SECTION STC
STEERING CONTROL SYSTEM

CONTENTS

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:0000000010119174

OPERATION PROHIBITION

WARNING:

- **Parts with strong magnet is used in this vehicle.**
- **Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.**

NORMAL CHARGE PRECAUTION

WARNING:

- **If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.**
- **As radiated electromagnetic wave generated by PDM (Power Delivery Module) at normal charge operation may affect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not approach motor room [PDM (Power Delivery Module)] at the hood-opened condition during normal charge operation.**

PRECAUTION AT TELEMATICS SYSTEM OPERATION

WARNING:

- **If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.**
- **The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.**
- **If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.**

PRECAUTION AT INTELLIGENT KEY SYSTEM OPERATION

WARNING:

- **If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.**
- **The electromagnetic wave of Intelligent Key might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), at door operation, at each request switch operation, or at engine starting.**
- **If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of Intelligent Key might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before Intelligent Key use.**

Point to Be Checked Before Starting Maintenance Work

INFOID:0000000010119175

The high voltage system may starts automatically. It is required to check that the timer air conditioner and timer charge (during EVSE connection) are not set before starting maintenance work.
NOTE:
If the timer air conditioner or timer charge (during EVSE connection) is set, the high voltage system starts automatically even when the power switch is in OFF state.

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

INFOID:0000000010119176

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS

system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the 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.**

Precaution for Removing 12V Battery

INFOID:0000000010119177

1. Check that EVSE is not connected.
   NOTE:
   If EVSE is connected, the air conditioning system may be automatically activated by the timer A/C function.
2. Turn the power switch OFF → ON → OFF. Get out of the vehicle. Close all doors (including back door).
3. Check that the charge status indicator lamp does not blink and wait for 5 minutes or more.
   NOTE:
   If the battery is removed within 5 minutes after the power switch is turned OFF, plural DTCs may be detected.
4. Remove 12V battery within 1 hour after turning the power switch OFF → ON → OFF.
   NOTE:
   - The 12V battery automatic charge control may start automatically even when the power switch is in OFF state.
   - Once the power switch is turned ON → OFF, the 12V battery automatic charge control does not start for approximately 1 hour.

   CAUTION:

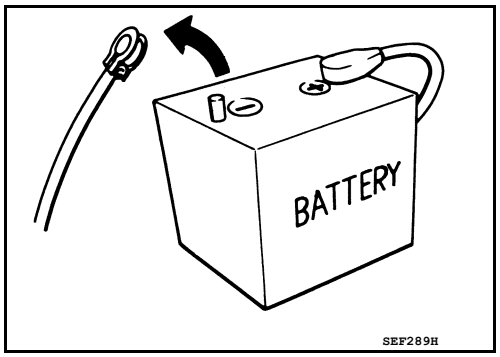
   - **After all doors (including back door) are closed, if a door (including back door) is opened before battery terminals are disconnected, start over from Step 1.**
   - **After turning the power switch OFF, if "Remote A/C" is activated by user operation, stop the air conditioner and start over from Step 1.**

Service Notice and Precautions for EPS System

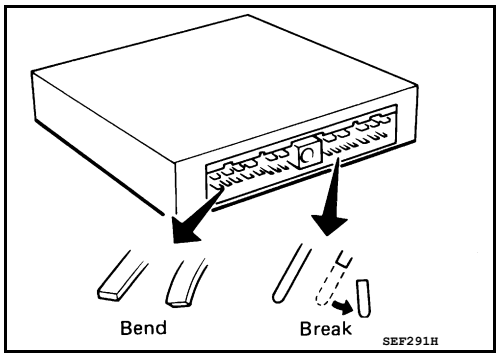
INFOID:0000000010119178

- 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 12V battery voltage is proper.

- Check connection conditions of each connector are proper.
- Before connecting or disconnecting the EPS control unit harness connector, turn power switch “OFF” and disconnect 12V battery ground cable. Because battery voltage is applied to EPS control unit even if power switch is turned “OFF”. Refer to STC-4, "Precaution for Removing 12V Battery".



- 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.
- During quick steering, rasping noise may be heard from around the steering wheel. This is not a malfunction. The noise is an operating noise of the EPS system under normal conditions. If the rasping noise occurs during slow steering, this may not be an operating noise of the system. In this case, it is necessary to find out the location of the noise and repair, if necessary.

