# STEERING CONTROL SYSTEM

А

В

С

D

Е

F

STC

Н

J

Κ

L

Μ

Ν

Ο

Ρ

# CONTENTS

BASIC INSPECTION6	UNBALANCE STEERING WHEEL TURNING
DIAGNOSIS AND REPAIR WORK FLOW 6 Work Flow	FORCE (TORQUE VARIATION)22 Description
SYSTEM DESCRIPTION7	PRECAUTION23
EPS SYSTEM7System Diagram7System Description7Component Parts Location9Component Description9	PRECAUTIONS
DTC/CIRCUIT DIAGNOSIS10	tion after Battery Disconnect
POWER SUPPLY AND GROUND CIRCUIT10	REMOVAL AND INSTALLATION25
Description	POWER STEERING CONTROL UNIT25 Exploded View
POWER STEERING SOLENOID VALVE11 Description	Removal and Installation25 WITH 4WAS
Diagnosis Procedure11 Component Inspection12	BASIC INSPECTION26
ENGINE SPEED SIGNAL CIRCUIT	DIAGNOSIS AND REPAIR WORKFLOW26 Work Flow
VEHICLE SPEED SIGNAL CIRCUIT15	ADDITIONAL SERVICE WHEN REPLACING
Description15 Diagnosis Procedure15	CONTROL UNIT
ECU DIAGNOSIS INFORMATION17	CONTROL UNIT : Description28
POWER STEERING CONTROL UNIT17         Reference Value	4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT

ment (Pattern 1) ......28

4WAS FRONT ACTUATOR NEUTRAL POSI-	
TION ADJUSTMENT : Special Repair Require-	
ment (Pattern 2)	. 29
4WAS FRONT ACTUATOR NEUTRAL POSI-	
TION ADJUSTMENT : Special Repair Require-	
ment (Pattern 3)	. 29
4WAS FRONT ACTUATOR NEUTRAL POSI-	
TION ADJUSTMENT : Special Repair Require-	
ment (Pattern 4)	. 31

# 

4WAS SYSTEM	33
System Diagram	33
System Description	34
Component Parts Location	
Component Description	37

#### 

System Diagram	
System Description	
Component Parts Location	
Component Description	39

# **DIAGNOSIS SYSTEM (4WAS FRONT CON-**

TROL UNIT)
CONSULT-III Function [4WAS(FRONT)] 40

# **DIAGNOSIS SYSTEM (4WAS MAIN CON-**

TROL UNIT)	. 44
CONSULT-III Function [4WAS(MAIN)/RAS/HI-	
CAS]	. 44

# DTC/CIRCUIT DIAGNOSIS ...... 48

#### 

Diagnosis Procedure	48
Component Inspection (4WAS Front Motor)	49
Special Repair Requirement	50

#### 

Diagnosis Procedure	. 51
Special Repair Requirement	. 52

#### 

Description	53
DTC Logic	53
Diagnosis Procedure	53
Component Inspection (Front Wheel Steering An-	
gle Sensor)	54
Special Repair Requirement	

# C1631, C1632 4WAS FRONT CONTROL

JNIT	56
Description	
DTC Logic	56

Diagnosis Procedure	
Special Repair Requirement	. 57
C1633 4WAS FRONT CONTROL UNIT	. 59
Description	
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	. 60
C1651 IGNITION POWER SUPPLY	. 61
Description	
DTC Logic	
Diagnosis Procedure Special Repair Requirement	
	. 02
C1652 4WAS FRONT MOTOR POWER SUP-	
PLY	
Description	
DTC Logic Diagnosis Procedure	
Special Repair Requirement	
C1654 4WAS FRONT ACTUATOR RELAY	
Description DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	
C1655 4WAS FRONT DRIVER	<b>67</b>
Description	
Description DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	. 67
C1661 4WAS FRONT LOCK SOLENOID	
VALVE	. 69
Description	
DTC Logic	
Diagnosis Procedure	. 69
Component Inspection (4WAS Front Lock Sole- noid Valve)	70
Special Repair Requirement	
C1667 LOCK INSERTION	
Description	
DTC Logic Diagnosis Procedure	
Special Repair Requirement	
C1668 LOCK HOLDER GAP DETECT Description	
Description	
Diagnosis Procedure	
Special Repair Requirement	
C1669 INCOMPLETE LOCK RELEASE	74
Description	
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	

# **C1671 ACTUATOR ADJUSTMENT NOT**

PERFORMED	75
Description	75
DTC Logic	
Diagnosis Procedure	75
Special Repair Requirement	

#### C1672 INCOMPLETE ACTUATOR ADJUST-

MENT	77
Description	77
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	

#### C1684, C1685 4WAS MAIN CONTROL UNIT

8
8
8
8
0
0
1

C1686 4WAS MAIN CONTROL UNIT .	82
Description	
DTC Logic	
Diagnosis Procedure	

# U1000, U1002 4WAS COMMUNICATION

	83
Description	83
DTC Logic	
Diagnosis Procedure	83
Component Inspection [ABS Actuator and Electric	
Unit (Control Unit)]	85
Component Inspection (Yaw Rate/Side G Sensor)	
	85
Special Repair Requirement	86

#### U1010 4WAS COMMUNICATION CIRCUIT .....87

Description	87
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	87

# C1900, C1901, C1906, C1907, C1927, C1933

4WAS MAIN CONTROL UNIT	88
Description	
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	

# C1902, C1903, C1904, C1910, C1913 4WAS

REAR MOTOR OUTPUT	90
Description	90
DTC Logic	
Diagnosis Procedure	
Component Inspection (4WAS Rear Motor)	

Special Repair Requirement92	
C1905, C1908, C1922, C1925, C1928 4WAS MAIN CONTROL UNIT93	A
Description	B C
C1909 4WAS MAIN CONTROL UNIT95 Description95	C
DTC Logic	D
C1911, C1912 4WAS REAR MOTOR POWER SUPPLY97	Е
Description	F
Component Inspection (Noise Suppressor)101 Special Repair Requirement	ST
C1914 REAR WHEEL STEERING ANGLE SENSOR102	Н
Description102DTC Logic102Diagnosis Procedure102Component Inspection103Special Repair Requirement104	I
C1915, C1916 REAR WHEEL STEERING AN- GLE SENSOR	J
Description105DTC Logic105Diagnosis Procedure105Component Inspection107Special Repair Requirement107	K
C1917, C1918 REAR WHEEL STEERING AN- GLE SENSOR	
Description	M
Component Inspection110 Special Repair Requirement110	Ν
C1919 VEHICLE SPEED SIGNAL	0
Special Repair Requirement112 C1920 STEERING ANGLE SEN	Ρ
Description	
C1921 ENGINE SPEED SIGNAL	

00

Description	
DTC Logic	
Diagnosis Procedure	116
Special Repair Requirement	
C1923 STEERING ANGLE SEN	
Description	118
DTC Logic	118
Diagnosis Procedure	118
Special Repair Requirement	119
C1924 STEERING ANGLE SEN	
Description	
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	122
	404
C1926, C1932 STEERING ANGLE SENSOR	
Description	
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	125
	407
C1930 4WAS FRONT CONTROL UNIT	
Description	
DTC Logic	
Diagnosis Procedure	127
C1931 4WAS FRONT CONTROL UNIT COM	_
MUNICATION	
Description	
DTC Logic	128
DTC Logic Diagnosis Procedure	128 128
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric	128 128 C
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)]	128 128 c 130
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor	128 128 c 130 )
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor	128 128 c 130 ) 130
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement	128 128 c 130 ) 130
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement	128 128 c 130 ) 130 131
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement U1000 CAN COMM CIRCUIT	128 128 c 130 ) 130 131 <b>. 132</b>
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement U1000 CAN COMM CIRCUIT Description	128 128 c 130 ) 130 131 <b>132</b> 132
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement U1000 CAN COMM CIRCUIT Description DTC Logic	128 128 c 130 ) 130 131 <b>132</b> 132 132
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement U1000 CAN COMM CIRCUIT Description DTC Logic Diagnosis Procedure	128 128 c 130 ) 130 131 <b>. 132</b> 132 132 132
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement U1000 CAN COMM CIRCUIT Description DTC Logic	128 128 c 130 ) 130 131 <b>. 132</b> 132 132 132
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement	128 128 130 130 131 <b>132</b> 132 132 132 132
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b>	128 128 130 ) 130 131 <b>132</b> 132 132 132 132
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement U1000 CAN COMM CIRCUIT Description DTC Logic Diagnosis Procedure Special Repair Requirement U1010 CONTROL UNIT (CAN) Description	128 128 c 130 ) 130 131 132 132 132 133 133
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic	128 128 
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure	128 128 C 130 ) 130 131 132 132 132 133 133 133 133
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic	128 128 C 130 ) 130 131 132 132 132 133 133 133 133
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> DESCRIPTION DTC Logic Diagnosis Procedure Special Repair Requirement	128 128 
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement	128 128 c 130 ) 131 132 132 132 133 133 133 133 133
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic DTC Logic DTC Logic DTC Logic DTC Logic DTC Logic DTC Logic DTC Logic DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b>	128 128 c 130 ) 131 131 132 132 132 133 133 133 133 133 134 134
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> DEscription DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> Diagnosis Procedure (4WAS Front Control Unit)	128 128 c 130 ) 131 132 132 132 132 133 133 133 133 133 134 134
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> Description Description Diagnosis Procedure (4WAS Front Control Unit) Diagnosis Procedure (4WAS Main Control Unit)	128 128 c 130 ) 131 132 132 132 133 133 133 133 133 134 134 134
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> . Description Diagnosis Procedure (4WAS Front Control Unit) Diagnosis Procedure (4WAS Main Control Unit) Component Inspection (4WAS Rear Motor Relay	128 128 c 130 ) 131 132 132 132 133 133 133 133 133 134 134 134 134 135 ).137
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> Description Description Diagnosis Procedure (4WAS Front Control Unit) Diagnosis Procedure (4WAS Main Control Unit)	128 128 c 130 ) 131 132 132 132 133 133 133 133 133 134 134 134 134 135 ).137
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> Description Description Diagnosis Procedure (4WAS Front Control Unit) Diagnosis Procedure (4WAS Main Control Unit) Component Inspection (AWAS Rear Motor Relay Component Inspection (Noise Suppressor)	128 128 c 130 ) 131 132 132 132 133 133 133 133 133 134 134 134 134 135 ).137 138
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> Diagnosis Procedure (4WAS Front Control Unit) Diagnosis Procedure (4WAS Rear Motor Relay Component Inspection (Noise Suppressor) <b>POWER STEERING SOLENOID VALVE</b>	128 128 c 130 ) 131 132 132 132 133 133 133 133 133 133 134 134 134 134 134 135 ).137 138
DTC Logic Diagnosis Procedure Component Inspection [ABS Actuator and Electric Unit (Control Unit)] Component Inspection (Yaw Rate/Side G Sensor Special Repair Requirement <b>U1000 CAN COMM CIRCUIT</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>U1010 CONTROL UNIT (CAN)</b> Description DTC Logic Diagnosis Procedure Special Repair Requirement <b>POWER SUPPLY AND GROUND CIRCUIT</b> Description Description Diagnosis Procedure (4WAS Front Control Unit) Diagnosis Procedure (4WAS Main Control Unit) Component Inspection (AWAS Rear Motor Relay Component Inspection (Noise Suppressor)	128 128 c 130 ) 131 132 132 132 132 133 133 133 133 133 134 135 ).137 138 139 139 139

Component Inspection140
4WAS WARNING LAMP141 Description
Diagnosis Procedure
Special Repair Requirement
ECU DIAGNOSIS INFORMATION143
4WAS FRONT CONTROL UNIT143 Reference Value
Wiring Diagram - 4WAS SYSTEM 147 Fail Safe 153
DTC Inspection Priority Chart
4WAS MAIN CONTROL UNIT157 Reference Value
Wiring Diagram - 4WAS SYSTEM
Fail Safe
DTC Inspection Priority Chart
DTC Index 169
SYMPTOM DIAGNOSIS171
4WAS WARNING LAMP DOES NOT TURN
ON171
Description171
Diagnosis Procedure 171
4WAS WARNING LAMP DOES NOT TURN
OFF172
Description
Diagnosis Procedure 172
STEERING WHEEL MISS ALIGNMENT173
Description 173
Diagnosis Procedure 173
STEERING SYSTEM VIBRATION AND NOISE
Description
UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)176
• •
Description
0
PRECAUTION177
PRECAUTIONS
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"

# REMOVAL AND INSTALLATION 179 Removal and Installation 180 4WAS FRONT CONTROL UNIT 179 Removal and Installation 181 Perioded View 179 Removal and Installation 181 4WAS MAIN CONTROL UNIT 180 180 182 Exploded View 180 180 180 Exploded View 180 180 180 C 180 180 180

D

Е

# STC

Н

J

Κ

L

Μ

Ν

0

Ρ

< BASIC INSPECTION >

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000004257843

DETAILED FLOW

**1.**COLLECT THE INFORMATION FROM THE CUSTOMER

It is also important to clarify customer complaints before inspection. First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. In some cases, it is necessary to check symptoms by driving vehicle with customer.

#### CAUTION:

Customers are not professional. It is dangerous to make an easy guess like "maybe the customer means that...," or "maybe the customer mentions this symptom".

>> GO TO 2.

2. CHECK THE STATUS

- 1. Power steering fluid leakage and check the power steering fluid level. Refer to ST-12, "Inspection".
- 2. Check the drive belt tension. Refer to EM-13. "Checking".
- 3. Check the power steering gear for damages, cracks and fluid leakage. Refer to <u>ST-12, "Inspection"</u>.
- 4. Check the relief oil pressure. Refer to <u>ST-52</u>, "FOR MODELS WITHOUT 4WAS AND MODELS EXCEPT SPORT MODELS : Inspection".

#### >> GO TO 3.

**3.** DIAGNOSIS CHART BY SYMPTOM

Perform the diagnosis by symptom. Refer to STC-22, "Diagnosis Procedure".

>> GO TO 4.

#### **4.**FINAL CHECK

Check the input/output standard values for the power steering control unit.

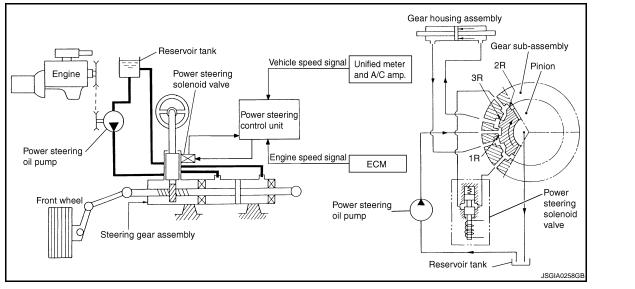
Are the power steering control unit input/output values within standard ranges respectively?

YES >> INSPECTION END NO >> GO TO 2.

