STEERING CONTROL SYSTEM

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Precaution for Technicians Using Medical Electric	В
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. 	C
NORMAL CHARGE PRECAUTION	L
 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 	F
room [PDM (Power Delivery Module)] at the hood-opened condition during normal charge operation. PRECAUTION AT TELEMATICS SYSTEM OPERATION	ST
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.	ŀ
 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 	I
able 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.	J
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. 	K
• 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 implant- able 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 manu- facturer before Intelligent Key use.	N

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Point to Be Checked Before Starting Maintenance Work

The high voltage system may starts automatically. It is required to check that the timer air conditioner Ο 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 Ρ automatically even when the power switch is in OFF state.

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" INFOID:00000009314274

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

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PRECAUTIONS

< PRECAUTION >

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

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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 \rightarrow ON \rightarrow 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 \rightarrow ON \rightarrow 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:000000008743490

- 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.

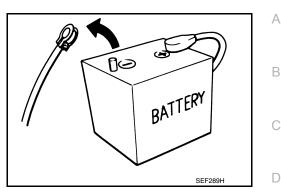
Revision: October 2013

STC-4

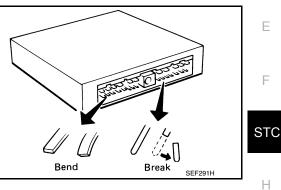
PRECAUTIONS

< PRECAUTION >

- 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.



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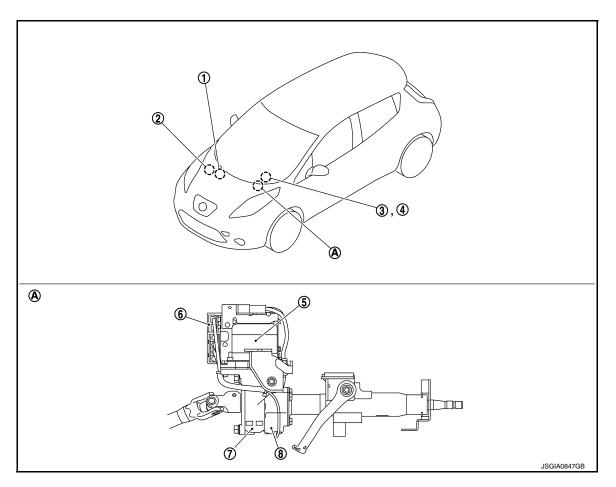
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< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location

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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 <u>EVC-16</u>, "<u>Component Parts Location</u>" 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 <u>BRC-10. "Component Parts Location"</u> for detailed in- stallation location.
3	Combination meter	 Transmits mainly the following signal to EPS control unit via CAN communication. Vehicle speed signal Refer to <u>MWI-6. "METER SYSTEM : Component Parts Loca- tion"</u> 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"

Revision: October 2013

COMPONENT PARTS

< SYSTEM DESCRIPTION >

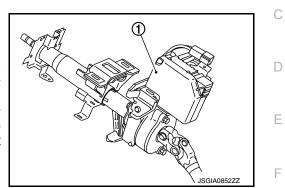
No.	Component	Function	^
6	EPS control unit	STC-7, "EPS Control Unit"	A
7	Reduction gear	STC-7, "EPS Motor, Torque Sensor, Reduction Gear"	
8	Torque sensor	STC-7, "EPS Motor, Torque Sensor, Reduction Gear"	В

EPS Control Unit

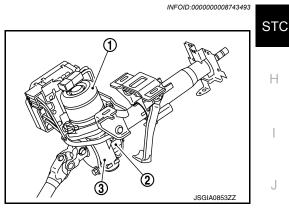
- EPS control unit (1) is installed to steering column assembly.
- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque signal to the EPS motor according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

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



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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.

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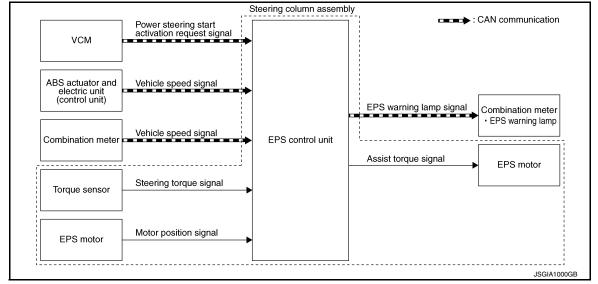
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SYSTEM EPS SYSTEM

EPS SYSTEM : System Description

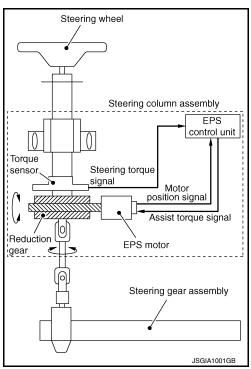
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SYSTEM DIAGRAM



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 <u>STC-9</u>, "EPS SYS-<u>TEM : Fail-Safe"</u>.
- 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 <u>STC-9</u>, "EPS SYSTEM : <u>Protection Function</u>".
- 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

