

SECTION **STC**

STEERING CONTROL SYSTEM

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STC

PRECAUTIONS

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PRECAUTION

PRECAUTIONS

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

INFOID:000000010102451

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

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precautions Necessary for Steering Wheel Rotation After Battery Disconnection

INFOID:000000010102452

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Turn the ignition switch to ACC position.
(At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.

PRECAUTIONS

< PRECAUTION >

4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT.

Precautions for Removing of Battery Terminal

INFOID:000000010281930

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

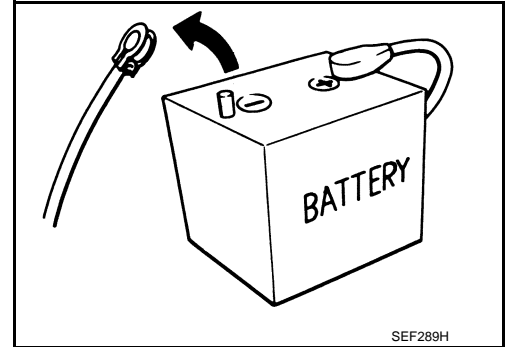
NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:

The removal of 12V battery may cause a DTC detection error.



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COMPONENT PARTS

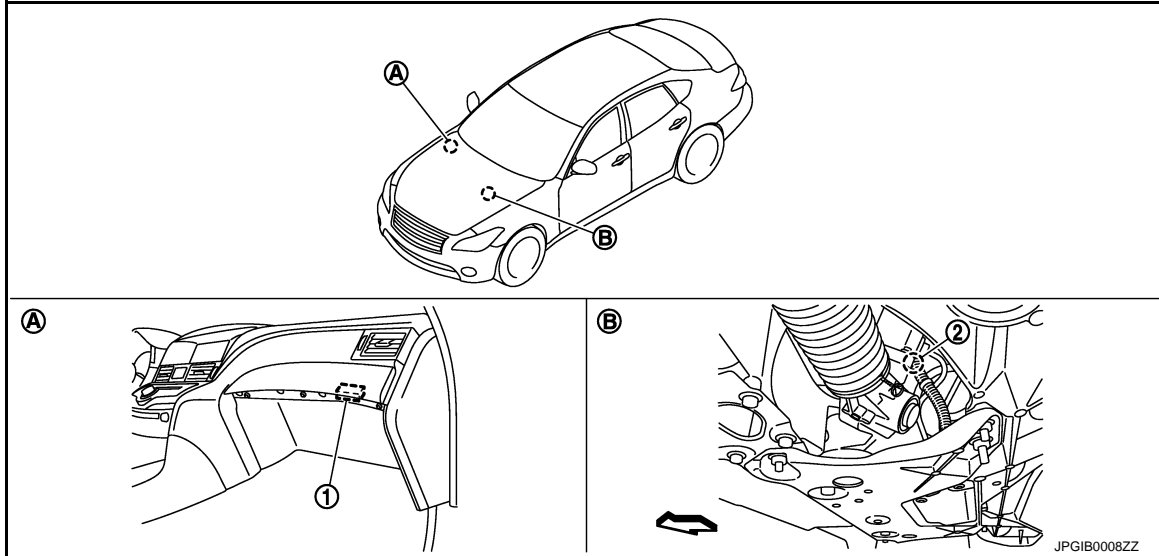
< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:000000010102453



- | | |
|--------------------------------|----------------------------------|
| 1. Power steering control unit | 2. Power steering solenoid valve |
| A. Glove box assembly removed | B. Steering gear assembly |

↶: Vehicle front

Component Description

INFOID:000000010102454

Component parts	Reference/Function
Power steering control unit	STC-4. "Power Steering Control Unit"
Power steering solenoid valve	STC-4. "Power Steering Solenoid Valve"
Combination meter	MWI-9. "METER SYSTEM : System Description"
ECM	EC-57. "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR for USA and Canada) EC-585. "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR for Mexico) EC-1005. "ENGINE CONTROL SYSTEM : System Description" (VK56VD for USA and Canada) EC-1597. "ENGINE CONTROL SYSTEM : System Description" (VK56VD for Mexico)

Power Steering Control Unit

INFOID:000000010102455

- Signals from various sensors control the driving voltage to power steering solenoid valve.
- Power steering control unit controls the driving voltage to power steering solenoid valve for maintaining the power steering assist force when the fail-safe function is activated. (The engine speed signals control EPS system if any vehicle speed signal error is detected.)

Power Steering Solenoid Valve

INFOID:000000010102456

EPS solenoid valve controls the power steering oil pressure in the gear housing assembly.

SYSTEM

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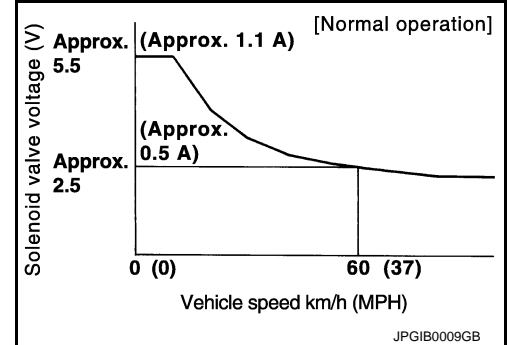
SYSTEM

