

# SECTION **STC**

## STEERING CONTROL SYSTEM

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

### CONTENTS

<b>PRECAUTION</b> .....	3	<b>Work Flow</b> .....	19
<b>PRECAUTIONS</b> .....	3	<b>DTC/CIRCUIT DIAGNOSIS</b> .....	20
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....	3	<b>C1601 BATTERY POWER SUPPLY</b> .....	20
Service Notice or Precautions for EPS System .....	3	DTC Logic .....	20
<b>SYSTEM DESCRIPTION</b> .....	5	Diagnosis Procedure .....	20
<b>COMPONENT PARTS</b> .....	5	<b>C1604 TORQUE SENSOR</b> .....	23
Component Parts Location .....	5	DTC Logic .....	23
EPS Control Unit .....	6	Diagnosis Procedure .....	23
EPS Motor, Torque Sensor, Reduction Gear .....	6	<b>C1606 EPS MOTOR</b> .....	24
<b>SYSTEM</b> .....	7	DTC Logic .....	24
<b>EPS SYSTEM</b> .....	7	Diagnosis Procedure .....	24
EPS SYSTEM : System Description .....	7	<b>C1607, C1608 EPS CONTROL UNIT</b> .....	25
EPS SYSTEM : Fail-Safe .....	8	DTC Logic .....	25
EPS SYSTEM : Protection Function .....	8	Diagnosis Procedure .....	25
<b>DIAGNOSIS SYSTEM (EPS CONTROL UNIT)</b>		<b>C1609 VEHICLE SPEED SIGNAL</b> .....	26
.....	9	DTC Logic .....	26
CONSULT Function .....	9	Diagnosis Procedure .....	26
<b>ECU DIAGNOSIS INFORMATION</b> .....	11	<b>U1000 CAN COMM CIRCUIT</b> .....	27
<b>EPS CONTROL UNIT</b> .....	11	Description .....	27
Reference Value .....	11	DTC Logic .....	27
Fail-Safe .....	13	Diagnosis Procedure .....	27
Protection Function .....	13	<b>EPS WARNING LAMP</b> .....	28
DTC Inspection Priority Chart .....	13	Component Function Check .....	28
DTC Index .....	13	Diagnosis Procedure .....	28
<b>WIRING DIAGRAM</b> .....	14	<b>SYMPTOM DIAGNOSIS</b> .....	29
<b>EPS SYSTEM</b> .....	14	<b>EPS WARNING LAMP DOES NOT TURN ON...</b>	29
Wiring Diagram .....	14	Description .....	29
<b>BASIC INSPECTION</b> .....	19	Diagnosis Procedure .....	29
<b>DIAGNOSIS AND REPAIR WORKFLOW</b> .....	19	<b>EPS WARNING LAMP DOES NOT TURN OFF</b> .....	30
		Description .....	30
		Diagnosis Procedure .....	30

STC

---

<b>STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT</b> .....	<b>31</b>
Description .....	31
Diagnosis Procedure .....	31
<b>UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT</b> .....	<b>33</b>
Description .....	33
Diagnosis Procedure .....	33

<b>UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)</b> .....	<b>34</b>
Description .....	34
Diagnosis Procedure .....	34
<b>REMOVAL AND INSTALLATION</b> .....	<b>36</b>
<b>EPS CONTROL UNIT</b> .....	<b>36</b>
Removal and Installation .....	36

# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000011328184

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.

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

#### **WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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 three minutes before performing any service.

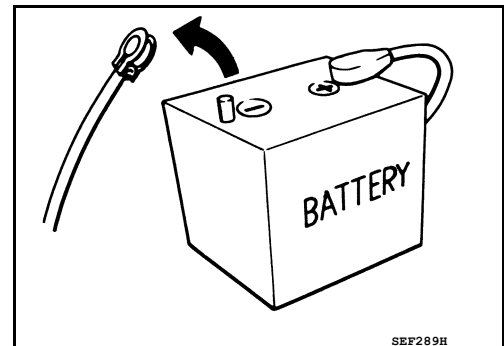
#### Service Notice or Precautions for EPS System

INFOID:000000011279635

#### **CAUTION:**

Check the following item when performing the trouble diagnosis.

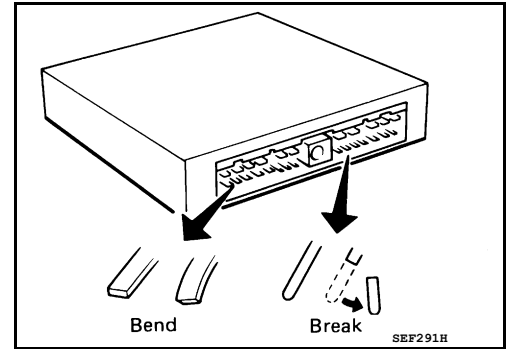
- Check any possible causes by interviewing the symptom and it's condition from the customer if any malfunction, such as EPS warning lamp is turned ON, occurs.
- Check if air pressure and size of tires are proper, the specified part is used for the steering wheel, and control unit is genuine part.
-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



## PRECAUTIONS

### < PRECAUTION >

- 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.



# COMPONENT PARTS

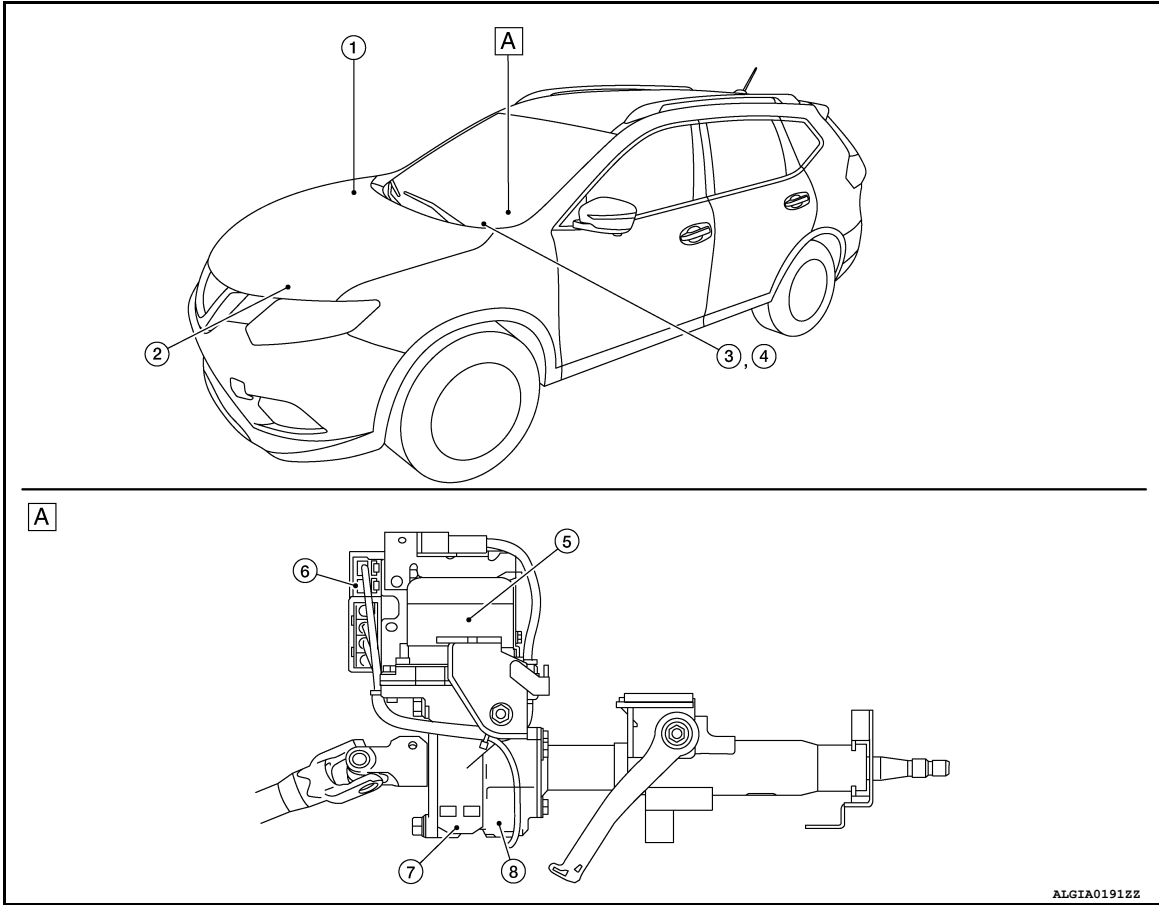
< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### Component Parts Location

