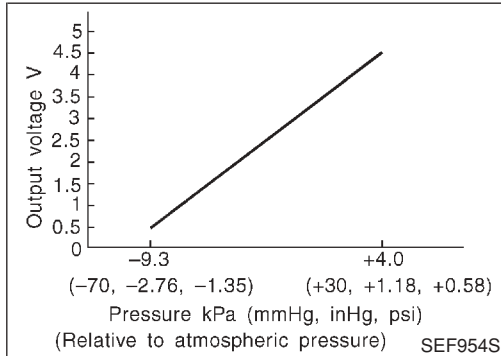
Component Description



Component Description

NFEC0977

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

NFEC0978

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	Ignition switch: ON	Approx. 3.4V

On Board Diagnosis Logic

NFEC0980

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 Water separator Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

NFEC0981

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.

6

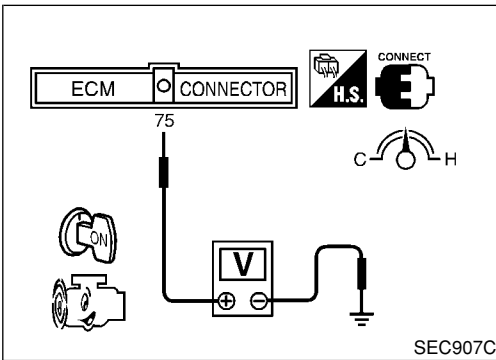
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

WITH CONSULT-II

NFEC0981S01

- 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 "Diagnostic Procedure", EC-397.



WITH GST

NFEC0981S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 75 (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.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-397.

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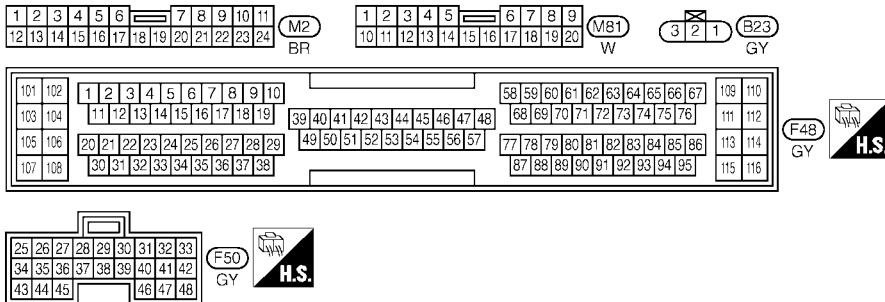
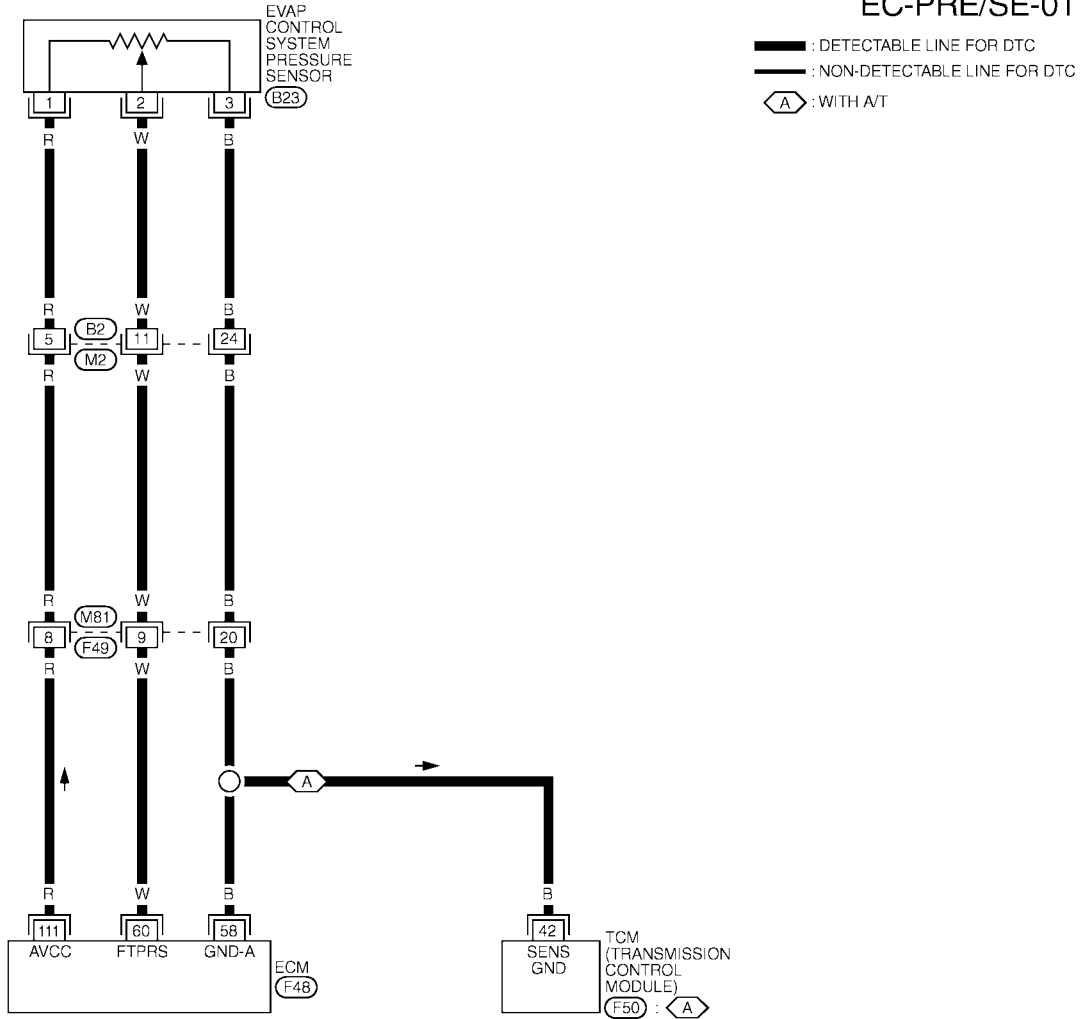
DTC P0453 EVAP SYSTEM PRESSURE SENSOR

Wiring Diagram

Wiring Diagram

NFEC0982

EC-PRE/SE-01



MEC496D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

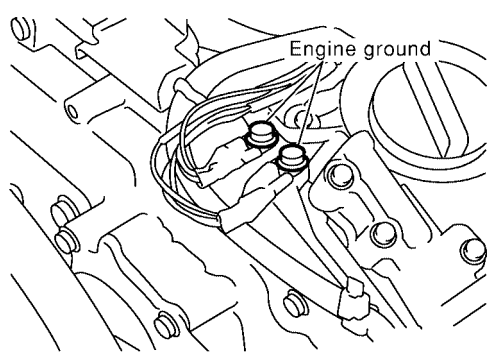
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSORS' GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
60	W	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF623XC

Diagnostic Procedure

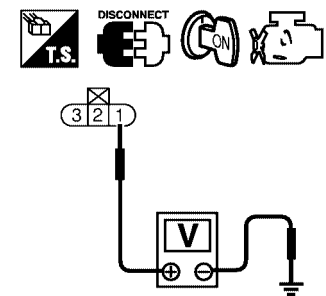
NFEC0983

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

GI
MA
EM
LC
EC

2	CHECK CONNECTOR
<p>1. Disconnect EVAP control system pressure sensor harness connector. 2. Check sensor harness connector for water. Water should not exist.</p>	
OK or NG	
OK	GO TO 3.
NG	Repair or replace harness connector.

FE
CL
MT
AT
AX

3	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "ON". 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p>	
	
Voltage: Approximately 5V	
OK or NG	
OK	GO TO 5.
NG	GO TO 4.

SU
BR
ST
RS
BT
HA

4	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors B2, M2 Harness connectors M81, F49 Harness for open or short between EVAP control system pressure sensor and ECM</p>	
Repair harness or connectors.	

SC
EL
IDX

DTC P0453 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram. 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 B2, M2 Harness connectors M81, F49 Harness for open between EVAP control system pressure sensor and ECM Harness for open between EVAP control system pressure sensor and TCM (Transmission Control Module)	
Repair open circuit or short to power in harness or connectors.	

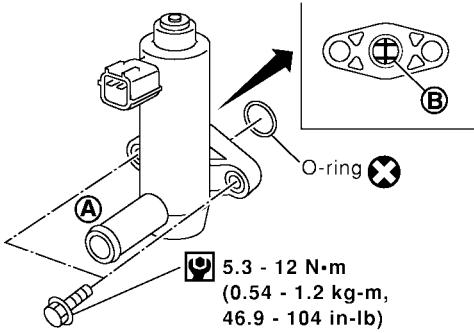
7	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 60 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.	
OK or NG	
OK	GO TO 9.
NG	GO TO 8.

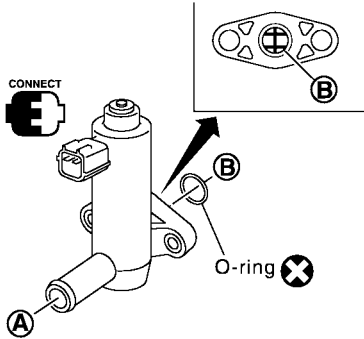
8	DETECT MALFUNCTIONING PART
Check the following. Harness connectors B2, M2 Harness connectors M81, F49 Harness for open or short between ECM and EVAP control system pressure sensor	
Repair open circuit or short to ground or short to power in harness or connectors.	

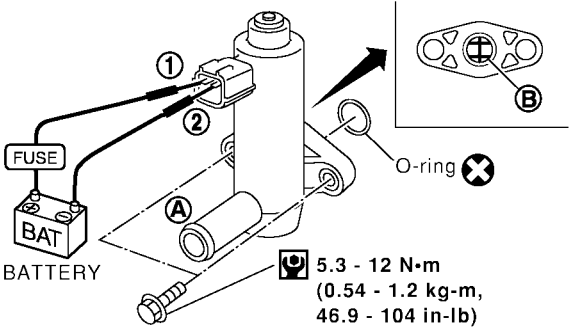
9	CHECK RUBBER TUBE FOR CLOGGING
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
OK or NG	
OK	GO TO 10.
NG	Clean the rubber tube using an air blower.

DTC P0453 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

10	CHECK EVAP CANISTER VENT CONTROL VALVE-I
<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p>	
 <p style="text-align: center;">5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 11.
NG	Replace EVAP canister vent control valve.

11	CHECK EVAP CANISTER VENT CONTROL VALVE																											
<p>Ⓟ With CONSULT-II</p> <p>1. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 2. Check air passage continuity and operation delay time under the following conditions.</p>																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN						<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V ON</td> <td>No</td> </tr> <tr> <td>VENT CONTROL/V OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																												
VENT CONTROL/V	OFF																											
MONITOR																												
ENG SPEED	XXX rpm																											
A/F ALPHA-B1	XXX %																											
A/F ALPHA-B2	XXX %																											
HO2S1 MNTR (B1)	LEAN																											
HO2S1 MNTR (B2)	LEAN																											
Condition	Air passage continuity between A and B																											
VENT CONTROL/V ON	No																											
VENT CONTROL/V OFF	Yes																											
SEF376Z																												

<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 13.						
NG	GO TO 12.						
SEF378Z							

DTC P0453 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

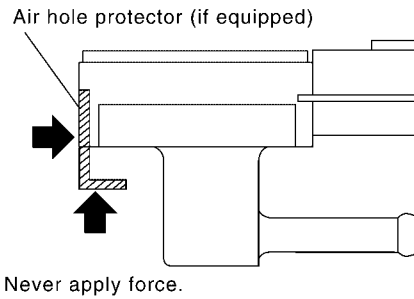
12	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 14 again.	
OK or NG	
OK	GO TO 13.
NG	Replace EVAP canister vent control valve.

13	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
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- Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



SEF799W

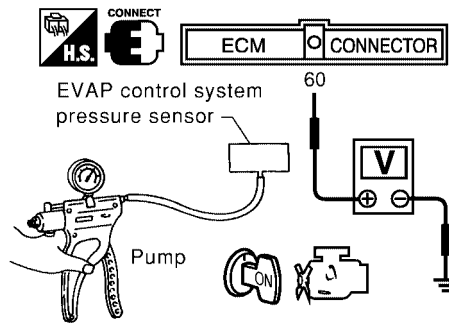
- Remove hose from EVAP control system pressure sensor.
- Turn ignition switch "ON".
- Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

- Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	GO TO 14.
NG	Replace EVAP control system pressure sensor.

DTC P0453 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

14	CHECK RUBBER TUBE
Check obstructed rubber tube connected to EVAP canister vent control valve.	
OK or NG	
OK	GO TO 15.
NG	Clean rubber tube using an air blower, repair or replace rubber tube.

15	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE: Do not disassemble water separator.</p> <p style="text-align: right;">PBIB1032E</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 16.
NG	Replace water separator.

16	CHECK IF EVAP CANISTER SATURATED WITH WATER
<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister. 	
<p style="text-align: right;">SEF596U</p> <p style="text-align: center;">Yes or No</p>	
Yes	GO TO 17.
No	GO TO 19.

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DTC P0453 EVAP SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

17	CHECK EVAP CANISTER
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).	
OK or NG	
OK	GO TO 19.
NG	GO TO 18.

18	DETECT MALFUNCTIONING PART
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection	
	Repair hose or replace EVAP canister.

19	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

On Board Diagnosis Logic

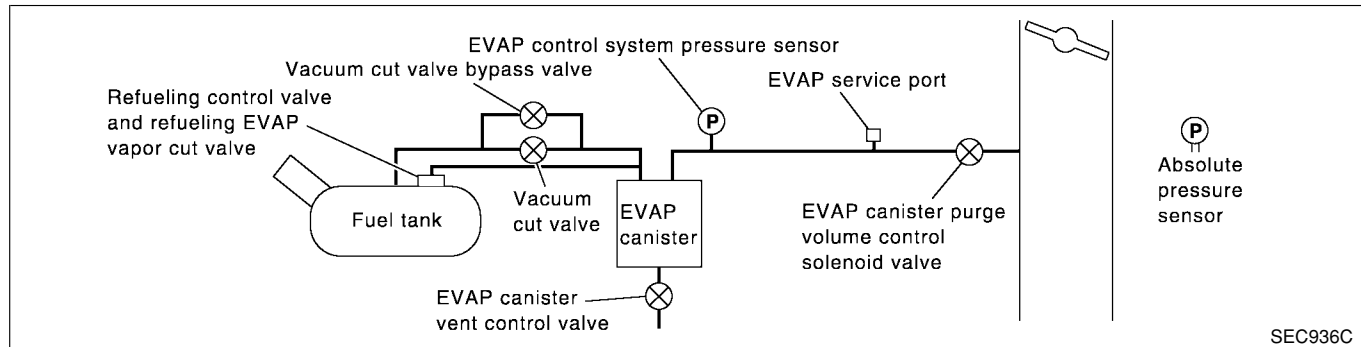
On Board Diagnosis Logic

NFEC1475

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-607.)

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.



Malfunction is detected when EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.

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.

Possible Cause

NFEC1476

- 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.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- 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

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Possible Cause (Cont'd)

Refueling control valve
ORVR system leaks

6

EVAP SML LEAK P0442/P1442

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
-FUEL LEVEL: 1/4-3/4
-AMBIENT TEMP: 0-30 C(32-86F)
-OPEN ENGINE HOOD.
2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
3)TOUCH START.

SEC760C

6

EVAP SML LEAK P0442/P1442


WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING AT IDLE SPEED.

SEC761C

6

EVAP SML LEAK P0442/P1442

MAINTAIN
1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.
(APPROX. 3 MINUTES)



1600 rpm 1850 rpm 2100 rpm

SEC762C

6

EVAP SML LEAK P0442/P1442

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEC763C

DTC Confirmation Procedure

NFEC1477

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-607.)

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 to 3/4 full and vehicle is placed on flat level surface.

Open engine hood before conducting the following procedures.

WITH CONSULT-II

NFEC1477S01

- 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.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A 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 "Basic Inspection", EC-121.

- 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 "Diagnostic Procedure", EC-405.
If P0442 is displayed, perform "Diagnostic Procedure" for DTC P0442.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

DTC Confirmation Procedure (Cont'd)

WITH GST

NFEC1477S02

NOTE:

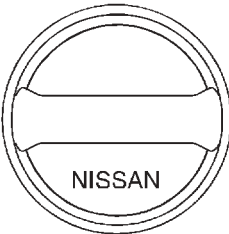
Be sure to read the explanation of "Driving Pattern" on EC-83 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to "Driving Pattern", EC-83.
- 3) Stop vehicle.
- 4) Select "MODE 1" with GST.
If SRT of EVAP system is not set yet, go to the following step.
If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds.
- 6) Start engine.
It is not necessary to cool engine down before driving.
- 7) Drive vehicle again according to the "Driving Pattern", EC-83.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-405.
If P0442 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0442, EC-361.
If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, EC-352.
If P0455, P0442 and P0441 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
If SRT of EVAP system is set, the result will be OK.
If SRT of EVAP system is not set, go to step 6.

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Diagnostic Procedure

NFEC1478

1	CHECK FUEL FILLER CAP DESIGN
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 2.
NG	Replace with genuine NISSAN fuel filler cap.

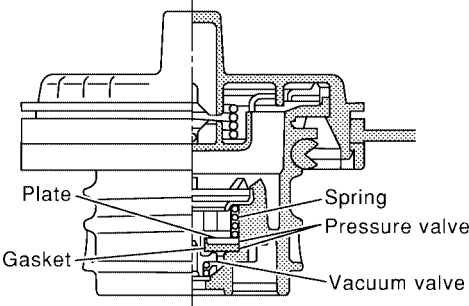
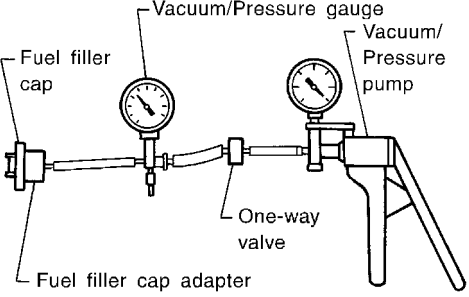
SEF915U

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

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	Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. 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
<p>1. Wipe clean valve housing.</p> <p>2. Check valve opening pressure and vacuum.</p>	
	
SEF445Y	
	
SEF943S	
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>	
OK or NG	
OK	GO TO 5.
NG	Replace fuel filler cap with a genuine one.

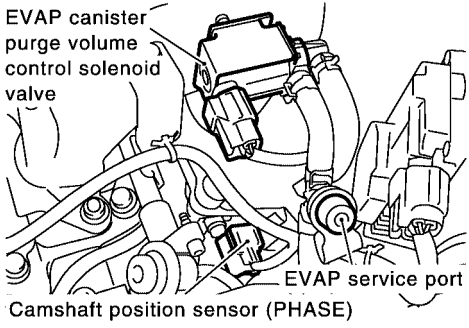
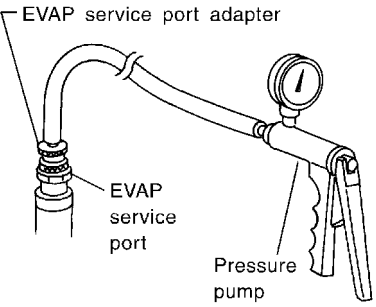
DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

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 "Evaporative Emission System", EC-36.	
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, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-381.	
OK or NG	
OK	GO TO 8.
NG	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

8	INSTALL THE PRESSURE PUMP
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.	
 <p>EVAP canister purge volume control solenoid valve</p> <p>EVAP service port</p> <p>Camshaft position sensor (PHASE)</p>	
SEC929C	
 <p>EVAP service port adapter</p> <p>EVAP service port</p> <p>Pressure pump</p>	
SEF916U	
NOTE:	
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.	
Models with CONSULT-II	GO TO 9.
Models without CONSULT-II	GO TO 10.

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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

9 CHECK FOR EVAP LEAK

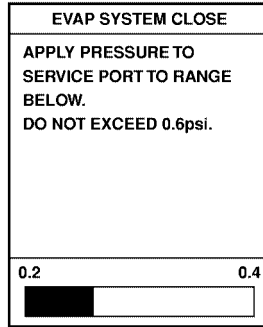
Ⓟ With CONSULT-II

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:

Never use compressed air or a high pressure pump.

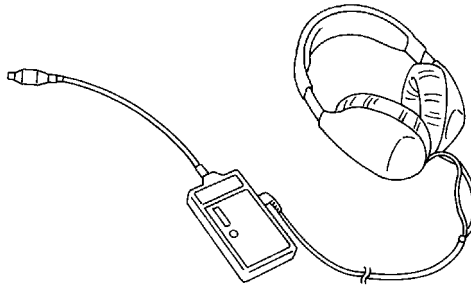
Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

OK or NG

OK

GO TO 11.

NG

Repair or replace.

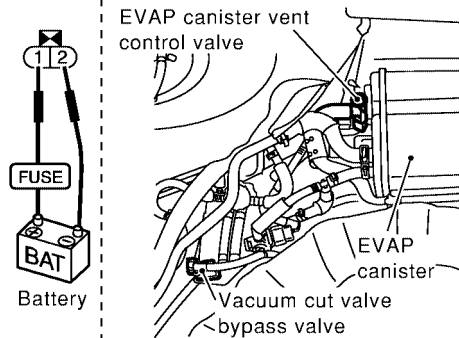
DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

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. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

4. 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.

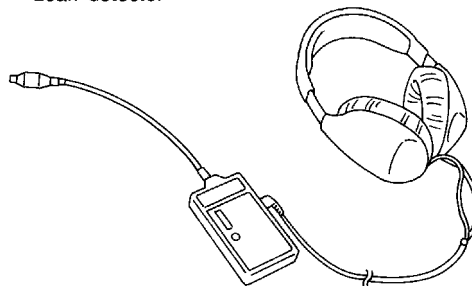
NOTE:

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.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

OK or NG

OK

GO TO 12.


NG

Repair or replace.


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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
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A/F ALPHA-B2	XXX %																				
HO2S1 MNTR (B1)	RICH																				
HO2S1 MNTR (B2)	RICH																				
<p>Vacuum should exist.</p> <p>OK or NG</p>																					
OK	GO TO 14.																				
NG	GO TO 13.																				

SEC142D

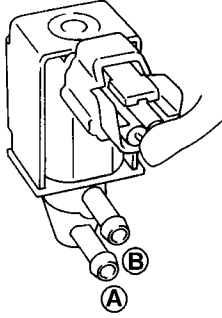
12	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service 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. 	
<p>Vacuum should exist.</p> <p>OK or NG</p>	
OK	GO TO 15.
NG	GO TO 13.

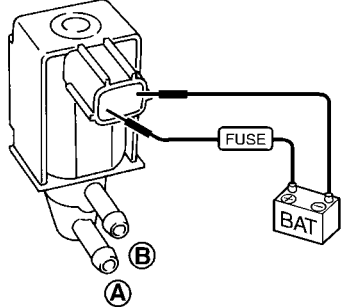
13	CHECK VACUUM HOSE
<p>Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.</p> <p style="text-align: center;">OK or NG</p>	
OK (With CONSULT-II)	GO TO 14.
OK (Without CONSULT-II)	GO TO 15.
NG	Repair or reconnect the hose.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																					
PURG VOL CONT/V	0.0%																				
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ENG SPEED	XXX rpm																				
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A/F ALPHA-B2	XXX %																				
HO2S1 MNTR (B1)	RICH																				
HO2S1 MNTR (B2)	RICH																				
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OK or NG																					
OK	GO TO 16.																				
NG	GO TO 15.																				

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE						
<p>Ⓟ With CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition PURG VOL CONT/V value</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>100.0%</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>0.0%</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>	Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B						
100.0%	Yes						
0.0%	No						
SEF334X							

<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
SEF335X							
OK or NG							
OK	GO TO 16.						
NG	Replace EVAP canister purge volume control solenoid valve.						

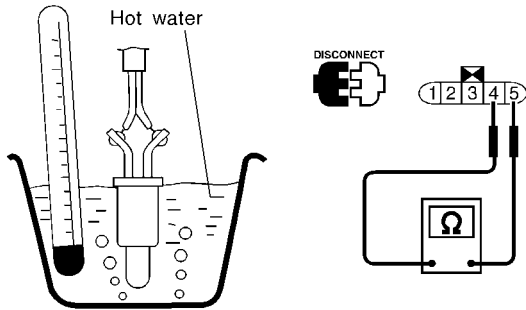
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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

16 CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
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

SEF587X

OK or NG

OK

GO TO 17.

NG

Replace fuel level sensor unit.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

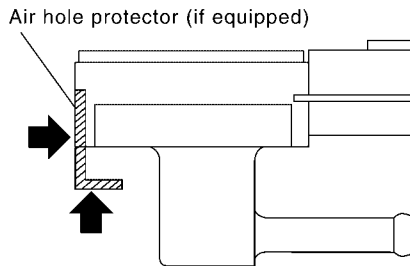
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17 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

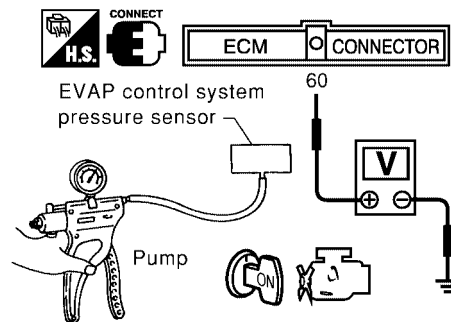
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK GO TO 18.

NG Replace EVAP control system pressure sensor.

18 CHECK REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-42.

OK or NG

OK GO TO 19.

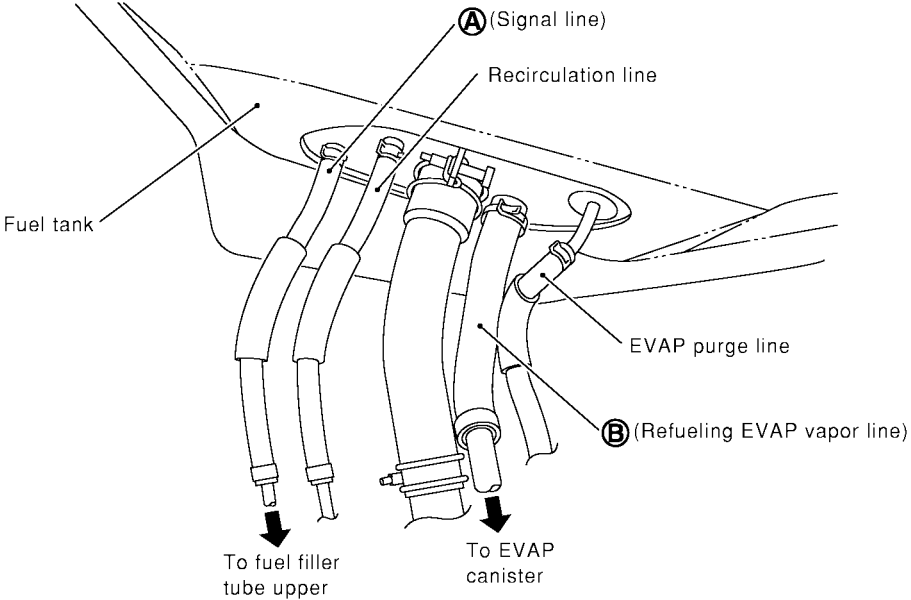
NG Repair or replace hoses and tubes.

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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

19	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and 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 hoses, tubes or filler neck tube.

20	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
 <p style="text-align: right;">SEF830X</p>	
OK or NG	
OK	GO TO 21.
NG	Replace refueling control valve with fuel tank.

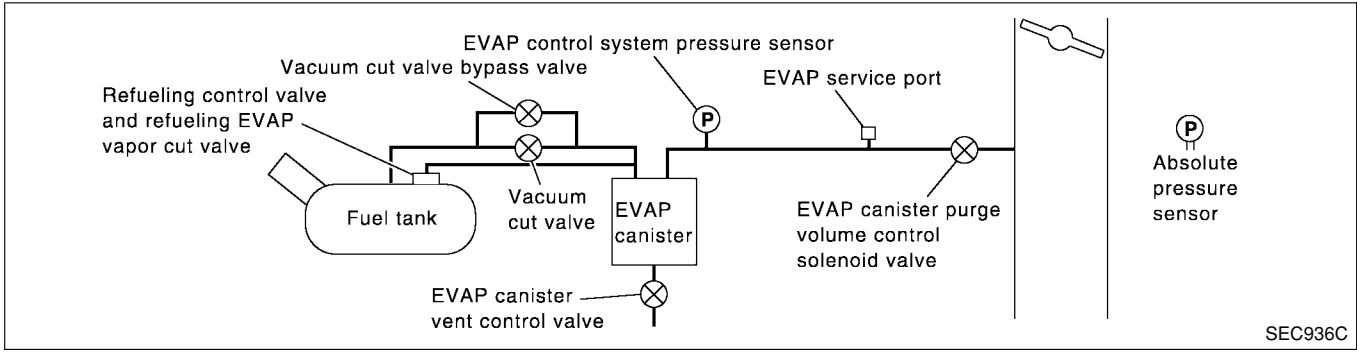
21	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P0456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC0987



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 same as a 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)	EVAP system has a very small leak. EVAP system does not operate properly.	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 Blocked or bent rubber tube to EVAP control system pressure sensor Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Absolute pressure sensor Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. Water separator EVAP canister saturated with water EVAP control system pressure sensor Refueling control valve ORVR system leaks Fuel level sensor and the circuit Foreign matter caught in EVAP canister purge volume control solenoid valve

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.

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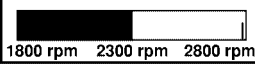
DTC P0456 EVAP CONTROL SYSTEM

DTC Confirmation Procedure

NFEC0988

5	EVAP V/S LEAK P0456/P1456
	CHECK FUEL LEVEL SENSOR(V). SEE SERVICE MANUAL FOR SPECIFICATION. IS THE VOLTAGE WITHIN THE SPECIFICATION?
	MONITOR
	FUEL LEVEL SE XXX V

SEC764C

5	EVAP V/S LEAK P0456/P1456
	MAINTAIN 1800-2800 RPM UNTIL FINAL RESULT APPEARS.
	

SEC765C

5	EVAP V/S LEAK P0456/P1456
	OK

SEC766C

DTC Confirmation Procedure

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

If DTC P0456 is displayed with P0442, perform TROUBLE DIAGNOSIS FOR DTC P0456 first.

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

After repair, make sure that the hoses and clips are installed properly.

TESTING CONDITION:

Open engine hood before conducting following procedure.

If any of following condition is met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.

- Fuel filler cap is removed.
- Refilled or drained the fuel.
- EVAP component parts is/are removed.

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Ⓜ With CONSULT-II

- Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- Make sure the following conditions are met.

FUEL LEVEL SE: 1.08 - 0.2V

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).

- Turn ignition switch “OFF” and wait at least 5 seconds.
- Turn ignition switch “ON”.
- Select “EVP V/S LEAK P0456/P1456” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.

Follow the instruction displayed.

- Make sure that “OK” is displayed.
If “NG” is displayed, refer to “Diagnostic Procedure”, EC-417.

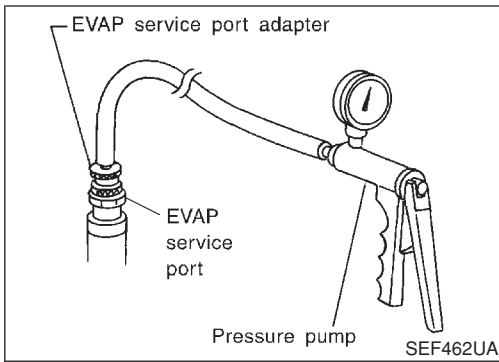
NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to “Basic Inspection”, EC-121.

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

DTC P0456 EVAP CONTROL SYSTEM

Overall Function Check



Overall Function Check

NFEC0989

WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

CAUTION:

Never 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) and vacuum cut valve bypass valve (open).
- 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 diagnostic procedure, EC-417.

NOTE:

For more information, refer to GST instruction manual.

Diagnostic Procedure

NFEC0990

1	CHECK FUEL FILLER CAP DESIGN
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p>	
OK or NG	
OK	GO TO 2.
NG	Replace with genuine NISSAN fuel filler cap.

SEF915U

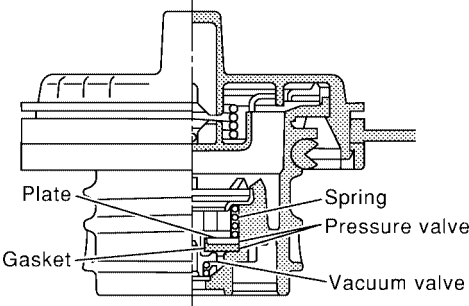
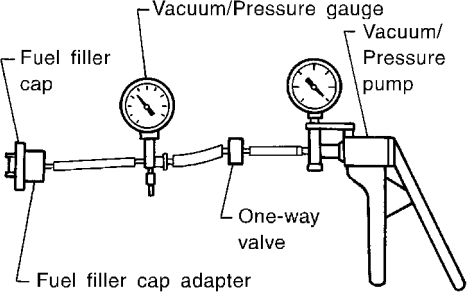
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DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

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	Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. 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.

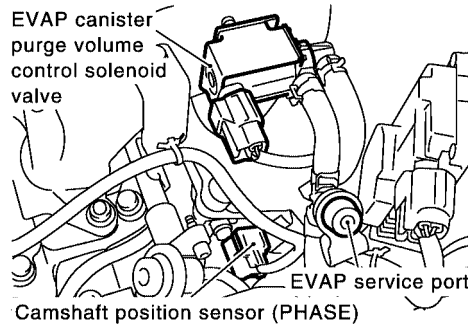
4	CHECK FUEL TANK VACUUM RELIEF VALVE
<p>1. Wipe clean valve housing.</p> <p>2. Check valve opening pressure and vacuum.</p>	
	
SEF445Y	
	
SEF943S	
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>	
OK or NG	
OK	GO TO 5.
NG	Replace fuel filler cap with a genuine one.

DTC P0456 EVAP CONTROL SYSTEM

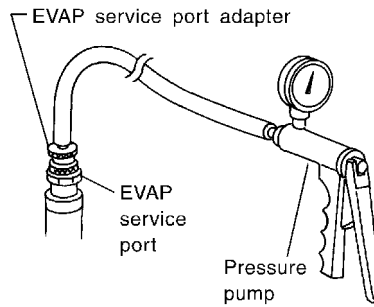
Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II	GO TO 6.
Models without CONSULT-II	GO TO 7.

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DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

6 CHECK FOR EVAP LEAK

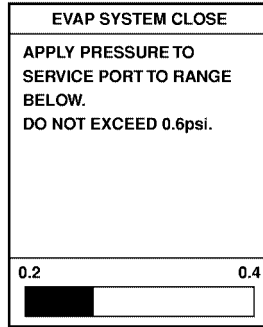
Ⓟ With CONSULT-II

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.

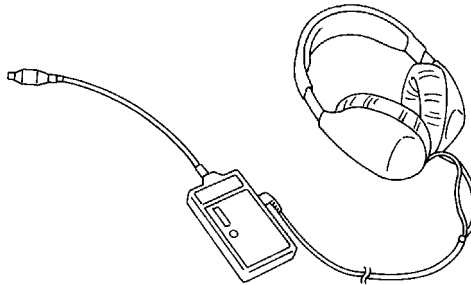
Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

OK or NG

OK

GO TO 8.

NG

Repair or replace.

DTC P0456 EVAP CONTROL SYSTEM

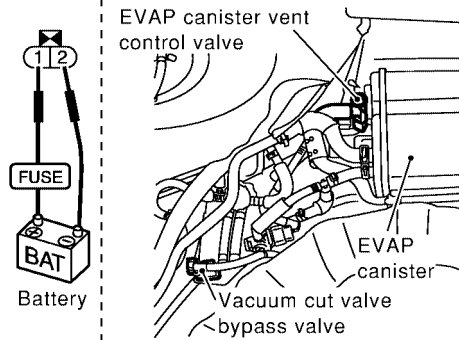
Diagnostic Procedure (Cont'd)

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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. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

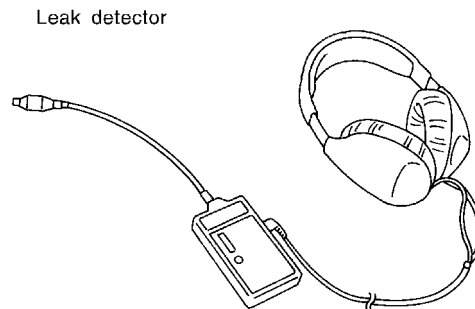
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

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.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

OK or NG

OK	GO TO 8.
NG	Repair or replace.

DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;"> <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">PBIB1032E</p>	
<p>5. In case of NG in items 2 - 4, replace the parts. NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
<p>Refer to "DTC Confirmation Procedure", EC-607.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister?</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF596U</p> <p style="text-align: center;">Yes or No</p>	
Yes	GO TO 11.
No (With CONSULT-II)	GO TO 13.
No (Without CONSULT-II)	GO TO 14.

DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK (With CONSULT-II)	GO TO 13.	
OK (Without CONSULT-II)	GO TO 14.	
NG	GO TO 12.	

12	DETECT MALFUNCTIONING PART	
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection		
		Repair hose or replace EVAP canister.

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
(P) 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 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																						
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HO2S1 MNTR (B2)	RICH																					
Vacuum should exist. SEC142D																						
OK or NG																						
OK	GO TO 16.																					
NG	GO TO 15.																					


14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
(X) 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 17.	
NG	GO TO 15.	

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DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

15	CHECK VACUUM HOSE
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.	
OK or NG	
OK (With CONSULT-II)	GO TO 16.
OK (Without CONSULT-II)	GO TO 17.
NG	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																					
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HO2S1 MNTR (B2)	RICH																				
SEC142D																					
OK or NG																					
OK	GO TO 18.																				
NG	GO TO 17.																				

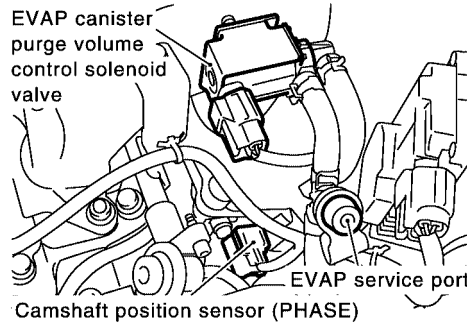
DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

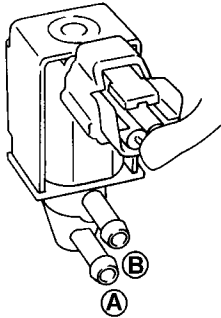
17 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

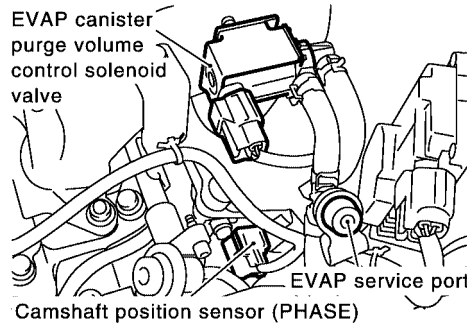


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

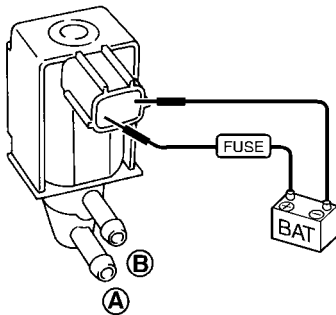
SEF334X

ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK

GO TO 18.

NG

Replace EVAP canister purge volume control solenoid valve.

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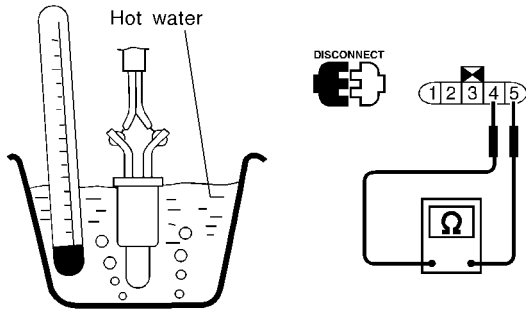
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DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

18 CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
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

SEF587X

OK or NG

OK

GO TO 19.

NG

Replace fuel level sensor unit.

DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

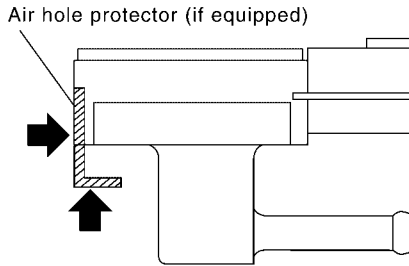
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19 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



Never apply force.

SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

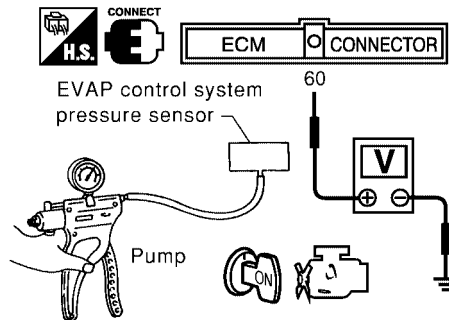
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK GO TO 20.

NG Replace EVAP control system pressure sensor.

20 CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-36.

OK or NG

OK GO TO 21.

NG Repair or reconnect the hose.

DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	GO TO 22.

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.	
OK or NG	
OK	GO TO 23.
NG	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK	GO TO 24.
NG	Repair or replace hoses, tubes or filler neck tube.

24	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check that there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
SEF830X	
OK or NG	
OK	GO TO 25.
NG	Replace or refueling control valve with fuel tank.

DTC P0456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

25	CHECK FUEL LEVEL SENSOR	
Refer to EL-129, "Fuel Level Sensor Unit Check".		
OK or NG		
OK	GO TO 26.	
NG	Replace fuel level sensor unit.	

26	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.		
INSPECTION END		

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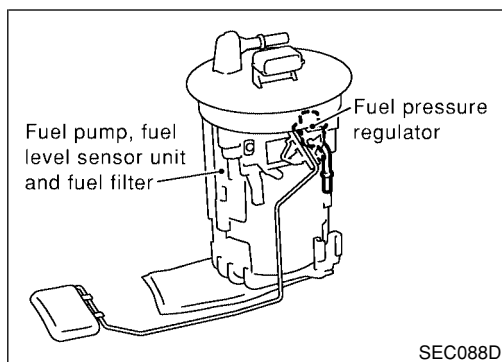
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DTC P0460 FUEL LEVEL SENSOR

Component Description



Component Description

NFEC0991

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 ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC0992

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.	Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.) Fuel level sensor

3

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

DTC Confirmation Procedure

NFEC0993

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

NFEC0993S01

- 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 "Diagnostic Procedure", EC-432.

WITH GST

NFEC0993S02

Follow the procedure "WITH CONSULT-II" above.

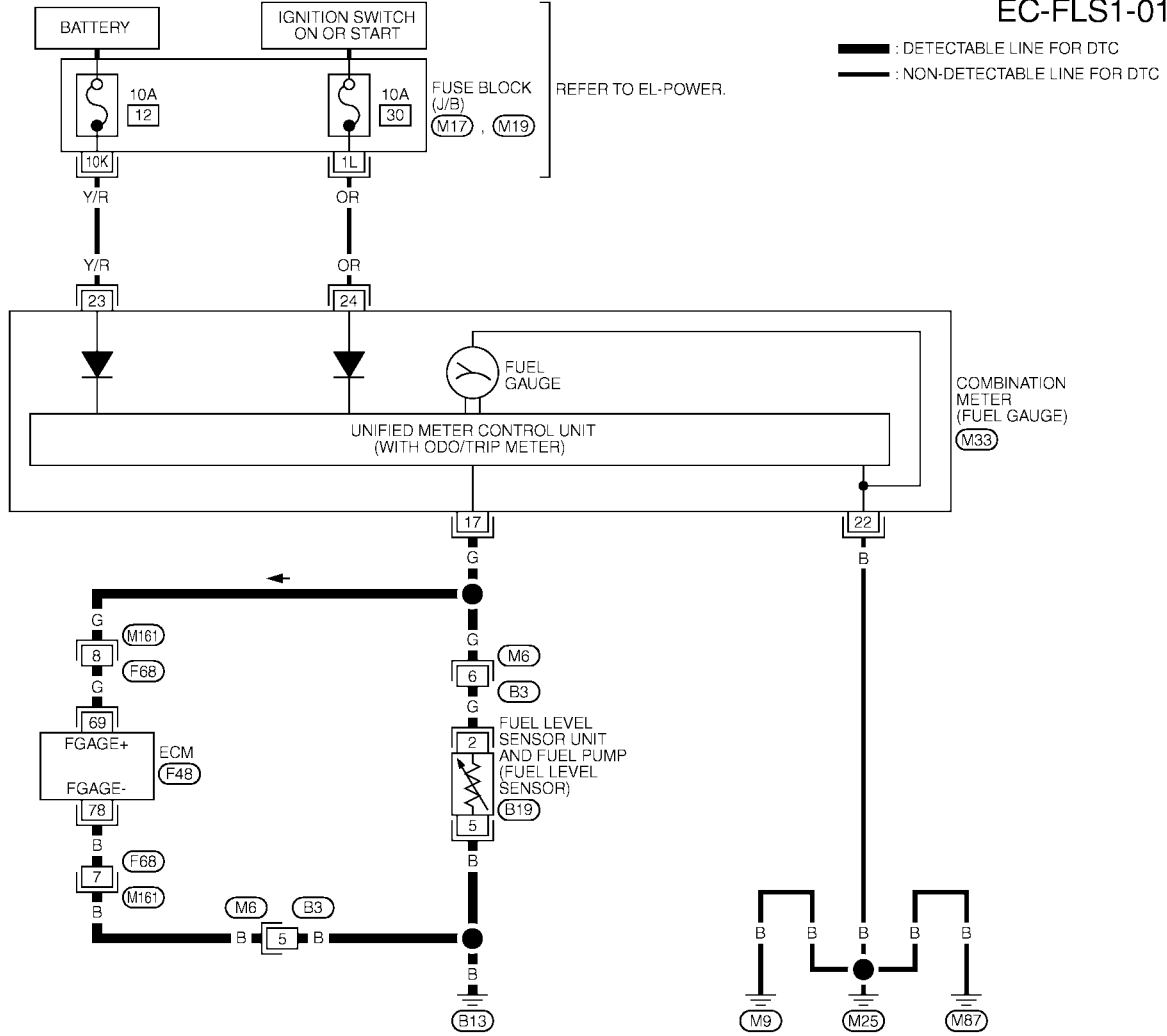
DTC P0460 FUEL LEVEL SENSOR

Wiring Diagram

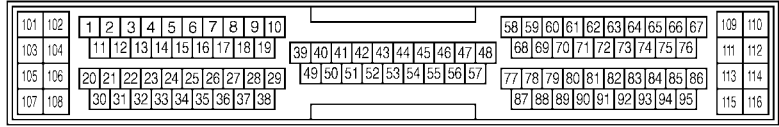
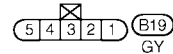
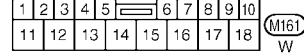
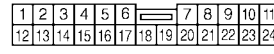
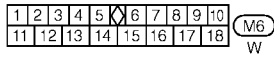
Wiring Diagram

NFEC0994

EC-FLS1-01



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REFER TO THE FOLLOWING.
 (M17), (M19) - FUSE BLOCK - JUNCTION BOX (J/B)

MEC497D

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	B	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V
69	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V OUTPUT VOLTAGE VARIES WITH FUEL LEVEL.

SEF711YB

DTC P0460 FUEL LEVEL SENSOR

Diagnostic Procedure

Diagnostic Procedure

=NFEC0995

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit and fuel pump terminal 2 and ground with CONSULT-II or a tester.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEC065D</p>	
Voltage: Battery voltage	
OK or NG	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors M6, B3 Harness for open or short between combination meter and fuel level sensor unit and fuel pump</p>	
Repair or replace harness or connectors.	

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power.</p>	
OK or NG	
OK	GO TO 4.
NG	Repair open circuit or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 69 and fuel level sensor unit and fuel pump terminal 2, ECM terminal 78 and fuel level sensor unit and fuel pump terminal 5. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	GO TO 6.
NG	GO TO 5.

DTC P0460 FUEL LEVEL SENSOR

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M161, F68 Harness connectors M6, B3 Harness for open or short between ECM and fuel level sensor unit and fuel pump	
	Repair open circuit or short to ground or short to power in harness or connectors.

GI

MA

EM

6	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	GO TO 7.
NG	Replace fuel level sensor unit and fuel pump.

LC

EC

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

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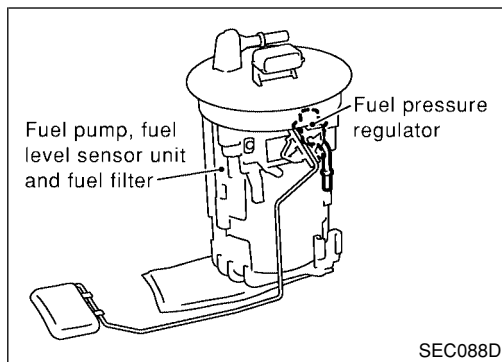
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DTC P0461 FUEL LEVEL SENSOR

Component Description



Component Description

~NFEC0996

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 ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC0997

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.	Harness or connectors (The level sensor circuit is open or shorted.) Fuel level sensor

Overall Function Check

NFEC0998

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 FE-4, "Fuel Tank".

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

7	DATA MONITOR	
	MONITOR	NO DTC
	FUEL T/TMP SE	XXX °C
	FUEL LEVEL SE	XXX V

SEF195Y

WITH CONSULT-II

NFEC0998S01

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 (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 "Fuel Pressure Release", EC-56.
- 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.
- 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 (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
- 10) Fill fuel into the fuel tank for 30 (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Check "FUEL LEVEL SE" output voltage and note it.

DTC P0461 FUEL LEVEL SENSOR

Overall Function Check (Cont'd)

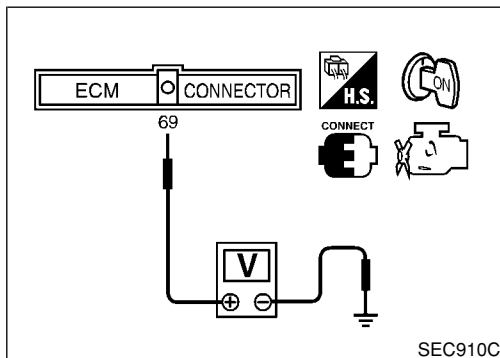
- 12) Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11. If NG, check the fuel level sensor, refer to EL-129, "FUEL LEVEL SENSOR UNIT CHECK".

GI

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WITH GST

NFEC0998S02

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 (7-7/8 US gal, 6-5/8 Imp gal) in advance.

EC

- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-56.
- 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".
- 6) Set voltmeters probe between ECM terminal 69 (fuel level sensor signal) and ground.
- 7) Turn ignition switch "ON".
- 8) Check voltage between ECM terminal 69 and ground and note it.
- 9) Drain fuel by 30 (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
- 10) Fill fuel into the fuel tank for 30 (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Confirm that the voltage between ECM terminal 69 and ground changes more than 0.03V during step 8 - 10. If NG, check component of fuel level sensor, refer to EL-129, "FUEL LEVEL SENSOR UNIT CHECK".

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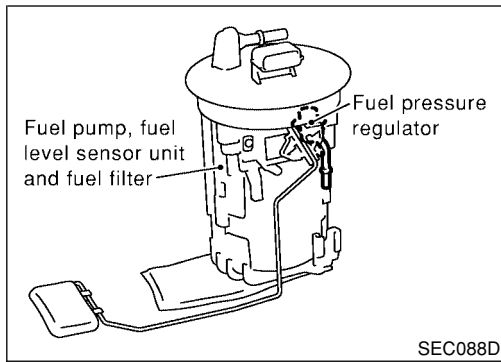
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DTC P0462, P0463 FUEL LEVEL SENSOR

Component Description



Component Description

NFEC0999

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 ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC1000

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

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 is sent from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.) Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor is sent to ECM.	

DTC Confirmation Procedure

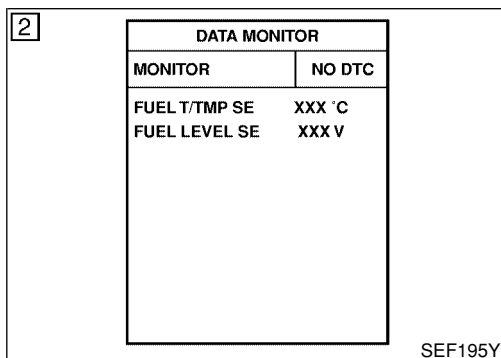
NFEC1001

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

NFEC1001S01

- 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 "Diagnostic Procedure", EC-438.

WITH GST

NFEC1001S02

Follow the procedure "WITH CONSULT-II" above.

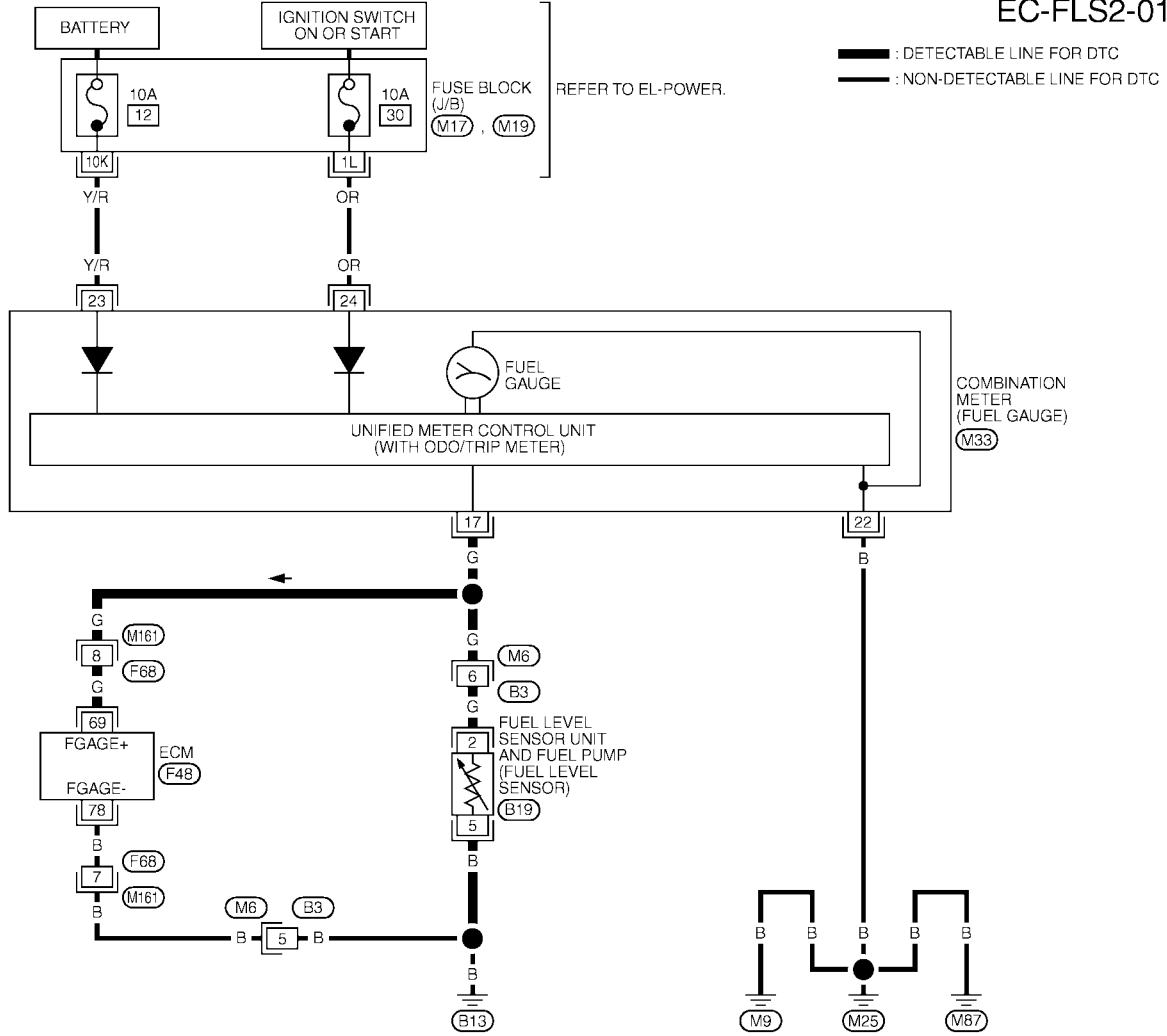
DTC P0462, P0463 FUEL LEVEL SENSOR

Wiring Diagram

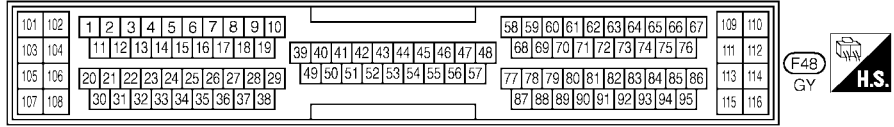
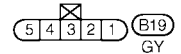
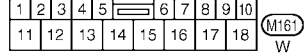
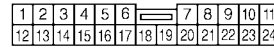
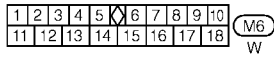
Wiring Diagram

NFEC1002

EC-FLS2-01



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REFER TO THE FOLLOWING.
 (M17), (M19) - FUSE BLOCK - JUNCTION BOX(J/B)

MEC498D

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

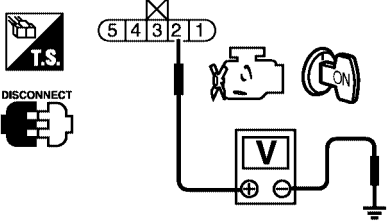
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	B	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V
69	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V OUTPUT VOLTAGE VARIES WITH FUEL LEVEL.

DTC P0462, P0463 FUEL LEVEL SENSOR

Diagnostic Procedure

Diagnostic Procedure

=NFEC1003

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect fuel level sensor unit and fuel pump harness connector. Turn ignition switch "ON". Check voltage between fuel level sensor unit and fuel pump terminal 2 and ground with CONSULT-II or tester. 	
	
<p>Voltage: Battery voltage</p> <p>OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

SEC220D

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors M6, B3 Harness for open or short between combination meter and fuel level sensor unit 	
<p>Repair or replace harness or connectors.</p>	

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Check harness continuity between fuel level sensor unit terminal 5 and body ground. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to power. 	
<p>OK or NG</p>	
OK	GO TO 4.
NG	Repair open circuit or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Disconnect ECM harness connector. Check harness continuity between ECM terminal 69 and fuel level sensor and fuel pump terminal 2. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to power. 	
<p>OK or NG</p>	
OK	GO TO 6.
NG	GO TO 5.

DTC P0462, P0463 FUEL LEVEL SENSOR

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F68, M161 Harness connectors M6, B3 Harness for open between ECM and fuel level sensor	
	Repair open circuit or short to power in harness on connectors.

GI

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6	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	GO TO 7.
NG	Replace fuel level sensor unit.

LC

EC

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

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DTC P0500 VSS

Component Description

Component Description

The vehicle speed sensor signal is sent from ABS actuator and electric unit or ABS/TCS control unit to combination meter. The combination meter then sends a signal to the ECM. =NFEC1004

On Board Diagnosis Logic

NFEC1006

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 signal is sent to ECM even when vehicle is being driven.	Harness or connector (The vehicle speed sensor signal circuit is open or shorted.) ABS actuator and electric unit or ABS/TCS control unit Combination meter

DTC Confirmation Procedure

NFEC1007

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

NFEC1007S01

- 1) Start engine.
- 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 "Diagnostic Procedure", EC-443.
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 10 consecutive seconds.

5	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

ENG SPEED	More than 1,800 rpm (A/T) More than 2,000 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	5.5 - 14.0 msec (A/T) 6.0 - 14.0 msec (M/T)
Selector lever	Suitable position
PW/ST SIGNAL	OFF

- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-443.

GI

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Overall Function Check

Use this procedure to check the overall function of the vehicle speed sensor signal circuit. During this check, a 1st trip DTC might not be confirmed.

NFEC1008

EC

WITH GST

NFEC1008S01

- 1) Lift up drive wheels.
- 2) Start engine.
- 3) Read vehicle speed sensor signal in “MODE 1” with GST.
The vehicle speed sensor signal on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 4) If NG, go to “Diagnostic Procedure”, EC-443.

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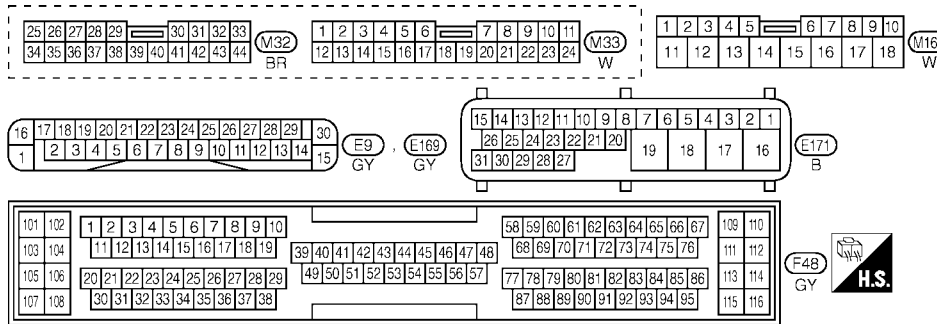
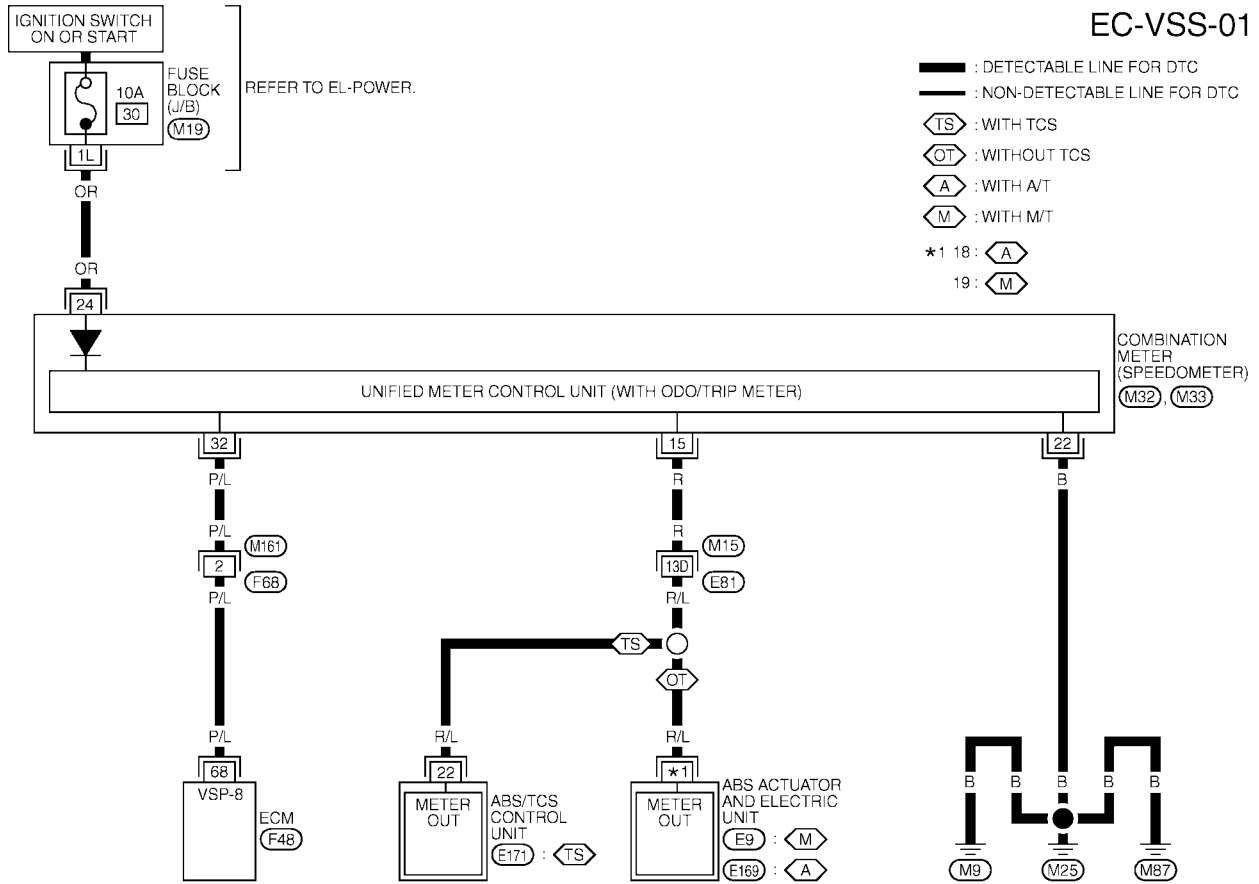
DTC P0500 VSS

Wiring Diagram

Wiring Diagram

=NFEC1009

EC-VSS-01



REFER TO THE FOLLOWING.

(M15) - SUPER - MULTIPLE JUNCTION (SMJ)

(M19) - FUSE BLOCK - JUNCTION BOX (J/B)

MEC499D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
68	P/L	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 10 KM/H (6 MPH) IN 1ST GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.5V
			VEHICLE DRIVING AT 30 KM/H (19 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.5V

SEC045DA

Diagnostic Procedure

NFEC1010

1	CHECK VEHICLE SPEED SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and combination meter harness connector M32. 3. Check harness continuity between ECM terminal 68 and combination meter terminal 32. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to power. <p style="text-align: center;">OK or NG</p>		
OK	GO TO 3.	
NG	GO TO 2.	

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2	DETECT MALFUNCTIONING PART	
Check the following. Harness connectors M161, F68 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.

FE

CL

3	CHECK COMBINATION METER FUNCTION	
Make sure that speedometer functions properly. <p style="text-align: center;">OK or NG</p>		
OK	GO TO 5.	
NG	GO TO 4.	

MT

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4	CHECK COMBINATION METER CIRCUIT FOR OPEN AND SHORT	
Check the following. Harness connectors M15, E81 Harness for open or short between combination meter and ABS actuator and electric unit or ABS/TCS control unit Harness for open between combination meter and ground <p style="text-align: center;">OK or NG</p>		
OK	Check combination meter and ABS actuator and electric unit or ABS/TCS control unit. Refer to EL section.	
NG	Repair open circuit or short to ground or short to power in harness or connectors.	

SU

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5	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. <p style="text-align: center;">INSPECTION END</p>		

BT

HA

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IDX

DTC P0506 ISC SYSTEM

Description

Description

NFEC0787

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

NFEC0790

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is not in the specified range.	Electric throttle control actuator Intake air leak

DTC Confirmation Procedure

NFEC0792

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 “Idle Air Volume Learning”, Idle Air Volume Learning , before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, EC-762.

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).

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

SEF174Y

④ WITH CONSULT-II

NFEC0792S03

- 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 “Diagnostic Procedure”, EC-445.

DTC P0506 ISC SYSTEM

DTC Confirmation Procedure (Cont'd)



WITH GST

Follow the procedure "With CONSULT-II" above.

NFEC0792S04

GI

MA

EM

LC

Diagnostic Procedure

NFEC0794

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.

EC

FE

CL

MT

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 "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-92. 4. Perform "Accelerator Pedal Released Position Learning", EC-71. 5. Perform "Throttle Valve Closed Position Learning", EC-71. 6. Perform "Idle Air Volume Learning", EC-71.	
	INSPECTION END

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0507 ISC SYSTEM

Description

Description

NFEC0795

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

NFEC0798

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is not in the specified range.	Electric throttle control actuator Intake air leak

DTC Confirmation Procedure

NFEC0800

NOTE:

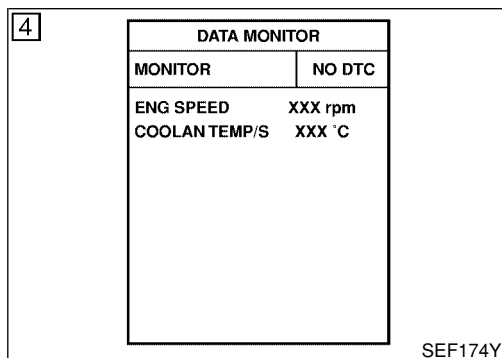
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

If the target idle speed is out of the specified value, perform “Idle Air Volume Learning”, Idle Air Volume Learning , before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, EC-762.

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).



④ WITH CONSULT-II

NFEC0800S03

- 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 “Diagnostic Procedure”, EC-447.

