# STEERING CONTROL SYSTEM

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## < PRECAUTION > PRECAUTION PRECAUTIONS

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

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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least 3 minutes before performing any service.

### Precautions for Performing 2-wheel Drive Test

INFOID:000000013509514

A vehicle with 2.2L diesel engine or 2.0L turbo gasoline engine of this model limits torque when a difference occurs in each wheel speed. For this reason, it is necessary to use Chassis Dynamometer Mode when performing the 2-wheel drive test (e.g. with 2-wheel chassis dynamometer, speedometer tester).

For Chassis Dynamometer Mode, refer to ENGINE >> ENGINE CONTROL SYSTEM >> BASIC INSPECTION >> CHASSIS DYNAMOMETER MODE >> Description.

### Precautions for Removing Battery Terminal

INFOID:000000013509512

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds



### PRECAUTIONS

	M9R engine : 4 minutes ZD30DDTT : 60 seconds	А
•	ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal s removed before ECU stops, then a DTC detection error or ECU data corruption may occur. After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.	В
	NOTE: • Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.	С
	<ul> <li>Driving for 30 minutes or more at 140 km/h (86 MPH) or more.</li> <li>Driving for 30 minutes or more on a steep slope.</li> </ul>	D
•	-or vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch. NOTE:	E
	If the ignition switch is turned ON with any one of the terminals of main battery and sub battery discon-	
•	After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC. NOTE:	F
	The removal of 12V battery may cause a DTC detection error.	
S	ervice Notice and Precautions for Hydraulic Pump Electric Power Steering System	STO
•	Check if air pressure and size of tires are proper, the specified part is used for the steering wheel is genuine	
•	Dart. Check if the connection of steering column assembly and steering gear assembly is proper (there is not	Н
•	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 pround clearance	
•	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.	J
• • •	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 picture load for steering rack, so pump works higher rotation to provide more bydraulic flow to create more	I J K
• • • •	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 nigher 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	I J K
•	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 nigher 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".	I J L M
• • • • •	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 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 nigher 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. 3efore 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".	I J M N

### SYSTEM DESCRIPTION COMPONENT PARTS

**Component Parts Location** 

INFOID:000000013355691



A Engine room left side

### **COMPONENT PARTS**

### < SYSTEM DESCRIPTION >

### [HYDRAULIC PUMP ELECTRIC P/S]

No.	Component		Function	А
1	Drive mode select switch		<ul> <li>Drive mode is selectable among PERSONAL, SPORT, and STANDARD by the operating the switch.</li> <li>Output the status of drive mode to the chassis control module.</li> <li>For detailed installation location, refer to <u>DMS-4</u>, "<u>Component</u> <u>Parts Location</u>".</li> </ul>	В
2	ECM		<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Engine status signal</li> <li>Stop/Start status signal</li> <li>Receives mainly the following signals from steering force control module via CAN communication.</li> <li>Steering torque signal</li> <li>For detailed installation location, refer to EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location".</li> </ul>	C D E
3	ABS actuator and electric unit (control unit)		<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Vehicle speed signal (ABS)</li> <li>For detailed installation location, refer to <u>BRC-10, "Component Parts Location"</u>.</li> </ul>	F
4	Chassis control module		<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Drive mode signal</li> <li>For detailed installation location, refer to <u>DAS-516</u>, "Component <u>Parts Location"</u>.</li> </ul>	STO
6	Combination meter (Power steering warning lamp)		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Vehicle speed signal (Meter)</li> <li>For detailed installation location, refer to <u>MWI-8</u>, "<u>METER SYS-TEM : Component Parts Location</u>".</li> <li>Turns ON the power steering warning lamp according to the signal from the power steering control module via CAN communication.</li> <li>For power steering warning lamp, refer to <u>STC-21</u>, "<u>WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp</u>".</li> </ul>	J
6	Steering angle sensor		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Steering angle sensor signal</li> <li>Steering angle speed signal</li> <li>Steering angle sensor malfunction signal</li> <li>For detailed installation location, refer to <u>BRC-10, "Component</u> <u>Parts Location"</u>.</li> </ul>	K
$\overline{\mathcal{O}}$		Reservoir tank		$\mathbb{M}$
8	Power steering oil pump	Power steering motor	STC 16 "Power Steering Oil Pump Assembly"	
9	assembly	Power steering control module		Ν
10		Power steering oil pump		

### < SYSTEM DESCRIPTION >

### [HYDRAULIC PUMP ELECTRIC P/S]

### Power Steering Oil Pump Assembly

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



### 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.

### POWER STEERING MOTOR

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

### POWER STEERING OIL PUMP

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

### **RESERVOIR TANK**

Fluid is filled from the reservoir tank.

### < SYSTEM DESCRIPTION > SYSTEM HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : System Description

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### SYSTEM DIAGRAM



### DESCRIPTION

- 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 (Constant steering assist level state). Refer to STC-20, "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-20, "HYDRAULIC PUMP **ELECTRIC POWER STEERING SYSTEM : Protection Function**".



• When the driver turns the steering wheel (torque application exceeding the specified torque) during stop/start, the power steering control module restarts the engine (disables stop/start system) and immediately brings the assist control in its ready-to-start state.

- If power steering system becomes out of order, the power steering warning lamp blinks and the Stop/Start System brings about such conditions as follows:
- Stop/start mode is not enabled under non stop/start state.
- The engine is restarted during stop/start, regardless of steering wheel operation.

### **OPERATION CHARACTERISTICS**

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### 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.
- With Infiniti Drive Mode Selector, the steering characteristics can be set corresponding to the preference of the driver. For details, refer to <u>DMS-13</u>, "Infiniti Drive Mode Selector : System Description (For 2.0L Turbo Gasoline Engine Models)".



[HYDRAULIC PUMP ELECTRIC P/S]

### **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.

### d is low.

### [HYDRAULIC PUMP ELECTRIC P/S]

### < 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 POWER STEERING WARNING LAMP ON

- When the hydraulic pump electric power steering system is operating and steering assist force is being generated, the 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 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 power steering warning lamp turns OFF. (The system is not malfunctioning.) For information about the protective function, refer to <u>STC-20</u>, "<u>HYDRAULIC PUMP ELECTRIC POWER STEERING</u> <u>SYSTEM</u> : <u>Protection Function</u>".

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	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	N

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### SYSTEM

### < SYSTEM DESCRIPTION >

### [HYDRAULIC PUMP ELECTRIC P/S]

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Circuit Diagram





### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Fail-safe INFOLD:000000013355695

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 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	Constant steering assist level state
C1601	Manual steering state
C1602	Constant steering assist level state
C1606	Manual steering state
C1607	Constant steering assist level state
C1608	Manual steering state
C1609	Constant steering assist level state
U1000	Normal control <b>NOTE:</b> If the cause is in a different ECU, the state changes to fixed steering assist force.

### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM : Protection Function

 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 power steering 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.

### SYSTEM

### < SYSTEM DESCRIPTION >

### [HYDRAULIC PUMP ELECTRIC P/S]

• Then, the power steering warning lamp turns OFF. If the system is OFF under the protection state, the power steering 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	В
C160A	The system temporarily enters the manual steering state. (This is not a hydraulic pump electric power steering system malfunction.)	

### WARNING/INDICATOR/CHIME LIST

### WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

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Name	Design	Layout/Function	
Power steering warning lamp		For layout, refer to <u>MWI-9</u> , <u>"METER SYSTEM : Design"</u> . For function, refer to <u>MWI-40</u> , <u>"WARNING LAMPS/INDICATOR LAMPS : Pow-</u> <u>er Steering Warning Lamp (Except Direct Adaptive Steering)"</u> .	E
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### DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE) < SYSTEM DESCRIPTION > [HYDRAULIC PUMP ELECTRIC P/S]

### DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE)

### **CONSULT** Function

INFOID:000000013355698

### APPLICATION ITEMS

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 <u>STC-25, "DTC Index"</u>.

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.
AUTO STOP START FLAG (OK/NG)	Displays a stop/start permission state of the EPS control unit.
AUTO STOP START STATUS (On/CRANK/ Off)	Displays a stop/start state received via CAN communication.
Idle Stop Act (On/Off)	Displays a stop/start system activation received via CAN communication.
STEERING MODE (NORML/SPORT)	Displays a steering mode received via CAN communication.
STEERING ANGLE (deg)	Displays the steering angle based on steering angle signal transmitted by CAN commu- nications.
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)	Power steering 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 communi- cations.

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### ECU DIAGNOSIS INFORMATION POWER STEERING CONTROL MODULE

### **Reference Value**

### 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.

NA-witewitewa		Data monitor		D
Monitor item		Condition	Display value	
BATTERY VOLT	Engine running		Battery voltage (V)	E
	Fasias avaias	No steering wheel operation	ОК	
AUTO STOP START FLAG	Engine running	Steering wheel operation	NG	
	During stop/start system	m operation	On	F
AUTO STOP START STA-	Restart (engine crankir	ng)	CRANK	
	Engine running		Off	eт
Stop/start system is active		tive	On	510
Idle Stop Act	Stop/start system is no	t active	Off	
	Steering mode: Standa	rd	NORML	Н
STEERING MODE	Steering mode: Sport		SPORT	
	The steering wheel is n	ot steered.	Approx. 0.0 deg	
STEERING ANGLE	The steering wheel is s	teered.	Displays steering angle speed (deg)	
	The steering wheel is n	ot steered.	Approx. 0.0 deg/s	
STR ANG SPD	The steering wheel is s	teered.	Displays steering angle speed (deg/s)	J
	Engine running	Steering wheel: Not steering (There is no steering force)	MAX approx. 10 A <sup>*1</sup>	
MOTOR CORRENT		Steering wheel: Right or left turn	Displays consumption current of pow- er steering control module (A)	Κ
	Engine running	Steering wheel: Not steering (There is no steering force)	Shows an almost constant value (rpm)	L
		Steering wheel: Right or left turn	The value changes as a steering speed (rpm)	
MTR REV SPD		Steering wheel: Not steering (There is no steering force)	Shows an almost constant value (rpm) <sup>*2</sup>	Μ
	Engine running	Steering wheel: Right or left turn	The value changes as a steering speed (rpm) <sup>*2</sup>	Ν
C/U TEMP	Engine running		Displays temperature of inside of power steering control module (°C or °F)	0
C/U TEMP A	Engine running		Displays temperature of inside of power steering control module (°C or °F)	D
MTR ASSIST	Engine running		100% <sup>*3</sup>	٢
	Vehicle stopped		0.00 km/h or mph	
ESTM VHCL SPD	While driving		Approximately equal to the indication on speedometer <sup>*4</sup> (inside of $\pm 10\%$ )	

### POWER STEERING CONTROL MODULE

### < ECU DIAGNOSIS INFORMATION >

### [HYDRAULIC PUMP ELECTRIC P/S]

Monitor itom	Data monitor			
Monitor tern	Condition	Display value		
	Power steering warning lamp: ON	On		
	Power steering warning lamp: OFF	Off		
	Engine not running	STOP		
ENGINE STATUS	Engine running	RUN		
	Engine cranking	CRANK		
	Vehicle speed signal can be received via CAN communication	ОК		
VHCL SPD JUDGE	Vehicle speed signal cannot be received via CAN communica- tion	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%.

\*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)		Descriptio	n	Condition	Value	
+	_	Signal name Input/Output			(πρριολ.)	
1 (BR)	Ground	Battery power supply	Input	Always	8.5 – 18.5 V	
2 (B)	Ground	Ground	_	Always	0 V	
5	Ground		Input	Ignition switch: ON	8.5 – 18.5 V	
(V)	Giouna	ignition power supply	input	Ignition switch: OFF	0 V	
7 (P)	_	CAN-L	Input/Output	_	_	
8 (L)		CAN-H	Input/Output	_	_	

### Fail-safe

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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 power steering warning lamp to warn the driver that the hydraulic pump electric power steering system is in the manual steering state.

### < ECU DIAGNOSIS INFORMATION >

[HYDRAULIC PUMP ELECTRIC P/S]

DTC	Fail-safe condition	A
C1143	Constant steering assist level state	
C1601	Manual steering state	
C1602	Constant steering assist level state	В
C1606	Manual steering state	
C1607	Constant steering assist level state	С
C1608	Manual steering state	
C1609	Constant steering assist level state	
U1000	Normal control <b>NOTE:</b> If the cause is in a different ECU, the state changes to fixed steering assist force.	D

### **Protection Function**

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- 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 power steering 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 STC 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 power steering warning lamp turns OFF. If the system is OFF under the protection state, the power Н steering 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**

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

Priority	Priority order item (DTC)	
1	C1602 NO TURNING SET	L
2	C1601 BATTERY VOLT     C1606 EPS MOTOR     C1608 CONTROL UNIT	M
3	• C1607 EEPROM	
4	C160A HEAT PROTECTION	
5	C1143 ST ANG SEN CIRCUIT     U1000 CAN COMM CIRCUIT     C1609 CAN VHCL SPEED	Ν

### **DTC** Index

INFOID:000000013355703

INFOID:000000013355702

DTC	Items	Power steering warning lamp	Reference
C1143	ST ANG SEN CIRCUIT	OFF	STC-38, "DTC Description"
C1601	BATTERY VOLT	ON	STC-39, "DTC Description"
C1602	NO TURNING SET	ON / OFF <sup>*1</sup>	STC-42, "DTC Description"
C1606	EPS MOTOR	ON	STC-45, "DTC Description"
C1607	EEPROM	ON / OFF <sup>*2</sup>	STC-46, "DTC Description"

### POWER STEERING CONTROL MODULE

### < ECU DIAGNOSIS INFORMATION >

### [HYDRAULIC PUMP ELECTRIC P/S]

DTC	Items	Power steering warning lamp	Reference
C1608	CONTROL UNIT	ON / OFF <sup>*2</sup>	STC-46, "DTC Description"
C1609	CAN VHCL SPEED	OFF	STC-47, "DTC Description"
C160A	HEAT PROTECTION	ON	STC-49, "DTC Description"
U1000	CAN COMM CIRCUIT	OFF	STC-50, "DTC Description"

\*1: Power steering warning lamp turns ON/OFF according to a condition when DTC is detected.

\*2: Even if DTC is detected, power steering warning lamp does not turns ON when assist torque is generated. **NOTE:** 

If two or more DTCs are detected, refer to STC-25. "DTC Inspection Priority Chart".

### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITHOUT CAN GATEWAY)

### < WIRING DIAGRAM >

[HYDRAULIC PUMP ELECTRIC P/S]

### WIRING DIAGRAM

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITHOUT CAN GATEWAY)

### Wiring Diagram

INFOID:000000013355704



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# HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITHOUT CAN GATEWAY)





JRGWC3171GB

### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITHOUT CAN GATEWAY)

< WIRING DIAGRAM >

### [HYDRAULIC PUMP ELECTRIC P/S]



JRGWC3172GB

### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITH CAN GATE-WAY)

< WIRING DIAGRAM >

[HYDRAULIC PUMP ELECTRIC P/S]

HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITH CAN GATEWAY)

Wiring Diagram

INFOID:000000013524465



HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITH CAN GATEWAY)

2015/11/27

### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITH CAN GATE-WAY)

### < WIRING DIAGRAM >

[HYDRAULIC PUMP ELECTRIC P/S]

А





### < WIRING DIAGRAM >

ΗΥС	RAULI	IC PUMP ELECTRIC POWER ST	TEERIN	NG SYS	TEM (WITH CAN GATEWAY)							
Connec	tor No.	8116	Conne	ector No.	8118	18	-		20	GR	- [With VR30 engine]	
Connec	tor Name	JOINT CONNECTOR-B06	Conne	sctor Name	JOINT CONNECTOR-B04	19		- [With 2.0L turbo gasoline engine]	20	SHIELD	- [With 2.0L turbo gasoline engine]	
Connec	or Tyne	24342 46424	Conne	sctor Tyne	24347 46674	5	- 201	- [With 2 Of Turbo escoline angine]	7 5	- e	- [with 2.00 tarbo gasonine engine] - [Mith VR30 engine]	
		C-9C0-1-9-10-14				2 2	SHIELD	- [With VR30 engine]	22	53		
E			ľ			21	_	- [With 2.0L turbo gasoline engine]	23	N		
		6 5 4 3 2 1		e	6 5 4 3 2 1	21	SHIELD	- [With VR30 engine]	24	M		
ĺ		12 11 10 9 8 7		ä	12 11 10 9 8 7	22	R					
		18 17 16 15 14 13			18 17 16 15 14 13	23	R	•				
						24	я		Connecto	or No.	E35	
									Connecto	or Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	
Termir	al Color Of	f Circuit Mamo (Considentian)	Termi	inal Color (	Df Eisenel Name (Encodefication)	Connec	or No.	8120	Connecto	or Type	SAZ30FB-SJZ4-U	
No.	Wire	oignar Name (opermeanon)	NG	. Wire	olgital traine (openingation)	Jonno	or Namo	IONT CONNECTOR BO3	ſ			
1	-		1	LG LG	- [With VR30 engine]	CONTRACT	allina in		E			
2	L		1	SHIEL.	D - [With 2.0L turbo gasoline engine]	Connec	or Type	24342_4GA2A	ů T		لرا <u>251   28   30   32   34</u> م	
e	L		2	P1	- [With VR30 engine]	4			<u>6</u> .		4 15 17 18 19 20 1 4	
4	_		2	SHIEL	D - [With 2.0L turbo gasoline engine]	E						
ŝ	_		m	SHIEL				6 5 4 3 2 1				
ە	_		4	9	- [With VR30 engine]			12 11 10 9 8 7 5				
2	8		4	SHIELL	D - [With 2.0L turbo gasoline engine]			18 17 15 14 13				
00	~	- [With Gateway]	5	9	- [With VR30 engine]			24 23 22 21 20 19	Termina	Color Of		
~~	>	- [Without Gateway]	5	SHIELL	9 - [With 2.0L turbo gasoline engine]				No.	Wire	Signal Name [Specification]	
6	~	- [With Gatewav]	9	9	- [With VR30 engine]				-	8	GND	
σ	>	- [Without Gateway]	y	CHIFI	D - [Mith 2 OI turbo ascoline angine]	Termin	al Color Of		ç	ď	GND	
1	•	- [withou dateway]			- frolor of wire differs depending on production	Ň	Wire	Signal Name [Specification]	4 m		VALVE BATTERY (With VB30 enrine)	
2	: >	[Mith 2 Of studio condition and and		: >	[Color of titles differe denording on production]	-	-			, ,	VALVE DATTEDY (With 2 OF stube accelled and	
10	> :	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	` °	> -	- [Color of wire differs depending on production]		* "		- m	- ,	VALVE BATTERY (With 2.0L turbo gasoline engine)	
7	>		×	2	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	7	×		4	Y	MULUK BALLEKY	
12	•	[With Gateway]	00	∝ :	<ul> <li>[With VR30 engine and without paddle shift]</li> </ul>	m		[With VR30 engine]	50 1	re:	STOP LAMP SW SIGNAL [With ADAS]	
Ĩ	×	- [Without Gateway]	~	>	<ul> <li>[With VK3U engine and with paddle shift]</li> </ul>	'n	×	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	n	>	STUP LAMP SW SIGNAL [WITH ASCU]	
13	SHIELD		6	9	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	4	-	<ul> <li>[With VR30 engine]</li> </ul>	7	GR	RR LH WHEEL SENSOR SIGNAL	
14	SHIELD		6	~	<ul> <li>[With VR30 engine and without paddle shift]</li> </ul>	4	æ	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	œ	U	RR LH WHEEL SENSOR POWER SUPPLY	
15	8	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	6	>	<ul> <li>[With VR30 engine and with paddle shift]</li> </ul>	5	_		6	BR	FR RH WHEEL SENSOR SIGNAL	
15	SHIELD	<ul> <li>- [With VR30 engine]</li> </ul>	5	٦ رو	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	9	_		10	GR	FR RH WHEEL SENSOR POWER SUPPLY	
16	_	- [With VR30 engine]	10	) SHIEL.	D - [With VR30 engine]	7	-		13	R	VACUUM SENSOR SIGNAL	
16	SHIELD	<ul> <li>- [With 2.0L turbo gasoline engine]</li> </ul>	11	PI PI	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	×	L		15	٩	CAN-L [Without Gateway]	
17	_	- [With VR30 engine]	11	I SHIEL	D - [With VR30 engine]	6	٦	- [With 2.0L turbo gasoline engine]	15	R	CAN-L [With gateway]	
17	SHIELD	<ul> <li>- [With 2.0L turbo gasoline engine]</li> </ul>	12	i Fe	- [With 2.0L turbo gasoline engine]	6	R	- [With VR30 engine]	17	Y	RR RH WHEEL SENSOR SIGNAL	
18	_	- [With VR30 engine]	11	SHIELI	D - [With VR30 engine]	10	_	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	18	P1	RR RH WHEEL SENSOR POWER SUPPLY [With 2.0L turbo gasoline engine]	
18	SHIELD	<ul> <li>- [With 2.0L turbo gasoline engine]</li> </ul>	13	-	- [With VR30 engine]	9	æ	- [With VR30 engine]	18	>	RR RH WHEEL SENSOR POWER SUPPLY [With VR30 engine]	
19	_	- [With 2.0L turbo gasoline engine]	9	۵. ~	- [With 2.0L turbo gasoline engine and without gateway]	Ħ	æ		19	SB	FR LH WHEEL SENSOR SIGNAL	
19	SHIELD	- [With VR30 engine]	[ <sup>#</sup>	"	- [With 2.0L turbo gasoline engine and with gateway]	12	~		20	8	FR LH WHEEL SENSOR POWER SUPPLY	
20	-	- [With 2.0L turbo gasoline engine]	14	-	- [With VR30 engine]	ц Ц	>		25	-	CAN-H	
20	SHIFLD	- [With VR30 engine]		•	- [With 2.0] turbo eacoline engine and without eateway]	41	>		38	Ŀ	VACIII M SENSOR POWER SLIPPLY	
2	-		1		. [With 2 OI hurdre and acceleration of with a terms of	÷	. >		<u>,</u>	,	VDC DEE SW SIGNAL	
12		-	- - - -	-		ç Ç	A 12175		e e	4		
7	- -		= ;		- [With VK50 engine]	7	SHIELU		32	SHIELU	VACUUM SENSOK GROUNU	
23	а (		-	¥ .	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	81	ж (		34	9	NGI	
24	•	- [With VR30 engine]	Ĭ	-	-	5		<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>				
24	>	<ul> <li>[With 2.0]. turbo pasoline engine]</li> </ul>	0	-		5	ë	- [With VR3D engine]				

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[HYDRAULIC PUMP ELECTRIC P/S]

### HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITH CAN GATE-WAY)

### < WIRING DIAGRAM >

### [HYDRAULIC PUMP ELECTRIC P/S]



JRGWC3176GB

### < WIRING DIAGRAM >

### 2019 17161514131211 -[With 2.0L turbo gasoline eng. [With VR30 engine and without - [With VR30 engine and with I' Signal Name [Specification] - [With VR30 engine and xcept with VR30 engine a h 2.0L turbo gaso JOINT CONNECTOR-M05 (With 2.0L M175 Color Of Wire SB SB Connector Name ≃ ≥ Connector No. 24 小 HS. Terminal No Signal Name [Specification] 6 5 4 3 2 12 11 10 9 8 18 17 16 15 14 1 24 23 22 21 20 1 With VR30 engl JOINT CONNECTOR-M03 turbo g [With Mith 2.0L tv With 2.0L M173 Connector No. Connector Name Wire . HS 20 No. Con HYDRAULIC PUMP ELECTRIC POWER STEERING SYSTEM (WITH CAN GATEWAY) 3 2 1 19 8 7 21 20 19 Signal Name [Specification] Signal Name [Specification] 5 4 GROUND [Without G Vith G IGN CAN-H STEERING ANGLE SENSOR JOINT CONNECTOR-M10 5 4 11 10 16 22 2 24342\_4GA2A M137 Color Of Wire Color Of Wire Connector Name Connector Name Connector No. E II Terminal .S.H. Terminal <sup>o</sup>N Ňo. E Signal Name [Specification] CAN-COMBINATION METER (CAN CAN-L Color Of Wire nector Name ≥ 8 ∝ BR LG SB H.S. rmina No. 45 46 48 E

JRGWC3177GB

[HYDRAULIC PUMP ELECTRIC P/S]

BASIC INSPE	CTION	Δ
DIAGNOSIS AND	REPAIR WORK FLOW	A
Work Flow	INFOID:000000013355706	R
		0
		C
Clarify customer complaint as well as fully understand vehicle with customer, if ne CAUTION:	s before inspection. First of all, perform an interview utilizing reproduce symptoms it. Ask customer about his/her complaints carefully. Check symptoms by driving cessary.	D
Customers are not profe "maybe the customer me	essional. Never guess easily like "maybe the customer means that," or not not on this symptom".	E
>> GO TO 2.		
2. CHECK SYMPTOM		F
Reproduce the symptom to obtained by interview. Also "Protection Function".	that is indicated by the customer, based on the information from the customer or check that the symptom is not caused by protection function. Refer to <u>STC-25</u> ,	ST
CAUTION: When the symptom is ca standing of customer tha	nused by normal operation, fully inspect each portion and obtain the under- t the symptom is not caused by a malfunction.	Н
>> GO TO 3		
3. CHECK VEHICLE CON	DITION	
With CONSULT  Turn ignition switch ON C. Check "C/U TEMP" an	J. d "C/U TEMP A" in "DATA MONITOR" in "EPS/DAST 3".	J
Monitor item	Values	
C/U TEMP	90°C (194°F) or less	K
C/U TEMP A	90°C (194°F) or less	
Is the inspection result nor	nal?	L
YES >> GO TO 4. NO >> Wait with the ig After the tempe	gnition switch OFF until the data monitor indication becomes 90 °C (194 °F) or less. erature drops to 90 °C (194 °F) or less, GO TO 4.	M
Perform self-diagnosis.		Ν
Is any DTC detected?		
YES >> Record or print NO >> GO TO 7.	DTC and freeze frame data (FFD). GO TO 5.	0
<b>5.</b> RECHECK SYMPTOM		-
With CONSULT  Erase self-diagnostic rule Perform DTC confirma	esults for "EPS/DAST 3". tion procedures for the error detected system.	Ρ
If some DTCs are detected 25. "DTC Inspection Priorit	at the same time, determine the order for performing the diagnosis based on <u>STC-</u> <u>y Chart"</u> .	

Is any DTC detected?

### DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

### YES >> GO TO 6.

NO >> Check harness and connectors based on the information obtained by interview.

### **6.**REPAIR OR REPLACE ERROR-DETECTED PARTS

### • Repair or replace error-detected parts.

• Reconnect part or connector after repairing or replacing.

When DTC is detected, erase self-diagnostic results for "EPS/DAST 3".

### >> GO TO 8.

### 7. IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection.

### Can the error-detected system be identified?

YES >> GO TO 8.

NO >> Check harness and connectors based on the information obtained by interview.

### 8.FINAL CHECK

### With CONSULT

- 1. Check the reference value for power steering control module.
- 2. Recheck the symptom and check that symptom is not reproduced on the same conditions.

Is the symptom reproduced?

YES >> GO TO 3.

NO >> INSPECTION END

### Diagnostic Work Sheet

INFOID:000000013355707

### Description

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

Interview sheet sample

Interview sheet								
Customer name	MR/MS	Registration number	tion		Initial year registration			
		Vehicle type				VIN		
Storage date		Engine				Mileage		km (Mile)
Symptom		□The steering wheel position (center) is in the wrong position.						
		□Warning lamp turns on.						
		□Noise □Vibration						
		□Others (						)
First occurrence		□Recently □Others (					)	
Frequency of occurrence		□Always □Under a certain conditions of □Sometimes (time(s)/day)						
Climate con- ditions		Dirrelevant						
	Weather	□Fine □C	Cloud	□Rain	□Snow	□Others (		)
	Temperature	□Hot □W	'arm	□Cool	□Cold	□Temperature	Approx.	°C (°F)]
	Relative humidity	□High □Moderate □Low						
Road conditions		□Urban area □Suburb area □High way □Mounting road (uphill or down hill) □Rough road						
## **DIAGNOSIS AND REPAIR WORK FLOW**

## < BASIC INSPECTION >

## [HYDRAULIC PUMP ELECTRIC P/S]

			Interview sheet			٨
Customer name	MR/MS	Registration number		Initial year registration		А
		Vehicle type		VIN		R
Storage date		Engine		Mileage	km (Mile)	D
Operation con	ditions, etc.	Irrelevant When engin During drivir During dece During steer	e starts	□At constant : ng (right curve or I	speed driving eft curve)	С
Other condition	ns					D
Memo						Ε

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# DTC/CIRCUIT DIAGNOSIS C1143 STEERING ANGLE SENSOR

## DTC Description

INFOID:000000013355708

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C1143	ST ANG SEN CIRCUIT (Steering angle sensor circuit)	When a malfunction is detected in steering angle sensor.

#### POSSIBLE CAUSE

· Harness or connector

Steering angle sensor

• Power steering control module

#### FAIL-SAFE

System enters into a constant steering assist level state.

#### 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

#### (B) With CONSULT

- 1. Turn the ignition switch OFF to ON.
- 2. Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "C1143" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-38, "Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000013355709

## **1.**CHECK STEERING ANGLE SENSOR CIRCUIT

Check steering angle sensor circuit. Refer to BRC-142, "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 <u>ST-50, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

## C1601 BATTERY POWER SUPPLY [HYDRAULIC PUMP ELECTRIC P/S]

## < DTC/CIRCUIT DIAGNOSIS >

## C1601 BATTERY POWER SUPPLY

## **DTC** Description

INFOID:000000013355710

А

DTC	Display item (Trouble diagnosis content)	Malfunction detec	ted condition
C1601	BATTERY VOLT (Battery voltage)	When a power supply voltage to the is maintained at 18.5 V or more or at 0.5 seconds or more.	power steering control module less than 8.5 V continuously for
POSSIBLE CA Harness or co Power steering Fuse Battery power Battery	USE nnector g control module supply circuit		
FAIL-SAFE System enters in	nto a manual steering state.		
f "DTC CONFIR wait at least 10	MATION PROCEDURE" has be seconds before conducting the n	en previously conducted, always tu ext test.	rn ignition switch OFF and
>> GO 2.dtc repro	TO 2. DUCTION PROCEDURE		
With CONSU Turn the ign C. Perform "EF S DTC "C1601"	<b>LT</b> ition switch OFF to ON. PS/DAST 3" self-diagnosis. detected?		
YES >> Prov NO-1 >> To c NO-2 >> Cor	ceed to diagnosis procedure. Re heck malfunction symptom befo firmation after repair: INSPECTI	fer to <u>STC-39, "Diagnosis Procedur</u> re repair: Refer to <u>GI-45, "Intermitte</u> ON END	<u>e"</u> <u>nt Incident"</u> .
Diagnosis Pr	ocedure		INFOID:000000013355711
<b>1.</b> CHECK POV	/ER STEERING CONTROL MO	DULE GROUND CIRCUIT	
<ol> <li>Turn ignitior</li> <li>Disconnect</li> <li>Check conti</li> </ol>	n switch OFF. power steering control module h nuity between power steering co	arness connector. Introl module harness connector ter	minal and ground.
F	ower steering control module		Continuity
Connor	or Terminal		
Connec	0		

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

## **STC-39**

## C1601 BATTERY POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

Power steering	control module		Voltage	
Connector Terminal			(Approx.)	
E222	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	
Connector	Terminal		(Approx.)	
E222	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 (#J).
- 3. Check the harness for open or short between power steering control module harness connector No.1 terminal and the 100A fusible link (#J).

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-94, "2.0L TURBO</u> <u>GASOLINE ENGINE : Wiring Diagram - BATTERY POWER SUPPLY -"</u>.
- 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	
Connector Terminal			(Approx.)	
E221	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
Connector Terminal			(Approx.)
E221	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 (#12).

 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 bl	Continuity	
Connector	Terminal	Connector Terminal		Continuity
E221	5	E65	11F	Existed

## C1601 BATTERY POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

## [HYDRAULIC PUMP ELECTRIC P/S]

#### Check continuity between power steering control module harness connector terminal and ground. 4. А Power steering control module Continuity Connector Terminal В E221 5 Ground Not existed Is the inspection result normal? YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-144, "2.0L TURBO С GASOLINE ENGINE : Wiring Diagram - IGNITION POWER SUPPLY -". NO >> Repair or replace error-detected parts. **6.**CHECK TERMINALS AND HARNESS CONNECTORS D Check the power steering control module pin terminals for damage or loose connection with harness connector. Ε Is the inspection result normal? YES >> Power steering control module is malfunctioning. Replace steering oil pump assembly. Refer to ST-50, "Removal and Installation". NO F >> Repair or replace error-detected parts.

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## C1602 NO TUNING SET

## **DTC** Description

INFOID:000000013355712

## DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1602	NO TURNING SET (No turning set)	When the information in power steering control module is not the same.

#### POSSIBLE CAUSE

- Harness or connector
- Power steering control module
- Battery power supply circuit
- Ignition power supply circuit
- Battery
- Fuse
- Ground circuit

FAIL-SAFE

Constant steering assist level state

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

>> GO TO 2.

## 2. DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "C1602" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-42, "Diagnosis Procedure"
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45</u>, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000013355713

## **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			Containdaty	
E222	2	Ground	Existed	

## 

YES >> GO TO 3.			
NO >> Repair open o	arcuit or short to ground or sho detected parts	ort to power in harness	or connectors, and repair or
CHECK POWER STEE			IT (1)
	n newer steering centrel modul		rminolo and ground
T. Check voltage betwee	in power steering control modul	e namess connector ter	minais and ground.
Power steerin	g control module		Voltage
Connector	Terminal	_	(Approx.)
E222	1	Ground	8.5 – 18.5 V
<ol> <li>Turn ignition switch OI CAUTION: Never start the engin</li> <li>Check voltage betwee</li> </ol>	N. I <b>e.</b> In power steering control modul	e harness connector ter	rminals and ground.
Power steerin	g control module		Voltage
Connector	Terminal	—	(Approx.)
E222	1	Ground	8.5 – 18.5 V
<ul> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; GO TO 4.</li> <li>CHECK POWER STEE</li> <li>1. Turn ignition switch OI</li> <li>2. Check the 100A fusibl</li> <li>3. Check the harness for minal and the 100A fu</li> </ul>	RING CONTROL MODULE PC FF. e link (#J). open or short between power s sible link (#J).	OWER SUPPLY CIRCU	IT (2) harness connector No.1 ter-
<ul> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; GO TO 4.</li> <li>CHECK POWER STEE</li> <li>Turn ignition switch OI</li> <li>Check the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Show the the second s</li></ul>	RING CONTROL MODULE PC FF. e link (#J). open or short between power s sible link (#J). <u>mal?</u> rouble diagnosis for battery pc <u>NGINE : Wiring Diagram - BAT</u> ace error-detected parts.	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref	IT (2) harness connector No.1 ter- fer to <u>PG-94, "2.0L TURBO</u>
YES>> GO TO 5.NO>> GO TO 4. $4.CHECK$ POWER STEE1. Turn ignition switch OI2. Check the 100A fusible3. Check the harness for minal and the 100A fusibleS. Check of the fusible5. CHECK POWER STEE1. Check voltage betwee	RING CONTROL MODULE PC FF. e link (#J). open or short between power s sible link (#J). <u>mal?</u> rouble diagnosis for battery po <u>NGINE : Wiring Diagram - BAT</u> ace error-detected parts. RING CONTROL MODULE PC on power steering control modul	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref <u>FERY POWER SUPPLY</u> OWER SUPPLY CIRCU e harness connector ter	IT (2) harness connector No.1 ter- fer to <u>PG-94, "2.0L TURBO</u> <u>(_"</u> . IT (3) rminals and ground.
<ul> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; GO TO 4.</li> <li>CHECK POWER STEE</li> <li>Turn ignition switch OI</li> <li>Check the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Sheck the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>Check the harness for minal and the 100A fusible</li> <li>CHECK POWER STEE</li> <li>Check voltage betwee</li> </ul>	RING CONTROL MODULE PC FF. e link (#J). open or short between power sible link (#J). <u>mal?</u> rouble diagnosis for battery pc <u>NGINE : Wiring Diagram - BAT</u> ace error-detected parts. RING CONTROL MODULE PC in power steering control modul	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref <u>TERY POWER SUPPLY</u> OWER SUPPLY CIRCU e harness connector ter	IT (2) harness connector No.1 ter- fer to <u>PG-94, "2.0L TURBO</u> (
YES>> GO TO 5.NO>> GO TO 4. <b>4.</b> CHECK POWER STEE1.Turn ignition switch OI2.Check the 100A fusible3.Check the harness for minal and the 100A fully3.Check the harness for minal and the 100A fully4.Stepetion result nor GASOLINE EI NONO>> Repair or replay5.CHECK POWER STEE1.Check voltage betweetPower steerin Connector	RING CONTROL MODULE PC FF. e link (#J). open or short between power s sible link (#J). <u>mal?</u> rouble diagnosis for battery pc <u>NGINE : Wiring Diagram - BAT</u> ace error-detected parts. RING CONTROL MODULE PC on power steering control modul g control module Terminal	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref <u>TERY POWER SUPPLY</u> OWER SUPPLY CIRCU e harness connector ter	IT (2) harness connector No.1 ter- fer to <u>PG-94, "2.0L TURBO</u> (". IT (3) rminals and ground. Voltage (Approx.)
YES>> GO TO 5.NO>> GO TO 4. <b>4.</b> CHECK POWER STEE1.Turn ignition switch OI2.Check the 100A fusible3.Check the harness for minal and the 100A fusible3.Check the harness for minal and the 100A fusible3.Check the harness for minal and the 100A fusible1.Section result nor GASOLINE EINO>> Repair or replay5.CHECK POWER STEE1.Check voltage betweePower steerin ConnectorE221	RING CONTROL MODULE PO FF. e link (#J). open or short between power sible link (#J). mal? rouble diagnosis for battery po NGINE : Wiring Diagram - BAT ace error-detected parts. RING CONTROL MODULE PO on power steering control modul g control module Terminal 5	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref TERY POWER SUPPLY OWER SUPPLY CIRCU e harness connector ter 	IT (2) harness connector No.1 ter- fer to <u>PG-94, "2.0L TURBO</u> (-". IT (3) rminals and ground. Voltage (Approx.) 0 V
YES>> GO TO 5.NO>> GO TO 4. <b>4.</b> CHECK POWER STEE1. Turn ignition switch OI2. Check the 100A fusible3. Check the harness for minal and the 100A fusible3. Check the harness for minal and the 100A fusible1. Check the harness for minal and the 100A fusibleYES>> Perform the tr GASOLINE EINO>> Repair or replate5. CHECK POWER STEE1. Check voltage betweePower steerin Connector2. Turn ignition switch OI CAUTION: Never start the engine3. Check voltage betwee	RING CONTROL MODULE PO FF. e link (#J). ropen or short between power sible link (#J). mal? rouble diagnosis for battery po NGINE : Wiring Diagram - BAT ace error-detected parts. RING CONTROL MODULE PO n power steering control modul g control module Terminal 5 N. ne. n power steering control modul	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref <u>TERY POWER SUPPLY</u> OWER SUPPLY CIRCU e harness connector ter <u>Ground</u> e harness connector ter	IT (2) harness connector No.1 ter- fer to PG-94, "2.0L TURBO (". IT (3) rminals and ground. Voltage (Approx.) 0 V rminals and ground.
YES >> GO TO 5. NO >> GO TO 4. 4.CHECK POWER STEE 1. Turn ignition switch OI 2. Check the 100A fusibl 3. Check the harness for minal and the 100A fu Is the inspection result nor YES >> Perform the ti <u>GASOLINE EI</u> NO >> Repair or replation 5.CHECK POWER STEE 1. Check voltage betwees Power steerin Connector E221 2. Turn ignition switch OI CAUTION: Never start the engin 3. Check voltage betwees Power steerin	RING CONTROL MODULE PC FF. e link (#J). open or short between power sible link (#J). mal? rouble diagnosis for battery pc NGINE : Wiring Diagram - BAT ace error-detected parts. RING CONTROL MODULE PC on power steering control modul g control module 15 N. ee. on power steering control modul	OWER SUPPLY CIRCU steering control module ower supply circuit. Ref <u>TERY POWER SUPPLY</u> OWER SUPPLY CIRCU e harness connector ter <u>Ground</u>	IT (2) harness connector No.1 ter- fer to PG-94, "2.0L TURBO (". IT (3) rminals and ground. Voltage (Approx.) 0 V rminals and ground.
YES>> GO TO 5. NONO>> GO TO 4. <b>4.</b> CHECK POWER STEE1. Turn ignition switch OI2. Check the 100A fusible3. Check the harness for minal and the 100A fuIs the inspection result nor YESYESYES>> Perform the tr GASOLINE EINO>> Repair or replation <b>5.</b> CHECK POWER STEE1. Check voltage betweePower steerin ConnectorCAUTION: Never start the engin3. Check voltage betweePower steerin ConnectorConnectorE2212. Turn ignition switch OI CAUTION: Never start the engin3. Check voltage betweePower steerin Connector	RING CONTROL MODULE PC FF. e link (#J). ropen or short between power sible link (#J). mal? rouble diagnosis for battery pc NGINE : Wiring Diagram - BAT ace error-detected parts. RING CONTROL MODULE PC in power steering control modul g control module Terminal g control module Terminal	DWER SUPPLY CIRCU steering control module ower supply circuit. Ref <u>TERY POWER SUPPLY</u> DWER SUPPLY CIRCU e harness connector ter Ground e harness connector ter	IT (2) harness connector No.1 ter- fer to PG-94, "2.0L TURBO /_". IT (3)

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 (#12).

[HYDRAULIC PUMP ELECTRIC P/S]

## C1602 NO TUNING SET

#### < DTC/CIRCUIT DIAGNOSIS >

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		Continuity
E221	5	E65	11F	Existed

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

Power steering control module			Continuity
Connector	Terminal		Continuity
E221	5	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to <u>PG-144, "2.0L TURBO</u> <u>GASOLINE ENGINE : Wiring Diagram - IGNITION POWER SUPPLY -"</u>.

- NO >> Repair or replace error-detected parts.
- 7. CHECK SELF-DIAGNOSIS RESULTS

#### With CONSULT

Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "C1602" detected?

- YES >> Power steering control module is malfunctioning. Replace steering oil pump assembly. Refer to <u>ST-50, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

## C1606 EPS MOTOR

## **DTC** Description

INFOID:000000013355714

А

## DTC DETECTION LOGIC

DTC DETECT	ION LOGIC		E
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	(
C1606	EPS MOTOR (EPS motor)	When the motor driver malfunction of power steering control module or power steering control module motor driver malfunction is detect- ed.	
POSSIBLE CA	NUSE		[
<ul><li>Harness or co</li><li>Power steerin</li><li>Power steerin</li></ul>	nnector g motor g control module		[
FAIL-SAFE	nto a manual steering		1
DTC CONFIRI			
1.PRECONDI			Q
If "DTC CONFI	RMATION PROCEDURE" has been	previously conducted, always turn ignition switch OFF and	3
wait at least 10	seconds before conducting the nex	tt test.	
>> GO	TO 2.		
2.DTC REPRO	DUCTION PROCEDURE		
	ILT		
<ol> <li>Turn the igr</li> <li>Perform "Fl</li> </ol>	nition switch OFF to ON. PS/DAST 3" self-diagnosis		
<u>Is DTC "C1606"</u>	<u>detected?</u>		
YES >> Pro NO-1 >> To NO-2 >> Cor	ceed to diagnosis procedure. Refer check malfunction symptom before nfirmation after repair: INSPECTION	r to <u>STC-45, "Diagnosis Procedure"</u> . repair: Refer to <u>GI-45, "Intermittent Incident"</u> . N END	
Diagnosis P	rocedure	INFOID:000000013355715	
1.PERFORM	SELF-DIAGNOSIS		
With CONSU	ILT		
<ol> <li>Turn the igr</li> <li>Erase self-or</li> </ol>	nition switch OFF to ON. diagnostic results for "EPS/DAST 3'	л -	
3. Turn the igr	nition switch OFF and wait for at lea	ast 10 seconds.	
<u>Is DTC "C1606"</u>	detected?		
YES >> Pov <u>50.</u> NO >> Che	ver steering motor is malfunctioning <u>"Removal and Installation"</u> . eck pin terminal and connection of e	g. Replace power steering oil pump assembly. Refer to <u>ST-</u> each harness connector for malfunctioning conditions.	

## C1607, C1608 POWER STEERING CONTROL MODULE DIAGNOSIS > [HYDRAULIC PUMP ELECTRIC P/S]

< DTC/CIRCUIT DIAGNOSIS >

C1607, C1608 POWER STEERING CONTROL MODULE

## **DTC** Description

INFOID:000000013355716

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C1607	EEPROM (EEPROM)	When the memory (EEPROM) system malfunction is detected in power steering control module.
C1608	CONTROL UNIT (Control unit)	When the internal malfunction is detected in power steering control module.

#### POSSIBLE CAUSE

· Power steering control module

#### FAIL-SAFE

DTC	Fail-safe condition
C1607	System enters into a constant steering assist level state.
C1608	System enters into a manual steering state.

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

>> GO TO 2.

## 2. DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "C1607" or "C1608" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-46, "Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000013355717

## **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C1607" or "C1608" detected?

- YES >> Power steering control module is malfunctioning. Replace power steering oil pump assembly. Refer to <u>ST-50, "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

## C1609 VEHICLE SPEED SIGNAL

## **DTC** Description

INFOID:000000013355718

А

## DTC DETECTION LOGIC

DTC DET	ECTION LOGIC		В
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	C
C1609	CAN VHCL SPEED (CAN vehicle speed signal)	<ul> <li>Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) via CAN communication.</li> <li>ABS actuator and electric unit (control unit) input signal error is de- tected.</li> </ul>	D
POSSIBL • Harness • Power s • ABS ma - Vehicle s	E CAUSE or connector (CAN communication line) teering control module Ifunction speed signal error		E
FAIL-SAF System er	E aters into a constant steering assist level	state.	F
If "DTC CC wait at lea	DNFIRMATION PROCEDURE" has been st 10 seconds before conducting the nex	previously conducted, always turn ignition switch OFF and t test.	Η
> >	> GO TO 2.		I
Z.DTC R	EPRODUCTION PROCEDURE		
With Co T. Turn t C. Perfor	DNSULT he ignition switch OFF to ON. m "EPS/DAST 3" self-diagnosis.		J
YES > NO-1 > NO-2 >	<ul> <li>Proceed to diagnosis procedure. Refer</li> <li>To check malfunction symptom before</li> <li>Confirmation after repair: INSPECTION</li> </ul>	to <u>STC-47, "Diagnosis Procedure"</u> . repair: Refer to <u>GI-45, "Intermittent Incident"</u> . NEND	K
Diagnos	is Procedure	INFOID:000000013355719	L
1.PERFC	ORM ABS ACTUATOR AND ELECTRIC U	JNIT (CONTROL UNIT) SELF-DIAGNOSIS	
With Contract of the second s	<b>DNSULT</b> he ignition switch OFF to ON.	CONSULT Function"	IVI
Is any DTO YES >	<u>C detected?</u> > Check the DTC. Refer to <u>BRC-72, "DT</u>	<u>C Index"</u> .	Ν
2.CHECK	> GO TO 2. ( TERMINALS AND HARNESS CONNE(	CTORS	0
Check pov Is the insp YES > NO > 3.PERFC	ver steering control module pin terminals <u>ection result normal?</u> > GO TO 3. > Repair or replace error-detected parts. DRM SELF-DIAGNOSIS	for damage or loose connection with harness connector.	Ρ

## With CONSULT

Perform "EPS/DAST 3" self-diagnosis.

## Is DTC "C1609" detected?

- YES >> Power steering control module is malfunctioning. Replace power steering oil pump assembly. Refer to <u>ST-50, "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

## **C160A HEAT PROTECTION**

## **DTC** Description

INFOID:000000013355720

## DTC DETECTION LOGIC

А

DTC DETE	CTION LOGIC	
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C160A	HEAT PROTECTION (Heat protection)	When the steering wheel is operated excessively and the interior temperature of the power steering system reaches $118^{\circ}C$ (244.4°F) or more. (Protection function) <b>NOTE:</b> Although the power steering 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 $90^{\circ}C$ ( $194^{\circ}F$ ) or less.
POSSIBLE • The protect	CAUSE ction of the hydraulic pump electric po	ower steering system
PROTECTI The system DTC CONF	ION FUNCTION temporarily enters the manual steerin FIRMATION PROCEDURE	ng state. (This is not a system malfunction.)
If "DTC CON wait at least	NFIRMATION PROCEDURE" has bee 10 seconds before conducting the ne	en previously conducted, always turn ignition switch OFF and ext test.
>> <b>2.</b> dtc ref	GO TO 2. PRODUCTION PROCEDURE	
With CON 1. Turn the 2. Perform	NSULT e ignition switch OFF to ON. 1 "EPS/DAST 3" self-diagnosis.	
<u>Is DTC "C16</u> YES >> NO-1 >> NO-2 >>	<u>60A" detected?</u> Go to <u>STC-35, "Work Flow"</u> . To check malfunction symptom before Confirmation after repair: INSPECTIC	e repair: Refer to <u>GI-45. "Intermittent Incident"</u> . ON END

## U1000 CAN COMM CIRCUIT

## **DTC** Description

INFOID:000000013355721

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 DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
U1000	CAN COMM CIRCUIT (CAN communication circuit)	Power steering control module is not transmitting/receiving CAN com- munication signal for 2 seconds or more.

#### POSSIBLE CAUSE

CAN communication error

#### FAIL-SAFE

System continue normal control.

#### 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/DAST 3" self-diagnosis.

#### Is DTC "U1000" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-50, "Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### **Diagnosis** Procedure

INFOID:000000013355722

Proceed to LAN-41, "Trouble Diagnosis Flow Chart".

## POWER SUPPLY AND GROUND CIRCUIT DSIS > [HYDRAULIC PUMP ELECTRIC P/S]

## < DTC/CIRCUIT DIAGNOSIS >

## POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure			A INFOID:000000013482201
1.CHECK THE GROUND	CIRCUIT		В
<ol> <li>Turn the ignition switch</li> <li>Disconnect power stee</li> <li>Check the continuity be</li> </ol>	n OFF. ering control module harness etween power steering contr	s connector. rol module harness connecto	r and ground.
Power steering	g control module		Continuity
Connector	Terminal	—	
E222	2	Ground	Existed
Is the inspection result norr YES >> GO TO 2. NO >> Repair open ci 2.CHECK THE BATTERY	mal? rcuit in harness or connecto POWER SUPPLY CIRCUIT	rs. Г (1)	F
Check the voltage between	power steering control moc	dule harness connector and g	round.
Power steering	g control module		Voltage
Connector	Terminal	—	(Approx.)
E222	1	Ground	8.5 – 18.5 V
<ul> <li>NO &gt;&gt; GO TO 3.</li> <li>3.CHECK THE BATTERY</li> <li>1. Check the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>2. Check the harness for minal and the 100A fusible</li> <li>3. Check the harness for minal and the 100A fusible</li> <li>4. CHECK THE IGNITION</li> </ul>	POWER SUPPLY CIRCUIT e link (#J). open or short between powe sible link (#J). <u>mal?</u> ouble diagnosis for battery <u>IGINE : Wiring Diagram - B/</u> ice error-detected parts. POWER SUPPLY CIRCUIT	Γ (2) er steering control module ha power supply circuit. Refer <u>ATTERY POWER SUPPLY -</u> "	to <u>PG-94, "2.0L TURBO</u> K
1. Check the voltage betw	veen power steering control	module harness connector a	nd ground.
Power steering	g control module	_	Voltage
Connector	Terminal		(Approx.)
E221	5	Ground	0 V
<ol> <li>Turn the ignition switch</li> <li>Check the voltage betw</li> </ol>	n ON. veen power steering control	module harness connector a	nd ground.
Power steering	g control module		Voltage
Connector	Terminal	—	(Approx.)
E221	5	Ground	8.5 – 18.5 V
Is the inspection result nor	mal?		

YES >> GO TO 6.

NO >> GO TO 5.

**5.**CHECK THE IGNITION POWER SUPPLY CIRCUIT (2)

1. Turn the ignition switch OFF.

2. Check the 10A fuse (#12).

## POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

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

Power steering control module		Fuse block (J/B)		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E221	5	E65	11F	Existed	

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

Power steering control module			Continuity
Connector	Terminal		Continuity
E221	5	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to <u>PG-144, "2.0L TURBO</u> <u>GASOLINE ENGINE : Wiring Diagram - IGNITION POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

#### **6.**CHECK TERMINAL

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

2. Check the fuse block (J/B) 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 <u>ST-50, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

POWER STEERING WARNING LAMP	
< DTC/CIRCUIT DIAGNOSIS > [HYDRAULIC PUMP ELECTRIC P/S]	
POWER STEERING WARNING LAMP	Λ
Component Function Check	A
1. CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP	В
Check that the power steering warning lamp turns ON when ignition switch turns ON. Then, power steering warning lamp turns OFF after the engine is started.	
Is the inspection result normal?	С
YES >> INSPECTION END	
NO >> Perform trouble diagnosis. Refer to <u>STC-53, Diagnosis Procedure</u> .	D
Diagnosis Procedure	
1.PERFORM SELF-DIAGNOSIS	Е
<ol> <li>Lurn the ignition switch OFF to ON.</li> <li>Perform "EPS/DAST 3" self-diagnosis</li> </ol>	_
Is any DTC detected?	F
YES >> Check the DTC. Refer to <u>STC-25, "DTC Index"</u> .	
NO $>>$ GO TO 2.	STO
2.CHECK POWER STEERING WARNING LAMP SIGNAL	
	Н
<ol> <li>Lurn the ignition switch ON.</li> <li>Select in "WARNING LAMP" in "DATA MONITOR" in "EPS/DAST 3"</li> </ol>	
3. Check that the item in "DATA MONITOR" is "On".	
CAUTION: Never start the engine	
4. Start the engine.	
CAUTION: Nover drive the vehicle	J
5. Check that the item in "DATA MONITOR" is "Off".	
Is the inspection result normal?	IZ.
YES >> Perform the trouble diagnosis for combination meter power supply circuit. Refer to <u>MWI-120</u> ,	n
NO >> GO TO 3.	
3. CHECK TERMINALS AND HARNESS CONNECTORS	L
Check the power steering control module pin terminals for damage or loose connection with harness connec-	
tor.	M
Is the inspection result normal?	
YES >> Power steering control module is malfunctioning. Replace power steering oil pump assembly.	
NO >> Repair or replace error-detected parts.	Ν
	0

# POWER STEERING WARNING LAMP DOSE NOT TURN ON < SYMPTOM DIAGNOSIS > [HYDRAULIC PUMP ELECTRIC P/S]

# SYMPTOM DIAGNOSIS

## POWER STEERING WARNING LAMP DOSE NOT TURN ON

## Description

INFOID:000000013355725

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

**Diagnosis Procedure** 

INFOID:000000013355726

1. CHECK THE POWER STEERING WARNING LAMP

Perform trouble diagnosis for the power steering warning lamp system. Refer to <u>STC-53, "Diagnosis Proce-dure"</u>.

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.

## POWER STEERING WARNING LAMP DOSE NOT TURN OFF < SYMPTOM DIAGNOSIS > [HYDRAULIC PUMP ELECTRIC P/S]

POWER STEERING WARNING LAMP DOSE NOT TURN OFF	^
Description	A
Power steering warning lamp does not turn OFF several seconds after engine started	В
Diagnosis Procedure	
1.PERFORM SELF-DIAGNOSIS	С
With CONSULT Perform "EPS/DAST 3" self-diagnosis	
Is any DTC detected?	D
YES >> Check the DTC. Refer to <u>STC-25, "DTC Index"</u> . NO >> GO TO 2.	_
2.CHECK POWER STEERING WARNING LAMP	E
Perform the trouble diagnosis of power steering warning lamp. Refer to <u>STC-53. "Diagnosis Procedure"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 3.	F
NO >> Repair or replace error-detected parts. 3 POWER STEERING CONTROL MODULE POWER SUPPLY AND GROUND CIRCUIT	STO
Perform the trouble diagnosis of power steering control module power supply and ground. Refer to <u>STC-39</u> , <u>"Diagnosis Procedure"</u> . Is the inspection result normal?	Н
<ul> <li>YES &gt;&gt; Check that the pin terminals and the connection of each connector are normal.</li> <li>NO &gt;&gt; Repair or replace error-detected parts.</li> </ul>	I
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## STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

#### < SYMPTOM DIAGNOSIS >

## STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

Diagnosis Procedure

**1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

Perform "EPS/DAST 3" self-diagnosis.

#### Is a malfunctioning system displayed?

YES >> Check malfunctioning system. Refer to <u>STC-25. "DTC Index"</u>.

NO >> GO TO 2.

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

#### With CONSULT

## 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/DAST 3".

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/DAST 3".
- 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/DAST 3".

Is the display value "10.5 V" or more?

- YES >> GO TO 5.
- NO >> Check the battery power system. Refer to <u>STC-39, "Diagnosis Procedure"</u>.

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

#### With CONSULT

Select "ESTM VHCL SPD" in "DATA MONITOR" in "EPS/DAST 3".

Monitor item	Test condition	Display value
	When stopped	0.00 km/h or mph
ESTM VHCL SPD	While driving	Approximately equal to the indication on speedometer $^{\star}$ (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. NO >> Check t

- >> Check the combination meter, ABS actuator and electric unit (control unit).
  - Combination meter: Refer to MWI-70, "CONSULT Function".

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INFOID:000000013355729

[HYDRAULIC PUMP ELECTRIC P/S]

## STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

#### < SYMPTOM DIAGNOSIS >

## [HYDRAULIC PUMP ELECTRIC P/S]

ABS actuator and electric unit (control unit): Refer to <u>BRC-61, "CONSULT Function"</u>.

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

#### With CONSULT

Select "STR ANG SPD" in "DATA MONITOR" in "EPS/DAST 3".

Monitor item	Test condition	Display value	_
	The steering wheel is not steered.	Approx. 0.0 deg/s	С
STR ANG SPD	The steering wheel is steered.	Displays steering angle speed (deg/s)	
Is the check result normal?			
YES >> GO TO 7.			D
NO >> Check the steering	angle sensor. Refer to STC-38, "Diag	nosis Procedure".	
<b>7.</b> CHECK THE POWER STEE	RING CONTROL MODULE SIGNAL	(6)	Е
(P)With CONSULT			
Select "ENGINE STATUS" in "D	DATA MONITOR" in "EPS/DAST 3".		
Is the display value "RUN"?			F
YES >> GO TO 8.			
NO >> Check the ECM. Re	efer to EC4-101, "CONSULT Function	<u>"</u> .	
8.CHECK STOP/START SYSTEM			STC

#### With CONSULT

- 1. Start the engine.
- 2. Select "AUTO STOP ST FLG" and "AUTO STOP ST STAT" in "DATA MONITOR" in "EPS/DAST 3".
- 3. Operate stop/start system. Refer to EC4-78, "STOP/START SYSTEM : System Description".
- 4. Turn the steering wheel.

Monitor item	Test condition	Display value	
AUTO STOP ST FLG	The steering wheel is steered.	NG	
AUTO STOP ST STAT	Engine is running.	Off	0
Is the check result normal?			
YES >> GO TO 9.			K

NO >> Check the ECM. Refer to EC4-101, "CONSULT Function".

## **9.**CHECK THE STEERING FORCE

Check the steering force. Refer to ST-18, "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 <u>ST-48</u>.

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

< SYMPTOM DIAGNOSIS >

[HYDRAULIC PUMP ELECTRIC P/S]

## UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BE-TWEEN RIGHT AND LEFT

Diagnosis Procedure

INFOID:000000013355730

**1.**CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP

Check the power steering warning lamp while engine is running.

Does the power steering warning lamp turn OFF?

YES >> GO TO 2.

NO >> Refer to <u>STC-55, "Diagnosis Procedure"</u>.

2. CHECK WHEEL ALIGNMENT

Check the wheel alignment.

• 2WD models: Refer to <u>FSU-9, "Inspection"</u>.

AWD models: Refer to <u>FSU-54, "EXCEPT DIRECT ADAPTIVE STEERING : Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 3.

- NO >> Adjustment of wheel alignment.
  - 2WD models: Refer to <u>FSU-9, "Adjustment"</u>.
  - AWD models: Refer to FSU-55, "EXCEPT DIRECT ADAPTIVE STEERING : Adjustment".

**3.**CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to ST-18, "Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to <u>ST-48, "Inspection"</u>.

## UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

< SYMPTOM DIAGNOSIS > [HYDRAULIC PUMP ELECTRIC P/S	J
UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIA	-
TION)	A
Diagnosis Procedure	31
1.PERFORM SELF-DIAGNOSIS	D
With CONSULT Perform "EPS/DAST 3" self-diagnosis.	С
Is a malfunctioning system displayed?	
YES >> Check malfunctioning system. Refer to <u>STC-25, "DTC Index"</u> . NO >> GO TO 2.	D
<b>2.</b> CHECK THE POWER STEERING CONTROL MODULE SIGNAL (1)	
With CONSULT  Start the engine. CAUTION: Never drive the vehicle.	- E F
<ol> <li>Turn the steering wheel until it stops.</li> <li>Select "MTR ASSIST" in "DATA MONITOR" in "EPS/DAST 3".</li> </ol>	
Is the display value "100%"?	ST
YES >> GO TO 4. NO >> GO TO 3	
$3_{\text{check}}$ the power steering control module signal (2)	Н
<ol> <li>Select "C/U TEMP" and "C/U TEMP A" in "DATA MONITOR" in "EPS/DAST 3".</li> <li>Stop the system until the DATA MONITOR display value drops to "90°C (194°F)" or less.</li> <li>Check whether symptom continues.</li> </ol>	I
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	J 1.
4. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (3)	K
<ul> <li>With CONSULT</li> <li>Turn the steering wheel to the straight-ahead position. (There is no steering force)</li> <li>Select "BATTERY VOLT" in "DATA MONITOR" in "EPS/DAST 3".</li> </ul>	L
Is the display value "10.5 V" or more?	
YES >> GO TO 5.	N
NO >> Check the battery power system. Refer to <u>STC-39. "Diagnosis Procedure"</u> .	
<b>D.</b> CHECK THE POWER STEERING CONTROL MODULE SIGNAL (4)	
With CONSULT Select in "ESTM VHCL SPD" in "DATA MONITOR" in "EPS/DAST 3".	N

Monitor item	Test condition	Display value	0
	When stopped	0.00 km/h or mph	
ESTM VHCL SPD	While driving	Approximately equal to the indication on speedometer <sup>*</sup> (Inside of $\pm 10\%$ )	Ρ

\*: 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).

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## UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

#### < SYMPTOM DIAGNOSIS >

- [HYDRAULIC PUMP ELECTRIC P/S]
- Combination meter: Refer to MWI-70, "CONSULT Function".
- ABS actuator and electric unit (control unit): Refer to BRC-61, "CONSULT Function".

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

#### With CONSULT

Select "STR ANG SPD" in "DATA MONITOR" in "EPS/DAST 3".

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 <u>STC-38, "Diagnosis Procedure"</u>.

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

## With CONSULT

Select "ENGINE STATUS" in "DATA MONITOR" in "EPS/DAST 3".

Is the display value "RUN"?

YES >> GO TO 8.

NO >> Check the ECM. Refer to EC4-101, "CONSULT Function".

 $\mathbf{8}$ . CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.

• Steering column assembly. Refer to <u>ST-33, "WITHOUT ELECTRIC MOTOR : Exploded View"</u> (Without electric motor), <u>ST-36, "WITH ELECTRIC MOTOR : Exploded View"</u> (With electric motor).

Steering gear assembly. Refer to <u>ST-44, "Exploded View"</u>.

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 <u>ST-18, "Inspection"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check the steering wheel turning force for mechanical malfunction. Refer to <u>ST-48, "Inspection"</u>.

#### **CAUTION:**

#### Disconnect battery negative terminal before starting operations.

Never remove power steering control module from steering oil pump assembly. When replacing power steer- <sup>C</sup> ing control module, replace steering oil pump assembly. Refer to <u>ST-50, "Removal and Installation"</u>.

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least 3 minutes before performing any service.

## Precautions for Removing Battery Terminal

INFOID:000000013509517

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		



#### 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.

 After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.
 NOTE:

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## Check the following item when performing the trouble diagnosis.

Service Notice and Precautions for EPS System

- Check any possible causes by interviewing the symptom and it's condition from the customer if any malfunction, such as power steering 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 con-Ν trol unit is genuine part.
- Check if the connection of steering column assembly and steering gear assembly is proper (there is not looseness of mounting bolts, damage of rods, boots or sealants, and leakage of grease, etc).
- Check if the wheel alignment is adjusted properly.
- Check if there is any damage or modification to suspension or body resulting in increased weight or altered ground clearance.
- Check if installation conditions of each link and suspension are proper.
- Check if the battery voltage is proper.
- Check connection conditions of each connector are proper.
- Before connecting or disconnecting the 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".
- When connecting or disconnecting pin connectors into or from power steering control module, take care not to damage pin terminals (bend or break).

## PRECAUTIONS

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
- Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
- Driving for 30 minutes or more on a steep slope.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

#### NOTE:

< PRECAUTION >

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.

## Precautions for Harness Repair

FLEXRAY AND CAN COMMUNICATION LINE Solder the repaired area and wrap tape around the soldered area. NOTE:

A fray of twisted lines must be within 110 mm (4.33 in).

 Bypass connection is never allowed at the repaired area. NOTE:

Bypass connection may cause FlexRay communication error as spliced wires that are separate from the main line or twisted lines lose noise immunity.

· Replace the applicable harness as an assembly if error is detected on the shield lines of FlexRay communication line.







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## [ELECTRIC POWER STEERING]

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INFOID:00000001350952

**STC-63** 

## PRECAUTIONS

< PRECAUTION >

#### [ELECTRIC POWER STEERING]

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

## < SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION COMPONENT PARTS

**Component Parts Location** 

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A Steering gear assembly

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## **COMPONENT PARTS**

#### < SYSTEM DESCRIPTION >

## [ELECTRIC POWER STEERING]

No.	Component		Function
1	Drive mode select switch		<ul> <li>Drive mode is selectable among PERSONAL, SPORT, and STANDARD by the operating the switch.</li> <li>Output the status of drive mode to the chassis control module.</li> <li>For detailed installation location, refer to <u>DMS-4</u>, "Component <u>Parts Location"</u>.</li> </ul>
2	ECM		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Engine status signal</li> <li>Receives mainly the following signals from power steering control module via CAN communication.</li> <li>Battery supply current signal</li> <li>For detailed installation location, refer to <u>EC6-33, "ENGINE</u> <u>CONTROL SYSTEM : Component Parts Location"</u>.</li> </ul>
3	) ABS actuator and electric unit (control unit)		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Vehicle speed signal (ABS)</li> <li>For detailed installation location, refer to <u>BRC-10</u>, "Component <u>Parts Location"</u>.</li> </ul>
4	) Chassis control module		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Drive mode signal</li> <li>For detailed installation location, refer to <u>DAS-516</u>, "Component <u>Parts Location"</u>.</li> </ul>
6	Combination meter (Power steering warning lamp)		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Vehicle speed signal (Meter)</li> <li>For detailed installation location, refer to <u>MWI-8</u>, "<u>METER SYS-TEM : Component Parts Location</u>".</li> <li>Turns ON the power steering warning lamp according to the signal from the power steering control module via CAN communication.</li> <li>For power steering warning lamp, refer to <u>STC-71, "WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp</u>".</li> </ul>
6	5) Steering angle sensor		<ul> <li>Transmits mainly the following signals to power steering control module via CAN communication.</li> <li>Steering angle sensor signal</li> <li>For detailed installation location, refer to <u>BRC-10, "Component Parts Location"</u>.</li> </ul>
$\bigcirc$		Power steering control module	
8	Steering gear assembly	Power steering torque sensor	STC-66, "Steering Gear Assembly"
9		EPS motor	

## Steering Gear Assembly

INFOID:000000013482235

The steering gear assembly is primarily composed of power steering control module (1), power steering torque sensor (2) and EPS motor (3).

• 2WD



• AWD

## [ELECTRIC POWER STEERING]



#### POWER STEERING CONTROL MODULE

By receiving steering angle sensor signal ,vehicle speed signal and torque sensor signal, the power steering control module calculates the current of motor drive according to the driving conditions. The power steering control module controls the EPS motor.

#### POWER STEERING TORQUE SENSOR

Power steering torque sensor detects the steering torque, and transmit the signal to power steering control module.

#### **EPS MOTOR**

The EPS motor provides the assist torque by the signal from power steering control module.

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## [ELECTRIC POWER STEERING]

# < SYSTEM DESCRIPTION >

## SYSTEM EPS SYSTEM

## EPS SYSTEM : System Description

- EPS system consists mainly of power steering control module, EPS motor, power steering torque sensor.
- EPS system calculates a control signal to transmit to the EPS motor based on information received from ECM, ABS actuator and electric unit (control unit), steering angle sensor, chassis control module, and combination meter via CAN communication and information received from torque sensor.
- Power steering control module 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.
- After engine start, the EPS system performs control.
- When a malfunction occurs in the system, the fail-safe function stops the EPS system (manual steering state) or restricts its operation (Constant steering assist level state). Refer to <u>STC-70, "EPS</u> <u>SYSTEM : Fail-safe"</u>.
- Power steering control module decreases the output signal to EPS motor while extremely using the power steering function (e.g., full steering) consecutively for protecting EPS motor and power steering control module (Overload protection control). Refer to <u>STC-70</u>, <u>"EPS SYSTEM : Protection Function"</u>.
- Infiniti drive mode selector which can change the steering characteristic corresponding to the preference of the driver was adopted.

For details, refer to <u>DMS-15</u>, "Infiniti Drive Mode Selector : System Description (For VR30DDTT Engine <u>Models</u>)".



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## < SYSTEM DESCRIPTION >

## [ELECTRIC POWER STEERING]

## SYSTEM DIAGRAM



#### CONDITIONS FOR POWER STEERING WARNING LAMP ON

- 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 ignition switch is turned ON, for purpose of lamp check. Turns OFF after the engine starts, if system is normal.

Condition	Power steering warning lamp	
Ignition switch ON. (Lamp check)	ON	N
After engine start (steering assist force is generated)	OFF	IN
When steering assist is stopped	ON	

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## < SYSTEM DESCRIPTION >

## [ELECTRIC POWER STEERING]

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## **EPS SYSTEM : Circuit Diagram**



## EPS SYSTEM : Fail-safe

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- If any malfunction occurs in the system and control module detects the malfunction, power steering warning lamp on combination meter turns ON to indicate system malfunction.
- When power steering warning lamp is ON, the system enters into a manual steering state. (Control turning force steering wheel becomes heavy.)

DTC	Fail-safe condition
C1143	Normal steering state
C1601	Manual steering state
C1604	Manual steering state
C1606	Manual steering state
C1607	Constant steering state
C1608	Manual steering state
C1609	Constant steering state
U1000	Constant steering state
U1010	Constant steering state
U140E	Normal steering state

## **EPS SYSTEM : Protection Function**

INFOID:000000013482298

Power steering control module decreases the output signal to EPS motor while extremely using the power steering function (e.g., full steering) consecutively for protecting EPS motor and power steering control module (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.

WARNING/INDICATOR/CHIME LIST

## **SYSTEM**

## [ELECTRIC POWER STEERING]

# < SYSTEM DESCRIPTION > WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp INFOID:000000013482240 А Layout/Function Name Design В For layout, refer to MWI-9, "METER SYSTEM : Design". Power steering warning lamp For function, refer to MWI-40, "WARNING LAMPS/INDICATOR LAMPS : Power Steering Warning Lamp (Except Direct Adaptive Steering)". С D Е F STC Н J Κ L Μ Ν Ο

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## DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE) < SYSTEM DESCRIPTION > [ELECTRIC POWER STEERING]

## DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE)

## **CONSULT** Function

INFOID:000000013482241

## APPLICATION ITEMS

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.

DTC

• Freeze frame data (FFD)

#### ECU IDENTIFICATION

Displays the part number stored in the control unit.

#### SELF-DIAG RESULTS MODE

Refer to STC-76, "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.

Freeze Frame Data Item	Unit	Description
ODO/TRIP METER	Km	Display the odometer value from combination meter via CAN communication.
BATTERY VOLT	V	Displays the power supply voltage for power steering control module.
IGN SW	OFF/ON	Display thestatus of ignition switch.
ENGINE STATUS	STOP/RUN/ CRANK	Displays the engine status based on the engine status signal transmitted by CAN communications.
Steering mode status	Standard/ Sports/Touring	Displays the status of steering mode based on the steering mode status signal transmitted by CAN communications.
VEHICLE SPEED	km/h	Display the vehicle speed from vehicle speed signal via CAN communication.
STEERING ANGLE SIGNAL	deg	Displays the steering angle based on steering angle signal transmitted by CAN communications.
STEERING ANGLE SPEED	deg/s	Displays the steering angle speed based on the steering angle signal transmitted by CAN communications.
STEERING TORQUE	Nm	Displays steering torque detected by torque sensor.
MOTOR CURRENT	A	Display the current value consumed by EPS motor.
Target motor current	A	Displays the target motor current value.
C/U TEMP	°C	Displays the temperature of the power steering control module.

#### 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.
STEERING TORQUE	Nm	Displays steering torque detected by torque sensor.
### DIAGNOSIS SYSTEM (POWER STEERING CONTROL MODULE)

### < SYSTEM DESCRIPTION >

[ELECTRIC POWER STEERING]

Monitor item	Unit	Remarks	0
STEERING ANGLE SIGNAL	deg	Displays the steering angle based on steering angle signal transmitted by CAN communications.	A
STEERING ANGLE SPEED	deg/s	Displays the steering angle speed based on the steering angle signal transmitted by CAN communications.	В
MOTOR CURRENT	А	Display the current value consumed by EPS motor.	
Target motor current	А	Displays the target motor current value.	C
C/U TEMP	°C	Displays the temperature of the power steering control module.	0
Assist level	%	Displays the current percentage of the allowable assist ratio EPS motor.	
VEHICLE SPEED	km/h	Display the vehicle speed from vehicle speed signal via CAN communication.	D
WARNING LAMP	OFF/On	Displays the control status of power steering warning lamp.	
STEERING ANGLE SENSOR STATUS	ABNORMAL/ NORMAL	Displays the status of steering angle based on the steering angle status signal transmitted by CAN communications.	Е
ENGINE STATUS	STOP/RUN/ CRANK	Displays the engine status based on the engine status signal transmitted by CAN communications.	
HEAT PROTCT STATUS	NORMAL/PR- TECT	Displays the status of overheat protection.	F
MOTOR REVOLUTION SPEED	rpm	Displays the EPS motor speed.	OT
CONTROL MODULE ESTM TEMP	°C	Displays the estimated temperature of power steering control module.	510
Steering mode status	Standard/ Sports/Touring	Displays the status of steering mode based on the steering mode status signal transmitted by CAN communications.	Н

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# ECU DIAGNOSIS INFORMATION POWER STEERING CONTROL MODULE

### **Reference Value**

INFOID:000000013482242

### 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 itom		Data monitor	
MONITOR REIT		Condition	Display value
BATTERY VOLT	Engine running		10.5 V – 16 V
		Steering wheel: Not steering (There is no steering force)	Approx. 0.0 Nm
STEERING TORQUE	Engine running	Steering wheel: Right turn	Positive value (Nm)
		Steering wheel: Left turn	Negative value (Nm)
	Steering wheel: Not ste	ering (There is no steering force)	Approx. 0 deg
STEERING ANGLE SIG- NAL	Steering wheel: Right to	Jrn	Positive value (deg)
	Steering wheel: Left tur	n	Negative value (deg)
	Steering wheel: Not ste	ering (There is no steering force)	Approx. 0 deg/s
STEERING ANGLE SPEED	Steering wheel: Right to	lıu	Positive value (deg/s)
	Steering wheel: Left tur	n	Negative value (deg/s)
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A
MOTOR CORRENT	Engine running	Steering wheel: Right or left turn	Displays consumption current of EPS motor (A) <sup>*1</sup>
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A
Target motor current	Engine running	Steering wheel: Right turn	Positive value (A)
	Engine running Engine running	Steering wheel: Left turn	Negative value (A)
C/U TEMP	Engine running		Displays temperature of inside of power steering control module [°C]
Assist level	Engine running		100% <sup>*2</sup>
	Vehicle stopped		0.00 km/h
VEHICLE SPEED	While driving		Approximately equal to the indication on speedometer <sup>*3</sup> (inside of $\pm 10\%$ )
	Power steering warning	alamp: ON	On
	Power steering warning	lamp: OFF	OFF
STEERING ANGLE SEN-	Malfunction in steering	angle sensor.	ABNORMAL
SOR STATUS	No Malfunction in steer	ing angle sensor.	NORMAL
	Engine not running		STOP
ENGINE STATUS	Engine running		RUN
	Engine cranking		CRANK
HEAT PROTECT STATUS	Ignition switch ON or	No over heat.	NORMAL
	Engine running	Over heat.	PRTECT

### POWER STEERING CONTROL MODULE

#### < ECU DIAGNOSIS INFORMATION >

[ELECTRIC POWER STEERING]

Monitoritor		Data monitor		
		Condition	Display value	А
		Steering wheel: Not steering (There is no steering force)	Displays an almost constant value (rpm)	B
MOTOR REVOLUTION SPEED	Engine running	Steering wheel: Right turn	The positive value changes as a steering speed (rpm)	D
		Steering wheel: Left turn	The negative value changes as a steering speed (rpm)	С
CONTROL MODULE ESTM TEMP	Engine running		Displays temperature of inside of power steering control module [°C]	
Steering mode status	Steering mode: Standard		Standard	D
	Steering mode: Sport		Sport	
	Steering mode: Touring		Touring	E

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

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

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

### TERMINAL LAYOUT



### PHYSICAL VALUES

Termiı (Wire	nal No. Color)	Descriptic	n	Condition	Value	K
+	-	Signal name	Input/Output		(Applox.)	
1 (B)	Ground	Ground	_	Always	0 V	- L
2 (W)	Ground	Battery power supply	Input	Always	10.5 – 16 V	N
4	Ground	Ignition power supply	loput	Ignition switch: ON	10.5 – 16 V	-
(R)	Ground	ignition power supply	input	Ignition switch: OFF	0 V	- N
5 (L)	_	CAN-H	Input/Output	_	_	- 11
6 (P)		CAN-L	Input/Output	_	_	C

### Fail-safe

INFOID:000000013482243

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• If any malfunction occurs in the system and control module detects the malfunction, power steering warning lamp on combination meter turns ON to indicate system malfunction.

• When power steering warning lamp is ON, the system enters into a manual steering state. (Control turning force steering wheel becomes heavy.)

### **POWER STEERING CONTROL MODULE**

#### < ECU DIAGNOSIS INFORMATION >

[ELECTRIC POWER STEERING]

DTC	Fail-safe condition
C1143	Normal steering state
C1601	Manual steering state
C1604	Manual steering state
C1606	Manual steering state
C1607	Constant steering state
C1608	Manual steering state
C1609	Constant steering state
U1000	Constant steering state
U1010	Constant steering state
U140E	Normal steering state

### **Protection Function**

INFOID:000000013482244

Power steering control module decreases the output signal to EPS motor while extremely using the power steering function (e.g., full steering) consecutively for protecting EPS motor and power steering control module (Overload protection control). While activating overload protection control, the assist torque gradually decreases, and the steering wheel turning force becomes heavy. The normal assist torque is recovered if the steering wheel is not turned for a while.

### **DTC Inspection Priority Chart**

INFOID:000000013482245

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

Priority	Priority order item (DTC)
1	C1601 BATTERY VOLT
2	<ul> <li>C1604 TORQUE SENSOR</li> <li>C1606 EPS MOTOR</li> <li>C1607 EEPROM</li> <li>C1608 CONTROL UNIT</li> </ul>
3	C1143 ST ANG SEN CIRCUIT     C1609 CAN VHCL SPEED     U140E Chassis control module
4	U1000 CAN COMM CIRCUIT     U1010 CONTROL UNIT(CAN)

### **DTC** Index

INFOID:000000013482246

DTC	Items	Power steering warning lamp	Reference
C1143	ST ANG SEN CIRCUIT	OFF	STC-86, "DTC Description"
C1601	BATTERY VOLT	ON	STC-87, "DTC Description"
C1604	TORQUE SENSOR	ON	STC-89, "DTC Description"
C1606	EPS MOTOR	ON	STC-90, "DTC Description"
C1607	EEPROM	OFF	STC-91, "DTC Description"
C1608	CONTROL UNIT	ON	STC-91, "DTC Description"
C1609	CAN VHCL SPEED	OFF	STC-93, "DTC Description"
U1000	CAN COMM CIRCUIT	OFF	STC-95, "DTC Description"
U1010	CONTROL UNIT(CAN)	ON	STC-96, "DTC Description"
U140E	Chassis control module	OFF	STC-97, "DTC Description"

#### NOTE:

If two or more DTCs are detected, refer to STC-76. "DTC Inspection Priority Chart".

### [ELECTRIC POWER STEERING]





**EPS SYSTEM** 

JRGWC3179GB

	А
Ith VR30 engine) Ith VR	В
0	С
20         6R           21         54HEL           21         6R           21         6R           21         6R           22         5           23         W           23         W           23         W           24         L           25         V           26         6           21         10           21         10           21         10           23         W           23         W           24         L           25         V           26         6           21         11           21         11           23         10           23         8           23         8           23         8	D
Iffice engine)       Office engine)       Office engine)       Office engine)       Office engine)       Office engine)       Iffication)       Iffication)       Iffice engine)       Office engine)	E
	F
L         L           SHELD         SHELD           Nme         JOIN           Nme         JOIN           SHELD         SHELD           SHELD         SHELD           SHELD         SHELD           SHELD         SHELD           SHELD         SHELD           SHELD         SHELD	STC
13         13<	Н
14         2       2       2       2       1       2         2       2       2       2       1       2 <td>I</td>	I
18118 20017 CONNECTOR-BA 21342, 46A3A 21342, 46A3A 21342, 46A3A 21342, 46A3A 21342, 46A3A 21342, 46A3A - 10011 - 10011 - 10011 - 100112,01,011 - 100112,01 - 100112	J
Connector No.         Connector Name           Connector Name         Connector Name           No.         Winc           1         1           2         SHELD           2         SHELD           1         L<	K
(1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	L
ONNECTOR-806           46A.2A	Μ
SYSTEM or Name Journ G or Name Journ G Name	Ν
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JRGWC3180GB

### < WIRING DIAGRAM >

[ELECTRIC POWER STEERING]

EPS S'	YSTEN	Σ									
Connector	No.	635	Connecto	or No.	E65	185	SB	IGNITION SWITCH	16	BG	
		CARTER I NO GARNED ATTER DURING AND SHEEP NO AVELAND A DURING			CLICE DLOCK (1 (D)	186	SB	ASCD STEERING SWITCH	17	Ы	
CONTRECTOR	Allbu		COLINECU	OF INALLIE		187	98	SENSOR GROUND [ASCD STEERING SWITCH]	18	-	
Connector	Type	SAZ30FB-SJZ4-U	Connecto	or Type	TH12FW-NH	188	>	FUEL PUMP CONTROL MODULE (FPCM)	19	M	
						189	>	ENGINE COMMUNICATION LINE-L	20	BG	
E			E			190	_	ENGINE COMMUNICATION LINE-H	21	Ь	
		H [ 151   28   30   32   34 ] H			[	191	а.	STOP LAMP SWITCH	22	-	
<u></u>		2 15 17 18 19 20 0 4	2			192	8	BRAKE PEDAL POSITION SWITCH	23	SB	- [Color of wire differs depending on production]
						193	ß	EVAP CAASTER VENT CONTROL WAVE [Color of wire of flors depending on preduction]	23	M	<ul> <li>[Color of wire differs depending on production]</li> </ul>
		<u> </u>			12F 11F 10F 9F 8F 7F	193	9	EVAP CARASTER VENT COVTROL VALVE (CORO of wire differs depending on production)	24	BG	- [Color of wire differs depending on production]
						194	M	SENSOR POWER SUPPLY	24	1G	- [Color of wire differs depending on production]
						195	BR	ACCELERATOR PEDAL POSITION SENSOR 2	25	Р	
Terminal	Color Of	f Signal Name [Snecification]	Termina	I Color O	f Signal Name (Specification)	196	ж	SENSOR GROUND [ACCELERATOR PEDAL POSITION SENSOR 2]	26	L	
No.	Wire		No.	Wire		197	Я	ECM POWER SUPPLY	27	Y	
1	8	GND	10F	>		198	-	SENSOR POWER SUPPLY	28	-	
2	8	GND	11F	9	- [Color of wire differs depending on production]	199	в	ECM GROUND			
m	9	VALVE BATTERY [With VR30 engine]	11F	æ	- [Color of wire differs depending on production]	200	>	SENSOR GROUND			
æ	٩	VALVE BATTERY [With 2.0L turbo gasoline engine]	12F	×	- [With VR30 engine]	201	8	ECM GROUND	Connecto	r No.	E173
4	~	MOTOR BATTERY	12F	>	- [With 2.0L turbo gasoline engine]	202	>	ACCELERATOR PEDAL POSITION SENSOR 1	Connector	- Manua	CONTRACTOR FOR
S	LG	STOP LAMP SW SIGNAL [With ADAS]	1F	œ		203	σ	SENSOR GROUND	CONTRACTO	Allie	
S	>	STOP LAMP SW SIGNAL [With ASCD]	2F	BR		204	8	ECM GROUND	Connecto	r Type	SGA28FDGY-J
7	GR	RR LH WHEEL SENSOR SIGNAL	ЗF	•							
00	9	RR LH WHEEL SENSOR POWER SUPPLY	SF	۵.					E		6 2
6	BR	FR RH WHEEL SENSOR SIGNAL	6F	-		Connecto	r No.	E172			
10	GR	FR RH WHEEL SENSOR POWER SUPPLY	7F	æ			:		1.3.		
13	æ	VACUUM SENSOR SIGNAL	48	-		Connecto	r Name	JOINT CONNECTOR-EUT			
15	٩	CAN-L [Without Gateway]	9F	-	•	Connecto	r Type	SGA28FLBR-J			
15	Я	CAN-L [With gateway]				ſ	_				
17	٨	RR RH WHEEL SENSOR SIGNAL				E		ے ر			
18	ΓC	RR RH WHEEL SENSOR POWER SUPPLY [With 2.0L turbo gasoline engine]	Connecto	or No.	E152	ŝ		4 0 0 4	Terminal	Color Of	Signal Name [Snarification]
18	>	RR RH WHEEL SENSOR POWER SUPPLY [With VR30 engine]	Connecto	amen v	FCM	<u>с</u> п /	_		No.	Wire	
19	SB	FR LH WHEEL SENSOR SIGNAL	CONTRACT						1	9	<ul> <li>[Color of wire differs depending on production]</li> </ul>
20	BG	FR LH WHEEL SENSOR POWER SUPPLY	Connecto	or Type	RH24FB-RZ8-L-RH					я	- [Color of wire differs depending on production]
25	_	CAN-H	C						m	8	
28	9	VACUUM SENSOR POWER SUPPLY	ľ						4	8	
30	я	VDC OFF SW SIGNAL	Ň		[[173]77] 183]189183]197[201]]]	Terminal	Color Of	Circuit Name (Constituention)	2	9	-
32	SHIELD	VACUUM SENSOR GROUND	6 H		178 182 188 190194 198 202	No.	Wire	oignar name (openingroup)	9	BR	
34	0	IGN			175 18/19/195 199 203	1	ß		2	8	
						2	>		∞	8	
						m	3		6	9	
						4	-		10	-	
			Termina.	I Color O	f ferrel Manual Constants	'n	ß		12	8	
			No.	Wire	Signal Name (Specification)	9	>		13	0	-
			173	88	FUEL TANK PRESSURE SENSOR	~	3		14	BR	
			175	•	CAN-L	∞	-	-	17	υ	-
			176		CAN-H	6	ß		21	9	
			177	0	SENSOR POWER SUPPLY [FUEL TANK PRESSURE SENSOR]	10	>		25	ч	
			178	>	TACHO METER SIGNAL	11	3		26	٦	
			180	•	FUEL TANK TEMPERATURE SENSOR	12	_	-			
			182	×	FUEL PUMP CONTROL MODULE (FPCM) CHECK	15	>				

JRGWC3181GB

< WIRING DIAGRAM >

[ELECTRIC POWER STEERING]
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**EPS SYSTEM** 

JRGWC3182GB

[ELECTRIC POWER STEERING]

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	EPS SYSTE	M	Ľ			:						
	DURECTOR NO.	M24	15	BR	FUEL LEVEL SENSOR SIGNAL	4			22	¥	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	
	onnector Name	CAN GATEWAY	52	8	GROUND	15		4 ,	22	< SB	<ul> <li>[With VR30 engine and without ISS]</li> <li>[With VP30 engine and with ISS]</li> </ul>	
	onnector Type	TH12FW-NH				9 E			23	• •	- [With 2 OI furtho eacoline entities]	
			Conne	ctor No.	M77	20	æ		23	SB	- [With VR30 engine and without ISS]	
	信		Conner	-tor Nama	STEEPING ANGLE SENSOR	21	Я	-	23	>	- [With VR30 engine and with ISS]	
	S II					22	я		24	æ	- [With 2.0L turbo gasoline engine]	
	1.6.	1 3 4 5 6	Conne	ctor Type	TH08FW-NH				24	SB :	- [With VR30 engine and without ISS]	
		7 9 10 11 12	Æ			Connecto	r No.	4173	24	>	- [With VK50 engine and with IS5]	
			主丁		K							
				vi		Connecto	r Name	OINT CONNECTOR-M03	Connecte	or No.	M175	
	erminal Color C	Of Signal Name (Specification)			t 1	Connecto	r Type	24342_4GA2A	Connecte	or Name	JOINT CONNECTOR-M05	
	No. Wire					ą						
	1	CAN-H (CAN COMMUNICATION CIRCUIT 1)							Connect	or Type	NH20FL-DC	
	° +	CAN-H (CAN COMMUNICATION CIRCUIT 2)	Termir	1al Color Of		H.S.		12 11 10 9 8 7	Æ			
	- s	GROUND	No.	Wire	Signal Name [Specification]			18 17 16 15 14 13	-H-T-			
7         P         CAL         CAL         Control Control         Control <td>۲ و</td> <td>CAN-H (CAN COMMUNICATION CIRCUIT 2)</td> <td>-</td> <td>•</td> <td>GROUND</td> <td></td> <td></td> <td>24 23 22 21 20 19</td> <td>CH N</td> <td>_</td> <td>87654321</td> <td></td>	۲ و	CAN-H (CAN COMMUNICATION CIRCUIT 2)	-	•	GROUND			24 23 22 21 20 19	CH N	_	87654321	
9         R         Entromotorest and server eventsets 3         CAN1 (NIC) (NIC)         Can1 (NIC) (NIC)         Controm (NIC)         Controm (NIC) <t< td=""><td>7 P</td><td>CAN-L (CAN COMMUNICATION CIRCUIT 1)</td><td>2</td><td>۵.</td><td>CAN-L [Without Gateway]</td><td></td><td></td><td></td><td></td><td></td><td>20 19 17 16 15 14 13 12 11 10</td><td></td></t<>	7 P	CAN-L (CAN COMMUNICATION CIRCUIT 1)	2	۵.	CAN-L [Without Gateway]						20 19 17 16 15 14 13 12 11 10	
9         W         International contraction interaction int	9 R	IGNITION POWER SUPPLY [With VR30 engine and without ISS]	7	æ	CAN-L [With Gateway]							
1/2         2         Convector Notation         Minimal Color Of a convector Name bornetor Name connector Name conneconnector Name connector Name conneconnector Name connector Name	9 0	IGNITION POWER SUPPLY [Except with VR30 engine and without ISS]	4 "	σ-	IGN	Terminal	Color Of	Signal Name [Specification]				
13         2         CM4.4 (CAN CONTINCICTION CIRCUT7)           13         1	4 T					-	-		Termina	I Color Of		
Image:	11 B	CAN-LI (CAN COMMINICATION CIRCIIIT 2)							No	Wire V	Signal Name [Specification]	
Image: Name         Mission           Image: Name         Mission           Image: Name         Connector Name           Image: Name         Standa           <	1		Connet	ctor No.	M137	4 m			-	-		
Ometacto Nai.         MSS         Commetantial						4	_		2			
Onnector Name Introduction Nuel Introduction Nuel Introductio	connector No.	M58	Conne	ctor Name	JOIN CONNECTOR-MID	'n			m	_		
Image: Normer File         Image:	Connector Name	COMBINATION METER	Conne	ctor Type	24342_4GA2A	9	L	-	4	-	-	
Image: Type         Int2FW-NH         Image: Transmission of the state of the sta			4			7	R		ŝ	L	-	
Image: Second	Connector Type	TH12FW-NH	E			~	ч	-	9	-		
Main         Image: Main	đ		Ę	Ľ	5 4 3 2 1	6	ж		2			
Image: Normal Color of the signal Name (Specification)         Image: Normal Color of the signal Name (Name C				5	1 10 9 8 7	10	ч		80			
1         1	S II				16 15 14 13	11	æ		10	•		
Trip         Signal Name (Specification)         No         With 201 Link parally and (Specification)         No         <		41 42 43 44 45 46			22 21 20 18	12	æ		11	۹.		
Image: Noise of the control		47 48 51 52				13	SB		12	-		
Terminal forminal on virte         Terminal signal Name [specification]         To virte         To virtual signal Name [specification]         To virtual signal signal Name [specification]         To virtual signal virtual signal signal Name [specification]         To virtual signal virtual signal signal Name [specification]         To virtual signal virtual signal signal virtual signal virtual signal virtual virtual signal virtual virtual signal virtual vi			,	1 0 1		14	89		m :			
Terminal         Color         Terminant         <			Iemi.	Nal Lolor UI	Signal Name [Specification]	J.	<del>9</del> -	- [Milth 3 Al trutho meeting and hal	15	- o		
Notify the interval effection         Z         B         Z         D         Signal Name (Specification)         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         D         Z         Z         D         Z <thz< th="">         Z         Z</thz<>	Towniand Color O		-				, <u></u> ;		4 F		(1100	
41         L         CAN-H         3         B	No. Wire	Signal Name [Specification]		• •		Q [2	n –	- [With 2.0] turbo gasoline engine]	16	- α	- [With 2:01 turbo easoline ensine]	
42         P         CAN-L           43         B         ILUNIMATION CSIGNAL         5         B	41	CAN-H	"			1	85	- [With VR30 engine]	17	•	- [With VR30 engine]	
43         B         ILLUMINATION CONTROL SIGNAL.         5         B         · · · · · · · · · · · · · · · · · · ·	42 P	CAN-L	4	-		18		- [With 2.0L turbo gasoline engine]	17	. œ	- [With 2.0L turbo gasoline engine]	
44         Y         FUEL LEVEL SENSOR GROUND         7         B		III LIMINATION CONTROL SIGNAL	r u			2 e	, 85	- [With VR30 engine]	19	: ~	- [With VR30 engine and with ISS]	
45         W         BATTERP POWES UPPLY         8         B         ·         Image: Second control of the second contro	44 Y	FLIFLIEVELSENSOR GROTIND				Ę	æ	- [With VR30 engine]	19	3	- [Excent with VR30 engine and with ISS]	
46         BG         Gammon statut, licence with WB regime and without ISI         9         B         -	45 W	BATTERY POWER SUPPLY	00			19	9	- [With 2.0L turbo gasoline engine]	20	ď	- [With VR30 engine and with ISS]	
46         R         IGNITION SGNAL [With VR30 engine and without IS3]         10         B         ·         20         LG         · [With 2:01 turbo gasoline engine]           77         FP         A         <	46 BG	IGNITION SIGNAL [Except with VR30 engine and without ISS]	6	•		20	R	- [With VR30 engine]	20	3	<ul> <li>Except with VR30 engine and with ISS1</li> </ul>	
	46 R	IGNITION SIGNAL (With VR30 engine and without ISS)	5			2	5 9	- Mith 2 Of turbo gasoline engine	â	:	fact that will be a fight of the trans of poor	
4/ DS I AV COMMUNICATION DISNALITI D I TI D I I DI I TI DI I VIUTI VADU ETIRUTEI I	47 SB	AV COMMUNICATION SIGNAL (H)	1	•		21	2 6	- [with 2.50 to baseline engine]				
	10	AV COMMUNICATION SIGNAL (1)	C.	-		5	-	[Mith 2 0] turko medine aneline]				
	48 FG	AV CUMINIUNICATION SIGNAL (L)	7	-		17	2	- [with 2.UL turbo gasoline engine]				

DIAGNOSIS AND REPAIR WORK FLOW	
< BASIC INSPECTION > [ELECTRIC POWER STEERING]	
BASIC INSPECTION	Δ
DIAGNOSIS AND REPAIR WORK FLOW	A
Work Flow	В
DETAILED FLOW	
1.INTERVIEW FROM THE CUSTOMER	С
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	D
"maybe the customer mentions this symptom".	E
>> GO TO 2.	
2. СНЕСК ЅҮМРТОМ	F
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-76.</u> "Protection Function".	STO
When the symptom is caused by normal operation, fully inspect each portion and obtain the under- standing of customer that the symptom is not caused by a malfunction.	Н
>> GO TO 3.	
3.CHECK VEHICLE CONDITION	1
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch ON.</li> <li>2. Check "HEAT PROTCT STATUS" in "DATA MONITOR" in "EPS/DAST 3".</li> </ul>	J
Monitor item Values	К
HEAT PROTCT STATUS NORMAL	
Is the inspection result normal?	I
NO >> Wait with the ignition switch OFF until the data monitor indication becomes "NORMAL". And then GO TO 4.	
4.PERFORM SELF-DIAGNOSIS	M
With CONSULT	
Perform self-diagnosis. Is any DTC detected?	Ν
YES >> Record or print DTC and freeze frame data (FFD). GO TO 5. NO >> GO TO 7.	
5.RECHECK SYMPTOM	0
<ul> <li>With CONSULT</li> <li>Erase self-diagnostic results for "EPS/DAST 3".</li> <li>Perform DTC confirmation procedures for the error detected system.</li> </ul>	Ρ
If some DTCs are detected at the same time, determine the order for performing the diagnosis based on <u>STC-76, "DTC Inspection Priority Chart"</u> . <u>Is any DTC detected?</u> YES >> GO TO 6.	

### DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

NO >> Check harness and connectors based on the information obtained by interview. Refer to <u>STC-84</u>. <u>"Diagnostic Work Sheet"</u>.

### **6.**REPAIR OR REPLACE ERROR-DETECTED PARTS

- Repair or replace error-detected parts.
- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase self-diagnostic results for "EPS/DAST 3".

#### >> GO TO 8.

### **7.** IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection.

#### Can the error-detected system be identified?

YES >> GO TO 8.

NO >> Check harness and connectors based on the information obtained by interview. Refer to <u>STC-84,</u> <u>"Diagnostic Work Sheet"</u>.

### 8.FINAL CHECK

#### With CONSULT

- T. Check the reference value for power steering control module.
- 2. Recheck the symptom and check that symptom is not reproduced on the same conditions.

Is the symptom reproduced?

YES >> GO TO 3.

NO >> INSPECTION END

#### Diagnostic Work Sheet

INFOID:000000013482250

#### 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	MR/MS	Registration number				Initial year registration		
name		Vehicle type				VIN		
Storage date		Engine				Mileage		km (Mile)
		□The steerin	g wheel	position (c	enter) is in t	the wrong position	on.	
		□Warning lamp turns on.						
Symptom		□Noise □Vibration						
		Dothers			)			
		(						)
First occurren	ce	Recently      Others (				)		
Frequency of	occurrence	□Always	□Unde	r a certain	conditions o	of DSometim	nes (time(s)/day)	
		□Irrelevant						
Climate con-	Weather	DFine D	Cloud	□Rain	□Snow	□Others (		)
ditions	Temperature	□Hot □V	Varm	□Cool	□Cold	□Temperature	e [Approx.	°C (°F)]
	Relative humidity	□High □	Moderat	te □Lo	w			
Road conditions		□Urban area □Mounting ro	S⊡ bad (uph	uburb area ill or down	a □High hill) □F	way Rough road		

### **DIAGNOSIS AND REPAIR WORK FLOW**

#### < BASIC INSPECTION >

### [ELECTRIC POWER STEERING]

Interview sheet						
Customer	MR/MS	Registration number		Initial year registration	A	
name		Vehicle type		VIN	P	
Storage date		Engine		Mileage	km (Mile)	
Operation con	ditions, etc.	Irrelevant When engin During drivir During dece During steer	e starts During idling ng During acceleration eleration During cornerin ring	□At constant spe g (right curve or left	ed driving C curve)	
Other condition	ns				D	
Memo					E	

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# DTC/CIRCUIT DIAGNOSIS C1143 STEERING ANGLE SENSOR

### DTC Description

INFOID:000000013482251

### DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detected condition		
C1143	ST ANG SEN CIRCUIT (Steering angle sensor circuit)	Diagnosis condition	When ignition switch is ON.	
		Signal (terminal)	Steering angle sensor signal	
		Threshold	Malfunction of steering angle sensor signal	
		Diagnosis delay time	2 seconds or more	

### POSSIBLE CAUSE

- Harness or connector
- Steering angle sensor
- Power steering control module

### FAIL-SAFE

Normal steering state

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

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

>> GO TO 2.

### 2.DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "C1143" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-86, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis Procedure**

INFOID:000000013482252

**1.**CHECK STEERING ANGLE SENSOR CIRCUIT

Check steering angle sensor circuit. Refer to <u>BRC-142, "Diagnosis Procedure"</u>.

#### 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 steering gear assembly. Refer to <u>ST-</u><u>95, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

### C1601 BATTERY POWER SUPPLY

### < DTC/CIRCUIT DIAGNOSIS >

# C1601 BATTERY POWER SUPPLY

### **DTC** Description

### DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detected condition		
C1601 BATTERY VOLT (Battery voltage)		Diagnosis condition	When ignition switch is ON.	
	BATTERY VOLT (Battery voltage)	Signal (terminal)	Power steering control module supply voltage (terminals 1 and 2)	
		Threshold	Less than 7 V or more than 18.2 V	-
		Diagnosis delay time	5 seconds or more	

#### POSSIBLE CAUSE

- Harness or connector
- Power steering control module
- Fuse
- Battery power supply circuit
- Battery

#### FAIL-SAFE

#### Manual steering state

#### 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/DAST 3" self-diagnosis.

#### Is DTC "C1601" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-87. "Diagnosis Procedure"</u>
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis Procedure**

### 1. CHECK POWER STEERING CONTROL MODULE POWER SUPPLY AND GROUND CIRCUIT

Check the power steering control module power supply and ground circuit. Refer to <u>STC-99, "Diagnosis Pro-</u> cedure".

#### 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 TERMINAL

- 1. Check the power steering control module pin terminals for damage or loose connection with harness connector.
- 2. Check the fuse block (J/B) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

### **STC-87**

[ELECTRIC POWER STEERING]

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INFOID:000000013482254

### C1601 BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-</u> <u>95, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

### C1604 TORQUE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# C1604 TORQUE SENSOR

# **DTC** Description

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DTC No.	CONSULT screen terms (Trouble diagnosis content)		DTC detected condition	
-		Diagnosis condition	When engine running.	C
04004	TORQUE SENSOR	Signal (terminal)		
C1604	(Torque sensor)	Threshold	Malfunction of power steering torque sensor	
		Diagnosis delay time	Less than 1 second	D
POSSIBLE ( • Harness or • Power stee • Power stee	CAUSE connector ring torque sensor ring control module			E
FAIL-SAFE Manual steer	ing state			F
DTC CONFI	RMATION PROCEDURE			
				ST
		s heen previouely con	ducted always turn ignition switch OEE and	
wait at least 1	10 seconds before conducting t	he next test.	ducted, always turn ignition switch Of F and	Н
>> (	GO TO 2.			
2.DTC REP	RODUCTION PROCEDURE			
With CON	SULT			
1. Start the	engine. N·			J
Never dr	ive the vehicle.			
2. Perform	"EPS/DAST 3" self-diagnosis.			
<u>Is DTC "C160</u>	04" detected?			K
YES >> F	Proceed to diagnosis procedure	e. Refer to <u>STC-89, "Di</u> before repair: Refer to	agnosis Procedure". GL45 "Intermittent Incident"	
NO-2 >> 0	Confirmation after repair: INSPE	ECTION END	or to, international incident.	L
Diagnosis	Procedure		INEDID-00000013493631	
4				
I.PERFORM	M SELF-DIAGNOSIS			IV
With CON	SULT			
1. Turn the	ignition switch OFF to ON. It-diagnostic results for "EPS/D	A ST 3"		
3. Turn the	ignition switch OFF and wait for	or at least 10 seconds.		
4. Start the	engine.			
	N: ive the vehicle			C
5. Perform	self-diagnosis for "EPS/DAST 3	3".		
<u>Is DTC "C160</u>	04" detected?			F
YES >> F	Power steering torque sensor is Removal and Installation".	malfunctioning. Repla	ace steering gear assembly. Refer to <u>ST-95,</u>	2
NO >> 0	Check pin terminal and connect	ion of each harness co	onnector for malfunctioning conditions.	

### < DTC/CIRCUIT DIAGNOSIS >

### C1606 EPS MOTOR

### **DTC** Description

INFOID:000000013482257

[ELECTRIC POWER STEERING]

### DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detected condition			
C1606	EPS MOTOR (EPS motor)	Diagnosis condition	When engine running.		
		Signal (terminal)	—		
		Threshold	Malfunction of EPS motor or power steering con- trol module motor driver		
		Diagnosis delay time	Less than 1 second		

### POSSIBLE CAUSE

Harness or connector

EPS motor

• Power steering control module

FAIL-SAFE

Manual steering state

### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

2. Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "C1606" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-90, "Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000013482258

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch OFF to ON.
- 2. Erase self-diagnostic results for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- Start the engine.
   CAUTION: Never drive the vehicle.
- 5. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C1606" detected?

- YES >> EPS motor is malfunctioning. Replace steering gear assembly. Refer to <u>ST-95, "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

### **STC-90**

### C1607, C1608 POWER STEERING CONTROL MODULE DIAGNOSIS > [ELECTRIC POWER STEERING]

### < DTC/CIRCUIT DIAGNOSIS >

# C1607, C1608 POWER STEERING CONTROL MODULE

### **DTC** Description

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### DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detected condition		
		Diagnosis condition	When engine running.	-
	FEDDOM	Signal (terminal)		-
C1607	(EEPROM)	Threshold	Malfunction of power steering control module memory (EEPROM) function	D
		Diagnosis delay time	Less than 1 second	_
		Diagnosis condition	When engine running.	E
C1608		Signal (terminal)		-
	(Control unit)	Threshold	Internal malfunction of power steering control module	F
	-	Diagnosis delay time	1 seconds or more	_

### POSSIBLE CAUSE

Power steering cont	rol module
---------------------	------------

### FAIL-SAFE

DTC	Fail-safe condition				
C1607	Constant steering state	1			
C1608	Aanual steering state				
DTC CONFI	RMATION PROCEDURE				
1.PRECOND	DITIONING	J			
If "DTC CONF wait at least 1	IRMATION PROCEDURE" has been previously conducted, always turn ignition switch OFF and 0 seconds before conducting the next test.	K			
>> G	O TO 2.				
2.DTC REPF	RODUCTION PROCEDURE	L			
With CONS	SULT				

1. Start the engine. CAUTION:

### Never drive the vehicle.

2. Perform "EPS/DAST 3" self-diagnosis.

Is DTC "C1607" or "C1608" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-91, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Erase self-diagnostic results for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

INFOID:000000013482260

### C1607, C1608 POWER STEERING CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

[ELECTRIC POWER STEERING]

#### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

Is DTC "C1607" or "C1608" detected?

- YES >> Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-</u><u>95, "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

### < DTC/CIRCUIT DIAGNOSIS >

# C1609 VEHICLE SPEED SIGNAL

### **DTC** Description

[ELECTRIC POWER STEERING]

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### DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detected condition	
	(Trouble diagnosis content)			С
			When ignition switch is ON.	
C1609	CAN VHCL SPEED	Signal (terminal)	Vehicle speed signal (ABS)	D
		I hreshold		
		Diagnosis delay time	2 seconds or more	
POSSIBLE	CAUSE			Е
<ul> <li>Harness or</li> <li>Power stee</li> </ul>	ring control module	n line)		
ABS malfur	nction			F
<ul> <li>Vehicle spe</li> </ul>	ed signal error			1
FAIL-SAFE				
Constant stee	ering state			ST
DTC CONFI	RMATION PROCEDURE			
1.PRECON	DITIONING			Ц
If "DTC CON	FIRMATION PROCEDURE" ha	s been previously con	ducted, always turn ignition switch OFF and	
wait at least 1	10 seconds before conducting t	he next test.		
>> (	GO TO 2.			
2.DTC REP	RODUCTION PROCEDURE			
	SULT			J
1. Turn the	ignition switch OFF to ON.			
	EPS/DAST 3 self-diagnosis.			Κ
YES >> F	Proceed to diagnosis procedure	Refer to STC-93 "D	iagnosis Procedure"	
NO-1 >> T	o check malfunction symptom	before repair: Refer to	<u>GI-45, "Intermittent Incident"</u> .	1
NO-2 >> 0	Confirmation after repair: INSPE	CTION END		L
Diagnosis	Procedure		INFOID:000000013482262	
1				M
I.PERFORM	ABS ACTUATOR AND ELEC	TRIC UNIT (CONTRO	DL UNIT) SELF-DIAGNOSIS	
With CON	SULT			
1. Turn the 2 Perform	Ignition switch OFF to ON. "ABS" self-diagnosis Refer to F	3RC-61 "CONSULT F	unction"	N
Is any DTC d	etected?			
YES >> 0	Check the DTC. Refer to <u>BRC-7</u>	2, "DTC Index".		0
NO >> 0	GO TO 2.			
2.снеск с	ONNECTOR AND TERMINAL			_
1. Turn the	ignition switch OFF.			Ρ
2. Disconne	ect ABS actuator and electric un	hit (control unit) harne	ss connector.	
4. Check th	e connector for disconnection of	or looseness.		
5. Check th	e pin terminals for damage or l	oose connection with	harness connector.	
Is the inspect	ion result normal?			

YES >> GO TO 3.

### STC-93

### **C1609 VEHICLE SPEED SIGNAL**

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace harness, connector, or terminal, securely lock the connector.

### **3.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect power steering control module harness connector.
- 3. Turn the ignition switch OFF to ON.
- 4. Erase self-diagnostic results for "EPS/DAST 3".
- 5. Turn the ignition switch OFF and wait for at least 10 seconds.
- 6. Turn the ignition switch OFF to ON.
- 7. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C1609" detected?

- YES >> Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-</u><u>95, "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

### **U1000 CAN COMM CIRCUIT**

### **DTC** 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 DETECTION LOGIC

INFOID:000000013482264

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#### D CONSULT screen terms DTC No. DTC detected condition (Trouble diagnosis content) E When ignition switch is ON. **Diagnosis condition** Signal (terminal) CAN communication signal CAN COMM CIRCUIT U1000 (CAN communication circuit) Threshold Malfunction of CAN communication signal F Diagnosis delay time 2 seconds or more POSSIBLE CAUSE STC CAN communication error FAIL-SAFE Constant steering state Н 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 Κ (P)With CONSULT

- Turn the ignition switch OFF to ON. 1.
- Perform "EPS/DAST 3" self-diagnosis. 2.

#### Is DTC "U1000" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-95, "Diagnosis Procedure".
- >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident". NO-1
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

Proceed to LAN-41, "Trouble Diagnosis Flow Chart".

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INFOID:000000013482265

# U1010 CONTROL UNIT (CAN)

### DTC Description

INFOID:000000013482699

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 DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detected condition			
U1010	CONTROL UNIT(CAN) [Cotrol unit (CAN)]	Diagnosis condition	When ignition switch is ON.		
		Signal (terminal)	—		
		Threshold	Malfunction of power steering control module during initial diagnosis		
		Diagnosis delay time	3 times after malfunction is detected.		

### POSSIBLE CAUSE

Power steering control module

#### FAIL-SAFE

Constant steering state.

#### 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/DAST 3" self-diagnosis.

#### Is DTC "U1010" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-96, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "U1010" detected?

- YES >> Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-</u><u>95. "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

### STC-96

INFOID:000000013482700

### **U140E CHASSIS CONTROL MODULE**

### < DTC/CIRCUIT DIAGNOSIS >

# **U140E CHASSIS CONTROL MODULE**

### **DTC** Description

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detected condition		
U140E Chassis control module (Chassis control module)		Diagnosis condition	When ignition switch is ON.	
	Chassis control module (Chassis control module)	Signal (terminal)	Drive mode signal (Steering mode signal)	
		Threshold	Malfunction of drive mode signal (steering mode signal)	C
		Diagnosis delay time	2 seconds or more	_

### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Power steering control module
- Chassis control module malfunction
- Steering mode signal error

#### FAIL-SAFE

Normal steering state

#### 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.
- Perform "EPS/DAST 3" self-diagnosis.

#### Is DTC "U140E" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-97, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

1.PERFORM CHASSIS CONTROL MODULE SELF-DIAGNOSIS

#### With CONSULT

- Turn the ignition switch OFF to ON. 1.
- Perform "CHASSIS CONTROL" self-diagnosis. Refer to DAS-526, "CONSULT Function". 2

#### Is any DTC detected?

YES >> Check the DTC. Refer to DAS-550, "DTC Index". NO >> GO TO 2.

# 2. CHECK CONNECTOR AND TERMINAL

- 1. Turn the ignition switch OFF.
- 2. Disconnect chassis control module harness connector.
- Disconnect power steering control module harness connector. 3.
- 4. Check the connector for disconnection or looseness.
- Check the pin terminals for damage or loose connection with harness connector. 5.

#### Is the inspection result normal?

### **STC-97**

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# [ELECTRIC POWER STEERING]

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### **U140E CHASSIS CONTROL MODULE**

< DTC/CIRCUIT DIAGNOSIS >

#### YES >> GO TO 3.

NO >> Repair or replace harness, connector, or terminal, securely lock the connector.

# **3.**PERFORM SELF-DIAGNOSIS

#### (B) With CONSULT

- 1. Connect chassis control module harness connector.
- 2. Connect power steering control module harness connector.
- 3. Turn the ignition switch OFF to ON.
- 4. Erase self-diagnostic results for "EPS/DAST 3".
- 5. Turn the ignition switch OFF and wait for at least 10 seconds.
- 6. Turn the ignition switch OFF to ON.
- 7. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "U140E" detected?

- YES >> Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-</u> <u>95, "Removal and Installation"</u>.
- NO >> Check pin terminal and connection of each harness connector for malfunctioning conditions.

### POWER SUPPLY AND GROUND CIRCUIT DSIS > [ELECTRIC POWER STEERING]

### < DTC/CIRCUIT DIAGNOSIS >

# POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure			INFOID:000000013482267
<b>1.</b> CHECK THE GROUND C	IRCUIT		
<ol> <li>Turn the ignition switch Q</li> <li>Disconnect power steering</li> <li>Check the continuity betw</li> </ol>	DFF. ng control module harness ween power steering contro	connector. bl module harness connect	or and ground.
Power steering c	ontrol module		Continuity
Connector	Terminal	_	Continuity
E177	1	Ground	Existed
YES >> GO TO 2. NO >> Repair open circ 2.CHECK THE BATTERY P	uit in harness or connector OWER SUPPLY CIRCUIT	s. (1)	around
Check the voltage between p	ower steering control mod		ground.
Power steering c Connector	ontrol module Terminal	_	Voltage S (Approx.)
E177	2	Ground	10.5 – 16 V
<ol> <li>Check the 100A fusible li</li> <li>Check the harness for op minal and the 100A fusible Is the inspection result normative YES &gt;&gt; Perform the trout ing Diagram - BA</li> </ol>	nk (#J). ben or short between powe le link (#J). <u>al?</u> ble diagnosis for battery po <u>TTERY POWER SUPPLY</u>	er steering control module h wer supply circuit. Refer to ".	PG-20, "VR30DDTT : Wir-
NO >> Repair or replace	error-detected parts.		
<ol> <li>CHECK THE IGNITION P</li> <li>Check the voltage between the voltage b</li></ol>	en power steering control	(1) nodule harness connector	and ground.
Power steering c	ontrol module		Voltage
Connector	Terminal	_	(Approx.)
E176	4	Ground	0 V
<ol> <li>Turn the ignition switch C</li> <li>Check the voltage betwe</li> <li>Power steering c</li> </ol>	DN. en power steering control i	module harness connector	and ground.
Connector	Terminal	—	(Approx.)
E176	4	Ground	10.5 – 16 V
Is the inspection result normal YES >> GO TO 6.	<u>al?</u>		

NO >> GO TO 5.

**5.**CHECK THE IGNITION POWER SUPPLY CIRCUIT (2)

1. Turn the ignition switch OFF.

2. Check the 10A fuse (#12).

### POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

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

Power steering control module		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E176	4	E65	11F	Existed

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

Power steering	Power steering control module		Continuity	
Connector	Terminal		Continuity	
E176	4	Ground	Not existed	

#### Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to <u>PG-65</u>, "VR30DDTT : Wiring Diagram - IGNITION POWER SUPPLY -".

NO >> Repair or replace error-detected parts.

#### 6.CHECK TERMINAL

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

2. Check the fuse block (J/B) pin terminals for damage or loose connection with harness connector.

#### Is the inspection result normal?

- YES >> Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-</u><u>95, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

POWER STEERING WARNING LAMP
< DTC/CIRCUIT DIAGNOSIS > [ELECTRIC POWER STEERING]
POWER STEERING WARNING LAMP
Component Function Check
1. CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP
Check that the power steering warning lamp turns ON when ignition switch turns ON. Then, 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-101, "Diagnosis Procedure".
Diagnosis Procedure
1.PERFORM SELF-DIAGNOSIS
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF to ON.</li> <li>2. Perform "EPS/DAST 3" self-diagnosis.</li> <li>Is any DTC detected?</li> </ul>
YES >> Check the DTC. Refer to <u>STC-76, "DTC Index"</u> . NO >> GO TO 2.
2.CHECK POWER STEERING WARNING LAMP SIGNAL
<ul> <li>With CONSULT</li> <li>Turn the ignition switch ON.</li> <li>Select in "WARNING LAMP" in "DATA MONITOR" in "EPS/DAST 3".</li> <li>Check that the item in "DATA MONITOR" is "On". CAUTION:</li> </ul>
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 <u>MWI-120</u> , "COMBINATION METER : Diagnosis Procedure".
NO $>> \overline{\text{GO TO 3.}}$
J.CHECK TERMINALS AND HARNESS CONNECTORS
Check the power steering control module pin terminals for damage or loose connection with harness connec- tor.
Is the inspection result normal?
<ul> <li>YES &gt;&gt; Power steering control module is malfunctioning. Replace steering gear assembly. Refer to <u>ST-95, "Removal and Installation"</u>.</li> <li>NO &gt;&gt; Repair or replace error-detected parts.</li> </ul>

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# POWER STEERING WARNING LAMP DOSE NOT TURN ON < SYMPTOM DIAGNOSIS > [ELECTRIC POWER STEERING]

# SYMPTOM DIAGNOSIS

# POWER STEERING WARNING LAMP DOSE NOT TURN ON

### Description

INFOID:000000013482270

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

### **Diagnosis Procedure**

INFOID:000000013482271

1. CHECK THE POWER STEERING WARNING LAMP

Perform trouble diagnosis for the power steering warning lamp system. Refer to <u>STC-101, "Diagnosis Proce-dure"</u>.

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.

POWER STEERING WARNING LAMP DOSE NOT TURN OFF < SYMPTOM DIAGNOSIS > [ELECTRIC POWER STEERING]	_
POWER STEERING WARNING LAMP DOSE NOT TURN OFF	^
Description INFOID:000000013482277	2
Power steering warning lamp does not turn OFF several seconds after engine started	В
Diagnosis Procedure	3
1.PERFORM SELF-DIAGNOSIS	С
With CONSULT Perform "EPS/DAST 3" self-diagnosis. Is any DTC detected? YES >> Check the DTC. Refer to STC-76, "DTC Index".	D
NO $\rightarrow$ GO TO 2. 2.CHECK POWER STEERING WARNING LAMP	Ε
Perform the trouble diagnosis of power steering warning lamp. Refer to <u>STC-101, "Diagnosis Procedure"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 3. NO >> Repair or replace error-detected parts	F
3. POWER STEERING CONTROL MODULE POWER SUPPLY AND GROUND CIRCUIT	STC
Perform the trouble diagnosis of power steering control module power supply and ground. Refer to <u>STC-87</u> . <u>"Diagnosis Procedure"</u> . <u>Is the inspection result normal?</u> YES >> Check that the pin terminals and the connection of each connector are normal. NO >> Repair or replace error-detected parts.	Н
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### STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

### < SYMPTOM DIAGNOSIS >

# STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

Diagnosis Procedure

INFOID:000000013482274

[ELECTRIC POWER STEERING]

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Perform "EPS/DAST 3" self-diagnosis.
- Is a malfunctioning system displayed?
- YES >> Check the DTC. Refer to <u>STC-76, "DTC Index"</u>.
- NO >> GO TO 2.

### 2.CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP

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

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Perform trouble diagnosis of power steering warning lamp. Refer to <u>STC-101, "Diagnosis Proce-</u> <u>dure"</u>.

**3.**CHECK THE POWER STEERING CONTROL MODULE SIGNAL (1)

#### With CONSULT

1. Start the engine.

### CAUTION:

#### Never drive the vehicle.

- 2. Turn steering wheel from full left stop to full right stop.
- 3. Select "Assist level" in "DATA MONITOR" in "EPS/DAST 3".

#### Is the display value "100%"?

YES >> GO TO 6.

NO >> GO TO 4.

**4.**CHECK THE POWER STEERING CONTROL MODULE SIGNAL (2)

#### With CONSULT

Select "BATTERY VOLT" in "DATA MONITOR" in "EPS/DAST 3".

Is the display value "10.5 V" or more?

- YES >> GO TO 5.
- NO >> Perform trouble diagnosis of power steering control module power supply and ground. Refer to <u>STC-87, "Diagnosis Procedure"</u>.

**5.**CHECK POWER STEERING CONTROL MODULE SIGNAL (3)

#### () With CONSULT

- 1. Select "Assist level" in "DATA MONITOR" in "EPS/DAST 3".
- 2. Stop the EPS system until the item in "DATA MONITOR" becomes "100%". **NOTE:**

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

3. Check that the symptom continues.

#### Dose the symptom continue?

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

**6.**CHECK POWER STEERING CONTROL MODULE SIGNAL (4)

#### With CONSULT

- 1. Start the engine. CAUTION:
  - Never drive the vehicle.
- 2. Turn steering wheel from full left stop to full right stop.

### STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT DIAGNOSIS > [ELECTRIC POWER STEERING]

#### < SYMPTOM DIAGNOSIS >

#### 3. Select "STEERING TORQUE" in "DATA MONITOR" in "EPS/DAST 3".

4. Perform the torque sensor inspection.

Monitor item	Condition	Display value	
	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm	В
STEERING TORQUE	Steering wheel: Right turn	Positive value (Nm)	
	Steering wheel: Left turn	Negative value (Nm)	С
Is the inspection result normal?			
YES >> GO TO 8.			D
<u>NO</u> >> GO TO 7.			
<b>/</b> .CHECK EPS MOTOR			
Perform the trouble diagnosis of EF	S motor. Refer to <u>STC-90, "Diagnosis</u>	s Procedure".	Е
Is the inspection result normal?			
YES >> GO TO 8.			_
NO >> Repair or replace the s	pecific malfunctioning part.		F
8. CHECK THE STEERING FORC	E		
Check the steering wheel turning for	prce. Refer to <u>ST-69, "Inspection"</u> .		STC
Is the check result normal?			
YES >> INSPECTION END			
NO >> It is possible that there	is a mechanical malfunction. Check	the steering system. Refer to <u>ST-98.</u>	Н
"Inspection".			
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### UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN **RIGHT AND LEFT**

< SYMPTOM DIAGNOSIS >

[ELECTRIC POWER STEERING]

# UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BE-TWEEN RIGHT AND LEFT

**Diagnosis** Procedure

INFOID:000000013482275

1.CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP

Check the power steering warning lamp while engine is running.

Does the power steering warning lamp turn OFF?

YES >> GO TO 2.

>> Refer to STC-103, "Diagnosis Procedure". NO

2.CHECK WHEEL ALIGNMENT

Check the wheel alignment.

2WD models: Refer to <u>FSU-28</u>, "<u>EXCEPT DIRECT ADAPTIVE STEERING</u> : <u>Inspection</u>".
 AWD models: Refer to <u>FSU-54</u>, "<u>EXCEPT DIRECT ADAPTIVE STEERING</u> : <u>Inspection</u>".

Is the inspection result normal?

#### YES >> GO TO 3.

- NO >> Adjustment of wheel alignment.
  - 2WD models: Refer to FSU-29, "EXCEPT DIRECT ADAPTIVE STEERING : Adjustment".
  - AWD models: Refer to FSU-55, "EXCEPT DIRECT ADAPTIVE STEERING : Adjustment".

 ${
m 3.}$  CHECK POWER STEERING CONTROL MODULE SIGNAL

### (P)With CONSULT

- 1 Start the engine.
  - **CAUTION:** Never drive the vehicle.
- 2. Turn steering wheel from full left stop to full right stop.
- Select "STEERING TORQUE" in "DATA MONITOR" in "EPS/DAST 3". 3.
- 4. Perform the torque sensor inspection.

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to STC-90, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace the specific malfunctioning part.

 ${f 5.}$ CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to ST-69, "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-98, "Inspection".

### **UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)**

< SYMPTOM DIAGNOSIS >

[ELECTRIC POWER STEERING] UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIA-

# TION)

Diagnosis Procedure	
1.PERFORM SELF-DIAGNOSIS	Β
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF to ON.</li> <li>2. Perform "EPS/DAST 3" self-diagnosis.</li> </ul>	С
<u>Is a malfunctioning system displayed?</u> YES >> Check the DTC. Refer to <u>STC-76, "DTC Index"</u> . NO >> GO TO 2.	D
<b>2.</b> CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP	Е
Check that the power steering warning lamp turns ON when ignition switch turns ON. Then, power steering warning lamp turns OFF after the engine is started.	
Is the inspection result normal?	F
<ul> <li>YES &gt;&gt; GO TO 3.</li> <li>NO &gt;&gt; Perform trouble diagnosis of power steering warning lamp. Refer to <u>STC-101, "Diagnosis Proce-dure"</u>.</li> </ul>	бтс
3. CHECK STEERING COLUMN AND STEERING GEAR	
<ul> <li>Check the steering column assembly and steering gear assembly.</li> <li>Steering column assembly. Refer to <u>ST-85, "WITH ELECTRIC MOTOR : Exploded View"</u>.</li> <li>Steering gear assembly. Refer to <u>ST-93, "Exploded View"</u>.</li> </ul>	Η
Is the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace error-detected parts.	
4. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (1)	J
<ul> <li>With CONSULT</li> <li>Start the engine.</li> <li>CAUTION:</li> <li>Never drive the vehicle.</li> <li>Turn steering wheel from full left stop to full right stop.</li> </ul>	K
3. Select "Assist level" in "DATA MONITOR" in "EPS/DAST 3".	L
YES $>>$ GO TO 7.	
5. CHECK THE POWER STEERING CONTROL MODULE SIGNAL (2)	Μ
With CONSULT     Select "BATTERY VOLT" in "DATA MONITOR" in "EPS/DAST 3".	Ν
Is the display value "10.5 V" or more?	
<ul> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; Perform trouble diagnosis of power steering control module power supply and ground. Refer to <u>STC-87, "Diagnosis Procedure"</u>.</li> </ul>	0
<b>6.</b> CHECK POWER STEERING CONTROL MODULE SIGNAL (3)	
<ul> <li>With CONSULT</li> <li>Select "Assist level" in "DATA MONITOR" in "EPS/DAST 3".</li> <li>Stop the EPS system until the item in "DATA MONITOR" becomes "100%". NOTE:</li> </ul>	٢
<ul><li>While stopping the EPS system, do not turn steering wheel.</li><li>3. Check that the symptom continues.</li><li>Dose the symptom continue?</li></ul>	

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### UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

[ELECTRIC POWER STEERING]

#### < SYMPTOM DIAGNOSIS >

- YES >> GO TO 7.
- NO >> The assist torque decreases because of protection function. This is not malfunction. INSPEC-TION END

**7.**CHECK POWER STEERING CONTROL MODULE SIGNAL (4)

#### With CONSULT

1. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn steering wheel from full left stop to full right stop.
- 3. Select "STEERING TORQUE" in "DATA MONITOR" in "EPS/DAST 3".
- 4. Perform the torque sensor inspection.

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

Is the inspection result normal?

YES >> GO TO 9. NO >> GO TO 8.

**8.**CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to STC-90, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace the specific malfunctioning part.

9.CHECK THE STEERING FORCE

Check the steering wheel turning force. Refer to ST-69, "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 <u>ST-98.</u> <u>"Inspection"</u>.
#### Removal and Installation

#### **CAUTION:**

#### Disconnect battery negative terminal before starting operations.

Never remove power steering control module from steering gear assembly. When replacing power steering <sup>C</sup> control module, replace steering gear assembly. Refer to <u>ST-95, "Removal and Installation"</u>.

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least 3 minutes before performing any service.

## Precautions for Removing Battery Terminal

INFOID:000000013509518

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		



#### 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.

 After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.
 NOTE:

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## PRECAUTIONS

#### [DIRECT ADAPTIVE STEERING]

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INFOID:000000013356536

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
- Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
- Driving for 30 minutes or more on a steep slope.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

#### NOTE:

< PRECAUTION >

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.

#### Precautions for Harness Repair

FLEXRAY AND CAN COMMUNICATION LINE Solder the repaired area and wrap tape around the soldered area. NOTE:

A fray of twisted lines must be within 110 mm (4.33 in).

 Bypass connection is never allowed at the repaired area. NOTE:

Bypass connection may cause FlexRay communication error as spliced wires that are separate from the main line or twisted lines lose noise immunity.

· Replace the applicable harness as an assembly if error is detected on the shield lines of FlexRay communication line.



## Set the vehicle to the straight-ahead position when checking direct adaptive steering and removing each component.

Check the following item when performing the trouble diagnosis.

Service Notice and Precautions for Direct Adaptive Steering

- Check if air pressure and size of tires are proper, the specified part is used for the steering wheel is genuine Ν 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, and boots or sealants, 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.
- A machine sound may be heard near the driver's seat when the system is starting. This is an operating sound in normal condition of system and the sound is not.
- Before connecting or disconnecting each component 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".

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## PRECAUTIONS

#### < PRECAUTION >

- When removing the 12V battery negative terminal, initialize is required for operating the direct adaptive steering normally. Refer to <u>STC-201, "Description"</u>.
- Refer to STC-202, "Special Repair Requirement" for the replacement of each component.

## [DIRECT ADAPTIVE STEERING]

## < SYSTEM DESCRIPTION > SYSTEM DESCRIPTION

COMPONENT PARTS

**Component Parts Location** 

INFOID:000000013356538

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#### < SYSTEM DESCRIPTION >

- A Behind of glove box
- B Steering gear assembly
- C Behind of front bumper (right side)

E Steering column assembly and steering shaft assembly

No.	Component	Function
1	Drive mode select switch	<ul> <li>Drive mode is selectable among PERSONAL, SPORT, and STANDARD by the operating the switch.</li> <li>Output the status of drive mode to the chassis control module.</li> <li>For detailed installation location, refer to <u>DMS-4</u>, "<u>Component</u> <u>Parts Location</u>".</li> </ul>
2	ТСМ	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Shift position signal</li> <li>For detailed installation location, refer to <u>TM-13</u>, <u>"A/T CON-TROL SYSTEM : Component Parts Location"</u>.</li> </ul>
3	ВСМ	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Sleep/wake up signal</li> <li>For detailed installation location, refer to <u>BCS-5</u>, "BODY CON- <u>TROL SYSTEM : Component Parts Location</u>".</li> </ul>
4	ECM	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Engine status signal</li> <li>Engine speed signal</li> <li>For detailed installation location, refer to <u>EC6-33, "ENGINE</u> <u>CONTROL SYSTEM : Component Parts Location"</u> (For USA and CANADA), <u>EC6-1024, "ENGINE CONTROL SYSTEM :</u> <u>Component Parts Location"</u> (For MEXICO).</li> </ul>
5	ABS actuator and electric unit (control unit)	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Front LH wheel sensor signal</li> <li>Front RH wheel sensor signal</li> <li>Vehicle speed signal</li> <li>Side G signal</li> <li>Yaw rate signal</li> <li>For detailed installation location, refer to <u>BRC-10, "Component</u> <u>Parts Location"</u>.</li> </ul>
6	Chassis control module	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Drive mode signal</li> <li>Steering angle sensor signal</li> <li>Transmits mainly the following signals to steering angle main control module via Chassis communication.</li> <li>Active lane control signal</li> <li>For detailed installation location, refer to <u>DAS-516</u>. "Component <u>Parts Location"</u>.</li> </ul>
7	Combination meter (Steering warning lamp)	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Odometer signal</li> <li>For detailed installation location, refer to <u>MWI-8, "METER SYS-TEM : Component Parts Location"</u>.</li> <li>Turns ON the power steering warning lamp according to the signal from steering force control module via CAN communication.</li> <li>For steering warning lamp, refer to <u>STC-129, "WARNING/INDI-CATOR/CHIME LIST : Warning Lamp/Indicator Lamp"</u>.</li> </ul>
8	Steering angle sensor	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Steering angle sensor signal</li> <li>Steering angle sensor malfunction signal</li> <li>For detailed installation location, refer to <u>BRC-10</u>, "Component <u>Parts Location</u>".</li> </ul>

#### < SYSTEM DESCRIPTION >

No.	C	Component	Function	
9	Steering force control module		STC-115, "Steering Force Control Module"	— A
	<ul> <li>Steering angle sub actu- ator</li> </ul>	Steering angle sub motor		
10		Sub motor angle sensor	STC-116. "Steering Angle Actuator"	В
		Sub reduction gear		
	(1) Steering angle main ac- tuator	Steering angle main motor		0
		Main motor angle sensor	STC-116 "Stooring Angle Actuator"	C
$\bigcirc$		Main reduction gear	_ <u>STC-TTC, Steering Angle Actualor</u>	
		Steering torque sensor		D
(12)	Steering angle sub control module		STC-116, "Steering Angle Sub Control Module"	
(13)	3 Steering angle main control module		STC-115, "Steering Angle Main Control Module"	F
14)	Steering clutch		STC-117, "Steering Clutch"	L
(15)	Steering force actuator		STC-116, "Steering Force Actuator"	

## Steering Force Control Module

- Calculates the optimum control variable for the steering force motor from the input values of force motor angle sensor and vehicle speed signal to controlling the steering force motor.
- Steering force control module changes steering reaction force based on the dive mode select signal from chassis control module.
- Performs the release and engagement control of the steering clutch.
- If a malfunction occurs in the system, the fail-safe function activates to perform state transition, and the power steering warning lamp in the combination meter illuminates.
- The malfunctioning portion is displayed by the electronic system diagnosis tester (CONSULT) according to the self-diagnosis function.
- Quickly switches the control after a malfunction occurs according to synchronous control using FlexRay communication.

## Steering Angle Main Control Module

- Calculates the optimum control variable for steering angle main motor from input values of force motor angle sensor, main motor angle sensor, and vehicle speed signal for controlling the steering angle main motor.
- Steering angle main control module changes the steering gear ratio based on the drive mode select signal from chassis control module.
- Quickly switches the control after a malfunction occurs according to synchronous control using FlexRay communication.
- When transferring to EPS mode, this calculates the optimum control variable for steering angle sub motor from input values of steering torque sensor to control steering angle sub motor (Torque assist control).





[DIRECT ADAPTIVE STEERING]

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#### < SYSTEM DESCRIPTION >

## Steering Angle Sub Control Module

- Calculates the optimum control variable for the steering angle sub motor from input values of force motor angle sensor, sub motor angle sensor, and vehicle speed signal for controlling the steering angle sub motor.
- Quickly switches the control after a malfunction occurs, according to synchronous control using FlexRay communication.



[DIRECT ADAPTIVE STEERING]

## Steering Force Actuator

Steering force actuator 1 mainly consists of the steering force motor, the force motor angle sensor, and the force motor temperature sensor.

#### Steering Force Motor

Steering force motor generates a torque equivalent to the reaction force from the road surface by the traction current from the steering force control module.

#### Force Motor Angle Sensor

Force motor angle sensor detects the angle of the steering force motor and outputs to the steering force control module by converting into voltage.

#### Force Motor Temperature Sensor

Force motor temperature sensor detects the temperature of the steering force motor and outputs to the steering force control module by converting into voltage.

#### Steering Angle Actuator

Steering angle actuator mainly consists of the sub motor angle sensor ①, the sub reduction gear ②, the steering gear ③, main reduction gear ④, the main motor angle sensor ⑤, the steering angle main motor ⑥, the steering torque sensor ⑦, and the steering angle sub motor ⑧.



#### STEERING GEAR

Steering gear converts the pinion torque into rack axial force and changes the direction of the tires by rotating the knuckle arms.

#### STEERING TORQUE SENSOR

Steering torque sensor detects the pinion torque and outputs the toque signal to the steering angle main control module by converting into voltage.

## STC-116

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#### [DIRECT ADAPTIVE STEERING]

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#### STEERING ANGLE MAIN MOTOR

Steering angle main motor generates a steering torque by the traction current from the steering angle main A control module.

#### MAIN REDUCTION GEAR

Main reduction gear increases the steering torque provided from steering angle main motor with worm gears, <sup>B</sup> and outputs to the pinion.

#### MAIN MOTOR ANGLE SENSOR

Main motor angle sensor detects the angular velocity of the steering angle main motor and outputs to the steering angle main control module by converting into voltage.

#### STEERING ANGLE SUB MOTOR

Steering angle sub motor generates an assist torque by the traction current from the steering angle sub control module.

#### SUB REDUCTION GEAR

Sub reduction gear increases the steering assist torque provided from steering angle sub motor with worm gears, and outputs to the steering rack.

#### MAIN MOTOR ANGLE SENSOR

Main motor angle sensor detects the angular velocity of the steering angle sub motor and outputs to the steering angle sub control module by converting into voltage.

#### Steering Clutch

- Once electrified from the steering force control module, the steering clutch (1) is released and the upper and lower steering shafts are separated.
- When a system malfunction occurs, when system is in protection mode, or when the steering wheel is turned with a force stronger than the butting reaction force generated by the steering force motor, the clutch is engaged while the electric from the steering force control module is shut out, and the upper and lower steering shafts are engaged.



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## SYSTEM DIRECT ADAPTIVE STEERING

DIRECT ADAPTIVE STEERING : System Description



- Instead of the conventional mechanical steering system, the direct adaptive steering that conveys the steering wheel operating to the tires by converting into an electrical signal was adopted.
- By converting the steering wheel operation into an electrical signal, the steering wheel operation is conveyed to the tires without delay.
- Even on a rough road surface, the direction of tires is controlled by the steering angle actuator control to prevent the unpleasant vibration from being conveyed to the steering wheel due to the rough road surface (the necessary information for driving, such as slipperiness of the road, is conveyed to the steering wheel).
- When the system is stopped or abnormal, the portions from the steering wheel to the steering gear assembly are connected mechanically while the steering clutch is engaged, and the steering wheel becomes operative.
- The steering angle actuator (steering gear assembly) and the steering force actuator (steering column) are controlled by 3 control modules. The 3 control modules share the computed result of each data and monitor each other.
- This system is linked with active lane control and applies a slight correction to the steering angle and the steering reaction force to improve the vehicle stability when the vehicle direction is shifted by a cross wind or other forces. For details, refer to <u>DAS-718</u>, "ACTIVE LANE CONTROL : System Description".
- Infiniti drive mode selector which can change the steering characteristic corresponding to the preference of the driver was adopted. For details, refer to <u>DMS-15</u>, "Infiniti Drive Mode Selector : System Description (For <u>VR30DDTT Engine Models</u>)".
- This enables trouble diagnosis with CONSULT.

#### [DIRECT ADAPTIVE STEERING]

## < SYSTEM DESCRIPTION >



#### **INPUT/OUTPUT SIGNAL**

Communicates the signal from each control unit via CAN communication, Chassis communication or FlexRay communication.

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#### < SYSTEM DESCRIPTION >

Control unit	Signal status
Chassis control module	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Drive mode signal</li> <li>Steering angle sensor signal</li> <li>Transmits mainly the following signals to steering angle main control module via Chassis communication.</li> <li>Active lane control signal</li> <li>Steering angle sensor signal<sup>*1</sup></li> <li>Steering angle sensor malfunction signal<sup>*1</sup></li> </ul>
ABS actuator and electric unit (control unit)	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Front LH wheel sensor signal</li> <li>Front RH wheel sensor signal</li> <li>Vehicle speed signal</li> <li>Side G signal</li> <li>Yaw rate signal</li> </ul>
ECM	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Engine status signal</li> <li>Engine speed signal</li> <li>Receives mainly the following signals from steering force control module via CAN communication.</li> <li>Steering torque signal</li> </ul>
ТСМ	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Shift position signal</li> </ul>
Combination meter	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Odometer signal</li> <li>Receives mainly the following signals from steering force control module via CAN communication.</li> <li>Power steering warning lamp signal</li> </ul>
Steering angle sensor	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Steering angle sensor signal</li> <li>Steering angle sensor malfunction signal</li> </ul>
BCM	<ul> <li>Transmits mainly the following signals to steering force control module via CAN communication.</li> <li>Sleep wake up signal</li> </ul>
Steering force control module Steering angle main control module Steering angle sub control module	<ul> <li>Interactively transmits and receives mainly the following signals via FlexRay communication<sup>*2</sup>.</li> <li>Direct adaptive steering control signal</li> </ul>

\*1: Chassis control module transmits the signal (received from steering angle sensor) via Chassis communication

\*2: Communication line between the steering force control module, the steering angle main control module, ule, and the steering angle sub control module

#### Front Wheel Control Mechanism

• Front wheel control mechanism is equipped with a function for calculating steering command angle and for controlling steering angle servo according to the command steering angle.

#### Steering Command Angle Calculation Function

- Steering force control module calculates steering command angle from the steering angle sensor signal, vehicle speed signal, yaw rate signal, and steering angle speed signal and transmits to the steering angle main control module.
- Steering angle main control module adds the steering angle command from chassis control module to the steering command angle.
- Steering angle main control module changes the steering gear ratio according to the mode change command from the chassis control module.

#### **STC-120**

#### < SYSTEM DESCRIPTION >

#### [DIRECT ADAPTIVE STEERING]

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#### Steering Angle Servo Control Function

- Steering angle main control module drives the steering angle main motor according to the servo command A current calculated from the steering command angle and main motor angle, and transmits the command current for assist to the steering angle sub control module.
- Steering angle sub control module drives the steering angle sub motor from the transmitted servo command current and operates assist.

#### Steering Reaction Force Control Mechanism

- Steering force control module calculates a steering reaction force equivalent to the tire reaction force from steering angle sensor signal, steering angle motor angle, steering angle motor current, and vehicle speed signal to drive steering force motor.
- Steering force control module adds steering reaction force command from chassis control module to steering reaction force.
- Steering force control module changes steering reaction force according to the mode change command from chassis control module.

#### Back Up Mechanism

- Steering clutch is released while the system is operating normally. Engages the clutch when the system is stopped, when a malfunction occurs, or when the steering wheel is turned with a force stronger than the reaction force generated by the steering force motor.
- Steering force control module, steering angle main control module, and steering angle sub-control module mutually monitor calculations.

#### Infiniti Drive Mode Selector

 With Infiniti Drive Mode Selector, the steering characteristics can be set corresponding to the preference of the driver. For details, refer to <u>DMS-15</u>, "Infiniti Drive Mode Selector : System Description (For VR30DDTT Engine Models)".

#### **OPERATION PRINCIPLE**

Turning the Steering to the Left (System is Normal, and Ignition Switch is ON)



- In the normal state, the steering clutch is not engaged, and the steering wheel is separated from the steering gear assembly.
- If turning the steering wheel to the left, the steering angle actuator is driven, and the tire is turned to the left direction.
- The reaction force from the tires is conveyed from the steering gear assembly to the steering force control module and conveyed to the steering wheel by driving the steering force motor.

## STC-121

### < SYSTEM DESCRIPTION >

Turning the Steering to the Left (Ignition Switch is OFF, and System is Malfunctioning)



• The steering clutch is engaged, and the system changes to EPS mode, protection mode, or manual steering status.

• No electrical control is performed in manual steering mode.

#### [DIRECT ADAPTIVE STEERING]

## SYSTEM

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## DIRECT ADAPTIVE STEERING : Circuit Diagram



#### < SYSTEM DESCRIPTION >



**SYSTEM** 

## [DIRECT ADAPTIVE STEERING]



## DIRECT ADAPTIVE STEERING : Fail-safe

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- If a malfunction occurs in the system, the fail-safe function stops the system (mode 3), activates the fail-safe mode (mode 1 or mode 2) or activates the protection mode. When the system enters mode 1, mode 2 or mode 3, the power steering warning lamp illuminates to inform the driver that the turning force is heavy in effect.
- Since three control modules monitor malfunctions mutually, DTC code varies from control module to control module.

## < SYSTEM DESCRIPTION >

#### [DIRECT ADAPTIVE STEERING]

• For details of protection function, refer to STC-128, "DIRECT ADAPTIVE STEERING : Protection Function".



	Relation between control module detecting DTC and system status		
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC
C13A0-00	Variable	Variable	Variable
C13A1-00	_	Mode 2	Mode 2
C13A2-00	Mode 1 or Mode 3	Mode 1 or Mode 3	Mode 1 or Mode 3
C13A3-00	Mode 2	Mode 2	Mode 2
C13A4-00	—	Mode 2	Mode 2
C13A5-00	_	_	Mode 2
C13A6-00	_	Mode 3	_
C13A7-00	_	Mode 3	—
C13A8-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13A9-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13AA-00	Mode 2	Mode 3	Mode 2

#### Revision: November 2016

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

	Relation between control module detecting DTC and system status			
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC	A
C13AB-00	Mode 2	Mode 3	Mode 2	D
C13AC-00	—	Mode 3	_	D
C13AD-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13AE-00	Mode 2	Mode 3	Mode 2	С
C13AF-00	Mode 2	Mode 3	Mode 2	
C13B0-00	Mode 2	Mode 3	Mode 2	_
C13B1-00	Mode 2	Mode 3	Mode 2	D
C13B2-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13B3-00	Mode 2	Mode 1 or Mode 3	Mode 2	Е
C13B4-00	Mode 2	Mode 3	Mode 2	
C13B5-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13B6-00	Mode 2	Mode 1 or Mode 3	Mode 2	F
C13B7-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13B8-00	Mode 2	Mode 1 or Mode 3	Mode 2	STO
C13B9-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13BA-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13BB-00		_		Н
C13BC-00		_		
C13BD-00		Mode 2		
C13BE-00	Mode 2	Mode 2	Mode 2	1
C13BF-00	Variable	Variable	Variable	
C13C0-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3	J
C13C1-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3	
C13C2-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3	
C13C3-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3	K
C13C4-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13C5-00	Mode 2	_		L
C13C6-00	Mode 2	_	_	
C13C7-00	Mode 2	_	_	
C13C8-00	—	_	_	M
C13C9-00	—	_	_	
C13CA-00	—	_	_	Ν
C13CB-00	_	—	_	
C13CC-00	_	—	_	
C13CD-00	—	_	_	0
C13CE-00	—	—	-	
C13CF-00	—	_	_	P
C13D0-00	-	—	-	I
C13D1-00	_	—	-	
C13D2-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13D3-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13D4-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13D5-00	Mode 2	Mode 1 or Mode 3	Mode 2	

#### < SYSTEM DESCRIPTION >

#### [DIRECT ADAPTIVE STEERING]

	Relation between control module detecting DTC and system status		
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC
C13D6-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D7-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D8-00		_	
C13D9-00	-	-	-
C13DA-00	—	_	-
C13DB-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13DC-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13DD-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13DE-00	Protection function mode	Protection function mode	Protection function mode
C13DF-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13E0-00	Mode 2	—	_
C13E1-00	Mode 2	_	_
C13E2-00	—	—	_
C13E3-00	Protection function mode	_	-
C13E4-00	Protection function mode	_	_
C13E5-00	Mode 2	_	_
C13E6-00	Protection function mode	Protection function mode	Protection function mode
C13E7-00	Protection function mode	Protection function mode	Protection function mode
C13E8-00	Protection function mode	Protection function mode	Protection function mode
C13E9-00	—	Mode 2	_
C13EA-00	Mode 2	—	_
C13EB-00	—	Mode 2	Mode 2
C13EE-00	Mode 3	Mode 3	Mode 3
C13EF-00	Mode 3	Mode 3	Mode 3
C13F0-00	Mode 2	Mode 2	Mode 2
C13F1-00	Mode 2		_
C13F2-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3
U1000-01	_		
U1010-49	—		

• \*1: When control module detects a malfunction at startup.

• \*2: When control module detects a malfunction except during startup.

#### **DIRECT ADAPTIVE STEERING : Protection Function**

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- When battery voltage malfunctions temporarily, system overheats continuously and system is overloaded continuously, system is in protection mode temporarily. This is not malfunction.
- When a causative condition is cleared, the system returns to normal control automatically. (Except C13E5-00)
- Since the protection function condition is not malfunction, power steering warning lamp does not turn ON. (Except C13E5-00) The following DTCs remain to distinguish from malfunction.

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

DTC	Condition	Vehicle condition	А
C13E3-00	The steering wheel is steered over the limit angle.	System changes to the protection mode temporarily. (Steering op-	
C13E4-00	When steering clutch is released, steering clutch is not released within regular time with overloading steering wheel.	eration may become heavy temporarily, however steering wheel can be operated without interference. This is not a system mal- function.)	
C13E5-00	When steering clutch is released, steering clutch is not released in spite of trying to release it many times with overloading steering wheel.	System changes to fail-safe mode (mode 2). For fail-safe, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u> .	С
C12E6.00	EPS/DAST 3: Internal temperature of steering force motor is 150°C (302°F) or more.		D
C13E6-00	DAST 1, DAST 2: Internal temperature of control module is 90°C (194°F) or more.	System changes to the protection mode temporarily. (Steering op-	
C13E7-00	Power supply voltage of control module is low tem- porarily.	<ul> <li>eration may become heavy temporarily, however steering wheel</li> <li>can be operated without interference. This is not a system mal- function.)</li> </ul>	
C13E8-00	<ul> <li>Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbetones or other sub-</li> </ul>		F
01320-00	<ul><li>stances.</li><li>Steering gear is out of neutral position. (Large)</li></ul>		ST
WARNIN	G/INDICATOR/CHIME LIST		

## WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

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Name	Design	Layout/Function
Steering warning lamp		For layout, refer to <u>MWI-9, "METER SYSTEM : Design"</u> . For function, refer to <u>MWI-41, "WARNING LAMPS/INDICATOR</u> <u>LAMPS : Power Steering Warning Lamp (Direct Adaptive Steer- ing)"</u> .

## HANDLING PRECAUTION

#### Handling Precautions for Direct Adaptive Steering

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#### WARNING:

When the power steering warning lamp illuminates with the engine running, the power assist for the steering will cease operation. Driver will still have control of the vehicle, but the steering will be harder to operate.

#### **CAUTION:**

- If wheels or tires other than the recommended ones are used, the direct adaptive steering system may not operate properly and the power steering warning lamp may illuminate.
- Do not modify the vehicle's suspension. If suspension parts such as shock absorbers, struts, springs, stabilizer bars, bushings and wheels are not recommended for the vehicle or are extremely deteriorated, the direct adaptive steering system may not operate properly and the power steering warning lamp may illuminate.
- Do not modify the vehicle's steering. If steering parts are not recommended for the vehicle or are extremely deteriorated, the direct adaptive steering system may not operate properly and the power steering warning lamp may illuminate.
- If the VDC warning lamp illuminates, the power steering warning lamp may also illuminate at the same time. Stop the vehicle in a safe location, turn the engine off and restart the engine. If the power steering warning lamp continues to illuminate, have the system checked.
- Do not place the ignition switch is in the ON position while the steering wheel or a tire is removed.
- Do not turn the steering wheel as much as possible while the ignition switch is in any position other than the ON position.
- Installing an accessory on the steering wheel, or changing the steering wheel, may reduce the steering performance.
- When the steering wheel is operated repeatedly or continuously while parking or driving at a very low speed, the power assist for the steering wheel will be reduced and the steering wheel may be off-center or feeling in turning steering wheel may change. This is to prevent overheating of the direct adaptive steering system and protect it from getting damaged. When the temperature of the direct adaptive steering system cools down, the power assist level will return to normal. Avoid repeating steering wheel operations that could cause the direct adaptive steering system to overheat.
- When the power steering warning lamp illuminates with the engine running, the power assist for the steering will cease operation. Driver will still have control of the vehicle. However, greater steering effort will be needed, especially in sharp turns, at low speeds, and at vehicle stopped.
- If the direct adaptive steering system is malfunctioning, the steering wheel may be off-center or feeling in turning steering wheel may change.
- Under the followings, the steering wheel may be off-center or feeling in turning steering wheel may change. This is due to a protection mechanism for the direct adaptive steering system.
- When the battery is discharged.
- When the engine is stalled.
- After the vehicle is tested on the fourwheel dynamometer.
- When driver turns steering wheel in the front tire side face touching an obstruction like curb stone.
- The steering wheel will return to the normal position after the protection mechanism deactivates. To return to normal condition from protection mode, leave the vehicle or restart the engine. When the steering wheel is off-center, turn the steering wheel to right and left to return the normal position after returning to the normal condition.
- When the vehicle is tested on the 2-wheel dynamometer, the power steering warning light may illuminate. To turn off the power steering warning lamp, stop the vehicle in a safe location, turn the engine off, restart the engine, and then drive the vehicle for a period of time.
- The following conditions do not indicate a malfunction of the direct adaptive steering system.
- Driver may notice wider steering play when the ignition switch is in the OFF or ACC position compared to when it is in the ON position.
- After the engine is started, the steering wheel may be off-center or feeling in turning steering wheel may change. To return to the normal position, drive the vehicle on a straight road for a period of time.
- Driver may hear a noise under the following conditions. However, this is not a malfunction.
- When the engine is started or stopped.
- When the steering wheel is turned in the full lock position.

#### < SYSTEM DESCRIPTION >

## DIAGNOSIS SYSTEM (STEERING FORCE CONTROL MODULE)

## **CONSULT** Function

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[DIRECT ADAPTIVE STEERING]

#### APPLICATION ITEMS

CONSULT can display each diagnostic item using the diagnostic test modes as follows.

Diagnostic test mode	Function	С
ECU Identification	Steering force control module part number 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 steering force control module can be read.	D
Work support	This mode enable a technican to adjust some devices faster and more accurately by fol- lowing the indication on the CONSULT.	
Re/programming. Configuration	<ul> <li>Read and save the vehicle specification (TYPE ID).</li> <li>Write the vehicle specification (TYPE ID) when replacing steering force control module.</li> </ul>	

\*: The following diagnosis information is erased by erasing.

• DTC

• Freeze frame data (FFD)

#### ECU IDENTIFICATION

Steering force control module part number can be read.

SELF DIAGNOSTIC RESULT Refer to <u>STC-156, "DTC Index"</u>.

When "PRSNT" 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.

Freeze Frame Data Item	Description
TOTAL DISTANCE	Display the odometer value from combination meter via CAN communication.
OWN ECU SYS STATUS	Display the status of steering force control module.
ST ANG MAIN SYS STATUS	Display the status of steering angle main control module.
ST ANG SUB SYS STATUS	Display the status of steering angle sub control module.
ST FORCE SYS STATUS	Display the status of steering force control module.
BACK UP CIRCUIT STATUS	Display the status of buck up circuit.
CONTROL MODULE CRNT	Display the electric current value of steering force control module.
DETAILED CODE 1	This is displayed, but it is not used.
DETAILED CODE 2	This is displayed, but it is not used.
DETAILED CODE 3	This is displayed, but it is not used.
FLESRAY COMM SYNC STATS	Display the sync status of FlexRay communication.
STEERING MODE	Display the steering mode.
ST CLUTCH PRTCT STATUS	Display the status of steering clutch.
ST CLUTCH CON RQEST	Display the control request status steering clutch.
SHIFT POSITION	Display the shift position from TCM via CAN communication.
FLEXRAY COMM DIAG (OWN)	Display the diagnosis status of FlexRay communication. (steering force control module)
FLEXRAY COMM DIAG (OTH1)	Display the diagnosis status of FlexRay communication. (steering angle main control module)

#### < SYSTEM DESCRIPTION >

[DIRECT ADAPTIVE STEERING]

Freeze Frame Data Item	Description
FLEXRAY COMM DIAG (OTH2)	Display the diagnosis status of FlexRay communication. (steering angle sub control module)
POWER TRAIN STATUS	Display the status of power train.
IGN SW STATUS (OWN ECU)	Display the ignition voltage status recognized by steering force control module.
IGN SW STATUS (SYSTEM)	Display the status of ignition voltage for direct adaptive steering.
STOP/START STATUS	Display the status of stop/start system from ECM via CAN communication.
INSTANT VLT DROP DETECT	Display the status of instantaneous voltage drop detection.
CURB STONE DETECT STATS	Display the status of curb stone detection.
BACK UP CIRCUIT A STATUS	Display the status of buck up circuit A.
BACK UP CIRCUIT B STATUS	Display the status of buck up circuit B.
FREE ROLLER MODE	Display the status of free roller mode.
CHASSIS DYNAMO MODE	Display the status of chassis dynamometer mode.
WRITING STATUS	Display the status the recorded angle information in steering force control module.
BACK UP SIG 1 VOLT	Display the voltage of buck up signal 1.
BACK UP SIG 2 VOLT	Display the voltage of buck up signal 2.
INVERTER RELAY ACT VOLT	Display the activation voltage of inverter relay.
CONT MODULE INSIDE VOLT	Display the inside voltage of steering force control module.
BATTERY VOLTAGE	Display the power supply voltage for steering force control module.
IGN VOLTAGE	Display the ignition power supply voltage for steering force control module.
C/M TEMPERATURE	Display the temperature of steering force motor.
VEHICLE SPEED	Display the vehicle speed from ABS actuator and electric unit (control unit) via CAN com- munication.
YAW RATE	Display yaw rate value from ABS actuator and electric unit (control unit) via CAN commu- nication.
SIDE G	Display side G value from ABS actuator and electric unit (control unit) via CAN commu- nication.
ST CLUTCH ACT CURRENT	Display the activation current of steering clutch.
MOTOR U ACT CURRENT	Display the activation current of steering force motor U phase.
MOTOR W ACT CURRENT	Display the activation current of steering force motor W phase.
TORQUE SEN MAIN 1	Display the steering torque sensor (main 1) value recognized by direct adaptive steering.
TEMPERATURE SENSOR	Display the temperature of steering force motor.
ENGINE SPEED	Display the engine speed from ECM via CAN communication.
ANGLE SENSOR SIGNAL 1	Display the voltage of angle sensor signal.
ANGLE SENSOR SIGNAL 2	Display the voltage of angle sensor signal.
ANGLE 1	Display the accuracy of calibration.
ANGLE 2	Display the command angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 1	Display the feedback angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 2	Display the feedback angle for steering angle main motor and steering angle sub motor.
ST ANGLE SENSOR	Display the steering angle from steering angle sensor via CAN communication.
ANGLE DIFFERENCE	Display the difference angle between steering wheel and steering pinion.
STEERING PINION ANGLE	Display the steering pinion angle.
STEERING PINION ANGLE 2	Display the steering pinion angle.
ANGLE 3	Display the angle information used for system control.
DATA MONITOR	

## NOTE:

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

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

X: Applicable

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Monitor item [Unit]	Remarks	
OWN ECU SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering force control module.	B C D
ST ANG MAIN SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle main control module.	E
ST ANG SUB SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle sub control module.	STC
ST FORCE SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering force control module.	l J
BACK UP CIRCUIT STATUS [0 – 255]	Display the status of buck up circuit.	Κ
CONTROL MODULE CRNT [A]	Display the electric current value of steering force control module.	
DETAILED CODE 1 [0 – 255]	This is displayed, but it is not used.	I
DETAILED CODE 2 [0 – 255]	This is displayed, but it is not used.	
DETAILED CODE 3 [0 – 255]	This is displayed, but it is not used.	
FLESRAY COMM SYNC STATS [STAT1/STAT2/STAT3/STAT4/STAT5/ STAT6/STAT7/STAT8/STAT9/STAT10]	Display the sync status of FlexRay communication.	M
STEERING MODE [CHARA A/CHARA B/CHARA C/CHARA D/ CHARA E/CHARA F/CHARA G/CHARA H/ CHARA I]	Display the steering mode.	Ν
ST CLUTCH PRTCT STATUS [STAT0/STAT1/STAT2/STAT3/STAT4/ STAT5/STAT6/STAT7/STAT8/STAT9/ STAT10/STAT11/STAT12/STAT20]	Display the status of steering clutch.	O
ST CLUTCH CON RQEST [STAT0/STAT1/STAT2/STAT3/STAT4/ STAT5]	Display the control request status steering clutch.	-
SHIFT POSITION [IDLE/1ST/2ND/3RD/4TH/5TH/6TH/7TH/ 8TH/R/N/P/CVT/UKNWN]	Display the shift position from ECM via CAN communication.	

#### < SYSTEM DESCRIPTION >

[DIRECT ADAPTIVE STEERING]

Monitor item [Unit]	Remarks
FLEXRAY COMM DIAG (OWN) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering force control module)
FLEXRAY COMM DIAG (OTH1) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle main control module)
FLEXRAY COMM DIAG (OTH2) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle sub control module)
POWER TRAIN STATUS [STOP/RUN]	Display the status of power train.
IGN SW STATUS (OWN ECU) [ON/OFF]	Display the ignition voltage status recognized by steering force control module.
IGN SW STATUS (SYSTEM) [ON/OFF]	Display the status of ignition voltage for direct adaptive steering.
STOP/START STATUS [ON/OFF]	Display the status of stop/start system from ECM via CAN communication.
INSTANT VLT DROP DETECT [UNDTCT/DETECT]	Display the status of instantaneous voltage drop detection.
CURB STONE DETECT STATS [UNDTCT/DETECT]	Display the status of curb stone detection.
BACK UP CIRCUIT A STATUS [STAT1/STAT2]	Display the status of buck up circuit A.
BACK UP CIRCUIT B STATUS [STAT1/STAT2]	Display the status of buck up circuit B.
FREE ROLLER MODE [ON/OFF]	Display the status of free roller mode.
CHASSIS DYNAMO MODE [PERMIT/ PROHBT]	Display the status of chassis dynamometer mode.
WRITING STATUS [OK/NG]	Display the status the recorded angle information in steering force control module.
BACK UP SIG 1 VOLT [V]	Display the voltage of buck up signal 1.
BACK UP SIG 2 VOLT [V]	Display the voltage of buck up signal 2.
INVERTER RELAY ACT VOLT [V]	Display the activation voltage of inverter relay.
CONT MODULE INSIDE VOLT [V]	Display the inside voltage of steering force control module.
BATTERY VOLTAGE [V]	Display the power supply voltage for steering force control module.
IGN VOLTAGE [V]	Display the ignition power supply voltage for steering force control module.
C/M TEMPERATURE [°C] or [°F]	Display the temperature of steering force motor.
VEHICLE SPEED [km/h] or [MPH]	Display the vehicle speed from ABS actuator and electric unit (control unit) via CAN com- munication.
YAW RATE [deg/s]	Display yaw rate value from ABS actuator and electric unit (control unit) via CAN commu- nication.
SIDE G [m/s^2]	Display side G value from ABS actuator and electric unit (control unit) via CAN commu- nication.
ST CLUTCH ACT CURRENT [A]	Display the activation current of steering clutch.
MOTOR U ACT CURRENT [A]	Display the activation current of steering force motor U phase.
MOTOR W ACT CURRENT [A]	Display the activation current of steering force motor W phase.
TORQUE SEN MAIN 1 [N·m]	Display the steering torque sensor (main 1) value recognized by direct adaptive steering.
TEMPERATURE SENSOR [°C] or [°F]	Display the temperature of steering force motor.
ENGINE SPEED [Tr/min]	Display the engine speed from ECM via CAN communication.
ANGLE SENSOR SIGNAL 1 [V]	Display the voltage of force motor angle sensor signal.
ANGLE SENSOR SIGNAL 2 [V]	Display the voltage of force motor angle sensor signal.
ANGLE 1 [deg]	Display the accuracy of calibration.
ANGLE 2 [deg]	Display the command angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 1 [deg]	Display the feedback angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 2 [deg]	Display the feedback angle for steering angle main motor and steering angle sub motor.
ST ANGLE SENSOR [deg]	Display the steering angle from steering angle sensor via CAN communication.

Revision: November 2016

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

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Monitor item [Unit]	Remarks	
ANGLE DIFFERENCE [deg]	Display the difference angle between steering wheel and steering pinion.	— A
STEERING PINION ANGLE [deg]	Display the steering pinion angle.	
STEERING PINION ANGLE 2 [deg]	Display the steering pinion angle.	В
ANGLE 3 [deg]	Display the angle information used for system control.	

#### WORK SUPPORT

Item	Description	
DAST CALIBRATION (MODE1)	Perform direct adaptive steering calibration. (with alignment tester)	Г
DAST CALIBRATION (MODE2)	Perform direct adaptive steering calibration. (without alignment tester)	-

#### **CAUTION:**

Never use "DAST CALIBRATION (MODE 1)" and "DAST CALIBRATION (MODE 2)" alone. When removing/installing/replacing the component parts or adjusting wheel alignment, refer to <u>STC-202, "Special</u> <u>Repair Requirement"</u>.

#### **RE/PROGRAMMING, CONFIGURATION**

Configuration includes the following functions.

Item Description STC Before replacing Allows the reading of vehicle specification (Type ID) written in steering force control module to store the specification in CONSULT. ECU Read/Write Configuration Allows the writing of vehicle information (Type ID) stored in CONSULT into the steering Н After replacing ECU force control module. Allows the writing of vehicle specification (Type ID) into the steering force control module Manual Configuration by hand.

### DIAGNOSIS SYSTEM (STEERING ANGLE MAIN CONTROL MODULE) < SYSTEM DESCRIPTION > [DIRECT ADAPTIVE STEERING]

## DIAGNOSIS SYSTEM (STEERING ANGLE MAIN CONTROL MODULE)

## **CONSULT** Function

INFOID:000000013356552

#### APPLICATION ITEMS

CONSULT can display each diagnostic item using the diagnostic test modes as follows.

Diagnostic test mode	Function
ECU Identification	Steering angle main control module part number 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 steering angle main control module can be read.
Re/programming. Configuration	<ul> <li>Read and save the vehicle specification (TYPE ID).</li> <li>Write the vehicle specification (TYPE ID) when replacing steering angle main control module.</li> </ul>

\*: The following diagnosis information is erased by erasing.

• DTC

• Freeze frame data (FFD)

#### ECU IDENTIFICATION

Steering angle main control module part number can be read.

## SELF DIAGNOSTIC RESULT

Refer to STC-169, "DTC Index".

When "PRSNT" 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.

Freeze Frame Data Item	Description
TOTAL DISTANCE	Display the odometer value from combination meter via CAN communication.
OWN ECU SYS STATUS	Display the status of steering angle main control module.
ST ANG MAIN SYS STATUS	Display the status of steering angle main control module.
ST ANG SUB SYS STATUS	Display the status of steering angle sub control module.
ST FORCE SYS STATUS	Display the status of steering force control module.
BACK UP CIRCUIT STATUS	Display the status of buck up circuit.
CONTROL MODULE CRNT	Display the electric current value of steering angle main control module.
DETAILED CODE 1	This is displayed, but it is not used.
DETAILED CODE 2	This is displayed, but it is not used.
DETAILED CODE 3	This is displayed, but it is not used.
FLESRAY COMM SYNC STATS	Display the sync status of FlexRay communication.
STEERING MODE	Display the steering mode.
ST CLUTCH PRTCT STATUS	Display the status of steering clutch.
ST CLUTCH CON RQEST	Display the control request status steering clutch.
FLEXRAY COMM DIAG (OWN)	Display the diagnosis status of FlexRay communication. (steering angle main control module)
FLEXRAY COMM DIAG (OTH1)	Display the diagnosis status of FlexRay communication. (steering angle sub control module)
FLEXRAY COMM DIAG (OTH2)	Display the diagnosis status of FlexRay communication. (steering force control module)
POWER TRAIN STATUS	Display the status of power train.

#### < SYSTEM DESCRIPTION >

[DIRECT ADAPTIVE STEERING]

Freeze Frame Data Item	Description
IGN SW STATUS (OWN ECU)	Display the ignition voltage status recognized by steering angle main control module.
IGN SW STATUS (SYSTEM)	Display the status of ignition voltage for direct adaptive steering.
STOP/START STATUS	Display the status of stop/start system from ECM via CAN communication.
INSTANT VLT DROP DETECT	Display the status of instantaneous voltage drop detection.
CURB STONE DETECT STATS	Display the status of curb stone detection.
BACK UP CIRCUIT A STATUS	Display the status of buck up circuit A.
BACK UP CIRCUIT B STATUS	Display the status of buck up circuit B.
FREE ROLLER MODE	Display the status of free roller mode.
CHASSIS DYNAMO MODE	Display the status of chassis dynamometer mode.
WRITING STATUS	Display the status the recorded angle information in steering angle main control module.
BACK UP SIG 1 VOLT	Display the voltage of buck up signal 1.
BACK UP SIG 2 VOLT	Display the voltage of buck up signal 2.
INVERTER RELAY ACT VOLT	Display the activation voltage of inverter relay.
CONT MODULE INSIDE VOLT	Display the inside voltage of steering angle main control module.
BATTERY VOLTAGE	Display the power supply voltage for steering angle main control module.
IGN VOLTAGE	Display the ignition power supply voltage for steering angle main control module.
C/M TEMPERATURE	Display the internal temperature of steering angle main control module.
VEHICLE SPEED	Display the vehicle speed from ABS actuator and electric unit (control unit) via CAN com- munication.
YAW RATE	Display yaw rate value from ABS actuator and electric unit (control unit) via CAN commu- nication.
SIDE G	Display side G value from ABS actuator and electric unit (control unit) via CAN commu- nication.
ST CLUTCH ACT CURRENT	Display the activation current of steering clutch.
MOTOR U ACT CURRENT	Display the activation current of steering angle main motor U phase.
MOTOR W ACT CURRENT	Display the activation current of steering angle main motor W phase.
TORQUE SEN MAIN 2	Display the steering torque sensor (main 2) value.
TORQUE SEN MAIN 1	Display the steering torque sensor (main 1) value recognized by direct adaptive steering.
TORQUE SEN SUB	Display the steering torque sensor (sub) value.
TORQUE SEN VOLTAGE	Display the power supply voltage for steering torque sensor.
TEMPERATURE SENSOR	Display the temperature of steering angle main control module.
SUB IGN VOLTAGE	Display the sub ignition power supply voltage for steering angle main control module.
ANGLE SENSOR SIGNAL 1	Display the voltage of angle sensor signal.
ANGLE SENSOR SIGNAL 2	Display the voltage of angle sensor signal.
ANGLE 1	Display the accuracy of calibration.
ANGLE 2	Display the command angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 1	Display the feedback angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 2	Display the feedback angle for steering angle main motor and steering angle sub motor.
ST ANGLE SENSOR	Display the steering angle from steering angle sensor via CAN communication.
ANGLE DIFFERENCE	Display the difference angle between steering wheel and steering pinion.
STEERING PINION ANGLE	Display the steering pinion angle.
STEERING PINION ANGLE 2	Display the steering pinion angle.

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

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

X: Applicable

Monitor item [Unit]	Remarks
OWN ECU SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle main control module.
ST ANG MAIN SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle main control module.
ST ANG SUB SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle sub control module.
ST FORCE SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering force control module.
BACK UP CIRCUIT STATUS [0 – 255]	Display the status of buck up circuit.
CONTROL MODULE CRNT [A]	Display the electric current value of steering angle main control module.
DETAILED CODE 1 [0 – 255]	This is displayed, but it is not used.
DETAILED CODE 2 [0 – 255]	This is displayed, but it is not used.
DETAILED CODE 3 [0 – 255]	This is displayed, but it is not used.
FLESRAY COMM SYNC STATS [STAT1/STAT2/STAT3/STAT4/STAT5/ STAT6/STAT7/STAT8/STAT9/STAT10]	Display the sync status of FlexRay communication.
STEERING MODE [CHARA A/CHARA B/CHARA C/CHARA D/ CHARA E/CHARA F/CHARA G/CHARA H/ CHARA I]	Display the steering mode.
ST CLUTCH PRTCT STATUS [STAT0/STAT1/STAT2/STAT3/STAT4/ STAT5/STAT6/STAT7/STAT8/STAT9/ STAT10/STAT11/STAT12/STAT20]	Display the status of steering clutch.
ST CLUTCH CON RQEST [STAT0/STAT1/STAT2/STAT3/STAT4/ STAT5]	Display the control request status steering clutch.
FLEXRAY COMM DIAG (OWN) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle main control module)
FLEXRAY COMM DIAG (OTH1) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle sub control module)

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

Monitor item [Unit]	Remarks
FLEXRAY COMM DIAG (OTH2) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle force control module)
POWER TRAIN STATUS [STOP/RUN]	Display the status of power train.
IGN SW STATUS (OWN ECU) [ON/OFF]	Display the ignition voltage status recognized by steering angle main control module.
IGN SW STATUS (SYSTEM) [ON/OFF]	Display the status of ignition voltage for direct adaptive steering.
STOP/START STATUS [ON/OFF]	Display the status of stop/start system from ECM via CAN communication.
INSTANT VLT DROP DETECT [UNDTCT/DETECT]	Display the status of instantaneous voltage drop detection.
CURB STONE DETECT STATS [UNDTCT/DETECT]	Display the status of curb stone detection.
BACK UP CIRCUIT A STATUS [STAT1/STAT2]	Display the status of buck up circuit A.
BACK UP CIRCUIT B STATUS [STAT1/STAT2]	Display the status of buck up circuit B.
FREE ROLLER MODE [ON/OFF]	Display the status of free roller mode.
CHASSIS DYNAMO MODE [PERMIT/ PROHBT]	Display the status of chassis dynamometer mode.
WRITING STATUS [OK/NG]	Display the status the recorded angle information in steering angle main control module.
BACK UP SIG 1 VOLT [V]	Display the voltage of buck up signal 1.
BACK UP SIG 2 VOLT [V]	Display the voltage of buck up signal 2.
INVERTER RELAY ACT VOLT [V]	Display the activation voltage of inverter relay.
CONT MODULE INSIDE VOLT [V]	Display the inside voltage of steering angle main control module.
BATTERY VOLTAGE [V]	Display the power supply voltage for steering angle main control module.
IGN VOLTAGE [V]	Display the ignition power supply voltage for steering angle main control module.
C/M TEMPERATURE [°C] or [°F]	Display the internal temperature of steering angle main control module.
VEHICLE SPEED [km/h] or [MPH]	Display the vehicle speed from ABS actuator and electric unit (control unit) via CAN com- munication.
YAW RATE [deg/s]	Display yaw rate value from ABS actuator and electric unit (control unit) via CAN communication.
SIDE G [m/s^2]	Display side G value from ABS actuator and electric unit (control unit) via CAN communication.
ST CLUTCH ACT CURRENT [A]	Display the activation current of steering clutch.
MOTOR U ACT CURRENT [A]	Display the activation current of steering angle main motor U phase.
MOTOR W ACT CURRENT [A]	Display the activation current of steering angle main motor W phase.
TORQUE SEN MAIN 2 [V]	Display the steering torque sensor (main 2) value.
TORQUE SEN MAIN 1 [N·m]	Display the steering torque sensor (main 1) value recognized by direct adaptive steering.
TORQUE SEN SUB [V]	Display the steering torque sensor (sub) value.
TORQUE SEN VOLTAGE [V]	Display the power supply voltage for steering torque sensor.
TEMPERATURE SENSOR [°C] or [°F]	Display the temperature of steering angle main control module.
SUB IGN VOLTAGE [V]	Display the sub ignition power supply voltage for steering angle main control module.
ANGLE SENSOR SIGNAL 1 [V]	Display the voltage of angle main motor angle sensor signal.
ANGLE SENSOR SIGNAL 2 [V]	Display the voltage of angle main motor angle sensor signal.
ANGLE 1 [deg]	Display the accuracy of calibration.
ANGLE 2 [deg]	Display the command angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 1 [deg]	Display the feedback angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 2 [deg]	Display the feedback angle for steering angle main motor and steering angle sub motor.
ST ANGLE SENSOR [deg]	Display the steering angle from steering angle sensor via CAN communication.

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#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STEERING]

Monitor item [Unit]	Remarks
ANGLE DIFFERENCE [deg]	Display the difference angle between steering wheel and steering pinion.
STEERING PINION ANGLE [deg]	Display the steering pinion angle.
STEERING PINION ANGLE 2 [deg]	Display the steering pinion angle.
ANGLE 3 [deg]	Display the angle information used for system control.

**RE/PROGRAMMING, CONFIGURATION** 

Configuration includes the following functions.

Item		Description
Read/Write Configu- ration	Before replacing ECU	Allows the reading of vehicle specification (Type ID) written in steering angle main control module to store the specification in CONSULT.
	After replacing ECU	Allows the writing of vehicle information (Type ID) stored in CONSULT into the steering angle main control module.
Manual Configuration		Allows the writing of vehicle specification (Type ID) into the steering angle main control module by hand.

#### **DIAGNOSIS SYSTEM (STEERING ANGLE SUB CONTROL MODULE)** [DIRECT ADAPTIVE STEERING]

#### < SYSTEM DESCRIPTION >

## DIAGNOSIS SYSTEM (STEERING ANGLE SUB CONTROL MODULE)

## **CONSULT** Function

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#### **APPLICATION ITEMS**

CONSULT can display each diagnostic item using the diagnostic test modes as follows.

Diagnostic test mode	Function
ECU Identification	Steering angle sub control module part number 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 steering angle sub control module can be read.
Re/programming. Configuration	<ul> <li>Read and save the vehicle specification (TYPE ID).</li> <li>Write the vehicle specification (TYPE ID) when replacing steering angle sub control modulo.</li> </ul>

Freeze frame data (FFD)

#### ECU IDENTIFICATION

Steering angle sub control module part number can be read.

#### SELF DIAGNOSTIC RESULT

Refer to STC-182, "DTC Index".

When "PRSNT" 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.

Freeze Frame Data Item	Description
TOTAL DISTANCE	Display the odometer value from combination meter via CAN communication.
OWN ECU SYS STATUS	Display the status of steering angle sub control module.
ST ANG MAIN SYS STATUS	Display the status of steering angle main control module.
ST ANG SUB SYS STATUS	Display the status of steering angle sub control module.
ST FORCE SYS STATUS	Display the status of steering force control module.
BACK UP CIRCUIT STATUS	Display the status of buck up circuit.
CONTROL MODULE CRNT	Display the electric current value of steering angle sub control module.
DETAILED CODE 1	This is displayed, but it is not used.
DETAILED CODE 2	This is displayed, but it is not used.
DETAILED CODE 3	This is displayed, but it is not used.
FLESRAY COMM SYNC STATS	Display the sync status of FlexRay communication.
STEERING MODE	Display the steering mode.
ST CLUTCH PRTCT STATUS	Display the status of steering clutch.
ST CLUTCH CON RQEST	Display the control request status steering clutch.
FLEXRAY COMM DIAG (OWN)	Display the diagnosis status of FlexRay communication. (steering angle sub control mod- ule)
FLEXRAY COMM DIAG (OTH1)	Display the diagnosis status of FlexRay communication. (steering angle main control module)
FLEXRAY COMM DIAG (OTH2)	Display the diagnosis status of FlexRay communication. (steering force control module)
POWER TRAIN STATUS	Display the status of power train.

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#### < SYSTEM DESCRIPTION >

[DIRECT ADAPTIVE STEERING]

Freeze Frame Data Item	Description
IGN SW STATUS (OWN ECU)	Display the ignition voltage status recognized by steering angle sub control module.
IGN SW STATUS (SYSTEM)	Display the status of ignition voltage for direct adaptive steering.
STOP/START STATUS	Display the status of stop/start system from ECM via CAN communication.
INSTANT VLT DROP DETECT	Display the status of instantaneous voltage drop detection.
CURB STONE DETECT STATS	Display the status of curb stone detection.
BACK UP CIRCUIT A STATUS	Display the status of buck up circuit A.
BACK UP CIRCUIT B STATUS	Display the status of buck up circuit B.
FREE ROLLER MODE	Display the status of free roller mode.
CHASSIS DYNAMO MODE	Display the status of chassis dynamometer mode.
WRITING STATUS	Display the status the recorded angle information in steering angle sub control module.
BACK UP SIG 1 VOLT	Display the voltage of buck up signal 1.
BACK UP SIG 2 VOLT	Display the voltage of buck up signal 2.
INVERTER RELAY ACT VOLT	Display the activation voltage of inverter relay.
CONT MODULE INSIDE VOLT	Display the inside voltage of steering angle sub control module.
BATTERY VOLTAGE	Display the power supply voltage for steering angle sub control module.
IGN VOLTAGE	Display the ignition power supply voltage for steering angle sub control module.
C/M TEMPERATURE	Display the internal temperature of steering angle sub control module.
VEHICLE SPEED	Display the vehicle speed from ABS actuator and electric unit (control unit) via CAN com- munication.
YAW RATE	Display yaw rate value from ABS actuator and electric unit (control unit) via CAN commu- nication.
SIDE G	Display side G value from ABS actuator and electric unit (control unit) via CAN commu- nication.
ST CLUTCH ACT CURRENT	Display the activation current of steering clutch.
MOTOR U ACT CURRENT	Display the activation current of steering angle sub motor U phase.
MOTOR W ACT CURRENT	Display the activation current of steering angle sub motor W phase.
TORQUE SEN MAIN 1	Display the steering torque sensor (main 1) value recognized by direct adaptive steering.
TEMPERATURE SENSOR	Display the temperature of steering angle sub control module.
ANGLE SENSOR SIGNAL 1	Display the voltage of angle sensor signal.
ANGLE SENSOR SIGNAL 2	Display the voltage of angle sensor signal.
ANGLE 1	Display the accuracy of calibration.
ANGLE 2	Display the command angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 1	Display the feedback angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 2	Display the feedback angle for steering angle main motor and steering angle sub motor.
ST ANGLE SENSOR	Display the steering angle from steering angle sensor via CAN communication.
ANGLE DIFFERENCE	Display the difference angle between steering wheel and steering pinion.
STEERING PINION ANGLE	Display the steering pinion angle.
STEERING PINION ANGLE 2	Display the steering pinion angle.
ANGLE 3	Display the angle information used for system control.

## DATA MONITOR

#### NOTE:

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

< SYSTEM DESCRIPTION >

[DIRECT ADAPTIVE STEERING]

	X: Applicable	
Monitor item [Unit]	Remarks	А
OWN ECU SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle sub control module.	B
ST ANG MAIN SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle main control module.	D
ST ANG SUB SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering angle sub control module.	F
ST FORCE SYS STATUS [BOOT/DIAG1/DIAG2/DIAG3/DIAG4/ DIAG5/DIAG6/DIAG7/DIAF8/DIAG9/ DIAG10/DOWN1/DOWN2/DOWN3/FIN1/ FIN2/FIN3/FIN4/FIN5/FIN6/FIN7/FIN8/ FIN9/FIN10/FIN11/FIN12/MALF1/MALF2/ MALF3/SETTING/STD1/STD2/STD3/ SYNC]	Display the status of steering force control module.	H
BACK UP CIRCUIT STATUS [0 – 255]	Display the status of buck up circuit.	
CONTROL MODULE CRNT [A]	Display the electric current value of steering angle sub control module.	
DETAILED CODE 1 [0 – 255]	This is displayed, but it is not used.	K
DETAILED CODE 2 [0 – 255]	This is displayed, but it is not used.	
DETAILED CODE 3 [0 – 255]	This is displayed, but it is not used.	L
FLESRAY COMM SYNC STATS [STAT1/STAT2/STAT3/STAT4/STAT5/ STAT6/STAT7/STAT8/STAT9/STAT10]	Display the sync status of FlexRay communication.	M
STEERING MODE [CHARA A/CHARA B/CHARA C/CHARA D/ CHARA E/CHARA F/CHARA G/CHARA H/ CHARA I]	Display the steering mode.	N
ST CLUTCH PRTCT STATUS [STAT0/STAT1/STAT2/STAT3/STAT4/ STAT5/STAT6/STAT7/STAT8/STAT9/ STAT10/STAT11/STAT12/STAT20]	Display the status of steering clutch.	0
ST CLUTCH CON RQEST [STAT0/STAT1/STAT2/STAT3/STAT4/ STAT5]	Display the control request status steering clutch.	Ρ
FLEXRAY COMM DIAG (OWN) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle sub control module)	
FLEXRAY COMM DIAG (OTH1) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering angle main control module)	
FLEXRAY COMM DIAG (OTH2) [NORMAL/DIAG/MALF]	Display the diagnosis status of FlexRay communication. (steering force control module)	

#### < SYSTEM DESCRIPTION >

## [DIRECT ADAPTIVE STÉERING]

Monitor item [Unit]	Remarks
POWER TRAIN STATUS [STOP/RUN]	Display the status of power train.
IGN SW STATUS (OWN ECU) [ON/OFF]	Display the ignition voltage status recognized by steering angle sub control module.
IGN SW STATUS (SYSTEM) [ON/OFF]	Display the status of ignition voltage for direct adaptive steering.
STOP/START STATUS [ON/OFF]	Display the status of stop/start system from ECM via CAN communication.
INSTANT VLT DROP DETECT [UNDTCT/DETECT]	Display the status of instantaneous voltage drop detection.
CURB STONE DETECT STATS [UNDTCT/DETECT]	Display the status of curb stone detection.
BACK UP CIRCUIT A STATUS [STAT1/STAT2]	Display the status of buck up circuit A.
BACK UP CIRCUIT B STATUS [STAT1/STAT2]	Display the status of buck up circuit B.
FREE ROLLER MODE [ON/OFF]	Display the status of free roller mode.
CHASSIS DYNAMO MODE [PERMIT/ PROHBT]	Display the status of chassis dynamometer mode.
WRITING STATUS [OK/NG]	Display the status the recorded angle information in steering angle sub control module.
BACK UP SIG 1 VOLT [V]	Display the voltage of buck up signal 1.
BACK UP SIG 2 VOLT [V]	Display the voltage of buck up signal 2.
INVERTER RELAY ACT VOLT [V]	Display the activation voltage of inverter relay.
CONT MODULE INSIDE VOLT [V]	Display the inside voltage of steering angle sub control module.
BATTERY VOLTAGE [V]	Display the power supply voltage for steering angle sub control module.
IGN VOLTAGE [V]	Display the ignition power supply voltage for steering angle sub control module.
C/M TEMPERATURE [°C] or [°F]	Display the internal temperature of steering angle sub control module.
VEHICLE SPEED [km/h] or [MPH]	Display the vehicle speed from ABS actuator and electric unit (control unit) via CAN com- munication.
YAW RATE [deg/s]	Display yaw rate value from ABS actuator and electric unit (control unit) via CAN commu- nication.
SIDE G [m/s^2]	Display side G value from ABS actuator and electric unit (control unit) via CAN commu- nication.
ST CLUTCH ACT CURRENT [A]	Display the activation current of steering clutch.
MOTOR U ACT CURRENT [A]	Display the activation current of steering angle sub motor U phase.
MOTOR W ACT CURRENT [A]	Display the activation current of steering angle sub motor W phase.
TORQUE SEN MAIN 1 [N·m]	Display the steering torque sensor (main 1) value recognized by direct adaptive steering.
TEMPERATURE SENSOR [°C] or [°F]	Display the temperature of steering angle sub control module.
ANGLE SENSOR SIGNAL 1 [V]	Display the voltage of angle sub motor angle sensor signal.
ANGLE SENSOR SIGNAL 2 [V]	Display the voltage of angle sub motor angle sensor signal.
ANGLE 1 [deg]	Display the accuracy of calibration.
ANGLE 2 [deg]	Display the command angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 1 [deg]	Display the feedback angle for steering angle main motor and steering angle sub motor.
F/B ANGLE 2 [deg]	Display the feedback angle for steering angle main motor and steering angle sub motor.
ST ANGLE SENSOR [deg]	Display the steering angle from steering angle sensor via CAN communication.
ANGLE DIFFERENCE [deg]	Display the difference angle between steering wheel and steering pinion.
STEERING PINION ANGLE [deg]	Display the steering pinion angle.
STEERING PINION ANGLE 2 [deg]	Display the steering pinion angle.
ANGLE 3 [deg]	Display the angle information used for system control.

