

SECTION **STC**

STEERING CONTROL SYSTEM

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001716715

DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet.

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#).

Is there any DTC displayed?

YES >> GO TO 3.

NO >> GO TO 4.

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to [STC-28, "DTC Index"](#).

>> GO TO 6.

4.CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.

Is ON/OFF timing normal?

YES >> GO TO 5.

NO >> GO TO 2.

5.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 7.

7.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#).

Is no other DTC present and the repair completed?

YES >> INSPECTION END

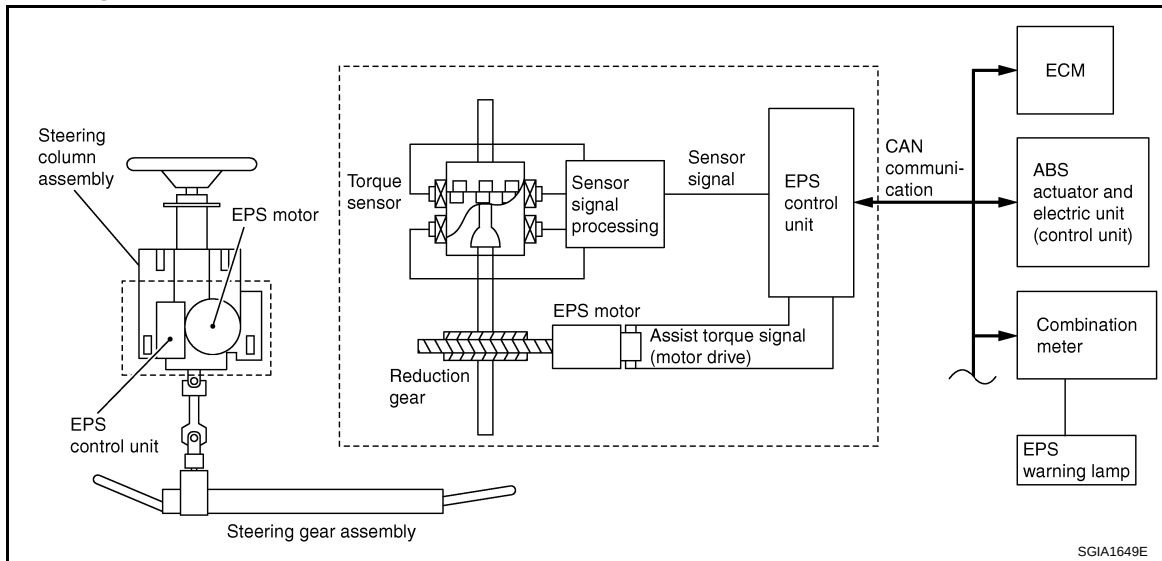
NO >> GO TO 3.

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FUNCTION DIAGNOSIS

EPS SYSTEM

System Diagram



System Description

INFOID:0000000001697714

EPS CONTROL UNIT

- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque to the EPS motor according to the driving condition.
- EPS control unit decreases the output to EPS motor while extremely using the power steering function (e.g., full steering) for protecting EPS motor and EPS control unit (Protect overload status). While activating protect overload status, the assist torque gradually decreases, and the steering wheel turning force becomes heavy. The normal assist torque reactivates by not steering.
- In case of an error in the electrical system, the fail-safe function stops output signals to the EPS motor. Then the previous state is changed to the manual steering state.
- Self-diagnosis can be done with CONSULT-III.

EPS MOTOR

EPS motor provides the assist torque by control signal from EPS control unit.

TORQUE SENSOR

Torque sensor detects the steering torque, and transmit the signal to EPS control unit.

REDUCTION GEAR

Reduction gear increases the assist torque provided from EPS motor with worm gears, and outputs to the column shaft.

EPS WARNING LAMP

Turns ON when there is a malfunction in EPS system. It indicates that fail-safe mode is engaged and enters a manual steering state (Control turning force steering wheel becomes heavy). Also turns ON when ignition switch is turned ON, for purpose of lamp check. Turns OFF after the engine starts if system is normal.

EPS Warning Lamp Indication

Condition	EPS warning lamp
Lamp check	Turns ON when ignition switch is turned ON. Turns OFF after engine start.