DTC P0507 ISC SYSTEM

DTC Confirmation Procedure (Cont'd)



WITH GST

Follow the procedure "With CONSULT-II" above.

NFEC0800S04

GI

MA

EM

LC

Diagnostic Procedure

NFEC0802

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.

EC

FE

CL

MT

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 "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-92. 4. Perform "Accelerator Pedal Released Position Learning", EC-71. 5. Perform "Throttle Valve Closed Position Learning", EC-71. 6. Perform "Idle Air Volume Learning", EC-71.	
	INSPECTION END

AT

AX

SU

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ST

RS

BT

HA

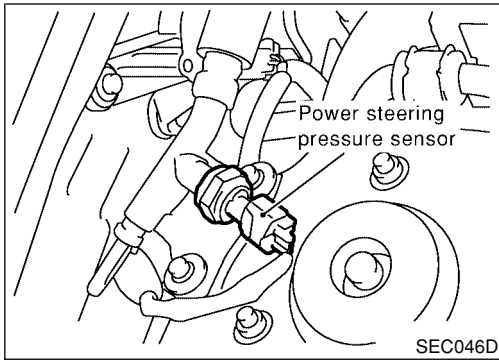
SC

EL

IDX

DTC P0550 PSP SENSOR

Component Description



Component Description

NFEC1250

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 ETC 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

NFEC1256

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

NFEC1251

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

NFEC1252

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-450, "Diagnostic Procedure".

Ⓛ With GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0550 PSP SENSOR

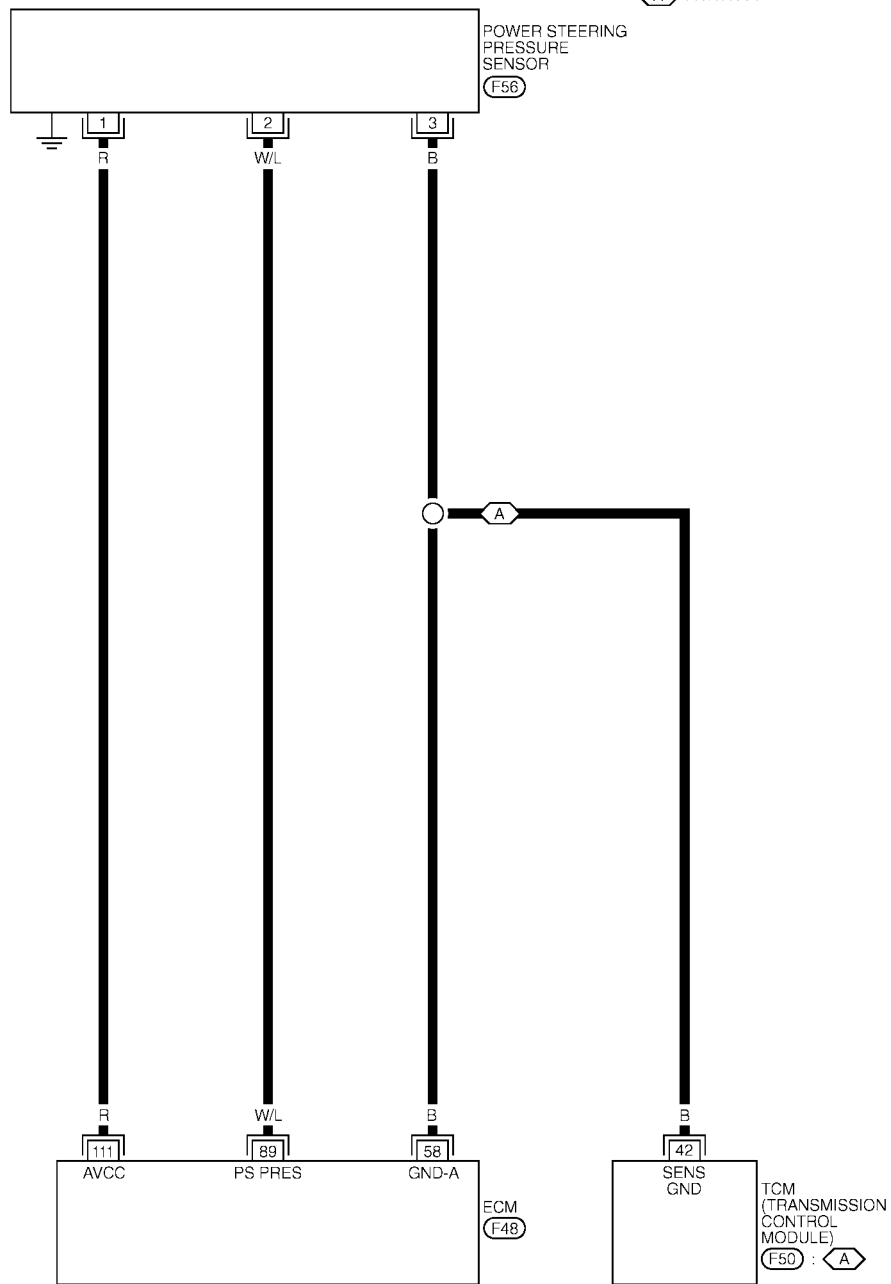
Wiring Diagram

Wiring Diagram

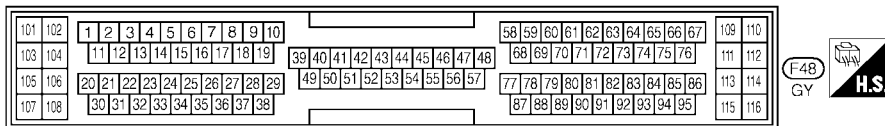
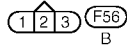
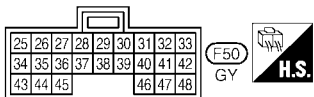
NFEC1253

EC-PS/SEN-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- (A)** : WITH AT



- GI
- MA
- EM
- LC
- EC**
- FE
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- AT
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- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



MEC516D

DTC P0550 PSP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body ground.

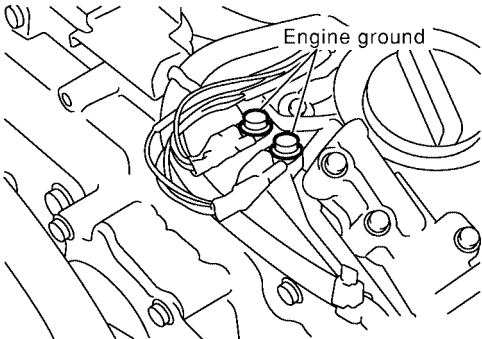
CAUTION:

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)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
89	W/L	Power steering pressure sensor	[Engine is running] Steering wheel is being turned.	0.5 - 4.0V
			[Engine is running] Steering wheel is not being turned.	0.4 - 0.8V
111	R	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V

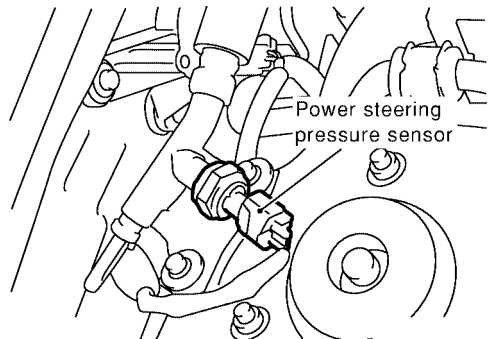
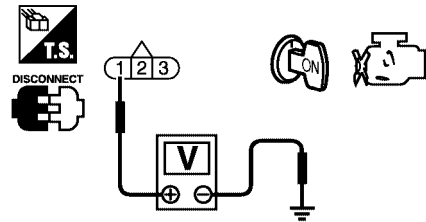
Diagnostic Procedure

NFEC1254

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC047D</p>	
GO TO 2.	

DTC P0550 PSP SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK PSP SENSOR POWER SUPPLY CIRCUIT	
<ol style="list-style-type: none"> 1. Disconnect PSP sensor harness connector. 2. Turn ignition switch "ON". 		GI MA EM LC EC FE CL MT AT AX SU
		SEC046D
<ol style="list-style-type: none"> 3. Check voltage between PSP sensor terminal 1 and ground with CONSULT-II or tester. 		
		SEC048D
<p>Voltage: Approximately 5V</p> <p>OK or NG</p>		
OK	GO TO 3.	
NG	Repair harness or connectors.	

3	CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check harness continuity between PSP sensor terminal 3 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power. 		BR ST RS BT HA
<p>OK or NG</p>		
OK	GO TO 5.	
NG	GO TO 4.	

4	DETECT MALFUNCTIONING PART	
Check the following. Harness for open or short between ECM and PSP sensor Harness for open or short between TCM (Transmission Control Module) and PSP sensor.		SC EL IDX
Repair open circuit or short to ground or short to power in harness or connectors.		

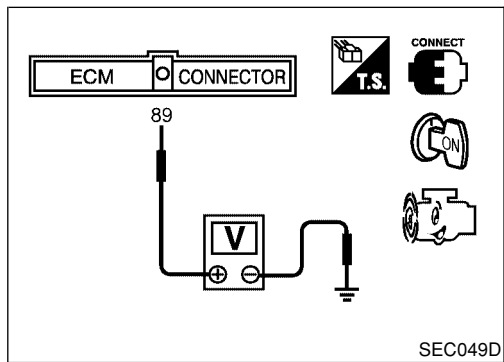
DTC P0550 PSP SENSOR

Diagnostic Procedure (Cont'd)

5	CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 89 and PSP sensor terminal 2. Continuity should exist. 3. 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 PSP SENSOR
Refer to "Component Inspection", EC-452.	
OK or NG	
OK	GO TO 7.
NG	Replace PSP sensor.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	



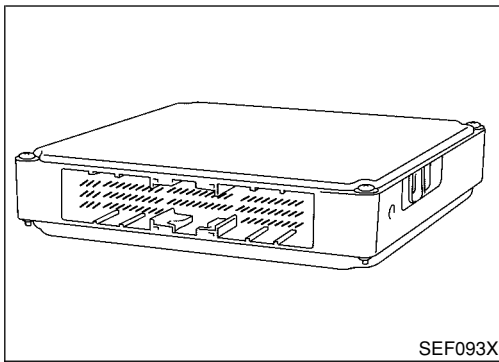
Component Inspection

POWER STEERING PRESSURE SENSOR

NFEC1257

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check voltage between ECM terminal 89 and ground under the following conditions.

Condition	Voltage
Steering wheel is turned fully.	Approximately 3.6V
Steering wheel is not turned.	Approximately 0.6V



Component Description

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the engine.

NFEC1032

GI
MA
EM
LC

On Board Diagnosis Logic

NFEC1033

DTC No.	Trouble diagnosis name	DTC Detecting Condition		Possible Cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	ECM
		B)	ECM EEPROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

EC
FE
CL

FAIL-SAFE MODE

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.

MT
AT
AX

DTC Confirmation Procedure

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

NFEC1445

ST
RS
BT
HA

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

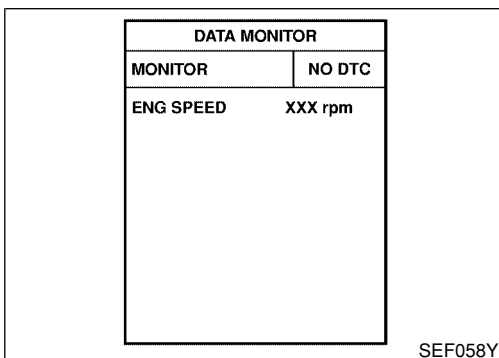
With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) If 1st trip DTC is detected, go to EC-454, "Diagnostic Procedure".

With GST

Follow the procedure "With CONSULT-II" above.

SC
EL
IDX



DTC P0605 ECM

DTC Confirmation Procedure (Cont'd)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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-454, "Diagnostic Procedure".

With GST

Follow the procedure "With CONSULT-II" above.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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 procedure, 32 times.
- 5) If 1st trip DTC is detected, go to EC-454, "Diagnostic Procedure".

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NFEC1035

1	INSPECTION START
<p>With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-453. 5. Is the 1st trip DTC P0605 displayed again? 	
<p>With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-453. 5. Is the 1st trip DTC P0605 displayed again? 	
Yes or No	
Yes	GO TO 2.
No	INSPECTION END

2	REPLACE ECM
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-92. 3. Perform "Accelerator Pedal Released Position Learning", EC-71. 4. Perform "Throttle Valve Closed Position Learning", EC-71. 5. Perform "Idle Air Volume Learning", EC-71. 	
INSPECTION END	

DTC P0650 MIL (CIRCUIT)

Component Description

Component Description

NFEC1258

Malfunction Indicator Lamp (MIL) is located on the instrument panel. When the ignition switch is turned ON without engine running, MIL will light up. This is a bulb check. When the engine is started, MIL should go off. If MIL remains on, the on board diagnostic system has detected an engine system malfunction.

On Board Diagnosis Logic

NFEC1259

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0650 0650	Malfunction indicator (MIL) control circuit	An excessively high voltage is sent to ECM through the MIL circuit under the condition that calls for MIL light up. An excessively low voltage is sent to ECM through the MIL circuit under the condition that calls for MIL not to light up.	Harness or connectors (MIL circuit is open or shorted.) MIL

GI
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FAIL-SAFE MODE

ECM enters in fail-safe mode when both DTC P0650 and another DTC, which calls for MIL to light up, are detected at the same time.

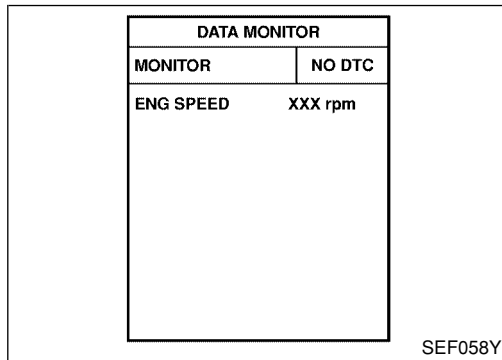
Detected items	Engine operating condition in fail-safe mode
MIL circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut.

DTC Confirmation Procedure

NFEC1260

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. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-457.

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0650 MIL (CIRCUIT)

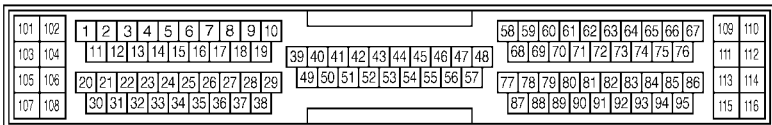
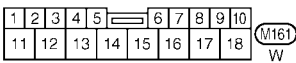
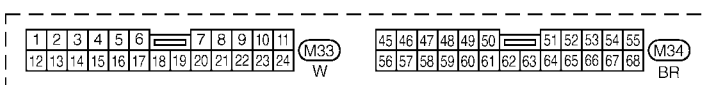
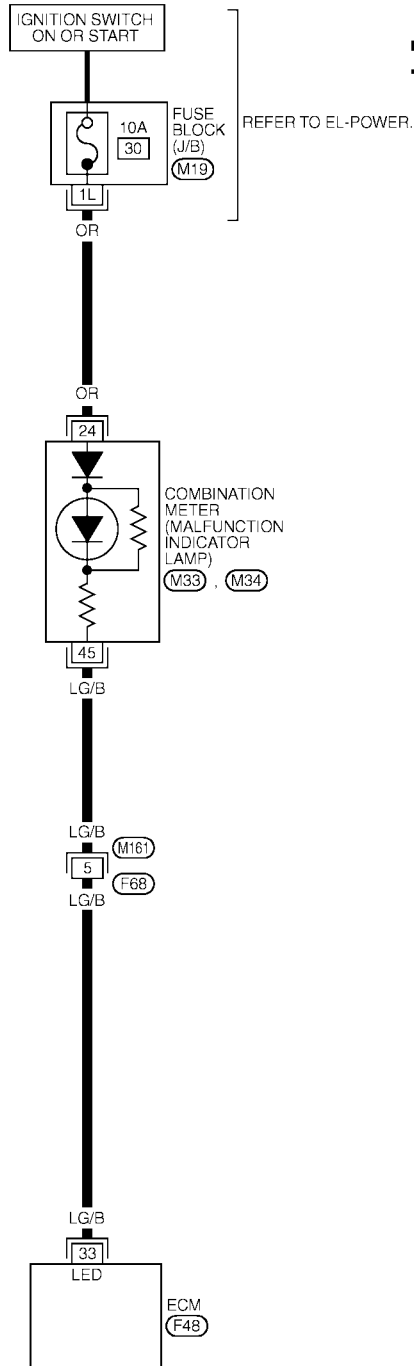
Wiring Diagram

Wiring Diagram

NFEC1261

EC-MIL-01

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



REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC519D

DTC P0650 MIL (CIRCUIT)

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body ground.

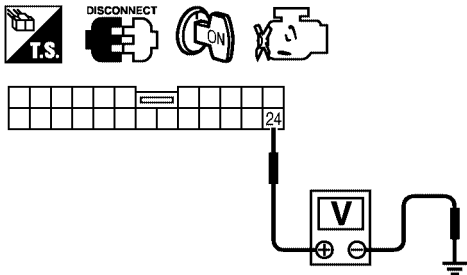
CAUTION:

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)
33	LG/B	MIL	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] Idle speed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

NFEC1262

1	CHECK MIL POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect combination meter harness connector. 3. Turn ignition switch "ON". 4. Check voltage between combination meter terminal 24 and ground with CONSULT-II or tester.</p>  <p>Voltage: Battery voltage</p> <p style="text-align: right;">SEC050D</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Fuse block (J/B) connector M19 10A fuse Harness for open or short between fuse block (J/B) and combination meter</p>	
	Repair harness or connectors.

3	CHECK MIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 33 and combination meter terminal 45. Refer to Wiring Diagram. Continuity should exist.</p>	
<p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

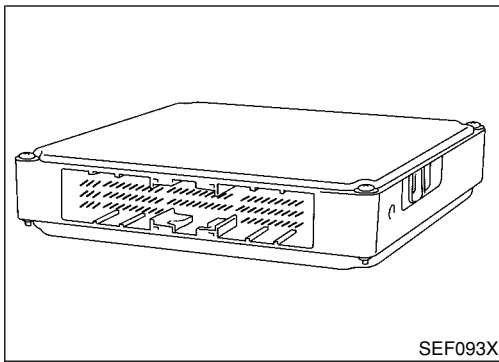
DTC P0650 MIL (CIRCUIT)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M161, F68 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.
5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. OK or NG	
OK	Replace combination meter. Refer to EL-117, "METERS AND GAUGES".
NG	Repair or replace.

DTC P1065 ECM POWER SUPPLY (BACK UP)

Component Description



Component Description

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory of the DTC memory, the air fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.

NFEC1263

GI
MA
EM
LC

On Board Diagnosis Logic

NFEC1264

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.	Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ECM

EC
FE
CL

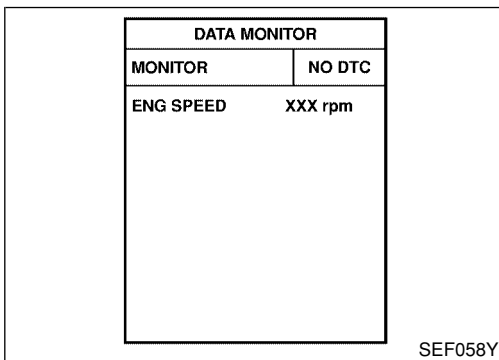
DTC Confirmation Procedure

NFEC1265

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.

AT
AX
SU
BR



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 four times.
6. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-461.

ST
RS
BT
HA

With GST

Follow the procedure "WITH CONSULT-II" above.

SC
EL
IDX

DTC P1065 ECM POWER SUPPLY (BACK UP)

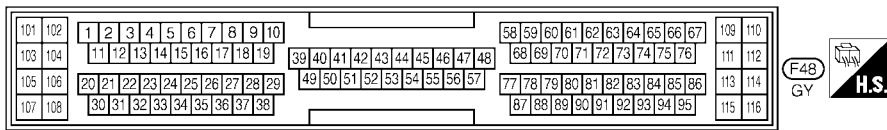
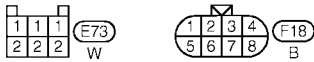
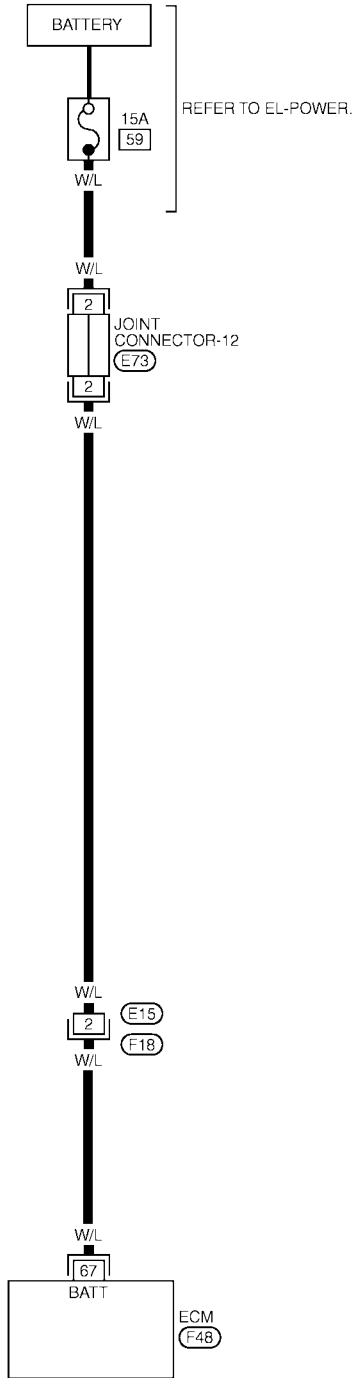
Wiring Diagram

Wiring Diagram

NFEC1266

EC-ECM/PW-01

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



MEC805D

DTC P1065 ECM POWER SUPPLY (BACK UP)

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body ground.

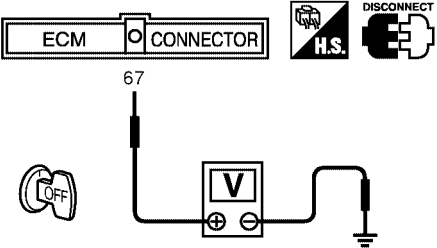
CAUTION:

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	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

NFEC1267



1	CHECK ECM POWER SUPPLY
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors E15, F18 Joint connector-12 15A fuse Harness for open or short between ECM and fuse</p>	
	Repair or replace harness or connectors.

3	CHECK INTERMITTENT INCIDENT
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	Repair or replace harness or connectors.

DTC P1065 ECM POWER SUPPLY (BACK UP)

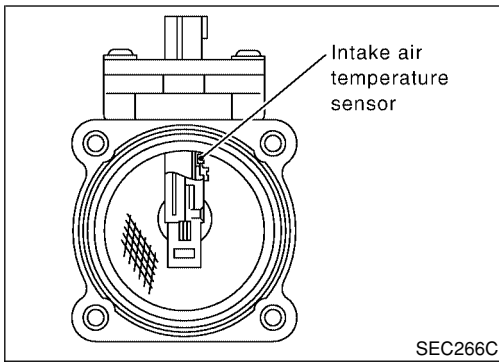
Diagnostic Procedure (Cont'd)

4 PERFORM DTC CONFIRMATION PROCEDURE	
<p> With CONSULT-II</p> <ol style="list-style-type: none">1. Turn ignition switch "ON".2. Select "SELF DIAG RESULTS" mode with CONSULT-II.3. Touch "ERASE".4. Perform "DTC Confirmation Procedure". See EC-459.5. Is the 1st trip DTC P1065 displayed again?	
<p> With GST</p> <ol style="list-style-type: none">1. Turn ignition switch "ON".2. Select MODE 4 with GST.3. Touch "ERASE".4. Perform "DTC Confirmation Procedure". See EC-459.5. Is the 1st trip DTC P1065 displayed again?	
Yes or No	
Yes	GO TO 5.
No	INSPECTION END

5 REPLACE ECM	
<ol style="list-style-type: none">1. Replace ECM.2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NIS-SAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.3. Perform "Accelerator Pedal Released Position Learning", EC-71.4. Perform "Throttle Valve Closed Position Learning", EC-71.5. Perform "Idle Air Volume Learning", EC-71.	
	INSPECTION END

DTC P1102 MAF SENSOR

Component Description



Component Description

NFEC0803

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. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0804

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

NFEC1446

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1102 1102	Mass air flow sensor circuit range/performance problem	A voltage from the sensor is constantly approx. 1.0V when engine is running.	Harness or connectors (The sensor circuit is open or shorted.) Mass air flow sensor

FAIL-SAFE MODE

NFEC1446S01

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 Confirmation Procedure

NFEC1447

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 P1102 MAF SENSOR

DTC Confirmation Procedure (Cont'd)

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NFEC1447S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait 5 seconds at most.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-466.

WITH GST

NFEC1447S02

Follow the procedure "With CONSULT-II" above.

DTC P1102 MAF SENSOR

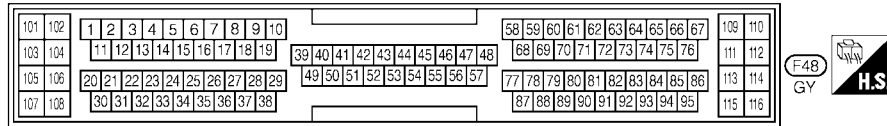
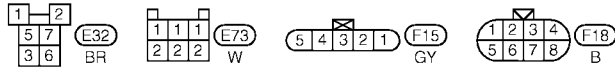
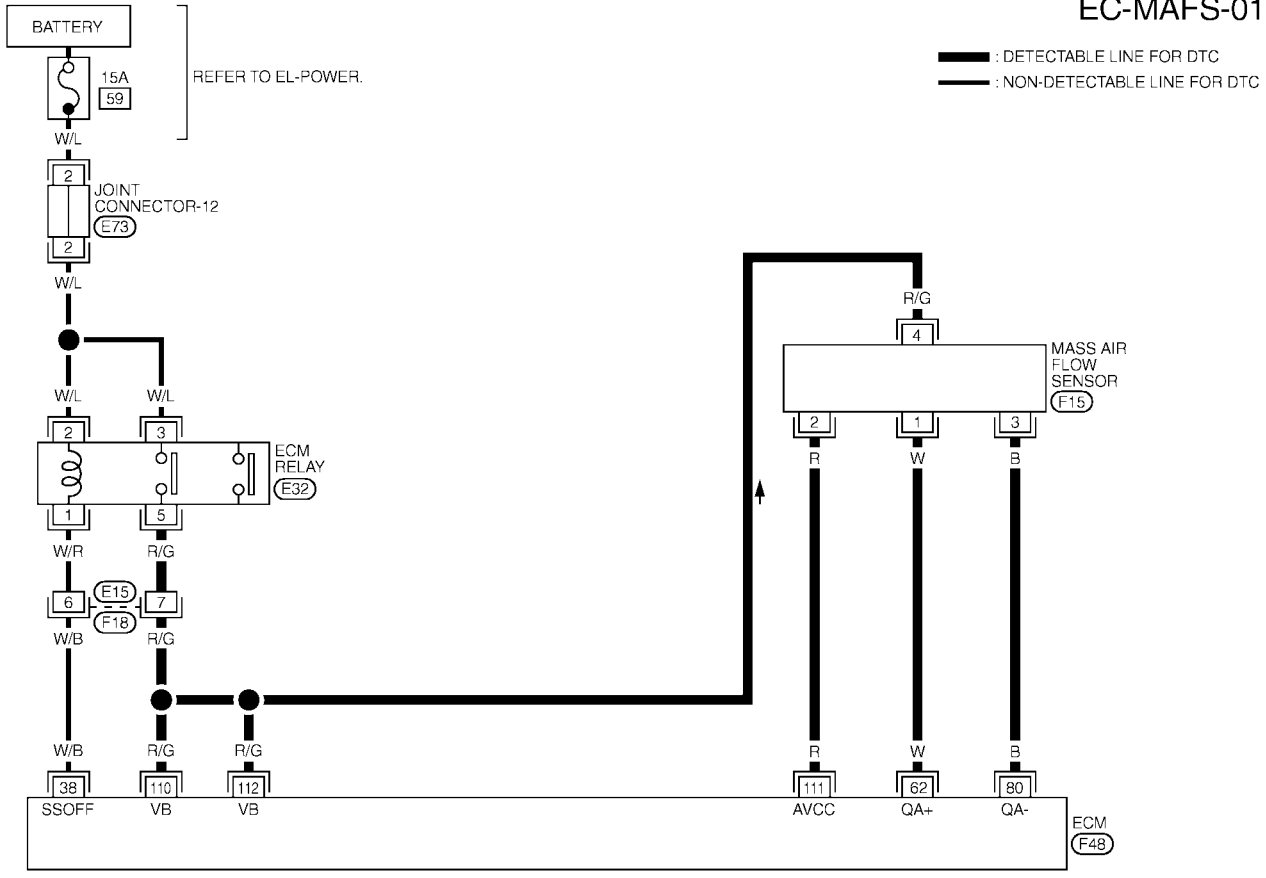
Wiring Diagram

Wiring Diagram

=NFEC0810

EC-MAFS-01

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MEC473D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.1 - 1.5V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.7 - 2.4V
80	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF650XC

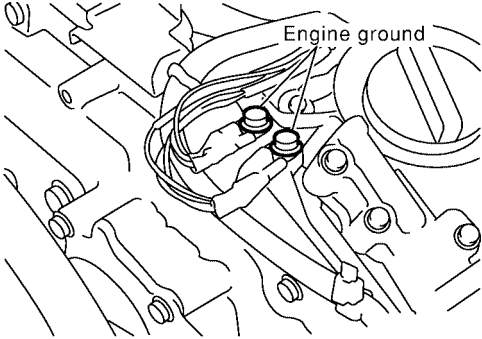
DTC P1102 MAF SENSOR

Diagnostic Procedure

Diagnostic Procedure

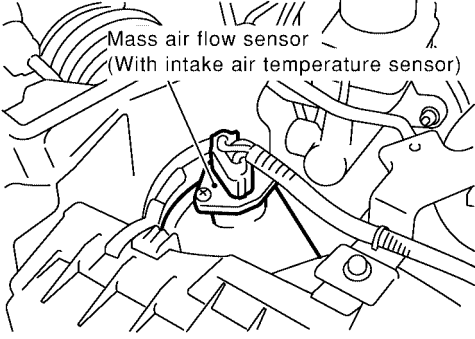
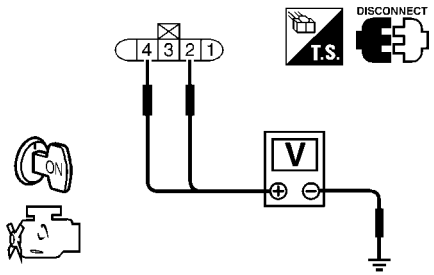
=NFEC0811

1	CHECK INTAKE SYSTEM
Check the following for connection. Air duct Vacuum hoses	
OK or NG	
OK	GO TO 2.
NG	Reconnect the parts.

2	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
 A technical line drawing of an engine block showing several ground screws. One screw is highlighted with a circle and labeled "Engine ground". The drawing shows the engine's internal components and the location of the ground screws.	
SEC047D	
	GO TO 3.

DTC P1102 MAF SENSOR

Diagnostic Procedure (Cont'd)

3	CHECK MAF SENSOR POWER SUPPLY CIRCUIT	<p>1. Disconnect mass air flow (MAF) sensor harness connector.</p> <div style="text-align: center;">  <p>Mass air flow sensor (With intake air temperature sensor)</p> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center; margin-top: 20px;">  <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Terminal</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-top: 10px;">SEC055D</p> <p style="text-align: right; margin-top: 10px;">SEF297X</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	Terminal	Voltage	2	Approximately 5	4	Battery voltage	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
Terminal	Voltage								
2	Approximately 5								
4	Battery voltage								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td style="width: 75%;">GO TO 5.</td> </tr> <tr> <td>NG</td> <td>GO TO 4.</td> </tr> </table>	OK	GO TO 5.	NG	GO TO 4.			
OK	GO TO 5.								
NG	GO TO 4.								

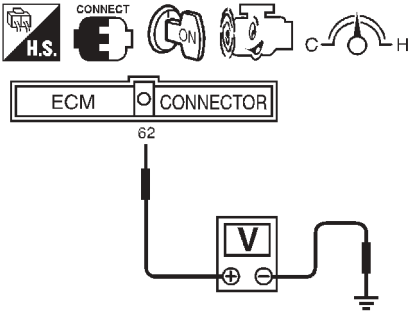
4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E15, F18 Harness for open or short between ECM relay and mass air flow sensor Harness for open or short between mass air flow sensor and ECM <p style="text-align: right; margin-top: 10px;">Repair harness or connectors.</p>	<p>BR</p> <p>ST</p> <p>RS</p>
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5	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td style="width: 75%;">GO TO 6.</td> </tr> <tr> <td>NG</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	GO TO 6.	NG	Repair open circuit or short to power in harness or connectors.	
OK	GO TO 6.						
NG	Repair open circuit or short to power in harness or connectors.						

DTC P1102 MAF SENSOR

Diagnostic Procedure (Cont'd)

6	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK MASS AIR FLOW SENSOR										
<p>1. Reconnect harness connectors disconnected.</p> <p>2. Start engine and warm it up to normal operating temperature.</p> <p>3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.</p>											
											
SEF391R											
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON" (Engine stopped.)</td> <td style="text-align: center;">Approx. 1.0</td> </tr> <tr> <td>Idle (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.1 - 1.5</td> </tr> <tr> <td>2,500 rpm (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.7 - 2.4</td> </tr> <tr> <td>Idle to about 4,000 rpm*</td> <td style="text-align: center;">1.1 - 1.5 to Approx. 4.0</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.</p>		Condition	Voltage V	Ignition switch "ON" (Engine stopped.)	Approx. 1.0	Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4	Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0
Condition	Voltage V										
Ignition switch "ON" (Engine stopped.)	Approx. 1.0										
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5										
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4										
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0										
MTBL1160											
<p>4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again. Then repeat above check.</p> <p style="text-align: center;">OK or NG</p>											
OK	GO TO 8.										
NG	Replace mass air flow sensor.										

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

Component Description

Component Description

NFEC1298

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

NFEC1299

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. This self-diagnosis has the one trip detection logic.	

FAIL-SAFE MODE

When the malfunction A or B is detected in the two consecutive trips, the ECM enters fail-safe mode and the MIL lights up.

When the malfunction C is detected even in the 1st trip, the ECM enters fail-safe mode and MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle 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

NFEC1300

NOTE:

Perform "PROCEDURE FOR MALFUNCTION A AND B" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION C".

If there is no problem on "PROCEDURE FOR MALFUNCTION A AND B", 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.

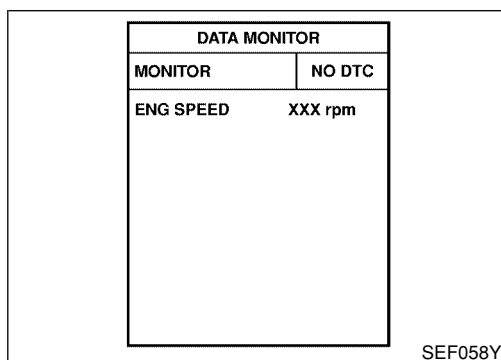
PROCEDURE FOR MALFUNCTION A AND B

④ 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) Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-470.

④ With GST

Follow the procedure "WITH CONSULT-II" above.



DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

DTC Confirmation Procedure (Cont'd)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

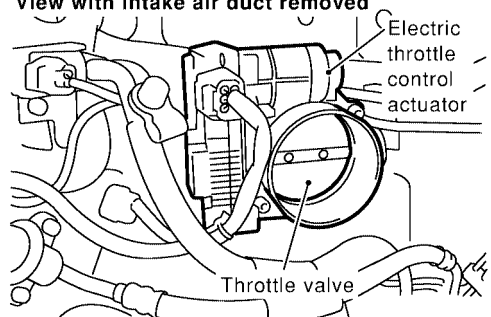
- 1) Turn ignition switch "ON" and wait at least 1 second.
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Shift selector lever to "D" position and wait at least 2 seconds.
- 4) Shift selector lever to "N" or "P" position.
- 5) Start engine and let it idle for 3 seconds.
- 6) If DTC is detected, go to "Diagnostic Procedure", EC-470.

With GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

NFEC1413

1	CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY
<ol style="list-style-type: none"> 1. Remove the intake air duct. 2. Check if a foreign matter is caught between the throttle valve and the housing. 	
<p>View with intake air duct removed</p>  <p style="text-align: right;">SEC083D</p>	
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
<ol style="list-style-type: none"> 1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71. 	
INSPECTION END	

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Description

Description

NFEC1301

NOTE:

If DTC P1122 is displayed with DTC P1121 or P1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-469, 479.

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 the 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

NFEC1448

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.	Harness or connectors (Throttle control motor circuit is open or shorted.) Electric throttle control actuator

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

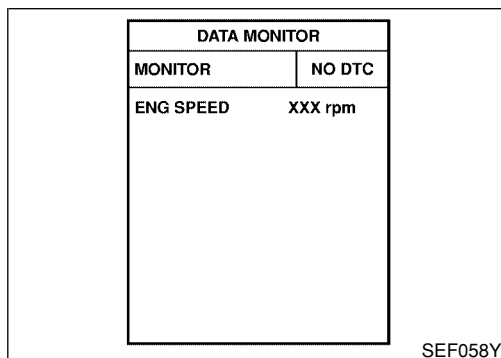
NFEC1449

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 “Diagnostic Procedure”, EC-474.



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DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

DTC Confirmation Procedure (Cont'd)



With GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

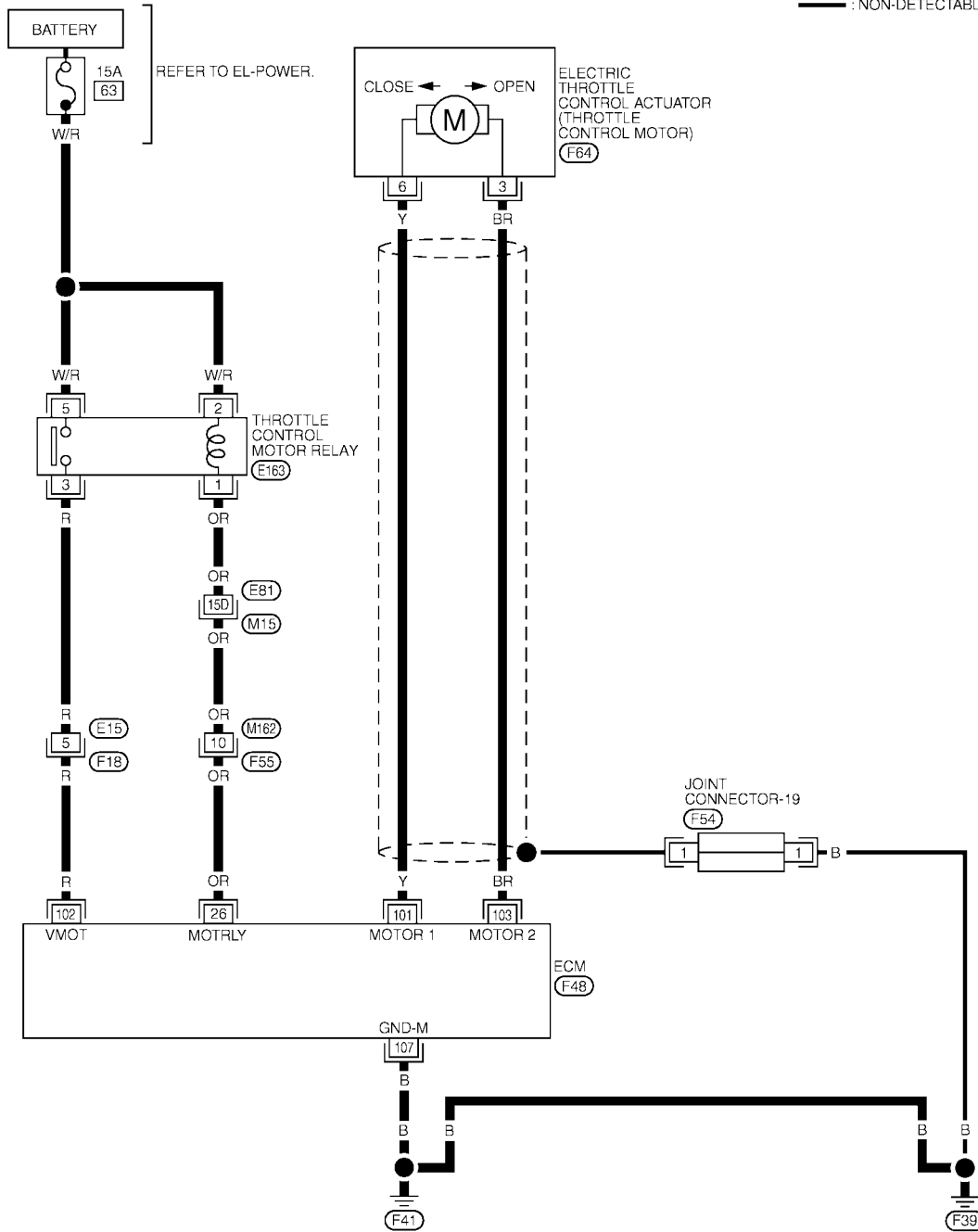
Wiring Diagram

Wiring Diagram

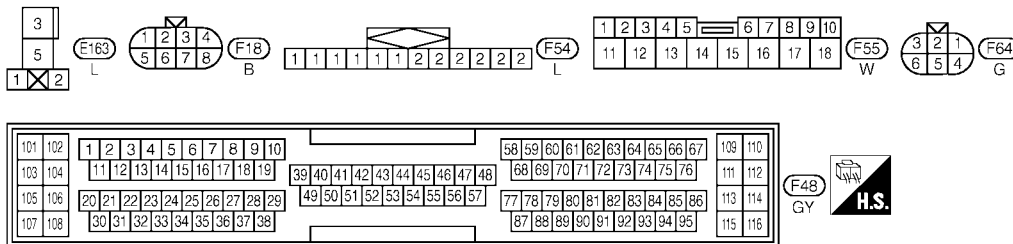
NFEC1304

EC-ETC1-01

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



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MEC478D

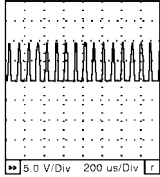
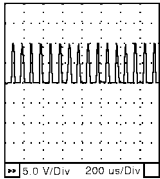
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

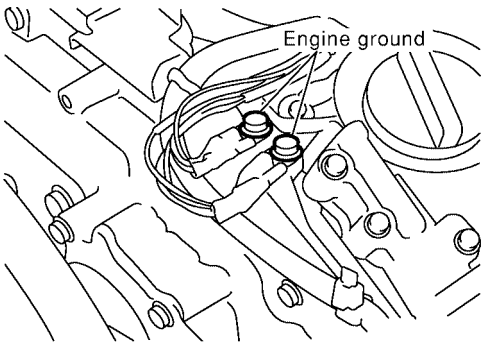
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
26	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
101	Y	Throttle control motor (Open)	[Ignition switch "ON"] Engine stopped Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal is depressing	0 - 14V★  SEC037D
102	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
103	BR	Throttle control motor (Close)	[Ignition switch "ON"] Engine stopped Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal is releasing	0 - 14V★  SEC038D
107	B	Throttle control motor ground	[Engine is running] Idle speed	Approximately 0V

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

Diagnostic Procedure

NFEC1305

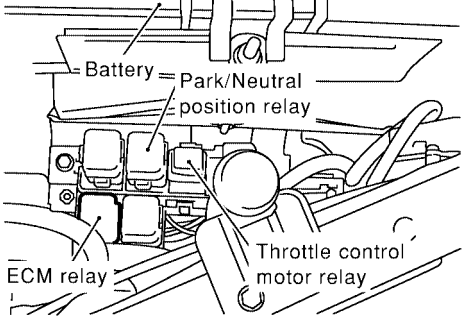
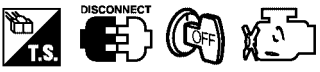
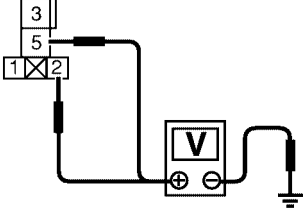
1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> 	
SEC047D	
GO TO 2.	

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Diagnostic Procedure (Cont'd)

2	CHECK THROTTLE CONTROL MOTOR GROUND CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 107 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power. 	
OK or NG	
OK	GO TO 3.
NG	Repair open circuit or short to power in harness or connectors.

3	CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I						
<ol style="list-style-type: none"> 1. Reconnect harness connector disconnected. 2. Check voltage between ECM terminal 102 and ground under the following conditions with CONSULT-II or tester. 							
<table border="1"> <thead> <tr> <th>Ignition switch</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>Approximately 0V</td> </tr> <tr> <td>ON</td> <td>Battery voltage (11- 14V)</td> </tr> </tbody> </table>		Ignition switch	Voltage	OFF	Approximately 0V	ON	Battery voltage (11- 14V)
Ignition switch	Voltage						
OFF	Approximately 0V						
ON	Battery voltage (11- 14V)						
MTBL1168							
OK or NG							
OK	GO TO 12.						
NG	GO TO 4.						

4	CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect throttle control motor relay. 	
	
SEC044D	
<ol style="list-style-type: none"> 3. Check voltage between throttle control motor relay terminals 2, 5 and ground with CONSULT-II or tester. 	
	
	
SEC091D	
Voltage: Battery voltage	
OK or NG	
OK	GO TO 6.
NG	GO TO 5.

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DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. 15A fuse Harness for open and short between throttle control motor relay and fuse	
	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 102 and throttle control motor relay terminal 3. 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 8.
NG	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. Harness connector E15, F18 Harness for open and short between throttle control motor relay and ECM	
	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Check harness continuity between ECM terminal 26 and throttle control motor relay 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 10.
NG	GO TO 9.

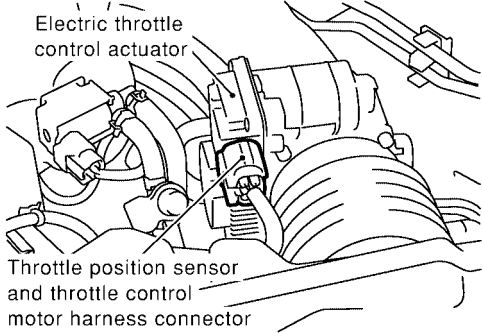
9	DETECT MALFUNCTIONING PART
Check the following. Harness connector E81, M15 Harness connectors M162, F55 Harness for open and short between throttle control motor relay and ECM	
	Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK THROTTLE CONTROL MOTOR RELAY
Refer to "Component Inspection", EC-478.	
OK or NG	
OK	GO TO 11.
NG	Replace throttle control motor relay.

11	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

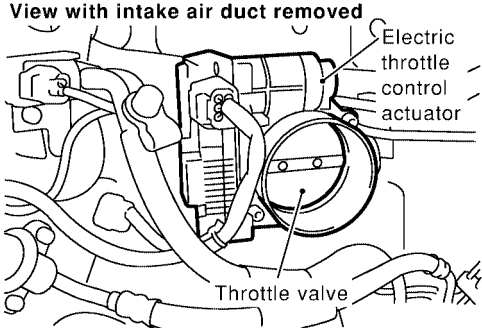
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Diagnostic Procedure (Cont'd)

12	CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT																	
<p>1. Turn ignition switch "OFF". 2. Disconnect electric throttle control actuator harness connector.</p> <div style="text-align: center;">  </div> <p>3. Disconnect ECM harness connector. 4. Check harness continuity between the following terminals. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Electric throttle control actuator terminal</th> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">Continuity</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">3</td> <td style="text-align: center;">101</td> <td style="text-align: center;">Should not exist</td> </tr> <tr> <td style="text-align: center;">103</td> <td style="text-align: center;">Should exist</td> </tr> <tr> <td rowspan="2" style="text-align: center;">6</td> <td style="text-align: center;">101</td> <td style="text-align: center;">Should exist</td> </tr> <tr> <td style="text-align: center;">103</td> <td style="text-align: center;">Should not exist</td> </tr> </tbody> </table> <p style="text-align: right;">SEC054D</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">OK</td> <td>GO TO 13.</td> </tr> <tr> <td>NG</td> <td>Repair or replace.</td> </tr> </table>		Electric throttle control actuator terminal	ECM terminal	Continuity	3	101	Should not exist	103	Should exist	6	101	Should exist	103	Should not exist	OK	GO TO 13.	NG	Repair or replace.
Electric throttle control actuator terminal	ECM terminal	Continuity																
3	101	Should not exist																
	103	Should exist																
6	101	Should exist																
	103	Should not exist																
OK	GO TO 13.																	
NG	Repair or replace.																	

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13	CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY				
<p>1. Remove the intake air duct. 2. Check if foreign matter is caught between the throttle valve and the housing.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC083D</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">OK</td> <td>GO TO 14.</td> </tr> <tr> <td>NG</td> <td>Remove the foreign matter and clean the electric throttle control actuator inside.</td> </tr> </table>		OK	GO TO 14.	NG	Remove the foreign matter and clean the electric throttle control actuator inside.
OK	GO TO 14.				
NG	Remove the foreign matter and clean the electric throttle control actuator inside.				

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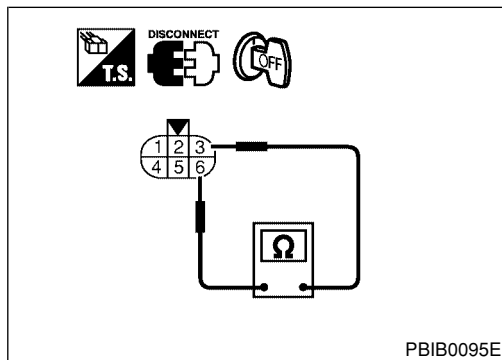
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

Diagnostic Procedure (Cont'd)

14	CHECK THROTTLE CONTROL MOTOR
Refer to "Component Inspection", EC-478.	
OK or NG	
OK	GO TO 15.
NG	GO TO 16.

15	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
OK or NG	
OK	GO TO 16.
NG	Repair or replace harness or connectors.

16	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71.	
INSPECTION END	

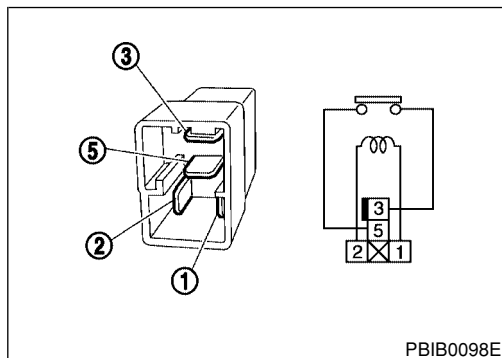


Component Inspection THROTTLE CONTROL MOTOR

NFEC1306

NFEC1306S01

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.
Resistance: Approximately 1 - 15Ω [at 25°C (77°F)]
3. If NG, replace electric throttle control actuator and go to next step.
4. Perform "Throttle Valve Closed Position Learning", EC-71.
5. Perform "Idle Air Volume Learning", EC-71.



THROTTLE CONTROL MOTOR RELAY

NFEC1306S02

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Component Description

Component Description

NFEC1307

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

NFEC1319

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	Ignition switch: ON	ON

On Board Diagnosis Logic

NFEC1450

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. This self-diagnosis has the one trip detection logic.	Harness or connectors (Throttle control motor relay circuit is open) Throttle control motor relay

FAIL-SAFE MODE

NFEC1450S01

When the malfunction is detected, ECM enters in fail-safe mode (for DTC P1124).

When the malfunction is detected, ECM enters in fail-safe mode and the MIL lights up (for DTC P1126).

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

NFEC1451

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:

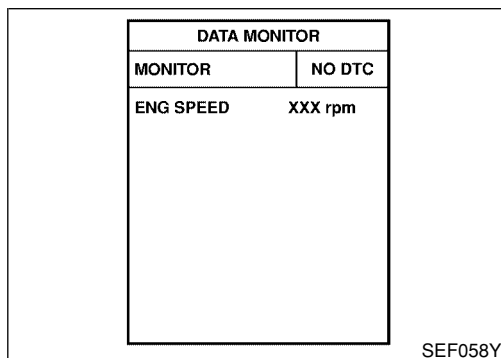
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

Ⓜ 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 "Diagnostic Procedure", EC-482.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.



DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

DTC Confirmation Procedure (Cont'd)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR DTC P1126

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 "Diagnostic Procedure", EC-482.

④ With GST

Follow the procedure "With CONSULT-II" above.

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

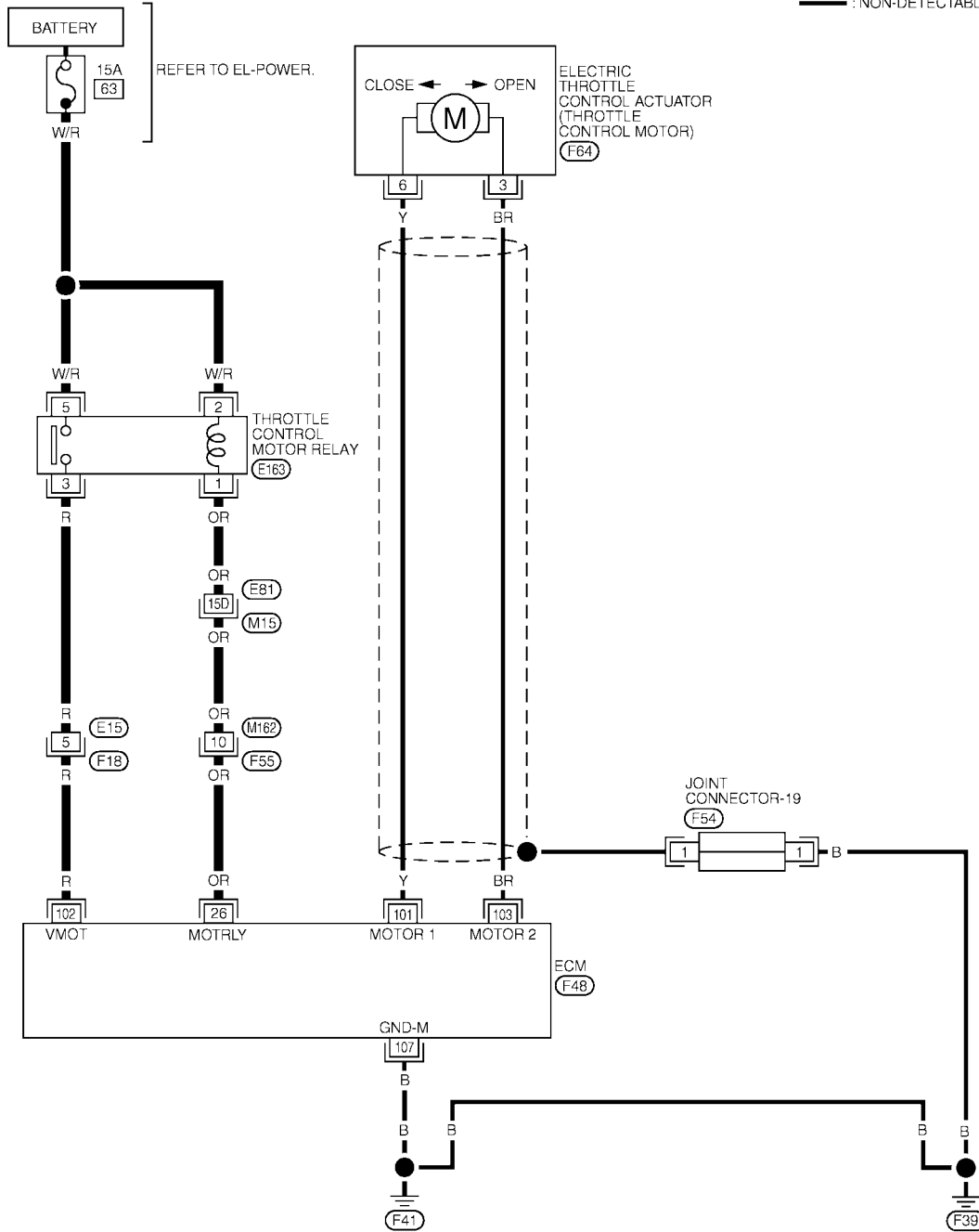
Wiring Diagram

Wiring Diagram

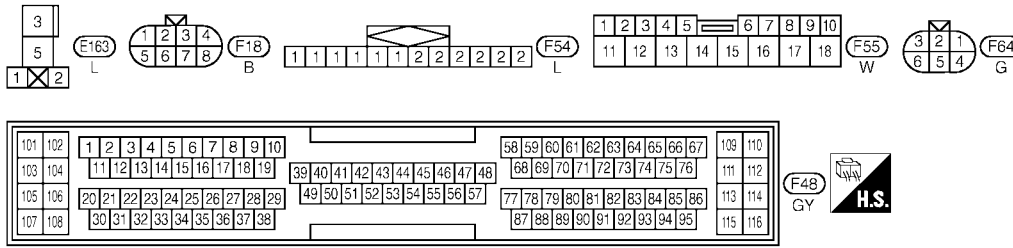
NFEC1310

EC-ETC2-01

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



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REFER TO THE FOLLOWING.
 (M15) -SUPER
 MULTIPLE JUNCTION (SMJ)

MEC654D

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

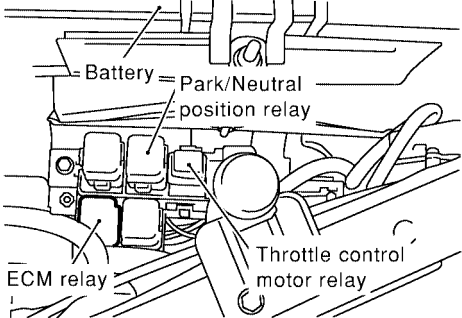

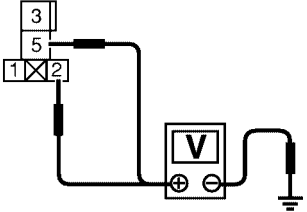
CAUTION:

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.

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
26	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
102	R	Throttle control motor relay	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "OFF"]	0 - 1.0V

Diagnostic Procedure

NFEC1311

1	CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect throttle control motor relay.</p> <div style="text-align: center;">  </div> <p>3. Check voltage between throttle control motor relay terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">   </div> <p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

SEC044D

SEC091D

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Diagnostic Procedure (Cont'd)

2	DETECT MALFUNCTIONING PART
Check the following. 15A fuse Harness for open and short between throttle control motor relay and fuse	
Repair open circuit or short to ground or short to power in harness or connectors.	

GI
MA

3	CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 102 and throttle control motor relay terminal 3. 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 5.
NG	GO TO 4.

EM
LC
EC

4	DETECT MALFUNCTIONING PART
Check the following. Harness connector E15, F18 Harness for open and short between throttle control motor relay and ECM	
Repair open circuit or short to ground or short to power in harness or connectors.	

CL
MT
AT

5	CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Check harness continuity between ECM terminal 26 and throttle control motor relay 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 7.
NG	GO TO 6.

AX
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ST

6	DETECT MALFUNCTIONING PART
Check the following. Harness connector E81, M15 Harness connectors M162, F55 Harness for open and short between throttle control motor relay and ECM	
Repair open circuit or short to ground or short to power in harness or connectors.	

RS
BT
HA

7	CHECK THROTTLE CONTROL MOTOR RELAY
Refer to "Component Inspection", EC-484.	
OK or NG	
OK	GO TO 8.
NG	Replace throttle control motor relay.

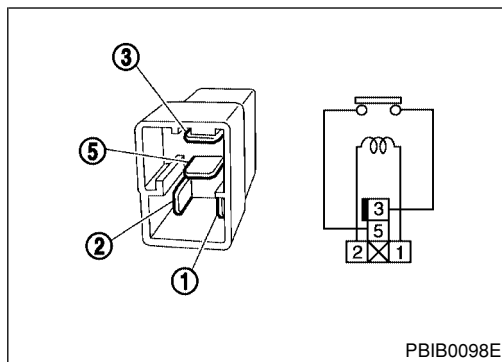
SC
EL

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

IDX

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

Component Inspection



Component Inspection

NFEC1312

THROTTLE CONTROL MOTOR RELAY

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.

DTC P1128 THROTTLE CONTROL MOTOR

Component Description

Component Description

NFEC1313

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

NFEC1452

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 both circuits between ECM and throttle control motor.	Harness or connectors (Throttle control motor circuit is shorted.) Electric throttle control actuator (Throttle control motor)

GI

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EM

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MT

DTC Confirmation Procedure

NFEC1453

NOTE:

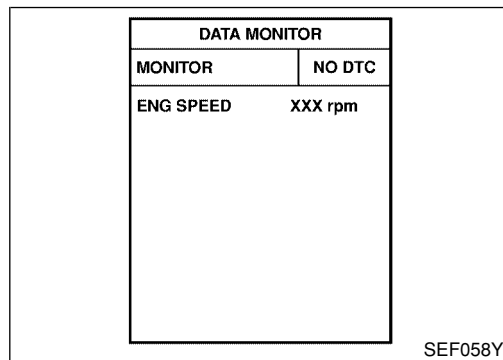
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

AT

AX

SU

BR



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 "Diagnostic Procedure", EC-487.

ST

RS

BT

HA

With GST

Follow the procedure "With CONSULT-II" above.

SC

EL

IDX

DTC P1128 THROTTLE CONTROL MOTOR

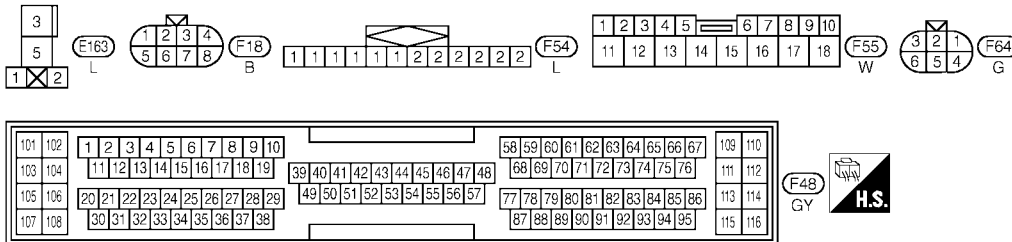
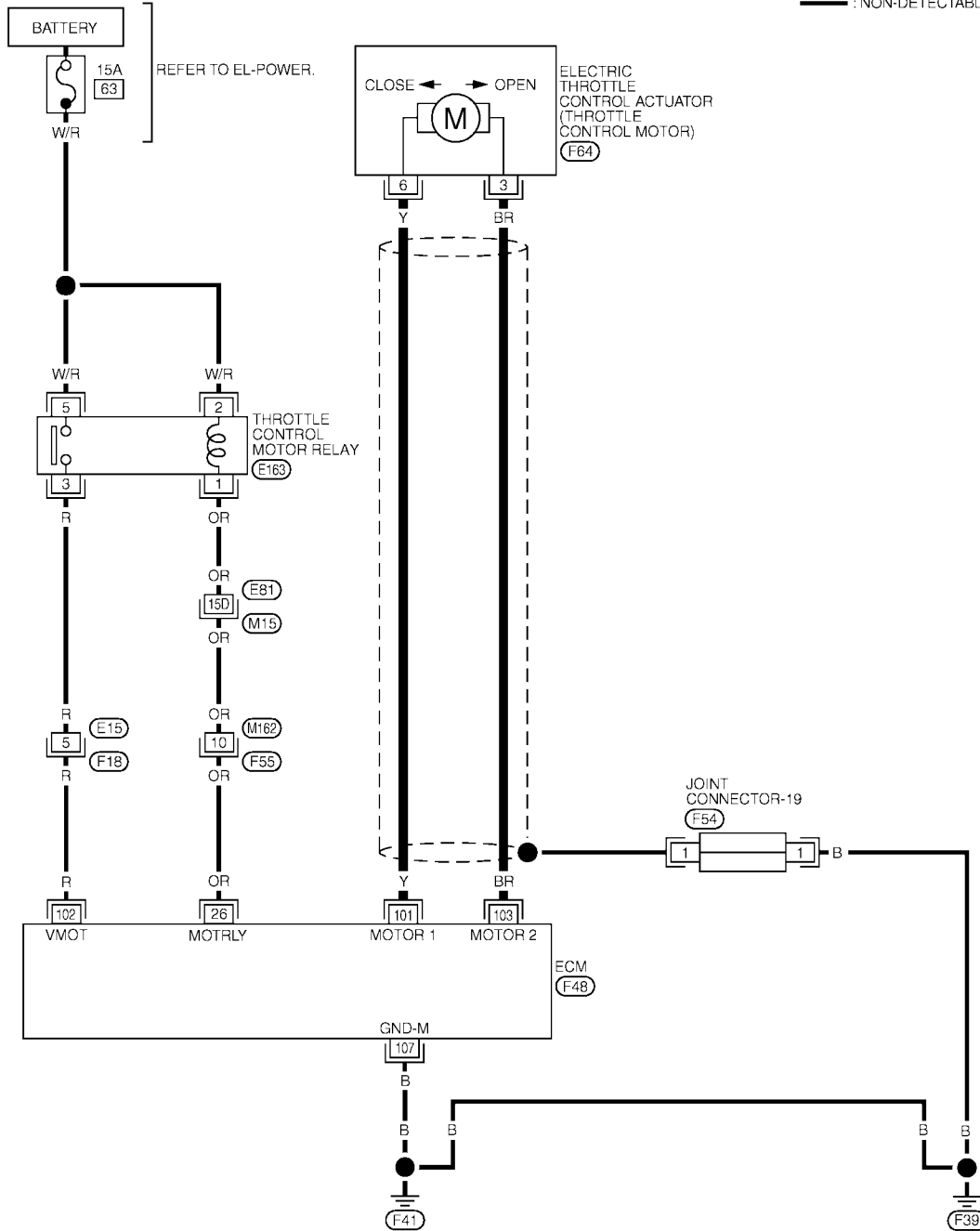
Wiring Diagram

Wiring Diagram

NFEC1316

EC-ETC3-01

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



REFER TO THE FOLLOWING.
 (M15) -SUPER
 MULTIPLE JUNCTION (SMJ)

MEC655D

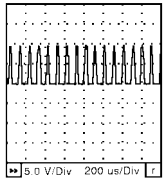
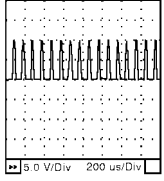
DTC P1128 THROTTLE CONTROL MOTOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

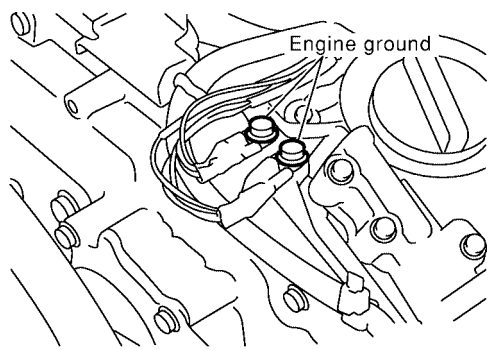
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	Y	Throttle control motor (Open)	<p>[Ignition switch "ON"] Engine stopped Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal is depressing</p>	<p>0 - 5V★</p>  <p>SEC037D</p>
103	BR	Throttle control motor (Close)	<p>[Ignition switch "ON"] Engine stopped Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal is releasing</p>	<p>0 - 3V★</p>  <p>SEC038D</p>

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

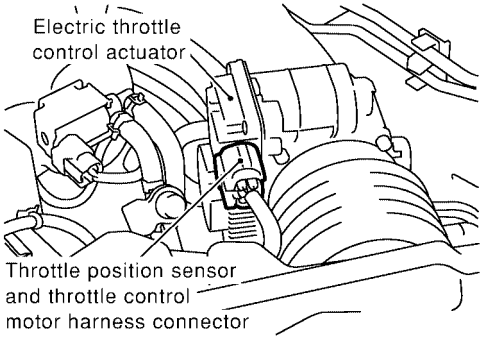
Diagnostic Procedure

NFEC1317

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>  <p style="text-align: right;">SEC047D</p>	
GO TO 2.	

