

A

B

C

D

E

F

STC

H

I

J

K

L

M

N

O

P

SECTION

STC

STEERING CONTROL SYSTEM

CONTENTS

PRECAUTION	3	Diagnosis Procedure	18
PRECAUTIONS	3	C1604 TORQUE SENSOR	21
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	3	DTC Logic	21
Service Notice and Precautions for EPS System.....	3	Diagnosis Procedure	21
SYSTEM DESCRIPTION	4	C1606 EPS MOTOR	23
COMPONENT PARTS	4	DTC Logic	23
Component Parts Location	4	Diagnosis Procedure	23
EPS Control Unit	5	Component Inspection	23
EPS Motor, Torque Sensor, Reduction Gear	5	C1607, C1608 EPS CONTROL UNIT	25
DIAGNOSIS SYSTEM (EPS CONTROL UNIT)	6	DTC Logic	25
CONSULT Function	6	Diagnosis Procedure	25
ECU DIAGNOSIS INFORMATION	8	C1609 VEHICLE SPEED SIGNAL	26
EPS CONTROL UNIT	8	Description	26
Reference Value	8	DTC Logic	26
Fail-Safe	9	Diagnosis Procedure	26
Protection Function	10	C1610 ENGINE STATUS SIGNAL	27
DTC Inspection Priority Chart	10	Description	27
DTC Index	10	DTC Logic	27
WIRING DIAGRAM	11	Diagnosis Procedure	27
EPS SYSTEM	11	U1000 CAN COMM CIRCUIT	28
Wiring Diagram	11	Description	28
BASIC INSPECTION	15	DTC Logic	28
DIAGNOSIS AND REPAIR WORKFLOW	15	Diagnosis Procedure	28
Work Flow	15	EPS WARNING LAMP	29
Diagnostic Work Sheet	16	Component Function Check	29
DTC/CIRCUIT DIAGNOSIS	18	Diagnosis Procedure	29
C1601 BATTERY POWER SUPPLY	18	SYMPTOM DIAGNOSIS	30
DTC Logic	18	EPS WARNING LAMP DOES NOT TURN ON...	30
Diagnosis Procedure	18	Description	30
C1602 TORQUE SENSOR	19	Diagnosis Procedure	30
DTC Logic	19	EPS WARNING LAMP DOES NOT TURN OFF	31
Diagnosis Procedure	19	Description	31
C1603 TORQUE SENSOR	20		
DTC Logic	20		
Diagnosis Procedure	20		

STC

cardiagn.co

Diagnosis Procedure	31
STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT	32
Description	32
Diagnosis Procedure	32
UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT	34
Description	34
Diagnosis Procedure	34

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)	35
Description	35
Diagnosis Procedure	35
REMOVAL AND INSTALLATION	37
EPS CONTROL UNIT	37
Exploded View	37
Removal and Installation	37

PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000012431939

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 and Precautions for EPS System

INFOID:000000012431940

- Check the following item when performing the trouble diagnosis:
 - Check for possible causes of the malfunction by interviewing the customer as to what conditions were present when the symptom occurred.
 - Check if the steering wheel and the EPS control unit are genuine parts.
 - Check if the air pressure and size of each tire is correct.
 - Check if the installation of the links and suspension components are correct.
 - Check if the tires are worn evenly, indicating the wheel alignment is correct.
 - Check if the installation of the steering column and the steering gear are correct. Check for loose bolts, damaged links, cracked boots and leaking grease, etc.
 - Check for damage or modification to suspension or body resulting in increased weight or altered ground clearance.
 - Check if the battery voltage is proper.
 - Check the EPS control unit harness to be sure the harness connectors are fully seated.
- Before connecting or disconnecting the EPS control unit harness connector, turn ignition switch "OFF" and disconnect the battery cable from the negative terminal. Battery voltage is applied to the EPS control unit even if ignition switch is turned "OFF".