INFOID:0000000011279636



A. Steering column assembly

No.	Component	Function
1.	ABS actuator and electric unit (control unit)	<ul style="list-style-type: none"> <li>Transmits the following signal to EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>Vehicle speed signal (ABS)</li> </ul> </li> </ul>
2.	ECM	<ul style="list-style-type: none"> <li>Transmits the following signal to EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>Engine status signal</li> </ul> </li> </ul>
3.	Combination meter	<ul style="list-style-type: none"> <li>Transmits the following signal to EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>Vehicle speed signal (Meter)</li> </ul> </li> <li>Turns ON the EPS warning lamp according to the signal from EPS control unit via CAN communication.</li> </ul>
4.	EPS warning lamp	<a href="#">STC-7. "EPS SYSTEM : System Description"</a>
5.	EPS motor	<a href="#">STC-6. "EPS Motor, Torque Sensor, Reduction Gear"</a>
6.	EPS control unit	<a href="#">STC-6. "EPS Control Unit"</a>
7.	Reduction gear	<a href="#">STC-6. "EPS Motor, Torque Sensor, Reduction Gear"</a>
8.	Torque sensor	<a href="#">STC-6. "EPS Motor, Torque Sensor, Reduction Gear"</a>

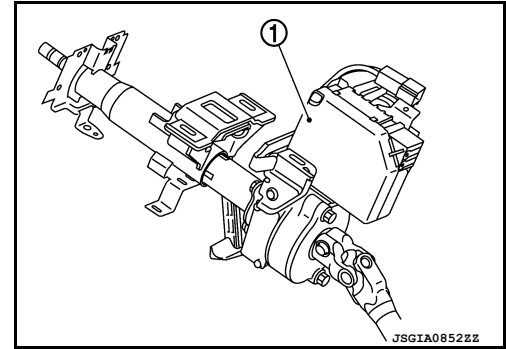
# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

### EPS Control Unit

INFOID:000000011279637

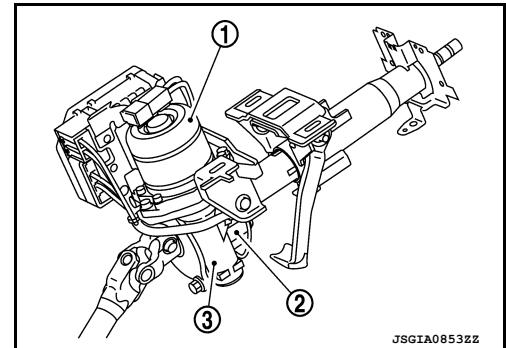
- EPS control unit (1) is installed to steering column assembly.
- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque signal to the EPS motor according to the driving condition.
- EPS control unit decreases the output signal to EPS motor during continuous extreme use of the power steering function (e.g., full steering) for protection of the EPS motor and EPS control unit (Overload protection control).



### EPS Motor, Torque Sensor, Reduction Gear

INFOID:000000011279638

EPS motor (1), torque sensor (2) and reduction gear (3) are installed to steering column assembly.



#### EPS MOTOR

EPS motor provides assist torque in proportion to the control signal from the EPS control unit.

#### TORQUE SENSOR

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

#### REDUCTION GEAR

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

# SYSTEM

< SYSTEM DESCRIPTION >

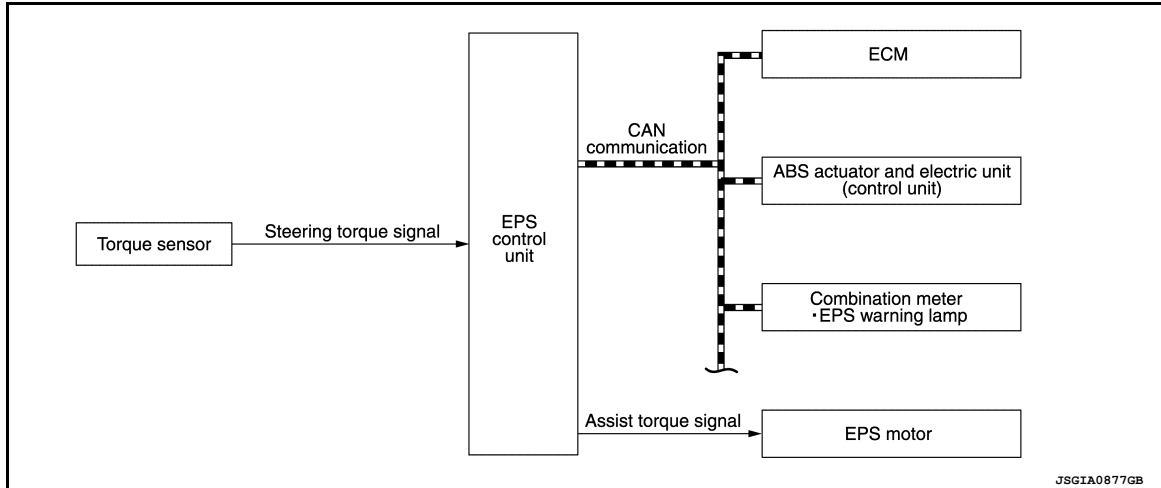
## SYSTEM

### EPS SYSTEM

#### EPS SYSTEM : System Description

INFOID:0000000011279639

#### SYSTEM DIAGRAM



#### INPUT/OUTPUT SIGNAL

Communicates the signal from each control unit via CAN communication.