EPS SYSTEM

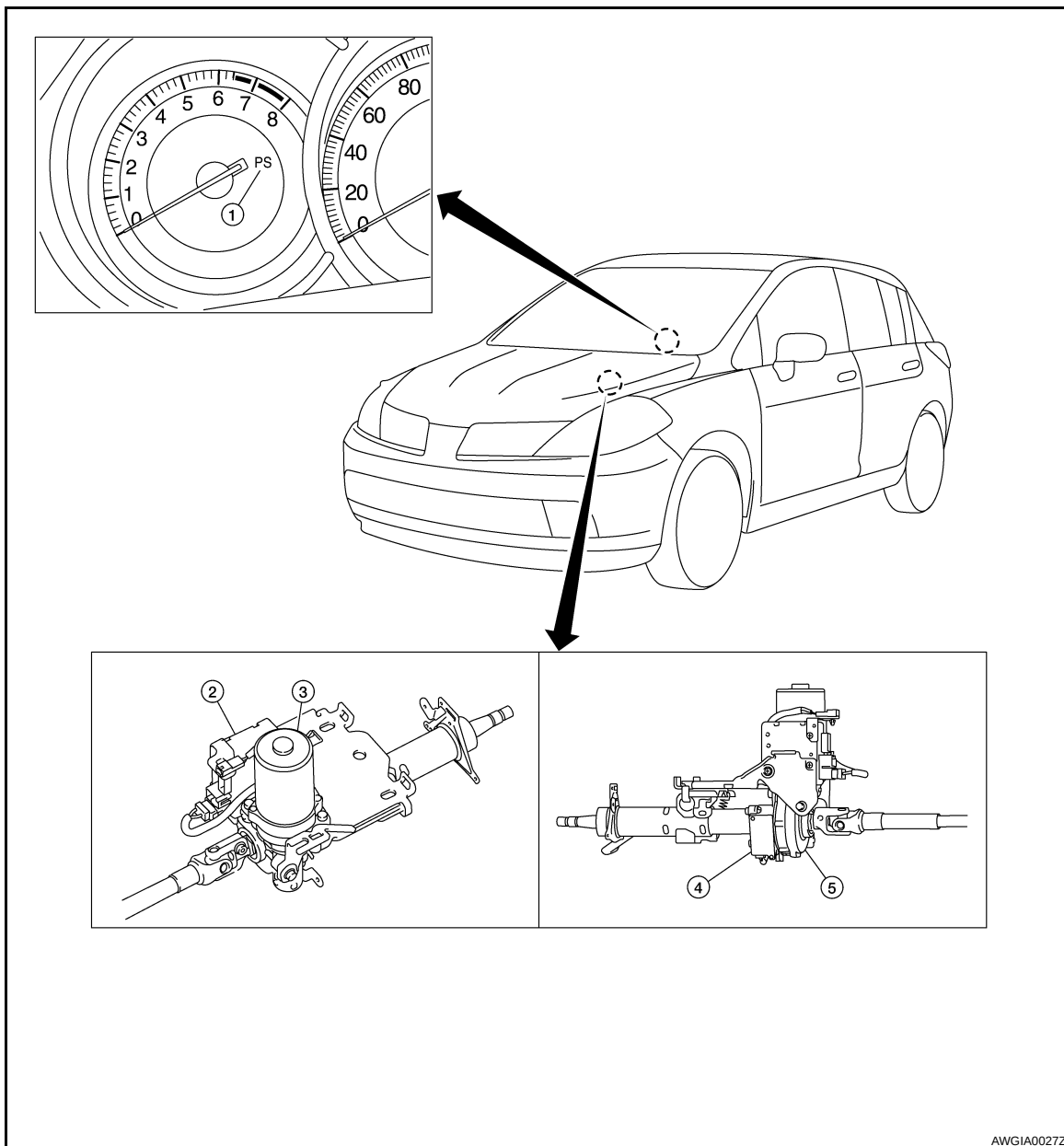
< FUNCTION DIAGNOSIS >

[EPS]

Condition	EPS warning lamp
EPS system malfunction	ON
Other than above (system normal)	OFF

Component Parts Location

INFOID:000000001697719



1. EPS warning lamp
4. Torque sensor

2. EPS control unit
5. Reduction gear

3. EPS motor

Component Description

INFOID:000000001716729

Component parts	Function
EPS control unit (Electric power steering control unit)	• Outputs optimum assist torque signal to EPS motor. • Reduces output signals to EPS motor and protects EPS motor and EPS control unit when using power steering continuously and excessively. • As a fail-safe function, turned off output signal to EPS motor and then enters a manual steering state, if malfunction is detected in EPS system.
EPS motor	Products assist torque by control signal from EPS control unit.
Torque sensor	Detects steering wheel turning force and outputs sensor signal to EPS control unit.
Reduction gear	Increases motor-produced assist torque by worm gear and transmits it to column shaft.
EPS warning lamp	Illuminates if malfunction is detected in electrical system of EPS system.
ECM	Transmits the following signals via CAN communication to EPS control unit. • Engine status signal
ABS actuator and electric unit (control unit)	Transmits the following signals via CAN communication to EPS control unit. • Vehicle speed signal
Combination meter	Transmits the following signals via CAN communication to EPS control unit. • Vehicle speed signal

CAN Communication

INFOID:000000001697716

SYSTEM DESCRIPTION

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

For details, refer to [LAN-30, "CAN System Specification Chart"](#).

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[EPS]

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

CONSULT-III Function (EPS)

INFOID:000000001697722

FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

EPS diagnostic mode	Description
SELF-DIAG RESULTS	• Displays EPS self-diagnosis results.
DATA MONITOR	• Displays EPS input/output data in real time.
CAN DIAG SUPPORT MNTR	• The result of transmit/receive diagnosis of CAN communication can be read.
ECU PART NUMBER	• EPS control unit part number can be read.

SELF-DIAG RESULTS MODE

Display Item List

Item (CONSULT-III screen terms)	Diagnostic item is detected when....	Check item
BATTERY VOLT [C1601]	When the power supply malfunction supplied to EPS control unit is detected.	STC-9
TORQUE SENSOR [C1604]	When the torque sensor malfunction assembled in steering column assembly is detected.	STC-11
EPS MOTOR [C1606]	When the motor driver malfunction of EPS control unit or EPS motor malfunction is detected.	STC-13
EEPROM [C1607]	When the memory (EEPROM) system malfunction is detected in EPS control unit.	STC-15
CONTROL UNIT [C1608]	When the internal malfunction is detected in EPS control unit.	STC-16
CAN VHCL SPEED [C1609]	When the malfunction is detected in vehicle speed signal received with CAN communication.	STC-17
CAN ENG RPM [C1610]	When the malfunction is detected in engine status signal received with CAN communication.	STC-19
CAN COMM CIRCUIT [U1000]	When EPS control unit is not transmitting or receiving CAN communication signal 2 seconds or more.	STC-21
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No NG item has been detected.	—

CAUTION:

If "CAN COMM CIRCUIT [U1000]" is displayed with other DTCs, first perform the trouble diagnosis for CAN communication line.

How to Erase Self-Diagnostic Results

1. Perform applicable inspection of malfunctioning item and then repair or replace.
2. Turn ignition switch "OFF" to erase memory.
3. Turn ignition switch "ON" and select "SELF-DIAG RESULTS" mode with CONSULT-III.
4. Touch "ERASE" on CONSULT-III screen to erase DTC memory.

CAUTION:

If memory cannot be erased, perform diagnosis.

DATA MONITOR

Display Item List

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[EPS]

Monitor item (Unit)	Remarks
MOTOR VOL (V)	Power supply voltage for EPS control unit is displayed
TORQUE SENSOR (Nm)	Steering wheel turning force detected by torque sensor is displayed
MOTOR SIG (A)	Current commanded value to EPS motor is displayed
MOTOR CURRENT (A)	Current value consumed by EPS motor is displayed
VEHICLE SPEED (km/h) or (mph)	Vehicle speed is displayed from vehicle speed signal with CAN communication
WARNING LAMP (ON/OFF)	EPS warning lamp control status is displayed
DERATING STAT (ON/OFF)	Protect overload status is displayed
ENGINE STATUS (STOP/RUN)	Engine speed is displayed from engine status signal with CAN communication

EPS CONTROL UNIT PART NUMBER

Display a part number of EPS control unit carried by a vehicle.

