# SECTION STC
# STEERING CONTROL SYSTEM

## CONTENTS

# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORK FLOW

### Work Flow

INFOID:0000000010580110

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-12, "Inspection".
2. Check the drive belt tension. Refer to EM-15, "Checking" (VQ37VHR), EM-173, "Checking" (VK50VE).
3. Check the power steering gear for damages, cracks and fluid leakage. Refer to ST-34, "Inspection".
4. Check the relief oil pressure. Refer to ST-40, "VQ37VHR : Inspection" (VQ37VHR), ST-46, "VK50VE : Inspection" (VK50VE).

>> GO TO 3.

#### 3.DIAGNOSIS CHART BY SYMPTOM

Perform the diagnosis by symptom. Refer to STC-22, "Diagnosis Procedure".

>> 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.

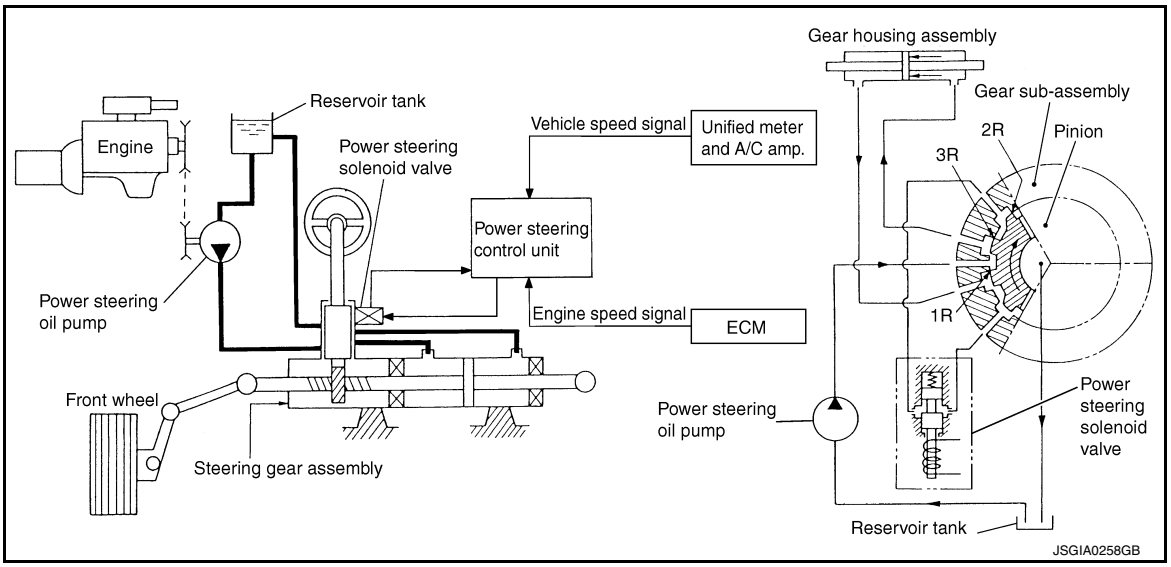
# SYSTEM DESCRIPTION

## EPS SYSTEM

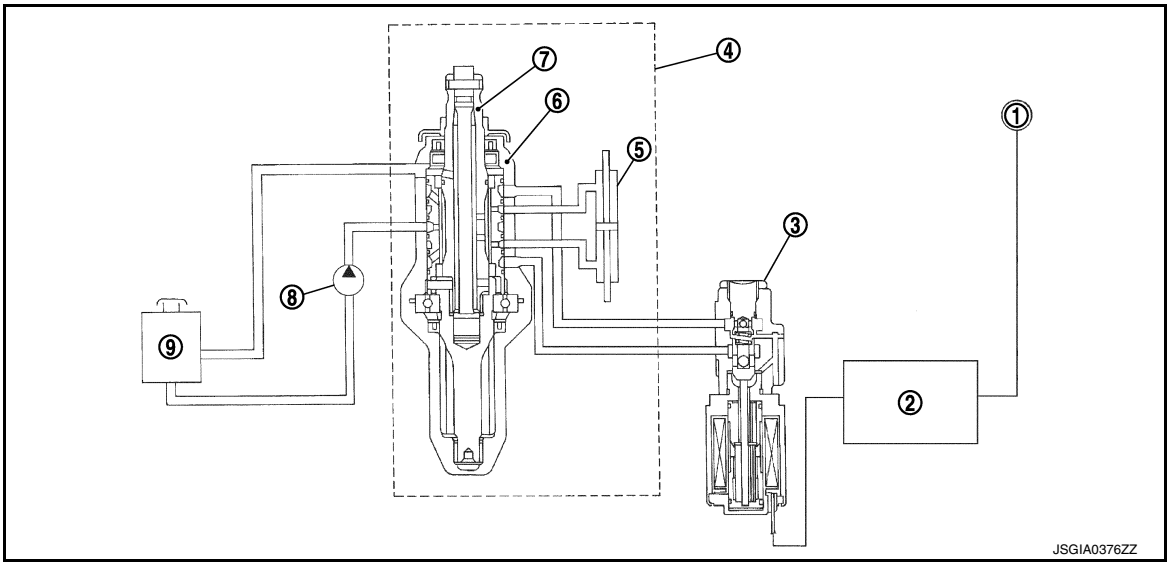
### System Diagram

INFOID:0000000010580111

#### CONTROL DIAGRAM




#### CROSS-SECTIONAL VIEW



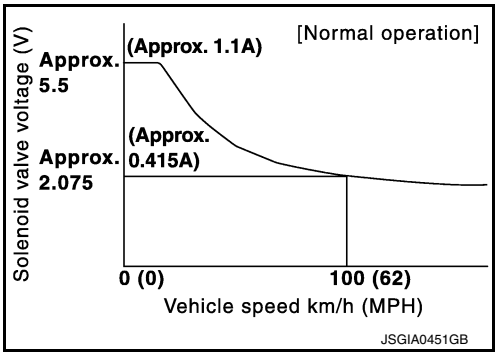

| | | | | | |
|---|---|---|---|---|---|
| 1. | Unified meter and A/C amp. | 2. | Power steering control unit | 3. | Power steering solenoid valve |
| 4. | Steering gear assembly | 5. | Gear housing assembly | 6. | Gear sub-assembly |
| 7. | Pinion | 8. | Power steering oil pump | 9. | Reservoir tank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