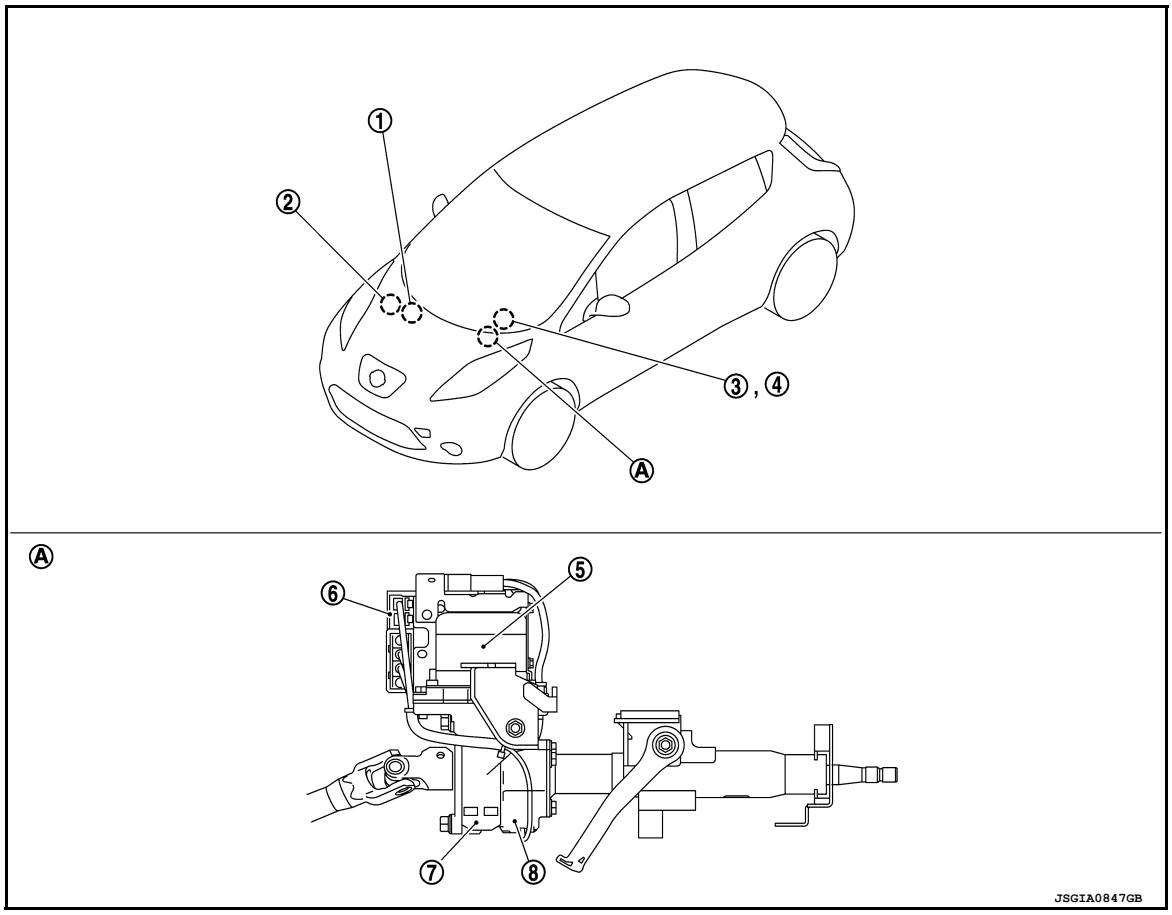


SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000010119179



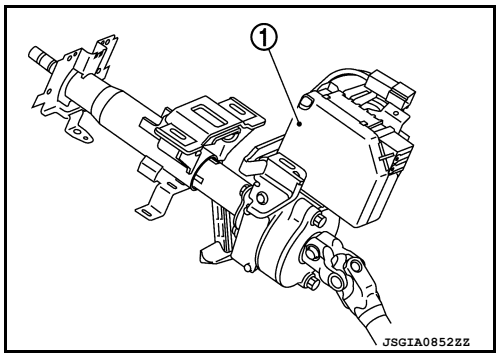
A. Steering column assembly

No.	Component	Function
1.	VCM (Vehicle Control Module)	• Transmits mainly the following signals to EPS control unit via CAN communication. - Power steering start activation request signal Refer to EVC-15, "Component Parts Location" for detailed installation location.
2.	ABS actuator and electric unit (control unit)	• Transmits mainly the following signal to EPS control unit via CAN communication. - Vehicle speed signal Refer to BRC-10, "Component Parts Location" for detailed installation location.
3.	Combination meter	• Transmits mainly the following signal to EPS control unit via CAN communication. - Vehicle speed signal Refer to MWI-6, "METER SYSTEM : Component Parts Location" for detailed installation location.
		• Turns ON the EPS warning lamp according to the signal from EPS control unit via CAN communication.
4.	EPS warning lamp	STC-8, "EPS SYSTEM : System Description"
5.	EPS motor	STC-7, "EPS Motor, Torque Sensor, Reduction Gear"
6.	EPS control unit	STC-7, "EPS Control Unit"
7.	Reduction gear	STC-7, "EPS Motor, Torque Sensor, Reduction Gear"
8.	Torque sensor	STC-7, "EPS Motor, Torque Sensor, Reduction Gear"