SYSTEM

< SYSTEM DESCRIPTION >

Condition	EPS warning lamp	
When vehicle is READY state	OFF	A
EPS system malfunction [Other diagnostic item]	ON	

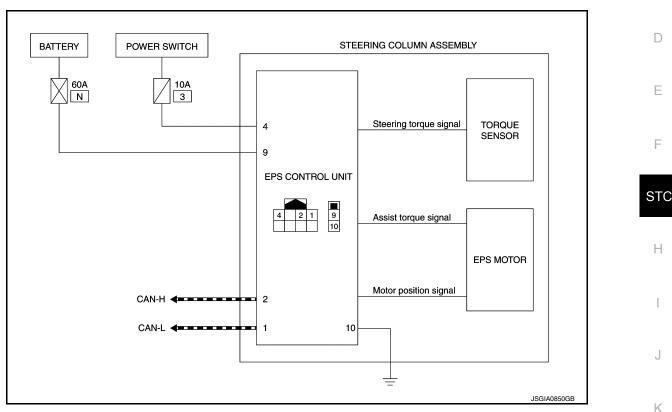
CAUTION:

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

EPS SYSTEM : Circuit Diagram

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EPS SYSTEM : Fail-Safe

- 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

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.

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DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

CONSULT Function

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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-13, "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→338→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.

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

< SYSTEM DESCRIPTION >

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

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

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

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< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION EPS CONTROL UNIT

Reference Value

VALUES ON THE DIAGNOSIS TOOL

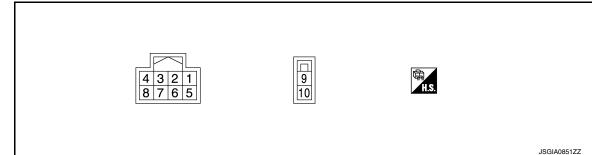
Monitor item		Condition	Value / Status
BATTERY VOLT	Power switch: ON		Battery voltage
STEERING ASSIST RE-	Vehicle state: Except RE	ADY	Off
QUEST	Vehicle state: READY	On	
		Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
TORQUE SENSOR	Vehicle state: READY	Steering wheel: Right turn	Positive value (Nm)
		Steering wheel: Left turn	Negative value (Nm)
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A
MOTOR CURRENT	Vehicle state: READY	Steering wheel: Right or left turn	Displays consumption current of EPS motor (A) ^{*1}
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A
MOTOR SIG	Vehicle state: READY	Steering wheel: Right turn	Positive value (A)
		Steering wheel: Left turn	Negative value (A)
ASSIST TORQUE	Vehicle state: READY	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	VEHICLE SIGLE. READ I	Steering wheel: Right or left turn	Displays assist torque of EPS motor (Nm)
C/U TEMP	Power switch: ON or Vel	nicle state: READY	Displays temperature of inside of EPS control unit [°C (°F)]
ASSIST LEVEL	Vehicle state: READY		100 %*2
	Vehicle stopped		0 km/h (0 mph)
VEHICLE SPEED	While driving		Approximately equal to the indication on speedometer ^{*3} (inside of $\pm 10\%$)
	EPS warning lamp: ON		On
WARNING LAMP	EPS warning lamp: OFF		Off

*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 in turned ON.

TERMINAL LAYOUT



INFOID:000000008743499

EPS CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

PHYSICAL VALUES

Terminal No. (Wire Color)		Description		Condition	Value
+	-	Signal name	Input/Output		(Approx.)
1 P)	_	CAN-L	Input/Output	_	_
2 L)	_	CAN-H	Input/Output	_	_
4	Ground	Dower oupply (Dower owitch)	loout	Power switch: ON	Battery voltage
W)	Ground	Power supply (Power switch)	Input	Power switch: OFF	0 V
9 R)	Ground	Power supply (12V Battery)	Input	Always	Battery voltage
10 B)	Ground	Ground	_	Always	0 V

Fail-Safe

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- 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

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

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When multiple DTCs are detected simultaneously, check	ck one by one depending on the following priority list.
	, i o oi ,

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

DTC Index

DTC	Items (CONSULT screen terms)	Reference	
C1601	BATTERY VOLT	STC-25, "DTC Logic"	0
C1604	TORQUE SENSOR	STC-27, "DTC Logic"	0
C1606	EPS MOTOR	STC-28, "DTC Logic"	
C1607	EEPROM	STC-29, "DTC Logic"	Ρ
C1608	CONTROL UNIT	STC-29, "DTC Logic"	
C1609	CAN VHCL SPEED	STC-30, "DTC Logic"	
U1000	CAN COMM CIRCUIT	STC-31, "DTC Logic"	

NOTE:

If some DTCs are displayed at the same time, refer to STC-13, "DTC Inspection Priority Chart".