### System Description

INFOID:0000000010580112

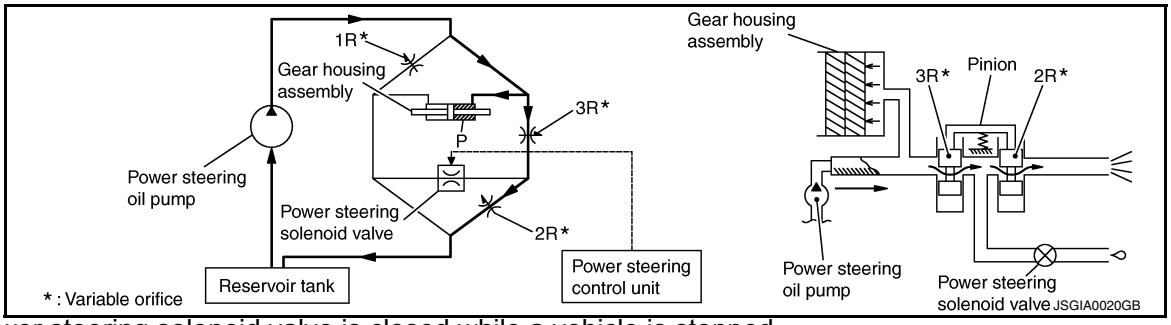
- The EPS system controls the power steering solenoid valve through the power steering control unit.

- The valve driving voltage to control the power steering solenoid valve varies according to the vehicle speed.



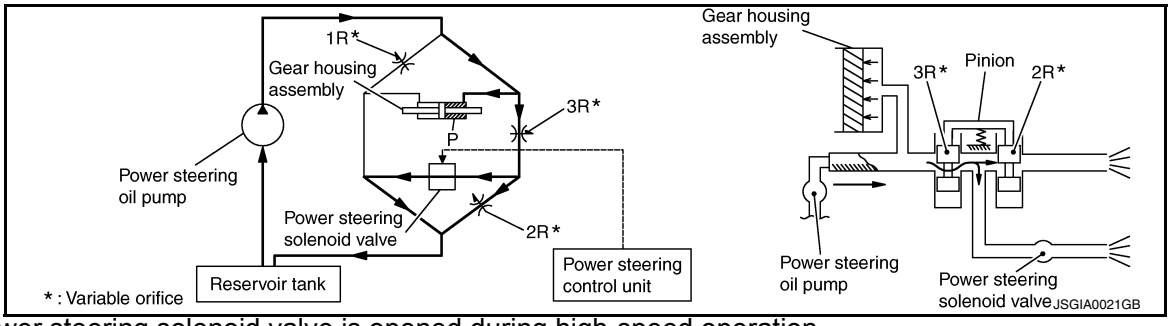

## OPERATION PRINCIPLE

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.

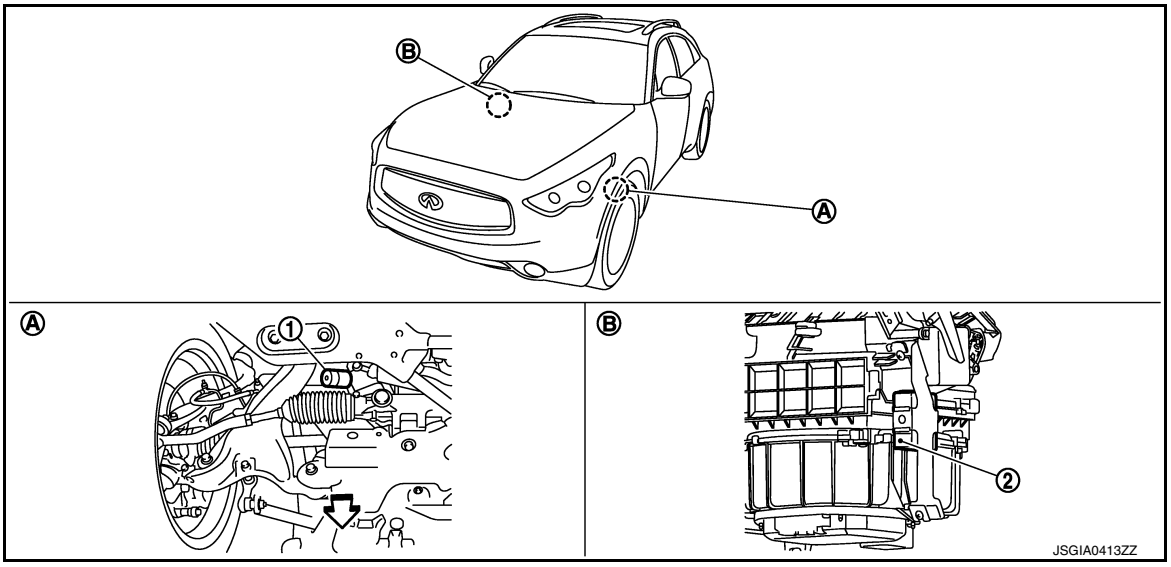
During High-speed Operation




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.

## Component Parts Location

INFOID:0000000010580113




1. Power steering solenoid valve
2. Power steering control unit

A. Steering gear assembly
B. Glove box assembly removed

⇦: Vehicle front

## Component Description

INFOID:0000000010580114

| Component parts | Reference/Function |
|---|---|
| Power steering control unit | • Signals from various sensors control the driving voltage to the power steering solenoid valve.<br>• The power steering control unit controls the driving voltage to the 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.) |
| Unified meter and A/C amp. | STC-12, "Description" |
| ECM | STC-9, "Description" |
| Power steering solenoid valve | STC-7, "Description" |

# DTC/CIRCUIT DIAGNOSIS

## POWER SUPPLY AND GROUND CIRCUIT

### Description

INFOID:0000000010580115

Power supply to EPS system

### Diagnosis Procedure

INFOID:0000000010580116

#### 1.CHECK POWER SUPPLY

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

| Power steering control unit | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| M108 | 3 | Ground | 0 V |

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

| Power steering control unit | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| M108 | 3 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the following. If any items are damaged, repair or replace damaged parts.
- 10A fuses (#45) open
- Harness for short or open between ignition switch and power steering control unit harness connector No. 3 terminal.
- Ignition switch.

