

SECTION **STC**

STEERING CONTROL SYSTEM

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PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000011326206

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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never 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:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never 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 3 minutes before performing any service.

Precautions for Removing Battery Terminal

INFOID:000000011326207

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

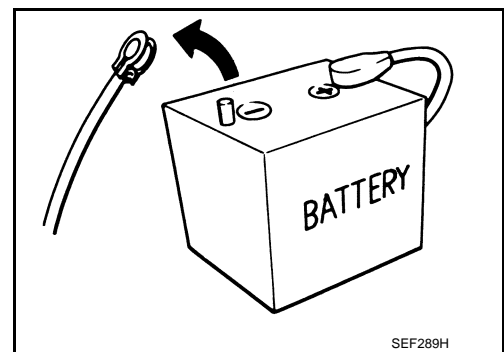
NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:

The removal of 12V battery may cause a DTC detection error.



Service Notice and Precautions for Hydraulic Pump Electric Power Steering System

INFOID:000000011326208

- Check if air pressure and size of tires are proper, the specified part is used for the steering wheel is genuine part.

PRECAUTIONS

< PRECAUTION >

- Check if the connection of steering column assembly and steering gear assembly is proper (there is not looseness of mounting bolts, damage of rods, boots or sealants, and leakage of grease, etc.).
- Check if the wheel alignment is adjusted properly.
- Check if there is any damage or modification to suspension or body resulting in increased weight or altered ground clearance.
- Check if installation conditions of each link and suspension are proper.
- Check if the battery voltage is proper.
- Check connection conditions of each connector are proper.
- Check that NISSAN genuine power steering fluid (E-PSF) is used. If power steering fluid other than genuine fluid is used, steering may become extremely hard.
- You may hear a high pitch noise from the front of the vehicle when the steering wheel is operated, especially at low speed such as a parking lot. However this is not a malfunction. Steer at low speed condition makes higher load for steering rack, so pump works higher rotation to provide more hydraulic flow to create more power assistance for lighter steering effort. This pump rotation is electrically controlled based on rotation map in ECU.
- Before connecting or disconnecting the power steering control module harness connector, turn ignition switch "OFF" and disconnect battery ground cable. Because battery voltage is applied to power steering control module even if ignition switch is turned "OFF".

COMPONENT PARTS

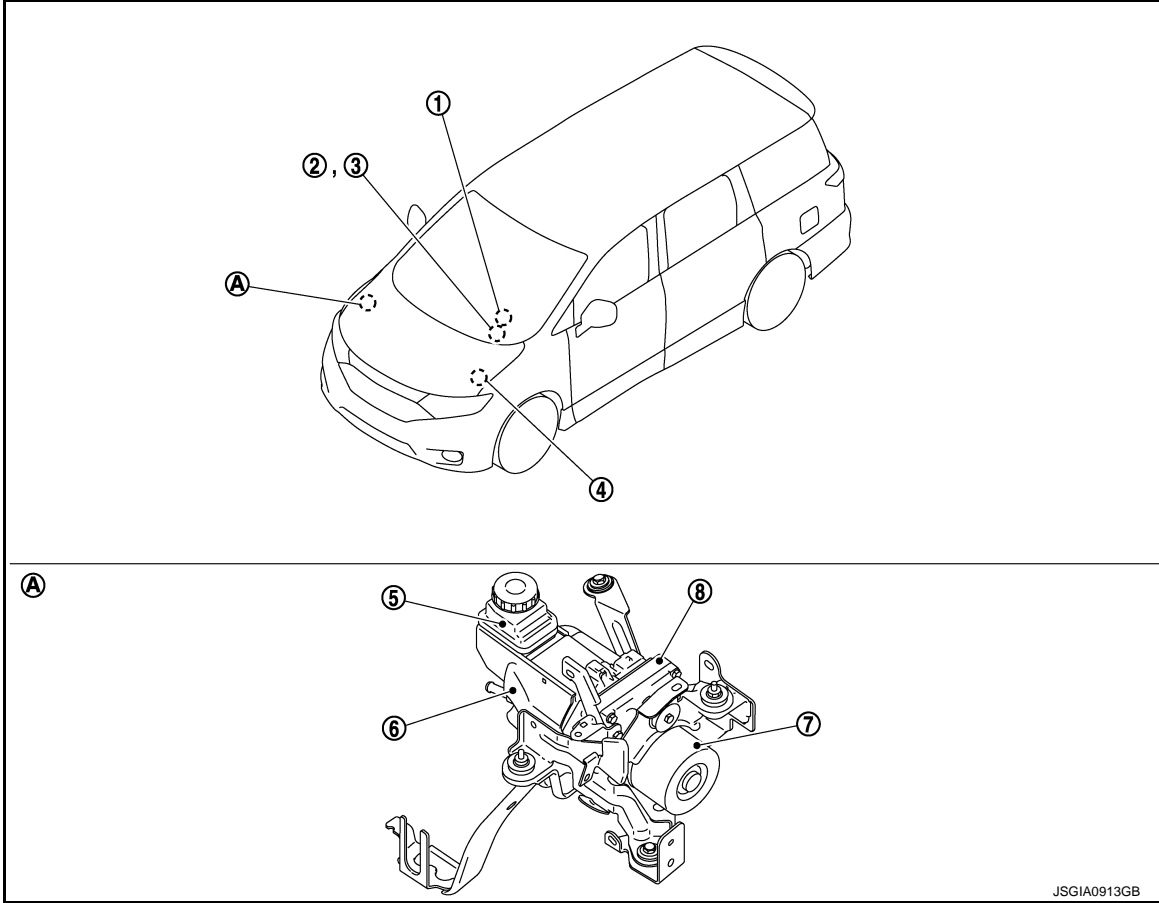
< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011326209



A. Engine room right side

No.	Component	Function
1.	Steering angle sensor	Transmits mainly the following signals to power steering control module via CAN communication. <ul style="list-style-type: none"> Steering angle sensor signal
2.	Combination meter	Transmits mainly the following signals to power steering control module via CAN communication. <ul style="list-style-type: none"> Vehicle speed signal Refer to MWI-6, "METER SYSTEM : Component Parts Location" for detailed installation location. <p>The hydraulic pump electric power steering system warning lamp turns ON according to the signal received by CAN communication from the power steering control module.</p>
3.	Hydraulic pump electric power steering system warning lamp (In combination meter)	STC-7, "HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : System Description"
4.	ECM	Transmits mainly the following signals to power steering control module via CAN communication. <ul style="list-style-type: none"> Engine status signal Refer to EC-16, "ENGINE CONTROL SYSTEM : Component Parts Location" for detailed installation location.

COMPONENT PARTS

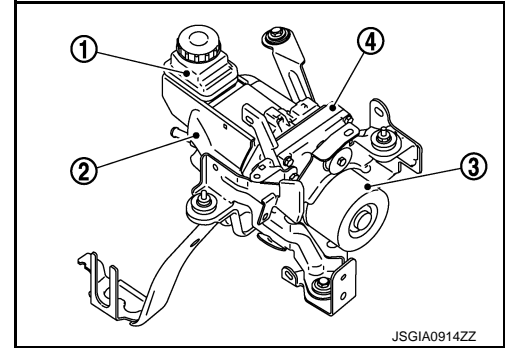
< SYSTEM DESCRIPTION >

No.	Component	Function
5.	Reservoir tank	STC-6. "Power Steering Oil Pump Assembly"
6.	Power steering oil pump	
7.	Power steering motor	
8.	Power steering control module	

Power Steering Oil Pump Assembly

INFOID:000000011326210

The power steering oil pump assembly is primarily composed of the reservoir tank (1), power steering oil pump (2), power steering motor (3), and power steering control module (4).