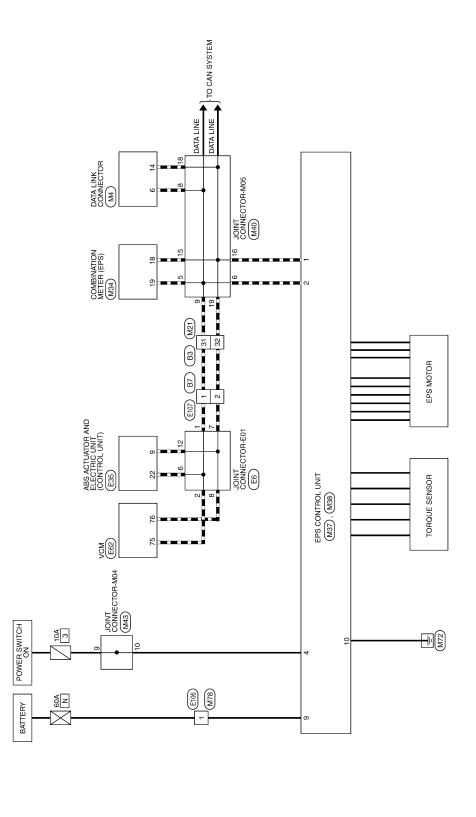
< WIRING DIAGRAM >

WIRING DIAGRAM

ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

Wiring Diagram

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ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

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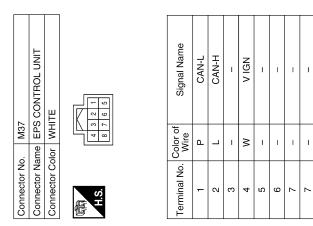
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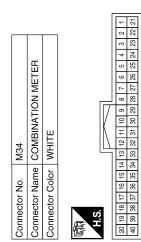
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ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM < WIRING DIAGRAM >

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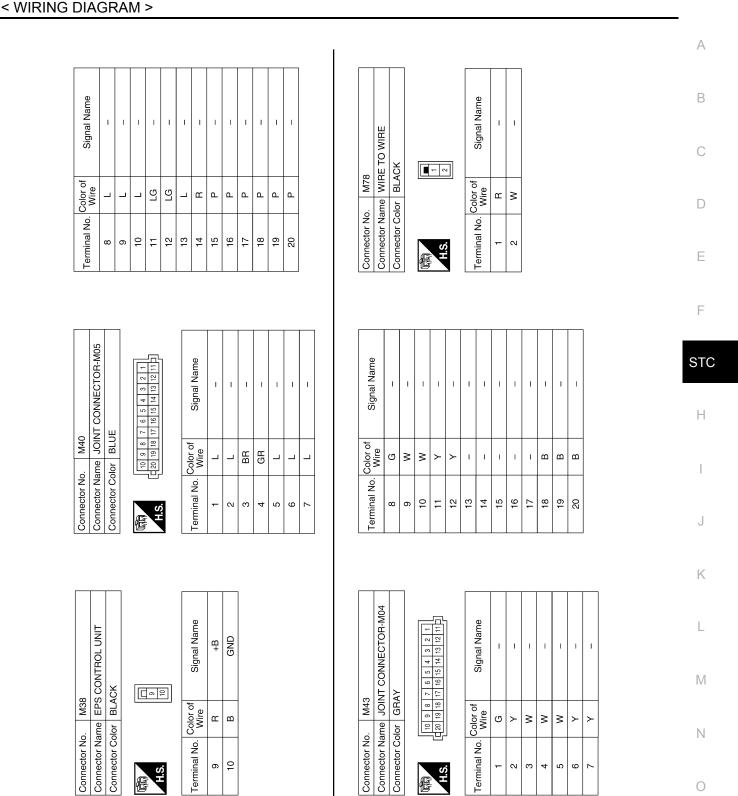
Signal Name	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Color of Wire	I	GR	I	BG	SB	в	щ	н	I	GR	I	M	σ	_	I	I	I	٨	ГG	M	
Terminal No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	



	Signal Name	I	I	I	I	I	I	I	I	I	I	ļ	I	I	ļ	I	I	I	I	I	I	
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ELECTRONICALLY	CONTROLLED POWER STEERING SYSTEM

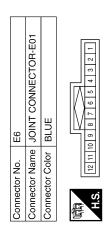


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Terminal No.	Color of Wire	Signal Name
13	ŋ	G SENSOR POWER SUPPLY
14	в	G SENSOR SIGNAL (+)
15	LG	RR RH WHEEL SENSOR SIGNAL
16	>	POWER SWITCH ON
17	ı	
18	I	
19	I	
20	_	CAN2-H
21	В	FR RH WHEEL SENSOR POWER SUPPLY
22	_	CAN-H
23	ш	FR LH WHEEL SENSOR POWER SUPPLY
24	I	
25	Μ	CAN2-L
26	В	RR LH WHEEL SENSOR POWER SUPPLY
27	≻	FR LH WHEEL SENSOR SIGNAL
28	œ	G SENSOR GND
29	≻	G SENSOR SIGNAL (-)
30	U	RR LH WHEEL SENSOR SIGNAL
31	I	
32	Р0	PRESS SENSOR GND