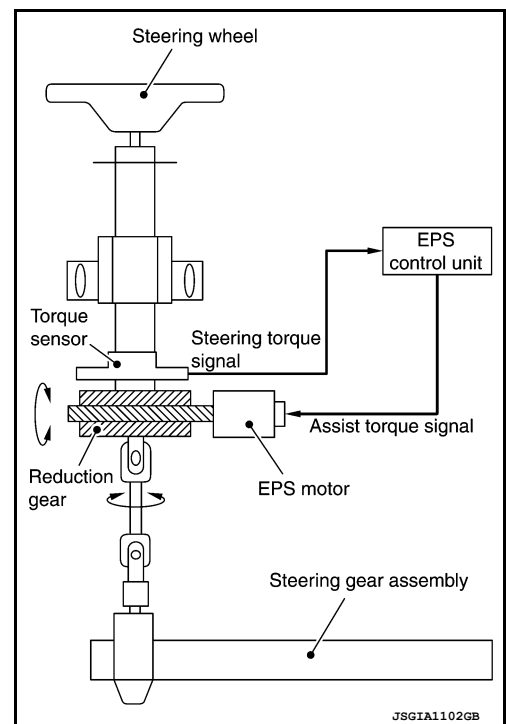
Control unit	Signal status
ECM	<ul style="list-style-type: none"> <li>Transmits the following signal to EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>Engine status signal</li> </ul> </li> </ul>
ABS actuator and electric unit (control unit)	<ul style="list-style-type: none"> <li>Transmits the following signal to EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>Vehicle speed signal (ABS)</li> </ul> </li> </ul>
Combination meter	<ul style="list-style-type: none"> <li>Transmits the following signal to EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>Vehicle speed signal (Meter)</li> </ul> </li> <li>Receives the following signal from EPS control unit via CAN communication:                             <ul style="list-style-type: none"> <li>EPS warning lamp signal</li> </ul> </li> </ul>

#### DESCRIPTION

# SYSTEM

## < SYSTEM DESCRIPTION >

- 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 signal to the EPS motor according to the driving condition.
- In case of an error in the electrical system, the fail-safe function stops output signals to the EPS motor. Refer to [STC-8. "EPS SYSTEM : Fail-Safe"](#).
- EPS control unit decreases the output signal to EPS motor during extreme use of the power steering function (e.g., full steering) for protection of the EPS motor and EPS control unit (Overload protection control).
- Extensive steering at low speed will cause the EPS control unit and EPS motor to heat up. Once temperature reaches the critical point, the EPS control unit will reduce current to reduce heat up. System will recover as temperature lowers (reduced or no assistance).



## EPS WARNING LAMP INDICATION

- Turns ON when there is a malfunction in the EPS system. If ON, fail-safe mode is engaged and the system enters a manual steering state (turning force at 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.

Condition	EPS warning lamp
Ignition switch ON. (Lamp check)	ON
Engine running.	OFF
EPS system malfunction [Other diagnostic item]	ON

### CAUTION:

**EPS warning lamp also turns ON due to data reception error, CAN communication error etc.**

## EPS SYSTEM : Fail-Safe

INFOID:000000011279640

- If any malfunction occurs in the system and the control unit detects the malfunction, the EPS warning lamp in the combination meter turns ON to indicate system malfunction.
- When EPS warning lamp is ON, the system enters into a manual steering state. (turning force at steering wheel becomes heavy.)
- Under abnormal vehicle speed signal conditions, vehicle speed is judged as constant.

## EPS SYSTEM : Protection Function

INFOID:000000011279641

While overload protection control is activated, assist torque gradually decreases and the steering wheel turning force becomes heavy. Assist torque returns to normal if the steering wheel is not turned for a while.



# DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< SYSTEM DESCRIPTION >

## DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

### CONSULT Function

INFOID:000000011279642

#### FUNCTION

CONSULT can display each diagnostic item using the diagnostic test modes shown following:

Diagnostic test mode	Function
ECU identification	The part number stored in the control unit can be read.
Self diagnostic result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the EPS control unit can be read.

\*: The following diagnosis information is cleared by erasing:

- DTC
- Freeze frame data (FFD)

#### ECU IDENTIFICATION

Displays the part number stored in the control unit.

#### SELF-DIAG RESULTS MODE

Refer to [STC-13, "DTC Index"](#).

When "CRNT" is displayed on "Self Diagnostic Result":

- The system is presently malfunctioning.

When "PAST" is displayed on "Self Diagnostic Result":

- System malfunction in the past is detected, but the system is presently normal.

#### FREEZE FRAME DATA (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on CONSULT:

Item name	Display item
IGN COUNTER (0 – 39)	<p>The number of times that ignition switch is turned ON after the DTC is detected is displayed:</p> <ul style="list-style-type: none"> <li>• When "0" is displayed: It indicates that the system is presently malfunctioning.</li> <li>• When except "0" is displayed: It indicates that system malfunction in the past is detected, but the system is presently normal.</li> </ul> <p><b>NOTE:</b> Each time when ignition switch is turned OFF to ON, numerical number increases in 1→2→3...38→39. When the operation number of times exceeds 39, the number do not increase and "39" is displayed until self-diagnosis is erased.</p>

#### DATA MONITOR MODE

##### NOTE:

The following table includes information (items) inapplicable to this vehicle: For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item (Unit)	Remarks
BATTERY VOLT (V)	Displays the power supply voltage for EPS control unit.
TORQUE SENSOR (Nm)	Displays steering wheel turning force detected by torque sensor.
MOTOR CURRENT (A)	Displays the current value consumed by EPS motor.* <sup>1</sup>
MOTOR SIG (A)	Displays the current commanded value to EPS motor.
ASSIST TORQUE (Nm)	Displays assist torque of EPS motor being output by the electric power steering.
C/U TEMP (°C) or (°F)	Displays the temperature of the EPS control unit.
ASSIST LEVEL (%)	Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it return to 100% when left standing.* <sup>2</sup>
VEHICLE SPEED (km/h) or (MPH)	Vehicle speed is displayed from vehicle speed signal via CAN communication.* <sup>3</sup>
WARNING LAMP (On/Off)	EPS warning lamp control status is displayed.
ENGINE STATUS (Stop/Run)	Engine speed is displayed from engine status signal via CAN communication.

A

B

C

D

E

F

STC

H

I

J

K

L

M

N

O

P

## DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

### < SYSTEM DESCRIPTION >

---

- \*1: Almost in accordance with the value of "MOTOR SIG". It is not a malfunction though these values are not accorded when steering quickly.
- \*2: Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it returns to 100% when left standing.
- \*3: It is not a malfunction, though it might not be corresponding just after ignition switch in turned ON.