EPS SYSTEM

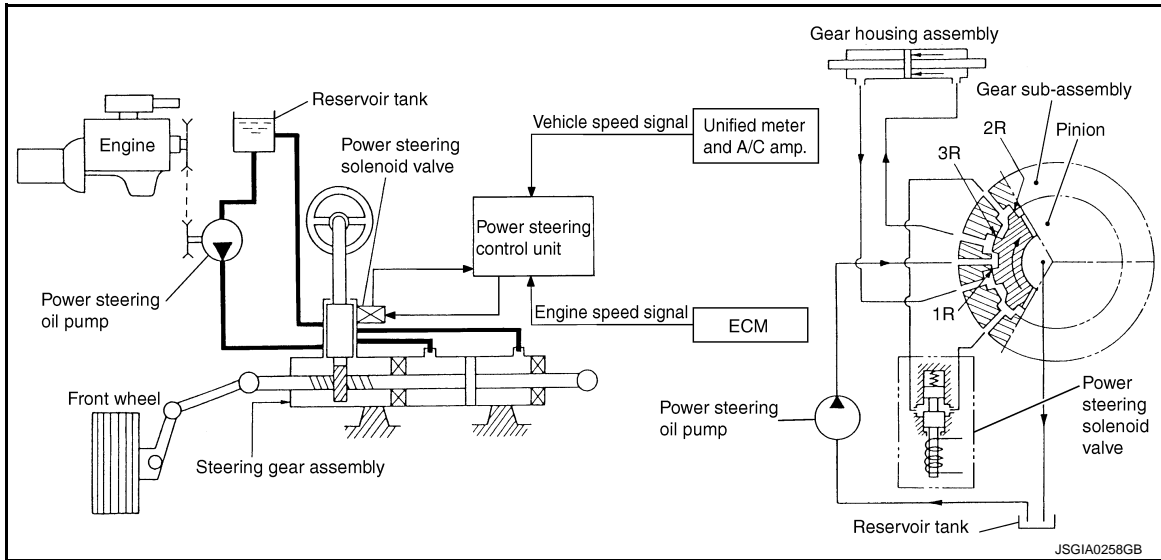
EPS SYSTEM : System Description

INFOID:000000010102457

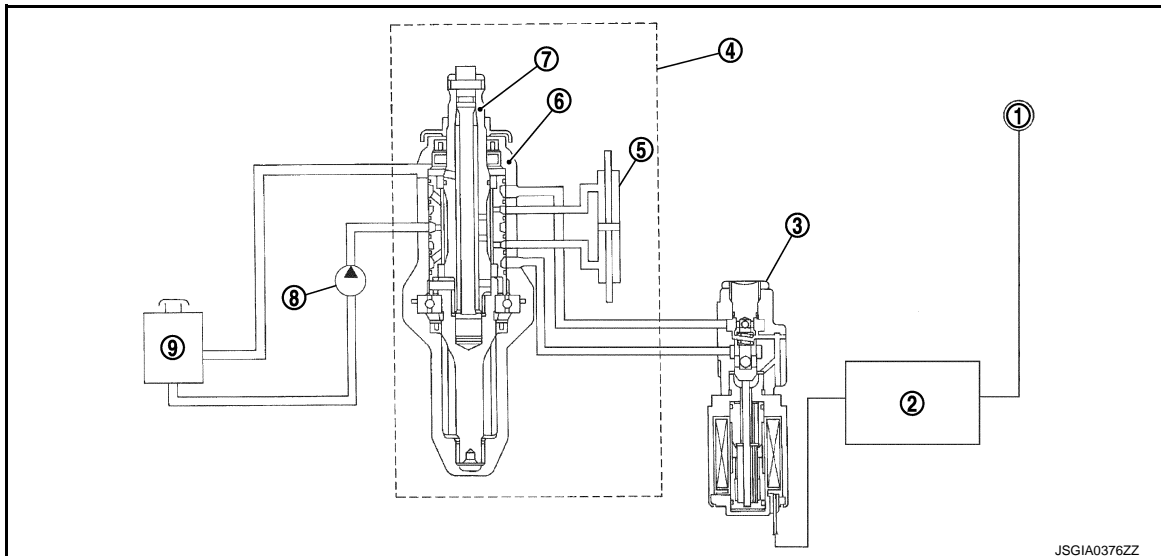
- EPS system controls the power steering solenoid valve through the power steering control unit.
- The valve driving voltage to control the power steering solenoid valve varies according to the vehicle speed.



CONTROL DIAGRAM



CROSS-SECTIONAL VIEW



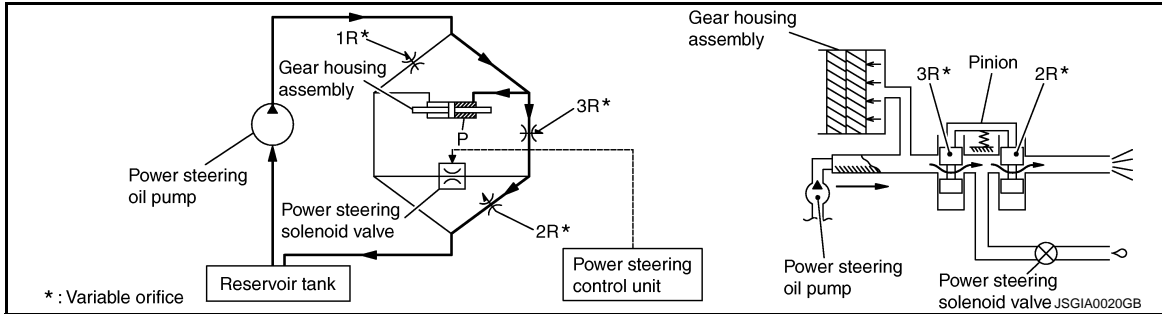
SYSTEM

< SYSTEM DESCRIPTION >

- | | | |
|---------------------------|--------------------------------|----------------------------------|
| 1. Combination meter | 2. Power steering control unit | 3. Power steering solenoid valve |
| 4. Steering gear assembly | 5. Gear housing assembly | 6. Gear sub-assembly |
| 7. Pinion | 8. Power steering oil pump | 9. Reservoir tank |

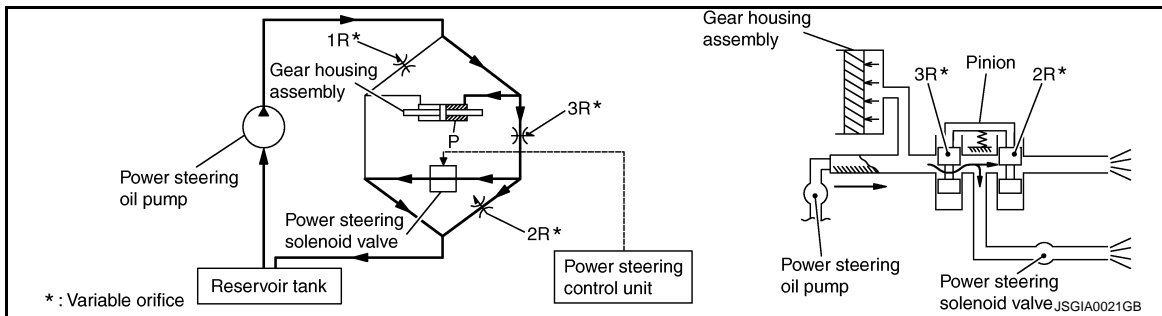
OPERATION PRINCIPLE

During Parking (When Turning The Steering Wheel To The Right.)