C1601 BATTERY POWER SUPPLY

< COMPONENT DIAGNOSIS >

[EPS]

COMPONENT DIAGNOSIS

C1601 BATTERY POWER SUPPLY

Description

INFOID:0000000001716732

Power is supplied from the battery to EPS control unit.

DTC Logic

INFOID:0000000001716733

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1601	BATTERY VOLT	When the power supply malfunction supplied to EPS control unit is detected.	• Harness or connector • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLT

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-9, "Diagnosis Procedure"](#).
NO >> INSPECTION END

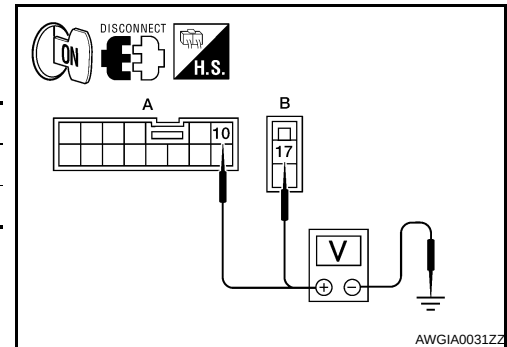
Diagnosis Procedure

INFOID:0000000001697724

1.CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between EPS control unit harness connector M53 (A) terminal 10 and M54 (B) terminal 17 and ground.

Connector	Terminal	Voltage
(A) M53	10 – Ground	Battery voltage
(B) M54	17 – Ground	Battery voltage



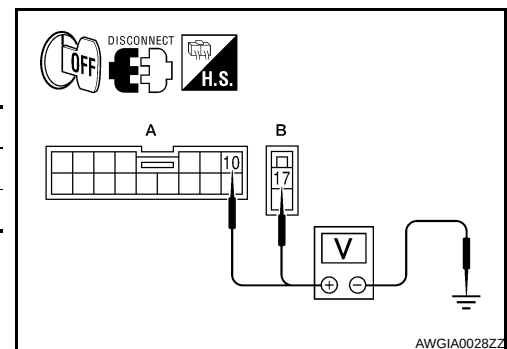
5. Turn ignition switch "OFF".
6. Check voltage between EPS control unit harness connector M53 (A) terminal 10 and M54 (B) terminal 17 and ground.

Connector	Terminal	Voltage
(A) M53	10 – Ground	Approx. 0 V
(B) M54	17 – Ground	Battery voltage

7. Connect EPS control unit harness connector.

OK or NG

- OK >> GO TO 2.



C1601 BATTERY POWER SUPPLY

[EPS]

< COMPONENT DIAGNOSIS >

- NG >> Check the following. If any items are damaged, repair or replace damaged parts.
- 60 A fusible link (letter **m**, located in the fuse and fusible link box).
 - 10 A fuse [No. 2, located in the fuse block (J/B)].
 - Harness for short or open between battery and EPS control unit harness connector M54 terminal 17.
 - Harness for short or open between ignition switch and EPS control unit harness connector M53 terminal 10.

2.CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check continuity between EPS control unit harness connector M54 terminal 18 and ground.

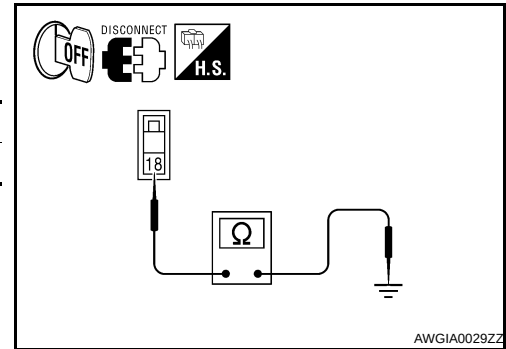
Connector	Terminal	Continuity
M54	18	Yes

Also check harness for short to power.

4. Connect EPS control unit harness connector.

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit, short to ground or short to power in harness or connectors.



3.CHECK DTC

1. Start engine.

Does EPS warning lamp turn OFF?

- YES >> **INSPECTION END**
- NO >> Perform self-diagnosis, repair or replace damaged parts. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#).

Special Repair Requirement (Models with ESP)

INFOID:0000000001716734

1.AJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

C1604 TORQUE SENSOR

< COMPONENT DIAGNOSIS >

[EPS]

C1604 TORQUE SENSOR

Description

INFOID:0000000001716736

Torque sensor detects the steering torque, and transmit the signal to EPS control unit.

DTC Logic

INFOID:0000000001716737

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1604	TORQUE SENSOR	Malfunction of the torque sensor in steering column assembly is detected.	• Harness or connector • Torque sensor • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
TORQUE SENSOR

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-11. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697725

1.CHECK TORQUE SENSOR SIGNAL

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR" mode for "EPS" with CONSULT-III.
3. Check the value of "TORQUE SENSOR". Refer to [STC-22. "EPS Control Unit Input/Output Signal Reference Value"](#).

Without CONSULT-III

1. Start engine.
2. Check voltage between EPS control unit harness connector M53 terminals 4, 5, 6, 7 and ground. Refer to [STC-22. "EPS Control Unit Input/Output Signal Reference Value"](#).

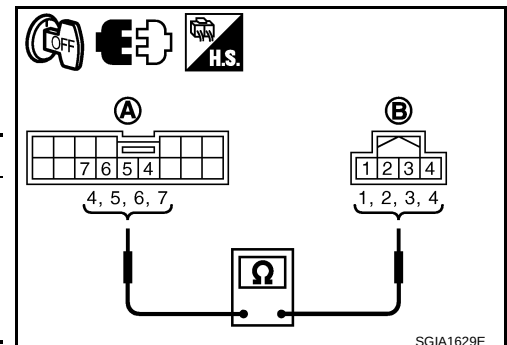
OK or NG

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

2.CHECK HARNESS AND CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector and torque sensor harness connector.
3. Check continuity between EPS control unit harness connector M53 (A) terminals 4, 5, 6, 7 and torque sensor harness connector M63 (B) terminals 1, 2, 3, 4.