DTC P1128 THROTTLE CONTROL MOTOR

Diagnostic Procedure (Cont'd)

2	CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT														
<p>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.</p>															
 <p style="text-align: center;">Electric throttle control actuator</p> <p style="text-align: center;">Throttle position sensor and throttle control motor harness connector</p>															
SEC054D															
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Electric throttle control actuator terminal</th> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">Continuity</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center; padding: 5px;">3</td> <td style="text-align: center; padding: 5px;">101</td> <td style="padding: 5px;">Should not exist</td> </tr> <tr> <td style="text-align: center; padding: 5px;">103</td> <td style="padding: 5px;">Should exist</td> </tr> <tr> <td rowspan="2" style="text-align: center; padding: 5px;">6</td> <td style="text-align: center; padding: 5px;">101</td> <td style="padding: 5px;">Should exist</td> </tr> <tr> <td style="text-align: center; padding: 5px;">103</td> <td style="padding: 5px;">Should not exist</td> </tr> </tbody> </table>			Electric throttle control actuator terminal	ECM terminal	Continuity	3	101	Should not exist	103	Should exist	6	101	Should exist	103	Should not exist
Electric throttle control actuator terminal	ECM terminal	Continuity													
3	101	Should not exist													
	103	Should exist													
6	101	Should exist													
	103	Should not exist													
MTBL1169															
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>															
OK	GO TO 3.														
NG	Repair or replace.														

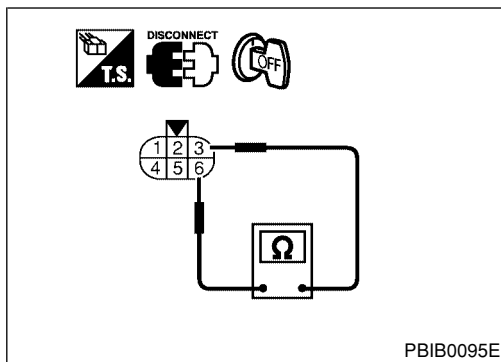
3	CHECK THROTTLE CONTROL MOTOR	
<p>Refer to "Component Inspection", EC-489.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 4.	
NG	GO TO 5.	

4	CHECK INTERMITTENT INCIDENT	
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 5.	
NG	Repair or replace harness or connectors.	

5	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	
<p>1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71.</p>		
INSPECTION END		

DTC P1128 THROTTLE CONTROL MOTOR

Component Inspection



Component Inspection

NFEC1318

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 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 "Throttle Valve Closed Position Learning", EC-71.
5. Perform "Idle Air Volume Learning", EC-71.

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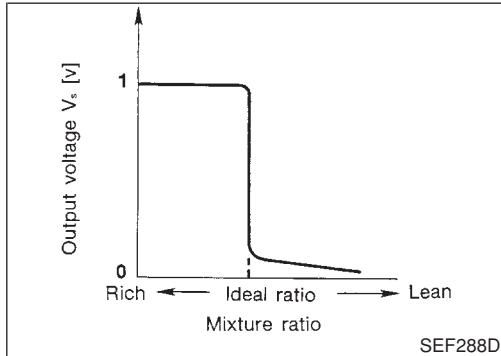
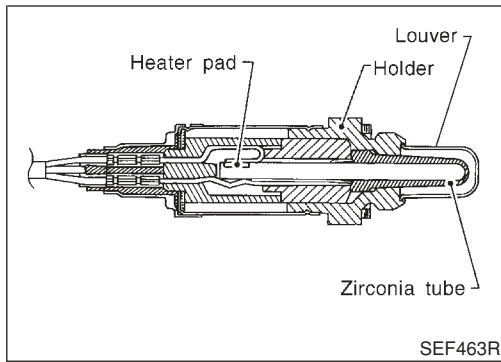
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DTC P1143, P1163 HO2S1

Component Description



Component Description

NFEC1147

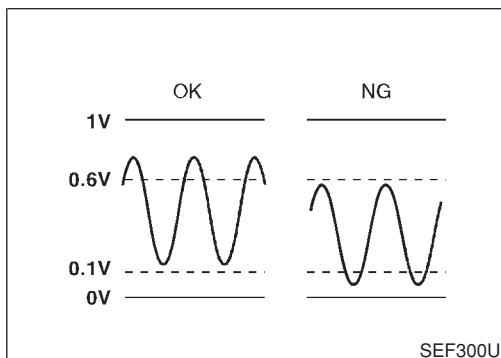
The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1148

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)			0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN + , RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC1150

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the "rich" output is sufficiently high and whether the "lean" output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.

DTC P1143, P1163 HO2S1

On Board Diagnosis Logic (Cont'd)

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1143 1143 (Bank 1) P1163 1163 (Bank 2)	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	Heated oxygen sensor 1 Heated oxygen sensor 1 heater Fuel pressure Injectors Intake air leaks

GI

MA

EM

LC

DTC Confirmation Procedure

NFEC1151

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 at a temperature above -10°C (14°F).

Before performing following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

NFEC1151S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "HO2S1 (B1)/(B2) P1143/ P1163" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 4) Touch "START".
- 5) Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 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 approximately 50 seconds or more.)

ENG SPEED	1,200 - 2,600 rpm (A/T) 1,800 - 2,600 rpm (M/T)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	3 - 9 msec (A/T) 2.5 - 9 msec (M/T)
Selector lever	Suitable position

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 "Diagnostic Procedure", EC-492.

6	<table border="1"> <tr> <td colspan="2">HO2S1 (B1) P1143</td> </tr> <tr> <td colspan="2">OUT OF CONDITION</td> </tr> <tr> <td colspan="2">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> <tr> <td>COOLAN TEMP/S</td> <td>XXX °C</td> </tr> <tr> <td>VHCL SPEED SEN</td> <td>XXX km/h</td> </tr> </table>	HO2S1 (B1) P1143		OUT OF CONDITION		MONITOR		ENG SPEED	XXX rpm	B/FUEL SCHDL	XXX msec	COOLAN TEMP/S	XXX °C	VHCL SPEED SEN	XXX km/h
HO2S1 (B1) P1143															
OUT OF CONDITION															
MONITOR															
ENG SPEED	XXX rpm														
B/FUEL SCHDL	XXX msec														
COOLAN TEMP/S	XXX °C														
VHCL SPEED SEN	XXX km/h														

PBIB0546E

6	<table border="1"> <tr> <td colspan="2">HO2S1 (B1) P1143</td> </tr> <tr> <td colspan="2">TESTING</td> </tr> <tr> <td colspan="2">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> <tr> <td>COOLAN TEMP/S</td> <td>XXX °C</td> </tr> <tr> <td>VHCL SPEED SEN</td> <td>XXX km/h</td> </tr> </table>	HO2S1 (B1) P1143		TESTING		MONITOR		ENG SPEED	XXX rpm	B/FUEL SCHDL	XXX msec	COOLAN TEMP/S	XXX °C	VHCL SPEED SEN	XXX km/h
HO2S1 (B1) P1143															
TESTING															
MONITOR															
ENG SPEED	XXX rpm														
B/FUEL SCHDL	XXX msec														
COOLAN TEMP/S	XXX °C														
VHCL SPEED SEN	XXX km/h														

PBIB0547E

6	<table border="1"> <tr> <td colspan="2">HO2S1 (B1) P1143</td> </tr> <tr> <td colspan="2">COMPLETED</td> </tr> </table>	HO2S1 (B1) P1143		COMPLETED	
HO2S1 (B1) P1143					
COMPLETED					

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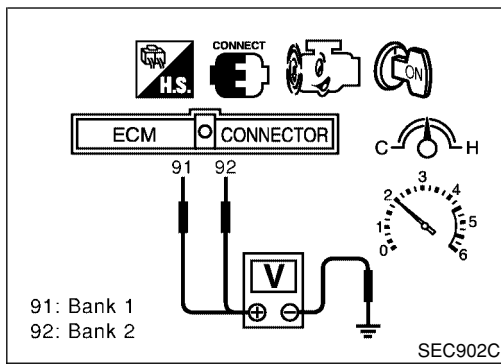
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DTC P1143, P1163 HO2S1

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed. NFEC1152

WITH GST

- 1) Start engine and warm it up to normal operating temperature. NFEC1152S01
- 2) Set voltmeter probes between ECM terminal 91 (bank 1 HO2S1 signal) or 92 (bank 2 HO2S1 signal) and engine ground.
- 3) Check one of the following with engine speed held at 2,000 rpm constant under no load.
The maximum voltage is over 0.6V at least one time.
The minimum voltage is over 0.1V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-492.

Diagnostic Procedure

NFEC1153

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p>The diagram shows a close-up of the engine block with several ground screws. One screw is labeled 'Engine ground'.</p>	
SEC047D	
GO TO 2.	

2	RETIGHTEN HEATED OXYGEN SENSOR 1
<p>Loosen and retighten corresponding heated oxygen sensor 1.</p> <p>Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)</p>	
GO TO 3.	

3	CLEAR THE SELF-LEARNING DATA									
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 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". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <tr> <th colspan="3" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">CLEAR</td> <td style="padding: 2px;">B1 100 %</td> </tr> <tr> <td colspan="2"></td> <td style="padding: 2px;">B2 100 %</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF968Y</p> <ol style="list-style-type: none"> 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? 		WORK SUPPORT			SELF-LEARNING CONT	CLEAR	B1 100 %			B2 100 %
WORK SUPPORT										
SELF-LEARNING CONT	CLEAR	B1 100 %								
		B2 100 %								
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91. 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? <p style="text-align: center; margin: 10px 0;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 2px;">Yes</td> <td style="padding: 2px;">Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-265.</td> </tr> <tr> <td style="padding: 2px;">No</td> <td style="padding: 2px;">GO TO 4.</td> </tr> </table>		Yes	Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-265.	No	GO TO 4.					
Yes	Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-265.									
No	GO TO 4.									

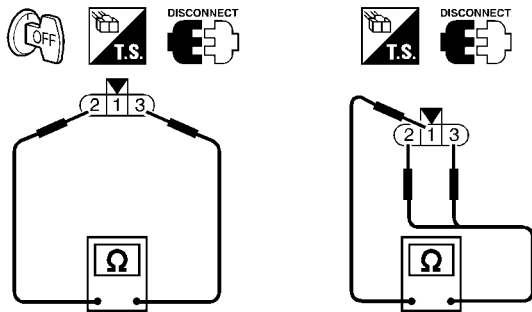
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DTC P1143, P1163 HO2S1

Diagnostic Procedure (Cont'd)

4 CHECK HEATED OXYGEN SENSOR 1 HEATER

1. Stop engine.
2. Disconnect HO2S1 harness connector.
3. Check resistance between HO2S1 terminals as follows.



Terminals	Resistance
2 and 3	2.3 - 4.3 Ω at 25°C (77°F)
1 and 2 1 and 3	$\infty \Omega$ (Continuity should not exist.)

SEF310X

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.

OK or NG

OK (With CONSULT-II)	GO TO 5.
OK (Without CONSULT-II)	GO TO 6.
NG	Replace malfunctioning heated oxygen sensor 1.

5 CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.
 "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
 5 times (cycles) are counted as shown below.

Bank 1
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

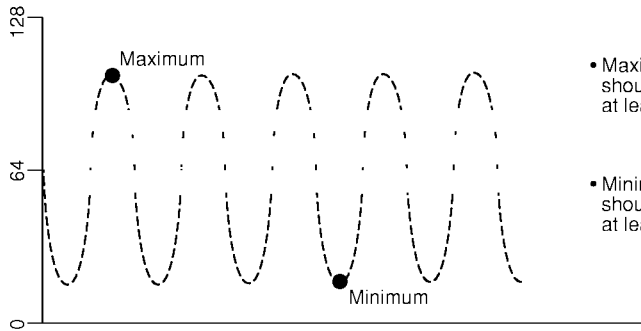
Bank 2
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
 MNTR (B1)/(B2) indicates RICH
 L means HO2S1
 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX
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	XXX	XXX
	XXX	XXX
	XXX	XXX
	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.
- Minimum voltage should be below 0.30V at least one time.

SEF648Y

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.

OK or NG

OK	GO TO 7.
NG	Replace malfunctioning heated oxygen sensor 1.

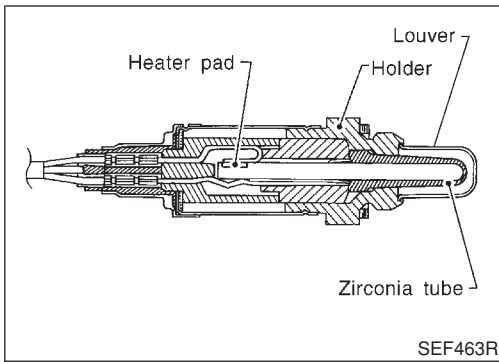
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DTC P1143, P1163 HO2S1

Diagnostic Procedure (Cont'd)

6	CHECK HEATED OXYGEN SENSOR 1
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground. Check the following with engine speed held at 2,000 rpm constant under no load. The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. The maximum voltage is over 0.6V at least one time. The minimum voltage is below 0.3V at least one time. The voltage never exceeds 1.0V. 1 time: 0 - 0.3V , 0.6 - 1.0V , 0 - 0.3V 2 times: 0 - 0.3V , 0.6 - 1.0V , 0 - 0.3V , 0.6 - 1.0V , 0 - 0.3V <div style="text-align: center;"> <p>91: Bank 1 92: Bank 2</p> </div> <p style="text-align: right;">SEC085D</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	Replace malfunctioning heated oxygen sensor 1.

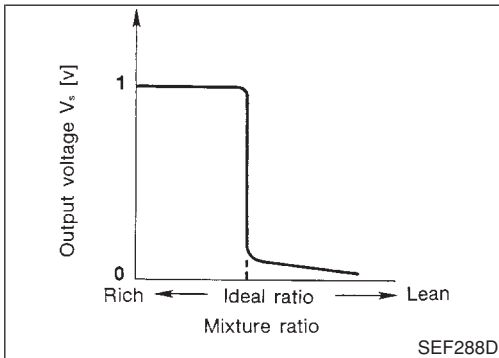
7	CHECK INTERMITTENT INCIDENT
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. For circuit, refer to "Wiring Diagram", EC-229.</p>	
INSPECTION END	



Component Description

The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NFEC1154

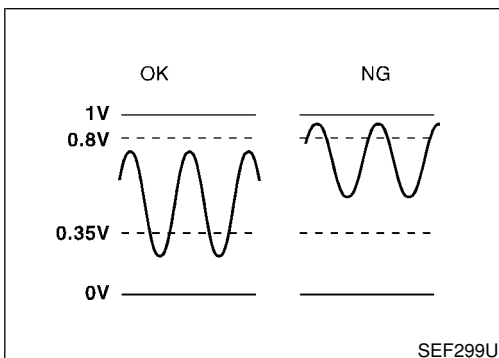


CONSULT-II Reference Value in Data Monitor Mode

NFEC1155

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)			0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN + , RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high. The “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.

NFEC1157

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DTC P1144, P1164 HO2S1

On Board Diagnosis Logic (Cont'd)

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1144 1144 (Bank 1) P1164 1164 (Bank 2)	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	Heated oxygen sensor 1 Fuel pressure Injectors Heated oxygen sensor 1 heater

DTC Confirmation Procedure

NFEC1158

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 at a temperature above -10°C (14°F).

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

NFEC1158S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "HO2S1 (B1)/(B2) P1144/P1164" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 4) Touch "START".
- 5) Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 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 approximately 50 seconds or more.)

ENG SPEED	1,200 - 2,600 rpm (A/T) 1,800 - 2,600 rpm (M/T)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	3 - 9 msec (A/T) 2.5 - 9 msec (M/T)
Selector lever	Suitable position

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 "Diagnostic Procedure", EC-499.

6	HO2S1 (B1) P1144	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SEN	XXX km/h

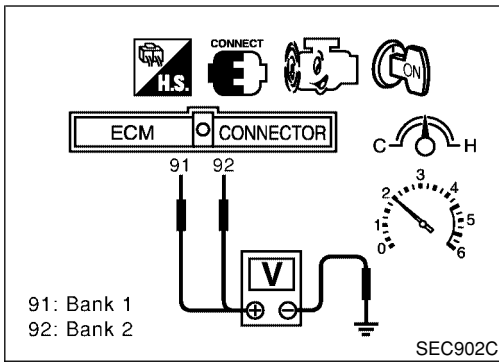
PBIB0548E

6	HO2S1 (B1) P1144	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SEN	XXX km/h

PBIB0549E

6	HO2S1 (B1) P1144	
	COMPLETED	

SEC772C



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

NFEC1159

WITH GST

NFEC1159S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground.
- 3) Check one of the following with engine speed held at 2,000 rpm constant under no load.
The maximum voltage is below 0.8V at least one time.
The minimum voltage is below 0.35V at least one time.
- 4) If NG, go to “Diagnostic Procedure”, EC-499.

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Diagnostic Procedure

NFEC1160

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch “OFF”.</p> <p>2. Loosen and retighten engine ground screws.</p>	
SEC047D	
GO TO 2.	

2	RETIGHTEN HEATED OXYGEN SENSOR 1
<p>Loosen and retighten corresponding heated oxygen sensor 1.</p> <p>Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)</p>	
GO TO 3.	

DTC P1144, P1164 HO2S1

Diagnostic Procedure (Cont'd)

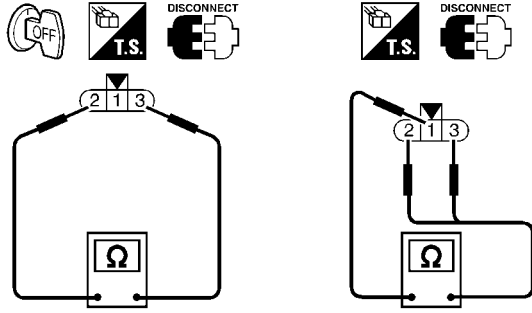
3	CLEAR THE SELF-LEARNING DATA									
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. Clear the self-learning control coefficient by touching "CLEAR". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <tr> <th colspan="3">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">CLEAR</td> <td style="padding: 2px;">B1 100 %</td> </tr> <tr> <td colspan="2"></td> <td style="padding: 2px;">B2 100 %</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF968Y</p> <ol style="list-style-type: none"> 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? 		WORK SUPPORT			SELF-LEARNING CONT	CLEAR	B1 100 %			B2 100 %
WORK SUPPORT										
SELF-LEARNING CONT	CLEAR	B1 100 %								
		B2 100 %								
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Turn ignition switch "OFF". Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed. Stop engine and reconnect mass air flow sensor harness connector. Make sure DTC P0102 is displayed. Erase the DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91. Make sure DTC P0000 is displayed. 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? <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Yes</td> <td>Perform trouble diagnosis for DTC P0172, P0175. Refer to EC-273.</td> </tr> <tr> <td>No</td> <td>GO TO 4.</td> </tr> </table>		Yes	Perform trouble diagnosis for DTC P0172, P0175. Refer to EC-273.	No	GO TO 4.					
Yes	Perform trouble diagnosis for DTC P0172, P0175. Refer to EC-273.									
No	GO TO 4.									

4	CHECK HO2S 1 CONNECTOR FOR WATER				
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect heated oxygen sensor 1 harness connector. Check connectors for water. Water should not exist. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">OK</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>Repair or replace harness or connectors.</td> </tr> </table>		OK	GO TO 5.	NG	Repair or replace harness or connectors.
OK	GO TO 5.				
NG	Repair or replace harness or connectors.				

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5 CHECK HEATED OXYGEN SENSOR 1 HEATER

Check resistance between HO2S1 terminals as follows.



Terminals	Resistance
2 and 3	2.3 - 4.3Ω at 25°C (77°F)
1 and 2 1 and 3	∞Ω (Continuity should not exist.)

SEF310X

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.

OK or NG

OK (With CONSULT-II)	GO TO 6.
OK (Without CONSULT-II)	GO TO 7.
NG	Replace malfunctioning heated oxygen sensor 1.

DTC P1144, P1164 HO2S1

Diagnostic Procedure (Cont'd)

6 CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

"HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below.

Bank 1
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

Bank 2
 cycle | 1 | 2 | 3 | 4 | 5 |
 HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
 MNTR (B1)/(B2) indicates RICH
 L means HO2S1
 MNTR (B1)/(B2) indicates LEAN

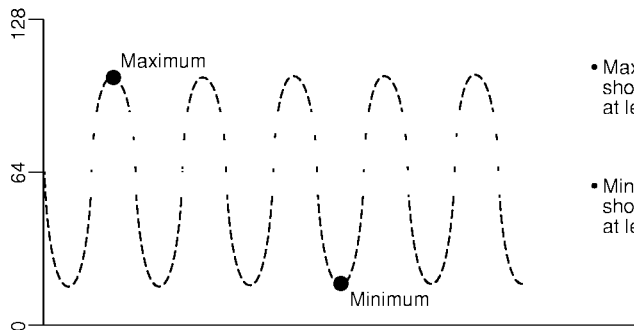
SEF647Y

"HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.

"HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.

"HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.

- Minimum voltage should be below 0.30V at least one time.

SEF648Y

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.

OK or NG

OK

GO TO 8.

NG

Replace malfunctioning heated oxygen sensor 1.

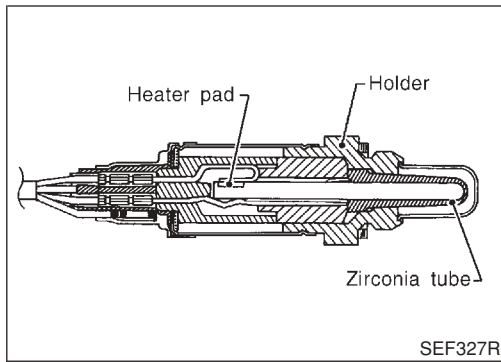
7	CHECK HEATED OXYGEN SENSOR 1
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground. 3. Check the following with engine speed held at 2,000 rpm constant under no load. The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds. The maximum voltage is over 0.6V at least one time. The minimum voltage is below 0.3V at least one time. The voltage never exceeds 1.0V. 1 time: 0 - 0.3V , 0.6 - 1.0V , 0 - 0.3V 2 times: 0 - 0.3V , 0.6 - 1.0V , 0 - 0.3V , 0.6 - 1.0V , 0 - 0.3V <div style="text-align: center; margin: 10px 0;"> </div> <p style="text-align: right; margin-right: 50px;">SEC085D</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	GO TO 8.
NG	Replace malfunctioning heated oxygen sensor 1.

8	CHECK INTERMITTENT INCIDENT
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. For circuit, refer to "Wiring Diagram", EC-229.</p>	
INSPECTION END	

GI
 MA
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DTC P1146, P1166 HO2S2

Component Description



Component Description

NFEC1161

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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.

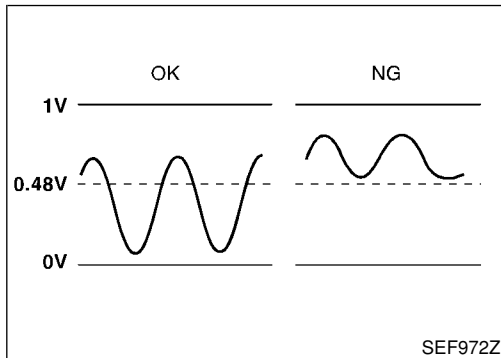
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1162

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	Revsing engine from idle up to 3,000 rpm quickly	0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN + , RICH



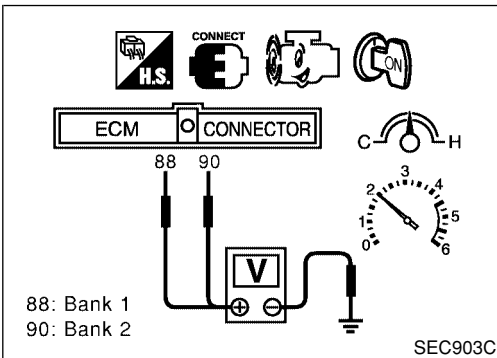
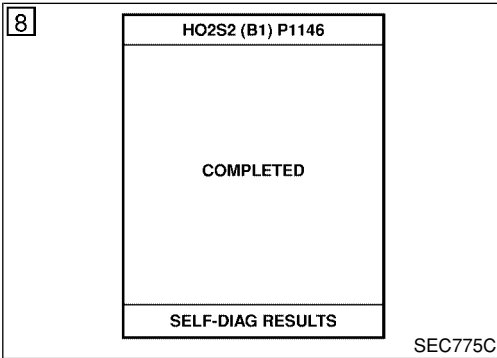
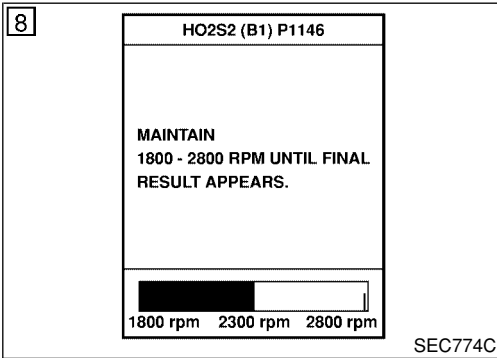
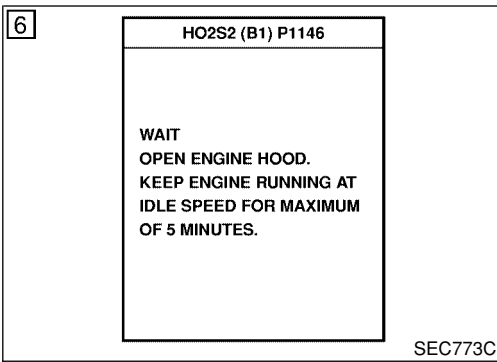
On Board Diagnosis Logic

NFEC1164

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1146 1146 (Bank 1) P1166 1166 (Bank 2)	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 Fuel pressure Injectors

NFEC1165



DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

NFEC1165S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Select "HO2S2 (B1) P1146" or "HO2S2 (B2) P1166" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Follow the instruction of CONSULT-II.
- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to EC-509, "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) Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- c) Start engine and warm it up while monitoring "COOLANTEMP/S" indication on CONSULT-II.
- d) When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 3.

Overall Function Check

NFEC1166

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

WITH GST

NFEC1166S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
- 6) Check the voltage when racing up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.48V 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)

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DTC P1146, P1166 HO2S2

Overall Function Check (Cont'd)

in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
The voltage should be below 0.48V at least once during this procedure.

- 8) If NG, go to "Diagnostic Procedure", EC-509.

Wiring Diagram

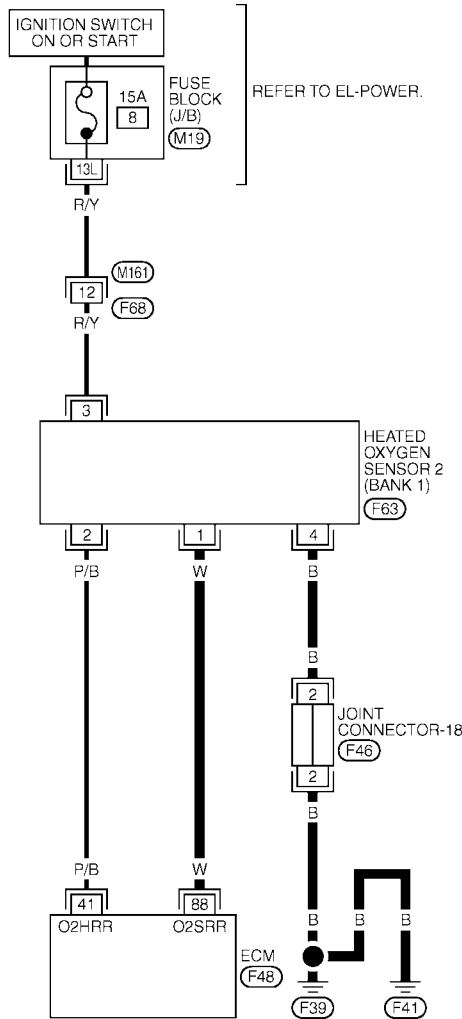
BANK 1

=NFEC1167

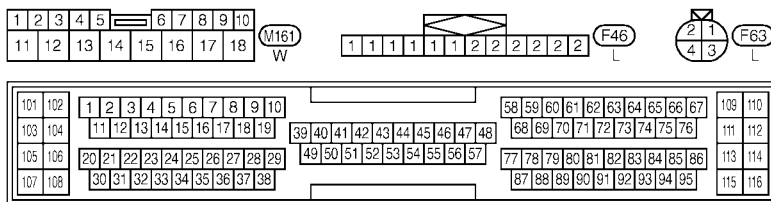
NFEC1167S01

EC-O2S2B1-01

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



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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC483D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (BANK 1)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

SEC661D

DTC P1146, P1166 HO2S2

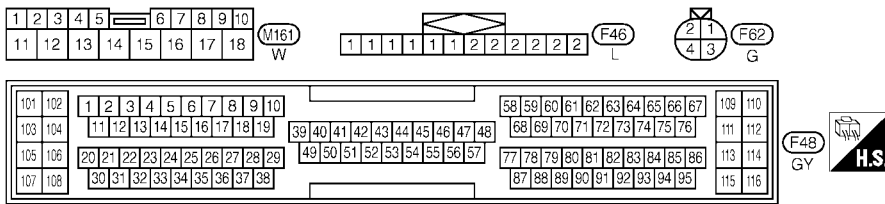
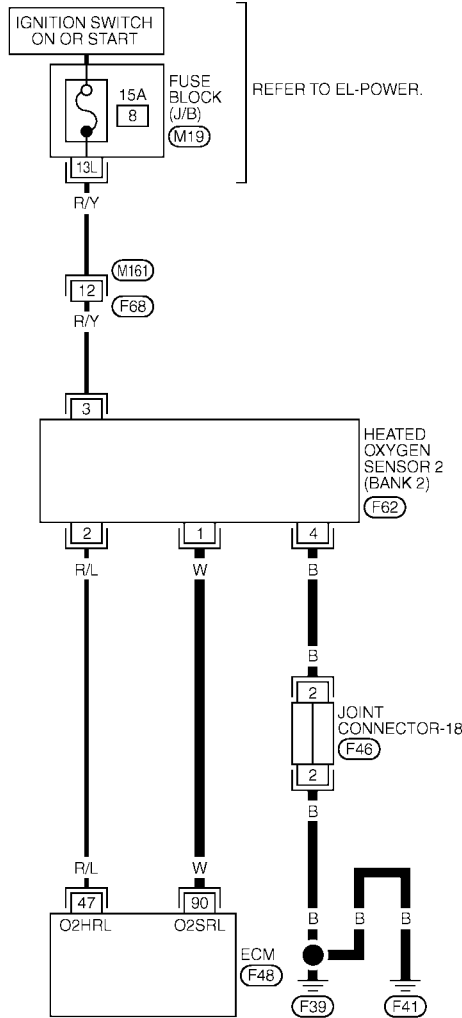
Wiring Diagram (Cont'd)

BANK 2

NFEC1167S02

EC-O2S2B2-01

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



REFER TO THE FOLLOWING.
 (M19) -FUSE BLOCK-JUNCTION BOX (J/B)

MEC484D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

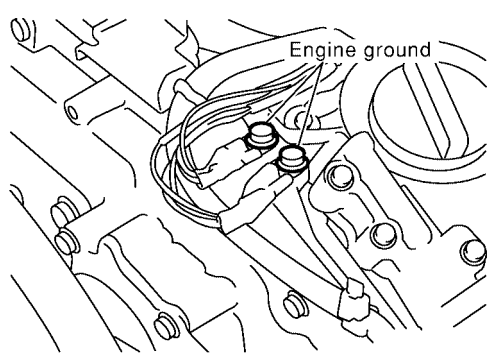
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (BANK 2)	<p>[ENGINE IS RUNNING]</p> <ul style="list-style-type: none"> • WARM-UP CONDITION • REVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD 	0 - APPROX. 1.0V

SEC662D

Diagnostic Procedure

NFEC1168

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

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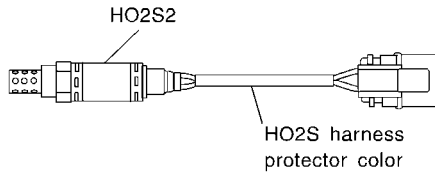
2	CLEAR THE SELF-LEARNING DATA									
<p><input type="checkbox"/> With CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR".</p>										
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="3" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">CLEAR</td> <td style="padding: 2px;">B1 100 %</td> </tr> <tr> <td colspan="2"></td> <td style="padding: 2px;">B2 100 %</td> </tr> </table>		WORK SUPPORT			SELF-LEARNING CONT	CLEAR	B1 100 %			B2 100 %
WORK SUPPORT										
SELF-LEARNING CONT	CLEAR	B1 100 %								
		B2 100 %								
SEF968Y										
<p>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?</p>										
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91. 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?</p>										
Yes or No										
Yes	Perform trouble diagnosis for DTC P0172, P0175. Refer to EC-273.									
No	GO TO 3.									

DTC P1146, P1166 HO2S2

Diagnostic Procedure (Cont'd)

3 CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

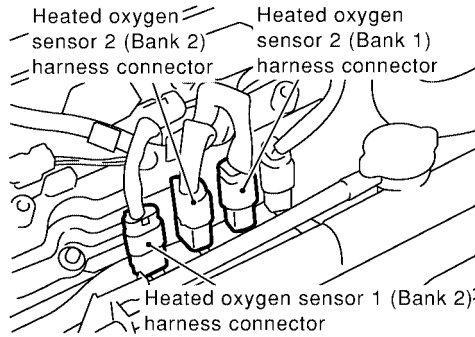
1. Turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
 HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

3. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

4. Disconnect ECM harness connector.
5. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1146	88	1	Bank 1
P1166	90	1	Bank 2

MTBL1161

Continuity should exist.

6. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P1146	88 or 1	Ground	Bank 1
P1166	90 or 1	Ground	Bank 2

MTBL1162

Continuity should not exist.

7. Also check harness for short to power.

OK or NG

OK

GO TO 4.

NG

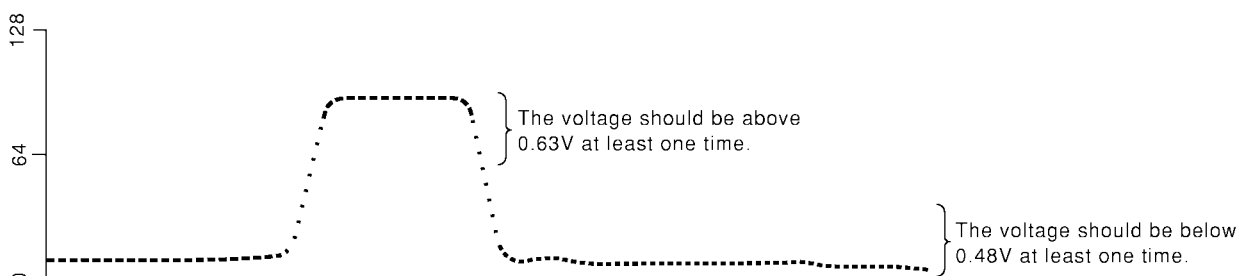
Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT	
1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.		
2. Also check harness for short to power.		
OK or NG		
OK (With CONSULT-II)	GO TO 6.	
OK (Without CONSULT-II)	GO TO 7.	
NG	GO TO 5.	

GI
 MA
 EM
 LC

5	DETECT MALFUNCTIONING PART	
Check the following. Joint connectors-18 Harness for open or short between heated oxygen sensor 2 and ground		
Repair open circuit or short to power in harness or connectors.		

EC
 FE
 CL

6	CHECK HEATED OXYGEN SENSOR 2	
(i) With CONSULT-II		
1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II. 6. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.		
(Reference data)		
		
"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.		
CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.		
OK or NG		
OK	GO TO 10.	
NG	GO TO 9.	

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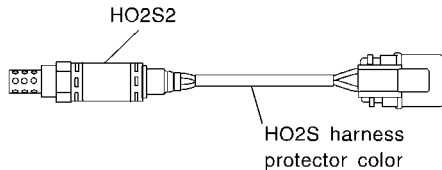
DTC P1146, P1166 HO2S2

Diagnostic Procedure (Cont'd)

7	CHECK HEATED OXYGEN SENSOR 2-I
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine 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.) 	
<p>88: Bank 1 90: Bank 2</p>	
<p>The voltage should be above 0.63V at least once during this procedure.</p> <p>OK or NG</p>	
OK	GO TO 10.
NG	GO TO 8.

SEC903C

8	CHECK HEATED OXYGEN SENSOR 2-II
<p>⊗ Without CONSULT-II</p> <p>Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).</p> <p>The voltage should go below 0.48V at least once during this procedure.</p> <p>CAUTION:</p> <p>Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p>	
<p>OK or NG</p>	
OK	GO TO 10.
NG	GO TO 9.

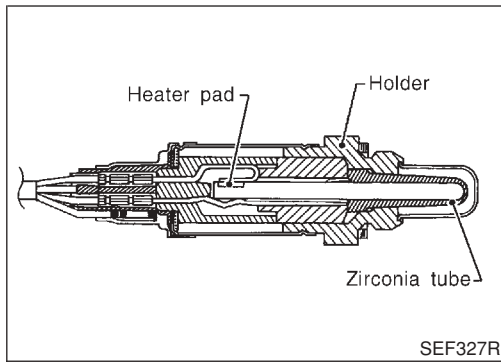
9	REPLACE HEATED OXYGEN SENSOR 2
<p>1. Stop vehicle and turn ignition switch OFF. 2. Check heated oxygen sensor 2 harness protector color.</p>	
	
<p>HO2S2 (bank 1): White or Gray HO2S2 (bank 2): Red or Red/Brown</p>	
SEF372ZB	
<p>CAUTION: Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
<p>Replace malfunctioning heated oxygen sensor 2.</p>	

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

GI
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DTC P1147, P1167 HO2S2

Component Description



Component Description

NFEC1169

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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.

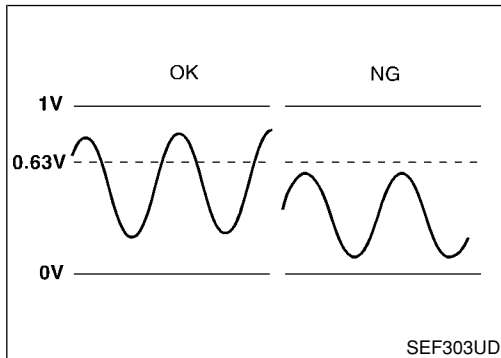
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1170

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	Revsing engine from idle up to 3,000 rpm quickly	0 - 0.3V + , Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN + , RICH



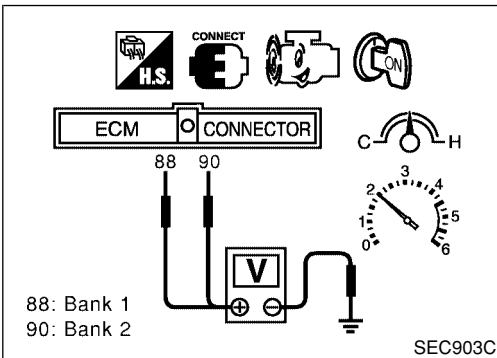
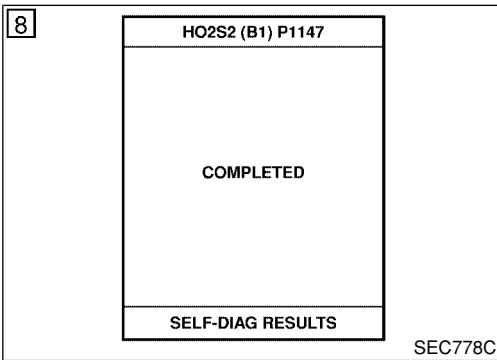
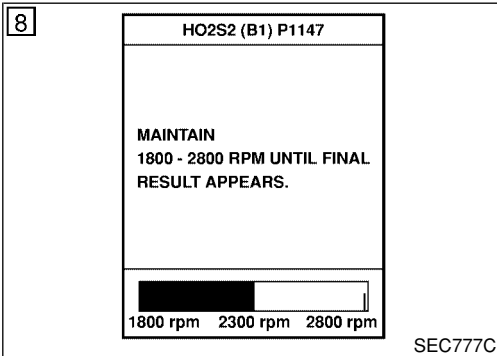
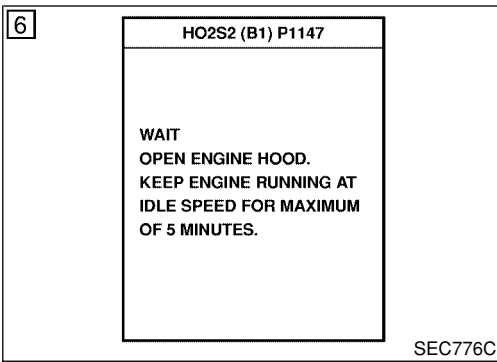
On Board Diagnosis Logic

NFEC1172

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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) P1167 1167 (Bank 2)	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 Fuel pressure Injectors Intake air leaks

NFEC1173



DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

NFEC1173S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Select "HO2S2 (B1) P1147" or "HO2S2 (B2) P1167" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Start engine and follow the instruction of CONSULT-II.
- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If "NG" is displayed, refer to EC-519, "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) Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- c) Start engine and warm it up while monitoring "COOLANTEMP/S" indication on CONSULT-II.
- d) When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 3.

Overall Function Check

NFEC1174

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

WITH GST

NFEC1174S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
- 6) Check the voltage when racing up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 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)

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DTC P1147, P1167 HO2S2

Overall Function Check (Cont'd)

in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
The voltage should be above 0.63V at least once during this procedure.

- 8) If NG, go to "Diagnostic Procedure", EC-519.

Wiring Diagram

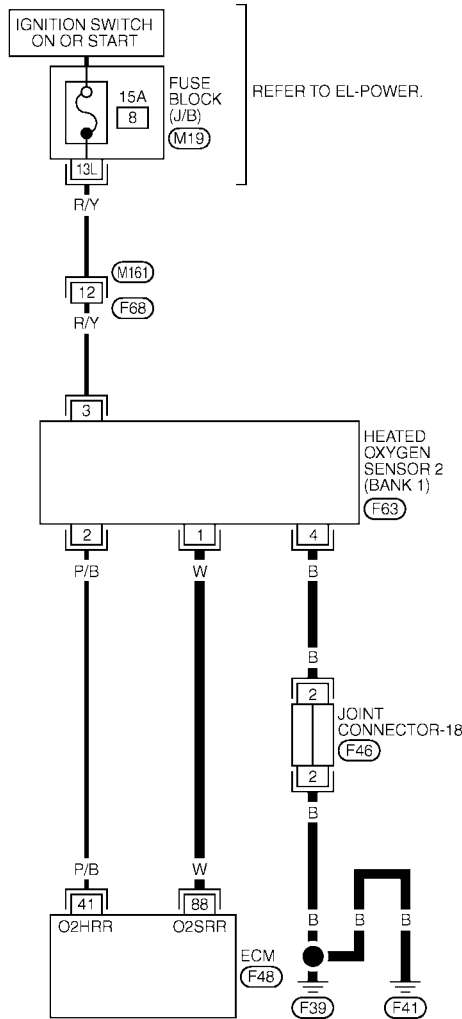
BANK 1

=NFEC1175

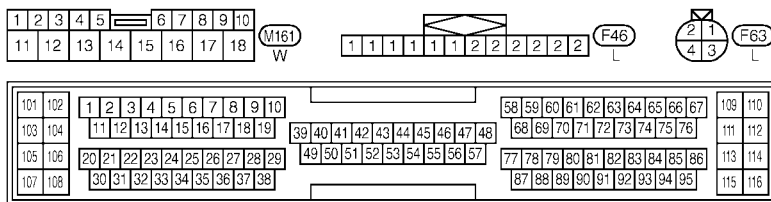
NFEC1175S01

EC-O2S2B1-01

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



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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK- JUNCTION BOX (J/B)

MEC483D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (BANK 1)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

SEC661D

DTC P1147, P1167 HO2S2

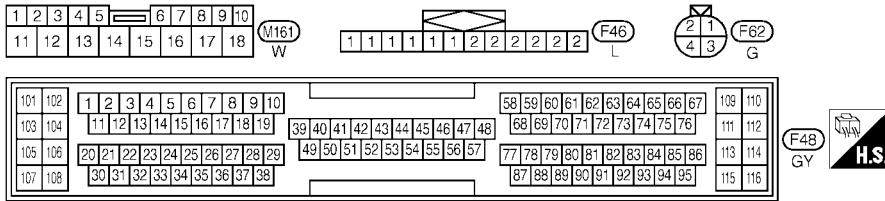
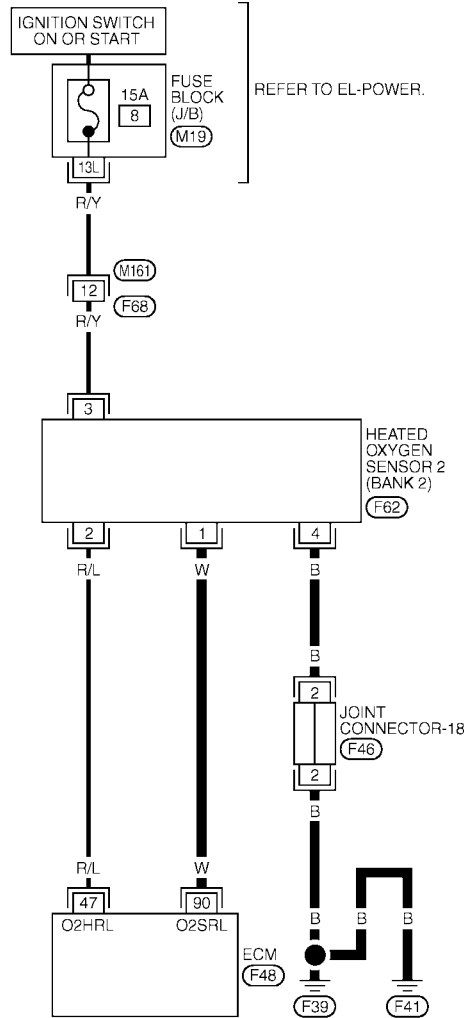
Wiring Diagram (Cont'd)

BANK 2

NFEC1175S02

EC-O2S2B2-01

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



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC484D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

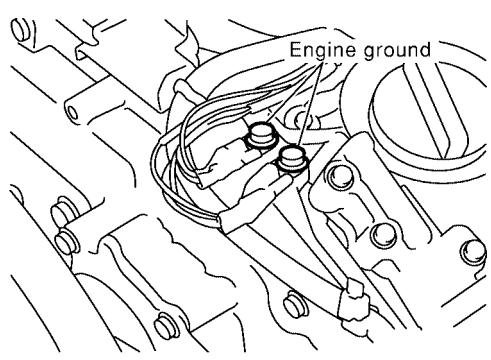
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (BANK 2)	[ENGINE IS RUNNING] • WARM-UP CONDITION • REVING ENGINE FROM IDLE UP TO 3,000 RPM QUICKLY AFTER THE FOLLOWING CONDITIONS ARE MET. • AFTER KEEPING ENGINE SPEED BETWEEN 3,500 AND 4,000 RPM FOR ONE MINUTE AND AT IDLE FOR ONE MINUTE UNDER NO LOAD	0 - APPROX. 1.0V

SEC662D

Diagnostic Procedure

NFEC1176

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

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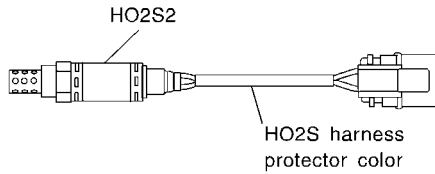
2	CLEAR THE SELF-LEARNING DATA									
<p><input type="checkbox"/> With CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR".</p>										
<table border="1" style="margin: auto;"> <tr> <th colspan="3">WORK SUPPORT</th> </tr> <tr> <td style="width: 30%;">SELF-LEARNING CONT</td> <td style="width: 20%;">CLEAR</td> <td style="width: 50%;">B1 100 %</td> </tr> <tr> <td></td> <td></td> <td>B2 100 %</td> </tr> </table>		WORK SUPPORT			SELF-LEARNING CONT	CLEAR	B1 100 %			B2 100 %
WORK SUPPORT										
SELF-LEARNING CONT	CLEAR	B1 100 %								
		B2 100 %								
<p>4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 or P0174 detected? Is it difficult to start engine?</p>										
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91. 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?</p>										
Yes or No										
Yes	Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-265.									
No	GO TO 3.									

DTC P1147, P1167 HO2S2

Diagnostic Procedure (Cont'd)

3 CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

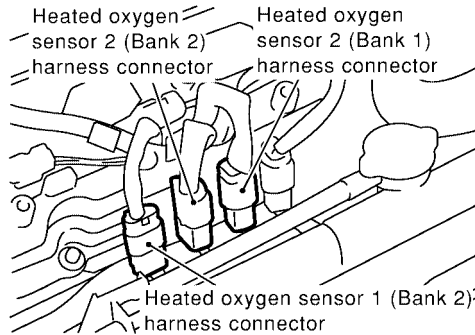
1. Turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
 HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

3. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

4. Disconnect ECM harness connector.
5. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1147	88	1	Bank 1
P1167	90	1	Bank 2

MTBL1163

Continuity should exist.

6. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P1147	88 or 1	Ground	Bank 1
P1167	90 or 1	Ground	Bank 2

MTBL1164

Continuity should not exist.

7. 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 P1147, P1167 HO2S2


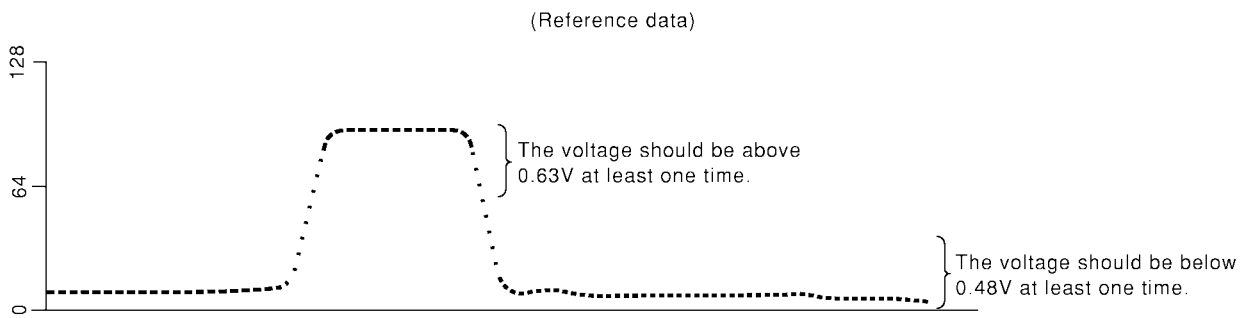
Diagnostic Procedure (Cont'd)

4	CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT	
1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist. 2. Also check harness for short to power.		
OK or NG		
OK (With CONSULT-II)	GO TO 6.	
OK (Without CONSULT-II)	GO TO 7.	
NG	GO TO 5.	

GI
MA
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LC

5	DETECT MALFUNCTIONING PART	
Check the following. Joint connectors-18 Harness for open or short between heated oxygen sensor 2 and ground		
Repair open circuit or short to power in harness or connectors.		

EC
FE
CL

6	CHECK HEATED OXYGEN SENSOR 2	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to the normal operating temperature. Turn ignition switch "ON" and wait at least 10 seconds. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. Let engine idle for one minute. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$. 		
(Reference data)		
		
<p>"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p>		
OK or NG		
OK	GO TO 10.	
NG	GO TO 9.	

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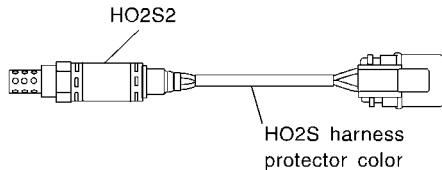
DTC P1147, P1167 HO2S2

Diagnostic Procedure (Cont'd)

7	CHECK HEATED OXYGEN SENSOR 2-I
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch "ON" and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load. 4. Let engine idle for one minute. 5. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S bank 2 signal) and engine 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.) <div style="text-align: center; margin: 10px 0;"> <p>88: Bank 1 90: Bank 2</p> </div> <p style="text-align: center;">The voltage should be above 0.63V at least once during this procedure.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	GO TO 8.

SEC903C

8	CHECK HEATED OXYGEN SENSOR 2-II
<p>⊗ Without CONSULT-II</p> <p>Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).</p> <p>The voltage should go below 0.48V at least once during this procedure.</p> <p>CAUTION: Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	GO TO 9.

9	REPLACE HEATED OXYGEN SENSOR 2
<p>1. Stop vehicle and turn ignition switch "OFF". 2. Check heated oxygen sensor 2 harness protector color.</p>	
	
<p>HO2S2 (bank 1): White or Gray HO2S2 (bank 2): Red or Red/Brown</p>	
SEF372ZB	
<p>CAUTION: Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.</p>	
Replace malfunctioning heated oxygen sensor 2.	

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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DTC P1148, P1168 CLOSED LOOP CONTROL

On Board Diagnosis Logic

On Board Diagnosis Logic

★ The closed loop control has the one trip detection logic.

NFEC1064

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1148 1148 (Bank 1) P1168 1168 (Bank 2)	Closed loop control	The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition, the closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition.	The heated oxygen sensor 1 circuit is open or shorted. Heated oxygen sensor 1 Heated oxygen sensor 1 heater

DTC Confirmation Procedure

NFEC1065

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:

Never raise engine speed above 3,600 rpm during the "DTC Confirmation Procedure". If the engine speed limit is exceeded, retry the procedure from step 2.

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	HO2S1 (B1)	XXX V
	HO2S1 (B2)	XXX V

SEC011C

WITH CONSULT-II

NFEC1065S01

- 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 one minute under no load.
- 4) Let engine idle for one minute.
- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) Hold engine speed at 2,000 rpm and check one of the following.
 - "HO2S1 (B1)/(B2)" voltage should go above 0.70V at least once.
 - "HO2S1 (B1)/(B2)" voltage should go below 0.21V at least once.
 If the check result is NG, perform "Diagnosis Procedure", EC-525.
 If the check result is OK, perform the following step.
- 7) Let engine idle at least 5 minutes.
- 8) Maintain the following condition at least 50 consecutive seconds.

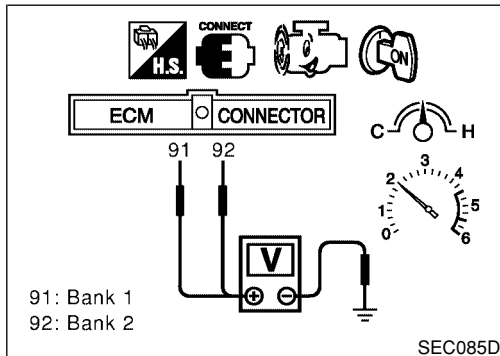
DTC P1148, P1168 CLOSED LOOP CONTROL

DTC Confirmation Procedure (Cont'd)

B/FUEL SCHDL	3.0 msec or more	
ENG SPEED	1,800 - 3,000 rpm	GI
Selector lever	Suitable position	
VHCL SPEED SE	More than 70 km/h (43 MPH)	MA

During this test, P0134 and/or P0154 may be displayed on CONSULT-II screen.

- If DTC is detected, go to "Diagnostic Procedure", EC-525.



Overall Function Check

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

WITH GST

- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Start engine and keep the engine speed at between 3,500 to 4,000 rpm for at least one minute under no load.
- Let engine idle for one minute.
- Set voltmeter probes between ECM terminal 91 [Heated oxygen sensor 1 bank 1 signal] or 92 [Heated oxygen sensor 1 bank 2 signal] and engine ground.
- Check the following with engine speed held at 2,000 rpm constant under no-load.
The voltage should go above 0.70V at least once.
The voltage should go below 0.21V at least once.
- If NG, go to "Diagnostic Procedure", EC-525.

Diagnostic Procedure

Perform trouble diagnosis for "DTC P0133, P0153", EC-226.

DTC P1211 ABS/TCS CONTROL UNIT

Description

Description

NFEC1268

The malfunction information related to ABS or ABS/TCS is transferred through the CAN communication line from ABS actuator and electric unit or ABS/TCS control unit to ECM.

Be sure to erase the malfunction information such as DTC not only for ABS actuator and electric unit or ABS/TCS control unit but also for ECM after the ABS or ABS/TCS related repair.

On Board Diagnosis Logic

NFEC1269

Freeze frame data is not stored in the ECM for this self-diagnosis. The MIL will not light up for this self-diagnosis.

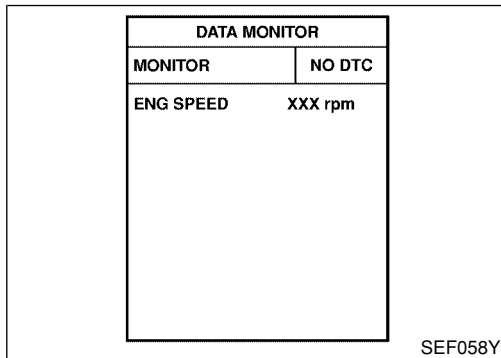
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	ABS/TCS control unit performance	ECM receives a malfunction information from ABS actuator and electric unit or ABS/TCS control unit.	ABS actuator and electric unit ABS/TCS control unit TCS related parts

DTC Confirmation Procedure

NFEC1270

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 60 seconds.
4. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-527.

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

Go to BR-56 (With ABS models) or BR-102 (With ABS/TCS models), "TROUBLE DIAGNOSIS — INTRODUCTION".

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DTC P1212 ABS/TCS COMMUNICATION LINE

Description

Description

NFEC1273

NOTE:

If DTC P1212 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to “DTC U1000, U1001 CAN COMMUNICATION LINE”, EC-162.

This CAN communication line is used to control the smooth engine operation during the ABS or TCS operation. Pulse signals are exchanged between ECM and ABS actuator and electric unit or ABS/TCS control unit. **Be sure to erase the malfunction information such as DTC not only in ABS actuator and electric unit or ABS/TCS control unit but also ECM after the ABS or ABS/TCS related repair.**

On Board Diagnosis Logic

NFEC1274

Freeze frame data is not stored in the ECM for this self-diagnosis. The MIL will not light up for this self-diagnosis.

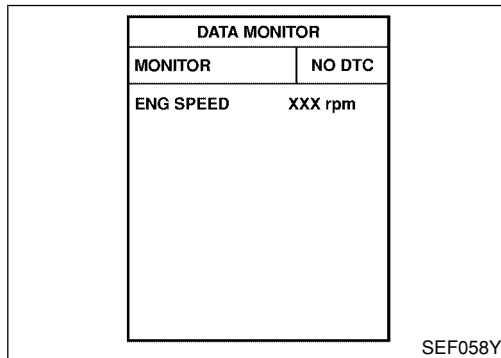
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	ABS/TCS communication line	ECM cannot receive the information from ABS actuator and electric unit or ABS/TCS control unit continuously.	Harness or connectors (The CAN communication line is open or shorted.) ABS actuator and electric unit ABS/TCS control unit Dead (Weak) battery

DTC Confirmation Procedure

NFEC1275

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 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-529.

WITH GST

Follow the procedure “WITH CONSULT-II” above.

DTC P1212 ABS/TCS COMMUNICATION LINE

Diagnostic Procedure

Diagnostic Procedure

NFEC1277

1	CHECK ABS/TCS CONTROL UNIT FUNCTION
Refer to "TROUBLE DIAGNOSIS — INTRODUCTION", BR-56 (With ABS models) or BR-102 (With ABS/TCS models).	
	INSPECTION END

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DTC P1217 ENGINE OVER TEMPERATURE

System Description

System Description

NFEC1320

COOLING FAN CONTROL

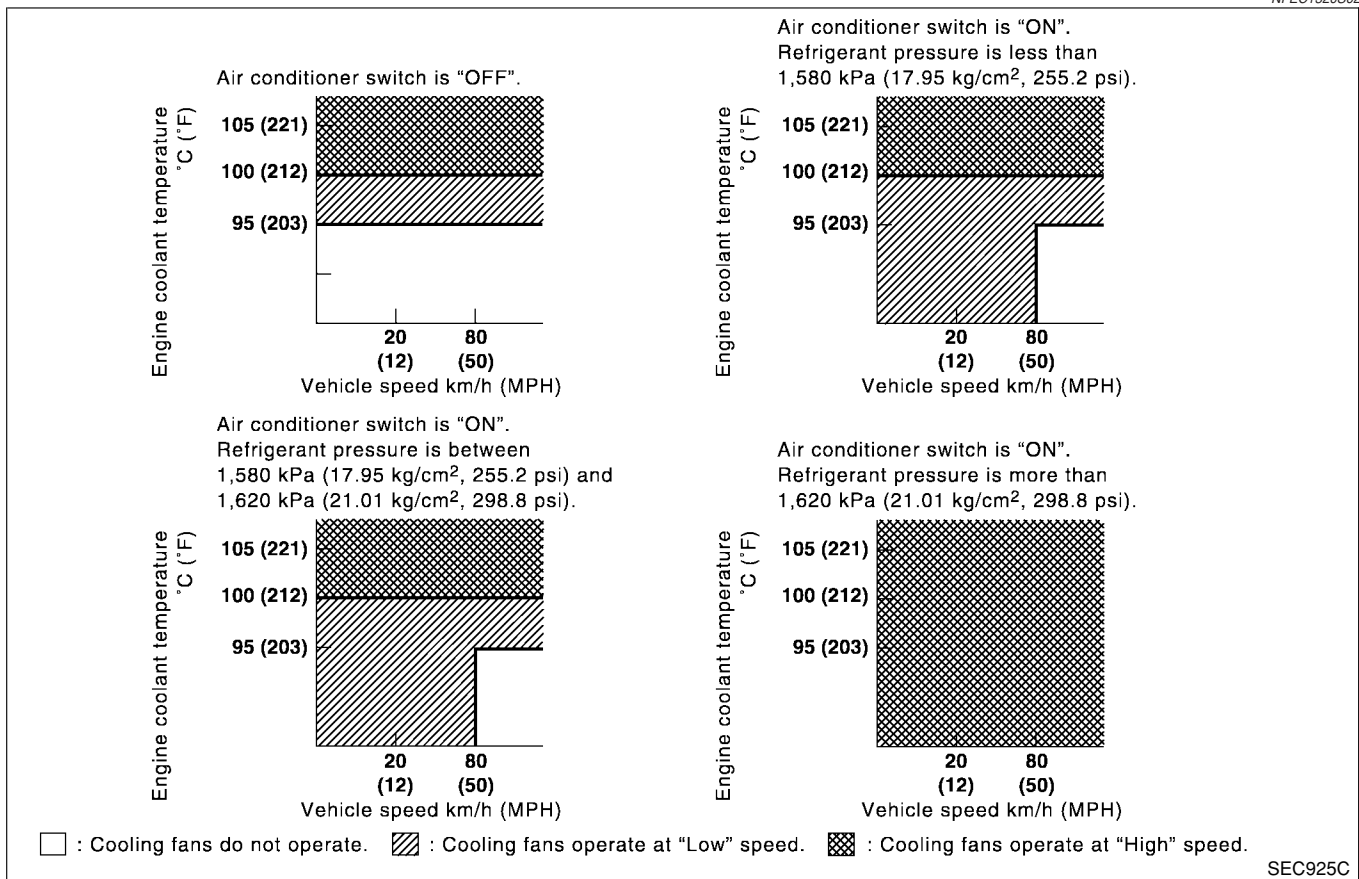
NFEC1320S01

Sensor	Input Signal to ECM	ECM function	Actuator
Wheel sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

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 3-step control [HIGH/LOW/OFF].

OPERATION

NFEC1320S02



SEC925C

CONSULT-II Reference Value in Data Monitor Mode

NFEC1321

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON

DTC P1217 ENGINE OVER TEMPERATURE

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION	
COOLING FAN	After warming up engine, idle the engine. Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF	GI
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW	MA
		Engine coolant temperature is 100°C (212°F) or more	HIGH	EM

On Board Diagnosis Logic

NFEC1454

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.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause	
P1217 1217	Engine over temperature	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.	Harness or connectors (The cooling fan circuit is open or shorted.) Cooling fan Radiator hose Radiator Radiator cap Water pump Thermostat For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-547.	FE CL MT AT AX

CAUTION:

When a malfunction is indicated, be sure to replace the coolant following the procedure in the MA-14, "Changing Engine Coolant". Also, replace the 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.

EC

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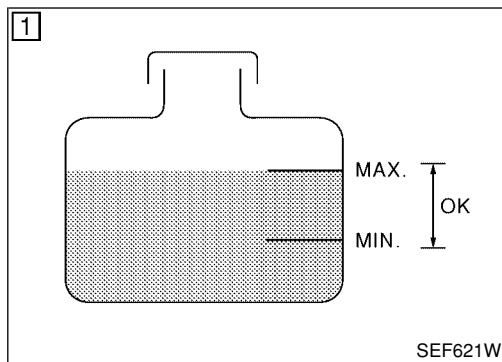
SC

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DTC P1217 ENGINE OVER TEMPERATURE

Overall Function Check



4

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF111X

Overall Function Check

NFEC1324

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

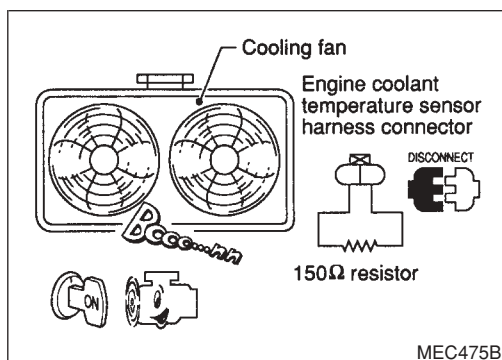
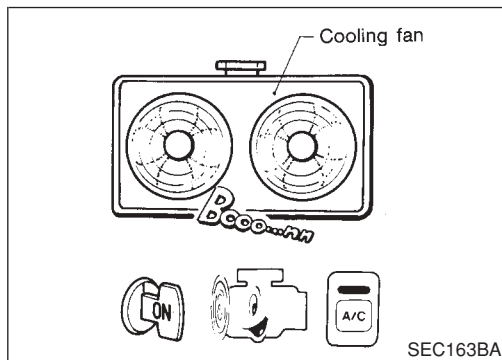
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

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

NFEC1324S01

- 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 "Diagnostic Procedure", EC-536.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-536.
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
- 5) If the results are NG, go to "Diagnostic Procedure", EC-536.



WITH GST

NFEC1324S03

- 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 "Diagnostic Procedure", EC-536.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-536.
- 3) Start engine.
Be careful not to overheat engine.
- 4) Set temperature control lever to full cold position.
- 5) Turn air conditioner switch "ON".
- 6) Turn blower fan switch "ON".
- 7) Run engine at idle for a few minutes with air conditioner operating.
Be careful not to overheat engine.
- 8) Make sure that cooling fan operates at low speed.
If NG, go to "Diagnostic Procedure", EC-536.
If OK, go to the following step.
- 9) Turn ignition switch "OFF".
- 10) Turn air conditioner switch and blower fan switch "OFF".