EPS Control Unit

INFOID:0000000010119180

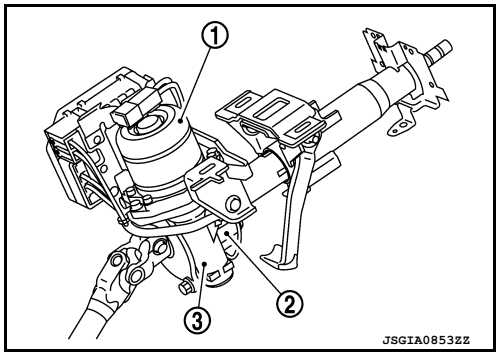
- EPS control unit (1) is installed to steering column assembly.
- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque signal to the EPS motor according 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:0000000010119181

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.

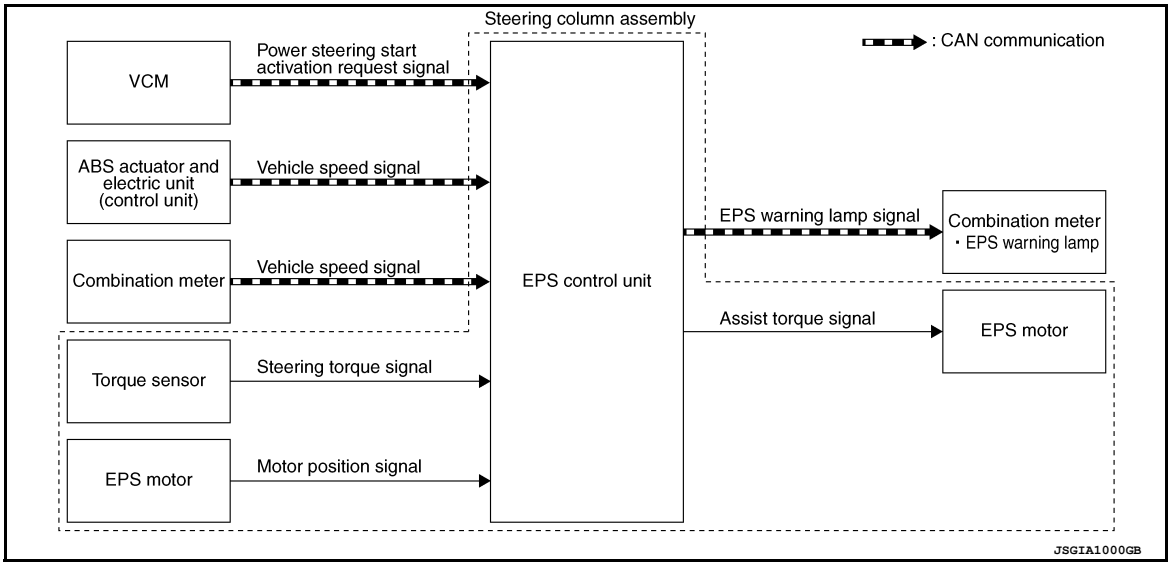
REDUCTION GEAR

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

SYSTEM
EPS SYSTEM
EPS SYSTEM : System Description

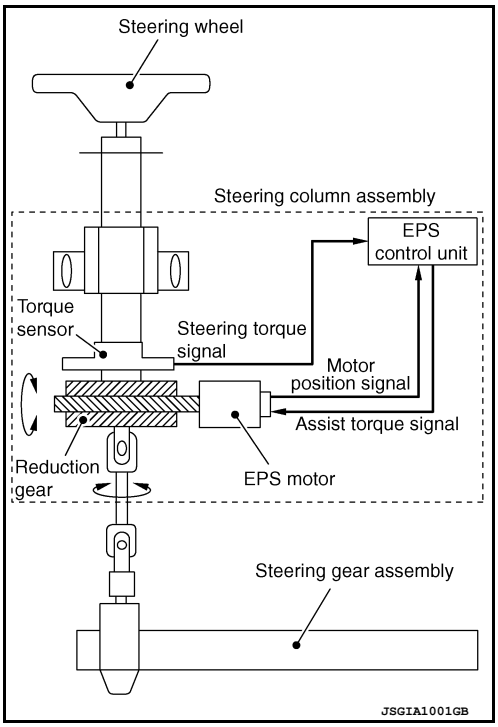
INFOID:0000000010119182

SYSTEM DIAGRAM



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-9, "EPS SYSTEM : Fail-Safe".
- 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). Refer to STC-9, "EPS SYSTEM : Protection Function".
- Extensive steering at low speed will cause the EPS control unit and EPS motor to heat up, once temperature reaches critical point EPS control unit will reduce current to reduce heat up. System will recover as temperature lowers (reduced or no assistance).