#### 2.CHECK GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to power in harness or connectors.

#### 3.CHECK TERMINALS AND HARNESS CONNECTORS

Check 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

## Description

INFOID:0000000010580117

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

## Diagnosis Procedure

INFOID:0000000010580118

### 1. CHECK POWER STEERING SOLENOID VALVE SIGNAL

Check 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 2.
NO >> GO TO 4.

### 2. CHECK HARNESS BETWEEN POWER STEERING SOLENOID VALVE AND POWER STEERING CONTROL UNIT

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 | |
| F45 | 1 | M108 | 1 | Existed |
| | 2 | | 5 | Existed |

5. Check 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 damaged parts.

### 3. CHECK POWER STEERING SOLENOID VALVE

Check power steering solenoid valve. Refer to STC-8, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace gear-sub assembly. Refer to ST-26, "Exploded View".

### 4. CHECK TERMINALS AND HARNESS CONNECTORS

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

## Component Inspection

INFOID:0000000010580119

### 1. CHECK POWER STEERING SOLENOID VALVE

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

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

4. Check power steering solenoid valve by listening for its operation sound while applying battery voltage to power steering solenoid valve connector F45 terminals 1 (positive) and 2 (negative).

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace gear-sub assembly. Refer to ST-26, "Exploded View".

# ENGINE SPEED SIGNAL CIRCUIT

## Description

INFOID:0000000010580120

ECM sends engine speed signal to power steering control unit.

## Diagnosis Procedure

INFOID:0000000010580121

### 1. PERFORM ECM SELF-DIAGNOSIS

**With CONSULT**

1. Turn the ignition switch ON.
2. Perform “ENGINE” self-diagnosis. Refer to EC-157, "CONSULT Function" (VQ37VHR FOR USA AND CANADA), EC-750, "CONSULT Function" (VQ37VHR FOR MEXICO), EC-1264, "CONSULT Function" (VK50VE).

Is any DTC detected?

YES >> Check the DTC.
NO >> GO TO 2.

### 2. CHECK HARNESS BETWEEN ECM AND POWER STEERING CONTROL UNIT

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

| ECM | | Power steering control unit | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M164 (VQ37VHR) | 110 | M108 | 10 | Existed |
| M160 (VK50VE) | 97 | | | |

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

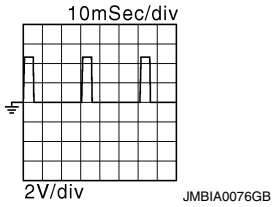
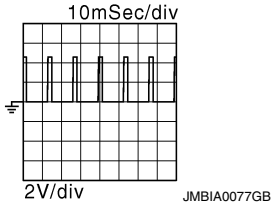
| Power steering control unit | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M108 | 10 | Ground | Not existed |

Is the inspection result normal?

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

### 3. CHECK ENGINE SPEED SIGNAL (1)

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

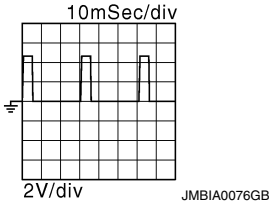
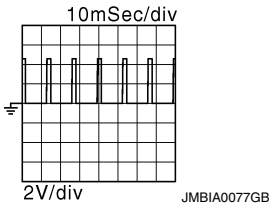
| ECM | | — | Condition | Voltage (Approx.) |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M164 (VQ37VHR)<br>M160 (VK50VE) | 110 (VQ37VHR)<br>97 (VK50VE) | Ground | Engine is running<br>• Warm-up condition<br>• Idle speed |  |
| | | | Engine is running<br>• Warm-up condition<br>• Engine speed: Approx. 2,000 rpm |  |

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace ECM. Refer to EC-29, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT (ECM) : Description" (VQ37VHR FOR USA AND CANADA), EC-639, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT (ECM) : Description" (VQ37VHR FOR MEXICO), EC-1133, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT (ECM) : Description" (VK50VE).

## 4. CHECK ENGINE SPEED SIGNAL (2)

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

| Power steering control unit | | — | Condition | Voltage (Approx.) |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M108 | 10 | Ground | Engine is running<br>• Warm-up condition<br>• Idle speed |  |
| | | | Engine is running<br>• Warm-up condition<br>• Engine speed: Approx. 2,000 rpm |  |

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace power steering control unit. Refer to STC-24, "Removal and Installation".

## 5. CHECK TERMINALS AND HARNESS CONNECTORS

- Check 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

## Description

INFOID:0000000010580122

Unified meter and A/C amp. sends vehicle speed signal to power steering control unit.

## Diagnosis Procedure

INFOID:0000000010580123

### 1. PERFORM UNIFIED METER AND A/C AMP. SELF-DIAGNOSIS

**With CONSULT**

1. Turn the ignition switch ON.
2. Perform “METER/M&A” self-diagnosis. Refer to MWI-45, "CONSULT Function (METER/M&A)".

Is any DTC detected?

YES >> Check the DTC.
NO >> GO TO 2.

### 2. CHECK HARNESS BETWEEN UNIFIED METER AND A/C AMP. AND POWER STEERING CONTROL UNIT

1. Turn the ignition switch OFF.
2. Disconnect unified meter and A/C amp. harness connector.
3. Disconnect power steering control unit harness connector.
4. Check continuity between unified meter and A/C amp. harness connector and power steering control unit harness connector.

| Unified meter and A/C amp. | | Power steering control unit | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M66 | 8 | M108 | 8 | Existed |

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

| Power steering control unit | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M108 | 8 | Ground | Not existed |

Is the inspection result normal?