DTC P1217 ENGINE OVER TEMPERATURE

Overall Function Check (Cont'd)

-
- 11) Disconnect engine coolant temperature sensor harness connector.
 - 12) Connect 150Ω resistor to engine coolant temperature sensor harness connector. GI
 - 13) Restart engine and make sure that cooling fan operates at higher speed than low speed. MA
Be careful not to overheat engine.
 - 14) If NG, go to “Diagnostic Procedure”, EC-536. EM

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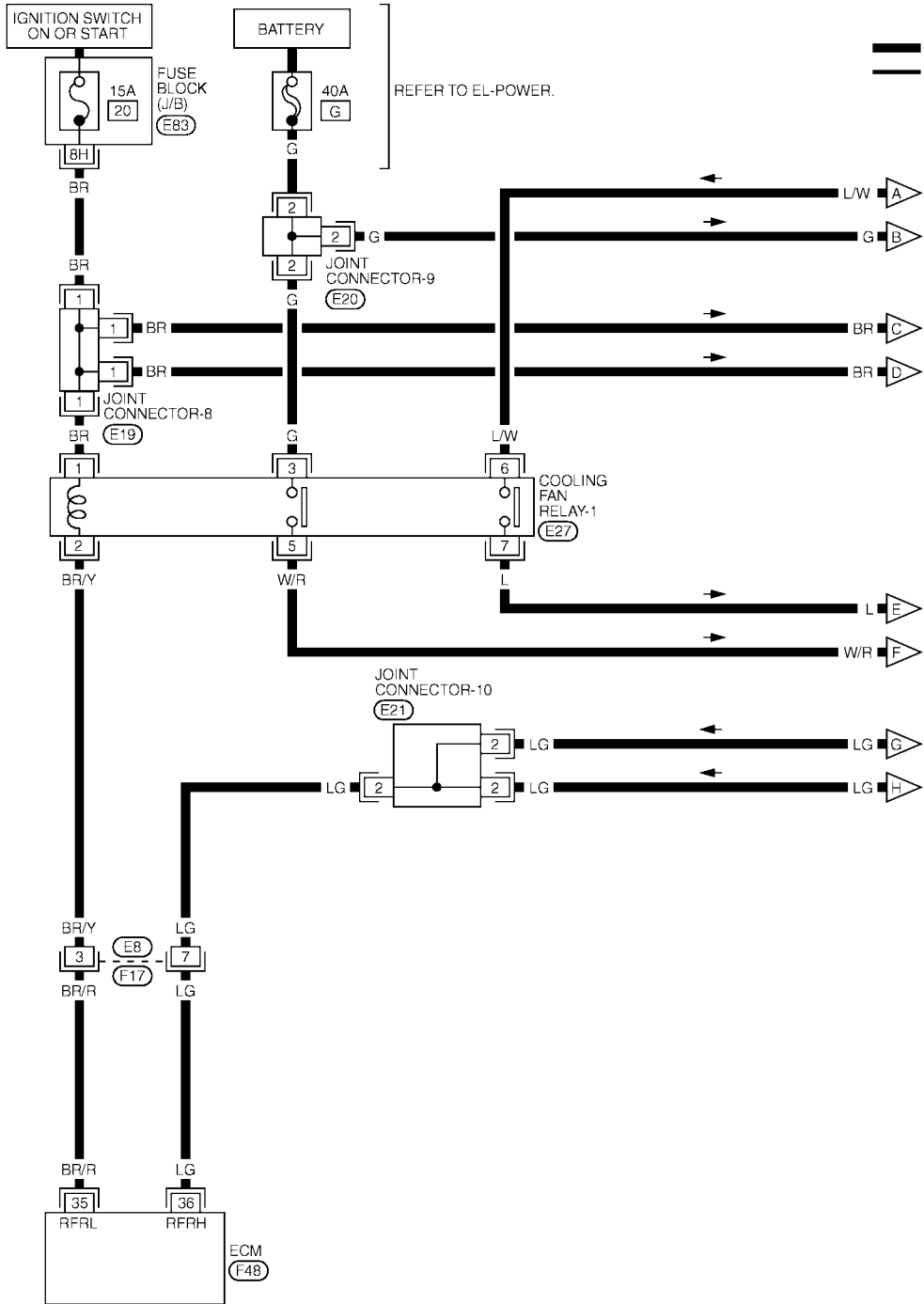
DTC P1217 ENGINE OVER TEMPERATURE

Wiring Diagram

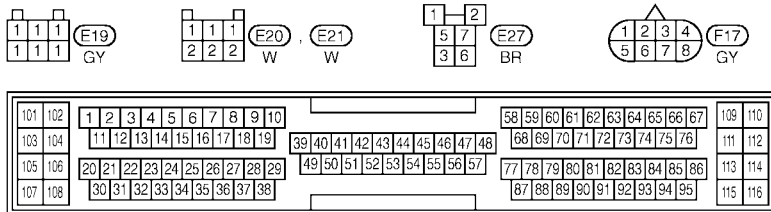
Wiring Diagram

NFEC1325

EC-COOL/F-01



NEXT PAGE



REFER TO THE FOLLOWING.
(E83) - FUSE BLOCK-
JUNCTION BOX (J/B)

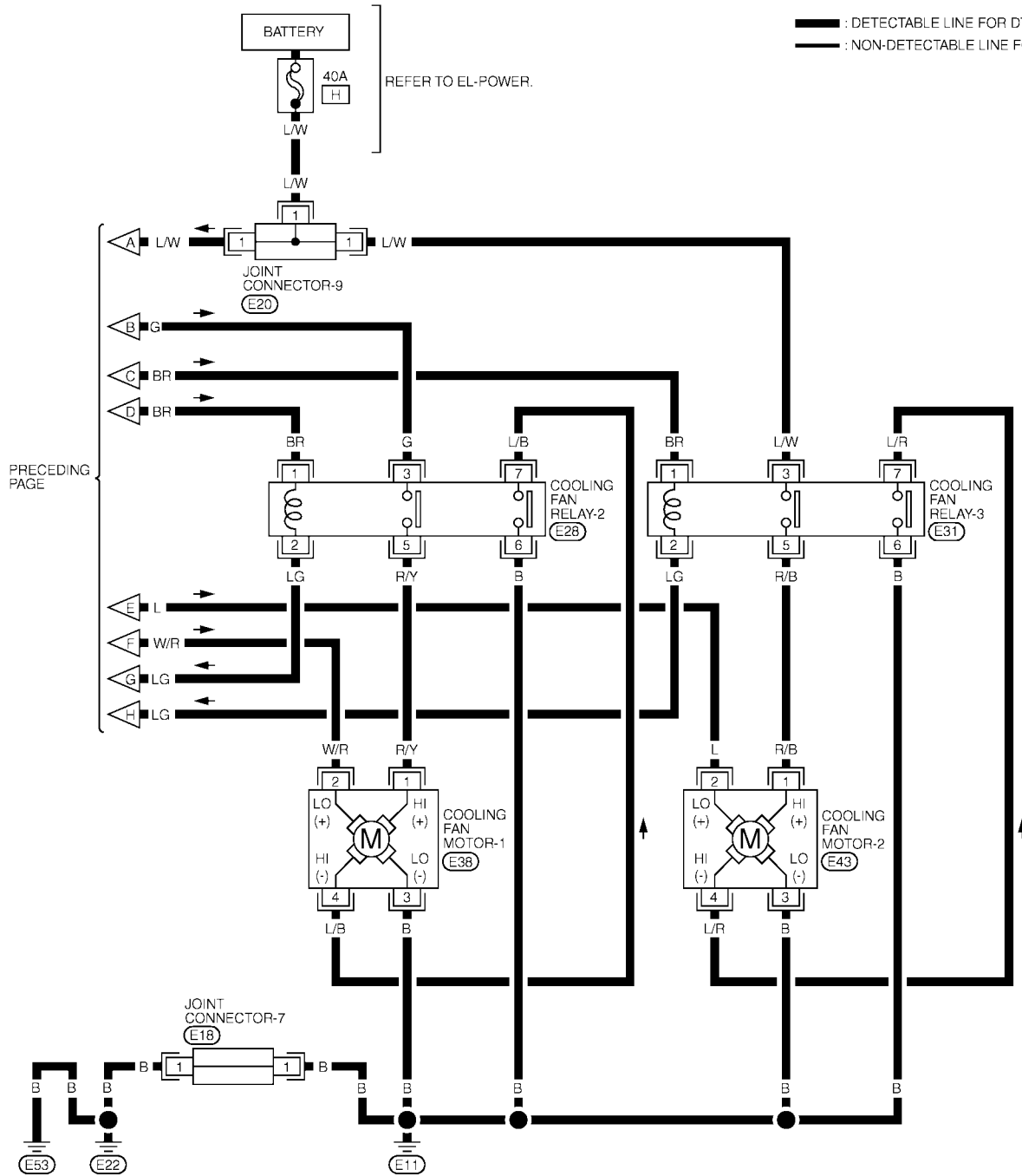
MEC490D

DTC P1217 ENGINE OVER TEMPERATURE

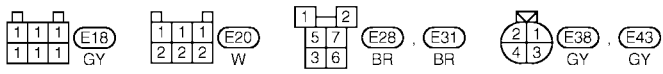
Wiring Diagram (Cont'd)

EC-COOL/F-02

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



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MEC491D

DTC P1217 ENGINE OVER TEMPERATURE

Wiring Diagram (Cont'd)

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.


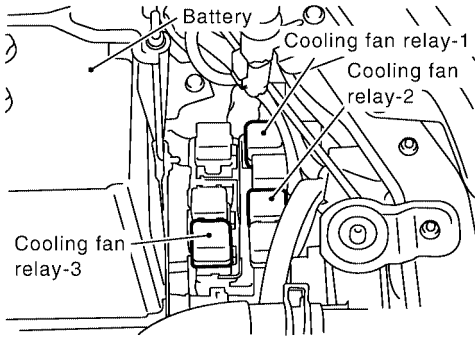
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
36	LG	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 1.0V
35	BR/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 1.0V

SEF630XC

Diagnostic Procedure

NFEC1326

1 INSPECTION START	
Do you have CONSULT-II?	
Yes or No	
Yes	GO TO 2.
No	GO TO 4.

2 CHECK COOLING FAN LOW SPEED OPERATION																									
<p> With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3.</p>																									
																									
<p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p>																									
<table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																									
COOLING FAN	OFF																								
MONITOR																									
COOLAN TEMP/S	XXX °C																								
<p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>																									
OK	GO TO 3.																								
NG	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-542.)																								

SEC006C

SEF646X

DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																						
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Turn ignition switch "ON". 4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. <div style="text-align: center; margin: 10px 0;"> <table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF111X</p> <ol style="list-style-type: none"> 5. Make sure that cooling fans-1 and -2 operate at high speed. <p style="text-align: center;">OK or NG</p>		ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C														
ACTIVE TEST																							
COOLING FAN	OFF																						
MONITOR																							
COOLAN TEMP/S	XXX °C																						
OK	GO TO 6.																						
NG	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-545.)																						

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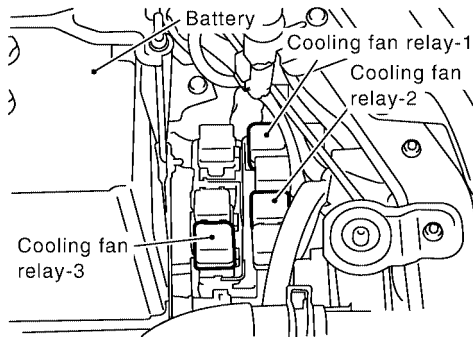
DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

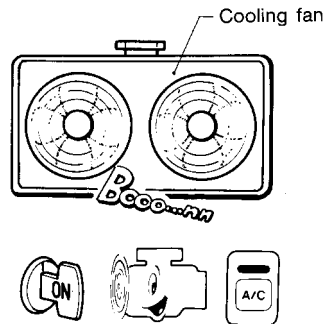
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



SEC006C

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



SEC163BA

OK or NG

OK

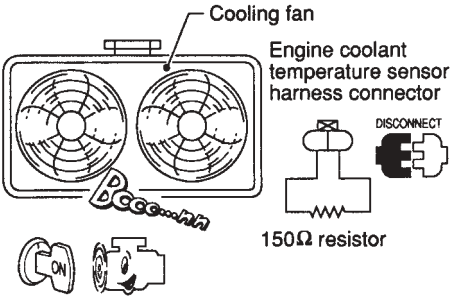
GO TO 5.

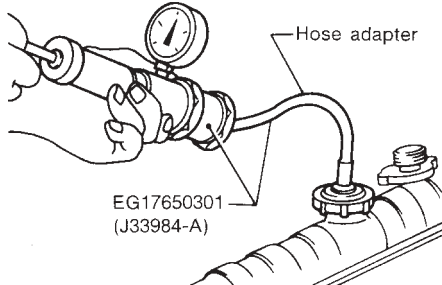
NG

Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-542.)

DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "OFF". Reconnect cooling fan relays-2 and -3. Turn air conditioner switch and blower fan switch "OFF". Disconnect engine coolant temperature sensor harness connector. Connect 150Ω resistor to engine coolant temperature sensor harness connector. Restart engine and make sure that cooling fans-1 and -2 operate at high speed. 	
 <p>The diagram illustrates the setup for testing the cooling fan high speed operation. It shows two cooling fans, the engine coolant temperature sensor harness connector, a 150Ω resistor, and a disconnect symbol. The resistor is connected to the sensor harness connector. A 'DISCONNECT' symbol is shown next to the sensor harness connector. Below the resistor, there are two small diagrams showing the 'ON' and 'OFF' positions of a switch.</p>	
MEC475B	
OK or NG	
OK	GO TO 6.
NG	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-545.)

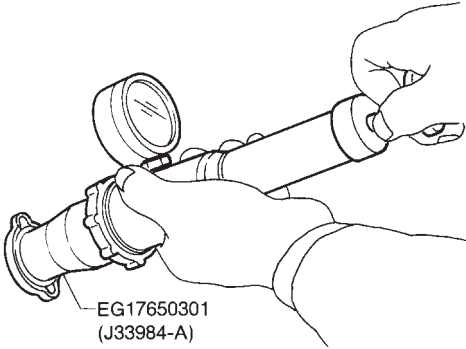
6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p>Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
 <p>The diagram shows a pressure tester with a gauge connected to the cooling system. A hose adapter is used to connect the tester to the system. The part number EG17650301 (J33984-A) is indicated. The tester is shown being applied to a radiator cap.</p>	
SLC754A	
Pressure should not drop.	
OK or NG	
OK	GO TO 8.
NG	GO TO 7.

7	DETECT MALFUNCTIONING PART
<p>Check the following for leak.</p> <ul style="list-style-type: none"> Hose Radiator Water pump (Refer to LC-14, "Water Pump".) 	
Repair or replace.	

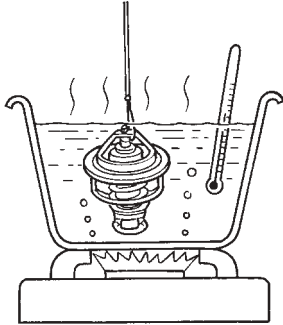
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DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

8	CHECK RADIATOR CAP
Apply pressure to cap with a tester and check radiator cap relief pressure.	
	
Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)	
OK or NG	
OK	GO TO 9.
NG	Replace radiator cap.

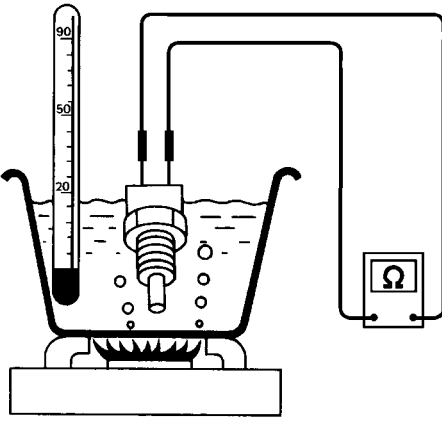
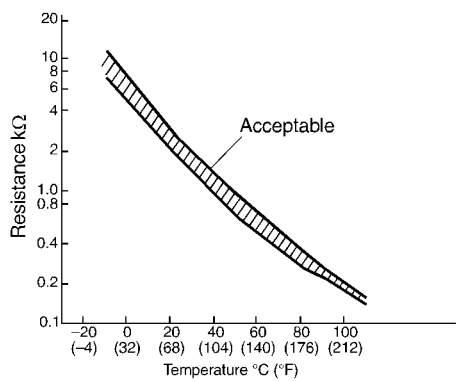
SLC755A

9	CHECK THERMOSTAT
1. Remove thermostat. 2. Check valve seating condition at normal room temperatures. It should seat tightly. 3. Check valve opening temperature and valve lift.	
	
Valve opening temperature: 82°C (180°F) [standard] Valve lift: More than 8.6 mm/95°C (0.339 in/203°F)	
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-18, "Thermostat".	
OK or NG	
OK	GO TO 10.
NG	Replace thermostat.

SLC343

DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

10	CHECK ENGINE COOLANT TEMPERATURE SENSOR								
<p>1. Remove engine coolant temperature sensor. 2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.</p>									
	<p><Reference data></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Temperature °C (°F)</th> <th>Resistance kΩ</th> </tr> </thead> <tbody> <tr> <td>20 (68)</td> <td>2.1 - 2.9</td> </tr> <tr> <td>50 (122)</td> <td>0.68 - 1.00</td> </tr> <tr> <td>90 (194)</td> <td>0.236 - 0.260</td> </tr> </tbody> </table>	Temperature °C (°F)	Resistance kΩ	20 (68)	2.1 - 2.9	50 (122)	0.68 - 1.00	90 (194)	0.236 - 0.260
Temperature °C (°F)	Resistance kΩ								
20 (68)	2.1 - 2.9								
50 (122)	0.68 - 1.00								
90 (194)	0.236 - 0.260								
									
OK or NG									
OK	GO TO 11.								
NG	Replace engine coolant temperature sensor.								

11	CHECK MAIN 12 CAUSES
If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-547.	
INSPECTION END	

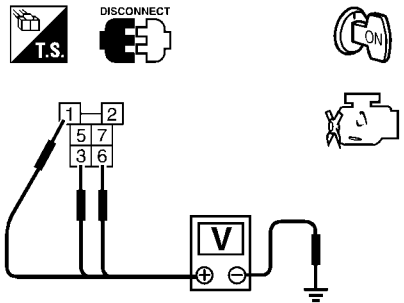
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DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

PROCEDURE A

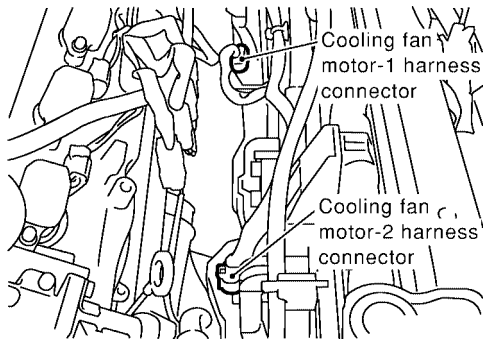
=NFEC1326S01

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p>	
	
SEF590X	
OK or NG	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Joint connector-8 Joint connector-9 15A fuse 40A fusible links Harness for open or short between cooling fan relay-1 and fuse Harness for open or short between cooling fan relay-1 and battery</p>	
	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN MOTORS CIRCUIT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>	
 <p>The diagram shows a top-down view of the engine compartment. Two harness connectors are highlighted with circles and labeled: 'Cooling fan motor-1 harness connector' and 'Cooling fan motor-2 harness connector'. The connectors are located near the cooling fan assembly.</p>	
SEC057D	
<p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 2, cooling fan motor-1 terminal 3 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 2, cooling fan motor-2 terminal 3 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

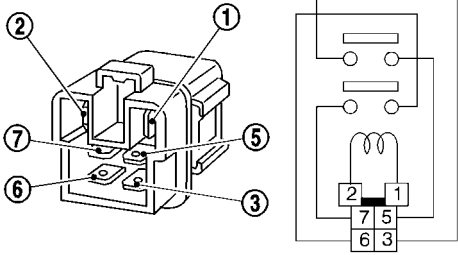
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 35 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	GO TO 5.

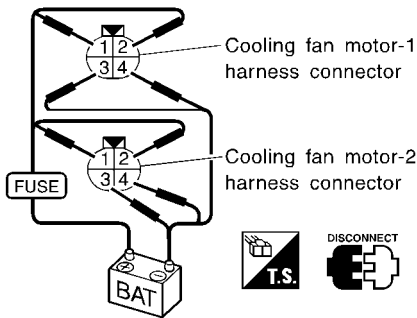
5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <p style="padding-left: 20px;">Harness connectors E8, F17</p> <p style="padding-left: 20px;">Harness for open or short between cooling fan relay-1 and ECM</p>	
Repair open circuit or short to ground or short to power in harness or connectors.	

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DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

6	CHECK COOLING FAN RELAY-1						
Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.							
							
<table border="1" style="margin-left: auto; margin-right: 0;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
No current supply	No						
SEF591X							
OK or NG							
OK	GO TO 7.						
NG	Replace cooling fan relay.						

7	CHECK COOLING FAN MOTORS-1 AND -2																				
Supply battery voltage between the following terminals and check operation.																					
																					
<table border="1" style="margin-left: auto; margin-right: 0;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor-1</td> <td>Low</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td rowspan="2">Cooling fan motor-2</td> <td>Low</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor-1	Low	2	3	High	1, 2	3, 4	Cooling fan motor-2	Low	2	3	High	1, 2	3, 4
	Speed			Terminals																	
		(+)	(-)																		
Cooling fan motor-1	Low	2	3																		
	High	1, 2	3, 4																		
Cooling fan motor-2	Low	2	3																		
	High	1, 2	3, 4																		
SEF592X																					
OK or NG																					
OK	GO TO 8.																				
NG	Replace cooling fan motors.																				

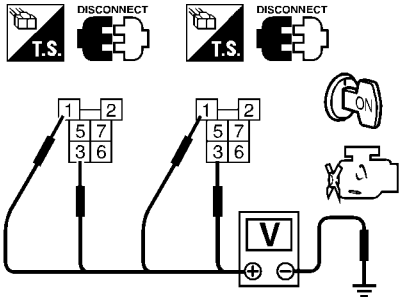
8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

PROCEDURE B

NFEC1326S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relays-2 and -3. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Voltage: Battery voltage</p> </div> </div> <p style="text-align: center; margin-top: 10px;">OK or NG</p> <p style="text-align: right; margin-right: 20px;">SEF593X</p>	
OK	GO TO 3.
NG	GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following. Joint connector-8 Joint connector-9 Harness for open or short between cooling fan relays-2 and -3 and joint connectors-8, -9</p>	
	Repair harness or connectors.

3	CHECK COOLING FAN CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 1, cooling fan relay-2 terminal 7 and cooling fan motor-1 terminal 4, cooling fan relay-2 terminal 6 and body ground. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power. 5. Check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 1, cooling fan relay-3 terminal 7 and cooling fan motor-2 terminal 4, cooling fan relay-3 terminal 6 and body ground. Refer to Wiring Diagram. Continuity should exist. 6. Also check harness for short to ground and short to power.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

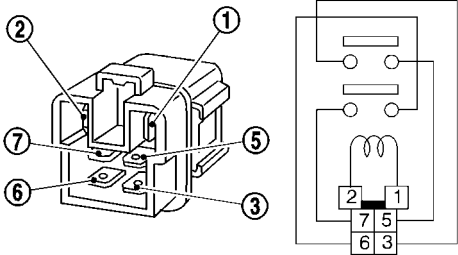
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 36 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	GO TO 6.
NG	GO TO 5.

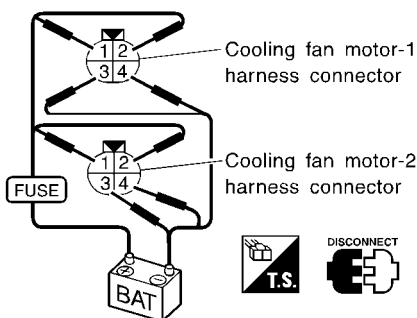
GI
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DTC P1217 ENGINE OVER TEMPERATURE

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E8, E17 Joint connector-10 Harness for open or short between cooling fan relays-2 and -3 and ECM	
Repair open circuit or short to ground or short to power in harness or connectors.	

6	CHECK COOLING FAN RELAYS-2 AND -3						
Check continuity between cooling fan relay-2, -3 terminals 3 and 5, 6 and 7 under the following conditions.							
							
<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
No current supply	No						
SEF591X							
OK or NG							
OK	GO TO 7.						
NG	Replace cooling fan relays.						

7	CHECK COOLING FAN MOTORS																				
Supply battery voltage between the following terminals and check operation.																					
																					
<table border="1" style="width: 100%;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor-1</td> <td>Low</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td rowspan="2">Cooling fan motor-2</td> <td>Low</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor-1	Low	2	3	High	1, 2	3, 4	Cooling fan motor-2	Low	2	3	High	1, 2	3, 4
	Speed			Terminals																	
		(+)	(-)																		
Cooling fan motor-1	Low	2	3																		
	High	1, 2	3, 4																		
Cooling fan motor-2	Low	2	3																		
	High	1, 2	3, 4																		
SEF592X																					
OK or NG																					
OK	GO TO 8.																				
NG	Replace cooling fan motors.																				

8	CHECK INTERMITTENT INCIDENT
1. Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P1217 ENGINE OVER TEMPERATURE

Main 12 Causes of Overheating

Main 12 Causes of Overheating

NFEC1327

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper	Visual	No blocking	—
	2	Coolant mixture	Coolant tester	50 - 50% coolant mixture	See MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	Coolant level	Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-14, "Changing Engine Coolant".
	4	Radiator cap	Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-12, "System Check".
ON*2	5	Coolant leaks	Visual	No leaks	See LC-12, "System Check".
ON*2	6	Thermostat	Touch the upper and lower radiator hoses	Both hoses should be hot	See LC-18, "Thermostat" and LC-20, "Radiator".
ON*1	7	Cooling fan	CONSULT-II	Operating	See trouble diagnosis for DTC P1217 (EC-530).
OFF	8	Combustion gas leak	Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	Coolant temperature gauge	Visual	Gauge less than 3/4 when driving	—
		Coolant overflow to reservoir tank	Visual	No overflow during driving and idling	See MA-14, "Changing Engine Coolant".
OFF*4	10	Coolant return from reservoir tank to radiator	Visual	Should be initial level in reservoir tank	See MA-13, "ENGINE MAINTENANCE".
OFF	11	Cylinder head	Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-44, "Inspection".
	12	Cylinder block and pistons	Visual	No scuffing on cylinder walls or piston	See EM-66, "Inspection".

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

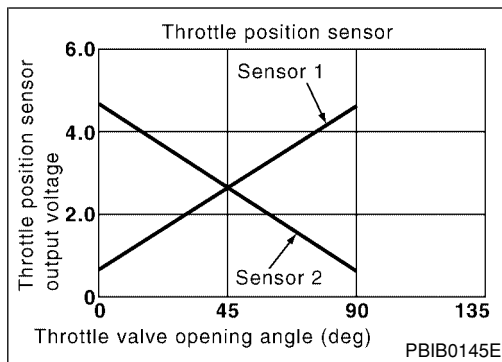
*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to LC-25, "OVERHEATING CAUSE ANALYSIS".

DTC P1223, P1224 TP SENSOR

Component Description



Component Description

NFEC1333

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

NFEC1334

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN2	Ignition switch: ON (Engine stopped) Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

On Board Diagnosis Logic

NFEC1455

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1223 1223	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	Harness or connectors (The TP sensor 2 circuit is open or shorted.) Electric throttle control actuator (TP sensor 2)
P1224 1224	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

NFEC1455S01

When the malfunction is detected, ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

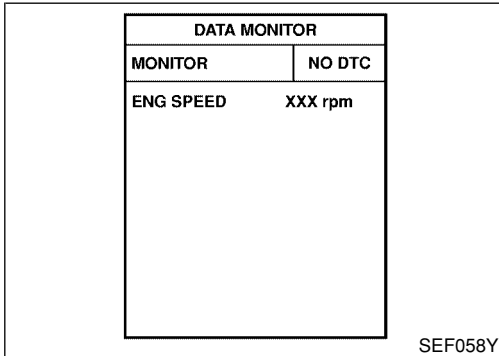
NFEC1456

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) Start engine and let it idle for 1 second.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-551.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P1223, P1224 TP SENSOR

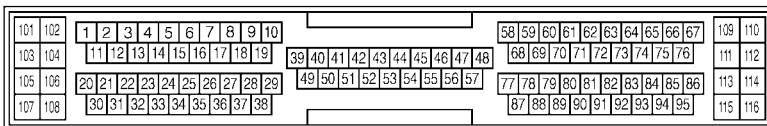
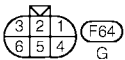
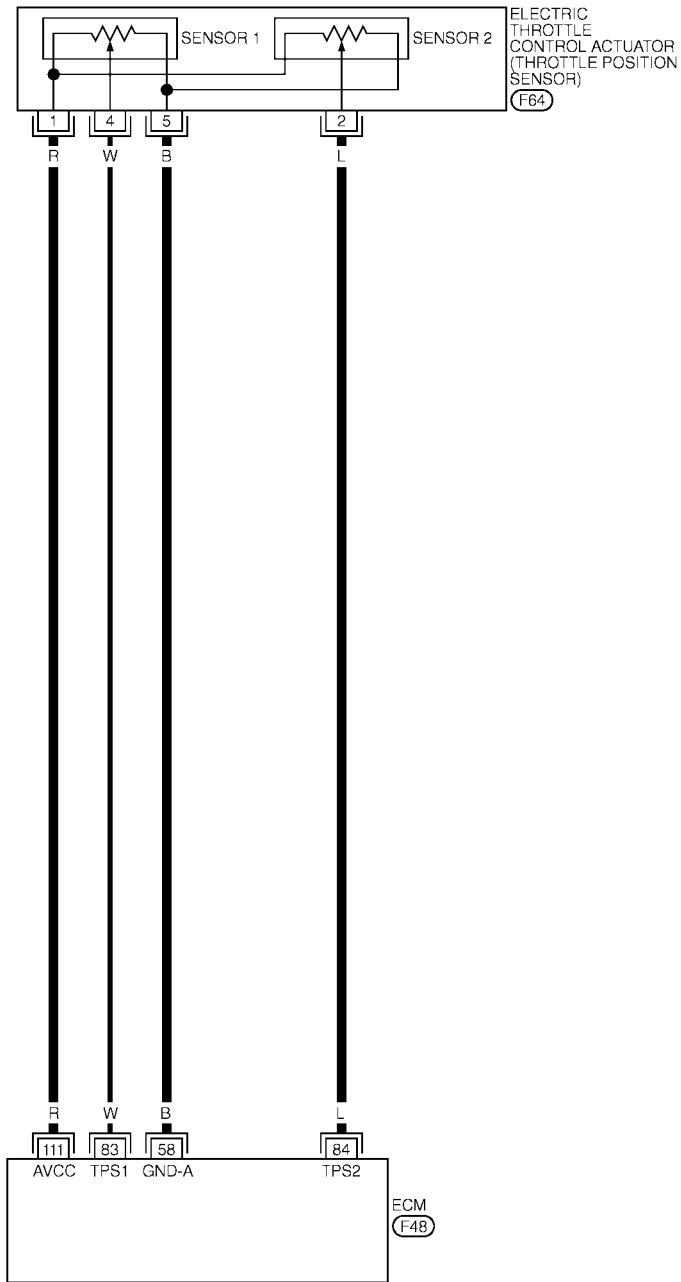
Wiring Diagram

Wiring Diagram

NFEC1337

EC-TPS2-01

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



MEC701D

DTC P1223, P1224 TP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

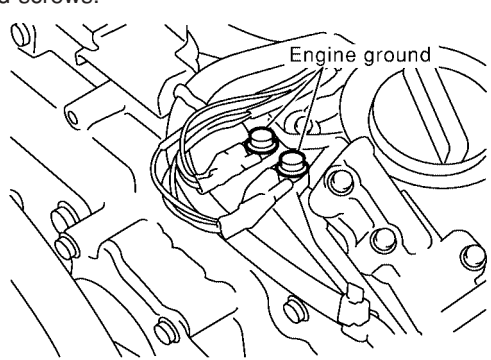
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal released	More than 0.36V
			[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal released	Less than 4.75V
			[Ignition switch "ON"] Shift lever position is "D" (A/T model) Shift lever position is "1st" (M/T model) Accelerator pedal fully depressed	More than 0.36V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

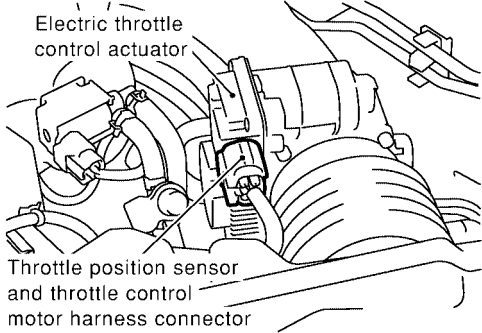
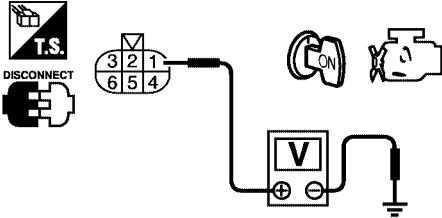
Diagnostic Procedure

NFEC1338

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
	
SEC047D	
GO TO 2.	

DTC P1223, P1224 TP SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT
<p>1. Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch "ON".</p> <div style="text-align: center;">  <p>Electric throttle control actuator</p> <p>Throttle position sensor and throttle control motor harness connector</p> </div> <p>3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="color: blue;">Voltage: Approximately 5V</p> <p style="text-align: center;">OK or NG</p>	
SEC054D	
PBIB0082E	
OK	GO TO 3.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram. <b style="color: blue;">Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following. Harness for open or short between electric throttle control actuator and ECM</p>	
	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P1223, P1224 TP SENSOR

Diagnostic Procedure (Cont'd)

5	CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 84 and electric throttle control actuator terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA
EM
LC

6	CHECK THROTTLE POSITION SENSOR
Refer to "Component Inspection", EC-553. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

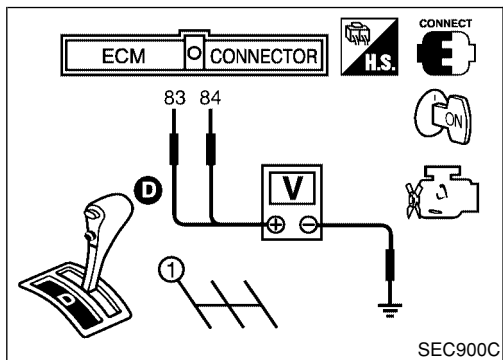
EC
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CL

7	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71. <p style="text-align: center;">INSPECTION END</p>	

MT
AT

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154. <p style="text-align: center;">INSPECTION END</p>	

AX
SU



Component Inspection THROTTLE POSITION SENSOR

NFEC1339

1. Reconnect all harness connectors disconnected.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1), 84 (TP sensor 2) and engine ground under the following conditions.

ST
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BT
HA

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (Throttle position sensor 2)	Released	Less than 4.75V
	Fully depressed	More than 0.36V

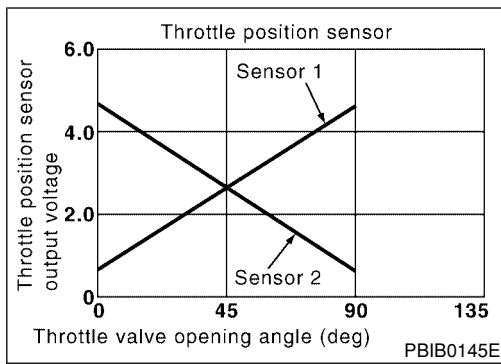
SC
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IDX

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform "Throttle Valve Closed Position Learning", EC-71.

DTC P1223, P1224 TP SENSOR

Component Inspection (Cont'd)

8. Perform "Idle Air Volume Learning", EC-71.



Component Description

NFEC1340

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.

GI
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On Board Diagnosis Logic

NFEC1342

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)

AT
AX
SU

BR

DTC Confirmation Procedure

NFEC1343

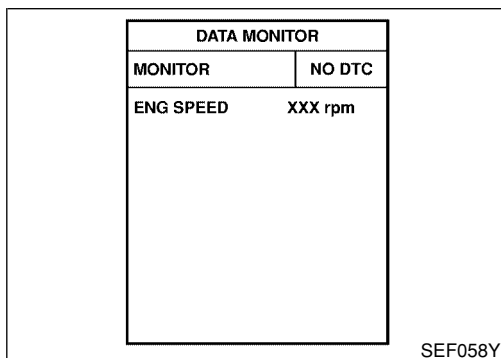
NOTE:

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.

ST
RS
BT
HA



With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Turn ignition switch "OFF", wait at least 10 seconds.
- 4) Turn ignition switch "ON".
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-556.

SC
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DTC P1225 TP SENSOR

DTC Confirmation Procedure (Cont'd)

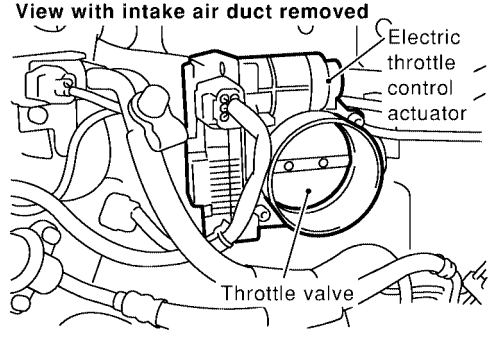


With GST

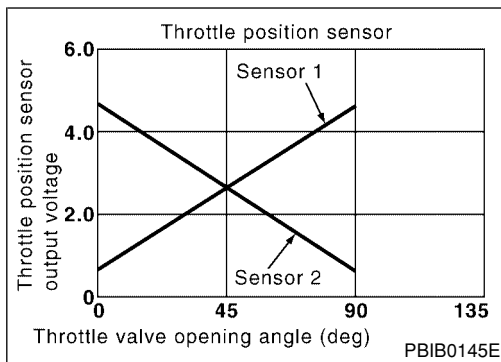
Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NFEC1345

1	CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY
<ol style="list-style-type: none">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.	
<p>View with intake air duct removed</p>  <p>SEC083D</p>	
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
<ol style="list-style-type: none">1. Replace the electric throttle control actuator.2. Perform "Throttle Valve Closed Position Learning", EC-71.3. Perform "Idle Air Volume Learning", EC-71.	
INSPECTION END	



Component Description

NFEC1361

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.

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On Board Diagnosis Logic

NFEC1362

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)

AT

AX

SU

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DTC Confirmation Procedure

NFEC1363

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:

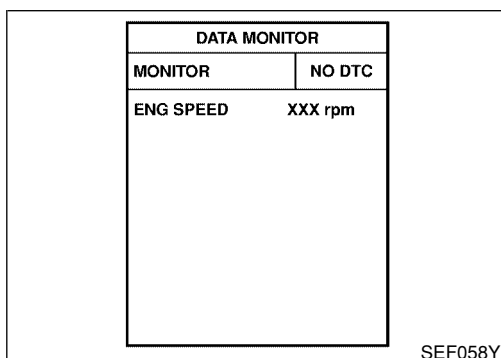
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

ST

RS

BT

HA



With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Turn ignition switch "OFF", wait at least 10 seconds.
- 4) Turn ignition switch "ON".
- 5) Repeat steps 3 and 4, 32 times.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-558.

SC

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DTC P1226 TP SENSOR

DTC Confirmation Procedure (Cont'd)

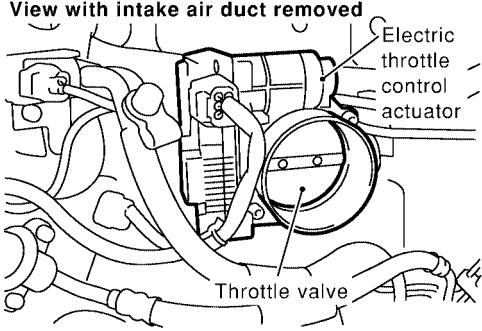


With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

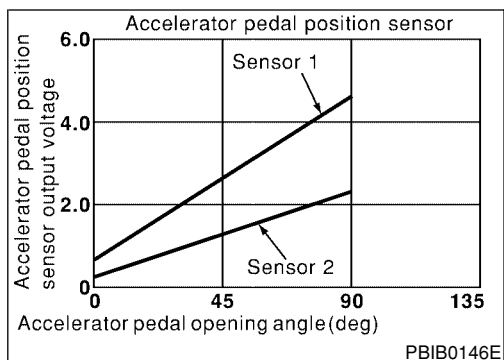
NFEC1364

1	CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY
<ol style="list-style-type: none">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.	
<p>View with intake air duct removed</p>  <p>SEC083D</p>	
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
<ol style="list-style-type: none">1. Replace the electric throttle control actuator.2. Perform "Throttle Valve Closed Position Learning", EC-71.3. Perform "Idle Air Volume Learning", EC-71.	
INSPECTION END	

DTC P1227, P1228 APP SENSOR

Component Description



Component Description

NFEC1347

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.

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CONSULT-II Reference Value in Data Monitor Mode

NFEC1348

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	Ignition switch: ON (engine stopped)	Accelerator pedal: Released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN2	Ignition switch: ON (engine stopped)	Accelerator pedal: Released	0.15 - 0.97V
		Accelerator pedal: Fully depressed	More than 3.5V
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Released	ON
		Accelerator pedal: Slightly depressed	OFF

AX
SU
BR
ST
RS

On Board Diagnosis Logic

NFEC1457

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	Harness or connectors (The APP sensor 2 circuit is open or shorted.) Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P1228 1228	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

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DTC P1227, P1228 APP SENSOR

On Board Diagnosis Logic (Cont'd)

FAIL-SAFE MODE

=NFEC1457S01

When the malfunction is detected, ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

NFEC1458

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.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

Ⓜ 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 "Diagnostic Procedure", EC-562.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

DTC P1227, P1228 APP SENSOR

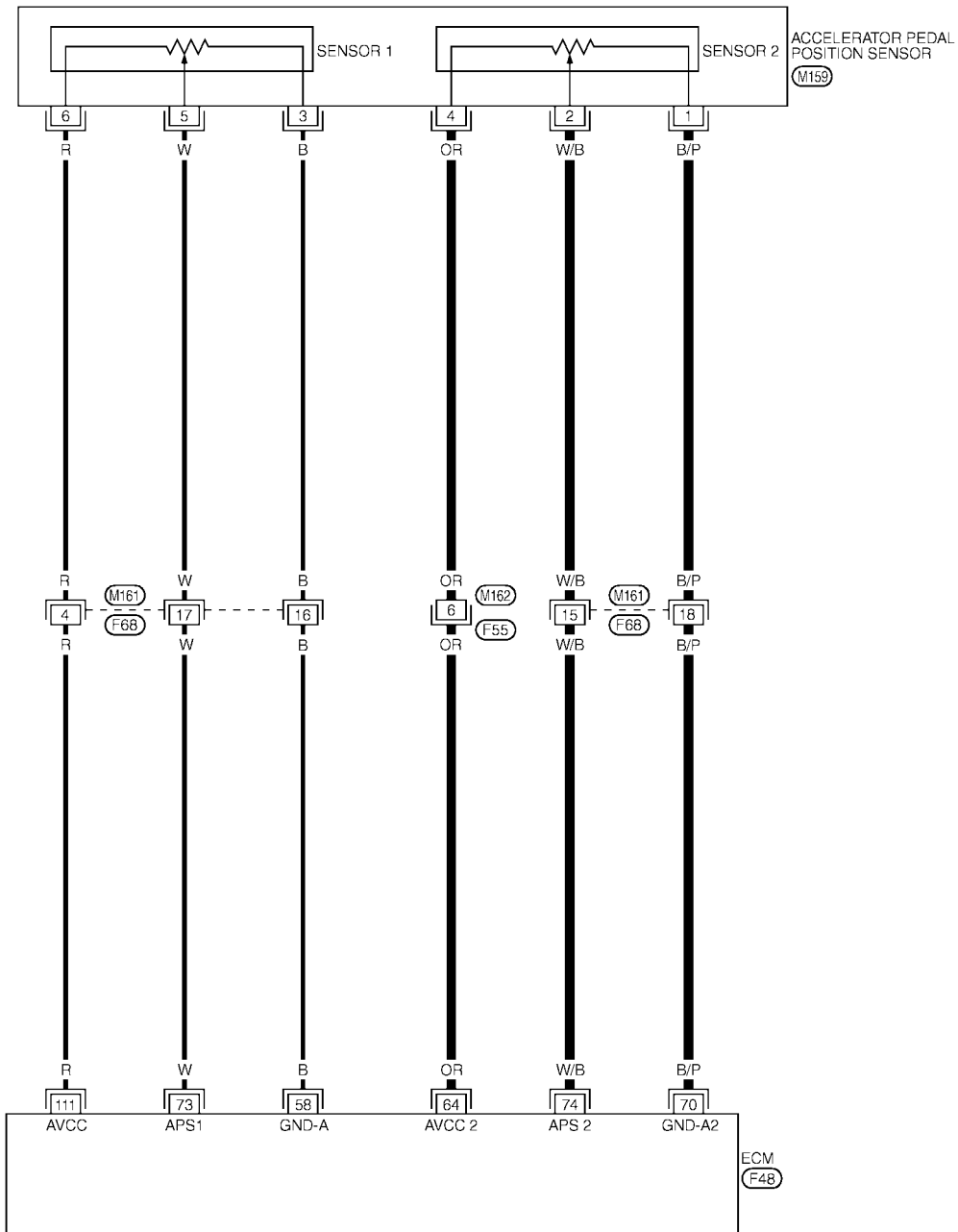
Wiring Diagram

Wiring Diagram

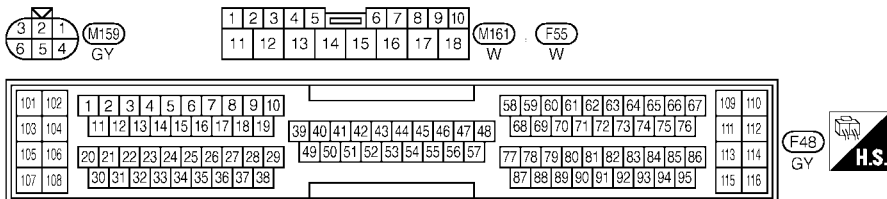
NFEC1351

EC-APPS2-01

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



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MEC927D

DTC P1227, P1228 APP SENSOR

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

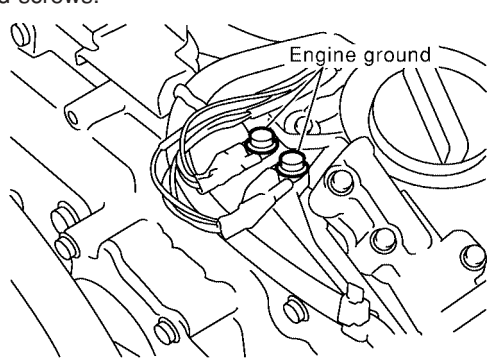
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
70	B/P	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] Accelerator pedal released	0.41 - 0.71V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] Accelerator pedal released	0.08 - 0.48V
			[Ignition switch "ON"] Accelerator pedal fully depressed	More than 1.8V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

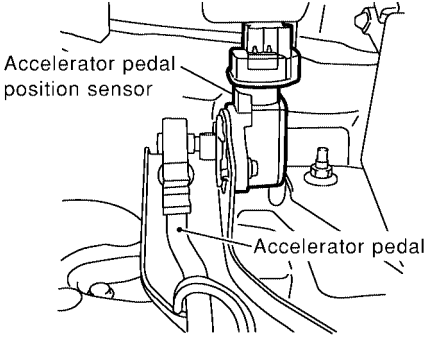
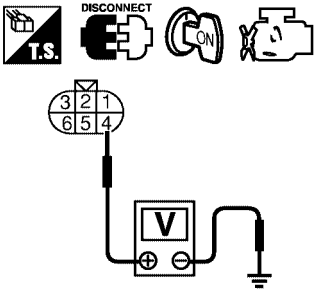
Diagnostic Procedure

NFEC1352

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
 <p>The diagram shows a close-up of the engine block with several ground screws. One screw is highlighted with a callout line and the text 'Engine ground'.</p>	
SEC047D	
GO TO 2.	

DTC P1227, P1228 APP SENSOR

Diagnostic Procedure (Cont'd)

2	CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT	
<p>1. Disconnect accelerator pedal position (APP) sensor harness connector. 2. Turn ignition switch "ON".</p>		
		
<p>3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.</p>		
		
SEC081D		
<p>Voltage: Approximately 2.5V</p>		
<p>OK or NG</p>		
SEC094D		
OK	GO TO 4.	
NG	GO TO 3.	

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3	DETECT MALFUNCTIONING PART	
<p>Check the following. Harness connectors M162, F55 Harness for open or short between ECM and accelerator pedal position sensor</p>		
<p>Repair open circuit or short to ground or short to power in harness or connectors.</p>		

BR
ST
RS

4	CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between APP sensor terminal 1 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p>		
<p>3. Also check harness for short to ground and short to power.</p>		
<p>OK or NG</p>		
OK	GO TO 6.	
NG	GO TO 5.	

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5	DETECT MALFUNCTIONING PART	
<p>Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor</p>		
<p>Repair open circuit or short to ground or short to power in harness or connectors.</p>		

IDX

DTC P1227, P1228 APP SENSOR

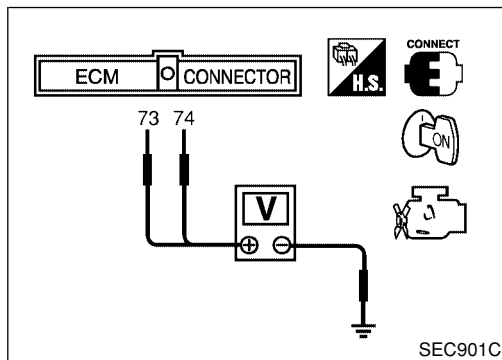
Diagnostic Procedure (Cont'd)

6	CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 74 and APP sensor terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M161, F68 Harness for open or short between ECM and accelerator pedal position sensor	
	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK APP SENSOR
Refer to "Component Inspection", EC-564.	
OK or NG	
OK	GO TO 9.
NG	Replace accelerator pedal assembly.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END



Component Inspection

ACCELERATOR PEDAL POSITION SENSOR

NFEC1459

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Released	0.41 - 0.71V
	Fully depressed	More than 3.7V
74 (Accelerator pedal position sensor 2)	Released	0.08 - 0.48V
	Fully depressed	More than 1.8V

4. If NG, replace accelerator pedal assembly.
5. Perform "Accelerator Pedal Released Position Learning", EC-71.
6. Perform "Throttle Valve Closed Position Learning", EC-71.
7. Perform "Idle Air Volume Learning", EC-71.

DTC P1229 SENSOR POWER SUPPLY

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC1460

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.	Harness or connectors (The TP sensor 1 and 2 circuit is shorted.) (APP sensor circuit is shorted.) (MAF sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Power steering pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) Electric throttle control actuator (TP sensor 1 and 2) Accelerator pedal position sensor (APP sensor 1) MAF sensor EVAP control system pressure sensor Power steering pressure sensor Refrigerant pressure sensor ECM pin terminal

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FAIL-SAFE MODE

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

NFEC1460S01

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.

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DTC Confirmation Procedure

NFEC1461

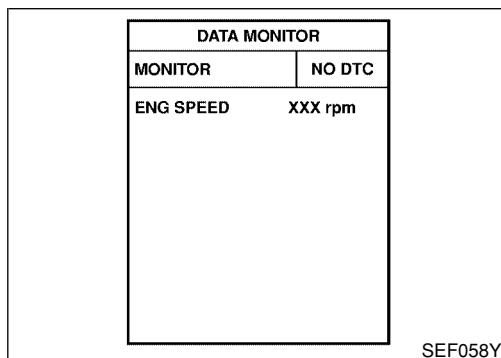
NOTE:

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.

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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 "Diagnostic Procedure", EC-568.

SC
EL
IDX

DTC P1229 SENSOR POWER SUPPLY

DTC Confirmation Procedure (Cont'd)



With GST

Follow the procedure "With CONSULT-II" above.

DTC P1229 SENSOR POWER SUPPLY

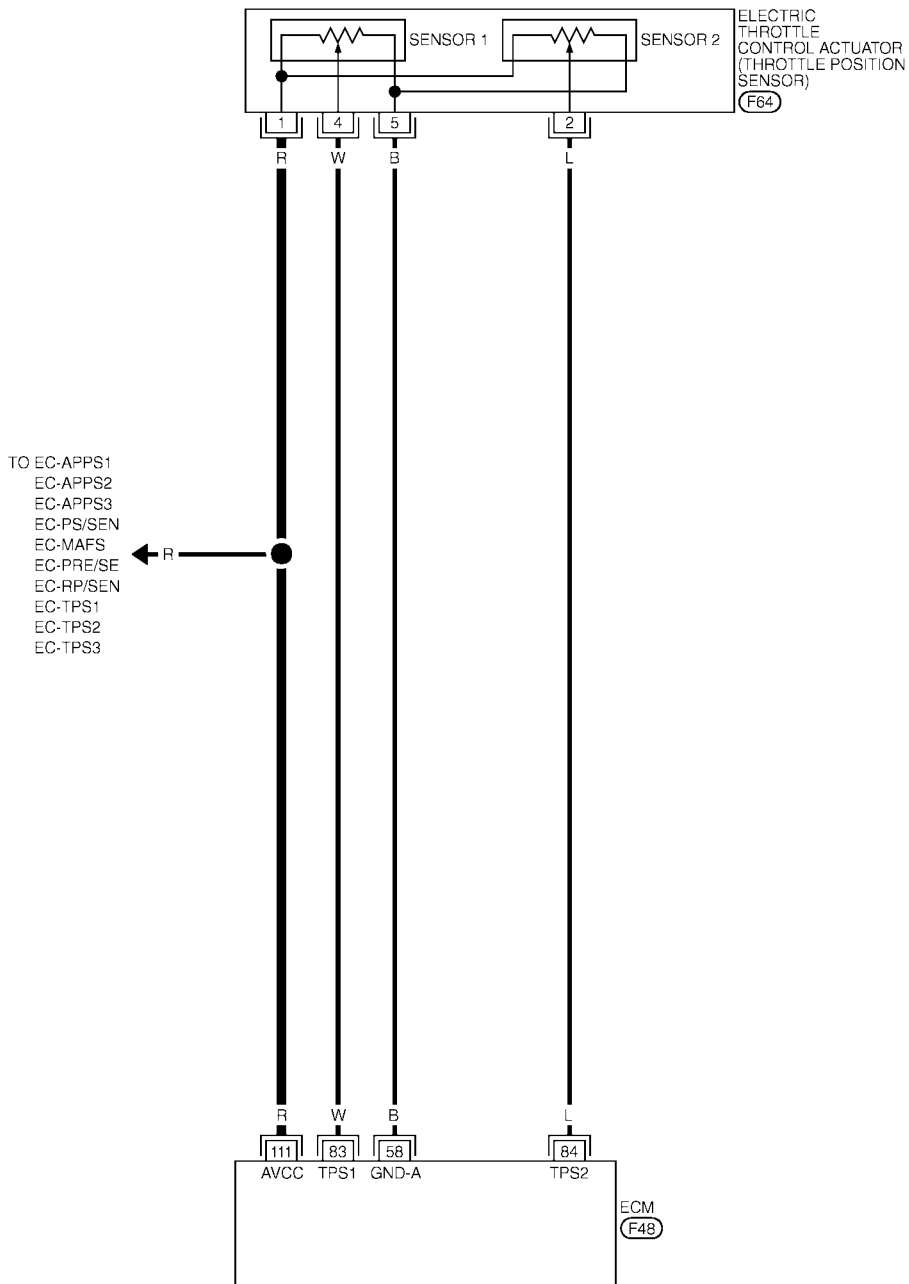
Wiring Diagram

Wiring Diagram

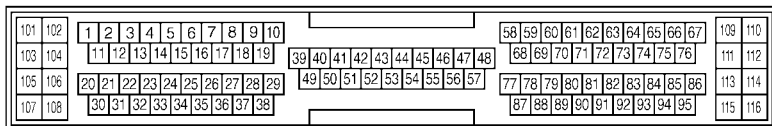
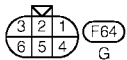
NFEC1358

EC-SEN/PW-01

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



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MEC657D

DTC P1229 SENSOR POWER SUPPLY

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

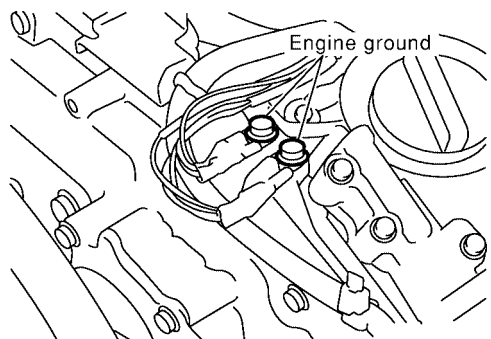
CAUTION:

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

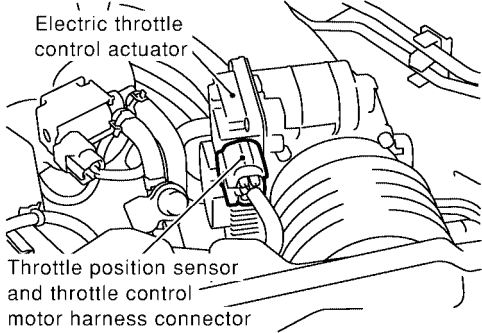
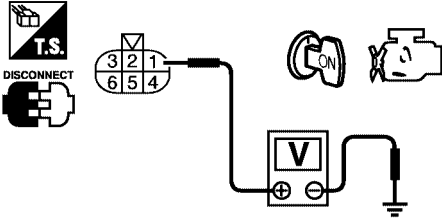
Diagnostic Procedure

NFEC1359

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC047D</p>	
GO TO 2.	

DTC P1229 SENSOR POWER SUPPLY

Diagnostic Procedure (Cont'd)

2	CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT
<p>1. Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch "ON".</p> <div style="text-align: center;">  <p>Electric throttle control actuator</p> <p>Throttle position sensor and throttle control motor harness connector</p> </div> <p>3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="color: blue;">Voltage: Approximately 5V</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 3.

SEC054D

PBIB0082E

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3	CHECK SENSOR POWER SUPPLY CIRCUITS
<p>Check the following.</p> <p>Harness for short to power and short to ground, between the following terminals.</p> <p>ECM terminal 111 and electric throttle control actuator terminal 1. Refer to "Wiring Diagram", EC-567.</p> <p>ECM terminal 111 and APP sensor terminal 2. Refer to "Wiring Diagram", EC-311.</p> <p>ECM terminal 111 and MAF sensor terminal 2. Refer to "Wiring Diagram", EC-195.</p> <p>ECM terminal 111 and EVAP control system pressure sensor terminal 1. Refer to "Wiring Diagram", EC-390.</p> <p>ECM terminal 111 and power steering pressure sensor terminal 1. Refer to "Wiring Diagram", EC-449.</p> <p>ECM terminal 111 and refrigerant pressure sensor terminal 1. Refer to "Wiring Diagram", EC-738.</p> <p>ECM pin terminal</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	Repair short to ground or short to power in harness or connectors.

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DTC P1229 SENSOR POWER SUPPLY

Diagnostic Procedure (Cont'd)

4	CHECK COMPONENTS
Check the following. Accelerator pedal position sensor (Refer to "Component Inspection", EC-307.) Mass air flow sensor (Refer to "Diagnostic Procedure", EC-190.) EVAP control system pressure sensor (Refer to "Diagnostic Procedure", EC-391.) Power steering pressure sensor (Refer to "Component Inspection", EC-452.) Refrigerant pressure sensor (Refer to "Diagnostic Procedure", EC-739.)	
OK or NG	
OK	GO TO 7.
NG	Replace malfunctioning component.

5	CHECK THROTTLE POSITION SENSOR
Refer to "Component Inspection", EC-293.	
OK or NG	
OK	GO TO 7.
NG	GO TO 6.

6	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR
1. Replace electric throttle control actuator. 2. Perform "Throttle valve closed position learning", EC-71. 3. Perform "Idle air volume learning", EC-71.	
INSPECTION END	

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

On Board Diagnosis Logic

NFEC1483

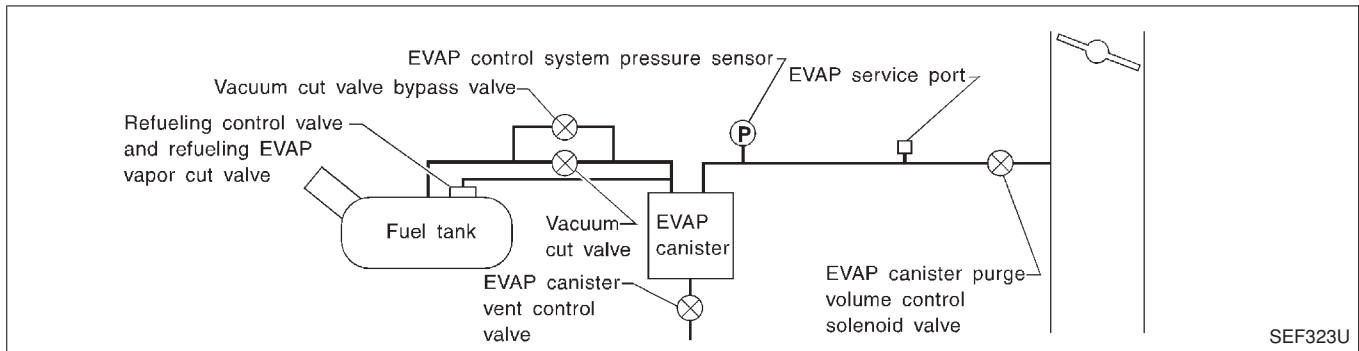
NOTE:

If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-607.)

This diagnosis detects leaks in the EVAP purge line using the vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank.

If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1442 1442	EVAP control system small leak detected (positive pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	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 Blocked or bent rubber tube to EVAP control system pressure sensor 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. Water separator EVAP canister is saturated with water. EVAP control system pressure sensor Fuel level sensor and the circuit Refueling control valve ORVR system leaks

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DTC P1442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic (Cont'd)

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.

5

EVAP SML LEAK P0442/P1442
1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS. -FUEL LEVEL: 1/4-3/4 -AMBIENT TEMP: 0-30 C(32-86F) -OPEN ENGINE HOOD. 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART. 3)TOUCH START.


SEC760C

5

EVAP SML LEAK P0442/P1442
WAIT 2 TO 10 MINUTES. KEEP ENGINE RUNNING AT IDLE SPEED.

SEC761C

5

EVAP SML LEAK P0442/P1442
MAINTAIN 1600 - 2100 RPM UNTIL FINAL RESULT APPEARS. (APPROX. 3 MINUTES)


SEC762C

5

EVAP SML LEAK P0442/P1442
OK
SELF-DIAG RESULTS
NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.

SEC763C

DTC Confirmation Procedure

NFEC1484

NOTE:

If DTC P1442 is displayed with P1448, first perform trouble diagnosis for DTC P1448 (See EC-607).

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 to 3/4 full and vehicle is placed on flat level surface.

Open engine hood before conducting the following procedure.

WITH CONSULT-II

NFEC1484S01

- 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.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
- 5) Select “EVP 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 “Basic Inspection”, EC-121.

- 6) Make sure that “OK” is displayed.

If “NG” is displayed, refer to “Diagnostic Procedure”, EC-573.

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

WITH GST

NFEC1484S02

NOTE:

Be sure to read the explanation of “Driving Pattern” on EC-83 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-83.
- 3) Stop vehicle.
- 4) Select “MODE 1” with GST.

If SRT of EVAP system is not set yet, go to the following step.

DTC P1442 EVAP CONTROL SYSTEM

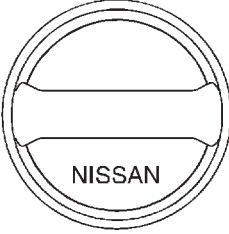
DTC Confirmation Procedure (Cont'd)

- If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 6) Start engine.
It is not necessary to cool engine down before driving.
 - 7) Drive vehicle again according to the "Driving Pattern", EC-83.
 - 8) Stop vehicle.
 - 9) Select "MODE 3" with GST.
If P1442 is displayed on the screen, go to "Diagnostic Procedure", EC-573.
If P0442 is displayed on the screen, go to "Diagnostic Procedure", EC-361.
If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, EC-352.
If P0441, P0442 and P1442 are not displayed on the screen, go to the following step.
 - 10) Select "MODE 1" with GST.
If SRT of EVAP system is set, the result will be OK.
If SRT of EVAP system is not set, go to step 6.

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Diagnostic Procedure

NFEC1485

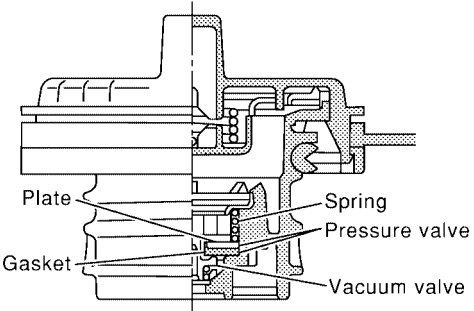
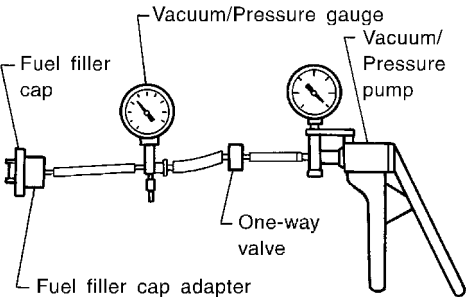
1	CHECK FUEL FILLER CAP DESIGN
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF915U</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 2.
NG	Replace with genuine NISSAN fuel filler cap.

2	CHECK FUEL FILLER CAP INSTALLATION
<p>Check that the cap is tightened properly by rotating the cap clockwise.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 3.
NG	Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Retighten until ratcheting sound is heard.

DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

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.

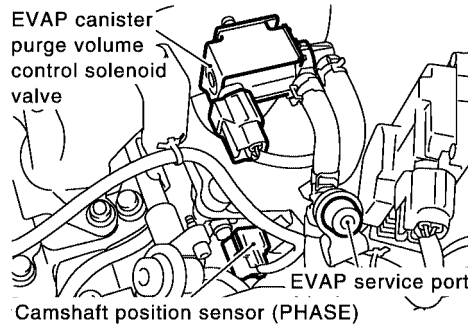
4	CHECK FUEL TANK VACUUM RELIEF VALVE
<ol style="list-style-type: none"> 1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum. 	
	
SEF445Y	
	
SEF943S	
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>	
OK or NG	
OK	GO TO 5.
NG	Replace fuel filler cap with a genuine one.

DTC P1442 EVAP CONTROL SYSTEM

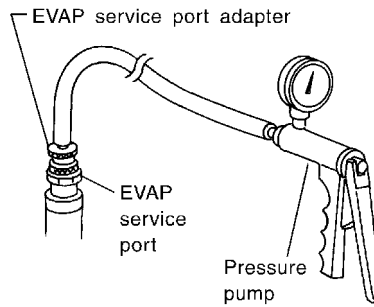
Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II	GO TO 6.
Models without CONSULT-II	GO TO 7.

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DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

6 CHECK FOR EVAP LEAK

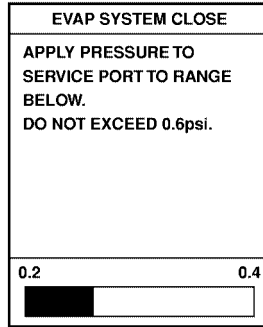
Ⓟ With CONSULT-II

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.

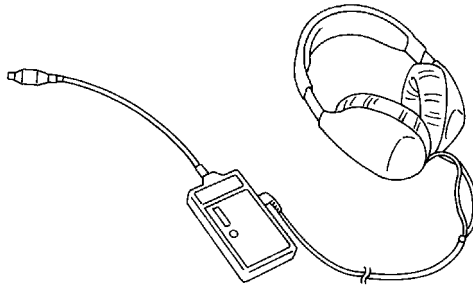
Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

OK or NG

OK

GO TO 8.

NG

Repair or replace.

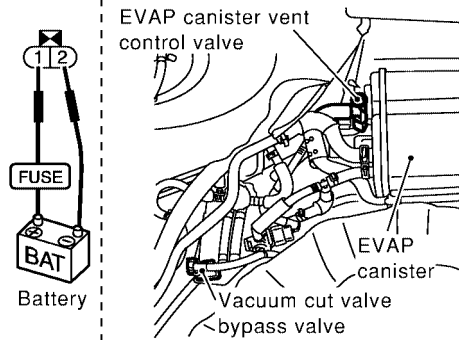
DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

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. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

4. 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.

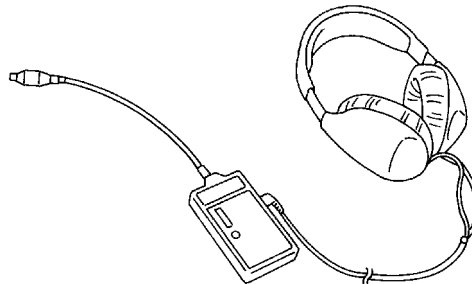
NOTE:

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.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

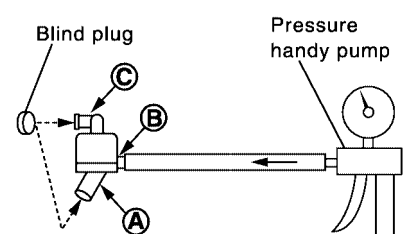
OK or NG

OK	GO TO 8.
NG	Repair or replace.

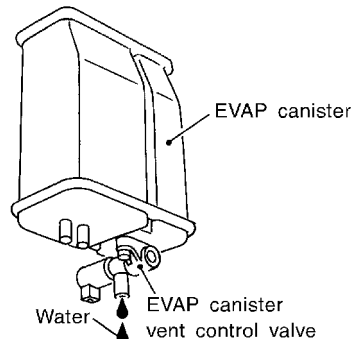
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DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
 <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
PBIB1032E	
<ol style="list-style-type: none"> 5. In case of NG in items 2 - 4, replace the parts. <p>NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-381.	
OK or NG	
OK	GO TO 10.
NG	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER
<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister? 	
	
Yes or No	
Yes	GO TO 11.
No (With CONSULT-II)	GO TO 13.
No (Without CONSULT-II)	GO TO 14.

SEF596U

DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK (With CONSULT-II)	GO TO 13.	
OK (Without CONSULT-II)	GO TO 14.	
NG	GO TO 12.	

12	DETECT MALFUNCTIONING PART	
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection		
		Repair hose or replace EVAP canister.