	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	ACK		5 6 7 8 9 101112131415161718 1920212223242526272829303132		Signal Name	MOTOR BATTERY	VALVE BATTERY	GROUND	GROUND	ESP OFF SW SIGNAL	BRAKE SW SIGNAL	PRESS SENSOR SIGNAL	STOP LAMP SW SIGNAL	CAN-L	PRESS SENSOR POWER SUPPLY	RR RH WHEEL SENSOR POWER SUPPLY	FR RH WHEEL SENSOR SIGNAL
. E35		Color BL		4 2		Color of Wire	σ	œ	в	в	٩	0	5	SB	٩	W/L	ВВ	8
Connector No.	Connector Name	Connector Co	[H.S.	IJ	Terminal No.	-	2	3	4	5	9	7	ω	6	10	11	12



Signal Name	I	I	I	I	I	I	I	I
Color of Wire	Γ	_	_	L	I	_	٩	٩.
Terminal No. Wire	1	2	3	4	5	6	7	8

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< WIRING DIAGRAM >

Terminal No. 110 112 113	Color of Wire SB × ≺	Signal Name COOLANT TEMPERATURE SENSOR ASCD STEERING SWITCH P POSITION SW NO.2 BRAKE PEDAL POSITION SW NO.2
115	SB <	SWITCH CHARGING STATUS INDICATOR 1 A/C RELAY
117	n LG	CHARGE CONNECTOR LOCK ACTUATOR (+)
120	L D	SENSOR GROUND (BATTERY CURRENT SENSOR)
121	M	SENSOR GROUND (COOLANT TEMPERATURE SENSOR)
122	В	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
123	ВВ	SENSOR GROUND (REFRIGERANT PRESSURE SENSOR)
124	M/L	ELECTRIC SHIFT SENSOR GND 2
125	BR	ASCD STEERING SWITCH GROUND
126	B/R	VCM GROUND
128	>	COOLING FAN CONTROL SIGNAL
129	~	IMMEDIATE CHARGING SWITCH
130	Ν	CHARGE CONNECTOR LOCK ACTUATOR (-)

Signal Name	CHARGE CONNECTOR LOCK SWITCH INDICATOR (LOCK)	M/C RELAY	CHARGING STATUS INDICATOR 2	CHARGING STATUS INDICATOR 3	CHARGE CONNECTOR LOCK SWITCH INDICATOR (AUTO)	CHARGE PORT ID OPENER SWITCH	CHARGE CONNECTOR LOCK SWITCH (LOCK)	BATTERY CURRENT SENSOR	SENSOR POWER SUPPLY (BATTERY CURRENT SENSOR)	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)	SENSOR POWER SUPPLY (REFRIGERANT PRESSURE SENSOR)	P POSITION SW NO.1	STOP LAMP SWITCH	PLUG IN INDICATOR LAMP	CHARGE CONNECTOR LOCK RELAY POWER SUPPLY	BATTERY TEMPERATURE SENSOR	ACCELERATOR PEDAL POSITION SENSOR 2	REFRIGERANT PRESSURE SENSOR
Color of Wire	>	SB	BR	U	0	BR	0	≻	æ	Ν	_	щ	٩	_	æ	L	щ	В
Terminal No.	87	88	89	06	91	93	94	95	96	26	86	66	101	103	104	107	108	109

Color BRO G G S S B Color BRO G G S S B Color BRO Color BRO	66 69 70 71 72 73 74 75 76 77 78 66 69 70 71 72 73 74 75 76 77 78 61 62 68 68 68 78 68 99 90 91 94 95 99 90 104 104 117 107 104 104 117 104 104 117 104 104 117 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 104 </th <th>Signal Name</th> <th>VERSE LAMP RELAY</th> <th>CONNECTION DETECTING CIRCUIT SIGNAL</th> <th>CONNECTION DETECTING CIRCUIT POWER SUPPLY</th> <th>POWER ON POWER SUPPLY</th> <th>CAN-H</th> <th>CAN-L</th> <th>CHARGE CONNECTOR LOCK RELAY</th> <th>' BATTERY POWER SUPPLY</th> <th>CHARGE CONNECTOR LOCK SWITCH (AUTO)</th> <th>CHARGE PORT LIGHT</th> <th>ELECTRIC SHIFT SENSOR POWER SUPPLY 2</th> <th>ELECTRIC SHIFT SENSOR NO.2</th> <th>ELECTRIC SHIFT SENSOR NO.4</th> <th>ELECTRIC SHIFT SENSOR NO.6</th>	Signal Name	VERSE LAMP RELAY	CONNECTION DETECTING CIRCUIT SIGNAL	CONNECTION DETECTING CIRCUIT POWER SUPPLY	POWER ON POWER SUPPLY	CAN-H	CAN-L	CHARGE CONNECTOR LOCK RELAY	' BATTERY POWER SUPPLY	CHARGE CONNECTOR LOCK SWITCH (AUTO)	CHARGE PORT LIGHT	ELECTRIC SHIFT SENSOR POWER SUPPLY 2	ELECTRIC SHIFT SENSOR NO.2	ELECTRIC SHIFT SENSOR NO.4	ELECTRIC SHIFT SENSOR NO.6
86 85 84 83 83 81 73 73 73 73 73 86 89 87 88 88 88 88 88 88 88 88 88 88 88 88			SB REV	٩.	0	ŋ			SB	R 12V		GR	>	M	U	U