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

### 3. CHECK VEHICLE SPEED SIGNAL (1)

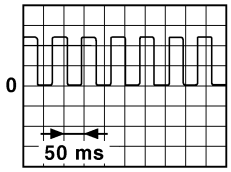
1. Connect unified meter and A/C amp. harness connector.
2. Check unified meter and A/C amp. input/output standard values. Refer to MWI-96, "Reference Value".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace unified meter and A/C amp. Refer to MWI-144, "Exploded View".

### 4. CHECK VEHICLE SPEED SIGNAL (2)

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

| Power steering control unit | | — | Condition | Voltage (Approx.) |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M108 | 8 | Ground | Vehicle speed: 40 km/h (25 MPH)<br>**CAUTION:**<br>**Check air pressure of tire under standard condition.** | **NOTE:**<br>The maximum voltage varies depending on the specification (destination unit).<br>  <br>JSNIA0015GB |

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace power steering control unit. Refer to STC-24, "Removal and Installation".

## 5. CHECK TERMINALS AND HARNESS CONNECTORS

- Check power steering control unit pin terminals for damage or loose connection with harness connector.
- Check unified meter and A/C amp. pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace damaged parts.

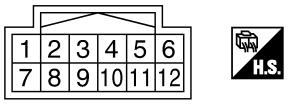
# ECU DIAGNOSIS INFORMATION

## POWER STEERING CONTROL UNIT

### Reference Value

INFOID:0000000010580124

#### TERMINAL LAYOUT

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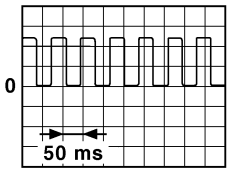
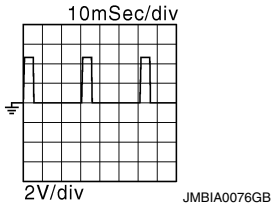
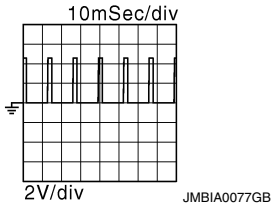
#### PHYSICAL VALUES

| Terminal No. (Wire color) | | 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) | 2.4 – 3.6 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 (L) | Ground | Vehicle speed signal | Input | Vehicle speed: 40 km/h (25 MPH)<br>**CAUTION:**<br>**Check air pressure of tire under standard condition.** | **NOTE:**<br>The maximum voltage varies depending on the specification (destination unit).<br>  <br><br>JSNIA0015GB |

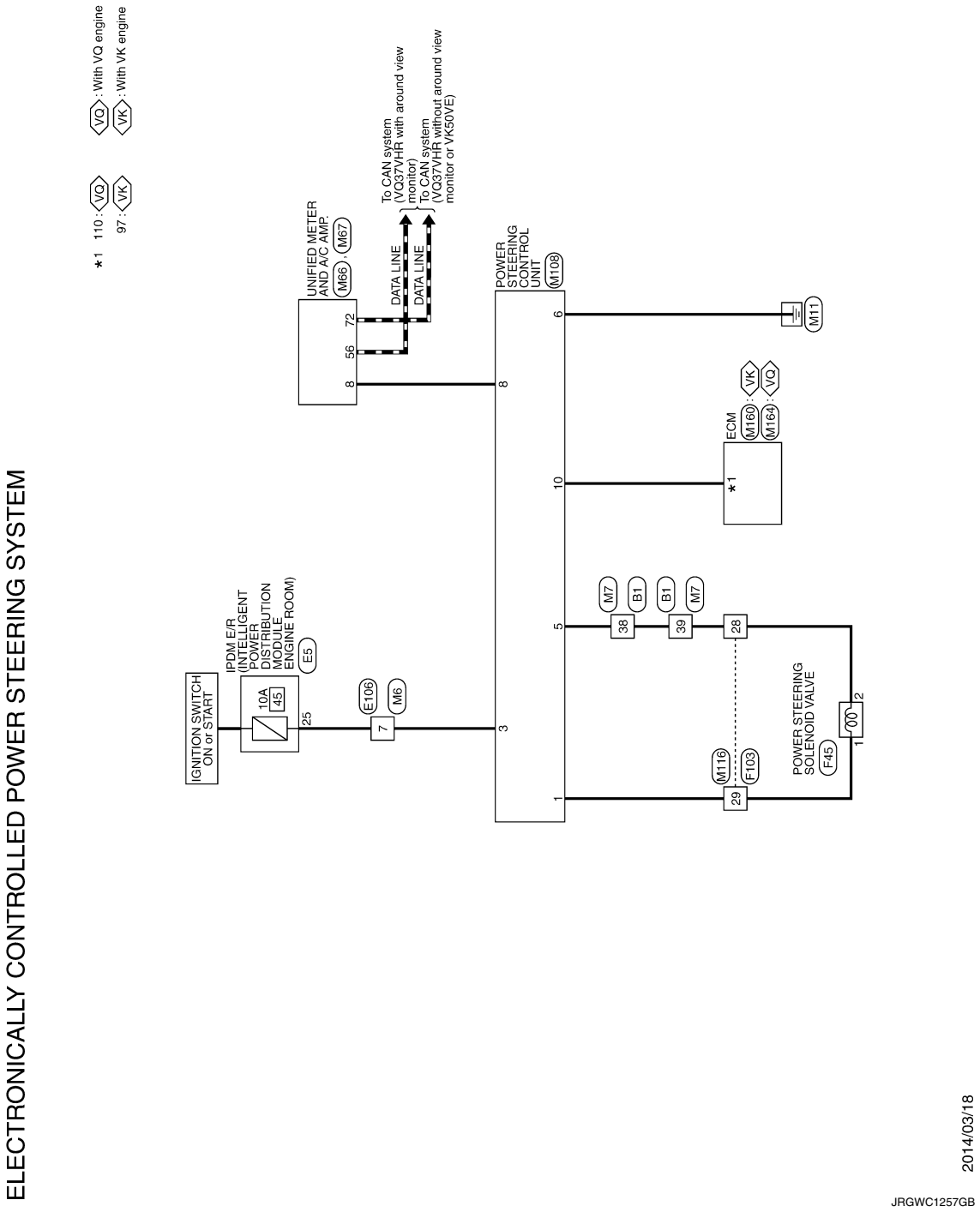
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | - | Signal name | Input/ Output | | |
| 10 (R) | Ground | Engine speed signal | Input | Engine is running<br>• Warm-up condition<br>• Idle speed |  |
| | | | | Engine is running<br>• Warm-up condition<br>• Engine speed: Approx. 2,000 rpm |  |