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
(P) 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 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
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A/F ALPHA-B2	XXX %																					
HO2S1 MNTR (B1)	RICH																					
HO2S1 MNTR (B2)	RICH																					
Vacuum should exist. SEC142D																						
OK or NG																						
OK	GO TO 16.																					
NG	GO TO 15.																					


14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
(X) 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 17.	
NG	GO TO 15.	

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DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

15	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.		
OK or NG		
OK (With CONSULT-II)	GO TO 16.	
OK (Without CONSULT-II)	GO TO 17.	
NG	Repair or reconnect the hose.	

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																						
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HO2S1 MNTR (B2)	RICH																					
SEC142D																						
OK or NG																						
OK	GO TO 18.																					
NG	GO TO 17.																					

DTC P1442 EVAP CONTROL SYSTEM

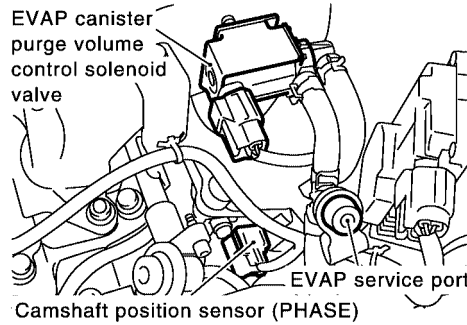
Diagnostic Procedure (Cont'd)

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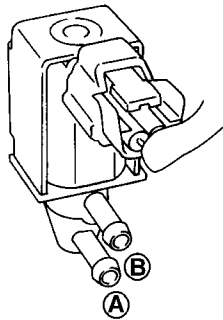
17 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

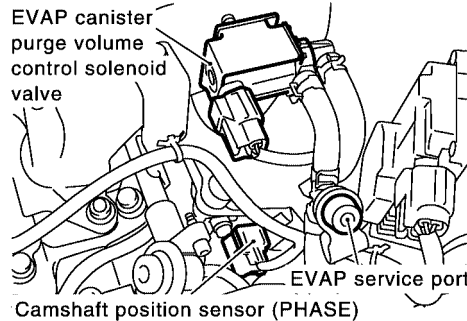


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

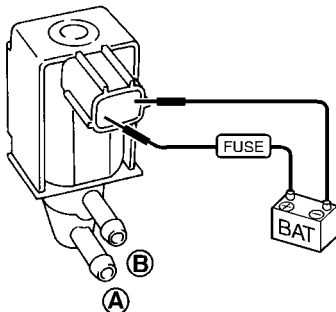
SEF334X

ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK

GO TO 18.

NG

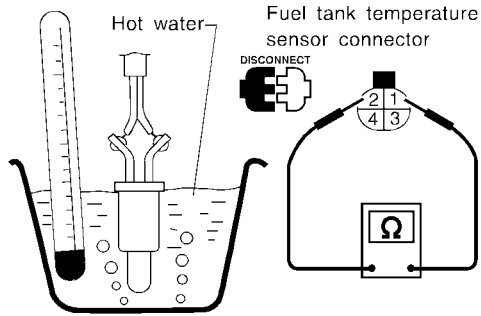
Replace EVAP canister purge volume control solenoid valve.

DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

18 CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit terminals 1 and 2 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

SEF974Y

OK or NG

OK

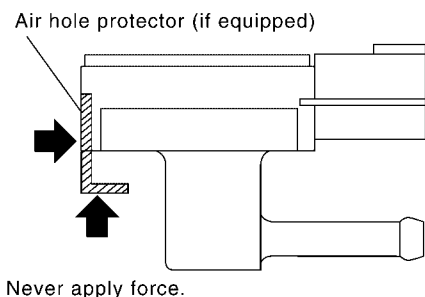
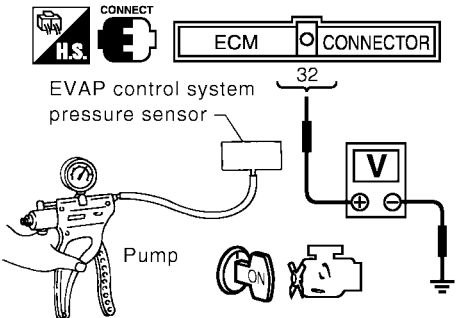
GO TO 19.

NG

Replace fuel level sensor unit.

DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

19	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected. Never apply force to the air hole protector of the sensor if equipped.</p>	
	
SEF799W	
<p>2. Remove EVAP control system pressure sensor from EVAP canister. Do not reuse the O-ring, replace it with a new one.</p> <p>3. Install a vacuum pump to EVAP control system pressure sensor.</p> <p>4. Turn ignition switch "ON" and check output voltage between ECM terminal 32 and ground under the following conditions.</p>	
	
SEC422D	
<p>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). Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p>	
OK or NG	
OK	GO TO 20.
NG	Replace EVAP control system pressure sensor.

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20	CHECK EVAP PURGE LINE
<p>Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-36.</p>	
OK or NG	
OK	GO TO 21.
NG	Repair or reconnect the hose.

21	CLEAN EVAP PURGE LINE
<p>Clean EVAP purge line (pipe and rubber tube) using air blower.</p>	
	GO TO 22.

DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.	
OK or NG	
OK	GO TO 23.
NG	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK	GO TO 24.
NG	Repair or replace hoses, tubes or filler neck tube.

24	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> Remove fuel filler cap. Check air continuity between hose ends A and B. Blow air into hose end B. Air should flow freely into the fuel tank. Blow air into hose end A and check that there is no leakage. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
SEF830X	
OK or NG	
OK	GO TO 25.
NG	Replace or refueling control valve with fuel tank.

25	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	GO TO 26.
NG	Replace fuel level sensor unit.

DTC P1442 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

26	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

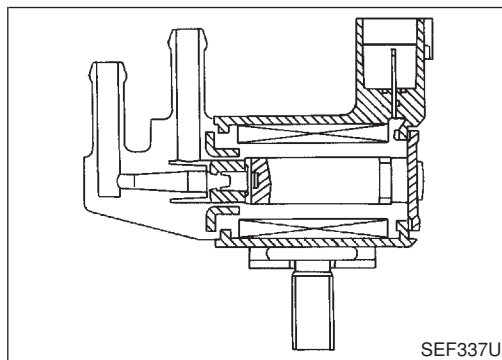
Description SYSTEM DESCRIPTION

NFEC1089

NFEC1089S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

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

NFEC1089S02

The EVAP canister purge volume control solenoid valve uses an 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

NFEC1090

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	Engine: After warming up Air conditioner switch "OFF" Shift lever: "N" No-load	Idle (Vehicle stopped)	0%
		2,000 rpm	—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC1092

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.	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.)

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DTC Confirmation Procedure

NFEC1093

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.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

DTC Confirmation Procedure (Cont'd)

6	PURG VOL CN/V P1444							
	OUT OF CONDITION							
	MONITOR							
	<table border="0"> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> <tr> <td>COOLAN TEMP/S</td> <td>XXX °C</td> </tr> <tr> <td>VHCL SPEED SE</td> <td>XXX km/h</td> </tr> </table>	ENG SPEED	XXX rpm	B/FUEL SCHDL	XXX msec	COOLAN TEMP/S	XXX °C	VHCL SPEED SE
ENG SPEED	XXX rpm							
B/FUEL SCHDL	XXX msec							
COOLAN TEMP/S	XXX °C							
VHCL SPEED SE	XXX km/h							

SEC143D

6	PURG VOL CN/V P1444							
	TESTING							
	MONITOR							
	<table border="0"> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> <tr> <td>COOLAN TEMP/S</td> <td>XXX °C</td> </tr> <tr> <td>VHCL SPEED SE</td> <td>XXX km/h</td> </tr> </table>	ENG SPEED	XXX rpm	B/FUEL SCHDL	XXX msec	COOLAN TEMP/S	XXX °C	VHCL SPEED SE
ENG SPEED	XXX rpm							
B/FUEL SCHDL	XXX msec							
COOLAN TEMP/S	XXX °C							
VHCL SPEED SE	XXX km/h							

SEC144D

6	PURG VOL CN/V P1444
	COMPLETED

SEF237Y

Ⓜ WITH CONSULT-II

NFEC1093S01

- 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 for 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 "Diagnostic Procedure", EC-591.

Ⓜ WITH GST

NFEC1093S02

- 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 "Diagnostic Procedure", EC-591.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

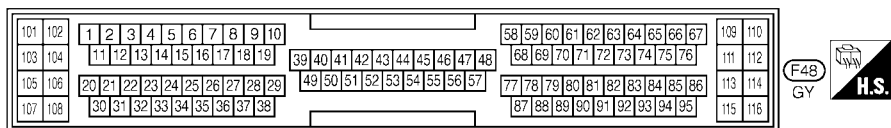
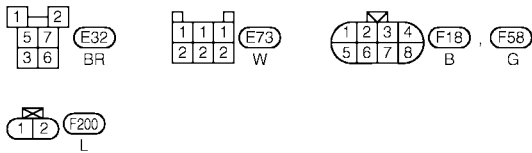
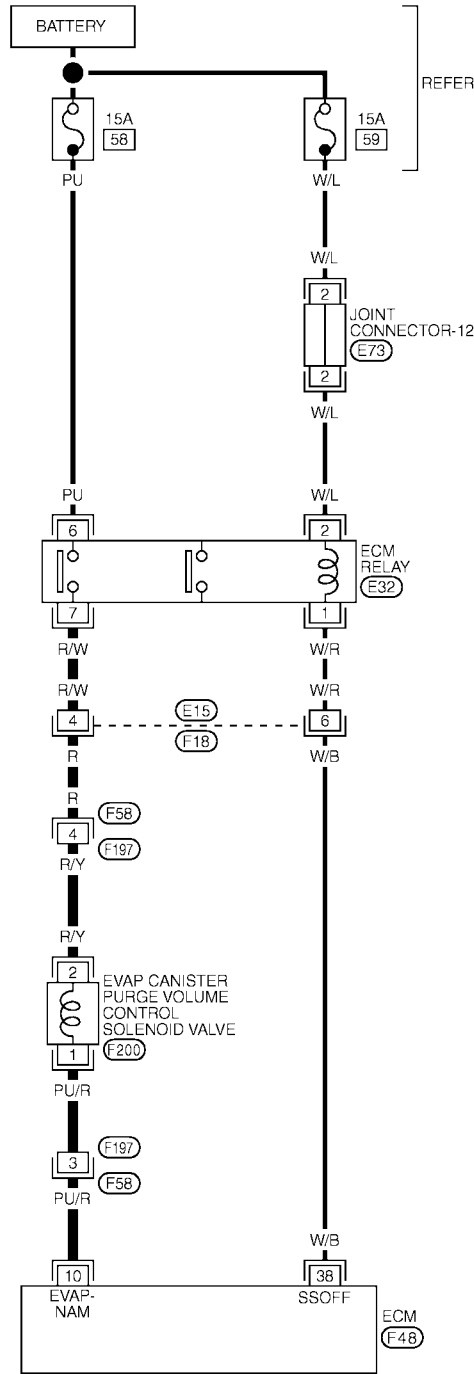
Wiring Diagram

Wiring Diagram

NFEC1094

EC-PGC/V-01

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



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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Wiring Diagram (Cont'd)

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

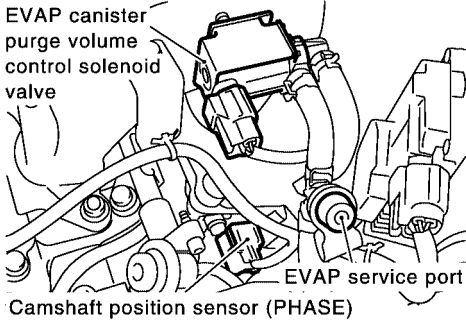
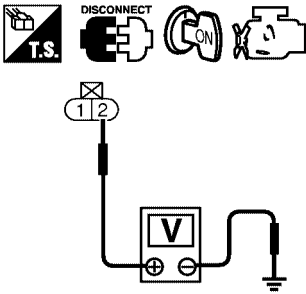
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	PU/R	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE

SEF800YB

Diagnostic Procedure

NFEC1095

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 2 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

SEC929C

SEC062D

2	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors E15, F18 Harness connectors F58, F197 Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay</p>	
	Repair harness or connectors.

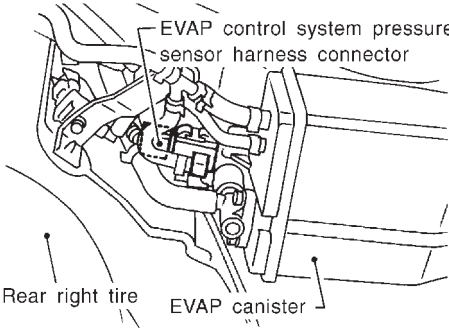
3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 10 and EVAP canister purge volume control solenoid valve terminal 1. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 5.
NG	GO TO 4.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F197, F58 Harness for open or short between ECM and EVAP canister purge volume control solenoid valve	
Repair open circuit or short to ground or short to power in harness or connectors.	

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
 <p>The diagram shows a side view of the rear right area of a vehicle. It labels the 'Rear right tire', the 'EVAP canister', and the 'EVAP control system pressure sensor harness connector'. The sensor connector is located near the EVAP canister and is connected to a hose.</p>	
SEF495R	
OK or NG	
OK	GO TO 6.
NG	Repair it.

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.

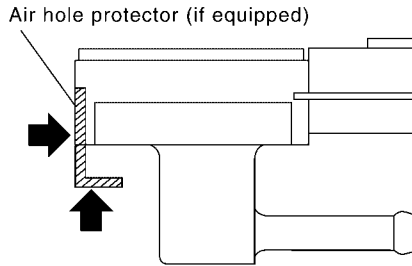
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7 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

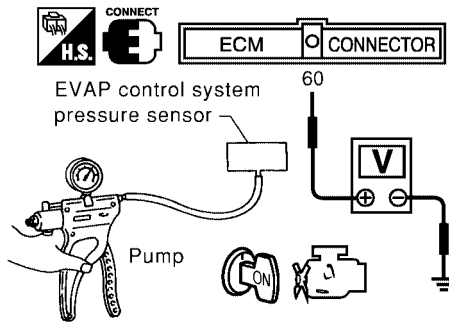
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:


Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.


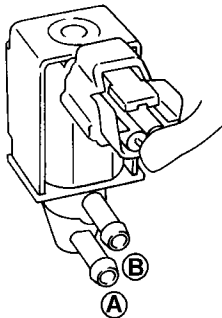
OK or NG


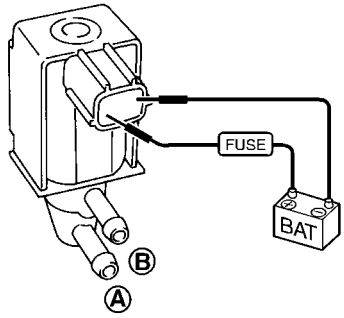
OK (With CONSULT-II)	GO TO 8.
OK (Without CONSULT-II)	GO TO 9.
NG	Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect 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. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td style="text-align: center;">0.0%</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td style="text-align: center;">XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td style="text-align: center;">XXX %</td></tr> <tr><td>A/F ALPHA-B2</td><td style="text-align: center;">XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td style="text-align: center;">RICH</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td style="text-align: center;">RICH</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																					
PURG VOL CONT/V	0.0%																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
A/F ALPHA-B2	XXX %																				
HO2S1 MNTR (B1)	RICH																				
HO2S1 MNTR (B2)	RICH																				
SEC142D																					
OK or NG																					
OK	GO TO 10.																				
NG	GO TO 9.																				

9	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE						
<p> With CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition PURG VOL CONT/V value</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">100.0%</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B						
100.0%	Yes						
0.0%	No						
SEF334X							

<p> Without CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
SEF335X							
OK or NG							
OK	GO TO 10.						
NG	Replace EVAP canister purge volume control solenoid valve.						

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

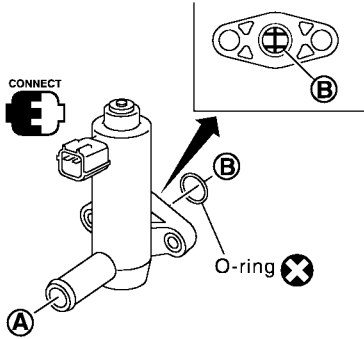
10	CHECK RUBBER TUBE FOR CLOGGING
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
OK or NG	
OK	GO TO 11.
NG	Clean the rubber tube using an air blower.

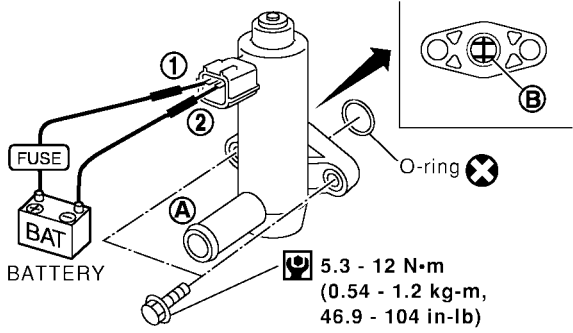
11	CHECK EVAP CANISTER VENT CONTROL VALVE-I
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.	
<p style="text-align: center;">OK or NG</p>	
OK	GO TO 12.
NG	Replace EVAP canister vent control valve.

GI
MA
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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

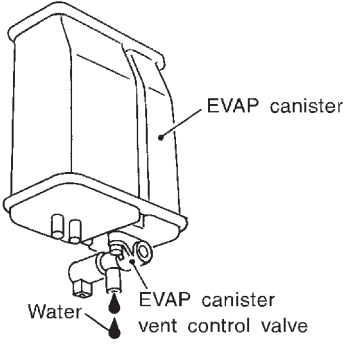
12	CHECK EVAP CANISTER VENT CONTROL VALVE-II																											
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Reconnect harness connectors disconnected. Turn ignition switch "ON". Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. Check air passage continuity and operation delay time. 																												
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>VENT CONTROL/V</td><td>OFF</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>A/F ALPHA-B2</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td>LEAN</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>	ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN						<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th>Condition</th><th>Air passage continuity between A and B</th></tr> <tr><td>VENT CONTROL/V ON</td><td>No</td></tr> <tr><td>VENT CONTROL/V OFF</td><td>Yes</td></tr> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																												
VENT CONTROL/V	OFF																											
MONITOR																												
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A/F ALPHA-B2	XXX %																											
HO2S1 MNTR (B1)	LEAN																											
HO2S1 MNTR (B2)	LEAN																											
Condition	Air passage continuity between A and B																											
VENT CONTROL/V ON	No																											
VENT CONTROL/V OFF	Yes																											
SEC158D																												

<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th>Condition</th><th>Air passage continuity between A and B</th></tr> <tr><td>12V direct current supply between terminals 1 and 2</td><td>No</td></tr> <tr><td>OFF</td><td>Yes</td></tr> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
<p>Make sure new O-ring is installed properly.</p>							
OK or NG							
OK	GO TO 14.						
NG	GO TO 13.						

13	CHECK EVAP CANISTER VENT CONTROL VALVE-III
<ol style="list-style-type: none"> Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. Perform procedure 9 again. 	
OK or NG	
OK	GO TO 14.
NG	Replace EVAP canister vent control valve.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

14	CHECK IF EVAP CANISTER SATURATED WITH WATER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.		
		
SEF596U		
Yes or No		
Yes	GO TO 15.	
No	GO TO 18.	

15	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	GO TO 17.	
NG	GO TO 16.	

16	DETECT MALFUNCTIONING PART	
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection		
		Repair hose or replace EVAP canister.

GI
MA
EM
LC
EC
FE
CL
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EL
IDX

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

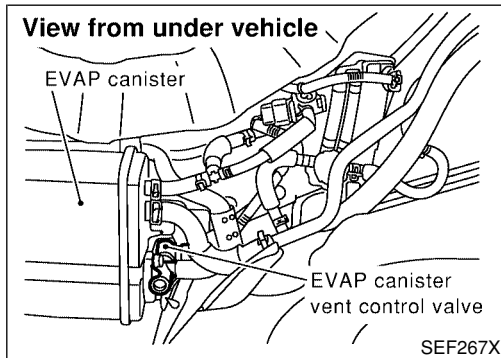
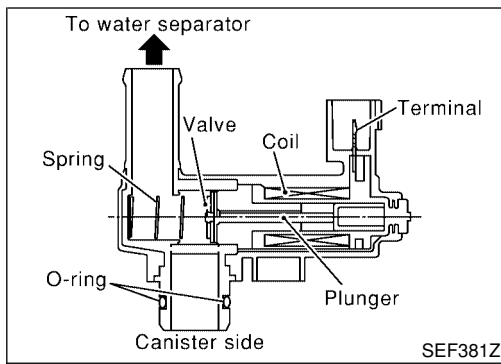
Diagnostic Procedure (Cont'd)

17	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;"> <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">PBIB1032E</p> <p>5. In case of NG in items 2 - 4, replace the parts. NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 18.
NG	Clean or replace water separator.

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

Component Description



Component Description

NFEC1096

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 (Small Leak)" diagnosis.

GI
MA
EM
LC
EC

CONSULT-II Reference Value in Data Monitor Mode

NFEC1097

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	Ignition switch: ON	OFF

AX
SU

On Board Diagnosis Logic

NFEC1099

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1446 1446	EVAP canister vent control valve closed	EVAP canister vent control valve remains closed under specified driving conditions.	EVAP canister vent control valve EVAP control system pressure sensor and the circuit Blocked rubber tube to EVAP canister vent control valve Water separator EVAP canister is saturated with water.

BR
ST
RS
BT

4

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

PBIB0164E

DTC Confirmation Procedure

NFEC1100

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.

WITH CONSULT-II

NFEC1100S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.

HA
SC
EL
IDX

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

DTC Confirmation Procedure (Cont'd)

- 3) Start engine.
- 4) Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:

If a malfunction exists, NG result may be displayed quicker.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-602.



WITH GST

Follow the procedure "WITH CONSULT-II" above.

NFEC1100S02

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

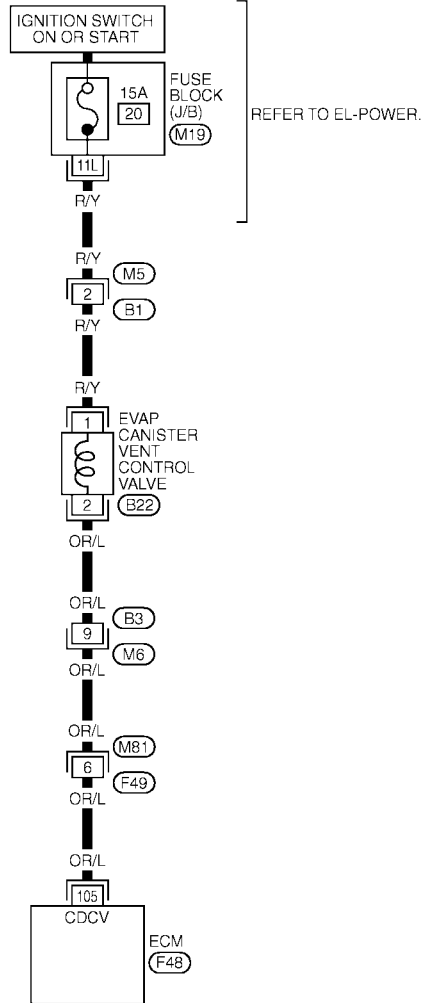
Wiring Diagram

Wiring Diagram

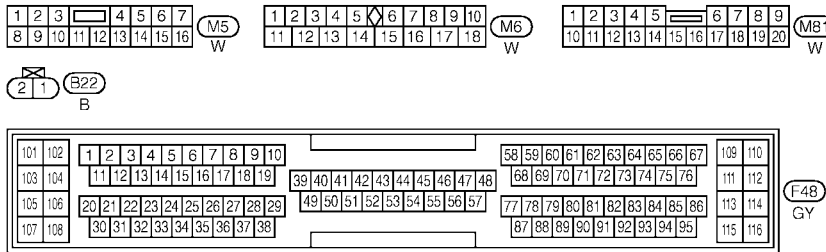
=NFEC1101

EC-VENT/V-01

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



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REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC495D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
105	OR/L	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

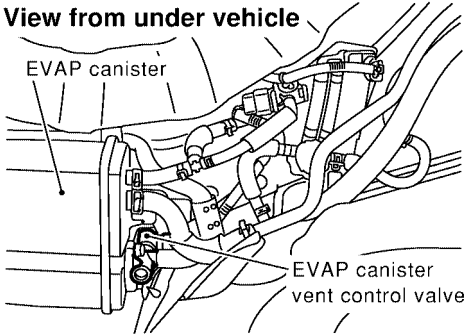
SEF668XC

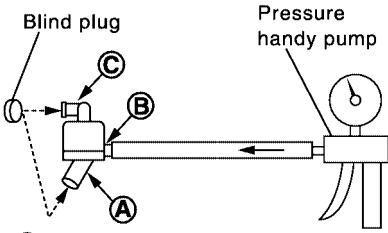
DTC P1446 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure

Diagnostic Procedure

NFEC1102

1	CHECK RUBBER TUBE	<p>1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging.</p> <div style="text-align: center;"> <p>View from under vehicle</p>  </div> <p style="text-align: right;">SEF267X</p>
OK or NG		
OK		GO TO 2.
NG		Clean rubber tube using an air blower.

2	CHECK WATER SEPARATOR	<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>★ (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">PBIB1032E</p> <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE: Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>
OK		GO TO 3.
NG		Clean or replace water separator.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-I

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.

SEF376Z

OK or NG

OK	GO TO 4.
NG	Replace EVAP canister vent control valve.

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4 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

- Turn ignition switch ON.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

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.

SEF378Z

Make sure new O-ring is installed properly.

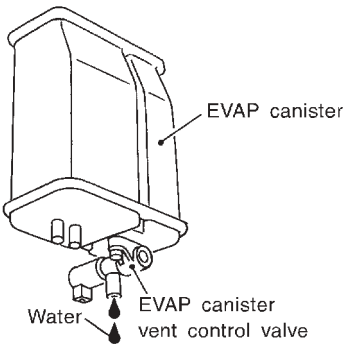
OK or NG

OK	GO TO 6.
NG	GO TO 5.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the procedure 4 again.	
OK or NG	
OK	GO TO 6.
NG	Replace EVAP canister vent control valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.	
	
Yes or No	
Yes	GO TO 7.
No	GO TO 9.

SEF596U

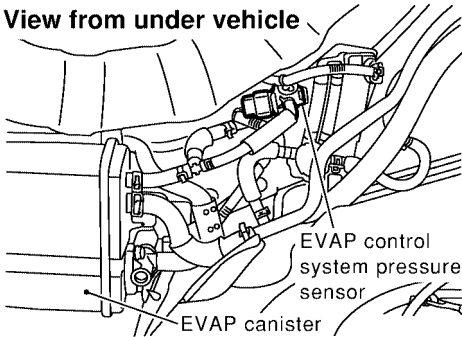
7	CHECK EVAP CANISTER
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).	
OK or NG	
OK	GO TO 9.
NG	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection	
Repair hose or replace EVAP canister.	

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
OK or NG	
OK	GO TO 10.
NG	Repair it.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

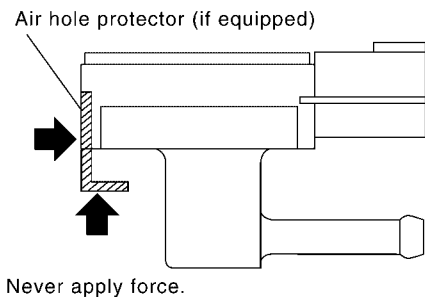
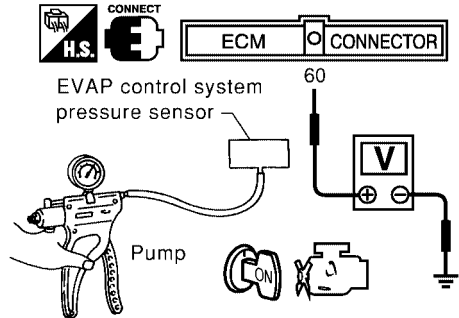
Diagnostic Procedure (Cont'd)

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;"> <p>View from under vehicle</p>  </div> <p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: right;">SEF268X</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 11.	
NG	Replace EVAP control system pressure sensor.	

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DTC P1446 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

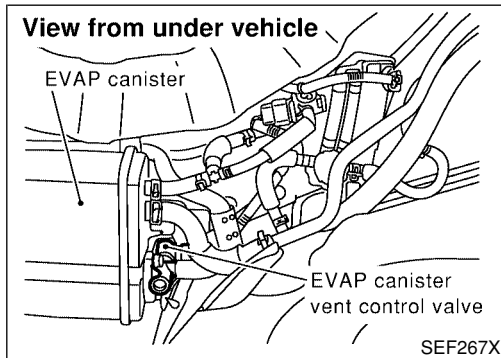
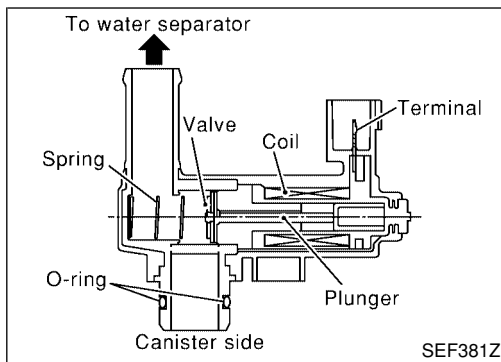
11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR										
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION: Never apply force to the air hole protector of the sensor if equipped.</p> <div style="text-align: center;">  <p>Air hole protector (if equipped)</p> <p>Never apply force.</p> </div> <p style="text-align: right;">SEF799W</p> <p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION: Always calibrate the vacuum pump gauge when using it. Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.</p> <p>5. Check input voltage between ECM terminal 60 and ground.</p> <div style="text-align: center;">  <p>CONNECT H.S. E ECM CONNECTOR</p> <p>EVAP control system pressure sensor</p> <p>60</p> <p>Pump</p> <p>V</p> <p>ON</p> </div> <p style="text-align: right;">SEC908C</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Pressure (Relative to atmospheric pressure)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 kPa (0 mmHg, 0 inHg)</td> <td style="text-align: center;">3.0 - 3.6</td> </tr> <tr> <td style="text-align: center;">-9.3 kPa (-70 mmHg, -2.76 inHg)</td> <td style="text-align: center;">0.4 - 0.6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1159</p> <p>CAUTION: Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 12.</td> </tr> <tr> <td>NG</td> <td>Replace EVAP control system pressure sensor.</td> </tr> </table>		Pressure (Relative to atmospheric pressure)	Voltage V	0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6	-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6	OK	GO TO 12.	NG	Replace EVAP control system pressure sensor.
Pressure (Relative to atmospheric pressure)	Voltage V										
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6										
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6										
OK	GO TO 12.										
NG	Replace EVAP control system pressure sensor.										

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

Component Description

NFEC1103



Component Description

NOTE:

If DTC P1448 is displayed with P0442 or P1442, perform trouble diagnosis for DTC P1448 first.

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 (Small Leak)" diagnosis.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1104

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	Ignition switch: ON	OFF

On Board Diagnosis Logic

NFEC1106

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1448 1448	EVAP canister vent control valve open	EVAP canister vent control valve remains opened under specified driving conditions.	EVAP canister vent control valve EVAP control system pressure sensor and circuit Blocked rubber tube to EVAP canister vent control valve Water separator EVAP canister is saturated with water. Vacuum cut valve

DTC Confirmation Procedure

NFEC1107

NOTE:

If DTC P1448 is displayed with P0442 or P1442, perform trouble diagnosis for DTC P1448 first.

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 P1448 EVAP CANISTER VENT CONTROL VALVE

DTC Confirmation Procedure (Cont'd)

NFEC1107S01

5

EVAP SML LEAK P0442/P1442

1) FOR BEST RSLT, PERFORM AT FOLLOWING CONDITIONS.
 - FUEL LEVEL: 1/4-3/4
 - AMBIENT TEMP: 0-30 C (32-86F)
 - OPEN ENGINE HOOD.
 2) START ENG WITH VHCL STOPPED. IF ENG IS ON, STOP FOR 5 SEC. THEN RESTART.
 3) TOUCH START.

SEC760C

5

EVAP SML LEAK P0442/P1442

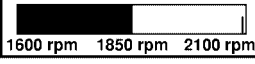
WAIT
 2 TO 10 MINUTES.
 KEEP ENGINE RUNNING AT IDLE SPEED.

SEC761C

5

EVAP SML LEAK P0442/P1442

MAINTAIN
 1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.
 (APPROX. 3 MINUTES)



1600 rpm 1850 rpm 2100 rpm

SEC762C

6

EVAP SML LEAK P0442/P1442

OK

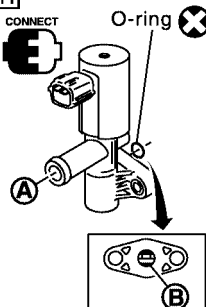
SELF-DIAG RESULTS

NO DTC DETECTED.
 FURTHER TESTING MAY BE REQUIRED.

SEC763C

11

CONNECT



O-ring

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0153E

WITH CONSULT-II

TESTING CONDITION:

Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 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).

Open engine hood before conducting the following procedure.

- 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.

COOLAN TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

- 5) Select "EVP 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 "Basic Inspection", EC-121.

- 6) Make sure that "OK" is displayed.
 If "NG" is displayed, go to the following step.

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

- 7) Stop engine and wait at least 10 seconds, then turn "ON".
- 8) Disconnect hose from water separator.
- 9) Select "VENT CONTROL/V" of "ACTIVE TEST" mode with CONSULT-II.
- 10) Touch "ON" and "OFF" alternately.

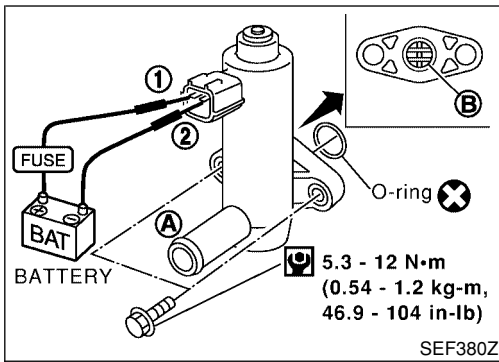
- 11) Make sure the following.

Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

If the result is NG, go to "Diagnostic Procedure", EC-611.
 If the result is OK, go to "Diagnostic Procedure" for DTC P0442, EC-359.

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed. NFEC1108

WITH GST

- 1) Disconnect hose from water separator. NFEC1108S01
- 2) Disconnect EVAP canister vent control valve harness connector.
- 3) Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to "Diagnostic Procedure", EC-611.
 If the result is OK, go to "Diagnostic Procedure" for DTC P0442, EC-359.

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DTC P1448 EVAP CANISTER VENT CONTROL VALVE

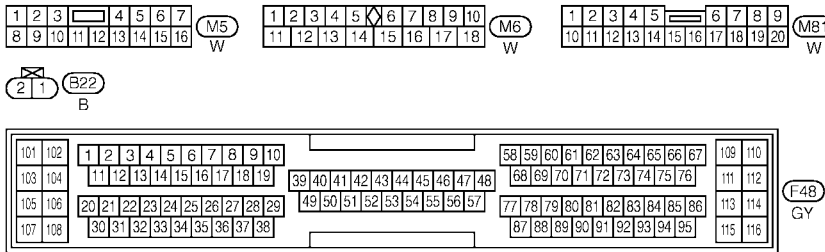
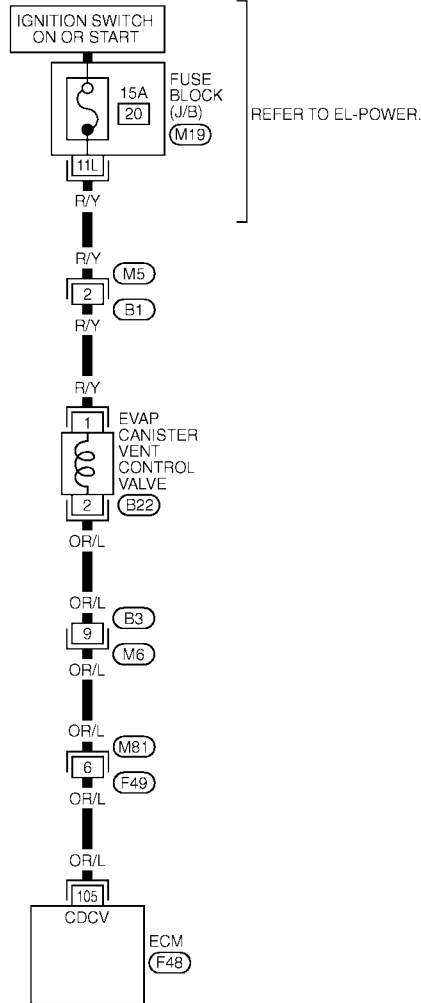
Wiring Diagram

Wiring Diagram

NFEC1109

EC-VENT/V-01

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



REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC495D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
105	OR/L	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

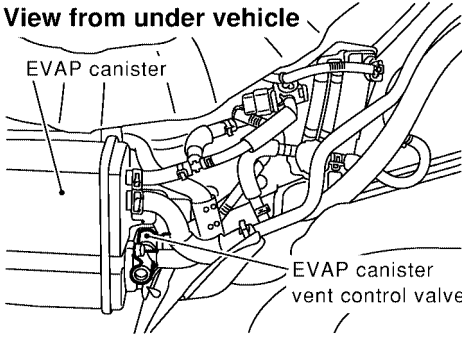
SEF668XC

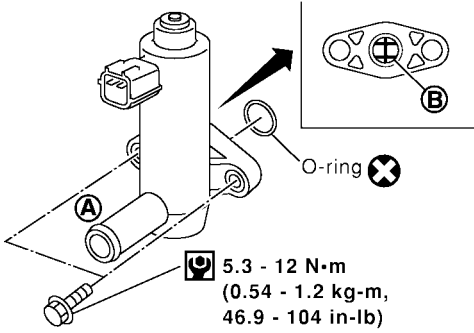
DTC P1448 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure

Diagnostic Procedure

NFEC1110

1	CHECK RUBBER TUBE	<p>1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging.</p> <div style="text-align: center;"> <p>View from under vehicle</p>  </div> <p style="text-align: right;">SEF267X</p>	GI MA EM LC EC FE CL MT
		OK or NG	
OK		GO TO 2.	
NG		Clean rubber tube using an air blower.	

2	CHECK EVAP CANISTER VENT CONTROL VALVE-I	<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF376Z</p>	AT AX SU BR ST RS BT HA SC EL IDX
		OK or NG	
OK		GO TO 3.	
NG		Replace EVAP canister vent control valve.	

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

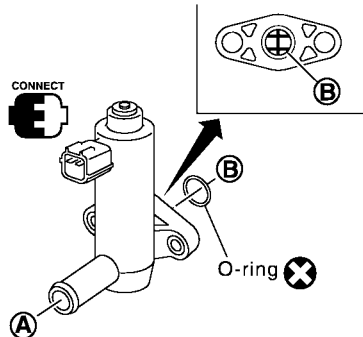
Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



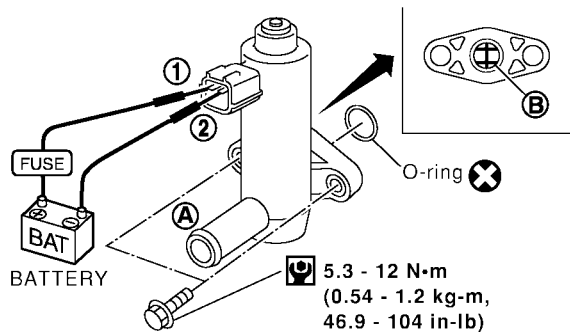
Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



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.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	GO TO 5.
NG	GO TO 4.

4 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 3 again.

OK or NG

OK	GO TO 5.
NG	Replace EVAP canister vent control valve.

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

5	CHECK VACUUM CUT VALVE
<p>1. Turn ignition switch OFF. 2. Remove vacuum cut valve. 3. Check vacuum cut valve as follows:</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF379Q</p> <p>a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	Replace vacuum cut valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF596U</p> <p style="text-align: center;">Yes or No</p>	
Yes	GO TO 7.
No	GO TO 9.

7	CHECK EVAP CANISTER
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	GO TO 8.

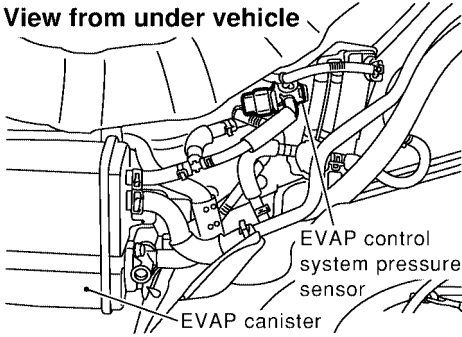
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DTC P1448 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

8	DETECT MALFUNCTIONING PART
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection	
	Repair hose or replace EVAP canister.

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
OK or NG	
OK	GO TO 10.
NG	Repair it.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector.	
View from under vehicle	
	
2. Check connectors for water. Water should not exist.	
OK or NG	
OK	GO TO 11.
NG	Replace EVAP control system pressure sensor.

SEF268X

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

Diagnostic Procedure (Cont'd)

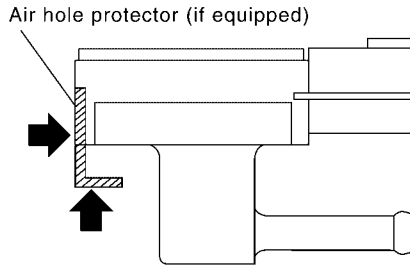
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11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

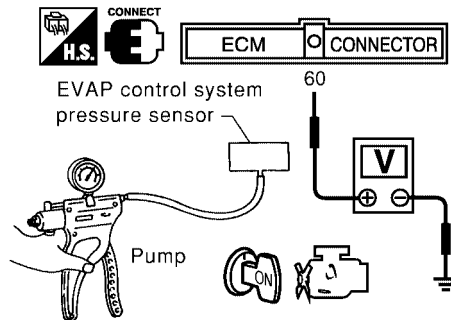
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK

GO TO 12.

NG

Replace EVAP control system pressure sensor.

12 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

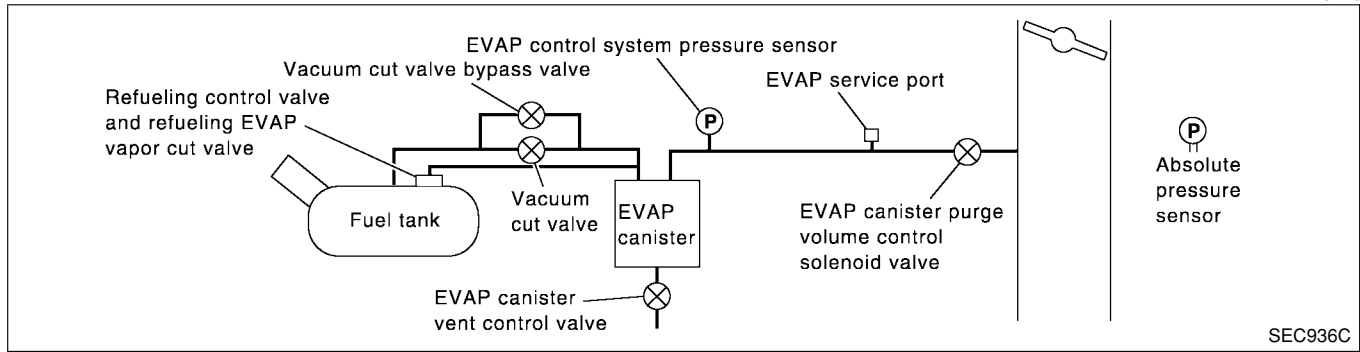
INSPECTION END

DTC P1456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC1479



This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank. If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.

If ECM judges a leak which corresponds to a very small leak, the very small leak P1456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P1442 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
P1456 1456	Evaporative emission control system very small leak (positive pressure check)	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 Blocked or bent rubber tube to EVAP control system pressure sensor 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. Water separator EVAP canister saturated with water EVAP control system pressure sensor Refueling control valve ORVR system leaks Fuel level sensor and the circuit Foreign matter caught in EVAP canister purge volume control solenoid valve

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.

DTC P1456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic (Cont'd)

If the fuel filler cap is not tightened properly, the MIL may come on.
Use only a genuine NISSAN rubber tube as a replacement.

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5	EVAP V/S LEAK P0456/P1456
	CHECK FUEL LEVEL SENSOR(V). SEE SERVICE MANUAL FOR SPECIFICATION. IS THE VOLTAGE WITHIN THE SPECIFICATION?
	MONITOR
	FUEL LEVEL SE XXX V

SEC764C

5	EVAP V/S LEAK P0456/P1456
	MAINTAIN 1800-2800 RPM UNTIL FINAL RESULT APPEARS.
	

SEC765C

5	EVAP V/S LEAK P0456/P1456
	OK

SEC766C

DTC Confirmation Procedure

NFEC1480

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

If DTC P1456 is displayed with P1442, perform TROUBLE DIAGNOSIS FOR DTC P1456 first.

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

After repair, make sure that the hoses and clips are installed properly.

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.

- a) Fuel filler cap is removed.
- b) Refilled or drained the fuel.
- c) EVAP component parts is/are removed.

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

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: 1.08 - 0.2V
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" and wait at least 10 seconds.
- 4) Turn ignition switch "ON".
- 5) Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.
- 6) Make sure that "OK" is displayed.
If "NG" is displayed, refer to "Diagnostic Procedure", EC-619.

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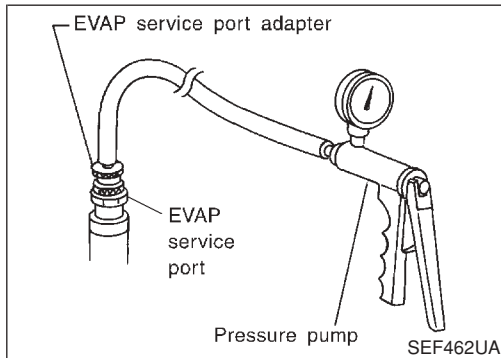
DTC P1456 EVAP CONTROL SYSTEM

DTC Confirmation Procedure (Cont'd)

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to “Basic Inspection”, EC-121.

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.



Overall Function Check

WITH GST

NFEC1481

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

NFEC1481S01

CAUTION:

Never 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) and vacuum cut valve bypass valve (open).
- 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)

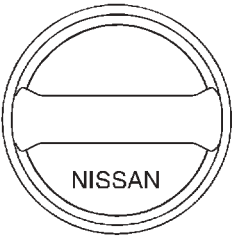
If NG, go to diagnostic procedure, EC-619.

NOTE:

For more information, refer to GST instruction manual.

Diagnostic Procedure

NFEC1482

1	CHECK FUEL FILLER CAP DESIGN	
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF915U</p>		
OK or NG		
OK	GO TO 2.	
NG	Replace with genuine NISSAN fuel filler cap.	

2	CHECK FUEL FILLER CAP INSTALLATION	
<p>Check that the cap is tightened properly by rotating the cap clockwise.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 3.	
NG	<p>1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. 2. Retighten until ratcheting sound is heard.</p>	

3	CHECK FUEL FILLER CAP FUNCTION	
<p>Check for air releasing sound while opening the fuel filler cap.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 5.	
NG	GO TO 4.	

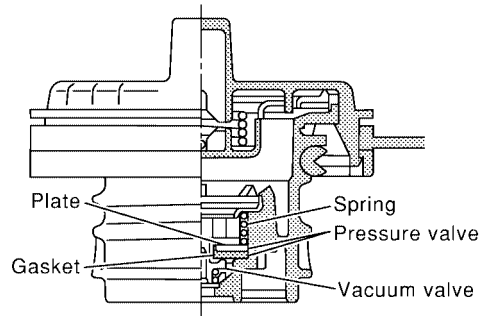
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DTC P1456 EVAP CONTROL SYSTEM

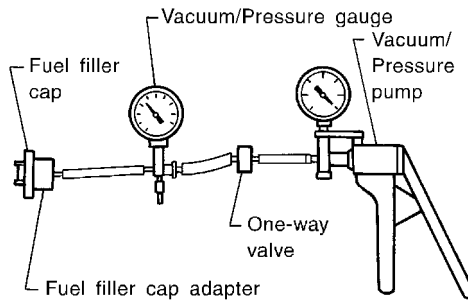
Diagnostic Procedure (Cont'd)

4 CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.



SEF445Y



SEF943S

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)

CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

OK

GO TO 5.

NG

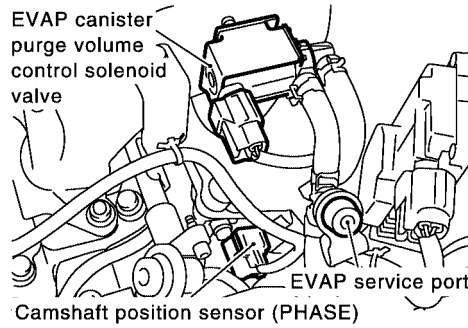
Replace fuel filler cap with a genuine one.

DTC P1456 EVAP CONTROL SYSTEM

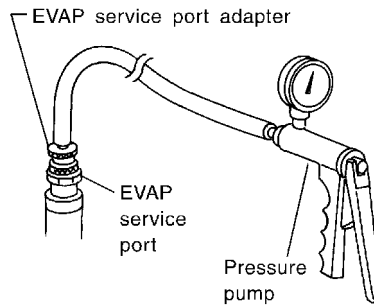
Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II	GO TO 6.
Models without CONSULT-II	GO TO 7.

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DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

6 CHECK FOR EVAP LEAK

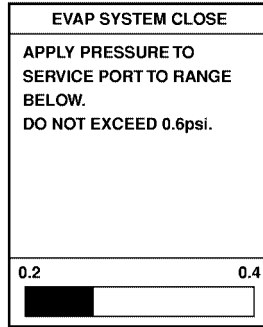
Ⓟ With CONSULT-II

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.

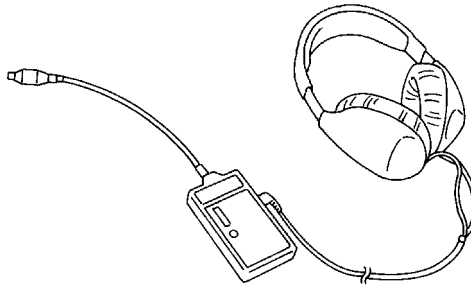
Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

Leak detector



SEF200U

OK or NG

OK

GO TO 8.

NG

Repair or replace.

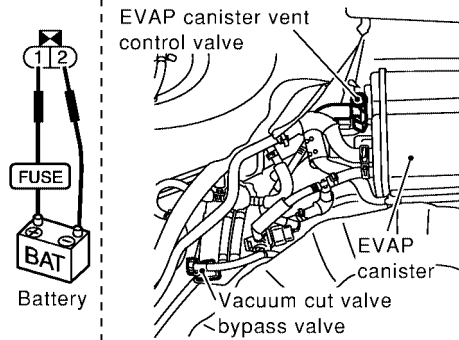
DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

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. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

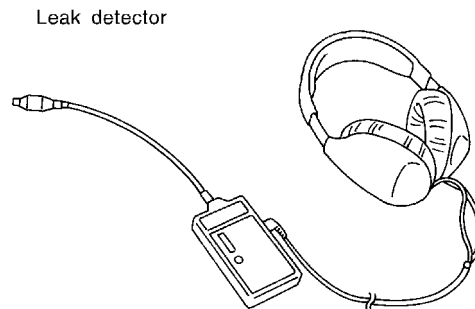
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

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.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

OK or NG

OK	GO TO 8.
NG	Repair or replace.

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DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;"> <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">PBIB1032E</p>	
OK or NG	
OK	GO TO 9.
NG	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-607.	
OK or NG	
OK	GO TO 10.
NG	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister?</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF596U</p>	
Yes or No	
Yes	GO TO 11.
No (With CONSULT-II)	GO TO 13.
No (Without CONSULT-II)	GO TO 14.

DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK (With CONSULT-II)	GO TO 13.	
OK (Without CONSULT-II)	GO TO 14.	
NG	GO TO 12.	

12	DETECT MALFUNCTIONING PART	
Check the following. EVAP canister for damage EVAP hose between EVAP canister and water separator for clogging or poor connection		
Repair hose or replace EVAP canister.		

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
④ 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 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
ACTIVE TEST																						
PURG VOL CONT/V	0.0%																					
MONITOR																						
ENG SPEED	XXX rpm																					
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A/F ALPHA-B2	XXX %																					
HO2S1 MNTR (B1)	RICH																					
HO2S1 MNTR (B2)	RICH																					
Vacuum should exist. SEC142D																						
OK or NG																						
OK	GO TO 16.																					
NG	GO TO 15.																					


14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
④ 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 17.	
NG	GO TO 15.	

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DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

15	CHECK VACUUM HOSE
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.	
OK or NG	
OK (With CONSULT-II)	GO TO 16.
OK (Without CONSULT-II)	GO TO 17.
NG	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td style="text-align: center;">0.0%</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		PURG VOL CONT/V	0.0%	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	RICH	HO2S1 MNTR (B2)	RICH				
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A/F ALPHA-B2	XXX %																				
HO2S1 MNTR (B1)	RICH																				
HO2S1 MNTR (B2)	RICH																				
SEC142D																					
OK or NG																					
OK	GO TO 18.																				
NG	GO TO 17.																				

DTC P1456 EVAP CONTROL SYSTEM

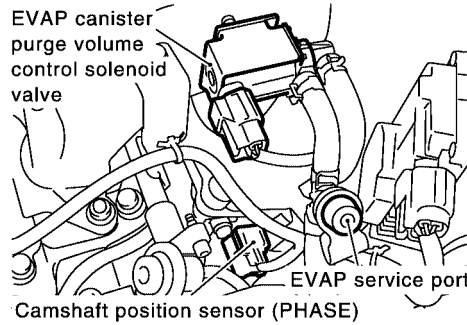
Diagnostic Procedure (Cont'd)

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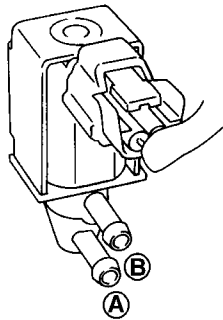
17 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

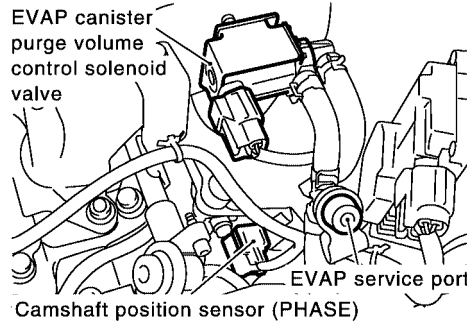


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

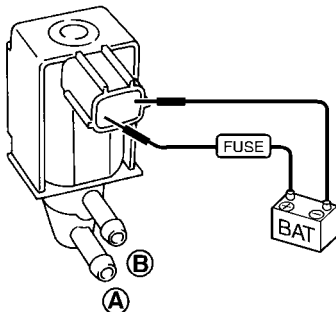
SEF334X

ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

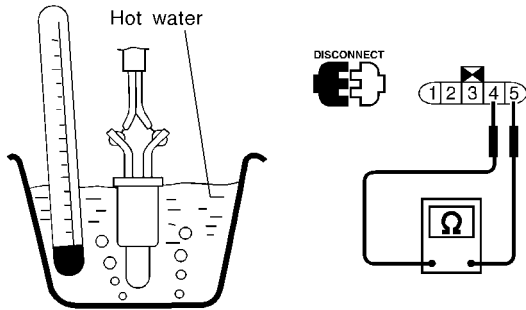
OK	GO TO 18.
NG	Replace EVAP canister purge volume control solenoid valve.

DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

18 CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
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

SEF587X

OK or NG

OK

GO TO 19.

NG

Replace fuel level sensor unit.

DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

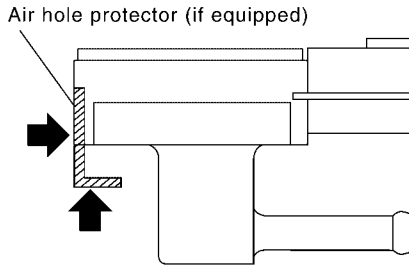
GI
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19 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

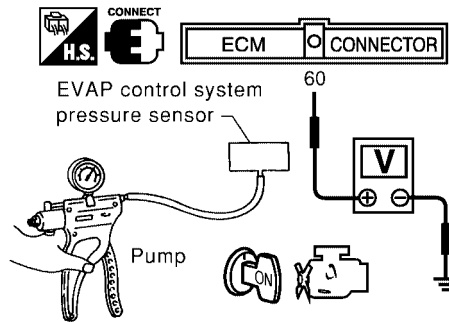
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:

Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK GO TO 20.

NG Replace EVAP control system pressure sensor.

20 CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-36.

OK or NG

OK GO TO 21.

NG Repair or reconnect the hose.

SC
EL
IDX

DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	GO TO 22.

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.	
OK or NG	
OK	GO TO 23.
NG	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK	GO TO 24.
NG	Repair or replace hoses, tubes or filler neck tube.

24	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> Remove fuel filler cap. Check air continuity between hose ends A and B. Blow air into hose end B. Air should flow freely into the fuel tank. Blow air into hose end A and check that there is no leakage. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
<p style="text-align: right;">SEF830X</p>	
OK or NG	
OK	GO TO 25.
NG	Replace or refueling control valve with fuel tank.

DTC P1456 EVAP CONTROL SYSTEM

Diagnostic Procedure (Cont'd)

25	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	GO TO 26.
NG	Replace fuel level sensor unit.

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26	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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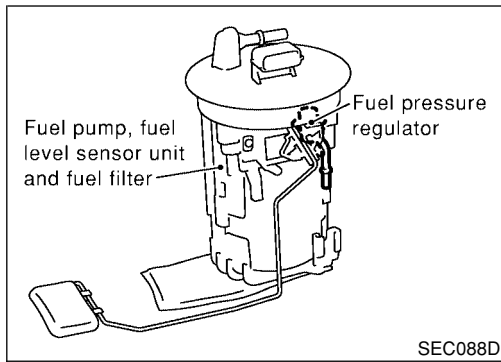
SC

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DTC P1464 FUEL LEVEL SENSOR

Component Description



Component Description

NFEC1111

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 ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC1112

ECM receives two signals from the fuel level sensor.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction.

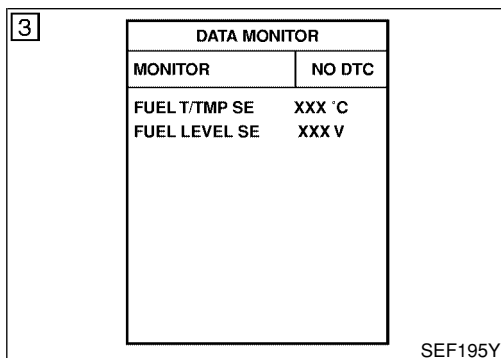
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1464 1464	Fuel level sensor circuit ground signal	A high voltage from the sensor is sent to ECM.	Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.)

DTC Confirmation Procedure

NFEC1113

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

NFEC1113S01

- 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 "Diagnostic Procedure", EC-634.

WITH GST

NFEC1113S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1464 FUEL LEVEL SENSOR

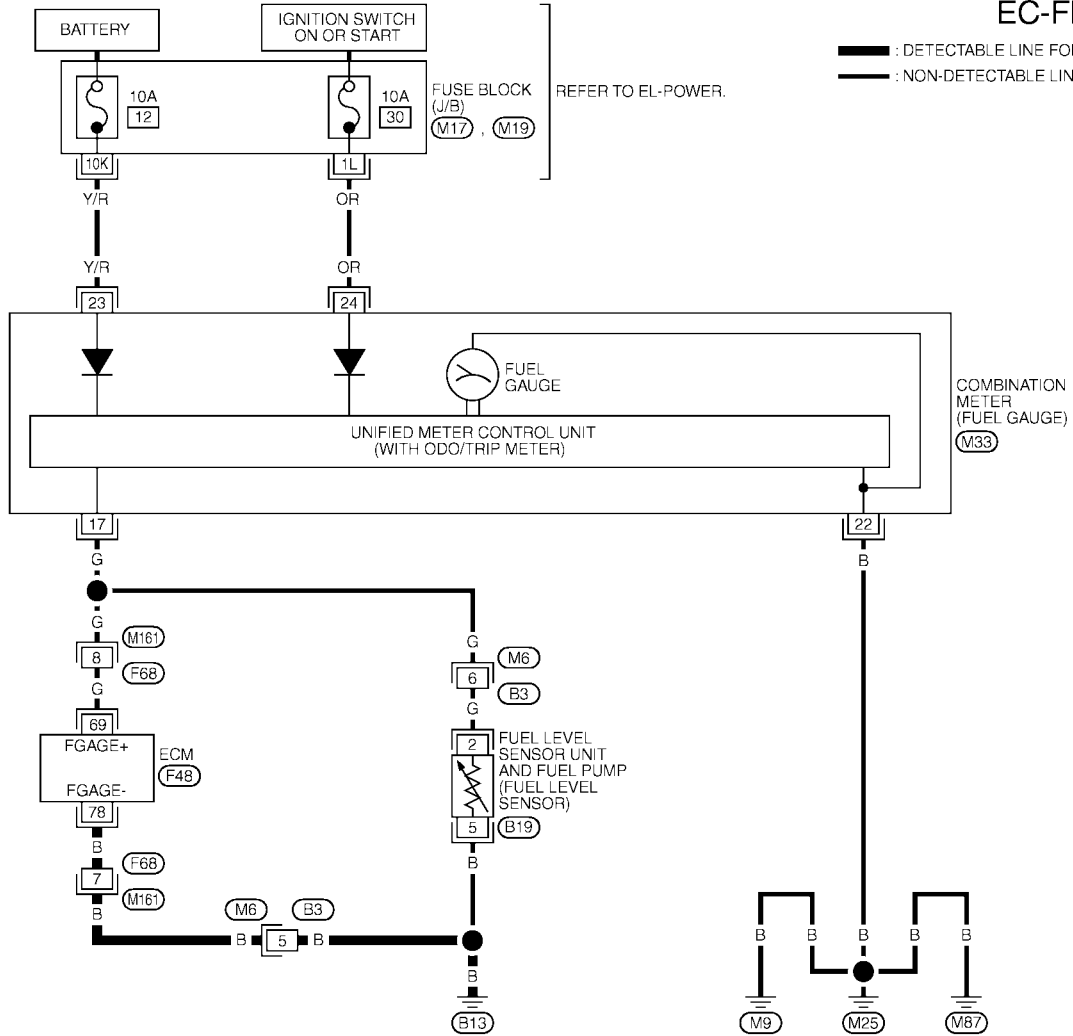
Wiring Diagram

Wiring Diagram

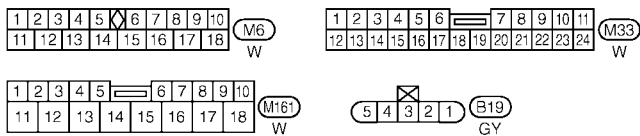
NFEC1114

EC-FLS3-01

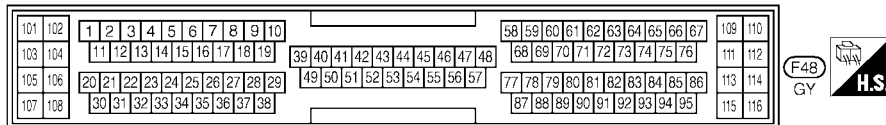
— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



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REFER TO THE FOLLOWING.
 (M17), (M19) - FUSE BLOCK - JUNCTION BOX (J/B)



MEC508D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	B	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V
69	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V OUTPUT VOLTAGE VARIES WITH FUEL LEVEL.

SEF711YB

DTC P1464 FUEL LEVEL SENSOR

Diagnostic Procedure

Diagnostic Procedure

=NFEC1115

1	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 78 and body ground. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to power.	
OK or NG	
OK	GO TO 3.
NG	GO TO 2.

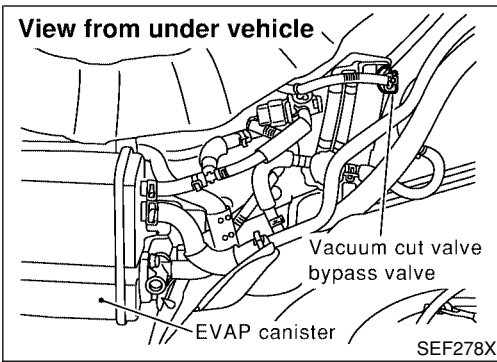
2	DETECT MALFUNCTIONING PART
1. Check the following. Harness connectors F68, M161 Harness connectors M6, B3 Harness for open between ECM and body ground	
	Replace open circuit or short to power in harness or connectors.

3	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	GO TO 4.
NG	Replace fuel level sensor unit.

4	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
OK or NG	
	INSPECTION END

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

Description



Description

COMPONENT DESCRIPTION

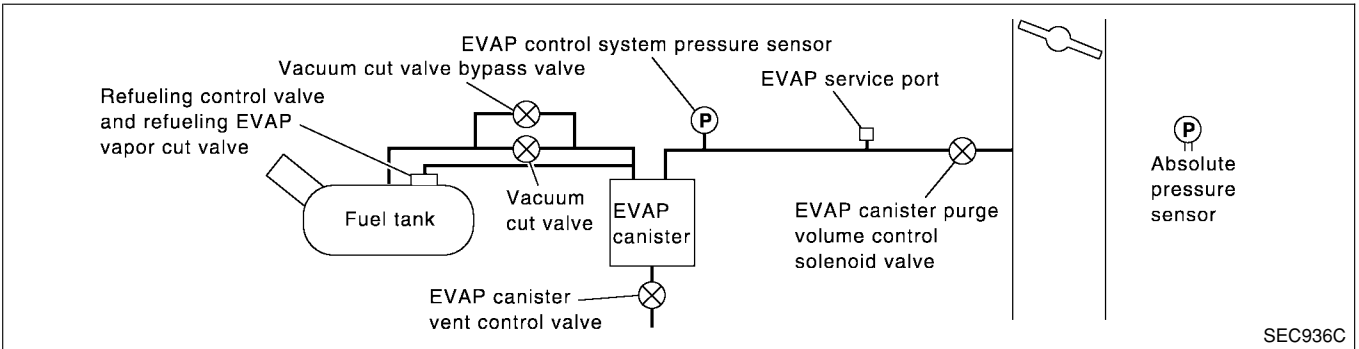
The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	Ignition switch: ON	OFF

On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1490 1490	Vacuum cut valve bypass valve circuit	An improper voltage signal is sent to ECM through vacuum cut valve bypass valve.	Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted.) Vacuum cut valve bypass valve

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

DTC Confirmation Procedure

DTC Confirmation Procedure

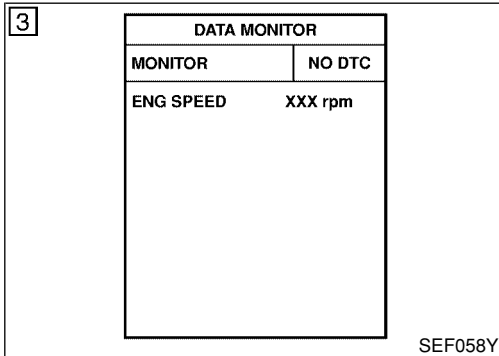
NFEC1120

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 speed.



WITH CONSULT-II

NFEC1120S01

- 1) Turn ignition switch “ON”.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Start engine and wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-638.