RESERVOIR TANK

Fluid is filled from the reservoir tank.

POWER STEERING OIL PUMP

The power steering oil pump is driven by the power steering motor and generates hydraulic oil pressure in the system.

POWER STEERING MOTOR

The power steering motor is controlled by the power steering control module and drives the power steering oil pump.

POWER STEERING CONTROL MODULE

By receiving steering angle sensor signal and vehicle speed signal, the power steering control module calculates hydraulic pressure of the hydraulic pump electric power steering system according to the driving conditions. The power steering control module controls the power steering motor.

SYSTEM

< SYSTEM DESCRIPTION >

SYSTEM

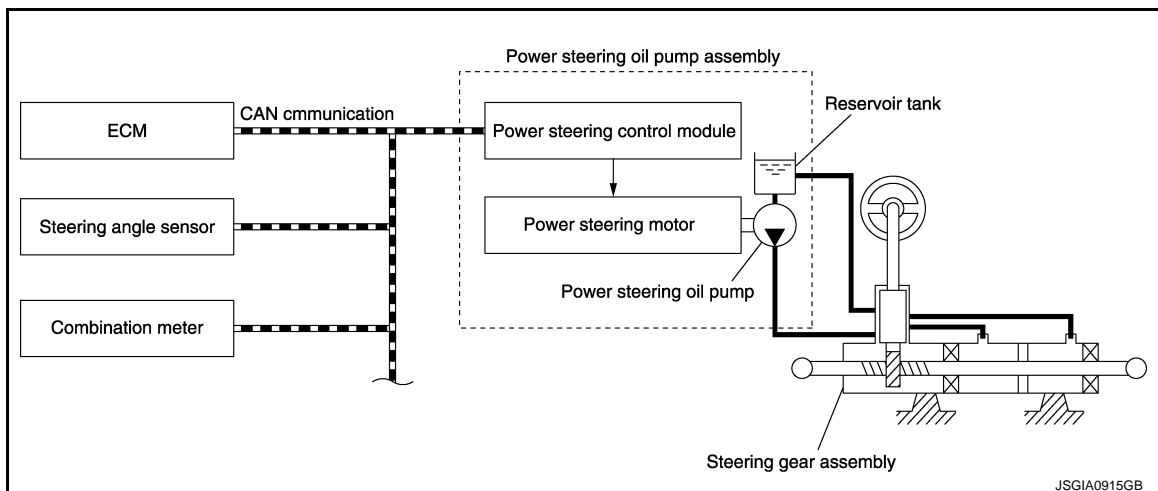
HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : System Description

INFOID:000000011326211

- The system is composed primarily of the power steering oil pump assembly (power steering control module, power steering motor, power steering oil pump, and reservoir tank), hydraulic pipes, and steering gear assembly.
- The power steering control module controls the speed of the power steering motor according to the vehicle speed and steering angle speed. By changing the power steering oil pump flow, the power steering control module controls the steering assist force.
- According to the power steering motor control, the system hydraulic pressure is transmitted from the power steering motor to power steering oil pump. The power steering oil pump is driven by the system hydraulic pressure.
- After engine start, the hydraulic pump electric power steering system performs control.
- When a malfunction occurs in the system, the fail-safe function stops the hydraulic pump electric power steering system (manual steering state) or restricts its operation (certain steering assist force). Refer to [STC-9, "HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Fail-safe"](#).
- When the power steering function is used continuously in an extreme manner, the protective function reduces the output to the power steering motor. Refer to [STC-10, "HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Protection Function"](#).

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL

Communicates the signal from each control unit via CAN communication.

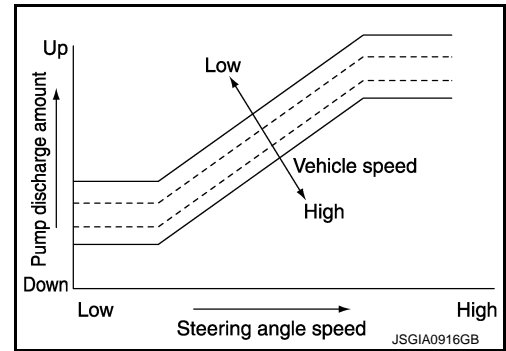
Control unit	Signal status
ECM	Transmits mainly the following signals to power steering control module via CAN communication. <ul style="list-style-type: none"> • Engine status signal
Steering angle sensor	Transmits mainly the following signals to power steering control module via CAN communication. <ul style="list-style-type: none"> • Steering angle sensor signal
Combination meter	Transmits mainly the following signals to power steering control module via CAN communication. <ul style="list-style-type: none"> • Vehicle speed signal
	Receives mainly the following signals from power steering control module via CAN communication. <ul style="list-style-type: none"> • Hydraulic pump electric power steering warning lamp signal

OPERATION CHARACTERISTICS

SYSTEM

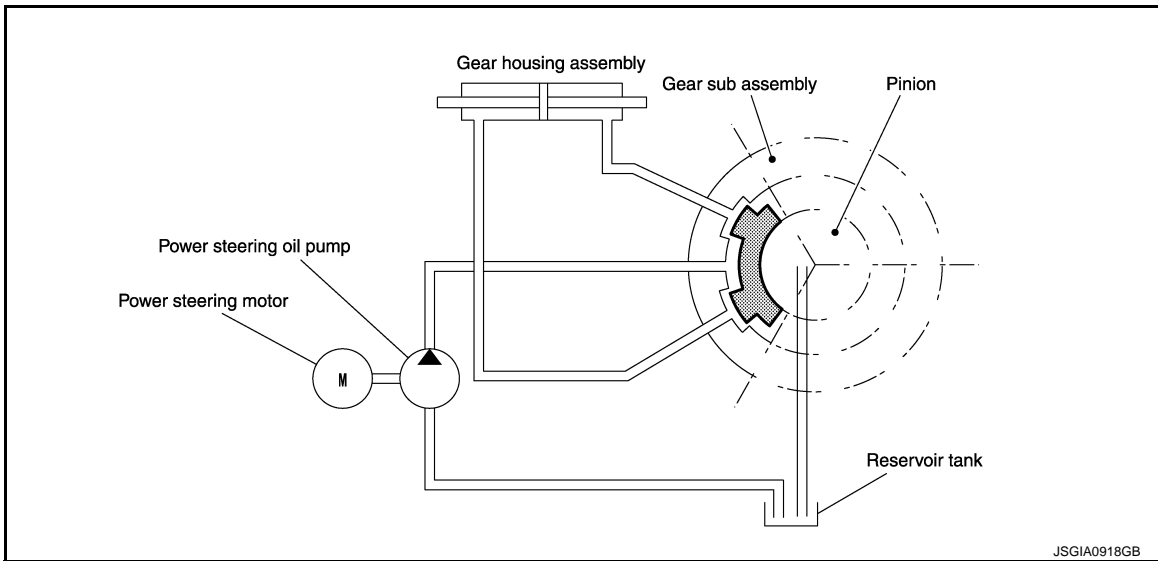
< SYSTEM DESCRIPTION >

When the steering angle speed is high or the vehicle speed is low, force is generated by increasing discharge amount from the power steering oil pump and by raising system hydraulic pressure.



