

# SECTION **STC**

## STEERING CONTROL SYSTEM

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STC

# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000012356026

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.

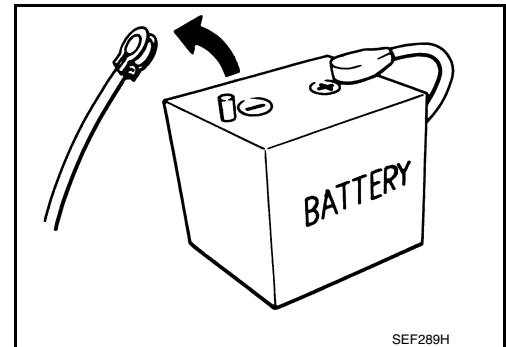
#### Precautions for Removing Battery Terminal

INFOID:000000013042317

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		
YD25DDTi	: 2 minutes		



#### **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.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

#### **NOTE:**

## PRECAUTIONS

### < PRECAUTION >

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- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

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**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.

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# COMPONENT PARTS

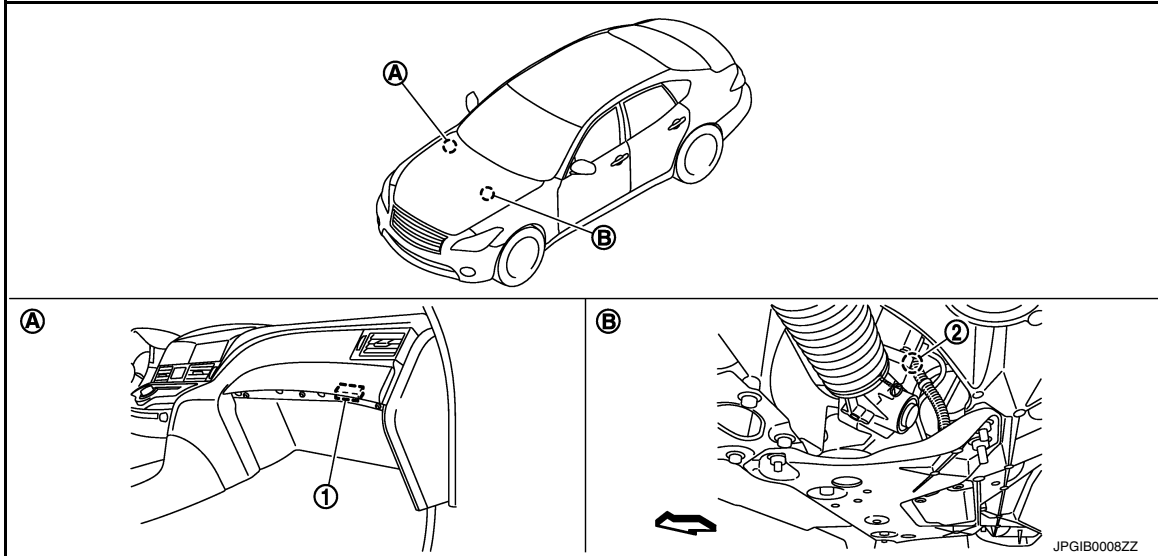
< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### Component Parts Location

INFOID:000000012356028



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

↶: Vehicle front

#### Component Description

INFOID:000000012356029

Component parts	Reference/Function
Power steering control unit	<a href="#">STC-4. "Power Steering Control Unit"</a>
Power steering solenoid valve	<a href="#">STC-4. "Power Steering Solenoid Valve"</a>
Combination meter	<a href="#">MWI-10. "METER SYSTEM : System Description"</a>
ECM	<a href="#">EC-57. "ENGINE CONTROL SYSTEM : System Description"</a> (VQ37VHR FOR USA AND CANADA) <a href="#">EC-587. "ENGINE CONTROL SYSTEM : System Description"</a> (VQ37VHR FOR MEXICO) <a href="#">EC-1008. "ENGINE CONTROL SYSTEM : System Description"</a> (VK56VD FOR USA AND CANADA) <a href="#">EC-1599. "ENGINE CONTROL SYSTEM : System Description"</a> (VK56VD FOR MEXICO)

#### Power Steering Control Unit

INFOID:000000012356030

- 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:000000012356031

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

# SYSTEM

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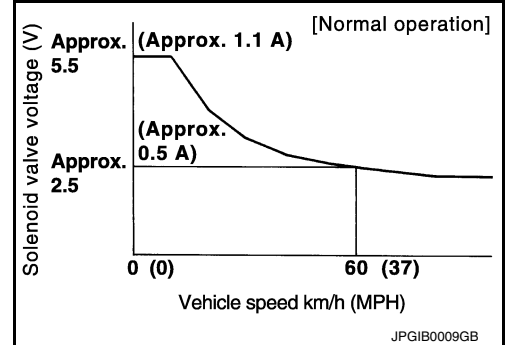
## SYSTEM