WITH GST

NFEC1120S02

Follow the procedure “WITH CONSULT-II” above.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

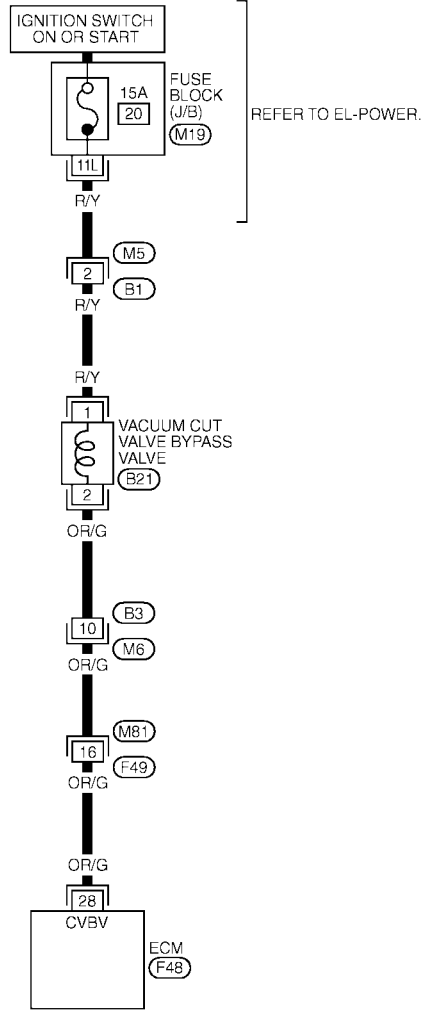
Wiring Diagram

Wiring Diagram

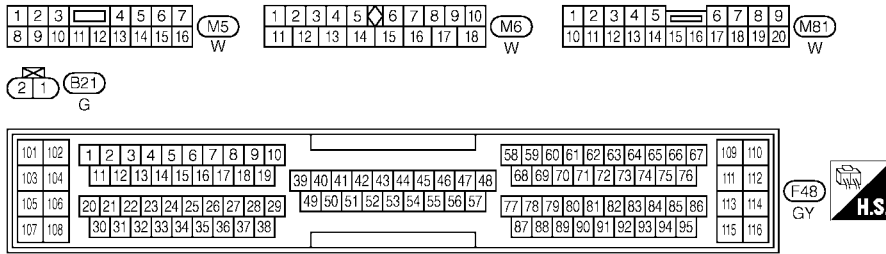
NFEC1121

EC-BYPS/V-01

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



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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC510D

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
28	OR/G	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE


DTC P1490 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure

Diagnostic Procedure

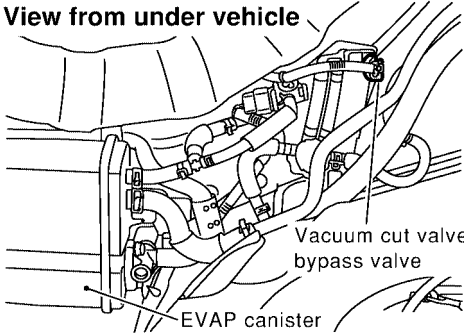

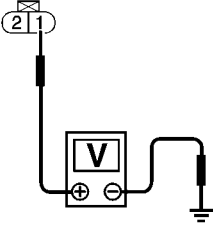
NFEC1122

1	INSPECTION START
Do you have CONSULT-II?	
Yes or No	
Yes	GO TO 2.
No	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and then "ON". 2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II. 3. Touch "ON/OFF" on CONSULT-II screen. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VC/V BYPASS/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B2)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN				
ACTIVE TEST																					
VC/V BYPASS/V	OFF																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
A/F ALPHA-B2	XXX %																				
HO2S1 MNTR (B1)	LEAN																				
HO2S1 MNTR (B2)	LEAN																				
PBIB0157E																					
4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.																					
OK or NG																					
OK	GO TO 7.																				
NG	GO TO 3.																				

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect vacuum cut valve bypass valve harness connector.</p> <div style="text-align: center;"> <p>View from under vehicle</p>  <p>Vacuum cut valve bypass valve EVAP canister</p> </div> <p style="text-align: right;">SEF278X</p> <p>3. Turn ignition switch "ON". 4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p>  <p>OK or NG</p> <p style="text-align: right;">SEF356X</p> </div>	
OK	GO TO 5.
NG	GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors M5, B1 Fuse block (J/B) connector M19 15A fuse Harness for open or short between vacuum cut valve bypass valve and fuse 	
Repair harness or connectors.	

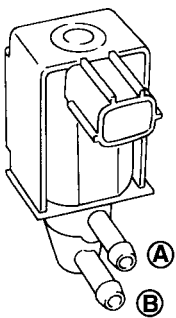

5	CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 28 and vacuum cut valve bypass valve terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	GO TO 6.

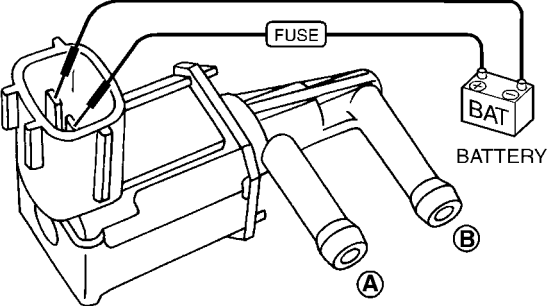
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DTC P1490 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
Check the following. Harness connectors B3, M6 Harness connectors M81, F49 Harness for open or short between vacuum cut valve bypass valve and ECM	
Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK VACUUM CUT VALVE BYPASS VALVE																										
Ⓜ With CONSULT-II 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time under the following conditions.																											
  <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VC/V BYPASS/V</th> <th>OFF</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px; margin-top: 10px;"> <thead> <tr> <th>Condition VC/V BYPASS/V</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>Yes</td> </tr> <tr> <td>OFF</td> <td>No</td> </tr> </tbody> </table> <p style="text-align: center; margin-left: 20px;">Operation takes less than 1 second.</p>		ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN					Condition VC/V BYPASS/V	Air passage continuity between A and B	ON	Yes	OFF	No
ACTIVE TEST																											
VC/V BYPASS/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
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HO2S1 MNTR (B1)	LEAN																										
HO2S1 MNTR (B2)	LEAN																										
Condition VC/V BYPASS/V	Air passage continuity between A and B																										
ON	Yes																										
OFF	No																										
SEC156D																											

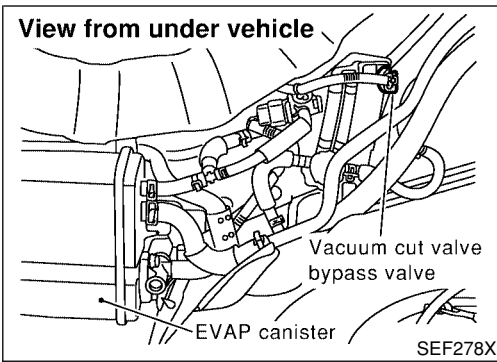
⊗ Without CONSULT-II Check air passage continuity and operation delay time under the following conditions.							
 <table border="1" style="margin-left: 20px; margin-top: 10px;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>Yes</td> </tr> <tr> <td>No supply</td> <td>No</td> </tr> </tbody> </table> <p style="text-align: center; margin-left: 20px;">Operation takes less than 1 second.</p>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
OK or NG							
SEF358X							

OK	GO TO 8.
NG	Replace vacuum cut valve bypass valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Description



Description

NFEC1123

COMPONENT DESCRIPTION

NFEC1123S01

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

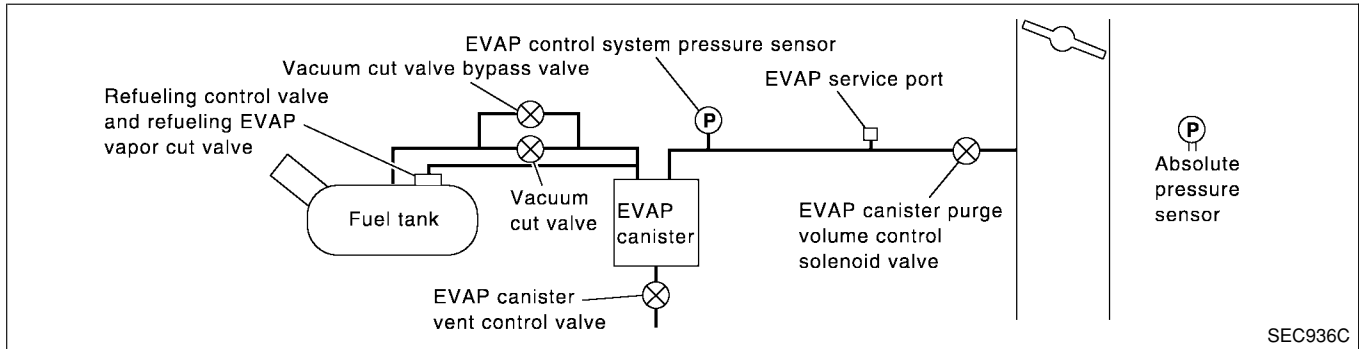
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM

NFEC1123S02



CONSULT-II Reference Value in Data Monitor Mode

NFEC1124

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	Ignition switch: ON	OFF

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

On Board Diagnosis Logic

On Board Diagnosis Logic

NFEC1126

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1491 1491	Vacuum cut valve bypass valve	Vacuum cut valve bypass valve does not operate properly.	Vacuum cut valve bypass valve Vacuum cut valve Bypass hoses for clogging EVAP control system pressure sensor and circuit EVAP canister vent control valve Hose between fuel tank and vacuum cut valve clogged Hose between vacuum cut valve and EVAP canister clogged EVAP canister EVAP purge port of fuel tank for clogging

7	VC CUT/V BP/V P1491	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF210Y

DTC Confirmation Procedure

NFEC1127

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:

For best results, perform test at a temperature of 5 to 30°C (41 to 86°F).

7	VC CUT/V BP/V P1491	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF211Y

WITH CONSULT-II

NFEC1127S01

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) 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 30 seconds.)

7	VC CUT/V BP/V P1491	
	COMPLETED	

SEF239Y

ENG SPEED	Idle speed or more
Selector lever	Suitable position
Vehicle speed	35 - 120 km/h (22 - 75 MPH) or more
B/FUEL SCHDL	1.3 - 8.1 msec

If "TESTING" is not displayed after 5 minutes, retry from step 3.

- 8) Make sure that "OK" is displayed after touching "SELF-DIAG

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

DTC Confirmation Procedure (Cont'd)

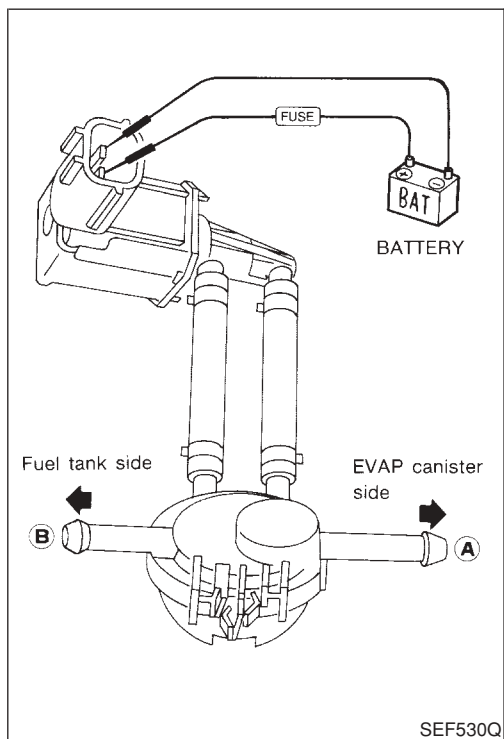
RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-645.

GI

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LC



Overall Function Check

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

NFEC1128

EC

WITH GST

NFEC1128S01

- 1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
- 2) Apply vacuum to port **A** and check that there is no suction from port **B**.
- 3) Apply vacuum to port **B** and check that there is suction from port **A**.
- 4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
- 5) Supply battery voltage to the terminal.
- 6) Blow air in port **A** and check that air flows freely out of port **B**.
- 7) Blow air in port **B** and check that air flows freely out of port **A**.
- 8) If NG, go to "Diagnostic Procedure", EC-645.

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

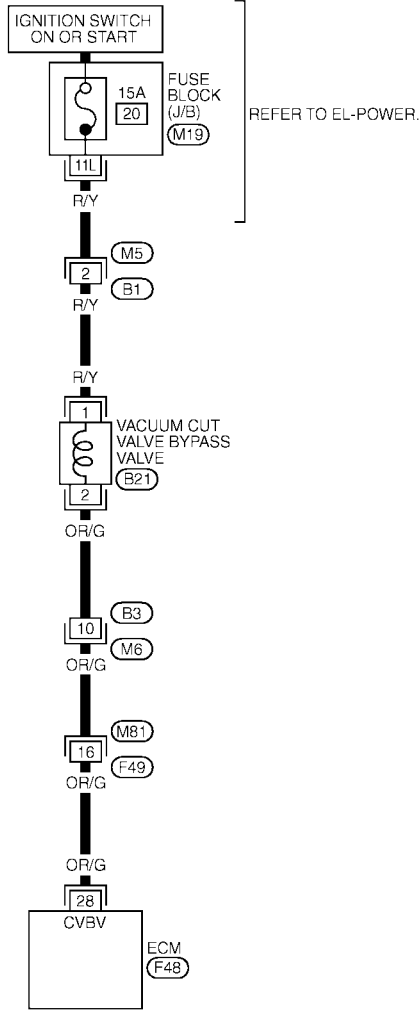
Wiring Diagram

Wiring Diagram

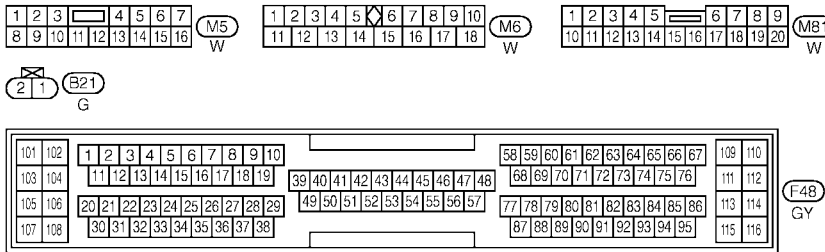
NFEC1129

EC-BYPS/V-01

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



REFER TO EL-POWER.



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC510D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
28	OR/G	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

SEF634XD

DTC P1491 VACUUM CUT VALVE BYPASS VALVE


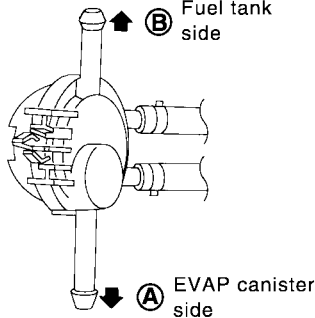
Diagnostic Procedure

Diagnostic Procedure

NFEC1130

1	INSPECTION START
Do you have CONSULT-II?	
Yes or No	
Yes	GO TO 2.
No	GO TO 3.

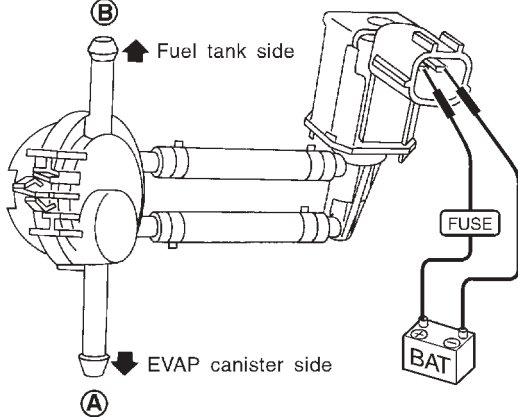
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2	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Turn ignition switch "ON". 7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON". 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <p style="text-align: right;">SEC157D</p> <p style="text-align: center;">OK or NG</p>		ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN				
ACTIVE TEST																					
VC/V BYPASS/V	OFF																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
A/F ALPHA-B2	XXX %																				
HO2S1 MNTR (B1)	LEAN																				
HO2S1 MNTR (B2)	LEAN																				
OK	GO TO 4.																				
NG	GO TO 5.																				

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

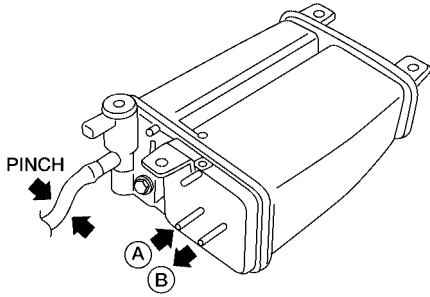
3	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Disconnect vacuum cut valve bypass valve harness connector. 7. Supply battery voltage to the terminal. 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 	
	
SEF914U	
OK or NG	
OK	GO TO 4.
NG	GO TO 7.

4	CHECK EVAP PURGE LINE
Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.	
OK or NG	
OK	GO TO 5.
NG	Repair it.

5	CHECK EVAP PURGE PORT
Check EVAP purge port of fuel tank for clogging.	
OK or NG	
OK	GO TO 6.
NG	Clean EVAP purge port.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

6	CHECK EVAP CANISTER
<p>1. Pinch the fresh air hose. 2. Blow air into port A and check that it flows freely out of port B.</p>	
	
AEC630A	
OK or NG	
OK	GO TO 12.
NG	Replace EVAP canister.

7	CHECK BYPASS HOSE
Check bypass hoses for clogging.	
OK or NG	
OK	GO TO 8.
NG	Repair or replace hoses.

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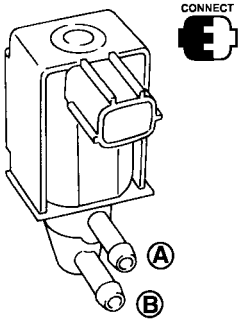
DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

8 CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

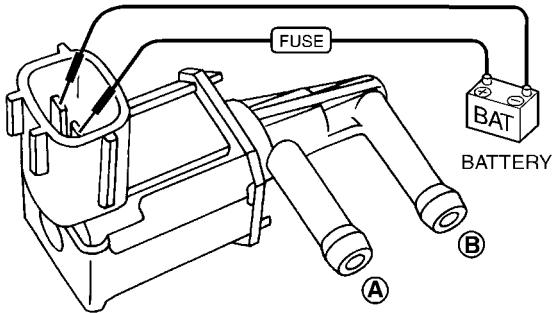
Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

SEC156D

Without CONSULT-II

- Check air passage continuity and operation delay time 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

Operation takes less than 1 second.

SEF358X

OK or NG

OK

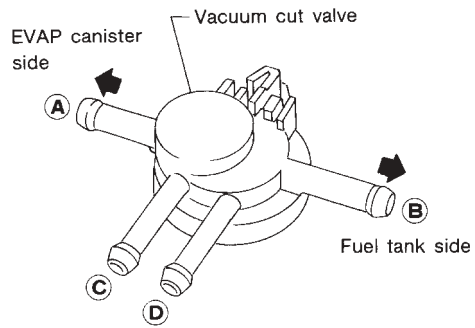
GO TO 9.

NG

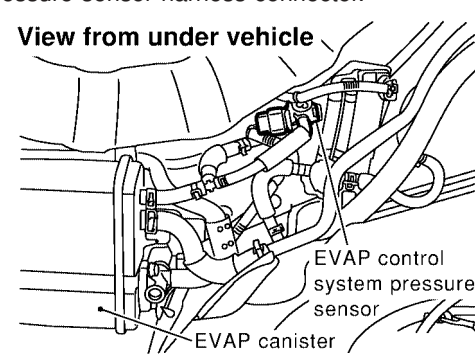
Replace vacuum cut valve bypass valve.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

9	CHECK VACUUM CUT VALVE
<p>Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF379Q</p> <ol style="list-style-type: none"> a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	Replace vacuum cut valve.

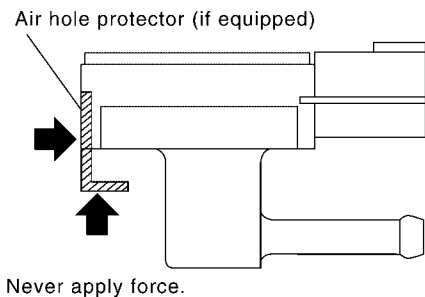
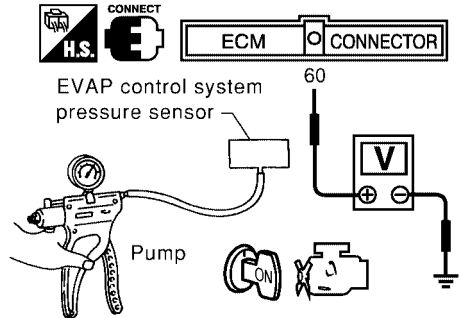
10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 11.
NG	Repair or replace.

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
<ol style="list-style-type: none"> 1. Disconnect EVAP control system pressure sensor harness connector. <div style="text-align: center;">  </div> <p style="text-align: right;">SEF268X</p> <ol style="list-style-type: none"> 2. Check connectors for water. Water should not exist. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 12.
NG	Replace EVAP control system pressure sensor.

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

12	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR										
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION: Never apply force to the air hole protector of the sensor if equipped.</p> <div style="text-align: center;">  <p>Air hole protector (if equipped)</p> <p>Never apply force.</p> </div> <p style="text-align: right;">SEF799W</p> <p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION: Always calibrate the vacuum pump gauge when using it. Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.</p> <p>5. Check input voltage between ECM terminal 84 and ground.</p> <div style="text-align: center;">  <p style="text-align: right;">SEC908C</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Pressure (Relative to atmospheric pressure)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 kPa (0 mmHg, 0 inHg)</td> <td style="text-align: center;">3.0 - 3.6</td> </tr> <tr> <td style="text-align: center;">-9.3 kPa (-70 mmHg, -2.76 inHg)</td> <td style="text-align: center;">0.4 - 0.6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1159</p> <p>CAUTION: Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">OK</td> <td>GO TO 13.</td> </tr> <tr> <td>NG</td> <td>Replace EVAP control system pressure sensor.</td> </tr> </table> </div>		Pressure (Relative to atmospheric pressure)	Voltage V	0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6	-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6	OK	GO TO 13.	NG	Replace EVAP control system pressure sensor.
Pressure (Relative to atmospheric pressure)	Voltage V										
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6										
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6										
OK	GO TO 13.										
NG	Replace EVAP control system pressure sensor.										

13	CHECK RUBBER TUBE FOR CLOGGING				
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve.</p> <p>2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">OK</td> <td>GO TO 14.</td> </tr> <tr> <td>NG</td> <td>Clean the rubber tube using an air blower.</td> </tr> </table>		OK	GO TO 14.	NG	Clean the rubber tube using an air blower.
OK	GO TO 14.				
NG	Clean the rubber tube using an air blower.				

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER VENT CONTROL VALVE-I
<ol style="list-style-type: none"> 1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted. 	
<p style="text-align: center;">OK or NG</p>	
OK	GO TO 15.
NG	Replace EVAP canister vent control valve.

GI
MA
EM
LC
EC

15	CHECK EVAP CANISTER VENT CONTROL VALVE-II																											
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN						<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V ON</td> <td>No</td> </tr> <tr> <td>VENT CONTROL/V OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																												
VENT CONTROL/V	OFF																											
MONITOR																												
ENG SPEED	XXX rpm																											
A/F ALPHA-B1	XXX %																											
A/F ALPHA-B2	XXX %																											
HO2S1 MNTR (B1)	LEAN																											
HO2S1 MNTR (B2)	LEAN																											
Condition	Air passage continuity between A and B																											
VENT CONTROL/V ON	No																											
VENT CONTROL/V OFF	Yes																											
SEC158D																												

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<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
<p>Make sure new O-ring is installed properly.</p> <p>OK or NG</p>							
OK	GO TO 17.						
NG	GO TO 16.						

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

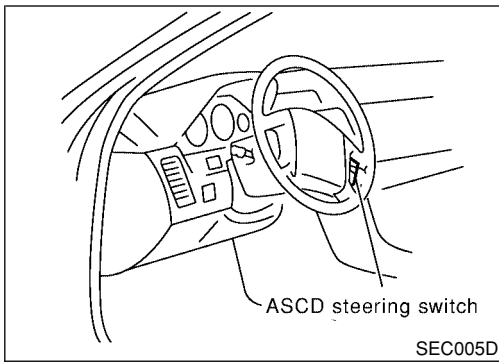
Diagnostic Procedure (Cont'd)

16	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the Test No. 15 again.	
OK or NG	
OK	GO TO 17.
NG	Replace EVAP canister vent control valve.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

DTC P1564 ASCD STEERING SWITCH

Component Description



Component Description

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-53 for the ASCD function.

NFEC1208

CONSULT-II Reference Value in Data Monitor Mode

NFEC1209

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	Ignition switch: ON	CRUISE switch pressed	ON
		CRUISE switch released	OFF
CANCEL SW	Ignition switch: ON	CANCEL switch pressed	ON
		CANCEL switch released	OFF
RESUME/ACC SW	Ignition switch: ON	ACCEL RES switch pressed	ON
		ACCEL RES switch released	OFF
SET SW	Ignition switch: ON	COAST/SET switch pressed	ON
		COAST/SET switch released	OFF

On Board Diagnosis Procedure

NFEC1462

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible cause
P1564 1564	ASCD steering switch	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.	Harness or connectors (The ASCD steering switch circuit is open or shorted.) ASCD steering switch ECM

DTC Confirmation Procedure

NFEC1463

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 "CRUISE" switch for at least 10 seconds, then release

DTC P1564 ASCD STEERING SWITCH

DTC Confirmation Procedure (Cont'd)

- it and wait at least 10 seconds.
5. Press "ACCEL/RES" 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 1st trip DTC is detected, go to "Diagnostic Procedure", EC-657.



With GST

Follow the procedure "With CONSULT-II" above.

DTC P1564 ASCD STEERING SWITCH

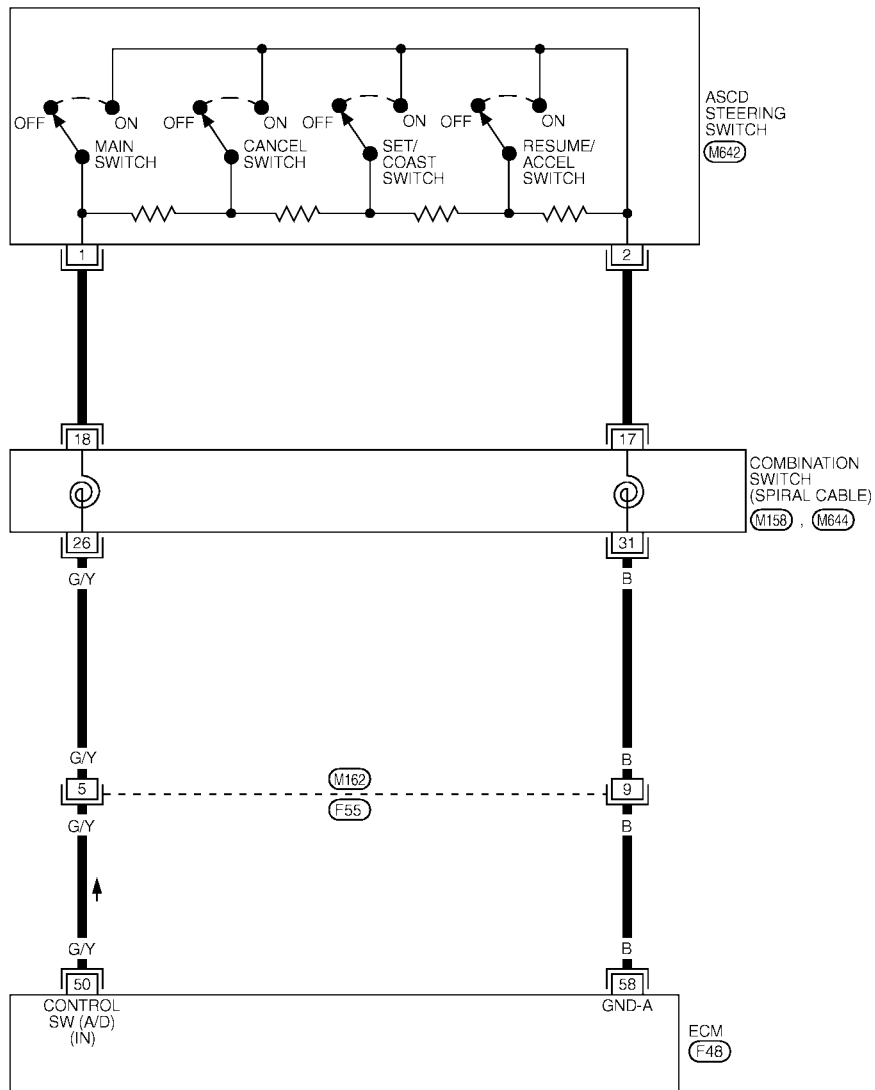
Wiring Diagram

Wiring Diagram

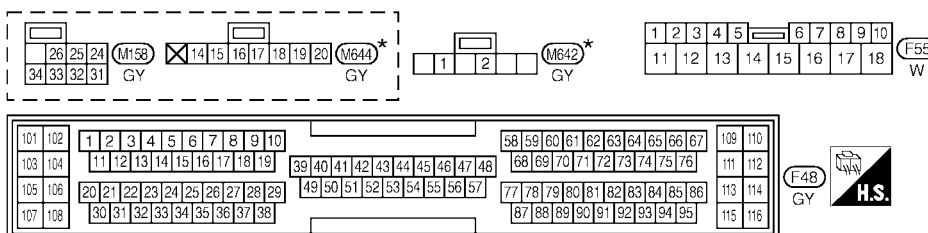
NFEC1464

EC-ASC/SW-01

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



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*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEC924D

DTC P1564 ASCD STEERING SWITCH

Wiring Diagram (Cont'd)

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
50	G/Y	ASCD steering switch	[Ignition switch "ON"] ASCD steering switch is "OFF".	Approximately 4.0V
			[Ignition switch "ON"] CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] CANCEL switch is "ON".	Approximately 1V
			[Ignition switch "ON"] COAST/SET switch is "ON".	Approximately 2V
			[Ignition switch "ON"] ACCEL/RES switch is "ON".	Approximately 3V
58	B	Sensors' ground	[Engine is running] Warm-up condition Idle speed	Approximately 0V

Diagnostic Procedure

NFEC1465

1 CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.

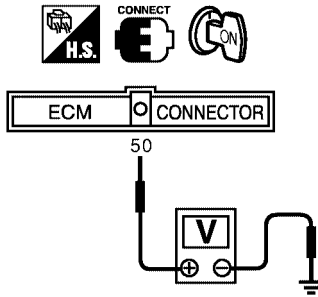
DATA MONITOR	
MONITOR	NO DTC
MAIN SW	OFF
CANCEL SW	OFF
RESUME/ACC SW	OFF
SET SW	OFF

3. Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF

Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 50 and ground with pressing each button.



Switch	Condition	Voltage [V]
CRUISE SW	Pressed	Approx. 0.5
	Released	Approx. 4.0
COAST/SET SW	Pressed	Approx. 2.0
	Released	Approx. 4.0
ACCEL/RES SW	Pressed	Approx. 3.0
	Released	Approx. 4.0
CANCEL SW	Pressed	Approx. 1.0
	Released	Approx. 4.0

Refer to Wiring Diagram.

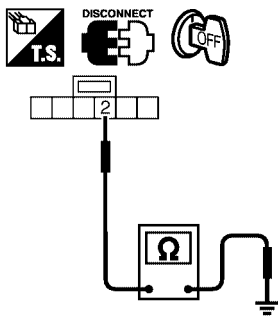
OK or NG

OK	GO TO 4.
NG	GO TO 2.

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DTC P1564 ASCD STEERING SWITCH

Diagnostic Procedure (Cont'd)

2	CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect ASCD steering harness connector. Check harness continuity between switch terminal 2 and ground. Refer to Wiring Diagram. 	
	
<p>Continuity should exist.</p> <ol style="list-style-type: none"> Also check harness for short to power. 	
OK or NG	
OK	GO TO 4.
NG	GO TO 3.

SEC198D

3	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M162, F55 Combination switch (spiral cable) Harness for open and short between ECM and ASCD steering switch	
Repair open circuit or short to power in harness or connectors.	

4	CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Disconnect ECM harness connector. Check harness continuity between ECM terminal 50 and ASCD steering switch terminal 1. Refer to Wiring Diagram. <p>Continuity should exist.</p> <ol style="list-style-type: none"> 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 M162, F55 Combination switch (spiral cable) Harness for open and short between ECM and ASCD steering switch	
Repair open circuit or short to ground or short to power in harness or connectors.	

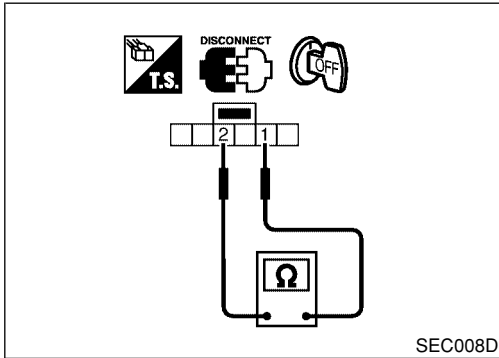
6	CHECK ASCD STEERING SWITCH
Refer to "Component Inspection", EC-659.	
OK or NG	
OK	GO TO 7.
NG	Replace ASCD steering switch.

DTC P1564 ASCD STEERING SWITCH

Diagnostic Procedure (Cont'd)

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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Component Inspection

NFEC1215

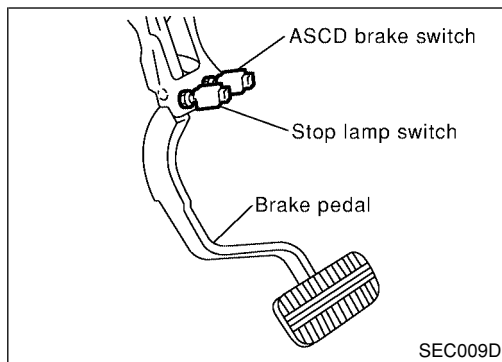
ASCD STEERING SWITCH

1. Disconnect ASCD steering switch.
2. Check continuity between terminals 1 and 2 by pushing each switch.

Switch	Condition	Resistance [Ω]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4,000
COAST/SET SW	Pressed	Approx. 660
	Released	Approx. 4,000
ACCEL/RES SW	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL SW	Pressed	Approx. 250
	Released	Approx. 4,000

DTC P1572 ASCD BRAKE SWITCH

Component Description



Component Description

NFEC1466

NOTE:

If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-453.

If DTC P1572 is displayed with DTC P1706, first perform the trouble diagnosis for DTC P1706. Refer to EC-680.

If DTC P1572 is displayed with DTC P1805, first perform the trouble diagnosis for DTC P1805. Refer to EC-691.

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-53 for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1217

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	Ignition switch: ON Shift lever: Except "N" and "P" position (AT models)	Brake pedal released	ON
		Brake pedal depressed	OFF
BRAKE SW 2 (Stop lamp switch)	Ignition switch: ON	Brake pedal released	OFF
		Brake pedal depressed	ON

On Board Diagnosis Procedure

NFEC1467

DTC	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 signal from the stop lamp switch and 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.) ASCD brake switch Stop lamp switch Harness or connectors (The ASCD brake switch or stop lamp switch circuit is open or shorted.) Incorrect stop lamp switch installation Incorrect ASCD brake switch installation ECM

DTC Confirmation Procedure

NFEC1468

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.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h

SEC010D

With CONSULT-II

- 1) Start engine (TCS switch "OFF").
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-664.

If 1st trip DTC is not detected, go to the following step.

- 4) Drive the vehicle for at least 5 consecutive seconds under the following condition.

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 1st trip DTC is detected, go to "Diagnostic Procedure", EC-664.

With GST

Follow the procedure "With CONSULT-II" above.

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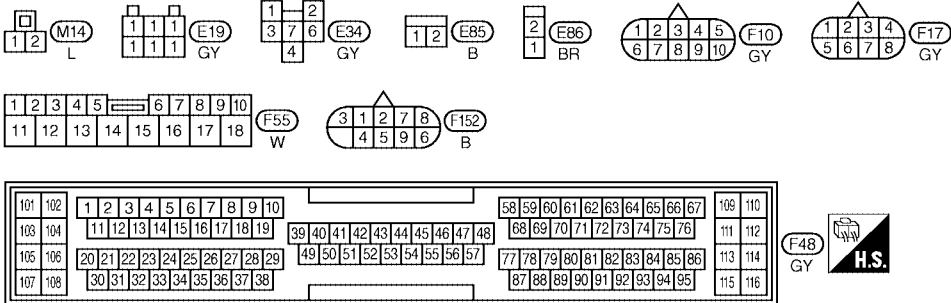
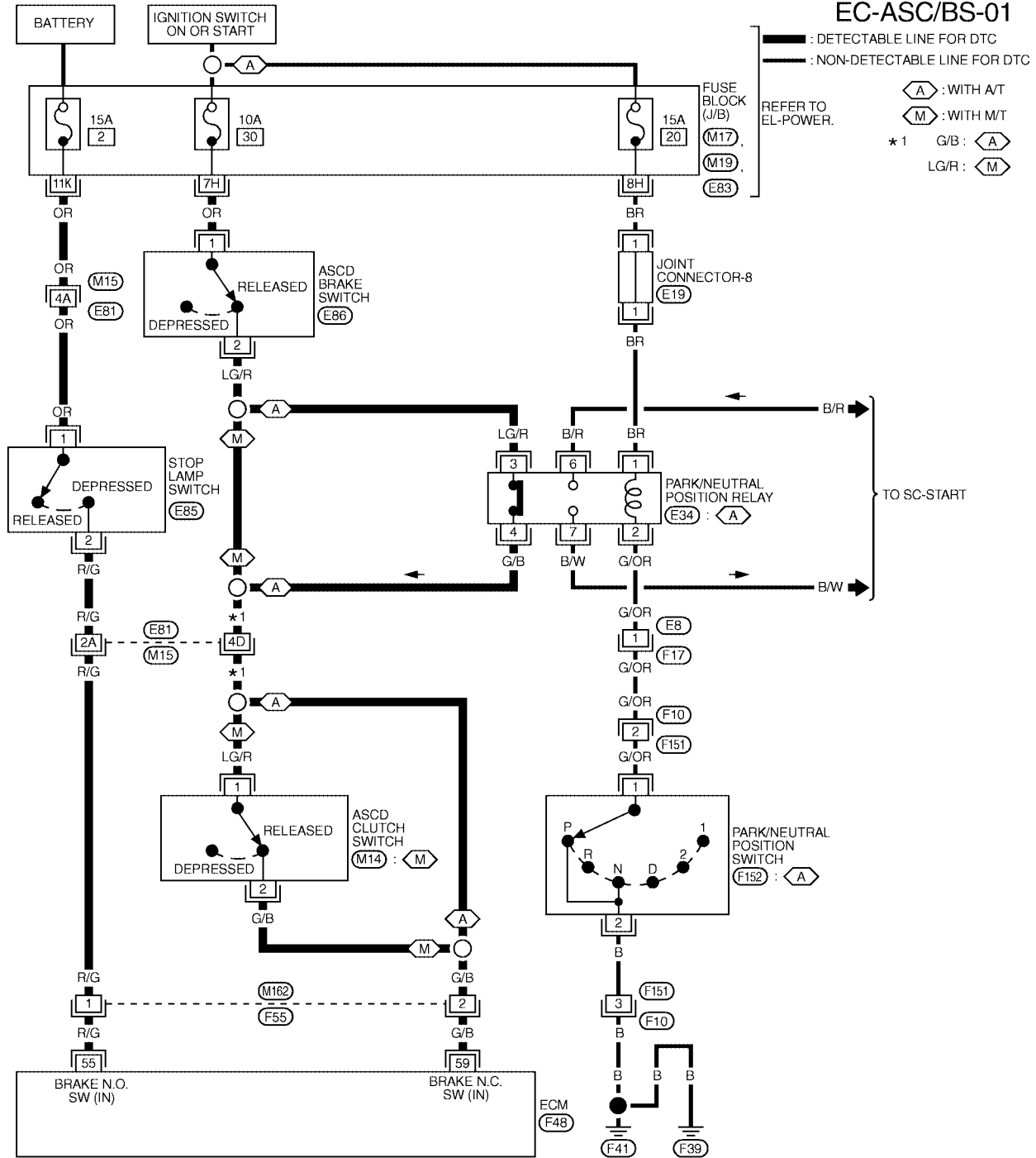
IDX

DTC P1572 ASCD BRAKE SWITCH

Wiring Diagram

Wiring Diagram

NFEC1221



REFER TO THE FOLLOWING.
 (M15) -SUPER
 MULTIPLE JUNCTION (SMJ)
 (M17) . (M19) . (E83)
 - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC693D

DTC P1572 ASCD BRAKE SWITCH

Wiring Diagram (Cont'd)

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R/G	Stop lamp switch	[Ignition switch "ON"] Brake pedal is released	Approximately 0V
			[Ignition switch "ON"] Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
59	G/B	ASCD brake switch	[Ignition switch "ON"] Gear position is except "P" or "N" Brake pedal is released Clutch pedal is released (M/T models)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] Gear position is except "P" or "N" Brake pedal is depressed Clutch pedal is fully depressed (M/T models)	Approximately 0V



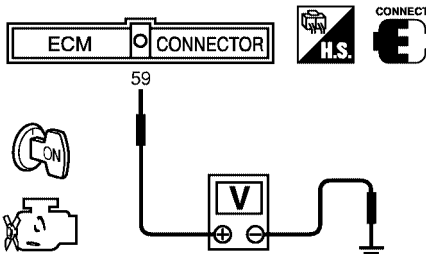
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DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure



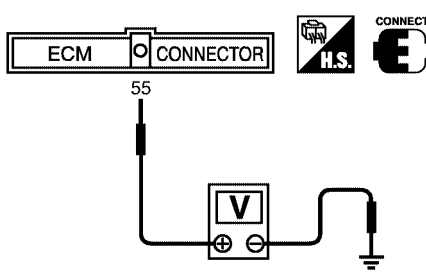
Diagnostic Procedure

NFEC1222

1	CHECK OVERALL FUNCTION-I						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II. Check the indication of "BRAKE SW1" under the following conditions. 							
<table border="1"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>BRAKE SW1</td> <td>OFF</td> </tr> </tbody> </table>		DATA MONITOR		MONITOR	NO DTC	BRAKE SW1	OFF
DATA MONITOR							
MONITOR	NO DTC						
BRAKE SW1	OFF						
SEC011D							
<p>A/T models</p> <p>When brake pedal is depressed or A/T selector lever is in "N" or "P" range: BRAKE SW1 OFF</p> <p>When brake pedal is released and A/T selector lever is not "N" or "P" range: BRAKE SW1 ON</p> <p>M/T models</p> <p>When clutch pedal or brake pedal is depressed: BRAKE SW1 OFF</p> <p>When clutch pedal and brake pedal are released: BRAKE SW1 ON</p>							
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Check voltage between ECM terminal 59 and ground under the following conditions. 							
							
SEC012D							
<p>When brake or clutch pedal is depressed (M/T), or when brake pedal is depressed or A/T selector lever is in "N" or "P" range (A/T): Approx. 0V</p> <p>When brake and clutch pedal are released (M/T), or when both brake pedal is released and A/T selector lever is not in "N" or "P" range (A/T): Battery voltage should exist.</p> <p>Refer to Wiring Diagram.</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 2.						
NG	A/T MODELS: GO TO 3.						
NG	M/T MODELS: GO TO 19.						

DTC P1572 ASCD BRAKE SWITCH

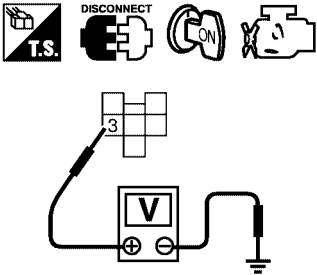
Diagnostic Procedure (Cont'd)

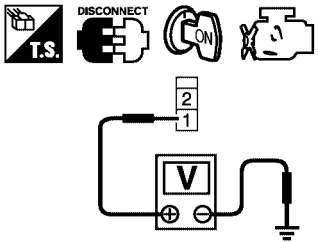
2	CHECK OVERALL FUNCTION-II						
<p> With CONSULT-II See "BRAKE SW2" indication in "DATA MONITOR" mode.</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <table border="1"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>BRAKE SW2</td> <td>OFF</td> </tr> </tbody> </table> </div> <p style="text-align: right;">SEC013D</p> <p>When brake pedal is released: BRAKE SW2 OFF When brake pedal is depressed: BRAKE SW2 ON</p>		DATA MONITOR		MONITOR	NO DTC	BRAKE SW2	OFF
DATA MONITOR							
MONITOR	NO DTC						
BRAKE SW2	OFF						
<p> Without CONSULT-II Check voltage between ECM terminal 55 and ground under the following conditions.</p> <div style="text-align: center; margin: 10px auto;">  </div> <p style="text-align: right;">SEC014D</p> <p>When brake pedal is released: Approx. 0V When brake pedal is depressed: Battery voltage should exist. Refer to Wiring Diagram.</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 33.						
NG	GO TO 28.						

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DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

3	CHECK ASCD BRAKE SWITCH CIRCUIT-I						
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect park/neutral position relay harness connector. 3. Turn ignition switch "ON". 4. Check voltage between park/neutral position relay terminal 3 and ground under the following conditions. 							
							
SEC209D							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">CONDITION</th> <th style="padding: 5px;">VOLTAGE</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">When brake pedal is released</td> <td style="padding: 5px;">Battery voltage</td> </tr> <tr> <td style="padding: 5px;">When brake pedal is depressed</td> <td style="padding: 5px;">Approx. 0V</td> </tr> </tbody> </table>		CONDITION	VOLTAGE	When brake pedal is released	Battery voltage	When brake pedal is depressed	Approx. 0V
CONDITION	VOLTAGE						
When brake pedal is released	Battery voltage						
When brake pedal is depressed	Approx. 0V						
MTBL1259							
OK or NG							
OK	GO TO 8.						
NG	GO TO 4.						

4	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 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. 	
	
PBIB0857E	
Voltage: Battery voltage	
OK or NG	
OK	GO TO 6.
NG	GO TO 5.

5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Fuse block (J/B) connector E83 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.	

DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

6	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Check continuity between ASCD brake switch terminal 2 and park/neutral position relay terminal 3. 	
<p>Continuity should exist.</p>	
<ol style="list-style-type: none"> 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.

SEC213D

7	CHECK ASCD BRAKE SWITCH
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 8.
NG	Replace ASCD brake switch.

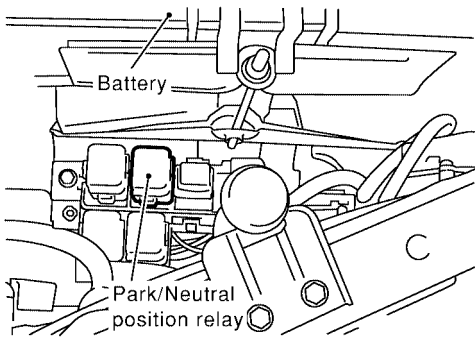
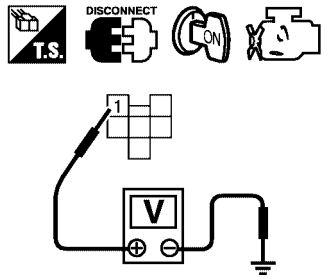
8	CHECK PARK/NEUTRAL POSITION (PNP) RELAY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect park/neutral position switch harness connector. Turn ignition switch "ON". Check voltage between park/neutral position (PNP) switch terminal 1 and ground with CONSULT-II or tester. 	
<p>Voltage: Battery voltage</p>	
OK or NG	
OK	GO TO 13.
NG	GO TO 9.

SEC214D

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DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

9	CHECK PARK/NEUTRAL POSITION (PNP) RELAY POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect park/neutral position (PNP) relay. 	
	
<ol style="list-style-type: none"> Turn ignition switch "ON". Check voltage between park/neutral position (PNP) relay terminal 1 and ground with CONSULT-II or tester. 	
	
<p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 11.
NG	GO TO 10.

SEC018D

SEC019D

10	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Fuse block (J/B) connector E83 15A fuse Joint connector-8 Harness for open or short between park/neutral position (PNP) relay and fuse 	
<p style="text-align: center;">Repair open circuit or short to ground in harness or connectors.</p>	

11	CHECK PARK/NEUTRAL POSITION RELAY CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Check continuity between park/neutral position (PNP) relay terminal 2 and park/neutral position switch terminal 1. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to ground and short to power. 	
<p style="text-align: center;">OK or NG</p>	
OK	GO TO 13.
NG	GO TO 12.

DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

12	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E8, F17 Harness connectors F10, F151 Harness for open or short between park/neutral position relay and park/neutral position switch	
Repair open circuit or short to ground or short to power in harness or connectors.	

GI
MA

13	CHECK PARK/NEUTRAL POSITION RELAY
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 28.
NG	Replace park/neutral position relay.

EM
LC

EC

14	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH GROUND CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect park/neutral position switch harness connector. 3. Check continuity between park/neutral position (PNP) switch terminal 2 and ground. Continuity should exist. 4. Also check harness for short to ground and short to power.	
OK or NG	
OK	GO TO 16.
NG	GO TO 15.

FE
CL
MT

AT

15	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F10, F151 Harness for open or short between park/neutral position (PNP) switch and ground	
Repair open circuit or short to ground or short to power in harness or connectors.	

AX
SU
BR

16	CHECK PARK/NEUTRAL POSITION SWITCH
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 17.
NG	Replace park/neutral position switch.

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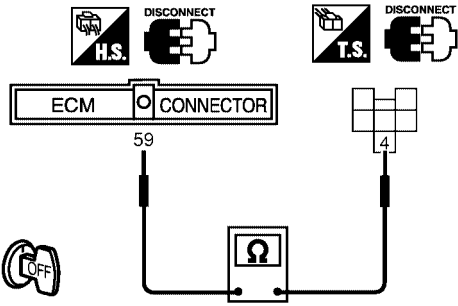
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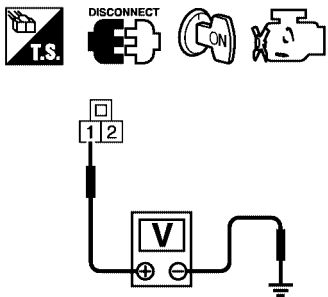
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DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

17	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and park/neutral position (PNP) relay harness connector. 3. Check harness continuity between park/neutral position (PNP) relay terminal 4 and ECM terminal 59. 	
	
SEC215D	
<p style="color: blue;">Continuity should exist.</p> <ol style="list-style-type: none"> 4. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 28.
NG	GO TO 18.

18	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E81, M15 Harness connectors M162, F55 Harness for open or short between park/neutral position (PNP) relay and ECM 	
Repair open circuit or short to ground or short to power in harness or connectors.	

19	CHECK ASCD BRAKE SWITCH CIRCUIT-II						
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ASCD clutch switch harness connector. 3. Turn ignition switch "ON". 4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions. 							
							
PBIB0799E							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">CONDITION</th> <th style="width: 50%;">VOLTAGE</th> </tr> </thead> <tbody> <tr> <td>When brake pedal is released</td> <td>Battery voltage</td> </tr> <tr> <td>When brake pedal is depressed</td> <td>Approx. 0V</td> </tr> </tbody> </table>		CONDITION	VOLTAGE	When brake pedal is released	Battery voltage	When brake pedal is depressed	Approx. 0V
CONDITION	VOLTAGE						
When brake pedal is released	Battery voltage						
When brake pedal is depressed	Approx. 0V						
<p style="text-align: right;">MTBL1303</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 25.						
NG	GO TO 20.						

DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

20	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect ASCD brake switch harness connector. Turn ignition switch "ON". Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester. 	
<p>Voltage: Battery voltage</p> <p>OK or NG</p>	
PBIB0857E	
OK	GO TO 22.
NG	GO TO 21.

21	DETECT MALFUNCTIONING PART
Check the following. Fuse block (J/B) connector E83 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.	

22	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect ASCD clutch switch harness connector. Check continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to ground and short to power. 	
<p>OK or NG</p>	
OK	GO TO 24.
NG	GO TO 23.

23	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E81, M15 Harness for open or short between ASCD brake switch and ASCD clutch switch	
Repair open circuit or short to ground or short to power in harness or connectors.	

24	CHECK ASCD BRAKE SWITCH
Refer to "Component Inspection", EC-674.	
<p>OK or NG</p>	
OK	GO TO 25.
NG	Replace ASCD brake switch.

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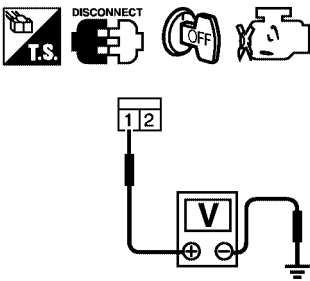
DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

25	CHECK ASCD CLUTCH SWITCH CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF".</p> <p>2. Check continuity between ASCD clutch switch terminal 2 and ECM terminal 59. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 27.
NG	GO TO 26.

26	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <p>Harness connectors M162, F55</p> <p>Harness for open or short between ASCD clutch switch and ECM</p>	
Repair open circuit or short to ground or short to power in harness or connectors.	

27	CHECK ASCD CLUTCH SWITCH
<p>Refer to "Component Inspection", EC-674.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 28.
NG	Replace ASCD clutch switch.

28	CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect stop lamp switch harness connector.</p> <p>3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.</p>	
	
<p>Voltage: Battery voltage</p> <p>OK or NG</p>	
OK	GO TO 30.
NG	GO TO 29.

PBIB0117E

29	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <p>Fuse block (J/B) connector M17</p> <p>15A fuse</p> <p>Harness connectors M15, E81</p> <p>Harness for open or short between stop lamp switch and fuse</p>	
Repair open circuit or short to ground in harness or connectors.	

DTC P1572 ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

30	CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 55.</p>		
SEC216D		
<p>Continuity should exist</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	GO TO 32.	
NG	GO TO 31.	

31	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors M15, E81 Harness connectors M162, F55 Harness for open or short between stop lamp switch and ECM 		
Repair open circuit or short to ground or short to power in harness or connectors.		

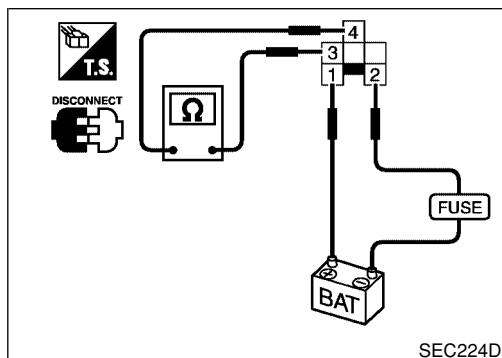
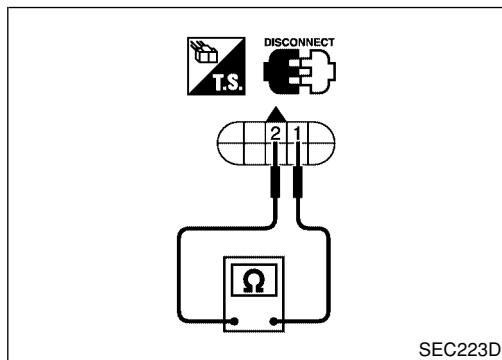
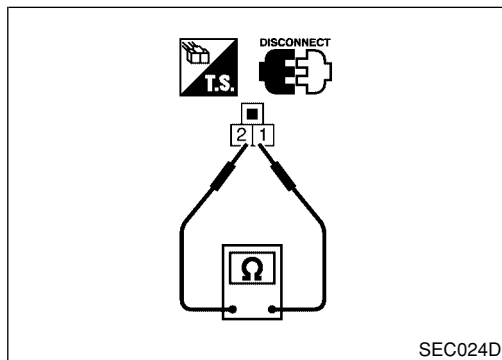
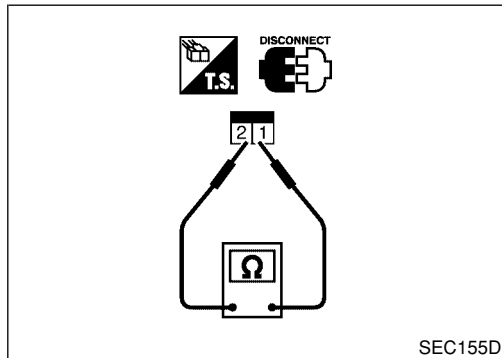
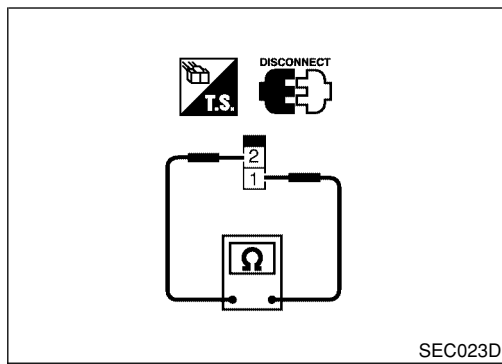
32	CHECK STOP LAMP SWITCH	
Refer to "Component Inspection", EC-674.		
OK or NG		
OK	GO TO 33.	
NG	Replace stop lamp switch.	

33	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.		
INSPECTION END		

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DTC P1572 ASCD BRAKE SWITCH

Component Inspection



Component Inspection

ASCD BRAKE SWITCH AND STOP LAMP SWITCH

NFEC1223

Condition	Continuity	
	ASCD brake switch	Stop lamp switch
When brake pedal is depressed	No	Yes
When brake pedal is released	Yes	No

Check each switch after adjusting brake pedal — refer to BR section.

ASCD CLUTCH SWITCH (FOR M/T MODELS)

Condition	Continuity
When clutch pedal is depressed	No
When clutch pedal is released	Yes

PARK/NEUTRAL POSITION (PNP) SWITCH (FOR A/T MODELS)

A/T selector lever position	Continuity
	Between terminals 1 and 2
"P"	Yes
"N"	Yes
Except "P" and "N"	No

PARK/NEUTRAL POSITION (PNP) RELAY (FOR A/T MODELS)

1. Apply 12V direct current between park/neutral position (PNP) relay terminals 1 and 2.
2. Check continuity between park/neutral position (PNP) relay Terminals 3 and 4.

Condition	Continuity
12V direct current supply between terminals 1 and 2	No
OFF	Yes

DTC P1574 ASCD VEHICLE SPEED SENSOR

Component Description

Component Description

NFEC1469

NOTE:

If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001, refer to EC-162.

If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-440.

If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-453.

ECM receives vehicle speed signals via two different lines, and detects vehicle speed for ASCD control.

Vehicle speed signals are input from combination meter and TCM separately.

Signal from TCM is sent via CAN communication line.

Refer to EC-53 for ASCD functions.

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On Board Diagnosis Procedure

NFEC1470

DTC	Trouble diagnosis name	DTC Detecting Condition	Possible cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference values between two vehicle speed signals if they are out of the specified range.	Harness or connectors (The CAN communication line is open or shorted.) Harness or connectors (The combination meter circuit is open or shorted.) Combination meter Vehicle speed sensor TCM ECM

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DTC Confirmation Procedure

NFEC1471

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.

EL

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DTC P1574 ASCD VEHICLE SPEED SENSOR

DTC Confirmation Procedure (Cont'd)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With CONSULT-II

- 1) Start engine (TCS switch "OFF").
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Drive the vehicle at more than 40 km/h (25 MPH).
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-678.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P1574 ASCD VEHICLE SPEED SENSOR

Wiring Diagram

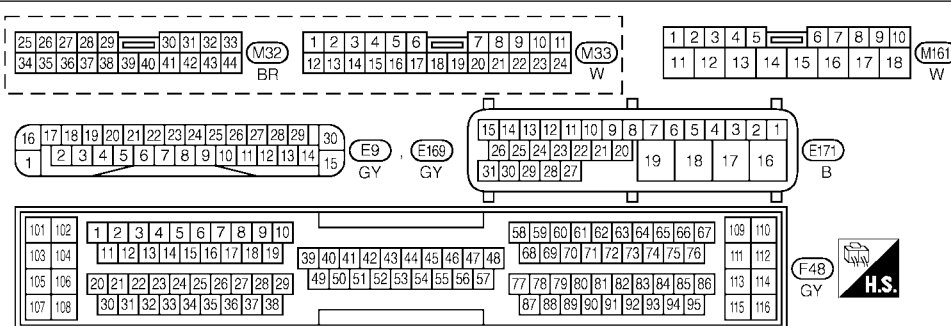
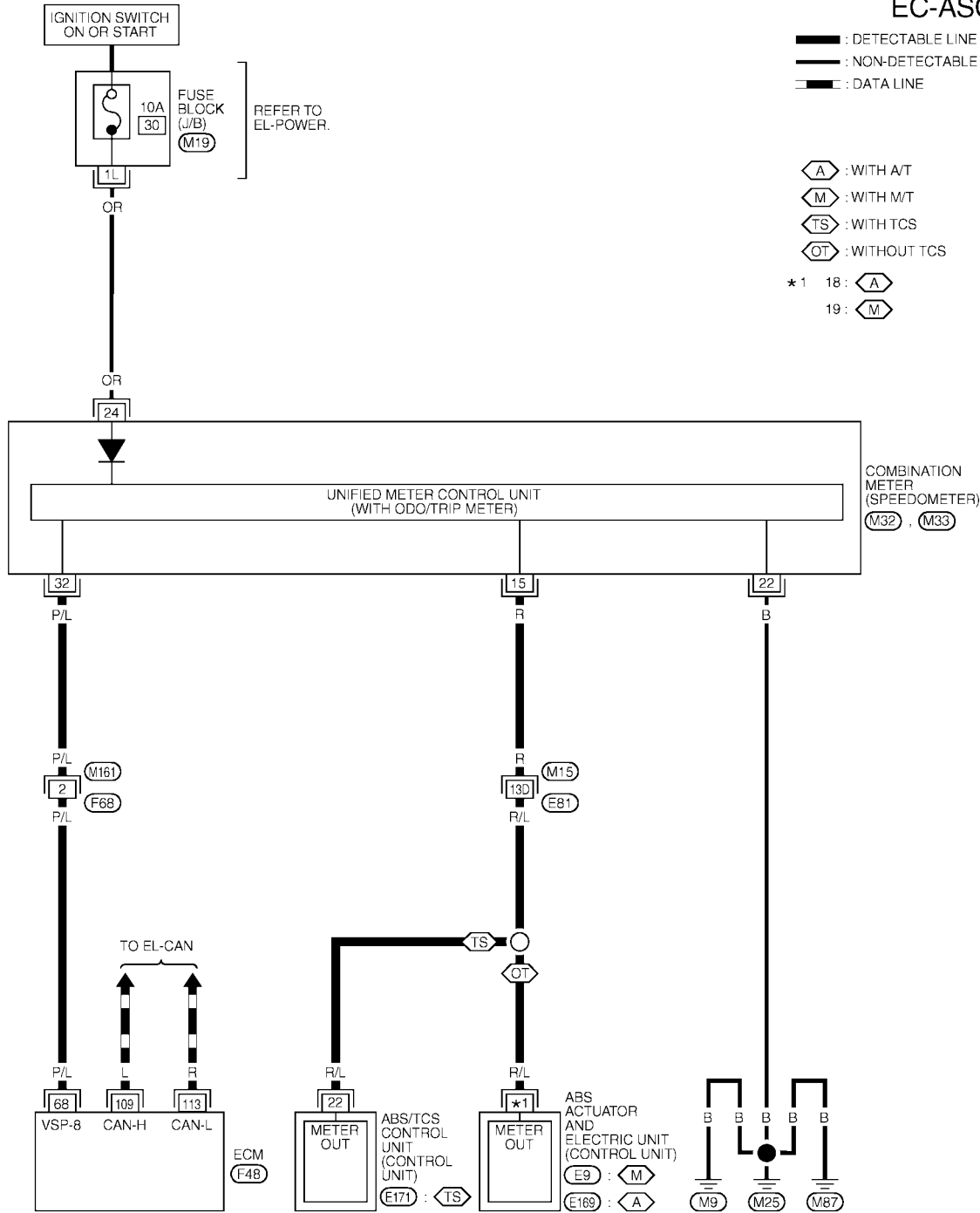
Wiring Diagram

NFEC1229

EC-ASC/VS-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- : DATA LINE

- A : WITH A/T
 - M : WITH M/T
 - TS : WITH TCS
 - OT : WITHOUT TCS
- * 1 18: A
 19: M



REFER TO THE FOLLOWING.
M15 -SUPER-MULTIPLE JUNCTION (SMJ)
M19 -FUSE BLOCK-JUNCTION BOX (J/B)



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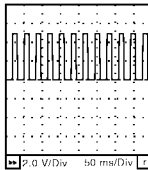
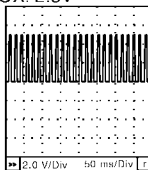
DTC P1574 ASCD VEHICLE SPEED SENSOR

Wiring Diagram (Cont'd)

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
68	P/L	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 10 KM/H (6 MPH) IN 1ST GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.5V 
			VEHICLE DRIVING AT 30 KM/H (19 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.5V 

SEC045DA

Diagnostic Procedure

NFEC1230

1	CHECK TCM FUNCTION
Check malfunction of the AT system with CONSULT-II or "O/D OFF" indicator. Refer to AT-5.	
OK or NG	
OK	GO TO 2.
NG	Check AT system. Refer to AT-5.

2	CHECK SPEEDOMETER OPERATION
Check if speedometer operates normally.	
OK or NG	
OK	GO TO 3.
NG	Check speedometer and vehicle speed sensor circuit. Refer to EL-117.

3	CHECK VEHICLE SPEED SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect ECM harness connector and combination meter harness connector. Check harness continuity between ECM terminal 68 and combination meter terminal 32 with CONSULT-II or tester. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to ground and short to power. 	
OK or NG	
OK	GO TO 5.
NG	GO TO 4.

DTC P1574 ASCD VEHICLE SPEED SENSOR

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F68, M161 Harness for open or short between combination meter and ECM	
	Repair open circuit or short to ground or short to power in harness or connectors.

GI

MA

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

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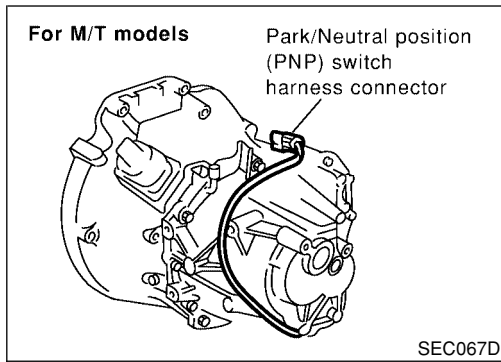
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DTC P1706 PNP SWITCH

Component Description



Component Description

NFEC1134

When the gear position is “P” (A/T models only) or “N”, park/neutral position (PNP) switch is “ON”.

ECM detects the position because the continuity of the line (the “ON” signal) exists.

For A/T models, the park/neutral position (PNP) switch assembly also includes a transmission range switch to detect selector lever position.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1135

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	Ignition switch: ON	Shift lever: “P” or “N”	ON
		Except above	OFF

On Board Diagnosis Logic

NFEC1137

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.	Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] Park/neutral position (PNP) switch

DTC Confirmation Procedure

NFEC1138

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.

DTC P1706 PNP SWITCH

DTC Confirmation Procedure (Cont'd)

2

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

WITH CONSULT-II

=NFEC1138S01

- 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" and "P" position	ON
Except the above position	OFF

If NG, go to "Diagnostic Procedure", EC-683.

If OK, go to following step.

5

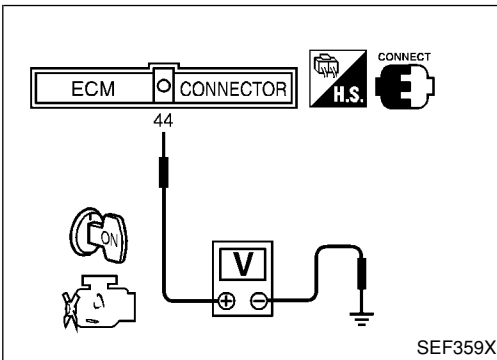
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

- 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 1,400 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 2 msec
VHCL SPEED SE	More than 65 km/h (40 MPH)
Selector lever	Suitable position (A/T models) 6th position (M/T models)

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-683.



Overall Function Check

NFEC1139

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

NFEC1139S01

- 1) Turn ignition switch "ON".
- 2) Check voltage between ECM terminal 44 and body ground under the following conditions.

Condition (Gear position)	Voltage V (Known-good data)
"P" and "N" position	Approx. 0
Except the above position	Battery voltage

- 3) If NG, go to "Diagnostic Procedure", EC-683.