# EPS CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

## ECU DIAGNOSIS INFORMATION

### EPS CONTROL UNIT

#### Reference Value

INFOID:0000000011279643

#### VALUES ON THE DIAGNOSIS TOOL

#### CAUTION:

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

#### NOTE:

The following table includes information (items) inapplicable to this vehicle: For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Data monitor		
	Condition	Display value	
BATTERY VOLT	Ignition switch: ON	Battery voltage	
TORQUE SENSOR	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
		Steering wheel: Right turn	Positive value (Nm)
		Steering wheel: Left turn	Negative value (Nm)
MOTOR CURRENT	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 A
		Steering wheel: Right or left turn	Displays consumption current of EPS motor (A) <sup>*1</sup>
MOTOR SIG	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 A
		Steering wheel: Right turn	Positive value (A)
		Steering wheel: Left turn	Negative value (A)
ASSIST TORQUE	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
		Steering wheel: Right or left turn	Displays assist torque of EPS motor (Nm)
C/U TEMP	Ignition switch ON or engine running	Displays temperature of inside of EPS control unit (°C) or (°F)	
ASSIST LEVEL	Engine running	100 % <sup>*2</sup>	
VEHICLE SPEED	Vehicle stopped	0 km/h (0 mph)	
	While driving	Approximately equal to the indication on speedometer <sup>*3</sup> (inside of ±10%)	
WARNING LAMP	EPS warning lamp: ON	On	
	EPS warning lamp: OFF	Off	
ENGINE STATUS	Engine not running	Stop	
	Engine running	Run	

\*1: Almost in accordance with the value of "MOTOR SIG". It is not a malfunction though these values are not accorded when steering quickly.

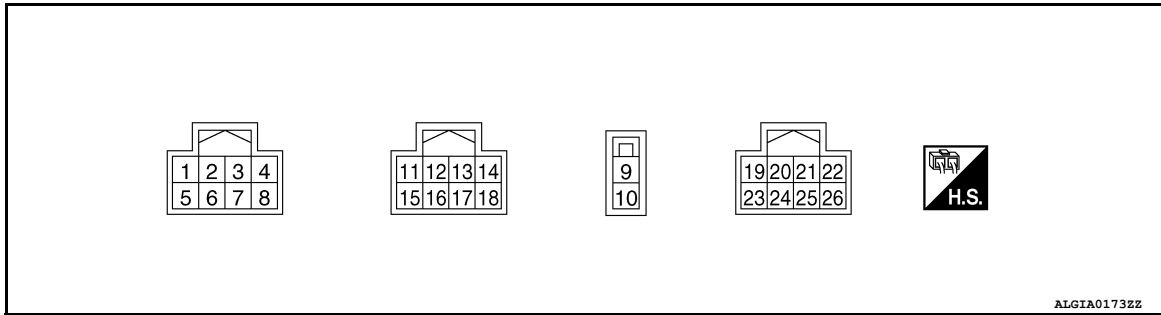
\*2: Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it returns to 100% when left standing.

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

# EPS CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

## TERMINAL LAYOUT



## PHYSICAL VALUES

Terminal No. (Wire Color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
1 (P)	—	CAN low	Input/Output	—		—
2 (L)	—	CAN high	Input/Output	—		—
4 (SB)	Ground	Ignition power supply	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
9 (R)	Ground	Battery power supply	Input	Always		Battery voltage
10 (B)	Ground	Ground	—	Always		0 V
11 (B)	Ground	Torque sensor ground	Input	Always		0 V
12 (Y)	Ground	Torque sub sensor signal	Input	Ignition switch: ON		Steering wheel: Not steering (There is no steering force) 2.5 V
				Engine running		Steering wheel: steering 1.6 V – 3.4 V (The value is changed according to steering left or right)
14 (R)	Ground	Torque sensor power supply	Output	Ignition switch: ON		10 V
15 (G)	Ground	Torque main sensor signal	Input	Ignition switch: ON		Steering wheel: Not steering (There is no steering force) 2.5 V
				Engine running		Steering wheel: steering 1.6 V – 3.4 V (The value is changed according to steering left or right)
17 (W)	Ground	Torque sensor reference voltage	Output	Ignition switch: ON		3.3 V
19 (W)	Ground	Reference signal R1	Input	Ignition switch: ON		Steering wheel: Not steering (There is no steering force) —
				Engine running		Steering wheel: steering —
21 (B)	Ground	Ground	—	Always		0 V

# EPS CONTROL UNIT

## < ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire Color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
24 (Y)	Ground	Position signal S2 (Sine)	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—
26 (R)	Ground	Position signal S (Co-sine)	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—

### Fail-Safe

INFOID:0000000011279644

- If any malfunction occurs in the system and the control unit detects the malfunction, the EPS warning lamp in the combination meter turns ON to indicate system malfunction.
- When EPS warning lamp is ON, the system enters into a manual steering state. (turning force at steering wheel becomes heavy.)
- Under abnormal vehicle speed signal conditions, vehicle speed is judged as constant.

### Protection Function

INFOID:0000000011279645

EPS control unit decreases the output signal to EPS motor during continuous extreme use of the power steering function (e.g., full steering) for protection of the EPS motor and EPS control unit (Overload protection control).

### DTC Inspection Priority Chart

INFOID:0000000011279646

When multiple DTCs are detected simultaneously, check one by one depending on the following priority list:

Priority	Priority order item (DTC)
1	U1000 CAN COMM CIRCUIT
2	C1609 CAN VHCL SPEED
3	C1601 BATTERY VOLT
4	Other than the above

### DTC Index

INFOID:0000000011279647

DTC	Items (CONSULT screen terms)	Reference
C1601	BATTERY VOLT	<a href="#">STC-20. "DTC Logic"</a>
C1604	TORQUE SENSOR	<a href="#">STC-23. "DTC Logic"</a>
C1606	EPS MOTOR	<a href="#">STC-24. "DTC Logic"</a>
C1607	EEPROM	<a href="#">STC-25. "DTC Logic"</a>
C1608	CONTROL UNIT	<a href="#">STC-25. "DTC Logic"</a>
C1609	CAN VHCL SPEED	<a href="#">STC-26. "DTC Logic"</a>
U1000	CAN COMM CIRCUIT	<a href="#">STC-27. "DTC Logic"</a>