Terminal	Continuity
4 - 3	Yes
5 - 2	
6 - 1	
7 - 4	



C1604 TORQUE SENSOR

[EPS]

< COMPONENT DIAGNOSIS >

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

4. Connect EPS control unit harness connector and torque sensor harness connector.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace damaged parts.

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22. "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

OK >> GO TO 4.

NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

OK >> **INSPECTION END**

NG >> Torque sensor is malfunctioning. Replace steering column assembly. Refer to [ST-9. "Removal and Installation"](#).

Special Repair Requirement (Models with ESP)

INFOID:0000000001730964

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

C1606 EPS MOTOR

< COMPONENT DIAGNOSIS >

[EPS]

C1606 EPS MOTOR

Description

INFOID:0000000001716739

EPS motor provides the assist torque by control signal from EPS control unit.

DTC Logic

INFOID:0000000001716740

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1606	EPS MOTOR	When the motor driver malfunction of EPS control unit or EPS motor malfunction is detected.	• Harness or connector • EPS motor • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
EPS MOTOR

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-13, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697726

1.CHECK EPS MOTOR SIGNAL

 With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR" mode for "EPS" with CONSULT-III.
3. Check the values of "MOTOR SIG" and "MOTOR CURRENT". Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

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

2.CHECK EPS MOTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check resistance between EPS control unit harness connector terminals.

Connector	Terminal	Resistance
M60	19 – 20	Approx. 0.1 Ω or less

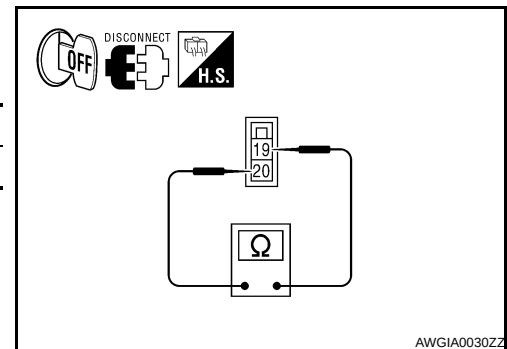
4. Connect EPS control unit harness connector.

OK or NG

- OK >> GO TO 3.
NG >> EPS motor is malfunctioning. Replace steering column assembly. Refer to [ST-9, "Removal and Installation"](#).

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).



C1606 EPS MOTOR

< COMPONENT DIAGNOSIS >

[EPS]

OK or NG

OK >> GO TO 4.

NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 3.

Special Repair Requirement (Models with ESP)

INFOID:0000000001730965

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

C1607 EEPROM

Description

INFOID:0000000001716742

EPS control unit incorporates a memory function.

DTC Logic

INFOID:0000000001716743

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1607	EEPROM	When the memory (EEPROM) system malfunction is detected in EPS control unit.	• Harness or connector • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
EEPROM

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-15, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697727

1.PERFORM SELF-DIAGNOSIS

Ⓜ With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select "SELF-DIAG RESULTS" mode for "EPS" with CONSULT-III.
3. Touch "ERASE".
4. Turn ignition switch OFF, and wait at least 10 seconds.
5. Start engine.
6. Perform the self-diagnosis again.

Is the "EEPROM [C1607]" displayed?

- YES >> Replace EPS control unit. Refer to [ST-9, "Removal and Installation"](#).
 NO >> **INSPECTION END**

Special Repair Requirement (Models with ESP)

INFOID:0000000001730966

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

C1608 EPS CONTROL UNIT

Description

INFOID:0000000001716745

EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque to the EPS motor according to the driving condition.

DTC Logic

INFOID:0000000001716746

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1608	CONTROL UNIT	When the internal malfunction is detected in EPS control unit.	• Harness or connector • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROL UNIT

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-16, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697728

1.PERFORM SELF-DIAGNOSIS

Ⓑ With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select "SELF-DIAG RESULTS" mode for "EPS" with CONSULT-III.
3. Touch "ERASE".
4. Turn ignition switch OFF, and wait at least 10 seconds.
5. Start engine.
6. Perform the self-diagnosis again.

Is the "CONTROL UNIT [C1608]" displayed?

- YES >> Replace EPS control unit. Refer to [ST-9, "Removal and Installation"](#).
 NO >> **INSPECTION END**

Special Repair Requirement (Models with ESP)

INFOID:0000000001730967

1.AJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

C1609 CAN VHCL SPEED

< COMPONENT DIAGNOSIS >

[EPS]

C1609 CAN VHCL SPEED

Description

INFOID:0000000001716755

EPS control unit receives vehicle speed input from the combination meter and ABS actuator and electric unit (control unit) through the CAN communication lines.

DTC Logic

INFOID:0000000001716756

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1609	CAN VHCL SPEED	When the malfunction is detected in vehicle speed signal received with CAN communication.	• Harness or connector • CAN communication line • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN VHCL SPEED

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-17, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697729

1.CHECK DTC WITH COMBINATION METER

Perform self-diagnosis with combination meter. Refer to [MWI-22, "CONSULT-III Function \(METER/M&A\)"](#).

Is any malfunction detected by self-diagnosis?

- YES >> Check the malfunctioning system.
NO >> GO TO 2.

2.CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform self-diagnosis with ABS actuator and electric unit (control unit). Refer to [BRC-25, "CONSULT-III Function \(ABS\)"](#) (with ABS) or [BRC-105, "CONSULT-III Function \(ABS\)"](#) (with ESP).

Is any malfunction detected by self-diagnosis?

- YES >> Check the malfunctioning system.
NO >> GO TO 3.

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

- OK >> GO TO 4.
NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

- OK >> **INSPECTION END**
NG >> Perform self-diagnosis with ABS actuator and electric unit (control unit) and combination meter. Refer to [BRC-25, "CONSULT-III Function \(ABS\)"](#) (with ABS), [BRC-105, "CONSULT-III Function \(ABS\)"](#) (with ESP) or [MWI-22, "CONSULT-III Function \(METER/M&A\)"](#).