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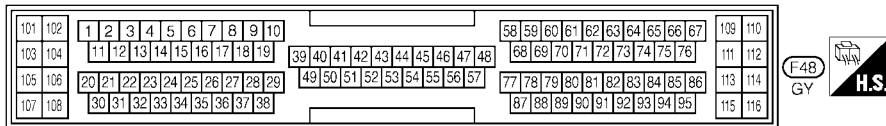
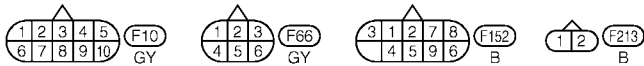
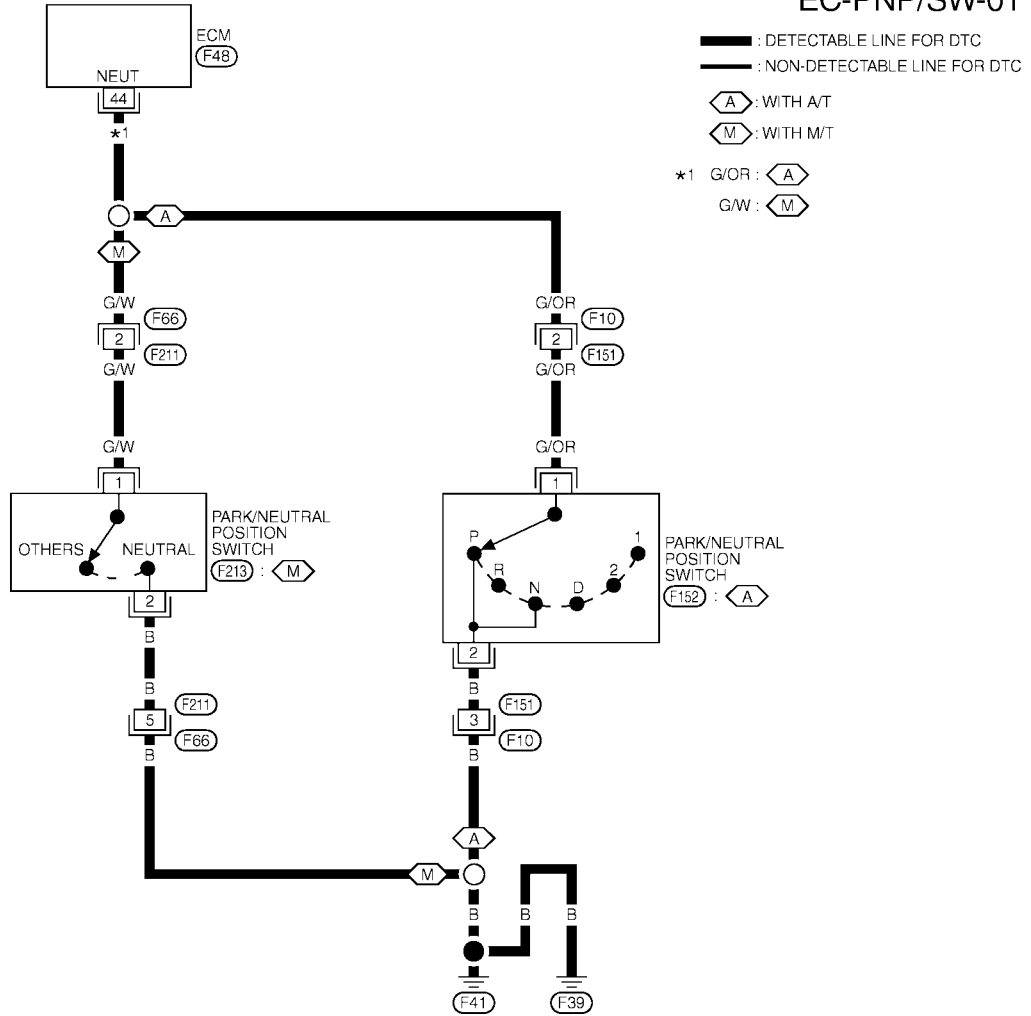
DTC P1706 PNP SWITCH

Wiring Diagram

Wiring Diagram

NFEC1140

EC-PNP/SW-01



MEC509D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

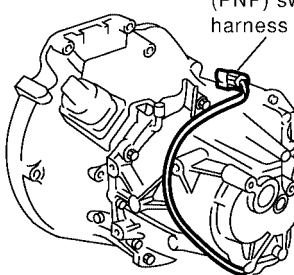
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
44	G/OR (A/T) G/W (M/T)	PARK/NEUTRAL POSITION (PNP) SWITCH	IGN ON WITH GEAR POSITION "N" OR "P"(A/T), GEAR POSITION NEUTRAL (M/T)	APPROX. 0V
			IGN ON WITHOUT THE ABOVE GEAR POSITION	BATTERY VOLTAGE

SEF635XB

Diagnostic Procedure FOR M/T MODELS

NFEC1141

NFEC1141S01

1	CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT				
<p>1. Turn ignition switch "OFF". 2. Disconnect park/neutral position (PNP) switch harness connector.</p> <p style="text-align: center;">For M/T models</p> <div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: center; margin-right: 20px;">  </div> <div style="text-align: left;"> <p>Park/Neutral position (PNP) switch harness connector</p> </div> </div> <p style="text-align: right;">SEC067D</p> <p>3. Check harness continuity between PNP switch terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td>GO TO 2.</td> </tr> </table>		OK	GO TO 3.	NG	GO TO 2.
OK	GO TO 3.				
NG	GO TO 2.				

2	DETECT MALFUNCTIONING PART		
<p>Check the following. Harness connectors F211, F66 Harness for open or short between park/neutral position (PNP) switch and ground</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>			Repair open circuit or short to power in harness or connectors.
	Repair open circuit or short to power in harness or connectors.		

3	CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT				
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 44 and PNP switch terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>GO TO 4.</td> </tr> </table>		OK	GO TO 5.	NG	GO TO 4.
OK	GO TO 5.				
NG	GO TO 4.				

4	DETECT MALFUNCTIONING PART		
<p>Check the following. Harness connectors F66, F211 Harness for open or short between park/neutral position (PNP) switch and ECM</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>			Repair open circuit or short to ground or short to power in harness or connectors.
	Repair open circuit or short to ground or short to power in harness or connectors.		

5	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH				
<p>Refer to MT section, "Position Switch Check".</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td>Replace park/neutral position (PNP) switch.</td> </tr> </table>		OK	GO TO 6.	NG	Replace park/neutral position (PNP) switch.
OK	GO TO 6.				
NG	Replace park/neutral position (PNP) switch.				

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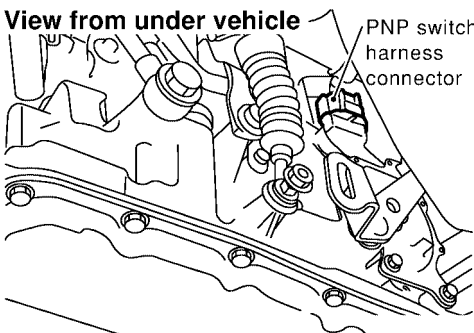
DTC P1706 PNP SWITCH

Diagnostic Procedure (Cont'd)

6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

FOR A/T MODELS

NFEC1141S02

1	CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT				
<p>1. Turn ignition switch "OFF". 2. Disconnect park/neutral position (PNP) switch harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF279X</p> <p>3. Check harness continuity between PNP switch terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td>GO TO 2.</td> </tr> </table>		OK	GO TO 3.	NG	GO TO 2.
OK	GO TO 3.				
NG	GO TO 2.				

2	DETECT MALFUNCTIONING PART		
<p>Check the following. Harness connectors F151, F10 Check harness for open between park/neutral position (PNP) switch and engine ground.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>			Repair open circuit or short to power in harness or connectors.
	Repair open circuit or short to power in harness or connectors.		

3	CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT				
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 44 and PNP switch terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">OK</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>GO TO 4.</td> </tr> </table>		OK	GO TO 5.	NG	GO TO 4.
OK	GO TO 5.				
NG	GO TO 4.				

4	DETECT MALFUNCTIONING PART		
<p>Check the following. Harness connectors F10, F151 Harness for open or short between ECM and park/neutral position (PNP) switch</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>			Repair open circuit or short to ground or short to power in harness or connectors.
	Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P1706 PNP SWITCH

Diagnostic Procedure (Cont'd)

5	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH
Refer to AT-107, "Diagnostic Procedure".	
OK or NG	
OK	GO TO 6.
NG	Replace park/neutral position (PNP) switch.

6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

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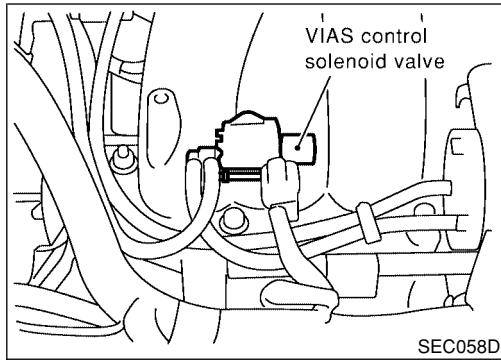
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DTC P1800 VIAS CONTROL SOLENOID VALVE

Component Description



Component Description

NFEC1400

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1404

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	Engine: After warming up	1,800 - 3,600 rpm	ON
		Except above condition	OFF

On Board Diagnosis Logic

NFEC1472

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1800 1800	VIAS control solenoid valve circuit open	An improper voltage signal is sent to ECM through VIAS control solenoid valve.	Harness connectors (The solenoid valve circuit is open or shorted.) VIAS control solenoid valve

DTC Confirmation Procedure

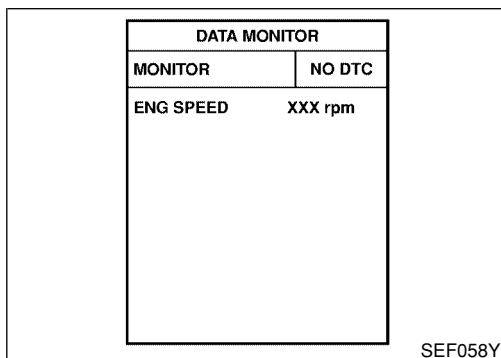
NFEC1473

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 let it for 10 seconds.
4. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-689.

DTC P1800 VIAS CONTROL SOLENOID VALVE

DTC Confirmation Procedure (Cont'd)



WITH GST

Follow the procedure "WITH CONSULT-II" above.

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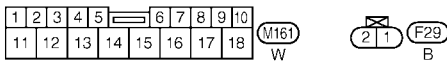
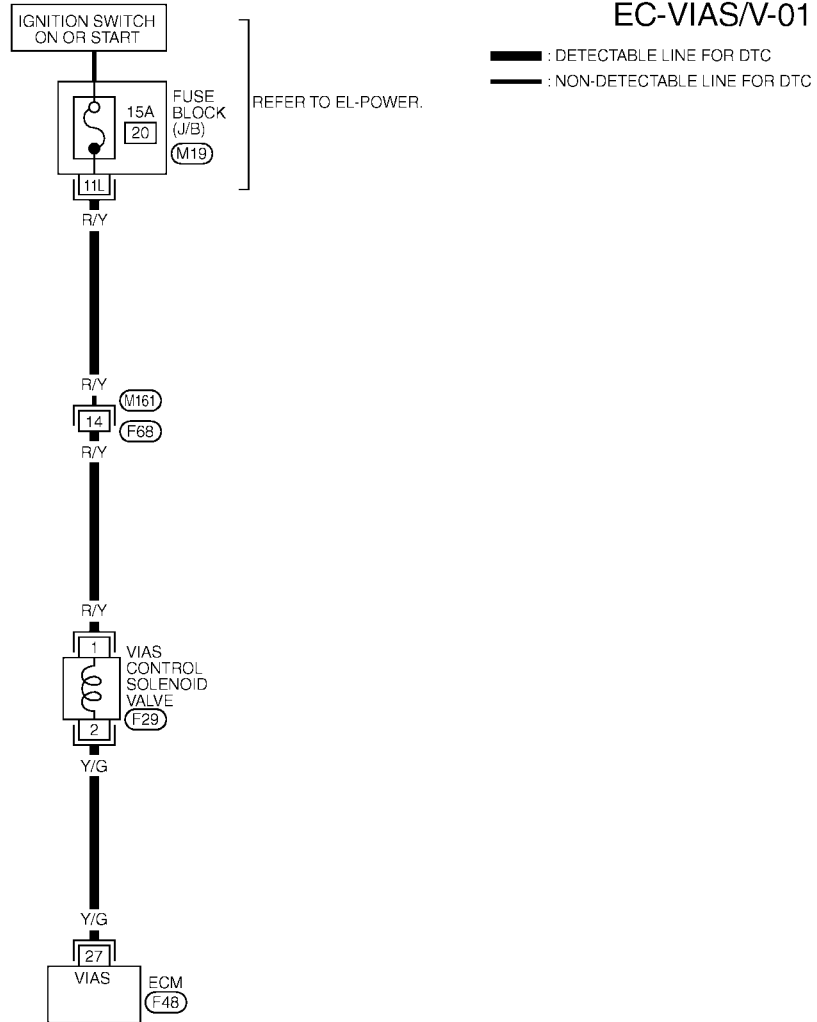
DTC P1800 VIAS CONTROL SOLENOID VALVE

Wiring Diagram

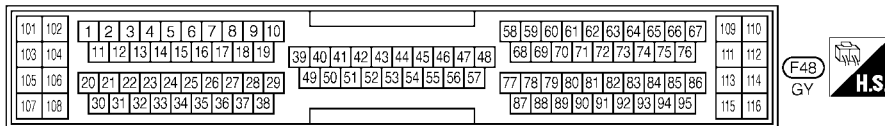
Wiring Diagram

=NFEC1402

EC-VIAS/V-01



REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)



MEC511D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

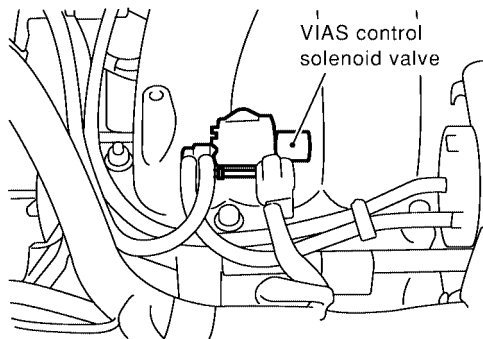
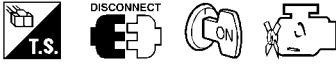
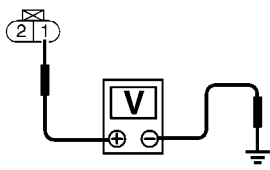
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	Y/G	VIAS CONTROL SOLENOID VALVE	ENGINE RUNNING BETWEEN 1,800 AND 3,600 RPM	0 - 1.0V
			EXCEPT ABOVE CONDITION	BATTERY VOLTAGE

SEF636XC

Diagnostic Procedure

NFEC1403

1	CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect VIAS control solenoid valve harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 150px;">VIAS control solenoid valve</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Voltage: Battery voltage</p>  </div> <p style="text-align: center;">OK or NG</p>	
SEC058D	
SEF603X	
OK	GO TO 3.
NG	GO TO 2.

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2	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors M161, F68 Fuse block (J/B) connector M19 15A fuse Harness continuity between fuse and VIAS control solenoid valve</p>	
Repair harness or connectors.	

3	CHECK VIAS CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 27 and terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

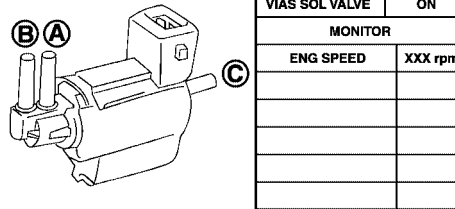
DTC P1800 VIAS CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

4 CHECK VIAS CONTROL SOLENOID VALVE

With CONSULT-II

1. Reconnect harness connector disconnected.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.



PBIB0177E

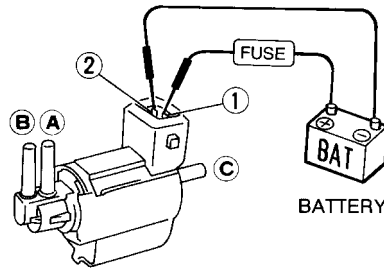
Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

MTBL1301

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



MEC488B

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.

MTBL1302

OK or NG

OK

GO TO 5.

NG

Replace VIAS control solenoid valve.

5 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

INSPECTION END

DTC P1805 BRAKE SWITCH

Description

Description

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.

NFEC1278

CONSULT-II Reference Value in Data Monitor Mode

NFEC1279

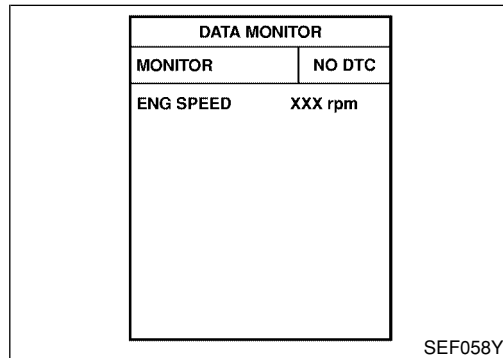
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	Ignition switch: ON	Brake pedal: Released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

NFEC1280

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.	Harness or connectors (Stop lamp switch circuit is open or shorted.) Stop lamp switch



DTC Confirmation Procedure

NFEC1281

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 "Diagnostic Procedure", EC-693.

WITH GST

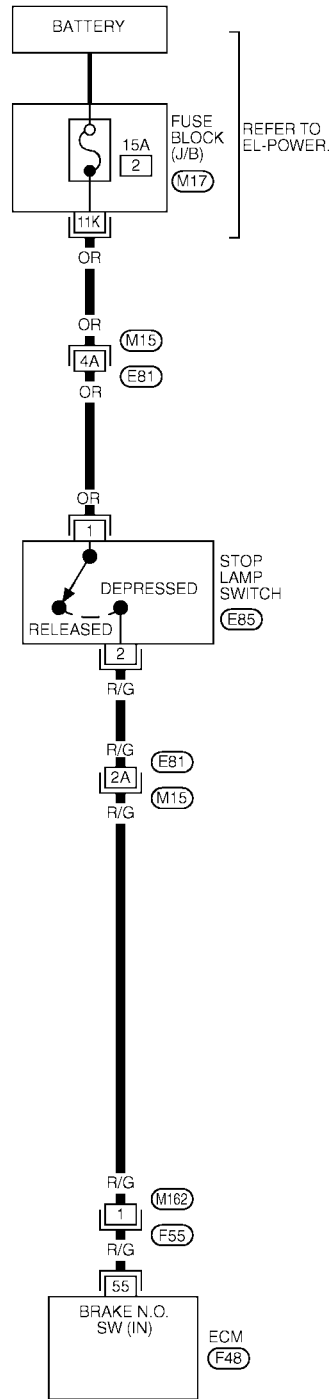
Follow the procedure "WITH CONSULT-II" above.

DTC P1805 BRAKE SWITCH

Wiring Diagram

Wiring Diagram

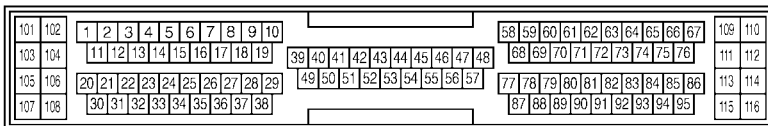
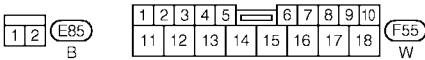
NFEC1282



EC-BRK/SW-01

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

REFER TO EL-POWER.



REFER TO THE FOLLOWING.

- (M15) -SUPER
- MULTIPLE JUNCTION (SMJ)
- (M17) -FUSE BLOCK-JUNCTION BOX (J/B)

MEC822D

DTC P1805 BRAKE SWITCH

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body 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/G	Stop lamp switch	[Engine is running] Brake pedal fully released	Approximately 0V
			[Engine is running] Brake pedal fully depressed	BATTERY VOLTAGE (11 - 14V)

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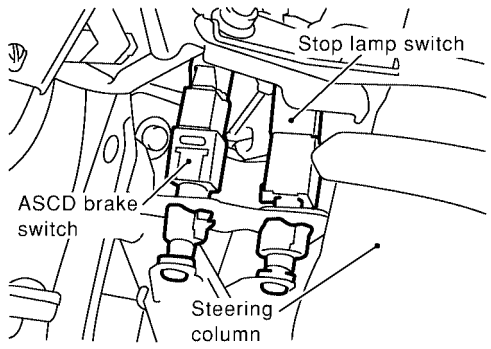
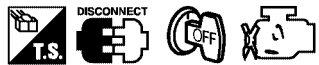
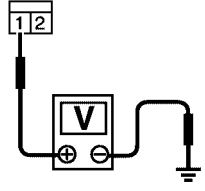
Diagnostic Procedure

NFEC1283

1	CHECK STOP LAMP SWITCH CIRCUIT						
<p>1. Turn ignition switch "OFF". 2. Check the stop lamp when depressing and releasing the brake pedal.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">Brake pedal</th> <th style="width: 50%;">Stop lamp</th> </tr> </thead> <tbody> <tr> <td>Released</td> <td>Not illuminated</td> </tr> <tr> <td>Depressed</td> <td>Illuminated</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1560</p> <p style="text-align: center;">OK or NG</p>		Brake pedal	Stop lamp	Released	Not illuminated	Depressed	Illuminated
Brake pedal	Stop lamp						
Released	Not illuminated						
Depressed	Illuminated						
OK	GO TO 4.						
NG	GO TO 2.						

DTC P1805 BRAKE SWITCH

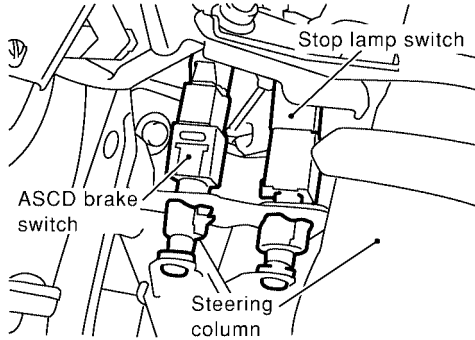
Diagnostic Procedure (Cont'd)

2	CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT
<p>1. Disconnect stop lamp switch harness connector.</p>  <p style="text-align: right;">SEC053D</p>	
<p>2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.</p>   <p style="text-align: right;">SEC051D</p>	
<p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	GO TO 3.

3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors M15, E81 15A fuse Fuse block (J/B) connector M17 Harness for open and short between stop lamp switch and battery 	
<p>Repair open circuit or short to ground or short to power in harness or connectors.</p>	

DTC P1805 BRAKE SWITCH

Diagnostic Procedure (Cont'd)

4	CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Disconnect stop lamp switch harness connector.</p>	
	
<p>4. Check harness continuity between ECM terminal 55 and stop lamp switch terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 6.
NG	GO TO 5.

SEC053D

5	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors E81, M15 Harness connectors M162, F55 Harness for open or short between ECM and stop lamp switch</p>	
<p>Repair open circuit or short to ground or short to power in harness or connectors.</p>	

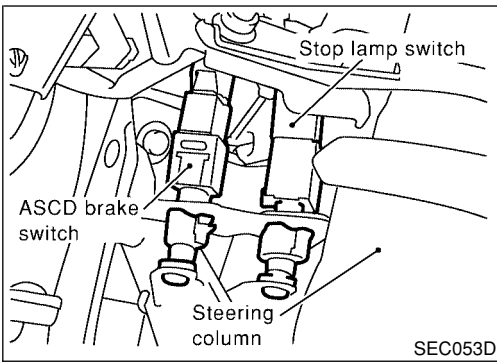
6	CHECK STOP LAMP SWITCH
<p>Refer to "Component Inspection", EC-696.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	Replace stop lamp switch.

7	CHECK INTERMITTENT INCIDENT
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.</p> <p style="text-align: center;">INSPECTION END</p>	

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DTC P1805 BRAKE SWITCH

Component Inspection



Component Inspection

=NFEC1284

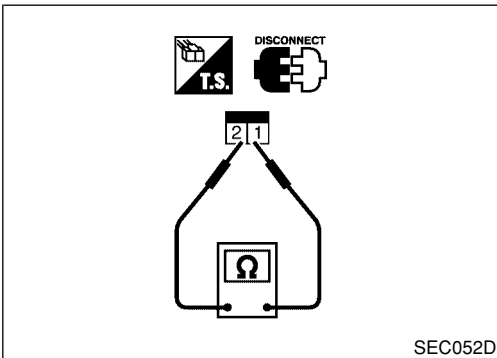
STOP LAMP SWITCH

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 released	Should not exist.
Brake pedal depressed	Should exist.

3. If NG, replace stop lamp switch.



VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

Description

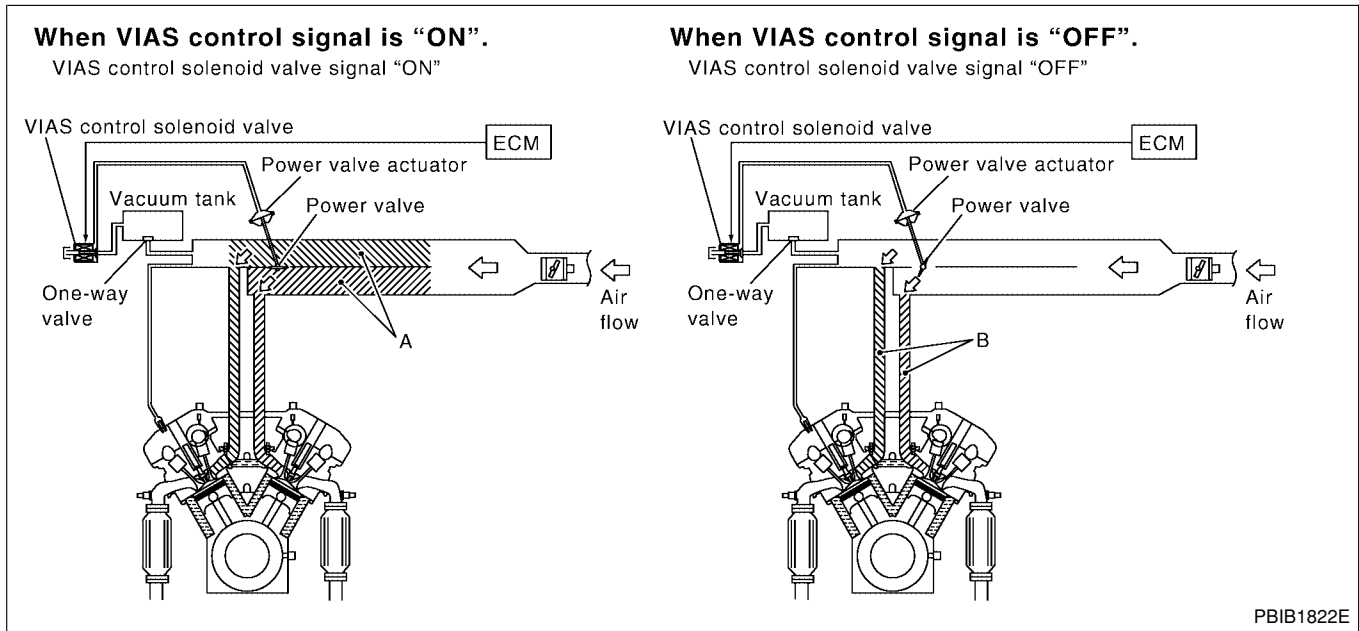
Description SYSTEM DESCRIPTION

NFEC0596

NFEC0596S01

Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Ignition switch	Start signal		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		

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When the engine is running at medium speed, the ECM sends the ON signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore closes the power valve.

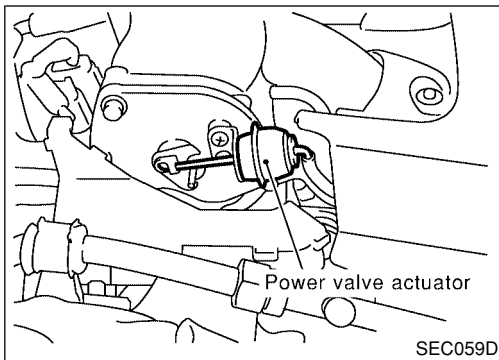
Under this condition, the effective intake manifold length is equivalent to the total length of passage A and passage B. This long intake manifold provides increased amount of intake air, which results in improved suction efficiency and higher torque.

When engine is running at low or high speed, the ECM sends the OFF signal to the VIAS control solenoid valve and the power valve is opened.

Under this condition, the effective intake manifold length is equivalent to the length of passage B. This shortened intake manifold length results in enhanced engine output due to reduced suction resistance under high speeds.

VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

Description (Cont'd)



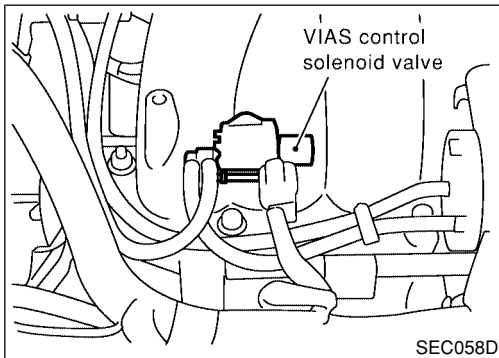
COMPONENT DESCRIPTION

NFEC0596S02

Power Valve

NFEC0596S0201

The power valve is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.



VIAS Control Solenoid Valve

NFEC0596S0202

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.

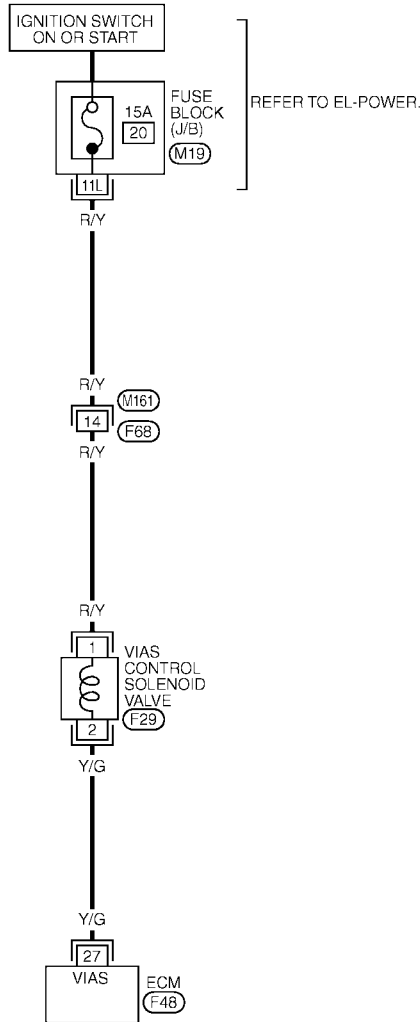
VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

Wiring Diagram

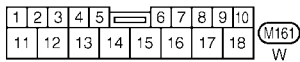
Wiring Diagram

NFEC0597

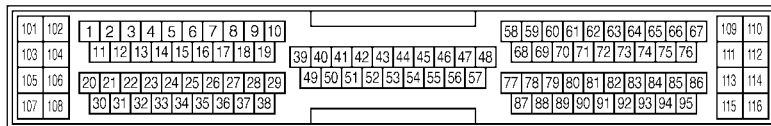
EC-VIAS-01



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REFER TO THE FOLLOWING.
(M19) - FUSE BLOCK - JUNCTION BOX (J/B)



MEC823D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	Y/G	VIAS CONTROL SOLENOID VALVE	ENGINE RUNNING BETWEEN 1,800 AND 3,600 RPM	0 - 1.0V
			EXCEPT ABOVE CONDITION	BATTERY VOLTAGE

SEF636XC

VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

Diagnostic Procedure

Diagnostic Procedure

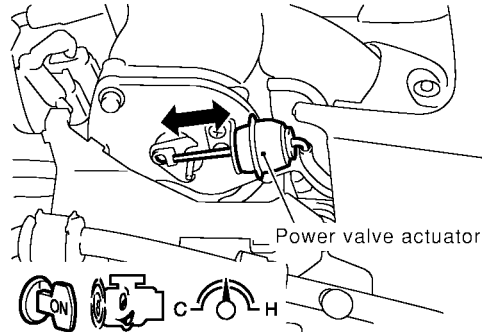
NFEC0598

1 CHECK OVERALL FUNCTION

☑ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
3. Turn VIAS control solenoid valve "ON" and "OFF", and make sure that power valve actuator moves.

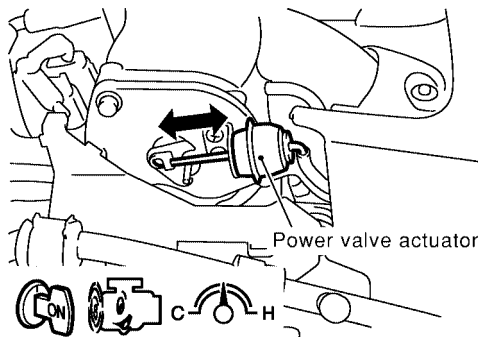
ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm



SEC128D

☒ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Rev engine quickly up to above 5,000 rpm and make sure that power valve actuator rod moves.



SEC060D

OK or NG

OK

INSPECTION END

NG

GO TO 2.

VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

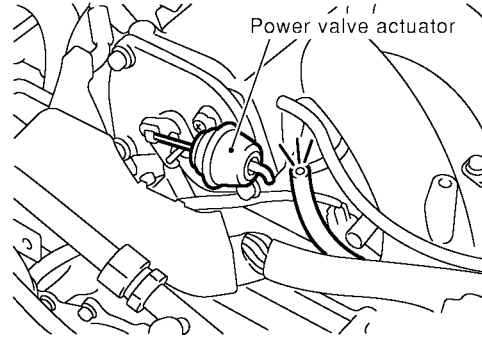
Diagnostic Procedure (Cont'd)

2 CHECK VACUUM EXISTENCE

With CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Start engine and let it idle.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
4. Turn VIAS control solenoid valve "ON" and "OFF", and check for the existence of vacuum under the following conditions.

ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm



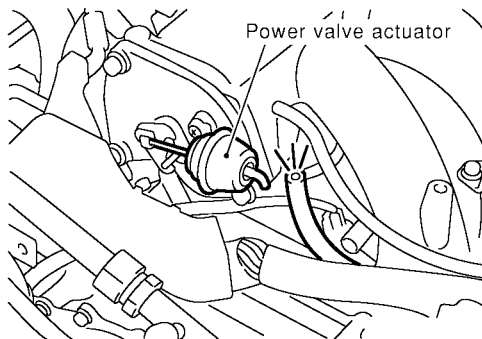
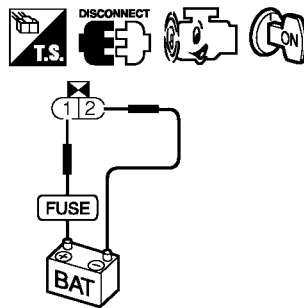
SEC129D

VIAS SOL VALVE	Vacuum
ON	Should exist.
OFF	Should not exist.

MTBL1174

Without CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Disconnect VIAS control solenoid valve harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve terminals 1 and 2.
5. Check for the existence of vacuum under the following conditions.



SEC130D

Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.

MTBL1175

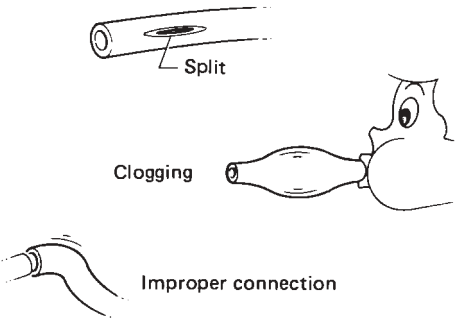
OK or NG

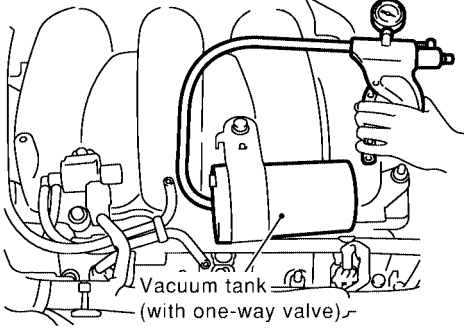
OK	Repair or replace power valve actuator.
NG	GO TO 3.

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VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

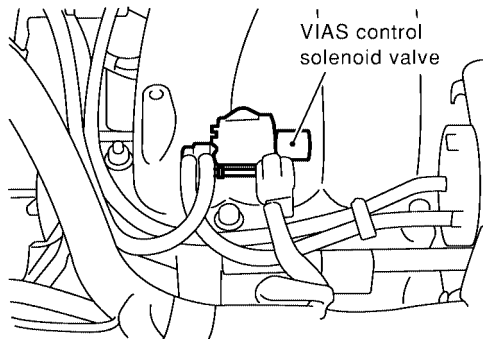
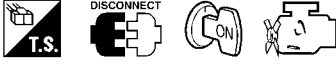
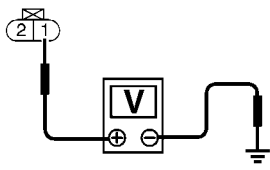
Diagnostic Procedure (Cont'd)

3 CHECK VACUUM HOSE	
<p>1. Stop engine. 2. Check hoses and tubes between intake manifold and power valve actuator for crack, clogging, disconnection or improper connection.</p>  <p>Split</p> <p>Clogging</p> <p>Improper connection</p> <p>OK or NG</p> <p>SEF109L</p>	
OK	GO TO 4.
NG	Replace vacuum hose.

4 CHECK VACUUM TANK	
<p>1. Disconnect vacuum hose connected to vacuum tank. 2. Connect a vacuum pump to port (at the center) of vacuum tank. 3. Apply vacuum and make sure that vacuum exists at another port.</p>  <p>Vacuum tank (with one-way valve)</p> <p>OK or NG</p> <p>SEC131D</p>	
OK	GO TO 5.
NG	Replace vacuum tank.

VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

Diagnostic Procedure (Cont'd)

5	CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Stop engine. 2. Disconnect VIAS control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>VIAS control solenoid valve</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>		
OK		GO TO 7.
NG		GO TO 6.

SEC058D

SEF603X

6	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors M161, F68 Fuse block (J/B) connector M19 15A fuse Harness continuity between fuse and VIAS control solenoid valve 		
		Repair harness or connectors.

7	CHECK VIAS CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 27 and terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		GO TO 8.
NG		Repair open circuit or short to ground or short to power in harness or connectors.

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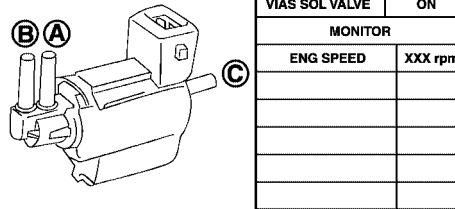
VARIABLE INDUCTION AIR CONTROL SYSTEM (VIAS)

Diagnostic Procedure (Cont'd)

8 CHECK VIAS CONTROL SOLENOID VALVE

Ⓟ With CONSULT-II

1. Reconnect disconnected harness connector.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.



PBIB0177E

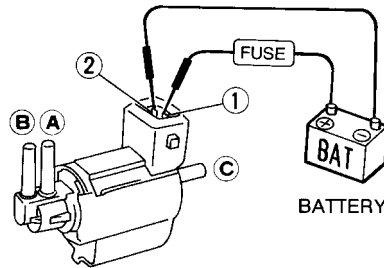
Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

MTBL1301

ⓧ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



MEC488B

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.

MTBL1302

OK or NG

OK

GO TO 9.

NG

Replace VIAS control solenoid valve.

9 CHECK INTERMITTENT INCIDENT

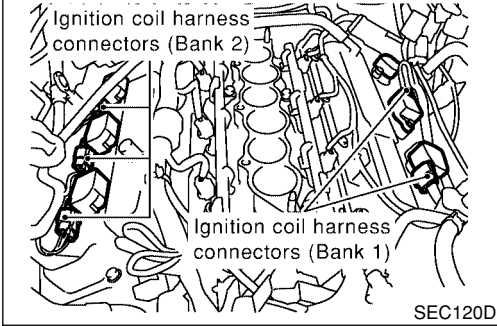
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.

INSPECTION END

IGNITION SIGNAL

Component Description

View with intake manifold collector removed



Component Description

IGNITION COIL & POWER TRANSISTOR

NFEC0817

NFEC0817S01

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.

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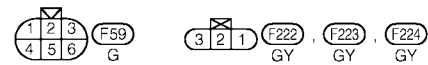
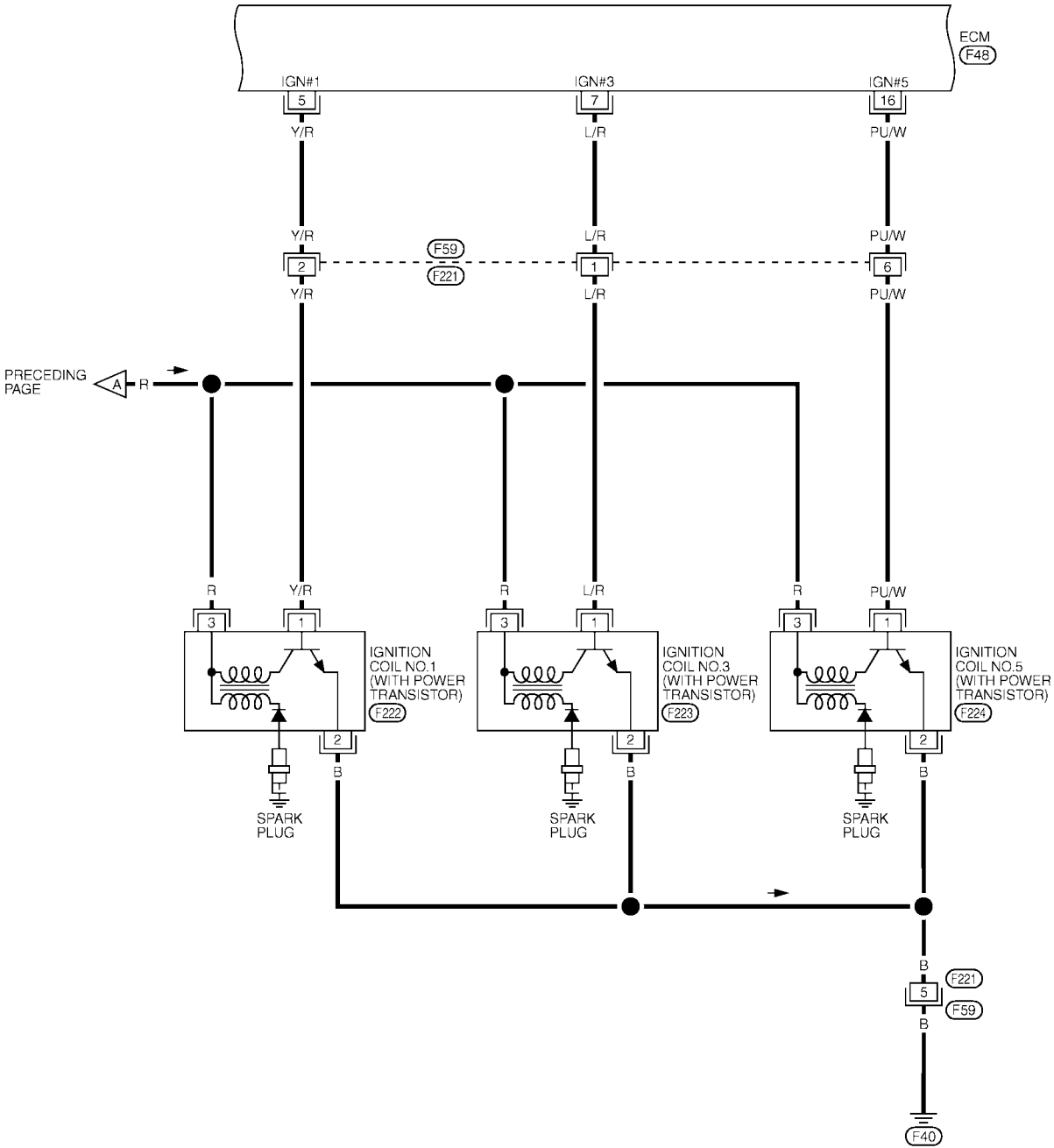
IDX

IGNITION SIGNAL

Wiring Diagram (Cont'd)

EC-IGNSYS-02

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



101	102	1	2	3	4	5	6	7	8	9	10					58	59	60	61	62	63	64	65	66	67	109	110					
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	



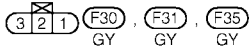
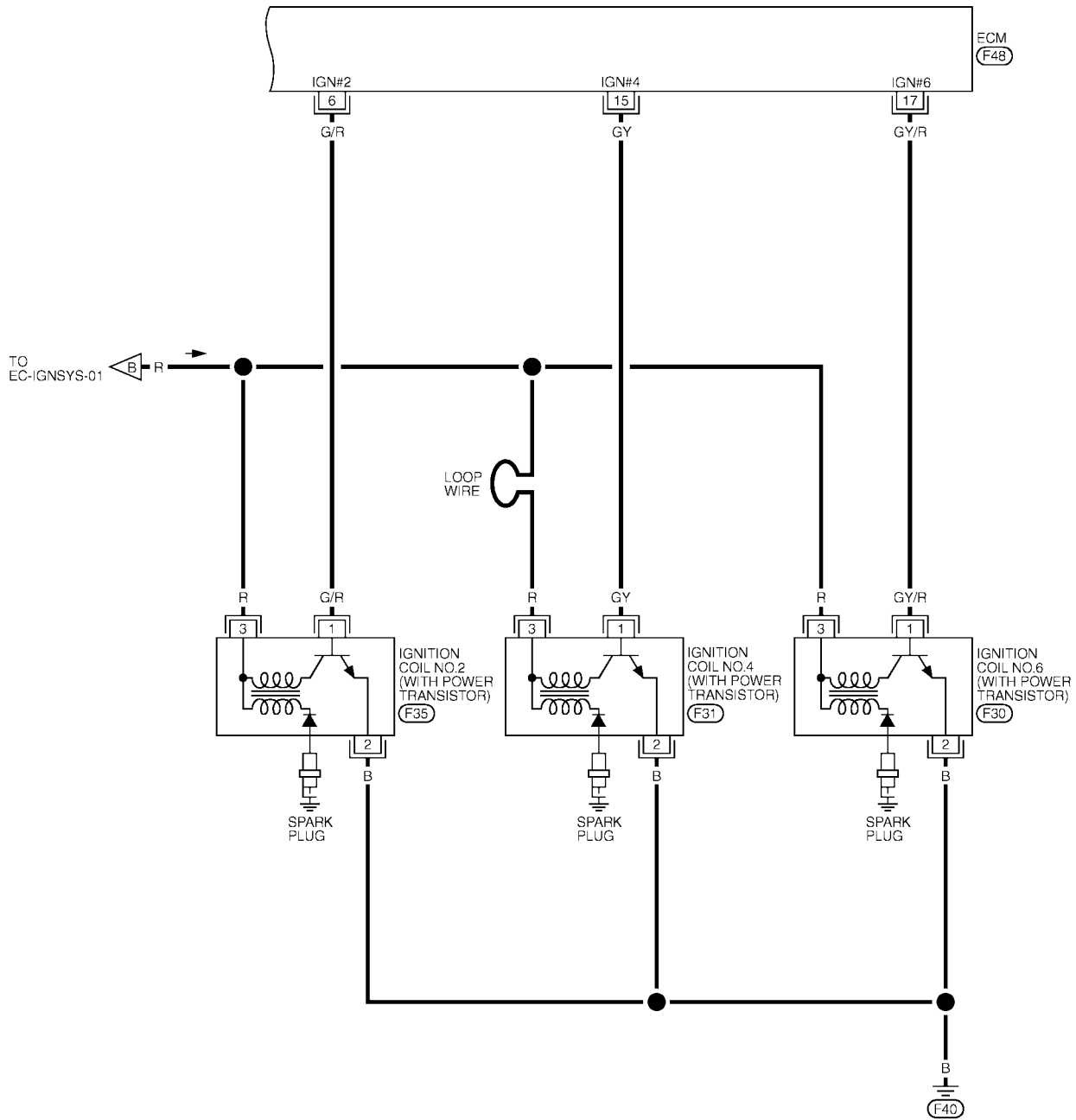
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IGNITION SIGNAL

Wiring Diagram (Cont'd)

EC-IGNSYS-03

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



101	102	1	2	3	4	5	6	7	8	9	10					58	59	60	61	62	63	64	65	66	67	109	110					
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	



MEC503D

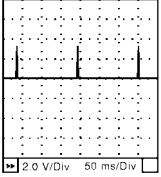
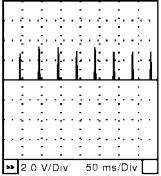
IGNITION SIGNAL

Wiring Diagram (Cont'd)

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5 6 7 15 16 17	Y/R G/R L/R GY PU/W GY/R	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4 Ignition signal No. 5 Ignition signal No. 6	<p>[Engine is running] Warm-up condition Idle speed</p>	<p>0 - 0.2V★</p>  <p>SEC986C</p>
			<p>[Engine is running] Warm-up condition Engine speed is 2,500 rpm.</p>	<p>0.1 - 0.3V★</p>  <p>SEC987C</p>

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


Diagnostic Procedure


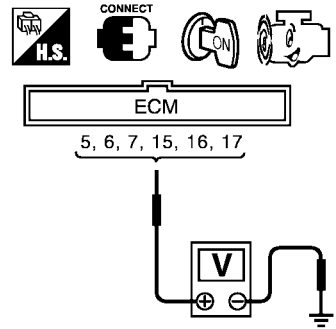
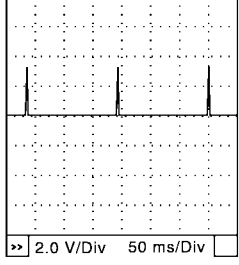
NFEC0820

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.	

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

2	CHECK OVERALL FUNCTION																		
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 2. Make sure that all circuits do not produce a momentary engine speed drop. 																			
<table border="1" style="margin: auto;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V								
ACTIVE TEST																			
POWER BALANCE																			
MONITOR																			
ENG SPEED	XXX rpm																		
MAS A/F SE-B1	XXX V																		
PBIB0133E																			
OK or NG																			
OK	INSPECTION END																		
NG	GO TO 14.																		

3	CHECK OVERALL FUNCTION
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Let engine idle. 2. Read the voltage signal between ECM terminals 5, 6, 7, 15, 16, 17 and ground with oscilloscope. 3. Verify that the oscilloscope screen shows the signal wave as shown below. 	
	
	
SEC159D	
OK or NG	
OK	INSPECTION END
NG	GO TO 14.

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

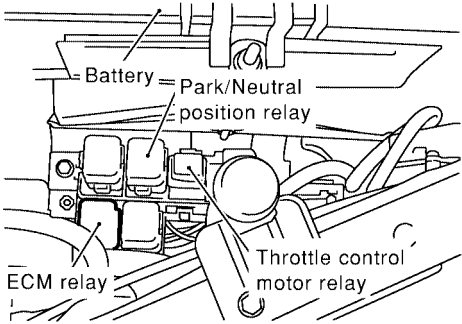
4	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I
<p>1. Turn ignition switch ON. 2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.</p>	
<p style="text-align: right;">SEF366X</p>	
OK or NG	
OK	GO TO 5.
NG	Go to TROUBLE DIAGNOSIS FOR POWER SUPPLY, EC-155.

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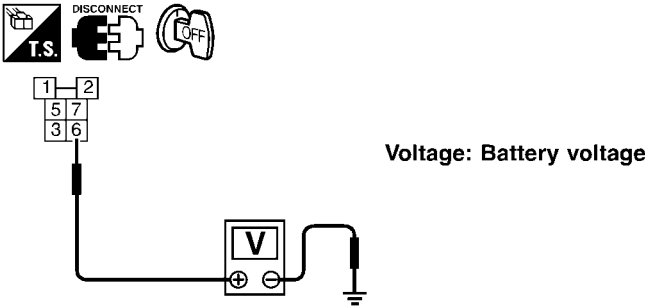
5	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II
<p>1. Check voltage between ECM terminal 31 and ground with CONSULT-II or tester.</p>	
<p style="text-align: right;">SEC914C</p>	
OK or NG	
OK	GO TO 11.
NG	GO TO 6.

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III
<p>1. Turn ignition switch OFF. 2. Disconnect ECM relay.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEC044D</p> <p>3. Check harness continuity between ECM relay terminal 31 and ECM relay terminal 7. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	GO TO 7.

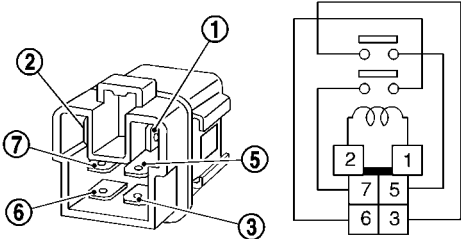
7	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors E15, F18 Harness for open or short between ECM and ECM relay</p>	
Repair open circuit or short to ground or short to power in harness or connectors.	

8	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV
<p>Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> </div> <p style="text-align: right;">SEF368X</p>	
OK	GO TO 10.
NG	GO TO 9.

9	DETECT MALFUNCTIONING PART
<p>Check the following. 15A fuse Harness for open and short between ECM relay and fuse</p>	
Repair or replace harness or connectors.	

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

10	CHECK ECM RELAY						
<ol style="list-style-type: none"> 1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between ECM relay terminals 3 and 5, 6 and 7. 							
							
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>OFF</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Condition	Continuity	12V direct current supply between terminals 1 and 2	Yes	OFF	No
Condition	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
OFF	No						
SEF296X							
OK or NG							
OK	GO TO 19.						
NG	Replace ECM relay.						


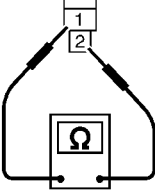
11	CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect condenser harness connector. 3. Check harness continuity between ECM terminal 31 and condenser terminal 1. Refer to Wiring Diagram. Continuity should exist. 4. Also check for 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.

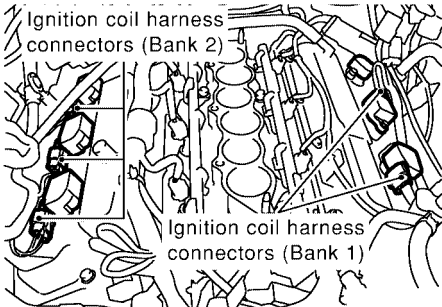

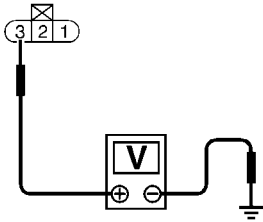
12	CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Check harness continuity between condenser terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 2. Also check harness for short to power. 	
OK or NG	
OK	GO TO 13.
NG	Repair open circuit or short to power in harness or connectors.

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 RS
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 HA
 SC
 EL
 IDX

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

13	CHECK CONDENSER
<p>Check resistance between condenser terminals 1 and 2.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">  <div style="text-align: center;"> <p>Resistance: Above 1MΩ at 25°C (77°F)</p> </div> </div> <div style="text-align: right; margin-top: 10px;">SEF369X</div>	
OK or NG	
OK	GO TO 14.
NG	Replace condenser.

14	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V
<ol style="list-style-type: none"> 1. Turn ignition switch OFF. 2. Reconnect harness connectors disconnected. 3. Disconnect ignition coil harness connector. <div style="text-align: center; margin-top: 10px;"> <p>View with intake manifold collector removed</p>  </div> <div style="text-align: right; margin-top: 10px;">SEC120D</div> <ol style="list-style-type: none"> 4. Turn ignition switch ON. 5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester. <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">  </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">  <div style="text-align: center;"> <p>Voltage: Battery voltage</p> </div> </div> <div style="text-align: right; margin-top: 10px;">SEF370X</div>	
OK or NG	
OK	GO TO 16.
NG	GO TO 15.

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

15	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F59, F221 Harness for open and short between ignition coil and harness connector F18	
	Repair or replace harness or connectors.

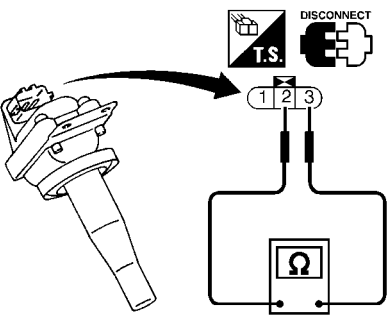
GI
MA

16	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 17.
NG	Repair open circuit or short to power in harness or connectors.

EM
LC
EC

17	CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminals 5, 6, 7, 15, 16, 17 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 18.
NG	Repair open circuit or short to ground or short to power in harness or connectors.

CL
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18	CHECK IGNITION COIL WITH POWER TRANSISTOR								
Check resistance between ignition coil terminals 2 and 3.									
 <table border="1" data-bbox="763 1281 1323 1396"> <thead> <tr> <th>Terminals</th> <th>Resistance</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td rowspan="2">2 and 3</td> <td>Not 0Ω</td> <td>OK</td> </tr> <tr> <td>0Ω</td> <td>NG</td> </tr> </tbody> </table>		Terminals	Resistance	Result	2 and 3	Not 0Ω	OK	0Ω	NG
Terminals	Resistance	Result							
2 and 3	Not 0Ω	OK							
	0Ω	NG							
SEF371X									
OK or NG									
OK	GO TO 19.								
NG	Replace ignition coil with power transistor.								

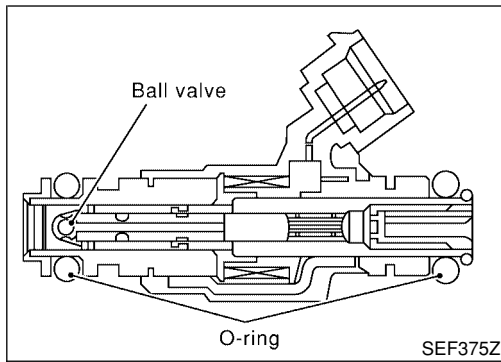
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19	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

EL
IDX

INJECTOR

Component Description



Component Description

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 ball 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.

NFEC0383

CONSULT-II Reference Value in Data Monitor Mode

NFEC0384

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B2 INJ PULSE-B1	Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
B/FUEL SCHDL	ditto	Idle	2.3 - 2.9 msec
		2,000 rpm	2.3 - 2.9 msec

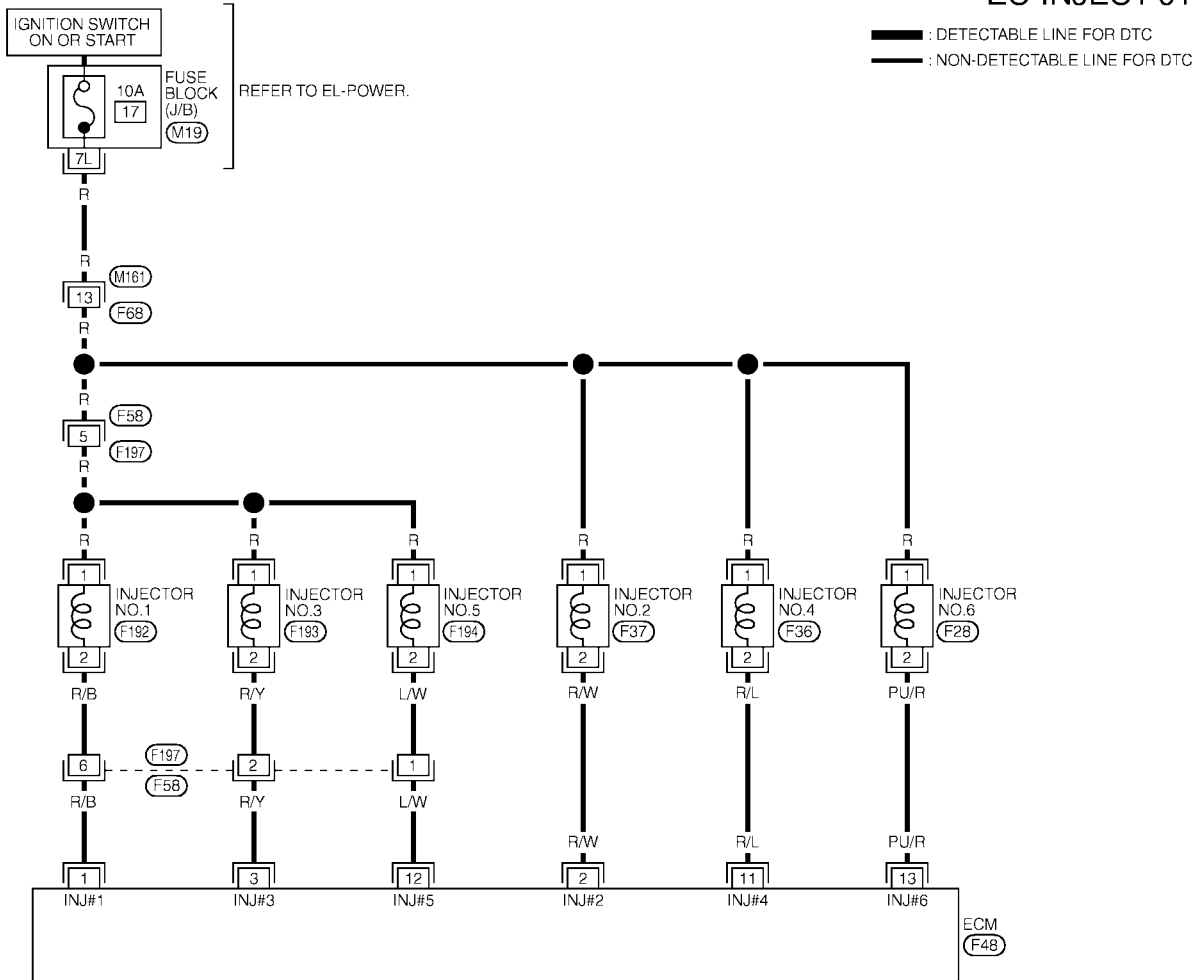
INJECTOR

Wiring Diagram

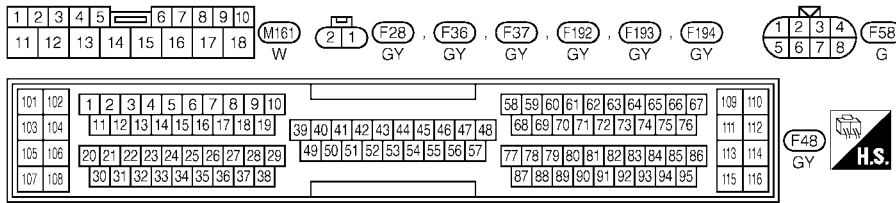
Wiring Diagram

NFEC0386

EC-INJECT-01



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REFER TO THE FOLLOWING.
(M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC512D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/B	INJECTOR NO. 1	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	BATTERY VOLTAGE
2	R/W	INJECTOR NO. 2		
3	R/Y	INJECTOR NO. 3		
11	R/L	INJECTOR NO. 4		
12	L/W	INJECTOR NO. 5		
13	PU/R	INJECTOR NO. 6		

SEF796YB


INJECTOR


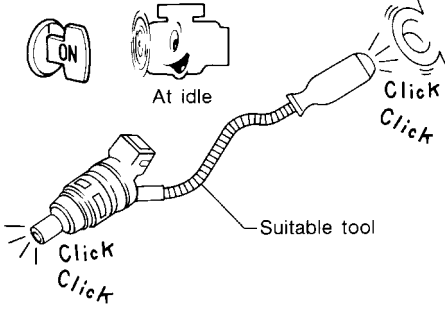
Diagnostic Procedure

Diagnostic Procedure

NFEC0387

1	INSPECTION START	
Turn ignition switch to "START". Is any cylinder ignited?		
Yes or No		
Yes	GO TO 2.	
No	GO TO 3.	

2	CHECK OVERALL FUNCTION																									
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 																										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th colspan="2">POWER BALANCE</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>MAS A/F SE-B1</th> <th>XXX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V														
ACTIVE TEST																										
POWER BALANCE																										
MONITOR																										
ENG SPEED	XXX rpm																									
MAS A/F SE-B1	XXX V																									
PBIB0133E																										
3. Make sure that each circuit produces a momentary engine speed drop.																										

<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Listen to each injector operating sound. 	
	
Clicking noise should be heard.	
OK or NG	

OK	INSPECTION END
NG	GO TO 3.

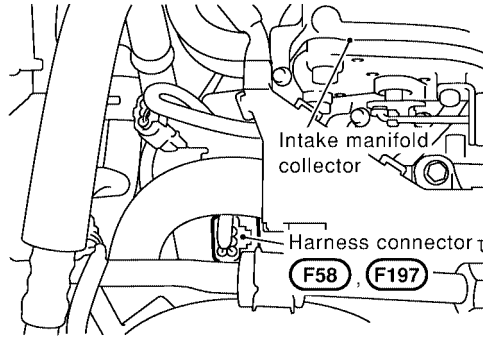
MEC703B

INJECTOR

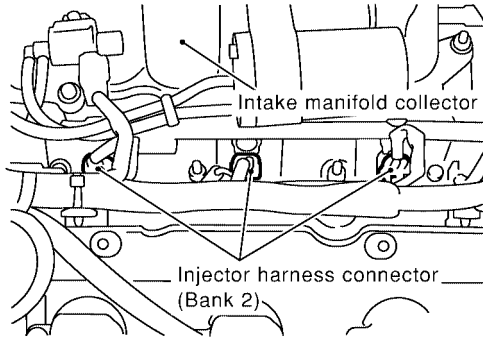
Diagnostic Procedure (Cont'd)

3 CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect injector harness connectors (bank 2) and harness connectors F58, F197 (bank 1).

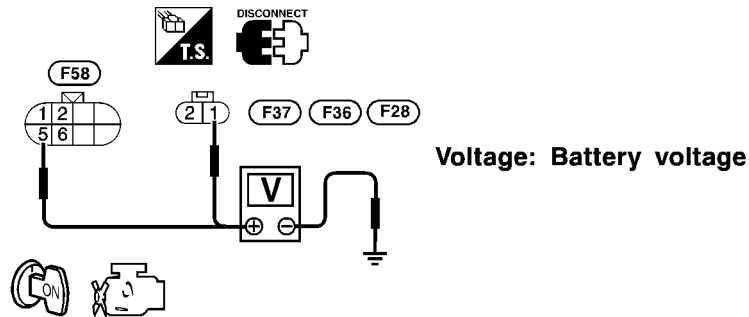


SEC086D



SEC087D

3. Turn ignition switch "ON".
4. Check voltage between injector terminal 1 and ground, harness connector F58 terminal 5 and ground with CONSULT-II or tester.



SEF897XA

OK or NG

OK	GO TO 5.
NG	GO TO 4.

4 DETECT MALFUNCTIONING PART

- Check the following.
- Harness connectors M161, F68
 - Harness connectors F58, F197
 - Fuse block (J/B) connector M19
 - 10A fuse
 - Harness for open or short between injector and fuse
 - Harness for open or short between harness connector F58 and fuse

Repair harness or connectors.

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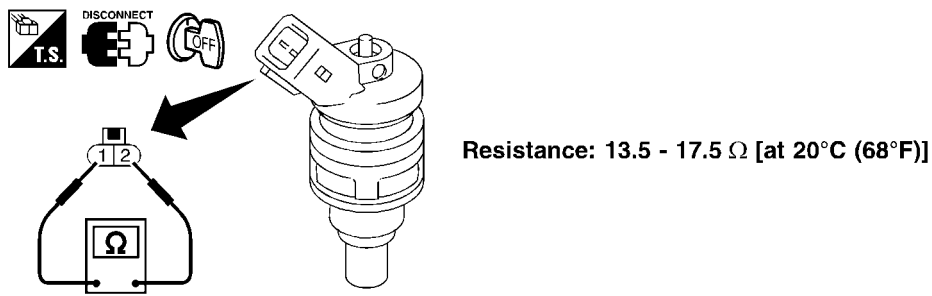
INJECTOR

Diagnostic Procedure (Cont'd)

5	CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between injector terminal 2 and ECM terminals 2, 11, 13, harness connector F58 terminals 6, 2, 1 and ECM terminals 1, 3, 12. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 7.
NG	GO TO 6.

6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors F58, F191 Harness for open or short between harness connector F58 and ECM Harness for open or short between ECM and injector 	
Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK SUB-HARNESS CIRCUIT FOR OPEN AND SHORT (BANK 1)						
<ol style="list-style-type: none"> 1. Remove intake manifold collector. 2. Disconnect injector harness connectors (Bank 1). 3. Check harness continuity between the following terminals. Refer to Wiring Diagram. 							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Harness connector F197</th> <th style="padding: 5px;">Injector F192, F193, F194</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">5</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">6, 2, 1</td> <td style="text-align: center; padding: 5px;">2</td> </tr> </tbody> </table>		Harness connector F197	Injector F192, F193, F194	5	1	6, 2, 1	2
Harness connector F197	Injector F192, F193, F194						
5	1						
6, 2, 1	2						
MTBL1173							
<p>Continuity should exist.</p> <p style="text-align: center;">OK or NG</p>							
OK	GO TO 8.						
NG	Repair open circuit or short to ground or short to power in harness or connectors.						

8	CHECK INJECTOR
<ol style="list-style-type: none"> 1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure. 	
	
SEF964XA	
OK or NG	
OK	GO TO 9.
NG	Replace injector.