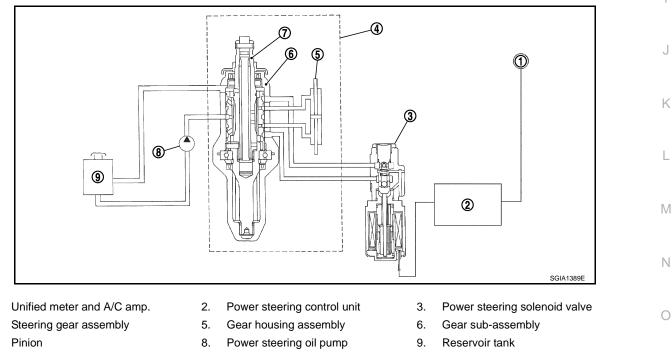
# < SYSTEM DESCRIPTION > SYSTEM DESCRIPTION EPS SYSTEM

# System Diagram

# CONTROL DIAGRAM



# CROSS-SECTIONAL VIEW



# System Description

1.

4. 7.

• The EPS system controls the power steering solenoid valve through the power steering control unit.

# STC-7

# 2009 G37 Coupe

INFOID:000000004257845

Ρ

А

D

Ε

F

STC

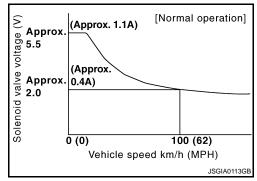
Н

# **EPS SYSTEM**

#### < SYSTEM DESCRIPTION >

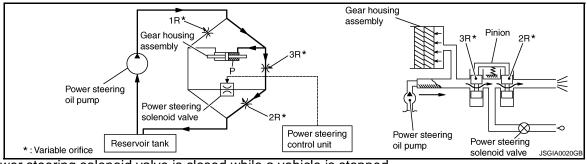
# [WITHOUT 4WAS]

• The valve driving voltage to control the power steering solenoid valve varies according to the vehicle speed.



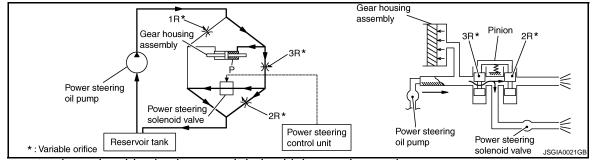
## OPERATION PRINCIPLE

During Parking (When Turning The Steering Wheel To The Right.)



- 1. Power steering solenoid valve is closed while a vehicle is stopped.
- 2. Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel.
- 3. Oil pressure "P" in the gear housing assembly is the sum of oil pressures occurred in "2R" and "3R". This results in a light steering force because of high pressure.

**During High-speed Operation** 



- 1. Power steering solenoid valve is opened during high-speed operation.
- 2. Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel.
- 3. Oil pressure "2R" does not occur because the power steering solenoid valve is on full throttle.
- 4. Oil pressure "P" in the gear housing assembly includes only oil pressure occurred in "3R" and results in a heavy steering force.

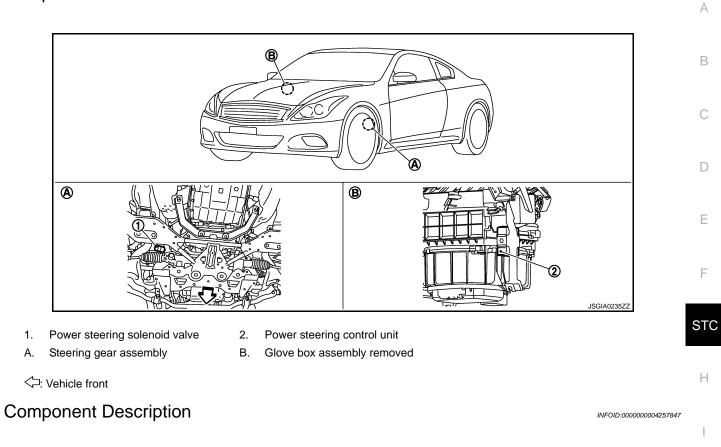
# **EPS SYSTEM**

# < SYSTEM DESCRIPTION >

# **Component Parts Location**

# [WITHOUT 4WAS]

#### INFOID:000000004257846



Component parts	Reference/Function	
Power steering control unit	<ul> <li>Signals from various sensors control the driving voltage to the power steering solenoid valve.</li> <li>The power steering control unit controls the driving voltage to the power steering solenoid valve for maintaining the power steering assist force when the fail-safe function is activated. (The engine speed signals control EPS system if any vehicle speed signal error is detected.)</li> </ul>	
Unified meter and A/C amp.	STC-15, "Description"	
ECM	STC-13, "Description"	
Power steering solenoid valve	STC-11, "Description"	

M

Ν

- 0
- Ρ

# DTC/CIRCUIT DIAGNOSIS POWER SUPPLY AND GROUND CIRCUIT

# Description

Power supply to EPS system

# **Diagnosis Procedure**

# **1.**CHECK POWER SUPPLY

- 1. Turn the ignition switch OFF.
- 2. Disconnect power steering control unit harness connector.
- 3. Check the voltage between power steering control unit harness connector and ground.

Power steering control unit		Voltage (Approx.)	
Connector	Terminal	vollage (Approx.)	
M108	3 – Ground	0 V	

4. Turn the ignition switch ON.

#### CAUTION: Never start the engine.

5. Check the voltage between power steering control unit harness connector and ground.

Pov	ver steering control unit	Voltage (Approx.)
Connector	Terminal	vollage (Applox.)
M108	3 – Ground	Battery voltage

Is the inspection result normal?

#### YES >> GO TO 2. NO >> Check th

- >> Check the following. If any items are damaged, repair or replace damaged parts.
  - 10A fuses (#45) open
  - Harness for short or open between ignition switch and power steering control unit harness connector No. 3 terminal.
  - Ignition switch. Refer to PCS-63, "Component Inspection".

# 2.CHECK GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Check the continuity between power steering control unit harness connector and ground.

	Continuity	
Connector	Terminal	Continuity
M108	6 – Ground	Existed

Also check harness for short to ground and short to power.

# Is the inspection result normal?

YES >> GO TO 3.

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

 ${f 3.}$  CHECK TERMINALS AND HARNESS CONNECTORS

Check the power steering control unit pin terminals for damage or loose connection with harness connector. Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

INFOID:000000004257849

INFOID:000000004257848

# POWER STEERING SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

# POWER STEERING SOLENOID VALVE

# Description

Power steering solenoid valve controls the power steering oil pressure in the gear housing assembly.

#### **Diagnosis** Procedure

# 1.CHECK POWER STEERING SOLENOID VALVE SIGNAL

- 1. Turn the ignition switch OFF.
- 2. Check the voltage between power steering control unit harness connector and ground.

	Voltage (Ap-					
Connector	Terminal	Condition	prox.)			
M108	1 – Ground	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	4.4 – 6.6 V			
		Vehicle speed: 100 km/h (62 MPH)	2.4 – 3.6 V			

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN POWER STEERING SOLENOID VALVE AND POWER STEERING CON-

- 1. Turn the ignition switch OFF.
- 2. Disconnect power steering solenoid valve harness connector.
- 3. Disconnect power steering control unit harness connector.
- 4. Check the continuity between power steering solenoid valve harness connector and the power steering control unit harness connector.

-		ing solenoid Ive	Power steering control unit		Continuity	
_	Connector	Terminal	Connector	Terminal	erminal	
-	F45	1	M108	1	Existed	
-	F45	2	M108	5	Existed	

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

**3.**CHECK POWER STEERING SOLENOID VALVE

1. Check the resistance between power steering solenoid valve connector terminals.

Powe	er steering solenoid valve	Resistance (Approx.)	
Connector	Terminal		
F45	1 – 2	4 – 6 Ω	

2. Check the power steering solenoid valve connector by listening for its operation sound while applying battery voltage to power steering solenoid valve connector F45 terminals 1 (positive) and 2 (negative).

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace gear-sub assembly. Refer to <u>ST-30, "2WD : Exploded View"</u> (2WD), <u>ST-37, "AWD :</u> <u>Exploded View"</u> (AWD).

#### **4.**CHECK TERMINALS AND HARNESS CONNECTORS

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

INFOID:000000004257850

INFOID:00000000425785

А

В

D

E

F

STC

Κ

Μ

Ν

Ρ

# POWER STEERING SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

[WITHOUT 4WAS]

Check the power steering solenoid valve pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

#### Component Inspection

INFOID:000000004257852

# **1.**CHECK POWER STEERING SOLENOID VALVE

1. Turn the ignition switch OFF.

2. Disconnect power steering solenoid valve harness connector.

3. Check the resistance between power steering solenoid valve connector terminals.

Powe	er steering solenoid valve	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
F45	1 – 2	4 – 6 Ω

4. Check the power steering solenoid valve connector by listening for its operation sound while applying battery voltage to power steering solenoid valve connector F45 terminals 1 (positive) and 2 (negative).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace gear-sub assembly. Refer to <u>ST-30, "2WD : Exploded View"</u> (2WD), <u>ST-37, "AWD :</u> <u>Exploded View"</u> (AWD).

# **ENGINE SPEED SIGNAL CIRCUIT**

< DTC/CIR(	CUIT DIAGN	OSIS >		[WITHOUT 4	WAS]
ENGINE	SPEED	SIGNAL	CIRCUI	Г	
escriptio	on			INFOID:0000	000004257853
CM sends	engine spee	d signal to p	ower steerin	g control unit.	
iagnosis	s Procedur	e		INFOID:0000	000004257854
.PERFOR	RM ECM SEL	F-DIAGNOS	SIS		
With CO					
	M self-diagno system deteo				
•	Check the er				
NO >>	GO TO 2.	•			
			CM AND PC	WER STEERING CONTROL UNIT	
	e ignition swit nect ECM har		ctors.		
. Disconr	nect power st	eering contr	ol unit harne	ss connector.	nantar
. Check t	ne continuity	Delween EC	JM namess (	connector and power steering control unit harness cor	mector.
E	СМ	Power steeri	ng control unit	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M107	110	M108	10	Existed	
	ction result no	-	ground and s	hort to power.	
YES >>	GO TO 3.				
	Repair or rep		-		
	ENGINE SPE		_ (1)		
	e ignition swit t ECM harne		rs.		
. Check t	he signal bet	ween ECM	harness con	nector and ground with oscilloscope.	
		ECM			
Connector	Terminal		Condition	Value (Approx.)	
				(V) 6	
		Engine spe (Warm-up o			
		(main up c	,enancen)	₀┝┦└┿┙╿┶╍┦┝╍┥╢╍┥╢╍┥╢╌┥	
				20ms PBIA3654J	
M107	110 – Ground				
				(V) 6	
		Engine spe (Warm-up o	ed: Approx. 2,0		
		(vvaini-up (	onullon)		
				20ms PBIA3655J	
		(vvarm-up c	onullion)		
	ook hornoog f	or short to a	round and a	hort to power.	

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

# **ENGINE SPEED SIGNAL CIRCUIT**

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace ECM. Refer to <u>EC-16</u>, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT (ECM) : Description".

**4.**CHECK ENGINE SPEED SIGNAL (2)

- 1. Turn the ignition switch OFF.
- 2. Connect power steering control unit harness connector.
- 3. Check the signal between power steering control unit harness connector and ground with oscilloscope.

	Power ste	Value (Approx.)		
Connector	Terminal	Condition	value (Applox.)	
M108	10 – Ground	Engine speed: At idle (Warm-up condition)	(V) 6 4 2 0 20ms PBIA3654J	
WIGO		Engine speed: Approx. 2,000 rpm (Warm-up condition)	(V) 6 4 2 0 20ms PBIA3655J	

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace power steering control unit. Refer to <u>STC-25, "Exploded View"</u>.

5. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

# VEHICLE SPEED SIGNAL CIRCUIT

				61
			[WITHOUT 4WA	<u> </u>
	JUSIGINA		11	
on			INFOID:00000000425	57855
er and A/C a	mp. sends ve	ehicle speed	signal to power steering control unit.	
s Procedu	re		INF0/D:00000000425	57856
		D A/C AMP.	SELF-DIAGNOSIS	
NSULT-III				
	•	self-diagnos	sis.	
•				
GO TO 2.				
HARNESS E	BETWEEN U	INIFIED ME	TER AND A/C AMP. AND POWER STEERING CONTRO	OL
o ignition swi				
nect unified n	neter and A/0			
				trol
r and A/C amp	Power steerir	na control unit		
Terminal	Connector	Terminal	Continuity	
8	M108	8	Existed	
	-	round and s	hort to power.	
	ormal?			
	place damag	ed parts.		
VEHICLE SF	PEED SIGNA	L (1)		
		ma haraaa	connector	
				<u>e"</u> .
	ormal?			
	fied meter ar	nd A/C amp.	Refer to MWI-125, "Exploded View".	
•		•		
	····· F ····			
Power st	-		Value (Approx.)	
Terminal	(	Condition		
	Vehicle speed 40 km/h (25 M CAUTION:			
	on er and A/C ar s Procedu M UNIFIED NSULT-III iffed meter a system deter Check the e GO TO 2. HARNESS E e ignition swi nect unified n nect power st the continuity ress connec r and A/C amp. Terminal 8 eck harness ction result n GO TO 3. Repair or rep VEHICLE SF e ignition swi ct unified met the unified met ction result n GO TO 4. Replace unified the signal bet	er and A/C amp. sends versions of the continuity between under the context of t	er and A/C amp. sends vehicle speed <b>S Procedure</b> <b>RM UNIFIED METER AND A/C AMP. S</b> <b>NSULT-III</b> ified meter and A/C amp. self-diagnost system detected? Check the error system. GO TO 2. HARNESS BETWEEN UNIFIED ME e ignition switch OFF. nect unified meter and A/C amp. harnest the continuity between unified meter at a M108 8 eck harness for short to ground and s ction result normal? GO TO 3. Repair or replace damaged parts. VEHICLE SPEED SIGNAL (1) e ignition switch OFF. tt unified meter and A/C amp. harness the unified meter and A/C amp. or VEHICLE SPEED SIGNAL (2) e ignition switch OFF. ction result normal? GO TO 4. Replace unified meter and A/C amp. VEHICLE SPEED SIGNAL (2) e ignition switch OFF. the unified meter and A/C amp. VEHICLE SPEED SIGNAL (2) e ignition switch OFF. Condition switch OFF. The power steering control unit harness the signal between power steering cort Power steering control unit Terminal Condition	er and A/C amp. sends vehicle speed signal to power steering control unit.  S Procedure  areasesses  AM UNIFIED METER AND A/C AMP. SELF-DIAGNOSIS  NSUL-III  ified meter and A/C amp. self-diagnosis.  system detected?  Check the error system. GO TO 2.  HARNESS BETWEEN UNIFIED METER AND A/C AMP. AND POWER STEERING CONTRe  e ignition switch OFF.  nect unified meter and A/C amp. harness connector.  he continuity between unified meter and A/C amp. harness connector.  he continuity between unified meter and A/C amp. harness connector.  he continuity between unified meter and A/C amp. harness connector.  rand A/C amp. Power steering control unit Continuity  Terminal Connector Terminal Continuity  GO TO 3.  Repair or replace damaged parts. VEHICLE SPEED SIGNAL (1)  e ignition switch OFF.  t unified meter and A/C amp. harness connector.  the unified meter and A/C amp. harness connector.  the unified meter and A/C amp. harness connector.  totion result normal?  GO TO 4.  Replace unified meter and A/C amp. Refer to MWI-125, "Exploded View".  VEHICLE SPEED SIGNAL (2)  e ignition switch OFF.  t power steering control unit harness connector.  the signal between power steering control unit harness connector.  the unified meter and A/C amp. Refer to MWI-125, "Exploded View".  VEHICLE SPEED SIGNAL (2)  e ignition switch OFF.  t power steering control unit harness connector.  the signal between power steering control unit harness connector and ground with oscilloscope.  Power steering control unit harness connector.  the signal between power steering control unit harness connector and ground with oscilloscope.  Power steering control unit harness connector.  ferminal Condition Value (Approx.)  D meter and A/C amp. Refer to Multing tables connector and ground with oscilloscope.  Power steering control unit harness connector.  Continuity Value (Approx.)  D meter and A/C amp. Refer to Marker and approx.  Continuity Control unit harness connector.  Continuity Control unit harness connector.  Contex and the data contex and the data ta

# VEHICLE SPEED SIGNAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace power steering control unit. Refer to <u>STC-25, "Exploded View"</u>.