RE/PROGRAMMING, CONFIGURATION Configuration includes the following functions.
### DIAGNOSIS SYSTEM (STEERING ANGLE SUB CONTROL MODULE) < SYSTEM DESCRIPTION > [DIRECT ADAPTIVE STEERING]

Item		Description	A
Read/Write Configu- ration	Before replacing ECU	Allows the reading of vehicle specification (Type ID) written in steering angle sub control module to store the specification in CONSULT.	
	After replacing ECU	Allows the writing of vehicle information (Type ID) stored in CONSULT into the steering angle sub control module.	E
Manual Configuration		Allows the writing of vehicle specification (Type ID) into the steering angle sub control module by hand.	C

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### ECU DIAGNOSIS INFORMATION STEERING FORCE CONTROL MODULE

### **Reference Value**

INFOID:000000013356554

### 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	Condition	Display value
	Judging system starting	BOOT
	System is diagnosing	DIAG1 – DIAG10
	Processing system shutdown	FIN1 – FIN12
	Finish the system control	DOWN1
	Wait for shutdown	DOWN2
	System is shutdown	DOWN3
OWN ECU SYS STATUS	System is in fail-safe mode 1	MALF1
	System is in fail-safe mode 2	MALF2
	System is in fail-safe mode 3	MALF3
	Performing initial setting	SETTING
	System is in normal control	STD1 STD2
	System is in protection mode	STD3
	System is synchronizing	SYNC
	Judging system starting	BOOT
		DIAG1 – DIAG10
	Processing system shutdown	FIN1 – FIN12
	Finish the system control	DOWN1
	Wait for shutdown	DOWN2
	System is shutdown	DOWN3
ST ANG MAIN SYS STATUS	System is in fail-safe mode 1	MALF1
	System is in fail-safe mode 2	MALF2
	System is in fail-safe mode 3	MALF3
	Performing initial setting	SETTING
	System is in normal control	STD1 STD2
	System is in protection mode	STD3
	System is synchronizing	SYNC

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

Monitor item	Condition	Display value	-
	Judging system starting	BOOT	A
	System is diagnosing	DIAG1 – DIAG10	-
	Processing system shutdown	FIN1 – FIN12	В
	Finish the system control	DOWN1	-
	Wait for shutdown	DOWN2	-
	System is shutdown	DOWN3	С
	System is in fail-safe mode 1	MALF1	-
51 ANG 500 515 51A105	System is in fail-safe mode 2	MALF2	
	System is in fail-safe mode 3	MALF3	
	Performing initial setting	SETTING	-
	System is in normal control	STD1 STD2	E
	System is in protection mode	STD3	-
	System is synchronizing	SYNC	F
	Judging system starting	BOOT	
	System is diagnosing	DIAG1 – DIAG10	STO
	Processing system shutdown	FIN1 – FIN12	
	Finish the system control	DOWN1	-
	Wait for shutdown	DOWN2	Н
	System is shutdown	DOWN3	-
ST FORCE SVS STATUS	System is in fail-safe mode 1	MALF1	-
	System is in fail-safe mode 2	MALF2	-
	System is in fail-safe mode 3	MALF3	-
	Performing initial setting	SETTING	J
	System is in normal control	STD1 STD2	_
	System is in protection mode	STD3	K
	System is synchronizing	SYNC	_
BACK UP CIRCUIT STATUS	Always	0 – 255	-
CONTROL MODULE CRNT	Always	0 – 255 A	- L
DETAILED CODE 1	This is displayed, but it is not used.	0 – 255	-
DETAILED CODE 2	This is displayed, but it is not used.	0 – 255	M
DETAILED CODE 3	This is displayed, but it is not used.	0 – 255	-
FLEXRAY COMM SYNC STATS	Always	STAT1 – 10	N
STEERING MODE	Always	CHARA – CHARA I	-
ST CLUTCH PRTCT STATUS	Always	STAT0 – STAT12, STAT20	
ST CLUTCH CON RQEST	Always	STAT0 – STAT5	0

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### < ECU DIAGNOSIS INFORMATION >

Monitor item	Con	dition	Display value
		Idle neutral is active	IDLE
SHIFT POSITION	Engine running	Shift selector: Manual mode	1ST 2ND 3RD 4TH 5TH 6TH 7TH 8TH
		Shift selector: R	R
		Shift selector: N	Ν
		Shift selector: P	Р
		CVT mode	CVT
		Range is unknown	UKNWN
	FlexRay communication of steer mal.	ing force control module is nor-	NORMAL
FLEXRAY COMM DIAG (OWN)	FlexRay communication of steer diagnosed.	ing force control module is being	DIAG
	FlexRay communication of steer function.	ing force control module is mal-	MALF
	FlexRay communication of steering angle main control module is normal.		NORMAL
FLEXRAY COMM DIAG (OTH1)	FlexRay communication of steering angle main control module is being diagnosed.		DIAG
	FlexRay communication of steering angle main control module is malfunction.		MALF
	FlexRay communication of steering angle sub control module is normal.		NORMAL
FLEXRAY COMM DIAG (OTH2)	FlexRay communication of steering angle sub control module is being diagnosed.		DIAG
	FlexRay communication of steering angle sub control module is malfunction.		MALF
	Power train stops.		STOP
FOWER TRAIN STATUS	Power train starts.		RUN
		Control module detects ignition voltage.	ON
IGN SW STATUS (OWN LOO)	Ignition switch. ON	Control module does not de- tects ignition voltage.	OFF
	Ignition switch: ON	Control module detects ignition voltage.	ON
IGN SW STATUS (STSTEM)	ignition switch. ON	Control module does not de- tects ignition voltage.	OFF
STOP/START STATUS	Stop/start system is operating.		ON
	Stop/start system is not operating.		OFF
INSTANT VIT DROP DETECT	Instantaneous voltage drop status is not detected.		UNDTCT
	Instantaneous voltage drop status is detected.		DETECT
CURB STONE DETECT STATS	The state of hitting curb stone is	not detected.	UNDTCT
	The state of hitting curb stone is	detected.	DETECT
BACK UP CIRCUIT A STATUS	System is abnormal.		STAT1
	System is normal.		STAT2

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

Monitor item	Con	dition	Display value	
	System is abnormal.		STAT1	А
BACK UP CIRCUIT B STATUS	System is normal.		STAT2	
	Free roller mode: ON		ON	В
FREE ROLLER MODE	Free roller mode: OFF		OFF	
CHASSIS DYNAMO MODE		System is normal mode (Driving is OK)	PERMIT	С
		System is chassis dynamome- ter mode (Driving is NG)	PROHBT	
WRITING STATUS	When system is starting, the req ed in control module.	uired angle information is record-	ОК	D
	When system is starting, the req corded in control module.	uired angle information is not re-	NG	Е
BACK UP SIG 1 VOLT	Ignition switch ON	When steering force control module is normal.	Approx. 0.5 – 4.75 V	
BACK UP SIG 2 VOLT	Ignition switch ON	When steering force control module is normal.	Approx. 0.5 – 4.75 V	F
INVERTER RELAY ACT VOLT	Engine running		Battery voltage	
CONT MODULE INSIDE VOLT	Engine running		Battery voltage – Approx. 0.6 V	ST
BATTERY VOLTAGE	Ignition switch ON		Battery voltage	
IGN VOLTAGE	Ignition switch ON		Battery voltage	Н
C/M TEMPERATURE	Engine running		Display temperature of inside of steering force motor [°C °F)]	11
	Vehicle stopped		0.00 km/h or 0.00 MPH	1
VEHICLE SPEED	Start the engine. Wait a minute. Drive the vehicle. CAUTION: Check air pressure of tire under standard conditions.		Approximately equal to the indi- cation on speedometer (Inside of ±10%)	
ΥΔΙΜ/ ΒΑΤΕ	Vehicle stopped		Approx. 0 deg/s	J
	Vehicle turning		Approx. 0 - ±201 deg/s	
SIDE G	Vehicle stopped		Approx. 0 m/s^2	Κ
SIDE O	Vehicle turning		Approx. 0 - ±2 m/s^2	
ST CLUTCH ACT CURRENT	Engine running		Approx. 0 – 5 A	
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A	L
MOTOR U ACT CURRENT	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 - 70 A)	M
		Steering wheel: Left turn	Negative vale [Approx. (–70) - (0) A]	
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A	Ν
MOTOR W ACT CURRENT	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 - 70 A)	0
		Steering wheel: Left turn	Negative vale [Approx. (–70) - (0) A]	
TORQUE SEN MAIN 1	Engine running		Approx. (–8.5) – 8.5 N⋅m	Ρ
TEMPERATURE SENSOR	Ignition switch ON or Engine running		Approx. [–40°C (–40°F) – 160°F (320°F)]	
	Engine stopped		0 Tr/min	
ENGINE SPEED	Engine running		Display the engine speed (Tr/ min)	
ANGLE SENSOR SIGNAL 1	Engine running		Approx. 1.0 - 3.5 V	

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#### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

Monitor item	Condition		Display value
ANGLE SENSOR SIGNAL 2	Engine running		Approx. 1.0 - 3.5 V
ANGLE 1	Engine running		Approx. (-4.4) - 4.4 deg
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg
ANGLE 2	Engine running	Steering wheel: Right turn	Positive vale
		Steering wheel: Left turn	Negative vale
F/B ANGLE 1	Engine running		Approx. (-20) - 20 deg
F/B ANGLE 2	Engine running		Approx. (-6) - 6 deg
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg
ST ANGLE SENSOR	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 – 900 deg)
		Steering wheel: Left turn	Negative vale [Approx. (–900) – 0 deg]
ANGLE DIFFERENCE	Engine running		Approx. 0 – 300 deg
	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 deg
STEERING PINION ANGLE		Steering wheel: Right turn	Positive vale (Approx. 0 – 550 deg)
		Steering wheel: Left turn	Negative vale [Approx. (–550) – 0 deg]
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg
STEERING PINION ANGLE 2	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 – 550 deg)
		Steering wheel: Left turn	Negative vale [Approx. (–550) – 0 deg]
ANGLE 3	Engine running	·	Approx. (-7425) - 7425 deg

### Fail-safe

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- If a malfunction occurs in the system, the fail-safe function stops the system (mode 3), activates the fail-safe mode (mode 1 or mode 2) or activates the protection mode. When the system enters mode 1, mode 2 or mode 3, the power steering warning lamp illuminates to inform the driver that the turning force is heavy in effect.
- Since three control modules monitor malfunctions mutually, DTC code varies from control module to control module.

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

### • For details of protection function, refer to STC-153. "Protection Function".



	Relation betwe	en control module detecting DTC an	d system status
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC
C13A0-00	Variable	Variable	Variable
C13A1-00	—	Mode 2	Mode 2
C13A2-00	Mode 1 or Mode 3	Mode 1 or Mode 3	Mode 1 or Mode 3
C13A3-00	Mode 2	Mode 2	Mode 2
C13A4-00	—	Mode 2	Mode 2
C13A5-00	_	—	Mode 2
C13A6-00	_	Mode 3	_
C13A7-00	—	Mode 3	—
C13A8-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13A9-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13AA-00	Mode 2	Mode 3	Mode 2

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### < ECU DIAGNOSIS INFORMATION >

	Relation betwee	en control module detecting DTC a	nd system status
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC
C13AB-00	Mode 2	Mode 3	Mode 2
C13AC-00	_	Mode 3	_
C13AD-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13AE-00	Mode 2	Mode 3	Mode 2
C13AF-00	Mode 2	Mode 3	Mode 2
C13B0-00	Mode 2	Mode 3	Mode 2
C13B1-00	Mode 2	Mode 3	Mode 2
C13B2-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13B3-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13B4-00	Mode 2	Mode 3	Mode 2
C13B5-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13B6-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13B7-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13B8-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13B9-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13BA-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13BB-00	_		_
C13BC-00	_	_	_
C13BD-00	_	Mode 2	_
C13BE-00	Mode 2	Mode 2	Mode 2
C13BF-00	Variable	Variable	Variable
C13C0-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3
C13C1-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3
C13C2-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3
C13C3-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3
C13C4-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13C5-00	Mode 2		_
C13C6-00	Mode 2	_	_
C13C7-00	Mode 2	_	_
C13C8-00	_	_	_
C13C9-00	_	_	_
C13CA-00	_	_	_
C13CB-00	_	_	_
C13CC-00		_	_
C13CD-00		_	_
C13CE-00		_	_
C13CF-00		_	_
C13D0-00		_	_
C13D1-00	-	_	_
C13D2-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D3-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D4-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D5-00	Mode 2	Mode 1 or Mode 3	Mode 2

#### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

	Relation between control module detecting DTC and system status			
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC	
C13D6-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13D7-00	Mode 2	Mode 1 or Mode 3	Mode 2	
C13D8-00	_	_	_	
C13D9-00	-	_	_	
C13DA-00		—	_	
C13DB-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	-	
C13DC-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_	
C13DD-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_	
C13DE-00	Protection function mode	Protection function mode	Protection function mode	
C13DF-00	—	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_	
C13E0-00	Mode 2	_	_	
C13E1-00	Mode 2	_	_	
C13E2-00		_	_	
C13E3-00	Protection function mode	_	_	
C13E4-00	Protection function mode	—	_	
C13E5-00	Mode 2	_	_	
C13E6-00	Protection function mode	Protection function mode	Protection function mode	
C13E7-00	Protection function mode	Protection function mode	Protection function mode	
C13E8-00	Protection function mode	Protection function mode	Protection function mode	
C13E9-00	-	Mode 2	_	
C13EA-00	Mode 2	—	-	
C13EB-00		Mode 2	Mode 2	
C13EE-00	Mode 3	Mode 3	Mode 3	
C13EF-00	Mode 3	Mode 3	Mode 3	
C13F0-00	Mode 2	Mode 2	Mode 2	
C13F1-00	Mode 2	—	-	
C13F2-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3	
U1000-01		—	—	
U1010-49	_	_	_	

• \*1: When control module detects a malfunction at startup.

• \*2: When control module detects a malfunction except during startup.

### **Protection Function**

- When battery voltage malfunctions temporarily, system overheats continuously and system is overloaded P continuously, system is in protection mode temporarily. This is not malfunction.
- When a causative condition is cleared, the system returns to normal control automatically. (Except C13E5-00)
- Since the protection function condition is not malfunction, power steering warning lamp does not turn ON. (Except C13E5-00) The following DTCs remain to distinguish from malfunction.

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### < ECU DIAGNOSIS INFORMATION >

DTC	Condition	Vehicle condition
C13E3-00	The steering wheel is steered over the limit angle.	System changes to the protection mode temporarily. (Steering op-
C13E4-00	When steering clutch is released, steering clutch is not released within regular time with overloading steering wheel.	eration may become heavy temporarily, however steering wheel can be operated without interference. This is not a system mal- function.)
C13E5-00	When steering clutch is released, steering clutch is not released in spite of trying to release it many times with overloading steering wheel.	System changes to fail-safe mode (mode 2). For fail-safe, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u> .
C13E6.00	EPS/DAST 3: Internal temperature of steering force motor is 150°C (302°F) or more.	
C13E0-00	DAST 1, DAST 2: Internal temperature of control module is 90°C (194°F) or more.	System changes to the protection mode temporarily. (Steering op-
C13E7-00	Power supply voltage of control module is low temporarily.	can be operated without interference. This is not a system mal- function.)
C13E8-00	<ul> <li>Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other sub- stances.</li> <li>Steering gear is out of neutral position. (Large)</li> </ul>	

### DTC Inspection Priority Chart

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

Priority	Priority order item (DTC)
1	U1000-01 CAN COMM CIRCUIT     U1010-49 CONTROL UNIT (CAN)
2	<ul> <li>C13C5-00 STEERING ANGLE SENSOR SIGNAL</li> <li>C13C6-00 G SENSOR SIGNAL</li> <li>C13C7-00 VEHICL SPEED SIGNAL</li> <li>C13C9-00 DRIVE MODE SIGNAL</li> <li>C13CA-00 ENGINE STATUS SIGNAL</li> <li>C13CC-00 T/M GEAR POSI SIGNAL</li> <li>C13CD-00 ENGINE SPEED SIGNAL</li> <li>C13CE-00 SLEEP/WAKEUP SIGNAL</li> <li>C13CF-00 ALC FUNCTION REQUEST SIGNAL</li> <li>C13D0-00 ALC FUNCTION REQUEST SIGNAL</li> <li>C13D1-00 STEERING ANGLE SENSOR SIGNAL</li> </ul>
3	<ul> <li>C13E9-00 BOOTING ANGLE PROCESSING</li> <li>C13EA-00 BOOTING ANGLE PROCESSING</li> <li>C13EB-00 BOOTING ANGLE PROCESSING</li> <li>C13EE-00 INCOMP CONFIG</li> <li>C13EF-00 CONFIG CHECK RESULT</li> <li>C13F0-00 IMCOMP DAST CALIBRATION</li> <li>C13F1-00 INCOMP ST ANG SEN ADJST</li> <li>C13F2-00 DIFFERENT SOFTWARE VERSION</li> </ul>

# < ECU DIAGNOSIS INFORMATION >

Priority	Priority order item (DTC)	
4	<ul> <li>C13A8-00 BACK UP CIRCUIT</li> <li>C13A9-00 BACK UP CIRCUIT</li> <li>C13AB-00 CONTROL MODULE</li> <li>C13AC-00 CONTROL MODULE</li> <li>C13B6-00 MOTOR CIRCUIT</li> <li>C13B9-00 CONTROL MODULE POWER SUPPLY</li> <li>C13BB-00 CONTROL MODULE IGN POWER SUP</li> <li>C13BC-00 CONTROL MODULE IGN POWER SUP</li> <li>C13BD-00 CONTROL MODULE IGN POWER SUP</li> <li>C13D4-00 CONTROL MODULE IGN POWER SUP</li> <li>C13D4-00 CONTROL MODULE</li> <li>C13D8-00 STEERING TORQUE SENSOR</li> <li>C13DD-00 STEERING TORQUE SENSOR</li> <li>C13DD-00 STEERING TORQUE SENSOR</li> <li>C13DE-00 TEMPERATURE SENSOR</li> <li>C13E1-00 STEERING CLUTCH</li> <li>C13E2-00 FRONT WHEEL SENSOR SIGNAL</li> </ul>	B C D
5	<ul> <li>C13BE-00 FLEXRAY COMMUNICATION</li> <li>C13BF-00 FLEXRAY COMMUNICATION</li> <li>C13C0-00 FLEXRAY COMMUNICATION</li> <li>C13C1-00 FLEXRAY COMMUNICATION</li> <li>C13C2-00 FLEXRAY COMMUNICATION</li> <li>C13C3-00 FLEXRAY COMMUNICATION</li> <li>C13C4-00 FLEXRAY COMMUNICATION</li> </ul>	F
6	<ul> <li>C13A0-00 CONTROL MODULE</li> <li>C13A1-00 CONTROL MODULE</li> <li>C13A2-00 CONTROL MODULE</li> <li>C13A4-00 CONTROL MODULE</li> <li>C13A4-00 CONTROL MODULE</li> <li>C13A5-00 CONTROL MODULE</li> <li>C13A6-00 CONTROL MODULE</li> <li>C13A7-00 CONTROL MODULE</li> <li>C13A7-00 CONTROL MODULE</li> <li>C13A7-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13B0-00 CONTROL MODULE</li> <li>C13B3-00 CONTROL MODULE</li> <li>C13B3-00 CONTROL MODULE</li> <li>C13B4-00 CONTROL MODULE</li> <li>C13B5-00 CONTROL MODULE</li> <li>C13D5-00 CONTROL MODULE&lt;</li></ul>	H I I M N
7	<ul> <li>C13E3-00 SPIRAL CABLE PROTECTION</li> <li>C13E4-00 ST CLUTCH RELEASE PROTECTION</li> <li>C13E5-00 ST CLUTCH RELEASE PROTECTION</li> <li>C13E6-00 HEAT PROTECTION</li> <li>C13E7-00 LOW VOLTAGE PROTECTION</li> <li>C13E8-00 CURB STONE PROTECTION</li> </ul>	Ρ

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

### **DTC** Index

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 $\times$ : Applicable

		Detect	ting control i	module	dule		
DTC	ltems	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference	
C13A0-00	CONTROL MODULE	×	×	×	ON	STC-218	
C13A1-00	CONTROL MODULE	×	×	×	OFF	STC-221	
C13A2-00	CONTROL MODULE	×	×	×	ON	<u>STC-224</u>	
C13A3-00	CONTROL MODULE	×	×	×	ON	<u>STC-227</u>	
C13A4-00	CONTROL MODULE		×	×	OFF	_	
C13A5-00	CONTROL MODULE			×	OFF	_	
C13A6-00	CONTROL MODULE		×		OFF	_	
C13A7-00	CONTROL MODULE		×		OFF	_	
C13A8-00	BACK UP CIRCUIT	×	×	×	ON	STC-236	
C13A9-00	BACK UP CIRCUIT	×	×	×	ON	<u>STC-241</u>	
C13AA-00	CONTROL MODULE	×	×	×	ON	<u>STC-246</u>	
C13AB-00	CONTROL MODULE	×	×	×	ON	<u>STC-250</u>	
C13AC-00	CONTROL MODULE		×		OFF	_	
C13AD-00	CONTROL MODULE	×	×	×	ON	<u>STC-256</u>	
C13AE-00	CONTROL MODULE	×	×	×	ON	<u>STC-262</u>	
C13AF-00	CONTROL MODULE	×	×	×	ON	<u>STC-265</u>	
C13B0-00	CONTROL MODULE	×	×	×	ON	<u>STC-268</u>	
C13B1-00	CONTROL MODULE	×	×	×	ON	<u>STC-271</u>	
C13B2-00	CONTROL MODULE	×	×	×	ON	<u>STC-274</u>	
C13B3-00	CONTROL MODULE	×	×	×	ON	<u>STC-280</u>	
C13B4-00	CONTROL MODULE	×	×	×	ON	<u>STC-286</u>	
C13B5-00	CONTROL MODULE	×	×	×	ON	<u>STC-289</u>	
C13B6-00	MOTOR CIRCUIT	×	×	×	ON	<u>STC-295</u>	
C13B7-00	CONTROL MODULE	×	×	×	ON	<u>STC-303</u>	
C13B8-00	CONTROL MODULE	×	×	×	ON	<u>STC-309</u>	
C13B9-00	CONTROL MODULE	×	×	×	ON	STC-312	
C13BA-00	CONTROL MODULE POWER SUPPLY	×	×	×	ON	<u>STC-318</u>	
C13BB-00	CONTROL MODULE POWER SUPPLY	×	×	×	OFF	<u>STC-323</u>	
C13BC-00	CONTROL MODULE IGN POWER SUP	×	×	×	OFF	<u>STC-328</u>	
C13BD-00	CONTROL MODULE IGN POWER SUP		×		OFF		
C13BE-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	
C13BF-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	
C13C0-00	FLEXRAY COMMUNICATION	×	×	×	ON	STC-334	

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### < ECU DIAGNOSIS INFORMATION >

		Detec	ting control	module			_
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference	B C D
C13C1-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	_
C13C2-00	FLEXRAY COMMUNICATION	×	×	×	ON	STC-334	E
C13C3-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	_
C13C4-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	F
C13C5-00	STEERING ANGLE SENSOR SIGNAL	×			ON	STC-338	
C13C6-00	G SENSOR SIGNAL	×			ON	<u>STC-340</u>	-
C13C7-00	VEHICL SPEED SIGNAL	×			ON	STC-342	STC
C13C9-00	DRIVE MODE SIGNAL	×			OFF	<u>STC-344</u>	-
C13CA-00	ENGINE STATUS SIGNAL	×			OFF	<u>STC-346</u>	- H
C13CC-00	T/M GEAR POSI SIGNAL	×			OFF	<u>STC-348</u>	_ !!
C13CD-00	ENGINE SPEED SIGNAL	×			OFF	<u>STC-350</u>	-
C13CE-00	SLEEP/WAKE UP SIGNAL	×			OFF	<u>STC-352</u>	
C13CF-00	ALC FUNCTION REQUEST SIGNAL		×		OFF	—	-
C13D0-00	ALC FUNCTION REQUEST SIGNAL		×		OFF	_	-
C13D1-00	STEERING ANGLE SENSOR SIGNAL		×		ON	_	J
C13D2-00	CONTROL MODULE	×	×	×	ON	<u>STC-360</u>	_
C13D3-00	CONTROL MODULE	×	×	×	ON	STC-363	K
C13D4-00	CONTROL MODULE	×	×	×	ON	<u>STC-366</u>	_
C13D5-00	CONTROL MODULE	×	×	×	ON	<u>STC-373</u>	_
C13D6-00	CONTROL MODULE	×	×	×	ON	<u>STC-376</u>	- L
C13D7-00	CONTROL MODULE	×	×	×	ON	<u>STC-383</u>	_
C13D8-00	CONTROL MODULE	×	×		OFF	<u>STC-386</u>	M
C13D9-00	CONTROL MODULE	×	×		OFF	<u>STC-390</u>	_
C13DB-00	STEERING TORQUE SENSOR		×		OFF	_	_
C13DC-00	STEERING TORQUE SENSOR		×		OFF	_	N
C13DD-00	STEERING TORQUE SENSOR		×		OFF	_	_
C13DE-00	TEMPERATURE SENSOR	×	×	×	OFF	<u>STC-401</u>	0
C13DF-00	CONTROL MODULE		×		OFF	_	
C13E0-00	ST CLUTCH COMMAND CIRCUIT	×			ON	<u>STC-408</u>	_
C13E1-00	STEERING CLUTCH	×			ON	<u>STC-410</u>	Ρ
C13E2-00	FRONT WHEEL SENSOR SIGNAL	×			OFF	<u>STC-413</u>	_
C13E3-00	SPIRAL CABLE PROTECTION	×			OFF	<u>STC-414</u>	_
C13E4-00	ST CLUTCH RELEASE PROTECTION	×			OFF	STC-415	_
C13E5-00	ST CLUTCH RELEASE PROTECTION	×			ON	<u>STC-418</u>	_
C13E6-00	HEAT PROTECTION	×	×	×	OFF	<u>STC-421</u>	

### < ECU DIAGNOSIS INFORMATION >

### [DIRECT ADAPTIVE STEERING]

		Detect	ing control	module		
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference
C13E7-00	LOW VOLTAGE PROTECTION	×	×	×	OFF	<u>STC-427</u>
C13E8-00	CURB STONE PROTECTION	×	×	×	OFF	<u>STC-432</u>
C13E9-00	BOOTING ANGLE PROCESSING		×		OFF	_
C13EA-00	BOOTING ANGLE PROCESSING	×			ON	<u>STC-439</u>
C13EB-00	BOOTING ANGLE PROCESSING		×	×	OFF	_
C13EE-00	INCOMP CONFIG	×	×	×	ON	<u>STC-447</u>
C13EF-00	CONFIG CHECK RESULT	×	×	×	ON	<u>STC-451</u>
C13F0-00	INCOMP DAST CALIBRATION	×	×	×	ON	<u>STC-455</u>
C13F1-00	INCOMP ST ANG SEN ADJST	×			ON	<u>STC-458</u>
C13F2-00	DIFFERENT SOFTWARE VERSION	×	×	×	ON	<u>STC-460</u>
U1000-01	CAN COMM CIRCUIT	×	×		OFF	<u>STC-463</u>
U1010-49	CONTROL UNIT (CAN)	×	×		OFF	<u>STC-465</u>

### NOTE:

If two or more DTCs are detected, refer to STC-154, "DTC Inspection Priority Chart".

### < ECU DIAGNOSIS INFORMATION >

### STEERING ANGLE MAIN CONTROL MODULE

### **Reference Value**

### 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	Condition	Display value	_
	Judging system starting	BOOT	D
OWN ECU SYS STATUS	System is diagnosing	DIAG1 – DIAG10	
	Processing system shutdown	FIN1 – FIN12	
	Finish the system control	DOWN1	E
	Wait for shutdown	DOWN2	
	System is shutdown	DOWN3	F
	System is in fail-safe mode 1	MALF1	
	System is in fail-safe mode 2	MALF2	
	System is in fail-safe mode 3	MALF3	ST
	Performing initial setting	SETTING	
	System is in normal control	STD1 STD2	Н
	System is in protection mode	STD3	
	System is synchronizing	SYNC	
	Judging system starting	BOOT	
	System is diagnosing	DIAG1 – DIAG10	
	Processing system shutdown	FIN1 – FIN12	J
	Finish the system control	DOWN1	
	Wait for shutdown	DOWN2	
	System is shutdown	DOWN3	- r
ST ANG MAIN SYS STATUS	System is in fail-safe mode 1	MALF1	
	System is in fail-safe mode 2	MALF2	L
	System is in fail-safe mode 3	MALF3	_
	Performing initial setting	SETTING	
	System is in normal control	STD1 STD2	IVI
	System is in protection mode	STD3	
	System is synchronizing	SYNC	— IN

[DIRECT ADAPTIVE STEERING]

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### < ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Display value
	Judging system starting	BOOT
	System is diagnosing	DIAG1 – DIAG10
	Processing system shutdown	FIN1 – FIN12
	Finish the system control	DOWN1
	Wait for shutdown	DOWN2
	System is shutdown	DOWN3
	System is in fail-safe mode 1	MALF1
31 ANG 300 313 31ATO3	System is in fail-safe mode 2	MALF2
	System is in fail-safe mode 3	MALF3
	Performing initial setting	SETTING
	System is in normal control	STD1 STD2
	System is in protection mode	STD3
	System is synchronizing	SYNC
	Judging system starting	BOOT
ST FORCE SYS STATUS	System is diagnosing	DIAG1 – DIAG10
	Processing system shutdown	FIN1 – FIN12
	Finish the system control	DOWN1
	Wait for shutdown	DOWN2
	System is shutdown	DOWN3
	System is in fail-safe mode 1	MALF1
	System is in fail-safe mode 2	MALF2
	System is in fail-safe mode 3	MALF3
	Performing initial setting	SETTING
	System is in normal control	STD1 STD2
	System is in protection mode	STD3
	System is synchronizing	SYNC
BACK UP CIRCUIT STATUS	Always	0 – 255
CONTROL MODULE CRNT	Always	0 – 255 A
DETAILED CODE 1	This is displayed, but it is not used.	0 – 255
DETAILED CODE 2	This is displayed, but it is not used.	0 – 255
DETAILED CODE 3	This is displayed, but it is not used.	0 – 255
FLEXRAY COMM SYNC STATS	Always	STAT1 – 10
STEERING MODE	Always	CHARA – CHARA I
ST CLUTCH PRTCT STATUS	Always	STAT0 – STAT12, STAT20
ST CLUTCH CON RQEST	Always	STAT0 – STAT5
	FlexRay communication of steering angle main control module is normal.	NORMAL
FLEXRAY COMM DIAG (OWN)	FlexRay communication of steering angle main control module is being diagnosed.	DIAG
	FlexRay communication of steering angle main control module is malfunction.	MALF

### < ECU DIAGNOSIS INFORMATION >

WOINOF ILETT	Cor	dition	Display value	٨
	FlexRay communication of stee normal.	ring angle sub control module is	NORMAL	A
FLEXRAY COMM DIAG (OTH1)	FlexRay communication of stee being diagnosed.	DIAG	В	
	FlexRay communication of stee malfunction.	ring angle sub control module is	MALF	
	FlexRay communication of stee mal.	FlexRay communication of steering force control module is nor- mal.		C
FLEXRAY COMM DIAG (OTH2)	FlexRay communication of stee diagnosed.	ring force control module is being	DIAG	D
	FlexRay communication of stee function.	ring force control module is mal-	MALF	_
POWER TRAIN STATUS	Power train stops.	Power train stops.		E
TOWER TRAIN STATUS	Power train starts.	ower train starts.		
IGN SW/ STATUS (OWN ECU)	Ignition switch: ON	Control module detects ignition voltage.	ON	F
IGN SW STATUS (OWN ECU)	Ignition switch. ON	Control module does not de- tects ignition voltage.	OFF	ет
IGN SW STATUS (SYSTEM)	Ignition switch: ON	Control module detects ignition voltage.	ON	51
	Ignition switch. ON	Control module does not de- tects ignition voltage.	OFF	H
	Stop/start system is operating.	Stop/start system is operating.		
	Stop/start system is not operating.		OFF	1
INSTANT VIT DROP DETECT	Instantaneous voltage drop state	UNDTCT		
INGINITI VEI DIGI DETEGI	Instantaneous voltage drop state	Instantaneous voltage drop status is detected.		
CURB STONE DETECT STATS	The state of hitting curb stone is	not detected.	UNDTCT	J
	The state of hitting curb stone is	detected.	DETECT	
BACK UP CIRCUIT A STATUS	System is abnormal.		STAT1	k
	System is normal.		STAT2	
BACK UP CIRCUIT B STATUS	System is abnormal.		STAT1	
	System is normal.		STAT2	L
	Free roller mode: ON		ON	
	Free roller mode: OFF		OFF	N
CHASSIS DYNAMO MODE		System is normal mode (Driving is OK)	PERMIT	IV
		System is chassis dynamome- ter mode (Driving is NG)	PROHBT	Ν
	When system is starting, the rec	uired angle information is record-	ОК	
	When system is starting, the required angle information is not re- corded in control module.		NG	С
BACK UP SIG 1 VOLT	Ignition switch ON	When steering angle main con- trol module is normal.	Approx. 0.5 – 4.75 V	Ρ
BACK UP SIG 2 VOLT	Ignition switch ON	When steering angle main con- trol module is normal.	Approx. 0.5 – 4.75 V	
INVERTER RELAY ACT VOLT	Engine running		Battery voltage	
CONT MODULE INSIDE VOLT	Engine running		Battery voltage – Approx. 0.6 V	
BATTERY VOLTAGE	Ignition switch ON		Battery voltage	

### < ECU DIAGNOSIS INFORMATION >

Monitor item	Con	dition	Display value		
IGN VOLTAGE	Ignition switch ON		Battery voltage		
C/M TEMPERATURE	Engine running		Display temperature of inside of steering angle main control module [°C °F)]		
	Vehicle stopped		0.00 km/h or 0.00 MPH		
VEHICLE SPEED	Start the engine. Wait a minute. Drive the vehicle. CAUTION: Check air pressure of tire under standard conditions.		Approximately equal to the indi- cation on speedometer (Inside of ±10%)		
	Vehicle stopped		Approx. 0 deg/s		
	Vehicle turning		Vehicle turning		Approx. 0 - ±201 deg/s
	Vehicle stopped		Approx. 0 m/s^2		
SIDE G	Vehicle turning		Approx. 0 - ±2 m/s^2		
ST CLUTCH ACT CURRENT	Engine running		Approx. 0 – 5 A		
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A		
MOTOR U ACT CURRENT	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 - 70 A)		
		Steering wheel: Left turn	Negative vale [Approx. (-70) - (0) A]		
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A		
MOTOR W ACT CURRENT	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 - 70 A)		
		Steering wheel: Left turn	Negative vale [Approx. (-70) - (0) A]		
		Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V		
TORQUE SEN MAIN 2	Engine running	Steering wheel: Right turn	Approx. 1.4 - 2.5 V		
		Steering wheel: Left turn	Approx. 2.5 - 3.6 V		
TORQUE SEN MAIN 1	Engine running		Approx. (-8.5) - 8.5 N·m		
		Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V		
TORQUE SEN SUB	Engine running	Steering wheel: Right turn	Approx. 1.4 - 2.5 V		
		Steering wheel: Left turn	Approx. 2.5 - 3.6 V		
TORQUE SEN VOLTAGE	Ignition switch ON		Approx. 4.5 – 5.5 V		
TEMPERATURE SENSOR	Ignition switch ON or Engine run	ning	Display temperature of inside of steering angle main control module [°C °F)]		
SUB IGN VOLTAGE	Ignition switch ON		Battery voltage		
ANGLE SENSOR SIGNAL 1	Engine running		Approx. 1.0 - 3.5 V		
ANGLE SENSOR SIGNAL 2	Engine running		Approx. 1.0 - 3.5 V		
ANGLE 1	Engine running		Approx. (-4.4) - 4.4 deg		
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg		
ANGLE 2	Engine running	Steering wheel: Right turn	Positive vale		
		Steering wheel: Left turn	Negative vale		
F/B ANGLE 1	Engine running		Approx. (-20) - 20 deg		
F/B ANGLE 2	Engine running		Approx. (-6) - 6 deg		

#### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

Monitor item	Condition		Display value	
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg	A
ST ANGLE SENSOR	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 – 900 deg)	В
		Steering wheel: Left turn	Negative vale [Approx. (–900) – 0 deg]	-
ANGLE DIFFERENCE	Engine running		Approx. 0 – 300 deg	С
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg	
STEERING PINION ANGLE	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 – 550 deg)	D
		Steering wheel: Left turn	Negative vale [Approx. (–550) – 0 deg]	E
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg	-
STEERING PINION ANGLE 2	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 – 550 deg)	F
		Steering wheel: Left turn	Negative vale [Approx. (–550) – 0 deg]	ST
ANGLE 3	Engine running		Approx. (-7425) - 7425 deg	

### Fail-safe

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- If a malfunction occurs in the system, the fail-safe function stops the system (mode 3), activates the fail-safe mode (mode 1 or mode 2) or activates the protection mode. When the system enters mode 1, mode 2 or mode 3, the power steering warning lamp illuminates to inform the driver that the turning force is heavy in effect.
- Since three control modules monitor malfunctions mutually, DTC code varies from control module to control module.
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Revision: November 2016

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

### • For details of protection function, refer to STC-166, "Protection Function".



	Relation betwe	ween control module detecting DTC and system status			
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC		
C13A0-00	Variable	Variable	Variable		
C13A1-00	_	Mode 2	Mode 2		
C13A2-00	Mode 1 or Mode 3	Mode 1 or Mode 3	Mode 1 or Mode 3		
C13A3-00	Mode 2	Mode 2	Mode 2		
C13A4-00	_	Mode 2	Mode 2		
C13A5-00	_	_	Mode 2		
C13A6-00	_	Mode 3	_		
C13A7-00	_	Mode 3	—		
C13A8-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13A9-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13AA-00	Mode 2	Mode 3	Mode 2		

### < ECU DIAGNOSIS INFORMATION >

	Relation between control module detecting DTC and system status				
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC		
C13AB-00	Mode 2	Mode 3	Mode 2		
C13AC-00	_	Mode 3	_		
C13AD-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13AE-00	Mode 2	Mode 3	Mode 2		
C13AF-00	Mode 2	Mode 3	Mode 2		
C13B0-00	Mode 2	Mode 3	Mode 2		
C13B1-00	Mode 2	Mode 3	Mode 2		
C13B2-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B3-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B4-00	Mode 2	Mode 3	Mode 2		
C13B5-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B6-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B7-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B8-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B9-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13BA-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13BB-00	_	_			
C13BC-00	_	_			
C13BD-00	_	Mode 2	_		
C13BE-00	Mode 2	Mode 2	Mode 2		
C13BF-00	Variable	Variable	Variable		
C13C0-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3		
C13C1-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3		
C13C2-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3		
C13C3-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3		
C13C4-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13C5-00	Mode 2	_			
C13C6-00	Mode 2	_			
C13C7-00	Mode 2	_	_		
C13C8-00	_	_	_		
C13C9-00	_	_	_		
C13CA-00	_	_			
C13CB-00	_	_	_		
C13CC-00		_			
C13CD-00		_			
C13CE-00		_			
C13CF-00		_			
C13D0-00		_			
C13D1-00		_	_		
C13D2-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13D3-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13D4-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13D5-00	Mode 2	Mode 1 or Mode 3	Mode 2		

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

	Relation betwee	n control module detecting DTC a	nd system status
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC
C13D6-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D7-00	Mode 2	Mode 1 or Mode 3	Mode 2
C13D8-00	—	—	
C13D9-00	—	—	_
C13DA-00	—	—	_
C13DB-00	_	Mode $3^{*1}$ Mode $2^{*2}$	_
C13DC-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13DD-00	_	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13DE-00	Protection function mode	Protection function mode	Protection function mode
C13DF-00	-	Mode 3 <sup>*1</sup> Mode 2 <sup>*2</sup>	_
C13E0-00	Mode 2	—	
C13E1-00	Mode 2	_	_
C13E2-00	—	—	
C13E3-00	Protection function mode	_	_
C13E4-00	Protection function mode	—	
C13E5-00	Mode 2	_	_
C13E6-00	Protection function mode	Protection function mode	Protection function mode
C13E7-00	Protection function mode	Protection function mode	Protection function mode
C13E8-00	Protection function mode	Protection function mode	Protection function mode
C13E9-00	_	Mode 2	
C13EA-00	Mode 2	—	_
C13EB-00	_	Mode 2	Mode 2
C13EE-00	Mode 3	Mode 3	Mode 3
C13EF-00	Mode 3	Mode 3	Mode 3
C13F0-00	Mode 2	Mode 2	Mode 2
C13F1-00	Mode 2	-	-
C13F2-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3
U1000-01	-	-	-
U1010-49	_	_	_

• \*1: When control module detects a malfunction at startup.

• \*2: When control module detects a malfunction except during startup.

### **Protection Function**

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- When battery voltage malfunctions temporarily, system overheats continuously and system is overloaded continuously, system is in protection mode temporarily. This is not malfunction.
- When a causative condition is cleared, the system returns to normal control automatically. (Except C13E5-00)
- Since the protection function condition is not malfunction, power steering warning lamp does not turn ON. (Except C13E5-00) The following DTCs remain to distinguish from malfunction.

#### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

DTC	Condition	Vehicle condition	А
C13E3-00	The steering wheel is steered over the limit angle.	System changes to the protection mode temporarily. (Steering op-	
C13E4-00	When steering clutch is released, steering clutch is not released within regular time with overloading steering wheel.	eration may become heavy temporarily, however steering wheel can be operated without interference. This is not a system mal- function.)	В
C13E5-00	When steering clutch is released, steering clutch is not released in spite of trying to release it many times with overloading steering wheel.	System changes to fail-safe mode (mode 2). For fail-safe, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u> .	С
C13E6.00	EPS/DAST 3: Internal temperature of steering force motor is 150°C (302°F) or more.		D
C13E6-00 -	DAST 1, DAST 2: Internal temperature of control module is 90°C (194°F) or more.	System changes to the protection mode temporarily. (Steering op-	E
C13E7-00	Power supply voltage of control module is low tem- porarily.	can be operated without interference. This is not a system mal- function.)	
C13E8-00	<ul> <li>Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other sub-</li> </ul>		F
01320-00	<ul><li>stances.</li><li>Steering gear is out of neutral position. (Large)</li></ul>		STO

### **DTC Inspection Priority Chart**

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

Priority	Priority order item (DTC)	1
1	U1000-01 CAN COMM CIRCUIT     U1010-49 CONTROL UNIT (CAN)	I
	C13C5-00 STEERING ANGLE SENSOR SIGNAL     C13C6-00 G SENSOR SIGNAL     C13C7-00 VEHICL SPEED SIGNAL     C13C7-00 VEHICL SPEED SIGNAL	J
2	C13C9-00 DRIVE MODE SIGNAL     C13CA-00 ENGINE STATUS SIGNAL     C13CC-00 T/M GEAR POSI SIGNAL     C13CD-00 ENGINE SPEED SIGNAL	K
	<ul> <li>C13CE-00 SLEEP/WAKEUP SIGNAL</li> <li>C13CF-00 ALC FUNCTION REQUEST SIGNAL</li> <li>C13D0-00 ALC FUNCTION REQUEST SIGNAL</li> <li>C13D1-00 STEERING ANGLE SENSOR SIGNAL</li> </ul>	L
	C13E9-00 BOOTING ANGLE PROCESSING     C13EA-00 BOOTING ANGLE PROCESSING     C13EB-00 BOOTING ANGLE PROCESSING     C13EE-00 INCOMP CONFIG	Μ
3	<ul> <li>C13EF-00 CONFIG CHECK RESULT</li> <li>C13F0-00 IMCOMP DAST CALIBRATION</li> <li>C13F1-00 INCOMP ST ANG SEN ADJST</li> <li>C13F2-00 DIFFERENT SOFTWARE VERSION</li> </ul>	Ν
		0

### < ECU DIAGNOSIS INFORMATION >

Priority	Priority order item (DTC)				
4	<ul> <li>C13A8-00 BACK UP CIRCUIT</li> <li>C13A9-00 BACK UP CIRCUIT</li> <li>C13AB-00 CONTROL MODULE</li> <li>C13AC-00 CONTROL MODULE</li> <li>C13B6-00 MOTOR CIRCUIT</li> <li>C13B9-00 CONTROL MODULE POWER SUPPLY</li> <li>C13BB-00 CONTROL MODULE IGN POWER SUPPLY</li> <li>C13BC-00 CONTROL MODULE IGN POWER SUP</li> <li>C13BD-00 CONTROL MODULE IGN POWER SUP</li> <li>C13D4-00 CONTROL MODULE</li> <li>C13DB-00 STEERING TORQUE SENSOR</li> <li>C13DD-00 STEERING TORQUE SENSOR</li> <li>C13DE-00 TEMPERATURE SENSOR</li> <li>C13DE-00 TEMPERATURE SENSOR</li> <li>C13DE-00 ST CLUTCH COMMAND CIRCUIT</li> <li>C13E1-00 STEERING CLUTCH</li> <li>C13E2-00 FRONT WHEEL SENSOR SIGNAL</li> </ul>				
5	<ul> <li>C13BE-00 FLEXRAY COMMUNICATION</li> <li>C13BF-00 FLEXRAY COMMUNICATION</li> <li>C13C0-00 FLEXRAY COMMUNICATION</li> <li>C13C1-00 FLEXRAY COMMUNICATION</li> <li>C13C2-00 FLEXRAY COMMUNICATION</li> <li>C13C3-00 FLEXRAY COMMUNICATION</li> <li>C13C4-00 FLEXRAY COMMUNICATION</li> </ul>				
6	<ul> <li>C13A0-00 CONTROL MODULE</li> <li>C13A1-00 CONTROL MODULE</li> <li>C13A2-00 CONTROL MODULE</li> <li>C13A3-00 CONTROL MODULE</li> <li>C13A4-00 CONTROL MODULE</li> <li>C13A5-00 CONTROL MODULE</li> <li>C13A6-00 CONTROL MODULE</li> <li>C13A7-00 CONTROL MODULE</li> <li>C13AA-00 CONTROL MODULE</li> <li>C13AA-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13B0-00 CONTROL MODULE</li> <li>C13B0-00 CONTROL MODULE</li> <li>C13B2-00 CONTROL MODULE</li> <li>C13B2-00 CONTROL MODULE</li> <li>C13B2-00 CONTROL MODULE</li> <li>C13B4-00 CONTROL MODULE</li> <li>C13B4-00 CONTROL MODULE</li> <li>C13B5-00 CONTROL MODULE</li> <li>C13D5-00 CONTROL MODULE</li> <li>C13D5-00 CONTROL MODULE</li> <li>C13D6-00 CONTROL MODULE&lt;</li></ul>				
7	<ul> <li>C13E3-00 SPIRAL CABLE PROTECTION</li> <li>C13E4-00 ST CLUTCH RELEASE PROTECTION</li> <li>C13E5-00 ST CLUTCH RELEASE PROTECTION</li> <li>C13E6-00 HEAT PROTECTION</li> <li>C13E7-00 LOW VOLTAGE PROTECTION</li> <li>C13E8-00 CURB STONE PROTECTION</li> </ul>				

### < ECU DIAGNOSIS INFORMATION >

### [DIRECT ADAPTIVE STEERING]

### DTC Index

#### INFOID:000000013356563

×: Applicable

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		Detecting control module					_
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference	D C
C13A0-00	CONTROL MODULE	×	×	×	ON	<u>STC-219</u>	
C13A1-00	CONTROL MODULE	×	×	×	ON	<u>STC-221</u>	F
C13A2-00	CONTROL MODULE	×	×	×	ON	<u>STC-225</u>	_
C13A3-00	CONTROL MODULE	×	×	×	ON	STC-228	STC
C13A4-00	CONTROL MODULE		×	×	ON	<u>STC-230</u>	510
C13A5-00	CONTROL MODULE			×	OFF		_
C13A6-00	CONTROL MODULE		×		ON	<u>STC-234</u>	Н
C13A7-00	CONTROL MODULE		×		ON	STC-235	_
C13A8-00	BACK UP CIRCUIT	×	×	×	ON	<u>STC-237</u>	_
C13A9-00	BACK UP CIRCUIT	×	×	×	ON	<u>STC-242</u>	_
C13AA-00	CONTROL MODULE	×	×	×	ON	<u>STC-247</u>	_
C13AB-00	CONTROL MODULE	×	×	×	ON	<u>STC-251</u>	J
C13AC-00	CONTROL MODULE		×		ON	<u>STC-254</u>	
C13AD-00	CONTROL MODULE	×	×	×	ON	<u>STC-257</u>	_
C13AE-00	CONTROL MODULE	×	×	×	ON	STC-263	- K
C13AF-00	CONTROL MODULE	×	×	×	ON	<u>STC-266</u>	_
C13B0-00	CONTROL MODULE	×	×	×	ON	<u>STC-269</u>	L
C13B1-00	CONTROL MODULE	×	×	×	ON	<u>STC-272</u>	_
C13B2-00	CONTROL MODULE	×	×	×	ON	<u>STC-275</u>	_
C13B3-00	CONTROL MODULE	×	×	×	ON	<u>STC-281</u>	M
C13B4-00	CONTROL MODULE	×	×	×	ON	<u>STC-287</u>	
C13B5-00	CONTROL MODULE	×	×	×	ON	<u>STC-290</u>	N
C13B6-00	MOTOR CIRCUIT	×	×	×	ON	<u>STC-297</u>	
C13B7-00	CONTROL MODULE	×	×	×	ON	<u>STC-304</u>	
C13B8-00	CONTROL MODULE	×	×	×	ON	<u>STC-310</u>	0
C13B9-00	CONTROL MODULE	×	×	×	ON	<u>STC-313</u>	_
C13BA-00	CONTROL MODULE POWER SUPPLY	×	×	×	ON	<u>STC-319</u>	-
C13BB-00	CONTROL MODULE POWER SUPPLY	×	×	×	OFF	<u>STC-324</u>	– P
C13BC-00	CONTROL MODULE IGN POWER SUP	×	×	×	OFF	<u>STC-328</u>	
C13BD-00	CONTROL MODULE IGN POWER SUP		×		ON	<u>STC-332</u>	
C13BE-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	_
C13BF-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	
C13C0-00	FLEXRAY COMMUNICATION	×	×	×	ON	STC-334	

### < ECU DIAGNOSIS INFORMATION >

	Detecting control module		module			
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference
C13C1-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>
C13C2-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>
C13C3-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>
C13C4-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>
C13C5-00	STEERING ANGLE SENSOR SIGNAL	×			OFF	_
C13C6-00	G SENSOR SIGNAL	×			OFF	_
C13C7-00	VEHICL SPEED SIGNAL	×			OFF	_
C13C9-00	DRIVE MODE SIGNAL	×			OFF	_
C13CA-00	ENGINE STATUS SIGNAL	×			OFF	_
C13CC-00	T/M GEAR POSI SIGNAL	×			OFF	_
C13CD-00	ENGINE SPEED SIGNAL	×			OFF	
C13CE-00	SLEEP WAKE UP SIGNAL	×			OFF	_
C13CF-00	ALC FUNCTION REQUEST SIGNAL		×		OFF	<u>STC-354</u>
C13D0-00	ALC FUNCTION REQUEST SIGNAL		×		OFF	<u>STC-356</u>
C13D1-00	STEERING ANGLE SENSOR SIGNAL		×		OFF	<u>STC-358</u>
C13D2-00	CONTROL MODULE	×	×	×	ON	<u>STC-361</u>
C13D3-00	CONTROL MODULE	×	×	×	ON	<u>STC-364</u>
C13D4-00	CONTROL MODULE	×	×	×	ON	<u>STC-368</u>
C13D5-00	CONTROL MODULE	×	×	×	ON	<u>STC-374</u>
C13D6-00	CONTROL MODULE	×	×	×	ON	<u>STC-378</u>
C13D7-00	CONTROL MODULE	×	×	×	ON	<u>STC-384</u>
C13D8-00	CONTROL MODULE	×	×		OFF	<u>STC-388</u>
C13D9-00	CONTROL MODULE	×	×		OFF	<u>STC-390</u>
C13DB-00	STEERING TORQUE SENSOR		×		ON	<u>STC-392</u>
C13DC-00	STEERING TORQUE SENSOR		×		ON	<u>STC-395</u>
C13DD-00	STEERING TORQUE SENSOR		×		ON	<u>STC-398</u>
C13DE-00	TEMPERATURE SENSOR	×	×	×	OFF	<u>STC-403</u>
C13DF-00	CONTROL MODULE		×		ON	<u>STC-407</u>
C13E0-00	ST CLUTCH COMMAND CIRCUIT	×			OFF	_
C13E1-00	STEERING CLUTCH	×			OFF	
C13E2-00	BOOTING ST CLUTCH NORMAL ACT	×			OFF	
C13E3-00	FRONT WHEEL SENSOR SIGNAL	×			OFF	
C13E4-00	ST CLUTCH RELEASE PROTECTION	×			OFF	
C13E5-00	ST CLUTCH RELEASE PROTECTION	×			OFF	
C13E6-00	HEAT PROTECTION	×	×	×	OFF	<u>STC-424</u>

### STEERING ANGLE MAIN CONTROL MODULE INFORMATION > [DIRECT ADAPTIVE STEERING]

#### < ECU DIAGNOSIS INFORMATION >

		Detec	Detecting control module				٨
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference	B C D
C13E7-00	LOW VOLTAGE PROTECTION	×	×	×	OFF	<u>STC-428</u>	_
C13E8-00	CURB STONE PROTECTION	×	×	×	OFF	<u>STC-433</u>	E
C13E9-00	BOOTING ANGLE PROCESSING		×		ON	<u>STC-436</u>	_
C13EA-00	BOOTING ANGLE PROCESSING	×			OFF		F
C13EB-00	BOOTING ANGLE PROCESSING		×	×	ON	<u>STC-441</u>	_
C13EE-00	INCOMP CONFIG	×	×	×	ON	<u>STC-448</u>	
C13EF-00	CONFIG CHECK RESULT	×	×	×	ON	<u>STC-452</u>	ST
C13F0-00	INCOMP DAST CALIBRATION	×	×	×	ON	<u>STC-456</u>	_
C13F1-00	INCOMP ST ANG SEN ADJST	×			OFF		- Н
C13F2-00	DIFFERENT SOFTWARE VERSION	×	×	×	ON	<u>STC-460</u>	
U1000-01	CAN COMM CIRCUIT	×	×		OFF	<u>STC-463</u>	_
U1010-49	CONTROL UNIT (CAN)	×	×		OFF	<u>STC-466</u>	

### NOTE:

If two or more DTCs are detected, refer to STC-167, "DTC Inspection Priority Chart".

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### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

### STEERING ANGLE SUB CONTROL MODULE

### **Reference Value**

INFOID:000000013356564

### 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	Condition	Display value
	Judging system starting	BOOT
	System is diagnosing	DIAG1 – DIAG10
	Processing system shutdown	FIN1 – FIN12
	Finish the system control	DOWN1
	Wait for shutdown	DOWN2
	System is shutdown	DOWN3
OWN ECU SYS STATUS	System is in fail-safe mode 1	MALF1
	System is in fail-safe mode 2	MALF2
	System is in fail-safe mode 3	MALF3
	Performing initial setting	SETTING
	System is in normal control	STD1 STD2
	System is in protection mode	STD3
	System is synchronizing	SYNC
	Judging system starting	BOOT
	System is diagnosing	DIAG1 – DIAG10
	Processing system shutdown	FIN1 – FIN12
	Finish the system control	DOWN1
	Wait for shutdown	DOWN2
	System is shutdown	DOWN3
ST ANG MAIN SYS STATUS	System is in fail-safe mode 1	MALF1
	System is in fail-safe mode 2	MALF2
	System is in fail-safe mode 3	MALF3
	Performing initial setting	SETTING
	System is in normal control	STD1 STD2
	System is in protection mode	STD3
	System is synchronizing	SYNC

### < ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Display value	
	Judging system starting	BOOT	A
	System is diagnosing	DIAG1 – DIAG10	
	Processing system shutdown	FIN1 – FIN12	В
	Finish the system control	DOWN1	
	Wait for shutdown	DOWN2	
	System is shutdown	DOWN3	С
ST ANG SUB SYS STATUS	System is in fail-safe mode 1	MALF1	
51 ANG 500 515 51A105	System is in fail-safe mode 2	MALF2	D
	System is in fail-safe mode 3	MALF3	
	Performing initial setting	SETTING	
	System is in normal control	STD1 STD2	E
	System is in protection mode	STD3	
	System is synchronizing	SYNC	F
	Judging system starting	BOOT	
	System is diagnosing	DIAG1 – DIAG10	ST
	Processing system shutdown	FIN1 – FIN12	
	Finish the system control	DOWN1	
	Wait for shutdown	DOWN2	Н
	System is shutdown	DOWN3	
ST FORCE SYS STATUS	System is in fail-safe mode 1	MALF1	
	System is in fail-safe mode 2	MALF2	
	System is in fail-safe mode 3	MALF3	
	Performing initial setting	SETTING	J
	System is in normal control	STD1 STD2	
	System is in protection mode	STD3	K
	System is synchronizing	SYNC	
BACK UP CIRCUIT STATUS	Always	0 – 255	1
CONTROL MODULE CRNT	Always	0 – 255 A	
DETAILED CODE 1	This is displayed, but it is not used.	0 – 255	
DETAILED CODE 2	This is displayed, but it is not used.	0 – 255	M
DETAILED CODE 3	This is displayed, but it is not used.	0 – 255	
FLEXRAY COMM SYNC STATS	Always	STAT1 – 10	Ν
STEERING MODE	Always	CHARA – CHARA I	
ST CLUTCH PRTCT STATUS	Always	STAT0 – STAT12, STAT20	$\cap$
ST CLUTCH CON RQEST	Always	STAT0 – STAT5	
	FlexRay communication of steering angle sub control module is normal.	NORMAL	Р
FLEXRAY COMM DIAG (OWN)	FlexRay communication of steering angle sub control module is being diagnosed.	DIAG	-
	FlexRay communication of steering angle sub control module is malfunction.	MALF	

### < ECU DIAGNOSIS INFORMATION >

Monitor item	Con	Display value	
	FlexRay communication of steen normal.	NORMAL	
FLEXRAY COMM DIAG (OTH1)	FlexRay communication of steen being diagnosed.	DIAG	
	FlexRay communication of steen malfunction.	ring angle main control module is	MALF
	FlexRay communication of steen mal.	ring force control module is nor-	NORMAL
FLEXRAY COMM DIAG (OTH2)	FlexRay communication of steen diagnosed.	ring force control module is being	DIAG
	FlexRay communication of steer function.	ring force control module is mal-	MALF
	Power train stops.		STOP
POWER TRAIN STATUS	Power train starts.		RUN
		Control module detects ignition voltage.	ON
IGN SW STATUS (OWN ECU)	Ignition switch: ON	Control module does not de- tects ignition voltage.	OFF
IGN SW/ STATUS (SYSTEM)	Ignition switch: ON	Control module detects ignition voltage.	ON
	Ignition switch. ON	Control module does not de- tects ignition voltage.	OFF
	Stop/start system is operating.	ON	
510P/51ART 51A105	Stop/start system is not operatin	OFF	
	Instantaneous voltage drop state	UNDTCT	
INSTANT VLI DROP DETECT	Instantaneous voltage drop statu	DETECT	
	The state of hitting curb stone is	UNDTCT	
CURB STONE DETECT STATS	The state of hitting curb stone is	DETECT	
	System is abnormal.	STAT1	
BACK UP CIRCUIT A STATUS	System is normal.	STAT2	
	System is abnormal.	STAT1	
BACK UP CIRCUIT B STATUS	System is normal.	STAT2	
	Free roller mode: ON		ON
FREE ROLLER MODE	Free roller mode: OFF		OFF
		System is normal mode (Driving is OK)	PERMIT
CHASSIS DTNAMO MODE	Engine running	System is chassis dynamome- ter mode (Driving is NG)	PROHBT
	When system is starting, the required angle information is record- ed in control module.		ОК
	When system is starting, the required angle information is not re- corded in control module.		NG
BACK UP SIG 1 VOLT	Ignition switch ON When steering angle sub con- trol module is normal.		Approx. 0.5 – 4.75 V
BACK UP SIG 2 VOLT	Ignition switch ON	When steering angle sub con- trol module is normal.	Approx. 0.5 – 4.75 V
INVERTER RELAY ACT VOLT	Engine running	Battery voltage	
CONT MODULE INSIDE VOLT	Engine running		Battery voltage – Approx. 0.6 V
BATTERY VOLT AGE	Ignition switch ON		Battery voltage

### < ECU DIAGNOSIS INFORMATION >

Monitor item	Condition		Display value		
IGN VOLTAGE	Ignition switch ON		Battery voltage	A	
C/M TEMPERATURE	Engine running	Display temperature of inside of steering angle sub control mod- ule [°C °F)]	В		
	Vehicle stopped	0.00 km/h or 0.00 MPH			
VEHICLE SPEED	Start the engine. Wait a minute. CAUTION: Check air pressure of tire und	Drive the vehicle.	Approximately equal to the indi- cation on speedometer (Inside of $\pm 10\%$ )	С	
	Vehicle stopped		Approx. 0 deg/s		
YAW RATE	Vehicle turning		Approx. 0 - ±201 deg/s	D	
	Vehicle stopped		Approx. 0 m/s^2		
SIDE G	Vehicle turning		Approx. 0 - ±2 m/s^2	E	
ST CLUTCH ACT CURRENT	Engine running		Approx. 0 – 5 A		
		Steering wheel: Not steering (There is no steering force)	Approx. 0 A	F	
MOTOR U ACT CURRENT	Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 - 70 A)		
		Steering wheel: Left turn	Negative vale [Approx. (-70) - (0) A]	ST	
	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 A	Н	
MOTOR W ACT CURRENT		Steering wheel: Right turn	Positive vale (Approx. 0 - 70 A)		
		Steering wheel: Left turn	Negative vale [Approx. (-70) - (0) A]		
TORQUE SEN MAIN 1	Engine running		Approx. (-8.5) - 8.5 N·m		
TEMPERATURE SENSOR	Ignition switch ON or Engine ru	nning	Display temperature of inside of steering angle sub control mod- ule [°C °F)]	J	
ANGLE SENSOR SIGNAL 1	Engine running		Approx. 1.0 - 3.5 V	K	
ANGLE SENSOR SIGNAL 2	Engine running		Approx. 1.0 - 3.5 V		
ANGLE 1	Engine running		Approx. (-4.4) - 4.4 deg		
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg	L	
ANGLE 2	Engine running	Steering wheel: Right turn	Positive vale	в. Л	
		Steering wheel: Left turn	Negative vale	IVI	
F/B ANGLE 1	Engine running		Approx. (-20) - 20 deg		
F/B ANGLE 2	Engine running		Approx. (-6) - 6 deg	Ν	
		Steering wheel: Not steering (There is no steering force)	Approx. 0 deg		
ST ANGLE SENSOR	ENSOR Engine running	Steering wheel: Right turn	Positive vale (Approx. 0 – 900 deg)	0	
		Steering wheel: Left turn	Negative vale [Approx. (–900) – 0 deg]	g] P	
ANGLE DIFFERENCE	Engine running		Approx. 0 – 300 deg		

#### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

Monitor item	Con	dition	Display value
STEERING PINION ANGLE	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 deg
		Steering wheel: Right turn	Positive vale (Approx. 0 – 550 deg)
		Steering wheel: Left turn	Negative vale [Approx. (–550) – 0 deg]
	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 deg
STEERING PINION ANGLE 2		Steering wheel: Right turn	Positive vale (Approx. 0 – 550 deg)
		Steering wheel: Left turn	Negative vale [Approx. (–550) – 0 deg]
ANGLE 3	Engine running		Approx. (-7425) - 7425 deg

### Fail-safe

INFOID:000000013356565

- If a malfunction occurs in the system, the fail-safe function stops the system (mode 3), activates the fail-safe mode (mode 1 or mode 2) or activates the protection mode. When the system enters mode 1, mode 2 or mode 3, the power steering warning lamp illuminates to inform the driver that the turning force is heavy in effect.
- Since three control modules monitor malfunctions mutually, DTC code varies from control module to control module.

### < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

### • For details of protection function, refer to STC-179. "Protection Function".



	Relation between control module detecting DTC and system status				
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC		
C13A0-00	Variable	Variable	Variable		
C13A1-00	—	Mode 2	Mode 2		
C13A2-00	Mode 1 or Mode 3	Mode 1 or Mode 3	Mode 1 or Mode 3		
C13A3-00	Mode 2	Mode 2	Mode 2		
C13A4-00	—	Mode 2	Mode 2		
C13A5-00	—	—	Mode 2		
C13A6-00	—	Mode 3	_		
C13A7-00	—	Mode 3	_		
C13A8-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13A9-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13AA-00	Mode 2	Mode 3	Mode 2		

### < ECU DIAGNOSIS INFORMATION >

	Relation between control module detecting DTC and system status				
DTC	When steering force control mod- ule detects DTC	When steering angle main control module detects DTC	When steering angle sub control module detects DTC		
C13AB-00	Mode 2	Mode 3	Mode 2		
C13AC-00	_	Mode 3			
C13AD-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13AE-00	Mode 2	Mode 3	Mode 2		
C13AF-00	Mode 2	Mode 3	Mode 2		
C13B0-00	Mode 2	Mode 3	Mode 2		
C13B1-00	Mode 2	Mode 3	Mode 2		
C13B2-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B3-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B4-00	Mode 2	Mode 3	Mode 2		
C13B5-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B6-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B7-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B8-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13B9-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13BA-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13BB-00		_			
C13BC-00		_	_		
C13BD-00		Mode 2			
C13BE-00	Mode 2	Mode 2	Mode 2		
C13BF-00	Variable	Variable	Variable		
C13C0-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3		
C13C1-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3		
C13C2-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3		
C13C3-00	Mode 1, Mode 2 or Mode 3	Mode 2	Mode 1, Mode 2 or Mode 3		
C13C4-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13C5-00	Mode 2	_			
C13C6-00	Mode 2	_			
C13C7-00	Mode 2	_			
C13C8-00	—	_	_		
C13C9-00		_			
C13CA-00		_			
C13CB-00	—	_			
C13CC-00	—	_	_		
C13CD-00	—	_			
C13CE-00	_	—	_		
C13CF-00	-	_	_		
C13D0-00	—	—	_		
C13D1-00	-	_	-		
C13D2-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13D3-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13D4-00	Mode 2	Mode 1 or Mode 3	Mode 2		
C13D5-00	Mode 2	Mode 1 or Mode 3	Mode 2		

### STEERING ANGLE SUB CONTROL MODULE [DIRECT ADAPTIVE STEERING]

Relation between control module detecting DTC and system status

When steering angle main

control module detects DTC

Mode 1 or Mode 3

Mode 1 or Mode 3

\_\_\_\_

Mode 3<sup>\*1</sup>

Mode 2<sup>\*2</sup> Mode 3<sup>\*1</sup>

Mode 2<sup>\*2</sup>

Mode 3<sup>\*1</sup>

Mode 2<sup>\*2</sup>

Protection function mode

Mode 3<sup>\*1</sup>

Mode 2<sup>\*2</sup>

\_\_\_\_

Protection function mode

Protection function mode

Protection function mode

Mode 2

### < ECU DIAGNOSIS INFORMATION >

When steering force control mod-

ule detects DTC

Mode 2

Mode 2

\_\_\_\_

Protection function mode

Mode 2

Mode 2

Protection function mode

Protection function mode

Mode 2

Protection function mode

Protection function mode

Protection function mode

\_\_\_\_

Mode 2

DTC

C13D6-00

C13D7-00

C13D8-00

C13D9-00 C13DA-00

C13DB-00

C13DC-00

C13DD-00

C13DE-00

C13DF-00

C13E0-00

C13E1-00

C13E2-00

C13E3-00

C13E4-00

C13E5-00

C13E6-00

C13E7-00

C13E8-00

C13E9-00

C13EA-00

C13EB-00	_	Mode 2	Mode 2	
C13EE-00	Mode 3	Mode 3	Mode 3	l
C13EF-00	Mode 3	Mode 3	Mode 3	
C13F0-00	Mode 2	Mode 2	Mode 2	
C13F1-00	Mode 2	_	—	Ν
C13F2-00	Mode 2 or Mode 3	Mode 2 or Mode 3	Mode 2 or Mode 3	
U1000-01	_	_		Ν
U1010-49	_	_	_	
<ul> <li>*1: When control m</li> <li>*2: When control m</li> </ul>	nodule detects a malfunction a nodule detects a malfunction e	at startup. except during startup.		C
Protection Funct	tion		INFOID:000000013356566	
When battery voltage malfunctions temporarily, system overheats continuously and system is overloaded				

- continuously, system is in protection mode temporarily. This is not malfunction. · When a causative condition is cleared, the system returns to normal control automatically. (Except C13E5-00)
- Since the protection function condition is not malfunction, power steering warning lamp does not turn ON. (Except C13E5-00) The following DTCs remain to distinguish from malfunction.

STC-179

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When steering angle sub control

module detects DTC

Mode 2

Mode 2

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Protection function mode

\_\_\_\_

Protection function mode

Protection function mode

Protection function mode

STC

#### < ECU DIAGNOSIS INFORMATION >

DTC	Condition	Vehicle condition	
C13E3-00	The steering wheel is steered over the limit angle.	System changes to the protection mode temporarily. (Steering op-	
C13E4-00	When steering clutch is released, steering clutch is not released within regular time with overloading steering wheel.	eration may become heavy temporarily, however steering wheel can be operated without interference. This is not a system mal- function.)	
C13E5-00	When steering clutch is released, steering clutch is not released in spite of trying to release it many times with overloading steering wheel.	System changes to fail-safe mode (mode 2). For fail-safe, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".	
C13E6-00	EPS/DAST 3: Internal temperature of steering force motor is 150°C (302°F) or more.		
	DAST 1, DAST 2: Internal temperature of control module is 90°C (194°F) or more.	System changes to the protection mode temporarily. (Steering op-	
C13E7-00	Power supply voltage of control module is low tem- porarily.	can be operated without interference. This is not a system mal- function.)	
C13E8-00	<ul> <li>Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other sub- stances.</li> <li>Steering gear is out of neutral position. (Large)</li> </ul>		

### **DTC Inspection Priority Chart**

INFOID:000000013356567

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

Priority	Priority order item (DTC)		
1	U1000-01 CAN COMM CIRCUIT     U1010-49 CONTROL UNIT (CAN)		
2	<ul> <li>C13C5-00 STEERING ANGLE SENSOR SIGNAL</li> <li>C13C6-00 G SENSOR SIGNAL</li> <li>C13C7-00 VEHICL SPEED SIGNAL</li> <li>C13C8-00 ST FUNCTION REQUEST SIGNAL</li> <li>C13C9-00 DRIVE MODE SIGNAL</li> <li>C13CA-00 ENGINE STATUS SIGNAL</li> <li>C13CC-00 T/M GEAR POSI SIGNAL</li> <li>C13CC-00 T/M GEAR POSI SIGNAL</li> <li>C13CC-00 ENGINE SPEED SIGNAL</li> <li>C13CE-00 SLEEP/WAKEUP SIGNAL</li> <li>C13CF-00 ALC FUNCTION REQUEST SIGNAL</li> <li>C13D0-00 ALC FUNCTION REQUEST SIGNAL</li> <li>C13D1-00 STEERING ANGLE SENSOR SIGNAL</li> </ul>		
3	<ul> <li>C13E9-00 BOOTING ANGLE PROCESSING</li> <li>C13EA-00 BOOTING ANGLE PROCESSING</li> <li>C13EB-00 BOOTING ANGLE PROCESSING</li> <li>C13EE-00 INCOMP CONFIG</li> <li>C13EF-00 CONFIG CHECK RESULT</li> <li>C13F0-00 IMCOMP DAST CALIBRATION</li> <li>C13F1-00 INCOMP ST ANG SEN ADJST</li> <li>C13F2-00 DIFFERENT SOFTWARE VERSION</li> </ul>		
## STEERING ANGLE SUB CONTROL MODULE

# < ECU DIAGNOSIS INFORMATION >

Priority	Priority order item (DTC)	
4	<ul> <li>C13A8-00 BACK UP CIRCUIT</li> <li>C13A9-00 BACK UP CIRCUIT</li> <li>C13AB-00 CONTROL MODULE</li> <li>C13AC-00 CONTROL MODULE</li> <li>C13B6-00 MOTOR CIRCUIT</li> <li>C13B9-00 CONTROL MODULE POWER SUPPLY</li> <li>C13BB-00 CONTROL MODULE IGN POWER SUP</li> <li>C13BC-00 CONTROL MODULE IGN POWER SUP</li> <li>C13BD-00 CONTROL MODULE IGN POWER SUP</li> <li>C13D4-00 CONTROL MODULE IGN POWER SUP</li> <li>C13D4-00 CONTROL MODULE</li> <li>C13D8-00 STEERING TORQUE SENSOR</li> <li>C13DD-00 STEERING TORQUE SENSOR</li> <li>C13DD-00 STEERING TORQUE SENSOR</li> <li>C13DE-00 TEMPERATURE SENSOR</li> <li>C13DE-00 ST CLUTCH COMMAND CIRCUIT</li> <li>C13E1-00 STEERING CLUTCH</li> <li>C13E2-00 FRONT WHEEL SENSOR SIGNAL</li> </ul>	A B C D E
5	<ul> <li>C13BE-00 FLEXRAY COMMUNICATION</li> <li>C13BF-00 FLEXRAY COMMUNICATION</li> <li>C13C0-00 FLEXRAY COMMUNICATION</li> <li>C13C1-00 FLEXRAY COMMUNICATION</li> <li>C13C2-00 FLEXRAY COMMUNICATION</li> <li>C13C3-00 FLEXRAY COMMUNICATION</li> <li>C13C4-00 FLEXRAY COMMUNICATION</li> </ul>	F
6	<ul> <li>C13A0-00 CONTROL MODULE</li> <li>C13A1-00 CONTROL MODULE</li> <li>C13A2-00 CONTROL MODULE</li> <li>C13A3-00 CONTROL MODULE</li> <li>C13A4-00 CONTROL MODULE</li> <li>C13A5-00 CONTROL MODULE</li> <li>C13A6-00 CONTROL MODULE</li> <li>C13A7-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13AF-00 CONTROL MODULE</li> <li>C13BF-00 CONTROL MODULE</li> <li>C13BF-00 CONTROL MODULE</li> <li>C13B2-00 CONTROL MODULE</li> <li>C13B2-00 CONTROL MODULE</li> <li>C13B2-00 CONTROL MODULE</li> <li>C13B3-00 CONTROL MODULE</li> <li>C13B5-00 CONTROL MODULE</li> <li>C13B7-00 CONTROL MODULE</li> <li>C13D7-00 CONTROL MODULE</li> <li>C13D6-00 CONTROL MODULE</li> <li>C13D7-00 CONTROL MODULE</li> <li>C13D7-00 CONTROL MODULE</li> <li>C13D7-00 CONTROL MODULE</li> </ul>	H J K L N
7	<ul> <li>C13DF-00 CONTROL MODULE</li> <li>C13E3-00 SPIRAL CABLE PROTECTION</li> <li>C13E4-00 ST CLUTCH RELEASE PROTECTION</li> <li>C13E5-00 ST CLUTCH RELEASE PROTECTION</li> <li>C13E6-00 HEAT PROTECTION</li> <li>C13E7-00 LOW VOLTAGE PROTECTION</li> </ul>	O
	C13E8-00 CURB STONE PROTECTION	

## STEERING ANGLE SUB CONTROL MODULE

## < ECU DIAGNOSIS INFORMATION >

[DIRECT ADAPTIVE STEERING]

## **DTC** Index

INFOID:000000013356568

 $\times$ : Applicable

		Detect	ting control	module		
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference
C13A0-00	CONTROL MODULE	×	×	×	ON	STC-219
C13A1-00	CONTROL MODULE	×	×	×	ON	STC-222
C13A2-00	CONTROL MODULE	×	×	×	ON	STC-226
C13A3-00	CONTROL MODULE	×	×	×	ON	<u>STC-229</u>
C13A4-00	CONTROL MODULE		×	×	ON	STC-231
C13A5-00	CONTROL MODULE			×	ON	STC-232
C13A6-00	CONTROL MODULE		×		OFF	_
C13A7-00	CONTROL MODULE		×		OFF	_
C13A8-00	BACK UP CIRCUIT	×	×	×	ON	<u>STC-239</u>
C13A9-00	BACK UP CIRCUIT	×	×	×	ON	<u>STC-244</u>
C13AA-00	CONTROL MODULE	×	×	×	ON	<u>STC-248</u>
C13AB-00	CONTROL MODULE	×	×	×	ON	<u>STC-252</u>
C13AC-00	CONTROL MODULE		×		OFF	_
C13AD-00	CONTROL MODULE	×	×	×	ON	<u>STC-259</u>
C13AE-00	CONTROL MODULE	×	×	×	ON	<u>STC-263</u>
C13AF-00	CONTROL MODULE	×	×	×	ON	<u>STC-266</u>
C13B0-00	CONTROL MODULE	×	×	×	ON	<u>STC-269</u>
C13B1-00	CONTROL MODULE	×	×	×	ON	<u>STC-272</u>
C13B2-00	CONTROL MODULE	×	×	×	ON	<u>STC-277</u>
C13B3-00	CONTROL MODULE	×	×	×	ON	<u>STC-283</u>
C13B4-00	CONTROL MODULE	×	×	×	ON	<u>STC-287</u>
C13B5-00	CONTROL MODULE	×	×	×	ON	STC-292
C13B6-00	MOTOR CIRCUIT	×	×	×	ON	<u>STC-300</u>
C13B7-00	CONTROL MODULE	×	×	×	ON	<u>STC-306</u>
C13B8-00	CONTROL MODULE	×	×	×	ON	<u>STC-310</u>
C13B9-00	CONTROL MODULE	×	×	×	ON	STC-315
C13BA-00	CONTROL MODULE POWER SUPPLY	×	×	×	ON	STC-321
C13BB-00	CONTROL MODULE POWER SUPPLY	×	×	×	OFF	<u>STC-326</u>
C13BC-00	CONTROL MODULE IGN POWER SUP	×	×	×	OFF	<u>STC-328</u>
C13BD-00	CONTROL MODULE IGN POWER SUP		×		OFF	_
C13BE-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>
C13BF-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>
C13C0-00	FLEXRAY COMMUNICATION	×	×	×	ON	STC-334

## STEERING ANGLE SUB CONTROL MODULE

#### < ECU DIAGNOSIS INFORMATION >

### [DIRECT ADAPTIVE STEERING]

		Detec	ting control	module			_
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference	B C D
C13C1-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	_
C13C2-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	E
C13C3-00	FLEXRAY COMMUNICATION	×	×	×	ON	STC-334	
C13C4-00	FLEXRAY COMMUNICATION	×	×	×	ON	<u>STC-334</u>	F
C13C5-00	STEERING ANGLE SENSOR SIGNAL	×			OFF		_ '
C13C6-00	G SENSOR SIGNAL	×			OFF		_
C13C7-00	VEHICL SPEED SIGNAL	×			OFF		STO
C13C9-00	DRIVE MODE SIGNAL	×			OFF		-
C13CA-00	ENGINE STATUS SIGNAL	×			OFF		- Ц
C13CC-00	T/M GEAR POSI SIGNAL	×			OFF		
C13CD-00	ENGINE SPEED SIGNAL	×			OFF		
C13CE-00	SLEEP WAKE UP SIGNAL	×			OFF		
C13CF-00	ALC FUNCTION REQUEST SIGNAL		×		OFF		
C13D0-00	ALC FUNCTION REQUEST SIGNAL		×		OFF		-
C13D1-00	STEERING ANGLE SENSOR SIGNAL		×		OFF		_ J
C13D2-00	CONTROL MODULE	×	×	×	ON	<u>STC-361</u>	
C13D3-00	CONTROL MODULE	×	×	×	ON	<u>STC-364</u>	K
C13D4-00	CONTROL MODULE	×	×	×	ON	<u>STC-370</u>	
C13D5-00	CONTROL MODULE	×	×	×	ON	<u>STC-374</u>	-
C13D6-00	CONTROL MODULE	×	×	×	ON	<u>STC-380</u>	- L
C13D7-00	CONTROL MODULE	×	×	×	ON	<u>STC-384</u>	
C13D8-00	CONTROL MODULE	×	×		OFF		M
C13D9-00	CONTROL MODULE	×	×		OFF		
C13DB-00	STEERING TORQUE SENSOR		×		OFF		
C13DC-00	STEERING TORQUE SENSOR		×		OFF		N
C13DD-00	STEERING TORQUE SENSOR		×		OFF		
C13DE-00	TEMPERATURE SENSOR	×	×	×	OFF	<u>STC-404</u>	0
C13DF-00	CONTROL MODULE		×		OFF	—	0
C13E0-00	ST CLUTCH COMMAND CIRCUIT	×			OFF		_
C13E1-00	STEERING CLUTCH	×			OFF	—	Ρ
C13E2-00	FRONT WHEEL SENSOR SIGNAL	×			OFF	—	_
C13E3-00	SPIRAL CABLE PROTECTION	×			OFF	_	_
C13E4-00	ST CLUTCH RELEASE PROTECTION	×			OFF	—	_
C13E5-00	ST CLUTCH RELEASE PROTECTION	×			OFF	—	_
C13E6-00	HEAT PROTECTION	×	×	×	OFF	STC-425	

### STEERING ANGLE SUB CONTROL MODULE IFORMATION > [DIRECT ADAPTIVE STEERING]

#### < ECU DIAGNOSIS INFORMATION >

		Detect	ting control	module		
DTC	Items	Steering force control module	Steering angle main control module	Steering angle sub control module	Power steering warning lamp	Reference
C13E7-00	LOW VOLTAGE PROTECTION	×	×	×	OFF	<u>STC-430</u>
C13E8-00	CURB STONE PROTECTION	×	×	×	OFF	<u>STC-434</u>
C13E9-00	BOOTING ANGLE PROCESSING		×		OFF	_
C13EA-00	BOOTING ANGLE PROCESSING	×			OFF	_
C13EB-00	BOOTING ANGLE PROCESSING		×	×	ON	<u>STC-443</u>
C13EE-00	INCOMP CONFIG	×	×	×	ON	<u>STC-449</u>
C13EF-00	CONFIG CHECK RESULT	×	×	×	ON	<u>STC-453</u>
C13F0-00	INCOMP DAST CALIBRATION	×	×	×	ON	<u>STC-456</u>
C13F1-00	INCOMP ST ANG SEN ADJST	×			OFF	_
C13F2-00	DIFFERENT SOFTWARE VERSION	×	×	×	ON	STC-460
U1000-01	CAN COMM CIRCUIT	×	×		OFF	_
U1010-49	CONTROL UNIT (CAN)	×	×		OFF	_

#### NOTE:

If two or more DTCs are detected, refer to STC-180, "DTC Inspection Priority Chart".