EPS WARNING LAMP INDICATION

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

Condition	EPS warning lamp
Power switch ON (Lamp check)	ON

Condition	EPS warning lamp
When vehicle is READY state	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:0000000010119184

- 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. (Control turning force steering wheel becomes heavy.)
- Under abnormal vehicle speed signal conditions, vehicle speed is judged as constant.

EPS SYSTEM : Protection Function

INFOID:0000000010119185

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 is recovered if the steering wheel is not turned for a while.

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

CONSULT Function

INFOID:0000000010119186

APPLICATION ITEMS

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

Diagnostic 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 erased by erasing.
- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

Displays the part number stored in the control unit.

SELF-DIAGNOSTIC RESULT

Refer to STC-14, "DTC Index".

When “CRNT” is displayed on self-diagnosis result.
- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis 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 power 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 power 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.

DATA MONITOR

Monitor item (Unit)	Remarks
BATTERY VOLT (V)	Displays the power supply voltage for EPS control unit.
STEERING ASSIST REQUEST (On/Off)	Condition of steering assist request is displayed from power steering start activation signal via CAN communication.
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 of EPS motor being output by the electric power steering.
C/U TEMP [°C (°F)]	Displays the temperature of inside of the EPS control unit.
ASSIST LEVEL (%)	Normally displays 100%. In case of an excessive stationary steering, the assist curvature gradually falls. However, it returns to 100% when left standing.*2
VEHICLE SPEED [km/h (MPH)]	Vehicle speed is displayed from vehicle speed signal via CAN communication.*3
WARNING LAMP (On/Off)	EPS warning lamp control status is displayed.

*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 power switch is turned ON.

ECU DIAGNOSIS INFORMATION

EPS CONTROL UNIT

Reference Value

INFOID:0000000010503214

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.

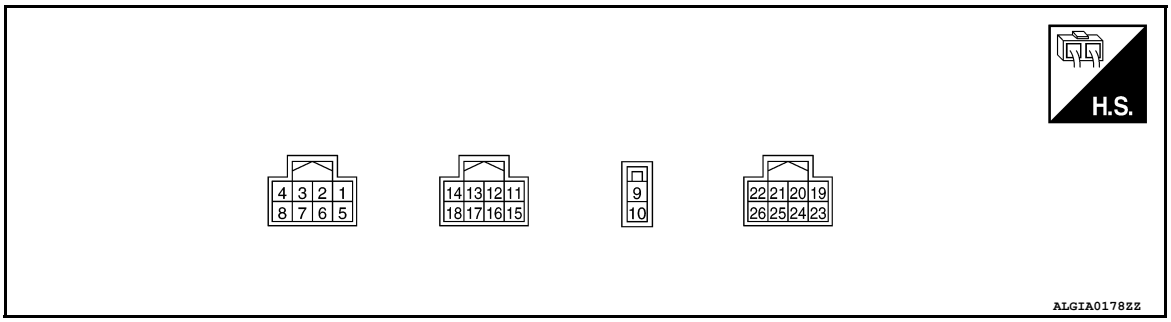
NOTE:

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)*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	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 % *2
VEHICLE SPEED	Vehicle stopped		0 km/h (0 mph)
	While driving		Approximately equal to the indication on speedometer*3 (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.

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire Color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/Output			
1 (P)	—	CAN-L	Input/Output	—		—
2 (L)	—	CAN-H	Input/Output	—		—
4 (W)	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 (G)	Ground	Reference signal R2	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—
22 (W)	Ground	Reference signal R1	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—

Terminal No. (Wire Color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/Output			
23 (Y)	Ground	Reference signal S2 (Sine 1)	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—
24 (L)	Ground	Reference signal S4 (Sine 2)	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—
25 (B)	Ground	Reference signal S3 (Cosine 1)	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—
26 (R)	Ground	Reference signal S1 (Cosine 2)	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	—
				Engine running	Steering wheel: steering	—

Fail-Safe

INFOID:0000000010119188

- 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. (Control turning force steering wheel becomes heavy.)
- Under abnormal vehicle speed signal conditions, vehicle speed is judged as constant.