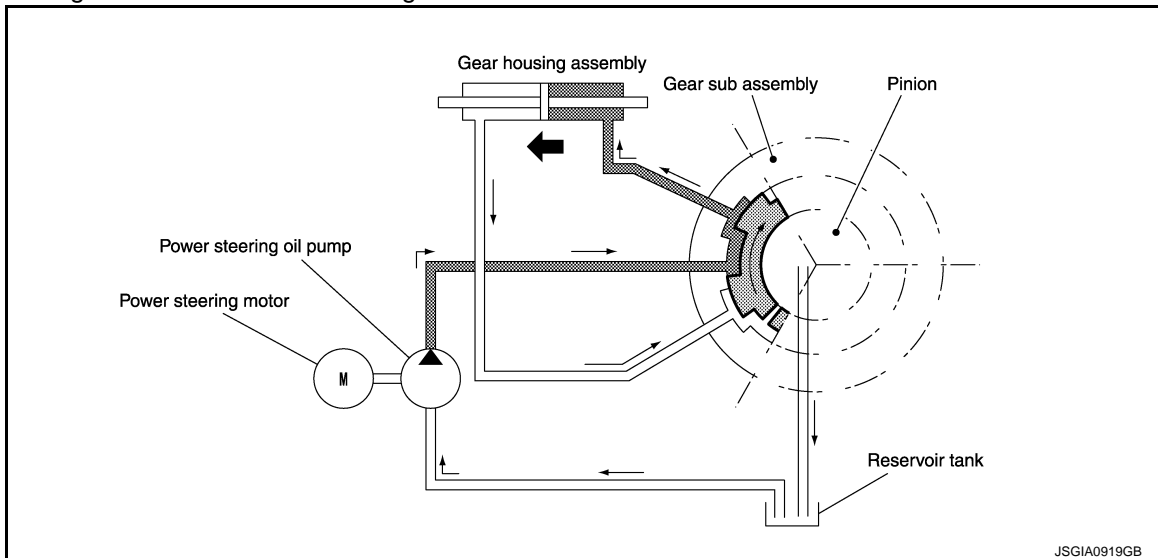
OPERATION PRINCIPLE

When Steering Wheel is in the Neutral Position



Because the hydraulic routes open at the power steering pump, gear housing right side, gear housing left side, and reservoir tank, the hydraulic pressure applied to the right side and left side of the gear housing is equal and no steering assist force is generated.

When Steering Wheel is Rotated to the Right

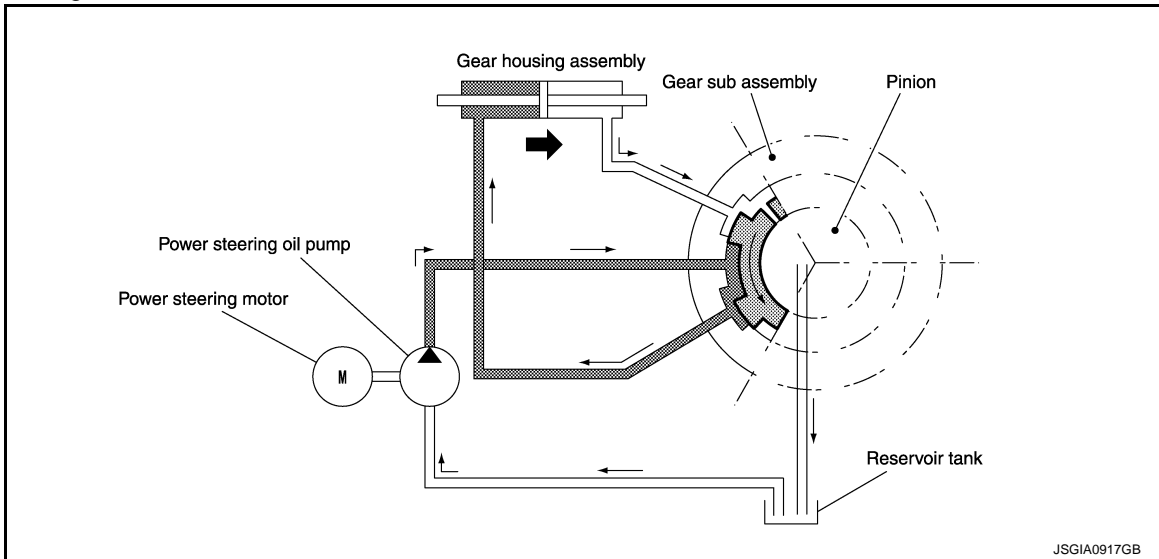


The hydraulic routes open from power steering pump to gear housing right side and from gear housing left side to reservoir tank, providing left direction assist force to the rack.

SYSTEM

< SYSTEM DESCRIPTION >

When Steering Wheel is Rotated to the Left



The hydraulic routes open from power steering pump to gear housing left side and from gear housing right side to reservoir tank, providing right direction assist force to the rack.

CONDITIONS FOR HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP ON

- When the hydraulic pump electric power steering system is operating and steering assist force is being generated, the hydraulic pump electric power steering warning lamp is OFF.
- When the hydraulic pump electric power steering system is stopped by the fail-safe or protective function and steering assist force is not being generated, the hydraulic pump electric power steering warning lamp turns ON to inform the driver that the system is in the manual steering state.

NOTE:

When the hydraulic pump electric power steering system turns ON according to the protection system, the cause is internal high temperature state of the hydraulic pump electric power steering system. By stopping the engine, internal temperature of the system decreases. After starting the engine, the system returns to the normal state and the hydraulic pump electric power steering system warning lamp turns OFF. (The system is not malfunctioning.) For information about the protective function, refer to [STC-10. "HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Protection Function"](#).

- When the ignition switch is turned ON, this lamp turns ON for lamp check (system check). When the system is operating normally, the lamp turns OFF after the engine starts.

Condition	Hydraulic pump electric power steering warning lamp
Ignition switch ON. (Lamp check)	ON
After engine start (steering assist force is generated)	OFF
When steering assist is stopped	ON

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Fail-safe INFOID:0000000011326212

When an error occurs in the hydraulic pump electric power steering system, fail-safe brings the system to a halt (manual steering) or restricted (constant steering assist level) state. When the system is in a halt state, fail-safe turns ON the hydraulic pump electric power steering warning lamp to warn the driver that the hydraulic pump electric power steering system is in the manual steering state.

DTC	Fail-safe condition
C1143	Certain steering assist force
C1601	Manual steering state
C1602	Certain steering assist force
C1606	Manual steering state
C1607	Certain steering assist force

SYSTEM

< SYSTEM DESCRIPTION >

DTC	Fail-safe condition
C1608	Manual steering state
U1000	Normal control NOTE: If the cause is in a different ECU, the state changes to fixed steering assist force.

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Protection Function

INFOID:000000011326213

- When the steering wheel is operated repeatedly or turned all the way for a long period during parking or low speed driving, the function of the hydraulic pump electric power steering system becomes limited to prevent the system from overheating. If the steering wheel is operated further more, the hydraulic pump electric power steering system stops and the hydraulic pump electric power steering system warning lamp may be turned ON. In this case, the steering wheel operation temporarily becomes hard. This is not a malfunction. When the engine is turned OFF (ignition switch OFF) and steering operation is stopped for a while, the temperature of the hydraulic pump electric power steering system decreases and the steering operation returns to normal after restarting the engine.
- Then, the hydraulic pump electric power steering system warning lamp turns OFF. If the system is OFF under the protection state, the hydraulic pump electric power steering system warning lamp turns ON to warn that the system is in the manual steering state. (This is not a system malfunction.) In addition, the following DTC remains to distinguish from malfunction.

DTC	vehicle condition
C160A	The system temporarily enters the manual steering state. (This is not a hydraulic pump electric power steering system malfunction.)

DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE)

CONSULT Function

INFOID:000000011326214

FUNCTION

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

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

*: The following diagnosis information is erased by erasing.

ECU IDENTIFICATION

Displays the part number stored in the control unit.

SELF-DIAG RESULTS MODE

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.