Special Repair Requirement (Models with ESP)

INFOID:000000001730968

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

C1610 CAN ENG RPM

Description

INFOID:0000000001716753

EPS control unit receives engine RPM input from the ECM through the CAN communication lines.

DTC Logic

INFOID:0000000001716754

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1610	CAN ENG RPM	When the malfunction is detected in engine status signal received with CAN communication.	• Harness or connector • CAN communication line • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN ENG RPM

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-19, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697730

1.CHECK DTC WITH ECM

Perform self-diagnosis for ECM. Refer to [EC-107, "CONSULT-III Function"](#) (HR16DE with EURO-OBD), [EC-462, "CONSULT-III Function"](#) (HR16DE without EURO-OBD), [EC-772, "CONSULT-III Function"](#) (MR18DE), [EC-1104, "Diagnosis Description"](#) (K9K).

Is any malfunction detected by self-diagnosis?

- YES >> Check the malfunctioning system.
 NO >> GO TO 2.

2.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

- OK >> GO TO 3.
 NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

3.CHECK DTC

Perform the self-diagnosis, after driving a vehicle for a while.

OK or NG

- OK >> **INSPECTION END**
 NG >> Perform self-diagnosis for ECM. Refer to [EC-107, "CONSULT-III Function"](#) (HR16DE with EURO-OBD), [EC-462, "CONSULT-III Function"](#) (HR16DE without EURO-OBD), [EC-772, "CONSULT-III Function"](#) (MR18DE), [EC-1104, "Diagnosis Description"](#) (K9K).

Special Repair Requirement (Models with ESP)

INFOID:0000000001730969

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

C1610 CAN ENG RPM

< COMPONENT DIAGNOSIS >

[EPS]

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

U1000 CAN COMM CIRCUIT

< COMPONENT DIAGNOSIS >

[EPS]

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001716748

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

DTC Logic

INFOID:0000000001716749

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	When EPS control unit is not transmitting or receiving CAN communication signal for 2 seconds or more.	• Harness or connector • CAN communication line • EPS control unit

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

STC

Check the self-diagnosis results.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [STC-21, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001697731

1.CHECK CAN COMMUNICATION CIRCUIT

 **With CONSULT-III**

1. Turn ignition switch ON and start engine.
2. Select "SELF-DIAG RESULTS" mode for "EPS" with CONSULT-III.
3. Perform the self-diagnosis.

Is the "CAN COMM CIRCUIT [U1000]" displayed?

- YES >> Print out CONSULT-II screen and go to [LAN-30, "CAN System Specification Chart"](#).
NO >> **INSPECTION END**

Special Repair Requirement (Models with ESP)

INFOID:0000000001730970

1.AJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the EPS control unit. Refer to [BRC-90, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"](#).

>> END

ECU DIAGNOSIS

EPS CONTROL UNIT

EPS Control Unit Input/Output Signal Reference Value

INFOID:000000001716757

SPECIFICATIONS WITH CONSULT-III

CAUTION:

The output signal indicates the EPS control unit calculation date. The normal values will be displayed even in the event that the output circuit (harness) is open.

Monitor item (Unit)	Content	Condition		Display value
MOTOR VOL (V)	Power supply voltage for EPS control unit	Ignition switch: ON		Battery voltage
TORQUE SENSOR (Nm)	Steering wheel turning force	Engine running	Steering wheel: Not steering (There is no steering force)	0.00 Nm
			Steering wheel: Steering	0 – 8.19 Nm ^{*1} (The value is changed according to steering left or right)
MOTOR SIG (A)	Command current to EPS motor	Engine running	Steering wheel: Not steering (There is no steering force)	0.00 A
			Steering wheel: Steering	0 – 65.00 A (The value is changed according to steering left or right)
MOTOR CURRENT (A)	Consumption current of EPS motor	Engine running	Steering wheel: Not steering (There is no steering force)	0.00 A
			Steering wheel: Steering	0 – 65.00 A ^{*2} (The value is changed according to steering left or right)
VEHICLE SPEED (km/h) or (mph)	Vehicle speed	Vehicle stopped		0 km/h (0 mph)
		While driving		Approximately equal to the indication on speedometer (Inside of ±10%)* ³
WARNING LAMP (ON/OFF)	EPS warning lamp condition	EPS warning lamp: ON		ON
		EPS warning lamp: OFF		OFF
DERATING STAT (ON/OFF)	Protect overload status	Engine running	Steering wheel: Normal steering	OFF
			Steering wheel: Steering over the stop	ON ^{*4}
ENGINE STATUS (RUN/STOP)	Engine status	Engine stopped (Engine speed: Less than 400 rpm)		STOP
		Engine running (Engine speed: 400 rpm or more)		RUN

*1: In the front of the value, "L" is displayed at steering left and "R" is displayed at steering right.

*2: Almost in accordance with the value of "MOTOR SIG". It is not a malfunction though these values are not accorded when steering quickly.

*3: It is not a malfunction, though it might not be corresponding just after ignition switch is turned ON.

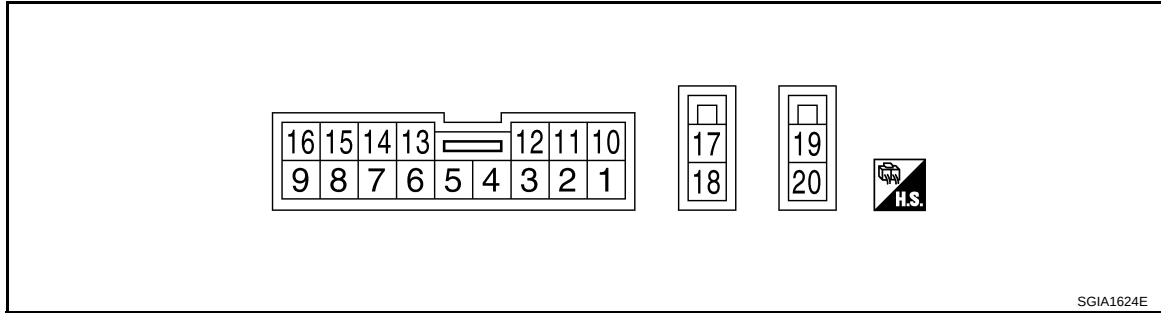
*4: It turns to OFF after waiting for a short period of time.