1. Power steering solenoid valve is closed while a vehicle is stopped.
2. Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel.
3. Oil pressure "P" in the gear housing assembly is the sum of oil pressures occurred in "2R" and "3R". This results in a light steering force because of high pressure.

During High-speed Operation

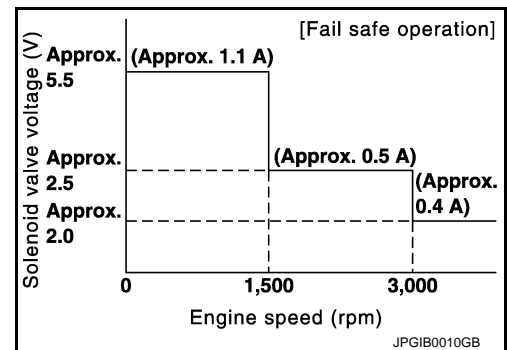


1. Power steering solenoid valve is opened during high-speed operation.
2. Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel.
3. Oil pressure "2R" does not occur because the power steering solenoid valve is on full throttle.
4. Oil pressure "P" in the gear housing assembly includes only oil pressure occurred in "3R" and results in a heavy steering force.

EPS SYSTEM : Fail-safe

INFOID:000000010102458

- EPS system enters the fail-safe mode (that allows the steering force to be controlled without impairing the drive ability) if any of the input/output values to/from EPS system (power steering control unit) deviate from the standard range.
- Power steering control unit controls the driving voltage to power steering solenoid valve for maintaining the power steering assist force when the fail-safe function is activated. (The engine speed signals control EPS system if any vehicle speed signal error is detected.)



SYSTEM

< SYSTEM DESCRIPTION >

Error area and root cause	Cancel condition	
Engine speed is 1,500 rpm or more and there is no vehicle speed signal input for over 10 seconds during vehicle travel.	<ul style="list-style-type: none">• When a vehicle speed signal of 2 km/h (1.2 MPH) or more is inputted.• Key switch is turned OFF to ON.	A
Vehicle speed signal has abruptly dropped from 30 km/h (19 MPH) or more to 2 km/h (1.2 MPH) or less within 1.4 seconds.		B
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POWER STEERING CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

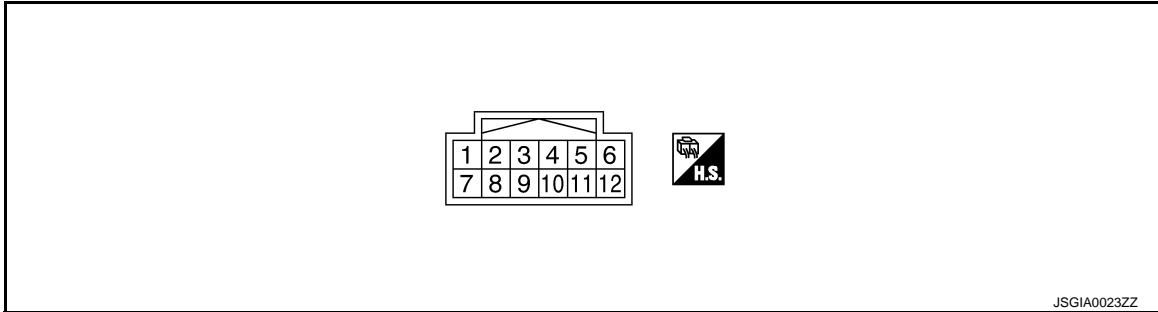
ECU DIAGNOSIS INFORMATION

POWER STEERING CONTROL UNIT

Reference Value

INFOID:000000010102459

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
1 (LG)	Ground	Power steering solenoid valve voltage	Output	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	4.4 – 6.6 V
				Vehicle speed: 100 km/h (62 MPH)	1.7 – 2.9 V
3 (G)	Ground	Ignition switch power supply	Input	Ignition switch: ON	Battery voltage
				Ignition switch: OFF	0 V
5 (B)	Ground	Power steering solenoid valve ground	—	Always	0 V
6 (B)	Ground	Ground	—	Always	0 V
8 (GR)	Ground	Vehicle speed signal	Input	Vehicle speed: 40 km/h (25 MPH) CAUTION: Check air pressure of tire under standard condition.	<p>The graph shows a square wave signal on a grid. The vertical axis is labeled (V) and ranges from 0 to 6. The horizontal axis is labeled 70 ms. The signal is a square wave with a period of 70 ms and a peak-to-peak voltage of approximately 5V.</p>

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POWER STEERING CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
10 (V)	Ground	Engine speed signal	Input	Engine speed: At idle (Warm-up condition)	VQ37VHR
				Engine speed: Approx. 2,000 rpm (Warm-up condition)	VK56VD
				Engine speed: Approx. 2,000 rpm (Warm-up condition)	VQ37VHR
					VK56VD

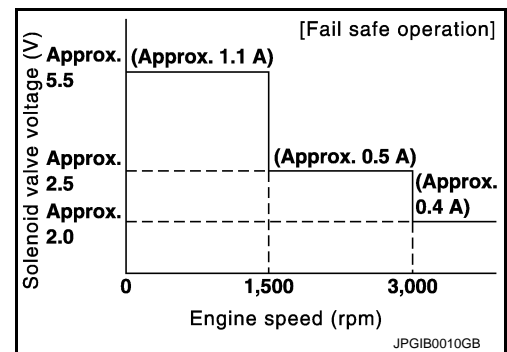
CAUTION:

When using circuit tester or oscilloscope to measure voltage for inspection, be sure not to forcibly extend any connector terminals.

Fail-safe

INFOID:0000000010102460

- EPS system enters the fail-safe mode (that allows the steering force to be controlled without impairing the drive ability) if any of the input/output values to/from EPS system (power steering control unit) deviate from the standard range.
- Power steering control unit controls the driving voltage to power steering solenoid valve for maintaining the power steering assist force when the fail-safe function is activated. (The engine speed signals control EPS system if any vehicle speed signal error is detected.)