**CAUTION:**

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

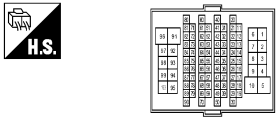
# Wiring Diagram - ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM -

INFOID:0000000010580125



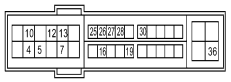
## ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

| | |
|---|---|
| Connector No. | B1 |
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80FW-CS16-TM4 |



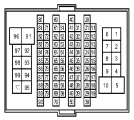
| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G | - |
| 2 | L | - |
| 3 | W | - |
| 6 | G | - |
| 7 | P | - |
| 8 | BG | - |
| 10 | SB | - |
| 11 | SB | - |
| 12 | B | - |
| 13 | G | - |
| 14 | R | - |
| 15 | W | - |
| 16 | SHIELD | - |
| 17 | L | - |
| 18 | P | - |
| 19 | G | - |
| 20 | Y | - |
| 21 | W | - |
| 23 | V | - |
| 24 | P | - |
| 25 | BR | - |
| 26 | GR | - |
| 27 | BG | - |
| 28 | W | - |
| 38 | B | - |
| 39 | B | - |
| 43 | SB | - |
| 44 | V | - |
| 45 | GR | - |
| 51 | V | - |
| 52 | SB | - |
| 53 | SHIELD | - |
| 54 | BR | - |
| 55 | Y | - |
| 56 | SHIELD | - |
| 57 | P | - |
| 58 | L | - |
| 59 | SHIELD | - |
| 60 | L | - |
| 61 | P | - |
| 62 | GR | - |
| 63 | G | - |
| 64 | BG | - |
| 65 | W | - |
| 66 | V | - |
| 67 | LG | - |
| 68 | Y | - |
| 69 | G | - |
| 70 | GR | - |
| 71 | G | - |
| 72 | B | - |
| 73 | W | - |
| 74 | V | - |
| 75 | BG | - |
| 76 | LG | - |
| 77 | L | - |
| 78 | GR | - |
| 79 | W | - |
| 80 | L | - |
| 81 | P | - |
| 82 | L | - |
| 83 | P | - |
| 84 | SB | - |
| 85 | R | - |
| 86 | Y | - |
| 87 | B | - |
| 88 | G | - |
| 89 | BR | - |
| 91 | R | - |
| 92 | BG | - |
| 93 | BR | - |
| 94 | V | - |
| 96 | BG | - |
| 97 | W | - |
| 98 | GR | - |
| 99 | W | - |

| | |
|---|---|
| Connector No. | E5 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Type | TH20FW-CS12-M4-1V |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 4 | V | - |
| 5 | L | - |
| 7 | R | - |
| 10 | SB | - |
| 12 | B | - |
| 13 | Y | - |
| 16 | LG | - |
| 19 | W | - |
| 25 | G | - |
| 26 | R | - |
| 27 | Y | - |
| 28 | BG | - |
| 30 | GR | - |
| 36 | G | - |

| | |
|---|---|
| Connector No. | E106 |
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80FW-CS16-TM4 |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G | - |
| 2 | BG | - |
| 3 | SB | - |
| 4 | LG | - |
| 5 | Y | - |
| 6 | W | - |
| 7 | G | - |
| 8 | V | - |
| 9 | R | - |
| 10 | BR | - |
| 11 | B | - |
| 12 | G | - |
| 13 | R | - |
| 14 | W | - |
| 15 | SHIELD | - |
| 16 | SB | - |
| 17 | L | - |
| 18 | P | - |
| 19 | G | - |
| 20 | W | - [With ICC] |
| 20 | Y | - [Without ICC] |
| 21 | BR | - |
| 22 | R | - [With ICC] |
| 22 | V | - [Without ICC] |
| 23 | G | - |
| 24 | L | - [With ICC] |
| 24 | P | - [Without ICC] |
| 25 | L | - [Without ICC] |
| 25 | Y | - [With ICC] |
| 26 | SHIELD | - |
| 28 | G | - |
| 29 | LG | - |
| 30 | BG | - |
| 32 | W | - |
| 33 | Y | - |
| 34 | BG | - |
| 37 | Y | - |
| 38 | GR | - |
| 39 | LG | - |
| 41 | LG | - |
| 42 | V | - |
| 43 | R | - |
| 44 | G | - |
| 45 | GR | - |
| 46 | W | - |
| 47 | L | - |
| 48 | P | - |
| 49 | SB | - |
| 50 | BR | - |
| 51 | B | - |
| 52 | Y | - |
| 53 | BG | - |
| 54 | R | - |
| 55 | SB | - |

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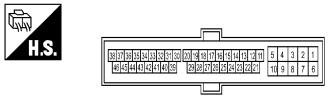
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

| | | |
|---|---|---|
| 59 | P | - |
| 60 | SB | - |
| 61 | V | - |
| 62 | P | - |
| 63 | LG | - |
| 64 | L | - |
| 65 | BG | - |
| 69 | L | - |
| 70 | SHIELD | - |
| 71 | G | - |
| 72 | G | - |
| 73 | R | - |
| 74 | BR | - |
| 76 | L | - |
| 77 | W | - |
| 78 | Y | - |
| 80 | SB | - |
| 81 | L | - |
| 82 | W | - |
| 83 | LG | - |
| 84 | GR | - |
| 85 | G | - |
| 86 | P | - |
| 87 | W | - |
| 88 | BG | - |
| 89 | LG | - |
| 90 | BR | - |
| 91 | GR | - |
| 92 | BR | - |
| 93 | SB | - |
| 95 | Y | - |
| 96 | W | - |
| 97 | W | - |
| 98 | SHIELD | - |
| 100 | Y | - |

| | |
|---|---|
| Connector No. | F45 |
| Connector Name | POWER STEERING SOLENOID VALVE |
| Connector Type | RS02FBR-DGY |