DATA MONITOR MODE

NOTE:

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

Monitor item (Unit)	Remarks
BATTERY VOLT (V)	Displays the power supply voltage for power steering control module.
STR ANG SPD (deg/s)	Displays the steering angle speed based on the steering angle signal transmitted by CAN communications.
MOTOR CURRENT (A)	Displays the current value consumed by power steering control module.
MTR REV SPD COMM (rpm)	Displays the power steering motor speed command value.
MTR REV SPD (rpm)	Displays the power steering motor speed.
C/U TEMP (°C or °F)	Displays the temperature of the power steering control module.
C/U TEMP A (°C or °F)	Displays the temperature of the power steering control module.
MTR ASSIST (%)	Displays the current percentage of the allowable assist ratio power steering motor.
ESTM VHCL SPD (km/h or mph)	Displays the vehicle speed calculated by the power steering control module.
WARNING LAMP (On/Off)	Hydraulic pump electric power steering system warning lamp control status is displayed.
ENGINE STATUS (STOP/RUN/CRANK)	Engine speed is displayed from engine condition signal with CAN communication
VHCL SPD JUDGE (OK/NG)	Displays the receiving status of the vehicle speed signal transmitted by CAN communications.

POWER STEERING CONTROL MODULE

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

POWER STEERING CONTROL MODULE

Reference Value

INFOID:0000000011326215

VALUES ON THE DIAGNOSIS TOOL

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	Engine running	Battery voltage (V)
STR ANG SPD	The steering wheel is not steered.	Approx. 0.0 deg/s
	The steering wheel is steered.	Displays steering angle speed (deg/s)
MOTOR CURRENT	Engine running	Steering wheel: Not steering (There is no steering force)
		Steering wheel: Right or left turn
MTR REV SPD COMM	Engine running	Steering wheel: Not steering (There is no steering force)
		Steering wheel: Right or left turn
MTR REV SPD	Engine running	Steering wheel: Not steering (There is no steering force)
		Steering wheel: Right or left turn
C/U TEMP	Engine running	Displays temperature of inside of power steering control module (°C or °F)
		Displays temperature of inside of power steering control module (°C or °F)
MTR ASSIST	Engine running	100% ^{*3}
ESTM VHCL SPD	Vehicle stopped	0.00 km/h or mph
	While driving	Approximately equal to the indication on speedometer ^{*4} (inside of ±10%)
WARNING LAMP	Hydraulic pump electric power steering warning lamp: ON	On
	Hydraulic pump electric power steering warning lamp: OFF	Off
ENGINE STATUS	Engine not running	STOP
	Engine running	RUN
	Engine cranking	CRANK
VHCL SPD JUDGE	Vehicle speed signal can be received via CAN communication	OK
	Vehicle speed signal cannot be received via CAN communication	NG

*1: The value changes according to load of power steering motor.

*2: This is in close agreement with a motor speed command value. Although a quick steering operation may cause disagreement, this is not a malfunction.

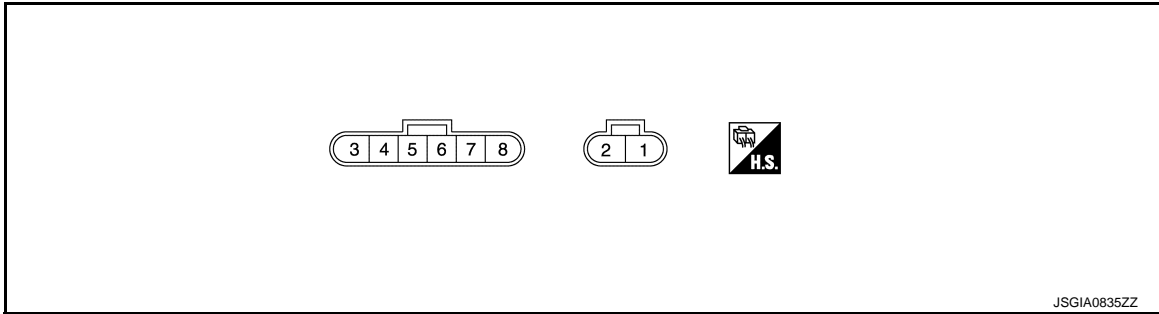
*3: Usually, 100% is displayed. An excessive steering operation gradually lowers the percentage. When left standing, the percentage returns to 100%.

POWER STEERING CONTROL MODULE

< ECU DIAGNOSIS INFORMATION >

*4: This may not agree with the speedometer indication immediately after the ignition switch is turned ON. This is not a malfunction.

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire Color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
1 (R)	Ground	Battery power supply	Input	Always	8.5 – 18.5 V
2 (B)	Ground	Ground	—	Always	0 V
5 (Y)	Ground	Ignition power supply	Input	Ignition switch: ON	8.5 – 18.5 V
				Ignition switch: OFF	0 V
7 (P)	—	CAN-L	Input/Output	—	—
8 (L)	—	CAN-H	Input/Output	—	—

Fail-safe

INFOID:0000000011326216

When an error occurs in the hydraulic pump electric power steering system, fail-safe brings the system to a halt (manual steering) or restricted (constant steering assist level) state. When the system is in a halt state, fail-safe turns ON the hydraulic pump electric power steering warning lamp to warn the driver that the hydraulic pump electric power steering system is in the manual steering state.

DTC	Fail-safe condition
C1143	Certain steering assist force
C1601	Manual steering state
C1602	Certain steering assist force
C1606	Manual steering state
C1607	Certain steering assist force
C1608	Manual steering state
U1000	Normal control NOTE: If the cause is in a different ECU, the state changes to fixed steering assist force.

Protection Function

INFOID:0000000011326217

- When the steering wheel is operated repeatedly or turned all the way for a long period during parking or low speed driving, the function of the hydraulic pump electric power steering system becomes limited to prevent the system from overheating. If the steering wheel is operated further more, the hydraulic pump electric power steering system stops and the hydraulic pump electric power steering system warning lamp may be turned ON. In this case, the steering wheel operation temporarily becomes hard. This is not a malfunction. When the engine is turned OFF (ignition switch OFF) and steering operation is stopped for a while, the tem-

POWER STEERING CONTROL MODULE

< ECU DIAGNOSIS INFORMATION >

perature of the hydraulic pump electric power steering system decreases and the steering operation returns to normal after restarting the engine.

- Then, the hydraulic pump electric power steering system warning lamp turns OFF. If the system is OFF under the protection state, the hydraulic pump electric power steering system warning lamp turns ON to warn that the system is in the manual steering state. (This is not a system malfunction.) In addition, the following DTC remains to distinguish from malfunction.

DTC	vehicle condition
C160A	The system temporarily enters the manual steering state. (This is not a hydraulic pump electric power steering system malfunction.)

DTC Inspection Priority Chart

INFOID:000000011326218

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

Priority	Priority order item (DTC)
1	<ul style="list-style-type: none"> • C1602 NO TURNING SET
2	<ul style="list-style-type: none"> • C1601 BATTERY VOLT • C1606 EPS MOTOR • C1608 CONTROL UNIT
3	<ul style="list-style-type: none"> • C1607 EEPROM
4	<ul style="list-style-type: none"> • C160A HEAT PROTECTION
5	<ul style="list-style-type: none"> • C1143 ST ANG SEN CIRCUIT • U1000 CAN COMM CIRCUIT

DTC Index

INFOID:000000011326219

DTC	Items (CONSULT screen terms)	Reference
C1143	ST ANG SEN CIRCUIT	STC-21, "DTC Logic"
C1601	BATTERY VOLT	STC-22, "DTC Logic"
C1602	NO TURNING SET	STC-25, "DTC Logic"
C1606	EPS MOTOR	STC-28, "DTC Logic"
C1607	EEPROM	STC-29, "DTC Logic"
C1608	CONTROL UNIT	STC-29, "DTC Logic"
C160A	HEAT PROTECTION	STC-30, "DTC Logic"
U1000	CAN COMM CIRCUIT	STC-31, "DTC Logic"

NOTE:

If two or more DTCs are detected, refer to [STC-14, "DTC Inspection Priority Chart"](#).