5. CHECK TERMINALS AND HARNESS CONNECTORS

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

• Check the unified meter and A/C amp. pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

# ECU DIAGNOSIS INFORMATION POWER STEERING CONTROL UNIT

# **Reference Value**

# TERMINAL LAYOUT



А

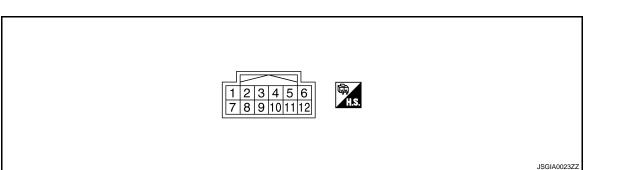
С

D

Е

F

INFOID:000000004257857 B



# PHYSICAL VALUES

Termi	nal No.	Wire	Description			
+	-	color	Signal name	Input/ Output	Condition	Value (Approx.)
1	Ground	LG	Power steering so- lenoid valve voltage	Output	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	4.4 – 6.6 V
			lenoid valve voltage		Vehicle speed: 100 km/h (62 MPH)	2.4 – 3.6 V
3	Ground	G	Ignition switch pow-	Input	Ignition switch: ON	Battery voltage
5	Ground	0	er supply	mput	Ignition switch: OFF	0 V
5	Ground	В	Power steering so- lenoid valve ground	_	Always	0 V
6	Ground	В	Ground	_	Always	0 V
8	Ground	L	Vehicle speed sig- nal	Input	Vehicle speed: 40 km/h (25 MPH) CAUTION: Check air pressure of tire under standard condition.	(V) 6 2 0 • • • 70 ms SEIA0775E
10	Ground	R	Engine speed signal	Input	Engine speed: At idle (Warm-up condition)	(V) 6 4 0 2 0 2 0 2 0 5 2 0 8 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1
10	Ground	ĸ	Engine speed signal	input	Engine speed: Approx. 2,000 rpm (Warm-up condition)	(V) 6 4 2 0 20ms PBIA3655J

#### CAUTION:

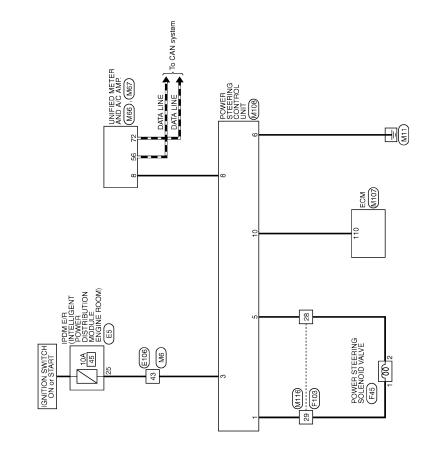
Revision: 2009 October

#### < ECU DIAGNOSIS INFORMATION >

When using circuit tester or oscilloscope to measure voltage for inspection, be sure not to forcibly extend any connector terminals.

Wiring Diagram - ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM -

INFOID:000000004257858



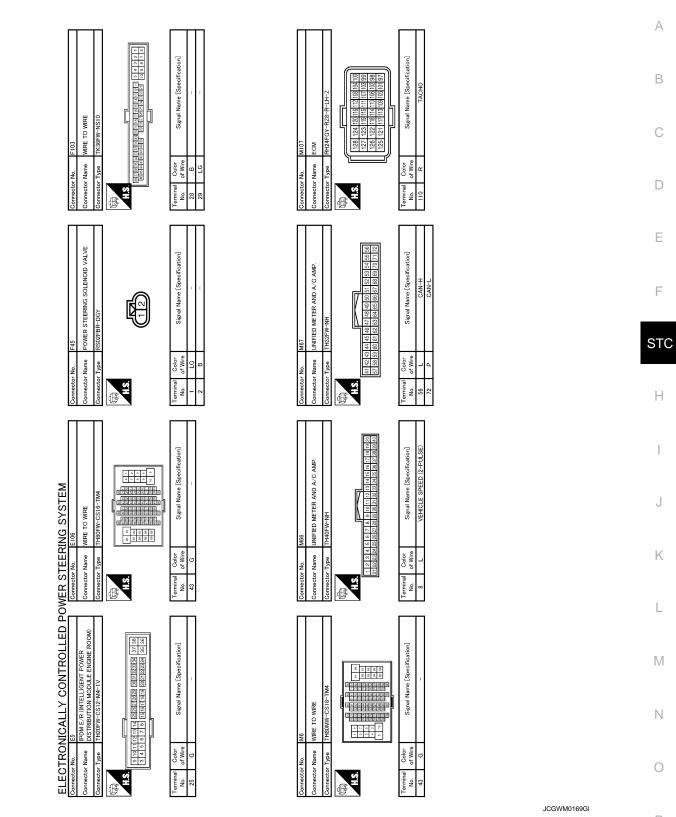
ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM

22 5008/08/25 JCGWM0168G

# POWER STEERING CONTROL UNIT

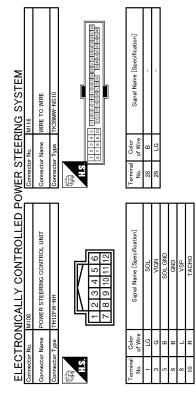
#### < ECU DIAGNOSIS INFORMATION >

[WITHOUT 4WAS]



Ρ

< ECU DIAGNOSIS INFORMATION >



Fail Safe

EPS system

JCGWM0170G

INFOID:000000004257859

# **POWER STEERING CONTROL UNIT**

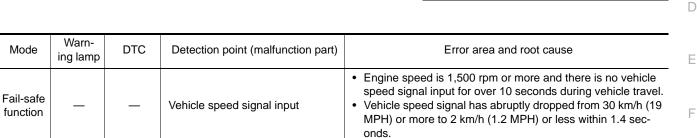
#### < ECU DIAGNOSIS INFORMATION >

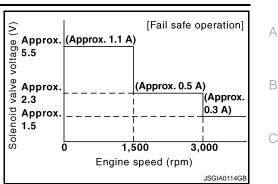
• EPS system enters the fail-safe mode (that allows the steering force to be controlled without impairing the drive ability) if any of the input/output values to/from EPS system (power steering control unit) deviate from the standard range.

NOTE:

The system enters the fail-safe mode if the engine speed remains at 1,500 rpm or more for over 10 seconds while the vehicle is stopped. This is normal.

 The fail-safe function is canceled when a vehicle speed signal of 2 km/h (1.2 MPH) or more is inputted or the key switch is turned OFF→ON. EPS system restores the normal operation at that time.





[WITHOUT 4WAS]

STC

Н

Κ

L

Μ

Ν

Ρ

# UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION) < SYMPTOM DIAGNOSIS > [WITHOUT 4WAS]

# SYMPTOM DIAGNOSIS

# UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIA-TION)

# Description

INFOID:000000004257860

- Hard steering when fully turning the steering wheel.
- Light steering when driving at a high speed.

# Diagnosis Procedure

INFOID:000000004257861

# **1.**CHECK SYSTEM FOR POWER SUPPLY AND GROUND

Perform trouble diagnosis for power supply and ground. Refer to <u>STC-10, "Diagnosis Procedure"</u>. Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.CHECK SYSTEM FOR VEHICLE SPEED SIGNAL

Perform trouble diagnosis for vehicle speed signal. Refer to STC-15, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

 $\mathbf{3.}$ CHECK SYSTEM FOR ENGINE SPEED SIGNAL

Perform trouble diagnosis for engine speed signal. Refer to STC-13, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

**4.**CHECK SYSTEM FOR POWER STEERING SOLENOID VALVE

Perform trouble diagnosis for power steering solenoid valve. Refer to <u>STC-11, "Diagnosis Procedure"</u>. Is the inspection result normal?

- YES >> Perform the symptom diagnosis for the steering system. Refer to <u>ST-3, "NVH Troubleshooting</u> <u>Chart"</u>.
- NO >> Repair or replace damaged parts.

А

В

Е

F

Н

L

Ρ

# < 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:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIR BAG".
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this STC Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### WARNING:

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000004257863

#### NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation pro-

#### OPERATION PROCEDURE

1. Connect both battery cables. NOTE:

Supply power using jumper cables if battery is discharged.

- 2. Turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
- 3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
- 4. Perform the necessary repair operation.

# PRECAUTIONS

#### < PRECAUTION >

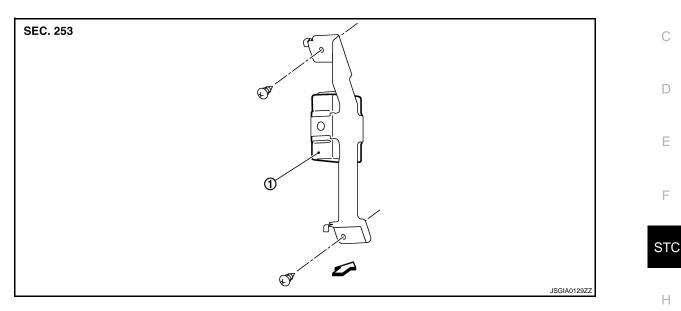
- 5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
- 6. Perform self-diagnosis check of all control units using CONSULT-III.

# REMOVAL AND INSTALLATION POWER STEERING CONTROL UNIT

А

INFOID:000000004257864

INFOID:000000004257865



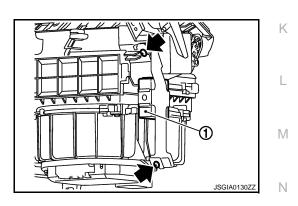
1. Power steering control unit

C: Vehicle front

# Removal and Installation

# REMOVAL

- 1. Remove glove box assembly. Refer to IP-11, "Exploded View".
- 2. Remove power steering control unit screws.
- 3. Remove power steering control unit (1).
- 4. Disconnect power steering control unit connector.



INSTALLATION Install in the reverse order of removal.

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000004257866

**IWITH 4WAS1** 

DETAILED FLOW

#### **1.**INTERVIEW FROM THE CUSTOMER

It is also important to clarify customer complaints before inspection. First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. In some cases, it is necessary to check symptoms by driving vehicle with customer.

#### CAUTION:

Customers are not professional. It is dangerous to make an easy guess like "maybe the customer means that...," or "maybe the customer mentions this symptom".

>> GO TO 2.

2. CHECK SYMPTOM

Start the engine.

Stop the vehicle.

Does 4WAS warning lamp turn ON?

YES >> GO TO 3. NO >> GO TO 6.

**3.**PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

Is any DTC detected other than "C1930" or "C1931"?

YES >> GO TO 4.

NO >> GO TO 5.

**4.**PERFORM TROUBLE DIAGNOSIS (4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

1. Check the error system detected from the self-diagnosis. CAUTION:

- Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function.
- 2. Erase 4WAS main control unit self-diagnosis memory. CAUTION:
  - Never erase the self-diagnosis result (record) history when replacing 4WAS main control unit.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

#### >> GO TO 5.

**5.**PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT AND 4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

- 1. Perform 4WAS front control unit self-diagnosis.
- 2. Check the error system detected from the self-diagnosis. CAUTION:

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function.

- 3. Erase 4WAS front control unit self-diagnosis memory.
  - CAUTION:
    - Never erase the self-diagnosis result (record) history when replacing 4WAS front control unit.
    - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".
- 4. Perform 4WAS main control unit self-diagnosis.

# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >	[WITH 4WAS]
5. Check the error system detected from the self-diagnosis.	
CAUTION: Check the "DATA MONITOR" value of each DTC detected with the self-diagne	osis function
6. Erase 4WAS main control unit self-diagnosis memory.	
CAUTION:	
<ul> <li>Never erase the self-diagnosis result (record) history when replacing 4WAS</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or</li> </ul>	
ues of "DATA MONITOR".	loool ang an tho ta
>> GO TO 6.	
6.CHECK TERMINAL	
Check each harness connector pin terminal for disconnection.	
>> GO TO 7. <b>7.</b> CHECK SYMPTOM REPRODUCTION	
With CONSULT-III Perform DTC reproduction procedure for the error system.	
Is any error system detected?	
YES >> GO TO 2.	
NO >> GO TO 8.	
<b>B.</b> PERFORM SYMPTOM DIAGNOSIS	
With CONSULT-III	
Perform the symptom diagnosis for each system.	
Is any error detected? YES >> GO TO 2.	
YES >> GO TO 2. NO >> GO TO 9.	
9. FINAL CHECK	
With CONSULT-III	
Check input/output signal standard of 4WAS front control unit and 4WAS main control	unit.
Is the input/output the standard value?	
YES >> INSPECTION END	
NO >> GO TO 2.	

Ρ

< BASIC INSPECTION >

# INSPECTION AND ADJUSTMENT

# ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

# ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000004257867

- Perform 4WAS front actuator adjustment after replacing 4WAS front control unit.
- Perform 4WAS front actuator adjustment when performing any service below.
- 4WAS front actuator and the steering components (including wheel alignment) removal. Refer to STC-28. "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 1)".

#### CAUTION:

- · Check the following items before the removal:
- 4WAS warning lamp is turned OFF after the engine starts.
- Self-diagnosis of each control unit of 4WAS system (4WAS front control unit/4WAS main control unit) is performed. Check that 4WAS system is controlled properly.
- 4WAS front actuator and the steering components (including wheel alignment) installation. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)".
- 4WAS front control unit and the steering angle sensor replacement. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".
- When driving while misaligning the steering wheel position (center) after installing 4WAS front actuator. Refer to STC-31, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 4)".

# 4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT

# 4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Description

INFOID:000000004257868

- Perform 4WAS front actuator adjustment when performing any service below.
- 4WAS front actuator and the steering components (including wheel alignment) removal. Refer to STC-28. "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 1)".

# **CAUTION:**

- Check the following items before the removal:
- 4WAS warning lamp OFF after the engine starts.
- Self-diagnosis of each control unit of 4WAS system (4WAS front control unit/4WAS main control unit) is performed. Check that 4WAS system controlled properly.
- 4WAS front actuator and the steering components (including wheel alignment) installation. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)".
- 4WAS front control unit and the steering angle sensor replacement. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".
- When driving while misaligning the steering wheel position (center) after installing 4WAS front actuator. Refer to STC-31, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 4)".