COMPONENT PARTS

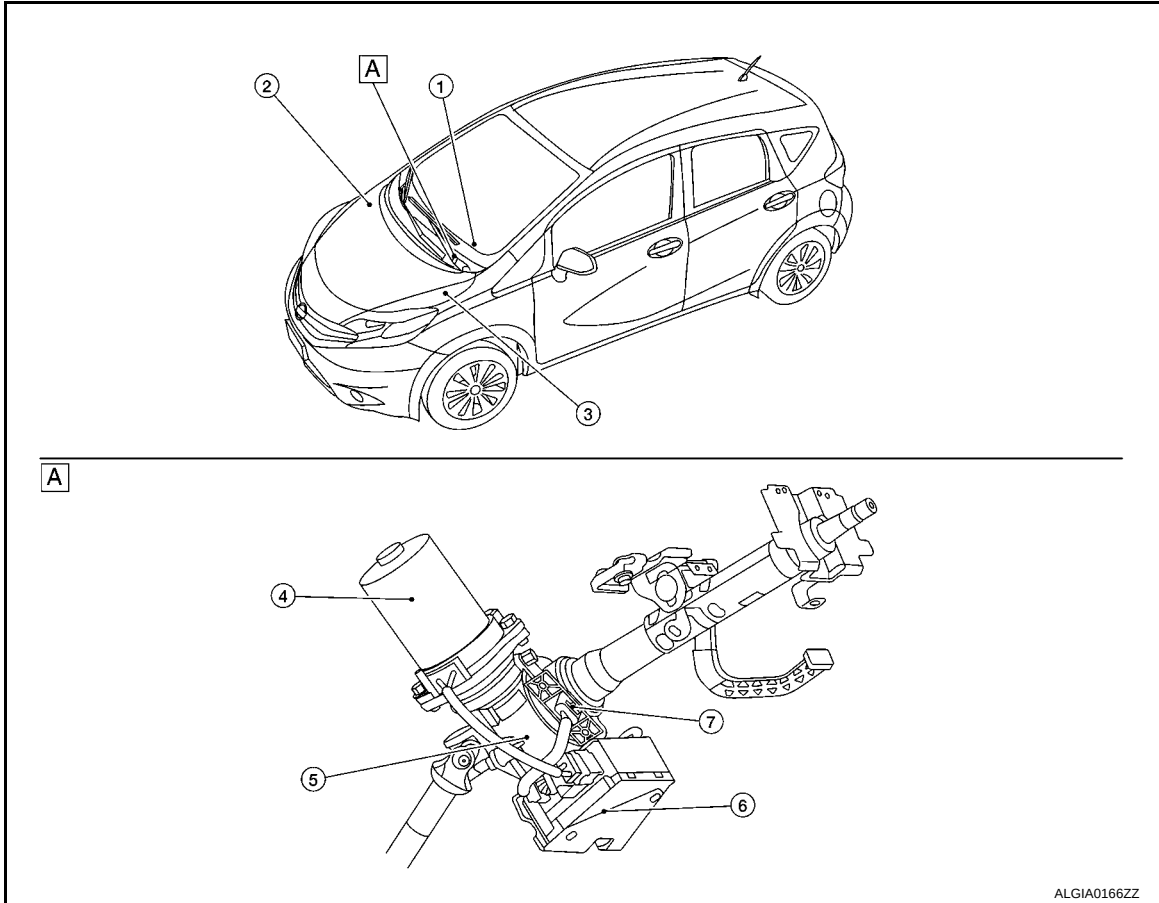
< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000012431941



A. Steering column assembly

No.	Component	Function
1.	Combination meter (EPS warning lamp)	- Transmits mainly the following signal to EPS control unit via CAN communication: - Vehicle speed signal (Meter) - Turns ON the EPS warning lamp according to the signal from EPS control unit via CAN communication. - For detailed installation location, refer to MWI-8, "METER SYSTEM : Component Parts Location" (Type A) or MWI-58, "METER SYSTEM : Component Parts Location" (Type B).
2.	ABS actuator and electric unit (control unit)	- Transmits mainly the following signal to EPS control unit via CAN communication: - Vehicle speed signal (ABS) - For detailed installation location, refer to BRC-7, "Component Parts Location".

COMPONENT PARTS

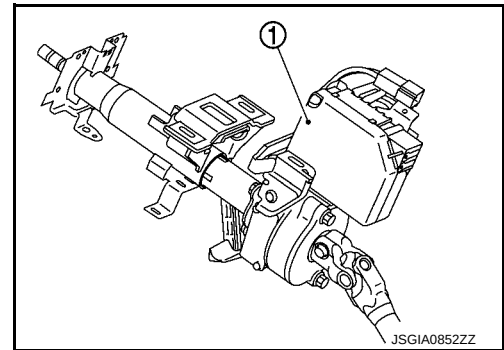
< SYSTEM DESCRIPTION >

No.	Component	Function
3.	ECM	- Transmits mainly the following signal to EPS control unit via CAN communication: - Engine status signal - For detailed installation location, refer to EC-14. "ENGINE CONTROL SYSTEM : Component Parts Location".
4.	EPS motor	Refer to STC-5. "EPS Motor, Torque Sensor, Reduction Gear" .
5.	Reduction gear	Refer to STC-5. "EPS Motor, Torque Sensor, Reduction Gear" .
6.	EPS control unit	Refer to STC-5. "EPS Control Unit" .
7.	Torque sensor	Refer to STC-5. "EPS Motor, Torque Sensor, Reduction Gear" .

EPS Control Unit

INFOID:0000000012431942

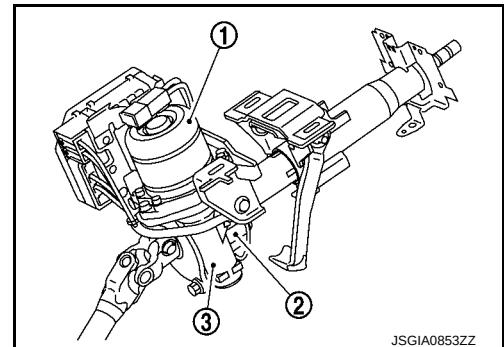
- EPS control unit (1) is installed to steering column assembly.
- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque signal to the EPS motor according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



EPS Motor, Torque Sensor, Reduction Gear

INFOID:0000000012431943

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



EPS MOTOR

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

TORQUE SENSOR

Torque sensor detects the steering torque, and transmits 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.