EPS CONTROL UNIT

< ECU DIAGNOSIS >

[EPS]

EPS HARNESS CONNECTOR TERMINAL LAYOUT



TERMINALS AND REFERENCE VALUES FOR EPS CONTROL UNIT

Data are reference values and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
4	V	Torque sensor sub	Engine running	Steering wheel: Not steering (There in no steering force)	2.5 V
				Steering wheel: Steering	1.7 V – 3.3 V (The value is changed according to steering left or right)
5	BR	Torque sensor power supply	Ignition switch: ON		8 V
			Ignition switch: OFF		0 V
6	G	Torque sensor main	Engine running	Steering wheel: Not steering (There is no steering force)	2.5 V
				Steering wheel: Steering	1.7 V – 3.3 V (The value is changed according to steering left or right)
7	R	Torque sensor ground	Always		0 V
9	L	CAN-H	—		—
10	O	Power supply	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		0 V
16	P	CAN-L	—		—
17	R	Power supply (Memory back-up)	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		Battery voltage
18	B	Ground	Always		0 V
19	—	Motor (+)	—		—
20	—	Motor (–)	—		—

CAUTION:

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

Wiring Diagram - EPS -

INFOID:000000001697720

**NO
DATA**

ALGWA0004GE

STEERING CONTROL SYSTEM CONNECTORS

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Color	WHITE



16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

Terminal No.	Color of Wire	Signal Name
1	L	—
16	L	—
17	P	—
32	P	—

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE



20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	P	CAN-L
21	B	GND 1 (ILL)
22	B	GND2 (POWER)
23	B	GND3
27	G	BAT
28	SB	IGN

Connector No.	M53
Connector Name	EPS CONTROL UNIT
Connector Color	WHITE



16	15	14	13	12		11	10	
9	8	7	6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
4	V	TSS
5	BR	TSV
6	G	TSM
7	R	TSE
9	L	CAN-H
10	O	V-IGN
16	P	CAN-L

Connector No.	M54
Connector Name	EPS CONTROL UNIT
Connector Color	BLACK



17	18
----	----

Terminal No.	Color of Wire	Signal Name
17	R	B+
18	B	GND

Connector No.	M63
Connector Name	TORQUE SENSOR
Connector Color	WHITE

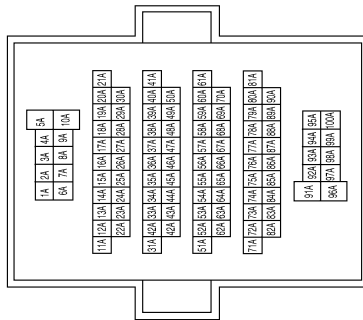


1	2	3	4
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Terminal No.	Color of Wire	Signal Name
1	G	TSM
2	BR	TSV
3	V	TSS
4	R	TSE (GND)

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Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE



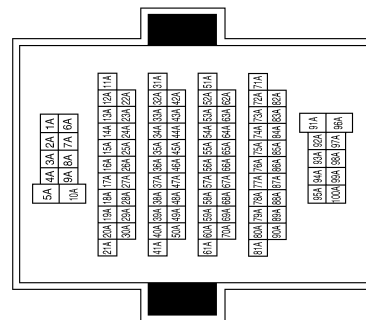
Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—

Connector No.	M78
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	R	—

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE



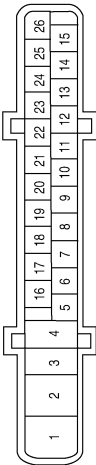
Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—

Connector No.	E11
Connector Name	WIRE TO WIRE
Connector Color	BLACK



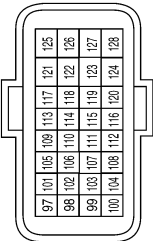
Terminal No.	Color of Wire	Signal Name
1	R	—

Connector No.	E33
Connector Name	ABS ACTUATOR AND ELECTRONIC UNIT (CONTROL UNIT)
Connector Color	BLACK



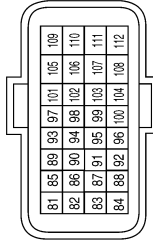
Terminal No.	Color of Wire	Signal Name
15	P	CAN-L
26	L	CAN-H

Connector No.	E16
Connector Name	ECM (LHD DIESEL)
Connector Color	BLACK



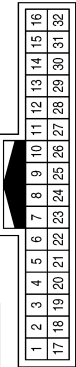
Terminal No.	Color of Wire	Signal Name
99	P	CAN-L
100	L	CAN-H

Connector No.	E16
Connector Name	ECM (NON-DIESEL)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
83	P	CAN-L
84	L	CAN-H

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	L	—
16	L	—
17	P	—
32	P	—

Fail-Safe Function

- If any malfunction occurs in the system, and control unit detects the malfunction, EPS warning lamp on combination meter turns ON to indicate system malfunction.
- When EPS warning lamp is ON, enters a manual steering state. (Control turning force steering wheel becomes heavy.)

EPS CONTROL UNIT

< ECU DIAGNOSIS >

[EPS]

DTC Index

INFOID:0000000001716730

DTC	Items (CONSULT screen terms)	Reference
C1601	BATTERY POWER SUPPLY	STC-9
C1604	TORQUE SENSOR	STC-11
C1606	EPS MOTOR	STC-13
C1607	EEPROM	STC-15
C1608	EPS CONTROL UNIT	STC-16
C1609	CAN VHCL SPEED	STC-17
C1610	CAN ENG RPM	STC-19
U1000	CAN COMM CIRCUIT	STC-21

EPS SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[EPS]

SYMPTOM DIAGNOSIS

EPS SYSTEM SYMPTOMS

Symptom Chart

INFOID:0000000001716771

If EPS warning lamp turns ON, perform self-diagnosis. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#).