### EPS SYSTEM

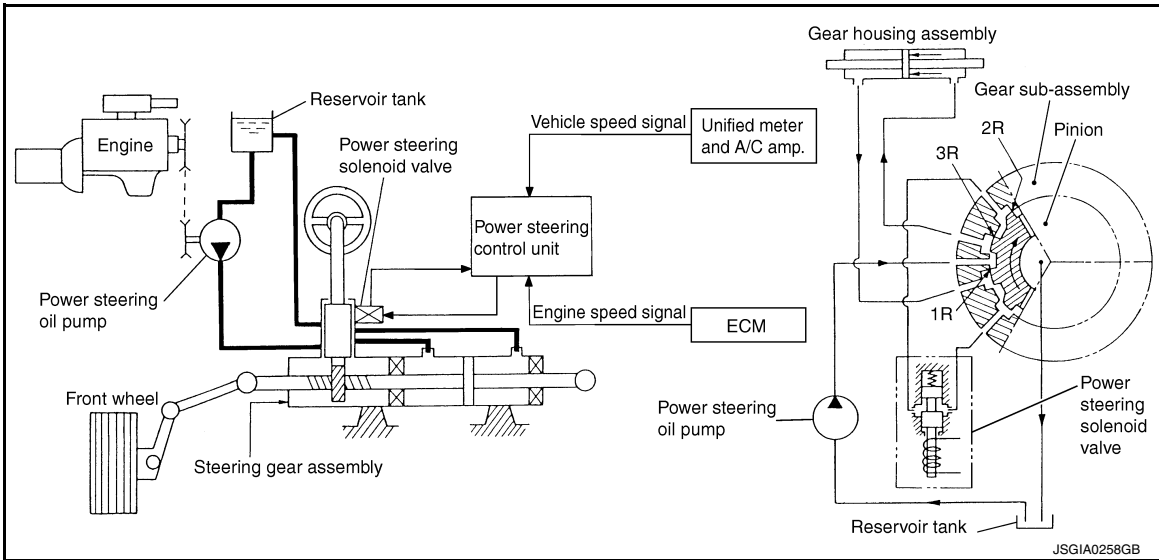
#### EPS SYSTEM : System Description

INFOID:0000000012356032

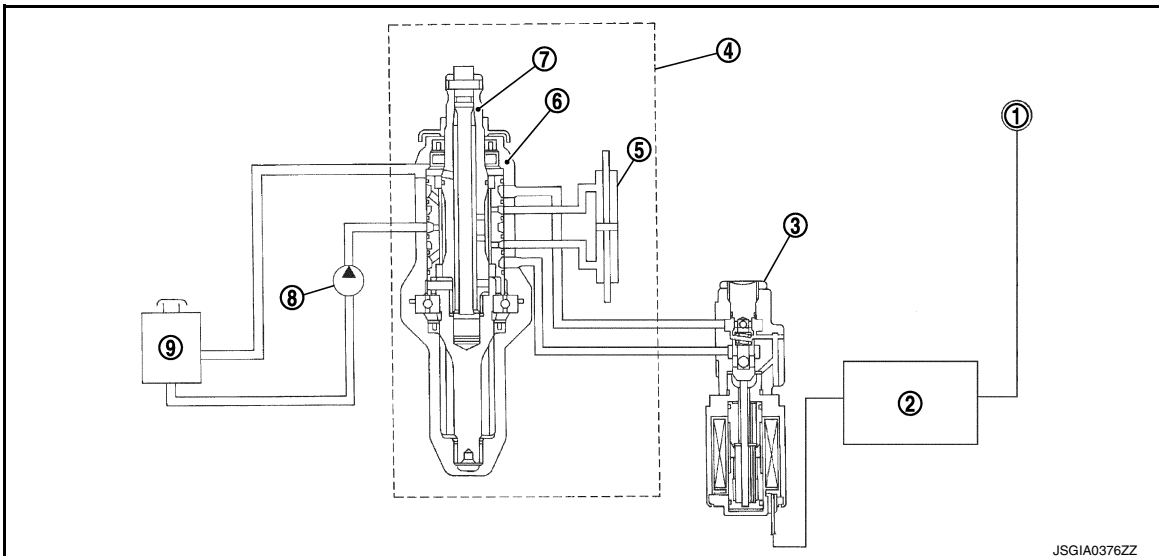
- EPS system controls the power steering solenoid valve through the power steering control unit.
- The valve driving voltage to control the power steering solenoid valve varies according to the vehicle speed.