Protection Function

INFOID:0000000010119189

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 is recovered if the steering wheel is not turned for a while.

DTC Inspection Priority Chart

INFOID:0000000010119190

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:0000000010119191

DTC	Items (CONSULT screen terms)	Reference
C1601	BATTERY VOLT	STC-23, "DTC Logic"
C1604	TORQUE SENSOR	STC-26, "DTC Logic"
C1606	EPS MOTOR	STC-27, "DTC Logic"

DTC	Items (CONSULT screen terms)	Reference
C1607	EEPROM	STC-28, "DTC Logic"
C1608	CONTROL UNIT	STC-28, "DTC Logic"
C1609	CAN VHCL SPEED	STC-29, "DTC Logic"
U1000	CAN COMM CIRCUIT	STC-30, "DTC Logic"

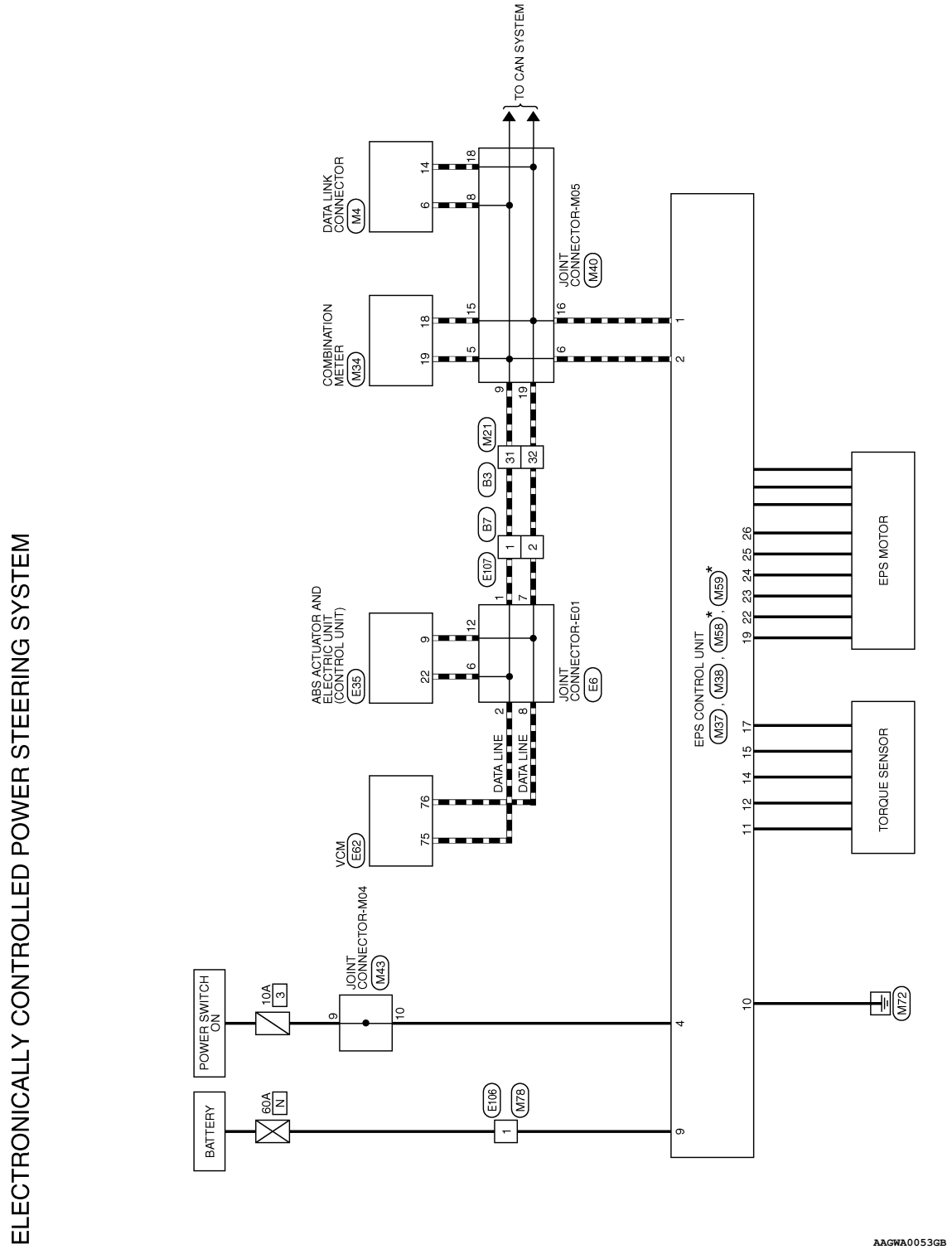
NOTE:
If some DTCs are displayed at the same time, refer to STC-14, "DTC Inspection Priority Chart".