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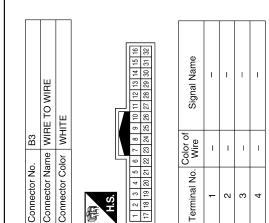
Signal Name	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Color of Wire	Ν	æ	В	σ	в	ГG	ВВ	თ	В	≻	щ	0	×	SHIELD	I
Terminal No.	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Signal Name	1	I	I	I	I	I	I	I	I	I	I	1	I	I
Color of Wire	1	I	I	I	I	щ	Μ	ГG	×	I	œ	GR	_	Ч
Terminal No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32

2	WIRE TO WIRE	ITE		5 6 7 8 9 10 11 12 17 18 19 20 21 22 23 24		Signal Name	I	I	I	I	I	I	I	I	I	
. E107	-	lor WHITE		2 3 4 14 15 16		Color of Wire	L	Р	SB	I	-	GR	I	Р	BR	
Connector No.	Connector Name	Connector Color	E E	H.S.]	Terminal No.	÷	2	3	4	5	9	7	8	6	

Signal Name	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Color of Wire	I	I	в	SHIELD	ш	SB	٩	BR	GR	Ь	_	σ	I	I	
Terminal No.	£	9	2	8	6	10	Ħ	12	13	14	15	16	17	18	

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E106	WIRE TO WIRE	3LACK	
Connector No.	Connector Name WIRE TO WIRE	Connector Color BLACK	

-~	Signa	
	Color of Wire	6
H.S.	Terminal No.	,

Signal Name	REVERSE LAMP RELAY	REVERSE LAMP RELAY	
Signa	REVERSE	REVERSE	
Wire	В	W	
Terminal No.	÷	2	

ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM < WIRING DIAGRAM >

																								7	
WIRE	6 5 4 3 2 1 18 17 16 15 4 13	Signal Name	1 1	1	1	1	1 1		1	1	1	1	1	1	1 1	1	1	1	1	-	1	1	1		
B7 MIRE TO WIRE WHITE	10 9 7 6 5 4 3 2 1 22 21 20 19 16 17 16 14 13		-				SB .						1				1		н П		- M		1		
Connector No. B7 Connector Name WIRE TO WIRE Connector Color WHITE	H.S. 22 21 20 19 18 77 16 15 14 13	Terminal No. Color of Signal Name	@			. (· @	. >	>		ۍ ع	<u>م</u> ت		BB CC	- 	В	~	В	۲		SHIELD			

< BASIC INSPECTION >

BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000008743505

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing <u>STC-23</u>, "<u>Diagnostic</u> <u>Work Sheet</u>" 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 <u>STC-13</u>. "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 <u>STC-13, "DTC Inspection Priority Chart"</u>.

Is any DTC detected?

YES >> GO TO 5.

NO >> Check harness and connectors based on the information obtained by interview. Refer to <u>GI-53</u>, <u>"Intermittent Incident"</u>.

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 results for "EPS".

>> GO TO 7.

O. IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Estimate malfunctioning system based on symptom diagnosis and perform inspection. Can the malfunctioning system be identified?

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

YES	>> GO TO 7.

NO >> Check harness and connectors based on the information obtained by interview. Refer to <u>GI-53</u>, A <u>"Intermittent Incident"</u>.

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

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 Initial year number registration	
name		Vehicle type VIN	
Storage date		Mileage km (Mile)	
		□The steering wheel position (center) is in the wrong position.	
		□EPS warning lamp turns on.	
Symptom		□Noise □Vibration	
		□Others ()
First occurren	се	□Recently □Others ()
Frequency of	occurrence	□Always □Under a certain conditions of □Sometimes (til	me(s)/day)
		□Irrelevant	
Climate con-	Weather	□Fine □Cloud □Rain □Snow □Others ()
ditions	Temperature	□Hot □Warm □Cool □Cold □Temperature [App	rox. °C °F)]
	Relative humidity	□High □Moderate □Low	
Road conditio	ns	□Urban area □Suburb area □High way □Mountain road (uphill or down hill) □Rough road	
Operation cor	iditions, etc.	□Irrelevant □During driving □During acceleration □At constant spee □During deceleration □During cornering (right curve or left co □During steering	0