4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 1)

INFOID:000000004257869

# 1.4WAS FRONT ACTUATOR ADJUSTMENT

#### (R) With CONSULT-III

Start the engine. 1. **CAUTION:** 

#### Stop the vehicle.

2. Turn the steering wheel to adjust "ACTR ROTA ANG" of the 4WAS front control unit "DATA MONITOR" so that it falls within the range shown below:

#### ACTR ROTA ANG : -3.5 – 3.5 deg

Turn the ignition switch OFF. 3.

< BASIC INSPECTION >	[WITH 4WAS]
CAUTION: Never touch the steering wheel after turning ignition switch OFF.	ŀ
>> END	
4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTME	NT : Special Repair
Requirement (Pattern 2)	INFOID:000000004257870
1.4WAS FRONT ACTUATOR ADJUSTMENT	C
With CONSULT-III	
1. Turn the ignition switch ON. CAUTION:	D
Never start the engine.	
<ol> <li>Steer 30° leftward slowly. Steer 30° rightward and return the steering wheel to</li> <li>Perform the steering angle sensor neutral position adjustment. Refer to E</li> <li>STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Require</li> </ol>	<u> 3RC-8, "ĂDJUSTMENT OF</u>
4. Turn the ignition switch OFF.	F
>> GO TO 2.	
<b>2.</b> PERFORM ACTIVE TEST (SLOW MODE)	ST
With CONSULT-III	
1. Start the engine. CAUTION:	
Stop the vehicle.	H
2. Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.	
<ol> <li>Perform "MODE START" of "ACTIVE TEST".</li> <li>Steer the steering wheel leftward slowly until the turning stops.</li> </ol>	1
<ol> <li>Steer the steering wheel rightward slowly until the turning stops.</li> </ol>	
Is "OK" indicated on both right and left on "SLOW MODE"?	
YES >> GO TO 3.	J
NO >> Refer to <u>STC-31, "4WAS FRONT ACTUATOR NEUTRAL POSITIC</u> Repair Requirement (Pattern 4)".	N ADJUSTMENT : Special
3.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)	K
With CONSULT-III     Perform 4WAS front control unit self-diagnosis.     NOTE:	L
Detect DTC "C1671" when replacing 4WAS front control unit or performing 4WA DTC "C1671" becomes past record if 4WAS front actuator adjustment is complete	d normally.
Is any error system detected?	Ň
YES >> Check the error system. NO >> GO TO 4.	
4. ERASE ERROR HISTORY	Ν
With CONSULT-III     Erase the memory of 4WAS main control unit and 4WAS main control unit self-dia	ignosis result.
>> END	
4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMEI Requirement (Pattern 3)	NT : Special Repair
<b>1.</b> PERFORM ACTIVE TEST (LOCK OPERATION)	

With CONSULT-III
Stop the vehicle to the straight-ahead position.

< BASIC INSPECTION >

- 2. Turn the ignition switch ON. CAUTION: Never start the engine.
- 3. Select "LOCK OPERATION" item on "ACTIVE TEST" of 4WAS front control unit.
- 4. Perform "RELEASE" of "ACTIVE TEST".

#### **CAUTION:**

- Turn the steering wheel 90°. Check that the front wheels do not move.
- Never turn the steering wheel during "RELEASE".
- 5. Turn the steering wheel to adjust "4WAS STR ANG" of the 4WAS front control unit "DATA MONITOR" so that it falls within the range shown below:

#### 4WAS STR ANG : -3.5 - 3.5 deg

- 6. Perform "LOCK" item on "ACTIVE TEST" of 4WAS front control unit.
- 7. Steer 30° leftward slowly. Steer 30° rightward and return the steering wheel to the straight-ahead position.
- 8. Finish 4WAS front control unit active test.

#### >> GO TO 2.

# $2. {\tt steering angle sensor neutral position adjustment}$

- 1. Perform the steering angle sensor neutral position adjustment. Refer to <u>BRC-8</u>, "ADJUSTMENT OF <u>STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.
- 2. Turn the ignition switch OFF.

#### >> GO TO 3.

# **3.**RETURN TO 4WAS FRONT ACTUATOR INITIAL POSITION

- 1. Start the engine. CAUTION: Stop the vehicle.
- 2. Steer 90° leftward slowly. Then steer 90° rightward.
- 3. Steer 90° leftward slowly again. Then steer 90° rightward. Return the steering wheel to the straight-ahead position.
- 4. Stop the vehicle in the straight-ahead position after driving for a period of time. (When engine is running)

>> GO TO 4.

#### **4.**CHECK 4WAS FRONT ACTUATOR INSPECTION

#### With CONSULT-III

T. Check "4WAS STR ANG" item on "DATA MONITOR" of 4WAS front control unit.

#### CAUTION:

Never touch the steering wheel during the service.

#### 4WAS STR ANG : -3.5 - 3.5 deg

- 2. Turn the ignition switch OFF.
- Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 1.

**5.**PERFORM ACTIVE TEST (SLOW MODE)

#### With CONSULT-III

- Start the engine.
   CAUTION:
   Stop the vehicle.
- 2. Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.
- 3. Perform "MODE START" of "ACTIVE TEST".
- 4. Steer the steering wheel leftward slowly until the turning stops.
- 5. Steer the steering wheel rightward slowly until the turning stops.

< BASIC INSPECTION >	[WITH 4WAS]
Is "OK" indicated on both right and left on "SLOW MODE"?	
YES >> GO TO 6.	
NO >> Refer to <u>STC-31, "4WAS FRONT ACTUATOR NEUTRAL POSITIO</u> <u>Repair Requirement (Pattern 4)".</u>	N ADJUSTMENT : Special
6.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)	В
With CONSULT-III	
Perform 4WAS front control unit self-diagnosis.	С
<u>Is any error system detected?</u> YES >> Check the error system.	
YES >> Check the error system. NO >> GO TO 7.	D
7. ERASE ERROR HISTORY	D
With CONSULT-III	
Erase the memory of 4WAS main control unit and 4WAS main control unit self-dia	ignosis result.
>> END	
4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTME	NT : Special Repair
Requirement (Pattern 4)	INFOID:00000004257872
1.CHECK 4WAS FRONT ACTUATOR	ST
<ol> <li>Stop the vehicle to the straight-ahead position.</li> <li>Remove and install 4WAS front actuator again. Check the installation condition</li> </ol>	n. H
3. Check that the steering wheel is neutral.	
>> GO TO 2.	1
2.PERFORM ACTIVE TEST (LOCK OPERATION)	
(P)With CONSULT-III	J
1. Stop the vehicle to the straight-ahead position.	J
2. Turn the ignition switch ON. CAUTION:	
Never start the engine.	K
<ol> <li>Select "LOCK OPERATION" item on "ACTIVE TEST" of 4WAS front control u</li> <li>Perform "RELEASE" of "ACTIVE TEST".</li> </ol>	nit.
CAUTION:	L
<ul> <li>Turn the steering wheel 90°. Check that the front wheels do not move.</li> <li>Never turn the steering wheel during "RELEASE".</li> </ul>	
5. Turn the steering wheel to adjust "4WAS STR ANG" of the 4WAS front control	ol unit "DATA MONITOR" so $_{\sf M}$
that it falls within the range shown below:	
4WAS STR ANG : -3.5 – 3.5 deg	Ν
<ol> <li>Perform "LOCK" item on "ACTIVE TEST" of 4WAS front control unit.</li> <li>Finish 4WAS front control unit active test.</li> </ol>	1.4
>> GO TO 3.	0
3.steering angle sensor neutral position adjustment	
1. Perform the steering angle sensor neutral position adjustment. Refer to E	
<ol> <li>STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Require</li> <li>Turn the ignition switch OFF.</li> </ol>	<u>iment"</u> .
-	
>> GO TO 4.	

**4.**RETURN TO 4WAS FRONT ACTUATOR INITIAL POSITION

1. Start the engine.

< BASIC INSPECTION >

#### CAUTION: Stop the vehicle.

- Steer 90° leftward slowly. Then steer 90° rightward.
- 3. Steer 90° leftward slowly again. Then steer 90° rightward. Return the steering wheel to the straight-ahead position.
- 4. Stop the vehicle in the straight-ahead position after driving for a period of time. (Engine running)

#### >> GO TO 5.

5. CHECK 4WAS FRONT ACTUATOR

#### With CONSULT-III

 Check "4WAS STR ANG" item on "DATA MONITOR" of 4WAS front control unit. CAUTION:

Never touch the steering wheel during the service.

#### 4WAS STR ANG : -3.5 - 3.5 deg

2. Turn the ignition switch OFF.

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 1.

6.PERFORM ACTIVE TEST (SLOW MODE)

#### With CONSULT-III

Start the engine.
 CAUTION:

# Stop the vehicle.

- 2. Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.
- 3. Perform "MODE START" of "ACTIVE TEST".
- 4. Steer the steering wheel leftward slowly until the turning stops.
- 5. Steer the steering wheel rightward slowly until the turning stops.

Is "OK" indicated on both right and left on "SLOW MODE"?

NO >> GO TO 1.

**1.**PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)

#### With CONSULT-III

Perform 4WAS front control unit self-diagnosis.

#### Is any error system detected?

YES >> Check the error system.

NO >> GO TO 8.

**8.**ERASE ERROR HISTORY

#### With CONSULT-III

Erase the memory of 4WAS front control unit and 4WAS main control unit self-diagnosis result.

>> END

Communication line

4WAS main

control unit

Rear wheel

steering

4WAS front

control unit

2.

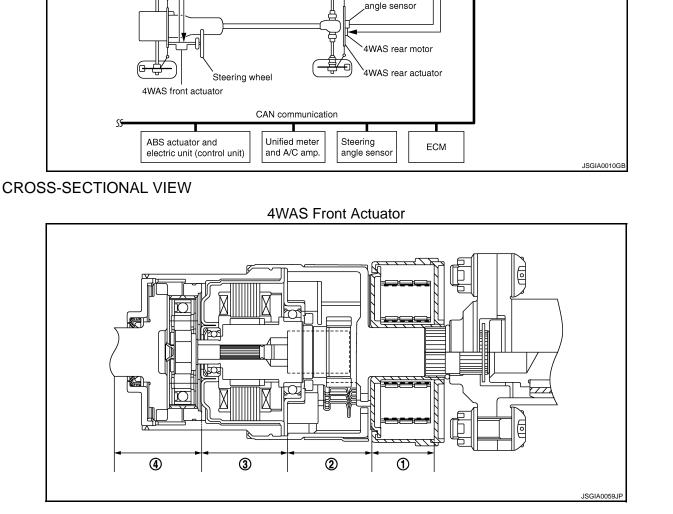
# < SYSTEM DESCRIPTION > SYSTEM DESCRIPTION 4WAS SYSTEM

4.

Gear shaft

# System Diagram

# CONTROL DIAGRAM



**STC-33** 

- 1. Front wheel steering angle sensor
- 4WAS front lock solenoid valve (lock 3. 4WAS front motor structure)

Р

0

# [WITH 4WAS]

INFOID:000000004257873

Stop lamp switch

А

В

С

D

Е

F

STC

Н

Κ

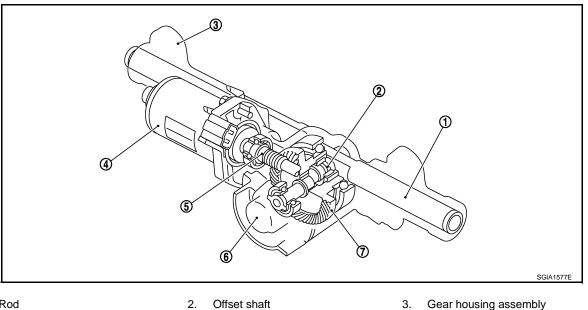
L

Μ

Ν

# < SYSTEM DESCRIPTION >





- 1. Rod
- 4. 4WAS rear motor
- 7. HRH gear

# System Description

INFOID:000000004257874

Rear wheel steering angle sensor

#### DESCRIPTION

 4WAS system consists of two control units (4WAS front control unit and 4WAS main control unit) and 4WAS rear actuator components.

6.

- 4WAS main control unit calculates front wheel and rear wheel angles via CAN communication based on the information of the steering angle sensor signal and vehicle speed signal.
- 4WAS main control unit controls 4WAS rear actuator according to the value calculated in 4WAS main control unit.
- It transmits the value that is calculated by 4WAS main control unit to 4WAS front control unit via 4WAS communication line (exclusive line of 4WAS system). 4WAS front control unit controls 4WAS front actuator based on the received demand.
- Self-diagnosis can be performed with CONSULT-III at each control unit to another (4WAS front control unit and 4WAS main control unit).
- It transmits/receives each signal from the following control unit via CAN communication line.

5.

Motor shaft

Component parts	Function
Steering angle sensor	It mainly transmits the following signals to 4WAS main control unit with CAN communication. • Steering angle sensor signal
ABS actuator and electronic unit (con- trol unit)	It mainly transmits the following signals to 4WAS main control unit with CAN communication. <ul> <li>Vehicle speed signal</li> </ul>
ECM	It mainly transmits the following signals to 4WAS main control unit with CAN communication. • Engine speed signal
Combination meter	It mainly transmits the following signals from 4WAS main control unit with CAN communica- tion. • 4WAS warning lamp signal

\*: Communication line between 4WAS front control unit and 4WAS main control unit

#### **Operation Description**

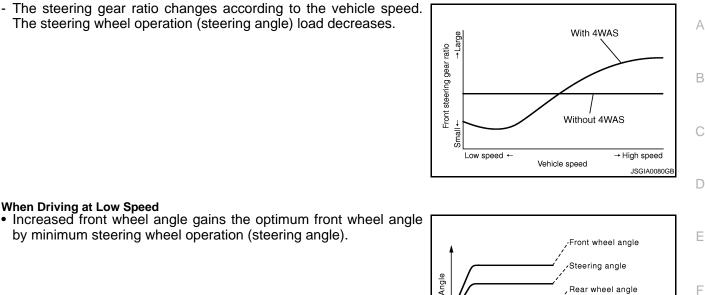
- The following performance is gained by controlling the best front wheel steering angle and the rear wheel steering angle.
- The desirable vehicle movement is gained toward the driver's steering angle operation (steering angle).

### < SYSTEM DESCRIPTION >

## [WITH 4WAS]

The steering gear ratio changes according to the vehicle speed. The steering wheel operation (steering angle) load decreases.

by minimum steering wheel operation (steering angle).



Time(Seconds)

Ð

Ľ,

JSGIA0050GE

STC

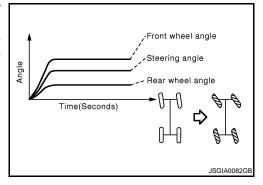
Н

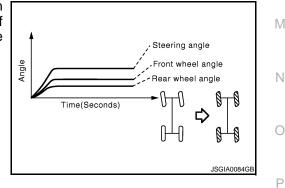
Κ

When Driving at Low Speed

#### When Driving at Middle Speed

 Increase the front steering angle while controlling to turn the rear wheel steering angle to the same steering angle side of steering wheel operation (steering angle). these operations make response better for vehicle yaw rate/lateral acceleration and also decrease the angle of sideslip.