POWER STEERING CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

Error area and root cause	Cancel condition
Engine speed is 1,500 rpm or more and there is no vehicle speed signal input for over 10 seconds during vehicle travel.	<ul style="list-style-type: none">• When a vehicle speed signal of 2 km/h (1.2 MPH) or more is inputted.• Key switch is turned OFF to ON.
Vehicle speed signal has abruptly dropped from 30 km/h (19 MPH) or more to 2 km/h (1.2 MPH) or less within 1.4 seconds.	

POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

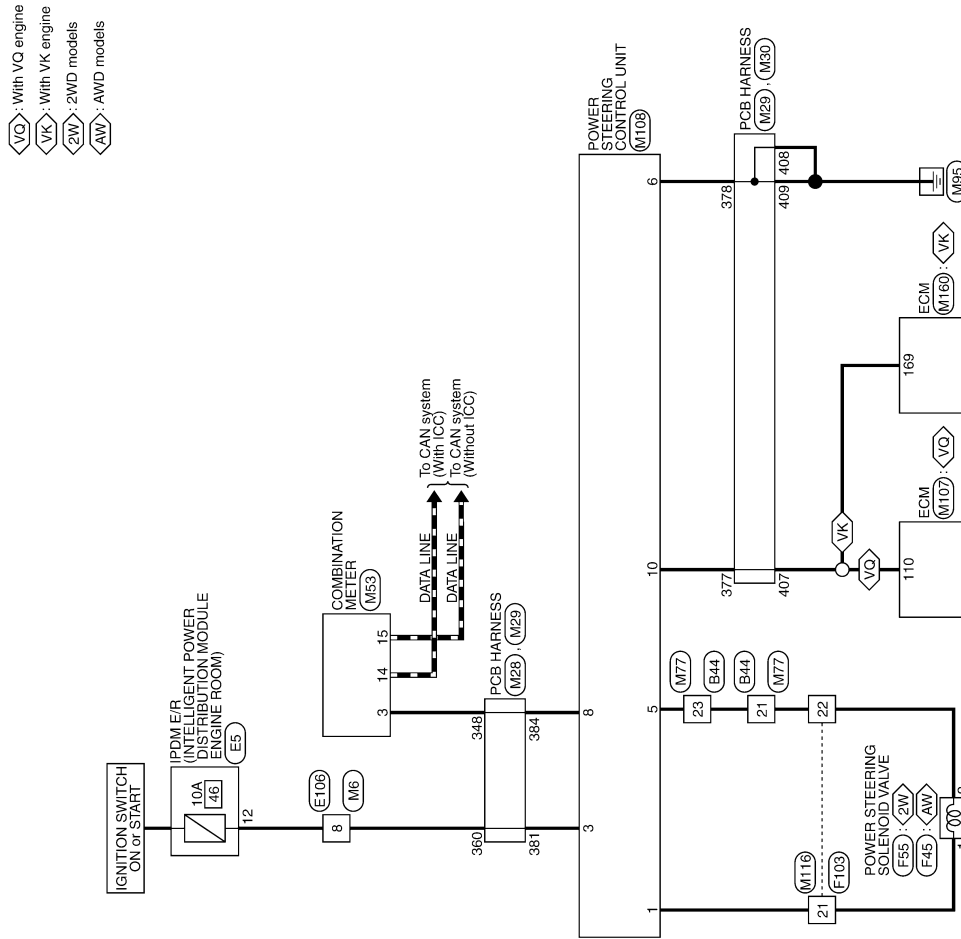
WIRING DIAGRAM

POWER STEERING CONTROL SYSTEM

Wiring Diagram

INFOID:0000000010102461

POWER STEERING CONTROL SYSTEM



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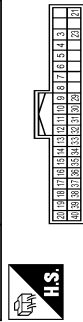
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POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

POWER STEERING CONTROL SYSTEM

Connector No.	B14
Connector Name	WIRE TO WIRE
Connector Type	T1485FW-NH



38	SHIELD	-
39	B	- [With BOSE system]
40	L	- [Without BOSE system]
41	W	- [With BOSE system]
42	Y	- [Without BOSE system]



Connector No.	E15
Connector Name	WIRE TO WIRE
Connector Type	T1485FW-NH



Connector No.	E15
Connector Name	WIRE TO WIRE
Connector Type	T1485FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
2	SHIELD	-
3	G	-
4	W	-
5	L	-
6	R	-
7	W	-
8	B	-
9	R	-
10	G	-
11	R	-
12	G	-
13	O	-
14	V	-
15	LG	-
16	L	-
17	BR	-
18	Y	-
19	SB	-
20	P	-
21	B	-
23	B	-
29	SHIELD	-
30	P	- [With BOSE system]
31	L	- [Without BOSE system]
31	O	- [Without BOSE system]
32	SHIELD	-
33	W	- [Without BOSE system]
33	Y	- [With BOSE system]
34	BR	- [Without BOSE system]
34	LG	- [With BOSE system]
35	SHIELD	- [Without BOSE system]
36	GR	- [Without BOSE system]
37	R	- [With BOSE system]
37	V	- [Without BOSE system]

Terminal No.	Color Of Wire	Signal Name [Specification]
4	W	ENG SOL
5	P	IGN COIL
6	R	ECM VB [With VG engine]
6	SB	ECM VB [With VK engine]
7	R	ETC [With VK engine]
7	Y	ETC [With VG engine]
8	LY	A/C COMP [With VK engine]
8	V	A/C COMP [With VG engine]
10	V	ECM FB
11	B	P-GND
12	G	ABS ECU
13	GR	FUEL PUMP [With VG engine]
13	W	FUEL PUMP [With VK engine]
16	V	WIPER AUTOSTOP
18	Y	IGN SIGNAL
22	BR	ALT-C
23	P	DTRL RLY [With VG engine]
23	SB	DTRL RLY [With VK engine]
24	O	HOOD SW
25	LG	SUB ECU
30	BR	PUSH START SW
31	WR	MP SW [With VK engine]
31	WR	MP SW [With VG engine]
36	GR	F L IGN SW