#### CONTROL DIAGRAM



#### CROSS-SECTIONAL VIEW



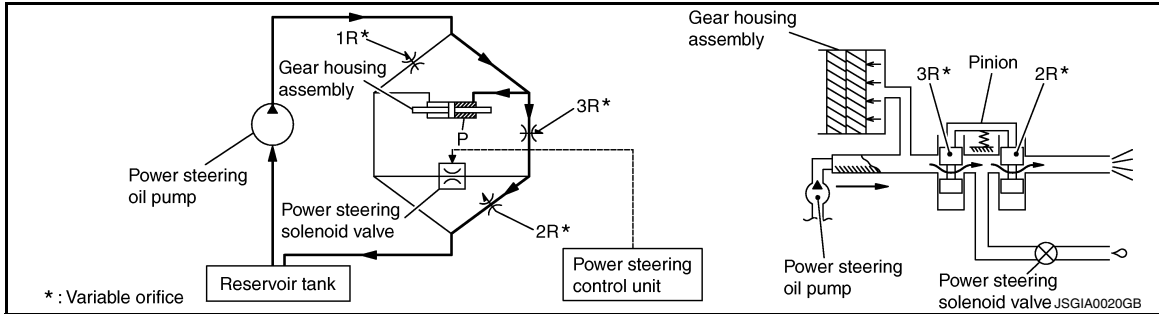
# SYSTEM

## < 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                |

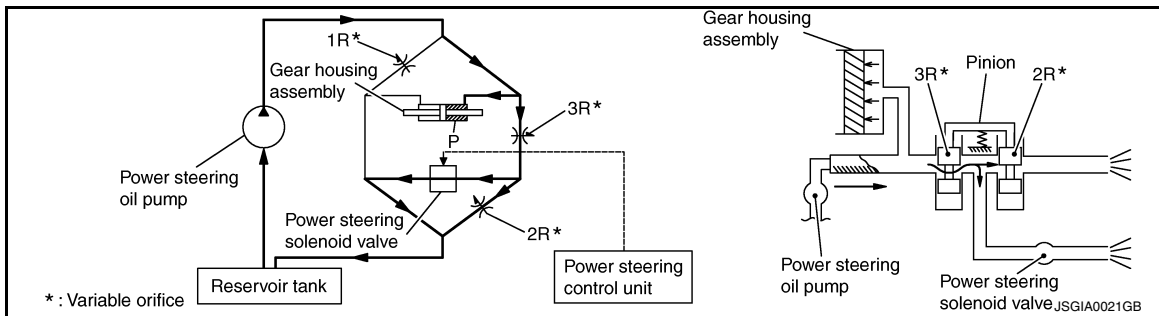
## OPERATION PRINCIPLE

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

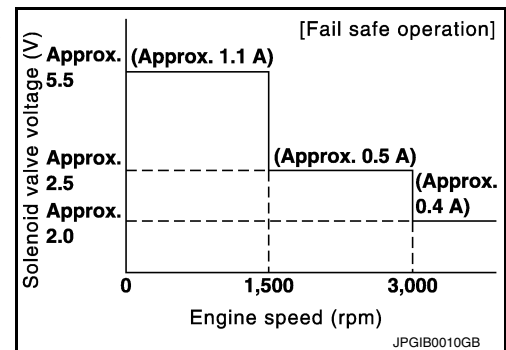


1. Power steering solenoid valve is opened during high-speed operation.
2. Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel.
3. Oil pressure "2R" does not occur because the power steering solenoid valve is on full throttle.
4. Oil pressure "P" in the gear housing assembly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

## EPS SYSTEM : Fail-safe

INFOID:000000012356033

- 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"><li>• When a vehicle speed signal of 2 km/h (1.2 MPH) or more is inputted.</li><li>• Key switch is turned OFF to ON.</li></ul>	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 >