#### WIRING DIAGRAM А DIRECT ADAPTIVE STEERING Wiring Diagram INFOID:000000013356569 В JOINT CONNECTOR-M07 (M177) AWD models (2W): 2WD models A/T ASSEMBLY С CONNECT LCM F100\* INIO D COMBINATION METER (M58) **★**1 4: (OS) **★**2 3: (OS) 10: (ES) 24: (ES) ₽ Е JOINT CONNECTOR-M05 (M175) 175 F ECM E152 176 \*: This connector is not shown in "Harness Layout". JOINT CONNECTOR E01 E172 18 JOINT CONNECTOR -M10 (M137) STC STEERING ANGLE SENSOR (M77) Н STEERING FORCE CONTROL MODULE (M71), (M72), (M151), (M152) ഹ FORCE MOTOR ANGLE SENSOR (M73) JOINT 4 CONNECTOR-M03 (M173) CHASSIS CONTROL MODULE E219 : ES 2 i\_\_\_. \* J ₽ P CAN GATEWAY M155 Κ 2 STEERING CLUTCH M156 L DIRECT ADAPTIVE STEERING SYSTEM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (E35) 15 Μ 24 STEERING FORCE MOTOR (M153), (M154) 52 18 17 JOINT CONNECTOR B116 JOINT CONNECTOR E02 (B120) E04 E04 E118) E011 FUSE BLOCK (J/B) (M133) Ν IGNITION SWITCH ON or START 10A Ο 25 E66 Ρ 2016/02/15 BATTERY JRGWC3184GB



Revision: November 2016



Ρ



JRGWC3187GB

UIRECT ADAPTIVE STEEKING STSTEIN									
Connector No. E13	~	w	CHASSIS COMM-L	31	>	- [With 2.0L turbo gasoline engine]	70	æ	
Connector Name WIRE TO WIRE	1 1 1 1 1	BG	th 2.0L turbo gasoline engine]	F C	> (	- [With VR30 engine]	5	<u>ب</u> ی	- [With 2.0L turbo gasoline engine]
Connector Type Buildeb	a :	= 9 -		7 <u>5</u>	<i>ء</i> و	- [With 2.0L turbo gasoline engine]	7 2	2 -	- [WITN VK3U engine] - [Mith 2 OI surbo modino andino]
connector type Antzia	1		CITAGOIS COMIN-FI	7 6	5 -	- [with VR30 engine]	7		- [WILL Z.OL ULDU BASOIILE ENBITE]
€.	1		Mith 2.01 turbo carolino pacinol	6 6	. >	- [with vido engine]	1 2	• •	[WILL VED CIRCLE]
F	19	RR CHASSIS	COMM-H [With VR30 engine]	34			52	> >	- [With 2 OI turbo gasoline engine]
	19	L CHASSIS COM	M-H [With 2.0L turbo gasoline engine]	8	B		74	8	- [With VR30 engine]
	23	6 FSS	RELAY [With VR30 engine]	36	~		74	-	- [With 2 01 turbo asoline ensine]
A211110 9 8 2	23	R ESS RELAY I	With 2.0L turbo gasoline engine	37	-	- [With 2.0L turbo gasoline engine]	75	•	- [With 2.0L turbo gasoline engine and without gateway]
)			,	37	>	- [With VR30 engine]	75	~	- [With 2.01 turbo Pasoline envine and with pateway]
				ĥ	· -	- [Mith VD30 and and	2 14	: >	- [M/ith V/020 and minol
Terminal Color Of	Connector	NO F25		ŝ	, .	- [With 2 OI high gasoline engine and without gateword	76	. e	
No Without Signal Name [Specification]		100		e e		[10164-7] Of anthe second conjust and ministration (1016-101)	2	, >	
- CD	Connector	Name WIRE TO WIR	E	e e		Device a Di Resolute automice allo Recención de la company	1		[With 2 OI and 2 million of the second
- 28		The second		50	¥	- [with 2.0L turbo gasoline engine]	×/	2	- [with 2.0L turbo gasoline engine and with AUAS]
	COLLIGCTO.	TAPE TRACEW-CST	0-11VI4	20		- [with vk30 engine]	°		- [with vksu engine]
	ą			40	SB		8	>	<ul> <li>[With 2.0L turbo gasoline engine and without ADAS]</li> </ul>
4 L -	B	L	2 2 2 2 2	41	ГG		79	88	
5 G -		z	21 01 051 151 210 21 051 051 210 210 20 12 051 051 20 1	44	Y		80	9	
6 R -	2.1	لقر		45	-	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	81	œ	
7 P -		*18		45	×	- [With VR30 engine]	82	>	
88		1	<ol> <li>101 102 41 201 10 5</li> <li>10 2</li> </ol>	46		- [With VR30 engine]	83	ß	- [With 2.0L turbo gasoline engine]
ه الا ا				46	>	- [M/ith 2 01 turbo ascoline angine]	83	۵	- [Mith VR30 engine]
10 W				47			8	<u> </u>	[]
11 V	Terminal	Color Of		48	CHIFLD		96	s s	
	ol v	Mirro Sig.	nal Name [Specification]	p q	1		3 5	3 0	
- NG 71	NO.	MIR		7 7	× ;		ò	: ۲	
	-	99		0,5	¥	- [With VK3U engine]	68	2	
	٥	>		20	35	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	95	9	- [With VR30 engine]
Connector No. E22	2			51			6	ß	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>
Connector Name CHASSIS CONTROL MODULE	00	BG	- [With VR30 engine]	52	≥		91	9	
	8	BR - [With	2.0L turbo gasoline engine]	53	^	-	93	BG	-
Connector Type TH24FW-NH	6	B - [With	2.0L turbo gasoline engine]	54	٩	- [With VR30 engine]	94	GR	- [With VR30 engine]
	6	GR - [with VR30 engl	ne) (Color of wire differs depending on production)	54	>	- [With 2.0L turbo gasoline engine]	94	-	- [With 2.0L turbo gasoline engine]
€E	σ	1.G - [With VR30 engi	nel [Cotor of wire differs depending on production]	55	ď	- [With 2 01 turbo gasoline engine]	<u>д</u>	g	- [With VR30 engine]
F	ļ			8		[Mith VD30 control	8	2	[Mith 2.01 turbo mediao andiao and without metaurad
		6 -		5	۵ (		n t		
3 4 5 6 7 8 10 11 12		-		ŝ	2	- [With 2.0L turbo gasoline engine]	-6 - 	×	<ul> <li>[With 2.0L turbo gasoline engine and with gateway]</li> </ul>
19 23	ł	ž	- [WITN VK3U engine]	ŝ	9	- [With VK3U engine]	95	3	
	12	P - [With	2.0L turbo gasoline engine]	57	8	<ul> <li>[With VR30 engine]</li> </ul>	67	5	
	13	SHIELD - [With	2.0L turbo gasoline engine]	57	N	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	98	-	-
	13	>	- [With VR30 engine]	58	8	- [Color of wire differs depending on production]	66	5	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>
Terminal Color Of	14			58	B/W	<ul> <li>[Color of wire differs depending on production]</li> </ul>	66	٩	- [With VR30 engine]
No Mire Signal Name (Specification)	÷	CP . DMith	2 OI turbo ascolina anginal	9	M				[a0
2 D CAN I Datishand Catanuard	,		Particle Viono Secondo Criginal	9 5	; .		2 T		
2 CANVEL [WILITOUT DATEWER]	ç ;	ac ac		10	- ;				
2 K CAN-L [WILL GALEWAY]	<u>م</u>	DIX - NIII	1 2.UL LUEDO gasoline enginej	ð	-				
4 L CAN-H	16	>	<ul> <li>[With VR30 engine]</li> </ul>	65	BR	<ul> <li>[Color of wire differs depending on production]</li> </ul>			
5 V DRIVE MODE SELECT SWITCH (UP) [With VR30 engine]	17	BR	- [With VR30 engine]	65	GR	- [Color of wire differs depending on production]			
5 Υ DRIVE MODE SELECT SWITCH (UP) [Wth 2.0t turbo gazoline engine]	17	GR - With	2.0L turbo gasoline engine]	99	GR				
6 G DRIVE MODE SELECT SW (DOWN)/With 2.0L turbo zasoline engine!	3	G - [With	2.01 turbo gasoline engine]	67	<u>e</u>				
	2	, a		5	2				
	9	<b>.</b>	- [with VRSU Engine]	8	2				
7 W CHASSIS COMM-L	19	>		69	_				
7 W CHASSIS COMM-L	19	_ >	-	69		_			

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Terminal         Color Of Nice         Signal Name [Specification]           No.         Write         Signal Name [Specification]           1         W         Stermice Aware Monte Man Morton Resources storm, [Specification]           2         R         Stermice Aware Monte Man Morton Resources storm, [Specification]           3         BB         Stermine Aware Monte Man Morton Resources storm, [Specification]           4         Y         Stermine Aware Man Morton Resources storm, [Specification]           5         G         Stermine Aware Man Morton Resources storm, [Specification]	Connector No. E94 Connector Name SuB MOTOR ANGLE SENSOR Connector Type R-H0GFB	Terminal         Color Of Nine         Signal Name (Specification)           No         Nine         Signal Name (Specification)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           2         R         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           Connector Name         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           Connector Name         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           Connector Name         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           Connector Name         STERMIK AMELTS IM NOTOR RESOLVER SIGNAL (SS-34)           Mine         Notice         Signal Name (Specification)           No         Signal Name (Specification)         Notice           No         Signal Name (SPECKEN FORKER SUPER SIGNAL (SS-34)         Notice           No         No         Signal Name (SPECKEN FORKER SIGNAL (SS-34)           No	
Connector No. <u>E91</u> Connector Name STEERING ANGLE SUB MOTOR Connector Type RS01FB	Terminal         Color Of Wire         Signal Name (Specification)           No.         Wire         Signal Name (Specification)           4         SHIELD         GROUND           Connector Na.         E22         GROUND           Connector Na.         E22         Connector Name	Cometor type Eta6	
Connector No. E89 Connector Name STEERING ANGLE MAIN MOTOR Connector Type E-LA6	Terminal Color Of Signal Name [Specification] No. Write Signal Name [Specification] 4 SHELD GROUND Connector No. ED Connector Name STEENIG ANGLE SUB MOTOR	Image: Connector Type     1035B-AI       Image: Connector Type     Image: Connector Type       Im	
DIRECT ADAPTIVE STEERING SYSTEM 25 L CANH 28 C VACUUM SENSOR ENVERSUPPLY 28 C VACUUM SENSOR ENVERSUP 32 SHELD VACUUM SENSOR ENVOLUD 34 G IGN Connector No. E66	connector type to the to which connector type to the second secon	No.         Wire         Ometor         E87           Connector No.         E87         Mile         Ometor           Connector Name         Wift IO Wift         Mile         Ometor           Connector Name         Wift IO Wift         Mile         Ometor           Connector Name         Mile         Mile         Ometor           Connector Name         Mile         Mile         Ometor           Mile         Signal Name [Specification]         Mile         Ometor           None         Signal Name [Specification]         Ometor         Ometor	

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NODULE) NODULE) NODULE) NODULE) NODULE) Specification) ESpecification) ESpecification) ESpecification) ESpecification) NODULE NO	В
STAR         STAR           61         61           61         61           62         66           60         66           60         66           61         100           740         66           66         600           66         600           66         600           66         600           66         60           66         60           67         60           68         61           7         747           7         747           60         6           60         6           60         6           60         6           60         6           60         6           60         6           7         6           7         6           7         6           6         6           6         6           7         6           8         6           9         10           10         10           10         10	С
9         -           20         -           20         -           20         -           20         -           20         -           20         -           20         -           20         -           20         -           21         -           22         -           23         -           23         -           23         -           23         -           23         -           23         -           23         -           24         -           25         -           27         -           28         -           27         -           28         -           27         -           28         -           29         -           20         -           21         -           26         -           27         -           29         -           20         -           21         -      29 <td>D</td>	D
Incational	E
SEMBLY G. DOP G. DOP Seman Landon Landon Seman	F
Interctor         No.         F2           rector         No.         A/T A           rector         No.         Min           initial         Otion         Min           initial         Color         F2           initial         Color         F           initial         F         F	STC
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[DIRECT ADAPTIVE STEERING]

	DIRECT ,	ADAPTIVE STEERING SYSTEM									
	Connector No.	M24	11	>	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	56	BG	<ul> <li>[With VR30 engine]</li> </ul>	96	W	
	Connector Nam	Pe CAN GATEWAY	12	•	- [With VR30 engine]	56	GR	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	97	۲c	
			12	BR	- [With 2.0L turbo gasoline engine]	57	GR	- [With VR30 engine]	98	Y	
	Connector Typu	e TH12FW-NH	13	GR	- [With VR30 engine]	57	Р	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	66	BR	- [With VR30 engine]
	¢		13	SHIELD	- [With 2.0L turbo gasoline engine]	58	В		66	LG	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>
	E		14	8	-	59	SB		100	SHIELD	-
		K	15	BG	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	61	W/B				
	Ч. С. Н		15	88	- [With VR30 engine]	64	7				
			16	m	- [With VR30 engine]	65	н	4	Connector	No.	M58
			16	BR	- [With 2.0L turbo gasoline engine]	99	٩	- [Color of wire differs depending on production]			CONTRACTOR A APPEND
			17	9		99	>	- [Color of wire differs depending on production]	CONNECTOR	name	CUMBINATION METER
			18	œ	- [With VR30 engine]	67	LG		Connector	Type	TH12FW-NH
	Terminal Colc	or Of 511111111111111111111111111111111111	18	W/B	- [With 2.0L turbo gasoline engine]	68	BG				
	No. W	fire becincation)	61	~		69	-		E		
	1	L CAN-H (CAN COMMUNICATION CIRCUIT 1)	31	>		70	æ				(
	3	W BATTERY POWER SUPPLY	32	0	- [With 2.0L turbo gasoline engine]	71	>	- [With VR30 engine]	С.Н		41 40 40 44 45 40
	4	L CAN-H (CAN COMMUNICATION CIRCUIT 2)	32	>	- [With VR30 engine]	11	M	- [With 2.0L turbo gasoline engine]			
	2	B GROUND	33	-	- [With VR30 engine]	72	-	- [With 2.0L turbo gasoline engine]			4/ 48 D1 D2
1              Construction (Construction)             Second (Construction)	9	L CAN-H (CAN COMMUNICATION CIRCUIT 2)	33	>	- [With 2.0L turbo gasoline engine]	72	LG	- [With VR30 engine]			
9       0	·	P CAN-L (CAN COMMUNICATION CIRCUIT 1)	34	۵.	-	73	ч	- [With VR30 engine]			
<ul> <li></li></ul>	6	R IGNITION POWER SUPPLY [With VR30 engine and without ISS]	35	BG		73	Μ	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	Terminal	Color Of	[contemporation]
10         1         Curvit:Curvit/Cur	6	W IGNITION POWER SUPPLY [Except with VR30 engine and without ISS]	36	0		74	BR	- [With VR30 engine]	No.	Wire	Signal Ivallie (Specification)
1       1       0       00000         1       1       0       1000000000000000000000000000000000000	10 1	R CAN-L (CAN COMMUNICATION CIRCUIT 2)	37		- [With VR30 engine]	74	-	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	41	L	CAN-H
1         CMULLCANCONCICCUT(1)           1         0	11	B GROUND	37	-	- [With 2.0L turbo gasoline engine]	75	-	- [With VR30 engine]	42	Ь	CAN-L
Image: state of the s	12 1	R CAN-L (CAN COMMUNICATION CIRCUIT 2)	38	_	- [With VR30 engine]	75	д.	- [With 2.0L turbo gasoline engine and without gateway]	43	8	ILLUMINATION CONTROL SIGNAL
Image: Second			38	•	- [With 2.0L turbo gasoline engine and without gateway]	75	ж	- [With 2.0L turbo gasoline engine and with gateway]	44	7	FUEL LEVEL SENSOR GROUND
Contract No.         Mu0           Contract Num         Writ 10 Writ           Contract Num         Writ 10			38	œ	- [With 2.0L turbo gasoline engine and with gateway]	76	W/B		45	W	BATTERY POWER SUPPLY
Other for Mut       Wer TO Wits         Other Contron       Wer TO Wits         Mit Ward Contron       Wei TO Wits         Mit Ward Contron	Connector No.	M40	39	ж	- [With 2.0L turbo gasoline engine]	77	SB		46	BG	IGNITION SIGNAL [Except with VR30 engine and without ISS]
Mutuation         Construction         Construction <td>Connector Mare</td> <td></td> <td>39</td> <td>٨</td> <td>- [With VR30 engine]</td> <td>78</td> <td>9</td> <td>- [With VR30 engine]</td> <td>46</td> <td>R</td> <td>IGNITION SIGNAL [With VR30 engine and without ISS]</td>	Connector Mare		39	٨	- [With VR30 engine]	78	9	- [With VR30 engine]	46	R	IGNITION SIGNAL [With VR30 engine and without ISS]
Controct Type         TRANW CS15:TAA         21         1<			40	GR		78	FG LG	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	47	SB	AV COMMUNICATION SIGNAL (H)
	Connector Typu	e TH80MW-CS16-TM4	41		-	79	æ		48	۲G	AV COMMUNICATION SIGNAL (L)
Main         Main <th< td=""><td>4</td><td></td><td>44</td><td>BR</td><td></td><td>80</td><td>U</td><td>-</td><td>51</td><td>BR</td><td>FUEL LEVEL SENSOR SIGNAL</td></th<>	4		44	BR		80	U	-	51	BR	FUEL LEVEL SENSOR SIGNAL
Image: Normal state of the state o	B		45	-	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	81	æ		52	8	GROUND
	ŝ	1 4 000 000 000 000 000 000 000 000 000	45	≥	- [With VR30 engine]	82	٦				
Timulation         Connector No.         M11         Connector No.         M11           Timulation         Signal Name [Specification]         Signal Name [Specification] <td< td=""><td>-C-11</td><td>2 2 2 1000 2000 2000 2000 2000 2000 200</td><td>46</td><td>9</td><td>- [With VR30 engine]</td><td>83</td><td>BR</td><td><ul> <li>[With 2.0L turbo gasoline engine]</li> </ul></td><td></td><td></td><td></td></td<>	-C-11	2 2 2 1000 2000 2000 2000 2000 2000 200	46	9	- [With VR30 engine]	83	BR	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>			
Training Inc.         Training Inc.         Traininc.         Training Inc.         Training Inc			46	>	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	83	٣	- [With VR30 engine]	Connector	No.	M71
Terminal Internationa			47	BG	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	84	>		Connector	Name	STEERING FORCE CONTROL MODULE
Timminal concision         Sint concentry free         Sint concentry free         Ritic concent			47	œ	- [With VR30 engine]	86	>				
Terminal Interiment I			48	SHIELD		87	σ		Connector	Type	RH24FB-RZ8-L-RH
No.         Wire	Terminal Colc	or Of Signal Name (Specification)	49		- [With VR30 engine]	68	>		ą		
1         With N         N <td>No.</td> <td>/ire</td> <td>49</td> <td>υ</td> <td><ul> <li>[With 2.0L turbo gasoline engine]</li> </ul></td> <td>6</td> <td>σ</td> <td><ul> <li>[With VR30 engine]</li> </ul></td> <td>B</td> <td></td> <td></td>	No.	/ire	49	υ	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	6	σ	<ul> <li>[With VR30 engine]</li> </ul>	B		
6         W/B         20         BR         - (With W30 engine)         21         W         MA           7         V         V         - (With W30 engine)         91         W         - (With W30 engine)	1 E		50	в	- [With 2.0L turbo gasoline engine]	6	>	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>	Ĩ		
7         V	6 0	//B -	50	BR	- [With VR30 engine]	91	W	-	ς.Π		10 11 22 20
8         BIG        (With Total engine)         32         C         With 201 ubus gasoline engine)         33         G        (With Vita) engine)         1000000000000000000000000000000000000	2 2	N	51	_		92	9				1/115 1718 20 30
8         9         1         (With 20L tubo gasoline engline)         53         G         (With 20L tubo gasoline engline)           9         1G         -(With 20L tubo gasoline engline)         54         58         -(With 20L tubo gasoline engline)           9         P         -(With 20L tubo gasoline engline)         54         Y         -(With 20L tubo gasoline engline)           10         W         -(With 20L tubo gasoline engline)         95         P         -(With 20L tubo gasoline engline)           11         W         -(With Y30 engline)         95         R         -(With 20L tubo gasoline engline)	8	3G - [With VR30 engine]	52	N		93	BR				19 20 23 24 31 32
9         1cl         - (With 2.01 Lurbe gasoline engine)         54         58         - (With 2.01 Lurbe gasoline engine)           9         P         - (With 2.01 Lurbe gasoline engine)         94         L         - (With 2.01 Lurbe gasoline engine)           0         W         - (With 2.01 Lurbe gasoline engine)         95         R         - (With 2.01 Lurbe gasoline engine)           10         W         - (With 2.01 Lurbe gasoline engine)         95         P         - (With 2.01 Lurbe gasoline engine)           11         W         - (With V330 engine)         55         P         - (With 2.01 Lurbe gasoline engine)	8	3R - [With 2.0L turbo gasoline engine]	53	0		94	GR	- [With VR30 engine]			
9         P         - [With 20L urbo gasoline engine]         54         Y         - [With VR30 engine]         95         BR         - [With VR30 engine]           10         W          55         B         - [With VR30 engine]         95         P         - [With VR30 engine]           11         W         - (With X00 engine]         95         R         - [With VR30 engine]         95         R         - [With VR30 engine]	1 6	.G - [With VR30 engine]	54	SB	- [With 2.0L turbo gasoline engine]	94	_	<ul> <li>[With 2.0L turbo gasoline engine]</li> </ul>			
10         W         .         Wich 2.01. Lurkby gasoline engine)         95         P         . Wich 2.01. Lurkby gasoline engine and without gatewand           11         W         - (With 2.01. Lurkby gasoline engine)         95         R         - (Wich 2.01. Lurkby gasoline engine and without gatewand	6	P - [With 2.0L turbo gasoline engine]	54	~	- [With VR30 engine]	95	BR	- [With VR30 engine]			
11         W         - [WMth VR30 erigine]         55         P         - [WMth VR30 erigine]         95         R         - [WMth 201 transition trano transi trano transition trano transition trano trano transiti	10		55	-	- [With 2.0L turbo gasoline engine]	95	٩	- [With 2.0L turbo gasoline engine and without gateway]			
	11	V - [With VR30 engine]	55	•	- [With VR30 engine]	35	~	<ul> <li>IWith 2.0L turbo gasoline engine and with gateway!</li> </ul>			
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	22TM	IOINT CONNECTOR-M07	24342_4GA2A	6         5         4         3         2         1           12         11         10         9         3         2         1           18         17         10         15         14         3         2         1           24         23         2         1         16         17         16         17         16           24         23         23         21         20         19         16         17         16	Signal Name (Specification)		4		. ,			,			,	-		'			,	,	-	'													
	No.	Name .	Type .		Color Of	Wire					٩	۰ ۵	<u> </u>	۵.	۵.	_				_	>	×	>	۰ ۵													
	Connector	Connector	Connector	唔 HS.	Terminal	- No.	2	ω.	4 5	n o	7	~ ~	η C	11	12	13	14	15	17	18	19	20	21	22	23	ţ											
[	Т					Т	Π	Π	Т	Τ		Т	Т	Г	Γ	Π	Т	Т	Т	Γ	Γ		Ţ	_													
	M175	JOINT CONNECTOR-M05	NH20FL-DC	20119 17 16 15 4 3 2 1 20119 17 16 15 14 13 12 11 10	Signal Name [Specification]						-	,						- [With VK30 engine]	- [with 2.0t turbo gasonine engine] - [With VR30 engine]	- [With 2.0L turbo gasoline engine]	- [With VR30 engine and with ISS]	- [Except with VR30 engine and with ISS	- [With VR30 engine and with ISS]	- [Except with VR30 engine and with ISS													
	No.	Name	Type		Color Of	Wire	-				-	-		۵.	٩	۵	<u>م</u> ،	- a	۵.	æ	œ	N	æ	>													
	Connector	Connector	Connector	强 H.S.	Terminal	- No.	2	ω.	4 0	9	7	∞ ç	₽ F	12	13	14	15	16	17	17	19	19	20	20													
∑[	Т					Τ			Т			Т							Τ					- T	Τ	Т	Τ		Π	Т	Т	Т	Т	T	Г	Γ	1
APTIVE STEERING SYSTER	M173	JOINT CONNECTOR-M03	24342_4GA2A	6         5         4         3         2         1           12         11         10         9         8         7           18         7         16         15         14         13           2         1         16         15         14         13           2         2         2         2         1         14           10         2         2         2         2         14           2         2         2         2         2         2         2	f Signal Name [Specification]							•					•	- Milth 2.01 turks modiling and and	- [with 2:0t tubo gasonine engine] - [With VR30 engine]	- [With 2.0L turbo gasoline engine]	- [With VR30 engine]	- [With 2.0L turbo gasoline engine]	- [With VR30 engine]	- [With VR30 engine]	- [With 2.0L turbo gasoline engine]	- [With 2.0] turbo easiline engine]	- [With VR30 engine]	- [With 2.0L turbo gasoline engine]	- [With 2.0L turbo gasoline engine]	<ul> <li>[With VR30 engine and without ISS]</li> </ul>	<ul> <li>[With VK3U engine and With ISS]</li> <li>[Mith 2 01 turbo ascoline and neared</li> </ul>	- [With VR30 engine and without ISS]	- [With VR30 engine and with ISS]	- [With 2.0L turbo gasoline engine]	- [With VR30 engine and without ISS]	- [With VR30 engine and with ISS]	
CT AD	or No.	or Name	or Type		Color Of	- Nire					я	œ (	× ¤	8	æ	SB	88	-  ⊼	- 8	-	88	_	88	8	28	5	8	ГG	ж	8	> 0	4	>	. ~	8	>	» 
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## **BASIC INSPECTION** DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000013356570

**DETAILED FLOW** 

**1**.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing STC-199, "Diagnostic Work Sheet" and reproduce symptoms as well as fully understand it. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

#### CAUTION:

Customers are not professional. Never guess easily like "maybe the customer means that...," or "maybe the customer mentions this symptom".

>> GO TO 2.

2.CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by protection function. Refer to STC-128, "DIRECT ADAPTIVE STEERING : 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 for "EPS/DAST 3", "DAST 1" and "DAST 2".

Is any DTC detected?

YES >> Record or print DTC and freeze frame data. GO TO 4.

>> GO TO 6. NO

**4.**RECHECK SYMPTOM

#### (P)With CONSULT

Erase self-diagnostic results for "EPS/DAST 3", "DAST 1" or "DAST 2". 1. 2.

Perform DTC confirmation procedures for the error detected system.

NOTE:

NO

If some DTCs are detected at the same time, determine the order for performing the diagnosis based on STC-154, "DTC Inspection Priority Chart".

#### Is any DTC detected?

- YES >> GO TO 5.
  - >> Check harness and connectors based on the information obtained by interview.
    - Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

## 5.REPAIR OR REPLACE ERROR-DETECTED PARTS

- 1. Repair or replace error-detected parts.
- Reconnect part or connector after repairing or replacing. 2.
- When DTC is detected, erase self-diagnostic results for "EPS/DAST 3", "DAST 1" or "DAST 2". 3.

>> GO TO 7.

#### 6. IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection.

## **STC-198**

## DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

#### [DIRECT ADAPTIVE STEERING]

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INFOID:00000001335657

#### Can the error-detected system be identified?

#### YES >> GO TO 7. NO >> Check h

- >> Check harness and connectors based on the information obtained by interview.
  - Check enlarged contact spring of terminal. Refer to GI-42. "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

## **7.**FINAL CHECK

#### With CONSULT

- Check the reference value for steering force control module, steering angle main control module or steering angle sub control module.
- 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	MR/MS	Registration     Initial year       number     registration									
name		Vehicle type VIN									
Storage date		Engine Mileage km (Mile)									
		The steering wheel position (center) is in the wrong position.									
		DPower steering warning lamp turns on.									
		The vehicle pulls to one direction.									
Symptom		Steering effort fluctuates ( Not smooth  Abruptly  Increased  Decreased)									
		□Noise □Vibration									
		□Others (     )									
First occurrent	ce	□Recently □Others ( )									
Frequency of	occurrence	□Always □Under a certain conditions of □Sometimes (time(s)/day) №									
		Dirrelevant									
Climate con-	Weather	□Fine □Cloud □Rain □Snow □Others ( )									
ditions	Temperature	□Hot □Warm □Cool □Cold □Temperature [Approx. °C(°F)]									
	Relative humidity	□High □Moderate □Low									
Road condition	IS	□Urban area □Suburb area □High way □Mounting road (uphill or down hill) □Rough road ○									
Steering mode	settings	Infiniti drive mode selector ( ), Steering mode setting ( )									
Operation con	ditions, etc.	□Irrelevant       P         □When engine starts [Steering wheel angle ( °), Tilt level (□High / □Mid /□Low)]       □During driving         □During driving       □At constant speed driving       □During idling         □During acceleration       □During deceleration       □During deceleration         □Traveling straight       □During cornering (right curve or left curve)         □During steering [Steering wheel angle ( °), Steering speed (□High / □Mid /□Low),         Steering effort (□Heavy / □Light)]         □Fully steered right or left (Road condition: )									

Revision: November 2016

## DIAGNOSIS AND REPAIR WORK FLOW

#### < BASIC INSPECTION >

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

Revision: November 2016

## ADDITIONAL SERVICE WHEN REMOVING 12V BATTERY NEGATIVE TERMI-

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[DIRECT ADAPTIVE STEERING]

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INFOID:000000013356573

ADDITIONAL	SERVICE	WHEN	REMOVING	12V	BATTERY	NEGATIVE	0
TERMINAL							А

## Description

< BASIC INSPECTION >

INFOID:000000013356572 When removing the 12V battery negative terminal, initialize is required for operating the direct adaptive steer-

ing normally. Refer to STC-201, "Work Procedure". **CAUTION:** 

When replacing the direct adaptive steering component parts, perform the corresponding work. Refer to STC-203, "Work Procedure".

## Work Procedure

## 1. DIRECT ADAPTIVE STEERING INITIALIZE

1.	Set the steering wheel to the straight-ahead position.	E
2.	Connect battery terminal.	
3.	Start the engine.	
	CAUTION:	F
	Never drive the vehicle.	I
4.	Turn the steering wheel from full left stop to full right stop.	
5.	Confirm the condition of turning the steering wheel is normal.	STC
	>> WORK END	

#### ADDITIONAL SERVICE WHEN REPLACING OR REMOVING DAST PARTS [DIRECT ADAPTIVE STEERING]

## < BASIC INSPECTION >

## ADDITIONAL SERVICE WHEN REPLACING OR REMOVING DAST PARTS

## Special Repair Requirement

INFOID:000000013356574

$\times$ :	App	licab	le
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	Service per- formedRe- place- mentRe- moval			Reference	
Parts name			Required service		
<ul> <li>Steering force control module</li> <li>Steering angle main control module</li> <li>Steering angle sub control module</li> </ul>	×		<ul> <li>Configuration for steering force control module</li> <li>Configuration for steering angle main control module</li> <li>Configuration for steering angle sub control module</li> <li>Configuration for steering angle sub control module</li> <li>Clutch phase position learning</li> <li>Steering rack neutral position learning</li> <li>Adjustment of steering angle sensor neutral position</li> </ul>	STC-206, "Description" CAUTION: When off-center is big- ger than 120°, refer to STC-478, "Diagnosis Procedure" to correct off-center before per- forming the work.	
Steering wheel	*1	*1	<ul> <li>Configuration for steering force control module</li> <li>Configuration for steering angle main control module</li> <li>Configuration for steering angle sub control module</li> <li>Configuration for steering angle sub control module</li> <li>Clutch phase position learning</li> <li>Steering rack neutral position learning</li> <li>Adjustment of steering angle sensor neutral position</li> </ul>	STC-203, "Work Proce- dure"	
Steering angle sensor	×	×	<ul> <li>Configuration for steering force control module</li> <li>Configuration for steering angle main control module</li> <li>Configuration for steering angle sub control module</li> <li>Clutch phase position learning</li> <li>Steering rack neutral position learning</li> <li>Adjustment of steering angle sensor neutral position</li> </ul>	STC-203, "Work Proce- dure"	
<ul> <li>Steering column assembly</li> <li>Steering clutch assembly</li> <li>Steering upper shaft / Steering lower shaft</li> </ul>	×	×	<ul> <li>Configuration for steering force control module</li> <li>Configuration for steering angle main control module</li> <li>Configuration for steering angle sub control module</li> <li>Clutch phase position learning</li> <li>Steering rack neutral position learning</li> <li>Adjustment of steering angle sensor neutral position</li> </ul>	STC-203, "Work Proce- dure"	
<ul> <li>Steering gear assembly</li> <li>Suspension components</li> </ul>	×	×	<ul> <li>Configuration for steering force control module</li> <li>Configuration for steering angle main control module</li> <li>Configuration for steering angle sub control module</li> <li>Clutch phase position learning</li> <li>Steering rack neutral position learning</li> <li>Adjustment of steering angle sensor neutral position</li> <li>Wheel alignment (toe-in) adjustment with CON-SULT</li> </ul>	<ul> <li><u>ST-126, "ALIGNMENT</u> <u>TESTER : Inspection</u> <u>and Adjustment"</u> (With alignment tester)</li> <li><u>ST-128, "EXCEPT</u> <u>ALIGNMENT TESTER :</u> <u>Inspection and Adjust-</u> <u>ment"</u> (Without alignment tester)</li> </ul>	

\*1: If the neutral position of the steering wheel is different from the straight-ahead status of the vehicle when installing the steering wheel to the same position when it was removed.

## ADDITIONAL SERVICE WHEN REPLACING OR REMOVING DAST PARTS

[DIRECT ADAPTIVE STEERING]

< BASIC INSPECTION >

Work Procedure INFOID:000000013356575 А WARNING: Never move the vehicle during "DAST CALIBRATION (MODE1)" because the steering gear is held in neutral position until ignition switch is turned OFF. В **CAUTION:**  Be careful for the moving parts, steering wheel and front wheels are steered automatically when start "DAST CALIBRATION (MODE1)". Do not rotate road wheels during the DAST calibration because the system is detected the vehicle running. **1.**CHECK OFF-CENTER (1) D (R) With CONSULT 1. Set the vehicle to the straight-ahead position. Turn the ignition switch ON. 2. Е **CAUTION:** Never start the engine. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ST ANGLE SENSOR", and F then and then check the value. Monitor item Standard value STC ST ANGLE SENSOR ST ANGLE SENSOR  $\leq \pm 120 \text{ deg}$ Is the inspection result normal? YES >> GO TO 2. Н NO >> • Refer to STC-478, "Diagnosis Procedure" to correct off-center and then, GO TO 2. CAUTION: Proceeding to the next step with off-center bigger than 120 deg causes the spiral cable to be torn off. 2. PREPARATION Set the front wheel on the turn table. 1. NOTE: Do not lift up the vehicle during "DAST CALIBRATION (MODE1)" Connect the battery charger to protect the battery. NOTE: Κ Much electricity is used in "DAST CALIBRATION (MODE1)". Connect the CONSULT. 4. Turn the ignition switch ON. L **CAUTION:** Never start the engine. M >> GO TO 3. 3.ECU CONFIGURATION Ν

#### With CONSULT

1. Perform configuration for steering force control module. Refer to <u>STC-212, "Work Procedure"</u>. **NOTE:** 

The replacement of control module included in configuration is not required.

 Perform configuration for steering angle main control module. Refer to <u>STC-214, "Work Procedure"</u>. NOTE:

The replacement of control module included in configuration is not required.

 Perform configuration for steering angle sub control module. Refer to <u>STC-212, "Work Procedure"</u>. NOTE:

The replacement of control module included in configuration is not required.

#### >> GO TO 4.

**4.**DAST CALIBRATION (MODE1) [CLUTCH PHASE LEARNING]

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## ADDITIONAL SERVICE WHEN REPLACING OR REMOVING DAST PARTS

< BASIC INSPECTION >

[DIRECT ADAPTIVE STEERING]

## 

- 1. Perform "DAST CALIBRATION (MODE1)". Refer to STC-209. "Description".
- 2. Turn the ignition switch OFF.
- CAUTION: Be sure to perform this step.

>> GO TO 5.

**5.**CHECK OFF-CENTER (2)

## With CONSULT

#### NOTE:

This confirmation is procedure to confirm that the steering wheel is not rotated 360 deg when performing the DAST calibration.

#### CAUTION:

## Proceeding to the next step with the steering wheel rotated 360 deg causes the spiral cable to be torn off.

1. Turn the ignition switch ON.

#### CAUTION:

#### Never start the engine.

2. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ST ANGLE SENSOR", and then and then check the value.

Monitor item	Standard value
ST ANGLE SENSOR	ST ANGLE SENSOR $\leq \pm 20$ deg

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

**6.**CORRECT STEERING WHEEL NEUTRAL POSITION

#### With CONSULT

- 1. Separate steering upper shaft from steering clutch assembly. And then, turn the steering wheel to the direction that the value returns to 0 deg with checking "ST ANGLE SENSOR" on "DATA MONITOR".
- 2. Connect steering clutch assembly and steering upper shaft. Refer to ST-139, "Removal and Installation".

>> Re-perform the work from configuration to reset the learning infromation of clutch phaze learning. GO TO 3.

**1**.DAST CALIBRATION (MODE1) [STEERING RACK NEUTRAL POSITION LEARNING]

#### With CONSULT

Perform "DAST CALIBRATION (MODE1)". Refer to STC-209, "Description".

>> GO TO 8.

 $\mathbf{8}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

## BWith CONSULT

- 1. On the CONSULT screen, select "ABS">>"WORK SUPPORT">>"ST ANGLE SENSOR ADJUSTMENT".
- Touch START.
   CAUTION: Never touch steering wheel while adjusting steering angle sensor.
- 3. After approx. 10 seconds, select "END".
- Turn ignition switch OFF, and then turn it ON again.
   CAUTION: Be sure to perform this step.

>> GO TO 9.

**9.**PERFORM SELF-DIAGNOSIS

## ADDITIONAL SERVICE WHEN REPLACING OR REMOVING DAST PARTS

[DIRECT ADAPTIVE STEERING]

< BASIC INSPECTION >

#### With CONSULT

- Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start the engine.

#### **CAUTION:** Never drive the vehicle.

3. Perform self-diagnosis for "EPS/DAST 3", "DAST 1" and "DAST 2".

#### Is any DTC detected?

YES >> When other than above DTC is detected, perform Perform trouble diagnosis for the detected DTC. Refer to <u>STC-156, "DTC Index"</u> (EPS/DAST 3), <u>STC-169, "DTC Index"</u> (DAST 1), <u>STC-182, "DTC Index"</u> (DAST 2).

NO >> GO TO 10.

**10.**FINAL CONFIRMATION

#### With CONSULT

1. Turn the ignition switch OFF to ON. CAUTION:

#### Never start the engine.

 On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ANGLE 1", and then and then check the value.

Monitor item	Standard value	0.70
ANGLE 1	-4.4 ≤ ANGLE 1 ≤ 4.4	

#### Is the confirmation result normal?

- YES >> WORK END
- NO >> Slightly lower the tilt position, and then re-perform "DAST CALIBRATION (MODE1)". GO TO 3.

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**Revision: November 2016** 

#### ADDITIONAL SERVICE WHEN REPLACING CONTROL MODULE INSPECTION > [DIRECT ADAPTIVE STEERING]

< BASIC INSPECTION >

## ADDITIONAL SERVICE WHEN REPLACING CONTROL MODULE

## Description

INFOID:000000013356576

When replacing steering force control module, steering angle main control module, or steering angle sub control module, configuration and DAST calibration are required. Refer to <u>STC-206, "Work Procedure"</u>.

## Work Procedure

INFOID:000000013356577

#### WARNING:

Never move the vehicle during "DAST CALIBRATION (MODE1)" because the steering gear is held in neutral position until ignition switch is turned OFF.

#### CAUTION:

- Be careful for the moving parts, steering wheel and front wheels are steered automatically when start "DAST CALIBRATION (MODE1)".
- Do not rotate road wheels during the DAST calibration because the system is detected the vehicle running.
- **1.**CHECK OFF-CENTER (1)

#### With CONSULT

- 1. Set the vehicle to the straight-ahead position.
- 2. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

3. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ST ANGLE SENSOR", and then and then check the value.

Monitor item	Standard value
ST ANGLE SENSOR	ST ANGLE SENSOR $\leq \pm 120 \text{ deg}$

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center and then, GO TO 2. CAUTION:

Proceeding to the next step with off-center bigger than 120 deg causes the spiral cable to be torn off.

## 2. PREPARATION

1. Set the front wheel on the turn table. **NOTE:** 

Do not lift up the vehicle during "DAST CALIBRATION (MODE1)"

- Connect the battery charger to protect the battery. NOTE: Much electricity is used in "DAST CALIBRATION (MODE1)".
- 3. Connect the CONSULT.
- 4. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

>> GO TO 3.

**3.**ECU CONFIGURATION

#### With CONSULT

- 1. Perform configuration for steering force control module. Refer to STC-212, "Work Procedure".
- 2. Perform configuration for steering angle main control module. Refer to STC-214, "Work Procedure".
- 3. Perform configuration for steering angle sub control module. Refer to <u>STC-212, "Work Procedure"</u>.

#### >> GO TO 4.

**4.** DAST CALIBRATION (MODE1) [CLUTCH PHASE LEARNING]

## ADDITIONAL SERVICE WHEN REPLACING CONTROL MODULE < BASIC INSPECTION > [DIRECT ADAPTIVE STEERING]

#### (B) With CONSULT

- 1. Perform "DAST CALIBRATION (MODE1)". Refer to STC-209. "Description".
- 2. Turn the ignition switch OFF.

CAUTION:

Be sure to perform this step.

>> GO TO 5.

**5.**CHECK OFF-CENTER (2)

## 

NOTE:

This confirmation is procedure to confirm that the steering wheel is not rotated 360 deg when performing the DAST calibration.

#### CAUTION:

Pro	oceed	ding	g to	the	next	step	with the	e steering	wheel	rotated	360 de	eg c	causes	the sp	iral c	able	to be	torn	E
off																			
	-																		

1. Turn the ignition switch ON.

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#### CAUTION: Never start the engine.

 On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ST ANGLE SENSOR", and then and then check the value.

		SIC
Monitor item	Standard value	
ST ANGLE SENSOR	ST ANGLE SENSOR $\leq \pm 20$ deg	
Is the inspection result normal?		$\left  - \right $
YES >> GO TO 7.		
NO >> GO TO 6.		
6.CORRECT STEERING WHEEL NEUTRAL POSITION	ON	I
<ul> <li>With CONSULT</li> <li>Separate steering upper shaft from steering clutc direction that the value returns to 0 deg with check</li> <li>Connect steering clutch assembly and steering upper</li> </ul>	ch assembly. And then, turn the steering wheel to the king "ST ANGLE SENSOR" on "DATA MONITOR". per shaft. Refer to <u>ST-139, "Removal and Installation"</u> .	J
>> Re-perform the work from configuration to GO TO 3.	reset the learning infromation of clutch phaze learning.	K
7. DAST CALIBRATION (MODE1) [STEERING RACK	NEUTRAL POSITION LEARNING]	L
With CONSULT     Perform "DAST CALIBRATION (MODE1)". Refer to <u>ST</u>	C-209, "Description".	M
>> GO TO 8		

 ${f 8}.$ ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

#### With CONSULT

- 1. On the CONSULT screen, select "ABS">>"WORK SUPPORT">>"ST ANGLE SENSOR ADJUSTMENT".
- Touch START. CAUTION: Never touch steering wheel while adjusting steering angle sensor.
   After approx. 10 seconds, select "END".
- Turn ignition switch OFF, and then turn it ON again.
   CAUTION: Be sure to perform this step.

>> GO TO 9.

9.PERFORM SELF-DIAGNOSIS

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## ADDITIONAL SERVICE WHEN REPLACING CONTROL MODULE

< BASIC INSPECTION >

[DIRECT ADAPTIVE STEERING]

#### With CONSULT

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start the engine.

#### CAUTION: Never drive the vehicle.

3. Perform self-diagnosis for "EPS/DAST 3", "DAST 1" and "DAST 2".

#### Is any DTC detected?

YES >> When other than above DTC is detected, perform Perform trouble diagnosis for the detected DTC. Refer to <u>STC-156, "DTC Index"</u> (EPS/DAST 3), <u>STC-169, "DTC Index"</u> (DAST 1), <u>STC-182, "DTC Index"</u> (DAST 2).

NO >> GO TO 10.

**10.**FINAL CONFIRMATION

#### With CONSULT

Turn the ignition switch OFF to ON. CAUTION:

#### Never start the engine.

2. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ANGLE 1",and then and then check the value.

Monitor item	Standard value
ANGLE 1	-4.4 ≤ ANGLE 1 ≤ 4.4

Is the confirmation result normal?

YES >> WORK END

NO >> Slightly lower the tilt position, and then re-perform "DAST CALIBRATION (MODE1)". GO TO 3.

## DAST CALIBRATION (MODE1)

< BASIC INSPECTION >

## DAST CALIBRATION (MODE1)

## Description

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#### WARNING:

- Never move the vehicle during "DAST CALIBRATION (MODE1)" because the steering gear is held in neutral position until ignition switch is turned OFF.
- "DAST CALIBRATION (MODE1)" is additional service when removing/installing/replacing DAST parts or adjusting wheel alignment. "DAST CALIBRATION (MODE1)" is used in [Clutch phase learning] and [Steering rack neutral learning]. Using it incorrectly cause off-center. Refer to "ADDITIONAL SERVICE WHEN REPLACING OR REMOVING DAST PARTS" (Refer to <u>STC-203, "Work Procedure".</u>) and "TOE-IN ADJUSTMENT" [Refer to <u>ST-126, "ALIGNMENT TESTER : Inspection and Adjustment"</u> (alignment tester), <u>ST-128, "EXCEPT ALIGNMENT TESTER : Inspection and Adjustment"</u> (except alignment tester).] before performing it.

#### **CAUTION:**

- Be careful for the moving parts, steering wheel and front wheels are steered automatically when start "DAST CALIBRATION (MODE1)".
- Do not rotate road wheels during the DAST calibration because the system is detected the vehicle running.
- When the work stops (CONSULT freezing etc,), re-perform the work from the first step.
- **1.**PREPARATION BEFORE DAST CALIBRATION

1.	Set the front wheel on the turn table.	N
	NOTE:	IN
	Do not lift up the vehicle during "DAST CALIBRATION (MODE1)"	
2.	Check that inner socket length is in the specified value. Refer to ST-153. "Steering Gear and Linkage".	
3.	Connect the battery charger to protect the battery.	0
	NOTE:	

Much electricity is used in "DAST CALIBRATION (MODE1)".

4. Place the tilt to the highest level.

>> GO TO 2.

2.DAST CALIBRATION (MODE1)

#### With CONSULT

1. Erase self-diagnostic result for "EPS/DAST 3", "DAST 1" and "DAST 2".

## STC-209

#### < BASIC INSPECTION >

- On the CONSULT screen, select "EPS/DAST 3" >> "WORK SUPPORT" >> "DAST CALIBRATION (MODE1)".
- 3. Touch "START".
  - CAUTION:

Be careful for the moving parts, steering wheel and front wheels are steered automatically when touch "START".

NOTE:

- When DTC is detected, "WORK SUPPORT" may not be started. When DTC is detected, check the DTC. Refer to <u>STC-156, "DTC Index"</u>.
- When "DAST CALIBRATION (MODE1)" is completed, the clutch is released.
- 4. After checking that the power steering warning lamp turns off, turn the steering wheel to the straightahead position. Then touch "START".

**CAUTION:** 

- Be careful in turning the steering wheel to the straight-ahead position.
- Since the force feedback of steering becomes smaller after the completion of auto steering, take good care for turning the steering.

#### NOTE:

The clutch is engaged and then the steering shaft connects to steering gear.

- 5. Touch "END".
  - CAUTION:

Never turn the ignition switch OFF.

>> WORK END

## DAST CALIBRATION (MODE2)

#### < BASIC INSPECTION >

## DAST CALIBRATION (MODE2)

## Description

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"DAST CALIBRATION (MODE2)" is a function to calculate an off-center of the steering rack after adjust toe-in without using the alignment tester.

Off-center © is calculated by the difference between a neutral position of the vehicle's alignment (A) and the neutral position of the steering rack (B). Refer to <u>STC-211, "Work Procedure"</u>.

#### **CAUTION:**

When adjusting toe-in without using the alignment tester, always perform "DAST CALIBRATION (MODE2)".



#### Work Procedure

Toe-in adjustment: Refer to ST-128, "EXCEPT ALIGNMENT TESTER : Inspection and Adjustment".

## **[DIRECT ADAPTIVE STEERING]**

#### CONFIGURATION (STEERING FORCE CONTROL MODULE) SPECTION > [DIRECT ADAPTIVE STEERING]

#### < BASIC INSPECTION >

## CONFIGURATION (STEERING FORCE CONTROL MODULE)

Work Procedure

INFOID:000000013356582

#### **CAUTION:**

- Use "Manual Configuration" only when "TYPE ID" of steering force control module cannot be read.
- If an error occurs during configuration, start over from the beginning.
- When off-center is bigger than 120°, refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center before performing the work.

**1.**CHECKING TYPE ID (1)

Use FAST (service parts catalogue) to search steering force control module of the applicable vehicle and find "Type ID".

Is "Type ID" displayed?

- YES >> Print out "Type ID" and GO TO 2.
- NO >> "Configuration" is not required for steering force control module. Replace in the usual manner. Refer to <u>STC-492, "Removal and Installation"</u>.

2. CHECKING TYPE ID (2)

CONSULT Configuration

- 1. Select "Before Replace ECU" of "Read/Write Configuration".
- 2. Check that "Type ID" is displayed on the CONSULT screen.

Is "Type ID" displayed?

YES >> GO TO 3.

NO >> GO TO 7.

**3.** VERIFYING TYPE ID (1)

#### CONSULT Configuration

Compare a "Type ID" displayed on the CONSULT screen with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other.

NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 4.

**4.**SAVING TYPE ID

CONSULT Configuration Save "Type ID" on CONSULT.

#### >> GO TO 5.

**5.**REPLACING STEERING FORCE CONTROL MODULE (1)

Replace steering force control module. Refer to STC-492, "Removal and Installation".

CAUTION:

Replace the control module only when necessary.

>> GO TO 6.

**6.**WRITING (AUTOMATIC WRITING)

CONSULT Configuration

- 1. Select "After Replace ECU" of "Re/programming, Configuration" or that of "Read / Write Configuration".
- Select the "Type ID" agreeing with the one stored on CONSULT and the one searched by using FAST (service parts catalogue) to write the "Type ID" into the steering force control module.
   NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 9.

## **CONFIGURATION (STEERING FORCE CONTROL MODULE)**

[DIRECT ADAPTIVE STEERING] < BASIC INSPECTION > **7.**REPLACING STEERING FORCE CONTROL MODULE (2) А Replace steering force control module. Refer to STC-492, "Removal and Installation". **CAUTION:** Replace the control module only when necessary. В >> GO TO 8. 8.WRITING (MANUAL WRITING) С CONSULT Configuration Select "Manual Configuration". 1. Select the "Type ID" searched by using FAST (service parts catalogue) to write the "Type ID" into the D 2. steering force control module. NOTE: For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID". E >> GO TO 9. 9.VERIFYING TYPE ID (2) F Compare "Type ID" written into the steering force control module with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other. STC

#### NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> WORK END.

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## CONFIGURATION (STEERING ANGLE MAIN CONTROL MODULE)

< BASIC INSPECTION >

## CONFIGURATION (STEERING ANGLE MAIN CONTROL MODULE)

## Work Procedure

INFOID:000000013356583

[DIRECT ADAPTIVE STEERING]

#### **CAUTION:**

- Use "Manual Configuration" only when "TYPE ID" of steering angle main control module cannot be read.
- If an error occurs during configuration, start over from the beginning.
- When off-center is bigger than 120°, refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center before performing the work.

**1.**CHECKING TYPE ID (1)

Use FAST (service parts catalogue) to search steering angle main control module of the applicable vehicle and find "Type ID".

Is "Type ID" displayed?

- YES >> Print out "Type ID" and GO TO 2.
- NO >> "Configuration" is not required for steering angle main control module. Replace in the usual manner. Refer to <u>STC-493, "Removal and Installation"</u>.

2. CHECKING TYPE ID (2)

CONSULT Configuration

- 1. Select "Before Replace ECU" of "Read/Write Configuration".
- 2. Check that "Type ID" is displayed on the CONSULT screen.

Is "Type ID" displayed?

YES >> GO TO 3.

NO >> GO TO 7.

**3.** VERIFYING TYPE ID (1)

**CONSULT** Configuration

Compare a "Type ID" displayed on the CONSULT screen with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other.

#### NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 4.

**4.**SAVING TYPE ID

CONSULT Configuration Save "Type ID" on CONSULT.

#### >> GO TO 5.

**5.**REPLACING STEERING ANGLE MAIN CONTROL MODULE (1)

Replace steering angle main control module. Refer to STC-493. "Removal and Installation".

CAUTION:

Replace the control module only when necessary.

>> GO TO 6.

**6.**WRITING (AUTOMATIC WRITING)

CONSULT Configuration

- 1. Select "After Replace ECU" of "Re/programming, Configuration" or that of "Read / Write Configuration".
- Select the "Type ID" agreeing with the one stored on CONSULT and the one searched by using FAST (service parts catalogue) to write the "Type ID" into the steering angle main control module.
   NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

## **CONFIGURATION (STEERING ANGLE MAIN CONTROL MODULE)**

< BASIC INSPECTION >

[DIRECT ADAPTIVE STEERING]

>> GO TO 9.	
7. REPLACING STEERING ANGLE MAIN CONTROL MODULE (2)	А
Replace steering angle main control module. Refer to STC-493, "Removal and Installation".	
CAUTION: Replace the control module only when necessary.	В
>> GO TO 8.	С
<b>Ö.</b> WRITING (MANUAL WRITING)	
CONSULT Configuration Configuration	D
2. Select the "Type ID" searched by using FAST (service parts catalogue) to write the "Type ID" into the	
steering angle main control module. NOTE:	_
For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".	
>> GO TO 9.	F
9. VERIFYING TYPE ID (2)	
Compare "Type ID" written into the steering angle main control module with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other.	ST
<b>NOTE:</b> For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".	Н
>> WORK END.	
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## CONFIGURATION (STEERING ANGLE SUB CONTROL MODULE)

< BASIC INSPECTION >

## CONFIGURATION (STEERING ANGLE SUB CONTROL MODULE)

## Work Procedure

INFOID:000000013356584

[DIRECT ADAPTIVE STEERING]

#### **CAUTION:**

- Use "Manual Configuration" only when "TYPE ID" of steering angle sub control module cannot be read.
- If an error occurs during configuration, start over from the beginning.
- When off-center is bigger than 120°, refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center before performing the work.

**1.**CHECKING TYPE ID (1)

Use FAST (service parts catalogue) to search steering angle sub control module of the applicable vehicle and find "Type ID".

Is "Type ID" displayed?

YES >> Print out "Type ID" and GO TO 2.

NO >> "Configuration" is not required for steering angle sub control module. Replace in the usual manner. Refer to <u>STC-494, "Removal and Installation"</u>.

2. CHECKING TYPE ID (2)

CONSULT Configuration

1. Select "Before Replace ECU" of "Read/Write Configuration".

2. Check that "Type D" is displayed on the CONSULT screen.

Is "Type ID" displayed?

YES >> GO TO 3.

NO >> GO TO 7.

**3.** VERIFYING TYPE ID (1)

**CONSULT** Configuration

Compare a "Type ID" displayed on the CONSULT screen with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other.

#### NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 4.

**4.**SAVING TYPE ID

CONSULT Configuration Save "Type ID" on CONSULT.

#### >> GO TO 5.

**5.**REPLACING STEERING ANGLE SUB CONTROL MODULE (1)

Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>. CAUTION:

#### Replace the control module only when necessary.

>> GO TO 6.

**6.**WRITING (AUTOMATIC WRITING)

CONSULT Configuration

- 1. Select "After Replace ECU" of "Re/programming, Configuration" or that of "Read / Write Configuration".
- Select the "Type ID" agreeing with the one stored on CONSULT and the one searched by using FAST (service parts catalogue) to write the "Type ID" into the steering angle sub control module.
   NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".
# CONFIGURATION (STEERING ANGLE SUB CONTROL MODULE)

< BASIC INSPECTION >

[DIRECT ADAPTIVE STEERING]

>> GO TO 9. 7 deditional and e que control module (0)	А
REPLACING STEERING ANGLE SUB CONTROL MODULE (2)	1
CAUTION:	5
Replace the control module only when necessary.	В
8 WRITING (MANUAL WRITING)	С
1. Select "Manual Configuration".	D
2. Select the "Type ID" searched by using FAST (service parts catalogue) to write the "Type ID" into the	
NOTE:	Е
For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".	
>> GO TO 9	_
9. VERIFYING TYPE ID (2)	F
Compare "Type ID" written into the steering angle sub control module with the one searched by using FAST	
(service parts catalogue) to check that these "Type ID" agree with each other.	STC
For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".	
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>> WORK END.	
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# DTC/CIRCUIT DIAGNOSIS C13A0-00 CONTROL MODULE

### EPS/DAST 3

**EPS/DAST 3 : DTC Description** 

INFOID:000000013356585

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A0-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected when the system is performing the initial setting.

#### POSSIBLE CAUSE

Steering force control module

#### FAIL-SAFE

- Variable
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

#### (B) With CONSULT

- 1. Start the engine. CAUTION:
- Never drive the vehicle.
- Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13A0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-218, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356586

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

#### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13A0-00" detected?

- YES >> Replace steering force control module. Refer to <u>STC-492</u>, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# DAST 1

NO

# C13A0-00 CONTROL MODULE

## < DTC/CIRCUIT DIAGNOSIS >

# DAST 1 : DTC Description

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356587

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### DTC DETECTION LOGIC

	Display item	
DTC	(Trouble diagnosis content)	Malfunction detected condition
C13A0-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected when the system is performing the initial setting.
POSSIBLE	CAUSE	
Steering a	angle main control module	
<ul> <li>FAIL-SAFE</li> <li>Variable</li> <li>NOTE:</li> </ul>		
For fall-sa	TREET TO STC-125, DIRECT A	DAPTIVE STEERING : Fail-safe".
		providually conducted, always turn ignition switch OFF and
wait at least	t 10 seconds before conducting the next	t test.
>> 2	GO TO 2.	
Z.DIC RE	PRODUCTION PROCEDURE	
With CO     Start the     CAUTIC     Never     C.     Perform	NSULI e engine. ON: drive the vehicle. n self-diagnosis for "DAST 1".	
Is DTC "C1	<u>3A0-00" detected?</u>	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer To check malfunction symptom before Confirmation after repair: INSPECTION	to <u>STC-219, "DAST 1 : Diagnosis Procedure"</u> . repair: Refer to <u>GI-45, "Intermittent Incident"</u> . I END
DAST 1 :	Diagnosis Procedure	
1. Turn the 2. Erase s 3. Turn the	e ignition switch ON. self-diagnosis for "DAST 1". e ignition switch OFF and wait for at lea	st 10 seconds.
A. Start in CAUTION Never	one of the second secon	
5. Perform	n self-diagnosis for "DAST 1".	
YES >> NO >>	<ul> <li>Replace steering angle main control me</li> <li>Check enlarged contact spring of terr</li> </ul>	odule. Refer to <u>STC-493, "Removal and Installation"</u> . ninal. Refer to <u>GI-42, "How to Check Terminal"</u> .
DAST 2	Perform intermittent incident while tur	ming steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .
DAST 2 :	DTC Description	INFOID:000000013356589
DTC DETE	ECTION LOGIC	

# C13A0-00 CONTROL MODULE

#### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A0-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected when the system is performing the initial setting.

#### POSSIBLE CAUSE

• Steering angle sub control module

#### FAIL-SAFE

Variable

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine.

### CAUTION:

- Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-220. "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 2 : Diagnosis Procedure

INFOID:000000013356590

#### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.
  - CAUTION:

NO

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A0-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# C13A1-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A1-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering force control module is detected.
POSSIBLE  • Steering f	CAUSE orce control module	
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.
>>	GO TO 2.	
2.dtc re	PRODUCTION PROCEDURE	
With CO Start th CAUTI Never 2 Turn th	NSULT e engine. ON: drive the vehicle. e steering wheel from full left stop to full rig	iht stop
<ol> <li>Return</li> <li>Perforn</li> </ol>	the steering wheel to the straight-ahead po n self-diagnosis for "EPS/DAST 3".	osition.
Is DTC "C1	<u>3A1-00" detected?</u>	
YES >> NO-1 >> NO-2 >>	To check malfunction symptom before rep Confirmation after repair: INSPECTION E	STC-221, "EPS/DAST 3 : Diagnosis Procedure". air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356592
<b>1.</b> PERFOR	RM SELF-DIAGNOSIS	
With CO 1. Turn th 2. Erase s	NSULT e ignition switch ON. self-diagnosis for "EPS/DAST 3". e ignition switch OEE and wait for at least (	10 seconds
4. Start th	e engine. ON: drive the vehicle	10 Seconds.
5. Turn th 6. Return 7. Perforn	e steering wheel from full left stop to full rig the steering wheel to the straight-ahead po n self-diagnosis for "EPS/DAST 3".	ht stop. osition.
<u>ls DTC "C1</u> YES >> NO >>	<ul> <li><u>3A1-00" detected?</u></li> <li>Replace steering force control module. Re</li> <li>Check enlarged contact spring of termin</li> </ul>	al. Refer to <u>GI-42, "Removal and Installation"</u> .
DAST 1	Perform intermittent incident while turnin	g steering wheel. Refer to GI-45, "Intermittent Incident".
DAST 1 :	DTC Description	INF0ID:000000013356593

DTC DETECTION LOGIC

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INFOID:000000013356591

# C13A1-00 CONTROL MODULE

#### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A1-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering force control module is detected.

#### POSSIBLE CAUSE

Steering force control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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

Start the engine.

#### **CAUTION:**

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A1-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-222, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45</u>, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356594

#### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

#### Never drive the vehicle.

- 5. Turn the steering wheel from full left stop to full right stop.
- 6. Return the steering wheel to the straight-ahead position.
- 7. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A1-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42. "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### DAST 2

#### DAST 2 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356595

# C13A1-00 CONTROL MODULE

#### < DTC/CIRCUIT DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A1-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering force control module is detected.
POSSIBL • Steering	E CAUSE force control module	
FAIL-SAF • Mode 2 NOTE: For fail-s	E afe mode, refer to <u>STC-125, "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECC	NDITIONING	
If "DTC CC wait at leas	NFIRMATION PROCEDURE" has been pre st 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.
>:	> GO TO 2.	_
2.dtc re	PRODUCTION PROCEDURE	
With CC Start th CAUT Never 2. Turn th	DNSULT ne engine. ION: drive the vehicle. ne steering wheel from full left stop to full rig	ht stop.
<ol> <li>Return</li> <li>Perform</li> <li><u>Is DTC "C1</u></li> </ol>	the steering wheel to the straight-ahead point of the steering wheel to the straight-ahead point of the steering of the ste	osition.
YES >: NO-1 >: NO-2 >:	<ul> <li>Proceed to diagnosis procedure. Refer to</li> <li>To check malfunction symptom before rep</li> <li>Confirmation after repair: INSPECTION El</li> </ul>	<u>STC-223, "DAST 2 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 2	: Diagnosis Procedure	INF0/D:000000013356596
<b>1</b> .PERFO	RM SELF-DIAGNOSIS	
With CC I. Turn th	DNSULT ne ignition switch ON.	
<ol> <li>Erase</li> <li>Turn th</li> <li>Start th</li> <li>CAUT</li> </ol>	ne ignition switch OFF and wait for at least 1 ne engine.	0 seconds.
5. Turn th 6. Return 7. Perfor	The steering wheel from full left stop to full rig the steering wheel to the straight-ahead po m self-diagnosis for "DAST 2".	ht stop. osition.
Is DTC "C1 YES >:	<u>3A1-00" detected?</u> > Replace steering force control module. Re	efer to <u>STC-492, "Removal and Installation"</u> .
INU >:	Perform intermittent incident while turnin	ig steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .

# C13A2-00 CONTROL MODULE EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356597

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A2-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering angle main control module is detected.

#### POSSIBLE CAUSE

• Steering angle main control module

#### FAIL-SAFE

Mode 1 or Mode 3

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13A2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-224, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356598

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.

# 4. Start the engine. CAUTION:

#### Never drive the vehicle.

- 5. Turn the steering wheel from full left stop to full right stop.
- 6. Return the steering wheel to the straight-ahead position.
- 7. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13A2-00" detected?

- YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# DAST 1

# DAST 1 : DTC Description

INFOID:000000013356599

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### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	0
C13A2-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering angle main control module is detected.	C
POSSIBLE • Steering a	CAUSE angle main control module		D
FAIL-SAFE • Mode 1 o NOTE: For fail-sa	: r Mode 3 afe mode, refer to <u>STC-125, "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".	E
DTC CON	FIRMATION PROCEDURE		F
1.PRECO	NDITIONING		
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been protected by the second sec	eviously conducted, always turn ignition switch OFF and est.	ST
>>	GO TO 2.		Н
2.DTC RE	PRODUCTION PROCEDURE		
With CO Start th CAUTI	NSULT e engine. ON:		Ι
<ul><li>Never</li><li>2. Turn th</li><li>3. Return</li><li>4 Perform</li></ul>	drive the vehicle. e steering wheel from full left stop to full rig the steering wheel to the straight-ahead po n self-diagnosis for "DAST 1"	ght stop. osition.	J
Is DTC "C1	3A2-00" detected?		Κ
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION E	<u>STC-225, "DAST 1 : Diagnosis Procedure"</u> . pair: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	L
DAST 1 :	Diagnosis Procedure	INFOID:000000013356600	
1.PERFOR	RM SELF-DIAGNOSIS		M
<ul> <li>With CO</li> <li>Turn th</li> <li>Erase s</li> <li>Turn th</li> </ul>	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 1". e ignition switch OFF and wait for at least <sup>•</sup>	10 seconds.	Ν
4. Start th	e engine. ON:		0
Never5.Turn th6.Return7.Perform	drive the vehicle. e steering wheel from full left stop to full rig the steering wheel to the straight-ahead po n self-diagnosis for "DAST 1".	ght stop. osition.	Ρ
Is DTC "C1 YES >> NO >>	<ul> <li><u>3A2-00" detected?</u></li> <li>Replace steering angle main control module</li> <li>Check enlarged contact spring of termin</li> <li>Perform intermittent incident while turnir</li> </ul>	ule. Refer to <u>STC-493, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . ng steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	

DAST 2

#### < DTC/CIRCUIT DIAGNOSIS >

### DAST 2 : DTC Description

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356601

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A2-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering angle main control module is detected.

#### POSSIBLE CAUSE

• Steering angle main control module

#### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-226, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 2 : Diagnosis Procedure

INFOID:000000013356602

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

NO

#### Never drive the vehicle.

- 5. Turn the steering wheel from full left stop to full right stop.
- 6. Return the steering wheel to the straight-ahead position.
- 7. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A2-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

# C13A3-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A3-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering angle sub control mod- ule is detected.
<ul><li>POSSIBLE</li><li>Steering a</li></ul>	CAUSE	
FAIL-SAFE • Mode 2 NOTE:		
For fail-sa	fe mode, refer to <u>STC-125, "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".
1.PRECON	VDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and est.
>> <b>2.</b> dtc rei	GO TO 2. PRODUCTION PROCEDURE	
With CO	NSULT e engine. DN:	
Never of 2. Turn the 3. Return 4. Perform	<b>Arive the vehicle.</b> The steering wheel from full left stop to full rig the steering wheel to the straight-ahead port State Steering stor "EPS/DAST 3".	jht stop. osition.
<u>ls DTC "C1:</u> YES >> NO-1 >> NO-2 >>	<u>3A3-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION E	<u>STC-227, "EPS/DAST 3 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356604
<b>1.</b> PERFOF	M SELF-DIAGNOSIS	
With CO	NSULT e ignition switch ON.	
<ol> <li>Erase s</li> <li>Turn the</li> <li>Start the</li> <li>CAUTIC</li> </ol>	elf-diagnosis for "EPS/DAST 3". e ignition switch OFF and wait for at least 1 e engine. DN:	10 seconds.
Never of 5. Turn the 6. Return 7. Perform	<b>drive the vehicle.</b> e steering wheel from full left stop to full rig the steering wheel to the straight-ahead po n self-diagnosis for "EPS/DAST 3".	iht stop. osition.
<u>IS DTC "C1;</u> YES >> NO >>	<ul> <li>3A3-00" detected?</li> <li>Replace steering angle sub control module</li> <li>Check enlarged contact spring of termin</li> <li>Perform intermittent incident while turnir</li> </ul>	e. Refer to <u>STC-494, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . ng steering wheel. Refer to GI-45, "Intermittent Incident".

# STC-227

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INFOID:000000013356603

# DAST 1

# DAST 1 : DTC Description

INFOID:000000013356605

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A3-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering angle sub control mod- ule is detected.

#### POSSIBLE CAUSE

• Steering angle sub control module

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine.

#### CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A3-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-228, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 1 : Diagnosis Procedure

INFOID:000000013356606

# **1.**PERFORM SELF-DIAGNOSIS

#### () With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.

#### Never drive the vehicle.

- 5. Turn the steering wheel from full left stop to full right stop.
- 6. Return the steering wheel to the straight-ahead position.
- 7. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A3-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

DAST 2

# C13A3-00 CONTROL MODULE

#### < DTC/CIRCUIT DIAGNOSIS >

# DAST 2 : DTC Description

[DIRECT ADAPTIVE STEERING]

DASIZ.	DIC Description	INFOID:000000013356607	А
DTC DETE	ECTION LOGIC		
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	В
C13A3-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering angle sub control mod- ule is detected.	С
POSSIBLE • Steering a	E CAUSE angle sub control module		
FAIL-SAFE • Mode 2 NOTE: For fail-sa	afe mode, refer to <u>STC-125, "DIRECT ADAF</u>	PTIVE STEERING : Fail-safe".	E
DTC CON	FIRMATION PROCEDURE		
1.PRECO	NDITIONING		F
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next tes	viously conducted, always turn ignition switch OFF and st.	STC
>> 2.dtc re	GO TO 2. PRODUCTION PROCEDURE		Н
With CO Start th CAUTI Never	NSULT e engine. ON: drive the vehicle.		I
<ol> <li>Turn th</li> <li>Return</li> <li>Perform</li> <li>Is DTC "C1</li> </ol>	e steering wheel from full left stop to full righ the steering wheel to the straight-ahead po n self-diagnosis for "DAST 2".	nt stop. sition.	J
YES >> NO-1 >> NO-2 >>	<ul> <li>Proceed to diagnosis procedure. Refer to <u>s</u></li> <li>To check malfunction symptom before repart</li> <li>Confirmation after repair: INSPECTION EN</li> </ul>	STC-229, "DAST 2 : Diagnosis Procedure". air: Refer to <u>GI-45, "Intermittent Incident"</u> . ID	K
DAST 2 :	Diagnosis Procedure	INF0ID:000000013356608	L
1.PERFOR	RM SELF-DIAGNOSIS		
With CO 1. Turn th	NSULT e ignition switch ON.		Μ
<ol> <li>2. Erases</li> <li>3. Turn th</li> <li>4. Start th</li> <li>CAUTI</li> <li>Never</li> </ol>	e ignition switch OFF and wait for at least 1 e engine. ON: drive the vehicle	0 seconds.	Ν
<ol> <li>Turn th</li> <li>Return</li> <li>Perform</li> </ol>	e steering wheel from full left stop to full right the steering wheel to the straight-ahead po n self-diagnosis for "DAST 2".	nt stop. sition.	0
Is DTC "C1	3A3-00" detected?		Ρ
YES >> NO >>	<ul> <li>Replace steering angle sub control module</li> <li>Check enlarged contact spring of termina</li> <li>Perform intermittent incident while turning</li> </ul>	<ul> <li>Refer to <u>STC-494, "Removal and Installation"</u>.</li> <li>al. Refer to <u>GI-42, "How to Check Terminal"</u>.</li> <li>g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.</li> </ul>	

# C13A4-00 CONTROL MODULE DAST 1

# DAST 1 : DTC Description

INFOID:000000013356609

[DIRECT ADAPTIVE STEERING]

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13A4-00 CONTROL MODULE (Control module)		Malfunction of calculation result in steering force control module is detected.	

#### POSSIBLE CAUSE

• Steering force control module

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A4-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-230, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 1 : Diagnosis Procedure

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.

# 4. Start the engine. CAUTION:

#### Never drive the vehicle.

- 5. Turn the steering wheel from full left stop to full right stop.
- 6. Return the steering wheel to the straight-ahead position.
- 7. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A4-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# STC-230

INFOID:000000013356610

# DAST 2

# DAST 2 : DTC Description

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356611

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### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A4-00	CONTROL MODULE (Control module)	Malfunction of calculation result in steering force control module is detected.
POSSIBLE • Steering f	CAUSE orce control module	
FAIL-SAFE • Mode 2 <b>NOTE:</b> For fail-sa	fe mode, refer to <u>STC-125, "DIRECT</u>	ADAPTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been to seconds before conducting the new to the new to second the new to se	en previously conducted, always turn ignition switch OFF and ext test.
<> 2.dtc re	GO TO 2. PRODUCTION PROCEDURE	
With CO Start th	NSULT e engine.	
CAUTION Never 2. Turn th 3. Return	<b>DN:</b> drive the vehicle. e steering wheel from full left stop to further straight-aher the straight-aher with the straight-aher	ull right stop. ad position.
4. Perforn Is DTC "C1:	1 Self-diagnosis for "DAST 2". 3A4-00" detected?	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refe To check malfunction symptom before Confirmation after repair: INSPECTIC	er to <u>STC-231, "DAST 2 : Diagnosis Procedure"</u> . e repair: Refer to <u>GI-45, "Intermittent Incident"</u> . DN END
DAST 2 :	Diagnosis Procedure	INFOID:000000013356612
1.PERFOR	RM SELF-DIAGNOSIS	
With CO 1. Turn th 2. Erase s 3. Turn th	<b>NSULT</b> e ignition switch ON. elf-diagnosis for "DAST 2". e ignition switch OFF and wait for at le	east 10 seconds.
4. Start th	e engine. ON:	
5. Turn th 6. Return 7. Perforn	e steering wheel from full left stop to further steering wheel from full left stop to further steering wheel to the straight-ahean self-diagnosis for "DAST 2".	ull right stop. ad position.
Is DTC "C1	3A4-00" detected?	
YES >> NO >>	<ul> <li>Replace steering force control modul</li> <li>Check enlarged contact spring of te</li> </ul>	e. Reter to <u>STC-492, "Removal and Installation"</u> . erminal. Refer to <u>GI-42, "How to Check Terminal"</u> .

• Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

# C13A5-00 CONTROL MODULE DAST 2

# DAST 2 : DTC Description

INFOID:000000013356613

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition		
C13A5-00	CONTROL MODULE (Control module)	The internal malfunction in steering angle sub control module is detected.		

#### POSSIBLE CAUSE

· Steering angle sub control module

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop. CAUTION:
  - Confirm the turning the steering wheel correctly by eyes.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A5-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-232. "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 2 : Diagnosis Procedure

INFOID:000000013356614

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

#### Never drive the vehicle.

- 5. Turn the steering wheel from full left stop to full right stop.
- 6. Return the steering wheel to the straight-ahead position.
- 7. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A5-00" detected?

YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".

#### < DTC/CIRCUIT DIAGNOSIS >

#### [DIRECT ADAPTIVE STEERING]

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- NO >>• Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

# C13A6-00 CONTROL MODULE DAST 1

# DAST 1 : DTC Description

INFOID:000000013356615

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition		
C13A6-00	CONTROL MODULE (Control module)	When system is in fail-safe mode (mode 2), the internal malfunc- tion in steering angle main control module is detected.		

#### POSSIBLE CAUSE

· Steering angle main control module

#### FAIL-SAFE

Mode 3

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

# Never drive the vehicle.

2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-234, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356616

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

NO

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A6-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to <u>GI-42. "How to Check Terminal"</u>.
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# C13A7-00 CONTROL MODULE DAST 1

# DAST 1 : DTC Description

# DTC DETECTION LOGIC

	Diantovitor	
DTC	(Trouble diagnosis content)	Malfunction detected condition
C13A7-00	CONTROL MODULE (Control module)	When system is in fail-safe mode (mode 2), the internal malfunc- tion in steering angle main control module is detected.
POSSIBLE	ECAUSE	
<ul> <li>Steering a</li> </ul>	angle main control module	
FAIL-SAFE	Ξ	
Mode 3		
For fail-sa	afe mode, refer to STC-125, "DIRECT AD	APTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	8
		reviously conducted, always turn ignition switch OFF and
wait at leas	t 10 seconds before conducting the next t	est.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
With CO	NSULT	
1. Start th	e engine.	
Never	drive the vehicle.	
2. Perforr	n self-diagnosis for "DAST 1".	
Is DTC "C1	<u>3A7-00" detected?</u>	
YES >> NO-1 >>	<ul> <li>Proceed to diagnosis procedure. Refer to</li> <li>To check malfunction symptom before re</li> </ul>	D <u>STC-235, "DAST 1 : Diagnosis Procedure"</u> .
NO-2 >>	Confirmation after repair: INSPECTION I	END
DAST 1	Diagnosis Procedure	INFOID:000000013356618
1		
I.PERFO	RM SELF-DIAGNOSIS	
With CO	NSULT	
<ol> <li>1. Turn th</li> <li>2. Erases</li> </ol>	e ignition switch ON. self-diagnosis for "DAST 1".	
3. Turn th	e ignition switch OFF and wait for at least	10 seconds.
4. Start th	e engine.	
Never	drive the vehicle.	
5. Perform	n self-diagnosis for "DAST 1".	
Is DTC "C1	<u>3A7-00" detected?</u>	
YES >> NO >>	<ul> <li>Replace steering angle main control mod</li> <li>Check enlarged contact spring of termi</li> </ul>	nal. Refer to GI-42. "How to Check Terminal".
	Perform intermittent incident while turn	ing steering wheel. Refer to GI-45, "Intermittent Incident".

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356617

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# C13A8-00 BACK UP CIRCUIT EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356619

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13A8-00	BACK UP CIRCUIT (Back up circuit)	<ul> <li>The signal voltage of back up circuit is following condition for 1 second or more continuously.</li> <li>Terminal voltage &lt; 0.5 V</li> <li>4.75 V &lt; Terminal voltage</li> </ul>	

#### POSSIBLE CAUSE

- Back up circuit (between steering force control module and steering angle main control module) is open or short.
- Steering force control module
- Steering angle main control module

#### FAIL-SAFE

- Mode 2
  - NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

# Never drive the vehicle.

Perform self-diagnosis for "EPS/DAST 3".

- Is DTC "C13A8-00" detected?
- YES >> Proceed to diagnosis procedure. Refer to STC-236, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356620

### **1.**CHECK STEERING FORCE CONTROL MODULE SINGNAL

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "BACK UP SIG 1 VOLT".
- 3. Check the value

Monitor item	Standard value (Approx.)
BACK UP SIG 1 VOLT	0.5 – 4.75 V

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 2.

#### < DTC/CIRCUIT DIAGNOSIS >

2.CHECK THE BAC	K UP SIGNAL CIRCUI	Т			Λ
<ol> <li>Turn the ignition</li> <li>Disconnect each</li> <li>Check the contin</li> </ol>	switch OFF. control module harness uity between both contr	s connector. ol module harness	connectors.		B
Steering force	control module	Steering angle	main control module	<b>2</b>	
Connector	Terminal	Connector	Terminal	Continuity	С
M71	17	E26	24	Existed	
4. Check the contin	uity between steering fo	orce control module	harness connector a	nd ground.	D
Steerin	g force control module			Continuity	
Connector	Termina	I		Continuity	Е
M71	17		Ground	Not existed	
NO >> Repair of <b>3.</b> PERFORM SELF- <b>With CONSULT</b> 1. Connect each co 2. Start the engine. <b>CAUTION:</b> <b>Never drive the</b> 3. Perform self-diag Is any DTC is detected YES >> Check th	replace error-detected DIAGNOSIS ntrol module harness c <b>vehicle.</b> nosis for "DAST 1". <u>ed?</u> e DTC. Refer to STC-1	part. onnector. 69. "DTC Index".			STC H
NO >> GO TO 4 4.CHECK INTERMI	TTENT INCIDENT	<u></u> .			J
<ol> <li>Turn the ignition</li> <li>Check enlarged of</li> <li>Perform intermitted</li> <li>Is the inspection result</li> </ol>	switch OFF. contact spring of termin ent incident while turnin It normal?	al. Refer to <u>GI-42. "</u> Ig steering wheel. R	How to Check Termir refer to GI-45, "Interm	nal". hittent Incident".	K
YES >> Replace NO >> Repair of DAST 1	steering force control m replace error-detected	nodule. Refer to <u>ST</u> part.	C-492, "Removal and	Installation".	L
DAST 1 : DTC D	escription			INFOID:000000013356621	M
DTC DETECTION I	LOGIC				Ν

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13A8-00	BACK UP CIRCUIT (Back up circuit)	<ul> <li>The signal voltage of back up circuit is following condition for 1 second or more continuously.</li> <li>Terminal voltage &lt; 0.5 V</li> <li>4.75 V &lt; Terminal voltage</li> </ul>	0

#### POSSIBLE CAUSE

• Back up circuit (between steering angle main control module and steering angle sub control module) is open or short.

• Steering angle main control module

Steering angle sub control module

FAIL-SAFE

< DTC/CIRCUIT DIAGNOSIS >

#### Mode 1 or Mode 3 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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

#### (B) With CONSULT

1. Start the engine.

#### CAUTION:

### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13A8-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-238, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356622

### **1.**CHECK STEERING ANGLE MAIN CONTROL MODULE SINGNAL

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "BACK UP SIG 1 VOLT".
- 3. Check the value

Monitor item	Standard value (Approx.)	
BACK UP SIG 1 VOLT	0.5 – 4.75 V	

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 2.

2.check the back up signal circuit

1. Turn the ignition switch OFF.

2. Disconnect each control module harness connector.

3. Check the continuity between both control module harness connectors.

Steering angle ma	ain control module	Steering angle s	Continuity	
Connector	Terminal	Connector Terminal		Continuity
E26	17	E29	22	Existed

4. Check the continuity between steering force control module harness connector and ground.

Steering angle main control module			Continuity
Connector	Terminal		Continuity
E26	17	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.** PERFORM SELF-DIAGNOSIS

INFOID:000000013356623

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#### < DTC/CIRCUIT DIAGNOSIS > ()With CONSULT Connect each control module harness connector. А Start the engine. 2. **CAUTION:** Never drive the vehicle. В Perform self-diagnosis for "DAST 2". Is any DTC is detected? YES >> Check the DTC. Refer to STC-182, "DTC Index". NO >> GO TO 4. **4.**CHECK INTERMITTENT INCIDENT D 1. Turn the ignition switch OFF. 2. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". Is the inspection result normal? Е YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation". >> Repair or replace error-detected part. NO DAST 2 F

# DAST 2 : DTC Description

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	Н
C13A8-00	BACK UP CIRCUIT (Back up circuit)	<ul> <li>The signal voltage of back up circuit is following condition for 1 second or more continuously.</li> <li>Terminal voltage &lt; 0.5 V</li> <li>4.75 V &lt; Terminal voltage</li> </ul>	I

### POSSIBLE CAUSE

 Back up circuit (between steering angle sub control module and steering angle main control module) is open or short.

Steering angle sub control module

Steering angle main control module

### FAIL-SAFE

<ul> <li>Mode 2 NOTE: For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.</li> </ul>
DTC CONFIRMATION PROCEDURE
1.PRECONDITIONING
If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

#### With CONSULT

Start the engine. 1

### **CAUTION:**

Never drive the vehicle.

2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A8-00" detected?

>> Proceed to diagnosis procedure. Refer to STC-240, "DAST 2 : Diagnosis Procedure". YES

>> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident". NO-1

>> Confirmation after repair: INSPECTION END NO-2

#### < DTC/CIRCUIT DIAGNOSIS >

# DAST 2 : Diagnosis Procedure

INFOID:000000013356624

#### **1.**CHECK STEERING ANGLE SUB CONTROL MODULE SINGNAL

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. On the CONSULT screen, select "DAST 2" >> "DATA MONITOR" >> "BACK UP SIG 1 VOLT".
- 3. Check the value

Monitor item	Standard value (Approx.)
BACK UP SIG 1 VOLT	0.5 - 4.75 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

**2.**CHECK THE BACK UP SIGNAL CIRCUIT

1. Turn the ignition switch OFF

2. Disconnect each control module harness connector.

3. Check the continuity between both control module harness connectors.

Steering angle sub control module		Steering angle main control module		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E29	17	E26	24	Existed

4. Check the continuity between steering angle sub control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal		Continuity
E29	17	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Connect each control module harness connector.
- 2. Start the engine.

#### **CAUTION:**

#### Never drive the vehicle.

3. Perform self-diagnosis for "DAST 1".

#### Is any DTC is detected?

YES >> Check the DTC. Refer to <u>STC-169</u>, "DTC Index".

NO >> GO TO 4.

#### **4.**CHECK INTERMITTENT INCIDENT

#### 1. Turn the ignition switch OFF

- 2. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected part.

# C13A9-00 BACK UP CIRCUIT **EPS/DAST 3**

# EPS/DAST 3 : DTC Description

INFOID:000000013356625

А

В

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A9-00	BACK UP CIRCUIT (Back up circuit)	<ul> <li>The signal voltage of back up circuit is following condition for 1 second or more continuously.</li> <li>Terminal voltage &lt; 0.5 V</li> <li>4.75 V &lt; Terminal voltage</li> </ul>
POSSIBLE	CAUSE	
<ul> <li>Back up of short.</li> </ul>	circuit (between steering force control mo	odule and steering angle sub control module) is open or
Steering f	orce control module	
	angle sub control module =	
Mode 2	-	
NOTE:	ofe mode, refer to STC-125 "DIRECT AD	APTIVE STEERING · Fail-safe"
	FIRMATION PROCEDURE	ALTIVE STEEKING . Lairsale.
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been p t 10 seconds before conducting the next t	reviously conducted, always turn ignition switch OFF and test.
~ ~	GO TO 2	
2.DTC RE	PRODUCTION PROCEDURE	
With CO Start th CAULT	NSULT e engine.	
Never 2. Perform	drive the vehicle. n self-diagnosis for "EPS/DAST 3".	
YES >> NO-1 >> NO-2 >>	<ul> <li>Proceed to diagnosis procedure. Refer to</li> <li>To check malfunction symptom before re</li> <li>Confirmation after repair: INSPECTION I</li> </ul>	o <u>STC-241, "EPS/DAST 3 : Diagnosis Procedure"</u> . pair: Refer to <u>GI-45, "Intermittent Incident"</u> . END
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356626
<b>1.</b> снеск	STEERING FORCE CONTROL MODULI	E SINGNAL
With CO 1. Turn th 2. On the 3. Check	<b>NSULT</b> e ignition switch ON. CONSULT screen, select "EPS/DAST 3" the value	>> "DATA MONITOR" >> "BACK UP SIG 2 VOLT".
	Monitor item	Standard value (Approx.)
BACK UP SI	G 2 VOLT	0.5 – 4.75 V
Is the inspe	ction result normal?	

YES >> GO TO 4.

NO >> GO TO 2.

#### < DTC/CIRCUIT DIAGNOSIS >

# 2. CHECK THE BACK UP SIGNAL CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect each control module harness connector.
- 3. Check the continuity between both control module harness connectors.

Steering force	control module	Steering angle s	ub control module	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M71	18	E29	24	Existed

4. Check the continuity between steering force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	18	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.** PERFORM SELF-DIAGNOSIS

#### () With CONSULT

- T. Connect each control module harness connector.
- Start the engine.
   CAUTION:
- Never drive the vehicle.
- 3. Perform self-diagnosis for "DAST 2".
- Is any DTC is detected?
- YES >> Check the DTC. Refer to <u>STC-182, "DTC Index"</u>.
- NO >> GO TO 4.

### **4.**CHECK INTERMITTENT INCIDENT

- 1. Turn the ignition switch OFF.
- 2. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> Repair or replace error-detected part.

DAST 1

### DAST 1 : DTC Description

INFOID:000000013356627

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A9-00	BACK UP CIRCUIT (Back up circuit)	<ul> <li>The signal voltage of back up circuit is following condition for 1 second or more continuously.</li> <li>Terminal voltage &lt; 0.5 V</li> <li>4.75 V &lt; Terminal voltage</li> </ul>

#### POSSIBLE CAUSE

- Back up circuit (between steering angle main control module and steering force control module) is open or short.
- Steering angle main control module
- Steering force control module

FAIL-SAFE

DTC/CIRCUIT DIA	JNOSIS >		-	
Mode 1 or Mode 3				
<b>NOTE:</b> For fail-safe mode, r	efer to STC-125. "DIRI	ECT ADAPTIVE STE	ERING : Fail-safe".	
TC CONFIRMATIC				
-PRECONDITIONIN	IG			
"DTC CONFIRMATIC		s been previously cor	nducted always turn	ignition switch OFF and
ait at least 10 second	ds before conducting th	he next test.	lauciea, always tam	ignition switch of F and
>> GO TO 2.				
DTC REPRODUCT	ION PROCEDURE			
With CONSULT				
CAUTION:				
Never drive the v	vehicle.			
Perform self-diagr	nosis for "DAST 1".			
<u>DIC "C13A9-00" de</u>	<u>tected?</u>	Defende OTO 040		Due ee duue "
NO-1 >> To check i	o diagnosis procedure.	. Refer to <u>STC-243,</u> pefore repair: Refer to	DAST 1: Diagnosis	Incident"
NO-2 >> Confirmat	ion after repair: INSPE	CTION END		<u></u> .
	sis Procedure			INFOID:00000001335662
ASI 1 : Diagnos				
AST 1 : Diagnos				
.CHECK STEERING	FORCE CONTROL	MODULE SINGNAL		
AST 1 : Diagnos .CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value	G FORCE CONTROL N witch ON.	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S	SIG 2 VOLT".
AST 1 : Diagnos .CHECK STEERING )With CONSULT Turn the ignition s On the CONSULT Check the value	G FORCE CONTROL N witch ON. screen, select "DAST	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S	SIG 2 VOLT". Approx.)
CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value	G FORCE CONTROL N witch ON. Screen, select "DAST	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
AST 1 : Diagnos CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value BACK UP SIG 2 VOLT the inspection result	G FORCE CONTROL N witch ON. screen, select "DAST Monitor item	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
AST 1 : Diagnos CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value BACK UP SIG 2 VOLT the inspection result YES >> GO TO 4.	G FORCE CONTROL N witch ON. `screen, select "DAST Monitor item	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
AST 1 : Diagnos CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value BACK UP SIG 2 VOLT the inspection result YES >> GO TO 4. NO >> GO TO 2.	G FORCE CONTROL N witch ON. Screen, select "DAST Monitor item	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value Check the value Check the value Check the value CHECK THE BACK	G FORCE CONTROL N witch ON. 'screen, select "DAST Monitor item t normal?	MODULE SINGNAL 1" >> "DATA MONIT	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value Check the value Check the value CHECK THE BACK Turn the ignition s	G FORCE CONTROL N witch ON. Screen, select "DAST Monitor item <u>tormal?</u> (UP SIGNAL CIRCUIT witch OFF.	MODULE SINGNAL	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
AST 1 : Diagnos CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value BACK UP SIG 2 VOLT the inspection result YES >> GO TO 4. NO >> GO TO 2. CHECK THE BACK Turn the ignition s Disconnect each of Check the continu	G FORCE CONTROL N witch ON. screen, select "DAST Monitor item tormal? (UP SIGNAL CIRCUIT witch OFF. sontrol module harness ity between both control	MODULE SINGNAL 1" >> "DATA MONIT T s connector. rol module harness co	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value Check the value Check the value CHECK THE BACK Turn the ignition s Disconnect each of Check the continu	G FORCE CONTROL N witch ON. screen, select "DAST Monitor item tormal? (UP SIGNAL CIRCUIT witch OFF. sontrol module harness ity between both control	MODULE SINGNAL 1" >> "DATA MONIT T s connector. rol module harness ca	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT". Approx.) V
AST 1 : Diagnos CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value BACK UP SIG 2 VOLT the inspection result YES >> GO TO 4. NO >> GO TO 4. NO >> GO TO 2. CHECK THE BACK Turn the ignition s Disconnect each of Check the continu	G FORCE CONTROL N witch ON. screen, select "DAST Monitor item <u>t normal?</u> (UP SIGNAL CIRCUIT witch OFF. control module harness ity between both control	MODULE SINGNAL 1" >> "DATA MONIT T s connector. ol module harness conservation of the service of the se	OR" >> "BACK UP S Standard value ( 0.5 – 4.75	SIG 2 VOLT".
AST 1 : DIAGNOS .CHECK STEERING )With CONSULT Turn the ignition s On the CONSULT Check the value ACK UP SIG 2 VOLT the inspection result (ES >> GO TO 4. NO >> GO TO 2. .CHECK THE BACK Turn the ignition s Disconnect each of Check the continu Steering angle ma Connector	G FORCE CONTROL N witch ON. screen, select "DAST Monitor item tormal? (UP SIGNAL CIRCUIT witch OFF. sontrol module harness ity between both control in control module	MODULE SINGNAL 1" >> "DATA MONIT DATA MONIT Sconnector. T Sconnector. T Sconnector. Steering force Connector	OR" >> "BACK UP S Standard value ( 0.5 – 4.75 onnectors.	SIG 2 VOLT".
AST 1 : DIAGNOS .CHECK STEERING )With CONSULT Turn the ignition s On the CONSULT Check the value ACK UP SIG 2 VOLT the inspection result (ES >> GO TO 4. NO >> GO TO 4. NO >> GO TO 4. .CHECK THE BACK Turn the ignition s Disconnect each of Check the continu Steering angle ma Connector E26	G FORCE CONTROL N witch ON. Screen, select "DAST Monitor item tormal? UP SIGNAL CIRCUIT witch OFF. control module harness ity between both control in control module Terminal 18	MODULE SINGNAL 1" >> "DATA MONIT T S connector. Tol module harness connector Steering force Connector M71	OR" >> "BACK UP S Standard value ( 0.5 – 4.75 Onnectors.	SIG 2 VOLT". Approx.) V Continuity Existed
AST 1 : Diagnos .CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value ACK UP SIG 2 VOLT the inspection result YES >> GO TO 4. NO >> GO TO 2. .CHECK THE BACK Turn the ignition s Disconnect each of Check the continu Steering angle ma Connector E26 Check the continu	G FORCE CONTROL N witch ON. Screen, select "DAST Monitor item tormal? UP SIGNAL CIRCUIT witch OFF. control module harness ity between both control in control module Terminal 18 ity between steering for	MODULE SINGNAL 1" >> "DATA MONIT 1" >> "DATA MONIT T S connector. Tol module harness co Steering force Connector M71 Drce control module h	OR" >> "BACK UP S Standard value ( 0.5 – 4.75 Onnectors. control module Terminal 22 harness connector an	SIG 2 VOLT". Approx.) V Continuity Existed ad ground.
AST 1 : DIAGNOS .CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value BACK UP SIG 2 VOLT the inspection result YES >> GO TO 4. NO >> GO TO 4. NO >> GO TO 2. .CHECK THE BACK Turn the ignition s Disconnect each of Check the continu Steering angle ma Connector E26 Check the continu	G FORCE CONTROL N witch ON. 'screen, select "DAST Monitor item tonormal? (UP SIGNAL CIRCUIT witch OFF. control module harness ity between both control in control module Terminal 18 ity between steering for gle main control module	MODULE SINGNAL 1" >> "DATA MONIT T S connector. Tol module harness co Steering force Connector M71 Drce control module h	OR" >> "BACK UP S Standard value ( 0.5 – 4.75 Onnectors. control module Terminal 22 harness connector an	BIG 2 VOLT". Approx.) V Continuity Existed ad ground.
AST 1 : DIAGNOS CHECK STEERING With CONSULT Turn the ignition s On the CONSULT Check the value Check the value Check the value CHECK THE BACK Turn the ignition s Disconnect each of Check the continu Steering angle ma Connector E26 Check the continu Steering angle ma Connector	G FORCE CONTROL N witch ON. Screen, select "DAST Monitor item tormal? (UP SIGNAL CIRCUIT witch OFF. control module harness ity between both control in control module Terminal 18 ity between steering for gle main control module Terminal	MODULE SINGNAL 1" >> "DATA MONIT  T s connector. ol module harness co Steering force Connector M71 prce control module h	OR" >> "BACK UP S Standard value ( 0.5 – 4.75 onnectors. control module Terminal 22 harness connector an	SIG 2 VOLT". Approx.) V Continuity Existed ad ground. Continuity Continuity

NO >> Repair or replace error-detected part.

 $3. {\tt perform self-diagnosis}$ 

< DTC/CIRCUIT DIAGNOSIS >

#### (I) With CONSULT

- 1. Connect each control module harness connector.
- 2. Start the engine.

#### CAUTION: Never drive the vehicle.

3. Perform self-diagnosis for "EPS/DAST 3".

#### Is any DTC is detected?

YES >> Check the DTC. Refer to <u>STC-156, "DTC Index"</u>.

NO >> GO TO 4.

**4.**CHECK INTERMITTENT INCIDENT

- 1. Turn the ignition switch OFF.
- 2. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected part.

DAST 2

# DAST 2 : DTC Description

INFOID:000000013356629

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13A9-00	BACK UP CIRCUIT (Back up circuit)	<ul> <li>The signal voltage of back up circuit is following condition for 1 second or more continuously.</li> <li>Terminal voltage &lt; 0.5 V</li> <li>4.75 V &lt; Terminal voltage</li> </ul>

### POSSIBLE CAUSE

- Back up circuit (between steering angle sub control module and steering force control module) is open or short.
- Steering angle sub control module
- Steering force control module

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### 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. Start the engine.
  - CAUTION:

### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13A9-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-245, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### < DTC/CIRCUIT DIAGNOSIS >

#### DAST 2 · Diagnosia Bross .

[DIRECT ADAPTIVE STEERING]

DAST 2 : Diagnos	sis Procedure				INFOID:000000013356630
1.CHECK STEERING	FORCE CONTROL	MODULE S	SINGNAL		
<ul> <li>With CONSULT</li> <li>1. Turn the ignition so</li> <li>2. On the CONSULT</li> <li>3. Check the value</li> </ul>	witch ON. screen, select "DAST	Г 2" >> "DA⁻	ΓΑ ΜΟΝΙΤΟ	DR" >> "BACK UP SI	G 2 VOLT".
	Monitor item			Standard value (A	pprox.)
BACK UP SIG 2 VOLT				0.5 – 4.75 \	1
Is the inspection result         YES       >> GO TO 4.         NO       >> GO TO 2. <b>2.</b> CHECK THE BACK         1.       Turn the ignition sv         2.       Disconnect each c         3.       Check the continue	normal? UP SIGNAL CIRCUI witch OFF. control module harnes ity between both cont	T s connecto rol module	r. harness co	nnectors.	
Steering angle sul	b control module	S	teering force	control module	
Connector	Terminal	Conn	ector	Terminal	- Continuity
E29	18	M7	71	24	Existed
Connector E29	Termina 18	al	(	Ground	Not existed
Is the inspection result YES >> GO TO 3. NO >> Repair or n 3.PERFORM SELF-D With CONSULT 1. Connect each con 2. Start the engine. CAUTION: Naver drive the ve	<u>normal?</u> replace error-detected DIAGNOSIS trol module harness o	d part.			
3. Perform self-diagn Is any DTC is detected	losis for "EPS/DAST ( 1 <u>?</u>	3".			
YES >> Check the NO >> GO TO 4.	DTC. Refer to STC-1	<u> 56, "DTC Ir</u>	<u>ndex"</u> .		
4.CHECK INTERMIT	TENT INCIDENT				
<ol> <li>Turn the ignition sv</li> <li>Check enlarged co</li> <li>Perform intermitter</li> </ol>	witch OFF. ontact spring of termir nt incident while turni	nal. Refer to ng steering	9 <u>GI-42, "Ho</u> wheel. Ref	ow to Check Terminal er to <u>GI-45, "Intermit</u> i	<u>"</u> ent Incident".
Is the inspection result YES >> Replace st	<u>normal?</u> teering angle sub con	trol module	. Refer to <u>S</u>	STC-494, "Removal a	nd Installation".

NO >> Repair or replace error-detected part.

# C13AA-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356631

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AA-00	CONTROL MODULE (Control module)	<ul> <li>The inside relay malfunction in control module is detected when the system is starting.</li> <li>Malfunction of motor circuit is detected when the system is start- ing.</li> </ul>

### POSSIBLE CAUSE

- Steering force control module
- Motor circuit (between steering force control module and steering force motor) is open or short.

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13AA-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-246, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356632

# **1.**CHECK THE MOTOR CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module and steering force motor harness connector.
- 3. Check the continuity between control module harness connector and motor harness connector.

Steering force control module		Steering force motor		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M151	35	M153	1	Existed	
	36		2		
	37		3		

4. Check the continuity between control module harness connector and ground.

# C13AA-00 CONTROL MODULE

#### < DTC/CIRCUIT DIAGNOSIS >

Steering force control module		Continuity		А
Connector	Terminal	— —	Continuity	
	35			_
M151	36	Ground	Not existed	kisted B
_	37			
Is the inspection result norm	nal?			С
YES >> GO TO 2. NO >> Repair or repla	ce error-detected part.			
2. CHECK INTERMITTENT INCIDENT				
<ol> <li>Check enlarged contact</li> <li>Perform intermittent inc</li> <li>Is the inspection result norm</li> </ol>	t spring of terminal. Refe ident while turning steer nal?	er to <u>GI-42, "How to Check Terr</u> ing wheel. Refer to <u>GI-45, "Inte</u>	minal". ermittent Incident".	E
YES >> Replace steerir NO >> Repair or replace DAST 1	ng force control module. ce error-detected part.	Refer to <u>STC-492, "Removal a</u>	nd Installation".	F
DAST 1 : DTC Descri	ption		INFOID:000000013356633	

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition		
C13AA-00	CONTROL MODULE (Control module)	<ul> <li>The inside relay malfunction in control module is detected when the system is starting.</li> <li>Malfunction of motor circuit is detected when the system is start- ing.</li> </ul>		
POSSIBLE	CAUSE			
<ul><li>Steering a</li><li>Motor circ</li></ul>	angle main control module suit (between steering angle main control r	nodule and steering angle main motor) is open or short.		
FAIL-SAFE	<u> </u>			
Mode 3				
For fail-sa	ife mode, refer to <u>STC-125, "DIRECT ADA</u>	APTIVE STEERING : Fail-safe".		
DTC CON	FIRMATION PROCEDURE			
1.PRECON	NDITIONING			
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pr t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and est.		
>>	GO TO 2.			
2.DTC RE	PRODUCTION PROCEDURE			
With CO	NSULT			
1. Start the	e engine.			
Never drive the vehicle.				
2. Perform	n self-diagnosis for "DAST 1".			
Is DTC "C13	<u>3AA-00" detected?</u>			
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION E	STC-248, "DAST 1 : Diagnosis Procedure". pair: Refer to <u>GI-45, "Intermittent Incident"</u> . ND		

# STC-247

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#### < DTC/CIRCUIT DIAGNOSIS >

### DAST 1 : Diagnosis Procedure

INFOID:000000013356634

#### **1.**CHECK THE MOTOR CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module and steering angle main motor harness connector.
- 3. Check the continuity between control module harness connector and motor harness connector.