Terminal No.	Color Of Wire	Signal Name [Specification]
2	W	-
3	SB	-
4	LG	-
5	O	-
7	GR	-
8	G	-
9	Y	-
10	BR	-
11	SB	-
12	V	-
13	GR	-
14	GR	-
15	V	-
17	GR	-
18	V	-
20	BR	-
21	P	-
22	L	-
23	P	-
27	SHIELD	-
29	W/L	-
31	BR	-
32	G	-
33	O	-
34	BR	-
44	W	-
45	L	-
46	GR	-
47	V	-
48	G	-
49	O	-

Connector No.	F45
Connector Name	POWER STEERING SOLENOID VALVE
Connector Type	RS05FBR-DQY



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POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

POWER STEERING CONTROL SYSTEM

Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	-
2	B	-

Connector No.	F55
Connector Name	POWER STEERING SOLENOID VALVE
Connector Type	RH02FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	-
2	B	-

Connector No.	F103
Connector Name	WIRE TO WIRE
Connector Type	TK3SPW-HS10



Terminal No.	Color Of Wire	Signal Name [Specification]
2	L	-
3	G	-
4	B	- [With VK engine]
4	R	- [With VG engine]
5	B	- [With VG engine]
5	CG	- [With VK engine]
7	LG	-
8	V	-
9	SB	- [With VG engine]
9	W	- [With VK engine]
10	BR	- [With VK engine]
10	V	- [With VG engine]

Terminal No.	Color Of Wire	Signal Name [Specification]
11	L	-
12	V	-
14	SB	-
15	R	-
16	W	-
17	GR	-
18	LG	-
21	LG	-
22	B	-
23	G	-
24	BR	-
25	O	-

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS1F-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	W	-
3	SB	-
4	LG	-
5	W	-
7	BG	-
8	G	-
9	Y	-
10	W	-
11	R	-
12	V	-
13	LG	-
14	L	-
15	B	-
16	R	-
17	GR	-
18	V	-
20	SB	-
21	BR	-
22	L	-
23	P	-

Terminal No.	Color Of Wire	Signal Name [Specification]
27	SHIELD	-
28	SB	-
31	BG	-
32	P	-
33	R	-
34	BG	-
41	BR	-
44	BR	-
45	Y	-
46	BG	-
47	V	-
48	G	-
49	BG	-
50	W	-
51	W	-
52	B	-
62	LS	-
63	BR	-
64	L	-
65	R	-
66	P	-
67	L	-
77	B	-
78	V	-
80	G	-
81	L	-
82	B	-
83	BG	-
84	Y	-
85	SB	-
86	L	-
87	V	-
88	V	-
89	LG	-
90	BG	-
91	W	-
92	BG	-
93	G	-
94	Y	-
95	W	-
97	SB	-
98	R	-
99	R	-
100	L	-

Connector No.	M28
Connector Name	PCB HARNESS
Connector Type	TH48FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
321	V	-
322	V	-
323	B	-
324	B	-
325	L	-
326	L	-
327	P	-
328	P	-
330	B	-
331	V	-
332	V	-
337	W	-
338	W	-
339	G	-
343	L	-
344	B	-
345	Y	-
346	B	-
347	B	-
348	GR	-
348	V	-
350	LG	-
351	P	-
352	R	-
353	P	-
358	W	-
359	W	-
360	G	-

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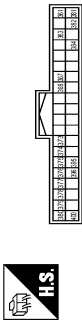
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POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

POWER STEERING CONTROL SYSTEM

Connector No.	M29
Connector Name	PCB HARNESS
Connector Type	TH40PW-NH



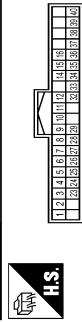
Terminal No.	Color Of Wire	Signal Name [Specification]
367	B	—
368	G	—
373	BR	—
374	BG	—
375	BG	—
376	V	—
377	V	—
378	B	—
379	R	—
380	R	—
381	G	—
382	V	—
383	GR	—
385	P	—
386	L	—
400	V	—

Connector No.	M30
Connector Name	PCB HARNESS
Connector Type	TH40PW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
402	R	—
403	R	—
407	V	—
408	B	—
409	B	—
411	B	—
413	Y	—
414	BR	—
416	LG	—
417	B	—
419	SB	—
420	SHIELD	—
421	Y	—
422	P	—
423	P	—
424	V	—
425	P	—
430	LG	—
431	B	—
432	Y	—
435	V	—
436	BG	—
437	B	—
438	P	—
439	L	—

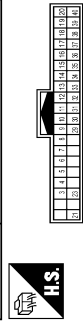
Connector No.	M53
Connector Name	COMBINATION METER
Connector Type	TH40PW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	BATTERY POWER SUPPLY
2	BG	IGNITION SIGNAL
3	GR	VEHICLE SPEED SIGNAL (Z-PULSE)
4	R	VEHICLE SPEED SIGNAL (Z-PULSE)
5	B	ILLUMINATION CONTROL SIGNAL
6	B	METER CONTROL SWITCH GROUND
7	SB	ENTER SWITCH SIGNAL
8	LG	SELECT SWITCH SIGNAL

Terminal No.	Color Of Wire	Signal Name [Specification]
9	G	ILLUMINATION CONTROL SWITCH SIGNAL (S)
10	GR	ILLUMINATION CONTROL SWITCH SIGNAL (S)
11	L	TRIP RESET SWITCH SIGNAL
12	B	GROUND
14	L	CAN-H
15	P	CAN-L
16	R	AIR BAG SIGNAL
19	V	—
20	V	—
21	B	FUEL LEVEL SENSOR GROUND
23	B	ALTERNATOR SIGNAL
25	W	—
26	V	PARKING BRAKE SWITCH SIGNAL
27	V	—
28	G	SECURITY SIGNAL
29	L	WASHER LEVEL SWITCH SIGNAL
30	Y	—
31	BR	—
32	BG	PROG. E SWITCH SWIFT UP SIGNAL
33	G	FUEL LEVEL SENSOR SIGNAL
34	G	—
35	W	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
36	G	PASSENGER SEAT BELT WARNING SIGNAL
37	G	NON-MANUAL MODE SIGNAL
38	V	MANUAL MODE SHIFT DOWN SIGNAL
39	L	MANUAL MODE SHIFT UP SIGNAL
40	W	MANUAL MODE SIGNAL