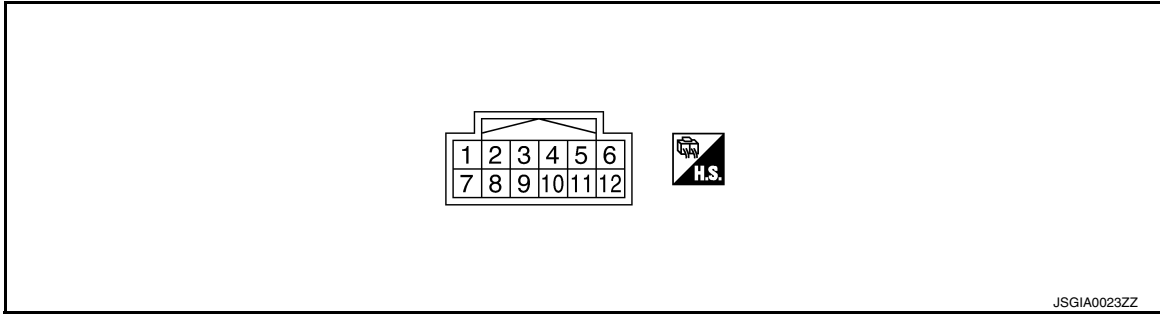
## ECU DIAGNOSIS INFORMATION

### POWER STEERING CONTROL UNIT

Reference Value

INFOID:000000012356034

#### TERMINAL LAYOUT



#### PHYSICAL VALUES

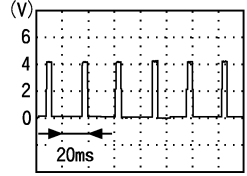
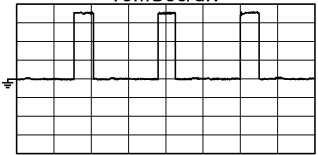
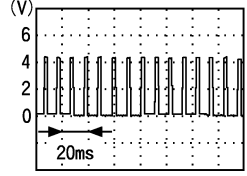
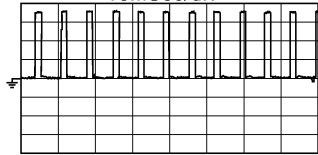
Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
1 (LG)	Ground	Power steering solenoid valve voltage	Output	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	4.4 – 6.6 V
				Vehicle speed: 100 km/h (62 MPH)	1.7 – 2.9 V
3 (G)	Ground	Ignition switch power supply	Input	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) <b>CAUTION:</b> 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 voltage of approximately 5V.</p>

SEIA0775E



# 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  PBIA3654J
				Engine speed: Approx. 2,000 rpm (Warm-up condition)	VK56VD 10mSec/div  2V/div JPBIA3352ZZ
				Engine speed: Approx. 2,000 rpm (Warm-up condition)	VQ37VHR  PBIA3655J
					VK56VD 10mSec/div  2V/div JPBIA3354ZZ

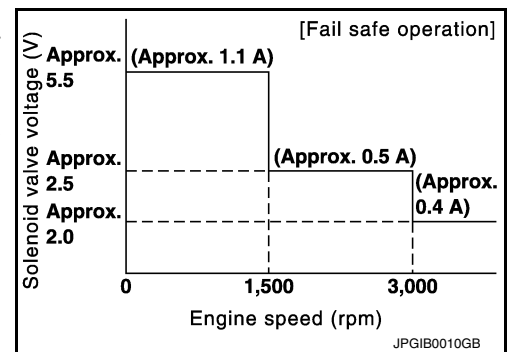
**CAUTION:**

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

### Fail-safe

INFOID:0000000012356035

- 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"><li>• When a vehicle speed signal of 2 km/h (1.2 MPH) or more is inputted.</li><li>• Key switch is turned OFF to ON.</li></ul>
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

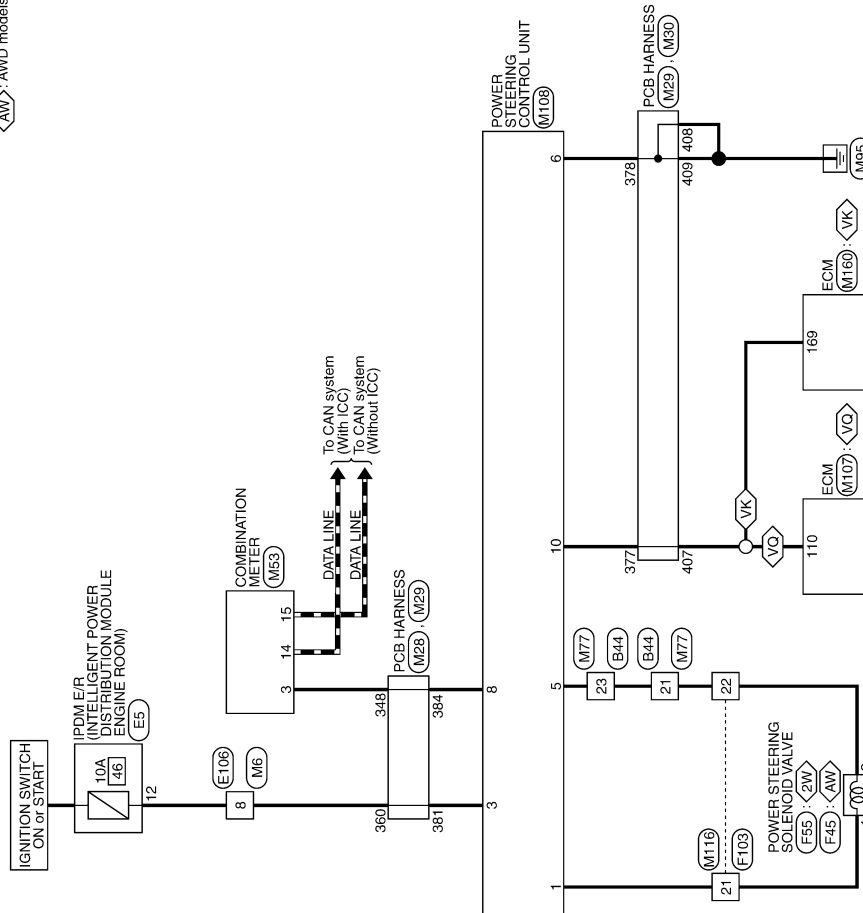
### POWER STEERING CONTROL SYSTEM

Wiring Diagram

INFOID:0000000012356036

#### POWER STEERING CONTROL SYSTEM

- <VQ>: VQ engine models
- <VK>: VK engine models
- <2W>: 2WD models
- <AW>: AWD models