Steering angle main control module		Steering angle main motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35	<b>-</b> *1	1	
E97	36	E88 <sup>1</sup>	3	Existed
	37	ETUS	2	

\*1: 2WD models

\*2: AWD models

4. Check the continuity between control module harness connector and ground.

Steering angle main control module			Continuity
Connector	Terminal		Continuity
	35		Not existed
E97	36	Ground	
	37		

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected part.

2. CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

2. Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

#### Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.

NO >> Repair or replace error-detected part.

DAST 2

# DAST 2 : DTC Description

INFOID:000000013356635

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AA-00	CONTROL MODULE (Control module)	<ul> <li>The inside relay malfunction in control module is detected when the system is starting.</li> <li>Malfunction of motor circuit is detected when the system is start- ing.</li> </ul>

#### POSSIBLE CAUSE

• Steering angle sub control module

• Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

# C13AA-00 CONTROL MODULE

#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]
EDURE" has been previously conducted, always turn ignition switch OEE and

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	
<ul> <li>With CONSULT</li> <li>Start the engine.</li> <li>CAUTION:</li> <li>Never drive the vehicle.</li> <li>Perform self-diagnosis for "DAST 2".</li> </ul>	
<u>Is DTC "C13AA-00" detected?</u> YES >> Proceed to diagnosis procedure. Refer to <u>STC-249, "DAST 2 : Diagnosis Procedure</u> NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u> . NO-2 >> Confirmation after repair: INSPECTION END	<u>}"</u> .
DAST 2 : Diagnosis Procedure 1.check the motor circuit	INFOID:000000013356636

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1. Turn the ignition switch OFF.

2. Disconnect steering angle sub control module and steering angle sub motor harness connector.

3. Check the continuity between control module harness connector and motor harness connector.

Steering angle sub control module		Steering angle sub motor		Continuity	Н
Connector	Terminal	Connector	Terminal	Continuity	11
E99 36 E90 37		1			
	36	E90	3	Existed	
	37		2		

#### 4. Check the continuity between control module harness connector and ground.

Steering angle sub control module			Continuity	-
Connector	Terminal			k
E99	35	Ground	Not existed	- 1
	36			
	37			L

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected part.

2. CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".

Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

Is the inspection result normal?

YES >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.

NO >> Repair or replace error-detected part.

# C13AB-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356637

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AB-00	CONTROL MODULE (Control module)	<ul> <li>Steering force control module detects the following status when the system is starting.</li> <li>Malfunction of internal relay</li> <li>Malfunction of each backup circuit</li> <li>Malfunction of steering clutch circuit</li> <li>Malfunction of inverter circuit</li> <li>Malfunction of motor circuit</li> <li>Malfunction of motor angle sensor circuit</li> </ul>

#### POSSIBLE CAUSE

- Back up circuit (between steering force control module and steering angle main control module) is open or short.
- Back up circuit (between steering force control module and steering angle sub control module) is open or short.
- Steering clutch circuit
- Steering clutch
- Motor circuit (between steering force control module and steering force motor) is open or short.
- Motor angle sensor circuit (between steering force control module and force motor angle sensor) is open or short.
- Steering force control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC "C13AB-00" is displayed with DTC "C13A8-00", "C13A9-00", "C13AD-00", "C13D4-00" or "C13E0-00", first perform the confirmation procedure (trouble diagnosis) for DTC "C13AB-00".

#### Is applicable DTC detected?

- YES-1 (C13A8-00 is detected)>>Refer to <u>STC-236, "EPS/DAST 3 : Diagnosis Procedure"</u>. YES-2 (C13A9-00 is detected)>>Refer to <u>STC-241, "EPS/DAST 3 : Diagnosis Procedure"</u>.
- YES-3 (C13AD-00 is detected)>>Refer to STC-256, "EPS/DAST 3 : Diagnosis Procedure".
- YES-4 (C13D4-00 is detected)>>Refer to STC-366, "EPS/DAST 3 : Diagnosis Procedure".

YES-5 (C13E0-00 is detected)>>Refer to STC-408, "EPS/DAST 3 : Diagnosis Procedure".

NO >> GO TO 2.

# 2.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 3.

# ${f 3}.$ DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Start the engine. CAUTION:
  - Never drive the vehicle.
- Perform self-diagnosis for "EPS/DAST 3". 2.

# **C13AB-00 CONTROL MODULE**

< DTC/CIRCUIT DIAGNOSIS >		[DIRECT ADAPTIVE STEERING]	
Is DTC "C13	3AB-00" detected?		
YES >> NO-1 >> NO-2 >>	<ul> <li>Proceed to diagnosis procedure. Refer to <u>STC-251, "EPS/DAST 3 : Diagnosis Procedure"</u>.</li> <li>To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.</li> <li>Confirmation after repair: INSPECTION END</li> </ul>		
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356638	
1.PERFOR	RM SELF-DIAGNOSIS		
<ul> <li>With COI</li> <li>Turn the</li> <li>Erase s</li> <li>Turn the</li> <li>Start the</li> <li>CAUTION</li> </ul>	<b>NSULT</b> e ignition switch ON. elf-diagnosis for "EPS/DAST 3". e ignition switch OFF and wait for at least 1 e engine. ON:	0 seconds.	
Never drive the vehicle. 5. Perform self-diagnosis for "EPS/DAST 3".			
YES >> NO >> DAST 1	<ul> <li>Replace steering force control module. Re</li> <li>Check enlarged contact spring of termina</li> <li>Perform intermittent incident while turning</li> </ul>	fer to <u>STC-492, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	
DAST 1 :	DTC Description	INFOID:000000013356639	
DTC DETE	CTION LOGIC		
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13AB-00	CONTROL MODULE (Control module)	<ul> <li>Steering angle main control module detects the following status when the system is starting.</li> <li>Malfunction of internal relay</li> <li>Malfunction of each backup circuit</li> <li>Malfunction of inverter circuit</li> <li>Malfunction of motor circuit</li> <li>Malfunction of motor angle sensor circuit</li> </ul>	
POSSIBLE	CAUSE	·	
<ul> <li>Back up cl or short.</li> <li>Back up c short.</li> </ul>	ircuit (between steering angle main control sircuit (between steering angle main contro	module and steering angle sub control module) is open I module and steering force control module) is open or	
<ul> <li>Motor circ</li> <li>Motor ang open or sh</li> <li>Steering a</li> </ul>	uit (between steering angle main control m gle sensor circuit (between steering angle nort. Ingle main control module	odule and steering angle main motor) is open or short. main control module and main motor angle sensor) is	
FAIL-SAFE • Mode 3 NOTE: For fail-sa	fe mode, refer to STC-125, "DIRECT ADA	PTIVE STEERING : Fail-safe".	
DTC CONF	FIRMATION PROCEDURE		
1.снеск	DTC PRIORITY		
If DTC "C13 the confirma	BAB-00" is displayed with DTC "C13A8-00" ation procedure (trouble diagnosis) for DTC	, "C13A9-00", "C13AD-00" or "C13D4-00", first perform "C13AB-00".	
Is applicable	e DTC detected?		

YES-1 (C13A8-00 is detected)>>Refer to <u>STC-238, "DAST 1 : Diagnosis Procedure"</u>. YES-2 (C13A9-00 is detected)>>Refer to <u>STC-243, "DAST 1 : Diagnosis Procedure"</u>. YES-3 (C13AD-00 is detected)>>Refer to <u>STC-258, "DAST 1 : Diagnosis Procedure"</u>.

# C13AB-00 CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

YES-4 (C13D4-00 is detected)>>Refer to STC-368, "DAST 1 : Diagnosis Procedure".

NO >> GO TO 2.

### 2. 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 3.

3.DTC REPRODUCTION PROCEDURE

#### With CONSULT

Start the engine.
 CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13AB-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-252, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356640

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.

# CAUTION:

- Never drive the vehicle.
- 5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13AB-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident".</u>

# DAST 2

NO

### DAST 2 : DTC Description

INFOID:000000013356641

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AB-00	CONTROL MODULE (Control module)	<ul> <li>Steering angle sub control module detects the following status when the system is starting.</li> <li>Malfunction of internal relay</li> <li>Malfunction of each backup circuit</li> <li>Malfunction of inverter circuit</li> <li>Malfunction of motor circuit</li> <li>Malfunction of motor angle sensor circuit</li> </ul>

#### POSSIBLE CAUSE

- Back up circuit (between steering angle sub control module and steering angle main control module) is open or short.
- Back up circuit (between steering angle sub control module and steering force control module) is open or short.
- Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.
- Motor angle sensor circuit (between steering angle sub control module and sub motor angle sensor) is open or short.
| < DTC/CIRCUIT DIAGNOSIS > [DIRECT ADAPTIVE STEERING   | ]        |
|---|----------|
| Steering angle sub control module   | -        |
| FAIL-SAFE   | А        |
| Mode 2  |          |
| NOTE:<br>For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"   | В        |
| DTC CONFIDMATION DDOCEDUDE  |          |
|   |          |
|   | С        |
| If DTC "C13AB-00" is displayed with DTC "C13A8-00", "C13A9-00", "C13AD-00" or "C13D4-00", first perforr the confirmation procedure (trouble diagnosis) for DTC "C13AB-00".  | n        |
| Is applicable DTC detected?   | D        |
| YES-1 (C13A8-00 is detected)>>Refer to <u>STC-240, "DAST 2 : Diagnosis Procedure"</u> .<br>YES-2 (C13A9-00 is detected)>>Refer to <u>STC-245, "DAST 2 : Diagnosis Procedure"</u> .<br>YES-3 (C13AD-00 is detected)>>Refer to <u>STC-260, "DAST 2 : Diagnosis Procedure"</u> .<br>YES-4 (C13D4-00 is detected)>>Refer to <u>STC-371, "DAST 2 : Diagnosis Procedure"</u> .<br>NO _>> GO TO 2. | E        |
| 2. PRECONDITIONING  | F        |
| If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch OFF an wait at least 10 seconds before conducting the next test.   | d<br>STC |
| >> GO TO 3.   |          |
| 3.DTC REPRODUCTION PROCEDURE  | Ц        |
| With CONSULT  | _        |
| 1. Start the engine.  |          |
| CAUTION:<br>Never drive the vehicle   |          |
| 2. Perform self-diagnosis for "DAST 2".   |          |
| Is DTC "C13AB-00" detected?   | 1        |
| YES >> Proceed to diagnosis procedure. Refer to <u>STC-253, "DAST 2 : Diagnosis Procedure"</u> .  | 0        |
| NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u> .  |          |
|   | K        |
| DAST 2: Diagnosis Procedure   | i42      |
| 1.PERFORM SELF-DIAGNOSIS  | L        |
| With CONSULT  |          |
| <ol> <li>1. Furn the ignition switch ON.</li> <li>2. Erase self-diagnosis for "DAST 2"</li> </ol>   | M        |
| 3. Turn the ignition switch OFF and wait for at least 10 seconds.   |          |
| 4. Start the engine.  |          |
| Never drive the vehicle.  | Ν        |
| 5. Perform self-diagnosis for "DAST 2".   |          |
| Is DTC "C13AB-00" detected?   | 0        |
| <ul> <li>YES &gt;&gt; Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.</li> <li>NO &gt;&gt; • Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.</li> </ul>  |          |

• Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

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# C13AC-00 CONTROL MODULE DAST 1

DAST 1 : DTC Description

INFOID:000000013356643

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AC-00	CONTROL MODULE (Control module)	<ul><li>Steering angle main control module detects the following status when the system is starting.</li><li>Malfunction of internal relay</li><li>Malfunction of each backup circuit</li></ul>

## POSSIBLE CAUSE

- Power supply circuit for steering force control module is open or short.
- Power supply circuit for steering angle sub control module is open or short.
- Back up circuit (between steering angle main control module and steering angle sub control module) is open or short.
- Back up circuit (between steering angle main control module and steering force control module) is open or short.
- Steering angle main control module

### FAIL-SAFE

Mode 3
 NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

## DTC CONFIRMATION PROCEDURE

# **1.**CHECK DTC PRIORITY

If DTC "C13AC-00" is displayed with DTC "C13A8-00" or "C13A9-00", first perform the confirmation procedure (trouble diagnosis) for DTC "C13AC-00".

### Is applicable DTC detected?

YES-1 (C13A8-00 is detected)>>Refer to STC-238, "DAST 1 : Diagnosis Procedure".

YES-2 (C13A9-00 is detected)>>Refer to STC-243. "DAST 1 : Diagnosis Procedure".

NO >> GO TO 2.

## 2.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 3.

3.DTC REPRODUCTION PROCEDURE

#### ()With CONSULT

- Start the engine.
   CAUTION: Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".
- Is DTC "C13AC-00" detected?
- YES >> Proceed to diagnosis procedure. Refer to STC-254, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356644

**1.**CHECK STEERING FORCE CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Turn the ignition switch OFF.

# STC-254

## < DTC/CIRCUIT DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

<ol> <li>Disconnect steering for</li> <li>Check the voltage betw</li> </ol>	ce control module harness veen steering force control n	connector. nodule harness connector a	nd ground.
Steering force	control module		
Connector	Terminal	—	Voltage (Approx.)
M72	34	Ground	10.5 – 16.0 V
Is the inspection result norn	nal?		
YES >> GO TO 3. NO >> GO TO 2.			
2. CHECK STEERING FOR	RCE CONTROL MODULE I	POWER SUPPLY CIRCUIT	(2)
<ol> <li>Check the 60A fusible I</li> <li>Check the harness for minal and the 60A fusible</li> </ol>	ink (#G). open or short between stee ble link (#G).	ring force control module ha	rness connector No.34 ter-
Is the inspection result norm         YES       >> Perform the tro         ing Diagram - E         NO       >> Repair or replace	nal? uble diagnosis for battery po <u>ATTERY POWER SUPPLY</u> ce error-detected parts.	ower supply circuit. Refer to ′″.	<u>PG-20, "VR30DDTT : Wir-</u>
3. CHECK STEERING AND	GLE SUB CONTROL MOD	JLE POWER SUPPLY CIRC	CUIT (1)
<ol> <li>Turn the ignition switch</li> <li>Disconnect steering an</li> <li>Check the voltage betw</li> </ol>	OFF. gle sub control module harr veen steering angle sub con	ness connector. trol module harness connec	tor and ground.
Steering angle su	ub control module	_	Voltage (Approx.)
Connector	Terminal		
E30	34	Ground	10.5 – 16.0 V
YES >> GO TO 5. NO >> GO TO 4. 4.CHECK STEERING AND	GLE SUB CONTROL MOD	JLE POWER SUPPLY CIRC	CUIT (2)
<ol> <li>Check the 100A fusible</li> <li>Check the harness for a terminal and the 100A fusible</li> </ol>	link (#H). open or short between steer fusible link (#H).	ing angle sub control module	e harness connector No.34
Is the inspection result norn	nal?		
YES >> Perform the tro	uble diagnosis for battery p	ower supply circuit. Refer to	PG-20, "VR30DDTT : Wir-
NO >> Repair or replace	ce error-detected parts.	<u>· - · ·</u> .	
5.PERFORM SELF-DIAGI	NOSIS		
1. Turn the ignition switch	ON.		
2. Erase self-diagnosis for	r "DAST 1".	0 cocondo	
<ol> <li>I urn the ignition switch</li> <li>Start the engine.</li> <li>CAUTION:</li> </ol>	OFF and wait for at least 1	U seconds.	
Never drive the vehic			
5. Perform self-diagnosis	tor "DAST 1".		
YES >> Replace steerir NO >> • Check enlarg • Perform inter	ed r ng angle main control modu ed contact spring of termina mittent incident while turning	le. Refer to <u>STC-493, "Rema</u> al. Refer to <u>GI-42, "How to C</u> g steering wheel. Refer to <u>GI</u>	oval and Installation". heck Terminal". -45, "Intermittent Incident".

# C13AD-00 CONTROL MODULE EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356645

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AD-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

### POSSIBLE CAUSE

- Steering force motor
- Steering force motor harness connector
- Motor circuit (between steering force control module and steering force motor) is open or short.
- Steering force control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13AD-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-256, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356646

# **1.**CHECK THE MOTOR

Check the steering force motor. Refer to <u>STC-257, "EPS/DAST 3 : Component Inspection"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2.

NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> <u>"Removal and Installation"</u>.

### 2.CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering force control module and steering force motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

	control module	Steering force motor		
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
M151	36	M153	2	
	37		3	Existed
M152	38	M154	5	
Check the continu	uity between control m	odule harness conr	nector and ground.	
Steering	n force control module			
Connector	Termina		—	Continuity
	35	~		
M151	36			
WIGH	37		Ground	Not existed
M152	38			
the inspection result	t normal?			
$\frac{1}{2} = \frac{1}{2} = \frac{1}$				
NO >> Repair or	replace error-detected	d part.		
S.CHECK INTERMI				
CHECK INTERMI	TENT INCIDENT	al Refer to GI-42	"How to Check Term	ninal"
CHECK INTERMIT	ontact spring of termir ontact spring of termir	nal. Refer to <u>GI-42,</u> ng steering wheel. I	"How to Check Term Refer to <u>GI-45, "Inte</u>	ninal". rmittent Incident".
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DTC DETECTION LOGIC

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AD-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

#### POSSIBLE CAUSE

- · Steering angle main motor
- Steering angle main motor harness connector
- Motor circuit (between steering angle main control module and steering angle main motor) is open or short.
- Steering angle main control module

#### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:
  - Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

### Is DTC "C13AD-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-258. "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356649

# **1.**CHECK THE MOTOR

Check the steering angle main motor. Refer to <u>STC-259, "DAST 1 : Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

# 2. CHECK THE MOTOR CIRCUIT

1. Disconnect steering angle main control module and steering angle main motor harness connector.

2. Check the continuity between control module harness connector and motor harness connector.

Steering angle ma	ain control module	Steering angle main motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35	<b>—</b> *1	1	
E97	36	E88 '	3	Evicted
	37	- E105	2	Existed
E98	38	E89	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

### **STC-258**

### < DTC/CIRCUIT DIAGNOSIS >

Steering angle	main control module		Continuity
Connector	Terminal		Continuity
	35		
E97	36		
	37	Ground	NOL EXISIED
E98	38	_	
s the inspection result no         YES       >> GO TO 3.         NO       >> Repair or rep         3.CHECK INTERMITTE         1. Check enlarged cont         2. Perform intermittent i         Is the inspection result no         YES       >> Replace stee         NO       >> Re	virmal? vlace error-detected part. NT INCIDENT act spring of terminal. Refer to ncident while turning steering vrmal? ering angle main control mode vlace error-detected part. nt Inspection ch OFF. angle main motor barness co	to <u>GI-42, "How to Check Terr</u> g wheel. Refer to <u>GI-45, "Inte</u> ule. Refer to <u>STC-493, "Rem</u>	minal". ermittent Incident". oval and Installation".
<ol> <li>Disconnect steering a</li> <li>Check the continuity</li> </ol>	between motor connector te	rminals.	
<ol> <li>Turn the ignition swit</li> <li>Disconnect steering a</li> <li>Check the continuity</li> </ol>	Steering angle main motor	rminals.	Continuity
<ol> <li>Disconnect steering a</li> <li>Check the continuity</li> </ol>	Steering angle main motor Terminal	rminals.	Continuity
<ol> <li>Turn the ignition switter</li> <li>Disconnect steering a</li> <li>Check the continuity</li> </ol>	Steering angle main motor Terminal	2	Continuity Existed
1. Turn the ignition switter     2. Disconnect steering a     3. Check the continuity     1     1	Steering angle main motor Terminal	2 3	Continuity Existed Existed
1. Turn the ignition switter 2. Disconnect steering a 3. Check the continuity 1 1 1 1	Steering angle main motor Terminal	2 3 4	Continuity Existed Existed Not existed
1. Turn the ignition swit     2. Disconnect steering a     3. Check the continuity     1     1     1     2	Steering angle main motor Terminal	2 3 4 3	Continuity Existed Existed Not existed Existed
Turn the ignition swit     Disconnect steering a     Check the continuity     1     1     1     2     2	Steering angle main motor Terminal	2 3 4 3 4	Continuity Existed Existed Not existed Existed Not existed
1. Turn the ignition swit     2. Disconnect steering a     3. Check the continuity     1     1     1     2     2     3	Steering angle main motor Terminal	2 3 4 3 4 4 4 4	Continuity Existed Existed Not existed Existed Not existed Not existed
1. Turn the ignition swit         2. Disconnect steering a         3. Check the continuity         1         1         2         2         3         Is the inspection result not yes         YES         > INSPECTION NO         NO         > Steering ang "Removal an DAST 2         DAST 2 : DTC Descent         DTC DETECTION LOG	Steering angle main motor connector te Steering angle main motor Terminal <u>prmal?</u> V END Ile main motor is malfunction <u>d Installation</u> ". SiIC	2 3 4 3 4 4 4 5 0 n. Replace steering gear a	Continuity Existed Existed Not existed Not existed Not existed Not existed Seembly. Refer to <u>ST-146</u> ,
1. Turn the ignition swit         2. Disconnect steering a         3. Check the continuity         1         1         1         2         3         Is the inspection result not yes         YES         > INSPECTION NO         >> Steering ang "Removal an DAST 2         DAST 2 : DTC Descond DTC DETECTION LOG         DTC         DTC	Steering angle main motor connector te Steering angle main motor Terminal <u>prmal?</u> V END Ile main motor is malfunction <u>d Installation</u> ". Cription SIC Display item puble diagnosis content)	2 3 4 3 4 4 3 4 0 n. Replace steering gear a Malfunction de	Continuity Existed Existed Not existed Not existed Not existed Not existed Not existed INFOID:000000013356651

- Steering angle sub motor
- Steering angle sub motor harness connector
- Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.
- Steering angle sub control module

< DTC/CIRCUIT DIAGNOSIS >

### FAIL-SAFE

Mode 2

#### NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

#### (B) With CONSULT

1. Start the engine. CAUTION:

### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 2".

### Is DTC "C13AD-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-260, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 2 : Diagnosis Procedure

INFOID:000000013356652

# **1.**CHECK THE MOTOR

Check the steering angle sub motor. Refer to <u>STC-261, "DAST 2 : Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

# 2.CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering angle sub control module and steering angle sub motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

Steering angle s	Steering angle sub control module		Steering angle sub motor	
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90	3	
	37		2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal		Continuity
	35		
E99	36	Ground	Not evicted
	37	Giouna	NOT EXISTED
E100	38		

< DTC/CIRCUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]	
s the inspection result normal?		
YES >> GO TO 3.		А
NO >> Repair or replace error-detected part.		
3. CHECK INTERMITTENT INCIDENT		D
<ol> <li>Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to</u></li> <li>Perform intermittent incident while turning steering wheel. Refer to</li> </ol>	Check Terminal". GI-45, "Intermittent Incident".	D
Is the inspection result normal?		C
YES >> Replace steering angle sub control module. Refer to <u>STC-</u> NO >> Repair or replace error-detected part.	494, "Removal and Installation".	0
DAST 2 : Component Inspection	INFOID:000000013356653	D
1.CHECK THE MOTOR		
1 Turn the ignition switch OEE		E

Turn the ignition switch OFF. 1.

2. Disconnect steering angle sub motor harness connector.

3. Check the continuity between motor connector terminals.

	Continuity	gle sub motor	Steering and
от о		Terminal	
	Existed	2	1
[	Existed	3	1
Н	Not existed	4	1
	Existed	3	2
	Not existed	4	2
	Not existed	4	3

### Is the inspection result normal?

YES >> INSPECTION END

>> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to ST-146, NO "Removal and Installation".

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# C13AE-00 CONTROL MODULE EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356654

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AE-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

### POSSIBLE CAUSE

Steering force control module

### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

# Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13AE-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-262, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356655

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13AE-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# DAST 1

NO

### < DTC/CIRCUIT DIAGNOSIS >

### DAST 1 : DTC Description

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356656 А DTC DETECTION LOGIC Display item DTC Malfunction detected condition (Trouble diagnosis content) CONTROL MODULE The internal malfunction is detected when control module is start-C13AE-00 (Control module) ing. POSSIBLE CAUSE Steering angle main control module D FAIL-SAFE Mode 3 NOTE: For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe". DTC CONFIRMATION PROCEDURE 1.PRECONDITIONING F If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test. STC >> GO TO 2. 2. DTC REPRODUCTION PROCEDURE Н (P)With CONSULT 1 Start the engine. CAUTION: Never drive the vehicle. 2. Perform self-diagnosis for "DAST 1". Is DTC "C13AE-00" detected? YES >> Proceed to diagnosis procedure. Refer to STC-263, "DAST 1 : Diagnosis Procedure". >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident". NO-1 NO-2 >> Confirmation after repair: INSPECTION END Κ DAST 1 : Diagnosis Procedure INFOID:00000001335665 1.PERFORM SELF-DIAGNOSIS L ()With CONSULT 1. Turn the ignition switch ON. M Erase self-diagnosis for "DAST 1". Turn the ignition switch OFF and wait for at least 10 seconds. 3. 4. Start the engine. CAUTION: Ν Never drive the vehicle. Perform self-diagnosis for "DAST 1". Is DTC "C13AE-00" detected? YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation". >> • Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". NO Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". P DAST 2 DAST 2 : DTC Description INFOID:000000013356658 DTC DETECTION LOGIC

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AE-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

### POSSIBLE CAUSE

• Steering angle sub control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### 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. Start the engine.

## CAUTION:

- Never drive the vehicle.
- Perform self-diagnosis for "DAST 2".

### Is DTC "C13AE-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-264. "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 2 : Diagnosis Procedure

INFOID:000000013356659

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.
  - CAUTION:

NO

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13AE-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

< DTC/CIRCUIT DIAGNOSIS >

# C13AF-00 CONTROL MODULE **EPS/DAST 3**

# EPS/DAST 3 : DTC Description

### INFOID:000000013356660

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# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AF-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.
POSSIBLE  • Steering for	CAUSE prce control module	
FAIL-SAFE • Mode 2 NOTE: For fail-sa	fe mode, refer to <u>STC-125, "DIRECT AD/</u>	APTIVE STEERING : Fail-safe".
DTC CONF	IRMATION PROCEDURE	-
1.PRECON	NDITIONING	
If "DTC CON wait at least	NFIRMATION PROCEDURE" has been pound of the next to th	reviously conducted, always turn ignition switch OFF and est.
>> 2.dtc ref	GO TO 2. PRODUCTION PROCEDURE	
With CON 1. Start the CAUTIC Never c	NSULT e engine. DN: Irive the vehicle.	
<u>Is DTC "C13</u> YES >> NO-1 >> NO-2 >>	<u>BAF-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before re Confirmation after repair: INSPECTION F	o <u>STC-265, "EPS/DAST 3 : Diagnosis Procedure"</u> . pair: Refer to <u>GI-45, "Intermittent Incident"</u> . -ND
FPS/DAS	T 3 · Diagnosis Procedure	
1.PERFOR	RM SELF-DIAGNOSIS	INFOIL.00000015550001
With CON 1. Turn the 2. Erase s 3. Turn the	<b>NSULT</b> e ignition switch ON. elf-diagnosis for "EPS/DAST 3". e ignition switch OFF and wait for at least	10 seconds.
4. Start the CAUTIC Never c	engine. DN: Irive the vehicle. Self-diagnosis for "EPS/DAST 3"	
<u>Is DTC "C13</u>	BAF-00" detected?	
YES >> NO >>	Replace steering force control module. R • heck enlarged contact spring of termina • Perform intermittent incident while turni	Refer to <u>STC-492, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . Ing steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .

### < DTC/CIRCUIT DIAGNOSIS >

# DAST 1 : DTC Description

INFOID:000000013356662

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AF-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

### POSSIBLE CAUSE

• Steering angle main control module

#### FAIL-SAFE

- Mode 3
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13AF-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-266. "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356663

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- Start the engine.
   CAUTION:
- Never drive the vehicle.
- 5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13AF-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

# DAST 2

## DAST 2 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356664

### < DTC/CIRCUIT DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13AF-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.
POSSIBLE • Steering a	CAUSE angle sub control module	
FAIL-SAFE • Mode 2 NOTE: For fail-sa	fe mode, refer to STC-125, "DIRECT AD	APTIVE STEERING : Fail-safe".
DTC CONI	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been p t 10 seconds before conducting the next t	previously conducted, always turn ignition switch OFF and test.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
With CO Start th CAUTION Never O 2. Perform	<b>NSULT</b> e engine. <b>ON:</b> drive the vehicle. n self-diagnosis for "DAST 2".	
Is DTC "C13 YES >> NO-1 >> NO-2 >>	<u>3AF-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before re Confirmation after repair: INSPECTION	o <u>STC-267, "DAST 2 : Diagnosis Procedure"</u> . apair: Refer to <u>GI-45, "Intermittent Incident"</u> . END
DAST 2 :	Diagnosis Procedure	INFOID:000000013356665
<b>1</b> .PERFOR	RM SELF-DIAGNOSIS	
With CO 1. Turn th 2. Erase s 3. Turn th 4. Start th	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 2". e ignition switch OFF and wait for at least e engine.	t 10 seconds.
CAUTION Never	ongine. ON: drive the vehicle. a self-diagnosis for "DAST 2"	
Is DTC "C1	<u>3AF-00" detected?</u>	
YES >> NO >>	<ul> <li>Replace steering angle sub control mode</li> <li>Check enlarged contact spring of term</li> <li>Perform intermittent incident while turn</li> </ul>	ule. Refer to <u>STC-494, "Removal and Installation"</u> . inal. Refer to <u>GI-42, "How to Check Terminal"</u> . ing steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .

# C13B0-00 CONTROL MODULE EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356666

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B0-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

### POSSIBLE CAUSE

Steering force control module

### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

# Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13B0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-268, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356667

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

### Is DTC "C13B0-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# DAST 1

NO

# < DTC/CIRCUIT DIAGNOSIS >

# DACT 1 DTC Description

[DIRECT ADAPTIVE STEERING]

DAST 1: DTC Description				
DTC DETECTION LOGIC				
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	В	
C13B0-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.	С	
POSSIBLE <ul> <li>Steering a</li> </ul>	CAUSE angle main control module			
FAIL-SAFE • Mode 3 NOTE: For fail-sa	fe mode, refer to STC-125, "DIRECT ADA	PTIVE STEERING · Fail-safe"	D	
DTC CON	FIRMATION PROCEDURE			
1.PRECO	NDITIONING		F	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre- t 10 seconds before conducting the next tes	eviously conducted, always turn ignition switch OFF and st.	STC	
>> <b>2.</b> dtc re	GO TO 2. PRODUCTION PROCEDURE		Ц	
With CO	NSULT			
1. Start th CAUTION	e engine. ON: drive the vehicle		I	
2. Perforn	n self-diagnosis for "DAST 1".			
Is DTC "C1	<u>3B0-00" detected?</u>		J	
YES >> NO-1 >> NO-2 >>	To check malfunction symptom before repairs Confirmation after repairs INSPECTION EI	air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	K	
DAST 1 :	Diagnosis Procedure	INFOID:000000013356669	IX	
<b>1.</b> PERFOR	RM SELF-DIAGNOSIS		L	
With CO 1. Turn th 2. Erase s 3. Turn th 4. Start th	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 1". e ignition switch OFF and wait for at least 1 e engine	0 seconds.	M	
5. Perform	ON: drive the vehicle. n self-diagnosis for "DAST 1".		Ν	
Is DTC "C1 YES >>	<u>3B0-00" detected?</u> Replace steering angle main control modu	le. Refer to <u>STC-493, "Removal and Installation"</u> .	0	
DAST 2	<ul> <li>Perform intermittent incident while turnin</li> </ul>	g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	Ρ	
DAST 2 :	DTC Description	INF0ID:000000013356670		
DTC DETE	DTC DETECTION LOGIC			

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B0-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

#### POSSIBLE CAUSE

• Steering angle sub control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine.

## CAUTION:

- Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 2".

### Is DTC "C13B0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-270, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 2 : Diagnosis Procedure

INFOID:000000013356671

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.
  - CAUTION:

NO

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B0-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# C13B1-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

### INFOID:000000013356672

А

В

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B1-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.
POSSIBLE  • Steering for	CAUSE prce control module	
FAIL-SAFE • Mode 2 <b>NOTE:</b> For fail-sa	fe mode, refer to <u>STC-125. "DIRECT AD</u>	DAPTIVE STEERING : Fail-safe".
DTC CONF	FIRMATION PROCEDURE	
1.PRECOM	NDITIONING	
If "DTC CON wait at least	NFIRMATION PROCEDURE" has been p 10 seconds before conducting the next	previously conducted, always turn ignition switch OFF and test.
>> 2.dtc rei	GO TO 2. PRODUCTION PROCEDURE	
With COI Start the CAUTIC	NSULT e engine. DN:	
2. Perform <u>Is DTC "C13</u> YES >> NO-1 >> NO-2 >>	n self-diagnosis for "EPS/DAST 3". <u>3B1-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before re Confirmation after repair: INSPECTION	to <u>STC-271, "EPS/DAST 3 : Diagnosis Procedure"</u> . epair: Refer to <u>GI-45, "Intermittent Incident"</u> . END
EPS/DAS	T 3 : Diagnosis Procedure	INFO/D-000000013356673
1.PERFOR	RM SELF-DIAGNOSIS	
With COI 1. Turn the 2. Erase s 3. Turn the 4. Stort the	<b>NSULT</b> e ignition switch ON. elf-diagnosis for "EPS/DAST 3". e ignition switch OFF and wait for at leas	st 10 seconds.
4. Start ine CAUTION Never of 5. Perform	ore engine. DN: drive the vehicle. a self-diagnosis for "EPS/DAST 3".	
Is DTC "C13	<u>BB1-00" detected?</u>	
YES >> NO >> DAST 1	<ul><li>Replace steering force control module.</li><li>Check enlarged contact spring of term</li><li>Perform intermittent incident while turr</li></ul>	Refer to <u>STC-492, "Removal and Installation"</u> . ninal. Refer to <u>GI-42, "How to Check Terminal"</u> . ning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .

### < DTC/CIRCUIT DIAGNOSIS >

# DAST 1 : DTC Description

INFOID:000000013356674

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B1-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

### POSSIBLE CAUSE

• Steering angle main control module

#### FAIL-SAFE

- Mode 3
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13B1-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-272, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356675

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

# Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13B1-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

# DAST 2

DAST 2 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356676

### < DTC/CIRCUIT DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B1-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.
POSSIBLE • Steering a	CAUSE angle sub control module	
FAIL-SAFE • Mode 2 NOTE: For fail-sa	afe mode, refer to STC-125, "DIRECT ADA	PTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	viously conducted, always turn ignition switch OFF and st.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
With CO Start th CAUTI Never Porform	NSULT e engine. ON: drive the vehicle.	
<u>Is DTC "C1</u> YES >> NO-1 >> NO-2 >>	<u>3B1-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION El	<u>STC-273, "DAST 2 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 2 :	Diagnosis Procedure	INEQID:000000013356677
1.PERFOR	RM SELF-DIAGNOSIS	
With CO 1. Turn th 2. Erase s 3. Turn th 4 Start th	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 2". e ignition switch OFF and wait for at least 1 e engine	0 seconds.
CAUTI Never	origino. ON: drive the vehicle.	
5. Perform	a self-diagnosis for "DAST 2". 3B1-00" detected?	
YES >> NO >>	<ul> <li>Replace steering angle sub control module</li> <li>Check enlarged contact spring of terminic</li> </ul>	e. Refer to <u>STC-494, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> .
	Perform intermittent incloent while turnin	g steering wheel. Refer to <u>GI-45, "Intermittent incident"</u> .

# C13B2-00 CONTROL MODULE EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356678

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B2-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

### POSSIBLE CAUSE

- Steering force motor
- Steering force motor harness connector
- Motor circuit (between steering force control module and steering force motor) is open or short.
- Steering force control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13B2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-274, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356679

# **1.**CHECK THE MOTOR

Check the steering force motor. Refer to <u>STC-275, "EPS/DAST 3 : Component Inspection"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2.

NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> <u>"Removal and Installation"</u>.

### 2.CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering force control module and steering force motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

Connector	Steering force control module		Steering force motor	
	Terminal	Connector	Terminal	Continuity
	35		1	
M151	36	M153	2	Existed
	37		3	Existed
M152	38	M154	5	
. Check the continu	uity between control m	odule harness conne	ector and ground.	
Steering	g force control module			<b>2</b>
Connector	Termina	al	_	Continuity
	35			
M151	36			Neg a tracel
	37		Ground	NOT EXISTED
M152	38			
s the inspection resul	t normal?	l		
YES >> GO TO 3.				
NO >> Repair or	replace error-detected	d part.		
<b>3.</b> CHECK INTERMIT	TENT INCIDENT			
. Check enlarged c	ontact spring of termin	nal. Refer to <u>GI-42, "</u>	How to Check Termi	nal".
. Perform intermitte	ent incident while turnin	ng steering wheel. R	efer to <u>GI-45, "Intern</u>	nittent Incident".
s the inspection resul	t normal?			
YES >> Replace s	steering force control n	nodule. Refer to <u>ST(</u>	C-492, "Removal and	Installation".
NO >> Repair or	replace error-delected			
		a part.		
PS/DAST 3 : Co	omponent Inspect	tion		INFOID:00000001335
PS/DAST 3 : Co	omponent Inspect	tion		INFOID:00000001335
PS/DAST 3 : Co .CHECK THE MOT	OR	tion		INFOID:00000001335
PS/DAST 3 : Co CHECK THE MOT Turn the ignition s	OR OR Switch OFF.	s connector.		INFOID:00000001335
<b>PS/DAST 3</b> : Co <b>.</b> CHECK THE MOT . Turn the ignition s . Disconnect steeri . Check the continu	OR OR witch OFF. ng force motor harnes uity between motor cor	s connector. nnector terminals.		INFOID:00000001335
CHECK THE MOT . Turn the ignition s . Disconnect steeri . Check the continu	OR OR witch OFF. ng force motor harnes uity between motor cor	s connector.		INFOID:00000001335
PS/DAST 3 : Co .CHECK THE MOT . Turn the ignition s . Disconnect steeri . Check the continu	OR OR switch OFF. ng force motor harnes uity between motor cor Steering force motor	tion s connector. nnector terminals.		INFOID:00000001335
PS/DAST 3 : CO CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu	OR OR witch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	s connector. nnector terminals.		INFOID:00000001335
EPS/DAST 3 : Co .CHECK THE MOT . Turn the ignition s . Disconnect steeri . Check the continu 1	OR OR Switch OFF. Ing force motor harnes uity between motor cor Steering force moto Terminal	tion s connector. nnector terminals.		INFOID:00000001335 Continuity Existed Existed
EPS/DAST 3 : CO .CHECK THE MOT . Turn the ignition s Disconnect steeri . Check the continu 1 1	OR OR switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	tion s connector. nnector terminals.		INFOID:00000001335 Continuity Existed Existed Not existed
EPS/DAST 3 : Co . CHECK THE MOT . Turn the ignition s Disconnect steeri . Check the continu 1 1 1 2	OR OR switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	tion s connector. nnector terminals.		INFOID:00000001335 Continuity Existed Existed Not existed Existed
EPS/DAST 3 : Co CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1 2 2	OR Switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	tion s connector. nnector terminals.		INFOID:00000001335 Continuity Existed Existed Not existed Existed Not existed
EPS/DAST 3 : Co . CHECK THE MOT . Turn the ignition s Disconnect steeri . Check the continu 1 1 2 2 2	OR OR Switch OFF. Ing force motor harnes uity between motor cor Steering force motor Terminal	tion s connector. nnector terminals.		INFOID:00000001335 Continuity Existed Existed Not existed Existed Not existed Not existed

DAST 1 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356681

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B2-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

#### POSSIBLE CAUSE

- · Steering angle main motor
- Steering angle main motor harness connector
- Motor circuit (between steering angle main control module and steering angle main motor) is open or short.
- Steering angle main control module

#### FAIL-SAFE

 Mode 1 or Mode 3 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:
  - Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

## Is DTC "C13B2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-276. "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356682

# **1.**CHECK THE MOTOR

Check the steering angle main motor. Refer to STC-277, "DAST 1 : Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

# 2. CHECK THE MOTOR CIRCUIT

1. Disconnect steering angle main control module and steering angle main motor harness connector.

2. Check the continuity between control module harness connector and motor harness connector.

Steering angle ma	ain control module	Steering angle main motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35	<b>—</b> *1	1	
E97	36	E88 '	3	Evicted
	37	- E105	2	Existed
E98	38	E89	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

### **STC-276**

### < DTC/CIRCUIT DIAGNOSIS >

	Steering angle m			Continuity
Co	onnector	Terminal		Continuity
E97		35		
		36	Ground	Not existed
		37		
	E98	38		
s the inspe YES >> NO >> 3.CHECK 1. Check ( 2. Perform s the inspe YES >> NO >> DAST 1 : 1.CHECK	ection result nor GO TO 3. Repair or repla INTERMITTEN enlarged contain intermittent in ection result nor Replace steeri Repair or repla Componen THE MOTOR	mal? ace error-detected part. IT INCIDENT ct spring of terminal. Ref cident while turning stee mal? ing angle main control m ace error-detected part. t Inspection	fer to <u>GI-42, "How to Check Tr</u> ering wheel. Refer to <u>GI-45, "In</u> module. Refer to <u>STC-493, "Re</u>	erminal". htermittent Incident". emoval and Installation".
<ol> <li>Turn the</li> <li>Disconri</li> <li>Check 1</li> </ol>	e ignition switcl nect steering ar the continuity b	h OFF. ngle main motor harness etween motor connector	s connector. r terminals.	
<ol> <li>Turn the</li> <li>Disconr</li> <li>Check to</li> </ol>	e ignition switcl nect steering ar the continuity b	h OFF. ngle main motor harness etween motor connector	s connector. r terminals.	
<ol> <li>Turn the</li> <li>Disconri</li> <li>Check to</li> </ol>	e ignition switcl nect steering ar the continuity b	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	s connector. r terminals.	Continuity
<ol> <li>Turn the</li> <li>Disconri</li> <li>Check to</li> </ol>	e ignition switcl nect steering a the continuity b	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	s connector. r terminals.	Continuity Existed
Turn the     Disconn     Check t	e ignition switcl nect steering ar the continuity b 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	2 3	Continuity Existed Existed
Turn the     Disconr     Check t	e ignition switcl nect steering ar the continuity b 1 1 1	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	s connector. r terminals.	Continuity Existed Existed Not existed
<ol> <li>Turn the</li> <li>Disconr</li> <li>Check t</li> </ol>	e ignition switcl nect steering ar the continuity b 1 1 1 2	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	2 3 4 3	Continuity Existed Existed Not existed Existed
<ol> <li>Turn the</li> <li>Disconr</li> <li>Check the</li> </ol>	e ignition switcl nect steering ar the continuity b 1 1 1 2 2 2	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	2 3 4 3 4 3 4 3 4	Continuity Existed Existed Not existed Existed Not existed
<ol> <li>Turn the</li> <li>Disconr</li> <li>Check t</li> </ol>	e ignition switcl nect steering ar the continuity b 1 1 1 2 2 2 3	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal	2 3 4 3 4 4 4 4	Continuity Existed Existed Not existed Existed Not existed Not existed
1. Turn the 2. Disconr 3. Check t 	e ignition switcl nect steering ar the continuity b 1 1 1 2 2 3 ection result nor Steering angle "Removal and : DTC Descr ECTION LOGI	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal mal? END e main motor is malfun Installation". Fiption C	s connector. r terminals.	Continuity Existed Existed Not existed Not existed Not existed Not existed
1. Turn the 2. Disconr 3. Check t	e ignition switcl nect steering ar the continuity b 1 1 1 2 2 3 2 ction result nor Steering angle "Removal and CTION LOGI	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal mal? END e main motor is malfun Installation". Tiption C Display item	s connector. r terminals.	Continuity Existed Existed Not existed Not existed Not existed Not existed Transembly. Refer to <u>ST-146</u> .
1. Turn the 2. Disconr 3. Check the 3. Check the Check the Check the 2. Disconr 3. Check the 1. Turn the 2. Disconr 2. Disconr 2. Disconr 2. Disconr 2. Disconr 2. Disconr 2. Disconr 3. Check the 1. Disconr 4. Disconr 4. Disconr 4. Disconr 4. Disconr 4. Disconr 4. Disconr 4. Disconr 4. Disconr 4. Disconr 5. Disconr	e ignition switcl nect steering ar the continuity b 1 1 1 2 2 3 ection result nor Steering angle "Removal and : DTC Descr ECTION LOGI	h OFF. ngle main motor harness etween motor connector Steering angle main motor Terminal mal? END e main motor is malfun Installation". ription C Display item ible diagnosis content) ULE	s connector. r terminals.  2 3 4 3 4 3 4 4 3 Ction. Replace steering gear Malfunction • The internal malfunction in	Continuity Existed Existed Not existed Not existed Not existed Not existed Not existed <i>INFOID:00000001335668-</i> <i>INFOID:00000001335668-</i> detected condition

- Steering angle sub motor
- Steering angle sub motor harness connector
- Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.
- Steering angle sub control module

# STC-277

< DTC/CIRCUIT DIAGNOSIS >

### FAIL-SAFE

Mode 2

#### NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

#### (B) With CONSULT

1. Start the engine. CAUTION:

### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-278, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 2 : Diagnosis Procedure

INFOID:000000013356685

# **1.**CHECK THE MOTOR

Check the steering angle sub motor. Refer to <u>STC-279, "DAST 2 : Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

# 2.CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering angle sub control module and steering angle sub motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

Steering angle s	ub control module	Steering angle sub motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90	3	
	37		2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

Steering angle sub control module			Continuity	
Connector	Terminal		Continuity	
E99	35			
	36	Ground	Not existed	
	37	Gibunu		
E100	38			

< DTC/CIRCUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]
Is the inspection result normal?	
YES >> GO TO 3. NO >> Repair or replace error-detected part. <b>3.</b> CHECK INTERMITTENT INCIDENT	·
<ol> <li>Check enlarged contact spring of terminal. Refer to <u>GI-42.</u>"</li> <li>Perform intermittent incident while turning steering wheel. R</li> </ol>	How to Check Terminal". efer to GI-45, "Intermittent Incident".
Is the inspection result normal?	
YES >> Replace steering angle sub control module. Refer to NO >> Repair or replace error-detected part.	STC-494, "Removal and Installation".
DAST 2 : Component Inspection	INF01D:000000013356686
<b>1.</b> CHECK THE MOTOR	
1 Turn the ignition switch OEE	

Turn the ignition switch OFF. 1.

2. Disconnect steering angle sub motor harness connector.

3. Check the continuity between motor connector terminals.

F					
	Continuity	Steering angle sub motor			
070	Continuity	ninal	Ter		
SIC	Existed	2	1		
	Existed	3	1		
Н	Not existed	4	1		
	Existed	3	2		
	Not existed	4	2		
	Not existed	4	3		

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to ST-146. "Removal and Installation".

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# C13B3-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356687

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B3-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

### POSSIBLE CAUSE

- Steering force motor
- Steering force motor harness connector
- Motor circuit (between steering force control module and steering force motor) is open or short.
- Steering force control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel quickly from full left stop to full right stop.
- 3. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13B3-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-280, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356688

## **1.**CHECK THE MOTOR

Check the steering force motor. Refer to <u>STC-281, "EPS/DAST 3 : Component Inspection"</u>.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135</u>, <u>"Removal and Installation"</u>.

# 2.CHECK THE MOTOR CIRCUIT

1. Disconnect steering force control module and steering force motor harness connector.

2. Check the continuity between control module harness connector and motor harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

Steering force	control module	Steering	force motor		
Connector	Terminal	Connector	Terminal	Continuity	
	35		1		
M151	36	M153	2	Eviated	
	37		3	- Existed	
M152	38	M154	5		
Check the continu	uity between control m	odule harness conne	ector and ground.		
Steering	g force control module				
Connector	Termina	al	—	Continuity	
	35				
M151	36				
	37		Ground	Not existed	
M152	38				
the inspection resul	t normal?				
YES >> GO TO 3	replace error-dotoctor	d part			
		a part.			
Check enlarged c	ontact spring of termin	nal. Refer to <u>GI-42, "I</u>	<u>How to Check Termin</u>	<u>nal"</u> .	
Dorform intermitte	بلصعب بالماسين المصما مأمصا المصر	na storring who of D	for to CLAE Untern	aittent Ingident"	
Perform intermitte	ent incident while turni	ng steering wheel. Ro	efer to <u>GI-45, "Intern</u>	<u>nittent Incident"</u> .	
Perform intermitte	ent incident while turnii t normal?	ng steering wheel. Ro	efer to <u>GI-45, "Intern</u>	nittent Incident".	
Perform intermitte the inspection resul YES >> Replace s	ent incident while turnin <u>t normal?</u> steering force control r replace error-detector	ng steering wheel. Re nodule. Refer to <u>STC</u>	efer to <u>GI-45, "Intern</u> -492, "Removal and	nittent Incident". I Installation".	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected	ng steering wheel. Re nodule. Refer to <u>STC</u> d part.	efer to <u>GI-45, "Intern</u> -492, "Removal and	<u>hittent Incident"</u> . I Installation".	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect	ng steering wheel. Re nodule. Refer to <u>STC</u> d part. tion	efer to <u>GI-45, "Intern</u> 2-492, "Removal and	nittent Incident". I Installation".	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co - CHECK THE MOT	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspection OR	ng steering wheel. Re nodule. Refer to <u>STC</u> d part. t <b>ion</b>	efer to <u>GI-45, "Intern</u> -492, "Removal and	nittent Incident". I Installation".	
Perform intermitte <u>the inspection resul</u> YES >> Replace s NO >> Repair or <b>PS/DAST 3 : Co</b> .CHECK THE MOT	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR	ng steering wheel. Re nodule. Refer to <u>STC</u> d part. tion	efer to <u>GI-45, "Intern</u> 2-492, "Removal and	nittent Incident". I Installation".	
Perform intermitte the inspection result (ES >> Replace so NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition so Disconnect steeri	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes	ng steering wheel. Refer to <u>STC</u> d part. tion	efer to <u>GI-45, "Intern</u> -492, "Removal and	nittent Incident". I Installation".	
Perform intermitte the inspection result (ES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor	ng steering wheel. Refer to <u>STC</u> d part. tion s connector. nnector terminals.	efer to <u>GI-45, "Intern</u> -492, "Removal and	nittent Incident". I Installation".	
Perform intermitte the inspection result YES >> Replace of NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition of Disconnect steeri Check the continu	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor	ng steering wheel. Refer to <u>STC</u> d part. tion s connector.	efer to <u>GI-45, "Intern</u> -492, "Removal and	nittent Incident". I Installation".	
Perform intermitte the inspection result YES >> Replace as NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition as Disconnect steeri Check the continu	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor Steering force motor	ng steering wheel. Refer to <u>STC</u> d part. tion s connector. nnector terminals.	efer to <u>GI-45, "Intern</u> -492, "Removal and	<u>hittent Incident"</u> . <u>I Installation"</u> . INFOID:00000001	
Perform intermitte the inspection result YES >> Replace of NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition of Disconnect steeri Check the continu	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	ng steering wheel. Refer to <u>STC</u> d part. tion s connector. nnector terminals.	efer to <u>GI-45, "Intern</u> 492, "Removal and	<u>hittent Incident"</u> . <u>I Installation"</u> . INFOID:00000001 Continuity Existed	
Perform intermitte the inspection result YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	ng steering wheel. Refer to <u>STC</u> d part. tion s connector. nnector terminals.	efer to <u>GI-45, "Intern</u> 492, "Removal and	Linstallation". INFOID:00000001 Continuity Existed Existed	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	ng steering wheel. Refer to <u>STC</u> d part. tion s connector. nnector terminals.	efer to <u>GI-45, "Intern</u> 492, "Removal and	Linstallation".	
Perform intermitte the inspection result YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1 2	ent incident while turnin t normal? steering force control r replace error-detected omponent Inspect OR switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	ng steering wheel. Refer to STC d part. tion as connector. nnector terminals.	efer to <u>GI-45, "Intern</u> 492, "Removal and 	Linstallation".	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 2 2	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes ity between motor cor Steering force motor Terminal	ng steering wheel. Refer to <u>STC</u> d part. tion s connector. nnector terminals.	efer to <u>GI-45, "Intern</u> 492, "Removal and	Linstallation".	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1 2 2 3	ent incident while turnin t normal? steering force control r replace error-detected omponent Inspect OR switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal	ng steering wheel. Refer to STC d part. tion s connector. nnector terminals. or 2 3 5 3 5 5 5 5	efer to <u>GI-45, "Intern</u> 492, "Removal and 	Linstallation". INFOID:00000000 INFOID:000000000 Existed Existed Existed Not existed Not existed Not existed Not existed	
Perform intermitte the inspection result YES >> Replace is NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition is Disconnect steeri Check the continu 1 1 1 2 2 3 the inspection result	ent incident while turnin t normal? steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes ity between motor cor Steering force motor Terminal	ng steering wheel. Refer to STC d part. tion s connector. nnector terminals. or 2 3 5 3 5 5 5 5 5	efer to <u>GI-45, "Intern</u> 492, "Removal and 	Continuity Existed Existed Not existed Not existed Not existed Not existed Not existed	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1 2 2 3 the inspection resul YES >> INSPECT	ent incident while turnin t normal? steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal t normal? ION END	ng steering wheel. Refer to STC d part. tion as connector. nnector terminals.	efer to <u>GI-45, "Intern</u> 492, "Removal and 	Linstallation". Installation". INFOID:00000000 Existed Existed Not existed Not existed Not existed Not existed	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1 1 2 2 3 the inspection resul YES >> INSPECT NO >> Steering	ent incident while turnin <u>t normal?</u> steering force control r replace error-detected omponent Inspect OR witch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal <u>t normal?</u> TON END force motor is malfu	ng steering wheel. Refer to STC d part. tion s connector. nnector terminals. or 2 3 5 3 5 5 5	efer to <u>GI-45, "Intern</u> 492, "Removal and 	Continuity Existed Existed Not existed Not existed Not existed Not existed Not existed	
Perform intermitte the inspection resul YES >> Replace s NO >> Repair or PS/DAST 3 : Co .CHECK THE MOT Turn the ignition s Disconnect steeri Check the continu 1 1 1 1 1 2 2 3 the inspection resul YES >> INSPECT NO >> Steering "Removal	ent incident while turnin t normal? steering force control r replace error-detected omponent Inspect OR switch OFF. ng force motor harnes uity between motor cor Steering force motor Terminal t normal? ION END force motor is malfu and Installation".	ng steering wheel. Refer to STC d part. tion s connector. nnector terminals. or 2 3 5 3 5 5 5 4 5	efer to <u>GI-45, "Intern</u> 492, "Removal and 	Continuity Continuity Existed Existed Existed Not existed Not existed Not existed Not existed Not existed Solution Existed Ex	

DAST 1 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356690

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B3-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

### POSSIBLE CAUSE

- · Steering angle main motor
- Steering angle main motor harness connector
- · Motor circuit (between steering angle main control module and steering angle main motor) is open or short.
- Steering angle main control module

### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel quickly from full left stop to full right stop.
- 3. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13B3-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-282, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356691

# **1.**CHECK THE MOTOR

Check the steering angle main motor. Refer to STC-283, "DAST 1 : Component Inspection".

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

### 2. CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering angle main control module and steering angle main motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

Steering angle m	ain control module	Steering angle main motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35	<b>F</b> o o *1	1	
E97	36	E88 <sup>-</sup> E105 <sup>*2</sup>	3	Evistod
	37		2	EXISIEU
E98	38	E89	4	

\*1: 2WD models

\*2: AWD models

### < DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between control module harness connector and ground. А Steering angle main control module Continuity Connector Terminal В 35 E97 36 Ground Not existed 37 E98 38 Is the inspection result normal? YES >> GO TO 3. D NO >> Repair or replace error-detected part.  ${\it 3.}$  CHECK INTERMITTENT INCIDENT Ε 1. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". 2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". Is the inspection result normal? F YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation". NO >> Repair or replace error-detected part. DAST 1 : Component Inspection STC INFOID:000000013356692 **1.**CHECK THE MOTOR Turn the ignition switch OFF. Н 1. Disconnect steering angle main motor harness connector. 2. Check the continuity between motor connector terminals. 3.

	Continuity	Steering angle main motor	
	Continuity	Terminal	
J	Existed	2	1
	Existed	3	1
K	Not existed	4	1
	Existed	3	2
	Not existed	4	2
L	Not existed	4	3

# Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>.

# DAST 2

DAST 2 : DTC Description

INFOID:000000013356693

Ν

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	Р
C13B3-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>	

### POSSIBLE CAUSE

Steering angle sub motor

Steering angle sub motor harness connector

Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.

Steering angle sub control module

< DTC/CIRCUIT DIAGNOSIS >

### FAIL-SAFE

#### Mode 2

#### NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel quickly from full left stop to full right stop.
- 3. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B3-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-284, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 2 : Diagnosis Procedure

INFOID:000000013356694

# **1.**CHECK THE MOTOR

Check the steering angle sub motor. Refer to <u>STC-285. "DAST 2 : Component Inspection"</u>. <u>Is the inspection result normal?</u>

- YES >> GO TO 2.
- NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

# 2. CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering angle sub control module and steering angle sub motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

Steering angle s	ub control module	Steering angle sub motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90 3		
	37		2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal	_	Continuity
	35		
E99	36	Ground	Not ovisted
	37	Giouna	NOT EXISTED
E100	38		

< DTC/CIRCUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]
Is the inspection result normal?	
YES >> GO TO 3. NO >> Repair or replace error-detected part. <b>3.</b> CHECK INTERMITTENT INCIDENT	
<ol> <li>Check enlarged contact spring of terminal. Refer to <u>GI-42, "Ho</u></li> <li>Perform intermittent incident while turning steering wheel. Refer</li> </ol>	w to Check Terminal". er to GI-45, "Intermittent Incident".
Is the inspection result normal?	
YES >> Replace steering angle sub control module. Refer to $\underline{S}$ NO >> Repair or replace error-detected part.	TC-494, "Removal and Installation".
DAST 2 : Component Inspection	INF0ID:000000013356695
<b>1.</b> CHECK THE MOTOR	
1 Turn the ignition switch OFF	

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub motor harness connector.
- 3. Check the continuity between motor connector terminals.

Steering angle sub motor			
Te	erminal	Continuity	070
1	2	Existed	SIC
1	3	Existed	
1	4	Not existed	Н
2	3	Existed	
2	4	Not existed	
3	4	Not existed	

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to ST-146. "Removal and Installation".

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# C13B4-00 CONTROL MODULE EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

INFOID:000000013356696

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B4-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

### POSSIBLE CAUSE

Steering force control module

### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125. "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

# Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13B4-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-286, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356697

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13B4-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

# DAST 1

NO

# STC-286

### < DTC/CIRCUIT DIAGNOSIS >

# DACT 1 DTC Description

[DIRECT ADAPTIVE STEERING]

DASI 1:	DIC Description	INFOID:000000013356698	А
DTC DETE	ECTION LOGIC		
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	В
C13B4-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.	С
POSSIBLE • Steering a	E CAUSE angle main control module		
FAIL-SAFE • Mode 3 NOTE: For fail-sa	afe mode, refer to STC-125, "DIRECT ADA	PTIVE STEERING : Fail-safe".	D
DTC CON	FIRMATION PROCEDURE		
1.PRECO	NDITIONING		F
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.	ST
>> 2.DTC RE	GO TO 2. PRODUCTION PROCEDURE		Н
1. Start th CAUTI Never	e engine. ON: drive the vehicle.		I
Is DTC "C1 YES >> NO-1 >>	<u>3B4-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep	<u>STC-287, "DAST 1 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> .	J
NO-2 >>	Confirmation after repair: INSPECTION E	ND	K
1.PERFOR	M SELE-DIAGNOSIS	INFOID:000000013356699	I
With CO 1. Turn th 2. Erase s 3. Turn th 4. Start th	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 1". e ignition switch OFF and wait for at least 1 e engine	10 seconds.	M
<b>CAUTI</b> <b>Never</b> 5. Perform	ON: drive the vehicle. n self-diagnosis for "DAST 1".		Ν
Is DTC "C1 YES >> NO >>	<ul> <li><u>3B4-00" detected?</u></li> <li>Replace steering angle main control module</li> <li>Check enlarged contact spring of termin</li> </ul>	Ile. Refer to <u>STC-493, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> .	0
DAST 2	Perform intermittent incident while turnin	g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	Ρ
DAST 2 :	DTC Description	INFOID:000000013356700	
DTC DETE	ECTION LOGIC		

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B4-00	CONTROL MODULE (Control module)	The internal malfunction is detected when control module is start- ing.

#### POSSIBLE CAUSE

• Steering angle sub control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### 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. Start the engine.

## CAUTION:

- Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B4-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-288. "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 2 : Diagnosis Procedure

INFOID:000000013356701

### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.
  - CAUTION:

NO

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B4-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".
# C13B5-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

А

В

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B5-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>
POSSIBLE <ul> <li>Steering f</li> <li>Steering f</li> <li>Motor circ</li> <li>Steering f</li> </ul>	CAUSE orce motor orce motor harness connector suit (between steering force control module	and steering force motor) is open or short.
<ul> <li>FAIL-SAFE</li> <li>Mode 2</li> <li>NOTE: For fail-sa</li> </ul>	ife mode, refer to <u>STC-125. "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".
DTC CONI <b>1.</b> PRECOI If "DTC CO	FIRMATION PROCEDURE NDITIONING NFIRMATION PROCEDURE" has been pre	eviously conducted, always turn ignition switch OFF and
wait at leas	GO TO 2.	st.
With CO Start th CAUTI	PRODUCTION PROCEDURE  NSULT e engine. ON:	
Never 2. Perform Is DTC "C1. YES >> NO-1 >>	drive the vehicle. n self-diagnosis for "EPS/DAST 3". <u>3B5-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before repair.	STC-289, "EPS/DAST 3 : Diagnosis Procedure". air: Refer to <u>GI-45, "Intermittent Incident"</u> .
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356703
1.снеск	THE MOTOR	
Check the s Is the inspe YES >> NO >> 2.CHECK	steering force motor. Refer to <u>STC-290, "EF</u> <u>ction result normal?</u> GO TO 2. Steering force motor is malfunction. Re <u>"Removal and Installation"</u> . THE MOTOR CIRCUIT	PS/DAST 3 : Component Inspection".
1. Disconi 2. Check	nect steering force control module and stee the continuity between control module harn	ring force motor harness connector. ess connector and motor harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

Steering force control module		Steering force motor		Continuity
Connector Terminal		Connector	Terminal	Continuity
	35		1	
M151	36	M153	2	Evictod
	37		3	Existed
M152	38	M154	5	

3. Check the continuity between control module harness connector and ground.

Steering force	control module		Continuity	
Connector Terminal			Continuity	
	35			
M151	36	Ground	Not existed	
	37	Gibana	NOT EXISTED	
M152	38			

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

# **3.**CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".

2. Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

#### Is the inspection result normal?

YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".

NO >> Repair or replace error-detected part.

## EPS/DAST 3 : Component Inspection

# **1.**CHECK THE MOTOR

1. Turn the ignition switch OFF.

2. Disconnect steering force motor harness connector.

3. Check the continuity between motor connector terminals.

Steering f	Continuity	
Ter	Continuity	
1	2	Existed
1	3	Existed
1	5	Not existed
2	3	Existed
2	5	Not existed
3	5	Not existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> <u>"Removal and Installation"</u>.

DAST 1

DAST 1 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356704

INFOID:000000013356705

### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis conten	:) Ma	alfunction detected condition	
C13B5-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>		
POSSIBLE Steering a Steering a Motor circ Steering a Steering a	CAUSE angle main motor angle main motor harness conne auit (between steering angle main angle main control module	ctor n control module and steering	g angle main motor) is open or	short.
Mode 1 or NOTE: For fail-sa	<sup>r</sup> Mode 3 fe mode, refer to <u>STC-125, "DIR</u>	ECT ADAPTIVE STEERING	<u> 3 : Fail-safe"</u> .	
OTC CON	FIRMATION PROCEDURE			
1.PRECO	NDITIONING			
If "DTC CO	NFIRMATION PROCEDURE" ha	s been previously conducted	d, always turn ignition switch OF	F and
wait at least	10 seconds before conducting	the next test.		
~	GO TO 2			
2.DTC RE	PRODUCTION PROCEDURE			
With CO	NSULT e engine.			
Never of 2. Perform	drive the vehicle. In self-diagnosis for "DAST 1".			
<u>Is DTC "C1:</u>	<u>3B5-00" detected?</u>			
YES >> NO-1 >> NO-2 >>	To check malfunction symptom Confirmation after repair: INSPI	e. Refer to <u>STC-291, "DAST</u> before repair: Refer to <u>GI-45</u> ECTION END	1 : Diagnosis Procedure". 5. "Intermittent Incident".	
DAST 1 :	Diagnosis Procedure		INFOID:00000	00013356706
1.снеск	THE MOTOR			
	teering angle main motor. Refer	to STC-292 "DAST 1 · Com		
Check the s	le en la	0 <u>010 202, Ditor 1.001</u>	ponent inspection".	
Check the s l <u>s the inspe</u> YES >> NO >>	ction result normal? GO TO 2. Steering angle main motor is <u>"Removal and Installation".</u>	malfunction. Replace steeri	ng gear assembly. Refer to <u>S</u>	T-146,
Check the s Is the inspe YES >> NO >> 2.CHECK	<u>ction result normal?</u> GO TO 2. Steering angle main motor is <u>"Removal and Installation"</u> . THE MOTOR CIRCUIT	malfunction. Replace steeri	ng gear assembly. Refer to <u>S</u>	<u>T-146,</u>
Check the s ls the inspe YES >> NO >> 2.CHECK 1. Disconr 2. Check t	<u>ction result normal?</u> GO TO 2. Steering angle main motor is <u>"Removal and Installation"</u> . THE MOTOR CIRCUIT nect steering angle main control the continuity between control m	malfunction. Replace steerin module and steering angle n odule harness connector and	ng gear assembly. Refer to <u>S</u> nain motor harness connector. d motor harness connector.	<u>T-146</u> ,
Check the s <u>Is the inspe</u> YES >> NO >> 2.CHECK 1. Disconr 2. Check to Steen	<u>ction result normal?</u> GO TO 2. Steering angle main motor is <u>"Removal and Installation"</u> . THE MOTOR CIRCUIT nect steering angle main control the continuity between control m	malfunction. Replace steerin module and steering angle n odule harness connector and Steering angle main	ng gear assembly. Refer to <u>S</u> nain motor harness connector. d motor harness connector.	<u>T-146</u> ,
Check the s ls the inspe YES >> NO >> 2.CHECK 1. Disconr 2. Check t Steer Conre	ction result normal?         GO TO 2.         Steering angle main motor is         "Removal and Installation".         THE MOTOR CIRCUIT         nect steering angle main control the continuity between control metring angle main control module         ring angle main control module         ector       Terminal	malfunction. Replace steerin module and steering angle n odule harness connector and Steering angle main Connector	ng gear assembly. Refer to <u>S</u> nain motor harness connector. d motor harness connector. motor <u>Continuity</u>	<u>T-146</u> ,
Check the s s the inspe YES >> NO >> CHECK 1. Disconr 2. Check t Steer Conne	ction result normal?         GO TO 2.         Steering angle main motor is         "Removal and Installation".         THE MOTOR CIRCUIT         nect steering angle main control         the continuity between control module         ector       Terminal         35	malfunction. Replace steerin module and steering angle n odule harness connector and Steering angle main Connector	ng gear assembly. Refer to <u>S</u> nain motor harness connector. d motor harness connector. <u>motor</u> Terminal 1	<u>T-146</u> ,
Check the s Is the inspe YES >> NO >> 2.CHECK 1. Discont 2. Check to Steel Conne E9	ction result normal?         GO TO 2.         Steering angle main motor is         "Removal and Installation".         THE MOTOR CIRCUIT         nect steering angle main control         the continuity between control module         ector         7         35         7	malfunction. Replace steerin module and steering angle n odule harness connector and Steering angle main Connector E88 <sup>*1</sup> E105 <sup>*2</sup>	ng gear assembly. Refer to <u>S</u> nain motor harness connector. d motor harness connector. <u>motor</u> Continuity <u>1</u> <u>3</u> Existed	<u>T-146</u> ,
Check the s Is the inspe YES >> NO >> 2.CHECK 1. Disconi 2. Check t Steel Conne E9	ction result normal?         GO TO 2.         Steering angle main motor is         "Removal and Installation".         THE MOTOR CIRCUIT         nect steering angle main control method the continuity between control method the continuity between control method the continuity and the control method the contr	malfunction. Replace steerin module and steering angle n odule harness connector and Steering angle main Connector E88 <sup>*1</sup> E105 <sup>*2</sup>	ng gear assembly. Refer to <u>S</u> nain motor harness connector. d motor harness connector. <u>motor</u> Continuity <u>1</u> <u>3</u> 2 <u>2</u> Existed	<u>T-146</u> ,

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

# STC-291

#### < DTC/CIRCUIT DIAGNOSIS >

Steering angle ma	ain control module		Continuity	
Connector Terminal			Continuity	
	35			
E97	36	Ground	Not ovisted	
	37	Ground		
E98	38	1		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.

NO >> Repair or replace error-detected part.

## DAST 1 : Component Inspection

INFOID:000000013356707

# **1.**CHECK THE MOTOR

1. Turn the ignition switch OFF.

2. Disconnect steering angle main motor harness connector.

3. Check the continuity between motor connector terminals.

Steering an	Continuity	
Terminal		Continuity
1	2	Existed
1	3	Existed
1	4	Not existed
2	3	Existed
2	4	Not existed
3	4	Not existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

# DAST 2

## DAST 2 : DTC Description

INFOID:000000013356708

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B5-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

### POSSIBLE CAUSE

• Steering angle sub motor

- · Steering angle sub motor harness connector
- Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.
- Steering angle sub control module

## STC-292

< DTC/CIRCUIT DIA	GNOSIS >		[DIRECT /	ADAPTIVE STEERING]
FAIL-SAFE				
NOTE:				
For fail-safe mode,	refer to <u>STC-125, "DIR</u>	ECT ADAPTIVE STI	EERING : Fail-safe	,
TC CONFIRMATIO	ON PROCEDURE			
.PRECONDITIONIN	١G			
f "DTC CONFIRMATI vait at least 10 secon	ON PROCEDURE" has ds before conducting the ds before conducting the	s been previously co he next test.	nducted, always tur	n ignition switch OFF and
>> GO TO 2				
2.DTC REPRODUC	TION PROCEDURE			
With CONSULT Start the engine. CAUTION: Never drive the posterior	vehicle.			
. Perform self-diag	nosis for "DAST 2".			
YES >> Proceed to NO-1 >> To check NO-2 >> Confirmation	to diagnosis procedure malfunction symptom k tion after repair: INSPE	e. Refer to <u>STC-293,</u> before repair: Refer t ECTION END	<u>"DAST 2 : Diagnosi</u> to <u>GI-45, "Intermitte</u>	<u>s Procedure"</u> . <u>nt Incident"</u> .
AST 2 : Diagno	sis Procedure			INFOID:000000013356709
.CHECK THE MOT	OR			
s the inspection result YES >> GO TO 2 NO >> Steering <u>"Remova</u>	<u>It normal?</u> angle sub motor is m <u>I and Installation"</u> .	nalfunction. Replace	steering gear ass	embly. Refer to <u>ST-146.</u>
2.CHECK THE MOT	OR CIRCUIT			
Disconnect steeri	ng angle sub control m uity between control mo	nodule and steering a odule harness conne	angle sub motor har ector and motor harr	ness connector. ness connector.
Steering angle st	ub control module	Steering ar	ngle sub motor	Questionity
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90	3	
	37		2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	
*1: 2WD models *2: AWD models . Check the continu	uity between control mo	odule harness conne	ector and ground.	
Steering a	ingle sub control module			Continuity
Connector	Termina	l	—	Continuity
	35			
E99	36	Ground Not exi		Not existed
	37			
E100 3		1		

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace error-detected part.

# **3.**CHECK INTERMITTENT INCIDENT

- 1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
- 2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
- NO >> Repair or replace error-detected part.

## DAST 2 : Component Inspection

INFOID:000000013356710

# **1.**CHECK THE MOTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub motor harness connector.
- 3. Check the continuity between motor connector terminals.

Steering angle	Orațianite	
Termin	Continuity	
1	2	Existed
1	3	Existed
1	4	Not existed
2	3	Existed
2	4	Not existed
3	4	Not existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

# C13B6-00 MOTOR CIRCUIT EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356711

А

В

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	С
C13B6-00	MOTOR CIRCUIT (Motor circuit)	<ul><li>Malfunction of motor circuit is detected.</li><li>Malfunction in each motor angle sensor is detected.</li></ul>	D
POSSIBLE	CAUSE	·	
<ul><li>Steering f</li><li>Steering f</li></ul>	orce motor orce motor harness connector		Е
<ul> <li>Motor circ</li> <li>Motor and short.</li> <li>Steering f</li> </ul>	cuit (between steering force control module gle sensor circuit (between steering force c	and steering force motor) is open or short. ontrol module and force motor angle sensor) is open or	F
		_	
• Mode 2 NOTE:	-	S	бΤС
For fail-sa	afe mode, refer to <u>STC-125, "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".	
DTC CON	FIRMATION PROCEDURE		Н
1.PRECO	NDITIONING		
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.	I
	60 10 2		1
2.DTC RE	PRODUCTION PROCEDURE		J
With CO Start th	NSULT		Κ
CAUTI	ON:		
2 Turn th	drive the vehicle. A steering wheel from full left stop to full rig	ht ston	L
3. Return	the steering wheel to the straight-ahead po	osition.	
4. Perform	n self-diagnosis for "EPS/DAST 3".		
VES	<u>3B6-00" detected?</u> Proceed to diagnosis procedure. Pofer to	STC 205 "EPS/DAST 3 · Diagnosis Procedure"	IVI
NO-1 >>	To check malfunction symptom before rep	air: Refer to <u>GI-45, "Intermittent Incident"</u> .	
NO-2 >>	Confirmation after repair: INSPECTION E	ND	Ν
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356712	
1.снеск	THE MOTOR		0
Check the s	steering force motor. Refer to <u>STC-297, "EF</u>	PS/DAST 3 : Component Inspection".	
Is the inspe	ction result normal?		Ρ
YES >> NO >>	GO TO 2. Steering force motor is malfunction. Re "Removal and Installation".	eplace steering column assembly. Refer to ST-135,	
2.снеск	THE MOTOR CIRCUIT		

1. Disconnect steering force control module and steering force motor harness connector.

2. Check the continuity between control module harness connector and motor harness connector.

# STC-295

## < DTC/CIRCUIT DIAGNOSIS >

Steering force control module		Steering force motor		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
	35	M153	1		
M151	36		2	Evicted	
	37		3	EXISIEU	
M152	38	M154	5		

3. Check the continuity between control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal	—	Continuity
	35		
M151	36	Ground	Not evisted
	37	Ground	
M152	38		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**CHECK THE SENSOR CIRCUIT

1. Disconnect force motor angle sensor harness connector.

2. Check the continuity between control module harness connector and angle sensor harness connector.

Steering force	control module	Force motor angle sensor		Force motor angle sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity		
	10		1			
	11		5			
M71	6	M73	4	Evicted		
	5		8	EXISIEU		
	4		2			
	2		6			

3. Check the continuity between control module harness connector and ground.

Steering force control module		_	Continuity
Connector	Terminal		Continuity
	10		
N474	11		
	6	Ground	Not ovisted
1017 1	5		NOT EXISTED
	4		
	2	1	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected part.

**4.**CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

2. Perform intermittent incident while turning steering wheel. Refer to <u>GI-45. "Intermittent Incident"</u>.

Is the inspection result normal?

YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".

# < DTC/CIRCUIT DIAGNOSIS >

## NO >> Repair or replace error-detected part.

# **EPS/DAST 3 : Component Inspection**

# 1.CHECK THE MOTOR

## 1. Turn the ignition switch OFF.

2. Disconnect steering force motor harness connector.

3. Check the continuity between motor connector terminals.

Steering force motor		Continuity	
Ter	minal	Continuity	D
1	2	Existed	
1	3	Existed	
1	5	Not existed	E
2	3	Existed	
2	5	Not existed	F
3	5	Not existed	

## Is the inspection result normal?

### YES >> INSPECTION END

NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135</u>. <u>"Removal and Installation"</u>.

# DAST 1

# DAST 1 : DTC Description

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13B6-00	MOTOR CIRCUIT (Motor circuit)	<ul><li>Malfunction of motor circuit is detected.</li><li>Malfunction in each motor angle sensor is detected.</li></ul>	-
POSSIBLE	CAUSE		- r

- Steering angle main motor
- Steering angle main motor harness connector

• Motor circuit (between steering angle main control module and steering angle main motor) is open or short.

- Motro angle sensor circuit (between steering angle main control module and main motor angle sensor) is open or short.
- Steering angle main control module

## FAIL-SAFE

Mode 1 or Mode 3     NOTE:	N
For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u> .	
DTC CONFIRMATION PROCEDURE	C

## 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. Start the engine. CAUTION: ST<u>C</u>

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INFOID:000000013356713

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INFOID:000000013356714

#### < DTC/CIRCUIT DIAGNOSIS >

## Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 1".

## Is DTC "C13B6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-298, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356715

# 1. CHECK THE MOTOR

Check the steering angle main motor. Refer to <u>STC-299, "DAST 1 : Component Inspection"</u>. Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

# 2. CHECK THE MOTOR CIRCUIT

1. Disconnect steering angle main control module and steering angle main motor harness connector.

2. Check the continuity between control module harness connector and motor harness connector.

Steering angle m	ain control module	Steering angle main motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35	E88 <sup>*1</sup> E105 <sup>*2</sup> 3		
E97	36		3	Evistod
	37	LIUS	2	LAISIEU
E98	38	E89	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

Steering angle main control module			Continuity	
Connector	Terminal		Continuity	
	35			
E97	36	Ground	Not ovisted	
	37	Ground	NOT EXISTED	
E98	38			

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**CHECK THE SENSOR CIRCUIT

1. Disconnect main motor angle sensor harness connector.

2. Check the continuity between control module harness connector and angle sensor harness connector.

## < DTC/CIRCUIT DIAGNOSIS >

Steering angle m	ain control module		Main motor	angle sensor	Continuity
Connector	Terminal	Conr	nector	Terminal	Continuity
	10			3	
	11	E03		6	
F26	6			1	Existed
220	5	-	00	5	Existed
	4			2	
	2			4	
3. Check the contin	uity between control m	odule harn	ess connec	ctor and ground.	
Steering a	ngle main control module				Questionity
Connector	Termina	al		—	Continuity
	10				
	11		-		
	6		-		<b></b>
E26	5			Ground	Not existed
	4				
	2		-		
s the inspection resu YES >> GO TO 4	<u>it normal?</u>	1			
Is the inspection resule         YES       >> GO TO 4         NO       >> Repair or         4.CHECK INTERMIT         1. Check enlarged of         2. Perform intermitted         s the inspection resule         YES       >> Replace         NO       >> Replace         OAST 1 : Compo         1.CHECK THE MOT         1. Turn the ignition set of the inspection set of the inspection         2. Disconnect steer	TENT INCIDENT contact spring of termin contact spring of termin ent incident while turnin <u>It normal?</u> steering angle main co replace error-detected ment Inspection OR Switch OFF.	d part. nal. Refer to ng steering ontrol modu d part.	o <u>GI-42, "H</u> wheel. Re le. Refer to	ow to Check Term fer to <u>GI-45, "Inte</u> o <u>STC-493, "Remo</u>	<u>ninal"</u> . <u>mittent Incident"</u> . <u>oval and Installation"</u> . <sup>INFOID:0000000133</sup>
s the inspection resure         YES       >> GO TO 4         NO       >> Repair or         1. CHECK INTERMIT         1. Check enlarged or         2. Perform intermitted         s the inspection resure         YES       >> Replace         NO       >> Replace         NO       >> Replair or         DAST 1 : Comport         1. CHECK THE MOT         1. Turn the ignition steer         2. Disconnect steer         3. Check the contin	replace error-detected TENT INCIDENT contact spring of termin ent incident while turnin <u>It normal?</u> steering angle main co replace error-detected inent Inspection OR switch OFF. ing angle main motor h uity between motor cor	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	o <u>GI-42, "H</u> wheel. Re le. Refer to nnector. minals.	ow to Check Term fer to <u>GI-45. "Inte</u> o <u>STC-493, "Remo</u>	<u>iinal"</u> . mittent Incident". oval and Installation". INFOID:0000000133
s the inspection resule         YES       >> GO TO 4         NO       >> Repair or         I.CHECK INTERMIT         . Check enlarged of         2. Perform intermittle         s the inspection resule         YES       >> Replace         NO       >> Repair or         DAST 1 : Compo         . CHECK THE MOT         . Turn the ignition s         . Disconnect steer         . Check the contin	Treplace error-detected TENT INCIDENT contact spring of termin ent incident while turnin It normal? steering angle main co replace error-detected onent Inspection OR switch OFF. ing angle main motor h uity between motor cor Steering angle main m	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	o <u>GI-42, "H</u> wheel. Re le. Refer to nnector. minals.	ow to Check Term fer to <u>GI-45, "Inte</u> STC-493, "Remo	<u>inal"</u> . mittent Incident". oval and Installation". INFOID:0000000133
s the inspection resure         YES       >> GO TO 4         NO       >> Repair or         I.CHECK INTERMI         . Check enlarged of         2. Perform intermitted         s the inspection resure         YES       >> Replace         NO       >> Replace         NO       >> Replace         NO       >> Replace         OAST 1 : Compo         I.CHECK THE MOT         . Turn the ignition and the ignit	replace error-detected TTENT INCIDENT contact spring of termin ent incident while turnin <u>It normal?</u> steering angle main co replace error-detected inent Inspection OR switch OFF. ing angle main motor h uity between motor cor Steering angle main m Terminal	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	o <u>GI-42, "H</u> wheel. Re le. Refer to nnector. minals.	ow to Check Term fer to GI-45. "Inte STC-493, "Remo	tinal". mittent Incident". oval and Installation". INFOID:0000000133
s the inspection resu YES >> GO TO 4 NO >> Repair or CHECK INTERMI Check enlarged of Perform intermitte the inspection resu YES >> Replace NO >> Repair or DAST 1 : Compo CHECK THE MOT CHECK THE MOT CHECK THE MOT CHECK the contin	Treplace error-detected TENT INCIDENT contact spring of termin ent incident while turnin It normal? steering angle main co replace error-detected onent Inspection TOR switch OFF. ing angle main motor h uity between motor cor Steering angle main m	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	o <u>GI-42, "H</u> wheel. Re le. Refer to nnector. minals.	ow to Check Term fer to <u>GI-45, "Inte</u> o <u>STC-493, "Remo</u>	inal". mittent Incident". oval and Installation". INFOID.0000000133 Continuity Existed
s the inspection resu YES >> GO TO 4 NO >> Repair of CHECK INTERMI CHECK INTERMI Check enlarged of Perform intermitte s the inspection resu YES >> Replace NO >> Replace NO >> Replar of CAST 1 : Compo CAST 1 : Compo CAST 1 : Compo CONST 1	replace error-detected TENT INCIDENT contact spring of termin ent incident while turnin It normal? steering angle main co replace error-detected onent Inspection OR switch OFF. ing angle main motor h uity between motor cor Steering angle main m Terminal	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	2 2 3	ow to Check Term fer to GI-45. "Inte STC-493, "Remo	ninal". mittent Incident". oval and Installation". INFOID:0000000133 Continuity Existed Existed
s the inspection resu YES >> GO TO 4 NO >> Repair of CHECK INTERMI CHECK INTERMI Check enlarged of Perform intermitte Sthe inspection resu YES >> Replace NO >> Repair of DAST 1 : Compo CAST 1 : Compo CAST 1 : Compo CONST 1	Treplace error-detected TENT INCIDENT contact spring of termin ent incident while turnin It normal? steering angle main co replace error-detected onent Inspection TOR switch OFF. ing angle main motor h uity between motor cor Steering angle main m	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	o <u>GI-42, "H</u> wheel. Re le. Refer to nnector. minals.	ow to Check Term fer to <u>GI-45. "Inte</u> STC-493, "Remo	inal". mittent Incident". oval and Installation". INFOID:0000000133 Continuity Existed Existed Not existed
s the inspection resu YES >> GO TO 4 NO >> Repair of CHECK INTERMI 1. Check enlarged of 2. Perform intermitte s the inspection resu YES >> Replace NO >> Repair of DAST 1 : Compo 1.CHECK THE MOT 1. Turn the ignition s 2. Disconnect steer 3. Check the contin 1 1 1 2	replace error-detected TENT INCIDENT contact spring of termin ent incident while turnin <u>It normal?</u> steering angle main co replace error-detected onent Inspection OR switch OFF. ing angle main motor h uity between motor cor Steering angle main m Terminal	d part. nal. Refer to ng steering ontrol modu d part. narness cor nnector terr	o <u>GI-42, "H</u> wheel. Re le. Refer to nnector. minals.	ow to Check Term fer to GI-45. "Inte STC-493, "Remo	inal". mittent Incident". oval and Installation". INFOID:0000000133 Continuity Existed Existed Not existed Existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

# DAST 2

## < DTC/CIRCUIT DIAGNOSIS >

## DAST 2 : DTC Description

INFOID:000000013356717

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B6-00	MOTOR CIRCUIT (Motor circuit)	<ul><li>Malfunction of motor circuit is detected.</li><li>Malfunction in each motor angle sensor is detected.</li></ul>

#### POSSIBLE CAUSE

- · Steering angle sub motor
- Steering angle sub motor harness connector
- Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.
- Motor angle sensor circuit (between steering angle sub control module and sub motor angle sensor) is open or short.
- Steering angle sub control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

## 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. Start the engine.

# CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-300, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 2 : Diagnosis Procedure

INFOID:000000013356718

### **1.**CHECK THE MOTOR

Check the steering angle sub motor. Refer to STC-302, "DAST 2 : Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

### 2. CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering angle sub control module and steering angle sub motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

## STC-300

## < DTC/CIRCUIT DIAGNOSIS >

Steering angle su	ib control module	Steer	ing angle sub motor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90	3	
	37	-	2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	
*1: 2WD models *2: AWD models Check the continu	uity between control m	odule harness c	onnector and ground.	
Steering a	ngle sub control module			
Connector	Termina	al	—	Continuity
	35			
E99	36			
	37		Ground	Not existed
E100	38			
he inspection resul	t normal?			1
D >> Repair or CHECK THE SENS Disconnect sub m	replace error-detected SOR CIRCUIT	d part.	oppostor and as also as	
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu	replace error-detected SOR CIRCUIT notor angle sensor har nity between control m	d part. ness connector. odule harness co Sub	onnector and angle se	ensor harness connec
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector	replace error-detected SOR CIRCUIT notor angle sensor har nity between control m nb control module Terminal	d part. ness connector. odule harness c Sub Connector	onnector and angle se motor angle sensor Terminal	ensor harness connec
O >> Repair or CHECK THE SEN Disconnect sub m Check the continu Steering angle su Connector	replace error-detected SOR CIRCUIT notor angle sensor har uity between control m ub control module Terminal 10	d part. ness connector. lodule harness c Sub Connector	onnector and angle se motor angle sensor Terminal 3	ensor harness connec
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector	replace error-detected SOR CIRCUIT notor angle sensor har nity between control m nb control module Terminal 10 11	d part. ness connector. odule harness c Sub Connector	onnector and angle se motor angle sensor Terminal 3 6	ensor harness connec
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector	replace error-detected SOR CIRCUIT notor angle sensor har uity between control m ub control module Terminal 10 11 6	d part. ness connector. lodule harness c Sub Connector	onnector and angle se motor angle sensor Terminal 3 6 1	ensor harness connec
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m hb control module Terminal 10 11 6 5	d part. ness connector. odule harness co Sub Connector E94	onnector and angle se motor angle sensor Terminal 3 6 1 5	ensor harness connec Continuity
C >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29	replace error-detected SOR CIRCUIT notor angle sensor har uity between control m ub control module Terminal 10 11 6 5 4	d part. ness connector. iodule harness c Sub Connector E94	onnector and angle semon motor angle sensor Terminal 3 6 1 5 2	ensor harness connec Continuity
D >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m hity betwe	d part. ness connector. odule harness co Sub Connector E94	onnector and angle semon motor angle sensor Terminal 3 6 1 5 2 4	ensor harness connec Continuity
C >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29 Check the continu	replace error-detected SOR CIRCUIT notor angle sensor har uity between control m ub control module Terminal 10 11 6 5 4 2 uity between control m	d part. ness connector. iodule harness c Sub Connector E94	onnector and angle se motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground.	ensor harness connec Continuity Existed
CHECK THE SENS Disconnect sub m Check the continu Steering angle si Connector E29 Check the continu Steering a	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m hb control module Terminal 10 11 6 5 4 2 hity between control m ngle sub control module	d part. ness connector. odule harness co Sub Connector E94	onnector and angle semon motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground.	ensor harness connec Continuity Existed
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29 Check the continu Steering a Connector	replace error-detected SOR CIRCUIT notor angle sensor har uity between control m ub control module Terminal 10 11 6 5 4 2 uity between control m ngle sub control module Termina	d part. ness connector. iodule harness c Sub Connector E94 iodule harness c	onnector and angle se motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground.	ensor harness connec Continuity Existed
O >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29 Check the continu Steering a Connector	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m ub control module Terminal 10 11 6 5 4 2 uity between control m ngle sub control module Termina 10	d part. ness connector. odule harness co Sub Connector E94 odule harness co	onnector and angle se motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground.	ensor harness connec Continuity Existed Continuity
D >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29 Check the continu Steering a Connector	replace error-detected SOR CIRCUIT notor angle sensor har uity between control m ub control module Terminal 10 11 6 5 4 2 uity between control m ngle sub control module Termina 10 11	d part. ness connector. iodule harness c Sub Connector E94 iodule harness c	onnector and angle se motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground.	ensor harness connect Continuity Existed
C >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29 Check the continu Steering a Connector	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m ub control module Terminal 10 11 6 5 4 2 ity between control m ngle sub control module Terminal 10 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 6 11 6 5 6 11 6 11 6 6 5 14 11 6 6 5 14 11 6 6 11 11 6 6 11 11 6 11 11 6 11 11	d part. ness connector. odule harness connector Sub Connector E94 odule harness connector	onnector and angle semon motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground.	ensor harness connec Continuity Existed Continuity Continuity
IO >> Repair or CHECK THE SENS Disconnect sub m Check the continu Steering angle su Connector E29 Check the continu Steering a Connector	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m ub control module Terminal 10 11 6 5 4 2 uity between control m ngle sub control module Termina 10 6 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 6 5 5 4 2 11 10 6 5 5 14 11 6 5 5 14 11 6 5 5 14 11 6 5 5 14 11 6 5 5 14 11 6 5 5 14 11 10 11 11	d part. ness connector. iodule harness c Sub Connector E94 iodule harness c	onnector and angle se motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground. Ground	ensor harness connect Continuity Existed Continuity
CHECK THE SENS CHECK THE SENS Disconnect sub m Check the continu Steering angle so Connector E29 Check the continu Steering a Connector E29	replace error-detected SOR CIRCUIT notor angle sensor har hity between control m ub control module Terminal 10 11 6 5 4 2 ity between control m ngle sub control module Termina ngle sub control module 11 6 5 4 2 10 11 6 5 4 2 10 11 6 5 4 2 10 11 6 5 4 2 10 11 6 5 4 2 10 11 6 5 4 2 10 11 6 5 4 2 11 6 5 4 2 11 6 5 4 2 11 6 5 5 4 1 1 6 5 5 4 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 6 5 5 4 1 1 1 1 6 5 5 4 1 1 1 1 6 5 5 4 1 1 1 1 6 5 5 4 1 1 1 1 6 5 5 4 1 1 1 1 1 6 5 5 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	d part. ness connector. odule harness connector Sub Connector E94 odule harness connector al	onnector and angle se motor angle sensor Terminal 3 6 1 5 2 4 onnector and ground. Ground	ensor harness connec Continuity Existed Continuity Not existed

**4.**CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

#### < DTC/CIRCUIT DIAGNOSIS >

### [DIRECT ADAPTIVE STEERING]

2. Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

#### Is the inspection result normal?

YES >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>. NO >> Repair or replace error-detected part.

## **DAST 2 : Component Inspection**

INFOID:000000013356719

## **1.**CHECK THE MOTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub motor harness connector.
- 3. Check the continuity between motor connector terminals.