#### When Driving at High Speed

· Decrease the front wheel steering angle while controlling to turn the rear wheel steering angle to the same steering angle side of steering wheel operation (steering angle). these operations make car response better and vehicle stability higher.

#### **Operation Feature**

#### **4WAS FRONT ACTUATOR**

- It is driven by 4WAS front motor.
- The front steering gear ratio (4WAS front actuator) changes with 4WAS front motor and the gear shaft when releasing the lock structure (4WAS front lock solenoid valve). NOTE:
  - The lock structure is released when turning 4WAS lock solenoid valve ON.

# **STC-35**

#### < SYSTEM DESCRIPTION >

• The lock structure (holder) absorbs force and applies the lock when applying strong force to 4WAS front actuator.

#### **CAUTION:**

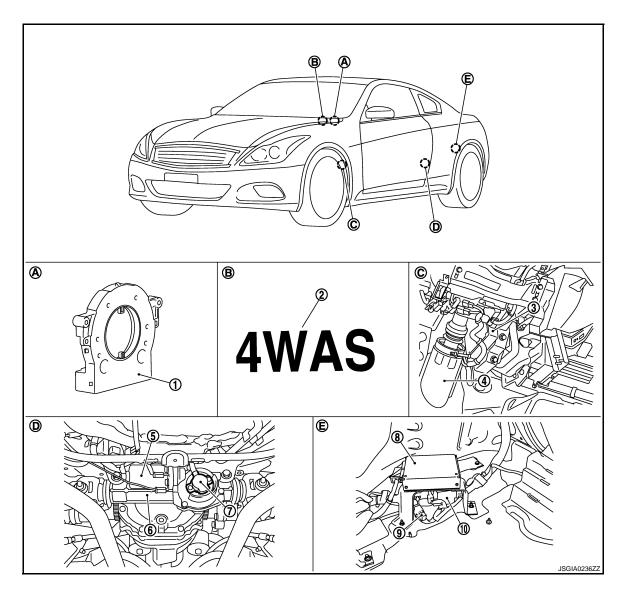
Replace 4WAS front actuator when the system breaks down due to the excessive external force (rotating direction) applied to 4WAS front actuator.

#### 4WAS REAR ACTUATOR

- It is driven by 4WAS rear motor.
- The irreversible efficiency performance hypoid gear secure the toe-stiffness of rear wheels against the road external force and keep the steering angle when system is malfunction.
- The power from the pinion gear (motor side) is transmitted, but the pinion gear does not rotate as caused by the gear mechanical characteristics (teeth angle) even though the ring gear (tire side) starts to rotate.

# **Component Parts Location**

INFOID:000000004257875



- 1. Steering angle sensor
- 4. 4WAS front actuator
- 7. Rear wheel steering angle sensor
- 10 Noise suppressor

- 2. 4WAS warning lamp
- 5. 4WAS rear motor
- 8. 4WAS main control unit
- 3. 4WAS front control unit
- 6. 4WAS rear actuator
- 9. 4WAS rear motor relay

## **4WAS SYSTEM**

#### < SYSTEM DESCRIPTION >

**Component Description** 

- A. Combination switch
- D. 4WAS rear actuator assembly
- B. Inside combination meter

# C. Inside the instrument driver lower panel

- E. Inside the rear wheel house finisher (left)
- l

INFOID:000000004257876

А

В

С

D

Ε

F

STC

Н

J

Κ

L

Μ

Ν

Ο

Ρ

[WITH 4WAS]

	Deference/Eurotian
Component parts	Reference/Function
4WAS front control unit	STC-56, "Description"
4WAS front actuator	The front wheel steering angle is activated.
Front wheel steering angle sensor	The front wheel steering angle increased/decreased degree is detected. It is output to 4WAS front control unit.
4WAS front motor	The front wheel steering angle increased/decreased degree is activated.
4WAS front lock solenoid valve	Secure the inside of 4WAS front actuator temporarily. (It operates when performing active test with fail-safe function and CONSULT-III.)
Steering angle sensor	STC-113, "Description"
4WAS main control unit	STC-88, "Description"
4WAS rear actuator	The rear wheel steering angle is activated.
Rear wheel steering angle sensor	The rear wheel steering angle increased/decreased degree is detected. It is output to 4WAS main control unit.
4WAS rear motor	4WAS rear actuator is activated.
ABS actuator and electronic unit (con- trol unit)	STC-111, "Description"
ECM	STC-116, "Description"
Combination meter	It mainly transmits the following signals from 4WAS main control unit with CAN communica- tion. • 4WAS warning lamp signal
Power steering solenoid valve	The power steering oil pressure in the gear housing assembly is controlled.
Stop lamp switch	The stop lamp switch condition is detected.

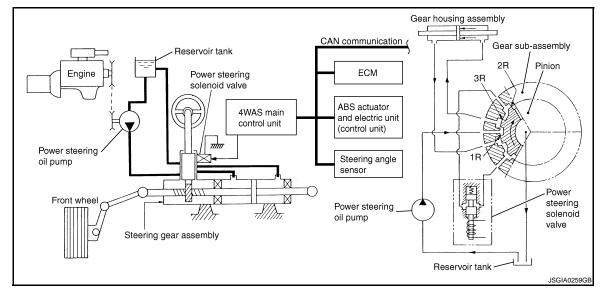
\*: Communication line between 4WAS front control unit and 4WAS main control unit

Revision: 2009 October

## < SYSTEM DESCRIPTION > EPS SYSTEM

INFOID:000000004257877

[WITH 4WAS]

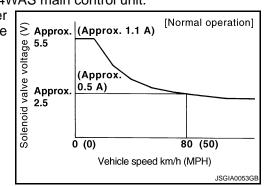


## System Description

INFOID:000000004257878

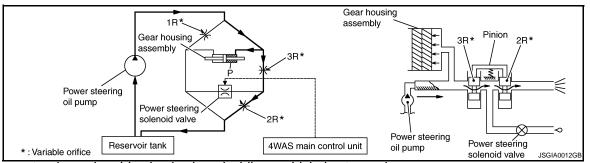
### DESCRIPTION

- The EPS system controls the power steering solenoid valve with 4WAS main control unit.
- The power steering solenoid valve control changes the power steering solenoid valve activation voltage according to the vehicle speed.



## **OPERATION PRINCIPLE**

During Parking (When Turning The Steering Wheel To The Right.)



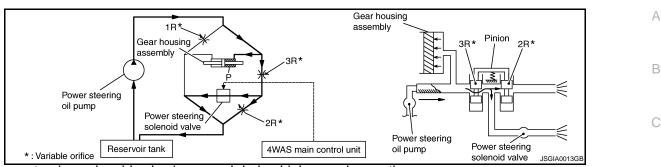
- 1. Power steering solenoid valve is closed while a vehicle is stopped.
- 2. Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel.
- 3. Oil pressure "P" in the gear housing assembly is the sum of oil pressures occurring in "2R" and "3R". This results in a light steering force because of high pressure.

**During High-speed Operation** 

## **EPS SYSTEM**

#### < SYSTEM DESCRIPTION >

#### [WITH 4WAS]



- Power steering solenoid valve is opened during high-speed operation. 1.
- Pinion "1R", "2R" and "3R" are closed depending on steering torque of steering wheel. 2.
- "2R" is bypassed to the return port by the EPS solenoid valve. 3.
- Oil pressure "P" in the gear housing assembly includes only oil pressure occurring in "3R" and results in a 4. heavy steering force.

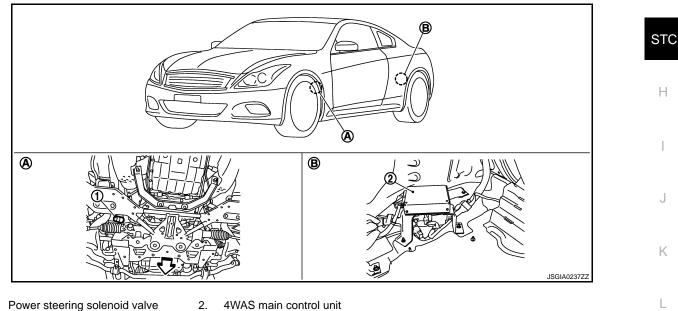
### **Component Parts Location**

INFOID:000000004257879

D

Ε

F



- Steering gear assembly Α.
- Β. Inside the rear wheel hose finisher (left)

C:Vehicle front

1.

## **Component Description**

DID:00000000042578	80

INFO

NL	
I N	

Μ

Component parts	Function
4WAS main control unit	<ul> <li>The power steering solenoid valve activation voltage is controlled by each sensor signal.</li> <li>The power steering solenoid valve activation voltage is controlled by 4WAS main control unit for maintaining the power steering force in the fail-safe mode. (EPS system is controlled by the engine speed signal if the vehicle speed signal error is detected.)</li> </ul>
ABS actuator and electric unit (control unit)	It mainly transmits the following signals to 4WAS main control unit with CAN communication. • Vehicle speed signal
ECM	It mainly transmits the following signals to 4WAS main control unit with CAN communication. <ul> <li>Engine speed signal</li> </ul>
Power steering solenoid valve	The power steering oil pressure in the gear housing assembly is controlled.

< SYSTEM DESCRIPTION >

# DIAGNOSIS SYSTEM (4WAS FRONT CONTROL UNIT)

## CONSULT-III Function [4WAS(FRONT)]

INFOID:000000004257881

[WITH 4WAS]

## FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown as follows:

Diagnostic test mode	Function	
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	
Data monitor	Input/Output data in the 4WAS front control unit can be read.	
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	
Active test	• Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the 4WAS front control unit and also shifts some parameters in a specified range.	
ECU part number	4WAS front control unit part number can be read.	

## SELF-DIAG RESULT MODE

#### **Display Item List**

Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
ACTUATOR [C1621]	4WAS front motor current error is detected. (4WAS front motor current is excessively large.)	4WAS front control unit or 4WAS front motor error is de- tected.
ACTUATOR [C1622]	4WAS front motor voltage or current error is detected. (4WAS front motor voltage error is detected.) (Voltage or current error is detected when starting the system.)	4WAS front control unit or 4WAS front motor error is de- tected.
ACTUATOR [C1627]	The indication value from 4WAS front actuator (front wheel angle) dif- fers from the value from 4WAS front control unit.	4WAS front actuator error
ACTUATOR [C1628]	The front wheel steering angle sensor error is detected.	Front wheel steering angle sensor error
CONTROL UNIT [C1631]	An error is detected inside 4WAS front control unit.	4WAS front control unit or 4WAS front control unit power supply error is detected.
CONTROL UNIT [C1632]	An error is detected inside 4WAS front control unit.	4WAS front control unit or 4WAS front control unit power supply error is detected.
CONTROL UNIT [C1633]	An error is detected inside 4WAS front control unit.	4WAS front control unit error
IGN POWER SUPPLY [C1651]	The ignition voltage signal error is detected.	4WAS front control unit or the ignition power supply error is detected.
MOTOR POWER SUPPLY [C1652]	4WAS front motor main power supply error is detected.	4WAS front control unit or 4WAS front motor power sup- ply error is detected.
ACTUATOR RELAY [C1654]	An error is detected on the main relay power supply inside 4WAS front control unit.	The main relay power supply inside 4WAS front control unit error is detected.
PRE-DRIVER [C1655]	4WAS rear motor 3-phase current error is detected. (Current is not applied to 4WAS front motor.)	4WAS front control unit or 4WAS front motor power sup- ply error is detected.
LOCK SOLENOID [C1661]	4WAS front lock solenoid valve error is detected. (An electric activation error is detected.)	4WAS front control unit or 4WAS front lock solenoid valve error is detected.
LOCK INSERTION [C1667]	4WAS front lock solenoid valve (lock) error is detected. (An error is detected in lock condition.)	The inside 4WAS front actua- tor error is detected.

#### < SYSTEM DESCRIPTION >

#### Items Diagnostic item is detected when... Possible cause А (CONSULT-III screen terms) LOCK HLD GAP DETCT 4WAS front lock solenoid valve (lock) error is detected. The inside 4WAS front actua-(Excessive force is applied to the lock.) [C1668] tor error is detected. В The power steering oil pres-INCOMP LOCK RELEAS 4WAS front actuator error is detected. sure or the inside 4WAS front (An error is detected in unlock condition.) [C1669] actuator error is detected. ACT ADJ NOT PRFRM 4WAS front actuator adjust-4WAS front actuator adjustment is not performed. [C1671] ment is not performed. 4WAS front actuator adjust-INCOMP ACTUATR ADJ 4WAS front actuator adjustment is incomplete. ment is incomplete. [C1672] D 4WAS communication line\*/ 4WAS MAIN ECU COMM 4WAS communication line\* data communication error is detected. 4WAS main control unit/ (An error signal is detected from 4WAS main control unit.) [C1684] 4WAS front control unit error 4WAS communication line\*/ 4WAS MAIN ECU COMM 4WAS communication line\* data communication error is detected. 4WAS main control unit/ [C1685] (An error signal is detected from 4WAS main control unit.) 4WAS front control unit error F 4WAS MAIN ECU An error is detected on 4WAS main control unit side. 4WAS main control unit failsafe mode [C1686] (4WAS main control unit fail-safe mode.) 4WAS communication line\*/ CAN COMM CIRCUIT When 4WAS front control unit is not transmitting or receiving 4WAS STC 4WAS main control unit/ [U1000] communication signal for 2 seconds or more. 4WAS front control unit error 4WAS communication line\*/ SYSTEM COMM(CAN) When 4WAS front control unit is not transmitting or receiving 4WAS 4WAS main control unit/ Н communication signal for 2 seconds or less. [U1002] 4WAS front control unit error 4WAS communication line\*/ CONTROL UNIT (CAN) When detecting error during the initial diagnosis of 4WAS controller of 4WAS main control unit/ [U1010] 4WAS front control unit. 4WAS front control unit error

\*: Communication line between 4WAS front control unit and 4WAS main control unit.

#### DATA MONITOR MODE

**Display Item List** 

Monitor item (Unit)	Remarks	
4WAS STR ANG [deg]	The steering angle sensor signal received from 4WAS main control unit via 4WAS commu- nication line * is indicated.	
VEHICLE SPEED [km/h] or [mph]	The vehicle speed signal received from 4WAS main control unit via 4WAS communication line * is indicated.	
MOTOR CURRENT [A]	4WAS front motor power supply current is indicated. (4WAS front control unit main power supply)	
MTR CRNT ESTM [A]	The value, which 4WAS front control unit presumes 4WAS front motor power supply current, is indicated. (4WAS front control unit main power supply)	
ACTR ROTA ANG [deg]	4WAS front actuator increased/decreased angle is indicated.	
LG VOLT [V]	4WAS front lock solenoid valve voltage is indicated.	
THERM TEMP [°C]	4WAS front control unit internal temperature is indicated.	
MOTOR VOLT [V]	4WAS front motor power supply voltage is indicated. (4WAS front control unit main power supply)	
IGN VOLT [V]	4WAS front control unit power supply voltage is indicated. (Ignition switch power supply voltage)	
ACTR ANG COMM [deg]	The command value of 4WAS front actuator increased/decreased angle received from 4WAS main control unit via 4WAS communication line* is indicated.	
ACTR ROTA SPD [deg/s]	4WAS front actuator increased/decreased rotation speed is indicated.	
DUTY COMMAND [%]	4WAS front actuator command voltage ratio is indicated.	