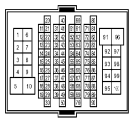
| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | LG | - |
| 2 | B | - |

| | |
|---|---|
| Connector No. | F103 |
| Connector Name | WIRE TO WIRE |
| Connector Type | TK36FW-NS10 |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 2 | G | - |
| 3 | W | - |
| 4 | GR | - [With VK engine] |
| 4 | R | - [With VQ engine] |
| 5 | B | - [With VQ engine] |
| 5 | R | - [With VK engine] |
| 7 | B | - |
| 9 | W | - [With VK engine] |
| 9 | Y | - [With VQ engine] |
| 10 | GR | - [With VQ engine] |
| 10 | L | - [With VK engine] |
| 19 | O | - |
| 20 | Y | - |
| 27 | L | - |
| 28 | B | - |
| 29 | LG | - |
| 31 | R | - |
| 34 | LG | - |
| 35 | BR | - |
| 36 | W | - |
| 37 | Y | - |
| 38 | Y | - |
| 43 | P | - |
| 44 | L | - |
| 45 | Y | - |
| 46 | V | - |

| | |
|---|---|
| Connector No. | M6 |
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-CS16-TM4 |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G | - |
| 2 | BG | - |
| 3 | LG | - [Without Auto aircon seat] |
| 3 | SB | - [With Auto aircon seat] |
| 4 | LG | - |
| 5 | GR | - |
| 6 | W | - |
| 7 | G | - |
| 8 | W | - |
| 9 | P | - |
| 10 | BR | - |
| 11 | B | - |
| 12 | G | - |
| 13 | R | - |
| 14 | W | - |
| 15 | SHIELD | - |
| 16 | BR | - |
| 17 | L | - |
| 18 | P | - |
| 19 | G | - |
| 20 | GR | - [Without ICC] |
| 20 | W | - [With ICC] |
| 21 | BR | - [With ICC] |
| 21 | R | - [Without ICC] |
| 22 | L | - [Without ICC] |
| 22 | R | - [With ICC] |
| 23 | G | - |
| 24 | L | - [With ICC] |
| 24 | P | - [Without ICC] |
| 25 | W | - [Without ICC] |
| 25 | Y | - [With ICC] |
| 26 | SHIELD | - |
| 28 | GR | - |
| 29 | V | - |
| 30 | BG | - |
| 32 | W | - |
| 33 | Y | - |
| 34 | L | - |
| 37 | G | - |
| 38 | R | - |
| 39 | G | - |
| 41 | L | - |
| 42 | W | - |
| 43 | R | - |
| 44 | LG | - |
| 45 | GR | - |
| 46 | W | - |
| 47 | L | - |
| 48 | P | - |
| 49 | BG | - |
| 50 | LG | - |
| 51 | SB | - |
| 52 | Y | - |
| 53 | BG | - |
| 54 | BR | - |
| 55 | SB | - |
| 59 | SB | - |
| 60 | SB | - |
| 61 | V | - |
| 62 | P | - |
| 63 | R | - |
| 64 | L | - |
| 65 | BG | - |
| 69 | V | - |
| 70 | SHIELD | - |
| 71 | BG | - |
| 72 | GR | - |
| 73 | W | - |
| 74 | SB | - |
| 76 | V | - |
| 77 | V | - |
| 78 | Y | - |
| 80 | BG | - |
| 81 | L | - |
| 82 | W | - |
| 83 | Y | - |

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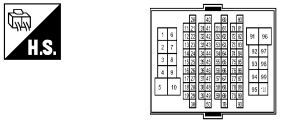
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

| | | |
|---|---|---|
| 84 | L | - |
| 85 | P | - |
| 86 | BR | - |
| 87 | P | - |
| 88 | V | - |
| 89 | G | - |
| 90 | P | - |
| 91 | R | - |
| 92 | R | - |
| 93 | GR | - |
| 95 | G | - |
| 96 | W | - |
| 97 | W | - |
| 98 | SHIELD | - |
| 100 | Y | - |

| | |
|---|---|
| Connector No. | M7 |
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-CS16-TM4 |

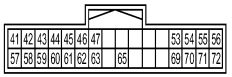


| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G | - [With Auto aircon seat] |
| 1 | Y | - [Without Auto aircon seat] |
| 2 | B | - |
| 3 | W | - |
| 6 | P | - |
| 7 | V | - |
| 8 | BG | - |
| 10 | W | - |
| 11 | BG | - |
| 12 | B | - |
| 13 | G | - |
| 14 | R | - |
| 15 | W | - |
| 16 | SHIELD | - |
| 17 | L | - |
| 18 | P | - |
| 19 | G | - |
| 20 | R | - |
| 21 | LG | - |
| 23 | V | - |
| 24 | P | - |
| 25 | BR | - |
| 26 | GR | - |
| 27 | BG | - |
| 28 | W | - |
| 38 | B | - |
| 39 | B | - |
| 43 | SB | - |
| 44 | W | - |
| 45 | B | - |
| 51 | V | - |
| 52 | LG | - |
| 53 | SHIELD | - |
| 54 | BR | - |
| 55 | Y | - |
| 56 | SHIELD | - |
| 57 | P | - |
| 58 | L | - |
| 59 | SHIELD | - |
| 60 | L | - |
| 61 | BR | - |
| 62 | R | - |
| 63 | Y | - |
| 64 | L | - |
| 65 | W | - |
| 66 | V | - |
| 67 | LG | - |
| 68 | Y | - |
| 69 | G | - |
| 70 | V | - |
| 71 | W | - |
| 72 | B | - |
| 73 | W | - |
| 74 | LG | - |
| 75 | P | - |
| 76 | LG | - |
| 77 | SB | - |
| 78 | GR | - |
| 79 | R | - |
| 80 | L | - |
| 81 | P | - |
| 82 | L | - |
| 83 | P | - |
| 84 | SB | - |
| 85 | W | - |
| 86 | Y | - |
| 87 | B | - |
| 88 | G | - |
| 89 | BG | - |
| 91 | R | - |
| 92 | BG | - |
| 93 | BR | - |
| 94 | V | - |
| 96 | BG | - |
| 97 | W | - |
| 98 | R | - |
| 99 | BG | - |