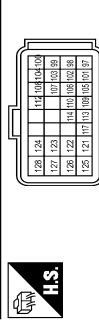
Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH40BW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
3	SHIELD	—
4	Y	—
5	G	—
7	W	—
8	B	—
9	LG	—
10	SB	—
11	LG	—
12	SB	—
13	B	—

Terminal No.	Color Of Wire	Signal Name [Specification]
14	P	— [With BOSE system]
14	V	— [Without BOSE system]
15	LG	—
16	L	—
17	G	—
18	R	—
19	V	—
20	V	—
21	B	—
23	B	—
29	SHIELD	—
30	V	— [Without BOSE system]
30	Y	— [With BOSE system]
31	BR	— [Without BOSE system]
31	Y	— [With BOSE system]
32	SHIELD	—
33	G	— [Without BOSE system]
33	SB	— [With BOSE system]
34	GR	— [Without BOSE system]
34	V	— [With BOSE system]
35	SHIELD	—
36	R	—
37	BR	— [Without BOSE system]
37	G	— [With BOSE system]
38	SHIELD	—
39	L	—
39	P	— [Without BOSE system]
40	G	— [Without BOSE system]
40	L	— [With BOSE system]

Connector No.	M107
Connector Name	ECM
Connector Type	FR24FCY-RZE-R-RH-Z



Terminal No.	Color Of Wire	Signal Name [Specification]
97	R	ACCELERATOR PEDAL POSITION SENSOR 1
98	Y	ACCELERATOR PEDAL POSITION SENSOR 2
99	G	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
100	W	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 1)
101	SB	ASC2D STEERING SWITCH

JRGWC0924GB

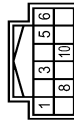
POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

POWER STEERING CONTROL SYSTEM

102	P	FUEL TANK PRESSURE SENSOR
103	B	SENSOR GROUND [Without ICC]
104	BR	SENSOR GROUND [With ICC]
105	LG	REFRIGERANT PRESSURE SENSOR
106	P	FUEL TANK TEMPERATURE SENSOR
107	BG	AVCC2 PDPRES/FTPRES
108	Y	GND ASGD SW
109	BR	TRANSMISSION RANGE SWITCH
110	V	ENGINE SPEED SIGNAL OUTPUT
112	V	GND PDPRES/FTPRES
113	P	CAN COMMUNICATION LINE
114	L	DATA LINK CONNECTOR
117	G	EVAP CANISTER VENT CONTROL VALVE
121	G	STOP LAMP SWITCH
122	B	ECM GROUND CH
124	B	ECM GROUND
125	SB	POWER SUPPLY FOR ECM
126	BR	ASGD BRAKE SWITCH
127	B	ECM GROUND
128	B	ECM GROUND

Connector No.	M108
Connector Name	POWER STEERING CONTROL UNIT
Connector Type	TH12FN-NH



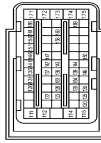
Terminal No.	Color	Wire	Signal Name [Specification]
1	LG		EPS SOL+
3	G		IGN
5	B		EPS SOL-
6	B		GND
8	OR		VEHICLE SPEED (SP)
10	V		ENG TACNO

Connector No.	M116
Connector Name	WIRE TO WIRE
Connector Type	TK28MW-AS10



Terminal No.	Color	Wire	Signal Name [Specification]
2	SB		
3	B		
4	B		- [With VK engine]
5	SB		- [With VO engine]
7	B		
8	Y		
9	SB		- [With VO engine]
9	W		- [With VK engine]
10	SB		
11	L		
12	P		
13	V		
14	R		
15	B		
16	SB		
17	BR		
18	LG		
21	LG		
22	B		
23	W		
24	W		
25	BG		

Connector No.	M160
Connector Name	ECM
Connector Type	MAB5FEF-MEB10-LH



Terminal No.	Color	Wire	Signal Name [Specification]
111	W		FUEL INJECTOR DRIVER POWER SUPPLY
112	W		FUEL INJECTOR DRIVER POWER SUPPLY
114	B		ECM GROUND
115	B		ECM GROUND
120	G		EVAP CANISTER VENT CONTROL VALVE
122	V		VEHICLE SPEED SIGNAL [Without ICC]
123	BG		THROTTLE CONTROL MOTOR RELAY
125	P		FUEL PUMP CONTROL MODULE (FPCM)
126	Y		ACCELERATOR PEDAL POSITION SENSOR 2
128	SB		ASGD STEERING SWITCH
129	B		SENSOR GROUND [Without ICC]
129	BR		SENSOR GROUND [With ICC]
130	Y		SENSOR GROUND
131	L		SENSOR POWER SUPPLY
133	BG		SENSOR POWER SUPPLY
134	B		FUEL TANK PRESSURE SENSOR
136	P		ACCELERATOR PEDAL POSITION SENSOR 1
137	G		SENSOR POWER SUPPLY
138	P		BATTERY CURRENT SENSOR
139	BG		BATTERY TEMPERATURE SENSOR
140	W		SENSOR GROUND
141	G		IGNITION SWITCH
142	GR		FUEL PUMP CONTROL MODULE (FPCM) CHECK
143	P		FUEL TANK PRESSURE SENSOR
144	LG		REFRIGERANT PRESSURE SENSOR
146	L		CAN COMMUNICATION LINE
147	BR		ASGD BRAKE SWITCH
150	V		SENSOR GROUND
151	V		CAN COMMUNICATION LINE
152	V		STOP LAMP SWITCH (PACK-UP)
153	P		STOP LAMP SWITCH
161	Y		ENG COMMUNICATION LINE
163	W		ECM RELAY (SELF SHUT-OFF)
166	BG		ENG COMMUNICATION LINE
169	V		ENGINE SPEED SIGNAL OUTPUT
171	SB		POWER SUPPLY FOR ECM

172	SB	POWER SUPPLY FOR ECM
172	R	THROTTLE CONTROL POWER SUPPLY
174	B	ECM GROUND
175	B	ECM GROUND

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000010102462

DETAILED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

It is also important to clarify customer complaints before inspection. First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. In some cases, it is necessary to check symptoms by driving vehicle with customer.

CAUTION:

Customers are not professional. It is dangerous to make an easy guess like “maybe the customer means that...,” or “maybe the customer mentions this symptom”.