[WITH 4WAS]

## < SYSTEM DESCRIPTION >

[WITH 4WAS]

LOCK DTY COMM [%]       4WAS front lock solenoid valve command voltage rails is indicated.         MTR U VOLT [V]       4WAS front motor V terminal voltage is indicated.         MTR V VOLT [V]       4WAS front motor V terminal voltage is indicated.         MTR V VOLT [V]       4WAS front motor V terminal voltage is indicated.         MTR V VOLT [V]       4WAS front motor V terminal voltage is indicated.         ACT TEMP ESTM [°C]       The value, which 4WAS front control unit presumes 4WAS front actuator temperature, is indicated.         ACTR ANGL SUB [deg]       4WAS front motor U, V, and W terminal current is indicated.         ACTR ANGL SUB [deg]       The final command value, which 4WAS front control unit calculates 4WAS front actuator command value ransmitted from 4WAS front control unit calculates 4WAS front actuator command value cannon angle calculated with the 4WAS front control unit inclusters.         STR ANGL SPD [deg/s]       It displays an engine speed value obtained from an angle calculated with the 4WAS front control unit brough the 4WAS scannonication.         OVRLD JDG TMG       It displays time of occurrence before turning ignition switch ON.)         ACT PRTCT TMG       It displays record d 4WAS system (entire 4WAS system) high load.         (It displays tercord d 4WAS system (entire 4WAS system) Nol.       (It displays tercord d 4WAS system (entire) awas the AWAS front motor)         RT PRTCT TMG       It displays record d 4WAS system (entire) awas the AWAS front motor)         It displays record d 4WAS system (e	Monitor item (Unit)	Remarks	
MTR V VOLT [V]       4WAS front motor V terminal voltage is indicated.         MTR V VOLT [V]       4WAS front motor W terminal voltage is indicated.         ACT TEMP ESTM [°C]       The value, which 4WAS front control unit presumes 4WAS front actuator temperature, is indicated.         MTR PHZ CRNT [A]       4WAS front actuator command value and the activation angle difference are indicated.         ACTR ANGL SUB [deg]       The final command value, which 4WAS front control unit calculates 4WAS front actuator command value and the activation angle difference are indicated.         ACTR ANGL SUB [deg]       The final command value, which 4WAS front control unit calculates 4WAS front actuator command value transmitted from 4WAS front control unit calculates 4WAS front actuator command value transmitted from 4WAS system (entire 4WAS system) high load.         GVRLD JDG TMG       It displays the of accurrence before turning ignition switch ON.)         ECU PRTCT TMG       It displays record of 4WAS system (MAS front actuator) overheating.         (It displays the of accurrence before turning ignition switch ON.)       It displays record of 4WAS system (MAS front control unit) overheating.         (It displays the of accurrence before turning ignition switch ON.)       It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal.         (It displays time of accurrence before turning ignition switch ON.)       It displays record of 4WAS system (terminal voltage of 4WAS front notor) intermittent abnormal.         MTR PW TMP TM       It displays record of 4WAS system	LOCK DTY COMM [%]	4WAS front lock solenoid valve command voltage ratio is indicated.	
MTR W VOLT [V]         4WAS front motor W terminal voltage is indicated.           ACT TEMP ESTM [°C]         The value, which 4WAS front control unit presumes 4WAS front actuator temperature, is in- dicated.           MTR PHZ CRNT [A]         4WAS front motor U, V, and W terminal current is indicated.           ACTR DEVI ANG [deg]         4WAS front actuator command value and the activation angle difference are indicated.           ACTR ANGL SUB [deg]         The final command value, which 4WAS front control unit calculated sWAS front actuator command value transmitted from 4WAS front control unit through 4WAS communication line*, is indicated.           STR ANGL SPD [deg/s]         It displays an engine speed value obtained from an angle calculated with the 4WAS front control unit, based on steering angle sensor speed signals transmitted from 4WAS spream (MAS Stont control unit hough the 4WAS communication line*.           OVRLD JDG TMG         It displays record of 4WAS system (WAS front actuator) overheating. (It displays time of occurrence before turning ignition switch ON.)           ECU PRTCT TMG         It displays record of 4WAS system (WAS front actuator) or who and (It displays time of occurrence before turning ignition switch ON.)           DRV TMPO TMG         It displays record of 4WAS system (WAS front motor) intermittent abnor- mal.           (It displays time of occurrence before turning ignition switch ON.)         It displays time of occurrence before turning ignition switch ON.)           LOW VOLT TMG         It displays record of 4WAS system (WAS front motor) intermittent abnor- mal.         It displays rec	MTR U VOLT [V]	4WAS front motor U terminal voltage is indicated.	
ACT TEMP ESTM [C]         The value, which 4WAS front control unit presumes 4WAS front actuator temperature, is indicated.           MTR PHZ CRNT [A]         4WAS front motor U, V, and W terminal current is indicated.           ACT R DEVI ANG [deg]         4WAS front notor U, V, and W terminal current is indicated.           ACTR ANGL SUB [deg]         4WAS front actuator command value and the activation angle difference are indicated.           ACTR ANGL SUB [deg]         The final command value, which 4WAS front control unit through 4WAS communication line". Is indicated.           STR ANGL SPD [deg/s]         It displays an engine speed value obtained from an angle calculate with the 4WAS mon control unit through the 4WAS system (entire 4WAS system) high load.           QVRLD JDG TMG         It displays tere ord of 4WAS system (entire 4WAS system) high load.           Rt displays tree ord or dWAS system (4WAS front actuator) overheating.           Rt displays tree ord ord 4WAS system (4WAS front actuator) overheating.           Rt displays tree ord of 4WAS system (4WAS front actuator) overheating.           Rt displays tree ord of 4WAS system (4WAS front actuator).           DRV TMPO TMG         It displays record of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal.           Rt displays tree or occurrence before turning ignition switch ON.)         It displays tree or occurrence before turning ignition switch ON.)           LOW VOLT TMG         It displays record of 4WAS system (terminal voltage of 4WAS front control unit and	MTR V VOLT [V]	4WAS front motor V terminal voltage is indicated.	
ACT TENPE SIME [0]       dicated.         MTR PHZ CRNT [A]       4WAS front motor U, V, and W terminal current is indicated.         ACTR DEVI ANG [deg]       4WAS front actuator command value and the activation angle difference are indicated.         ACTR ANGL SUB [deg]       The final command value which 4WAS front control unit calculates 4WAS front actuator command value transmitted from 4WAS front control unit through 4WAS communication line*, is indicated.         STR ANGL SPD [deg/s]       It displays are angine speed value obtained from an angle calculate with the 4WAS main control unit through the 4WAS system (angle stramsmitted from the 4WAS system (angle stramsmitted from the 4WAS system) high load.         OVRLD JDG TMG       It displays record of 4WAS system (angle stramsmitted from the 4WAS infort actuator) overheating.         ECU PRTCT TMG       It displays record of 4WAS system (angle stramsmitted from the 4WAS front control unit norough the dives system (AWAS front actuator) overheating.         RT displays the of occurrence before turning ignition switch ON.)       It displays record of 4WAS system (AWAS front actuator) overheating.         RT displays the of occurrence before turning ignition switch ON.)       It displays record of 4WAS system (AWAS front control unit and 4WAS front actuator) overheating.         MTR PW TMP TM       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage.         LOW VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. <t< td=""><td>MTR W VOLT [V]</td><td>4WAS front motor W terminal voltage is indicated.</td></t<>	MTR W VOLT [V]	4WAS front motor W terminal voltage is indicated.	
ACTR DEVI ANG [deg]       4WAS front actuator command value and the activation angle difference are indicated.         ACTR ANGL SUB [deg]       The final command value, which 4WAS front control unit actuates 4WAS front actuator command value transmitted from 4WAS front control unit through 4WAS communication line*, is indicated.         STR ANGL SPD [deg/s]       It displays an engine speed value obtained from an angle calculates 4WAS front control unit through the 4WAS front control unit unit through the 4WAS system (fertire 4WAS system) high load.         OVRLD JDG TMG       It displays record of 4WAS system (entrire 4WAS system) high load.         (It displays time of occurrence before turning ignition switch ON.)       ECU PRTCT TMG         ECU PRTCT TMG       It displays record of 4WAS system (WAS front control unit) overheating.         (It displays time of occurrence before turning ignition switch ON.)       It displays tecord of 4WAS system (terminal power supply converter of 4WAS front motor) intermitten abnormal.         (It displays time of occurrence before turning ignition switch ON.)       It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays tecord of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) intermittent abnormal.         (It displays time of occurrence before turning ignition switch ON.)       It displays tencord occurrence before turning ignition switch ON.)         LOW V	ACT TEMP ESTM [°C]		
ACTR ANGL SUB [deg]         The final command value, which 4WAS front control unit calculates 4WAS front actuator command value transmitted from 4WAS front control unit through 4WAS communication line", is indicated.           STR ANGL SPD [deg/s]         It displays an engine speed value obtained from an angle calculated with the 4WAS front control unit through the 4WAS communication line", is indicated.           OVRLD JDG TMG         It displays record of 4WAS system (entire 4WAS system) high load. (It displays time of occurrence before turning ignition switch ON.)           ACT PRTCT TMG         It displays record of 4WAS system (4WAS front actuator) overheating. (It displays time of accurrence before turning ignition switch ON.)           ECU PRTCT TMG         It displays tecord of 4WAS system (4WAS front actuator) overheating. (It displays time of accurrence before turning ignition switch ON.)           ECU PRTCT TMG         It displays tecord of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal. (It displays time of accurrence before turning ignition switch ON.)           DRV TMPO TMG         It displays tecord of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) overheating. (It displays time of accurrence before turning ignition switch ON.)           LOW VOLT TMG         It displays tecord of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) overheating ignition switch ON.)           HIGH VOLT TMG         It displays tecord of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) overheating ignition switch ON.)           HICH VOLT TMG	MTR PHZ CRNT [A]	4WAS front motor U, V, and W terminal current is indicated.	
ACTR ANGL SUB [deg]       command value transmitted from 4WAS front control unit through 4WAS communication line", is indicated.         STR ANGL SPD [deg/s]       It displays an engine speed value obtained from an angle calculated with the 4WAS front control unit through the 4WAS communication line".         OVRLD JDG TMG       It displays record of 4WAS system (entire 4WAS system) high load. (It displays itme of occurrence before turning ignition switch ON.)         ACT PRTCT TMG       It displays record of 4WAS system (4WAS front actuator) overheating. (It displays itme of occurrence before turning ignition switch ON.)         ECU PRTCT TMG       It displays record of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         DRV TMPO TMG       It displays itme of occurrence before turning ignition switch ON.)         MTR PW TMP TM       It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays free or occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays itme of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) workseq. (It displays itme of occurrence before turning ignition switch ON.)         VKLD JDG FLG [On/Off]       • 4WAS system	ACTR DEVI ANG [deg]	4WAS front actuator command value and the activation angle difference are indicated.	
STR ANGL SPD [deg/s]       trol unit, based on steering angle sensor speed signals transmitted from the 4WAS main control unit through the 4WAS communication line*.         OVRLD JDG TMG       It displays record of 4WAS system (entire 4WAS system) high load. (It displays time of occurrence before turning ignition switch ON.)         ACT PRTCT TMG       It displays record of 4WAS system (4WAS front actuator) overheating. (It displays time of occurrence before turning ignition switch ON.)         ECU PRTCT TMG       It displays record of 4WAS system (4WAS front control unit) overheating. (It displays time of occurrence before turning ignition switch ON.)         DRV TMPO TMG       It displays record of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         MTR PW TMP TM       It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) overtage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) vertage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS system (vertage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG<	ACTR ANGL SUB [deg]	command value transmitted from 4WAS front control unit through 4WAS communication	
OVRCD JDG TMG         (It displays time of occurrence before turning ignition switch ON.)           ACT PRTCT TMG         It displays record of 4WAS system (4WAS front actuator) overheating. (It displays time of occurrence before turning ignition switch ON.)           ECU PRTCT TMG         It displays record of 4WAS system (4WAS front control unit) overheating. (It displays record of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal. (It displays record of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)           MTR PW TMP TM         It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnor- mal. (It displays time of occurrence before turning ignition switch ON.)           LOW VOLT TMG         It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays treme voltage. (It displays treme voltage. (It displays terme voltage. (It displays terme voltage. (It displays terme voltage. (It displays the function function mode           ACT PRTCT FLG [On/Off]         4WAS system (the entire system) heavy load condition is indicated. 4WAS system protection function mode           ACT PRTCT FLG [On/Off]         4WAS system front control unit) over-heated condition is indicated. 4WAS system protection function mode           DRV TMPO FLG [On/Off]         4WAS system	STR ANGL SPD [deg/s]	trol unit, based on steering angle sensor speed signals transmitted from the 4WAS main con-	
ACT PRICT TMG       (It displays time of occurrence before turning ignition switch ON.)         ECU PRTCT TMG       It displays record of 4WAS system (4WAS front control unit) overheating. (It displays time of occurrence before turning ignition switch ON.)         DRV TMPO TMG       It displays time of occurrence before turning ignition switch ON.)         MTR PW TMP TM       It displays time of occurrence before turning ignition switch ON.)         MTR PW TMP TM       It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front control unit and 4WAS front actuator) low voltage. (It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays time of occurrence before turning ignition switch ON.)         OVRLD JDG FLG [On/Off]       • 4WAS system (the entire system) heavy load condition is indicated. • 4WAS system protection function mode         ACT PRTCT FLG [On/Off]       • 4WAS system (4WAS front actuator) over-heated condition is indicated. • 4WAS system protection function mode         DRV TMPO FLG [On/Off]       • 4WAS system frotection function mode         MTR PW TMP FL [On/Off]       • 4WAS systen (4WAS front c	OVRLD JDG TMG		
ECU PRICT FINIS       (It displays time of occurrence before turning ignition switch ON.)         DRV TMPO TMG       It displays record of 4WAS system (terminal power supply converter of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         MTR PW TMP TM       It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)         OVRLD JDG FLG [On/Off]       • 4WAS system (the entire system) heavy load condition is indicated. • 4WAS system protection function mode         ACT PRTCT FLG [On/Off]       • 4WAS system (4WAS front control unit) over-heated condition is indicated. • 4WAS system protection function mode         DRV TMPO FLG [On/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is in- dicated. • 4WAS system rotection function mode	ACT PRTCT TMG		
DRV TMPO TMG       intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         MTR PW TMP TM       It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)         OVRLD JDG FLG [On/Off]       • 4WAS system (the entire system) heavy load condition is indicated. • 4WAS system protection function mode         ACT PRTCT FLG [On/Off]       • 4WAS system (4WAS front actuator) over-heated condition is indicated. • 4WAS system protection function mode         DRV TMPO FLG [On/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is indicated. • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal power supply front driver) intermittent error is indicated. • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system (4WAS front control un	ECU PRTCT TMG		
MTR PW TMP TM       mal. (It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays time of occurrence before turning ignition switch ON.)         LOW VOLT TMG       It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays time of occurrence before turning ignition switch ON.)         HIGH VOLT TMG       It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)         OVRLD JDG FLG [On/Off]       • 4WAS system (the entire system) heavy load condition is indicated. • 4WAS system protection function mode         ACT PRTCT FLG [On/Off]       • 4WAS system (4WAS front actuator) over-heated condition is indicated. • 4WAS system protection function mode         ECU PRTCT FLG [On/Off]       • 4WAS system (4WAS front control unit) over-heated condition is indicated. • 4WAS system protection function mode         DRV TMPO FLG [On/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is indicated. • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       •	DRV TMPO TMG	intermittent abnormal.	
LOW VOLT TMGfront actuator) low voltage. (It displays time of occurrence before turning ignition switch ON.)HIGH VOLT TMGIt displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)OVRLD JDG FLG [On/Off]• 4WAS system (the entire system) heavy load condition is indicated. • 4WAS system protection function modeACT PRTCT FLG [On/Off]• 4WAS system (4WAS front actuator) over-heated condition is indicated. • 4WAS system protection function modeECU PRTCT FLG [On/Off]• 4WAS system (4WAS front control unit) over-heated condition is indicated. • 4WAS system protection function modeDRV TMPO FLG [On/Off]• 4WAS system (4WAS front motor terminal power supply converter) intermittent error is in- dicated. • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is in- dicated. • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated. • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated. • 4WAS system protection function modeMTR PW TMP FL [On/Off]• 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition • 4WAS system protection function modeLOW VOLT FLG [On/Off]• 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition • 4WAS system protection function modeLOW VOLT FLG [On/Off]• 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition • 4WAS system protection function mode	MTR PW TMP TM	mal.	
HIGH VOLT TMGfront actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)OVRLD JDG FLG [On/Off]• 4WAS system (the entire system) heavy load condition is indicated. • 4WAS system protection function modeACT PRTCT FLG [On/Off]• 4WAS system (4WAS front actuator) over-heated condition is indicated. • 4WAS system protection function modeECU PRTCT FLG [On/Off]• 4WAS system (4WAS front control unit) over-heated condition is indicated. • 4WAS system protection function modeECU PRTCT FLG [On/Off]• 4WAS system (4WAS front control unit) over-heated condition is indicated. • 4WAS system protection function modeDRV TMPO FLG [On/Off]• 4WAS system (4WAS front motor terminal power supply converter) intermittent error is in- dicated. • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated. • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated. • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated. • 4WAS system protection function modeMTR PW TMP FL [On/Off]• 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition • 4WAS system protection function modeLOW VOLT FLG [On/Off]• 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition • 4WAS system protection function mode	LOW VOLT TMG	front actuator) low voltage.	
OVRED JDG FEG [On/Off]       • 4WAS system protection function mode         ACT PRTCT FLG [On/Off]       • 4WAS system (4WAS front actuator) over-heated condition is indicated.         ECU PRTCT FLG [On/Off]       • 4WAS system (4WAS front control unit) over-heated condition is indicated.         DRV TMPO FLG [On/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is indicated.         DRV TMPO FLG [On/Off]       • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated.         MTR PW TMP FL [On/Off]       • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       • 4WAS system protection function mode         4WAS system protection function mode       • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system protection function mode         • 4WAS system protection function mode       • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       • 4WAS system protection function mode         • 4WAS system protection function mode       • 4WAS system protection function mode         • 4WAS system protection function mode       • 4WAS system protection function mode         • 4WAS system protection function mode       • 4WAS system protection function mode	HIGH VOLT TMG	front actuator) extreme voltage.	
ACT PRTCT FLG [0n/Off]       • 4WAS system protection function mode         ECU PRTCT FLG [0n/Off]       • 4WAS system (4WAS front control unit) over-heated condition is indicated.         DRV TMPO FLG [0n/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is indicated.         DRV TMPO FLG [0n/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is indicated.         MTR PW TMP FL [0n/Off]       • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated.         MTR PW TMP FL [0n/Off]       • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated.         LOW VOLT FLG [0n/Off]       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition         LOW VOLT FLG [0n/Off]       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition         4 WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition	OVRLD JDG FLG [On/Off]		
ECU PRICT FLG [On/Off]       • 4WAS system protection function mode         DRV TMPO FLG [On/Off]       • 4WAS system (4WAS front motor terminal power supply converter) intermittent error is indicated.         MTR PW TMP FL [On/Off]       • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated.         MTR PW TMP FL [On/Off]       • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated.         LOW VOLT FLG [On/Off]       • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition         4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition	ACT PRTCT FLG [On/Off]		
DRV TMPO FLG [On/Off]       dicated.         • 4WAS system protection function mode         MTR PW TMP FL [On/Off]       • 4WAS system (4WAS front motor terminal power supply front driver) intermittent error is indicated.         • 4WAS system protection function mode       • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition         • 4WAS system protection function mode       • 4WAS system protection function mode         • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-dropped condition	ECU PRTCT FLG [On/Off]		
MTR PW TMP FL [On/Off]       indicated.         • 4WAS system protection function mode         LOW VOLT FLG [On/Off]       • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition         • 4WAS system protection function mode         • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition         • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage- dropped condition         • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-	DRV TMPO FLG [On/Off]	dicated.	
LOW VOLT FLG [On/Off]       dropped condition         • 4WAS system protection function mode         • 4WAS system (4WAS front control unit and 4WAS front actuator terminal voltage) voltage-	MTR PW TMP FL [On/Off]	indicated.	
	LOW VOLT FLG [On/Off]	dropped condition	
<ul> <li>4WAS system protection function mode</li> </ul>	HIGH VOLT FLG [On/Off]	jumped condition	
MTR SEN U OUT [Hi/Low] 4WAS front motor U terminal output voltage is indicated.	MTR SEN U OUT [Hi/Low]	4WAS front motor U terminal output voltage is indicated.	
MTR SEN V OUT [Hi/Low] 4WAS front motor V terminal output voltage is indicated.	MTR SEN V OUT [Hi/Low]	4WAS front motor V terminal output voltage is indicated.	
MTR SEN W OUT [Hi/Low] 4WAS front motor W terminal output voltage is indicated.	MTR SEN W OUT [Hi/Low]	4WAS front motor W terminal output voltage is indicated.	