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

CONSULT Function

INFOID:000000012431944

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 DIAGNOSTIC RESULT MODE

Refer to [STC-10, "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)	The number of times that ignition switch is turned ON after the DTC is detected is displayed. • When "0" is displayed: It indicates that the system is presently malfunctioning. • When except "0" is displayed: It indicates that system malfunction in the past is detected, but the system is presently normal. NOTE: 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 does not increase and "39" is displayed until self-diagnosis is erased.

DATA MONITOR MODE

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.* ¹
MOTOR SIG (A)	Displays the current commanded value to EPS motor.
ASSIST TORQUE (Nm)	Displays assist torque 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.* ²
VEHICLE SPEED (km/h or MPH)	Vehicle speed is displayed from vehicle speed signal via CAN communication.* ³
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.

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

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< SYSTEM DESCRIPTION >

*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.

A

B

C

D

E

F

STC

H

I

J

K

L

M

N

O

P

EPS CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

EPS CONTROL UNIT

Reference Value

INFOID:0000000012431945

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.

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) ^{*1}
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		Approx. 0 Nm ^{*2}
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 % ^{*3}
VEHICLE SPEED	Vehicle stopped		0 km/h or mph
	While driving		Approximately equal to the indication on speedometer ^{*4} (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: A fixed value is indicated regardless of steering turning.

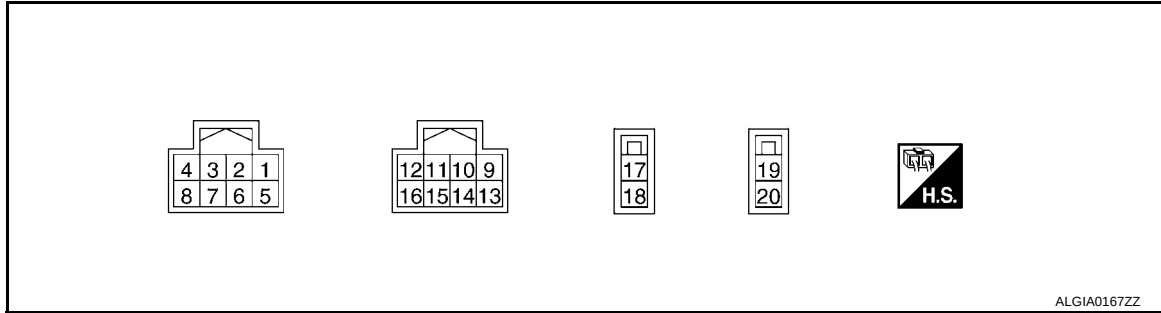
*3: Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it returns to 100% when left standing.

*4: 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 (Y)	Ground	Ignition power supply	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
13 (R)	Ground	Torque sensor power supply	Output	Ignition switch: ON		5 V
				Ignition switch: OFF		0 V
14 (Y)	Ground	Torque sensor sub	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)
15 (B)	Ground	Torque sensor ground	Input	Always		0 V
16 (W)	Ground	Torque sensor main	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 (R)	Ground	Battery power supply	Input	Always		Battery voltage
18 (B)	Ground	Ground	—	Always		0 V
19 (R)	—	Motor +	—	—		—
20 (B)	—	Motor -	—	—		—

Fail-Safe

INFOID:0000000012431946

- 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, the system enters into a manual steering state. (Steering wheel turning force becomes heavy.)
- Under abnormal vehicle speed signal conditions, vehicle speed is judged as constant.

EPS CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

Protection Function

INFOID:0000000012431947

EPS control unit decreases the output signal to EPS motor while extremely using the power steering function (e.g., full steering) consecutively for protecting EPS motor and EPS control unit (Overload protection control). While activating overload protection control, the assist torque gradually decreases, and the steering wheel turning force becomes heavy. The normal assist torque reactivates by no steering.

DTC Inspection Priority Chart

INFOID:0000000012431948

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, C1610 CAN ENG RPM
3	C1601 BATTERY VOLT
4	Other than the above