WIRING DIAGRAM

ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

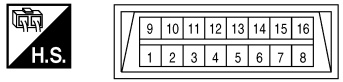
Wiring Diagram

INFOID:0000000010119192



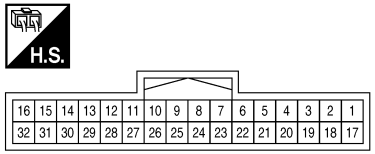
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM - CONNECTORS

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Color	WHITE



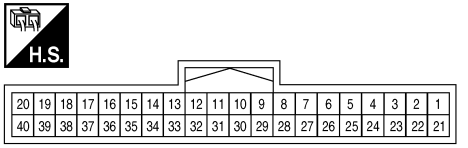
Terminal No.	Color of Wire	Signal Name
6	L	–
14	P	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
31	L	–
32	P	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
18	P	–
19	L	–

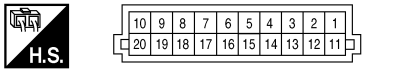
Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Color	WHITE

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

Connector No.	M38
Connector Name	EPS CONTROL UNIT
Connector Color	BLACK

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

Connector No.	M40
Connector Name	JOINT CONNECTOR-M05
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
5	L	–
6	L	–
8	L	–
9	L	–
15	P	–
16	P	–
18	P	–
19	P	–

AAGIA0144GB

Connector No.	M43
Connector Name	JOINT CONNECTOR-M04
Connector Color	GRAY

H.S.

10	9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11

Terminal No.	Color of Wire	Signal Name
9	W	–
10	W	–

Connector No.	M58
Connector Name	EPS CONTORL UNIT
Connector Color	GRAY

H.S.

14	13	12	11
18	17	16	15

Terminal No.	Color of Wire	Signal Name
11	B	TORQUE SENSOR GNG
12	Y	TORQUE SUB SENSOR SIGNAL
13	–	–
14	R	TORQUE SENSOR POWER SUPPLY
15	G	TORQUE MAIN SENSOR SIGNAL
16	–	–
17	W	TORQUE SENSOR REFERENCE VOLTAGE
18	–	–

Connector No.	M59
Connector Name	EPS CONTORL UNIT
Connector Color	BLACK

H.S.

22	21	20	19
26	25	24	23

Terminal No.	Color of Wire	Signal Name
19	G	REFERENCE SIGNAL R2
20	–	–
21	–	–
22	W	REFERENCE SIGNAL R1
23	Y	REFERENCE SIGNAL S2 (SINE1)
24	L	REFERENCE SIGNAL S4 (SINE 2)
25	B	REFERENCE SIGNAL S3 (COSINE 1)
26	R	REFERENCE SIGNAL S1 (COSINE 2)

Connector No.	E6
Connector Name	JOINT CONNECTOR-E01
Connector Color	BLUE

H.S.

12	11	10	9	8	7	6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
1	L	–
2	L	–
6	L	–
7	P	–
8	P	–
12	P	–

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

H.S.

1
2

Terminal No.	Color of Wire	Signal Name
1	R	–

AAGIA0145GB

Connector No.	E35
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
9	P	CAN-L
22	L	CAN-H

Connector No.	E62
Connector Name	VCM
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
75	L	CAN-H
76	P	CAN-L

Connector No.	E106
Connector Name	WIRE TO WIRE
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	–

Connector No.	E107
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
31	L	–
32	P	–

Connector No.	B7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–

AAGIA0146GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000010119193

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing STC-21, "Diagnostic Work Sheet" and reproduce symptoms as well as fully understand it. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

Customers are not professional. Never guess easily like “maybe the customer means that...,” or “maybe the customer mentions 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-14, "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-diagnosis.

Is any DTC detected?

YES >> Record or print DTC and freeze frame data (FFD). GO TO 4.
NO >> GO TO 6.

4.RECHECK SYMPTOM

With CONSULT

1. Erase self-diagnostic results.
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-14, "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-53, "Intermittent Incident".

5.REPAIR OR REPLACE MALFUNCTIONING PARTS

- Repair or replace malfunctioning parts.
- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase “Self-Diagnostic Result” for “EPS”.

>> GO TO 7.

6.IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Estimate malfunctioning system based on symptom diagnosis and perform inspection.