Steering angle sub motor		Continuity	
Term	Terminal		
1	2	Existed	
1	3	Existed	
1	4	Not existed	
2	3	Existed	
2	4	Not existed	
3	4	Not existed	

## Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

# C13B7-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

## INFOID:000000013356720

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# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B7-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>
POSSIBLE	CAUSE	
• Steering f	orce motor	
<ul> <li>Steering f</li> <li>Motor circ</li> </ul>	orce motor harness connector	and steering force motor) is open or short
<ul> <li>Steering f</li> </ul>	orce control module	
FAIL-SAFE		
Mode 2		
NOTE:	of mode refer to STC 125 "DIRECT ADAI	
	EDMATION DEOCEDUDE	TIVE STEEKING . Lairsale.
I.PRECO	NDITIONING	
If "DTC CO	NFIRMATION PROCEDURE" has been pre	viously conducted, always turn ignition switch OFF and
wall at leas	t to seconds before conducting the next tes	51.
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	GO TO 2	
1 Start th	NSULI e engine	
CAUTI	ON:	
2 Rever	drive the vehicle.	
Is DTC "C1"	3B7-00" detected?	
YES >>	Proceed to diagnosis procedure. Refer to	STC-303. "EPS/DAST 3 : Diagnosis Procedure".
NO-1 >>	To check malfunction symptom before rep	air: Refer to <u>GI-45. "Intermittent Incident"</u> .
NO-2 >>	Confirmation after repair: INSPECTION EI	ND
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356721
1.CHECK		
	tooring force motor. Pofer to STC 304 "EE	PS/DAST 2 : Component Inspection"
Is the inspe	ction result normal?	S/DAST 5 . Component inspection.
YES >>	GO TO 2.	
NO >>	Steering force motor is malfunction. Re "Removal and Installation".	eplace steering column assembly. Refer to <u>ST-135.</u>
2.CHECK	THE MOTOR CIRCUIT	
1. Disconi 2. Check	nect steering force control module and stee the continuity between control module harn	ring force motor harness connector. ess connector and motor harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

Steering force control module		Steering force motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
M151	36	M153	2	Evictod
	37		3	Existed
M152	38	M154	5	

3. Check the continuity between control module harness connector and ground.

Steering force	control module		Continuity
Connector Terminal			Continuity
	35		
M151	36	Ground	Not ovisted
	37	Gibana	NOT EXISTED
M152	38		

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

# **3.**CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".

2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".

NO >> Repair or replace error-detected part.

## **EPS/DAST 3 : Component Inspection**

**1.**CHECK THE MOTOR

1. Turn the ignition switch OFF.

2. Disconnect steering force motor harness connector.

3. Check the continuity between motor connector terminals.

Steering	Continuity	
Ter	Continuity	
1	2	Existed
1	3	Existed
1	5	Not existed
2	3	Existed
2	5	Not existed
3	5	Not existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> <u>"Removal and Installation"</u>.

DAST 1

DAST 1 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356723

INFOID:000000013356722

### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display (Trouble diagn	/ item losis content)	Malfunction detected	condition	
C13B7-00	CONTROL MODULE (Control module)		<ul> <li>The internal malfunction in control n</li> <li>Malfunction of motor circuit is detected</li> </ul>	nodule is detected. ted.	
POSSIBLE • Steering a • Steering a • Motor circ • Steering a	CAUSE angle main motor angle main motor harne suit (between steering a angle main control mod	ess connector angle main control m lule	odule and steering angle main n	notor) is open or short.	
FAIL-SAFE • Mode 1 of NOTE: For fail-sa	r Mode 3 ífe mode, refer to <u>STC-</u>	-125, "DIRECT ADA	PTIVE STEERING : Fail-safe".		
DTC CON	FIRMATION PROCE	DURE			
1.PRECO	NDITIONING				
If "DTC CO wait at leas	NFIRMATION PROCE t 10 seconds before co	DURE" has been pre inducting the next te	eviously conducted, always turn i st.	gnition switch OFF and	
>>	GO TO 2.				
2.DTC RE	PRODUCTION PROC	EDURE			
With CO Start th CAUTIC Never C Derform	NSULT e engine. ON: drive the vehicle.	QT 1"			
2. Perform self-diagnosis for "DAST 1". Is DTC "C13B7-00" detected?					
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis To check malfunction Confirmation after rep	procedure. Refer to symptom before rep air: INSPECTION EI	<u>STC-305, "DAST 1 : Diagnosis F</u> air: Refer to <u>GI-45, "Intermittent I</u> ND	Procedure". Incident".	
DAST 1 : Diagnosis Procedure					
1.CHECK THE MOTOR					
Check the s Is the inspe YES >> NO >>	steering angle main mo ction result normal? GO TO 2. Steering angle main "Removal and Installa	ntor. Refer to <u>STC-30</u> motor is malfunction	06, "DAST 1 : Component Inspec n. Replace steering gear asser	<u>tion"</u> . nbly. Refer to <u>ST-146.</u>	
2.снеск	THE MOTOR CIRCUI	Г Г			
1. Discon 2. Check	nect steering angle ma the continuity between	in control module an control module harn	d steering angle main motor har less connector and motor harnes	ness connector. ss connector.	
Stee	ring angle main control mod	ule	Steering angle main motor	Continuity	
Conne	ector Termi	nal Con	nector Terminal	Continuity	
E9	7 35 7 36 37	E1	38*1     1       05*2     3       2	_ Existed	
E9	8 38	E	89 4	-	
*1: 2W	D models				

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

# STC-305

#### < DTC/CIRCUIT DIAGNOSIS >

Steering angle ma	ain control module		Continuity
Connector Terminal			Continuity
	35		
E97	36	- Ground Not existed	Not existed
	37		
E98	38	1	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**CHECK INTERMITTENT INCIDENT

1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.

NO >> Repair or replace error-detected part.

## DAST 1 : Component Inspection

INFOID:000000013356725

# **1.**CHECK THE MOTOR

1. Turn the ignition switch OFF.

2. Disconnect steering angle main motor harness connector.

3. Check the continuity between motor connector terminals.

Steering angle main motor Terminal		Continuity
		Continuity
1	2	Existed
1	3	Existed
1	4	Not existed
2	3	Existed
2	4	Not existed
3	4	Not existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>. <u>"Removal and Installation"</u>.

# DAST 2

## DAST 2 : DTC Description

INFOID:000000013356726

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B7-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>Malfunction of motor circuit is detected.</li></ul>

### POSSIBLE CAUSE

• Steering angle sub motor

- · Steering angle sub motor harness connector
- Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.
- Steering angle sub control module

## STC-306

< DTC/CIRCUIT DIA	GNOSIS >		[DIRECT	ADAPTIVE STEERING]
FAIL-SAFE				
Mode 2				
<b>NOTE:</b> For fail-safe mode, I	refer to <u>STC-125, "DIR</u>	ECT ADAPTIVE ST	EERING : Fail-safe	<u>e"</u> .
DTC CONFIRMATIO	ON PROCEDURE			
	NG			
If "DTC CONFIRMATI wait at least 10 secon	ON PROCEDURE" had before conducting to the set of the s	as been previously c the next test.	onducted, always t	urn ignition switch OFF and
>> GO TO 2				
<b>Z.</b> DTC REPRODUC	TION PROCEDURE			
With CONSULT				
1. Start the engine.				
Never drive the	vehicle.			
2. Perform self-diag	nosis for "DAST 2".			
<u>ls DTC "C13B7-00" de</u>	etected?		_	-
YES >> Proceed t	to diagnosis procedure	e. Refer to <u>STC-307</u>	<u>, "DAST 2 : Diagno</u> to CL 45, "Intermitt	<u>sis Procedure"</u> .
NO-1 >> To check NO-2 >> Confirmation	tion after repair: INSPE	ECTION END	10 <u>GI-45, Intermitt</u>	
DAST 2 : Diagno	sis Procedure			INFOID:000000013356727
1. СНЕСК ТНЕ МОТ	OR			
Check the steering an	gle sub motor. Refer t	o <u>STC-308,</u> "DAST	2 : Component Inst	pection".
s the inspection resul	t normal?			
YES >> GO TO 2				
NO >> Steering	angle sub motor is r	nalfunction. Replac	e steering gear as	ssembly. Refer to ST-146,
<ol> <li>Disconnect steeri</li> <li>Check the continu</li> </ol>	ng angle sub control n uity between control m	nodule and steering odule harness conn	angle sub motor hat ector and motor hat	arness connector. Irness connector.
Steering angle s	ub control module	Steering a	angle sub motor	Orantinuitu
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90	3	
	37		2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	
*1: 2WD models			1	1
*2: AWD models				
<ol><li>Check the continue</li></ol>	uity between control m	odule harness conn	ector and ground.	
Steering a	ngle sub control module			
Connector	Termina	al	—	Continuity
	35			
E99	36			
	37		Ground	Not existed
E100	38			

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace error-detected part.

# **3.**CHECK INTERMITTENT INCIDENT

- 1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
- 2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
- NO >> Repair or replace error-detected part.

## DAST 2 : Component Inspection

INFOID:000000013356728

## **1.**CHECK THE MOTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub motor harness connector.
- 3. Check the continuity between motor connector terminals.

Steering angle sub motor Terminal		Continuity
		Continuity
1	2	Existed
1	3	Existed
1	4	Not existed
2	3	Existed
2	4	Not existed
3	4	Not existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

# C13B8-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	С
C13B8-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	D
<ul><li>POSSIBLE</li><li>Steering for</li></ul>	CAUSE prce control module		
FAIL-SAFE • Mode 2 NOTE:			
For fail-sa	fe mode, refer to <u>STC-125, "DIRECT ADAF</u>	PTIVE STEERING : Fail-safe".	F
DTC CONF	FIRMATION PROCEDURE		
1.PRECON	NDITIONING		STC
If "DTC CO	VFIRMATION PROCEDURE" has been pre	viously conducted, always turn ignition switch OFF and	
wait at least	10 seconds before conducting the next tes	ST.	Н
>>	GO TO 2.		
2.DTC REI	PRODUCTION PROCEDURE		
(P)With CO	NSULT		
1. Start the	e engine.		I
Never of	drive the vehicle.		J
2. Perform	e self-diagnosis for "EPS/DAST 3".		
Is DTC "C13	<u>3B8-00" detected?</u>		Κ
YES >> NO-1 >> NO-2 >>	To check malfunction symptom before repar Confirmation after repair: INSPECTION EN	air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	L
EPS/DAS	T 3 : Diagnosis Procedure	INFOID:000000013356730	
1			в. Л
I.PERFOR	M SELF-DIAGNOSIS		IVI
With COI Turn the Erase s	NSULT e ignition switch ON. elf-diagnosis for "EPS/DAST 3".	0 seconds	Ν
<ol> <li>Furn the</li> <li>Start the</li> </ol>	e ignition switch OFF and wait for at least 1 e engine.	U Seconds.	
CAUTIO	DN:		0
5. Perform	arive the vehicle. a self-diagnosis for "EPS/DAST 3".		
Is DTC "C13	BB8-00" detected?		Р
YES >> NO >>	<ul> <li>Replace steering force control module. Re</li> <li>Check enlarged contact spring of termina</li> <li>Perform intermittent incident while turning</li> </ul>	fer to <u>STC-492, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . a steering wheel Refer to GI-45, "Intermittent Incident"	
DAST 1			

А

В

INFOID:000000013356729

## < DTC/CIRCUIT DIAGNOSIS >

## DAST 1 : DTC Description

INFOID:000000013356731

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B8-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

#### POSSIBLE CAUSE

• Steering angle main control module

#### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

## 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13B8-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-310, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356732

## **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.
- CAUTION: Never drive the vehicle.
- 5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13B8-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

# DAST 2

DAST 2 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356733

## < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B8-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.
POSSIBLE • Steering a	CAUSE angle sub control module	
FAIL-SAFE • Mode 2 NOTE:		
For fail-sa	ite mode, refer to <u>STC-125, "DIRECT ADAI</u> FIRMATION PROCEDURE	PIIVE STEERING : Fail-safe".
1.PRECO	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	viously conducted, always turn ignition switch OFF and st.
>>	GO TO 2.	
2.dtc re	PRODUCTION PROCEDURE	
With CO Start th CAUTIO Never C. Perform	<b>NSULT</b> e engine. <b>ON:</b> drive the vehicle. n self-diagnosis for "DAST 2".	
<u>Is DTC "C13</u> YES >> NO-1 >> NO-2 >>	<u>3B8-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION EI	<u>STC-311, "DAST 2 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 2 :	Diagnosis Procedure	INF0ID:000000013356734
<b>1.</b> PERFOR	RM SELF-DIAGNOSIS	
With CO 1. Turn the 2. Erase s 3. Turn the 4. Start the	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 2". e ignition switch OFF and wait for at least 1 e engine.	0 seconds.
CAUTION Never	ON: drive the vehicle. n self-diagnosis for "DAST 2".	
Is DTC "C1	<u>3B8-00" detected?</u>	
YES >> NO >>	<ul> <li>Replace steering angle sub control module</li> <li>Check enlarged contact spring of termina</li> <li>Perform intermittent incident while turnin</li> </ul>	e. Refer to <u>STC-494, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . Ig steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .

# C13B9-00 CONTROL MODULE EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356735

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B9-00	CONTROL MODULE (Control module)	<ul><li>Malfunction of motor circuit is detected.</li><li>The internal malfunction in control module is detected.</li></ul>

### POSSIBLE CAUSE

- Steering force motor
- Steering force motor harness connector
- Motor circuit (between steering force control module and steering force motor) is open or short.
- Steering force control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine.

## Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13B9-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-312, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356736

## **1.**CHECK THE MOTOR

Check the steering force motor. Refer to STC-313, "EPS/DAST 3 : Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering force motor is malfunction. Replace steering column assembly. Refer to <u>ST-135,</u> <u>"Removal and Installation"</u>.

## 2.CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering force control module and steering force motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

Steering force	control module	Steering	force motor	
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
M151	36	M153	M153 2	
	37		3	Existed
M152	38	M154	5	
6. Check the continu	uity between control m	odule harness conne	ctor and ground.	
Steering	a force control module			
Connector	Termin	al	_	Continuity
	35			
M151	36			
	37		Ground	Not existed
M152	38			
<u>s the inspection result</u> YES >> Replace s NO >> Repair or <b>PS/DAST 3</b> : Co .CHECK THE MOT . Turn the ignition s Disconnect steeri	t normal? steering force control i replace error-detecter omponent Inspec OR or switch OFF. ng force motor harnes	module. Refer to <u>STC</u> d part. tion	-492, "Removal and	<u>d Installation"</u> .
<ol> <li>Check the continue</li> </ol>	uity between motor co	nnector terminals.		
	Steering force mot Terminal	or		Continuity
1		2		Existed
1		3		Existed
1		5		Not existed
2		3		Existed
2		5		Not existed
3		5		Not existed
3 s the inspection resul	t normal?	5		Not existed

DAST 1 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356738

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13B9-00	CONTROL MODULE (Control module)	<ul><li>Malfunction of motor circuit is detected.</li><li>The internal malfunction in control module is detected.</li></ul>

#### POSSIBLE CAUSE

- · Steering angle main motor
- Steering angle main motor harness connector
- · Motor circuit (between steering angle main control module and steering angle main motor) is open or short.
- Steering angle main control module

#### FAIL-SAFE

 Mode 1 or Mode 3 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13B9-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-314, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 1 : Diagnosis Procedure

INFOID:000000013356739

## **1.**CHECK THE MOTOR

Check the steering angle main motor. Refer to STC-315. "DAST 1 : Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## 2. CHECK THE MOTOR CIRCUIT

- 1. Disconnect steering angle main control module and steering angle main motor harness connector.
- 2. Check the continuity between control module harness connector and motor harness connector.

Steering angle m	ain control module	Steering angle main motor		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	35	<b>F</b> o o *1	1		
E97	36	E88 <sup>+</sup> E105 <sup>*2</sup>	3	Evisted	
	37		2	Existed	
E98	38	E89	4		

\*1: 2WD models

#### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

\*2: AWD models 3. Check the continuity between control module harness connector and ground. А Steering angle main control module Continuity Connector Terminal 35 E97 36 Ground Not existed 37 E98 38 Is the inspection result normal? D YES >> GO TO 3. NO >> Repair or replace error-detected part.  ${
m 3.}$  CHECK INTERMITTENT INCIDENT Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". 1. 2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". F Is the inspection result normal? YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation". NO >> Repair or replace error-detected part. STC DAST 1 : Component Inspection INFOID:000000013356740 **1.**CHECK THE MOTOR Н 1. Turn the ignition switch OFF. Disconnect steering angle main motor harness connector. 2. Check the continuity between motor connector terminals. 3. Steering angle main motor Continuity Terminal 1 2 Existed 3 1 Existed 1 4 Not existed 2 3 Existed 2 4 Not existed 3 4 Not existed Is the inspection result normal? M YES >> INSPECTION END NO >> Steering angle main motor is malfunction. Replace steering gear assembly. Refer to ST-146. "Removal and Installation". DAST 2 Ν DAST 2 : DTC Description INFOID:000000013356741 DTC DETECTION LOGIC Display item DTC Malfunction detected condition (Trouble diagnosis content) CONTROL MODULE · Malfunction of motor circuit is detected. C13B9-00 (Control module) • The internal malfunction in control module is detected. POSSIBLE CAUSE Steering angle sub motor Steering angle sub motor harness connector

Revision: November 2016

## STC-315

Motor circuit (between steering angle sub control module and steering angle sub motor) is open or short.

< DTC/CIRCUIT DIAGNOSIS >

### • Steering angle sub control module

## FAIL-SAFE

#### Mode 2

#### NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

## 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. Start the engine.

# CAUTION:

## Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13B9-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-316, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 2 : Diagnosis Procedure

## **1.**CHECK THE MOTOR

Check the steering angle sub motor. Refer to STC-317, "DAST 2 : Component Inspection".

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Steering angle sub motor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## 2. CHECK THE MOTOR CIRCUIT

#### 1. Disconnect steering angle sub control module and steering angle sub motor harness connector.

2. Check the continuity between control module harness connector and motor harness connector.

Steering angle sub control module		Steering angle sub motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	35		1	
E99	36	E90	3	
	37		2	Existed
E100	38	E91 <sup>*1</sup> E92 <sup>*2</sup>	4	

\*1: 2WD models

\*2: AWD models

3. Check the continuity between control module harness connector and ground.

INFOID:000000013356742

#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Connector	Steering angle sub control module		
	Terminal		Containing
	35		
E99	36	Ground	Not existed
	37	Ground	NOI EXISIED
E100	38		
<u>s the inspection result norma</u> YES >> GO TO 3.	<u>l?</u>		
NO >> Repair or replace	error-detected part.		
<b>3.</b> CHECK INTERMITTENT I	NCIDENT		
<ul> <li>Perform intermittent incides</li> <li><u>s the inspection result norma</u></li> <li>YES &gt;&gt; Replace steering</li> <li>NO &gt;&gt; Repair or replace</li> </ul>	ent while turning steeri <u> 1?</u> angle sub control mod error-detected part.	ng wheel. Refer to <u>GI-45, "I</u> ule. Refer to <u>STC-494, "Re</u>	ntermittent Incident". moval and Installation".
DAST 2 : Component Ir	nspection		INFOID:000000013
DAST 2 : Component li	nspection		INFOID:000000013
DAST 2 : Component li	nspection		INFOID:000000013
DAST 2 : Component II .CHECK THE MOTOR Turn the ignition switch O Disconnect steering angle Check the continuity betw	FF. e sub motor harness co reen motor connector t	onnector. erminals.	INFOID:000000013
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O . Disconnect steering angle . Check the continuity betw	FF. e sub motor harness co veen motor connector t	onnector. erminals.	INFOID:000000013
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O Disconnect steering angle . Check the continuity betw	FF. e sub motor harness co veen motor connector t ering angle sub motor Terminal	onnector. erminals.	INFOID:000000013
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O Disconnect steering angle . Check the continuity betw Stee	FF. e sub motor harness co /een motor connector t ering angle sub motor Terminal	onnector. erminals.	INFOID:000000013
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O Disconnect steering angle Check the continuity betw Stee 1 1	FF. e sub motor harness co veen motor connector t ering angle sub motor Terminal	onnector. erminals.	INFOID:000000013 Continuity Existed Existed
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O Disconnect steering angle Check the continuity betw Stee 1 1 1	FF. e sub motor harness co veen motor connector t ering angle sub motor Terminal	onnector. erminals.	INFOID:000000013 Continuity Existed Existed Not existed
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O Disconnect steering angle . Check the continuity betw Stee 1 1 1 2	FF. e sub motor harness co veen motor connector t ering angle sub motor Terminal	2 3 4 3	INFOID:000000013 Continuity Existed Existed Not existed Existed Existed
DAST 2 : Component II .CHECK THE MOTOR . Turn the ignition switch O Disconnect steering angle . Check the continuity betw Stee 1 1 1 2 2	FF. e sub motor harness co veen motor connector t ering angle sub motor Terminal	onnector. erminals.	INFOID:000000013 Continuity Existed Existed Not existed Existed Not existed Not existed

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# C13BA-00 CONTROL MODULE POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

# C13BA-00 CONTROL MODULE POWER SUPPLY EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356744

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13BA-00	CONTROL MODULE POWER SUPPLY (Control module power supply)	Control module power supply is following condition. • Battery power supply $\leq 4 \text{ V}$

### POSSIBLE CAUSE

- Harness and connector
- Battery
- Fusible link
- Power supply circuit
- Steering force control module

### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

## 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

Start the engine.

CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13BA-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-318, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356745

## 1.CHECK CONTROL MODULE GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering force	control module		Continuity
Connector Terminal			Continuity
M72	33	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.

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

## C13BA-00 CONTROL MODULE POWER SUPPLY [DIRECT ADAPTIVE STEERING]

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#### 1. Turn the ignition switch ON.

	Steering force control r	nodule		Continuity
Co	nnector	Terminal		Continuity
	M72	34	Ground	10.5 – 16.0 V
s the inspe YES >> NO >>	ction result normal? GO TO 4. GO TO 3.			
<b>J.</b> CHECK	CONTROL MODULE	POWER SUPPLY	Y CIRCUIT (2)	
<ol> <li>Turn the</li> <li>Check 1</li> <li>Check 1</li> <li>Check 1</li> <li>minal a</li> </ol>	e ignition switch OFF. he 60A fusible link (#C he harness for open o nd the 60A fusible link	G). r short between s (#G).	steering force control module harn	ess connector No.34 ter-
<u>ls the inspe</u> YES >> NO >>	ction result normal? Perform the trouble di ing Diagram - BATTE Repair or replace erro	agnosis for batte RY POWER SUP or-detected parts.	ery power supply circuit. Refer to <u>P</u> PPLY -".	<u>G-20, "VR30DDTT : Wir</u> -
4.снеск	INTERMITTENT INCI	DENT		
3. Perform <u>Is the inspe</u> YES >> NO >> DAST 1	n intermittent incident v ction result normal? Replace steering force Repair or replace erro	e control module.	ring wheel. Refer to <u>GI-45, "Interm</u> . Refer to <u>STC-492, "Removal and</u>	<u>inittent Incident"</u> .
DAST 1 :	DTC Description			INFOID:00000001335674
DTC DETE	CTION LOGIC			
DTC	Displa <u>y</u> (Trouble diagr	y item losis content)	Malfunction detect	ted condition
C13BA-00	CONTROL MODULE PO	NER SUPPLY pply)	Control module power supply is follow • Battery power supply $\leq 4 \text{ V}$	owing condition.
POSSIBLE • Harness a • Battery • Fusible lin • Power sup • Steering a	CAUSE and connector k pply circuit angle main control mod	lule		

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.

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### < DTC/CIRCUIT DIAGNOSIS >

2.DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Start the engine.
   CAUTION: Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13BA-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-320, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356747

# 1. CHECK CONTROL MODULE GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering angle m	ain control module		Continuity	
Connector	Terminal		Continuity	
E27	33	Ground	Evistod	
E28	39	Gibana	LAISIEU	

Is the inspection result normal?

YES >> GO TO 2.

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

# **2.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Turn the ignition switch ON.

2. Check the voltage between control module harness connector and ground.

Steering angle m	ain control module		Continuity
Connector Terminal			Continuity
E27	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

# **3.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (2)

#### 1. Turn the ignition switch OFF.

- 2. Check the 100A fusible link (#J).
- 3. Check the harness for open or short between steering angle main control module harness connector No.34 terminal and the 100A fusible link (#J).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

## **4.**CHECK INTERMITTENT INCIDENT

- 1. Turn the ignition switch OFF.
- 2. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".

NO >> Repair or replace error-detected part.

## < DTC/CIRCUIT DIAGNOSIS >

# DAST 2

# DAST 2 : DTC Description

INFOID:000000013356748

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## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction det	ected condition
C13BA-00	CONTROL MODULE POWER SUPPLY (Control module power supply)	Control module power supply is f • Battery power supply ≤ 4 V	ollowing condition.
POSSIBLE	CAUSE		
<ul> <li>Harness a</li> <li>Battery</li> <li>Fusible lin</li> <li>Power sup</li> <li>Steering a</li> </ul>	and connector nk pply circuit angle sub control module		
FAIL-SAFE • Mode 2 NOTE: For fail-sa	fe mode, refer to <u>STC-125, "DIRECT A</u>	DAPTIVE STEERING : Fail-safe	<u>ə"</u> .
DTC CONF	FIRMATION PROCEDURE		
1.PRECON	NDITIONING		
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been t 10 seconds before conducting the nex	previously conducted, always to test.	urn ignition switch OFF and
<u>&gt;&gt;</u>	GO TO 2.		
Z.DTC RE	PRODUCTION PROCEDURE		
With COI Start the CAUTIC Never of	NSULT e engine. ON: drive the vehicle.		
Is DTC "C1."	3BA-00" detected?		
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer To check malfunction symptom before Confirmation after repair: INSPECTION	<sup>.</sup> to <u>STC-321, "DAST 2 : Diagno</u> repair: Refer to <u>GI-45, "Intermitt</u> N END	<u>sis Procedure"</u> . ent Incident".
DAST 2 :	Diagnosis Procedure		INFOID:000000013356749
<b>1.</b> CHECK	CONTROL MODULE GROUND CIRCU	JIT	
<ol> <li>Turn the</li> <li>Disconr</li> <li>Check t</li> </ol>	e ignition switch OFF. nect steering angle sub control module l the continuity between control module h	harness connector. harness connector and ground.	
	Steering angle sub control module		Continuity
			Conunuity
Co	onnector Terminal		
Co	DescriptionTerminalE3033	Ground	Existed

YES >> GO TO 2.

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

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

# C13BA-00 CONTROL MODULE POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

#### 1. Turn the ignition switch ON.

2. Check the voltage between control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal		Continuity
E30	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

# **3.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (2)

- 1. Turn the ignition switch OFF.
- 2. Check the 100A fusible link (#H).
- 3. Check the harness for open or short between steering angle sub control module harness connector No.34 terminal and the 100A fusible link (#H).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

## **4.**CHECK INTERMITTENT INCIDENT

- 1. Turn the ignition switch OFF.
- 2. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
- 3. Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

#### Is the inspection result normal?

- YES >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected part.

## C13BB-00 CONTROL MODULE POWER SUPPLY AGNOSIS > [DIRECT ADAPTIVE STEERING]

< DTC/CIRCUIT DIAGNOSIS >

# C13BB-00 CONTROL MODULE POWER SUPPLY EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

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INFOID:000000013356750

# DTC DETECTION LOGIC

Control module power supply is following condition. 20 V $\leq$ Battery power supply
ously conducted, always turn ignition switch OFF and
<u>C-323, "EPS/DAST 3 : Diagnosis Procedure"</u> . : Refer to <u>GI-45, "Intermittent Incident"</u> . )
INFOID:000000013356751
NGNAL
Standard value (Approx.)
Battery voltage – 0.6 V
Battery voltage

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

# STC-323

# C13BB-00 CONTROL MODULE POWER SUPPLY

## < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Steering force control module			Continuity
Connector	Terminal	Continuity	Continuity
M72	33	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.

# **3.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (1)

#### 1. Turn the ignition switch ON.

2. Check the voltage between control module harness connector and ground.

Steering force control module		_	Continuity
Connector	Terminal		Continuity
M72	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

## **4.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (2)

#### 1. Turn the ignition switch OFF.

- 2. Check the 60A fusible link (#G).
- 3. Check the harness for open or short between steering force control module harness connector No.34 terminal and the 60A fusible link (#G).

#### Is the inspection result normal?

YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram - BATTERY POWER SUPPLY -"</u>.

### NO >> Repair or replace error-detected parts.

## 5. CHECK INTERMITTENT INCIDENT

1. Turn the ignition switch OFF.

- 2. Check enlarged contact spring of terminal. Refer to GI-42. "How to Check Terminal".
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> Repair or replace error-detected part.

DAST 1

## DAST 1 : DTC Description

INFOID:000000013356752

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13BB-00	CONTROL MODULE POWER SUPPLY (Control module power supply)	Control module power supply is following condition. • 20 V ≤ Battery power supply

#### POSSIBLE CAUSE

- Battery
- Power supply circuit
- Alternator
- Steering angle main control module

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING
## C13BB-00 CONTROL MODULE POWER SUPPLY

INIPECT ADAPTIVE STEEPINGI

< DTC/CIRCUIT DIAGNOS			
If "DTC CONFIRMATION PI	ROCEDURE" has been prev	iously conducted, always tu	urn ignition switch OFF and
valt at least 10 seconds bei	fore conducting the next test		
>> GO TO 2.			
2.DTC REPRODUCTION	PROCEDURE		
With CONSULT			
CAUTION:			
Never drive the vehicl	<b>6.</b> for "DAST 1"		
s DTC "C13BB-00" detecte	d?		
YES >> Proceed to diag	nosis procedure. Refer to <u>S</u>	TC-325, "DAST 1 : Diagnos	sis Procedure".
NO-1 >> To check malful	nction symptom before repair	r: Refer to <u>GI-45, "Intermitte</u>	ent Incident".
	lei repair. INSPECTION EN	D	
JAST 1 : Diagnosis P	rocedure		INFOID:00000001335675
1.CHECK STEERING AND	GLE MAIN CONTROL MOD	JLE SINGNAL	
<ol> <li>Turn the ignition switch</li> <li>On the CONSULT scre and "BATTERY VOLTA"</li> </ol>	ON. een, select "DAST 1" >> "Da GE".	ata monitor" >> "Cont	MODULE INSIDE VOLT
3. Check the value			
3. Check the value	or item	Standard valu	ue (Approx.)
3. Check the value Monito	or item	Standard valu Battery volta	ue (Approx.) age – 0.6 V
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE Is the inspection result norm	nal?	Standard valu Battery volta Battery	ue (Approx.) age – 0.6 V voltage
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE Is the inspection result norm YES >> GO TO 5. NO >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering and 3. Check the continuity be	or item hal? DULE GROUND CIRCUIT OFF. gle main control module harne tween control module harne	Standard valu Battery volta Battery Battery ness connector. ss connector and ground.	ue (Approx.) age – 0.6 V voltage
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE s the inspection result norm YES $>>$ GO TO 5. NO $>>$ GO TO 5. NO $>>$ GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering angle 3. Check the continuity be Steering angle ma	or item hal? DULE GROUND CIRCUIT OFF. gle main control module harne tween control module harne	Standard valu Battery volta Battery v Battery v ness connector. ss connector and ground.	ue (Approx.) age – 0.6 V voltage
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE s the inspection result norm YES >> GO TO 5. NO >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering angle 3. Check the continuity be Steering angle ma Connector	DULE GROUND CIRCUIT OFF. gle main control module harne tween control module harne	Standard valu Battery volta Battery ness connector. ss connector and ground.	ue (Approx.) age – 0.6 V voltage
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE s the inspection result norm YES >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering ang 3. Check the continuity be Steering angle ma Connector E27	DULE GROUND CIRCUIT OFF. gle main control module harne tween control module harne in control module Terminal 33	Standard value Battery volta Battery volta B	ue (Approx.) age – 0.6 V voltage Continuity
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE Is the inspection result norm YES $>>$ GO TO 5. NO $>>$ GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering and 3. Check the continuity be Steering angle ma Connector E27 E28	or item mal? DULE GROUND CIRCUIT OFF. gle main control module harne tween control module harne in control module Terminal 33 39	Standard value Battery volta Battery volta B	ue (Approx.) age – 0.6 V voltage Continuity Existed
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE Is the inspection result norm YES >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering and 3. Check the continuity be Steering angle ma Connector E27 E28 Is the inspection result norm YES >> GO TO 3. NO >> Repair open cirr 3. CHECK CONTROL MOD 1. Turn the ignition switch 2. Check the voltage betw	or item DULE GROUND CIRCUIT OFF. gle main control module harne tween control module harne in control module Terminal 33 39 nal? cuit or short to ground or sho DULE POWER SUPPLY CIR ON. een control module harness	Standard value Battery volta Battery • Battery • Ground Ort to power in harness or c CUIT (1) connector and ground.	ue (Approx.) age – 0.6 V voltage Continuity Existed
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE Is the inspection result norm YES >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering and 3. Check the continuity be Steering angle ma Connector E27 E28 Is the inspection result norm YES >> GO TO 3. NO >> Repair open cirr 3. CHECK CONTROL MOD 1. Turn the ignition switch 2. Check the voltage betw	or item  Dule GROUND CIRCUIT  OFF.  gle main control module harne  tween control module harne  in control module  Terminal  33  39  nal?  cuit or short to ground or she  Dule POWER SUPPLY CIR  ON.  reen control module harness  in control module harness	Standard value Battery volta Battery volta Ground CUIT (1) connector and ground.	ue (Approx.) age – 0.6 V voltage Continuity Existed
3. Check the value Monito CONT MODULE INSIDE VOLT BATTERY VOLTAGE Is the inspection result norm YES >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MOD 1. Turn the ignition switch 2. Disconnect steering angle Steering angle ma Connector E27 E28 Is the inspection result norm YES >> GO TO 3. NO >> Repair open cirr 3.CHECK CONTROL MOD 1. Turn the ignition switch 2. Check the voltage betw Steering angle ma Connector	or item  Definition  Definition Definition  Definition Definition Definition Definition Definition Definition Definition Definition Definition Definition Definiti	Standard value Battery volta Battery volta Ground Date Date Date Date Date Date Date Date	ue (Approx.) age – 0.6 V voltage Continuity Existed

## C13BB-00 CONTROL MODULE POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Turn the ignition switch OFF.
- 2. Check the 100A fusible link (#J).
- Check the harness for open or short between steering angle main control module harness connector No.34 terminal and the 100A fusible link (#J).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wiring Dia-</u> <u>gram - BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

#### 5. CHECK INTERMITTENT INCIDENT

- 1. Turn the ignition switch OFF.
- 2. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".
- NO >> Repair or replace error-detected part.

DAST 2

#### DAST 2 : DTC Description

INFOID:000000013356754

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13BB-00	CONTROL MODULE POWER SUPPLY (Control module power supply)	Control module power supply is following condition. • 20 V ≤ Battery power supply

#### POSSIBLE CAUSE

- Battery
- Power supply circuit
- Alternator
- Steering angle sub 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

- Start the engine.
   CAUTION:
  - Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13BB-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-326, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 2 : Diagnosis Procedure

1. CHECK STEERING ANGLE SUB CONTROL MODULE SINGNAL

#### With CONSULT

#### STC-326

INFOID:000000013356755

#### C13BB-00 CONTROL MODULE POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn the ignition switch ON.
- On the CONSULT screen, select "DAST 2" >> "DATA MONITOR" >> "CONT MODULE INSIDE VOLT" A and "BATTERY VOLTAGE".
- 3. Check the value

Monitor item		Standard value (Approx.)	
CONT MODULE INSIDE VOLT		Battery voltage – 0.6 V	
BATTERY VOLTAGE		Battery voltage	
Is the inspection result norr YES >> GO TO 5. NO >> GO TO 2. 2.CHECK CONTROL MO	nal? DULE GROUND CIRCUIT		
<ol> <li>Turn the ignition switch</li> <li>Disconnect steering an</li> <li>Check the continuity be</li> </ol>	OFF. gle sub control module harn atween control module harne	ness connector. ess connector and ground.	
Steering angle su	ub control module		Continuity
Connector	Terminal	—	Continuity
E30	33	Ground	Existed
E31	39	Ground	Existed
<ol> <li>Turn the ignition switch</li> <li>Check the voltage betw</li> </ol>	ON. /een control module harness	s connector and ground.	
Steering angle si	Ib control module	_	Continuity
E30		Ground	10.5 – 16.0 V
Is the inspection result norr YES >> GO TO 5. NO >> GO TO 4. <b>4.</b> CHECK CONTROL MO	nal? DULE POWER SUPPLY CIF	RCUIT (2)	
<ol> <li>Turn the ignition switch</li> <li>Check the 100A fusible</li> <li>Check the harness for terminal and the 100A</li> <li>Is the inspection result norr</li> <li>YES &gt;&gt; Perform the tro</li> </ol>	OFF. Ink (#H). open or short between steer fusible link (#H). nal? puble diagnosis for power su	ing angle sub control module	e harness connector No.34
NO >> Repair or repla	<u>XY POWER SUPPLY -"</u> . ce error-detected parts.		
<b>5.</b> CHECK INTERMITTEN	Γ INCIDENT		
<ol> <li>Turn the ignition switch</li> <li>Check enlarged contact</li> <li>Perform intermittent incomplete</li> </ol>	OFF. t spring of terminal. Refer to tident while turning steering	o <u>GI-42, "How to Check Term</u> wheel. Refer to <u>GI-45, "Inte</u>	ninal". rmittent Incident".
Is the inspection result norr	<u>nal?</u> na opalo sub control module	Defer to STC 404 "Demo	val and Installation"
NO >> Replace steerin	ce error-detected part.		<u>zai anu installation"</u> .

### < DTC/CIRCUIT DIAGNOSIS >

## C13BC-00 CONTROL MODULE IGN POWER SUP

## **DTC** Description

INFOID:000000013356756

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13BC-00	CONTROL MODULE IGN POWER SUP (Control module ignition power supply)	The malfunction in control module ignition power supply circuit is detected

#### POSSIBLE CAUSE

- · Harness and connector
- Battery
- Fuse
- Ignition power supply circuit (open or short)
- Steering force control module
- Steering angle main control module
- Steering angle sub 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3", "DAST 1" or "DAST 2".

#### Is DTC "C13BC-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-328</u>, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### **Diagnosis Procedure**

INFOID:000000013356757

#### **1.**CHECK IGNITION POWER SUPPLY FOR STEERING ANGLE MAIN CONTROL MODULE

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module harness connector.
- 3. Check the voltage between steering angle main control module harness connector and ground.

Steering angle main control module			Continuity
Connector	Terminal		Continuity
E26	25	Ground	0 V

4. Turn the ignition switch ON.

5. Check the voltage between steering angle control module harness connector and ground.

Steering angle main control module			Continuity
Connector	Terminal		Continuity
E26	25	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 2. NO >> GO TO 3.

## 

	TTENT INCIDENT FO	R STEERING ANGLE		
. Turn the ignition 2. Check enlarged 3. Perform intermitt s the inspection resu YES >> Replace	switch OFF. contact spring of termir ent incident while turnir It normal? steering angle main co	nal. Refer to <u>GI-42, "Ho</u> ng steering wheel. Refe ntrol module. Refer to	w to Check Tern er to <u>GI-45, "Inte</u> STC-493, "Remo	ninal". rmittent Incident". oval and Installation".
	replace error-detected	d part.		
<ol> <li>Turn the ignition</li> <li>Disconnect steer</li> <li>Check the contin sub control modu</li> </ol>	switch OFF. ing angle sub control n uity between steering ile harness connector.	nodule harness connec angle main control mo	tor. dule harness co	nnector and steering angle
Steering angle m	ain control module	Steering angle su	b control module	Orationity
Connector	Terminal	Connector	Terminal	Continuity
E26	25	E29	27	Existed
	Steering angle sub contro Terminal	I module		Continuity
	Terminal			Continuity
25		27		Existed
YES >> GO TO 5 NO >> Replace D.CHECK IGNITION . Check the voltag	steering angle sub con I POWER SUPPLY FO e between steering and	trol module. Refer to S R STEERING ANGLE gle sub control module	TC-494, "Remove SUB CONTROL harness connect	val and Installation". MODULE tor and ground.
Steering	angle sub control module		_	Continuity
Connector	Termina	al		
E29 . Turn the ignition . Check the voltag	25 switch ON. e between steering an	gle control module harr	Bround	0 V ind ground.
Steering	angle sub control module			
Connector	Termina	al	—	Continuity
E29	25	(	Ground	10.5 – 16.0 V
the inspection results the inspection results YES >> GO TO 6 NO >> GO TO 7	<u>lt normal?</u>			
. Turn the ignition 2. Check enlarged 3. Perform intermitt	switch OFF. contact spring of termir ent incident while turnin It normal?	nal. Refer to <u>GI-42, "Ho</u> ng steering wheel. Refe	w to Check Tern er to GI-45, "Inte	ninal". rmittent Incident".

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected part.

**7.**CHECK IGNITION POWER SUPPLY CIRCUIT (2)

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.
- 3. Check the continuity between steering angle sub control module harness connector and steering force control module harness connector.

Steering angle s	Steering angle sub control module Steering fo		Steering force control module		
Connector	Terminal	Connector Terminal		Continuity	
E29	25	M71	27	Existed	

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

#### 8.CHECK INTERNAL CIRCUIT IN STEERING FORCE CONTROL MODULE

Check the continuity between steering force control module connector terminals.

Steering force control module		Continuity
Terminal		Continuity
25	27	Existed

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.

9.CHECK IGNITION POWER SUPPLY FOR STEERING FORCE CONTROL MODULE

1. Check the voltage between steering force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	25	Ground	0 V

2. Turn the ignition switch ON.

3. Check the voltage between force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	25	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT FOR STEERING FORCE CONTROL MODULE

1. Turn the ignition switch OFF.

2. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".

3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".

NO >> Repair or replace error-detected part.

## 11. CHECK IGNITION POWER SUPPLY CIRCUIT (3)

1. Turn the ignition switch OFF.

- 2. Check the 10A fuse (#12).
- 3. Check the harness for open or short between steering force control module harness connector No.25 terminal and the 10A fuse (#12).

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

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YES	>> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-65, "VR30DDTT : Wir-
	ing Diagram - IGNITION POWER SUPPLY -".
	>> Popair or replace error detected parts

NO >> Repair or replace error-detected parts.

#### < DTC/CIRCUIT DIAGNOSIS >

## C13BD-00 CONTROL MODULE IGN POWER SUP DAST 1

#### DAST 1 : DTC Description

INFOID:000000013356758

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13BD-00	CONTROL MODULE IGN POWER SUP (Control module ignition power supply)	The malfunction in CAN wake up circuit is detected

#### POSSIBLE CAUSE

- Harness and connector
- CAN wake up circuit (open or short)
- Steering force control module
- Steering angle main control module

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3", "DAST 1" or "DAST 2".

#### Is DTC "C13BD-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-332, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356759

## 1. CHECK CAN WAKE UP CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector and steering angle main control module harness connector.
- 3. Check the continuity between steering force control module harness connector and steering angle main control module harness connector.

Steering force control module		Steering angle ma	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M71	23	E26	23	Existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK STEERING ANGLE MAIN CONTROL MODULE SIGNAL

#### [DIRECT ADAPTIVE STEERING]

#### < DTC/CIRCUIT DIAGNOSIS > (P)With CONSULT 1. Connect steering force control module harness connector and steering angle main control module harness connector. 2. Turn the ignition switch ON. On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "SUB IGN VOLTAGE". Check the value Monitor item Standard value (Approx.) SUB IGN VOLTAGE Battery voltage Is the inspection result normal? >> GO TO 3. YES NO >> Replace steering force control module. Refer to STC-492, "Removal and Installation". $\mathbf{3}$ .perform self-diagnosis for steering angle main control module With CONSULT 1. Turn the ignition switch OFF. 2. Connect steering angle main control module harness connector. Turn the ignition switch ON. 4. Erase self-diagnosis for "DAST 1". 5. Turn the ignition switch OFF and wait for at least 10 seconds. 6. Start the engine. **CAUTION:** Never drive the vehicle. 7. Perform self-diagnosis for "DAST 1". Is DTC "C13BD-00" detected? YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation". NO >> • Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

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#### < DTC/CIRCUIT DIAGNOSIS >

## C13BE-00 - C13C4-00 FLEXRAY COMMUNICATION

#### **DTC** Description

INFOID:000000013356760

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13BE-00	FLEXRAY COMMUNICATION (FlexRay communication)	The malfunction in FlexRay communication between control mod- ules is detected when the system is starting.
C13BF-00	FLEXRAY COMMUNICATION (FlexRay communication)	<ul> <li>The malfunction in FlexRay communication between control modules is detected.</li> <li>The malfunction status of other control module is detected.</li> </ul>
C13C0-00	FLEXRAY COMMUNICATION (FlexRay communication)	<ul> <li>The malfunction in FlexRay communication between control modules is detected.</li> <li>The malfunction status of other control module is detected.</li> </ul>
C13C1-00	FLEXRAY COMMUNICATION (FlexRay communication)	The malfunction in FlexRay communication between control mod- ules is detected.
C13C2-00	FLEXRAY COMMUNICATION (FlexRay communication)	The malfunction in FlexRay communication between control mod- ules is detected.
C13C3-00	FLEXRAY COMMUNICATION (FlexRay communication)	The malfunction in FlexRay communication between control mod- ules is detected.
C13C4-00	FLEXRAY COMMUNICATION (FlexRay communication)	The malfunction of synchronization in FlexRay communication be- tween control modules is detected.

#### POSSIBLE CAUSE

- FlexRay communication circuit (open or short)
- Steering force control module
- Steering angle main control module
- Steering angle sub control module
- Battery power supply circuit (open or short)
- Ignition power supply circuit (open or short)
- Harness connector

#### FAIL-SAFE

DTC	Fail-safe mode
C13BE-00	Mode 2
C13BF-00	Variable
C13C0-00	Mode 2 or Mode 3
C13C1-00	Mode 1, Mode 2 or Mode 3 <sup>*1</sup>
C13C2-00	Mode 1, Mode 2 or Mode 3 <sup>*1</sup>
C13C3-00	Mode 1, Mode 2 or Mode 3 <sup>*1</sup>
C13C4-00	Mode 2 <sup>*2</sup>

\*1: When DTC is detected in steering angle main control module, fail-safe mode is Mode 2.

\*1: When DTC is detected in steering angle main control module, fail-safe mode is Mode 1 or Mode 3.

#### NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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.

## [DIRECT ADAPTIVE STEERING]

>> GO TO 2.						-
2.DTC REPRODUCTIO	N PROCEDURE					А
<ul> <li>With CONSULT</li> <li>Start the engine.</li> <li>CAUTION:</li> </ul>						В
Never drive the veh 2. Perform self-diagnos	icle. is for "EPS/DAST 3	3", "DAST <sup>-</sup>	1" or "DAST	2".		C
Is DTC "C13BE-00" – "C YES >> Proceed to d NO-1 >> To check ma NO-2 >> Confirmation	13C4-00" detected? iagnosis procedure lfunction symptom l after repair: INSPE	2 . Refer to before rep CTION EI	<u>STC-335, "</u> air: Refer to ND	Diagnosis Procedure GI-45, "Intermittent	<u>e"</u> . Incident".	D
Diagnosis Procedur	e				INFOID:00000001335676	1
1.CHECK FLEXRAY CO	MMUNICATION C	IRCUIT				E
<ol> <li>Turn the ignition swit</li> <li>Disconnect each con</li> <li>Check the continuity</li> </ol>	ch OFF. trol module harnes between each cont	s connecto trol module	or. e harness c	onnector.		F
Steering force con	trol module	Ste	ering angle m	ain control module	Continuity	STC
Connector	Terminal	Coni	nector	Terminal		
M71	19	E	26	19	Existed	
	20			20		- H
Steering angle main o	control module	Ste	ering angle s	ub control module		-
Connector	Terminal	Coni	nector	Terminal	Continuity	
	19			19		-
E20	20	E	29	20	Existed	J
Steering force con	trol module	Ste	ering angle si	ib control module		-
Connector	Terminal	Coni	nector	Terminal	Continuity	K
	19			19		
M71	20	E	29	20	Existed	
4. Check the continuity	between control me	odule harn	ess connec	tor and ground.		L
Steering for	ce control module				Continuity	-
Connector	Termina	ıl		—	Continuity	IVI
M71	19		Ground		Not existed	-
	20			Cround		N
Steering angle	main control module					-
Connector	Termina	l	-	—	Continuity	0
	19		Ground			-
E20	20				NOI existed	P
Steering angle	sub control module					-
Connector	Termina	ıl	-	-	Continuity	
F29	19			Ground	Not existed	-
	20					_

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

#### YES >> GO TO 2.

NO >> Repair or replace error-detected part.

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

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.

3. Check the voltage between steering force control module harness connector and ground.

Steering force	control module		Voltage (Approx)	
Connector Terminal			voltage (Approx.)	
M72	34	Ground	10.5 – 16.0 V	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

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

1. Check the 60A fusible link (#G).

2. Check the harness for open or short between steering force control module harness connector No.34 terminal and the 60A fusible link (#G).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

#### **4.**CHECK STEERING ANGLE MAIN CONTROL MODULE POWER SUPPLY CIRCUIT (1)

- 1. Disconnect steering angle main control module harness connector.
- 2. Check the voltage between steering angle main control module harness connector and ground.

Steering angle m	ain control module		Voltago (Approx.)
Connector	Terminal		Voliage (Approx.)
E27	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

**5.**CHECK STEERING ANGLE MAIN CONTROL MODULE POWER SUPPLY CIRCUIT (2)

- 1. Check the 100A fusible link (#J).
- Check the harness for open or short between steering angle main control module harness connector No.34 terminal and the 100A fusible link (#J).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-</u> ing Diagram - <u>BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

#### **6.**CHECK STEERING ANGLE SUB CONTROL MODULE POWER SUPPLY CIRCUIT (1)

- 1. Disconnect steering angle sub control module harness connector.
- 2. Check the voltage between steering angle sub control module harness connector and ground.

Steering angle sub control module			Voltage (Approx.)
Connector Terminal			
E30	34	Ground	10.5 – 16.0 V
le the increation regult norm	2012		

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

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

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Check the 100A fusible link (#H).
- Check the harness for open or short between steering angle sub control module harness connector No.34 A terminal and the 100A fusible link (#H).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-</u> B <u>ing Diagram - BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

**8.**CHECK IGNITION POWER SUPPLY CIRCUIT

Check ignition power supply circuit. Refer to STC-328, "Diagnosis Procedure".

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

#### 9. CHECK INTERMITTENT INCIDENT

1. Turn the ignition switch OFF.

2. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering angle main control module, steering angle sub control module and steering force control module. Refer to <u>STC-493</u>, "<u>Removal and Installation</u>", <u>STC-494</u>, "<u>Removal and Installation</u>", <u>STC-494</u>, "<u>Removal and Installation</u>".
- NO >> Repair or replace error-detected part.

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#### C13C5-00 STEERING ANGLE SENSOR SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

# C13C5-00 STEERING ANGLE SENSOR SIGNAL EPS/DAST 3

## **EPS/DAST 3 : DTC Description**

INFOID:000000013356762

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13C5-00	STEERING ANGLE SENSOR SIGNAL (Steering angle sensor signal)	Malfunction is detected in steering angle sensor signal that is out- put from steering angle sensor for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Steering force control module
- Steering angle sensor

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

Is DTC "C13C5-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-338, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356763

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

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "ABS".

#### Is any DTC detected?

YES >> Check the DTC. Refer to <u>BRC-72, "DTC Index"</u>.

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

- Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Turn the ignition switch ON.
- 5. Perform self-diagnosis for "EPS/DAST 3".
- Is DTC "C13C5-00" detected?

YES >> GO TO 3.

## C13C5-00 STEERING ANGLE SENSOR SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

#### [DIRECT ADAPTIVE STEERING]

<ul> <li>NO &gt;&gt; • Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.</li> <li>• Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.</li> </ul>	А
3. CHECK TERMINAL	
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect steering force control module harness connector and then check steering force control module pin terminals for damage or loose connection with harness connector.</li> </ol>	В
3. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.	С
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.</li> <li>NO &gt;&gt; Repair or replace error-detected part.</li> </ul>	D
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## C13C6-00 G SENSOR SIGNAL EPS/DAST 3

#### **EPS/DAST 3 : DTC Description**

INFOID:000000013356764

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13C6-00	G SENSOR SIGNAL (G sensor signal)	Malfunction is detected in G sensor signal that is output from ABS actuator and electric unit (control unit) for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Steering force control module
- ABS actuator and electric unit (control unit)

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

Is DTC "C13C6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-340, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356765

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

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "ABS".

#### Is any DTC detected?

YES >> Check the DTC. Refer to <u>BRC-72, "DTC Index"</u>.

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

- Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Turn the ignition switch ON.
- 5. Perform self-diagnosis for "EPS/DAST 3".
- Is DTC "C13C6-00" detected?

YES >> GO TO 3.

#### C13C6-00 G SENSOR SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

#### [DIRECT ADAPTIVE STEERING]

<ul> <li>NO &gt;&gt; • Check enlarged contact spring of terminal. Refer to <u>GI-42. "How to Check Terminal"</u>.</li> <li>• Perform intermittent incident while turning steering wheel. Refer to <u>GI-45. "Intermittent Incident"</u>.</li> </ul>	A
3.CHECK TERMINAL	
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect steering force control module harness connector and then check steering force control module pin terminals for damage or loose connection with harness connector.</li> <li>Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator</li> </ol>	В
and electric unit (control unit) pin terminals for damage or loose connection with harness connector.	С
YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".	
NO >> Repair or replace error-detected part.	D
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< DTC/CIRCUIT DIAGNOSIS >

## C13C7-00 VEHICLE SPEED SIGNAL EPS/DAST 3

**EPS/DAST 3 : DTC Description** 

INFOID:000000013356766

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13C7-00	VEHICL SPEED SIGNAL (Vehicle speed signal)	Malfunction is detected in vehicle speed signal (ABS) that is output from ABS actuator and electric unit (control unit) for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Steering force control module
- · ABS actuator and electric unit (control unit)

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

Is DTC "C13C7-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-342, "EPS/DAST 3 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356767

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

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "ABS".

#### Is any DTC detected?

YES >> Check the DTC. Refer to <u>BRC-72, "DTC Index"</u>.

NO >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Turn the ignition switch ON.
- 5. Perform self-diagnosis for "EPS/DAST 3".
- Is DTC "C13C7-00" detected?

### C13C7-00 VEHICLE SPEED SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

### [DIRECT ADAPTIVE STEERING]

YES >> GO TO 3. NO >> • Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u> . • Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	А
<b>J.</b> CHECK TERMINAL	
1. Turn the ignition switch OFF.	В
2. Disconnect steering force control module harness connector and then check steering force control module pin terminals for damage or loose connection with harness connector.	
3. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.	С
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.</li> <li>NO &gt;&gt; Repair or replace error-detected part.</li> </ul>	D
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## C13C9-00 DRIVE MODE SIGNAL EPS/DAST 3

#### **EPS/DAST 3 : DTC Description**

INFOID:000000013356768

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13C9-00	DRIVE MODE SIGNAL (Drive mode signal)	Malfunction is detected in drive mode signal that is output from chassis control module for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Steering force control module
- Chassis 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13C9-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-344, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356769

#### **1.**PERFORM CHASSIS CONTROL MODULE SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "CHASSIS CONTROL".

#### Is any DTC detected?

- YES >> Check the DTC. Refer to <u>DAS-550, "DTC Index"</u>.
- NO >> GO TO 2.

#### 2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C13C9-00" detected?

#### YES >> GO TO 3. NO >> • Check e

- >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

## 3. CHECK TERMINAL

#### C13C9-00 DRIVE MODE SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

1. 2.	Turn the ignition switch OFF. Disconnect steering force control module harness connector and then check steering force control mod- ule pin terminals for damage or loose connection with harness connector	А
3.	Disconnect chassis control module harness connector and then check chassis control module pin termi- nals for damage or loose connection with harness connector.	В
<u>Is th</u>	e inspection result normal?	
YE NC	<ul> <li>S &gt;&gt; Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.</li> <li>&gt;&gt; Repair or replace error-detected part.</li> </ul>	С
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## C13CA-00 ENGINE STATUS SIGNAL EPS/DAST 3

### **EPS/DAST 3 : DTC Description**

INFOID:000000013356770

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13CA-00	ENGINE STATUS SIGNAL (Engine status signal)	Malfunction is detected in engine status signal that is output from ECM for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Steering force control module
- ECM

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Turn the ignition switch ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13CA-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-346, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45. "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356771

#### **1.**PERFORM ECM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "ENGINE".

#### Is any DTC detected?

- YES >> Check the DTC. Refer to <u>EC6-164, "TURBO HIGH PRESSURE MODEL : DTC Index"</u> (For USA and CANADA), <u>EC6-1139, "DTC Index"</u> (For MEXICO).
- NO >> GO TO 2.

#### 2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C13CA-00" detected?

- YES >> GO TO 3. NO >> • Check e
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### 3.CHECK TERMINAL

#### **C13CA-00 ENGINE STATUS SIGNAL**

#### < DTC/CIRCUIT DIAGNOSIS >

<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect steering force control module harness connector and then check steering force control with harness connector.</li> </ol>	ol mod-
<ol> <li>Disconnect ECM harness connector and then check ECM pin terminals for damage or loose con with harness connector</li> </ol>	nection
s the inspection result normal?	
YES >> Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u> . NO >> Repair or replace error-detected part.	

< DTC/CIRCUIT DIAGNOSIS >

## C13CC-00 T/M GEAR POSI SIGNAL EPS/DAST 3

**EPS/DAST 3 : DTC Description** 

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13CC-00	T/M GEAR POSI SIGNAL (T/M gear position signal)	Malfunction is detected in shift position signal that is output from TCM for 2 seconds or more.

#### POSSIBLE CAUSE

• Harness or connector (CAN communication line)

- Steering force control module
- TCM

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Turn the ignition switch ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13CC-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-348, "EPS/DAST 3 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356773

#### **1.**PERFORM TCM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "TRANSMISSION".

#### Is any DTC detected?

- YES >> Check the DTC. Refer to <u>TM-111, "VR30DDTT : DTC Index"</u>.
- NO >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C13CC-00" detected?

YES >> GO TO 3.

NO

- >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### 3.CHECK TERMINAL

## STC-348

INFOID:000000013356772

#### C13CC-00 T/M GEAR POSI SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect steering force control module harness connector and then check steering force control module pin terminals for damage or loose connection with harness connector.</li> <li>Disconnect TCM harness connector and then check TCM pin terminals for damage or loose connection</li> </ol>	А
with harness connector.	В
YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".	
NO >> Repair or replace error-detected part.	С
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< DTC/CIRCUIT DIAGNOSIS >

## C13CD-00 ENGINE SPEED SIGNAL EPS/DAST 3

**EPS/DAST 3 : DTC Description** 

INFOID:000000013356774

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13CD-00	ENGINE SPEED SIGNAL (Engine speed signal)	Malfunction is detected in engine speed signal that is output from ECM for 2 seconds or more.

#### POSSIBLE CAUSE

• Harness or connector (CAN communication line)

- Steering force control module
- ECM

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

#### With CONSULT

- Turn the ignition switch ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13CD-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-350, "EPS/DAST 3 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45. "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356775

#### **1.**PERFORM ECM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "ENGINE".

#### Is any DTC detected?

- YES >> Check the DTC. Refer to <u>EC6-164, "TURBO HIGH PRESSURE MODEL : DTC Index"</u> (For USA and CANADA), <u>EC6-1139, "DTC Index"</u> (For MEXICO).
- NO >> GO TO 2.
- 2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C13CD-00" detected?

- YES >> GO TO 3. NO >> • Check e
  - >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

**3.**CHECK TERMINAL

#### C13CD-00 ENGINE SPEED SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

1. 2.	Turn the ignition switch OFF. Disconnect steering force control module harness connector and then check steering force control mod- ule pin terminals for damage or loose connection with harness connector	А
3.	Disconnect ECM harness connector and then check ECM pin terminals for damage or loose connection	
	with harness connector.	D
ls t	he inspection result normal?	В
Y	ES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".	
N	O >> Repair or replace error-detected part.	C
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## C13CE-00 SLEEP/WAKE SIGNAL EPS/DAST 3

## EPS/DAST 3 : DTC Description

INFOID:000000013356776

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13CE-00	SLEEP WAKE UP SIGNAL (Sleep wake up signal)	Malfunction is detected in sleep wake up signal that is output from BCM for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (CAN communication line)
- Steering force control module
- BCM

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13CE-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-352, "EPS/DAST 3 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356777

#### **1.**PERFORM BCM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "BCM".

#### Is any DTC detected?

YES >> Check the DTC. Refer to <u>BCS-63, "DTC Index"</u>.

NO >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C13CE-00" detected?

YES >> GO TO 3.

NO

- >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

## 3. CHECK TERMINAL

#### C13CE-00 SLEEP/WAKE SIGNAL

#### 

< DTC/CIRCUIT DIAGNOSIS >	
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect steering force control module harness connector a ule pin terminals for damage or loose connection with harness</li> </ol>	and then check steering force control mod-
3. Disconnect BCM harness connector and then check BCM pin with harness connector.	terminals for damage or loose connection
Is the inspection result normal?	В
YES >> Replace steering force control module. Refer to <u>STC-4</u>	92. "Removal and Installation".
NO >> Repair or replace error-detected part.	C
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## C13CF-00 ALC FUNCTION REQUEST SIGNAL DAST 1

## DAST 1 : DTC Description

INFOID:000000013356778

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13CF-00	ALC FUNCTION REQUEST SIGNAL (Active lane control function request signal)	Malfunction is detected in Active lane control signal A that is output from chassis control module for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (Chassis communication line)
- Steering angle main control module
- Chassis 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

- Turn the ignition switch ON.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13CF-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-354, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356779

#### **1.**PERFORM CHASSIS CONTROL MODULE SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "CHASSIS CONTROL".

#### Is any DTC detected?

- YES >> Check the DTC. Refer to <u>DAS-550, "DTC Index"</u>.
- NO >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Turn the ignition switch ON.
- 5. Perform self-diagnosis for "DAST 1".
- Is DTC "C13CF-00" detected?
- YES >> GO TO 3.

NO

- >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

## 3. CHECK TERMINAL

#### **C13CF-00 ALC FUNCTION REQUEST SIGNAL**

#### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

1. Turn the ignition switch OFF. 2. Disconnect steering angle main control module harness connector and then check steering angle main А control module pin terminals for damage or loose connection with harness connector. 3. Disconnect chassis control module harness connector and then check chassis control module pin terminals for damage or loose connection with harness connector. В Is the inspection result normal? YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation". NO >> Repair or replace error-detected part. С D Ε F STC Н J Κ

Revision: November 2016

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# C13D0-00 ALC FUNCTION REQUEST SIGNAL DAST 1

## DAST 1 : DTC Description

INFOID:000000013356780

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D0-00	ALC FUNCTION REQUEST SIGNAL (Active lane control function request signal)	Malfunction is detected in active lane control signal B that is output from chassis control module for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (Chassis communication line)
- Steering angle main control module
- Chassis 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

- Turn the ignition switch ON.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13D0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-356, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356781

#### **1.**PERFORM CHASSIS CONTROL MODULE SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Perform self-diagnosis for "CHASSIS CONTROL".

#### Is any DTC detected?

- YES >> Check the DTC. Refer to <u>DAS-550, "DTC Index"</u>.
- NO >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Turn the ignition switch ON.
- 5. Perform self-diagnosis for "DAST 1".
- Is DTC "C13D0-00" detected?
- YES >> GO TO 3.

NO

- >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

## 3. CHECK TERMINAL

#### C13D0-00 ALC FUNCTION REQUEST SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

- Turn the ignition switch OFF.
   Disconnect steering angle main control r
- 2. Disconnect steering angle main control module harness connector and then check steering angle main A control module pin terminals for damage or loose connection with harness connector.
- 3. Disconnect chassis control module harness connector and then check chassis control module pin terminals for damage or loose connection with harness connector.

#### Is the inspection result normal?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
- NO >> Repair or replace error-detected part.

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## C13D1-00 STEERING ANGLE SIGNAL DAST 1

DAST 1 : DTC Description

INFOID:000000013356782

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D1-00	STEERING ANGLE SENSOR SIGNAL (Steering angle sensor signal)	Malfunction is detected in steering angle sensor signal (received from steering angle sensor) that is output from chassis control module for 2 seconds or more.

#### POSSIBLE CAUSE

- Harness or connector (Chassis communication line)
- Steering angle main control module
- Chassis control module
- Steering angle sensor

#### 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 ON.

2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13D1-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-358, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356783

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

#### With CONSULT

- Turn the ignition switch ON.
- 2. Perform self-diagnosis for "ABS".

#### Is any DTC detected?

YES >> Check the DTC. Refer to <u>BRC-72, "DTC Index"</u>.

NO >> GO TO 2.

2. PERFORM CHASSIS CONTROL MODULE SELF-DIAGNOSIS

#### With CONSULT

1. Turn the ignition switch ON.

2. Perform self-diagnosis for "CHASSIS CONTROL".

#### Is any DTC detected?

YES >> Check the DTC. Refer to <u>DAS-550, "DTC Index"</u>.

NO >> GO TO 3.

**3.** PERFORM SELF-DIAGNOSIS

#### With CONSULT

Turn the ignition switch ON.

## C13D1-00 STEERING ANGLE SIGNAL

< DTC/CIRCUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]	
<ol> <li>Erase self-diagnosis for "DAST 1".</li> <li>Turn the ignition switch OFF and wait for at least 10 seconds.</li> <li>Turn the ignition switch ON</li> </ol>		
5. Perform self-diagnosis for "DAST 1".		
Is DTC "C13D1-00" detected?		
YES >> GO TO 4.		
<ul> <li>NO &gt;&gt; • Check enlarged contact spring of terminal. Refer to <u>GI-4</u></li> <li>• Perform intermittent incident while turning steering whee</li> </ul>	2. "How to Check Terminal" I. Refer to <u>GI-45. "Intermittent Incident"</u>	
4.CHECK TERMINAL		
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect steering angle main control module harness connector and then check steering angle main control module pin terminals for damage or loose connection with harness connector.</li> <li>Disconnect chassis control module harness connector and then check chassis control module pin terminals for damage or loose connector and then check chassis control module pin terminals for damage or loose connector.</li> </ol>		
Is the inspection result normal?		
YES >> Replace steering angle main control module. Refer to <u>STC</u> NO >> Repair or replace error-detected part.	-493, "Removal and Installation".	

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## C13D2-00 CONTROL MODULE EPS/DAST 3

## EPS/DAST 3 : DTC Description

INFOID:000000013356784

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D2-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

#### POSSIBLE CAUSE

Steering force control module

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125. "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine. CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13D2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-360, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356785

#### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

#### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13D2-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### DAST 1

NO
# < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

DASI 1:	DIC Description	INFOID:000000013356786	Δ
DTC DETE	ECTION LOGIC		~
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	В
C13D2-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	С
POSSIBLE • Steering a	ECAUSE angle main control module		
FAIL-SAFE • Mode 1 o NOTE: For fail-sa	E r Mode 3 afe mode, refer to STC-125, "DIRECT ADA	PTIVE STEERING · Fail-safe"	D
	FIRMATION PROCEDURE	THVE OFERINO . Failsale.	
1.PRECO	NDITIONING		F
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.	STO
>> 2.DTC RE	GO TO 2. PRODUCTION PROCEDURE		Н
1. Start th CAUTI Never	e engine. ON: drive the vehicle.		
2. Perform	n self-diagnosis for "DAST 1".		
<u>Is DTC "C1</u> YES >> NO-1 >> NO-2 >>	3D2-00" detected? Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION E	<u>STC-361, "DAST 1 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	J
DAST 1 :	Diagnosis Procedure	INFOID:000000013356787	N
1.PERFOR	RM SELF-DIAGNOSIS		L
With CO 1. Turn th 2. Erases 3. Turn th 4. Start th	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 1". e ignition switch OFF and wait for at least 1 e engine.	0 seconds.	Μ
CAUTI Never 5. Perform	ON: drive the vehicle. n self-diagnosis for "DAST 1".		Ν
YES >> NO >>	<ul> <li>Replace steering angle main control module</li> <li>Check enlarged contact spring of termin</li> </ul>	Ile. Refer to <u>STC-493, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> .	0
DAST 2	Perform intermittent incident while turnin	g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	Ρ
DAST 2 :	DTC Description	INFOID:000000013356788	
DTC DETE	ECTION LOGIC		

### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D2-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

### POSSIBLE CAUSE

• Steering angle sub control module

### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

### 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. Start the engine.

## CAUTION:

Never drive the vehicle.
 Perform self-diagnosis for "DAST 2".

## Is DTC "C13D2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-362, "DAST 2 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 2 : Diagnosis Procedure

INFOID:000000013356789

### **1.**PERFORM SELF-DIAGNOSIS

### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.
  - CAUTION:

NO

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13D2-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

## C13D3-00 CONTROL MODULE EPS/DAST 3

## EPS/DAST 3 : DTC Description

## DTC DETECTION LOGIC

	1		$\sim$
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	С
C13D3-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	D
POSSIBLE	ECAUSE		
<ul> <li>Steering f</li> </ul>	force control module		Е
FAIL-SAFE	Ξ		
Mode 2     NOTE:			
For fail-sa	afe mode, refer to <u>STC-125, "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".	F
DTC CON	FIRMATION PROCEDURE		
1.PRECO	NDITIONING		STC
If "DTC CO	NFIRMATION PROCEDURE" has been pro	eviously conducted, always turn ignition switch OFF and	
wait at leas	t 10 seconds before conducting the next te	st.	Н
>> 2			
	PRODUCTION PROCEDURE		
With CO			
CAUTI	ON:		J
Never	drive the vehicle.		
	n self-diagnosis for "EPS/DAST 3".		1Z
YFS >>	<ul> <li>Proceed to diagnosis procedure. Refer to</li> </ul>	STC-363 "EPS/DAST 3 · Diagnosis Procedure"	K
NO-1 >>	To check malfunction symptom before rep	air: Refer to GI-45, "Intermittent Incident".	
NO-2 >>	<ul> <li>Confirmation after repair: INSPECTION E</li> </ul>	ND	L
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356791	
1.PERFO	RM SELF-DIAGNOSIS		M
(P)With CO	NSULT		
1. Turn th	e ignition switch ON.		N
2. Erases	self-diagnosis for "EPS/DAST 3". le ignition switch OEE and wait for at least "	10 seconds	IN
4. Start th	le engine.		
	ON: drive the vehicle		0
5. Perforr	n self-diagnosis for "EPS/DAST 3".		
<u>Is DTC "C1</u>	3D3-00" detected?		Ρ
YES >>	Replace steering force control module. Re	efer to STC-492. "Removal and Installation".	
NO >>	<ul> <li>Check enlarged contact spring of termin</li> <li>Perform intermittent incident while turnir</li> </ul>	al. Refer to GI-42, "How to Check Terminal".	
DAST 1			

А

В

### < DTC/CIRCUIT DIAGNOSIS >

### DAST 1 : DTC Description

INFOID:000000013356792

[DIRECT ADAPTIVE STEERING]

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D3-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

### POSSIBLE CAUSE

• Steering angle main control module

### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D3-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-364, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356793

## **1.**PERFORM SELF-DIAGNOSIS

### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.

### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D3-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

## DAST 2

DAST 2 : DTC Description

DTC DETECTION LOGIC

### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D3-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.
POSSIBLE		
<ul> <li>Steering a</li> <li>FAIL-SAFE</li> </ul>	angle sub control module	
Mode 2     NOTE:	-	
For fail-sa	afe mode, refer to <u>STC-125, "DIRECT A</u>	DAPTIVE STEERING : Fail-safe".
	FIRMATION PROCEDURE	
wait at least	NFIRMATION PROCEDURE" has been t 10 seconds before conducting the next	previously conducted, always turn ignition switch OFF and t test.
	00 70 0	
אר 2 סדר RE		
	NSULT	
1. Start the	e engine.	
Never (	ON: drive the vehicle.	
2. Perform	n self-diagnosis for "DAST 2".	
YES >>	Proceed to diagnosis procedure. Refer	to STC-365, "DAST 2 : Diagnosis Procedure".
NO-1 >>	To check malfunction symptom before	repair: Refer to <u>GI-45, "Intermittent Incident"</u> .
DAST 2 ·	Diagnosis Procedure	
1		INFOID:000000013356795
I.PERFOF	RM SELF-DIAGNOSIS	
With CO	<b>NSULT</b> e ignition switch ON.	
2. Erase s	self-diagnosis for "DAST 2".	at 10 accords
4. Start the	e engine.	st to seconds.
CAUTI Never	ON: drive the vehicle.	
5. Perform	n self-diagnosis for "DAST 2".	
<u>Is DTC "C1;</u> VES	<u>3D3-00" detected?</u>	dule Refer to STC-494 "Removal and Installation"
NO >>	Check enlarged contact spring of terr	ninal. Refer to <u>GI-42, "How to Check Terminal"</u> .
	Perform intermittent incident while tur	rning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .

## C13D4-00 CONTROL MODULE EPS/DAST 3

## **EPS/DAST 3 : DTC Description**

INFOID:000000013356796

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D4-00	CONTROL MODULE (Control module)	The malfunction in each motor angle sensor is detected.

### POSSIBLE CAUSE

- Force motor angle sensor
- Sensor circuit (between steering force control module and force motor angle sensor) is open or short.
- Steering force control module

### FAIL-SAFE

 Mode 1 or Mode 2 NOTE:

For details of fail-safe, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

### (B) With CONSULT

Start the engine.
 CAUTION:
 Never drive the vehicle.

## Turn the steering wheel from full left stop to full right stop.

Perform self-diagnosis for "EPS/DAST 3".

### Is DTC "C13D4-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-366, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356797

## **1.**CHECK THE ANGLE SENSOR

Check the force motor angle sensor. Refer to <u>STC-367, "EPS/DAST 3 : Component Inspection"</u>. Is the inspection result normal?

YES >> GO TO 2.

NO >> Force motor angle sensor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> <u>"Removal and Installation"</u>.

### 2.CHECK THE SENSOR CIRCUIT

- 1. Disconnect steering force control module and force motor angle sensor harness connector.
- 2. Check the continuity between control module harness connector and angle sensor harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

Steering force control module		Force mot	Force motor angle sensor	
Connector	Terminal	Connector	Terminal	Continuity
	10		1	
	11		5	
M71	6	M73	4	
	5		8	
	4	2		
	2		6	
3. Check the contin	uity between control m	odule harness conn	ector and ground.	
Steerin	g force control module			Ocartinuitu
Connector	Termin	al	—	Continuity
	10			
	11			
N /1 7 4	6		Ground	Not aviated
IV17 1	5		Ground	INUL EXISTED
	4			
	2			
YES >> Replace NO >> Repair or EPS/DAST 3 : C 1.CHECK THE ANG 1. Turn the ignition 2. Disconnect force	steering force control i replace error-detecter omponent Inspec LE SENSOR switch OFF. motor angle sensor ha	module. Refer to <u>ST(</u> d part. tion arness connector.	C-492, "Removal an	d Installation".
3. Check continuity	Force motor angle se	sensor connector ter		Continuity
4	ierminai	0		Not existed
1		<u></u>		Not existed
1		<u>т</u> 5		Existed
1		6		Not existed
1		8		Not existed
2		4		Not existed
2		5		Not existed
2		6		Existed
2		8		Not existed
		-		

### < DTC/CIRCUIT DIAGNOSIS >

Force motor	Continuity	
Teri	Continuity	
4	6	Not existed
4	8	Existed
5	6	Not existed
5	8	Not existed
6	8	Not existed

### Is the inspection result normal?

#### YES >> INSPECTION END

NO >> Force motor angle sensor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> "Removal and Installation".

## DAST 1

## DAST 1 : DTC Description

DTC DETECTION LOGIC

INFOID:000000013356799

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D4-00	CONTROL MODULE (Control module)	The malfunction in each motor angle sensor is detected.

## POSSIBLE CAUSE

- Main motor angle sensor
- Sensor circuit (between steering angle main control module and main motor angle sensor) is open or short.
- Steering angle main control module

### FAIL-SAFE

Mode 1 or Mode 3

NOTE:

For details of fail-safe, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:

## Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D4-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-368. "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 1 : Diagnosis Procedure

INFOID:000000013356800

**1.**CHECK THE ANGLE SENSOR

Check the main motor angle sensor. Refer to STC-369, "DAST 1 : Component Inspection".

## STC-368

< DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

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#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Main motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## 2. CHECK THE SENSOR CIRCUIT

- 1. Disconnect steering angle main control module and main motor angle sensor harness connector.
- 2. Check the continuity between control module harness connector and angle sensor harness connector.

Steering angle ma	in control module	Main motor a	angle sensor	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	10	E93 3 6 1 5	3		
-	11				
Fac	6		1	Existed	
E20	5		5		
	4	-	2		
-	2		4		

3. Check the continuity between control module harness connector and ground.

Steering angle main control module			Continuity	
Connector	Connector Terminal		Continuity	
	10		Not existed	Н
	11			
E26	6	Cround Not evisted		
E20 -	5	Giouna	Ground Not existed	
-	4			
	2			J

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

### 3.CHECK INTERMITTENT INCIDENT

Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
 Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

## Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>. NO >> Repair or replace error-detected part.

## DAST 1 : Component Inspection

## **1.**CHECK THE ANGLE SENSOR

1. Turn the ignition switch OFF.

2. Disconnect main motor angle sensor harness connector.

3. Check continuity between motor angle sensor connector terminals.

Main motor angle sensor Terminal		Continuity
		Continuity
1	2	Not existed
1	3	Not existed
1	4	Not existed
1	5	Existed

### < DTC/CIRCUIT DIAGNOSIS >

Main moto	Main motor angle sensor		
Te	rminal	Continuity	
1	6	Not existed	
2	3	Not existed	
2	4	Existed	
2	5	Not existed	
2	6	Not existed	
3	4	Not existed	
3	5	Not existed	
3	6	Existed	
4	5	Not existed	
4	6	Not existed	
5	6	Not existed	

## Is the inspection result normal?

### YES >> INSPECTION END

NO >> Main motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## DAST 2

### DAST 2 : DTC Description

INFOID:000000013356802

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D4-00	CONTROL MODULE (Control module)	The malfunction in each motor angle sensor is detected.

### POSSIBLE CAUSE

• Sub motor angle sensor

- Sensor circuit (between steering angle sub control module and sub motor angle sensor) is open or short.
- Steering sub control module

### FAIL-SAFE

- Mode 2
- NOTE:

For details of fail-safe, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

Start the engine.
 CAUTION:

### Never drive the vehicle.

- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Perform self-diagnosis for "DAST 2".

### Is DTC "C13D4-00" detected?

YES >> Proceed to diagnosis procedure. Refer to STC-371, "DAST 2 : Diagnosis Procedure".

< DTC/CIRCUIT DIA	GNOSIS >		[DIRECT AI	DAPTIVE STEERING]
NO-1 >> To check NO-2 >> Confirmat	malfunction symptom tion after repair: INSPE	before repair: Refer ECTION END	to <u>GI-45, "Intermittent</u>	Incident".
DAST 2 : Diagno	sis Procedure			INFOID:000000013356803
1.CHECK THE ANG	LE SENSOR			
Check the sub motor a	angle sensor. Refer to	STC-371, "DAST 2	: Component Inspection	on".
Is the inspection result YES >> GO TO 2. NO >> Sub moto <u>"Removal</u>	<u>t normal?</u> or angle sensor is m and Installation".	alfunction. Replace	steering gear asser	nbly. Refer to <u>ST-146.</u>
<b>Z</b> .CHECK THE SEN	SOR CIRCUIT			
<ol> <li>Disconnect steeri</li> <li>Check the continu</li> </ol>	ng angle sub control n uity between control m	nodule and sub moto odule harness conne	or angle sensor harnes ector and angle senso	ss connector. r harness connector.
Steering angle su	ub control module	Sub moto	r angle sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	10		3	
	11		6	
E29	6	E94	1	Existed
	5	5		
	4		2	
	2		4	
3. Check the continu	uity between control m	odule harness conne	ector and ground.	
Steering a	ngle sub control module			Continuity
Connector	Termina	al	—	Continuity
	10			
	11			
E29	6		Ground	Not existed
-	5			
	4			
	2			
Is the inspection result YES >> GO TO 3. NO >> Repair or <b>3.</b> CHECK INTERMIT	replace error-detected	d part.		
<ol> <li>Check enlarged c</li> <li>Perform intermitte</li> </ol>	ontact spring of termir ent incident while turni	nal. Refer to <u>GI-42, "</u> ng steering wheel. R	How to Check Termina efer to <u>GI-45, "Intermi</u>	al". ttent Incident".
Is the inspection resul YES >> Replace s NO >> Repair or	<u>t normal?</u> steering angle sub con replace error-detected	trol module. Refer to d part.	STC-494, "Removal	and Installation".
DAST 2 : Compo	nent Inspection			INFOID:000000013356804
<b>1.</b> CHECK THE ANG	LE SENSOR			
1. Turn the ignition s	witch OFF.			

- 2. Disconnect sub motor angle sensor harness connector.
- 3. Check continuity between motor angle sensor connector terminals.

### < DTC/CIRCUIT DIAGNOSIS >

Sub motor a	ingle sensor	Continuity
Tern	ninal	Continuity
1	2	Not existed
1	3	Not existed
1	4	Not existed
1	5	Existed
1	6	Not existed
2	3	Not existed
2	4	Existed
2	5	Not existed
2	6	Not existed
3	4	Not existed
3	5	Not existed
3	6	Existed
4	5	Not existed
4	6	Not existed
5	6	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Sub motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## C13D5-00 CONTROL MODULE EPS/DAST 3

## EPS/DAST 3 : DTC Description

## DTC DETECTION LOGIC

			_
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	С
C13D5-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	D
POSSIBLE	CAUSE		
<ul> <li>Steering f</li> </ul>	orce control module		E
FAIL-SAFE • Mode 2 NOTE: For fail-sa	ife mode, refer to STC-125, "DIRECT ADA	APTIVE STEERING : Fail-safe".	F
DTC CON	FIRMATION PROCEDURE		
1.PRECO	NDITIONING		STO
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pr t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and est.	Н
>> 2.dtc re	PRODUCTION PROCEDURE		I
With CO Start th CAUTIC Never	NSULT e engine. ON: drive the vehicle.		J
<ol> <li>Turn th</li> <li>Perforn</li> </ol>	e steering wheel from full left stop to full riç n self-diagnosis for "EPS/DAST 3".	ght stop.	K
Is DTC "C1	3D5-00" detected?		1.
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION E	STC-373, "EPS/DAST 3 : Diagnosis Procedure". Dair: Refer to <u>GI-45, "Intermittent Incident"</u> . SND	L
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356806	
1.PERFOR	RM SELF-DIAGNOSIS		M
With CO 1. Turn th 2. Erase s	<b>NSULT</b> e ignition switch ON. self-diagnosis for "EPS/DAST 3".		Ν
<ol> <li>Turn th</li> <li>Start th</li> <li>CAUTION</li> </ol>	e ignition switch OFF and wait for at least e engine. ON:	10 seconds.	0
5. Perforn	n self-diagnosis for "EPS/DAST 3".		
Is DTC "C1	3D5-00" detected?		Ρ
YES >> NO >>	<ul> <li>Replace steering force control module. Re</li> <li>Check enlarged contact spring of termir</li> <li>Perform intermittent incident while turning</li> </ul>	efer to <u>STC-492, "Removal and Installation"</u> . nal. Refer to <u>GI-42, "How to Check Terminal"</u> . ng steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	
DAST 1			

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### < DTC/CIRCUIT DIAGNOSIS >

## DAST 1 : DTC Description

INFOID:000000013356807

[DIRECT ADAPTIVE STEERING]

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D5-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

### POSSIBLE CAUSE

• Steering angle main control module

### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Turn the steering wheel from full left stop to full right stop.
- 3. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D5-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-374, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 1 : Diagnosis Procedure

INFOID:000000013356808

## **1.**PERFORM SELF-DIAGNOSIS

### () With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

## Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D5-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

### DAST 2

NO

DAST 2 : DTC Description

DTC DETECTION LOGIC

### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display item	Malfunction detected condition
C13D5-00	CONTROL MODULE	The internal malfunction in control module is detected.
POSSIBI F		
<ul> <li>Steering a</li> </ul>	ngle sub control module	
FAIL-SAFE • Mode 2 NOTE: For fail-sa	fe mode, refer to STC-125, "DIRECT ADA	PTIVE STEERING : Fail-safe".
DTC CONF		
1.PRECOM	NDITIONING	
If "DTC CO	NFIRMATION PROCEDURE" has been pre	eviously conducted, always turn ignition switch OFF and
wait at least	10 seconds before conducting the next te	st.
>>	GO TO 2.	
2.DTC REI	PRODUCTION PROCEDURE	
With CO	NSULT	
1. Start the	e engine.	
Never	Irive the vehicle.	
<ol> <li>I urn the</li> <li>Perform</li> </ol>	e steering wheel from full left stop to full rig a self-diagnosis for "DAST 2".	int stop.
Is DTC "C13	BD5-00" detected?	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION E	<u>STC-375, "DAST 2 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 2 :	Diagnosis Procedure	INFOID:000000013356810
1.PERFOR	M SELE-DIAGNOSIS	
With CO	NSULT	
1. Turn the	e ignition switch ON.	
<ol> <li>Erase s</li> <li>Turn the</li> </ol>	elf-diagnosis for "DAST 2". e ignition switch OFF and wait for at least 1	10 seconds.
4. Start the	e engine.	
Never of	Irive the vehicle.	
5. Perform	self-diagnosis for "DAST 2".	
Is DTC "C1	3D5-00" detected?	a Pofer to STC 404 "Permavel and Installation"
NO >>	<ul> <li>Check enlarged contact spring of termin</li> <li>Perform intermittent incident while turnin</li> </ul>	al. Refer to <u>GI-42, "How to Check Terminal"</u> . ag steering wheel. Refer to <u>GI-45, "Intermittent In</u> cident".

Ρ

## C13D6-00 CONTROL MODULE EPS/DAST 3

## **EPS/DAST 3 : DTC Description**

INFOID:000000013356811

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D6-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>The malfunction in each motor angle sensor is detected.</li></ul>

### POSSIBLE CAUSE

- Force motor angle sensor
- Sensor circuit (between steering force control module and force motor angle sensor) is open or short.
- Steering force control module

### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

- Start the engine.
   CAUTION:
- Never drive the vehicle.
- 2. Perform self-diagnosis for "EPS/DAST 3".
- Is DTC "C13D6-00" detected?
- YES >> Proceed to diagnosis procedure. Refer to STC-376, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356812

## **1.**CHECK THE ANGLE SENSOR

Check the force motor angle sensor. Refer to STC-377, "EPS/DAST 3 : Component Inspection".

### Is the inspection result normal?

YES >> GO TO 2.

NO >> Force motor angle sensor is malfunction. Replace steering column assembly. Refer to <u>ST-135,</u> <u>"Removal and Installation"</u>.

## 2.CHECK THE SENSOR CIRCUIT

- 1. Disconnect steering force control module and force motor angle sensor harness connector.
- 2. Check the continuity between control module harness connector and angle sensor harness connector.

## < DTC/CIRCUIT DIAGNOSIS >

Steering force control module Force		Force motor	angle sensor	nsor	
Connector	Terminal	Connector		Terminal	Continuity
	10			1	
	11		5 4		
N/71	6	N			Evicted
1017-1	5	- IV	13	8	Existed
	4		2		
	2			6	
3. Check the continu	uity between control n	nodule harn	ess connec	ctor and ground.	
Steering	g force control module				
Connector	Termir	nal		_	Continuity
	10				
	11				
<b></b>	6				<b>N C C C</b>
M71	5			Ground	Not existed
	4				
	2				
Is the inspection result         YES       >> Replace s         NO       >> Repair or         EPS/DAST 3 : Co         1.CHECK THE ANG         1. Turn the ignition s         2. Disconnect force         3. Check continuity	it normal? steering force control replace error-detecte Omponent Inspec LE SENSOR switch OFF. motor angle sensor h between motor angle	module. Re ed part. ction arness con sensor con	fer to <u>STC-</u> nector. nector term	492, "Removal ar	nd Installation".
	Force motor angle o	ensor			
	Terminal				Continuity
1			2		Not existed
1			4		Not existed
1			5		Existed
1			6		Not existed
1			8		Not existed
2			4		Not existed
2			5		Not existed
2			6		Existed

4

5

Not existed

### < DTC/CIRCUIT DIAGNOSIS >

Force motor	angle sensor	Continuity
Teri	ninal	Continuity
4	6	Not existed
4	8	Existed
5	6	Not existed
5	8	Not existed
6	8	Not existed

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Force motor angle sensor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> "Removal and Installation".

## DAST 1

## DAST 1 : DTC Description

INFOID:000000013356814

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D6-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>The malfunction in each motor angle sensor is detected.</li></ul>

### POSSIBLE CAUSE

- Main motor angle sensor
- Sensor circuit (between steering angle main control module and main motor angle sensor) is open or short.
- Steering angle main control module

### FAIL-SAFE

Mode 1 or Mode 3

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. CAUTION:
- Never drive the vehicle.
- Perform self-diagnosis for "DAST 1".

### Is DTC "C13D6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-378, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45. "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### DAST 1 : Diagnosis Procedure

INFOID:000000013356815

**1.**CHECK THE ANGLE SENSOR

Check the main motor angle sensor. Refer to <u>STC-379, "DAST 1 : Component Inspection"</u>. <u>Is the inspection result normal?</u>

## STC-378

< DTC/CIRCUIT DIAGNOSIS >

В

- YES >> GO TO 2.
- NO >> Main motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, A <u>"Removal and Installation"</u>.

## 2. CHECK THE SENSOR CIRCUIT

### 1. Disconnect steering angle main control module and main motor angle sensor harness connector.

2. Check the continuity between control module harness connector and angle sensor harness connector.

Steering angle mai	n control module	Main motor a	ngle sensor	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	10		3		
	11	E02	6		
F.00	6		1	- Eviated	
E20	5	E93	5	Existed	
	4		2		
	2		4		

3. Check the continuity between control module harness connector and ground.

Steering angle m	ain control module		Continuity	етс
Connector	Terminal		Continuity	310
	10			
	11	-		Н
500	6	Ground	Not evicted	
E20	5	- Ground	NOL EXISTED	
	4	-		
	2			
Is the inspection result norr YES >> GO TO 3.	nal?			J
3.CHECK INTERMITTEN	ce error-detected part. T INCIDENT			K
<ol> <li>Check enlarged contact</li> <li>Perform intermittent ind</li> <li>Is the inspection result norm</li> <li>YES &gt;&gt; Replace steering</li> <li>NO &gt;&gt; Repair or replace</li> </ol>	et spring of terminal. Refer t cident while turning steering <u>mal?</u> ng angle main control modu ice error-detected part.	o <u>GI-42, "How to Check Terr</u> g wheel. Refer to <u>GI-45, "Inte</u> ule. Refer to <u>STC-493, "Rem</u>	minal". ermittent Incident". noval and Installation".	L
DAST 1 : Component	t Inspection		INFOID:000000013356816	IVI
1.CHECK THE ANGLE SI	ENSOR			Ν
<ol> <li>Turn the ignition switch</li> <li>Disconnect main motor</li> <li>Check continuity between</li> </ol>	n OFF. r angle sensor harness con een motor angle sensor con	nector. nector terminals.		0
	Main motor angle sensor			

Continuity	angle sensor	Main motor
Continuity	Terminal	
Not existed	2	1
Not existed	3	1
Not existed	4	1
Existed	5	1
Not existed	6	1

### < DTC/CIRCUIT DIAGNOSIS >

Main motor	angle sensor	Continuity
Ter	ninal	Continuity
2	3	Not existed
2	4	Existed
2	5	Not existed
2	6	Not existed
3	4	Not existed
3	5	Not existed
3	6	Existed
4	5	Not existed
4	6	Not existed
5	6	Not existed

#### Is the inspection result normal?

#### YES >> INSPECTION END

NO >> Main motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146</u>, <u>"Removal and Installation"</u>.

## DAST 2

### DAST 2 : DTC Description

INFOID:000000013356817

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D6-00	CONTROL MODULE (Control module)	<ul><li>The internal malfunction in control module is detected.</li><li>The malfunction in each motor angle sensor is detected.</li></ul>

### POSSIBLE CAUSE

- Sub motor angle sensor
- Sensor circuit (between steering angle sub control module and sub motor angle sensor) is open or short.
- Steering angle sub control module

### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine.
  - CAUTION:

### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 2".

### Is DTC "C13D6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-381, "DAST 2 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## STC-380

### < DTC/CIRCUIT DIAGNOSIS >

DAST 2 : Diagnosis Procedure

### [DIRECT ADAPTIVE STEERING]

INFOID:000000013356818

#### А **1.**CHECK THE ANGLE SENSOR Check the sub motor angle sensor. Refer to STC-381, "DAST 2 : Component Inspection". В Is the inspection result normal? >> GO TO 2. YES >> Sub motor angle sensor is malfunction. Replace steering gear assembly. Refer to ST-146, NO "Removal and Installation". 2. CHECK THE SENSOR CIRCUIT 1. Disconnect steering angle sub control module and sub motor angle sensor harness connector. D 2. Check the continuity between control module harness connector and angle sensor harness connector. Steering angle sub control module Sub motor angle sensor Ε Continuity Connector Terminal Connector Terminal 10 3 F 6 11 6 1 E29 E94 Existed 5 5 STC 4 2 2 4 Check the continuity between control module harness connector and ground. Н 3. Steering angle sub control module Continuity Connector Terminal 10 11 6 E29 Ground Not existed 5 4 Κ 2 Is the inspection result normal? >> GO TO 3. YES NO >> Repair or replace error-detected part. ${\it 3.}$ CHECK INTERMITTENT INCIDENT M Check enlarged contact spring of terminal. Refer to GI-42. "How to Check Terminal". 1. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". 2. Is the inspection result normal? Ν >> Replace steering angle sub control module. Refer to STC-494. "Removal and Installation". YES >> Repair or replace error-detected part. NO C DAST 2 : Component Inspection INFOID:000000013356819 **1.**CHECK THE ANGLE SENSOR P 1. Turn the ignition switch OFF. Disconnect sub motor angle sensor harness connector. 2. Check continuity between motor angle sensor connector terminals. 3.