DTC Index

INFOID:0000000012431949

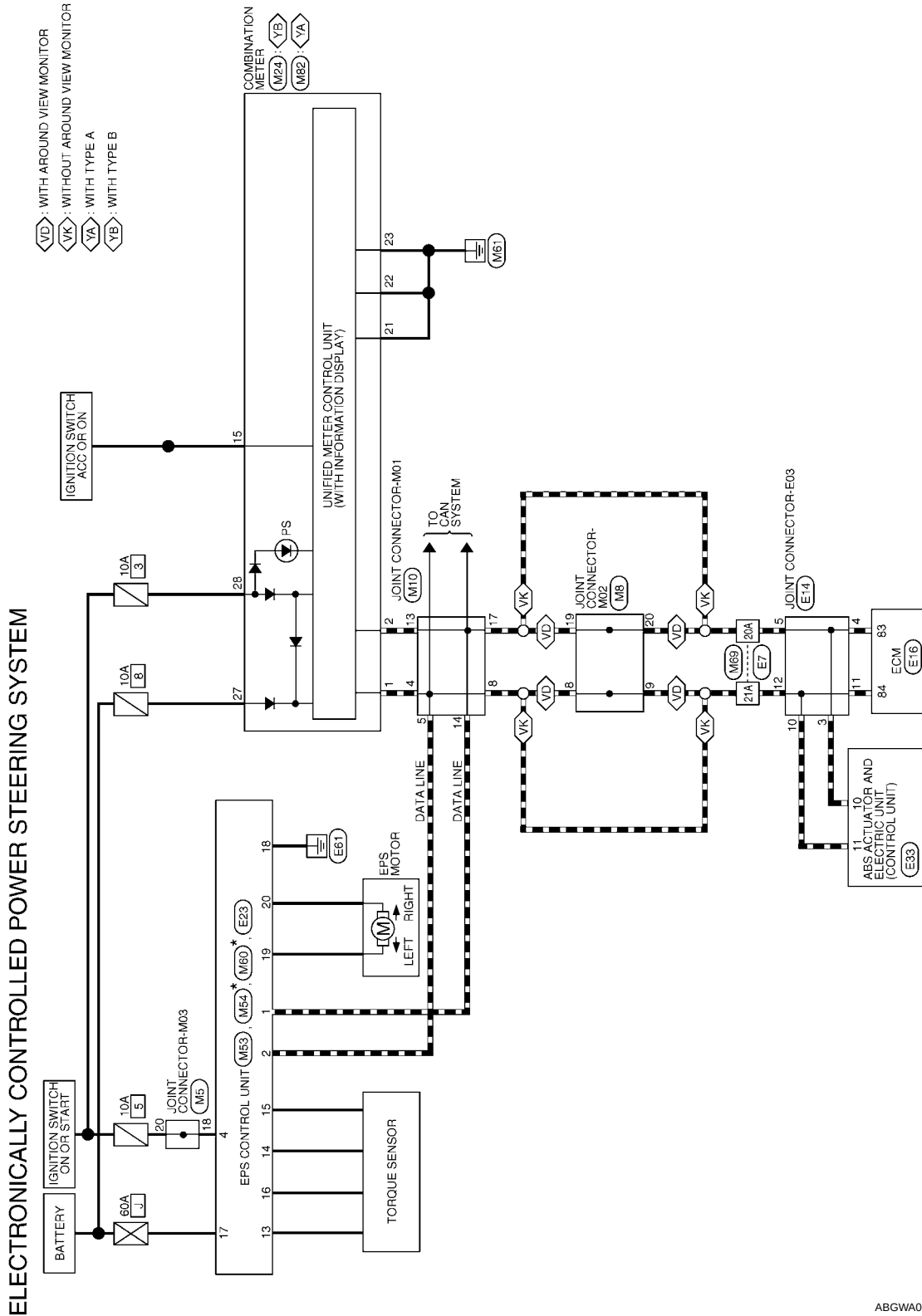
DTC	Items (CONSULT screen terms)	Reference
C1601	BATTERY VOLT	STC-18, "DTC Logic"
C1604	TORQUE SENSOR	STC-21, "DTC Logic"
C1606	EPS MOTOR	STC-23, "DTC Logic"
C1607	EEPROM	STC-25, "DTC Logic"
C1608	CONTROL UNIT	STC-25, "DTC Logic"
C1609	CAN VHCL SPEED	STC-26, "DTC Logic"
C1610	CAN ENG RPM	STC-27, "DTC Logic"
U1000	CAN COMM CIRCUIT	STC-28, "DTC Logic"

WIRING DIAGRAM

EPS SYSTEM

Wiring Diagram

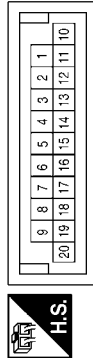
INFOID:0000000012431950



ABGWA0111GB

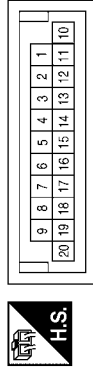
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM CONNECTORS

Connector No.	M5
Connector Name	JOINT CONNECTOR-M03
Connector Color	WHITE



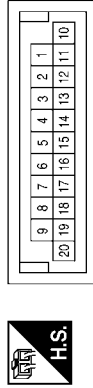
Terminal No.	Color of Wire	Signal Name
18	Y	-
20	BG	-

Connector No.	M8
Connector Name	JOINT CONNECTOR-M02
Connector Color	GREEN



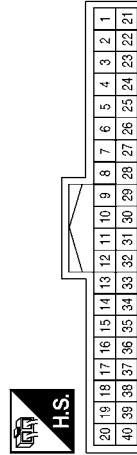
Terminal No.	Color of Wire	Signal Name
8	L	-
9	L	-
19	P	-
20	P	-

Connector No.	M10
Connector Name	JOINT CONNECTOR-M01
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
4	L	-
5	L	-
8	L	-
13	P	-
14	P	-
17	P	-

Connector No.	M24
Connector Name	COMBINATION METER (WITH TYPE B)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	P	CAN-L
15	R	ACC SW
21	B	GND (ILL)
22	B	GND (POWER)
23	B	GND (CIRCUIT)
27	R/W	BAT
28	GR	IGN