INJECTOR

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

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START SIGNAL

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NFEC0388

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	Ignition switch: ON , START , ON	OFF , ON , OFF

START SIGNAL

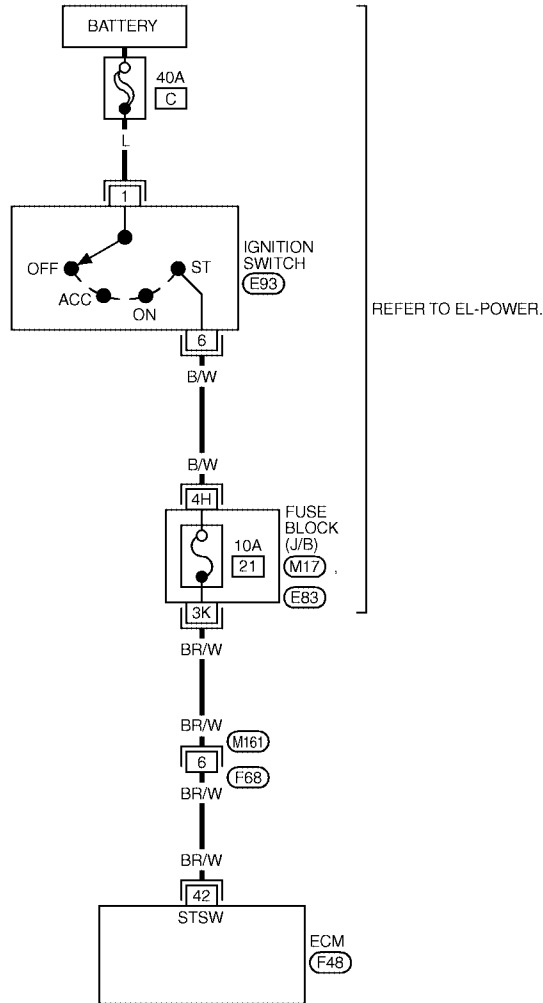
Wiring Diagram

Wiring Diagram

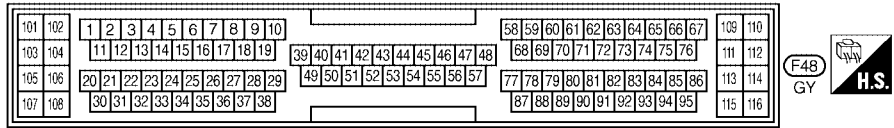
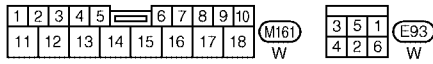
=NFEC0390

EC-S/SIG-01

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



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REFER TO THE FOLLOWING.
 (M17), (E83) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC513D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	BR/W	START SIGNAL	IGN ON IGN START	APPROX 0V 9 - 12V

SEF638XB


START SIGNAL


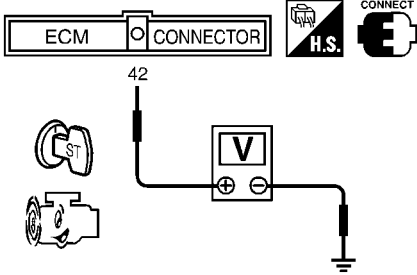
Diagnostic Procedure

Diagnostic Procedure

NFEC0391

1	INSPECTION START
Do you have CONSULT-II?	
Yes or No	
Yes	GO TO 2.
No	GO TO 3.

2	CHECK OVERALL FUNCTION																		
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>																			
<table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>START SIGNAL</td> <td>OFF</td> </tr> <tr> <td>CLSD THL POS</td> <td>ON</td> </tr> <tr> <td>AIR COND SIG</td> <td>OFF</td> </tr> <tr> <td>P/N POSI SW</td> <td>ON</td> </tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th>Condition</th> <th>"START SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON"</td> <td>OFF</td> </tr> <tr> <td>Ignition switch "START"</td> <td>ON</td> </tr> </tbody> </table>		DATA MONITOR		MONITOR	NO DTC	START SIGNAL	OFF	CLSD THL POS	ON	AIR COND SIG	OFF	P/N POSI SW	ON	Condition	"START SIGNAL"	Ignition switch "ON"	OFF	Ignition switch "START"	ON
DATA MONITOR																			
MONITOR	NO DTC																		
START SIGNAL	OFF																		
CLSD THL POS	ON																		
AIR COND SIG	OFF																		
P/N POSI SW	ON																		
Condition	"START SIGNAL"																		
Ignition switch "ON"	OFF																		
Ignition switch "START"	ON																		
SEF072Y																			
OK or NG																			
OK	INSPECTION END																		
NG	GO TO 4.																		

3	CHECK OVERALL FUNCTION						
<p> Without CONSULT-II</p> <p>Check voltage between ECM terminal 42 and ground under the following conditions.</p>							
							
<table border="1"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "START"</td> <td>Battery voltage</td> </tr> <tr> <td>Other positions</td> <td>Approximately 0V</td> </tr> </tbody> </table>		Condition	Voltage	Ignition switch "START"	Battery voltage	Other positions	Approximately 0V
Condition	Voltage						
Ignition switch "START"	Battery voltage						
Other positions	Approximately 0V						
SEF362X							
OK or NG							
OK	INSPECTION END						
NG	GO TO 4.						

4	CHECK STARTING SYSTEM
Turn ignition switch "OFF", then turn it to "START".	
Does starter motor operate?	
Yes or No	
Yes	GO TO 5.
No	Refer to SC-10, "STARTING SYSTEM".

START SIGNAL

Diagnostic Procedure (Cont'd)

5	CHECK FUSE	
1. Turn ignition switch "OFF". 2. Disconnect 10A fuse. 3. Check if 10A fuse is OK.		GI
OK or NG		MA
OK	GO TO 6.	EM
NG	Replace 10A fuse.	

6	CHECK START SIGNAL INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Disconnect ignition switch harness connector. 3. Check harness continuity between ECM terminal 42 and ignition switch terminal 6. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.		LC
OK or NG		EC
OK	GO TO 8.	FE
NG	GO TO 7.	CL

7	DETECT MALFUNCTIONING PART	
Check the following. Harness connectors F68, M161 Fuse block (J/B) connectors M17, E83 Harness for open or short between ignition switch and ECM		MT
OK or NG		AT
	Repair open circuit or short to ground or short to power in harness or connectors.	AX

8	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.		SU
INSPECTION END		BR

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FUEL PUMP

System Description

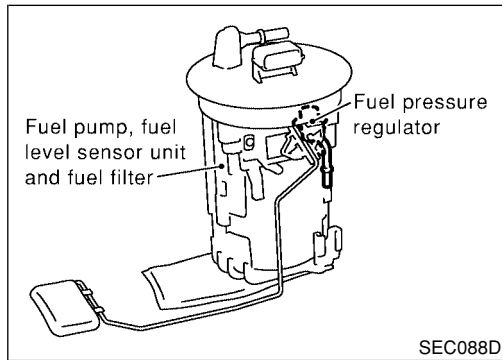
System Description

NFEC0392

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Fuel pump control	Fuel pump relay
Ignition switch	Start signal		

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 120° signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the 120° 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.



SEC088D

Component Description

NFEC0393

The fuel pump with a fuel damper is an in-tank type (the pump and damper are located in the fuel tank).

CONSULT-II Reference Value in Data Monitor Mode

NFEC0394

Specification data are reference values.

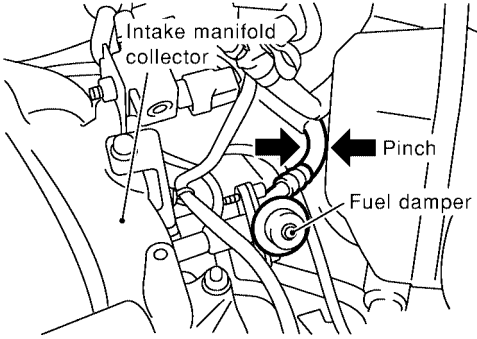
MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	Ignition switch is turned to ON. (Operates for 1 second.) Engine running and cranking	ON
	Except as shown above	OFF

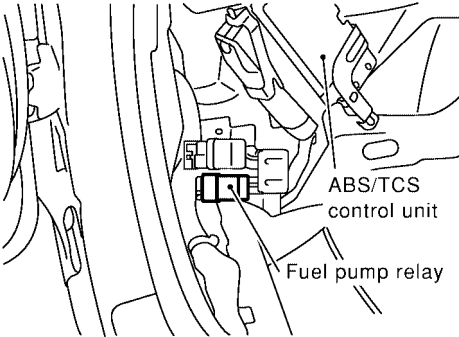
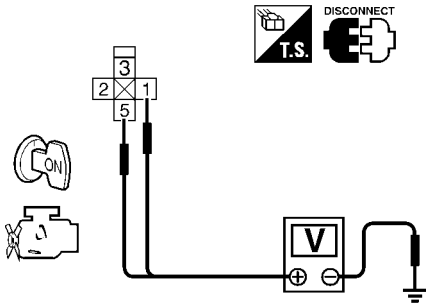
FUEL PUMP

Diagnostic Procedure

Diagnostic Procedure

NFEC0397

1	CHECK OVERALL FUNCTION
<p>1. Turn ignition switch "ON". 2. Pinch fuel feed hose with two fingers.</p>  <p style="text-align: right;">SEC089D</p> <p style="text-align: center;">Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned "ON".</p> <p style="text-align: center;">OK or NG</p>	
OK	INSPECTION END
NG	GO TO 2.

2	CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel pump relay.</p>  <p style="text-align: right;">SEF284X</p> <p>3. Turn ignition switch "ON". 4. Check voltage between terminals 1, 5 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF898X</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 4.
NG	GO TO 3.

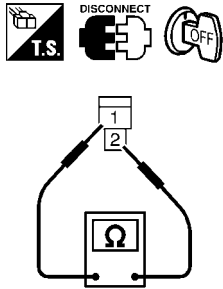
FUEL PUMP

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. Fuse block (J/B) connector B5 10A fuse 15A fuse Harness for open or short between fuse and fuel pump relay	
Repair harness or connectors.	

4	CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect condenser harness connector. 3. Check harness continuity between fuel pump relay terminal 3 and condenser terminal 1, condenser terminal 2 and body ground. 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.

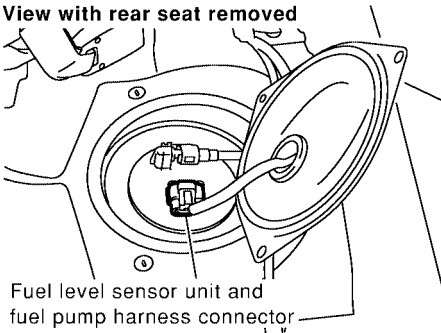
5	DETECT MALFUNCTIONING PART
Check the following. Harness for open or short between fuel pump relay and condenser Harness for open or short between condenser and body ground	
Repair open circuit or short to ground or short to power in harness or connectors.	

6	CHECK CONDENSER
1. Turn ignition switch "OFF". 2. Disconnect condenser harness connector. 3. Check resistance between condenser terminals 1 and 2.	
	
Resistance: Above 1 MΩ at 25°C (77°F)	
OK or NG	
OK	GO TO 7.
NG	Replace condenser.

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FUEL PUMP

Diagnostic Procedure (Cont'd)

7	CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector.</p> <div style="text-align: center;"> <p>View with rear seat removed</p>  <p>Fuel level sensor unit and fuel pump harness connector</p> </div> <p style="text-align: right;">SEC082D</p> <p>3. Check harness continuity between fuel pump terminal 3 and body ground, fuel pump terminal 1 and fuel pump relay terminal 3. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 9.
NG	GO TO 8.

8	DETECT MALFUNCTIONING PART
<p>Check the following. Harness for open or short between fuel pump relay and fuel pump Harness for open or short between fuel pump and body ground</p>	
Repair open circuit or short to ground or short to power in harness or connectors.	

9	CHECK FUEL PUMP RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 23 and fuel pump relay terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 11.
NG	GO TO 10.

10	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors B3, M6 Harness connectors M81, F49 Harness for open or short between ECM and fuel pump relay</p>	
Repair open circuit or short to ground or short to power in harness or connectors.	

FUEL PUMP

Diagnostic Procedure (Cont'd)

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11 CHECK FUEL PUMP RELAY

With CONSULT-II

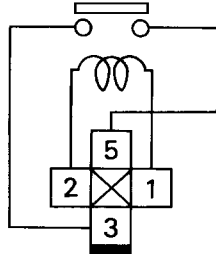
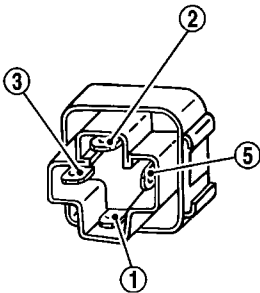
1. Reconnect fuel pump relay, fuel level sensor unit and fuel pump harness connector and ECM harness connector.
2. Turn ignition switch "ON".
3. Turn fuel pump relay "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT-II and check operating sound.

ACTIVE TEST	
FUEL PUMP RELAY	ON
MONITOR	
ENG SPEED	XXX rpm

SEF073Y

Without CONSULT-II

Check continuity between terminals 3 and 5 under the following conditions.



Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

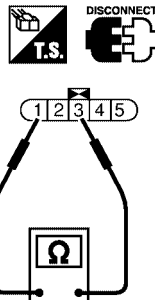
SEF608X

OK or NG

OK	GO TO 12.
NG	Replace fuel pump relay.

12 CHECK FUEL PUMP

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)]

SEC918C

OK or NG

OK	GO TO 13.
NG	Replace fuel pump.

FUEL PUMP

Diagnostic Procedure (Cont'd)

13	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

ELECTRONIC CONTROLLED ENGINE MOUNT

System Description

System Description

NFEC1328

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Engine mount control	Electronic controlled engine mount
Wheel sensor	Vehicle speed		

The ECM controls the engine mount operation corresponding to the engine speed and the vehicle speed. The control system has 2-step control [soft/hard].

Vehicle condition	Engine mount control
Idle (with vehicle stopped)	Soft
Driving	Hard

CONSULT-II Reference Value in Data Monitor Mode

NFEC1329

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ENGINE MOUNT	Engine: Running	Idle	"IDLE"
		Except above	"TRVL"

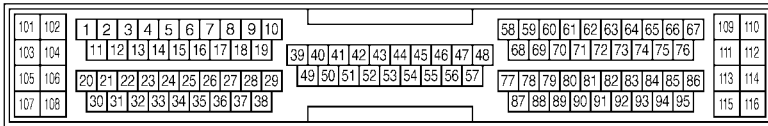
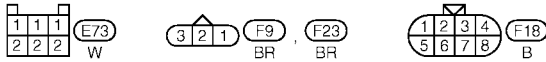
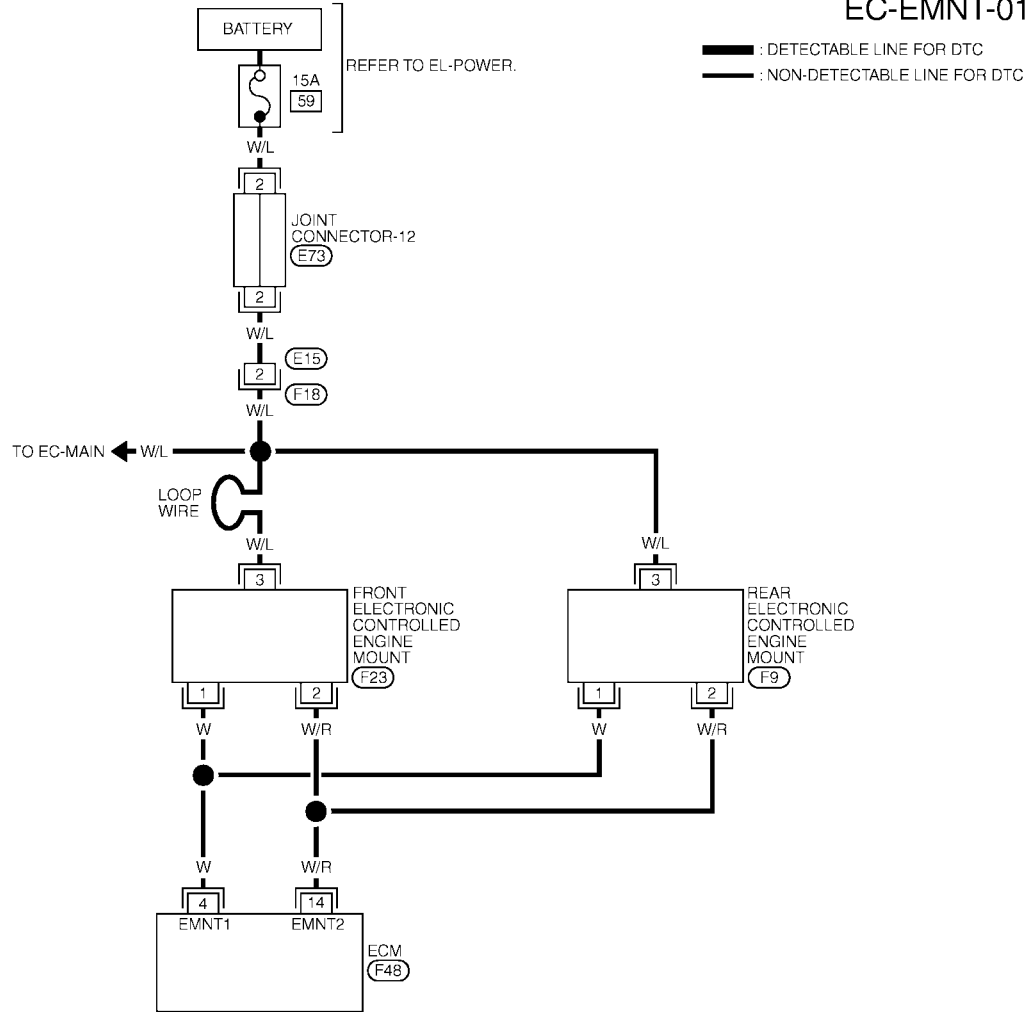
ELECTRONIC CONTROLLED ENGINE MOUNT

Wiring Diagram

Wiring Diagram

NFEC1330

EC-EMNT-01



MEC515D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
4	W	ELECTRONIC CONTROLLED ENGINE MOUNT-1	ENGINE RUNNING AT IDLE SPEED	0 - 1.0V
			EXCEPT ABOVE	BATTERY VOLTAGE
14	W/R	ELECTRONIC CONTROLLED ENGINE MOUNT-2	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE
			EXCEPT ABOVE	0 - 1.0V

SEF640XC

Diagnostic Procedure

NFEC1331

1	CHECK THE OVERALL FUNCTION																								
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. After warming up engine, run it at idle speed. 2. Shift selector lever to “D” range while depressing the brake pedal and pulling the parking brake control lever. 3. Perform “ENGINE MOUNTING” in “ACTIVE TEST” mode with CONSULT-II and check that the body vibration changes according to switching the condition (With vehicle stopped). 																									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>ENGINE MOUNTING</th> <th>IDLE</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		ENGINE MOUNTING	IDLE	MONITOR		ENG SPEED	XXX rpm	COOLAN TEMP/S	XXX °C														
ACTIVE TEST																									
ENGINE MOUNTING	IDLE																								
MONITOR																									
ENG SPEED	XXX rpm																								
COOLAN TEMP/S	XXX °C																								
SEC237C																									
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. After warming up engine, run it at idle speed. 2. Shift selector lever to “D” range while depressing the brake pedal and pulling the parking brake control lever. 3. Disconnect front or rear electronic controlled engine mount harness connector when engine speed is more than 1,000 rpm. 4. When returning engine speed to idle speed, check that the body vibration increases, compared with the condition of the above step 2 (With vehicle stopped). 																									
OK or NG																									
OK	INSPECTION END																								
NG	GO TO 2.																								

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2	CHECK ELECTRONIC CONTROLLED ENGINE MOUNT POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 1. Turn ignition switch “OFF”. 2. Disconnect front or rear electronic controlled engine mount harness connector. 3. Check voltage between electronic controlled engine mount terminal 3 and ground with CONSULT-II or tester. 	
<p style="text-align: center;">Voltage: Battery voltage</p>	
OK or NG	
OK	GO TO 4.
NG	GO TO 3.

SEF899X

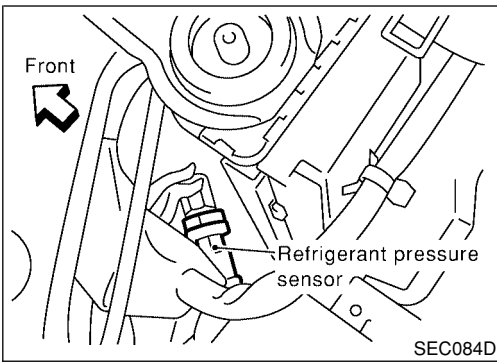
ELECTRONIC CONTROLLED ENGINE MOUNT

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E15, F18 15A fuse Joint connector-12 Harness for open or short between electronic controlled engine mount and battery	
	Repair harness or connectors.
4	CHECK ELECTRONIC CONTROLLED ENGINE MOUNT OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 4 and electronic controlled engine mount terminal 1, ECM terminal 14 and electronic controlled engine mount 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 5.
NG	Repair open circuit, short to ground or short to power in harness connectors.
5	CHECK ELECTRONIC CONTROLLED ENGINE MOUNT
Visually check front and rear electronic controlled engine mount.	
OK or NG	
OK	GO TO 6.
NG	Replace front or rear engine mount assembly.
6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
	INSPECTION END

REFRIGERANT PRESSURE SENSOR

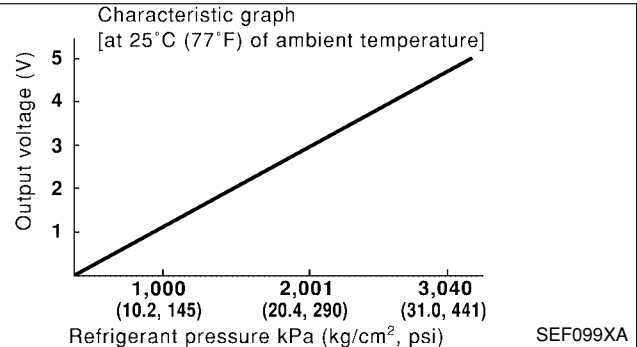
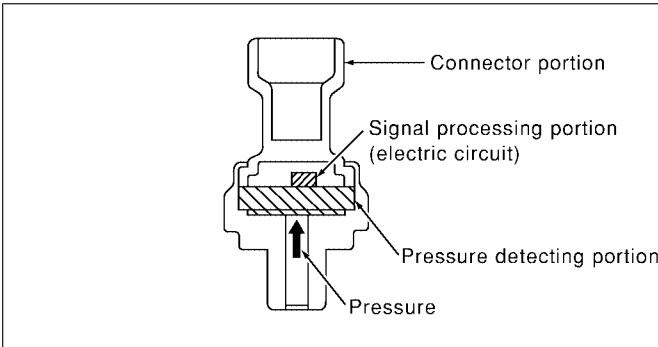
Description



Description

NFEC0636

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.



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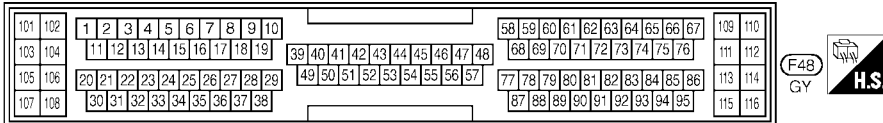
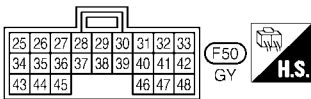
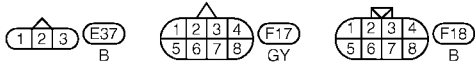
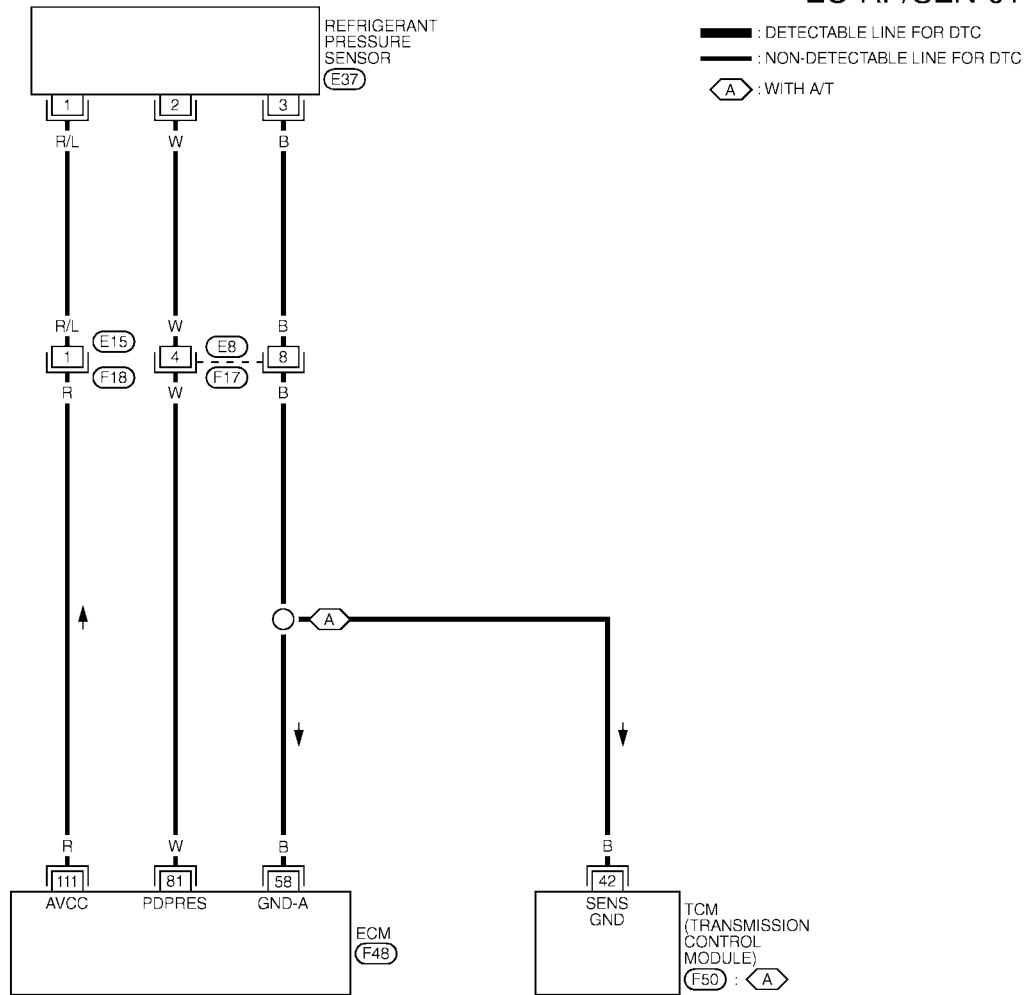
REFRIGERANT PRESSURE SENSOR

Wiring Diagram

Wiring Diagram

NFEC0637

EC-RP/SEN-01



MEC517D

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	0V
81	W	REFRIGERANT PRESSURE SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH A/C SWITCH AND BLOWER SWITCH ON	1.0 - 4.0V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

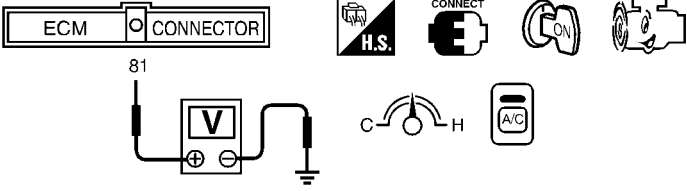
SEF643XC

REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure

Diagnostic Procedure

NFEC0638

1	CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION
<ol style="list-style-type: none"> 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 81 and ground with CONSULT-II or tester. 	
 <p style="text-align: right;">Voltage: 1 - 4V</p>	
SEF617XA	
OK or NG	
OK	INSPECTION END
NG	GO TO 2.

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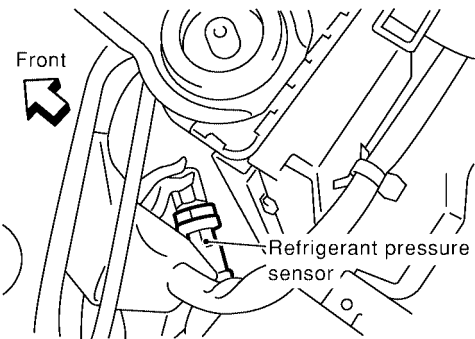
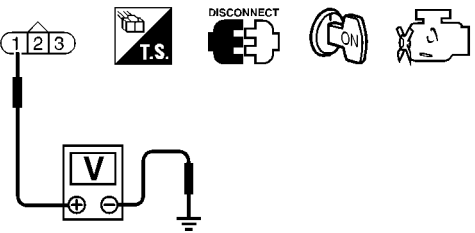
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2	CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 1. Turn A/C switch and blower switch "OFF". 2. Stop engine. 3. Disconnect refrigerant pressure sensor harness connector. 	
	
SEC084D	
<ol style="list-style-type: none"> 4. Turn ignition switch "ON". 5. Check voltage between refrigerant pressure sensor terminal 1 and ground with CONSULT-II or tester. 	
 <p style="text-align: right;">Voltage: Approximately 5V</p>	
SEF618X	
OK or NG	
OK	GO TO 4.
NG	GO TO 3.

AT

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REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E15, F18 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. Check harness continuity between refrigerant pressure sensor terminal 3 and engine 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 E8, F17 Harness for open between ECM and refrigerant pressure sensor Harness for open between TCM (Transmission control module) and refrigerant pressure sensor	
Repair open circuit or short to power in harness or connectors.	

6	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 81 and refrigerant pressure sensor 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 8.
NG	GO TO 7.

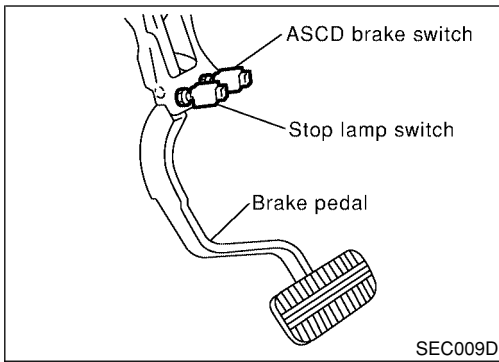
7	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E8, F17 Harness for open or short between ECM and refrigerant pressure sensor	
Repair open circuit or short to ground or short to power in harness or connectors.	

8	CHECK REFRIGERANT PRESSURE SENSOR
Refer to HA-15, "Refrigerant pressure sensor".	
OK or NG	
OK	GO TO 9.
NG	Replace refrigerant pressure sensor.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

ASC D BRAKE SWITCH

Component Description



Component Description

NFEC1232

When depressing the brake pedal, ASCD brake switch is turned OFF and stop lamp switch is turned ON.

ECM detects the state of the brake pedal by this two kinds of input (ON/OFF signal).

Refer to EC-53 for the ASCD function.

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CONSULT-II Reference Value in Data Monitor Mode

NFEC1233

CONSULT-II Reference Value in Data Monitor Mode Specification data are reference values.

EC

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASC D brake switch)	Ignition switch: ON Shift lever: Except "N" and "P" position	Brake pedal released	ON
		Brake pedal depressed	OFF
BRAKE SW 2 (Stop lamp switch)	Ignition switch: ON	Brake pedal released	OFF
		Brake pedal depressed	ON

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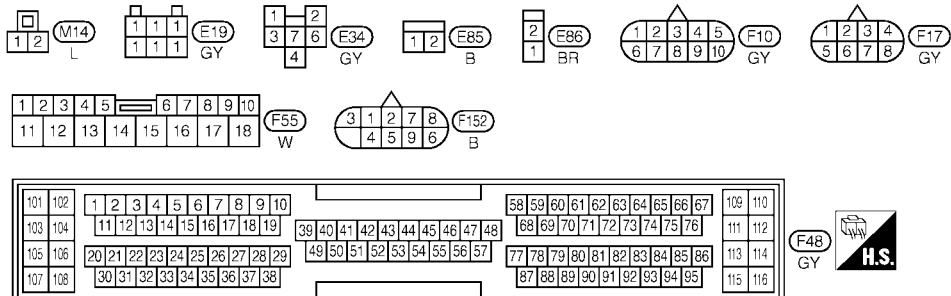
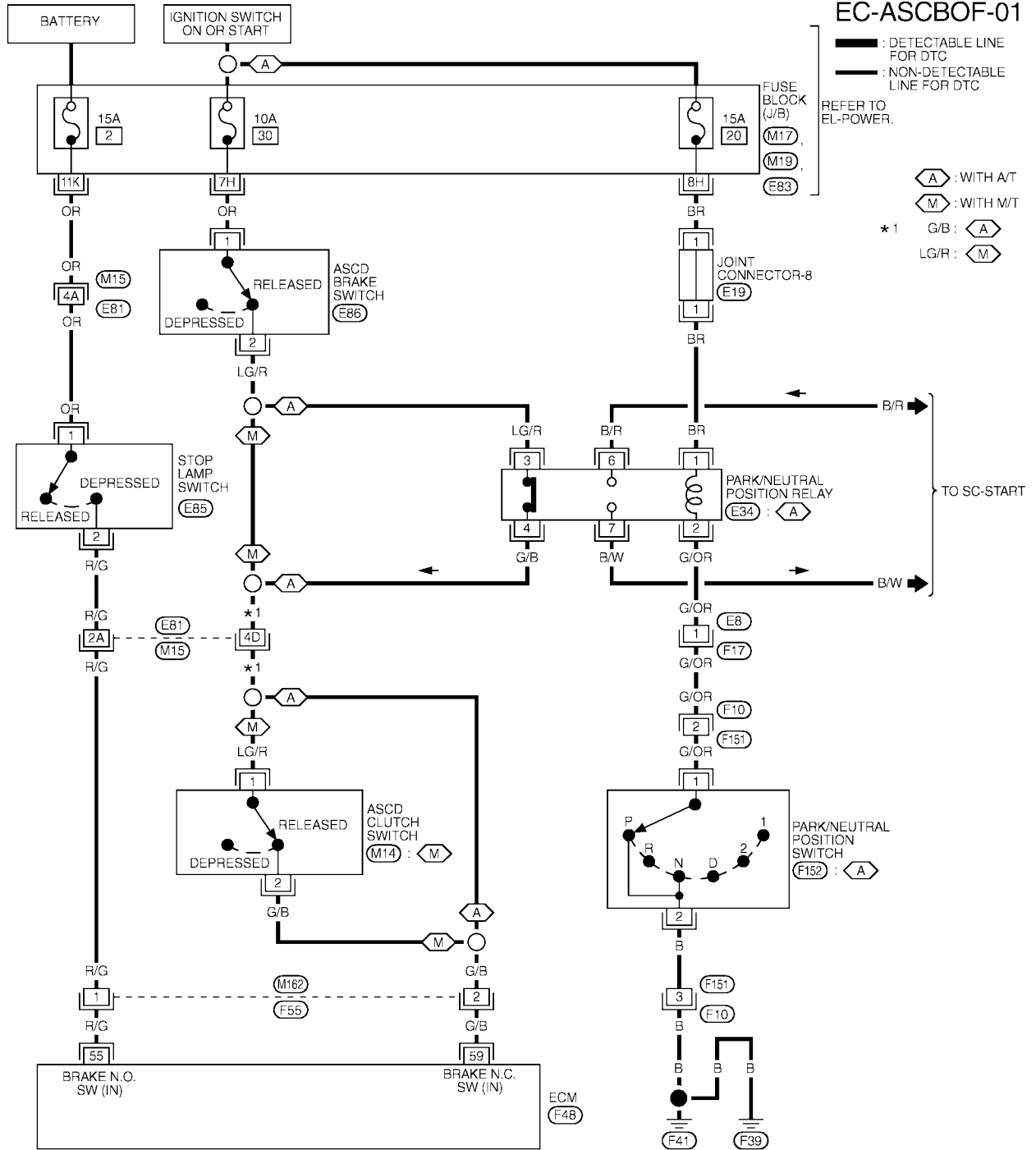
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ASCD BRAKE SWITCH

Wiring Diagram

Wiring Diagram

NFEC1237



REFER TO THE FOLLOWING.
 (M15) -SUPER
 MULTIPLE JUNCTION (SMJ)
 (M17) . (M19) . (E83)
 - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC694D

ASCD BRAKE SWITCH

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

CAUTION:



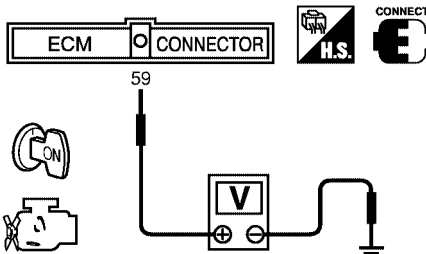
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R/G	Stop lamp switch	[Ignition switch "ON"] Brake pedal is released	Approximately 0V
			[Ignition switch "ON"] Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
59	G/B	ASCD brake switch	[Ignition switch "ON"] Gear position is except "P" or "N" Brake pedal is released Clutch pedal is released (M/T models)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] Gear position is except "P" or "N" Brake pedal is depressed Clutch pedal is fully depressed (M/T models)	Approximately 0V

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ASCD BRAKE SWITCH

Diagnostic Procedure

1	CHECK OVERALL FUNCTION-I						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II. Check the indication of "BRAKE SW1" under the following conditions. <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; margin: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="text-align: center;">MONITOR</th> <th style="text-align: center;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">BRAKE SW1</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-right: 50px;">SEC011D</p> <p>A/T models When brake pedal is depressed or A/T selector lever is in "N" or "P" range: BRAKE SW1 OFF When brake pedal is released and A/T selector lever is not "N" or "P" range: BRAKE SW1 ON</p> <p>M/T models When clutch pedal or brake pedal is depressed: BRAKE SW1 OFF When clutch pedal and brake pedal are released: BRAKE SW1 ON</p>		DATA MONITOR		MONITOR	NO DTC	BRAKE SW1	OFF
DATA MONITOR							
MONITOR	NO DTC						
BRAKE SW1	OFF						
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Check voltage between ECM terminal 59 and ground under the following conditions. <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 50px;">SEC012D</p> <p>When brake or clutch pedal is depressed (M/T), or when brake pedal is depressed or A/T selector lever is in "N" or "P" range (A/T): Approx. 0V When brake and clutch pedal are released (M/T), or when both brake pedal is released and A/T selector lever is not in "N" or "P" range (A/T): Battery voltage should exist. Refer to Wiring Diagram.</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p>							
OK	GO TO 2.						
NG	A/T MODELS: GO TO 3.						
NG	M/T MODELS: GO TO 19.						

ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

2 CHECK OVERALL FUNCTION-II

With CONSULT-II

See "BRAKE SW2" indication in "DATA MONITOR" mode.

DATA MONITOR	
MONITOR	NO DTC
BRAKE SW2	OFF

SEC013D

When brake pedal is released:

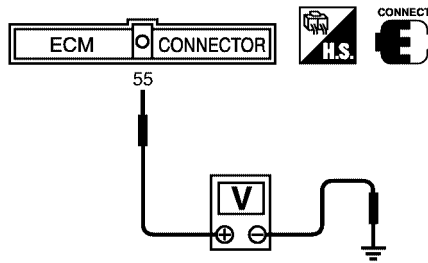
BRAKE SW2 OFF

When brake pedal is depressed:

BRAKE SW2 ON

Without CONSULT-II

Check voltage between ECM terminal 55 and ground under the following conditions.



SEC014D

When brake pedal is released:

Approx. 0V

When brake pedal is depressed:

Battery voltage should exist.

Refer to Wiring Diagram.

OK or NG

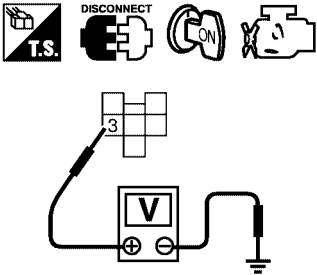
OK GO TO 33.

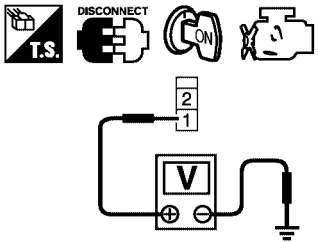
NG GO TO 28.

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ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

3	CHECK ASCD BRAKE SWITCH CIRCUIT-I						
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect park/neutral position relay harness connector. 3. Turn ignition switch "ON". 4. Check voltage between park/neutral position relay terminal 3 and ground under the following conditions. 							
							
SEC209D							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">CONDITION</th> <th style="padding: 5px;">VOLTAGE</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">When brake pedal is released</td> <td style="padding: 5px;">Battery voltage</td> </tr> <tr> <td style="padding: 5px;">When brake pedal is depressed</td> <td style="padding: 5px;">Approx. 0V</td> </tr> </tbody> </table>		CONDITION	VOLTAGE	When brake pedal is released	Battery voltage	When brake pedal is depressed	Approx. 0V
CONDITION	VOLTAGE						
When brake pedal is released	Battery voltage						
When brake pedal is depressed	Approx. 0V						
MTBL1259							
OK or NG							
OK	GO TO 8.						
NG	GO TO 4.						

4	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 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. 	
	
PBIB0857E	
Voltage: Battery voltage	
OK or NG	
OK	GO TO 6.
NG	GO TO 5.

5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Fuse block (J/B) connector E83 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.	

ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

6	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Check continuity between ASCD brake switch terminal 2 and park/neutral position relay terminal 3. 	
<p>Continuity should exist.</p>	
<ol style="list-style-type: none"> 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.

SEC213D

7	CHECK ASCD BRAKE SWITCH
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 8.
NG	Replace ASCD brake switch.

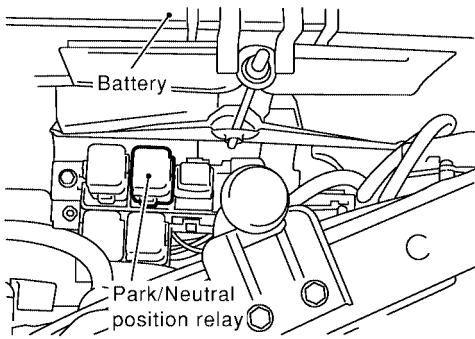
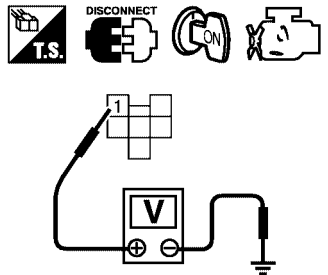
8	CHECK PARK/NEUTRAL POSITION (PNP) RELAY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect park/neutral position switch harness connector. Turn ignition switch "ON". Check voltage between park/neutral position (PNP) switch terminal 1 and ground with CONSULT-II or tester. 	
<p>Voltage: Battery voltage</p>	
OK or NG	
OK	GO TO 13.
NG	GO TO 9.

SEC214D

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ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

9	CHECK PARK/NEUTRAL POSITION (PNP) RELAY POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect park/neutral position (PNP) relay. <div style="text-align: center; margin: 10px 0;">  </div> 	
SEC018D	
<ol style="list-style-type: none"> Turn ignition switch "ON". Check voltage between park/neutral position (PNP) relay terminal 1 and ground with CONSULT-II or tester. <div style="text-align: center; margin: 10px 0;">  </div> <p style="color: blue; margin-top: 10px;">Voltage: Battery voltage</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
SEC019D	
OK	GO TO 11.
NG	GO TO 10.

10	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Fuse block (J/B) connector E83 15A fuse Joint connector-8 Harness for open or short between park/neutral position (PNP) relay and fuse 	
Repair open circuit or short to ground in harness or connectors.	

11	CHECK PARK/NEUTRAL POSITION RELAY CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Check continuity between park/neutral position (PNP) relay terminal 2 and park/neutral position switch terminal 1. Refer to Wiring Diagram. <p style="color: blue; margin-top: 5px;">Continuity should exist.</p> Also check harness for short to ground and short to power. <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	GO TO 13.
NG	GO TO 12.

ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

12	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E8, F17 Harness connectors F10, F151 Harness for open or short between park/neutral position relay and park/neutral position switch	
OK or NG	
	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA

13	CHECK PARK/NEUTRAL POSITION RELAY
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 28.
NG	Replace park/neutral position relay.

EM
LC

EC

14	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH GROUND CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect park/neutral position switch harness connector. 3. Check continuity between park/neutral position (PNP) switch terminal 2 and ground. Continuity should exist. 4. Also check harness for short to ground and short to power.	
OK or NG	
OK	GO TO 16.
NG	GO TO 15.

FE
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15	DETECT MALFUNCTIONING PART
Check the following. Harness connectors F10, F151 Harness for open or short between park/neutral position (PNP) switch and ground	
OK or NG	
	Repair open circuit or short to ground or short to power in harness or connectors.

AX
SU
BR

16	CHECK PARK/NEUTRAL POSITION SWITCH
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 17.
NG	Replace park/neutral position switch.

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ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

17	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and park/neutral position (PNP) relay harness connector. 3. Check harness continuity between park/neutral position (PNP) relay terminal 4 and ECM terminal 59. 	
<p>Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 28.
NG	GO TO 18.

SEC215D

18	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> Harness connectors E81, M15 Harness connectors M162, F55 Harness for open or short between park/neutral position (PNP) relay and ECM 	
<p>Repair open circuit or short to ground or short to power in harness or connectors.</p>	

19	CHECK ASCD BRAKE SWITCH CIRCUIT-II						
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ASCD clutch switch harness connector. 3. Turn ignition switch "ON". 4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions. 							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">CONDITION</th> <th style="padding: 5px;">VOLTAGE</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">When brake pedal is released</td> <td style="padding: 5px;">Battery voltage</td> </tr> <tr> <td style="padding: 5px;">When brake pedal is depressed</td> <td style="padding: 5px;">Approx. 0V</td> </tr> </tbody> </table> <p style="text-align: center;">OK or NG</p>		CONDITION	VOLTAGE	When brake pedal is released	Battery voltage	When brake pedal is depressed	Approx. 0V
CONDITION	VOLTAGE						
When brake pedal is released	Battery voltage						
When brake pedal is depressed	Approx. 0V						
OK	GO TO 25.						
NG	GO TO 20.						

PBIB0799E

MTBL1303

ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

20	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect ASCD brake switch harness connector. Turn ignition switch "ON". Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester. 	
<p>Voltage: Battery voltage</p> <p style="text-align: right;">PBIB0857E</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 22.
NG	GO TO 21.

21	DETECT MALFUNCTIONING PART
Check the following. Fuse block (J/B) connector E83 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.	

22	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect ASCD clutch switch harness connector. Check continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to ground and short to power. 	
OK or NG	
OK	GO TO 24.
NG	GO TO 23.

23	DETECT MALFUNCTIONING PART
Check the following. Harness connectors E81, M15 Harness for open or short between ASCD brake switch and ASCD clutch switch	
Repair open circuit or short to ground or short to power in harness or connectors.	

24	CHECK ASCD BRAKE SWITCH
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 25.
NG	Replace ASCD brake switch.

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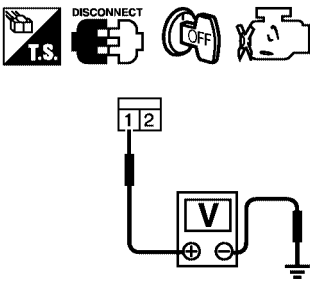
ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

25	CHECK ASCD CLUTCH SWITCH CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check continuity between ASCD clutch switch terminal 2 and ECM terminal 59. Continuity should exist. 3. Also check harness for short to ground and short to power.	
OK or NG	
OK	GO TO 27.
NG	GO TO 26.

26	DETECT MALFUNCTIONING PART
Check the following. Harness connectors M162, F55 Harness for open or short between ASCD clutch switch and ECM	
	Repair open circuit or short to ground or short to power in harness or connectors.

27	CHECK ASCD CLUTCH SWITCH
Refer to "Component Inspection", EC-674.	
OK or NG	
OK	GO TO 28.
NG	Replace ASCD clutch switch.

28	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 30.
NG	GO TO 29.

PBIB0117E

29	DETECT MALFUNCTIONING PART
Check the following. Fuse block (J/B) connector M17 15A fuse Harness connectors M15, E81 Harness for open or short between stop lamp switch and fuse	
	Repair open circuit or short to ground in harness or connectors.

ASCD BRAKE SWITCH

Diagnostic Procedure (Cont'd)

30	CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 55.</p>		GI
		MA EM LC
<p>Continuity should exist</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		EC
OK	GO TO 32.	FE
NG	GO TO 31.	CL

SEC216D

31	DETECT MALFUNCTIONING PART	
<p>Check the following. Harness connectors M15, E81 Harness connectors M162, F55 Harness for open or short between stop lamp switch and ECM</p>		MT AT
	Repair open circuit or short to ground or short to power in harness or connectors.	AX

32	CHECK STOP LAMP SWITCH	
<p>Refer to "Component Inspection", EC-674.</p> <p style="text-align: center;">OK or NG</p>		SU BR
OK	GO TO 33.	ST
NG	Replace stop lamp switch.	

33	CHECK INTERMITTENT INCIDENT	
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.</p>		RS
	INSPECTION END	BT

ASCD INDICATOR LAMP

Component Description

Component Description

NFEC1240

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 CRUISE switch on steering switch is turned ON to indicate that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met. CRUISE indicator illuminates, and SET switch on steering switch is turned ON while vehicle speed is within range of ASCD setting. SET indicator remains lit during ASCD control. Refer to EC-53 for ASCD functions.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1474

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	Ignition switch: ON	CRUISE switch is depressed at first time , second time.	ON , OFF
SET LAMP	When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH), and CRUISE switch is ON.	COAST/SET switch pressed	ON
		ASCD control is canceled.	OFF

ASCD INDICATOR LAMP

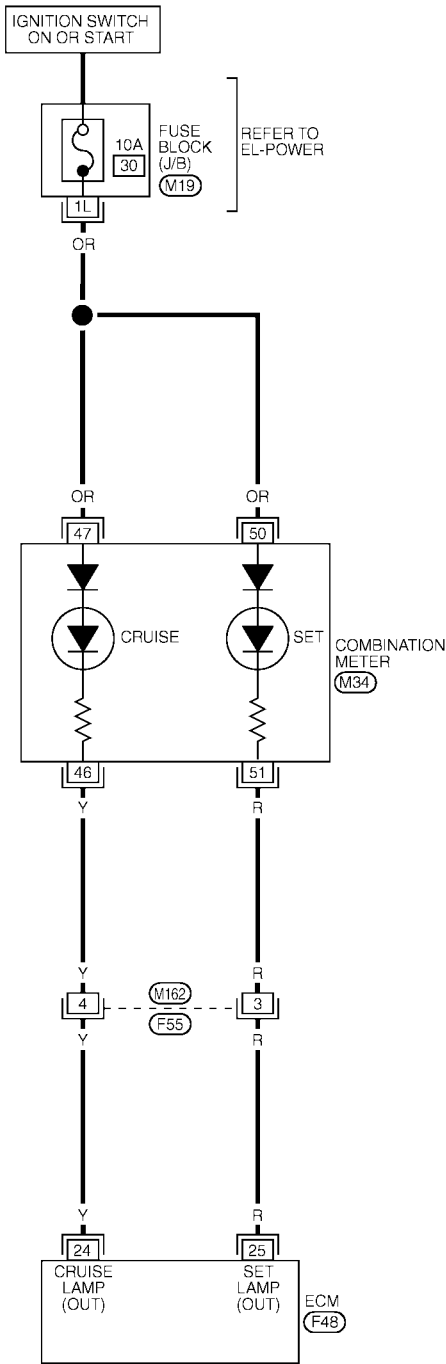
Wiring Diagram

Wiring Diagram

NFEC1242

EC-ASCIND-01

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



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45	46	47	48	49	50	51	52	53	54	55		
56	57	58	59	60	61	62	63	64	65	66	67	68

M34
BR

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

F55
W

101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38		87	88	89	90	91	92	93	94	95	87	88	89	90	91	92	93	94	95	115	116	

F48
GY

REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MEC692D

ASCD INDICATOR LAMP

Diagnostic Procedure

Diagnostic Procedure

NFEC1243

1	CHECK OVERALL FUNCTION			
Check ASCD indicator under the following conditions.				
	MONITOR ITEM	CONDITION	SPECIFICATION	
	CRUISE LAMP	Ignition switch : ON	CRUISE switch pressed	ON
			CRUISE switch released	OFF
	SET LAMP	When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH), and CRUISE switch is ON.	COAST/SET switch pressed	ON
			COAST/SET switch released	OFF
MTBL1561				
OK or NG				
OK	INSPECTION END			
NG	GO TO 2.			

2	CHECK COMBINATION METER OPERATION		
Check that combination meter operates normally.			
OK or NG			
OK	GO TO 3.		
NG	Check combination meter circuit. Refer to EL-121.		

3	CHECK INDICATOR CIRCUIT		
1. Turn ignition switch "ON". 2. Check voltage between ECM terminals 24, 25 and ground with CONSULT-II or tester.			
<p>24: CRUISE 25: SET</p>			
Battery voltage should exist.			
OK or NG			
OK	GO TO 5.		
NG	GO TO 4.		

SEC028D

4	DETECT MALFUNCTIONING PART		
Check the following.			
Harness connectors F55, M162			
Harness for open or short between combination meter and ECM			
Repair open circuit or short to ground or short to power in harness or connectors.			

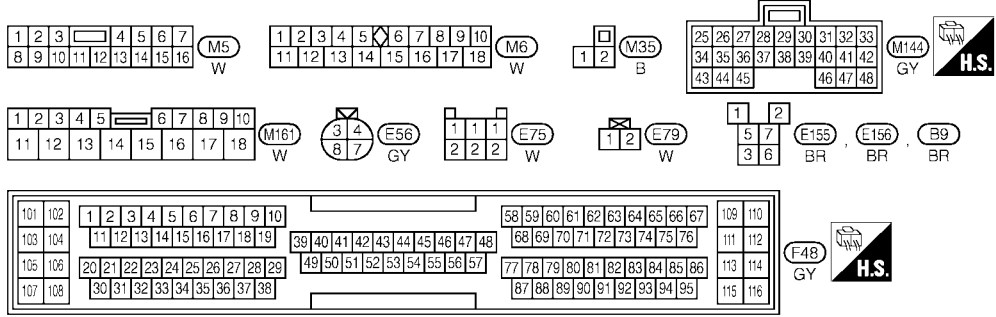
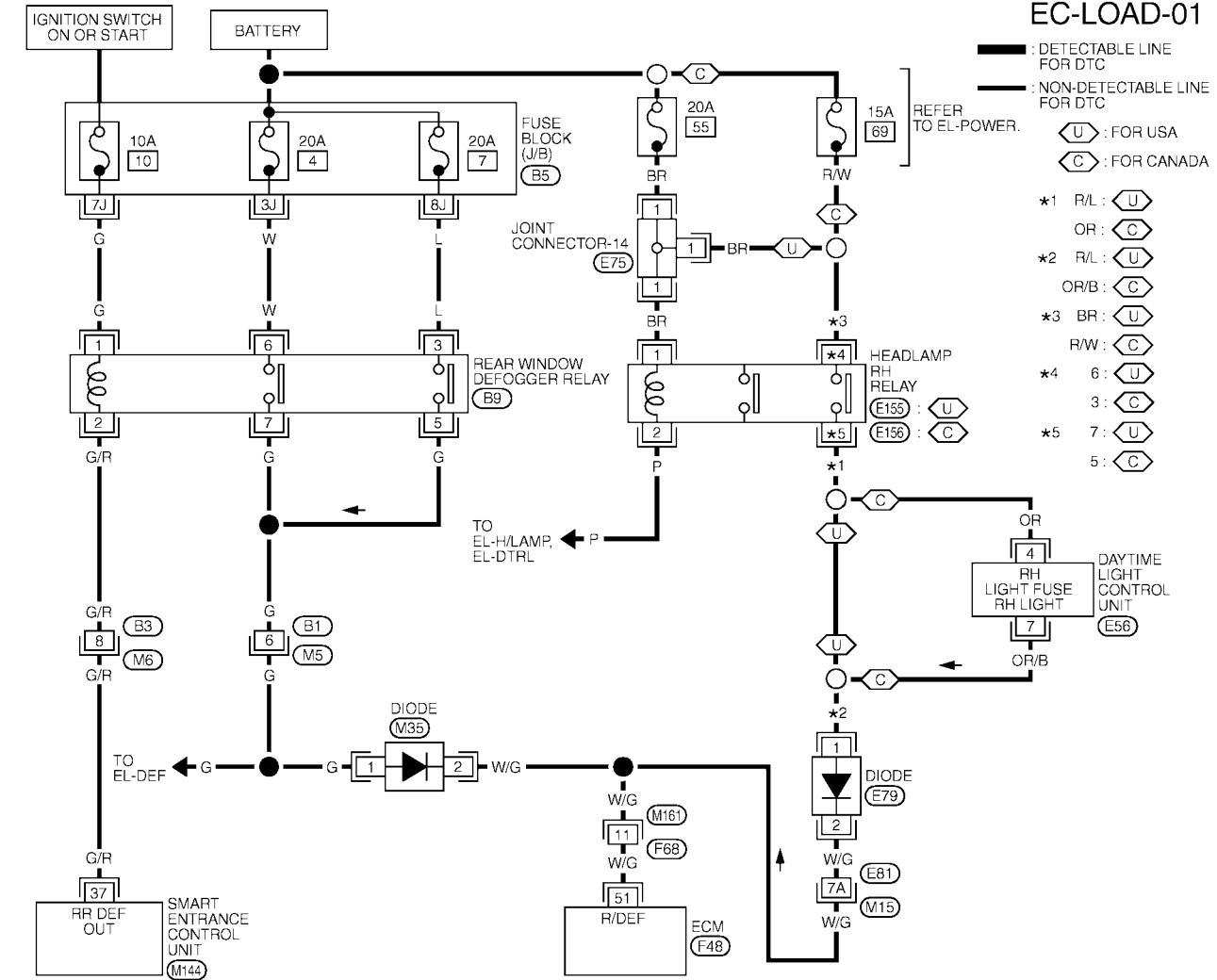
5	CHECK INTERMITTENT INCIDENT		
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.			
INSPECTION END			

ELECTRICAL LOAD SIGNAL

Wiring Diagram

Wiring Diagram

NFEC0604



REFER TO THE FOLLOWING.
M15 -SUPER
M15 -MULTIPLE JUNCTION (SMJ)
B5 -FUSE BLOCK-JUNCTION BOX (J/B)

MEC518D

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
51	W/G	ELECTRICAL LOAD SIGNAL	IGN ON WITH REAR WINDOW DEFOGGER SWITCH ON OR LIGHTING SWITCH ON AT 1ST POSITION	BATTERY VOLTAGE
			IGN ON UNDER EXCEPT ABOVE CONDITION	0V

SEF642XC

ELECTRICAL LOAD SIGNAL

Diagnostic Procedure

Diagnostic Procedure

NFEC0605

1	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I						
<p>1. Turn ignition switch "ON". 2. Check voltage between ECM terminal 51 and ground under the following conditions.</p>							
SEC090D							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>		Condition	Voltage	Rear window defogger switch "ON"	BATTERY VOLTAGE	Rear window defogger switch "OFF"	0V
Condition	Voltage						
Rear window defogger switch "ON"	BATTERY VOLTAGE						
Rear window defogger switch "OFF"	0V						
MTBL1165							
OK or NG							
OK	GO TO 2.						
NG	GO TO 3.						

2	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II						
<p>Check voltage between ECM terminal 51 and ground under the following conditions.</p>							
SEC090D							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "ON" at 1st position</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>		Condition	Voltage	Lighting switch "ON" at 1st position	BATTERY VOLTAGE	Lighting switch "OFF"	0V
Condition	Voltage						
Lighting switch "ON" at 1st position	BATTERY VOLTAGE						
Lighting switch "OFF"	0V						
MTBL1166							
OK or NG							
OK	INSPECTION END						
NG	GO TO 7.						

ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

3	CHECK REAR WINDOW DEFOGGER FUNCTION
1. Start engine. 2. Turn "ON" the rear window defogger switch. 3. Check the rear windshield. Is the rear windshield heated up? <p style="text-align: center;">Yes or No</p>	
Yes	GO TO 4.
No	Refer to EL-167, "Rear Window Defogger".

GI
MA
EM

4	CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT						
1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect rear window defogger relay. 4. Check harness continuity between ECM terminal 51 and rear window defogger relay terminal 5 and 7.							
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Should exist.</td> </tr> <tr> <td>2</td> <td>Should not exist.</td> </tr> </tbody> </table> <p style="text-align: right;">SEC125D</p>		CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY						
1	Should exist.						
2	Should not exist.						
5. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>							
OK	GO TO 6.						
NG	GO TO 5.						

EC
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5	DETECT MALFUNCTIONING PART
Check the following. Harness connectors B1, M5 Harness connectors M161, F68 Diode M35 Harness for open and short between ECM and rear window defogger relay	
Repair open circuit or short to ground or short to power in harness or connectors.	

BR
ST
RS

6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

BT
HA

7	CHECK HEADLAMP FUNCTION
1. Start engine. 2. Turn the lighting switch "ON" at 1st position with high beam. 3. Check that headlamps are illuminated. <p style="text-align: center;">OK or NG</p>	
OK	GO TO 8.
NG	Refer to EL-37, "HEADLAMP (FOR USA)" or "EL-51, "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM".

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ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

8	CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect headlamp RH relay (Models for USA), daytime light control unit harness connector (Models for Canada). 4. Check harness continuity between ECM terminal 51 and headlamp LH relay terminal 7 under the following conditions. (Models for USA)</p>	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>	
SEC126D	
<p>5. Check harness continuity between ECM terminal 51 and daytime light control unit terminal 7 under the following conditions. (Model for Canada)</p>	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>	
SEC127D	
<p>6. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	GO TO 10.
NG	GO TO 9.

9	DETECT MALFUNCTIONING PART
<p>Check the following. Harness connectors E81, M15 Harness connectors M161, F68 Diode E79 Harness for open and short between ECM and headlamp RH relay or daytime light control unit</p>	
Repair open circuit or short to ground or short to power in harness or connectors.	

10	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-154.	
INSPECTION END	

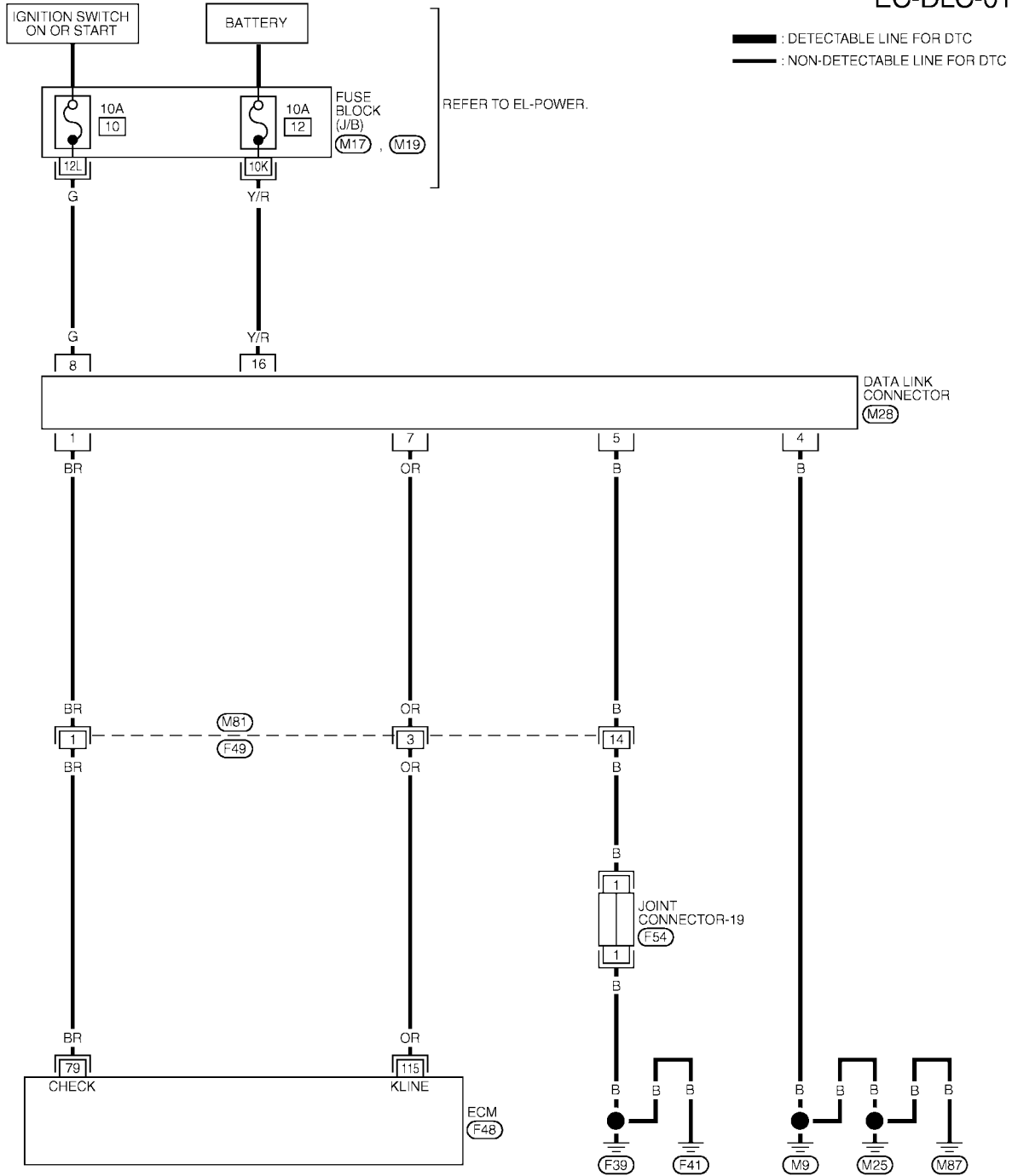
DATA LINK CONNECTORS

Wiring Diagram

Wiring Diagram

NFEC0407

EC-DLC-01



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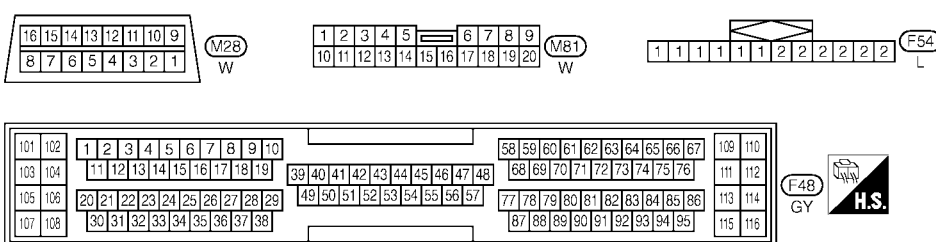
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REFER TO THE FOLLOWING.
 (M17), (M19) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MEC697D

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pressure Regulator

Fuel Pressure Regulator

NFEC0408

Fuel pressure at idling kPa (kg/cm², psi)

Approximately 350 (3.7, 51)

Idle Speed and Ignition Timing

NFEC0409

Target idle speed*1	No-load*2 (in "P" or N" position)	M/T: 625±50 rpm A/T: 675±50 rpm
Air conditioner: ON	In "P" or N" position	825 rpm or more
Ignition timing*1	In "P" or N" position	15°±5° BTDC

*1: Throttle position sensor harness connector connected

*2: Under the following conditions:

Air conditioner switch: OFF

Electric load: OFF (Lights, heater fan & rear window defogger)

Steering wheel: Kept in straight-ahead position

Mass Air Flow Sensor

NFEC0411

Supply voltage	Battery voltage (11 - 14)V
Output voltage at idle	1.1 - 1.5V
Mass air flow (Using CONSULT-II or GST)	2.0 - 6.0 g·m/sec at idle* 7.0 - 20.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no-load.

Engine Coolant Temperature Sensor

NFEC0412

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Heated Oxygen Sensor 1 Heater

NFEC0414

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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Fuel Pump

NFEC0415

Resistance [at 25°C (77°F)]	0.2 - 5.0Ω
-----------------------------	------------

Injector

NFEC0417

Resistance [at 20°C (68°F)]	13.5 - 17.5Ω
-----------------------------	--------------

Calculated Load Value

NFEC0420

	Calculated load value % (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Intake Air Temperature Sensor

NFEC0421

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

SERVICE DATA AND SPECIFICATIONS (SDS)

Heated Oxygen Sensor 2 Heater

Heated Oxygen Sensor 2 Heater

NFEC0422

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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GI

Fuel Tank Temperature Sensor

NFEC0424

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

MA

EM

Throttle Control Motor

NFEC1332

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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LC

EC

Crankshaft Position Sensor (POS)

NFEC1414

Refer to "Component Inspection", EC-334.

FE

Camshaft Position Sensor (PHASE)

NFEC0639

Refer to "Component Inspection", EC-343.

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NOTES