| | |
|---|---|
| Connector No. | M66 |
| Connector Name | UNIFIED METER AND A/C AMP. |
| Connector Type | TH40FW-NH |

| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | L | MANUAL MODE SHIFT UP SIGNAL |
| 6 | BG | PADDLE SHIFTER UP SIGNAL |
| 7 | GR | COMMUNICATION SIGNAL (AMP.->METER) |
| 8 | L | VEHICLE SPEED SIGNAL (2-PULSE) |
| 9 | SB | SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE) |
| 10 | W | MANUAL MODE SIGNAL |
| 11 | G | NON-MANUAL MODE SIGNAL |
| 14 | BR | COMMUNICATION SIGNAL (LCD->AMP.) |
| 20 | L | ION SENSOR SIGNAL |
| 23 | Y | AT SNOW SWITCH SIGNAL |
| 25 | V | MANUAL MODE SHIFT DOWN SIGNAL |
| 26 | G | PADDLE SHIFTER DOWN SIGNAL |
| 27 | LG | COMMUNICATION SIGNAL (METER->AMP.) |
| 28 | R | VEHICLE SPEED SIGNAL (8-PULSE) |
| 30 | V | PARKING BRAKE SWITCH SIGNAL |
| 34 | Y | COMMUNICATION SIGNAL (AMP.->LCD) |
| 38 | L | BLOWER MOTOR CONTROL SIGNAL |

| | |
|---|---|
| Connector No. | M67 |
| Connector Name | UNIFIED METER AND A/C AMP. |
| Connector Type | TH32FW-NH |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 41 | V | ACC POWER SUPPLY |
| 42 | Y | FUEL LEVEL SENSOR SIGNAL |
| 43 | R | INTAKE SENSOR SIGNAL |
| 44 | LG | IN-VEHICLE SENSOR SIGNAL |
| 45 | P | AMBIENT SENSOR SIGNAL |
| 46 | BG | SUNLOAD SENSOR SIGNAL |
| 47 | V | GAS SENSOR SIGNAL |
| 53 | G | IGNITION POWER SUPPLY |
| 54 | BG | BATTERY POWER SUPPLY |
| 55 | B | GROUND |
| 56 | L | CAN-H |
| 57 | W | BRAKE FLUID LEVEL SWITCH SIGNAL |
| 58 | B | FUEL LEVEL SENSOR GROUND |
| 59 | GR | INTAKE SENSOR GROUND |
| 60 | L | IN-VEHICLE SENSOR GROUND |
| 61 | BR | AMBIENT SENSOR GROUND |
| 62 | SB | SUNLOAD SENSOR GROUND |
| 63 | R | ION MODE SIGNAL |
| 65 | BG | ECV SIGNAL |
| 69 | L | A/C LAN SIGNAL |
| 70 | R | EACH DOOR MOTOR POWER SUPPLY |
| 71 | B | GROUND |
| 72 | P | CAN-L |

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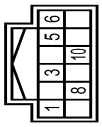
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

| Connector No. | M108 |
|---|---|
| Connector Name | POWER STEERING CONTROL UNIT |
| Connector Type | TH12FW-NH |

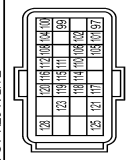


| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | LG | EPS SOL+ |
| 3 | G | IGN |
| 5 | B | EPS SOL- |
| 6 | B | GROUND |
| 8 | L | VEHICLE SPEED (2P) |
| 10 | R | ENG TACHO |

| Connector No. | M116 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TK36MW-NS10 |

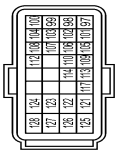
| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 2 | W | - |
| 3 | L | - |
| 4 | B | - [With VK engine] |
| 4 | R | - [With VQ engine] |
| 5 | B | - [With VQ engine] |
| 5 | R | - [With VK engine] |
| 7 | B | - |
| 9 | L | - [With VK engine] |
| 9 | R | - [With VQ engine] |
| 10 | R | - |
| 19 | BG | - |
| 20 | Y | - |
| 27 | L | - |
| 28 | B | - |
| 29 | LG | - |
| 31 | W | - |
| 34 | LG | - |
| 35 | BR | - |
| 36 | W | - |
| 37 | Y | - |
| 38 | BG | - |
| 43 | P | - |
| 44 | L | - |
| 45 | G | - |
| 46 | Y | - |

| Connector No. | M160 |
|---|---|
| Connector Name | ECM |
| Connector Type | RH24FGY-RZ8-R-LH-Z |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 97 | R | ENGINE SPEED SIGNAL OUTPUT |
| 99 | G | SENSOR POWER SUPPLY |
| 100 | L | SENSOR POWER SUPPLY |
| 101 | P | CAN COMMUNICATION LINE |
| 102 | SB | ASCD/ICC STEERING SWITCH |
| 104 | R | ACCELERATOR PEDAL POSITION SENSOR 1 |
| 105 | L | CAN COMMUNICATION LINE |
| 106 | L | IGNITON SWITCH |
| 108 | P | ACCELERATOR PEDAL POSITION SENSOR 2 |
| 110 | P | STOP LAMP SWITCH |
| 111 | V | SENSOR GROUND |
| 112 | LG | FUEL PUMP CONTROL MODULE (FPCM) CHECK |
| 114 | GR | DATA LINK CONNECTOR |
| 115 | GR | SENSOR GROUND |
| 116 | G | TRANSMISSION RANGE SWITCH |
| 117 | BR | ASCD/ICC BRAKE SWITCH |
| 118 | R | POWER SUPPLY FOR ECM (BACK-UP) |
| 119 | W | SENSOR GROUND |
| 120 | W | FUEL TANK TEMPERATURE SENSOR |
| 121 | GR | POWER SUPPLY FOR ECM |
| 123 | B | ECM GROUND |
| 125 | R | FUEL PUMP CONTROL MODULE (FPCM) |
| 128 | B | ECM GROUND |