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



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

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

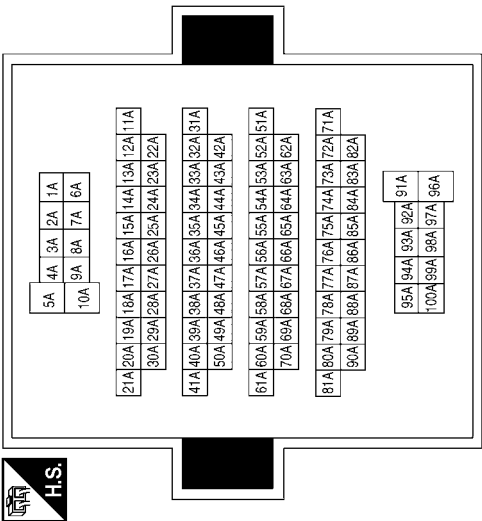


Terminal No.	Color of Wire	Signal Name
9	-	-
10	-	-
11	-	-
12	-	-
13	R	TSV
14	Y	TSS
15	B	TSE (GND)
16	W	TSM

< WIRING DIAGRAM >

Terminal No.	Color of Wire	Signal Name
20A	P	-
21A	L	-

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



Connector No.	M60
Connector Name	EPS CONTROL UNIT
Connector Color	BLUE

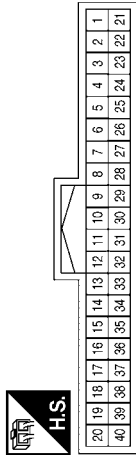


Terminal No.	Color of Wire	Signal Name
19	R	M+
20	B	M-



Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	P	CAN-L
15	R	ACC SW
21	B	GND (ILLUMINATION)
22	B	GND (POWER)
23	B	GND (CIRCUIT)
27	R/W	BAT
28	GR	IGN

Connector No.	M82
Connector Name	COMBINATION METER (WITH TYPE A)
Connector Color	WHITE

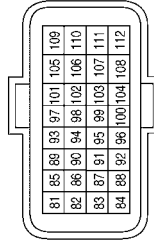


ABGIA0170GB

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

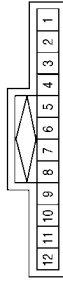
STC
cardiagn.co

Connector No.	E16
Connector Name	ECM
Connector Color	BLACK



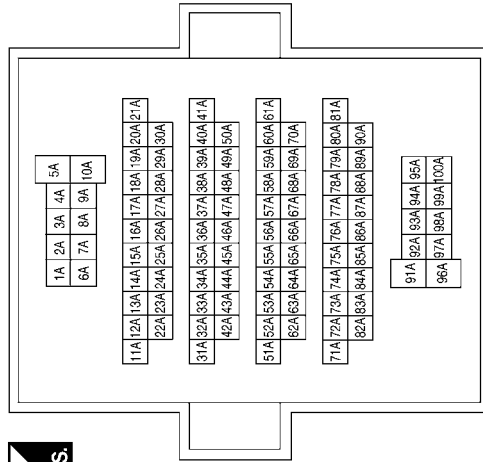
Terminal No.	Color of Wire	Signal Name
83	P	CAN-L
84	L	CAN-H

Connector No.	E14
Connector Name	JOINT CONNECTOR-E03
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
3	P	-
4	P	-
5	P	-
10	L	-
11	L	-
12	L	-

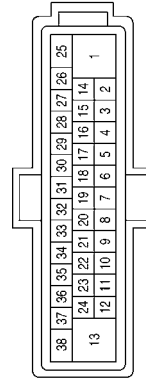
Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
20A	P	-
21A	L	-

Terminal No.	Color of Wire	Signal Name
10	P	CAN-L
11	L	CAN-H

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



Connector No.	E23
Connector Name	EPS CONTROL UNIT
Connector Color	BLACK



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

ABGIA0171GB

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000012431951

DETAILED FLOW

1. INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing [STC-16, "Diagnostic Work Sheet"](#) and reproduce symptoms to understand them fully. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

Customers are not professional. Never make assumptions like "maybe the customer means that....," or "maybe the customer mentioned this symptom".

>> GO TO 2.

2. CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by protection function. Refer to [STC-10, "Protection Function"](#).

CAUTION:

When the symptom is caused by normal operation, fully inspect each portion and obtain the understanding of customer that the symptom is not caused by a malfunction.

>> GO TO 3.

3. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform "Self Diagnostic Result" of "EPS".

Is any DTC detected?

- YES >> Record or print self-diagnostic results. GO TO 4.
NO >> GO TO 6.

4. RECHECK SYMPTOM

With CONSULT

1. Erase "Self Diagnostic Result" of "EPS".
2. Perform DTC confirmation procedures for the malfunctioning system.

NOTE:

If some DTCs are detected at the same time, determine the order for performing the diagnosis based on [STC-10, "DTC Inspection Priority Chart"](#).

Is any DTC detected?

- YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to [GI-42, "Intermittent Incident"](#).

5. REPAIR OR REPLACE MALFUNCTIONING COMPONENT

- Repair or replace malfunctioning component.
- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase "Self Diagnostic Result" of "EPS".

>> GO TO 7.

6. IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Identify malfunctioning system based on symptom diagnosis and perform inspection.