# EPS SYSTEM

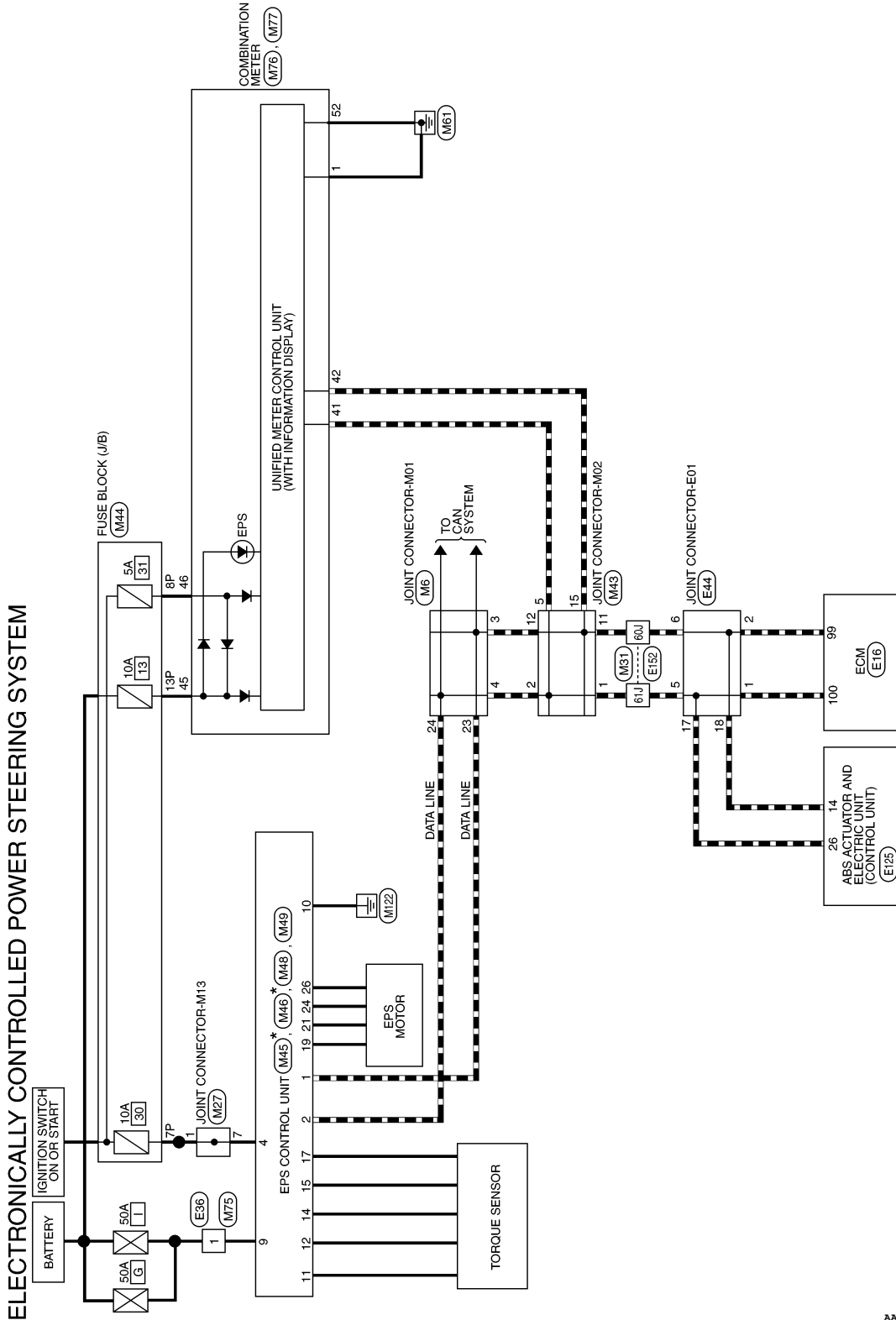
< WIRING DIAGRAM >

## WIRING DIAGRAM

### EPS SYSTEM

#### Wiring Diagram

INFOID:000000011279648

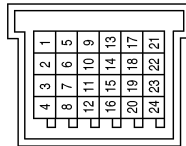


\* : THIS CONNECTOR IS NOT SHOWN IN "HARNES LAYOUT" OF PG SECTION.

AAGWA0066GB

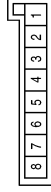
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM CONNECTORS

Connector No.	M6
Connector Name	JOINT CONNECTOR-M01
Connector Color	GRAY



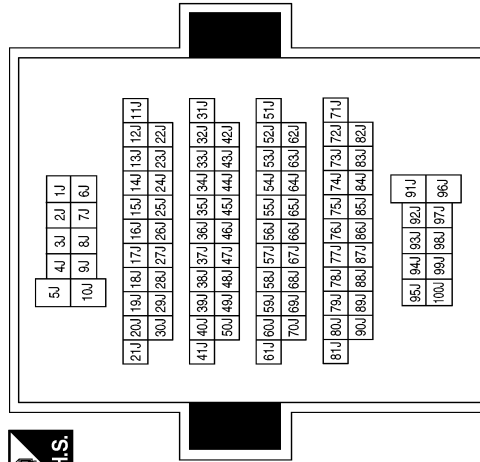
Terminal No.	Color of Wire	Signal Name
3	P	-
4	L	-
23	P	-
24	L	-

Connector No.	M27
Connector Name	JOINT CONNECTOR-M13
Connector Color	WHITE



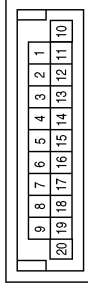
Terminal No.	Color of Wire	Signal Name
1	SB	-
7	SB	-

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
60J	P	-
61J	L	-

Connector No.	M43
Connector Name	JOINT CONNECTOR-M02
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	L	-
2	L	-
5	L	-
11	P	-
12	P	-
15	P	-

Connector No.	M44
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
7P	Y	-
8P	LA/BR	-
13P	LA/G	-

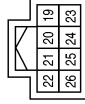
AAGIA0178GB

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

# EPS SYSTEM

< WIRING DIAGRAM >

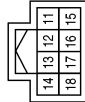
Connector No.	M46
Connector Name	EPS CONTROL UNIT
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
19	W	REFERENCE SIGNAL R1
20	-	-
21	B	GND
22	-	-
23	-	-
24	Y	POSITION SIGNAL S2 (SINE)
25	-	-
26	R	POSITION SIGNAL S1 (COSINE)

Terminal No.	Color of Wire	Signal Name
16	-	-
17	W	TORQUE SENSOR REFERENCE VOLTAGE
18	-	-

Connector No.	M45
Connector Name	EPS CONTROL UNIT
Connector Color	GRAY



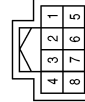
Terminal No.	Color of Wire	Signal Name
11	B	TORQUE SENSOR GND
12	Y	TORQUE SUB SENSOR SIGNAL
13	-	-
14	R	TORQUE SENSOR POWER SUPPLY
15	G	TORQUE MAIN SENSOR SIGNAL

Connector No.	M75
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	R	-

Connector No.	M49
Connector Name	EPS CONTROL UNIT
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	P	CAN-L
2	L	CAN-H
3	-	-
4	SB	IG SIGNAL
5	-	-
6	-	-
7	-	-
8	-	-

Connector No.	M48
Connector Name	EPS CONTROL UNIT
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
9	R	BATTERY +
10	B	GND