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

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

Memo

DTC/CIRCUIT DIAGNOSIS C1601 BATTERY POWER SUPPLY

DTC Logic

DTC DETECTION LOGIC

DTC		Display item	Ma	Ifunction detected condition		Possible cause
DIC		Display item	IVIA			
C1601	BATTERY	VOLT	is maintained	r supply voltage to the EPS c at 18.2 V or more or at less t or five second or more.		 Harness or connector EPS control unit Fuse Power supply system 12V Battery
DTC CO	ONFIRM	ATION PROCE	DURE			
	CONDITI					
			NIRE" has been	previously conducted	alwave ti	urn power switch OFF and
		econds before co			always it	
			C C			
_	>> GO 1					
2. DTC	REPROD	DUCTION PROCE	EDURE			-
<pre></pre>	CONSUL	.т				
1. Turr	n the pow	er switch OFF to	ON.			
		S" self-diagnosis.				
YES		letected? and to diagnosis i	procedure Pefer	to STC-25, "Diagnosis	Procedu	۰۵"
NO		ection End.		to <u>516-25, Diagnosis</u>	Tiocedui	<u> </u>
Diagno	osis Pro	ocedure				INFOID:00000008743508
1 our		CONTROL UNIT		UT		
				J11		
		witch OFF. PS control unit h	arness connector			
				ness connector termina	I and gro	und.
	EPS co	ntrol unit	_	Continuity		
Con	nector	Terminal		j		
	//38	10	Ground	Yes		
		S control unit harn	ess connector.			
		result normal?				
YES NO	>> GO T		short to around a	r short to power in harr		nnectors
`	•	CONTROL UNIT	-	•		
1. Che	eck voltag	e between EPS c	control unit harnes	ss connector terminals	and grou	nd.
	FPS co	ntrol unit				
Con	nector	Terminal	_	Voltage		
001	nector	Terrinia				

 Turn power switch ON.
 CAUTION: Never set the vehicle to READY.

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M37

Approx. 0 V

Ground

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C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

3. Check voltage between EPS control unit harness connector and ground.

EPS co	ntrol unit		Voltage		
Connector	Terminal		Voltage		
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 <u>PG-30, "Wiring Dia-</u> <u>gram - ON POWER SUPPLY -"</u>.
- 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 co	ntrol unit		Voltage
 Connector	Terminal		voltage
 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 co	ntrol unit		Voltage		
Connector	Terminal		voltage		
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 <u>PG-15, "Wiring Diagram -</u> <u>BATTERY POWER SUPPLY -"</u>.
- 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 <u>ST-36, "Removal</u> <u>and Installation"</u>.
- NO >> Repair or replace the malfunctioning parts.

C1604 TORQUE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1604 TORQUE SENSOR

DTC Logic

INFOID:00000008743509 DTC DETECTION LOGIC DTC Malfunction detected condition Possible cause Display item · Harness or connector TORQUE SENSOR C1604 When torque sensor output signal is malfunctioning. 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 (P)With CONSULT Turn the power switch OFF to ON. 1. 2. Perform "EPS" self-diagnosis. Is DTC "C1604" detected? YES >> Proceed to diagnosis procedure. Refer to STC-27, "Diagnosis Procedure". NO >> Inspection End. **Diagnosis** Procedure INFOID:000000008743510 1. CHECK TERMINALS AND HARNESS CONNECTORS Check EPS control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace malfunctioning parts. Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace malfunctioning parts. 2.PERFORM SELF-DIAGNOSIS

- With CONSULT
- 1. Erase self-diagnostic results for "EPS".
- Turn the power switch OFF, and then wait 10 seconds and more. 2.
- Turn the power switch OFF to ON. 3.
- Perform self-diagnosis for "EPS". 4.

Is DTC "C1604" detected?

- Ν YES >> Torque sensor is malfunctioning. Replace steering column assembly. Refer to ST-36, "Removal and Installation".
- NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

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C1606 EPS MOTOR

< DTC/CIRCUIT DIAGNOSIS >

C1606 EPS MOTOR

DTC Logic

INFOID:000000008743511

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 connectorEPS motorEPS 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

(B) With CONSULT

- Turn the power switch OFF to ON.
- 2. Perform "EPS" self-diagnosis.

Is DTC "C1606" detected?

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

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

With CONSULT

- 1. Erase self-diagnostic results for "EPS".
- 2. Turn the power switch OFF, and then wait 10 seconds and more.
- 3. Turn the power switch OFF to ON.
- 4. Perform self-diagnosis for "EPS".

Is DTC "C1606" detected?

- YES >> EPS motor is malfunctioning. Replace steering column assembly. Refer to <u>ST-36, "Removal and</u> <u>Installation"</u>.
- 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.

INFOID:000000008743512

C1607, C1608 EPS CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

C1607, C1608 EPS CONTROL UNIT

DTC Logic

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INFOID:000000008743513

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 CO	ONFIRMATION PROCEDU	RE	
1.PREG	CONDITIONING		
If "DTC wait at le	CONFIRMATION PROCEDUF east 10 seconds before condu	RE" has been previously conducted, always t cting the next test.	urn power switch OFF and
_	>> GO TO 2.		
2 .ртс	REPRODUCTION PROCEDU	IRE	
1. Turr 2. Perl	CONSULT In the power switch OFF to ON form "EPS" self-diagnosis. <u>C1607" or "C1608" detected?</u> >> Proceed to diagnosis proc >> Inspection End.	edure. Refer to <u>STC-29, "Diagnosis Procedu</u>	<u>re"</u> .
Diagno	osis Procedure		INFOID:00000008743514
1. CHE	CK TERMINALS AND HARNE	SS CONNECTORS	
	PS control unit pin terminals f d, repair or replace malfunctio	or damage or loose connection with harness	connector. If any items are
-	spection result normal?		
YES	>> GO TO 2.		
	>> Repair or replace malfunc FORM SELF-DIAGNOSIS	tioning parts.	
1. Eras	CONSULT se self-diagnostic results for "E n the power switch OFF, and th n the power switch OFF to ON	nen wait 10 seconds and more.	
3. Turr		•	
 Turr Perf 	form self-diagnosis for "EPS".		
 Turr Perf 	form self-diagnosis for "EPS". <u>C1607" or "C1608" detected?</u> >> EPS control unit is malfun <u>and Installation"</u> .		Refer to <u>ST-36. "Removal</u>