Can the malfunctioning system be identified?

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

YES >> GO TO 7.

NO >> Check harness and connectors based on the information obtained by interview. Refer to [GI-42](#), ["Intermittent Incident"](#).

7.FINAL CHECK

With CONSULT

1. Check the reference value for EPS control unit.

2. Recheck the symptom and check that symptom is not reproduced on the same conditions.

Is the symptom reproduced?

YES >> GO TO 3.

NO >> Inspection End.

Diagnostic Work Sheet

INFOID:0000000012431952

Description

- In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about his/her concerns carefully. To systemize all the information for the diagnosis, prepare the interview sheet referring to the interview points.
- In some cases, multiple conditions that appear simultaneously may cause a DTC to be detected.

Interview sheet sample

Interview sheet					
Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Symptom		☐ The steering wheel position (center) is in the wrong position.			
		☐ Warning lamp turns on.			
		☐ Noise ☐ Vibration			
		☐ Others ()			
First occurrence		☐ Recently ☐ Others ()			
Frequency of occurrence		☐ Always ☐ Under a certain conditions of ☐ Sometimes (time(s)/day)			
Climate conditions		☐ Irrelevant			
	Weather	☐ Fine ☐ Cloud ☐ Rain ☐ Snow ☐ Others ()			
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Temperature [Approx. °C (°F)]			
	Relative humidity	☐ High ☐ Moderate ☐ Low			
Road conditions		☐ Urban area ☐ Suburb area ☐ High way ☐ Mountain road (uphill or down hill) ☐ Rough road			
Operation conditions, etc.		☐ Irrelevant ☐ When engine starts ☐ During idling ☐ During driving ☐ During acceleration ☐ At constant speed driving ☐ During deceleration ☐ During cornering (right curve or left curve) ☐ During steering			

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Interview sheet					
Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Other conditions					
Memo					

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:0000000012431953

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 17.5 V or more or at less than 9V continuously for five second or more.	• Harness or connector • EPS control unit • Fuse • Power supply system • Battery

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-18, "Diagnosis Procedure"](#).
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000012431954

Regarding Wiring Diagram information, refer to [STC-11, "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		
E23	18	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 terminal and ground.

C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M53	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		
M53	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 No. 5.
- Check the harness for open or short between EPS control unit harness connector M53 terminal 4 and the 10A fuse No. 5.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to [PG-27, "Wiring Diagram — Ignition Power Supply —"](#).

NO >> Repair or replace malfunctioning component.

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

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

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
E23	17	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		
E23	17	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 60A fusible link (J).
- Check the harness for open or short between EPS control unit harness connector E23 terminal 17 and the 60A fusible link (J).

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to [PG-15, "Wiring Diagram — Battery Power Supply —"](#).

C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace malfunctioning component.

6.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect torque sensor harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

Is the inspection result normal?

YES >> Replace EPS control unit. Refer to [STC-37. "Removal and Installation"](#).

NO >> Repair or replace malfunctioning component.

C1604 TORQUE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1604 TORQUE SENSOR

DTC Logic

INFOID:0000000012431955

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1604	TORQUE SENSOR	When torque sensor output signal is malfunctioning.	• Harness or connector • Torque sensor • 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

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-21, "Diagnosis Procedure"](#).
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000012431956

Regarding Wiring Diagram information, refer to [STC-11, "Wiring Diagram"](#).

1.CHECK TORQUE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF to ON.
CAUTION:
Never start the engine.
2. Check voltage between EPS control unit harness connector terminal and ground.

CAUTION:
Steering wheel in neutral position. (There is no steering force.)

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M54	13	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Perform the trouble diagnosis for battery power supply circuit. Refer to [STC-18, "Diagnosis Procedure"](#).

2.CHECK TORQUE SENSOR GROUND CIRCUIT

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

CAUTION:
Steering wheel in neutral position. (There is no steering force.)

C1604 TORQUE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

EPS control unit		—	Continuity
Connector	Terminal		
M54	15	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK TORQUE SENSOR SIGNAL

1. Turn ignition switch OFF to ON.
2. Check voltage between EPS control unit harness connector terminal and ground.

CAUTION:

Steering wheel in neutral position. (There is no steering force.)

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M54	16	Ground	2.5 V
	14		

3. Start the engine.
4. Check voltage between EPS control unit harness connector terminal and ground while turning the steering wheel.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M54	16	Ground	1.6 V – 3.4 V (The value is changed according to steering left or right)
	14		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Torque sensor is malfunctioning. Replace steering column assembly. Refer to [ST-9, "Exploded View"](#).

4.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

Is the inspection result normal?

YES >> Replace EPS control unit. Refer to [STC-37, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning component.

C1606 EPS MOTOR

< DTC/CIRCUIT DIAGNOSIS >

C1606 EPS MOTOR

DTC Logic

INFOID:0000000012431957

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.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 "C1606" detected?

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

Diagnosis Procedure

INFOID:0000000012431958

1.CHECK EPS MOTOR

Check the EPS motor. Refer to [STC-23, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> EPS motor is malfunction. Replace steering column assembly. Refer to [ST-9, "Exploded View"](#).