>> GO TO 2.

2. CHECK THE STATUS

1. Power steering fluid leakage and check the power steering fluid level. Refer to [ST-30. "Inspection"](#).
2. Check the drive belt tension. Refer to [EM-22. "Checking"](#) (VQ37VHR), [EM-182. "Checking"](#) (VK56VD).
3. Check the power steering gear for damages, cracks and fluid leakage. Refer to [ST-48. "2WD : Inspection"](#) (2WD), [ST-58. "AWD : Inspection"](#) (AWD).
4. Check the relief oil pressure. Refer to [ST-64. "VQ37VHR : Inspection"](#) (VQ37VHR), [ST-70. "VK56VD : Inspection"](#) (VK56VD).

>> GO TO 3.

3. DIAGNOSIS CHART BY SYMPTOM

Perform the diagnosis by symptom.

>> GO TO 4.

4. FINAL CHECK

Check the input/output standard values for the power steering control unit.

Are the power steering control unit input/output values within standard ranges respectively?

- YES >> INSPECTION END
NO >> GO TO 2.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000010102463

Power supply to EPS system.

Diagnosis Procedure

INFOID:0000000010102464

1.CHECK POWER SUPPLY (1)

1. Turn the ignition switch OFF.
2. Disconnect power steering control unit harness connector.
3. Check the voltage between power steering control unit harness connector and ground.

Power steering control unit		—	Voltage (Approx.)
Connector	Terminal		
M108	3	Ground	0 V

4. Turn the ignition switch ON.
CAUTION:
Never start the engine.
5. Check the voltage between power steering control unit harness connector and ground.

Power steering control unit		—	Voltage (Approx.)
Connector	Terminal		
M108	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK POWER SUPPLY (2)

1. Turn the ignition switch OFF.
2. Check 10A fuse (#46).
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between power steering control unit harness connector and IPDM E/R harness connector.

Power steering control unit		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M108	3	E5	12	Existed

5. Check the continuity between power steering control unit harness connector and ground.

Power steering control unit		—	Continuity
Connector	Terminal		
M108	3	Ground	Not existed

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ignition power supply circuit. Refer to [PG-57, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).
- NO >> Repair or replace damaged parts.

3.CHECK GROUND CIRCUIT

1. Turn the ignition switch OFF.
2. Check the continuity between power steering control unit harness connector and ground.

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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Power steering control unit		—	Continuity
Connector	Terminal		
M108	6	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4.CHECK TERMINALS AND HARNESS CONNECTORS

Check the power steering control unit pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

POWER STEERING SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

POWER STEERING SOLENOID VALVE

Component Function Check

INFOID:000000010102465

1. CHECK POWER STEERING SOLENOID VALVE OPERATION

Check changes in steering force from a halt condition to high-speed driving.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check the power steering solenoid valve. Refer to [STC-19, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000010102466

1. CHECK POWER STEERING SOLENOID VALVE SIGNAL

Check the voltage between power steering control unit harness connector and ground.

Power steering control unit		—	Condition	Voltage (Approx.)
Connector	Terminal			
M108	1	Ground	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	4.4 – 6.6 V
			Vehicle speed: 100 km/h (62 MPH)	2.4 – 3.6 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2. CHECK POWER STEERING SOLENOID VALVE CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect power steering solenoid valve harness connector.
3. Disconnect power steering control unit harness connector.
4. Check the continuity between power steering solenoid valve harness connector and the power steering control unit harness connector.

Power steering solenoid valve		Power steering control unit		Continuity
Connector	Terminal	Connector	Terminal	
F55 (2WD) F45 (AWD)	1	M108	1	Existed
	2		5	

5. Check the continuity between power steering control unit harness connector and ground.

Power steering control unit		—	Continuity
Connector	Terminal		
M108	1	Ground	Not existed
	5		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK POWER STEERING SOLENOID VALVE

Check the power steering solenoid valve. Refer to [STC-20, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Power steering solenoid valve is malfunctioning. Replace gear-sub assembly. Refer to [ST-41, "2WD : Removal and Installation"](#) (2WD), [ST-51, "AWD : Removal and Installation"](#) (AWD).

4. CHECK TERMINALS AND HARNESS CONNECTORS

POWER STEERING SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

- Check the power steering control unit pin terminals for damage or loose connection with harness connector.
- Check the power steering solenoid valve pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:000000010102467

1. CHECK POWER STEERING SOLENOID VALVE

1. Turn the ignition switch OFF.
2. Disconnect power steering solenoid valve harness connector.
3. Check the resistance between power steering solenoid valve connector terminals.

Power steering solenoid valve		Resistance (Approx.)
Terminal		
1	2	4 – 6 Ω

4. Check the power steering solenoid valve connector by listening for its operation sound while applying battery voltage to power steering solenoid valve connector terminals.

Power steering solenoid valve		Operation sound
Terminal		
1 (Positive)	2 (Negative)	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Power steering solenoid valve is malfunctioning. Replace gear-sub assembly. Refer to [ST-41, "2WD : Removal and Installation"](#) (2WD), [ST-51, "AWD : Removal and Installation"](#) (AWD).

ENGINE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

ENGINE SPEED SIGNAL CIRCUIT

Diagnosis Procedure

INFOID:000000010102468

1. PERFORM ECM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ENGINE".

Is any error system detected?

YES >> Check the DTC. Refer to [EC-116, "DTC Index"](#) (VQ37VHR for USA and Canada), [EC-638, "DTC Index"](#) (VQ37VHR for Mexico), [EC-1077, "DTC Index"](#) (VK56VD for USA and Canada), [EC-1664, "DTC Index"](#) (VK56VD for Mexico).

NO >> GO TO 2.

2. CHECK ENGINE SPEED SIGNAL CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect ECM harness connectors.
3. Disconnect power steering control unit harness connector.
4. Check the continuity between ECM harness connector and power steering control unit harness connector.