### < DTC/CIRCUIT DIAGNOSIS >

Sub motor a	ngle sensor	Continuity
Term	ninal	Continuity
1	2	Not existed
1	3	Not existed
1	4	Not existed
1	5	Existed
1	6	Not existed
2	3	Not existed
2	4	Existed
2	5	Not existed
2	6	Not existed
3	4	Not existed
3	5	Not existed
3	6	Existed
4	5	Not existed
4	6	Not existed
5	6	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Sub motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## C13D7-00 CONTROL MODULE EPS/DAST 3

## EPS/DAST 3 : DTC Description

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	С
C13D7-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	D
POSSIBLE <ul> <li>Steering for</li> </ul>	CAUSE prce control module		F
FAIL-SAFE • Mode 2 NOTE:			F
For fail-sa	te mode, refer to <u>STC-125, "DIRECT ADAI</u>	PTIVE STEERING : Fail-safe".	
			STO
			310
wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next tes	eviously conducted, always turn ignition switch OFF and st.	Н
>> <b>2.</b> dtc re	GO TO 2. PRODUCTION PROCEDURE		I
With CO 1. Start the CAUTION	NSULT e engine. DN:		J
Never of 2. Perform Is DTC "C1"	drive the vehicle. a self-diagnosis for "EPS/DAST 3". 3D7-00" detected?		K
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before repar Confirmation after repair: INSPECTION EN	STC-383, "EPS/DAST 3 : Diagnosis Procedure". air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	L
EPS/DAS	GT 3 : Diagnosis Procedure	INFOID:000000013356821	
<b>1.</b> PERFOF	RM SELF-DIAGNOSIS		M
With CO 1. Turn the 2. Erase s 3. Turn the	<b>NSULT</b> e ignition switch ON. elf-diagnosis for "EPS/DAST 3". e ignition switch OFF and wait for at least 1	0 seconds.	Ν
4. Start the CAUTIC Never of	b engine. DN: drive the vehicle.		0
5. Perform	a self-diagnosis for "EPS/DAST 3".		-
YES >> NO >>	<ul> <li>Replace steering force control module. Re</li> <li>Check enlarged contact spring of termina</li> <li>Perform intermittent incident while turning</li> </ul>	fer to <u>STC-492, "Removal and Installation"</u> . al. Refer to <u>GI-42, "How to Check Terminal"</u> . g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	Р
DAST 1		· · · · · · · · · · · · · · · · · · ·	

A

В

### < DTC/CIRCUIT DIAGNOSIS >

## DAST 1 : DTC Description

INFOID:000000013356822

[DIRECT ADAPTIVE STEERING]

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D7-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

### POSSIBLE CAUSE

• Steering angle main control module

### FAIL-SAFE

Mode 1 or Mode 3
 NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D7-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-384, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356823

## **1.**PERFORM SELF-DIAGNOSIS

### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.

### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D7-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493. "Removal and Installation".
- NO >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
  - Perform intermittent incident while turning steering wheel. Refer to GI-45. "Intermittent Incident".

## DAST 2

DAST 2 : DTC Description

DTC DETECTION LOGIC

### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D7-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.
POSSIBLE	CAUSE	
FAIL-SAFE		
<ul> <li>Mode 2</li> <li>NOTE: For fail-sa</li> </ul>	fe mode, refer to <u>STC-125, "DIRECT AD</u>	DAPTIVE STEERING : Fail-safe".
	FIRMATION PROCEDURE	
1.PRECON	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been p t 10 seconds before conducting the next	previously conducted, always turn ignition switch OFF and test.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
<ul> <li>With COI</li> <li>Start the CAUTION</li> <li>CAUTION</li> <li>Never of 2.</li> </ul>	<b>NSULT</b> e engine. <b>ON:</b> d <b>rive the vehicle.</b> n self-diagnosis for "DAST 2".	
<u>Is DTC "C1:</u> YES >> NO-1 >> NO-2 >>	<u>3D7-00" detected?</u> Proceed to diagnosis procedure. Refer To check malfunction symptom before re Confirmation after repair: INSPECTION	to <u>STC-385, "DAST 2 : Diagnosis Procedure"</u> . epair: Refer to <u>GI-45, "Intermittent Incident"</u> . END
DAST 2 :	Diagnosis Procedure	INFOID:000000013356825
<b>1.</b> PERFOF	RM SELF-DIAGNOSIS	
With CO Turn the Erase s Turn the Start the	<b>NSULT</b> e ignition switch ON. self-diagnosis for "DAST 2". e ignition switch OFF and wait for at leas e engine	st 10 seconds.
CAUTION Never	ongine. ON: drive the vehicle.	
5. Perform Is DTC "C1:	n self-diagnosis for "DAST 2". 3D7-00" detected?	
YES >> NO >>	<ul> <li>Replace steering angle sub control mod</li> <li>Check enlarged contact spring of term</li> </ul>	Jule. Refer to <u>STC-494, "Removal and Installation"</u> . ninal. Refer to <u>GI-42, "How to Check Terminal"</u> .
	Perform intermittent incident while turn	ning steering wheel. Refer to <u>GI-45. "Intermittent Incident"</u> .

## C13D8-00 CONTROL MODULE EPS/DAST 3

## EPS/DAST 3 : DTC Description

INFOID:000000013356826

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D8-00	CONTROL MODULE (Control module)	The malfunction in each motor angle sensor is detected.

### POSSIBLE CAUSE

- Force motor angle sensor
- Sensor circuit (between steering force control module and force motor angle sensor) is open or short.
- Steering force control module

### DTC CONFIRMATION PROCEDURE

### **1.**DTC REPRODUCTION PROCEDURE

### () With CONSULT

- Turn the ignition switch OFF and wait for at least 10 seconds.
- 2. Start the engine. CAUTION:

### Never drive the vehicle.

3. Perform self-diagnosis for "EPS/DAST 3".

### Is DTC "C13D8-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-386, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.

NO-2 >> Confirmation after repair: INSPECTION END

### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356827

## **1.**CHECK THE ANGLE SENSOR

Check the force motor angle sensor. Refer to <u>STC-387, "EPS/DAST 3 : Component Inspection"</u>.

### Is the inspection result normal?

YES >> GO TO 2.

NO >> Force motor angle sensor is malfunction. Replace steering column assembly. Refer to <u>ST-135</u>, <u>"Removal and Installation"</u>.

## 2. CHECK THE SENSOR CIRCUIT

- 1. Disconnect steering force control module and force motor angle sensor harness connector.
- 2. Check the continuity between control module harness connector and angle sensor harness connector.

Steering force	control module	Force motor	angle sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	10		1	
	11		5	
N/74	6	M72	4	Eviated
IVI7 I	5	- W175	8	Existed
	4		2	
	2		6	

3. Check the continuity between control module harness connector and ground.

### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Steering force	control module		Continuity
Connector	Terminal		Continuity
	10		
	11	-	
171	6	Ground	Not ovisted
	5	Ground	NOT EXISTED
	4		
	2		
Is the inspection result nor	mal?		
3.CHECK INTERMITTEN	T INCIDENT		
<ol> <li>Check enlarged contact</li> <li>Perform intermittent in</li> <li>Is the inspection result norm</li> </ol>	ct spring of terminal. Refer t cident while turning steering <u>mal?</u>	o <u>GI-42, "How to Check Terr</u> wheel. Refer to <u>GI-45, "Inte</u>	<u>minal"</u> . ermittent Incident".
YES >> Replace steeri NO >> Repair or repla	ng force control module. Re ace error-detected part.	fer to <u>STC-492, "Removal a</u>	nd Installation".
EPS/DAST 3 : Comp	onent Inspection		INFOID:000000013356828
<b>1.</b> CHECK THE ANGLE S	ENSOR		
1. Turn the ignition switch	n OFF.		
<ol><li>Disconnect force moto</li></ol>	r angle sensor harness con	nector.	

3. Check continuity between motor angle sensor connector terminals.

J	Continuity	otor angle sensor	Force moto
	Continuity	Terminal	Те
	Not existed	2	1
k	Not existed	4	1
	Existed	5	1
	Not existed	6	1
	Not existed	8	1
	Not existed	4	2
N	Not existed	5	2
	Existed	6	2
h	Not existed	8	2
	Not existed	5	4
	Not existed	6	4
C	Existed	8	4
	Not existed	6	5
	Not existed	8	5
F	Not existed	8	6

Is the inspection result normal?

YES >> INSPECTION END

NO >> Force motor angle sensor is malfunction. Replace steering column assembly. Refer to <u>ST-135.</u> <u>"Removal and Installation"</u>.

DAST 1

### < DTC/CIRCUIT DIAGNOSIS >

## DAST 1 : DTC Description

INFOID:000000013356829

[DIRECT ADAPTIVE STEERING]

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D8-00	CONTROL MODULE (Control module)	The malfunction in each motor angle sensor is detected.

### POSSIBLE CAUSE

- Main motor angle sensor
- Sensor circuit (between steering angle main control module and main motor angle sensor) is open or short.
- Steering angle main control module

### DTC CONFIRMATION PROCEDURE

## **1.**DTC REPRODUCTION PROCEDURE

### With CONSULT

- Turn the ignition switch OFF and wait for at least 10 seconds.
- 2. Start the engine.

### CAUTION:

### Never drive the vehicle.

3. Perform self-diagnosis for "DAST 1".

### Is DTC "C13D8-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-388, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356830

## **1.**CHECK THE ANGLE SENSOR

Check the main motor angle sensor. Refer to STC-389, "DAST 1 : Component Inspection".

### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Main motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## 2.CHECK THE SENSOR CIRCUIT

1. Disconnect steering angle main control module and main motor angle sensor harness connector.

2. Check the continuity between control module harness connector and angle sensor harness connector.

Steering angle m	ain control module	Main motor angle sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	10	E93 3 3 6 1 5	3	
	11		6	
E26	6		Evistod	
E20	5		5	LAISted
	4		2	
	2		4	

3. Check the continuity between control module harness connector and ground.

### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Steering angle ma	ain control module	Continuity	Continuity	А
Connector	Terminal		Continuity	
	10			
	11	-		В
FOC	6	Ground	Not evicted	
E20	5	- Grouna	NOT EXISTED	С
	4	-		
	2	-		
Is the inspection result norr	nal?	-	· · · · · · · · · · · · · · · · · · ·	D
YES >> GO TO 3.	ce error-detected part			
3.CHECK INTERMITTEN	T INCIDENT			E
<ol> <li>Check enlarged contact</li> <li>Perform intermittent ind</li> </ol>	t spring of terminal. Refer t cident while turning steering	o <u>GI-42, "How to Check Ter</u> g wheel. Refer to <u>GI-45, "Inte</u>	minal". ermittent Incident".	F
Is the inspection result norr	nal?			
YES >> Replace steerin NO >> Repair or repla	ng angle main control modu ce error-detected part.	ule. Refer to <u>STC-493, "Rem</u>	oval and Installation".	ST
DAST 1 : Component	Inspection		INFOID:000000013356831	
1. CHECK THE ANGLE SE	ENSOR			ŀ
1. Turn the ignition switch	OFF.			
<ol> <li>Disconnect main motor</li> <li>Check continuity between</li> </ol>	angle sensor harness con en motor angle sensor cor	nector. inector terminals.		I

Main motor angle sensor		Continuity	
Ter	minal	Continuity	
1	2	Not existed	
1	3	Not existed	K
1	4	Not existed	
1	5	Existed	
1	6	Not existed	
2	3	Not existed	
2	4	Existed	M
2	5	Not existed	
2	6	Not existed	N
3	4	Not existed	IN
3	5	Not existed	
3	6	Existed	0
4	5	Not existed	
4	6	Not existed	
5	6	Not existed	P

Is the inspection result normal?

YES >> INSPECTION END

NO >> Main motor angle sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146.</u> <u>"Removal and Installation"</u>.

## C13D9-00 CONTROL MODULE EPS/DAST 3

## EPS/DAST 3 : DTC Description

#### INFOID:000000013356832

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13D9-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	
POSSIBLE <ul> <li>Steering for</li> </ul>	CAUSE prce control module		
DTC CONF	FIRMATION PROCEDURE		
1.DTC REI	PRODUCTION PROCEDURE		
With COI 1. Turn the Start the CAUTIC Never C 2. Perform	<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF and wait for at least 10 seconds. Start the engine.</li> <li>CAUTION: Never drive the vehicle.</li> <li>Perform self-diagnosis for "EPS/DAST 3"</li> </ul>		
Is DTC "C13	3D9-00" detected?		
YES >> NO-1 >>	Proceed to diagnosis procedure. Refer to <u>s</u> To check malfunction symptom before repa	STC-390, "EPS/DAST 3 : Diagnosis Procedure". air: Refer to <u>GI-45, "Intermittent Incident"</u> .	

NO-2 >> Confirmation after repair: INSPECTION END

## EPS/DAST 3 : Diagnosis Procedure

## **1.**PERFORM SELF-DIAGNOSIS

### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

### Never drive the vehicle.

5. Perform self-diagnosis for "EPS/DAST 3".

### Is DTC "C13D9-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

## DAST 1

NO

## DAST 1 : DTC Description

#### INFOID:000000013356834

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13D9-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.

POSSIBLE CAUSE

• Steering angle main control module

## 

C13D9-00 CONTROL MODULE	
< DTC/CIRCUIT DIAGNOSIS > [DIRECT ADAPTIVE STEEF	{ING]
	Λ
1.DTC REPRODUCTION PROCEDURE	A
<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF and wait for at least 10 seconds.</li> <li>Start the engine. CAUTION: Never drive the vehicle.</li> </ul>	В
3. Perform self-diagnosis for "DAST 1".	С
Is DTC "C13D9-00" detected?YES>> Proceed to diagnosis procedure. Refer to STC-391, "DAST 1 : Diagnosis Procedure".NO-1>> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".NO-2>> Confirmation after repair: INSPECTION END	D
DAST 1 : Diagnosis Procedure	)0013356835
1.PERFORM SELF-DIAGNOSIS	
With CONSULT     Turn the ignition switch ON	F
<ol> <li>Erase self-diagnosis for "DAST 1".</li> <li>Turn the ignition switch OFF and wait for at least 10 seconds.</li> <li>Start the engine. CAUTION:</li> </ol>	STC
5. Perform self-diagnosis for "DAST 1".	Н
Is DTC "C13D9-00" detected?	
<ul> <li>YES &gt;&gt; Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>, NO</li> <li>&gt;&gt; • Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.</li> <li>• Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Inc</u></li> </ul>	ident"
	J
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## C13DB-00 STEERING TORQUE SENSOR DAST 1

DAST 1 : DTC Description

INFOID:000000013356836

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13DB-00	STEERING TORQUE SENSOR (Steering torque sensor)	<ul> <li>The signal voltage of steering torque sensor is following condition for 1 second or more continuously.</li> <li>Main signal voltage &lt; 0.3 V, 4.7 V &lt; Main signal voltage</li> <li>Sub signal voltage &lt; 0.3 V, 4.7 V &lt; Sub signal voltage</li> </ul>

### POSSIBLE CAUSE

- Steering torque sensor
- Sensor circuit (between steering angle main control module and steering torque sensor) is open or short.
- Steering angle main control module

### FAIL-SAFE

- Mode 3 (When control module detects a malfunction at startup.)
- Mode 2 (When control module detects a malfunction except during startup.)
   NOTE:

For details of fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. Start the engine. **NOTE:** 
  - Never drive the vehicle.
- 2. Turn the steering wheel.
- 3. Perform self-diagnosis for "DAST 1".

### Is DTC "C13DB-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-392, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356837

### 1.CHECK TORQUE SENSOR POWER SUPPLY CIRCUIT

### With CONSULT

- 1. Turn the ignition switch ON.
- 2. On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "TORQUE SEN VOLTAGE".
- 3. Check the value

Monitor item	Standard value (Approx.)
TORQUE SEN VOLTAGE	4.5 – 5.5 V

Is the inspection result normal?

YES >> GO TO 2.

## C13DB-00 STEERING TORQUE SENSOR

[DIRECT ADAPTIVE STEERING]

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### < DTC/CIRCUIT DIAGNOSIS >

NO >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram - BATTERY POWER SUPPLY -"</u>.

## 2. CHECK TORQUE SENSOR GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering angle main control module			Continuity	С
Connector	Terminal	Continuity		
E26	32	Ground	Existed	Г

#### Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK TORQUE SENSOR SIGNAL

#### (B)With CONSULT

- 1. Connect steering angle main control module harness connector.
- 2. Start the engine.
  - CAUTION:

## Never drive the vehicle.

- On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "TORQUE SEN MAIN 2", and "TORQUE SEN SUB".
- Check the value

Monitor item	Condition	Standard value (Approx.)	
	Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V	I
TORQUE SEN MAIN 2	Steering wheel: Right turn	Approx. 1.4 - 2.5 V	
	Steering wheel: Left turn	Approx. 2.5 - 3.6 V	
	Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V	0
TORQUE SEN SUB	Steering wheel: Right turn	Approx. 1.4 - 2.5 V	K
	Steering wheel: Left turn	Approx. 2.5 - 3.6 V	

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

### 4.CHECK TORQUE SENSOR CIRCUIT

#### 1. Turn the ignition switch OFF.

2. Disconnect steering angle main control module harness connector.

3. Disconnect steering torque sensor harness connector.

Check the continuity between steering angle main control module harness connector and steering torque
 N sensor harness connector.

Steering angle m	ain control module	Steering torque sensor		Steering torque sensor		Continuity	
Connector	Terminal	Connector	Terminal	Continuity			
E26	8	2			2		
	1	EQ5	4	- Eviated	P		
	3	E95	3	Existed			
	7		1				

5. Check the continuity between control module harness connector and ground.

## C13DB-00 STEERING TORQUE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

Steering angle main control module			Continuity
Connector	Terminal		Continuity
E26	8	Ground Not ex	Not eviated
	1		
	3		NUL EXISTED
	7		

Is the inspection result normal?

YES >> Torque sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146, "Removal and</u> <u>Installation"</u>.

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

5. CHECK INTERMITTENT INCIDENT

1. Turn the ignition switch OFF.

2. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

3. Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".

NO >> Repair or replace error-detected part.

## < DTC/CIRCUIT DIAGNOSIS > C13DC-00 STEERING TORQUE SENSOR DAST 1

## DAST 1 : DTC Description

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INFOID:000000013356838

## DTC DETECTION LOGIC

	Display item	
DTC	(Trouble diagnosis content)	Malfunction detected condition
C13DC-00	STEERING TORQUE SENSOR (Steering torque sensor)	<ul> <li>The signal voltage of steering torque sensor is following condition for 1 second or more continuously.</li> <li>Main signal voltage + Sub signal voltage &lt; 4.75 V</li> <li>5.25 V &lt; Main signal voltage + Sub signal voltage</li> </ul>
POSSIBLE	CAUSE	
<ul> <li>Steering to</li> <li>Sensor cire</li> <li>Steering a</li> </ul>	orque sensor cuit (between steering angle main control i ingle main control module	module and steering torque sensor) is open or short.
FAIL-SAFE		
<ul> <li>Mode 3 (V</li> <li>Mode 2 (V</li> <li>NOTE:</li> </ul>	Vhen control module detects a malfunction Vhen control module detects a malfunction	at startup.) except during startup.)
For details	s of fail-safe mode, refer to <u>STC-125. "DIRI</u>	ECT ADAPTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.
>>	GO TO 2.	
2.dtc re	PRODUCTION PROCEDURE	
With CO 1. Start the NOTE:	NSULT e engine.	
Never of 2. Turn the 3. Perform	Irive the vehicle. e steering wheel. n self-diagnosis for "DAST 1".	
<u>Is DTC "C13</u> YES >> NO-1 >> NO-2 >>	<u>3DC-00" detected?</u> Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION EI	<u>STC-395, "DAST 1 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 1 :	Diagnosis Procedure	INFCID:000000013356839
1.снеск	TORQUE SENSOR POWER SUPPLY CIR	CUIT
With CO 1. Turn the 2. On the 3. Check t	<b>NSULT</b> e ignition switch ON. CONSULT screen, select "DAST 1" >> "DA he value	ATA MONITOR" >> "TORQUE SEN VOLTAGE".
	Monitor item	Standard value (Approx.)
TORQUE SE	N VOLTAGE	4.5 – 5.5 V

Is the inspection result normal?

YES >> GO TO 2.

## C13DC-00 STEERING TORQUE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

NO >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram - BATTERY POWER SUPPLY -"</u>.

## 2. CHECK TORQUE SENSOR GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module harness connector.

3. Check the continuity between control module harness connector and ground.

Steering angle main control module			Continuity	
Connector	Terminal		Continuity	
E26	32	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.

3.CHECK TORQUE SENSOR SIGNAL

#### (B) With CONSULT

- 1. Connect steering angle main control module harness connector.
- 2. Start the engine.

## CAUTION:

- Never drive the vehicle.
- 3. On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "TORQUE SEN MAIN 2", and "TORQUE SEN SUB".
- Check the value

Monitor item	Condition	Standard value (Approx.)	
	Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V	
TORQUE SEN MAIN 2	Steering wheel: Right turn	Approx. 1.4 - 2.5 V	
	Steering wheel: Left turn	Approx. 2.5 - 3.6 V	
	Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V	
TORQUE SEN SUB	Steering wheel: Right turn	Approx. 1.4 - 2.5 V	
	Steering wheel: Left turn	Approx. 2.5 - 3.6 V	

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

## **4.**CHECK TORQUE SENSOR CIRCUIT

### 1. Turn the ignition switch OFF.

2. Disconnect steering angle main control module harness connector.

3. Disconnect steering torque sensor harness connector.

4. Check the continuity between steering angle main control module harness connector and steering torque sensor harness connector.

Steering angle main control module		Steering torque sensor		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E26	8	- E95	2	- Existed	
	1		4		
	3		3		
	7		1		

5. Check the continuity between steering torque sensor connector terminals.
## C13DC-00 STEERING TORQUE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

3 Check the continuity bet	Townsings		Continuity
3 Check the continuity bet	Terminal   Ochanital     3   4   Not existed		
Check the continuity het			Not existed
Check the continuity bei	tween control module ha	arness connector and ground	d.
Steering angle mai	in control module		Operationsity
Connector	Terminal		Continuity
	8		
E26	1	Ground	Not existed
_	3		
	7		
Turn the ignition switch Check enlarged contact Perform intermittent inci <u>e inspection result norm</u> S >> Replace steering > >> Repair or replace	OFF. spring of terminal. Refe dent while turning steeri <u>al?</u> g angle main control mo e error-detected part.	r to <u>GI-42, "How to Check Te</u> ng wheel. Refer to <u>GI-45, "Ir</u> dule. Refer to <u>STC-493, "Re</u>	erminal". htermittent Incident". emoval and Installation".

# C13DD-00 STEERING TORQUE SENSOR DAST 1

DAST 1 : DTC Description

INFOID:000000013356840

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13DD-00	STEERING TORQUE SENSOR (Steering torque sensor)	<ul> <li>The power supply voltage of steering torque sensor is following condition for 1 second or more continuously.</li> <li>Power supply voltage &lt; 4.5 V, 5.5 V &lt; Power supply voltage</li> </ul>

### POSSIBLE CAUSE

- Steering torque sensor
- Sensor circuit (between steering angle main control module and steering torque sensor) is open, short or ground short.
- Steering angle main control module

#### FAIL-SAFE

- Mode 3 (When control module detects a malfunction at startup.)
- Mode 2 (When control module detects a malfunction except during startup.) NOTE:

For details of fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

#### (B) With CONSULT

- 1. Start the engine. **NOTE:** 
  - Never drive the vehicle.
- 2. Turn the steering wheel.
- 3. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13DD-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-398, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# DAST 1 : Diagnosis Procedure

INFOID:000000013356841

## 1.CHECK TORQUE SENSOR POWER SUPPLY CIRCUIT

#### (B) With CONSULT

- 1. Turn the ignition switch ON.
- 2. On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "TORQUE SEN VOLTAGE".
- 3. Check the value

Monitor item	Standard value (Approx.)
TORQUE SEN VOLTAGE	4.5 – 5.5 V

Is the inspection result normal?

YES >> GO TO 2.

# C13DD-00 STEERING TORQUE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram - BATTERY POWER SUPPLY -"</u>.

# 2. CHECK TORQUE SENSOR GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering angle main control module			Continuity	С
Connector	Terminal		Continuity	
E26	32	Ground	Existed	Г

#### Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK TORQUE SENSOR SIGNAL

#### With CONSULT

- 1. Connect steering angle main control module harness connector.
- 2. Start the engine.
  - CAUTION:

## Never drive the vehicle.

- On the CONSULT screen, select "DAST 2" >> "DATA MONITOR" >> "TORQUE SEN MAIN 2", and "TORQUE SEN SUB".
- Check the value

Monitor item	Condition	Standard value (Approx.)	
	Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V	
TORQUE SEN MAIN 2	Steering wheel: Right turn	Approx. 1.4 - 2.5 V	
	Steering wheel: Left turn	Approx. 2.5 - 3.6 V	
	Steering wheel: Not steering (There is no steering force)	Approx. 2.5 V	
TORQUE SEN SUB	Steering wheel: Right turn	Approx. 1.4 - 2.5 V	K
	Steering wheel: Left turn	Approx. 2.5 - 3.6 V	

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

### 4.CHECK TORQUE SENSOR CIRCUIT

#### 1. Turn the ignition switch OFF.

2. Disconnect steering angle main control module harness connector.

3. Check the continuity between steering angle main control module harness connector and steering torque sensor harness connector.

Steering angle m	Steering angle main control module		Steering torque sensor		
Connector	Terminal	Connector	Terminal	Continuity	0
	8		2		-
E26 1 3	1	FOF	E05 4	Evictod	Р
	E95	3	Existed		
	7		1		

4. Check the continuity between control module harness connector and ground.

[DIRECT ADAPTIVE STEERING]

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## C13DD-00 STEERING TORQUE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

Steering angle main control module			Continuity	
Connector	Terminal		Continuity	
E26	8	Ground Not o		
	1		Not eviated	
	3		NUL EXISTED	
	7			

Is the inspection result normal?

YES >> Torque sensor is malfunction. Replace steering gear assembly. Refer to <u>ST-146, "Removal and</u> <u>Installation"</u>

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

5. CHECK INTERMITTENT INCIDENT

1. Turn the ignition switch OFF.

2. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.

3. Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

Is the inspection result normal?

YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".

NO >> Repair or replace error-detected part.

# C13DE-00 TEMPERATURE SENSOR EPS/DAST 3

# EPS/DAST 3 : DTC Description

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INFOID:000000013356842

# DTC DETECTION LOGIC

DTC	(Trout	Display item ble diagnosis content)	Malfunction de	etected condition
C13DE-00	TEMPERATURE (Temperature sen	SENSOR sor)	Control module detects that the force motor is in following state • Temperature < -50°C (-58°F,	internal temperature in steering for 1 seconds or more. ), 250°C (482°F) < Temperature
POSSIBLE <ul> <li>Force mot</li> <li>Sensor cir</li> <li>Steering for</li> </ul>	CAUSE for temperature rcuit (between s prce control mo	sensor (included in force m teering force control modul dule	notor angle sensor) e and force motor angle se	nsor) is open or short.
FAIL-SAFE • Protection <b>NOTE:</b> For details <u>tion</u> ".	mode s of protection	functions, refer to <u>STC-128</u>	8, "DIRECT ADAPTIVE ST	EERING : Protection Func-
DTC CONF	FIRMATION P	ROCEDURE		
1.PRECON	NDITIONING			
If "DTC CON wait at least	NFIRMATION P 10 seconds be	ROCEDURE" has been pre fore conducting the next te	eviously conducted, always st.	turn ignition switch OFF and
>>	GO TO 2.			
2.DTC REI	PRODUCTION	PROCEDURE		
With COI Start the CAUTIC Never c C. Turn the C. Derform	NSULT e engine. DN: drive the vehic e steering whee	<b>le.</b>  . for "EDS/DAST 2"		
Is DTC "C1:	3DE-00" detecte	ad?		
YES >> NO-1 >> NO-2 >>	Proceed to diag To check malfu Confirmation a	gnosis procedure. Refer to nction symptom before rep fter repair: INSPECTION E	<u>STC-401, "EPS/DAST 3 : D</u> air: Refer to <u>GI-45, "Intermi</u> ND	Diagnosis Procedure". ttent Incident".
EPS/DAS	ST 3 : Diagno	osis Procedure		INFOID:000000013356843
1.снеск	TEMPERATUR	E SENSOR POWER SUPF	PLY (1)	
<ol> <li>Turn the</li> <li>Disconr</li> <li>Turn the</li> <li>Check t</li> </ol>	e ignition switch nect force motor e ignition switch he voltage betw	OFF. r angle sensor harness con ON. veen force motor angle sen	nector. sor harness connector pin t	erminals.
		Force motor angle sensor		
Co	nnector	Ter	minal	Voltage (Approx.)
	M73	3	7	5 V

Is the inspection result normal?

В

## C13DE-00 TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 6. NO >> GO TO 2.

NO >> GO TO Z.

**2.**CHECK TEMPERATURE SENSOR POWER SUPPLY (2)

Check the voltage between force motor angle sensor harness connector pin terminals.

Force motor angle sensor			
Connector	Terminal		Voltage (Approx.)
Connector	+	-	
M73	3	Ground	5 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

**3.**CHECK TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect steering force control module harness connector.

3. Check the continuity between steering force control module harness connector and force motor angle sensor harness connector.

Steering force control module		Force motor angle sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M71	29	M73	7	Existed

Is the inspection result normal?

YES >> GO TO 7.

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

4.CHECK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect steering force control module harness connector.

3. Check the continuity between steering force control module harness connector and force motor angle sensor harness connector.

Steering force control module		Force motor angle sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M71	31	M73	3	Existed

4. Check the continuity between steering force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	31	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT

Check the power supply circuit for steering force control module. Refer to <u>STC-467, "Diagnosis Procedure"</u>. Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected part.

**O.**CHECK TEMPERATURE SENSOR

Check the force motor temperature sensor. Refer to <u>STC-403</u>, "EPS/DAST 3 : Component Inspection". Is the inspection result normal?

## STC-402

# C13DE-00 TEMPERATURE SENSOR

[DIRECT ADAPTIVE STEERING]

#### YES >> GO TO 7. NO >> Force motor temperature sensor is malfunction. Replace steering column assembly. Refer to ST-А 135, "Removal and Installation". 7. CHECK INTERMITTENT INCIDENT В Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". 1 Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". 2. Is the inspection result normal? YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation". NO >> Repair or replace error-detected part. EPS/DAST 3 : Component Inspection INFOID:000000013356844 D 1.CHECK FORCE MOTOR TEMPERATURE SENSOR Turn the ignition switch OFF. 1. 2. Disconnect force motor angle sensor harness connector. 3. Check resistance between force motor angle sensor connector pin terminals. F Force motor angle sensor Condition Resistance (Approx.) Terminal STC 0°C 34.8 kΩ 3 7 25°C $10.0 \text{ k}\Omega$ 40°C 5.2 kΩ Check continuity between force motor angle sensor connector and ground. 4. Force motor angle sensor Continuity Terminal 3 Not existed Ground 7 Is the inspection result normal? YES >> INSPECTION END Κ >> Force motor temperature sensor is malfunction. Replace steering column assembly. Refer to ST-NO 135, "Removal and Installation". DAST 1 L DAST 1 : DTC Description INFOID:000000013356845 M DTC DETECTION LOGIC Display item DTC Malfunction detected condition (Trouble diagnosis content) Ν Control module detects that the internal temperature in steering TEMPERATURE SENSOR angle main control module is in following state for 1 seconds or C13DE-00 (Temperature sensor) more. C Temperature < -40°C (-40°F), 150°C (302°F) < Temperature</li> POSSIBLE CAUSE Ρ Steering angle main control module FAIL-SAFE Protection mode NOTE: For details of protection functions, refer to STC-128. "DIRECT ADAPTIVE STEERING : Protection Func-

#### DTC CONFIRMATION PROCEDURE

< DTC/CIRCUIT DIAGNOSIS >

tion".

# STC-403

#### < DTC/CIRCUIT DIAGNOSIS >

# 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. Start the engine. CAUTION:
- Never drive the vehicle.
- 2. Turn the steering wheel.
- 3. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13DE-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-404, "DAST 1 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## DAST 1 : Diagnosis Procedure

INFOID:000000013356846

## **1.**CHECK THE TEMPERATURE OF CONTROL MODULE

#### With CONSULT

1. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. On the CONSULT screen, select "DAST 1" >> "DATA MONITOR" >> "C/M TEMPERATURE".
- Wait with the ignition switch OFF until the data monitor indication becomes between -40°C (-40°F) and 150°C (302°F).

Does the temperature become between -40°C (-40°C) and 150°C (302°F)?

YES >> GO TO 2.

NO >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.

## 2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.

## CAUTION:

- Never drive the vehicle.
- 5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13DE-00" detected?

- YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.
- NO >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

# DAST 2

DAST 2 : DTC Description

## DTC DETECTION LOGIC

INFOID:000000013356847

# C13DE-00 TEMPERATURE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

## [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13DE-00	TEMPERATURE SENSOR (Temperature sensor)	Control module detects that the internal temperature in steering angle sub control module is in following state for 1 seconds or more. • Temperature $< -40^{\circ}$ C ( $-40^{\circ}$ E) 150°C (302°E) $<$ Temperature
		= 1000000000000000000000000000000000000
Steering a	CAUSE	
	-	
Protection	mode	
NOTE:	inidae	
For details	s of protection functions, refer to <u>STC-128</u>	3, "DIRECT ADAPTIVE STEERING : Protection Func-
	-IRMATION PROCEDURE	
1.PRECON	NDITIONING	
If "DTC COI	NFIRMATION PROCEDURE" has been pre	eviously conducted, always turn ignition switch OFF and
		51.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
(P)With CO	NSULT	-
1. Start the	e engine.	
	ON: drive the vehicle	
2. Turn the	e steering wheel.	
3. Perform	n self-diagnosis for "DAST 2".	
Is DTC "C1:	3DE-00" detected?	
YES >>	Proceed to diagnosis procedure. Refer to	STC-405, "DAST 2 : Diagnosis Procedure".
NO-1 >> NO-2 >>	To check malfunction symptom before rep Confirmation after repair: INSPECTION FI	air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
102 2 ·	Diagnosis Procedure	
	Diagnosis Flocedure	INFOID:000000013356848
1.снеск	THE TEMPERATURE OF CONTROL MOD	DULE
With CO	NSULT	
1. Start the	e engine.	
Never of	drive the vehicle.	
2. On the	CONSULT screen, select "DAST 2" >> "DA	ATA MONITOR" >> "C/M TEMPERATURE".
3. Wait wi	th the ignition switch OFF until the data m	onitor indication becomes between -40°C (-40°F) and
150°C ( Dece the te	$(302^{\circ}F)$ .	(2) and $(202)$ (202) ( $(202)$ ( $(20$
		<u>) anu 150 ( (502 F) (</u>
NO >>	Replace steering angle sub control module	e. Refer to STC-494. "Removal and Installation".
2 PERFOR	RM SELE-DIAGNOSIS	
1. Turn the	nouli e ignition switch ON.	
2. Erase s	elf-diagnosis for "DAST 2".	
3. Turn the	e ignition switch OFF and wait for at least 1	0 seconds.
4. Start the	e engine.	
Never	drive the vehicle.	
5. Perform	n self-diagnosis for "DAST 2".	

< DTC/CIRCUIT DIAGNOSIS >

Is DTC "C13DE-00" detected?

NO

- YES >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

# C13DF-00 CONTROL MODULE DAST 1

# DAST 1 : DTC Description

# DTC DETECTION LOGIC

			0
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	C
C13DF-00	CONTROL MODULE (Control module)	The internal malfunction in control module is detected.	D
POSSIBLE	CAUSE		
<ul> <li>Steering a</li> </ul>	ingle main control module		Е
FAIL-SAFE			
<ul> <li>Mode 3 (V</li> <li>Mode 2 (V</li> <li>NOTE:</li> </ul>	Vhen control module detects a malfunction Vhen control module detects a malfunction	at startup.) except during startup.)	F
For details	s of fail-safe mode, refer to <u>STC-125, "DIRI</u>	ECT ADAPTIVE STEERING : Fail-safe".	
DTC CONF	FIRMATION PROCEDURE		STC
1.PRECON	NDITIONING		
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next tee	eviously conducted, always turn ignition switch OFF and st.	Н
>>	GO TO 2.		I
<b>Z.</b> DTC RE	PRODUCTION PROCEDURE		
With COl Start the NOTE: Never of	NSULT e engine. Irive the vehicle		J
2. Perform	n self-diagnosis for "DAST 1".		K
Is DTC "C13	3DF-00" detected?		
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before repar- Confirmation after repair: INSPECTION EI	<u>STC-407, "DAST 1 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	L
DAST 1 :	Diagnosis Procedure	INFOID:000000013356850	
1.PERFOF	RM SELF-DIAGNOSIS		Μ
1. Turn the	e ignition switch ON.		Ν
2. Erase s	elf-diagnosis for "DAST 1".		
3. Turn the 4 Start the	e ignition switch OFF and wait for at least 1	U seconds.	$\circ$
NOTE:	c origine.		0
Never of	Irive the vehicle.		
5. Perform	n self-diagnosis for "DAST 1".		Ρ
	Deplace steering angle main control mode	le Defer to STC 402 "Demoval and Installation"	
NO >>	<ul> <li>Check enlarged contact spring of termina</li> <li>Perform intermittent incident while turnin</li> </ul>	al. Refer to <u>GI-42, "How to Check Terminal"</u> . g steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u> .	

А

В

INFOID:000000013356849

# C13E0-00 ST CLUTCH COMMAND CIRCUIT EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356851

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13E0-00	ST CLUTCH COMMAND CIRCUIT (Steering clutch command circuit)	Malfunction current in steering clutch activation circuit is detected.	

#### POSSIBLE CAUSE

- Steering clutch
- Steering clutch circuit is open or short.
- Steering force control module

#### FAIL-SAFE

- MODE 2
- NOTE:

For details of fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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

#### (B) With CONSULT

- Start the engine.
   CAUTION: Never drive the vehicle.
- 2. Turn the steering wheel.
- 3. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13E0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-408, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356852

## **1.**CHECK THE STEERING CLUTCH

Check the steering clutch. Refer to <u>STC-409</u>, "EPS/DAST 3 : Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u>, "Removal and <u>Installation"</u>.

### 2.CHECK THE CLUTCH CIRCUIT

- 1. Disconnect steering force control module.
- 2. Check the continuity between steering force control module harness connector and steering clutch harness connector.

# C13E0-00 ST CLUTCH COMMAND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Terminal 1 3 ground. heck Termina -45. "Intermi	Continuity Existed Continuity Not existed
1 3 ground. heck Termina -45. "Intermi	Existed Continuity Not existed
ground.	Continuity Not existed
heck Termina I-45. "Intermi	Continuity Not existed
heck Termina I-45. "Intermi	Not existed
heck Termina I-45, "Intermi	Not existed
heck Termina I-45. "Intermi	al". ittent Incident".
heck Termina I-45. "Intermi	<u>al"</u> . ittent Incident".
ernoval and I	Installation".
•	Continuity
	<b>F</b> 1.4.1
	Existed
	Continuity
	-
	Not existed
	bly. Refer to

< DTC/CIRCUIT DIAGNOSIS >

# C13E1-00 STEERING CLUTCH EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356854

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13E1-00	STEERING CLUTCH (Steering clutch)	Malfunction of steering clutch is detected.	

#### POSSIBLE CAUSE

- Steering clutch
- Steering clutch circuit is open or short.
- Steering gear

#### FAIL-SAFE

• MODE 2

#### NOTE:

For details of fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

## 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.CHECK DATA MONITOR

#### With CONSULT

Start the engine.
 CAUTION:
 Never drive the vehicle.

# On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "TORQUE SEN MAIN 1".

Check that the value is within standard value while steering the steering wheel.

Monitor item	Standard value (Approx.)
TORQUE SEN MAIN 1	–0.9 N·m ≤ TORQUE SEN MAIN 1 ≤ 0.9 N·m

Is the inspection result normal?

- YES >> Steering clutch protection function is active temporarily by overloading the steering wheel. This is not system malfunction.
- NO >> Proceed to diagnosis procedure. Refer to <u>STC-410, "EPS/DAST 3 : Diagnosis Procedure"</u>.

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356855

## **1.**CHECK THE STEERING CLUTCH

Check the steering clutch. Refer to STC-411, "EPS/DAST 3 : Component Inspection".

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u>, "Removal and <u>Installation"</u>.
- 2. CHECK THE CLUTCH CIRCUIT
- 1. Disconnect steering force control module.
- Check the continuity between steering force control module harness connector and steering clutch harness connector.

## STC-410

# C13E1-00 STEERING CLUTCH

### < DTC/CIRCUIT DIAGNOSIS >

Steering force of	control module	Steer	ing clutch	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M71	26	M156	1	Existed
	28	- 101150	3	Existed
3. Check the continu	ity between control n	nodule harness conne	ector and ground.	
Steering	force control module		_	Continuity
Connector	Termin	al		
M71	26		Ground	Not existed
	28			
<ul> <li><b>D.</b>REPLACE STEERI</li> <li><b>With CONSULT</b></li> <li>1. Replace steering of</li> <li>2. Start the engine.</li> <li><b>CAUTION:</b></li> <li><b>Never drive the v</b></li> <li>3. On the CONSULT</li> </ul>	NG CLUTCH clutch assembly. Refe ehicle. screen, select "EPS,	er to <u>ST-139. "Remov</u> /DAST 3" >>» "DATA	al and Installation". MONITOR" >> "TOR	QUE SEN MAIN 1".
4. Check that the val		value while steering	Standard value	(Approx.)
				(Approx.)
	10			NIMAIN $1 \ge 0.9$ N·III
YES >> INSPECT NO >> GO TO 4. 4.REPLACE STEERI	NG FORCE CONTR	OL MODULE		
<ul> <li>With CONSULT</li> <li>Replace steering f</li> <li>Start the engine.</li> <li>CAUTION:</li> <li>Never drive the v</li> <li>On the CONSULT</li> <li>Check that the val</li> </ul>	orce control module. Pehicle. screen, select "EPS ue is within standard	Refer to <u>STC-492. "I</u> /DAST 3" >>» "DATA value while steering	Removal and Installat MONITOR" >> "TOR the steering wheel.	<u>ion"</u> . QUE SEN MAIN 1".
	Monitor item		Standard value	(Approx.)
TORQUE SEN MAIN 1		–0.9 N⋅m ≤ TORQUE SEN	NMAIN 1 ≤ 0.9 N⋅m	
Is the inspection result YES >> INSPECT NO >> Replace s EPS/DAST 3 : Co 1.CHECK THE STEE	<u>normal?</u> ION END teering gear assemb I <b>mponent Inspec</b> RING CLUTCH	ly. Refer to <u>ST-146, "</u> tion	Removal and Installat	tion". INFOID:0000000

3. Check continuity between steering clutch connector pin terminals.

# C13E1-00 STEERING CLUTCH

#### < DTC/CIRCUIT DIAGNOSIS >

Steerin	Continuity	
Terr		
1	Existed	

#### 4. Check continuity between steering clutch connector and ground.

Steering clutch		Continuity
Terminal		Continuity
1	Ground	Not existed
3		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u>, "Removal and <u>Installation"</u>.

# C13E2-00 FRONT WHEEL SENSOR SIGNAL

## < DTC/CIRCUIT DIAGNOSIS >

# C13E2-00 FRONT WHEEL SENSOR SIGNAL EPS/DAST 3

# EPS/DAST 3 : DTC Description

# DTC DETECTION LOGIC

DTC	Display item	Molfunction datacted condition
	(Trouble diagnosis content)	
C13E2-00	FRONT WHEEL SENSOR SIGNAL (Front wheel sensor signal)	Malfunction value of front wheel sensor (both side) is detected.
POSSIBLE	CAUSE	
<ul> <li>Using the</li> <li>Continuing</li> </ul>	2 wheel chassis dynamometer a the slip condition for long time	
Front whe	el sensor	
DTC CON	FIRMATION PROCEDURE	
1.PRECON	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
With CO With CO Turn the	NSULT e ignition switch ON. e steering wheel	
3. Perform	n self-diagnosis for "EPS/DAST 3".	
Is DTC "C1:	3E2-00" detected?	
YES >> NO-1 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep	<u>STC-413, "EPS/DAST 3 : Diagnosis Procedure"</u> . air: Refer to GI-45, "Intermittent Incident".
NO-2 >>	Confirmation after repair: INSPECTION E	ND
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356858
1.PERFOR	RM ABS ACTUATOR AND ELECTRIC UNI	T (CONTROL UNIT) SELF-DIAGNOSIS
With CO	NSULT	
1. Turn the 2. Perform	e ignition switch ON. n self-diagnosis for "ABS".	
Is any DTC	detected?	
YES >>	Check the DTC. Refer to <u>BRC-72, "DTC In</u>	ndex".
1. Turn the	NSULT e ignition switch OFF and wait for at least 1	10 seconds.
2. Turn the	e ignition switch ON.	
3. Perform	1 self-alagnosis for "EPS/DAST 3". 3C7-00" or "C13E2-00" detected?	
YES-1 >>	C13C7-00 is detected: Refer to $STC-342$ ,	"EPS/DAST 3 : DTC Description".
YES-2 >>	C13E2-00 is detected: Replace steering f	orce control module. Refer to STC-492, "Removal and
NO >>	<ul> <li>Check enlarged contact spring of termin</li> </ul>	al. Refer to <u>GI-42, "How to Check Terminal"</u> .

Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

## STC-413

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INFOID:000000013356857

< DTC/CIRCUIT DIAGNOSIS >

# C13E3-00 SPIRAL CABLE PROTECTION EPS/DAST 3

EPS/DAST 3 : DTC Description

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	
C13E3-00	SPIRAL CABLE PROTECTION (Spiral cable protection)	Spiral cable protection function is active by steering the steering wheel over the limit angle.	

#### POSSIBLE CAUSE

• Steering the steering wheel over the limit angle

Steering force control module

#### FAIL-SAFE

- Protection mode
  - NOTE:

For details of protection mode, refer to STC-128, "DIRECT ADAPTIVE STEERING : Protection Function".

### 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. Start the engine.
  - CAUTION:

#### Never drive the vehicle.

2. Perform self-diagnosis for "EPS/DAST 3".

Is DTC "C13E3-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-414, "EPS/DAST 3 : Diagnosis Procedure"</u>.
- NO >> Spiral cable protection function is active temporarily by steering the steering wheel over the limit angle. This is not system malfunction.

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356860

# **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION: Never drive the vehicle.
- Turn the steering wheel to the center position.
   CAUTION:

#### Never touch the steering wheel after setting it to center position.

6. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13E3-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> Spiral cable protection function is active by steering the steering wheel over the limit angle. This is not system malfunction.

## STC-414

#### INFOID:000000013356859

## C13E4-00 ST CLUTCH RELEASE PROTECTION GNOSIS > [DIRECT ADAPTIVE STEERING]

< DTC/CIRCUIT DIAGNOSIS >

# C13E4-00 ST CLUTCH RELEASE PROTECTION EPS/DAST 3

# EPS/DAST 3 : DTC Description

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В

INFOID:000000013356861

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition
510	(Trouble diagnosis content)	
C13E4-00	ST CLUTCH RELEASE PROTECTION (Steering clutch release protection)	When steering clutch is released, steering clutch is not released within regular time.
POSSIBLE • When stee • Steering c • Steering f • Steering g	CAUSE ering clutch is released, overloading the ste lutch orce control module lear	eering wheel.
FAIL-SAFE • Protection <b>NOTE:</b> For details	n mode s of protection mode, refer to <u>STC-128, "DI</u>	IRECT ADAPTIVE STEERING : Protection Function".
DTC CON	FIRMATION PROCEDURE	
1.PRECON	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre to 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and est.
»» <b>2.</b> снеск	GO TO 2. DATA MONITOR	
1. Start the CAUTION Never 0 2. On the 3. Check t	e engine. DN: drive the vehicle. CONSULT screen, select "EPS/DAST 3" > hat the value is within standard value while	» "DATA MONITOR" >> "TORQUE SEN MAIN 1". e steering the steering wheel.
Monitor item		Standard value (Approx.)
IORQUE SE		$-0.9 \text{ N} \cdot \text{m} \le \text{TORQUE SEN MAIN 1} \le 0.9 \text{ N} \cdot \text{m}$
YES >> NO >>	Ction result normal? Steering clutch protection function is activ not system malfunction. Proceed to diagnosis procedure. Refer to	e temporarily by overloading the steering wheel. This is <u>STC-415, "EPS/DAST 3 : Diagnosis Procedure"</u> .
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356862
1.снеск	THE STEERING CLUTCH	
Check the s	teering clutch. Refer to <u>STC-416, "EPS/DA</u>	AST 3 : Component Inspection".
Is the inspe	ction result normal?	
YES >> NO >>	GO TO 2. Steering clutch is malfunction. Replace ste Installation".	eering clutch assembly. Refer to <u>ST-139, "Removal and</u>
2.CHECK	THE CLUTCH CIRCUIT	

1. Disconnect steering force control module.

# C13E4-00 ST CLUTCH RELEASE PROTECTION

[DIRECT ADAPTIVE STEERING]

#### < DTC/CIRCUIT DIAGNOSIS >

2. Check the continuity between steering force control module harness connector and steering clutch harness connector.

Steering force	Steering force control module		ig clutch	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M71	26	M156	1	Existed
1017 1	28	MIJO	3	LXISIEU

3. Check the continuity between control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	26	Ground	Not existed
	28	Croand	Not existed

### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**REPLACE STEERING CLUTCH

## With CONSULT

- 1. Replace steering clutch assembly. Refer to <u>ST-139, "Removal and Installation"</u>.
- 2. Start the engine. CAUTION:

## Never drive the vehicle.

- 3. On the CONSULT screen, select "EPS/DAST 3" >> » "DATA MONITOR" >> "TORQUE SEN MAIN 1".
- 4. Check that the value is within standard value while steering the steering wheel.

Monitor item	Standard value (Approx.)
TORQUE SEN MAIN 1	–0.9 N·m $\leq$ TORQUE SEN MAIN 1 $\leq$ 0.9 N·m

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**REPLACE STEERING FORCE CONTROL MODULE

## With CONSULT

- 1. Replace steering force control module. Refer to STC-492, "Removal and Installation".
- 2. Start the engine.

CAUTION:

## Never drive the vehicle.

- 3. On the CONSULT screen, select "EPS/DAST 3" >> » "DATA MONITOR" >> "TORQUE SEN MAIN 1".
- 4. Check that the value is within standard value while steering the steering wheel.

Monitor item	Standard value (Approx.)	
TORQUE SEN MAIN 1	-0.9 N·m ≤ TORQUE SEN MAIN 1 ≤ 0.9 N·m	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace steering gear assembly. Refer to <u>ST-146, "Removal and Installation"</u>.

# EPS/DAST 3 : Component Inspection

INFOID:000000013356863

# **1.**CHECK THE STEERING CLUTCH

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering clutch harness connector.
- 3. Check continuity between steering clutch connector pin terminals.

# C13E4-00 ST CLUTCH RELEASE PROTECTION

#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Immunity         Steering clutch         Continuity           3         Existed             4. Check continuity between steering clutch connector and ground.             Steering clutch         -           1         Ground         Not existed   Is the inspection result normal?           YES         >> INSPECTION END           NO         >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139. "Installation".	terminal         Image: Continuity between steering clutch connector and ground.           Steering clutch         Image: Continuity clutch connector and ground.           Image: Continuity clutch connector and ground.         Continuity clutch clutch connector and ground.           Image: Continuity clutch connector and ground.         Continuity clutch clutc			Continuity
1       3       Existed         . Check continuity between steering clutch connector and ground.       Image: Continuity Terminal       Image: Continuity Terminal         1       Ground       Not existed         3       Bite inspection result normal?       YES         YES       >> INSPECTION END       NO         NO       >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139. "Installation".	1       3       Existed         continuity between steering clutch connector and ground.       Image: Continuity         1       -       Continuity         1       Ground       Not existed         -       -       Continuity         1       Ground       Not existed         -       -       Continuity         -       Stepering clutch is malifunction. Replace steeri			
Steering dutch	Steering clutch	1	3	Existed
Steering clutch          Continuity           1         Ground         Not existed           3         Ground         Not existed           sthe inspection result normal?         YES         >> INSPECTION END           NO         >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139. "Installation".	Steering clutch         Continuity           1         Ground         Not existed           a         Ground         Not existed	. Check continuity between steerin	g clutch connector and ground.	
Image:	Terminal         Crown           1         Ground         Not existed           ection result normal?         INSPECTION END           > Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139. "Removal and Installation".         ST-139. "Removal and Installation".	Steering clutch	_	Continuity
1       Ground       Not existed         the inspection result normal?       (ES >> INSPECTION END       Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139, ")         NO       >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139, ")         Installation".	1       Ground       Not existed	Terminal		
the inspection result normal? YES >> INSPECTION END NO >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u> , "I Installation".	ection result normal? > INSPECTION END > Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u> , "Removal and Installation".	1	Ground	Not existed
the inspection result normal?         YES       >> INSPECTION END         IO       >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to ST-139. "I         Installation".	ection result normal? > INSPECTION END > Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139, "Removal and Installation"</u> .	3		
		<ul> <li>YES &gt;&gt; INSPECTION END</li> <li>IO &gt;&gt; Steering clutch is malfund</li> <li><u>Installation</u>".</li> </ul>	ction. Replace steering clutch asser	mbly. Refer to <u>ST-139, "Removal and</u>

# C13E5-00 ST CLUTCH RELEASE PROTECTION

< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

# C13E5-00 ST CLUTCH RELEASE PROTECTION EPS/DAST 3

# EPS/DAST 3 : DTC Description

INFOID:000000013356864

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E5-00	ST CLUTCH RELEASE PROTECTION (Steering clutch release protection)	When steering clutch is released, steering clutch is not released in spite of trying to release it many times.

### POSSIBLE CAUSE

- When steering clutch is released, overloading steering wheel.
- Steering clutch
- Steering force control module
- Steering gear

#### FAIL-SAFE

- MODE 2
- NOTE:

For details of fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

### 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. CHECK DATA MONITOR

#### With CONSULT

1. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. On the CONSULT screen, select "EPS/DAST 3" >>> "DATA MONITOR" >> "TORQUE SEN MAIN 1".
- 3. Check that the value is within standard value while steering the steering wheel.

Monitor item	Standard value (Approx.)
TORQUE SEN MAIN 1	-0.9 N·m $\leq$ TORQUE SEN MAIN 1 $\leq$ 0.9 N·m

Is the inspection result normal?

- YES >> Steering clutch protection function is active temporarily by overloading the steering wheel. This is not system malfunction.
- NO >> Proceed to diagnosis procedure. Refer to <u>STC-418</u>, "EPS/DAST 3 : Diagnosis Procedure".

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356865

### **1.**CHECK THE STEERING CLUTCH

Check the steering clutch. Refer to <u>STC-419, "EPS/DAST 3 : Component Inspection"</u>.

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u>, "Removal and <u>Installation"</u>.
- 2. CHECK THE CLUTCH CIRCUIT

1. Disconnect steering force control module.

#### C13E5-00 ST CLUTCH RELEASE PROTECTION GNOSIS > [DIRECT ADAPTIVE STEERING]

#### < DTC/CIRCUIT DIAGNOSIS >

Check the continuity between steering force control module harness connector and steering clutch harness connector.

Steering force	Steering force control module Steering clutch		Continuity	•	
Connector	Terminal	Connector	Terminal	Continuity	В
M71	26	M156	1	Evisted	-
IVI7 1	28	W130	3	LAISted	

3. Check the continuity between control module harness connector and ground.

Steering for	ce control module		Continuity	_ 
Connector	Terminal		Continuity	D
N/71	26	Ground	Not ovicted	-
	28	Gibulia	NOT EXISTED	E

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected part.

**3.**REPLACE STEERING CLUTCH

#### With CONSULT

- 1. Replace steering clutch assembly. Refer to ST-139, "Removal and Installation".
- 2. Start the engine. CAUTION:

#### Never drive the vehicle.

- 3. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "TORQUE SEN MAIN 1".
- 4. Check that the value is within standard value while steering the steering wheel.

Monitor item	Standard value (Approx.)
TORQUE SEN MAIN 1	-0.9 N·m $\leq$ TORQUE SEN MAIN 1 $\leq$ 0.9 N·m
Is the inspection result normal?	
YES >> INSPECTION END	
NO >> GO TO 4.	
<b>4.</b> REPLACE STEERING FORCE CONTROL MODUL	E
<ol> <li>Replace steering force control module. Refer to <u>ST</u></li> <li>Start the engine. <b>CAUTION:</b> <b>Never drive the vehicle.</b>         On the CONSULT screen, select "EPS/DAST 3" &gt;&gt;         Check that the value is within standard value while</li> </ol>	C-492, "Removal and Installation". >» "DATA MONITOR" >> "TORQUE SEN MAIN 1". steering the steering wheel.
Monitor item	Standard value (Approx.)
TORQUE SEN MAIN 1	-0.9 N·m $\leq$ TORQUE SEN MAIN 1 $\leq$ 0.9 N·m
Is the inspection result normal? YES >> INSPECTION END	
NO >> Replace steering gear assembly. Refer to 3	ST-146, "Removal and Installation".
EPS/DAST 3 : Component Inspection	INFOID:000000013356866

**1**.CHECK THE STEERING CLUTCH

1. Turn the ignition switch OFF.

2. Disconnect steering clutch harness connector.

3. Check continuity between steering clutch connector pin terminals.

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# **C13E5-00 ST CLUTCH RELEASE PROTECTION**

#### < DTC/CIRCUIT DIAGNOSIS >

Steering clutch		- Continuity
Terminal		
1	3	Existed

#### 4. Check continuity between steering clutch connector and ground.

Steering clutch		Continuity	
Terminal			
1	Ground	Not existed	
3	Giouna	NUL EXISTED	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Steering clutch is malfunction. Replace steering clutch assembly. Refer to <u>ST-139</u>, "Removal and <u>Installation"</u>.

# < DTC/CIRCUIT DIAGNOSIS > C13E6-00 HEAT PROTECTION EPS/DAST 3

## **EPS/DAST 3 : DTC Description**

### NOTE:

The DTC "C13E6-00" may be detected due to the high temperature of engine in the following condition. • Starting the direct adaptive steering system after idling the engine for a long time

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	D		
C13E6-00	HEAT PROTECTION (Heat protection)	The internal temperature of steering force motor reaches 150°C (302°F) or more, and then the protection function operates.	E		
<ul> <li>POSSIBLE CAUSE</li> <li>Continuing the overloading steering (Sports driving in the circuit etc,)</li> <li>Steering force motor</li> </ul>					
FAIL-SAFE • Protection <b>NOTE:</b> For details	mode s of protection mode, refer to <u>STC-128, "DI</u>	RECT ADAPTIVE STEERING : Protection Function".	STC		
DTC CONF	FIRMATION PROCEDURE		Н		
1.PRECON	NDITIONING				
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.	I		
>> GO TO 2. 2.DTC REPRODUCTION PROCEDURE					
With CONSULT  Start the engine. CAUTION:					
2. Perform	a self-diagnosis for "EPS/DAST 3". 3E6-00" detected?		L		
YES >> NO >>	Proceed to diagnosis procedure. Refer to The temporary rise of steering force moto operate. This is not a system malfunction.	STC-421, "EPS/DAST 3 : Diagnosis Procedure". r internal temperature caused the protection function to INSPECTION END	Μ		
EPS/DAS	T 3 : Diagnosis Procedure	INFOID:000000013356868			
1.снеск	THE TEMPERATURE OF CONTROL MOD	DULE	Ν		
With CONSULT  Start the engine. CAUTION: Nover drive the vehicle					
2. On the 3. Wait wit <u>Does the te</u> YES >>	CONSULT screen, select "EPS/DAST 3" > th the ignition switch OFF until the data mo <u>mperature drop to 140°C (284°F) or less?</u> GO TO 2.	» "DATA MONITOR" >> "C/M TEMPERATURE". onitor indication becomes 140°C (284°F) or less.	Ρ		
2.PERFOF	RM SELF-DIAGNOSIS				

#### With CONSULT

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INFOID:000000013356867

< DTC/CIRCUIT DIAGNOSIS >

- Turn the ignition switch ON.
   Erase self-diagnosis for "EPS/DAST 3".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- Start the engine.
   CAUTION: Never drive the vehicle.
- 5. Perform self-diagnosis for "EPS/DAST 3".

## Is DTC "C13E6-00" detected?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> The rise of steering force motor internal temperature caused the protection function to operate. This is not a system malfunction. INSPECTION END

# **3.**CHECK TEMPERATURE SENSOR POWER SUPPLY (1)

- 1. Turn the ignition switch OFF.
- 2. Disconnect force motor angle sensor harness connector.
- 3. Turn the ignition switch ON.
- 4. Check the voltage between force motor angle sensor harness connector pin terminals.

Connector	Terr	Voltage (Approx.)	
Connector	+	_	
M73	3	7	5 V

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 4.

#### **4.**CHECK TEMPERATURE SENSOR POWER SUPPLY (2)

Check the voltage between force motor angle sensor harness connector pin terminals.

Force motor	angle sensor			
Connector	Terminal		Voltage (Approx.)	
Connector	+	_		
M73	3	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 7.

**5.**CHECK TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect steering force control module harness connector.

3. Check the continuity between steering force control module harness connector and force motor angle sensor harness connector.

Steering force	control module	Force motor	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M71	29	M73	7	Existed

#### Is the inspection result normal?

YES >> GO TO 6.

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

**6.**CHECK CONTROL MODULE GROUND CIRCUIT

Check the continuity between steering force control module harness connector and ground.

#### < DTC/CIRCUIT DIAGNOSIS >

Steering angle	main control module				Continuity
Connector	Terminal			-	Continuity
M71	30		Ground	und	Existed
M72	M72 33				
Is the inspection result n         YES       >> GO TO 10.         NO       >> Repair open         7.CHECK TEMPERATU         1.       Turn the ignition swing         2.       Disconnect steering         3.       Check the continuity sensor barness control	circuit or short to g IRE SENSOR POV ch OFF. force control moduly between steering	round or sh VER SUPP le harness force cont	nort to power ir LY CIRCUIT connector. trol module ha	n harness or c	onnectors.
Stooring force cor	trol modulo		Force motor and	lo sonsor	
Connector	Terminal	Conr		Terminal	Continuity
M71	.31	M	73	3	Existed
4. Check the continuity	between steering f	orce contro	ol module harn	ess connector	and ground.
					5
Steering fo	ce control module		_	-	Continuity
M71	21	al	Ontword		Not ovisted
le the inerestion result n					
NO >> Repair open 8.CHECK CONTROL M Check the power supply Is the inspection result n YES >> GO TO 10. NO >> Repair or rep 9.CHECK TEMPERATU	circuit or short to g ODULE POWER S circuit for steering f ormal? blace error-detected IRE SENSOR	round or sh SUPPLY CII force contro	nort to power ir RCUIT bl module. Refe	n harness or c er to <u>STC-467</u>	onnectors. , "Diagnosis Procedure".
Check the force motor te	mperature sensor.	Refer to ST	C-403, "EPS/I	DAST 3 : Com	ponent Inspection".
Is the inspection result n YES >> GO TO 10. NO >> Force motor 135. "Remov	temperature senso al and Installation	or is malfun	ction. Replace	steering colu	mn assembly. Refer to <u>ST-</u>
			01.40		- 1 10
<ol> <li>Check enlarged con</li> <li>Perform intermittent</li> </ol>	act spring of termining of termin	ng steering	wheel. Refer t	o <u>GI-45, "Inte</u>	ninal". rmittent Incident".
Is the inspection result n YES >> Replace stee NO >> Repair or rep	ormal? ering force control r place error-detected	nodule. Re d part.	fer to <u>STC-492</u>	e, "Removal ar	nd Installation".
EPS/DAST 3 : Com	ponent Inspect	tion			INFOID:000000013356869
1.CHECK FORCE MOT	OR TEMPERATUR	RE SENSO	R		
1. Turn the ignition swit	ch OFF.				

- 2. Disconnect force motor angle sensor harness connector.
- 3. Check resistance between force motor angle sensor connector pin terminals.

#### < DTC/CIRCUIT DIAGNOSIS >

Force motor	angle sensor	Condition	Resistance (Approx.)
Terr	ninal		
		0°C	34.8 kΩ
3	7	25°C	10.0 kΩ
		40°C	5.2 kΩ

4. Check continuity between force motor angle sensor connector and ground.

Force motor angle sensor		Continuity	
Terminal			
3	Ground	Not existed	
7	Clouina	Not existed	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Force motor temperature sensor is malfunction. Replace steering column assembly. Refer to <u>STC-492, "Removal and Installation"</u>.

## DAST 1

## DAST 1 : DTC Description

NOTE:

The DTC "C13E6-00" may be detected due to the high temperature of engine in the following condition.

- Starting the direct adaptive steering system after idling the engine for a long time
- · Repeating the engine idling and sports driving in the circuit
- Turning steering wheel in the front tire side face touching an abstraction like curb stone.
- Turning steering wheel repeatedly in the vehicle stopping for a long time.

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E6-00	HEAT PROTECTION (Heat protection)	The internal temperature of steering angle main control module reaches 90°C (194°F) or more, and then the protection function operates.

#### POSSIBLE CAUSE

- Continuing the overloading steering (Sports driving in the circuit etc,)
- Steering force motor

#### FAIL-SAFE

Protection mode

NOTE:

For details of protection mode, refer to STC-128, "DIRECT ADAPTIVE STEERING : Protection Function".

#### 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

Start the engine.
 CAUTION:

Never drive the vehicle.

INFOID:000000013356870

	CUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]
2. Perform	n self-diagnosis for "DAST 1".	
<u>s DTC "C1:</u>	3E6-00" detected?	
YES >> NO >>	Proceed to diagnosis procedure. Refer to The temporary rise of steering angle ma tion function to operate. This is not a system	o <u>STC-425, "DAST 1 : Diagnosis Procedure"</u> . in control module internal temperature caused the protec- stem malfunction. INSPECTION END
DAST 1 :	Diagnosis Procedure	INFOID:000000013356871
1.снеск	THE TEMPERATURE OF CONTROL MO	DDULE
With CO Start the CAUTIC Never (	NSULT e engine. ON: drive the vehicle	
2. On the 3. Wait with Does the te	CONSULT screen, select "DAST 1" >> "I th the ignition switch OFF until the data n mperature drop to 85°C (185°C) or less?	DATA MONITOR" >> "C/M TEMPERATURE". nonitor indication becomes 80°C (176°C) or less.
YES >> NO >> 2 DEREOS	GO TO 2. Replace steering angle main control more	dule. Refer to STC-493, "Removal and Installation".
1. Turn the L. Erase s	e ignition switch ON. self-diagnosis for "DAST 1".	t 10 seconds
4. Start the CAUTIC Never of 5. Perform	e engine. ON: drive the vehicle. n self-diagnosis for "DAST 1".	
<u>s DIC "C1;</u>	<u>3E6-00" detected?</u>	dula Defente CTC 402 "Demousliend Installation"
NO >>	The rise of steering angle main control mo tion to operate. This is not a system mal	module internal temperature caused the protection func- function. INSPECTION END
DAST 2		
DAST 2 :	DTC Description	INFOID:000000013356872
NOTE: The DTC "C Starting th Repeatinc	C13E6-00" may be detected due to the high the direct adaptive steering system after id the engine idling and sports driving in th	gh temperature of engine in the following condition. lling the engine for a long time le circuit
<ul> <li>Turning st</li> <li>Turning st</li> </ul>	eering wheel in the front tire side face to eering wheel repeatedly in the vehicle sto	uching an abstraction like curb stone. opping for a long time.
DTC DETE	ECTION LOGIC	
	Display item	Malfunction detected condition
DTC		

• Steering force motor

## FAIL-SAFE

Protection mode
 **NOTE:**

For details of protection mode, refer to STC-128, "DIRECT ADAPTIVE STEERING : Protection Function".

## STC-425

#### < DTC/CIRCUIT DIAGNOSIS >

## 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. Start the engine. CAUTION:
- Never drive the vehicle.
   Perform self-diagnosis for "DAST 2".
- 2. Perioriti sell-diagnosis for DAS

#### Is DTC "C13E6-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-426, "DAST 2 : Diagnosis Procedure".
- NO >> The temporary rise of steering angle sub control module internal temperature caused the protection function to operate. This is not a system malfunction. INSPECTION END

#### DAST 2 : Diagnosis Procedure

INFOID:000000013356873

## **1.**CHECK THE TEMPERATURE OF CONTROL MODULE

#### (B) With CONSULT

1. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. On the CONSULT screen, select "DAST 2" >> "DATA MONITOR" >> "C/M TEMPERATURE".
- 3. Wait with the ignition switch OFF until the data monitor indication becomes 80°C (176°C) or less.

#### Does the temperature drop to 85°C (185°C) or less?

YES >> GO TO 2.

NO >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 2".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine.

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13E6-00" detected?

- YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".
- NO >> The rise of steering angle sub control module internal temperature caused the protection function to operate. This is not a system malfunction. INSPECTION END

# C13E7-00 LOW VOLTAGE PROTECTION EPS/DAST 3

# **EPS/DAST 3 : DTC Description**

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INFOID:000000013356874

# DTC DETECTION LOGIC

DTC	(Trout	Display item ble diagnosis content)	Malfunction de	c c condition
C13E7-00	LOW VOLTAGE F (Low voltage prot	PROTECTION ection)	<ul> <li>The power supply voltage of confort 1 second or more continuous active.</li> <li>Power supply voltage ≤ 9.1 V</li> </ul>	trol module is following condition ly, and then protection function is
POSSIBLE	CAUSE			E
<ul> <li>Harness a</li> <li>Battery</li> <li>Fusible lir</li> <li>Power sul</li> <li>Steering f</li> </ul>	and connector nk oply circuit orce control mo	dule		F
<ul> <li>FAIL-SAFE</li> <li>Protection</li> <li>NOTE:</li> <li>For details</li> </ul>	mode s of protection n	node, refer to STC-128, "DII	RECT ADAPTIVE STEERIN	ST
DTC CON	- FIRMATION P			H
1.PRECO				
If "DTC COI wait at least	NFIRMATION P t 10 seconds be	ROCEDURE" has been pre fore conducting the next tes	viously conducted, always t st.	urn ignition switch OFF and
>> 2.dtc re	GO TO 2. PRODUCTION	PROCEDURE		J
With CO Start th	NSULT e engine.			K
2. Perform	<b>drive the vehic</b> n self-diagnosis	le. for "EPS/DAST 3".		L
YES >> NO >>	Proceed to diag	<u>d?</u> gnosis procedure. Refer to <u>s</u> tion is active temporarily by	STC-427, "EPS/DAST 3 : D	agnosis Procedure". M not system malfunction.
EPS/DAS	ST 3 : Diagno	osis Procedure		INFOID:000000013356875
1.снеск	CONTROL MO	DULE GROUND CIRCUIT		Ν
<ol> <li>Turn the</li> <li>Disconi</li> <li>Check to</li> </ol>	e ignition switch nect steering for the continuity be	OFF. ce control module harness etween control module harn	connector. ess connector and ground.	0
	Steering force	control module		P
Co	onnector	Terminal	_	Continuity
	M72	33	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.

#### < DTC/CIRCUIT DIAGNOSIS >

# **2.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (1)

Check the voltage between control module harness connector and ground.

Steering force	control module		Continuity
Connector	Terminal		Continuity
M72	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

# **3.**CHECK CONTROL MODULE POWER SUPPLY CIRCUIT (2)

1. Check the 60A fusible link (#G).

 Check the harness for open or short between steering force control module harness connector No.34 terminal and the 60A fusible link (#G).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-ing Diagram BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

### **4.**CHECK INTERMITTENT INCIDENT

- 1. Turn the ignition switch OFF.
- 2. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
- 3. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".
- NO >> Repair or replace error-detected part.

#### DAST 1

## DAST 1 : DTC Description

INFOID:000000013356876

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E7-00	LOW VOLTAGE PROTECTION (Low voltage protection)	The power supply voltage of control module is following condition for 1 second or more continuously, and then protection function is active. • Power supply voltage $\leq 9.1 \text{ V}$

#### POSSIBLE CAUSE

- Harness and connector
- Battery
- Fusible link
- Power supply circuit
- Steering angle main control module

#### FAIL-SAFE

• Protection mode **NOTE:** 

For details of protection mode, refer to STC-128, "DIRECT ADAPTIVE STEERING : Protection Function".

#### 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.

## **STC-428**

< DTC/CIRCUIT DIAGNO	SIS >	[DIRECT	ADAPTIVE STEERING]
>> GO TO 2.			
2. DTC REPRODUCTION	PROCEDURE		
With CONSULT Start the engine. CAUTION: Never drive the vehic Perform self-diagnosis Is DTC "C13E7-00" detected YES >> Proceed to dia NO >> Protection function	<b>le.</b> for "DAST 1". ed? gnosis procedure. Refer to s tion is active temporarily by	<u>STC-429, "DAST 1 : Diagnos</u> v low battery voltage. This is i	sis Procedure". not system malfunction.
DAST 1 : Diagnosis F	Procedure		INFOID:000000013356877
1.CHECK CONTROL MO	DULE GROUND CIRCUIT		
<ol> <li>Turn the ignition switch</li> <li>Disconnect steering an</li> <li>Check the continuity be</li> </ol>	n OFF. Igle main control module ha etween control module harn	rness connector. less connector and ground.	
Steering angle m	ain control module		Continuity
Connector	Terminal		
E27	33	Ground	Existed
2.CHECK CONTROL MO Check the voltage between	DULE POWER SUPPLY CI	RCUIT (1) nnector and ground.	
Steering angle m	ain control module		Continuity
Connector	Terminal		
E27	34	Ground	10.5 – 16.0 V
Is the inspection result norrYES>> GO TO 4.NO>> GO TO 3.3.CHECK CONTROL MO	<u>nal?</u> DULE POWER SUPPLY CI	RCUIT (2)	
<ol> <li>Check the 100A fusible</li> <li>Check the harness for No.34 terminal and the</li> </ol>	e link (#J). r open or short between st 100A fusible link (#J).	teering angle main control r	module harness connector
Is the inspection result norr	<u>mal?</u>		
YES >> Perform the tro ing Diagram - I	ouble diagnosis for battery p BATTERY POWER SUPPL	power supply circuit. Refer to $\frac{1}{2}$ .	<u>PG-20, "VR30DDTT : Wir-</u>
NO >> Repair or repla	ce error-detected parts.		
4.CHECK INTERMITTEN	TINCIDENT		
<ol> <li>Turn the ignition switch</li> <li>Check enlarged contact</li> <li>Perform intermittent ind</li> </ol>	o OFF. Et spring of terminal. Refer to cident while turning steering	o <u>GI-42. "How to Check Term</u> wheel. Refer to <u>GI-45. "Inte</u>	<u>ninal"</u> . rmittent Incident".
VES Deplace stort	<u>nal?</u> na analo main control medu	lo Defer to STC 402 "Demo	wal and Installation"
TES >> Keplace steerl	ng angle main control modu	ile. Relei lu <u>510-493, Rema</u>	<u>ovai anu installation"</u> .

NO >> Repair or replace error-detected part. DAST 2

### < DTC/CIRCUIT DIAGNOSIS >

## DAST 2 : DTC Description

INFOID:000000013356878

[DIRECT ADAPTIVE STEERING]

## DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E7-00	LOW VOLTAGE PROTECTION (Low voltage protection)	The power supply voltage of control module is following condition for 1 second or more continuously, and then protection function is active. • Power supply voltage $\leq 9.1 \text{ V}$

#### POSSIBLE CAUSE

- Harness and connector
- Battery
- Fusible link
- Power supply circuit
- Steering angle sub control module

#### FAIL-SAFE

 Protection mode NOTE:

For details of protection mode, refer to STC-128, "DIRECT ADAPTIVE STEERING : Protection Function".

### 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

- Start the engine.
   CAUTION: Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13E7-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-430, "DAST 2 : Diagnosis Procedure"</u>.
- NO >> Protection function is active temporarily by low battery voltage. This is not system malfunction.

## DAST 2 : Diagnosis Procedure

INFOID:000000013356879

# 1. CHECK CONTROL MODULE GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal	Communy	Continuity
E30	33	Ground	Evisted
E31	39		

Is the inspection result normal?

YES >> GO TO 2.

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

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

Check the voltage between control module harness connector and ground.

#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

			Continuity
Connector	Terminal		Continuity
E30	34	Ground	10.5 – 16.0 V
the inspection result nor YES >> GO TO 4. NO >> GO TO 3.	mal?		
CHECK CONTROL MC	DULE POWER SUPPLY CI	RCUIT (2)	
Check the 100A fusible Check the harness for terminal and the 100A	e link (#H). open or short between stee fusible link (#H).	ring angle sub control mod	ule harness connector No.34
the inspection result nor YES >> Perform the tro gram - BATTE	<u>mal?</u> ouble diagnosis for power su <u>RY POWER SUPPLY -"</u> .	upply circuit. Refer to <u>PG-2</u>	0, "VR30DDTT : Wiring Dia-
Check enlarged conta	ct spring of terminal. Refer to	o <u>GI-42, "How to Check Te</u>	rminal".
Perform intermittent in	cident while turning steering	wheel. Refer to <u>GI-45, "In</u>	termittent Incident".
YES >> Replace steeri NO >> Repair or repla	ing angle sub control module ace error-detected part.	e. Refer to <u>STC-494, "Rem</u>	oval and Installation".

Ρ

# C13E8-00 CURB STONE PROTECTION EPS/DAST 3

EPS/DAST 3 : DTC Description

#### INFOID:000000013356880

[DIRECT ADAPTIVE STEERING]

# DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E8-00	CURB STONE PROTECTION (Curb stone protection)	Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances, and then the protection function is active.

#### POSSIBLE CAUSE

- Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances.
- Steering gear is out of neutral position. (Large)
- Steering force control module

### FAIL-SAFE

Protection mode

#### NOTE:

For details of protection mode, refer to STC-128. "DIRECT ADAPTIVE STEERING : Protection Function".

### 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

Start the engine.

CAUTION:

#### Never drive the vehicle.

2. Turn the steering wheel from full left stop to full right stop. **NOTE:** 

Perform the work at the place where curbstones or other substances does not interfere with tire.

- 3. Return the steering wheel to the straight-ahead position.
- 4. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13E8-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-432, "EPS/DAST 3 : Diagnosis Procedure".
- NO >> Protection function is active by operating steering wheel under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances. This is not system malfunction. Since this may cause mechanical malfunction, check the suspension, axle and steering component.

## EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356881

## **1.**CHECK THE STEERING ANGLE

Turn the steering wheel to right and left.

Is the steering angle of right and left same?

YES >> GO TO 2.

## NO >> Refer to <u>STC-473, "Symptom Table"</u>.

2. PERFORM SELF-DIAGNOSIS
### C13E8-00 CURB STONE PROTECTION

< DTC/CIRCUIT DIAGNOSIS >

1. Turn the ignition switch ON. 2. Erase self-diagnosis for "EPS/DAST 3". А 3. Turn the ignition switch OFF and wait for at least 10 seconds. 4. Start the engine. **CAUTION:** В Never drive the vehicle. Turn the steering wheel to the straight-ahead position. (There is no steering force) 5. 6. Perform self-diagnosis for "EPS/DAST 3". С Is DTC "C13E8-00" detected? YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation". NO >> Protection function is active by operating steering wheel under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances. This is not D system malfunction. Since this may cause mechanical malfunction, check the suspension, axle and steering component. DAST 1 Е DAST 1 : DTC Description INFOID:000000013356882 F

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	STO
C13E8-00	CURB STONE PROTECTION (Curb stone protection)	Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances, and then the protection function is active.	Н
POSSIBLE	CAUSE		
<ul> <li>Steering v influence</li> <li>Steering g</li> <li>Steering a</li> </ul>	wheel is operated under a condition where of curbstones or other substances. gear is out of neutral position. (Large) angle main control module	e the steering angle is physically restricted due to the	Ι
FAIL-SAFE			J
<ul> <li>Protection NOTE: For detail tion".</li> </ul>	n mode s of protection functions, refer to <u>STC-128</u>	3, "DIRECT ADAPTIVE STEERING : Protection Func-	K
DTC CON	FIRMATION PROCEDURE		1
1.PRECO	NDITIONING		L
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next tes	eviously conducted, always turn ignition switch OFF and st.	M
>>	GO TO 2.		
2.DTC RE	PRODUCTION PROCEDURE		Ν
(P)With CO	NSULT		
1. Start th	e engine.		0
Never	UN: drive the vehicle		
2. Turn th	e steering wheel from full left stop to full rig	ht stop.	_
NOTE:		r other substances does not interfere with tire	Р
<ol> <li>Periorn</li> <li>Return</li> <li>Perforn</li> </ol>	the steering wheel to the straight-ahead ponself-diagnosis for "DAST 1".	sition.	
<u>Is DTC "C1</u>	3E8-00" detected?		
YES >> NO >>	Proceed to diagnosis procedure. Refer to Protection function is active by operating angle is physically restricted due to the in	STC-434, "DAST 1 : Diagnosis Procedure". steering wheel under a condition where the steering fluence of curbstones or other substances. This is not	

### C13E8-00 CURB STONE PROTECTION

#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356883

INFOID:000000013356884

system malfunction. Since this may cause mechanical malfunction, check the suspension, axle and steering component.

#### DAST 1 : Diagnosis Procedure

**1.**CHECK THE STEERING ANGLE

Turn the steering wheel to right and left.

Is the steering angle of right and left same?

YES >> GO TO 2.

NO >> Refer to STC-473, "Symptom Table".

2. PERFORM SELF-DIAGNOSIS

#### With CONSULT

- Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start the engine. CAUTION:

#### Never drive the vehicle.

- 5. Turn the steering wheel to the straight-ahead position. (There is no steering force)
- 6. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13E8-00" detected?

- YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".
- NO >> Protection function is active by operating steering wheel under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances. This is not system malfunction. Since this may cause mechanical malfunction, check the suspension, axle and steering component.

#### DAST 2

DAST 2 : DTC Description

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E8-00	CURB STONE PROTECTION (Curb stone protection)	Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances, and then the protection function is active.

#### POSSIBLE CAUSE

- Steering wheel is operated under a condition where the steering angle is physically restricted due to the influence of curbstones or other substances.
- Steering gear is out of neutral position. (Large)
- Steering angle sub control module

#### FAIL-SAFE

Protection mode

NOTE:

For details of protection mode, refer to STC-128. "DIRECT ADAPTIVE STEERING : Protection Function".

#### 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

### **C13E8-00 CURB STONE PROTECTION**

< DTC/CIRCUIT DIAGNOSIS > [DIRECT A	DAPTIVE STEERING]
With CONSULT Start the engine. CAUTION:	A
<ol> <li>Never drive the vehicle.</li> <li>Turn the steering wheel from full left stop to full right stop.</li> <li>NOTE:</li> </ol>	В
<ol> <li>Perform the work at the place where curbstones or other substances does not int</li> <li>Return the steering wheel to the straight-ahead position.</li> <li>Perform self-diagnosis for "DAST 2".</li> </ol>	erfere with tire.
Is DTC "C13E8-00" detected?	
YES >> Proceed to diagnosis procedure. Refer to <u>STC-435</u> , "DAST 2 : Diagnosis NO >> Protection function is active by operating steering wheel under a cond angle is physically restricted due to the influence of curbstones or other system malfunction. Since this may cause mechanical malfunction, che and steering component.	Procedure". ition where the steering D substances. This is not ck the suspension, axle
DAST 2 : Diagnosis Procedure	INFOID:000000013356885
1.CHECK THE STEERING ANGLE	F
Turn the steering wheel to right and left.	
Is the steering angle of right and left same?	576
YES >> GO TO 2.	SIC
NO >> Refer to <u>STC-473, "Symptom Table"</u> .	
2.PERFORM SELF-DIAGNOSIS	Н
(P)With CONSULT	
1. Turn the ignition switch ON.	
2. Erase self-diagnosis for "DAST 2".	I
3. Turn the ignition switch OFF and wait for at least 10 seconds.	
4. Start the engine.	
Never drive the vehicle.	J
5. Turn the steering wheel to the straight-ahead position. (There is no steering force	)
6. Perform self-diagnosis for "DAST 2".	
Is DTC "C13E8-00" detected?	K
<ul> <li>YES &gt;&gt; Replace steering angle sub control module. Refer to <u>STC-494</u>, "<u>Removal</u> NO</li> <li>&gt;&gt; Protection function is active by operating steering wheel under a cond angle is physically restricted due to the influence of curbstones or other system malfunction. Since this may cause mechanical malfunction, che and steering component.</li> </ul>	and Installation". ition where the steering substances. This is not ck the suspension, axle

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< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

### C13E9-00 BOOTING ANGLE PROCESSING DAST 1

### DAST 1 : DTC Description

INFOID:000000013356886

#### NOTE:

During engine start, the DTC "C13E9-00" may be detected due to temporary low voltage.

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13E9-00	BOOTING ANGLE PROCESSING (Booting angle processing)	The malfunction of processing to acquire angle information is de- tected when control module is starting.

#### POSSIBLE CAUSE

• The malfunction of processing information

#### FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".
- Is DTC "C13E9-00" detected?
- YES >> Proceed to diagnosis procedure. Refer to <u>STC-436. "DAST 1 : Diagnosis Procedure"</u>.
- NO >> INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356887

#### **1.**CHECK THE SELF-DIAGNOSTIC RESULT

#### With CONSULT

Start the engine.
 CAUTION:

#### Never drive the vehicle.

- 2. Perform self-diagnosis for "EPS/DAST 3" and "DAST 2".
- 3. Check the diagnostic result for "EPS/DAST 3", "DAST 1" and "DAST 2".

#### What is DTC detected?

Except C13E9-00, C13EB-00, C13EE-00, C13EF-00, C13F0-00, C13F1-00 or C13F2-00>>Refer to <u>STC-156, "DTC Index"</u> (EPS/DAST 3), <u>STC-169, "DTC Index"</u> (DAST 1), <u>STC-182, "DTC Index"</u> (DAST 2).

C13EE-00, C13EF-00, C13F0-00, C13F1-00 or C13F2-00>>GO TO 4.

C13E9-00 or C13EB-00>>GO TO 2.

#### **2.** AUTO ADJUSTING MODE (1)

1. Drive straight ahead at around 32 km/h (20 MPH) or more for more than 5 seconds.

#### < DTC/CIRCUIT DIAGNOSIS >

#### [DIRECT ADAPTIVE STEERING]

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#### CAUTION:

• Check the safety operation of the vehicle before driving. Bumps, pot holes, or other steering imput may affect the calibration. Drive on a straight flat road. Keep the steering wheel, so the vehicle stays in a straight line. Traffic condition that requires steering input may affect the calibration. Drive on a road with very light or no traffic. NOTE: Drive at 65 km/h (40 MPH) or less, as much as possible. It is easy to succeed with the work. 2. Stop the vehicle. 3. Turn the ignition switch OFF, and then turn it ON again. Does the power steering warning lamp turn OFF? YES >> WORK END NO-1 (Steering wheel is not off-center)>>Repeat the step 1-3 (driving - turning ignition switch OFF/ON) 5 times until the warning lamp turns OFF. When the waning lamp does not turn OFF, GO TO 3. NO-2 (Steering wheel is off-center)>>GO TO 3. **3.**AUTO ADJUSTING MODE (2) 1. When the vehicle has not yet stopped, stop the vehicle on the safety place. 2. Turn the ignition switch OFF, and then turn it ON again. 3. Turn the steering wheel to the center position. 4. Turn the steering wheel to left/right 90 degree or more from center position 2 times. 5. Drive straight ahead at around 32 km/h (20 MPH) or more for more than 5 seconds. **CAUTION:** · Check the safety operation of the vehicle before driving. Bumps, pot holes, or other steering imput may affect the calibration. Drive on a straight flat road. • Keep the steering wheel, so the vehicle stays in a straight line. Traffic condition that requires steering input may affect the calibration. Drive on a road with very light or no traffic. NOTE: Drive at 65 km/h (40 MPH) or less, as much as possible. It is easy to succeed with the work. During driving the vehicle, turn the steering wheel to the center position slowly. 7. Stop the vehicle. Turn the ignition switch OFF, and then turn it ON again. 8. Does the power steering warning lamp turn OFF? YES >> WORK END NO >> Repeat the step 3-8 (driving - turning ignition switch OFF/ON) 5 times until the warning lamp turns OFF. When the waning lamp does not turn OFF, GO TO 4. 4. PREPARATION 1 Set the front wheel on the turn table. NOTE: Do not lift up the vehicle during "DAST CALIBRATION (MODE1)" 2. Connect the battery charger to protect the 12V battery. NOTE: Much electricity is used in "DAST CALIBRATION (MODE1)". 3. Connect the CONSULT. 4. Turn the ignition switch ON. CAUTION: Never start the engine. >> GO TO 5. **5.** ECU CONFIGURATION (P)With CONSULT 1. Perform configuration for steering force control module. Refer to STC-212, "Work Procedure". NOTE:

The replacement of control module included in configuration is not required.

Perform configuration for steering angle main control module. Refer to <u>STC-214. "Work Procedure"</u>. NOTE:

The replacement of control module included in configuration is not required.

#### < DTC/CIRCUIT DIAGNOSIS >

3. Perform configuration for steering angle sub control module. Refer to <u>STC-216, "Work Procedure"</u>. **NOTE:** 

The replacement of control module included in configuration is not required.

#### >> GO TO 6.

**6.**DAST CALIBRATION (MODE1) [CLUTCH PHASE LEARNING]

#### With CONSULT

- 1. Perform "DAST CALIBRATION (MODE1)". Refer to STC-209, "Description".
- 2. Turn the ignition switch OFF.
  - CAUTION: Be sure to perform this step.

#### >> GO TO 7.

**7.**DAST CALIBRATION (MODE1) [STEERING RACK NEUTRAL POSITION LEARNING]

#### () With CONSULT

1. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

2. Perform "DAST CALIBRATION (MODE1)". Refer to STC-209, "Description".

>> GO TO 8.

#### $\mathbf{8}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

#### With CONSULT

- 1. On the CONSULT screen, select "ABS">>"WORK SUPPORT">>"ST ANGLE SENSOR ADJUSTMENT".
- 2. Touch START.
- CAUTION: Never touch

#### Never touch steering wheel while adjusting steering angle sensor.

- 3. After approx. 10 seconds, select "END".
- Turn ignition switch OFF, and then turn it ON again.
   CAUTION: Be sure to perform this step.

>> GO TO 9.

9.PERFORM SELF-DIAGNOSIS

#### (B) With CONSULT

- Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start the engine. CAUTION:

#### Never drive the vehicle.

3. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13E9-00" detected?

- YES >> Replace steering angle main control module, steering angle sub control module and steering force control module. Refer to <u>STC-493</u>, "<u>Removal and Installation</u>", <u>STC-494</u>, "<u>Removal and Installation</u>" and <u>STC-492</u>, "<u>Removal and Installation</u>". After replacing the control modules, confirm that DTC "C13E9-00" is not detected.
- NO >> WORK END

< DTC/CIRCUIT DIAGNOSIS >

## C13EA-00 BOOTING ANGLE PROCESSING EPS/DAST 3

### EPS/DAST 3 : DTC Description

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В

INFOID:000000013356888

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EA-00	BOOTING ANGLE PROCESSING (Booting angle processing)	The malfunction of processing to acquire angle information is de- tected when control module is starting.
POSSIBLE • The malfu	CAUSE	
FAIL-SAFE • Mode 2 NOTE: For fail-sa	fe mode, refer to <u>STC-125. "DIRECT /</u>	ADAPTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been t 10 seconds before conducting the net	n previously conducted, always turn ignition switch OFF and xt test.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
With CO Start th CAUTIO	NSULT e engine. ON:	
2. Perform	n self-diagnosis for "EPS/DAST 3".	
Is DTC "C1	3EA-00" detected?	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refe To check malfunction symptom before Confirmation after repair: INSPECTIO	er to <u>STC-439, "EPS/DAST 3 : Diagnosis Procedure"</u> . e repair: Refer to <u>GI-45, "Intermittent Incident"</u> . N END
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356889
<b>1.</b> CHECK	THE SELF-DIAGNOSTIC RESULT	
With CO 1. Start th	NSULT e engine.	
CAUTI Never	ON: drive the vehicle.	
2. Perform	n self-diagnosis for "DAST 1" and "DAS	ST 2".
What is DT	C detected with DTC "C13EA-00"?	, DAST I AND DAST 2.
C13C5-00 C13D1-00 C13D2-00	>Refer to <u>STC-338, "EPS/DAST 3 : D</u> >>Refer to <u>STC-358, "DAST 1 : Diagno</u> >>Refer to <u>STC-360, "EPS/DAST 3 :</u>	Diagnosis Procedure". osis Procedure". Diagnosis Procedure" (EPS/DAST 3), <u>STC-361, "DAST 1 :</u>
C13D3-00	Diagnosis Procedure" (DAST 1), STC >>Refer to STC-363, "EPS/DAST 3 : Diagnosis Procedure" (DAST 1), STC	<u>-362, "DAST 2 : Diagnosis Procedure"</u> (DAST 2). <u>Diagnosis Procedure"</u> (EPS/DAST 3), <u>STC-364, "DAST 1 :</u> -365, "DAST 2 : Diagnosis Procedure" (DAST 2)
C13D4-00	>>Refer to <u>STC-366</u> , "EPS/DAST 3 : <u>Diagnosis Procedure</u> " (DAST 1), STC	<u>Diagnosis Procedure</u> " (EPS/DAST 3), <u>STC-368, "DAST 1 :</u> -371, "DAST 2 : Diagnosis Procedure" (DAST 2).

< DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

C13D5-00>>Refer to STC-373, "EPS/DAST 3 : Diagnosis Procedure" (EPS/DAST 3), STC-374, "DAST 1 :
Diagnosis Procedure" (DAST 1), STC-375, "DAST 2 : Diagnosis Procedure" (DAST 2).
C13D6-00>>Refer to STC-376, "EPS/DAST 3 : Diagnosis Procedure" (EPS/DAST 3), STC-378, "DAST 1 :
<u>Diagnosis Procedure"</u> (DAST 1), <u>STC-381, "DAST 2 : Diagnosis Procedure"</u> (DAST 2).
C13D7-00>>Refer to STC-383, "EPS/DAST 3 : Diagnosis Procedure" (EPS/DAST 3), STC-384, "DAST 1 :
<u>Diagnosis Procedure</u> " (DAST 1), <u>STC-385, "DAST 2 : Diagnosis Procedure"</u> (DAST 2).