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS motor harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

Is the inspection result normal?

- YES >> Replace EPS control unit. Refer to [STC-37, "Removal and Installation"](#).
NO >> Repair or replace malfunctioning component.

Component Inspection

INFOID:0000000012431959

1.CHECK EPS MOTOR

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

EPS motor		Resistance (Approx.)
Terminal		
19	20	0.1 Ω or less

Is the inspection result normal?

C1606 EPS MOTOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Inspection End.

NO >> EPS motor is malfunctioning. Replace steering column assembly. Refer to [ST-9, "Removal and Installation"](#).

C1607, C1608 EPS CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

C1607, C1608 EPS CONTROL UNIT

DTC Logic

INFOID:0000000012431960

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

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

Is DTC "C1607" or "C1608" detected?

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

Diagnosis Procedure

INFOID:0000000012431961

1. PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is DTC "C1607" or "C1608" detected?

- YES >> Replace EPS control unit. Refer to [STC-37. "Removal and Installation"](#).
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any item are damaged, repair or replace malfunctioning component.

C1609 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1609 VEHICLE SPEED SIGNAL

Description

INFOID:0000000012431962

EPS control unit receives the vehicle speed signal from ABS actuator and electric unit (control unit) via CAN communication line.

DTC Logic

INFOID:0000000012431963

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1609	CAN VHCL SPEED	- Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) via CAN communication. - ABS actuator and electric unit (control unit) input signal error is detected.	- Harness or connector - CAN communication line - EPS control unit - ABS malfunction - Vehicle speed signal error

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" of "EPS"

Is DTC "C1609" detected?

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

Diagnosis Procedure

INFOID:0000000012431964

1. PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF DIAGNOSTIC RESULT

With CONSULT

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

Is any DTC detected?

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

2. PERFORM SELF DIAGNOSTIC RESULT

With CONSULT

Perform "Self Diagnostic Result" of "EPS".

Is DTC "C1609" detected?

- YES >> Replace EPS control unit. Refer to [STC-37. "Removal and Installation"](#).
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any item are damaged, repair or replace malfunctioning component.

C1610 ENGINE STATUS SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1610 ENGINE STATUS SIGNAL

Description

INFOID:0000000012431965

EPS control unit receives the engine status signal from ECM via CAN communication line.

DTC Logic

INFOID:0000000012431966

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1610	CAN ENG RPM	- Malfunction is detected in engine status signal that is output from ECM via CAN communication. - ECM input signal error is detected.	- Harness or connector - CAN communication line - EPS control unit - ECM - Engine status signal error

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" of "EPS".

Is DTC "C1610" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-27. "Diagnosis Procedure"](#).
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000012431967

1. PERFORM ECM SELF DIAGNOSTIC RESULT

With CONSULT

- Turn the ignition switch OFF to ON.
- Perform "Self Diagnostic Result" of "ENGINE". Refer to [EC-60. "CONSULT Function"](#).

Is any DTC detected?

- YES >> Check the DTC. Refer to [EC-87. "DTC Index"](#).
NO >> GO TO 2.

2. PERFORM SELF DIAGNOSTIC RESULT

With CONSULT

Perform "Self Diagnostic Result" of "EPS".

Is DTC "C1610" detected?

- YES >> Replace EPS control unit. Refer to [STC-37. "Removal and Installation"](#).
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any item are damaged, repair or replace malfunctioning components.

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000012431968

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:0000000012431969

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.	• CAN communication error • 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

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

Is DTC "U1000" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-28, "Diagnosis Procedure"](#).
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000012431970

Proceed to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

EPS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

EPS WARNING LAMP

Component Function Check

INFOID:0000000012431971

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-29. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000012431972

1.PERFORM SELF DIAGNOSTIC RESULT

With CONSULT

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

Is any DTC detected?

YES >> Check the DTC. Refer to [STC-10. "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-43. "COMBINATION METER : Diagnosis Procedure"](#) (Type A) or [MWI-98. "COMBINATION METER : Diagnosis Procedure"](#) (Type B).

NO >> Replace the EPS control unit. Refer to [STC-37. "Removal and Installation"](#).

EPS WARNING LAMP DOES NOT TURN ON

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

EPS WARNING LAMP DOES NOT TURN ON

Description

INFOID:0000000012431973

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:0000000012431974

1.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to [STC-29, "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.

EPS WARNING LAMP DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

EPS WARNING LAMP DOES NOT TURN OFF

Description

INFOID:0000000012431975

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

Diagnosis Procedure

INFOID:0000000012431976

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

- YES >> Check the DTC. Refer to [STC-10, "DTC Index"](#).
NO >> GO TO 2.

2.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to [STC-29, "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-18, "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:0000000012431977

Steering wheel turning force is heavy or light.

Diagnosis Procedure

INFOID:0000000012431978

1.PERFORM SELF DIAGNOSTIC RESULT

With CONSULT

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

Is any DTC detected?

- YES >> Check the DTC. Refer to [STC-10, "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-29, "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 V or more?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis of EPS control unit power supply and ground. Refer to [STC-18, "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%".

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:

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-23, "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-19, "Steering Wheel Turning Force"](#).