| Connector No. | M164 |
|---|---|
| Connector Name | ECM |
| Connector Type | RH24FGY-RZ8-R-LH-Z |



| Terminal No. | Color Of Wire | Signal Name [Specification] |
|---|---|---|
| 97 | R | ACCELERATOR PEDAL POSITION SENSOR 1 |
| 98 | P | ACCELERATOR PEDAL POSITION SENSOR 2 [Without NAVI] |
| 98 | Y | ACCELERATOR PEDAL POSITION SENSOR 2 [With NAVI] |
| 99 | G | SENSOR POWER SUPPLY [With NAVI] |
| 99 | L | SENSOR POWER SUPPLY [Without NAVI] |
| 100 | W | SENSOR GROUND |
| 101 | SB | ASCD/ICC STEERING SWITCH |
| 102 | LG | EVAP CONTROL SYSTEM PRESSURE SENSOR |
| 103 | G | SENSOR POWER SUPPLY [Without NAVI] |
| 103 | L | SENSOR POWER SUPPLY [With NAVI] |
| 104 | BR | SENSOR GROUND [With NAVI] |
| 104 | GR | SENSOR GROUND [Without NAVI] |
| 105 | L | REFRIGERANT PRESSURE SENSOR |
| 106 | W | FUEL TANK TEMPERATURE SENSOR |
| 107 | BG | SENSOR POWER SUPPLY |
| 108 | V | SENSOR GROUND |
| 109 | G | PNP SIGNAL |
| 110 | R | ENGINE SPEED OUTPUT SIGNAL |
| 112 | V | SENSOR GROUND [With EVAP CONTROL SYSTEM PRESSURE SENSOR] |
| 112 | W | SENSOR GROUND [Without EVAP CONTROL SYSTEM PRESSURE SENSOR] |
| 113 | P | CAN COMMUNICATION LINE |
| 114 | L | CAN COMMUNICATION LINE |
| 117 | GR | DATA LINK CONNECTOR |
| 121 | LG | EVAP CANISTER VENT CONTROL VALVE |
| 122 | P | STOP LAMP SWITCH |
| 123 | B | ECM GROUND |
| 124 | B | ECM GROUND |
| 125 | GR | POWER SUPPLY FOR ECM |
| 126 | BR | ASCD/ICC BRAKE SWITCH |
| 127 | B | ECM GROUND |
| 128 | B | ECM GROUND |

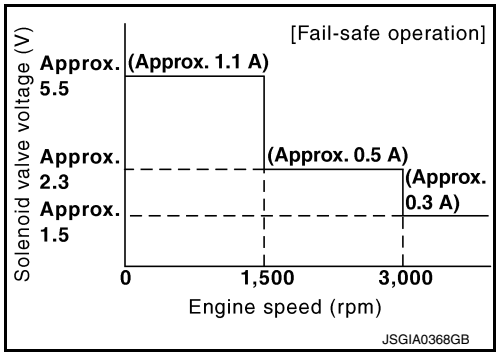
JRGWC1261GB

## Fail-Safe

*INFOID:0000000010580126*

EPS system

- EPS system enters the fail-safe mode (that allows the steering force to be controlled without impairing the drivability) if any of the input/output values to/from EPS system (power steering control unit) deviate from the standard range.
  **NOTE:**
  The system enters the fail-safe mode if the engine speed remains at 1,500 rpm or more for over 10 seconds while the vehicle is stopped. This is normal.
- The fail-safe function is canceled when a vehicle speed signal of 2 km/h (1.2 MPH) or more is inputted or the ignition switch is turned OFF→ON. EPS system restores the normal operation at that time.




| Mode | Warning lamp | DTC | Detection point (malfunction part) | Error area and root cause |
|---|---|---|---|---|
| Fail-safe | — | — | Vehicle speed signal input | • Engine speed is 1,500 rpm or more and there is no vehicle speed signal input for over 10 seconds during vehicle travel.<br>• 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. |

# SYMPTOM DIAGNOSIS

## UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

### Description

INFOID:0000000010580127

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

### Diagnosis Procedure

INFOID:0000000010580128

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

Perform trouble diagnosis for power supply and ground. Refer to STC-6, "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-12, "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-9, "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-7, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Perform the symptom diagnosis for the steering system. Refer to ST-3, "NVH Troubleshooting Chart".
NO >> Repair or replace damaged parts.

# PRECAUTION

## PRECAUTIONS

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

INFOID:0000000010580129

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.

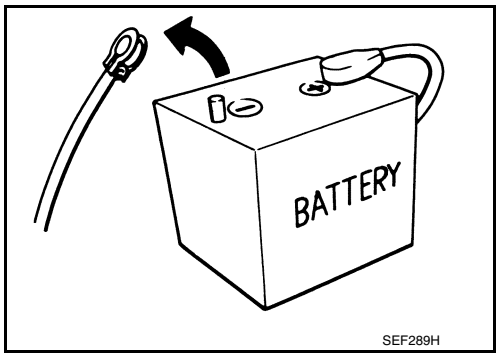
**WARNING:**
**Always observe the following items for preventing accidental activation.**
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized 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:0000000010715433




- 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.

# REMOVAL AND INSTALLATION

## POWER STEERING CONTROL UNIT

### Removal and Installation

INFOID:0000000010580130

REMOVAL

1. Remove instrument lower cover RH. Refer to IP-12, "Exploded View".
2. Remove instrument lower panel RH. Refer to IP-12, "Exploded View".
3. Remove power steering control unit.
4. Disconnect power steering control unit connector.

INSTALLATION

Install in the reverse order of removal.