Can the malfunctioning system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-53, "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:0000000010119194

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		Mileage	km (Mile)		
Symptom		☐The steering wheel position (center) is in the wrong position.			
		☐EPS 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 ☐During driving ☐During acceleration ☐At constant speed driving ☐During deceleration ☐During cornering (right curve or left curve) ☐During steering			

Interview sheet

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

Memo

DTC/CIRCUIT DIAGNOSIS

C1601 BATTERY POWER SUPPLY

DTC Logic

INFOID:0000000010119195

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.	• Harness or connector • EPS control unit • Fuse • Power supply system • 12V Battery

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn power 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 power switch OFF to ON.
2. Perform “Self-Diagnosis Result” of “EPS” control unit.

Is DTC “C1601” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-23, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000010119196

Regarding Wiring Diagram information, refer to STC-16, "Wiring Diagram".

1. CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Turn power 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		
M38	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.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M37	4	Ground	0 V

2. Turn power switch ON.
CAUTION:
Never set the vehicle to READY.
3. Check voltage between EPS control unit harness connector and ground.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M37	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)

1. Turn power switch OFF.
2. Check the 10A fuse (#3).
3. Check the harness for open or short between EPS control unit harness connector M37 terminal 4 and the 10A fuse (#3).

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power switch ON power supply. Refer to PG-15, "Wiring Diagram — Battery Power Supply —".
NO >> Repair or replace malfunctioning parts.

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

1. Turn power switch OFF.
2. Check voltage between EPS control unit harness connector terminals and ground.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M38	9	Ground	Battery voltage

3. Turn power switch ON.
CAUTION:
Never set the vehicle to READY.
4. Check voltage between EPS control unit harness connector and ground.

EPS control unit		—	Voltage (Approx.)
Connector	Terminal		
M38	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)

1. Turn power switch OFF.
2. Check the 60A fusible link (N).
3. Check the harness for open or short between EPS control unit harness connector M38 terminal 9 and the 60A fusible link (N).

Is the inspection result normal?

YES >> Perform the trouble diagnosis for 12V battery power supply. Refer to PG-15, "Wiring Diagram — Battery Power Supply —".

NO >> Repair or replace the 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 ST-35, "Removal and Installation".

NO >> Repair or replace the malfunctioning parts.

C1604 TORQUE SENSOR

DTC Logic

INFOID:0000000010119197

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 power 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 power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “C1604” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-26, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000010119198

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 Result” of “EPS” control unit.
2. Turn the power switch OFF, and then wait 10 seconds and more.
3. Turn the power switch OFF to ON.
4. Perform “Self-Diagnostic Result” of “EPS”.

Is DTC “C1604” detected?

YES >> Torque sensor is malfunctioning. Replace steering column assembly. Refer to ST-35, "Removal and Installation".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

C1606 EPS MOTOR

DTC Logic

INFOID:0000000010119199

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 power 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 power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “C1606” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-27, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000010119200

1.PERFORM SELF-DIAGNOSIS

With CONSULT
1. Erase “Self-Diagnostic Result” of “EPS” control unit.
2. Turn the power switch OFF, and then wait 10 seconds and more.
3. Turn the power switch OFF to ON.
4. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “C1606” detected?

YES >> EPS motor is malfunctioning. Replace steering column assembly. Refer to ST-35, "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 Logic

INFOID:0000000010119201

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 power 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 power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “C1607” or “C1608” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-28, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000010119202

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 Result” results of “EPS” control unit.
2. Turn the power switch OFF, and then wait 10 seconds and more.
3. Turn the power switch OFF to ON.
4. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “C1607” or “C1608” detected?

YES >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to ST-35, "Removal and Installation".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

C1609 VEHICLE SPEED SIGNAL

DTC Logic

INFOID:0000000010119203

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 power 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 power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “C1609” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-29, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000010119204

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

With CONSULT

1. Turn the power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-56, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

Perform “Self-diagnostic Result” of “EPS” control unit.

Is DTC “C1609” detected?

YES >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to ST-35, "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 parts.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000010119205

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:0000000010119206

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 power 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 power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-30, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000010119207

Proceed to LAN-17, "Trouble Diagnosis Flow Chart".

EPS WARNING LAMP

Component Function Check

INFOID:0000000010119208

1.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when power switch turns ON. Then, EPS warning lamp turns OFF after the vehicle is READY state.

Is the inspection result normal?

YES >> Inspection End.
NO >> Perform trouble diagnosis. Refer to STC-31, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010119209

1.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the power switch OFF to ON.
2. Perform ”Self-Diagnostic Result” of ”EPS” control unit.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-14, "DTC Index".
NO >> GO TO 2.