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM

< WIRING DIAGRAM >

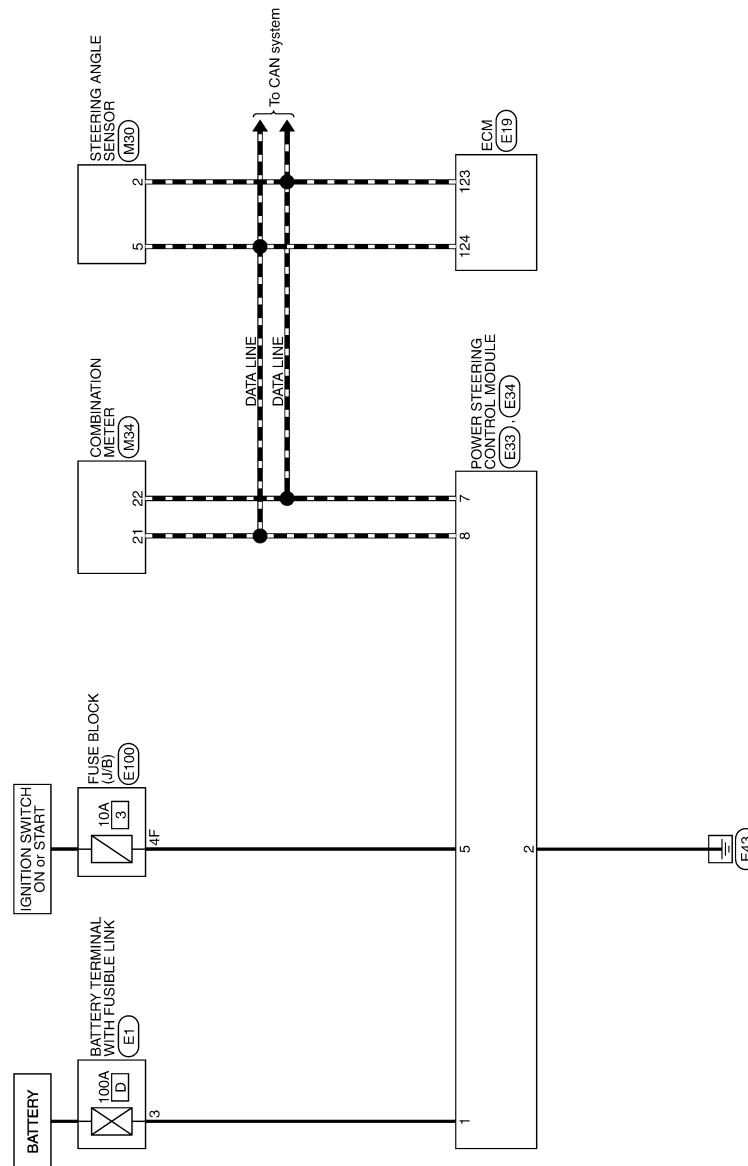
WIRING DIAGRAM

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM

Wiring Diagram

INFOID:0000000011326220

POWER STEERING CONTROL SYSTEM



2014/07/25

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HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM

< WIRING DIAGRAM >

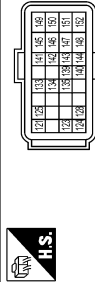
POWER STEERING CONTROL SYSTEM

Connector No.	E1
Connector Name	BATTERY TERMINAL WITH FUSELINE LINK
Connector Type	L027GY-MC



Terminal No.	Color Of Wire	Signal Name [Specification]
3	R	
4	R	

Connector No.	E19
Connector Name	ECM
Connector Type	R124RF-R28-L-LH



Terminal No.	Color Of Wire	Signal Name [Specification]
121	LG	EVAP CONTROL SYSTEM PRESSURE SENSOR
123	P	CAN COMMUNICATION LINE (CAN-L)
124	L	CAN COMMUNICATION LINE (CAN-H)
125	W	SENSOR POWER SUPPLY
128	Y	FUEL TANK TEMPERATURE SENSOR
133	BR	IGNITION SWITCH
134	Y	ASC/D STEERING SWITCH
135	BR	STOP LAMP SWITCH
139	SB	STOP LAMP SWITCH
140	BR	BRAKE PEDAL POSITION SWITCH
141	Y	EVAP CONTROL SYSTEM PRESSURE SENSOR
142	GR	ACCELERATOR PEDAL POSITION SENSOR 2
143	G	SENSOR GROUND
144	G	POWER SUPPLY FOR ECM
145	L	SENSOR POWER SUPPLY
146	P	SENSOR POWER SUPPLY
147	B	ECM GROUND

146	V	SENSOR GROUND
148	B	ECM GROUND
150	W	ACCELERATOR PEDAL POSITION SENSOR 1
151	B	SENSOR GROUND
152	B	ECM GROUND

Connector No.	E53
Connector Name	POWER STEERING CONTROL MODULE
Connector Type	Female_R200500194(BLACK)



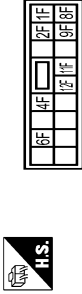
Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	BAT
2	B	GROUND

Connector No.	E54
Connector Name	POWER STEERING CONTROL MODULE
Connector Type	FEA04FE-FHA2-LG



Terminal No.	Color Of Wire	Signal Name [Specification]
5	Y	IGN
7	P	CAN-L
8	L	CAN-H

Connector No.	E100
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS



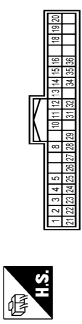
Terminal No.	Color Of Wire	Signal Name [Specification]
1	D	BATTERY FUSE SUPPLY (With automatic drive position)
2	G	IGNITION SIGNAL (With automatic drive position)
3	Y	IGNITION SIGNAL (With automatic drive position)
4	B	GROUND
5	B	ILLUMINATION CONTROL SIGNAL (Without automatic drive position)
6	B/P	ILLUMINATION CONTROL SIGNAL (With automatic drive position)
8	G	TRIP RESET SWITCH SIGNAL (Without automatic drive position)
8	SB	TRIP RESET SWITCH SIGNAL (With automatic drive position)
10	P	METER CONTROL SWITCH GROUND
11	G	ENTER SWITCH SIGNAL
12	BR	SELECT SWITCH SIGNAL (With automatic drive position)
12	R	SELECT SWITCH SIGNAL (Without automatic drive position)
13	W	ILLUMINATION CONTROL SIGNAL (Without automatic drive position)
13	V	ILLUMINATION CONTROL SIGNAL (With automatic drive position)
14	G	ILLUMINATION CONTROL SIGNAL (Without automatic drive position)
14	V	ILLUMINATION CONTROL SIGNAL (With automatic drive position)
15	BR	AIR BAG SIGNAL
16	L	ENGINE COOLANT TEMPERATURE SIGNAL
18	L	AMBIENT SENSOR SIGNAL (Without automatic drive position)
18	LG	AMBIENT SENSOR SIGNAL (With automatic drive position)
19	R	A/C AUTO AMP CONNECTION RECOGNITION SIGNAL
20	G	AMBIENT SENSOR GROUND (Without automatic drive position)
20	Y	AMBIENT SENSOR GROUND (With automatic drive position)
21	L	CAN-H
22	P	CAN-L
23	B	GROUND
24	B	FUEL LEVEL SENSOR GROUND
25	BR	AIR FERTILIZER SIGNAL
25	W	AIR FERTILIZER SIGNAL (Without automatic drive position)
26	BR	PARKING BRAKE SWITCH SIGNAL
27	BE	BRAKE FLUID LEVEL SWITCH SIGNAL (Without automatic drive position)
27	Y	BRAKE FLUID LEVEL SWITCH SIGNAL (With automatic drive position)
28	V	SECURITY SIGNAL