C13EB-00 BOOTING ANGLE PROCESSING		
< DTC/CIR	CUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]
C13EB- DAST 1	00 BOOTING ANGLE PROC	CESSING
DAST 1 :	DTC Description	INFOID:000000013356890
NOTE: During engi	ine start, the DTC "C13EB-00" may be de	etected due to temporary low voltage.
DTC DETE	ECTION LOGIC	C
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EB-00	BOOTING ANGLE PROCESSING (Booting angle processing)	The malfunction of processing to acquire angle information is de- tected when control module is starting.
POSSIBLE • The malfu FAIL-SAFE • Mode 2	E CAUSE unction of processing information	F
For fail-sa	afe mode, refer to <u>STC-125. "DIRECT AD</u>	DAPTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been p t 10 seconds before conducting the next	previously conducted, always turn ignition switch OFF and test.
>> <b>2.</b> dtc re	GO TO 2. PRODUCTION PROCEDURE	I
With CO 1. Start th CAUTI	NSULT e engine. ON:	J
Never 2. Perform	drive the vehicle. n self-diagnosis for "DAST 1".	K

- Is DTC "C13EB-00" detected?
- YES >> Proceed to diagnosis procedure. Refer to <u>STC-441, "DAST 1 : Diagnosis Procedure"</u>. NO >> INSPECTION END
- DAST 1 : Diagnosis Procedure
- 1. CHECK THE SELF-DIAGNOSTIC RESULT

#### With CONSULT

- Start the engine.
   CAUTION:
   Never drive the vehicle.
- Perform self-diagnosis for "EPS/DAST 3" and "DAST 2".
- 3. Check the diagnostic result for "EPS/DAST 3", "DAST 1" and "DAST 2".

#### What is DTC detected?

Except C13E9-00, C13EB-00, C13EE-00, C13EF-00, C13F0-00, C13F1-00 or C13F2-00>>Refer to <u>STC-156, "DTC Index"</u> (EPS/DAST 3), <u>STC-169, "DTC Index"</u> (DAST 1), <u>STC-182, "DTC Index"</u> (DAST 2).

C13EE-00, C13EF-00, C13F0-00, C13F1-00 or C13F2-00>>GO TO 4.

C13E9-00 or C13EB-00>>GO TO 2.

### **2.** AUTO ADJUSTING MODE (1)

1. Drive straight ahead at around 32 km/h (20 MPH) or more for more than 5 seconds.

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#### < DTC/CIRCUIT DIAGNOSIS >

#### CAUTION:

- Check the safety operation of the vehicle before driving.
- Bumps, pot holes, or other steering imput may affect the calibration. Drive on a straight flat road.
- Keep the steering wheel, so the vehicle stays in a straight line.
- Traffic condition that requires steering input may affect the calibration. Drive on a road with very light or no traffic.

NOTE:

Drive at 65 km/h (40 MPH) or less, as much as possible. It is easy to succeed with the work.

- 2. Stop the vehicle.
- 3. Turn the ignition switch OFF, and then turn it ON again.

#### Does the power steering warning lamp turn OFF?

#### YES >> WORK END

NO-1 (Steering wheel is not off-center)>>Repeat the step 1-3 (driving - turning ignition switch OFF/ON) 5 times until the warning lamp turns OFF. When the waning lamp does not turn OFF, GO TO 3.

NO-2 (Steering wheel is off-center)>>GO TO 3.

### **3.** AUTO ADJUSTING MODE (2)

- 1. When the vehicle has not yet stopped, stop the vehicle on the safety place.
- 2. Turn the ignition switch OFF, and then turn it ON again.
- 3. Turn the steering wheel to the center position.
- 4. Turn the steering wheel to left/right 90 degree or more from center position 2 times.
- 5. Drive straight ahead at around 32 km/h (20 MPH) or more for more than 5 seconds.

### CAUTION

- Check the safety operation of the vehicle before driving.
- Bumps, pot holes, or other steering imput may affect the calibration. Drive on a straight flat road.
- Keep the steering wheel, so the vehicle stays in a straight line.
- Traffic condition that requires steering input may affect the calibration. Drive on a road with very light or no traffic.

#### NOTE:

Drive at 65 km/h (40 MPH) or less, as much as possible. It is easy to succeed with the work.

- 6. During driving the vehicle, turn the steering wheel to the center position slowly.
- 7. Stop the vehicle.
- 8. Turn the ignition switch OFF, and then turn it ON again.

#### Does the power steering warning lamp turn OFF?

- YES >> WORK END
- NO >> Repeat the step 3-8 (driving turning ignition switch OFF/ON) 5 times until the warning lamp turns OFF. When the waning lamp does not turn OFF, GO TO 4.

#### 4.PREPARATION

- 1. Set the front wheel on the turn table. NOTE:
- Do not lift up the vehicle during "DAST CALIBRATION (MODE1)"
- Connect the battery charger to protect the 12V battery. NOTE:
  - Much electricity is used in "DAST CALIBRATION (MODE1)".
- 3. Connect the CONSULT.
- 4. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

>> GO TO 5.

### **5.**ECU CONFIGURATION

#### With CONSULT

 Perform configuration for steering force control module. Refer to <u>STC-212, "Work Procedure"</u>. NOTE:

The replacement of control module included in configuration is not required.

 Perform configuration for steering angle main control module. Refer to <u>STC-214. "Work Procedure"</u>. NOTE:

The replacement of control module included in configuration is not required.

C13EB-00 BOOTING ANGLE PROCESSING	
< DTC/CIRCUIT DIAGNOSIS > [DIRECT ADAPTIVE STEERING]	
<ol> <li>Perform configuration for steering angle sub control module. Refer to <u>STC-216, "Work Procedure"</u>.</li> </ol>	Δ
The replacement of control module included in configuration is not required.	A
>> GO TO 6.	В
O.DAST CALIBRATION (MODE1) [CLUTCH PHASE LEARNING]	
<ul> <li>With CONSULT</li> <li>Perform "DAST CALIBRATION (MODE1)". Refer to <u>STC-209, "Description"</u>.</li> <li>Turn the ignition switch OFF. CAUTION: Be sure to perform this step.</li> </ul>	C
>> GO TO 7.	_
<b>7.</b> DAST CALIBRATION (MODE1) [STEERING RACK NEUTRAL POSITION LEARNING]	E
<ul> <li>With CONSULT</li> <li>Turn the ignition switch ON.</li> <li>CAUTION: Never start the engine.</li> <li>Perform "DAST CALIBRATION (MODE1)". Refer to <u>STC-209. "Description"</u>.</li> </ul>	F
	010
>> GU IU 8. 8 AD HISTMENT OF STEEDING ANGLE SENSOD NEUTRAL DOSITION	Ц
<ol> <li>On the CONSULT screen, select "ABS"&gt;&gt;"WORK SUPPORT"&gt;&gt;"ST ANGLE SENSOR ADJUSTMENT".</li> <li>Touch START.</li> <li>CAUTION:</li> </ol>	I
<ol> <li>Never touch steering wheel while adjusting steering angle sensor.</li> <li>After approx. 10 seconds, select "END".</li> </ol>	.1
4. Turn ignition switch OFF, and then turn it ON again.	0
Be sure to perform this step.	K
	N
>> GU IU 9. Q dedeodmasele diagnosis	
	L
1. Turn ignition switch OFF and wait at least 10 seconds.	
2. Start the engine.	Μ
Never drive the vehicle.	
Is DTC "C13E9-00" detected?	Ν
<ul> <li>YES &gt;&gt; Replace steering angle main control module, steering angle sub control module and steering force control module. Refer to <u>STC-493</u>, "Removal and Installation", <u>STC-494</u>, "Removal and Installation" and <u>STC-492</u>, "Removal and Installation". After replacing the control modules, confirm that DTC "C13E9-00" is not detected.</li> <li>NO &gt;&gt; WORK END</li> </ul>	O
DASI 2: DIC Description	
<b>NOTE:</b> During engine start, the DTC "C13EB-00" may be detected due to temporary low voltage.	

DTC DETECTION LOGIC

#### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EB-00	BOOTING ANGLE PROCESSING (Booting angle processing)	The malfunction of processing to acquire angle information is de- tected when control module is starting.

#### POSSIBLE CAUSE

• The malfunction of processing information

FAIL-SAFE

- Mode 2
- NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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. Start the engine.

#### CAUTION:

- Never drive the vehicle.
- Perform self-diagnosis for "DAST 2".

#### Is DTC "C13EB-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-444, "DAST 2 : Diagnosis Procedure".
- NO >> INSPECTION END
- DAST 2 : Diagnosis Procedure

INFOID:000000013356893

#### **1.**CHECK THE SELF-DIAGNOSTIC RESULT

#### With CONSULT

1. Start the engine. CAUTION:

#### Never drive the vehicle.

- 2. Perform self-diagnosis for "EPS/DAST 3" and "DAST 1".
- 3. Check the diagnostic result for "EPS/DAST 3", "DAST 1" and "DAST 2".

#### What is DTC detected?

Except C13E9-00, C13EB-00, C13EE-00, C13EF-00, C13F0-00, C13F1-00 or C13F2-00>>Refer to <u>STC-156, "DTC Index"</u> (EPS/DAST 3), <u>STC-169, "DTC Index"</u> (DAST 1), <u>STC-182, "DTC Index"</u> (DAST 2).

C13EE-00, C13EF-00, C13F0-00, C13F1-00 or C13F2-00>>GO TO 4.

C13E9-00 or C13EB-00>>GO TO 2.

### **2.** AUTO ADJUSTING MODE (1)

- 1. Drive straight ahead at around 32 km/h (20 MPH) or more for more than 5 seconds. CAUTION:
  - · Check the safety operation of the vehicle before driving.
  - Bumps, pot holes, or other steering imput may affect the calibration. Drive on a straight flat road.
  - Keep the steering wheel, so the vehicle stays in a straight line.
  - Traffic condition that requires steering input may affect the calibration. Drive on a road with very light or no traffic.

NOTE:

Drive at 65 km/h (40 MPH) or less, as much as possible. It is easy to succeed with the work.

- 2. Stop the vehicle.
- 3. Turn the ignition switch OFF, and then turn it ON again.

< DTC/CIRCUIT DIAGNOSIS > Does the power steering warning lamp turn OFF? YES >> WORK END NO-1 (Steering wheel is not off-center)>>Repeat the step 1-3 (driving - turning ignition switch OFF/ON) 5 times until the warning lamp turns OFF. When the waning lamp does not turn OFF, GO TO 3. NO-2 (Steering wheel is off-center)>>GO TO 3.  $\mathbf{3.}$ AUTO ADJUSTING MODE (2)

1. When the vehicle has not yet stopped, stop the vehicle on the safety place. Turn the ignition switch OFF, and then turn it ON again. 2. Turn the steering wheel to the center position. 4. Turn the steering wheel to left/right 90 degree or more from center position 2 times. 5. Drive straight ahead at around 32 km/h (20 MPH) or more for more than 5 seconds. D **CAUTION:**  Check the safety operation of the vehicle before driving. Bumps, pot holes, or other steering imput may affect the calibration. Drive on a straight flat road. Е Keep the steering wheel, so the vehicle stays in a straight line. Traffic condition that requires steering input may affect the calibration. Drive on a road with very light or no traffic. NOTE: F Drive at 65 km/h (40 MPH) or less, as much as possible. It is easy to succeed with the work. During driving the vehicle, turn the steering wheel to the center position slowly. 7. Stop the vehicle. STC 8. Turn the ignition switch OFF, and then turn it ON again. Does the power steering warning lamp turn OFF? YES >> WORK END Н NO >> Repeat the step 3-8 (driving - turning ignition switch OFF/ON) 5 times until the warning lamp turns OFF. When the waning lamp does not turn OFF, GO TO 4. 4.PREPARATION 1. Set the front wheel on the turn table. NOTE: Do not lift up the vehicle during "DAST CALIBRATION (MODE1)" 2. Connect the battery charger to protect the 12V battery. NOTE: Much electricity is used in "DAST CALIBRATION (MODE1)". Connect the CONSULT. Κ 4. Turn the ignition switch ON. CAUTION: Never state or start the engine. L >> GO TO 5. 5. ECU CONFIGURATION M (P)With CONSULT Perform configuration for steering force control module. Refer to STC-212, "Work Procedure". Ν NOTE: The replacement of control module included in configuration is not required. Perform configuration for steering angle main control module. Refer to STC-214, "Work Procedure".

- NOTE: The replacement of control module included in configuration is not required.
- Perform configuration for steering angle sub control module. Refer to STC-216, "Work Procedure". NOTE:

The replacement of control module included in configuration is not required.

#### >> GO TO 6.

#### **O.**DAST CALIBRATION (MODE1) [CLUTCH PHASE LEARNING]

#### (P)With CONSULT

Perform "DAST CALIBRATION (MODE1)". Refer to STC-209, "Description".

#### **STC-445**

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< DTC/CIRCUIT DIAGNOSIS >

Turn the ignition switch OFF.
 CAUTION:
 Be sure to perform this step.

#### >> GO TO 7.

 $7. {\tt DAST CALIBRATION (MODE1) [STEERING RACK NEUTRAL POSITION LEARNING]}$ 

#### With CONSULT

- 1. Turn the ignition switch ON. CAUTION:
  - Never state or start the engine.
- 2. Perform "DAST CALIBRATION (MODE1)". Refer to STC-209. "Description".

#### >> GO TO 8.

#### $\mathbf{8}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

#### With CONSULT

- 1. On the CONSULT screen, select "ABS">>"WORK SUPPORT">>"ST ANGLE SENSOR ADJUSTMENT".
- 2. Touch START. CAUTION: Never touch steering wheel while adjusting steering angle sensor.
- 3. After approx. 10 seconds, select "END".
- 4. Turn ignition switch OFF, and then turn it ON again.
- CAUTION: Be sure to perform this step.

#### >> GO TO 9.

**9.**PERFORM SELF-DIAGNOSIS

#### (B) With CONSULT

- Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start the engine.

#### CAUTION: Never drive the vehicle.

3. Perform self-diagnosis for "DAST 2".

#### Is DTC "C13E9-00" detected?

- YES >> Replace steering angle main control module, steering angle sub control module and steering force control module. Refer to <u>STC-493</u>, "<u>Removal and Installation</u>", <u>STC-494</u>, "<u>Removal and Installation</u>" and <u>STC-492</u>, "<u>Removal and Installation</u>". After replacing the control modules, confirm that DTC "C13E9-00" is not detected.
- NO >> WORK END

### C13EE-00 INCOMP CONFIG EPS/DAST 3

### EPS/DAST 3 : DTC Description

INFOID:000000013356894

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### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EE-00	INCOMP CONFIG (Incomplete config)	Configuration of one control module at least in three control mod- ules is wrong or incomplete.
POSSIBLE • Configura	ECAUSE tion of one control module at least in th	ree control modules is wrong or incomplete.
FAIL-SAFE • Mode 3 <b>NOTE:</b> For fail-sa	fe mode, refer to <u>STC-125. "DIRECT A</u>	ADAPTIVE STEERING : Fail-safe"
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been t 10 seconds before conducting the nex	n previously conducted, always turn ignition switch OFF and tt test.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
With CO Start er CAUTI	NSULT ngine. ON:	
2 Perform	drive the vehicle. a self-diagnosis for "FPS/DAST 3"	
Is DTC "C1	<u>3EE-00" detected?</u>	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer To check malfunction symptom before Confirmation after repair: INSPECTIO	r to <u>STC-447, "EPS/DAST 3 : Diagnosis Procedure"</u> . repair: Refer to <u>GI-45, "Intermittent Incident"</u> . N END
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:0000000013356895
1.PERFOR	RM CONFIGURATION	
Perform co	nfiguration for each control module. Ref	er to <u>STC-212, "Work Procedure"</u> (EPS/DAST 3), <u>STC-214,</u>
	EQUIE (DAST 1), STC-216, WORK PROC	$\frac{1}{2}$
>>	GO TO 2.	
2.PERFOR	RM SELF-DIAGNOSIS	
With CO	NSULT	
<ol> <li>1. Turn th</li> <li>2. Erase s</li> </ol>	e ignition switch ON. self-diagnosis for "EPS/DAST 3".	
3. Turn th	e ignition switch OFF and wait for at lea	ast 10 seconds.
4. Start er	igine. ON:	
5 Perform	drive the vehicle.	
Is DTC "C1	3EE-00" detected?	

YES >> Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.

# NO >> INSPECTION END DAST 1

### DAST 1 : DTC Description

INFOID:000000013356896

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EE-00	INCOMP CONFIG (Incomplete config)	Configuration of one control module at least in three control mod- ules is wrong or incomplete.

#### POSSIBLE CAUSE

• Configuration of one control module at least in three control modules is wrong or incomplete.

#### FAIL-SAFE

Mode 3

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"

#### 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

- Start engine.
   CAUTION:
  - Never drive the vehicle.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13EE-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-448. "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356897

### **1.**PERFORM CONFIGURATION

Perform configuration for each control module. Refer to <u>STC-212, "Work Procedure"</u> (EPS/DAST 3), <u>STC-214,</u> "Work Procedure" (DAST 1), <u>STC-216, "Work Procedure"</u> (DAST 2).

#### >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start engine. CAUTION:

### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13EE-00" detected?

YES >> Replace steering angle main control module. Refer to STC-493, "Removal and Installation".

### DAST 2 : DTC Description

INFOID:000000013356898

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#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EE-00	INCOMP CONFIG (Incomplete config)	Configuration of one control module at least in three control mod- ules is wrong or incomplete.
POSSIBLE • Configura	E CAUSE ition of one control module at least in th	nree control modules is wrong or incomplete.
FAIL-SAFE • Mode 3 <b>NOTE:</b> For fail-sa	afe mode, refer to <u>STC-125, "DIRECT /</u>	ADAPTIVE STEERING : Fail-safe"
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been to second sec	n previously conducted, always turn ignition switch OFF and xt test.
	C C	
>> م	• GO TO 2.	
Z.DTC RE	PRODUCTION PROCEDURE	
With CO Start er	NSULT Daine	
CAUTI	ON:	
2. Perforn	drive the vehicle. n self-diagnosis for "DAST 2".	
Is DTC "C1	<u>3EE-00" detected?</u>	
YES >> NO-1 >> NO-2 >>	<ul> <li>Proceed to diagnosis procedure. Refe</li> <li>To check malfunction symptom before</li> <li>Confirmation after repair: INSPECTIO</li> </ul>	er to <u>STC-449, "DAST 2 : Diagnosis Procedure"</u> . e repair: Refer to <u>GI-45, "Intermittent Incident"</u> . N END
DAST 2 :	Diagnosis Procedure	INFCID:000000013356899
Porform cor	figuration for each control module. Bo	for to STC 212 "Work Procedure" (EPS/DAST 2) STC 214
<u>"Work Proc</u>	edure" (DAST 1), <u>STC-216, "Work Pro</u>	<u>cedure"</u> (DAST 2).
>>	GO TO 2	
2.PERFOR	RM SELF-DIAGNOSIS	
( With CO	NSULT	
1. Turn th	e ignition switch ON.	
2. Erase s 3. Turn th	self-diagnosis for "DAST 2". e ignition switch OFF and wait for at le	ast 10 seconds.
4. Start er	ngine.	
CAUTI Never	ON: drive the vehicle.	
5. Perforn	n self-diagnosis for "DAST 2".	

Is DTC "C13EE-00" detected?

YES >> Replace steering angle sub control module. Refer to STC-494, "Removal and Installation".

### C13EE-00 INCOMP CONFIG

< DTC/CIRCUIT DIAGNOSIS >

#### < DTC/CIRCUIT DIAGNOSIS >

# C13EF-00 CONFIG CHECK RESULT EPS/DAST 3

### EPS/DAST 3 : DTC Description

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	С
C13EF-00	CONFIG CHECK RESULT (Config checking result)	Configuration result of control module is malfunction.	D
POSSIBLE • Incomplet • Mistake of	CAUSE e of configuration for steering force control f configuration for steering force control mo	module dule	E
FAIL-SAFE • Mode 3 NOTE: For fail-sa	fe mode, refer to STC-125, "DIRECT ADAI	PTIVE STEERING : Fail-safe"	F
DTC CONF	FIRMATION PROCEDURE		ет
1.PRECON	NDITIONING		ы
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next tes	eviously conducted, always turn ignition switch OFF and st.	Н
>> <b>2.</b> dtc re	GO TO 2. PRODUCTION PROCEDURE		I
With COM 1. Start en CAUTION	NSULT gine. DN:		J
2. Perform	arive the vehicle. a self-diagnosis for "EPS/DAST 3". 3EF-00" detected?		K
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to a To check malfunction symptom before repar Confirmation after repair: INSPECTION EN	<u>STC-451, "EPS/DAST 3 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	L
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356901	
1.PERFOR	RM CONFIGURATION		M
Perform cor	figuration for control module. Refer to STC	C-212, "Work Procedure".	Ν
>> <b>2.</b> perfor	GO TO 2. RM SELF-DIAGNOSIS		0
With CO 1. Turn the 2. Erase s 3. Turn the 4. Start en CAUTIO	NSULT e ignition switch ON. elf-diagnosis for "EPS/DAST 3". e ignition switch OFF and wait for at least 1 igine. DN:	0 seconds.	Ρ
Never of 5. Perform Is DTC "C13	<b>drive the vehicle.</b> a self-diagnosis for "EPS/DAST 3". <u>3EF-00" detected?</u>		

YES >> Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.

#### STC-451

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#### < DTC/CIRCUIT DIAGNOSIS >

### NO >> INSPECTION END

#### DAST 1 : DTC Description

INFOID:000000013356902

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EF-00	CONFIG CHECK RESULT (Config checking result)	Configuration result of control module is malfunction.

#### POSSIBLE CAUSE

- Incomplete of configuration for steering angle main control module
- · Mistake of configuration for steering angle main control module
- · Incomplete of configuration for steering angle main control module

#### FAIL-SAFE

- Mode 3
- NOTE:

For fail-safe mode, refer to STC-125. "DIRECT ADAPTIVE STEERING : Fail-safe"

#### 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. Start engine.

CAUTION:

### Never drive the vehicle.

2. Perform self-diagnosis for "DAST 1".

Is DTC "C13EF-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-452, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356903

#### **1.**PERFORM CONFIGURATION

Perform configuration for control module. Refer to STC-214, "Work Procedure".

#### >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch ON.
- 2. Erase self-diagnosis for "DAST 1".
- 3. Turn the ignition switch OFF and wait for at least 10 seconds.
- 4. Start engine. CAUTION:

#### Never drive the vehicle.

5. Perform self-diagnosis for "DAST 1".

Is DTC "C13EF-00" detected?

### C13EF-00 CONFIG CHECK RESULT

#### < DTC/CIRCUIT DIAGNOSIS >

YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>. NO >> INSPECTION END DAST 2

### DAST 2 : DTC Description

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13EF-00	CONFIG CHECK RESULT (Config checking result)	Configuration result of control module is malfunction.
<ul><li>POSSIBLE</li><li>Incomplet</li><li>Mistake o</li></ul>	E CAUSE te of configuration for steering angle sub f configuration for steering angle sub co	control module ntrol module
FAIL-SAFE • Mode 3 <b>NOTE:</b> For fail-sa	fe mode, refer to <u>STC-125, "DIRECT AI</u>	DAPTIVE STEERING : Fail-safe"
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been t 10 seconds before conducting the next	previously conducted, always turn ignition switch OFF and t test.
>> 2.dtc re	GO TO 2. PRODUCTION PROCEDURE	
With CO 1. Start er CAUTI Never	NSULT ngine. ON: drive the vehicle.	
2. Perform	n self-diagnosis for "DAST 2". 3EE-00" detected?	
YES >> NO-1 >> NO-2 >>	<ul> <li>Proceed to diagnosis procedure. Refer</li> <li>To check malfunction symptom before r</li> <li>Confirmation after repair: INSPECTION</li> </ul>	to <u>STC-449, "DAST 2 : Diagnosis Procedure"</u> . repair: Refer to <u>GI-45, "Intermittent Incident"</u> . I END
DAST 2 :	Diagnosis Procedure	INFOID:000000013356905
1.PERFOR	RM CONFIGURATION	
Perform co	nfiguration for control module. Refer to S	STC-216, "Work Procedure".
>> 2 =====	GO TO 2.	
	RM SELF-DIAGNOSIS	
<ul> <li>With CO</li> <li>1. Turn th</li> <li>2. Erase s</li> <li>3. Turn th</li> <li>4. Start er</li> </ul>	NSULT e ignition switch ON. self-diagnosis for "DAST 2". e ignition switch OFF and wait for at leas ngine. ON:	st 10 seconds.
5. Perform	drive the vehicle.	

Is DTC "C13EF-00" detected?

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#### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

- >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.
  >> INSPECTION END YES
- NO

### C13F0-00 INCOMP DAST CALIBRATION EPS/DAST 3

### EPS/DAST 3 : DTC Description

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition
C13F0-00	INCOMP DAST CALIBRATION (Incomplete direct adaptive steering calibration)	Initial learning of direct adaptive steering is incomplete.
POSSIBLE • Incomplet	E CAUSE te of direct adaptive steering initial learning.	·
FAIL-SAFE • Mode 2 NOTE: For fail-sa	afe mode, refer to <u>STC-125. "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECO	NDITIONING	S
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.
>> <b>2.</b> dtc re	GO TO 2. PRODUCTION PROCEDURE	
With CO	NSULT	
2. Perform	n self-diagnosis for "EPS/DAST 3".	
YES >> NO-1 >> NO-2 >>	<ul> <li>Proceed to diagnosis procedure. Refer to</li> <li>To check malfunction symptom before rep</li> <li>Confirmation after repair: INSPECTION EI</li> </ul>	<u>STC-455, "EPS/DAST 3 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
EPS/DAS	ST 3 : Diagnosis Procedure	INFOID:000000013356907
1.PERFOR	RM CALIBRATION	
Perform the STC-203, "	e working including "DAST CALIBRATION ( Work Procedure".	(MODE1)" performed just before from the first. Refer to
>> <b>2.</b> PERFOR	GO TO 2. RM SELF-DIAGNOSIS	
With CO 1. Turn th 2. Erase s	<b>NSULT</b> e ignition switch ON. self-diagnosis for "EPS/DAST 3".	
<ol> <li>Turn th</li> <li>Turn th</li> <li>Perform</li> </ol>	e ignition switch OFF and wait for at least 1 e ignition switch ON. n self-diagnosis for "EPS/DAST 3".	0 seconds.
Is DTC "C1 YES >> NO >>	<u>3F0-00" detected?</u> · Replace steering force control module. Re · INSPECTION END	fer to STC-492. "Removal and Installation".

DAST 1

### STC-455

А

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#### C13F0-00 INCOMP DAST CALIBRATION

#### < DTC/CIRCUIT DIAGNOSIS >

#### DAST 1 : DTC Description

INFOID:000000013356908

[DIRECT ADAPTIVE STEERING]

#### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13F0-00	INCOMP DAST CALIBRATION (Incomplete direct adaptive steering calibration)	Initial learning of direct adaptive steering is incomplete.

#### POSSIBLE CAUSE

• Incomplete of direct adaptive steering initial learning.

#### FAIL-SAFE

- Mode 2
  - NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "C13F0-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-456, "DAST 1 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356909

#### **1.**PERFORM CALIBRATION

Perform the working including "DAST CALIBRATION (MODE1)" performed just before from the first. Refer to <u>STC-203, "Work Procedure"</u>.

#### >> GO TO 2.

#### 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

#### Is DTC "C13F0-00" detected?

#### YES >> Replace steering angle main control module. Refer to <u>STC-493. "Removal and Installation"</u>.

NO >> INSPECTION END

#### DAST 2

#### DAST 2 : DTC Description

DTC DETECTION LOGIC

#### STC-456

### C13F0-00 INCOMP DAST CALIBRATION

#### < DTC/CIRCUIT DIAGNOSIS >

#### [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13F0-00	INCOMP DAST CALIBRATION (Incomplete direct adaptive steering calibration)	Initial learning of direct adaptive steering is incomplete.
POSSIBLE	CAUSE	
Incomplet	e of direct adaptive steering initial learning. -	
<ul> <li>FAIL-SAFE</li> <li>Mode 2</li> <li>NOTE: For fail-sa</li> </ul>	: Ife mode, refer to <u>STC-125, "DIRECT ADA</u>	PTIVE STEERING : Fail-safe".
DTC CON	FIRMATION PROCEDURE	
1.PRECOM	NDITIONING	
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre t 10 seconds before conducting the next te	eviously conducted, always turn ignition switch OFF and st.
>>	GO TO 2.	
2.DTC RE	PRODUCTION PROCEDURE	
	NSULT	
1. Turn the	e ignition switch ON. self-diagnosis for "DAST 2"	
Is DTC "C1;	<u>3F0-00" detected?</u>	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION EI	<u>STC-457, "DAST 2 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 2 :	Diagnosis Procedure	INFOID:000000013356911
1.PERFOF	RM CALIBRATION	
Perform the STC-203, "\	e working including "DAST CALIBRATION ( Work Procedure".	(MODE1)" performed just before from the first. Refer to
>>	GO TO 2.	
2.PERFOF	RM SELF-DIAGNOSIS	
	NSULT	
1. Turn the 2 Frase s	e ignition switch ON. self-diagnosis for "DAST 2"	
3. Turn the	e ignition switch OFF and wait for at least 1	0 seconds.
4. Turn the 5. Perform	e ignition switch ON. n self-diagnosis for "DAST 2".	
<u>ls DTC "C1;</u>	3F0-00" detected?	
YES >> NO >>	Replace steering angle sub control module INSPECTION END	e. Refer to STC-494, "Removal and Installation".

### C13F1-00 INCOMP ST ANG SEN ADJST EPS/DAST 3

### **EPS/DAST 3 : DTC Description**

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13F1-00	INCOMP ST ANG SEN ADJST Incomplete steering angle sensor adjustment	Steering angle sensor neutral position adjustment is incomplete

#### POSSIBLE CAUSE

• In complete of steering angle sensor neutral position adjustment

#### FAIL-SAFE

Mode 2

NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13F1-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-458, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

INFOID:000000013356913

#### **1.**PERFORM CALIBRATION

Perform the working including "DAST CALIBRATION (MODE1)" performed just before from the first. Refer to <u>STC-203, "Work Procedure"</u>.

#### >> GO TO 2.

 $\mathbf{2}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust neutral position of steering angle sensor. Refer to <u>BRC-91, "Work Procedure"</u>.

#### >> GO TO 3.

#### **3.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

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

Is DTC "C13F1-00" detected?

#### **STC-458**

< DTC/	CIRCUIT DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]
YES	>> Replace steering force control module. Refer to <u>STC-49</u>	2. "Removal and Installation".
NO		

C13F1-00 INCOMP ST ANG SEN ADJST

#### C13F2-00 MISMATCHED SOFTWARE VERSION

< DTC/CIRCUIT DIAGNOSIS >

### [DIRECT ADAPTIVE STEERING]

### C13F2-00 MISMATCHED SOFTWARE VERSION EPS/DAST 3

### EPS/DAST 3 : DTC Description

INFOID:000000013356914

### DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13F2-00	DIFFERENT SOFTWARE VERSION (Different software version)	The software version of each control module is different.

#### POSSIBLE CAUSE

• The software version of steering force control module, steering angle main control module and steering angle main control module is different.

#### FAIL-SAFE

- Mode 2 or Mode 3
  - NOTE:

For fail-safe mode, refer to <u>STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe"</u>.

#### 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 ON.
- 2. Perform self-diagnosis for "EPS/DAST 3".

#### Is DTC "C13F2-00" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-460, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### EPS/DAST 3 : Diagnosis Procedure

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INFOID:000000013356915

**1.**CHECK THE WORK

Check the work performed just before.

What is the work performed just before?

RE/PROGRAMMING>>Perform the "RE/PROGRAMMING" according to the procedure.Refer to "CONSULT Operation Manual",

Replacing control module>>When replacing the control module, replace three control modules as a set. Refer to <u>STC-492, "Removal and Installation"</u>, <u>STC-493, "Removal and Installation"</u>, <u>STC-494,</u> <u>"Removal and Installation"</u>. After replacing three control modules, perform the self-diagnosis again, and then check that DTC"C13F2-00" is not detected.

DAST 1

DAST 1 : DTC Description

DTC DETECTION LOGIC

### C13F2-00 MISMATCHED SOFTWARE VERSION

#### < DTC/CIRCUIT DIAGNOSIS >

#### [DIRECT ADAPTIVE STEERING]

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13F2-00	DIFFERENT SOFTWARE VERSION (Different software version)	The software version of each control module is different.
POSSIBLE • The softw angle mai	CAUSE are version of steering force control mod n control module is different.	lule, steering angle main control module and steering
AIL-SAFE Mode 2 or <b>NOTE:</b> For fail-sa	Mode 3	PTIVE STEERING : Fail-safe"
TC CONF	FIRMATION PROCEDURE	TIVE OTEENING . Fail Sale .
If "DTC COI wait at least	NFIRMATION PROCEDURE" has been pre 10 seconds before conducting the next tee	eviously conducted, always turn ignition switch OFF and st.
>> 2.DTC REI	GO TO 2. PRODUCTION PROCEDURE	
With COI Turn the Content of the United States of	NSULT e ignition switch ON. n self-diagnosis for "DAST 1". 3F2-00" detected?	
YES >> NO-1 >> NO-2 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before rep Confirmation after repair: INSPECTION EI	<u>STC-460, "EPS/DAST 3 : Diagnosis Procedure"</u> . air: Refer to <u>GI-45, "Intermittent Incident"</u> . ND
DAST 1 :	Diagnosis Procedure	INFOID:0000000013356917
1.снеск	THE WORK	
Check the w	vork performed just before.	
<u>What is the</u> RE/PROG	work performed just before? RAMMING>>Perform the "RE/PROGRAM Operation Manual",	MING" according to the procedure.Refer to "CONSULT
Replacing	control module>>When replacing the con Refer to <u>STC-492, "Removal and Installa</u> " <u>Removal and Installation</u> ". After replacing again and then check that DTC"C13E2-00	ation", <u>STC-493</u> , " <u>Removal and Installation</u> ", <u>STC-494</u> , <u>STC-493</u> , " <u>Removal and Installation</u> ", <u>STC-494</u> , <u>STC-494</u>
DAST 2		
DAST 2 :	DTC Description	INFOID:000000013356918
OTC DETE	CTION LOGIC	
DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C13F2-00	DIFFERENT SOFTWARE VERSION (Different software version)	The software version of each control module is different.

#### POSSIBLE CAUSE

• The software version of steering force control module, steering angle main control module and steering angle main control module is different.

#### FAIL-SAFE

• Mode 2 or Mode 3

### **C13F2-00 MISMATCHED SOFTWARE VERSION**

< DTC/CIRCUIT DIAGNOSIS >

#### NOTE:

For fail-safe mode, refer to STC-125, "DIRECT ADAPTIVE STEERING : Fail-safe".

#### 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 ON.

2. Perform self-diagnosis for "DAST 2".

Is DTC "C13F2-00" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>STC-460, "EPS/DAST 3 : Diagnosis Procedure"</u>.

- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 2 : Diagnosis Procedure

INFOID:000000013356919

#### **1.**CHECK THE WORK

Check the work performed just before.

What is the work performed just before?

RE/PROGRAMMING>>Perform the "RE/PROGRAMMING" according to the procedure.Refer to "CONSULT Operation Manual",

Replacing control module>>When replacing the control module, replace three control modules as a set. Refer to <u>STC-492</u>, "<u>Removal and Installation</u>", <u>STC-493</u>, "<u>Removal and Installation</u>", <u>STC-494</u>, "<u>Removal and Installation</u>". After replacing three control modules, perform the self-diagnosis again, and then check that DTC"C13F2-00" is not detected.

### U1000-01 CAN COMM CIRCUIT EPS/DAST 3

### EPS/DAST 3 : DTC 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 DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition	Ε
U1000-01	CAN COMM CIRCUIT (CAN communication circuit)	Steering force control module is not transmitting/receiving CAN communication signal for 2 seconds or more.	_
POSSIBLE	CAUSE		Г
<ul><li>CAN com</li><li>CAN com</li></ul>	munication error munication line		STO
FAIL-SAFE	1		
<ul> <li>System co</li> </ul>	ontinue normal control.		Н
DTC CONI	FIRMATION PROCEDURE		11
1.PRECO	NDITIONING		
If "DTC CO wait at leas	NFIRMATION PROCEDURE" has been provide the second s	reviously conducted, always turn ignition switch OFF and est.	
>>	GO TO 2.		J
2.dtc re	PRODUCTION PROCEDURE		
With CO	NSULT		Κ
1. Turn th 2 Perform	e ignition switch ON. self-diagnosis for "EPS/DAST 3"		
Is DTC "U1	000-01" detected?		I
YES >> NO-1 >>	Proceed to diagnosis procedure. Refer to To check malfunction symptom before re	STC-463, "EPS/DAST 3 : Diagnosis Procedure". pair: Refer to <u>GI-45, "Intermittent Incident"</u> .	L
			$\mathbb{M}$
EPS/DAS	31 3 : Diagnosis Procedure	INFOID:000000013356921	
Proceed to DAST 1	LAN-41, "Trouble Diagnosis Flow Chart".		Ν
DAST 1 :	DTC Description	INFOID:000000013356922	0
CAN (Contr	oller Area Network) is a serial communica	ation line for real time application. It is an on-vehicle mul-	

tiplex 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 (CANH 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 DETECTION LOGIC

#### STC-463

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### U1000-01 CAN COMM CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
U1000-01	CAN COMM CIRCUIT (CAN communication circuit)	Steering angle main control module is not transmitting/receiving CAN communication signal for 2 seconds or more.

#### POSSIBLE CAUSE

- CAN communication error
- CAN communication line

#### FAIL-SAFE

• System continue normal control.

#### 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 ON.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "U1000-01" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-464. "DAST 1 : Diagnosis Procedure"</u>.
- NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356923

Proceed to LAN-41, "Trouble Diagnosis Flow Chart".

### U1010-49 CONTROL UNIT (CAN) EPS/DAST 3

#### **EPS/DAST 3 : DTC 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 DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Е
U1010-49	CONTROL UNIT(CAN)	When detecting error during the initial diagnosis of CAN controller to steering force control module.	
POSSIBLE	CAUSE		F
<ul> <li>Steering f</li> </ul>	orce control module internal error		
FAIL-SAFE	E		ст
<ul> <li>System co</li> </ul>	ontinue normal control.		ы
DTC CON	FIRMATION PROCEDURE		
1.PRECO	NDITIONING		Н
If "DTC CO	NFIRMATION PROCEDURE" has been pr	eviously conducted, always turn ignition switch OFF and	
wait at least	t 10 seconds before conducting the next te	est.	
	60 10 2		
2 DTC DE			
			J
( With CO) Turn th	NSULT e ignition switch ON		
2. Perform	n self-diagnosis for "EPS/DAST 3".		Κ
<u>Is DTC "U1</u>	010-49" detected?		
YES >>	Proceed to diagnosis procedure. Refer to	STC-463, "EPS/DAST 3 : Diagnosis Procedure".	
NO-1 >> NO-2 >>	Confirmation after repair: INSPECTION E	pair: Refer to <u>GI-45, "Intermittent Incident"</u> . ND	L
EPS/DAS	ST 3 : Diagnosis Procedure	INF01D:000000013356925	5.4
	RM SELE-DIAGNOSIS		IVI
1. Turn th	e ianition switch ON.		Ν
2. Erase s	self-diagnosis for "EPS/DAST 3".		
3. Turn the	e ignition switch OFF and wait for at least	10 seconds.	0
5. Perforn	n self-diagnosis for "EPS/DAST 3".		0
<u>Is DTC "U1</u>	010-49" detected?		
YES >>	Replace steering force control module. R	efer to STC-492, "Removal and Installation".	Ρ
NO >>	Check enlarged contact spring of termin     Derform intermittent insident while turning	nal. Refer to <u>GI-42, "How to Check Terminal"</u> .	
DAST 1		ng steening wheel. Relef to <u>GI-45, internittent incldent</u> .	

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#### U1010-49 CONTROL UNIT (CAN)

#### < DTC/CIRCUIT DIAGNOSIS >

### [DIRECT ADAPTIVE STEERING]

#### DAST 1 : DTC Description

INFOID:000000013356926

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 DETECTION LOGIC

DTC	Display item	Malfunction detected condition
U1010-49	CONTROL UNIT(CAN)	When detecting error during the initial diagnosis of CAN controller to steering angle main control module.

#### POSSIBLE CAUSE

• Steering angle main control module internal error

FAIL-SAFE

· System continue normal control.

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 ON.
- 2. Perform self-diagnosis for "DAST 1".

#### Is DTC "U1010-49" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-463, "EPS/DAST 3 : Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: INSPECTION END

#### DAST 1 : Diagnosis Procedure

INFOID:000000013356927

#### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

NO

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

#### Is DTC "U1010-49" detected?

- YES >> Replace steering angle main control module. Refer to <u>STC-493, "Removal and Installation"</u>.
  - >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
    - Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

#### POWER SUPPLY AND GROUND CIRCUIT [DIRECT ADAPTIVE STEERING] < DTC/CIRCUIT DIAGNOSIS > POWER SUPPLY AND GROUND CIRCUIT А **Diagnosis** Procedure INFOID:000000013356929 1. CHECK STEERING FORCE CONTROL MODULE GROUND CIRCUIT 1. Turn the ignition switch OFF. 2. Disconnect steering force control module harness connector. Check the continuity between control module harness connector and ground. 3. Steering force control module Continuity Connector Terminal D M72 33 Existed Ground Is the inspection result normal? >> GO TO 2. YES NO >> Repair open circuit in harness or connectors. **2.**CHECK STEERING ANGLE MAIN CONTROL MODULE GROUND CIRCUIT Disconnect steering angle main control module harness connector. 1. 2. Check the continuity between control module harness connector and ground. STC Steering angle main control module Continuity Terminal Connector E27 33 Н Ground Existed E28 39 Is the inspection result normal? YES >> GO TO 3. NO >> Repair open circuit in harness or connectors. ${\it 3.}$ check steering angle sub control module ground circuit 1. Disconnect steering angle sub control module harness connector. Check the continuity between control module harness connector and ground. 2. Steering angle sub control module Continuity Connector Terminal E30 33 Ground Existed F31 39

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit in harness or connectors.

#### **4.**CHECK STEERING FORCE CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Disconnect steering force control module harness connector.

2. Check the voltage between steering force control module harness connector and ground.

Steering force control module			Continuity	
Connector	Terminal			
M72	34	Ground	10.5 – 16.0 V	Р

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

**5.**CHECK STEERING FORCE CONTROL MODULE POWER SUPPLY CIRCUIT (2)

1. Check the 60A fusible link (#G).

### STC-467

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### POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

2. Check the harness for open or short between steering force control module harness connector No.34 terminal and the 60A fusible link (#G).

Is the inspection result normal?

YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-</u> ing Diagram - <u>BATTERY POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

**6.**CHECK STEERING ANGLE MAIN CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Turn the ignition switch OFF.

2. Disconnect steering angle main control module harness connector.

3. Check the voltage between steering angle main control module harness connector and ground.

Steering angle main control module			Continuity
Connector	Terminal		
E27	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

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

- 1. Check the 100A fusible link (#J).
- 2. Check the harness for open or short between steering angle main control module harness connector No.34 terminal and the 100A fusible link (#J).

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-</u> ing Diagram - <u>BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

**8.**CHECK STEERING ANGLE SUB CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Turn the ignition switch OFF.

- 2. Disconnect steering angle sub control module harness connector.
- 3. Check the voltage between steering angle sub control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal	_	Continuity
E30	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

**9.**CHECK STEERING ANGLE SUB CONTROL MODULE POWER SUPPLY CIRCUIT (2)

- 1. Check the 100A fusible link (#H).
- 2. Check the harness for open or short between steering angle sub control module harness connector No.34 terminal and the 100A fusible link (#H).

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-</u> ing Diagram - <u>BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

#### 10. CHECK IGNITION POWER SUPPLY FOR STEERING ANGLE MAIN CONTROL MODULE

1. Turn the ignition switch OFF.

- 2. Disconnect steering angle main control module harness connector.
- 3. Check the voltage between steering angle main control module harness connector and ground.
# POWER SUPPLY AND GROUND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

			_	Continuity	
Connector	Termina				
E26	25		Ground	0 V	
Check the voltage	switch ON. e between steering ang	gle control module ha	arness connector	and ground.	
Steering a	ngle main control module			Continuity	
Connector	Termina	al	_	Continuity	
E26	25		Ground	10.5 – 16.0 V	
<pre>/ES &gt;&gt; INSPECT NO &gt;&gt; GO TO 1 1.CHECK IGNITIO Turn the ignition s Disconnect steeri Check the contin aub control module</pre>	TION END. 1. IN POWER SUPPLY C switch OFF. ng angle sub control m uity between steering a	CIRCUIT (1) nodule harness conn angle main control n	ector. nodule harness co	onnector and steering	
Sub control modu	ain control module	Steering angle	sub control module		
Connector	Terminal	Connector	Terminal	minal Continuity 27 Existed	
E26	25	E29	27	Existed	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	2. replace error-detected IAL CIRCUIT IN STEE	l parts. RING ANGLE SUB sub control module	CONTROL MODU	JLE als.	
YES >> GO TO 1 NO >> Repair or 2.CHECK INTERN heck the continuity b	It normal? 2. replace error-detected IAL CIRCUIT IN STEE between steering angle Steering angle sub control	I parts. RING ANGLE SUB sub control module module	CONTROL MODU	JLE als. Continuity	
YES >> GO TO 1 NO >> Repair or 2.CHECK INTERN heck the continuity to 25	It normal? 2. replace error-detected IAL CIRCUIT IN STEE between steering angle Steering angle sub control Terminal	a parts. RING ANGLE SUB sub control module module 27	CONTROL MODU	JLE als. Continuity Existed	
YES $>>$ GO TO 1 NO $>>$ Repair or <b>2.</b> CHECK INTERN theck the continuity to 25 the inspection result YES $>>$ GO TO 13 NO $>>$ Replace so <b>3.</b> CHECK IGNITIC . Check the voltage	It normal? 2. replace error-detected IAL CIRCUIT IN STEE between steering angle Steering angle sub control Terminal It normal? 3. steering angle sub control DN POWER SUPPLY F	a parts. RING ANGLE SUB sub control module module 27 trol module. Refer to OR STEERING ANG gle sub control modu	CONTROL MODU connector termina <u>STC-494, "Remo</u> GLE SUB CONTR le harness connec	JLE als. Continuity Existed Val and Installation". OL MODULE ctor and ground.	
$\frac{110 \text{ inspection result}}{\text{YES}} >> \text{GO TO 1}}{\text{NO}} >> \text{Repair or}$ $\frac{2.\text{CHECK INTERN}}{heck the continuity the $	It normal? 2. replace error-detected IAL CIRCUIT IN STEE between steering angle Steering angle sub control Terminal It normal? 3. steering angle sub control DN POWER SUPPLY F e between steering angle	a parts. RING ANGLE SUB sub control module module 27 trol module. Refer to OR STEERING ANG gle sub control modu	CONTROL MODU connector termina <u>STC-494, "Remo</u> GLE SUB CONTR le harness connec	JLE als. Continuity Existed Val and Installation". OL MODULE ctor and ground.	
$\frac{110 \text{ inspection result}}{28} >> \text{GO TO 1} \\ 10 >> \text{Repair or} \\ \textbf{2.CHECK INTERN} \\ 10  heck the continuity the cont$	It normal?         2.         replace error-detected         IAL CIRCUIT IN STEE         between steering angle         Steering angle sub control         Terminal         It normal?         3.         steering angle sub control         DN POWER SUPPLY F         be between steering angle         ungle sub control module         Terminal	I parts. RING ANGLE SUB sub control module module 27 trol module. Refer to OR STEERING ANG gle sub control modu	CONTROL MODU connector termina STC-494, "Remo GLE SUB CONTR le harness connec	JLE als. Continuity Existed Val and Installation". OL MODULE ctor and ground. Continuity	
ES >> GO TO 1 IO >> Repair or 2.CHECK INTERN leck the continuity to 25 the inspection result ES >> GO TO 13 IO >> Replace so 3.CHECK IGNITIC Check the voltage Steering at Connector E29	In normal?         2.         replace error-detected         IAL CIRCUIT IN STEE         between steering angle         Steering angle sub control         Terminal         It normal?         3.         steering angle sub control         DN POWER SUPPLY F         e between steering angle         ingle sub control module         Terminal         2.	a parts. RING ANGLE SUB sub control module module 27 trol module. Refer to OR STEERING ANG gle sub control modu	CONTROL MODU connector termina STC-494, "Remo GLE SUB CONTR le harness connea 	JLE als. Continuity Existed val and Installation". OL MODULE ctor and ground. Continuity 0 V	
$\frac{113332}{128} >> GO TO 1$ $\frac{123}{10} >> Repair or$ $\frac{2.CHECK INTERN}{2.CHECK INTERN}$ $\frac{25}{10}$	2. replace error-detected IAL CIRCUIT IN STEE between steering angle Steering angle sub control Terminal It normal? 3. steering angle sub control N POWER SUPPLY F be between steering angle sub control module Termina 25 switch ON. be between steering angle	a parts. RING ANGLE SUB sub control module module 27 trol module. Refer to OR STEERING ANG gle sub control module al al gle control module ha	CONTROL MODU connector termina STC-494, "Remo GLE SUB CONTR le harness connector Ground	JLE als. Continuity Existed val and Installation". OL MODULE ctor and ground. Continuity 0 V and ground.	
YES >> GO TO 1 NO >> Repair or 2.CHECK INTERN heck the continuity to 25 the inspection resu YES >> GO TO 1 NO >> Replace of 3.CHECK IGNITIC Check the voltage Steering a Connector E29 Turn the ignition of Check the voltage	In normal?         2.         replace error-detected         IAL CIRCUIT IN STEE         between steering angle         Steering angle sub control         Terminal         It normal?         3.         steering angle sub control         ON POWER SUPPLY F         e between steering angle         ingle sub control module         Terminal         25         switch ON.         e between steering angle	a parts. RING ANGLE SUB sub control module module 27 trol module. Refer to OR STEERING ANG gle sub control module al gle control module ha	CONTROL MODU connector termina 9 <u>STC-494, "Remo</u> GLE SUB CONTR le harness connector Ground arness connector	JLE als. Continuity Existed val and Installation". OL MODULE ctor and ground. Continuity 0 V and ground.	
$\frac{110 \text{ inspection result}}{\text{YES}} >> \text{GO TO 1}}{\text{NO}} >> \text{Repair or} \\ \textbf{2.CHECK INTERN} \\ heck the continuity the continuity the continuity the continuity the continuity the continuity the content of the continuity the content of the c$	In normal?         2.         replace error-detected         IAL CIRCUIT IN STEE         between steering angle         Steering angle sub control         Terminal         It normal?         3.         steering angle sub control         DN POWER SUPPLY F         e between steering angle         ungle sub control module         Terminal         25         switch ON.         e between steering angle         ungle sub control module         Terminal         25         switch ON.         e between steering angle         ungle sub control module         Termina         25	a parts. RING ANGLE SUB a sub control module module 27 trol module. Refer to COR STEERING AND gle sub control module al gle control module has al	CONTROL MODU connector termina STC-494, "Remo GLE SUB CONTR le harness connector Ground arness connector	JLE als. Continuity Existed Val and Installation". OL MODULE ctor and ground. Continuity 0 V and ground.	

Revision: November 2016

# POWER SUPPLY AND GROUND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

# 14. CHECK IGNITION POWER SUPPLY CIRCUIT (2)

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.
- 3. Check the continuity between steering angle sub control module harness connector and steering force control module harness connector.

Steering angle so	Steering angle sub control module		Steering force control module		
Connector	Terminal	Connector	Terminal	Continuity	
E29	25	M71	27	Existed	

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair or replace error-detected parts.

15. CHECK INTERNAL CIRCUIT IN STEERING FORCE CONTROL MODULE

Check the continuity between steering force control module connector terminals.

Steering force	Continuity	
Steering force control module Terminal		Continuity
25	27	Existed

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.

16. Check ignition power supply for steering force control module

1. Check the voltage between steering force control module harness connector and ground.

Steering force	control module		Continuity
Connector	Terminal		Continuity
M71	25	Ground	0 V

2. Turn the ignition switch ON.

3. Check the voltage between force control module harness connector and ground.

Steering force	control module		Continuity
Connector	Terminal		Continuity
M71	25	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> • Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
 • Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

```
NO >> GO TO 17.
```

**17.**CHECK IGNITION POWER SUPPLY CIRCUIT (3)

- 1. Turn the ignition switch OFF.
- 2. Check the 10A fuse (#12).
- 3. Disconnect fuse block (J/B) harness connector.
- 4. Check the continuity between steering force control module connector and fuse block (J/B).

Steering force	control module	Fuse block (J/B)		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M71	25	M133	20C	Existed	

5. Check the continuity between steering force control module connector and ground.

# POWER SUPPLY AND GROUND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Steering force control module			Oradiavity	A	
	Connector	Terminal		Continuity	
	M71	25	Ground	Not existed	
Is the ir	nspection result norr	nal?			В
YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to <u>PG-65, "VR30DDTT : Wir-</u> ing Diagram - IGNITION POWER SUPPLY -".					
NO	>> Repair or repla	ce error-detected parts.			С

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### < DTC/CIRCUIT DIAGNOSIS >

# POWER STEERING WARNING LAMP

# **Component Function Check**

# **1.**CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP

Check that the power steering warning lamp turns ON when ignition switch turns ON. Then, 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 <u>STC-467, "Diagnosis Procedure"</u>

# Diagnosis Procedure

**1.**PERFORM SELF-DIAGNOSIS

# 

Perform self-diagnosis for "EPS/DAST 3", "DAST 1" and "DAST 2".

# Is any DTC detected?

YES >> Check the DTC. Refer to <u>STC-156, "DTC Index"</u> (EPS/DAST 3), <u>STC-169, "DTC Index"</u> (DAST 1) and <u>STC-182, "DTC Index"</u> (DAST 2).

NO >> GO TO 2.

**2.**CHECK POWER STEERING WARNING LAMP SIGNAL

### With CONSULT

- 1. Turn the ignition switch ON.
- 2. On CONSULT screen, select "METER/M&A" >> "DATA MONITOR" >> "EPS W/L".
- 3. Check that the item in "DATA MONITOR" is "On".
- 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 <u>MWI-120.</u> <u>"COMBINATION METER : Diagnosis Procedure"</u>.
- NO >> Replace steering force control module. Refer to <u>MWI-141, "Removal and Installation"</u>.

INFOID:000000013356930

INFOID:000000013356931

# < SYMPTOM DIAGNOSIS >

# SYMPTOM DIAGNOSIS SYSTEM SYMPTOM

# Symptom Table

INFOID:000000013356932

[DIRECT ADAPTIVE STEERING]

Symptom		Warning lamp	Possible cause	Diagnosis method	Priority	С
While driving the vehicle, steer-		ON	Fail safe mode 2 For fail-safe mode, refer to <u>STC-125, "DIRECT ADAP-</u> <u>TIVE STEERING : Fail-</u> <u>safe"</u> .	Perform self-diagnosis	1	D
	The vehicle does not pull to one direction. <sup>*1</sup>	OFF <sup>*3</sup>	Protection mode For protection function, refer to <u>STC-128</u> , "DIRECT <u>ADAPTIVE STEERING :</u> <u>Protection Function"</u> .	Perform self-diagnosis <b>NOTE:</b> When DTC is detected as "PAST", this is control in nor- mal condition.	2	F
ing wheel is on-center.		OFF	Mistake of calibration proce- dure.	Perform self-diagnosis When DTC is not detected, refer to <u>STC-203, "Work</u> <u>Procedure"</u> .	2	ST
	The vehicle pulls to one direction.	OFF	<ul> <li>Steering wheel is off-center slightly.</li> <li>Steering wheel is off-center temporarily.</li> </ul>	Perform symptom diagnosis "THE VEHICLE PULLS TO ONE SIDE" Refer to <u>STC-476, "Diagno-</u> <u>sis Procedure"</u> .	1	Н
<ul> <li>When turning the steering wheel from full left stop to full right stop, the sound is heard from left or right side.</li> <li>When turning the steering wheel from full left stop to full right stop, it is not able to turn until halfway position of left or right.</li> </ul>	The vehicle pulls to one direction. *2	OFF	<ul> <li>Steering wheel is off-center slightly.</li> <li>Steering wheel is off-center temporarily.</li> </ul>	Perform symptom diagnosis "THE VEHICLE PULLS TO ONE SIDE" Refer to <u>STC-476, "Diagno-</u> <u>sis Procedure"</u> .	1	l
	The vehicle does not pull to one direction. *1	OFF	The neutral position of the vehicle's alignment and the neutral position of the steer- ing rack are off-center.	Perform "TOE-IN ADJUST- MENT" with alignment tester. Refer to <u>ST-126, "ALIGN- MENT TESTER : Inspection</u> <u>and Adjustment"</u> . <b>CAUTION:</b> Be sure to use alignment tester for the symptom.	1	K
		ON	Fail safe mode 2 or 3 For fail-safe mode, refer to <u>STC-125. "DIRECT ADAP-</u> <u>TIVE STEERING : Fail-</u> <u>safe"</u> .	Perform self-diagnosis	1	M
<ul><li>Steering gear ratio changes</li><li>Steering wheel turning force is heavy</li></ul>		OFF <sup>*3</sup>	Protection mode For protection function, refer to <u>STC-128</u> , " <u>DIRECT</u> <u>ADAPTIVE STEERING</u> : <u>Protection Function</u> ".	Perform self-diagnosis <b>NOTE:</b> When DTC is detected as "PAST", this is control in nor- mal condition.	2	0
		OFF	Steering mode is except "Normal". For steering mode, refer to <u>STC-118, "DIRECT ADAP-</u> <u>TIVE STEERING : System</u> <u>Description"</u> .	Not required <b>NOTE:</b> Since the steering mode is except "Normal", steering characteristic is changed. This is control in normal condition.	3	Ρ

# SYSTEM SYMPTOM

### < SYMPTOM DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

Symptom	Warning Iamp	Possible cause	Diagnosis method	Priority
	ON	Fail safe mode 2 For fail-safe mode, refer to <u>STC-125. "DIRECT ADAP-</u> <u>TIVE STEERING : Fail-</u> <u>safe"</u> .	Perform self-diagnosis	1
Steering wheel turning force is light	OFF <sup>*3</sup>	Protection mode For protection function, refer to <u>STC-128, "DIRECT</u> <u>ADAPTIVE STEERING :</u> <u>Protection Function"</u> .	Perform self-diagnosis <b>NOTE:</b> When DTC is detected as "PAST", this is control in nor- mal condition.	2
	OFF	Steering mode is except "Normal". For steering mode, refer to <u>STC-118. "DIRECT ADAP-</u> <u>TIVE STEERING : System</u> <u>Description"</u> .	Not required <b>NOTE:</b> Since the steering mode is except "Normal", steering characteristic is changed. This is control in normal condition.	3
	ON	Fail safe mode 2 (Operation sound of steering clutch) For fail-safe mode, refer to <u>STC-125, "DIRECT ADAP-</u> <u>TIVE STEERING : Fail-</u> <u>safe"</u> .	Perform self-diagnosis	1
Vibration / Noise occurs	OFF <sup>*3</sup>	Protection mode (Operation sound of steering clutch) For protection function, refer to <u>STC-128</u> , "DIRECT <u>ADAPTIVE STEERING :</u> <u>Protection Function"</u> .	Perform self-diagnosis <b>NOTE:</b> When DTC is detected as "PAST", this is control in nor- mal condition.	2
	OFF	Operating sound of steering force actuator	Not required NOTE:	
	OFF	Operating sound of steering angle actuator	This is an operating sound in normal condition of direct adaptive steering.	3
	ON	Malfunction of steering clutch (When sound is ab- normal sound.)	Perform self-diagnosis	
When start the engine, sound is heard.	OFF	Operating sound of steering clutch	Not required <b>NOTE:</b> This is an operating sound in normal condition of direct adaptive steering.	1
Unbalance steering wheel turning force (torque	ON	Fail safe mode 2 For fail-safe mode, refer to <u>STC-125, "DIRECT ADAP-</u> <u>TIVE STEERING : Fail-</u> <u>safe"</u> .	Perform self-diagnosis	1
variation)	OFF <sup>*3</sup>	Protection mode For protection function, refer to <u>STC-128, "DIRECT</u> <u>ADAPTIVE STEERING :</u> <u>Protection Function"</u> .	Perform self-diagnosis <b>NOTE:</b> When DTC is detected as "PAST", this is control in nor- mal condition.	2

# SYSTEM SYMPTOM

### < SYMPTOM DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

Symptom	Warning Iamp	Possible cause	Diagnosis method	Priority	А
When starting the engine ⇔ turning the ignition switch OFF, steering wheel moves.	OFF	Starting the engine in the condition that steering angle is over 360 degree	Not required <b>NOTE:</b> The gear ration is different between direct adaptive steering mode and others.if steering angle is over 360 degree when engine starts, the system adjust it.	2	B
	ON	Malfunction of steering clutch	Perform self-diagnosis NOTE: When starting the engine ⇔ turning the ignition switch OFF, it is normal that the steering wheel slightly moves.	1	D
When turning quickly, the vehicle follows slowly compared with turning normally.	ON	Fail safe mode 1 For fail-safe mode, refer to STC-125. "DIRECT ADAP- TIVE STEERING : Fail- safe".	Perform self-diagnosis <b>NOTE:</b> After the system starts again, system is in fail-safe mode 3.	1	F
When turning the steering wheel from full left stop to full right stop, steering reaction force is light.	OFF	The output of steering force motor decreases.	Not required NOTE: System decrease the output of steering force motor to avoid overheating steering force motor. This is control in normal condition of direct adaptive steering.	1	STC
*1: Even if driver releases the hands of the steering wheel, the vehicle keeps running straightly. *2: If driver tries to drive straightly, the steering wheel pulls and then the reaction force to be returned to the center position is generated. If driver releases the hands of the steering wheel, the steering wheel is returned to the center position and the vehicle pulls to one direction. *3: Except C13E5-00					J
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# THE VEHICLE PULLS TO ONE SIDE

### < SYMPTOM DIAGNOSIS >

# THE VEHICLE PULLS TO ONE SIDE

# Description

- If driver tries to drive straightly, the steering wheel pulls and then the reaction force to be returned to the center position is generated.
- If driver releases the hands of the steering wheel, the steering wheel is returned to the center position and the vehicle pulls to one direction.

# Diagnosis Procedure

INFOID:000000013356934

INFOID:000000013356933

**1.**CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP

1. Start the engine. CAUTION:

### Never drive the vehicle.

2. Check that the power steering warning lamp turns OFF.

Does the power steering warning lamp turn OFF?

- YES >> GO TO 2.
- NO >> Perform self-diagnosis for "EPS/DAST 3", "DAST 1" and "DAST 2".
  - EPS/DAST 3: Refer to STC-156, "DTC Index".
  - DAST 1: Refer to STC-169, "DTC Index".
  - DAST 2: Refer to <u>STC-182, "DTC Index"</u>.

# **2.** AUTO ADJUSTING MODE (1)

1. Turn the steering wheel to left/right 90 degree or more from center position 2 times.

- 2. Drive straight ahead at around 30 km/h (19 MPH) for more than 5 seconds.
- CAUTION:
  - Drive on a straight flat road.

# • Keep the steering wheel, so the vehicle stays in a straight line. NOTE:

Drive at between 30 km/h (19 MPH) and 40 km/h (25 MPH), as much as possible. It is easy to succeed with the work.

3. Stop the vehicle.

>> GO TO 3.

3.Symptom confirmation

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

Is the symptom corrected?

YES >> INSPECTION END NO >> GO TO 4.

**4.**AUTO ADJUSTING MODE (2)

1. Drive straight ahead at 60 km/h (37 MPH) or more for more than 15 seconds.

- CAUTION:
- Drive on a straight flat road.
- Keep the steering wheel, so the vehicle stays in a straight line. NOTE:

When the vehicle pulls to one side slightly, the driving at between 30 km/h (19 MPH) and 40 km/h (25 MPH) may not dissolve the symptom.

- 2. Stop the vehicle.
- 3. Repeat the driving and stopping 5 times.

>> GO TO 5.

**5.**SYMPTOM CONFIRMATION

Recheck the symptom and check that symptom is not reproduced on the same conditions. <u>Is the symptom corrected?</u>

# STC-476

# THE VEHICLE PULLS TO ONE SIDE

# [DIRECT ADAPTIVE STEERING]

< SYMPTOM DIAGNOSIS >	[DIRECT ADAPTIVE STEERING]	
YES >> INSPECTION END NO >> GO TO 6.	A	4
6.CHECK SUSPENSION AND STEERING PARTS INSTALLATION CO	NDITION	
Check suspension and steering parts installation condition.		5
Is the inspection result normal?	D	)
<ul> <li>YES &gt;&gt; GO TO 7.</li> <li>NO &gt;&gt; Install suspension and steering parts properly. Then perform <u>126, "ALIGNMENT TESTER : Inspection and Adjustment"</u>.</li> </ul>	n the toe-in adjustment. Refer to $\underline{ST}$	2
7.TOE-IN ADJUSTMENT		
Adjust toe-in. Refer to ST-126, "ALIGNMENT TESTER : Inspection and	Adjustment".	)
>> GO TO 8.	_	_
8.FINAL CHECK	E	-
Recheck the symptom and check that symptom is not reproduced on the	e same conditions.	
Is the symptom corrected?	F	-
YES >> INSPECTION END		
NO >> GO TO 7.	ST	ГС
	F	-

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### < SYMPTOM DIAGNOSIS >

# **BIG OFF-CENTER OCCURS**

# Description

Theoff-center thant is bigger than 120° occurs.

#### NOTE:

This procedure is for preventing the spiral cable from being torn off when replacing the direct adaptive steering related parts.

### **CAUTION:**

Never perform the replacement of control module, the configuration, or the DAST calibration, with offcenter bigger than 120°.

### Diagnosis Procedure

INFOID:000000013356936

INFOID:000000013356935

# 1. CHECK THE ILLUMINATION OF THE POWER STEERING WARNING LAMP

1. Start the engine. CAUTION:

Never drive the vehicle.

Check that the power steering warning lamp turns OFF.

Does the power steering warning lamp turn OFF?

- >> GO TO 2. YES NO
  - >> Perform self-diagnosis for "EPS/DAST 3", "DAST 1" and "DAST 2".
    - EPS/DAST 3: Refer to <u>STC-156, "DTC Index"</u>.
      DAST 1: Refer to <u>STC-169, "DTC Index"</u>.

    - DAST 2: Refer to STC-182, "DTC Index".

# **2.**AUTO ADJUSTING MODE (1)

1. Turn the steering wheel to left/right 90 degree or more from center position 2 times.

2. Drive straight ahead at around 30 km/h (19 MPH) or more for more than 5 seconds.

- CAUTION:
- Drive on a straight flat road.

# • Keep the steering wheel, so the vehicle stays in a straight line.

#### NOTE:

Drive at between 30 km/h (19 MPH) and 40 km/h (25 MPH), as much as possible. It is easy to succeed with the work.

3. Stop the vehicle.

>> GO TO 3.

 $\mathbf{3.}$ SYMPTOM CONFIRMATION

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

Is the symptom corrected?

YES >> INSPECTION END NO >> GO TO 4.

**4.** AUTO ADJUSTING MODE (2)

1. Drive straight ahead at 60 km/h (37 MPH) or more for more than 15 seconds.

CAUTION:

### Drive on a straight flat road.

Keep the steering wheel, so the vehicle stays in a straight line.

NOTE:

When the vehicle pulls to one side slightly, the driving at between 30 km/h (19 MPH) and 40 km/h (25 MPH) may not dissolve the symptom.

- 2. Stop the vehicle.
- 3. Repeat the driving and stopping 5 times.

>> GO TO 5.

5.symptom confirmation

# **BIG OFF-CENTER OCCURS**

### < SYMPTOM DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

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

#### <u>Is the symptom corrected?</u> YES >> INSPECTION END

NO >> GO TO 6.

# 6.PREPARATION

1. Set the front wheel on the turn table.

### NOTE:

- Do not lift up the vehicle during "DAST CALIBRATION (MODE1)"
- 2. Set the front wheel to the straight-ahead position.
- 3. Connect the battery charger to protect the 12V battery. **NOTE:**

# Much electricity is used in "DAST CALIBRATION (MODE1)".

# >> GO TO 7.

# 7.CORRECT STEERING WHEEL POSITION

# With CONSULT

1. Remove steering upper shaft mounting bolt (steering clutch assembly side). Refer to <u>ST-139, "Removal</u> and Installation".

### CAUTION:

- When removing steering column assembly, fix the steering upper shaft using wire etc., because steering upper shaft may separate the steering column side and steering clutch side. Never separate steering upper shaft steering column side and steering clutch side.
- Place a matching marks (A) on steering upper shaft (1). When the steering upper shaft is separated, use matching marks.

 Move steering upper shaft ① to the steering column side to separate it from steering clutch assembly.
 CAUTION:

When separating steering upper shaft, never insert a tool, sach as a screwdriver, into the yoke groove to pull out the steering upper shaft. In the case of the violation of the above, replace steering upper shaft with a new one.



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Turn the ignition switch ON.
 CAUTION:
 Never start the engine.

- 4. On the CONSULT screen, select "EPS/DAST 3" >> "DATA MONITOR" >> "ST ANGLE SENSOR", and then check the value.
- 5. Turn the steering wheel until the value is 0 deg.

### >> GO TO 8.

**8.**DAST CALIBRATION (MODE1) [CLUTCH PHASE LEARNING]

# STC-479

# **BIG OFF-CENTER OCCURS**

### < SYMPTOM DIAGNOSIS >

#### With CONSULT

Perform "DAST CALIBRATION (MODE1)" while holding the steering wheel with hand. Refer to <u>STC-209.</u> "Description".

### CAUTION:

Never release the hand from the steering wheel.

>> GO TO 9.

9.CONNECT STEERING UPPER SHAFT

### With CONSULT

After the movement of front wheel stops and then the steering clutch assembly is released by DAST calibration, connect the steering upper shaft to steering clutch assembly. Refer to <u>ST-139</u>, "<u>Removal and Installation</u>".

**CAUTION:** 

# About the aligning, turn the shaft part of steering clutch assembly by hand. NOTE:

About the direction of rotation, both is OK. Because the shaft part of steering clutch is free in this timing. 2. Select "END".

Turn ignition switch OFF.
 CAUTION:
 Be sure to perform this step.

>> GO TO 10.

# 10. DAST CALIBRATION (MODE1) [STEERING RACK NEUTRAL POSITION LEARNING]

#### () With CONSULT

- Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
- 2. Perform "DAST CALIBRATION (MODE1)". Refer to STC-209, "Description".

>> GO TO 11.

# **11.** ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

#### (B) With CONSULT

- 1. On the CONSULT screen, select "ABS">>"WORK SUPPORT">>"ST ANGLE SENSOR ADJUSTMENT".
- 2. Touch START.
- CAUTION: Never touch s

### Never touch steering wheel while adjusting steering angle sensor.

- 3. After approx. 10 seconds, select "END".
- Turn ignition switch OFF, and then turn it ON again.
   CAUTION: Be sure to perform this step.

>> WORK END

# POWER STEERING WARNING LAMP DOSE NOT TURN ON < SYMPTOM DIAGNOSIS > [DIRECT ADAPTIVE STEERING]

#### POWER STEERING WARNING LAMP DOSE NOT TURN ON А Description INFOID:000000013356937 Power steering warning lamp does not illuminate when the ignition switch is turned ON (lamp check). В **Diagnosis** Procedure INFOID:000000013356938 1. CHECK THE POWER STEERING WARNING LAMP С Perform trouble diagnosis for power steering warning lamp system. Refer to STC-472, "Diagnosis Procedure". Is the check result normal? D YES >> • Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". • Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

NO >> Repair or replace the malfunctioning parts.

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# POWER STEERING WARNING LAMP DOSE NOT TURN OFF < SYMPTOM DIAGNOSIS > [DIRECT ADAPTIVE STEERING]

# POWER STEERING WARNING LAMP DOSE NOT TURN OFF

# Description

Power steering warning lamp does not turn OFF several seconds after the engine is started.

### **Diagnosis** Procedure

INFOID:000000013356940

INFOID:000000013356939

**1.**PERFORM SELF-DIAGNOSIS

### With CONSULT

1. Start the engine.

2. Perform "EPS/DAST 3", "DAST 1" and "DAST 2" self-diagnosis.

### Is any DTC displayed?

YES >> Check the DTC.

- EPS/DAST 3: Refer to STC-156, "DTC Index".
- DAST 1: Refer to <u>STC-169</u>, "DTC Index".
- DAST 2: Refer to STC-182, "DTC Index".

NO >> GO TO 2.

**2.**CHECK THE POWER STEERING WARNING LAMP

Perform trouble diagnosis for power steering warning lamp system. Refer to <u>STC-472, "Diagnosis Procedure"</u>. <u>Is the check result normal?</u>

YES >> GO TO 3.

NO >> Repair or replace the malfunctioning parts.

**3.**CHECK THE DIRECT ADAPTIVE STEERING POWER AND GROUND CIRCUIT

Perform trouble diagnosis for the direct adaptive steering power and ground circuit. Refer to <u>STC-467. "Diagnosis Procedure"</u>.

Is the check result normal?

- YES >> Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
  - Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.
- NO >> Repair or replace the malfunctioning parts.

### < SYMPTOM DIAGNOSIS >

# SYSTEM IS NOT DISPLAYED ON CONSULT

# Description

### "DAST 1", "DAST 2" or "EPS/DAST 3" is not displayed on CONSULT.

#### Self-diagnostic result or System condition

Detected DTC or system condition			Possible cause	Poforonco	
DAST 1	DAST 2	EPS/DAST 3	russible cause	Relefence	С
System is not dis- played on CON- SULT	System is not dis- played on CON- SULT	System is not dis- played on CON- SULT	<ul> <li>Battery power supply circuit</li> <li>Ignition power supply circuit</li> <li>Power supply circuit for steering force control module</li> <li>Steering force control module harness connector</li> </ul>	TYPE 1: Re- fer to <u>STC-</u> <u>483</u> .	D
System is not dis- played on CON- SULT	C13BE-00, C13C0- 00 or C13C2-00	C13BE-00, C13C0- 00 or C13C2-00	<ul><li>FlexRay communication line</li><li>Steering angle main control module</li></ul>	TYPE 2: Re- fer to <u>STC-</u> <u>485</u> .	E
System is not dis- played on CON- SULT	System is not dis- played on CON- SULT	C13C1-00 and C13C4-00	<ul> <li>FlexRay communication line</li> <li>Steering force control module</li> <li>Steering angle main control module</li> <li>Steering angle sub control module</li> </ul>	TYPE 3: Re- fer to <u>STC-</u> <u>485</u> .	F
C13C0-00, C13C2- 00 or System is not displayed on CON- SULT	System is not dis- played on CON- SULT	C13BE-00, C13C0- 00 or C13C3-00	<ul><li>FlexRay communication line</li><li>Steering angle sub control module</li></ul>	TYPE 4: Re- fer to <u>STC-</u> <u>486</u> .	Н
System is not dis- played on CON- SULT	C13C0-00 and C13C2-00	C13C0-00 and C13C2-00	<ul> <li>Power supply circuit for steering angle main control module</li> <li>Steering angle main control module harness connector</li> <li>Ignition power supply circuit (between steering angle main control module and steering angle sub control module)</li> </ul>	TYPE 5: Re- fer to <u>STC-</u> <u>487</u> .	l
System is not dis- played on CON- SULT	System is not dis- played on CON- SULT	C13C0-00, C13C2- 00 and C13C3-00	<ul> <li>Ignition power supply circuit (between steering force control module and steering angle sub control module)</li> <li>Steering force control module</li> <li>Steering angle sub control module</li> </ul>	TYPE 6: Re- fer to <u>STC-</u> <u>488</u> .	K
C13C0-00 and C13C2-00	System is not dis- played on CON- SULT	C13C0-00 and C13C3-00	Steering angle sub control module harness con- nector	TYPE 7: Re- fer to <u>STC-</u> <u>489</u> .	L
System is not dis- played on CON- SULT	System is not dis- played on CON- SULT	C13BE-00, C13C1- 00 or C13C4-00	<ul><li>FlexRay communication line</li><li>Steering force control module</li></ul>	TYPE 8: Re- fer to <u>STC-</u> <u>490</u> .	M

# TYPE 1

# TYPE 1 : Diagnosis Procedure

# 1. CHECK steering force control module ground circuit

1. Turn the ignition switch OFF.

- 2. Disconnect steering force control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal	_	Continuity
M72	33	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.

INFOID:000000013356942

[DIRECT ADAPTIVE STEERING]

INFOID:000000013356941

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### < SYMPTOM DIAGNOSIS >

# [DIRECT ADAPTIVE STEERING]

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

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

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.
- 3. Check the voltage between steering force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M72	34	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

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

1. Check the 60A fusible link (#G).

 Check the harness for open or short between steering force control module harness connector No.34 terminal and the 60A fusible link (#G).

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20, "VR30DDTT : Wir-</u> ing Diagram - BATTERY POWER SUPPLY -".
- NO >> Repair or replace error-detected parts.

### **4.**CHECK INTERNAL CIRCUIT IN STEERING FORCE CONTROL MODULE

Check the continuity between steering force control module connector terminals.

Steering force	- Continuity	
Terr		
25 27		Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace steering force control module. Refer to <u>STC-492, "Removal and Installation"</u>.

5.CHECK IGNITION POWER SUPPLY FOR STEERING FORCE CONTROL MODULE

1. Check the voltage between steering force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal	Terminal	
M71	25	Ground	0 V

2. Turn the ignition switch ON.

3. Check the voltage between force control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	25	Ground	10.5 – 16.0 V

Is the inspection result normal?

YES >> • Check enlarged contact spring of terminal. Refer to GI-42. "How to Check Terminal".

Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.
 NO >> GO TO 6.

6.CHECK IGNITION POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Check the 10A fuse (#12).

3. Disconnect fuse block (J/B) harness connector.

4. Check the continuity between steering force control module connector and fuse block (J/B).

# STC-484

### < SYMPTOM DIAGNOSIS >

Steering force	control module	Fuse	block (J/B)	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M71	25	M133	20C	Existed
5. Check the continu	uity between steering f	orce control module	connector and ground	1.
Steering	a force control module			
Connector	Termin:	al	—	Continuity
M71	25		Ground	Not existed
Is the inspection resul	t normal?		Croana	
YES >> Perform the	he trouble diagnosis fo	or ignition power sup	ply circuit. Refer to PG	-20, "VR30DDTT : W
ing Diagra	am - BATTERY POWE	<u>R SUPPLY -"</u>		
NO >> Repair or	replace error-detected	d parts.		
TYPE 2 : Diagnos	sis Procedure			INFOID:000000013356
<ol> <li>Turn the ignition s</li> <li>Disconnect each (</li> </ol>	control module harnes	s connector		
<ol> <li>Check the continu</li> </ol>	uity between each con	trol module harness	connector.	
<b>2</b>		<b>A</b>		
Steering angle ma	ain control module	Steering angle	sub control module	Continuity
Connector	Terminal	Connector	Terminal	
E26	19	E29	19	Existed
	20		20	
4. Check the continu	uity between control m	odule harness conn	ector and ground.	
Steering ar	ngle main control module			
Connector	Termina	al	—	Continuity
	19			
E26	20		Ground	Not existed
Is the inspection resul	t normal?			
YES >> GO TO 2.				
NO >> Repair or	replace error-detected	d part.		
2. CHECK INTERMIT	TENT INCIDENT			
1. Check enlarged c	ontact spring of termin	nal. Refer to <u>GI-42, "</u>	How to Check Termina	<u>al"</u> .
2. Perform intermitte	ent incident while turni	ng steering wheel. F	efer to GI-45, "Intermi	ttent Incident".
Is the inspection resul	t normal?			
YES >> Replace s	steering angle main co	ontrol module. Refer	to <u>STC-493, "Remova</u>	l and Installation".
TYPE 3	replace error-detected	a part.		
TYPE 3 : Diagnos	sis Procedure			INFOID:000000013356
1.CHECK FLEXRAY	COMMUNICATION C	RCUIT		
1 Turn the ignition of				
2. Disconnect each	control module harnes	s connector.		

3. Check the continuity between each control module harness connector.

# SYSTEM IS NOT DISPLAYED ON CONSULT < SYMPTOM DIAGNOSIS > [DIRECT ADAPTIVE STEERING]

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# Steering angle main control module Steering angle sub control module Continuity Connector Terminal Connector Terminal E26 19 E29 Existed

Steering force	control module	odule Steering angle main control module		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M71	19	E26	19	Existed	
	20	L20	20	LAISIEU	

4. Check the continuity between control module harness connector and ground.

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Steering angle main control module			Continuity
Connector	Terminal	—	Continuity
E26	19	Ground	Not existed
E20	20	Ground	NOT EXISTED

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected part.

### 2. CHECK INTERMITTENT INCIDENT

- 1. Check enlarged contact spring of terminal. Refer to <u>GI-42, "How to Check Terminal"</u>.
- 2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".
- Is the inspection result normal?
- YES >> Replace steering angle main control module, steering angle sub control module and steering force control module. Refer to <u>STC-493, "Removal and Installation"</u>, <u>STC-494, "Removal and Installation"</u>, <u>STC-494, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected part.

### TYPE 4

# TYPE 4 : Diagnosis Procedure

INFOID:000000013356945

# 1. CHECK FLEXRAY COMMUNICATION CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect each control module harness connector.
- 3. Check the continuity between each control module harness connector.

Steering angle s	ub control module	Steering angle main control module		Continuity	
Connector	Terminal	Connector Terminal			
E20	19	E26	19	Existed	
E29 -	20	E20	20	EXISTED	

#### 4. Check the continuity between control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal		Continuity
E20	19	Ground	Not existed
E29	20	Ground	NOT EXISTED

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected part.

### 2. CHECK INTERMITTENT INCIDENT

### SYSTEM IS NOT DISPLAYED ON CONSULT [DIRECT ADAPTIVE STEERING]

### < SYMPTOM DIAGNOSIS >

- 1. Check enlarged contact spring of terminal. Refer to GI-42. "How to Check Terminal".
- 2. Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident".

### Is the inspection result normal?

YES >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.

NO >> Repair or replace error-detected part.

# TYPE 5

TYPE 5 : Diagnosis Procedure

# 1. CHECK STEERING ANGLE MAIN CONTROL MODULE GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle main control module harness connector.
- 3. Check the continuity between control module harness connector and ground.

Steering angle m	ain control module		Continuity
Connector	Terminal	_	Continuity
E27	33	Ground	Not existed
s the inspection result nor	mal?		
YES >> GO TO 2.			
NO >> Repair open ci	rcuit or short to ground or sh	hort to power in harness or o	connectors.
CHECK STEERING AN	IGLE MAIN CONTROL MOD	OULE POWER SUPPLY CIF	RCUIT (1)
. Turn the ignition switch	n OFF.		
. Disconnect steering ar	ngle main control module ha	rness connector.	
<ol> <li>Check the voltage bety</li> </ol>	ween steering angle main co	ontrol module harness conne	ector and ground.
Steering angle m	ain control module		
Connector	Terminal		Continuity
E27	34	Ground	10.5 – 16.0 V
CHECK STEERING AN	GLE MAIN CONTROL MOD	OULE POWER SUPPLY CIF	RCUIT (2)
<ol> <li>Check the 100A fusible</li> <li>Check the harness fo No.34 terminal and the</li> </ol>	e link (#J). r open or short between st e 100A fusible link (#J).	eering angle main control	module harness connector
s the inspection result nor	mal?		
YES >> Perform the tro	ouble diagnosis for battery p	ower supply circuit. Refer to	PG-20, "VR30DDTT : Wir-
NO >> Repair or repla	BATTERY POWER SUPPLY	<u>( -"</u> .	
		NG ANGLE MAIN CONTRU	
. Turn the ignition switch	1 OFF.	rnoss connoctor	
<ol> <li>B. Check the voltage bety</li> </ol>	ween steering angle main co	ontrol module harness conne	ector and ground.
Steering angle m	ain control module		Continuity
Connector	Terminal	_	Continuity
E26	25	Ground	0 V

4. Turn the ignition switch ON.

5. Check the voltage between steering angle control module harness connector and ground.

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INFOID:000000013356946

### < SYMPTOM DIAGNOSIS >

[DIRECT ADAPTIVE STEERING]

Steering angle main control module			Continuity
Connector	Terminal		Continuity
E26	25	Ground	10.5 – 16.0 V

Is the inspection result normal?

- >> Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
- Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.
   NO >> GO TO 5.

# **5.**CHECK IGNITION POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub control module harness connector.
- 3. Check the continuity between steering angle main control module harness connector and steering angle sub control module harness connector.

Steering angle main control module Steering		Steering angle s	ub control module	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E26	25	E29	27	Existed	

Is the inspection result normal?

NO >> Repair or replace error-detected parts.

# TYPE 6

YES

# TYPE 6 : Diagnosis Procedure

INFOID:000000013356947

# 1. CHECK INTERNAL CIRCUIT IN STEERING ANGLE SUB CONTROL MODULE

Check the continuity between steering angle sub control module connector terminals.

Steering angle su	Continuity	
Tern	Continuity	
25	27	Existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace steering angle sub control module. Refer to <u>STC-494, "Removal and Installation"</u>.

2.CHECK IGNITION POWER SUPPLY FOR STEERING ANGLE SUB CONTROL MODULE

1. Check the voltage between steering angle sub control module harness connector and ground.

Steering angle sub control module			Continuity
Connector	Terminal		Continuity
E29	25	Ground	0 V

2. Turn the ignition switch ON.

3. Check the voltage between steering angle control module harness connector and ground.

Steering angle sub control module			Continuity	
Connector	Terminal		Continuity	
E29	25	Ground	10.5 – 16.0 V	

Is the inspection result normal?

NO >> GO TO 4.

3.CHECK INTERMITTENT INCIDENT

YES >> Check the ignition power supply circuit for steering force control module and steering angle sub control module. Refer to <u>STC-467</u>, "Diagnosis Procedure".

### < SYMPTOM DIAGNOSIS >

- [DIRECT ADAPTIVE STEERING]
- Turn the ignition switch OFF. 1.
- Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". 2.
- Perform intermittent incident while turning steering wheel. Refer to GI-45, "Intermittent Incident". 3.

### Is the inspection result normal?

- YES >> Replace steering force control module and steering angle sub control module. Refer to STC-492, В "Removal and Installation", STC-494, "Removal and Installation".
- NO >> Repair or replace error-detected part.

# **4.**CHECK IGNITION POWER SUPPLY CIRCUIT (2)

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering force control module harness connector.
- Check the continuity between steering angle sub control module harness connector and steering force 3. D control module harness connector.

Continuity	Steering force control module		ub control module	Steering angle s
Continuity	Terminal	Connector	Terminal	Connector
Existed	27	M71	25	E29

### Is the inspection result normal?

- YES >> Check the ignition power supply circuit for steering force control module. Refer to STC-328, "Diagnosis Procedure".
- NO >> Repair or replace error-detected parts.

TYPE 7

# TYPE 7 : Diagnosis Procedure

# 1. CHECK STEERING ANGLE SUB CONTROL MODULE GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect steering angle sub control module harness connector.
- Check the continuity between control module harness connector and ground. 3.

Steering angle sub control module			Continuity	0
Connector	Terminal			
E30	33	Ground	Not existed	K

Is the inspection result normal?

YES >> GO TO 2.

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

# **2.**CHECK STEERING ANGLE SUB CONTROL MODULE POWER SUPPLY CIRCUIT (1)

1. Turn the ignition switch OFF.

- 2. Disconnect steering angle sub control module harness connector.
- 3. Check the voltage between steering angle sub control module harness connector and ground.

Continuity	
Connector Terminal	
E30 34 Ground 10.5 – 16.0 V	0

### Is the inspection result normal?

>> • Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal". YES

 Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>. P NO >> GO TO 3.

### ${f 3.}$ CHECK STEERING ANGLE SUB CONTROL MODULE POWER SUPPLY CIRCUIT (2)

Check the 100A fusible link (#H). 1.

Check the harness for open or short between steering angle sub control module harness connector No.34 2. terminal and the 100A fusible link (#H).

Is the inspection result normal?

# **STC-489**

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INFOID:000000013356948

#### < SYMPTOM DIAGNOSIS >

- YES >> Perform the trouble diagnosis for battery power supply circuit. Refer to <u>PG-20. "VR30DDTT : Wir-</u> ing Diagram - <u>BATTERY POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

TYPE 8

# **TYPE 8 : Diagnosis Procedure**

INFOID:000000013356949

[DIRECT ADAPTIVE STEERING]

# 1. CHECK FLEXRAY COMMUNICATION CIRCUIT

- 1. Disconnect each control module harness connector.
- 2. Check the continuity between each control module harness connector.

Steering force	e control module	Steering angle main control module		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M71	19	E26	19	Existed	
	1017-1	20	E20	20	Existed

#### 3. Check the continuity between control module harness connector and ground.

Steering force control module			Continuity
Connector	Terminal		Continuity
M71	19	Ground Not existed	
	20	Gibana	

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected part.

# 2. CHECK INTERMITTENT INCIDENT

- 1. Check enlarged contact spring of terminal. Refer to GI-42, "How to Check Terminal".
- Perform intermittent incident while turning steering wheel. Refer to <u>GI-45, "Intermittent Incident"</u>.

Is the inspection result normal?

YES >> Replace steering force control module. Refer to STC-492, "Removal and Installation".

NO >> Repair or replace error-detected part.

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INFOID:000000013356950

# REMOVAL AND INSTALLATION STEERING FORCE CONTROL MODULE

**Exploded View** 

FOR VR30DDTT



# **STEERING FORCE CONTROL MODULE**

### < REMOVAL AND INSTALLATION >



① Steering force control module ② Bracket

# Removal and Installation

INFOID:000000013356951

### CAUTION:

- Perform additional service when replacing steering force control module. Refer to <u>STC-206,</u> <u>"Description"</u>.
- When off-center is bigger than 120°, refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center before performing the work.

### REMOVAL

- 1. Remove the glove box. Refer to IP-13, "Removal and Installation".
- 2. Remove the instrument lower panel. Refer to IP-13, "Removal and Installation".
- 3. Disconnect steering force control module harness connectors.
- 4. Disconnect EMCM harness connector. (Except for VR30DDTT) Refer to <u>EC4-968, "Removal and Installa-</u> tion".
- 5. Remove the bracket with steering force control module. (For VR30DDTT)
- 6. Remove the bracket with steering force control module and EMCM. (Except for VR30DDTT)
- 7. Remove the steering force control module from bracket. CAUTION:
  - When replacing control module, replace the following control modules as a set.
  - Steering force control module
  - Steering angle main control module
  - Steering angle sub control module
- 8. Remove the EMCM from bracket. (Except for VR30DDTT) Refer to EC4-968. "Removal and Installation".

### INSTALLATION

Note following, and install in the reverse order of removal.

### CAUTION:

Perform additional service when replacing steering force control module. Refer to <u>STC-206, "Descrip-</u> tion".

C: Vehicle front

# STEERING ANGLE MAIN CONTROL MODULE

### < REMOVAL AND INSTALLATION >

# [DIRECT ADAPTIVE STEERING]

# STEERING ANGLE MAIN CONTROL MODULE

# **Exploded View**

INFOID:000000013356952

INFOID:000000013356953

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Ch: Vehicle front

# Removal and Installation

### **CAUTION:**

- Perform additional service when replacing steering angle main control module. Refer to <u>STC-206.</u> <u>"Description"</u>.
- When off-center is bigger than 120°, refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center before performing the work.

### REMOVAL

- 1. Remove front bumper. Refer to EXT-15, "Removal and Installation"
- 2. Remove washer tank. Refer to WW-63, "WASHER TANK : Removal and Installation".
- 3. Disconnect steering angle main control module connectors.
- 4. Remove the bolts of steering angle main control module ①.
- 5. Remove the steering angle main control module. **CAUTION:**

### When replacing control module, replace the following control modules as a set.

- Steering force control module
- Steering angle main control module
- Steering angle sub control module



### INSTALLATION

Note following, and install in the reverse order of removal.

Perform additional service when replacing steering angle main control module. Refer to <u>STC-206,</u> <u>"Description"</u>.

# STEERING ANGLE SUB CONTROL MODULE

# < REMOVAL AND INSTALLATION >

[DIRECT ADAPTIVE STEERING]

# STEERING ANGLE SUB CONTROL MODULE

# Exploded View

INFOID:000000013356954



(1) Steering angle sub control module

C: Vehicle front

### Removal and Installation

INFOID:000000013356955

### **CAUTION:**

- Perform additional service when replacing steering angle sub control module. Refer to <u>STC-206.</u> <u>"Description"</u>.
- When off-center is bigger than 120°, refer to <u>STC-478, "Diagnosis Procedure"</u> to correct off-center before performing the work.

### REMOVAL

- 1. Remove front bumper. Refer to EXT-15, "Removal and Installation"
- 2. Disconnect steering angle sub control module connectors.
- 3. Remove the bolts of steering angle sub control module ①.
- 4. Remove the steering angle sub control module. CAUTION:

When replacing control module, replace the following control modules as a set.

- Steering force control module
- Steering angle main control module
- Steering angle sub control module



### INSTALLATION

Note following, and install in the reverse order of removal.

### CAUTION:

Perform additional service when replacing steering angle sub control module. Refer to <u>STC-206,</u> <u>"Description"</u>.