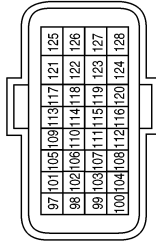
AAGIA0179GB



# EPS SYSTEM

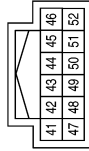
< WIRING DIAGRAM >

Connector No.	E16
Connector Name	ECM
Connector Color	BLACK



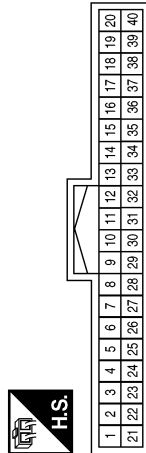
Terminal No.	Color of Wire	Signal Name
99	P	CAN-L
100	L	CAN-H

Connector No.	M77
Connector Name	COMBINATION METER
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
41	L	CAN-H
42	P	CAN-L
45	LA/G	BAT
46	LA/BR	IGN
52	B	G1

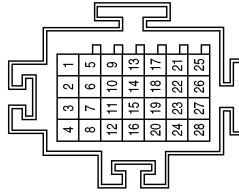
Connector No.	M76
Connector Name	COMBINATION METER
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	B	GND

Terminal No.	Color of Wire	Signal Name
1	L	-
2	P	-
5	L	-
6	P	-
17	L	-
18	P	-

Connector No.	E44
Connector Name	JOINT CONNECTOR-E01
Connector Color	WHITE



Connector No.	E36
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	R	-

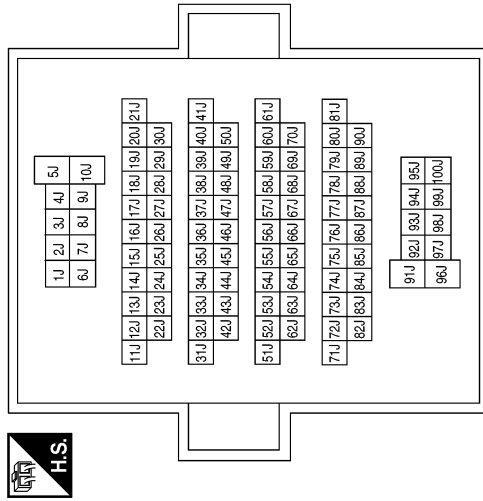
AAGIA0180GB

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

# EPS SYSTEM

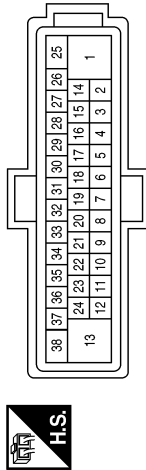
< WIRING DIAGRAM >

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
60J	P	-
61J	L	-

Connector No.	E125
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK



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

AAGIA0182GB

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000011279649

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 Diagnostic Result". Refer to [STC-9, "CONSULT Function"](#).

Is there any DTC displayed?

YES >> Record or print DTC and freeze frame data (FFD). GO TO 3.

NO >> GO TO 4.

#### 3. PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to [STC-13, "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 Diagnostic Result" again, and check that the malfunction is repaired completely. After checking, erase the "Self Diagnostic Result". Refer to [STC-9, "CONSULT Function"](#).

Is no other DTC present and the repair completed?

YES >> Inspection End.

NO >> GO TO 3.

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

# C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### C1601 BATTERY POWER SUPPLY

#### DTC Logic

INFOID:0000000011279650

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1601	BATTERY VOLT	When a power supply voltage to the EPS control unit is maintained at 18.2 V or more or at less than 9 V continuously for five second or more.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• EPS control unit</li><li>• Fuse</li><li>• Power supply system</li><li>• Battery</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> GO TO 2.

##### 2. DTC REPRODUCTION PROCEDURE

###### With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" of "EPS".

###### Is DTC "C1601" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-20, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:0000000011279651

Regarding Wiring Diagram information, refer to [STC-14, "Wiring Diagram"](#).

##### 1. 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 terminal and ground.

EPS control unit		—	Continuity
Connector	Terminal		
M48	10	Ground	Yes

4. Connect EPS control unit harness connector.

###### Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

##### 2. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT (1)

1. Check voltage between EPS control unit harness connector terminals and ground.

# C1601 BATTERY POWER SUPPLY

## < DTC/CIRCUIT DIAGNOSIS >

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M49	4	Ground	0 V

- Turn ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
- Check voltage between EPS control unit harness connector and ground.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M49	4	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> GO TO 3.

### 3. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT (2)

- Turn ignition switch OFF.
- Check the 10A fuse 30.
- Check the harness for open or short between EPS control unit harness connector terminal 4 and the 10A fuse 30.

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to [PG-13, "Wiring Diagram — Battery Power Supply —"](#).  
NO >> Repair or replace malfunctioning parts.

### 4. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT (3)

- Turn ignition switch OFF.
- Check voltage between EPS control unit harness connector and ground.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M48	9	Ground	Battery voltage

- Turn ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
- Check voltage between EPS control unit harness connector and ground.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M48	9	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> GO TO 5.

### 5. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT (4)

- Turn ignition switch OFF.
- Check the 50A fusible links G and I.
- Check the harness for open or short between EPS control unit harness connector terminal 9 and the 50A fusible links G and I.

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit. Refer to [PG-13, "Wiring Diagram — Battery Power Supply —"](#).

## C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

---

NO >> Repair or replace malfunctioning parts.

### 6. CHECK TERMINALS AND HARNESS CONNECTORS

---

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

Is the inspection result normal?

YES >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to [STC-36](#).  
["Removal and Installation"](#).

NO >> Repair or replace malfunctioning parts.

# C1604 TORQUE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

## C1604 TORQUE SENSOR

### DTC Logic

INFOID:0000000011279652

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1604	TORQUE SENSOR	When torque sensor output signal is malfunctioning.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Torque sensor</li><li>• EPS control unit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

##### With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" of "EPS".

Is DTC "C1604" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-23, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000011279653

#### 1. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

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

#### 2. PERFORM SELF-DIAGNOSIS

##### With CONSULT

1. Erase "Self Diagnostic Results" for "EPS".
2. Turn the ignition switch OFF, and then wait 10 seconds and more.
3. Perform "Self Diagnostic Result" for "EPS".

Is DTC "C1604" detected?

- YES >> Torque sensor is malfunctioning. Replace steering column assembly. Refer to [ST-12, "Removal and Installation"](#).  
NO >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

# C1606 EPS MOTOR

< DTC/CIRCUIT DIAGNOSIS >

## C1606 EPS MOTOR

### DTC Logic

INFOID:000000011279654

### 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.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• EPS motor</li><li>• EPS control unit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

##### Ⓟ With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" for "EPS".

Is DTC "C1606" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-24, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000011279655

#### 1. PERFORM SELF-DIAGNOSIS

##### Ⓟ With CONSULT

1. Erase "Self Diagnostic Results" for "EPS".
2. Turn the ignition switch OFF, and then wait 10 seconds and more.
3. Perform "Self Diagnostic Results" for "EPS".