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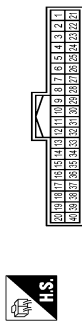
STC

# POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

## POWER STEERING CONTROL SYSTEM

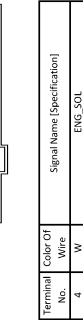
Connector No.	E44
Connector Name	WIRE TO WIRE
Connector Type	TH807M-AH



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

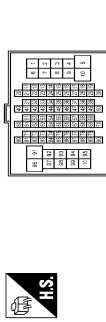
35	SHIELD	- [Without BOSE system]
36	GR	- [With BOSE system]
37	B	- [With BOSE system]
37	V	- [Without BOSE system]
38	SHIELD	-
39	B	- [With BOSE system]
39	L	- [Without BOSE system]
40	W	- [With BOSE system]
40	Y	- [Without BOSE system]

Connector No.	E5
Connector Name	FROM THE INTELLIGENT POWER DISTRIBUTION MODULE ENGINE (E004)
Connector Type	TIZ07W-CS12-A4-LV



Terminal No.	Color Of Wire	Signal Name [Specification]
4	W	ENG_S01
5	P	IGN_CO1
6	R	ECM_VB [With V037 engine]
6	SB	ECM_VB [With V036 engine]
7	Y	ETC [With V037 engine]
8	UV	A/C_COMP [With V036 engine]
8	P	A/C_COMP [With V037 engine]
10	V	ECM_BAT
11	B	P-END
12	G	ABS_ECU
13	GR	FUEL_PUMP [With V037 engine]
13	W	FUEL_PUMP [With V036 engine]
16	V	WIPER_AUTOSTOP
18	Y	IGN_SIGNAL
22	BR	ALT-C
23	P	DRBL_RLV
24	O	HOOD_SW
25	LG	SUB_ECU
30	BR	PUSH_START_SW
31	BR	NP_SW [With V036 engine]
31	W	NP_SW [With V037 engine]
36	GR	F/L_IGN_SW

Connector No.	E106
Connector Name	WIRE TO WIRE
Connector Type	TH807W-CS16-TM4



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

47	V	-
48	G	-
49	O	-
50	LG	-
54	R	-
55	B	-
60	W	-
61	G	-
62	Y	-
63	BR	-
64	B	-
65	Y	-
66	R	-
67	SB	-
68	G	-
69	SHIELD	-
70	W	-
71	W	-
72	R	-
73	G	-
74	Y	-
75	B	-
76	SHIELD	-
77	O	-
80	V	-
82	SR	-
83	GR	-
84	Y	-
85	Y	-
86	L	-
87	V	-
88	BR	-
89	LG	-
90	W	-
91	W	-
92	P	-
93	LG	-
94	BR	-
95	W	-
97	R	-
98	Y	-
99	V	-
100	V	-

# POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

## POWER STEERING CONTROL SYSTEM

Connector No.	F45
Connector Name	POWER STEERING SOLENOID VALVE
Connector Type	HS02FBR-DGT



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

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



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

Connector No.	F103
Connector Name	WIRE TO WIRE
Connector Type	TK3EPN-ANS10



Terminal No.	Color Of Wire	Signal Name [Specification]
2	L	-
3	G	-
4	B	- [With W56 engine]
4	R	- [With VQ37 engine]
5	B	- [With W56 engine]
5	GR	- [With VQ37 engine]
7	LG	-
8	Y	-
9	SB	- [With VQ37 engine]
9	W	- [With W56 engine]
10	BR	- [With W56 engine]
10	V	- [With VQ37 engine]
11	L	-
12	P	-
13	V	-
14	L	-
15	V	-
16	GR	-
18	GR	-
18	GR	-
20	SB	-
21	BR	-
22	L	-
23	B	-
23	P	-
27	SHIELD	-
28	V	-
29	SB	-
31	BG	-
32	P	-
33	R	-
34	BG	-
36	V	-
37	G	-
41	BR	-
44	BR	-
45	Y	-
46	BG	-
47	V	-

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Type	TH808WV-CS16-3M4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	W	-
3	SB	-
4	LG	-
5	W	-
6	W	-
7	BG	-
8	G	-
9	Y	-
10	W	-
11	R	-
12	V	-
13	LG	-
14	L	-
15	V	-
16	GR	-
18	GR	-
20	SB	-
21	BR	-
22	L	-
23	P	-
27	SHIELD	-
28	V	-
29	SB	-
31	BG	-
32	P	-
33	R	-
34	BG	-
36	V	-
37	G	-
41	BR	-
44	BR	-
45	Y	-
46	BG	-
47	V	-