Connector No.	M30
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	
2	P	
4	G	
5	L	

Connector No.	M54
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	D	BATTERY FUSE SUPPLY (With automatic drive position)
2	G	IGNITION SIGNAL (Without automatic drive position)
2	Y	IGNITION SIGNAL (With automatic drive position)
3	B	GROUND
4	B	GROUND
5	B	ILLUMINATION CONTROL SIGNAL (Without automatic drive position)
5	B/P	ILLUMINATION CONTROL SIGNAL (With automatic drive position)
8	G	TRIP RESET SWITCH SIGNAL (Without automatic drive position)
8	SB	TRIP RESET SWITCH SIGNAL (With automatic drive position)
10	P	METER CONTROL SWITCH GROUND
11	G	ENTER SWITCH SIGNAL
12	BR	SELECT SWITCH SIGNAL (With automatic drive position)
12	R	SELECT SWITCH SIGNAL (Without automatic drive position)
13	W	ILLUMINATION CONTROL SIGNAL (Without automatic drive position)
13	V	ILLUMINATION CONTROL SIGNAL (With automatic drive position)
14	G	ILLUMINATION CONTROL SIGNAL (Without automatic drive position)
14	V	ILLUMINATION CONTROL SIGNAL (With automatic drive position)
15	BR	AIR BAG SIGNAL
16	L	ENGINE COOLANT TEMPERATURE SIGNAL
18	L	AMBIENT SENSOR SIGNAL (Without automatic drive position)
18	LG	AMBIENT SENSOR SIGNAL (With automatic drive position)
19	R	A/C AUTO AMP CONNECTION RECOGNITION SIGNAL
20	G	AMBIENT SENSOR GROUND (Without automatic drive position)
20	Y	AMBIENT SENSOR GROUND (With automatic drive position)
21	L	CAN-H
22	P	CAN-L
23	B	GROUND
24	B	FUEL LEVEL SENSOR GROUND
25	BR	AIR FERTILIZER SIGNAL
25	W	AIR FERTILIZER SIGNAL (Without automatic drive position)
26	BR	PARKING BRAKE SWITCH SIGNAL
27	BE	BRAKE FLUID LEVEL SWITCH SIGNAL (Without automatic drive position)
27	Y	BRAKE FLUID LEVEL SWITCH SIGNAL (With automatic drive position)
28	V	SECURITY SIGNAL

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM

< WIRING DIAGRAM >

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STC

POWER STEERING CONTROL SYSTEM

29	WASHER LEVEL SWITCH SIGNAL
30	RESERVE SIGNAL SWITCH SIGNAL
32	OVERENGINE CONTROL SWITCH SIGNAL
34	FUEL LEVEL SENSOR SIGNAL
35	BR
35	SEAT BELT SENSOR SIGNAL (DRIVER SEAT BELT SENSOR SIGNAL)
36	PASSENGER SEAT BELT WARNING SIGNAL

JRGWC1669GB

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000011326221

DETAILED FLOW

1. INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing 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-13, "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. CHECK VEHICLE CONDITION

With CONSULT

1. Turn ignition switch ON.
2. Check “C/U TEMP” and “C/U TEMP A” in “DATA MONITOR” in “EPS”.

Monitor item	Values
C/U TEMP	90°C (194°F) or less
C/U TEMP A	90°C (194°F) or less

Is the inspection result normal?

YES >> GO TO 4.

NO >> Wait with the ignition switch OFF until the data monitor indication becomes 90 °C (194 °F) or less. Go to 4 after the temperature drops to 90 °C (194 °F) or less.

4. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis.

Is any DTC detected?

YES >> Record or print DTC and freeze frame data (FFD). GO TO 5.

NO >> GO TO 7.

5. RECHECK SYMPTOM

With CONSULT

1. Erase self-diagnostic results for “EPS”.
2. Perform DTC confirmation procedures for the error detected 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?

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

Interview sheet					
Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Operation conditions, etc.		<input type="checkbox"/> Irrelevant <input type="checkbox"/> When engine starts <input type="checkbox"/> During idling <input type="checkbox"/> During driving <input type="checkbox"/> During acceleration <input type="checkbox"/> At constant speed driving <input type="checkbox"/> During deceleration <input type="checkbox"/> During cornering (right curve or left curve) <input type="checkbox"/> During steering			
Other conditions					
Memo					

C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

C1143 STEERING ANGLE SENSOR

DTC Logic

INFOID:000000011326223

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1143	ST ANG SEN CIRCUIT	When a malfunction is detected in steering angle sensor.	<ul style="list-style-type: none">• Harness or connector• Steering angle sensor• Power steering control module

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC "C1143" detected?

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

Diagnosis Procedure

INFOID:000000011326224

1. CHECK STEERING ANGLE SENSOR CIRCUIT

Check steering angle sensor circuit. Refer to [BRC-82, "Diagnosis Procedure"](#).

Is the inspection result normal?

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

2. CHECK TERMINALS AND HARNESS CONNECTORS

Check the power steering control module pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

- YES >> Power steering control module is malfunctioning. Replace power steering oil pump assembly. Refer to [ST-32, "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

C1601 BATTERY POWER SUPPLY

DTC Logic

INFOID:000000011326225

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1601	BATTERY VOLT	When a power supply voltage to the power steering control module is maintained at 18.5 V or more or at less than 8.5 V continuously for 0.5 seconds or more.	<ul style="list-style-type: none">• Harness or connector• Power steering control module• Fuse• Battery power supply circuit• Battery

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

Ⓟ With CONSULT

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

Is DTC "C1601" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-22. "Diagnosis Procedure"](#)
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000011326226

1. CHECK POWER STEERING CONTROL MODULE GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power steering control module harness connector.
3. Check continuity between power steering control module harness connector terminal and ground.

Power steering control module		—	Continuity
Connector	Terminal		
E33	2	Ground	Existed

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, and repair or replace error-detected parts.

2. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Check voltage between power steering control module harness connector terminals and ground.

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E33	1	Ground	8.5 – 18.5 V

2. Turn ignition switch ON.
CAUTION:
Never start the engine.
3. Check voltage between power steering control module harness connector terminals and ground.

C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E33	1	Ground	8.5 – 18.5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (2)

1. Turn ignition switch OFF.
2. Check the 100A fusible link (#D).
3. Disconnect battery terminal with fusible link harness connector.
4. Check continuity and short between power steering control module harness connector terminal and battery terminal with fusible link harness connector terminal.

Power steering control module		Battery terminal with fusible link		Continuity
Connector	Terminal	Connector	Terminal	
E33	1	E1	3	Existed

5. Check continuity between power steering control module harness connector terminal and ground.

Power steering control module		—	Continuity
Connector	Terminal		
E33	1	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to [PG-12. "Wiring Diagram - BATTERY POWER SUPPLY -"](#).

NO >> Repair or replace error-detected parts.

4. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (3)

1. Check voltage between power steering control module harness connector terminals and ground.

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E34	5	Ground	0 V

2. Turn ignition switch ON.
CAUTION:
Never start the engine.
3. Check voltage between power steering control module harness connector terminals and ground.

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E34	5	Ground	8.5 – 18.5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (4)

1. Turn ignition switch OFF.
2. Check the 10A fuse (#3).
3. Check continuity and short between power steering control module harness connector terminal and fuse block harness connector terminal.