Is DTC "C1606" detected?

- YES >> EPS motor is malfunctioning. Replace steering column assembly. Refer to [ST-12, "Removal and Installation"](#).  
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace malfunctioning parts.



# C1607, C1608 EPS CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

## C1607, C1608 EPS CONTROL UNIT

### DTC Logic

INFOID:000000011279656

### 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.	EPS control unit
C1608	CONTROL UNIT	When the internal malfunction is detected in EPS control unit.	

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

##### Ⓜ With CONSULT

- Turn the ignition switch OFF to ON.
- Perform "Self Diagnostic Result" for "EPS".

Is DTC "C1607" or "C1608" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-25. "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000011279657

#### 1. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

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

#### 2. PERFORM SELF-DIAGNOSIS

##### Ⓜ With CONSULT

- Erase "Self Diagnostic Result" for "EPS".
- Turn the ignition switch OFF, and then wait 10 seconds and more.
- Perform "Self Diagnostic Result" for "EPS".

Is DTC "C1607" or "C1608" detected?

- YES >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to [STC-36. "Removal and Installation"](#).  
NO >> Check intermittent incident. Refer to [GI-44. "Intermittent Incident"](#).

# C1609 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

## C1609 VEHICLE SPEED SIGNAL

### DTC Logic

INFOID:000000011279658

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1609	CAN VHCL SPEED	<ul style="list-style-type: none"><li>Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) via CAN communication.</li><li>ABS actuator and electric unit (control unit) input signal error is detected.</li></ul>	<ul style="list-style-type: none"><li>Harness or connector (CAN communication line)</li><li>EPS control unit</li><li>ABS malfunction</li><li>- Vehicle speed signal error</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> GO TO 2.

##### 2. DTC REPRODUCTION PROCEDURE

###### With CONSULT

- Turn the ignition switch OFF to ON.
- Perform "Self Diagnostic Result" for "EPS".

###### Is DTC "C1609" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-26, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000011279659

##### 1. PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

###### With CONSULT

- Turn the ignition switch OFF to ON.
- Perform "Self Diagnostic Result" for "ABS".

###### Is any DTC detected?

- YES >> Check the DTC. Refer to [BRC-53, "DTC Index"](#).  
NO >> GO TO 2.

##### 2. CHECK TERMINALS AND HARNESS CONNECTORS

Check EPS control unit pin terminals for damage or loose connection with harness connector.

###### Is the inspection result normal?

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

##### 3. PERFORM SELF-DIAGNOSIS

###### With CONSULT

Perform "Self Diagnostic Result" for "EPS".

###### Is DTC "C1609" detected?

- YES >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to [STC-36, "Removal and Installation"](#).  
NO >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

# U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## U1000 CAN COMM CIRCUIT

### Description

INFOID:0000000011279660

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 communicate data but selectively reads required data only.

### DTC Logic

INFOID:0000000011279661

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	EPS control unit is not transmitting/receiving CAN communication signal for 2 seconds or more.	<ul style="list-style-type: none"><li>• CAN communication error</li><li>• EPS control unit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

##### With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" for "EPS".

##### Is DTC "U1000" detected?

YES >> Proceed to diagnosis procedure. Refer to [STC-27, "Diagnosis Procedure"](#).

NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000011279662

Proceed to [LAN-17, "Trouble Diagnosis Flow Chart"](#).

# EPS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

---

## EPS WARNING LAMP

### Component Function Check

INFOID:000000011279663

#### 1. CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when ignition switch turns ON. Then, EPS warning lamp turns OFF after the engine is started.

Is the inspection result normal?

YES >> Inspection End.

NO >> Perform trouble diagnosis. Refer to [STC-28, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000011279664

#### 1. PERFORM SELF-DIAGNOSIS

---

##### Ⓜ With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" for "EPS".

Is any DTC detected?

YES >> Check the DTC. Refer to [STC-13, "DTC Index"](#).

NO >> GO TO 2.

#### 2. CHECK EPS WARNING LAMP SIGNAL

---

##### Ⓜ With CONSULT

1. Turn the ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
2. Select "Data Monitor" of "EPS" and select "WARNING LAMP".
3. Check that the EPS warning lamp is turned ON.
4. Start the engine.  
**CAUTION:**  
**Never drive the vehicle.**
5. Check that the EPS warning lamp is turned OFF.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for combination meter power supply circuit. Refer to [MWI-60, "COMBINATION METER : Diagnosis Procedure"](#).

NO >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to [STC-36, "Removal and Installation"](#).

# EPS WARNING LAMP DOES NOT TURN ON

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### EPS WARNING LAMP DOES NOT TURN ON

#### Description

INFOID:0000000011279665

EPS warning lamp does not turn ON when turning ignition switch ON from OFF. (Check the illumination of the EPS warning lamp.)

#### Diagnosis Procedure

INFOID:0000000011279666

#### 1. CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to [STC-28, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.
- NO >> Repair or replace the specific malfunctioning part.

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

STC

# EPS WARNING LAMP DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

---

## EPS WARNING LAMP DOES NOT TURN OFF

### Description

INFOID:000000011279667

EPS warning lamp does not turn OFF several seconds after engine started.

### Diagnosis Procedure

INFOID:000000011279668

#### 1. PERFORM SELF-DIAGNOSIS

---

##### With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" for "EPS".

##### Is any DTC detected?

- YES >> Check the DTC. Refer to [STC-13, "DTC Index"](#).  
NO >> GO TO 2.

#### 2. CHECK EPS WARNING LAMP

---

Perform the trouble diagnosis of EPS warning lamp. Refer to [STC-28, "Diagnosis Procedure"](#).

##### Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace the specific malfunctioning part.

#### 3. CHECK EPS CONTROL UNIT POWER SUPPLY AND GROUND CIRCUIT

---

Perform the trouble diagnosis of EPS control unit power supply and ground. Refer to [STC-20, "Diagnosis Procedure"](#).

##### Is the inspection result normal?

- YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.  
NO >> Repair or replace the specific malfunctioning part.

# STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

< SYMPTOM DIAGNOSIS >

## STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

### Description

INFOID:0000000011279669

Steering wheel turning force is heavy or light.

### Diagnosis Procedure

INFOID:0000000011279670

#### 1.PERFORM SELF-DIAGNOSIS

##### With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" for "EPS".

##### Is any DTC detected?

- YES >> Check the DTC. Refer to [STC-13, "DTC Index"](#).  
NO >> GO TO 2.

#### 2.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when ignition switch turns ON. Then, EPS warning lamp turns OFF after the engine is started.

##### Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Perform trouble diagnosis of EPS warning lamp. Refer to [STC-28, "Diagnosis Procedure"](#).