Power steering control unit		ECM		Continuity
Connector	Terminal	Connector	Terminal	
M108	10	M107 ^{*1} M160 ^{*2}	110 ^{*1} 169 ^{*2}	Existed

*1: VQ37VHR

*2: VK56VD

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

3. CHECK ENGINE SPEED SIGNAL (ECM)

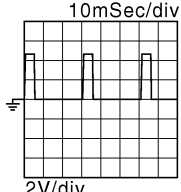
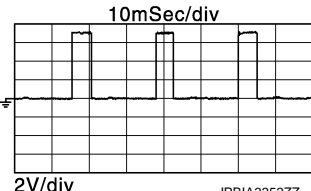
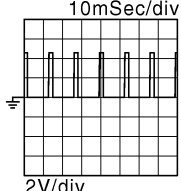
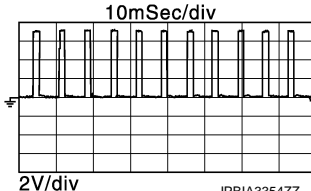
1. Connect ECM harness connectors.
2. Check the signal between ECM harness connector and ground with oscilloscope.

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ENGINE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

ECM		—	Condition	Value (Approx.)
Connector	Terminal			
M107*1 M160*2	110*1 169*2	Ground	Engine speed: At idle (Warm-up condition)	VQ37VHR  VK56VD 
			Engine speed: Approx. 2,000 rpm (Warm-up condition)	VQ37VHR  VK56VD 

*1: VQ37VHR

*2: VK56VD

Is the inspection result normal?

YES >> GO TO 4.

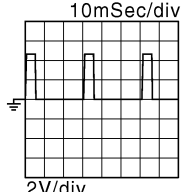
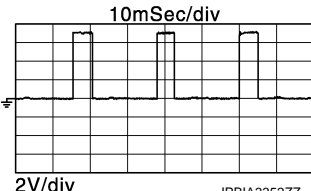
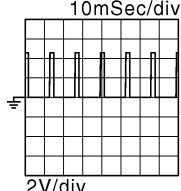
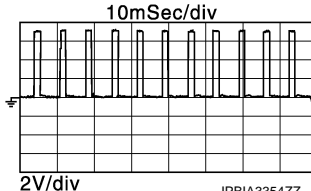
NO >> Replace ECM. Refer to [EC-163, "Description"](#) (VQ37VHR for USA and Canada), [EC-683, "Description"](#) (VQ37VHR for Mexico), [EC-1133, "Description"](#) (VK56VD for USA and Canada), [EC-1718, "Description"](#) (VK56VD for Mexico).

4. CHECK ENGINE SPEED SIGNAL (POWER STEERING CONTROL UNIT)

1. Turn the ignition switch OFF.
2. Connect power steering control unit harness connector.
3. Check the signal between power steering control unit harness connector and ground with oscilloscope.

ENGINE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Power steering control unit		—	Condition	Value (Approx.)
Connector	Terminal			
M108	10	Ground	Engine speed: At idle (Warm-up condition)	VQ37VHR 
				VQK56VD 
			Engine speed: Approx. 2,000 rpm (Warm-up condition)	VQ37VHR 
				VK56VD 

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Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace power steering control unit. Refer to [STC-27, "Removal and Installation"](#).

5. CHECK TERMINALS AND HARNESS CONNECTORS

- Check the power steering control unit pin terminals for damage or loose connection with harness connector.
- Check ECM pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

VEHICLE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

VEHICLE SPEED SIGNAL CIRCUIT

Diagnosis Procedure

INFOID:000000010102469

1. PERFORM COMBINATION METER SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "METER/M&A".

Is any error system detected?

YES >> Check the DTC. Refer to [MWI-44, "DTC Index"](#).

NO >> GO TO 2.

2. CHECK VEHICLE SPEED SIGNAL CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect power steering control unit harness connector.
3. Disconnect combination meter harness connector.
4. Check the continuity between combination meter harness connector and power steering control unit harness connector.

Power steering control unit		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
M108	8	M53	3	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

3. CHECK VEHICLE SPEED SIGNAL (COMBINATION METER)

1. Connect combination meter harness connector.
2. Check the combination meter input/output standard values. Refer to [MWI-36, "Reference Value"](#).

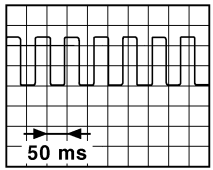
Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace combination meter. Refer to [MWI-92, "Removal and Installation"](#).

4. CHECK VEHICLE SPEED SIGNAL (POWER STEERING CONTROL UNIT)

1. Connect power steering control unit harness connector.
2. Check the signal between power steering control unit harness connector and ground with oscilloscope.

Power steering control unit		—	Condition	Value (Approx.)
Connector	Terminal			
M108	8	Ground	Vehicle speed: 40 km/h (25 MPH) CAUTION: Check the air pressure of tire under standard condition.	 JSNIA0015GB

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace power steering control unit. Refer to [STC-27, "Removal and Installation"](#).

5. CHECK TERMINALS AND HARNESS CONNECTORS

- Check the power steering control unit pin terminals for damage or loose connection with harness connector.
- Check the combination meter pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END

VEHICLE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace damaged parts.

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UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Description

INFOID:0000000010102470

- Hard steering when fully turning the steering wheel.
- Light steering when driving at a high speed.

Diagnosis Procedure

INFOID:0000000010102471

1. CHECK SYSTEM FOR POWER SUPPLY AND GROUND

Perform trouble diagnosis for power supply and ground. Refer to [STC-17, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace damaged parts.

2. CHECK SYSTEM FOR VEHICLE SPEED SIGNAL

Perform trouble diagnosis for vehicle speed signal. Refer to [STC-24, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace damaged parts.

3. CHECK SYSTEM FOR ENGINE SPEED SIGNAL

Perform trouble diagnosis for engine speed signal. Refer to [STC-21, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace damaged parts.

4. CHECK SYSTEM FOR POWER STEERING SOLENOID VALVE

Perform trouble diagnosis for power steering solenoid valve. Refer to [STC-19, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Perform the symptom diagnosis for the steering system. Refer to [ST-28, "NVH Troubleshooting Chart"](#).
- NO >> Repair or replace damaged parts.

POWER STEERING CONTROL UNIT

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

POWER STEERING CONTROL UNIT

Removal and Installation

INFOID:000000010102472

REMOVAL

1. Remove instrument lower panel RH. Refer to [IP-12. "Exploded View"](#).
2. Disconnect power steering control unit connector.
3. Remove power steering control unit.

INSTALLATION

Install in the reverse order of removal.

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