Is the inspection result normal?

- YES >> Inspection End.
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-19, "Steering Wheel Turning Force"](#).

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:0000000012431979

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

Diagnosis Procedure

INFOID:0000000012431980

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-29, "Diagnosis Procedure"](#).

2.CHECK WHEEL ALIGNMENT

1. Check the wheel alignment. Refer to [FSU-7, "Inspection"](#).

2. Perform "Self Diagnostic Result" of "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-23, "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-19, "Steering Wheel Turning Force"](#).

Is the inspection result normal?

YES >> Inspection End.

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-19, "Steering Wheel Turning Force"](#).

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Description

INFOID:0000000012431981

Unbalance steering wheel turning force (torque variation).

Diagnosis Procedure

INFOID:0000000012431982

1.PERFORM SELF DIAGNOSTIC RESULT

With CONSULT

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

Is any DTC detected?

- YES >> Check the DTC. Refer to [STC-10, "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-29, "Diagnosis Procedure"](#).

3.CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.

- Steering column assembly. Refer to [ST-9, "Exploded View"](#).
- Steering gear assembly. Refer to [ST-14, "Exploded View"](#).

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 V or more?

- YES >> GO TO 6.
NO >> Perform trouble diagnosis of EPS control unit power supply and ground. Refer to [STC-18, "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%".
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-23, "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-19, "Steering Wheel Turning Force"](#).

Is the inspection result normal?

YES >> Inspection End.

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-19, "Steering Wheel Turning Force"](#).

EPS CONTROL UNIT

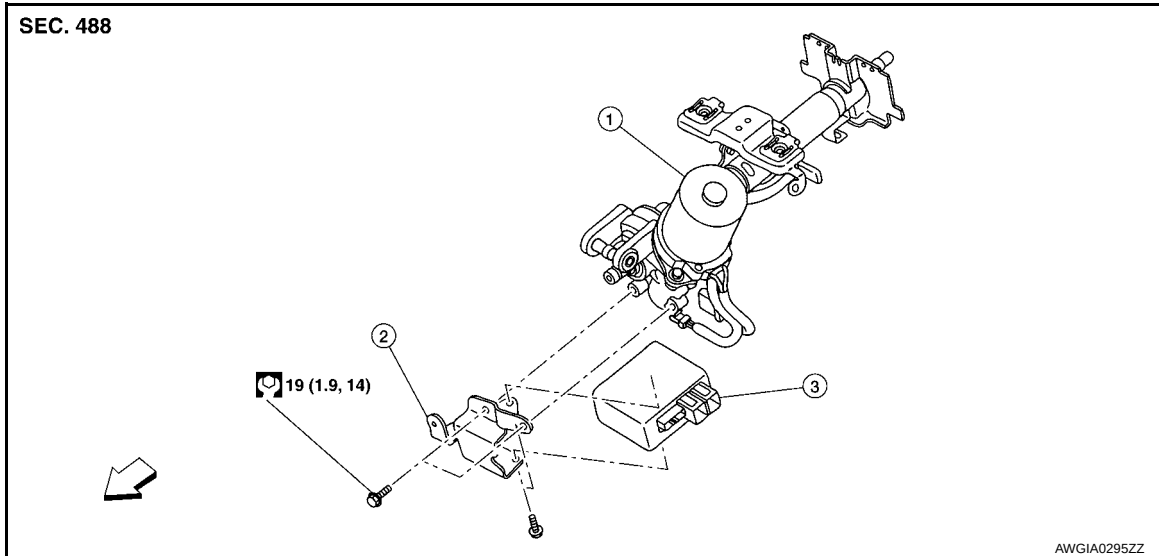
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

EPS CONTROL UNIT

Exploded View

INFOID:0000000012431983



1. Steering column

2. Bracket plate

3. EPS control unit

⇐ Front

Removal and Installation

INFOID:0000000012431984

CAUTION:

- Do not shock EPS control unit, e.g. drop or hit.
- Do not allow EPS control unit to get wet with water, moisture or any other liquid. Also, protect the EPS control unit from extreme temperatures.
- Do not disassemble or remodel EPS control unit, EPS motor, torque sensor, harness and connectors.

REMOVAL

1. Perform a CPU memory erase on the EPS with CONSULT before removal.
2. Disconnect the battery cable from the negative terminal. Refer to [PG-70, "Removal and Installation \(Battery\)"](#)
3. Remove instrument lower panel (LH). Refer to [IP-24, "Removal and Installation"](#).
4. Disconnect harness connectors from EPS control unit.

CAUTION:

Hold and pull the connector housing, do not pull on harness when disconnecting connectors. Also, do not grip, collapse or apply excessive force to the connector.

5. Remove screws and EPS control unit from steering column.
6. Remove bolts and bracket plate from steering column (if necessary).

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Check that the harness connector, terminals and the EPS control unit are not visibly damaged before installing the EPS control unit.
- Check that the harness connector, terminals and the EPS control unit are free of foreign materials before installing.
- Replace the EPS control unit if it has been dropped or sustained an impact.

After installing steering column, perform self-diagnosis with CONSULT to ensure correct operation. Refer to [STC-6, "CONSULT Function"](#).