Symptom	Condition	Check item	Reference page
EPS warning lamp does not turn ON when ignition switch to "ON". (EPS warning lamp check)	Ignition switch: ON	CAN communication line	STC-30
		Combination meter	
EPS warning lamp does not turn OFF for several seconds after starting the engine	Engine running	CAN communication line	STC-31
		Power supply and ground for EPS control unit	
		Torque sensor	
		EPS motor	
		Vehicle speed signal	
		Engine status signal	
		Combination meter	
Steering wheel turning force is heavy or light, while driving	- While driving - Steering wheel turning	CAN communication line	STC-33
		Vehicle speed signal	
		Engine status signal	
		EPS motor	
		Steering wheel turning force (Mechanical malfunction)	
Unbalance steering wheel turning force and return between right and left, while driving	- While driving - Steering wheel turning	Wheel alignment	STC-34
		Steering wheel turning force (Mechanical malfunction)	
Unbalance steering wheel turning force, while driving (Torque variation)	- While driving - Steering wheel turning	Steering column intermediate shaft installation condition	STC-35
		Steering wheel turning force (Mechanical malfunction)	

A

B

C

D

E

F

STC

H

I

J

K

L

M

N

O

P

EPS WARNING LAMP DOES NOT TURN ON

< SYMPTOM DIAGNOSIS >

[EPS]

EPS WARNING LAMP DOES NOT TURN ON

Diagnosis Procedure

INFOID:000000001697733

SYMPTOM:

EPS warning lamp does not turn ON when ignition switch to “ON”.

DIAGNOSTIC PROCEDURE

1.CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#) .

Is the “CAN COMM CIRCUIT [U1000]” displayed?

- YES >> Perform trouble diagnosis for CAN communication line. Refer to [STC-21, "Diagnosis Procedure"](#) .
- NO >> GO TO 2.

2.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

3.SYMPTOM CHECK

Check again.

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace combination meter. Refer to [MWI-94, "Removal and Installation"](#).

EPS WARNING LAMP DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

[EPS]

EPS WARNING LAMP DOES NOT TURN OFF

Diagnosis Procedure

INFOID:000000001697734

SYMPTOM:

EPS warning lamp does not turn OFF for several seconds after starting the engine.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#).

Is any malfunction detected by self-diagnosis?

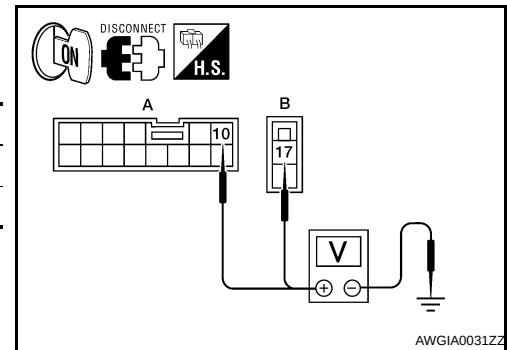
YES >> Check the malfunctioning system.

NO >> GO TO 2.

2.CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

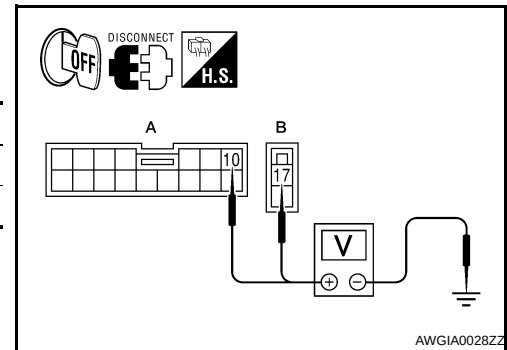
1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between EPS control unit harness connector M53 (A) terminal 10 and M54 (B) terminal 17 and ground.

Connector	Terminal	Voltage
(A) M53	10 – Ground	Battery voltage
(B) M54	17 – Ground	Battery voltage



5. Turn ignition switch OFF.
6. Check voltage between EPS control unit harness connector M53 (A) terminal 10 and M54 (B) terminal 17 and ground.

Connector	Terminal	Voltage
(A) M53	10 – Ground	Approx. 0 V
(B) M54	17 – Ground	Battery voltage



7. Connect EPS control unit harness connector.

OK or NG

OK >> GO TO 3.

NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- 60 A fusible link (letter **m**, located in the fuse and fusible link box).
- 10 A fuse [No. 2, located in the fuse block (J/B)].
- Harness for short or open between battery and EPS control unit harness connector M54 terminal 17.
- Harness for short or open between ignition switch and EPS control unit harness connector M53 terminal 10.

3.CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.

EPS WARNING LAMP DOES NOT TURN OFF

[EPS]

< SYMPTOM DIAGNOSIS >

3. Check continuity between EPS control unit harness connector M54 terminal 18 and ground.

Connector	Terminal	Continuity
M54	18	YES

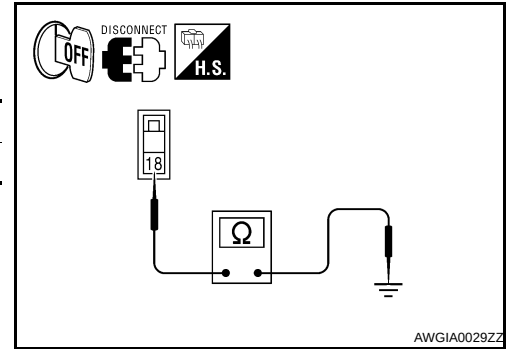
Also check harness for short to power.

4. Connect EPS control unit harness connector.

OK or NG

OK >> GO TO 4.

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



4.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22. "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

OK >> GO TO 5.

NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

5.SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> Replace combination meter. Refer to [MWI-94. "Removal and Installation"](#).

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

< SYMPTOM DIAGNOSIS >

[EPS]

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

Diagnosis Procedure

INFOID:000000001697735

SYMPTOM:

Steering wheel turning force is heavy or light, while driving.

DIAGNOSTIC PROCEDURE

1.CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to [STC-7, "CONSULT-III Function \(EPS\)"](#).

Is the "CAN COMM CIRCUIT [U1000]" displayed?

- YES >> Perform trouble diagnosis for CAN communication line. Refer to [STC-21, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2.CHECK VEHICLE SPEED SIGNAL

Perform self-diagnosis with ABS actuator and electric unit (control unit). Refer to [BRC-25, "CONSULT-III Function \(ABS\)"](#) (with ABS) or [BRC-105, "CONSULT-III Function \(ABS\)"](#) (with ESP).