C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

Power steering control module		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
E34	5	E100	4F	Existed

4. Check continuity between power steering control module harness connector terminal and ground.

Power steering control module		—	Continuity
Connector	Terminal		
E34	5	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to [PG-56, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).

NO >> Repair or replace error-detected parts.

6. CHECK TERMINALS AND HARNESS CONNECTORS

Check the power steering control module pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Power steering control module is malfunctioning. Replace steering oil pump assembly. Refer to [ST-32, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

C1602 NO TUNING SET

< DTC/CIRCUIT DIAGNOSIS >

C1602 NO TUNING SET

DTC Logic

INFOID:0000000011326227

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible cause
C1602	NO TURNING SET	When the information in power steering control module is not the same.	<ul style="list-style-type: none"> • Harness or connector • Power steering control module • Battery power supply circuit • Ignition power supply circuit • Battery • Fuse • Ground circuit

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC "C1602" detected?

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

Diagnosis Procedure

INFOID:0000000011326228

1. CHECK TERMINALS AND HARNESS CONNECTORS

1. Turn ignition switch OFF.
2. Check the power steering control module harness connector for disconnection or looseness.
3. Disconnect power steering control module harness connector and then check the power steering control module pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

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

2. CHECK POWER STEERING CONTROL MODULE GROUND CIRCUIT

Check continuity between power steering control module harness connector terminal and ground.

Power steering control module		—	Continuity
Connector	Terminal		
E33	2	Ground	Existed

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors, and repair or replace error-detected parts.

3. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Check voltage between power steering control module harness connector terminals and ground.

C1602 NO TUNING SET

< DTC/CIRCUIT DIAGNOSIS >

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E33	1	Ground	8.5 – 18.5 V

2. Turn ignition switch ON.

CAUTION:

Never start the engine.

3. Check voltage between power steering control module harness connector terminals and ground.

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E33	1	Ground	8.5 – 18.5 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (2)

1. Turn ignition switch OFF.

2. Check the 100A fusible link (#D).

Is the inspection result normal?

YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to [PG-12. "Wiring Diagram - BATTERY POWER SUPPLY -"](#).

NO >> Repair or replace error-detected parts.

5. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (3)

1. Check voltage between power steering control module harness connector terminals and ground.

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E34	5	Ground	0 V

2. Turn ignition switch ON.

CAUTION:

Never start the engine.

3. Check voltage between power steering control module harness connector terminals and ground.

Power steering control module		—	Voltage (Approx.)
Connector	Terminal		
E34	5	Ground	8.5 – 18.5 V

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY CIRCUIT (4)

1. Turn ignition switch OFF.

2. Check the 10A fuse (#3).

3. Check continuity and short between power steering control module harness connector terminal and fuse block (J/B) harness connector terminal.

Power steering control module		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
E34	5	E100	4F	Existed

4. Check continuity between power steering control module harness connector terminal and ground.

C1602 NO TUNING SET

< DTC/CIRCUIT DIAGNOSIS >

Power steering control module		—	Continuity
Connector	Terminal		
E34	5	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to [PG-56, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).

NO >> Repair or replace error-detected parts.

7. CHECK SELF-DIAGNOSIS RESULTS

With CONSULT

Perform "EPS" self-diagnosis.

Is DTC "C1602" detected?

YES >> Power steering control module is malfunctioning. Replace steering oil pump assembly. Refer to [ST-32, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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C1606 EPS MOTOR

< DTC/CIRCUIT DIAGNOSIS >

C1606 EPS MOTOR

DTC Logic

INFOID:000000011326229

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1606	EPS MOTOR	When the motor driver malfunction of power steering control module or power steering control module motor driver malfunction is detected.	<ul style="list-style-type: none">• Harness or connector• Power steering control motor• Power steering control module

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC "C1606" detected?

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

Diagnosis Procedure

INFOID:000000011326230

1. PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Erase self-diagnostic results for "EPS".
3. Turn the ignition switch OFF and wait for at least 10 seconds.
4. Perform self-diagnosis for "EPS".

Is DTC "C1606" detected?

- YES >> Power steering motor is malfunctioning. Replace power steering oil pump assembly. Refer to [ST-32, "Removal and Installation"](#).
NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

C1607, C1608 POWER STEERING CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

C1607, C1608 POWER STEERING CONTROL MODULE

DTC Logic

INFOID:000000011326231

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1607	EEPROM	When the memory (EEPROM) system malfunction is detected in power steering control module.	Power steering control module
C1608	CONTROL UNIT	When the internal malfunction is detected in power steering control module.	

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC "C1607" or "C1608" detected?

- YES >> Proceed to diagnosis procedure. Refer to [STC-29, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000011326232

1. PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Erase self-diagnostic results for "EPS".
3. Turn the ignition switch OFF and wait for at least 10 seconds.
4. Perform self-diagnosis for "EPS".

Is DTC "C1607" or "C1608" detected?

- YES >> Power steering control module is malfunctioning. Replace power steering oil pump assembly. Refer to [ST-32, "Removal and Installation"](#).
NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

C160A HEAT PROTECTION

< DTC/CIRCUIT DIAGNOSIS >

C160A HEAT PROTECTION

DTC Logic

INFOID:0000000011326233

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C160A	HEAT PROTECTION	<p>When the steering wheel is operated excessively and the interior temperature of the power steering system reaches 118°C (244.4°F) or more. (Protection function)</p> <p>NOTE: Although the hydraulic pump electric power steering system warning lamp turns ON, this is not a system malfunction. The state returns to normal after stopping steering operation and waiting until the system interior temperature drops to 90°C (194°F) or less.</p>	The protection of the hydraulic pump electric power steering system

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

Ⓟ With CONSULT

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

Is DTC "C160A" detected?

- YES >> Go to [STC-18. "Work Flow"](#).
NO >> INSPECTION END

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

INFOID:000000011326234

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:000000011326235

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	Power steering control module is not transmitting/receiving CAN communication signal for 2 seconds or more.	CAN communication error

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC "U1000" detected?

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

Diagnosis Procedure

INFOID:000000011326236

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

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HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP

Component Function Check

INFOID:000000011326237

1. CHECK THE ILLUMINATION OF THE HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP

Check that the hydraulic pump electric power steering warning lamp turns ON when ignition switch turns ON. Then, hydraulic pump electric power steering warning lamp turns OFF after the engine is started.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Perform trouble diagnosis. Refer to [STC-32, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000011326238

1. PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Check the DTC. Refer to [STC-14, "DTC Index"](#).

NO >> GO TO 2.

2. CHECK HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP SIGNAL

With CONSULT

1. Turn the ignition switch ON.
2. Select in "WARNING LAMP" in "DATA MONITOR" in "EPS".
3. Check that the item in "DATA MONITOR" is "On".

CAUTION:

Never start the engine.

4. Start the engine.

CAUTION:

Never drive the vehicle.

5. 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-71, "COMBINATION METER : Diagnosis Procedure"](#).

NO >> GO TO 3.

3. CHECK TERMINALS AND HARNESS CONNECTORS

Check the power steering control module pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Power steering control module is malfunctioning. Replace power steering oil pump assembly. Refer to [ST-32, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP DOES NOT TURN ON

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP DOES NOT TURN ON

Description

INFOID:0000000011326239

The hydraulic pump electric power steering warning lamp does not illuminate when the ignition switch is turned ON (lamp check).

Diagnosis Procedure

INFOID:0000000011326240

1. CHECK THE HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP

Perform trouble diagnosis for the hydraulic pump electric power steering warning lamp system. Refer to [STC-32. "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Check that the pin terminals and the connection of each connector are normal.
- NO >> Repair or replace error-detected parts.