Revision: 2009 October

#### < SYSTEM DESCRIPTION >

Monitor item (Unit)	Remarks	
MAIN ECU FAIL [On/Off]	4WAS main control unit fail-safe function condition transmitted from 4WAS main control unit through 4WAS communication line * is indicated.	
M-ECU TMPO FL [On/Off]	The protection function mode status of 4WAS main control unit transmitted from 4WAS main control unit through 4WAS communication line* is indicated.	
LOCK MODE [0/1/2/3/4/5]	<ul> <li>4WAS front lock solenoid valve (lock structure) condition is indicated.</li> <li>0: Lock released condition</li> <li>1 - 5: Lock condition</li> </ul>	
NEUTRAL OUT [On/Off]	4WAS front actuator misaligned angle adjustment control condition is indicated.	
EX OPERAT [On/Off]	4WAS system enters in the protection function due to the heavy load condition and tempo- rarily abnormal voltage is indicated.	
SLOW MODE [Ok/-]	ACTIVE TEST "SLOW MODE" judgment condition is indicated.	

\*: Communication line between 4WAS front control unit and 4WAS main control unit

#### CAN DIAGNOSTIC SUPPORT MONITOR

Description

- The communication condition from 4WAS front control unit to 4WAS main control unit and malfunction counter are displayed.
- Error counter displays OK if any malfunction is not detected in the past. If the malfunction is detected, it displays 0. The upper limit of the counters is 39.

Item	PRSNT	PAST	
TRANSMIT DIAG	OK / UNKWN	OK / 0 – 39	Н
4WAS(MAIN)	OK / UNKWN	OK / 0 – 39	

#### ACTIVE TEST MODE

Description

- 4WAS front actuator assembly activation is checked according to the control signal from CONSULT-III.
- 4WAS front lock solenoid valve (lock structure) is activated forcibly (ON/OFF) using each control signal of "LOCK OPERATION". Perform this mode when performing 4WAS front actuator adjustment.
   CAUTION:

#### Never steer the steering wheel during "RELEASE".

The steering angle sensor neutral point judgment (OK/NG) is performed using each control signal of "SLOW MODE".

Select test item	Control signal	Remarks	L
	RELEASE	4WAS front lock solenoid valve lock is re- leased.	
LOCK OPERATION	LOCK	4WAS front lock solenoid valve lock is applied.	M
SLOW MODE	MODE START	Steering angle sensor neutral point check starts. (Turn the steering wheel rightward and left- ward slowly. Steer until the turning stops.)	Ν
	MODE END	Steering angle sensor neutral point check ends.	0

Ρ

Е

STC

[WITH 4WAS]

## < SYSTEM DESCRIPTION >

# DIAGNOSIS SYSTEM (4WAS MAIN CONTROL UNIT)

## CONSULT-III Function [4WAS(MAIN)/RAS/HICAS]

INFOID:000000004257882

[WITH 4WAS]

## FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown below.

Diagnostic test mode	Function	
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	
Data monitor	Input/Output data in the 4WAS main control unit can be read.	
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	
Active test	• Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the 4WAS main control unit and also shifts some parameters in a specified range.	
ECU part number	4WAS main control unit part number can be read.	

### SELF-DIAG RESULT MODE

#### **Display Item List**

Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
CONTROL UNIT [ABNORMAL1] [C1900]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
CONTROL UNIT [ABNORMAL2] [C1901]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
MOTOR OUTPUT [REV CURRENT] [C1902]	4WAS rear motor current error is detected. (4WAS rear motor current output direction differs.)	4WAS rear motor error
MOTOR OUTPUT [NO CURRENT] [C1903]	4WAS rear motor current error is detected. (Current is input to 4WAS main control unit if 4WAS main control unit output is "OFF".)	4WAS rear motor error
MOTOR OUTPUT [OVERCURRENT] [C1904]	4WAS rear motor current error is detected. (4WAS rear motor output current is large.)	4WAS rear motor error
CONTROL UNIT [ABNORMAL3] [C1905]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
CONTROL UNIT [ABNORMAL5] [C1906]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
CONTROL UNIT [ABNORMAL4] [C1907]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
CONTROL UNIT [ABNORMAL7] [C1908]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
CONTROL UNIT [ABNORMAL6] [C1909]	An error is detected inside 4WAS main control unit.	4WAS main control unit
MOTOR OUTPUT [MOTOR LOCK] [C1910]	Inside 4WAS rear motor error is detected. (4WAS main motor does not move or the rear wheel angle sensor value does not change if 4WAS main control unit output is 14 A or more.)	4WAS rear motor error

#### < SYSTEM DESCRIPTION >

#### [WITH 4WAS]

Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
MOTOR VOLTAGE [LOW VOLTAGE] [C1911]	4WAS rear motor voltage error is detected. (4WAS rear motor voltage is low.)	4WAS rear motor power supply error
MOTOR VOLTAGE BAD OBSTRCT] C1912]	4WAS rear motor voltage error is detected. (Voltage is applied to 4WAS main motor if 4WAS main control unit output is "OFF".)	4WAS rear motor power supply error
10TOR OUTPUT ABNORML SIG] C1913]	4WAS rear motor current error is detected. (4WAS main motor does not move or the rear wheel angle sensor output does not change when 4WAS main control unit output is 18A or more and 4WAS main motor output is low.)	4WAS rear motor error
R ST ANGLE SENSOR BNORML VOL] 21914]	The rear wheel angle sensor power supply error is detected.	Rear wheel steering sensor power supply error
R ST ANGLE SENSOR /AIN SIGNAL] 21915]	The rear wheel angle sensor signal (main) output voltage value error is detected.	Rear wheel steering sensor out- put voltage error
R ST ANGLE SENSOR SUB SIGNAL] C1916]	The rear wheel angle sensor signal (sub) output voltage value error is detected.	Rear wheel steering sensor out- put voltage error
R ST ANGLE SENSOR DFFSET SIG1] C1917]	The rear wheel angle sensor signal (main and sub) error is detected. (The output signal value differs temporarily between main and sub.)	Rear wheel steering sensor (main and sub) output signal val- ue error signal
R ST ANGLE SENSOR DFFSET SIG2] (1918]	The rear wheel angle sensor signal (main and sub) error is detected. (The output signal value differs between main and sub.)	Rear wheel steering sensor (main and sub) output signal er- ror
EHICLE SPEED SEN IO SIGNAL] (1919]	Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) via CAN communication. (Improper signal is input while driving.)	Vehicle speed signal error
TEERING ANGLE SEN IO SIGNAL] 21920]	Malfunction is detected in steering angle sensor signal that is output from steering angle sensor via CAN communication. (No transmission from the steering angle sensor)	Steering angle sensor input sig- nal error
NG REV SIGNAL (1921]	Malfunction is detected in engine speed signal that is output from ECM via CAN communication. (Improper signal is input to the engine speed.)	Engine speed signal error
ONTROL UNIT ABNORMAL8] \$1922]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
TEERING ANGLE SEN IO CHANGE] 21923]	Malfunction is detected in steering angle sensor signal that is output from steering angle sensor via CAN communication. [Steering angle sensor input signal error is detected when driving at 60 km/h (37 MPH) or more.]	Steering angle sensor input sig- nal error
TEERING ANGLE SEN NO NEUT STATE] C1924]	Driving continuously at 10 km (6 mile) while the steering angle sensor value is other than $L10^{\circ} - R10^{\circ}$ . (Not detected in 4WAS front control unit fail-safe mode)	Steering angle sensor input sig- nal error
D CONVERTER 21925]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
TEERING ANGLE SEN 21926]	Malfunction is detected in steering angle sensor signal that is output from steering angle sensor via CAN communication. (When improper signal inputs to steering angle sensor and steering angle sensor itself detects the malfunction)	Steering angle sensor error
ONTROL UNIT BNORMAL5] 21927]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
ONTROL UNIT ABNORMAL9] C1928]	An error is detected inside 4WAS main control unit.	4WAS main control unit error

#### < SYSTEM DESCRIPTION >

#### [WITH 4WAS]

Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
4WAS FRONT ECU [C1930]	An error is detected on 4WAS front control unit side. (4WAS front control unit fail safe mode)	4WAS front control unit fail-safe mode
4WAS FRONT ECU COMM [C1931]	4WAS communication line* data communication error is detected. (An error signal is detected from 4WAS front control unit.)	4WAS communication line/ 4WAS front control unit/4WAS main control unit error
STEERING ANGLE SEN [C1932]	If the steering angle sensor error is detected. (Steering angle sensor output value is abnormal.)	Steering angle sensor input sig- nal error
CONTROL UNIT [C1933]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
CAN COMM [U1000]	When 4WAS main control unit is not transmitting or receiving CAN communication signal for 2 seconds or more.	CAN communication error
CONTROL UNIT (CAN) [U1010]	When detecting error during the initial diagnosis of CAN controller of 4WAS main control unit.	CAN communication line and 4WAS main control unit/ECM/ ABS actuator and electric unit (control unit) error