< DTC/CIRCUIT DIAGNOSIS >

C1609 VEHICLE SPEED SIGNAL

DTC Logic

INFOID:000000008743515

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 (con- trol 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

(B) With CONSULT

- 1. Turn the power switch OFF to ON.
- 2. Perform "EPS" self-diagnosis.

Is DTC "C1609" detected?

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

Diagnosis Procedure

INFOID:000000008743516

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

With CONSULT

- Turn the power switch OFF to ON.
- 2. Perform "ABS" self-diagnosis.

Is any DTC detected?

- YES >> Check the DTC. Refer to <u>BRC-57, "DTC Index"</u>.
- NO >> GO TO 2.
- 2.PERFORM SELF-DIAGNOSIS

(P)With CONSULT

Perform "EPS" self-diagnosis.

Is DTC "C1609" detected?

- YES >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to <u>ST-36, "Removal</u> <u>and Installation"</u>.
- 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.

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

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

DTC Logic

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INFOID:000000008743517

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DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	EPS control unit is not transmitting/re- ceiving CAN communication signal for 2 seconds or more.	CAN communication errorEPS control unit
TC CONFIF	RMATION PROCEDUR	RE	
.PRECOND	ITIONING		
		E" has been previously conducted, a	lways turn power switch OFF and
vait at least 10) seconds before conduc	ting the next test.	
>> G	O TO 2.		
2.DTC REPR	ODUCTION PROCEDU	RE	
	ower switch OFF to ON. EPS" self-diagnosis.		
<u>s DTC "U100</u>			
	oceed to diagnosis proce spection End.	edure. Refer to <u>STC-31, "Diagnosis F</u>	Procedure".
Diagnosis F	•		INFOID:0000000874351
•		- Elow Chart"	
	N-16, "Trouble Diagnosis	S Flow Ghart	

< DTC/CIRCUIT DIAGNOSIS >

EPS WARNING LAMP

Component Function Check

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 <u>STC-32, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000008743521

INFOID:000000008743520

1.PERFORM SELF-DIAGNOSIS

With CONSULT

- Turn the power switch OFF to ON.
- 2. Perform "EPS" self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-13, "DTC Index".

NO >> GO TO 2.

2.CHECK EPS WARNING LAMP SIGNAL

With CONSULT

- 1. 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 <u>MWI-92</u>, <u>"COMBINATION METER : Diagnosis Procedure"</u>.
- NO >> EPS control unit is malfunctioning. Replace steering column assembly. Refer to <u>ST-36, "Removal</u> <u>and Installation"</u>.

EPS WARNING LAMP DOES NOT TURN ON

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS EPS WARNING LAMP DOES NOT TURN ON

Description

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

Diagnosis Procedure

1.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to <u>STC-32, "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u>

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

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EPS WARNING LAMP DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

EPS WARNING LAMP DOES NOT TURN OFF

Description

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

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

With CONSULT

Turn the power switch OFF to ON.

2. Perform "EPS" self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to <u>STC-13, "DTC Index"</u>.

NO >> GO TO 2.

2. CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning lamp. Refer to STC-32, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the specific malfunctioning part.

 ${f 3}.$ CHECK EPS CONTROL UNIT POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis of EPS control unit power supply and ground. Refer to <u>STC-25. "Diagnosis Pro-</u> cedure".

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.

INFOID:000000008743525

INFOID:00000008743524

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

STEERING WHEEL TURNING FORCE IS HEAVY OR	LIGHT
< SYMPTOM DIAGNOSIS >	
STEERING WHEEL TURNING FORCE IS HEAVY OR LIGH	Т
Description	INFOID:00000008743526
Steering wheel turning force is heavy or light.	
Diagnosis Procedure	INFOID:00000008743527
1.PERFORM SELF-DIAGNOSIS	
 With CONSULT 1. Turn the power switch OFF to ON. 2. Perform "EPS" self-diagnosis. Is any DTC detected? 	
YES >> Check the DTC. Refer to <u>STC-13, "DTC Index"</u> . 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 wafter the vehicle is READY state.	varning lamp turns OFF
Is the inspection result normal?	
YES >> GO TO 3. NO >> Perform trouble diagnosis of EPS warning lamp. Refer to <u>STC-32, "Diagno</u>	o <u>sis Procedure"</u> .
3. CHECK EPS CONTROL UNIT SIGNAL (1)	
 With CONSULT Set the vehicle to READY. Select "ASSIST LEVEL" in "DATA MONITOR" in "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" in "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. F <u>nosis Procedure</u>". 	efer to <u>STC-25, "Diag-</u>
5. CHECK EPS CONTROL UNIT SIGNAL (3)	
 With CONSULT Select "C/U TEMP" in "DATA MONITOR" in "EPS". Stop the EPS system until the item in "DATA MONITOR" becomes "85°C (185°F)" NOTE: While stopping the EPS system, do not turn steering wheel. 	or less.
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 i End. 	malfunction. Inspection
6. CHECK EPS CONTROL UNIT SIGNAL (4)	
With CONSULT Set the vehicle to READY. CAUTION:	