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HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP DOES NOT TURN OFF

Description

INFOID:000000011326241

Hydraulic pump electric power steering warning lamp does not turn OFF several seconds after engine started

Diagnosis Procedure

INFOID:000000011326242

1. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform "EPS" self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to [STC-14, "DTC Index"](#).

NO >> GO TO 2.

2. CHECK HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP

Perform the trouble diagnosis of hydraulic pump electric power steering warning lamp. Refer to [STC-32, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. POWER STEERING CONTROL MODULE POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis of power steering control module power supply and ground. Refer to [STC-22, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check that the pin terminals and the connection of each connector are normal.

NO >> Repair or replace error-detected parts.

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

< SYMPTOM DIAGNOSIS >

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

Diagnosis Procedure

INFOID:0000000011326243

1. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform "EPS" self-diagnosis.

Is a malfunctioning system displayed?

- YES >> Check malfunctioning system. Refer to [STC-14, "DTC Index"](#).
- NO >> GO TO 2.

2. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (1)

With CONSULT

1. Start the engine.

CAUTION:

Never drive the vehicle.

- 2. Turn the steering wheel until it stops.
- 3. Select "MTR ASSIST" in "DATA MONITOR" in "EPS".

Is the display value "100%"?

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

3. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (2)

With CONSULT

- 1. Select "C/U TEMP" and "C/U TEMP A" in "DATA MONITOR" in "EPS".
- 2. Stop the system until the DATA MONITOR display value drops to "90°C (194°F)" or less.
- 3. Check whether symptom continues.

Did symptom continue?

- YES >> GO TO 4.
- NO >> This occurs because the protection function lowers the assist force. It is not a system malfunction.
INSPECTION END

4. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (3)

With CONSULT

- 1. Turn the steering wheel to the straight-ahead position. (There is no steering force)
- 2. Select "BATTERY VOLT" in "DATA MONITOR" in "EPS".

Is the display value "10.5 V" or more?

- YES >> GO TO 5.
- NO >> Check the battery power system. Refer to [STC-22, "Diagnosis Procedure"](#).

5. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (4)

With CONSULT

Select "ESTM VHCL SPD" in "DATA MONITOR" in "EPS".

Monitor item	Test condition	Display value
ESTM VHCL SPD	When stopped	0.00 km/h or mph
	While driving	Approximately equal to the indication on speedometer* (Inside of ±10%)

*: This may not agree with the speedometer indication immediately after the ignition switch is turned ON. This is not a malfunction.

Is the check result normal?

- YES >> GO TO 6.
- NO >> Check the combination meter, ABS actuator and electric unit (control unit). Refer to [MWI-35, "CONSULT Function"](#) and [BRC-30, "CONSULT Function"](#).

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

< SYMPTOM DIAGNOSIS >

6. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (5)

With CONSULT

Select "STR ANG SPD" in "DATA MONITOR" in "EPS".

Monitor item	Test condition	Display value
STR ANG SPD	The steering wheel is not steered.	Approx. 0.0 deg/s
	The steering wheel is steered.	Displays steering angle speed (deg/s)

Is the check result normal?

YES >> GO TO 7.

NO >> Check the steering angle sensor. Refer to [STC-21, "Diagnosis Procedure"](#).

7. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (6)

With CONSULT

Select "ENGINE STATUS" in "DATA MONITOR" in "EPS".

Is the display value "RUN"?

YES >> GO TO 8.

NO >> Check the ECM. Refer to [EC-73, "CONSULT Function"](#).

8. CHECK THE STEERING FORCE

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

Is the check result normal?

YES >> INSPECTION END

NO >> It is possible that there is a mechanical malfunction. Check the steering system. Refer to [ST-30, "Inspection"](#).

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

< SYMPTOM DIAGNOSIS >

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

Diagnosis Procedure

INFOID:000000011326244

1.CHECK THE ILLUMINATION OF THE HYDRAULIC PUMP ELECTRIC POWER STEERING WARNING LAMP

Check the hydraulic pump electric power steering warning lamp while engine is running.

Does the hydraulic pump electric power steering warning lamp turn OFF?

YES >> GO TO 2.

NO >> Refer to [STC-34, "Diagnosis Procedure"](#).

2.CHECK WHEEL ALIGNMENT

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Adjustment of wheel alignment. Refer to [FSU-7, "Adjustment"](#).

3.CHECK STEERING WHEEL TURNING FORCE

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-30, "Inspection"](#).

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UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Diagnosis Procedure

INFOID:000000011326245

1. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform "EPS" self-diagnosis.

Is a malfunctioning system displayed?

YES >> Check malfunctioning system. Refer to [STC-14. "DTC Index"](#).

NO >> GO TO 2.

2. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (1)

With CONSULT

1. Start the engine.

CAUTION:

Never drive the vehicle.

2. Turn the steering wheel until it stops.

3. Select "MTR ASSIST" in "DATA MONITOR" in "EPS".

Is the display value "100%"?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (2)

With CONSULT

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

2. Stop the system until the DATA MONITOR display value drops to "90°C (194°F)" or less.

3. Check whether symptom continues.

Did symptom continue?

YES >> GO TO 4.

NO >> This occurs because the protection function lowers the assist force. It is not a system malfunction.
INSPECTION END

4. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (3)

With CONSULT

1. Turn the steering wheel to the straight-ahead position. (There is no steering force)

2. Select "BATTERY VOLT" in "DATA MONITOR" in "EPS".

Is the display value "10.5 V" or more?

YES >> GO TO 5.

NO >> Check the battery power system. Refer to [STC-22. "Diagnosis Procedure"](#).

5. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (4)

With CONSULT

Select in "ESTM VHCL SPD" in "DATA MONITOR" in "EPS".

Monitor item	Test condition	Display value
ESTM VHCL SPD	When stopped	0.00 km/h or mph
	While driving	Approximately equal to the indication on speedometer* (Inside of $\pm 10\%$)

*: This may not agree with the speedometer indication immediately after the ignition switch is turned ON. This is not a malfunction.

Is the check result normal?

YES >> GO TO 6.

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS >

NO >> Check the combination meter, ABS actuator and electric unit (control unit). Refer to [MWI-35, "CONSULT Function"](#) and [BRC-30, "CONSULT Function"](#).

6. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (5)

With CONSULT

Select "STR ANG SPD" in "DATA MONITOR" in "EPS".

Monitor item	Test condition	Display value
STR ANG SPD	The steering wheel is not steered.	Approx. 0.0 deg/s
	The steering wheel is steered.	Displays steering angle speed (deg/s)

Is the check result normal?

YES >> GO TO 7.

NO >> Check the steering angle sensor. Refer to [STC-21, "Diagnosis Procedure"](#).

7. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (6)

With CONSULT

Select "ENGINE STATUS" in "DATA MONITOR" in "EPS".

Is the display value "RUN"?

YES >> GO TO 8.

NO >> Check the ECM. Refer to [EC-73, "CONSULT Function"](#).

8. CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.

- Steering column assembly. Refer to [ST-13, "Exploded View"](#).
- Steering gear assembly. Refer to [ST-20, "Exploded View"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9. CHECK STEERING WHEEL TURNING FORCE

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to [ST-30, "Inspection"](#).

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POWER STEERING CONTROL MODULE

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

POWER STEERING CONTROL MODULE

Removal and Installation

INFOID:000000011326246

CAUTION:

Disconnect battery negative terminal before starting operations.

Never remove power steering control module from steering oil pump assembly. When replacing power steering control module, replace steering oil pump assembly. Refer to [ST-13, "Removal and Installation"](#).