#### 3.CHECK EPS CONTROL UNIT SIGNAL (1)

##### With CONSULT

1. Start the engine.  
**CAUTION:**  
**Never drive the vehicle.**
2. Select "ASSIST LEVEL" in "Data Monitor" of "EPS".

##### Does the item in "Data Monitor" indicate "100%"?

- YES >> GO TO 6.  
NO >> GO TO 4.

#### 4.CHECK EPS CONTROL UNIT SIGNAL (2)

##### With CONSULT

Select "BATTERY VOLT" in "Data Monitor" of "EPS".

##### Does the item in "Data Monitor" indicate "10.5 V" or more?

- YES >> GO TO 5.  
NO >> Perform trouble diagnosis of EPS control unit power supply and ground. Refer to [STC-20, "Diagnosis Procedure"](#).

#### 5.CHECK EPS CONTROL UNIT SIGNAL (3)

##### With CONSULT

1. Select "ASSIST LEVEL" in "Data Monitor" of "EPS".
2. Stop the EPS system until the item in "Data Monitor" becomes "100%" or less.

##### **NOTE:**

While stopping the EPS system, do not turn steering wheel.

3. Check that the symptom continues.

##### Does the symptom continue?

- YES >> GO TO 6.  
NO >> The assist torque decreases because of protection function. This is not malfunction. Inspection End.

#### 6.CHECK EPS CONTROL UNIT SIGNAL (4)

##### With CONSULT

1. Start the engine.

##### **CAUTION:**

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

STC

# STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

## < SYMPTOM DIAGNOSIS >

**Never drive the vehicle.**

2. Turn steering wheel from full left stop to full right stop.
3. Select "TORQUE SENSOR" in "Data Monitor" of "EPS".

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	Steering wheel: Right turn	Positive value (Nm)
	Steering wheel: Left turn	Negative value (Nm)

### Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 7.

## 7.CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to [STC-24. "Diagnosis Procedure"](#).

### Is the inspection result normal?

- YES >> GO TO 8.  
NO >> Repair or replace the specific malfunctioning part.

## 8.CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to [ST-6. "Inspection"](#).

### Is the inspection result normal?

- YES >> Inspection End.  
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-6. "Inspection"](#).



# UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

< SYMPTOM DIAGNOSIS >

## UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

### Description

INFOID:0000000011279671

Unbalance steering wheel turning force and return between right and left.

### Diagnosis Procedure

INFOID:0000000011279672

#### 1. CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check the EPS warning lamp while engine is running.

Does the EPS warning lamp turn OFF?

YES >> GO TO 2.

NO >> Refer to [STC-30, "Diagnosis Procedure"](#).

#### 2. CHECK WHEEL ALIGNMENT

1. Check the wheel alignment. Refer to [FSU-8, "Adjustment"](#).

2. Perform "Self Diagnostic Result" for "EPS".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Adjustment of wheel alignment. Refer to [FSU-8, "Adjustment"](#).

#### 3. CHECK EPS CONTROL UNIT SIGNAL

##### With CONSULT

1. Start the engine.

##### **CAUTION:**

**Never drive the vehicle.**

2. Turn steering wheel from full left stop to full right stop.

3. Select "Data Monitor" of "EPS" and select "TORQUE SENSOR".

4. Perform the torque sensor inspection.

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	Steering wheel: Right turn	Positive value (Nm)
	Steering wheel: Left turn	Negative value (Nm)

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

#### 4. CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to [STC-24, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace the specific malfunctioning part.

#### 5. CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to [ST-6, "Inspection"](#).

Is the inspection result normal?

YES >> Inspection End.

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-6, "Inspection"](#).

# UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

## UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

### Description

INFOID:000000011279673

Unbalance steering wheel turning force (torque variation).

### Diagnosis Procedure

INFOID:000000011279674

#### 1. PERFORM SELF-DIAGNOSIS

##### With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform "Self Diagnostic Result" for "EPS".

Is any DTC detected?

- YES >> Check the DTC. Refer to [STC-13, "DTC Index"](#).  
NO >> GO TO 2.

#### 2. CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check the EPS warning lamp while the engine is started.

Does the EPS warning lamp turn OFF?

- YES >> GO TO 3.  
NO >> Refer to [STC-28, "Diagnosis Procedure"](#).

#### 3. CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.

- Steering column assembly. Refer to [ST-8, "Inspection"](#).
- Steering gear assembly. Refer to [ST-9, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair or replace the specific malfunctioning part.

#### 4. CHECK EPS CONTROL UNIT SIGNAL (1)

##### With CONSULT

1. Start the engine.  
**CAUTION:**  
**Never drive the vehicle.**
2. Turn steering wheel from full left stop to full right stop.
3. Select "ASSIST LEVEL" in "Data Monitor" of "EPS".

Does the item in "Data Monitor" maintain "100%"?

- YES >> GO TO 7.  
NO >> GO TO 5.

#### 5. CHECK EPS CONTROL UNIT SIGNAL (2)

##### With CONSULT

Select "BATTERY VOLT" in "Data Monitor" of "EPS".

Does the item in "Data Monitor" indicate "10.5 V" or more?

- YES >> GO TO 6.  
NO >> Perform trouble diagnosis of EPS control unit power supply and ground. Refer to [STC-20, "Diagnosis Procedure"](#).

#### 6. CHECK EPS CONTROL UNIT SIGNAL (3)

##### With CONSULT

1. Select "ASSIST LEVEL" in "Data Monitor" of "EPS".
2. Stop the EPS system until the item in "Data Monitor" becomes "100%" or less.

**NOTE:**

While stopping the EPS system, do not turn steering wheel.

3. Check that the symptom continues.

# UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

## < SYMPTOM DIAGNOSIS >

### Does the symptom continue?

YES >> GO TO 7.

NO >> The assist torque decreases because of protection function. This is not malfunction. Inspection End.

## 7. CHECK EPS CONTROL UNIT SIGNAL (4)

### With CONSULT

1. Start the engine.

#### **CAUTION:**

**Never drive the vehicle.**

2. Turn steering wheel from full left stop to full right stop.

3. Select "TORQUE SENSOR" in "Data Monitor" of "EPS".

4. Perform the torque sensor inspection.

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	Steering wheel: Right turn	Positive value (Nm)
	Steering wheel: Left turn	Negative value (Nm)

### Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

## 8. CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to [STC-24, "Diagnosis Procedure"](#).

### Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace the specific malfunctioning part.

## 9. CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to [ST-6, "Inspection"](#).

### Is the inspection result normal?

YES >> Inspection End.

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-6, "Inspection"](#).

## EPS CONTROL UNIT

< REMOVAL AND INSTALLATION >

---

# REMOVAL AND INSTALLATION

## EPS CONTROL UNIT

### Removal and Installation

INFOID:000000011279675

**CAUTION:**

**Disconnect the battery negative terminal before removing the EPS control unit.**

The EPS control unit is an integral part of the steering column. If the replacement of the EPS control unit is necessary, replace the steering column. Refer to [ST-12, "Removal and Installation"](#).