48	G	-
49	BS	-
50	W	-
54	G	-
50	GR	-
61	B	-
62	LG	-
63	BR	-
64	L	- [Without LCC]
64	SB	- [Without LCC]
65	R	- [Without LCC]
65	Y	- [Without LCC]
66	P	-
67	L	-
68	R	-
69	SHIELD	-
70	B	-
71	W	-
72	R	-
73	G	-
74	Y	-
75	B	-
76	SHIELD	-
77	B	-
78	V	-
80	G	-
82	B	-
83	BS	-
84	SB	-
85	Y	-
87	V	-
88	V	-
89	LG	-
90	BG	-
91	W	-
92	BG	-
93	G	-
94	Y	-
95	W	-
97	SB	-
98	R	-
99	W	-
100	L	-

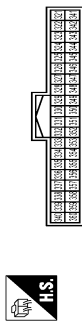
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# POWER STEERING CONTROL SYSTEM

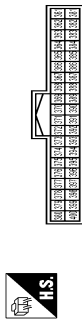
## < WIRING DIAGRAM >

### POWER STEERING CONTROL SYSTEM

Connector No.	M28
Connector Name	PCB HARNESS
Connector Type	TH40PW-NH

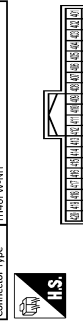


Connector No.	M29
Connector Name	PCB HARNESS
Connector Type	TH40PB-NH



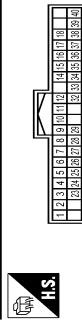
Terminal No.	Color Of Wire	Signal Name [Specification]
321	V	-
322	B	-
324	B	-
325	L	-
326	L	-
327	P	-
328	P	-
330	B	-
331	V	-
332	V	-
335	B	-
337	W	-
338	W	-
343	L	-
344	R	-
345	GR	-
346	L	-
347	P	-
348	GR	-
349	V	-
350	LG	-
352	P	-
353	P	-
358	W	-
359	W	-
360	G	-

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



Terminal No.	Color Of Wire	Signal Name [Specification]
402	R	-
403	R	-
406	B	-
407	V	-
408	B	-
409	B	-
410	B	-
411	B	-
413	Y	-
414	BR	-
416	LG	-
417	B	-
419	SB	-
420	SHIELD	-
422	V	-
427	P	-
428	V	-
429	P	-
430	LG	-
431	B	-
432	Y	-
435	V	-
436	BG	-
437	B	-
438	P	-
439	L	-
440	B	-

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



Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	BATTERY POWER SUPPLY
2	BG	IGNITION SIGNAL
3	GR	VEHICLE SPEED SIGNAL (2-PULSE)
4	R	VEHICLE SPEED SIGNAL (8-PULSE)
5	B	ILLUMINATION CONTROL SIGNAL

Terminal No.	Color Of Wire	Signal Name [Specification]
6	B	METER CONTROL SWITCH/ GROUND
9	SB	LED SENSOR SIGNAL
8	LG	SELECT SWITCH SIGNAL
9	G	ILLUMINATION CONTROL SWITCH SIGNAL (L)
10	GR	ILLUMINATION CONTROL SWITCH SIGNAL (R)
11	L	TRIP RESET SWITCH SIGNAL
12	B	GROUND
14	L	CAN-L
15	P	CAN-R
16	R	AIR BAG SIGNAL
17	G	LED HEADLAMP (RH) WARNING SIGNAL
18	V	LED HEADLAMP (LH) WARNING SIGNAL
23	B	GROUND
24	B	FUEL LEVEL SENSOR SIGNAL
25	W	ALTERNATOR SIGNAL
26	V	PARKING BRAKE SWITCH SIGNAL
27	V	BRAKE FLUID LEVEL SWITCH SIGNAL
28	G	SECURITY SIGNAL
29	L	WASHER LEVEL SWITCH SIGNAL
32	G	PADDLE SHIFTER SHIFT DOWN SIGNAL
33	BG	PADDLE SHIFTER SHIFT UP SIGNAL
34	G	FUEL LEVEL SENSOR SIGNAL
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	TH40MM-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
3	SHIELD	-
4	Y	-
5	G	-
6	R	-
7	W	-
8	B	-


# POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

**POWER STEERING CONTROL SYSTEM**

9	LC	-
10	SB	-
11	B	-
12	B	-
13	B	-
14	B	-
15	LG	-
16	LG	-
17	G	-
18	R	-
19	V	-
20	V	-
21	B	-
22	B	-
23	B	-
24	W	-
25	G	-
26	R	-
27	SHIELD	-
28	B	-
29	SHIELD	-
30	V	- [Without BOSE system]
30	Y	- [With BOSE system]
31	BR	- [Without BOSE system]
31	P	- [With BOSE system]
32	SHIELD	-
33	G	-
33	SB	- [Without BOSE system]
34	GR	- [Without BOSE system]
34	V	- [With BOSE system]
35	SHIELD	-
36	R	-
37	BR	- [Without BOSE system]
37	BR	- [With BOSE system]
38	SHIELD	-
38	L	- [Without BOSE system]
38	P	- [With BOSE system]
40	G	-
40	L	- [Without BOSE system]