 Set the vehicle to REA CAUTION:

Never drive the vehicle.

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

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

< SYMPTOM DIAGNOSIS >

3. Select "TORQUE SENSOR" in "DATA MONITOR" in "EPS".

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steer- ing (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-28, "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-34, "Inspection".

Is the inspection result normal?

YES >> Inspection End.

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to <u>ST-45, "Inspection"</u>.

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

	RI	GHT AND LEFT		
< SYMPTOM DIAGNO	OSIS >			
UNBALANCE S	TEERING WHE	EL TURNING FOR	CE AND RETURN BE-	
TWEEN RIGHT			A	L
_				
Description			INFOID:00000008743528	2
Unbalance steering wh	eel turning force and re	eturn between right and left.		
Diagnosis Proced	ure		INFOID:00000008743529	
			C	,
	AINATION OF THE EPS			
	g lamp while the vehicle	e is READY state.	D)
Does the EPS warning YES >> GO TO 2.	amp turn OFF?			
	TC-34, "Diagnosis Proc	edure".	E	
2.CHECK WHEEL AL			_	
Check the wheel align	ment. Refer to FSU-11,	"Inspection".		_
Is the inspection result	normal?		F	
YES >> GO TO 3.				
		efer to FSU-11, "Inspection".	ST	С
3.CHECK EPS CONT	ROL UNIT SIGNAL			
With CONSULT			Н	
 Set the vehicle to I CAUTION: 	READT.			
Never drive the v				
	el from full left stop to fu SENSOR" in "DATA MC			
	e sensor inspection.			
Monitor item	Condition	Display value	0	
TORQUE SENSOR	Steering wheel: Not steer- ing (There is no steering force)	Approx. 0 Nm	K	r 1
TORQUE SENSOR	Steering wheel: Right turn	Positive value (Nm)		
	Steering wheel: Left turn	Negative value (Nm)	L	
Is the inspection result	normal?			
YES >> GO TO 5.				
NO $>>$ GO TO 4.			M	
4.CHECK EPS MOTO	-			
	•	Refer to <u>STC-28, "Diagnosis Pr</u>	ocedure". N	
Is the inspection result YES >> GO TO 5.	<u>normal?</u>			
	replace the specific mal	functioning part.		、 、
5. CHECK STEERING	WHEEL TURNING FO	DRCE	0)
Check the steering wheel turning force. Refer to <u>ST-34, "Inspection"</u> .				
Is the inspection result normal?				
 YES >> Inspection End. NO >> Check the steering wheel turning force for mechanical malfunction. Refer to <u>ST-45, "Inspection"</u>. 				
NO >> Check the	steering wheel turning	torce for mechanical malfunction	on. Refer to <u>S1-45, "Inspection"</u> .	

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIA-TION)

Description

INFOID:000000008743530

INFOID:00000008743531

Unbalance steering wheel turning force (torque variation).

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

With CONSULT

Turn the power switch OFF to ON.

2. Perform "EPS" self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to <u>STC-13, "DTC Index"</u>.

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-34, "Diagnosis Procedure".

\mathbf{3}. CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.

Steering column assembly. Refer to <u>ST-36, "Exploded View"</u>.

Steering gear assembly. Refer to <u>ST-41, "Exploded View"</u>.

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

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" in "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" in "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 <u>STC-25. "Diagnosis Procedure"</u>.

6.CHECK EPS CONTROL UNIT SIGNAL (3)

With CONSULT

- 1. Select "C/U TEMP" in "DATA MONITOR" in "EPS".
- 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.

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. Set the vehicle to READY. CAUTION:
 - Never drive the vehicle.
- Turn steering wheel from full left stop to full right stop.
 Select "TORQUE SENSOR" in "DATA MONITOR" in "EPS".
- 4. Perform the torque sensor inspection.

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steer- ing (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	Н
Perform the trouble diagnosis of EPS motor. Refer to STC-28, "Diagnosis Procedure".	
Is the inspection result normal?	I
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-34, "Inspection".

Is the inspection result normal?

YES >> Inspection End.

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to <u>ST-45. "Inspection"</u>.

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< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION EPS CONTROL UNIT

Removal and Installation

INFOID:000000008743532

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 <u>ST-36, "Removal and Installation"</u>.