Is any malfunction detected by self-diagnosis?

- YES >> Check the malfunctioning system.
NO >> GO TO 3.

3.CHECK COMBINATION METER SIGNAL

Perform self-diagnosis with combination meter. Refer to [MWI-22, "CONSULT-III Function \(METER/M&A\)"](#).

Is any malfunction detected by self-diagnosis?

- YES >> Check the malfunctioning system.
NO >> GO TO 4.

4.CHECK ENGINE STATUS SIGNAL

Perform self-diagnosis for ECM. Refer to [EC-107, "CONSULT-III Function"](#) (HR16DE with EURO-OBD), [EC-462, "CONSULT-III Function"](#) (HR16DE without EURO-OBD), [EC-772, "CONSULT-III Function"](#) (MR18DE), [EC-1104, "Diagnosis Description"](#) (K9K).

Is any malfunction detected by self-diagnosis?

- YES >> Check the malfunctioning system.
NO >> GO TO 5.

5.CHECK EPS MOTOR SYSTEM

Perform trouble diagnosis for EPS motor. Refer to [STC-13, "Diagnosis Procedure"](#).

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

- OK >> GO TO 7.
NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

7.SYMPTOM CHECK

Check again.

OK or NG

- OK >> **INSPECTION END**
NG >> Check the steering wheel turning force because there may be mechanical malfunction. Refer to [ST-6, "On-Vehicle Inspection and Service"](#).

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

< SYMPTOM DIAGNOSIS >

[EPS]

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

Diagnosis Procedure

INFOID:000000001697736

SYMPTOM:

Unbalance steering wheel turning force and return between right and left, while driving.

DIAGNOSTIC PROCEDURE

1.CHECK EPS WARNING LAMP

Confirm EPS warning lamp during engine running.

Does EPS warning lamp turn OFF?

YES >> GO TO 2.

NO >> Go to [STC-31, "Diagnosis Procedure"](#).

2.CHECK WHEEL ALIGNMENT

Check wheel alignment. Refer to [FSU-6, "Wheel Alignment Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Adjust wheel alignment. Refer to [FSU-6, "Wheel Alignment Inspection"](#).

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

OK >> GO TO 4.

NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> Check the steering wheel turning force because there may be mechanical malfunction. Refer to [ST-6, "On-Vehicle Inspection and Service"](#).

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

[EPS]

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Diagnosis Procedure

INFOID:000000001697737

SYMPTOM:

Unbalance steering wheel turning force, while driving (Torque variation).

DIAGNOSTIC PROCEDURE

1.CHECK EPS WARNING LAMP

Confirm EPS warning lamp during engine running.

Does EPS warning lamp turn OFF?

YES >> GO TO 2.

NO >> Go to [STC-31, "Diagnosis Procedure"](#).

2.CHECK STEERING COLUMN INTERMEDIATE SHAFT

Check the connection between intermediate shaft and the mounting part of steering column assembly and steering gear assembly. Refer to [ST-9, "Removal and Installation"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace damaged parts.

3.CHECK EPS CONTROL UNIT

Check EPS control unit input/output signal. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

OK or NG

OK >> GO TO 4.

NG >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4.SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> Check the steering wheel turning force because there may be mechanical malfunction. Refer to [ST-6, "On-Vehicle Inspection and Service"](#).

PRECAUTION

PRECAUTIONS

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

INFOID:000000001697712

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. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000001716731

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the 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. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Service Notice or Precaution for EPS System

INFOID:000000001697713

CAUTION:

Check or confirm the following item when performing the trouble diagnosis.

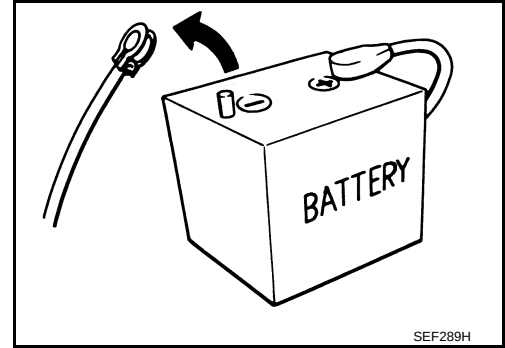
- Check any possible causes by interviewing the symptom and it's condition from the customer if any malfunction, such as EPS warning lamp turns ON, occurs.
- Check if air pressure and size of tires are proper, the specified part is used for the steering wheel, and control unit is genuine part.

PRECAUTIONS

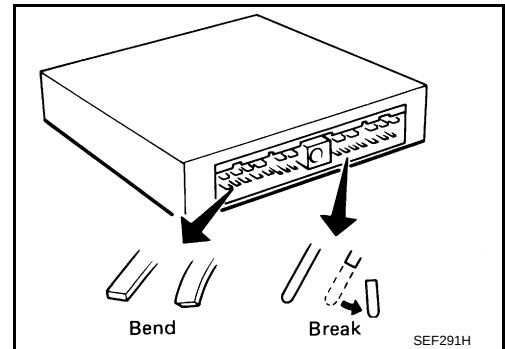
[EPS]

< PRECAUTION >

- Check if the connection of steering column assembly and steering gear assembly is proper (there is not looseness of mounting bolts, damage of rods, boots or sealants, and leakage of grease, etc).
- Check if the wheel alignment is adjusted properly.
- Check if there is any damage or modification to suspension or body resulting in increased weight or altered ground clearance.
- Check if installation conditions of each link and suspension are proper.
- Check if the battery voltage is proper
- Check connection conditions of each connector are proper.
- Before connecting or disconnecting the EPS control unit harness connector, turn ignition switch "OFF" and disconnect battery ground cable. Because battery voltage is applied to EPS control unit even if ignition switch is turned "OFF".



- When connecting or disconnecting pin connectors into or from EPS control unit, take care not to damage pin terminals (bend or break).
When connecting pin connectors, make sure that there are no bends or breaks on EPS control unit pin terminal.



- Before replacing EPS control unit, perform EPS control unit input/output signal inspection and make sure whether EPS control unit functions properly or not. Refer to [STC-22, "EPS Control Unit Input/Output Signal Reference Value"](#).