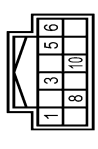
Connector No. M107  
Connector Name ECM  
Connector Type RHZ4GF-4B2-6RH-Z



**H.S.**

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	ASC2 STEERING SWITCH
102	P	FUEL TANK PRESSURE SENSOR
103	L	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
104	BR	SENSOR GROUND (Without LCI)
104	BR	SENSOR GROUND (With LCI)
105	LG	REFRIGERANT PRESSURE SENSOR
106	P	FUEL TANK TEMPERATURE SENSOR
107	BG	AVCC2 POPUP/PIPPRES
108	Y	GND ASC2 SW
109	BR	TRANSMISSION RANGE SWITCH
110	V	ENGINE SPEED SIGNAL OUTPUT
112	V	GND POPUP/PIPPRES
113	P	GND POPUP/PIPPRES
113	P	CAN COMMUNICATION LINE
117	V	DATA LINE CONNECTOR
121	G	EVAP CANISTER VENT CONTROL VALVE
122	P	STOP LAMP SWITCH
123	B	ECM GROUND
124	B	ECM GROUND
125	SB	POWER SUPPLY FOR ECM
126	BR	ASC2 BRAKE SWITCH
127	B	ECM GROUND
128	B	ECM GROUND


Connector No. M108  
Connector Name POWER STEERING CONTROL UNIT  
Connector Type TH12FW-4H



**H.S.**

Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	EPS SOL+
3	G	IGN
5	B	EPS SOL-
6	B	GND
8	GR	VEHICLE SPEED (2P)
10	V	ENG TACHO

Connector No. M116  
Connector Name WIRE TO WIRE  
Connector Type TK36MW-4S1D

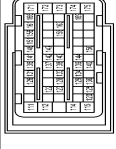


**H.S.**

Terminal No.	Color Of Wire	Signal Name [Specification]
2	SB	-
3	Y	-
4	B	- [With VAS56 engine]
4	SB	- [With VQ37 engine]
5	B	-
7	W	-
8	Y	-
9	SB	- [With VQ37 engine]
9	W	- [With VAS56 engine]
10	SB	-
11	L	-
12	P	-
13	V	-
14	R	-

15	Y	-
16	SB	-
17	BR	-
18	LG	-
19	LG	-
22	B	-
23	W	-
24	W	-
25	BG	-

Connector No. M160  
Connector Name ECM  
Connector Type MAB55FB-MEB1D-LH-Z



**H.S.**

Terminal No.	Color Of 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
120	V	WIPER MOTOR RELAY
132	BG	THROTTLE CONTROL MODULE (FCM)
135	P	FUEL PUMP CONTROL MODULE (FCM)
136	Y	ACCELERATOR PEDAL POSITION SENSOR 2
138	SB	ASC2 STEERING SWITCH
129	B	SENSOR GROUND (Without LCI)
129	BR	SENSOR GROUND (With LCI)
130	Y	SENSOR POWER SUPPLY
131	L	SENSOR POWER SUPPLY
133	BG	FUEL TANK TEMPERATURE SENSOR
134	P	FUEL TANK TEMPERATURE SENSOR
136	R	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 (FCM) CHECK
143	P	FUEL TANK PRESSURE SENSOR
144	LG	REFRIGERANT PRESSURE SENSOR

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# POWER STEERING CONTROL SYSTEM

< WIRING DIAGRAM >

POWER STEERING CONTROL SYSTEM

146	U	CAN COMMUNICATION LINE
147	BR	STOP SWITCH
148	P	STOP SWITCH
150	P	CAN COMMUNICATION LINE
151	P	CAN COMMUNICATION LINE
152	P	CAN COMMUNICATION LINE
154	W	POWER SUPPLY FOR ECM (BACK-UP)
155	W	POWER SUPPLY FOR ECM (BACK-UP)
158	P	STOP LAMP SWITCH
161	Y	ENG COMMUNICATION LINE
163	W	ENG COMMUNICATION LINE
163	W	ECM RELAY (SELF SHUT-OFF)
166	BG	ENG COMMUNICATION LINE
169	V	ENGINE SPEED SIGNAL OUTPUT
171	S8	POWER SUPPLY FOR ECM
172	S8	POWER SUPPLY FOR ECM
173	R	THROTTLE CONTROL MOTOR POWER SUPPLY
174	B	ECM GROUND
175	B	ECM GROUND

JRGWC2756GB



# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000012356037

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.

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# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### POWER SUPPLY AND GROUND CIRCUIT

#### Description

INFOID:0000000012356038

Power supply to EPS system.