2.CHECK EPS WARNING LAMP SIGNAL

With CONSULT

1. Select “Data Monitor” of “EPS” and select “WARNING LAMP”.
2. Check that the item in “Data Monitor” is “On”.
3. Set the vehicle to READY.
   CAUTION:
   Never drive the vehicle.
4. Check that the item in “Data Monitor” is “Off”.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for combination meter power supply circuit. Refer to MWI-85, "COMBINATION METER : Diagnosis Procedure".
NO >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to ST-35, "Removal and Installation".

SYMPTOM DIAGNOSIS

EPS WARNING LAMP DOES NOT TURN ON

Description

INFOID:0000000010119210

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

Diagnosis Procedure

INFOID:0000000010119211

1.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to STC-31, "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

Description

INFOID:0000000010119212

EPS warning lamp does not turn OFF several seconds after the vehicle is READY state.

Diagnosis Procedure

INFOID:0000000010119213

1.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-14, "DTC Index".
NO >> GO TO 2.

2.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to STC-31, "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-23, "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

Description

INFOID:0000000010119214

Steering wheel turning force is heavy or light.

Diagnosis Procedure

INFOID:0000000010119215

1.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the power switch OFF to ON.
2. Perform “Self-Diagnostic Result” of “EPS” control unit.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-14, "DTC Index".
NO >> GO TO 2.

2.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when power switch turns ON. Then, EPS warning lamp turns OFF after the vehicle is READY state.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Perform trouble diagnosis of EPS warning lamp. Refer to STC-31, "Diagnosis Procedure".

3.CHECK EPS CONTROL UNIT SIGNAL (1)

With CONSULT

1. Set the vehicle to READY.
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-23, "Diagnosis Procedure".

5.CHECK EPS CONTROL UNIT SIGNAL (3)

With CONSULT

1. Select “C/U TEMP” in “Data Monitor” of “EPS”.
2. Stop the EPS system until the item in “Data Monitor” becomes “85°C (185°F)” 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. Set the vehicle to READY.
   CAUTION:
   Never drive the vehicle.
2. Turn steering wheel from full left stop to full right stop.

3. Select “TORQUE SENSOR” in “Data Monitor” in “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-27, "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-33, "Inspection".

Is the inspection result normal?

YES >> Inspection End.
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to ST-44, "Inspection".

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

Description

INFOID:0000000010119216

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

Diagnosis Procedure

INFOID:0000000010119217

1.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check the EPS warning lamp while the vehicle is READY state.

Does the EPS warning lamp turn OFF?

YES >> GO TO 2.
NO >> Refer to STC-33, "Diagnosis Procedure".

2.CHECK WHEEL ALIGNMENT

Check the wheel alignment. Refer to FSU-11, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Adjustment of wheel alignment. Refer to FSU-11, "Inspection".

3.CHECK EPS CONTROL UNIT SIGNAL

With CONSULT

1. Set the vehicle to READY.
   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 5.
NO >> GO TO 4.

4.CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to STC-27, "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-33, "Inspection".

Is the inspection result normal?

YES >> Inspection End.
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to ST-44, "Inspection".

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Description

INFOID:0000000010119218

Unbalance steering wheel turning force (torque variation).

Diagnosis Procedure

INFOID:0000000010119219

1.PERFORM SELF-DIAGNOSIS

With CONSULT
1. Turn the power switch OFF to ON.
2. Perform "Self-Diagnostic Result" of "EPS" control unit.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-14, "DTC Index".
NO >> GO TO 2.

2.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check the EPS warning lamp while the vehicle is READY state.

Does the EPS warning lamp turn OFF?

YES >> GO TO 3.
NO >> Refer to STC-33, "Diagnosis Procedure".

3.CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.
- Steering column assembly. Refer to ST-35, "Exploded View".
- Steering gear assembly. Refer to ST-40, "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. Set the vehicle to READY.
   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-23, "Diagnosis Procedure".

6.CHECK EPS CONTROL UNIT SIGNAL (3)

With CONSULT
1. Select "C/U TEMP" in "Data Monitor" of "EPS".
2. Stop the EPS system until the item in "Data Monitor" becomes "85°C (185°F)" 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 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. Set the vehicle to READY.
   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-27, "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-33, "Inspection".

Is the inspection result normal?

YES >> Inspection End.
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to ST-44, "Inspection".

REMOVAL AND INSTALLATION

EPS CONTROL UNIT

Removal and Installation

INFOID:0000000010119220

CAUTION:

Disconnect 12V battery negative terminal before starting operations.

Never remove EPS control unit from steering column assembly. When replacing EPS control unit, replace steering column assembly. Refer to ST-35, "Removal and Installation".