#### Diagnosis Procedure

INFOID:0000000012356039

#### 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-61, "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.

# 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.

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STC

# POWER STEERING SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

## POWER STEERING SOLENOID VALVE

### Component Function Check

INFOID:000000012356040

#### 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-20, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000012356041

#### 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-21, "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-42, "2WD : Disassembly and Assembly"](#) (2WD), [ST-52, "AWD : Disassembly and Assembly"](#) (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:000000012356042

### 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-42](#), "[2WD : Disassembly and Assembly](#)" (2WD), [ST-52](#), "[AWD : Disassembly and Assembly](#)" (AWD).

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STC

# ENGINE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## ENGINE SPEED SIGNAL CIRCUIT

### Diagnosis Procedure

INFOID:000000012356043

#### 1. PERFORM ECM SELF-DIAGNOSIS

##### With CONSULT

Perform self-diagnosis for "ENGINE".

##### Is any error system detected?

- YES >> Check the DTC.
- VQ37VHR FOR USA AND CANADA: Refer to [EC-116, "DTC Index"](#).
  - VQ37VHR FOR MEXICO: Refer to [EC-640, "DTC Index"](#).
  - VK56VD FOR USA AND CANADA: Refer to [EC-1079, "DTC Index"](#).
  - VK56VD FOR MEXICO: Refer to [EC-1663, "DTC Index"](#).
- 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 <sup>*1</sup>	110 <sup>*1</sup>	Existed
		M160 <sup>*2</sup>	169 <sup>*2</sup>	

\*1: VQ37VHR

\*2: VK56VD

##### Is the inspection result normal?

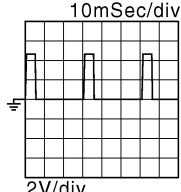
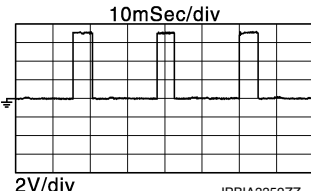
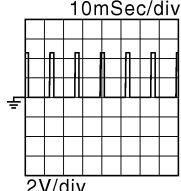
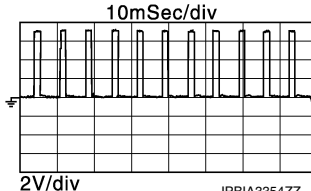
- YES >> GO TO 3.  
NO >> Repair or replace damaged parts.

#### 3. CHECK ENGINE SPEED SIGNAL (ECM)

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

# 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 
			Engine speed: Approx. 2,000 rpm (Warm-up condition)	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.

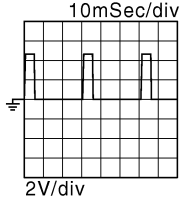
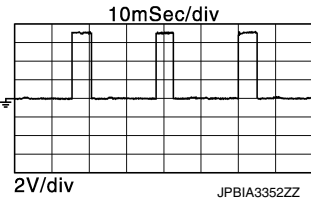
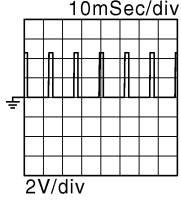
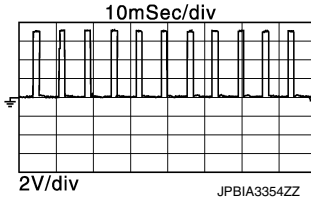
- VQ37VHR FOR USA AND CANADA: Refer to [EC-165, "Description"](#).
- VQ37VHR FOR MEXICO: Refer to [EC-686, "Description"](#).
- VK56VD FOR USA AND CANADA: Refer to [EC-1138, "Description"](#).
- VK56VD FOR MEXICO: Refer to [EC-1720, "Description"](#).

## 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 
			Engine speed: Approx. 2,000 rpm (Warm-up condition)	VK56VD 
				VQ37VHR 
				VK56VD 

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace power steering control unit. Refer to [STC-28, "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:000000012356044

#### 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-46, "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)

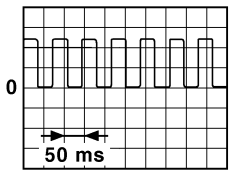
1. Connect combination meter harness connector.
2. Check the combination meter input/output standard values. Refer to [MWI-37, "Reference Value"](#).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace combination meter. Refer to [MWI-95, "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) <b>CAUTION:</b> Check the air pressure of tire under standard condition.	

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace power steering control unit. Refer to [STC-28, "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

A  
B  
C  
D  
E  
F  
H  
I  
J  
K  
L  
M  
N  
O  
P

STC

## VEHICLE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

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NO >> Repair or replace damaged parts.

# UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

#### Description

INFOID:0000000012356045

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

#### Diagnosis Procedure

INFOID:0000000012356046

#### 1. CHECK SYSTEM FOR POWER SUPPLY AND GROUND

Perform trouble diagnosis for power supply and ground. Refer to [STC-18, "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-25, "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-22, "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-20, "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 >

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## REMOVAL AND INSTALLATION

### POWER STEERING CONTROL UNIT

#### Removal and Installation

INFOID:000000012356047

#### 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.