\*: Communication line between 4WAS front control unit and 4WAS main control unit

#### DATA MONITOR MODE

#### **Display Item List**

Monitor item (Unit)	Remarks
VHCL SPEED SE [km/h] or [mph]	The vehicle speed signal from ABS actuator and electric unit (control unit) is indicated with CAN communication line.
STEERING ANG [°]	The steering angle sensor signal from the steering angle sensor is indicated with CAN com- munication line.
ENGINE SPEED [rpm]	The engine speed signal from ECM is indicated with CAN communication line.
STR ANGL SPD [deg/s]	The steering angle speed signal from the steering angle sensor is indicated with CAN com- munication line.
POWER STR SOL [A]	The current value of the power steering solenoid valve is indicated.
RR ST ANG-MAI [V]	The voltage of the rear wheel steering angle sensor (main) is indicated.
RR ST ANG-SUB [V]	The voltage of the rear wheel steering angle sensor (sub) is indicated.
RR ST ANG-VOL [V]	The power supply voltage of the rear wheel steering angle sensor is indicated.
C/U VOLTAGE [V]	The power supply voltage value of 4WAS main control unit is indicated.
MOTOR VOLTAGE [V]	The voltage value of 4WAS rear motor is indicated.
MOTOR CURRENT [A]	The current value of 4WAS rear motor is indicated.
MTR CRNT OPE [A]	The current value input to 4WAS rear motor is indicated.
RR ANGLE OPE [°]	The angle command value is indicated for activating 4WAS rear motor.
FR ANGLE OPE [°]	The front wheel angle value transmitted from 4WAS main control unit to 4WAS front control unit is indicated.
STOP LAMP SW [On/Off]	The stop lamp switch status is indicated.
HICAS RELAY [On/Off]	4WAS rear motor relay condition is indicated.
FAIL SAFE [On/Off]	The fail-safe mode status of 4WAS main control unit is indicated.
WARNING LAMP [On/Off]	4WAS warning lamp ON/OFF condition is indicated.
FRNT ECU FAIL [On/Off]	The fail-safe mode status of 4WAS main control unit transmitted from 4WAS front control unit via 4WAS communication line* is indicated.
FRNT ECU EX [On/Off]	The protection function mode status of 4WAS front control unit transmitted from 4WAS front control unit via 4WAS communication line* is indicated.

\*: Communication line between 4WAS front control unit and 4WAS main control unit

#### CAN DIAGNOSTIC SUPPORT MONITOR

#### < SYSTEM DESCRIPTION >

Description

- The communication status and the number of errors of 4WAS main control unit, ECM, ABS actuator and electric unit (control unit), 4WAS front control unit and the steering angle sensor are indicated.
- Error counter displays OK if any malfunction is not detected in the past. If the malfunction is detected, it displays 0. The upper limit of the counters is 39.

Item	PRSNT	PAST	
TRANSMIT DIAG	OK / UNKWN	OK / 0 – 39	
ECM	OK / UNKWN	OK / 0 – 39	0
VDC/TCS/ABS	OK / UNKWN	OK / 0 – 39	-
STRG	OK / UNKWN	OK / 0 – 39	D
4WAS	OK / UNKWN	OK / 0 – 39	-

#### ACTIVE TEST MODE

Description

- 4WAS rear actuator assembly activation is checked according to the control signal from CONSULT-III.
- The control signal forcibly activates (ON/OFF) 4WAS rear assembly, performs the self-diagnosis and checks each sensor in "SELF DIAGNOSTIC MODE".

**CAUTION:** 

#### Perform the active test while the vehicle is stopped.

Select test item	Control signal	Remarks
SELF DIAGNOSTIC MODE	ON CAUTION: Perform the active test while the vehicle is stopped.	4WAS rear actuator assembly activates. It activates in the same direction as the steer- ing angle by inputting the steering angle.
	OFF	4WAS rear actuator assembly stops the ac- tivation.
Standard value		
Monitor item	Active test "C	N"

Monitor Item		Active test "ON"		0
STEERING ANG	0° (Neutral)	R 90°	L 90°	
RR ST ANG-MAI	2.4 V	Approx. 4.4 V	Approx. 0.4 V	K
RR ST ANG-SUB	2.4 V	Approx. 4.4 V	Approx. 0.4 V	
MOTOR CURRENT	No output (Approx. 0 A)	Output	(change)	
				L

M

Ν

Ρ

[WITH 4WAS]

А

В

Е

F

STC

# DTC/CIRCUIT DIAGNOSIS C1621, C1622 4WAS FRONT ACTUATOR

## Description

INFOID:000000004257883

- Wiring connected to 4WAS front actuator is integrated with 4WAS front actuator.
- 4WAS front actuator rotates together with steering wheel.
- 4WAS front actuator mainly consists of five components. [4WAS front lock solenoid valve (lock structure), front wheel steering angle sensor, 4WAS front motor, gear shaft, and spiral cable]
- 4WAS front lock solenoid valve (lock structure) is controlled by the 4WAS front control unit, and locks/ unlocks 4WAS front actuator.
- If a strong force (rotation direction) is applied to 4WAS front actuator, the locking mechanism (holder) absorbs the force and locks 4WAS front actuator.
- Front wheel steering angle sensor detects a turning angle of 4WAS front motor.
- 4WAS front motor controls number of revolutions by a command value from the 4WAS front control unit.
- Gear shaft is an output axis of 4WAS front motor. (Gear shaft = 4WAS front motor revolution + steering angle)
- Spiral cables mean the power line and signal lines of 4WAS front motor.

## DTC Logic

INFOID:000000004257884

## DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1621	ACTUATOR	4WAS front motor current valve error is detected. (4WAS front motor current valve is excessively large.)	4WAS front control unit or 4WAS front motor error is detected.
C1622	ACTUATOR	4WAS front motor voltage valve or current error valve is detected. (4WAS front motor voltage valve error is detected.) (Voltage valve or current valve error is detected when starting the system.)	4WAS front control unit or 4WAS front motor error is detected.

## DTC CONFIRMATION PROCEDURE

## **1**.RECHECK DTC

#### With CONSULT-III

- 1. Start the engine.
  - **CAUTION:**

#### Stop the vehicle.

2. Steer 360° leftward slowly. Then steer 360° rightward to return the steering wheel to the straight-ahead position. Repeat the same service for 1 minute or more.

#### NOTE:

The protection function mode (overheat protection) activates and the system stops if steering repeats for a long time.

3. Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1621" or "C1622" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-48, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

## Diagnosis Procedure

#### **1.**CHECK 4WAS FRONT MOTOR CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front actuator harness connector.
- 3. Check the resistance between 4WAS front actuator harness connectors.

## STC-48

INFOID:000000004257885

## C1621, C1622 4WAS FRONT ACTUATOR

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

	4WAS fro	nt actuator		Resistance				
Connector	Terminal	Connector	Terminal	(Approx.)				
	1		5					
M351	1	M351	6	0.1 – 1 Ω				
	5		6					
<ol> <li>Check the second se second second sec</li></ol>	ne continuity	v between 4W	VAS front ac	ctuator harne	ss connector	and the gro	ound.	
	4)4/A C fro	at a studtor						
Connector	40045 110	nt actuator Terminal		Continuity				
Connector		1 – Ground						
M351		5 – Ground		Not existed				
		6 – Ground						
s the inspec	tion result n							
•	GO TO 2.	<u>ernur</u>						
		AS front actu	uator. Refer	to <u>STC-181,</u>	"Removal ar	<u>nd Installatio</u>	<u>on"</u> .	
2.PERFOR	M SELF-DIA	AGNOSIS (4)	WAS FRON	IT CONTROL	UNIT)			
	ISULT-III							
1. Connect	t 4WAS front	t control unit						
<ol><li>Perform</li></ol>	4WAS front	control unit	self-diagnos					
			0	SIS.				
		22" detected	<u>?</u>					
YES >>	Replace 4W	22" detected	<u>?</u>	fer to <u>STC-1</u>	79, "Explode	<u>d View"</u> .		
YES >> NO >>	Replace 4W GO TO 3.	22" detected AS front con	<u>?</u>		79. "Explode	<u>d View"</u> .		
YES >> NO >> 3.CHECK I	Replace 4W GO TO 3. NFORMATIO	22" detected AS front con	<u>?</u>		79, "Explode	<u>d View"</u> .		
YES >> NO >> 3.CHECK I	Replace 4W GO TO 3. NFORMATIO	22" detected´ AS front con DN	? trol unit. Re	fer to <u>STC-17</u>			tion Refer to S	 TC-143
YES >> NO >> 3.CHECK I	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONI <sup>-</sup>	22" detected´ AS front con DN	? trol unit. Re	fer to <u>STC-17</u>			ction. Refer to <u>S</u>	<u> </u>
YES >> NO >> 3.CHECK I With CON Check the "E Reference V	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONI <sup>-</sup>	22" detected AS front con DN TOR" value o	? trol unit. Re	fer to <u>STC-17</u>			ction. Refer to <u>S</u>	<u>TC-143.</u>
YES >> NO >> 3.CHECK I With CON Check the "E Reference V s each data YES >>	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONIT Value". the standard Check each	22" detected AS front con DN FOR" value o <u>d value?</u> harness con	? trol unit. Re of each DTC nector pin t	fer to <u>STC-17</u> detected wit	th the self-dia	agnosis func	ction. Refer to <u>S</u>	<u> </u>
YES >> NO >> 3.CHECK I With CON Check the "E Reference s each data YES >> NO >>	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONIT Value". the standard Check each Replace 4W	22" detected AS front con DN FOR" value o d value? harness con AS front con	<u>?</u> trol unit. Re of each DTC nector pin t trol unit. Re	fer to <u>STC-17</u> detected wite erminal for difer to <u>STC-17</u>	th the self-dia	agnosis func	ction. Refer to <u>S</u>	<u> </u>
YES >> NO >> 3.CHECK I With CON Check the "E Reference s each data YES >> NO >>	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONIT Value". the standard Check each Replace 4W	22" detected AS front con DN FOR" value o <u>d value?</u> harness con	<u>?</u> trol unit. Re of each DTC nector pin t trol unit. Re	fer to <u>STC-17</u> detected wite erminal for difer to <u>STC-17</u>	th the self-dia	agnosis func		<u>TC-143.</u>
YES >> NO >> 3.CHECK I With CON Check the "E Reference V s each data YES >> NO >> Compone	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONIT Value". the standard Check each Replace 4W nt Inspec	22" detected AS front con DN TOR" value o d value? harness con AS front con tion (4WA	<u>?</u> trol unit. Re of each DTC nector pin t trol unit. Re	fer to <u>STC-17</u> detected wite erminal for difer to <u>STC-17</u>	th the self-dia	agnosis func		
YES >> NO >> 3.CHECK I With CON Check the "E Reference V s each data YES >> NO >> Compone 1.CHECK 4	Replace 4W GO TO 3. NFORMATIO <b>ISULT-III</b> DATA MONIT <u>Value</u> ". <u>the standar</u> Check each Replace 4W nt Inspec	22" detected AS front con DN FOR" value o d value? harness con AS front con tion (4WA	<u>?</u> trol unit. Re of each DTC nector pin t trol unit. Re	fer to <u>STC-17</u> detected wite erminal for difer to <u>STC-17</u>	th the self-dia	agnosis func		
YES >> NO >> 3.CHECK I With CON Check the "E Reference Seach data YES >> NO >> Compone 1.CHECK 4	Replace 4W GO TO 3. NFORMATIO ISULT-III DATA MONIT Value". the standard Check each Replace 4W nt Inspec WAS FRON	22" detected AS front con DN FOR" value o harness con AS front con tion (4WA IT MOTOR tch OFF.	trol unit. Re of each DTC nector pin t trol unit. Re S Front N	fer to <u>STC-17</u> detected with erminal for di fer to <u>STC-17</u> <b>/otor)</b>	th the self-dia	agnosis func		
YES >> NO >> 3.CHECK I With CON Check the "E Reference s each data YES >> NO >> Compone 1.CHECK 4 1. Turn the 2. Disconn	Replace 4W GO TO 3. NFORMATION SULT-III DATA MONI Alue". the standard Check each Replace 4W nt Inspec WAS FROM ignition swi ect 4WAS fr	22" detected AS front con DN TOR" value o harness con AS front con tion (4WA IT MOTOR tch OFF. ont actuator	trol unit. Re of each DTC nector pin t trol unit. Re <b>S Front N</b> harness cou	fer to <u>STC-17</u> detected with erminal for di fer to <u>STC-17</u> <b>/otor)</b>	th the self-dia sconnection 79. "Explode	agnosis func <u>d View"</u> .		
YES >> NO >> 3.CHECK I With CON Check the "E Reference s each data YES >> NO >> Compone 1.CHECK 4 1. Turn the 2. Disconn	Replace 4W GO TO 3. NFORMATION SULT-III DATA MONI Alue". the standard Check each Replace 4W nt Inspec WAS FROM ignition swi ect 4WAS fr	22" detected AS front con DN TOR" value o harness con AS front con tion (4WA IT MOTOR tch OFF. ont actuator	trol unit. Re of each DTC nector pin t trol unit. Re <b>S Front N</b> harness cou	fer to <u>STC-11</u> detected with erminal for di fer to <u>STC-11</u> <b>/otor)</b>	th the self-dia sconnection 79. "Explode	agnosis func <u>d View"</u> .		
YES >> NO >> 3.CHECK I With CON Check the "E Reference S each data YES >> NO >> Compone 1.CHECK 4 1. Turn the 2. Disconn	Replace 4W GO TO 3. NFORMATIC ISULT-III DATA MONIT Alue". the standar Check each Replace 4W nt Inspec WAS FROM ignition swi ect 4WAS fr he resistance	22" detected AS front con DN TOR" value o harness con AS front con tion (4WA IT MOTOR tch OFF. ont actuator	trol unit. Re of each DTC nector pin t trol unit. Re <b>S Front N</b> harness cou	fer to <u>STC-11</u> detected with erminal for di fer to <u>STC-11</u> <b>/otor)</b>	th the self-dia sconnection 79. "Explode	agnosis func <u>d View"</u> .		
YES >> NO >> 3.CHECK I With CON Check the "E Reference s each data YES >> NO >> Compone 1.CHECK 4 1. Turn the 2. Disconn	Replace 4W GO TO 3. NFORMATIC ISULT-III DATA MONIT Alue". the standar Check each Replace 4W nt Inspec WAS FROM ignition swi ect 4WAS fr he resistance	22" detected AS front con DN TOR" value o d value? harness con AS front con tion (4WA IT MOTOR tch OFF. ont actuator e between 4V	trol unit. Re of each DTC nector pin t trol unit. Re <b>S Front N</b> harness cou	fer to <u>STC-1</u> detected with erminal for di fer to <u>STC-1</u> <b>/otor)</b> nnector. ctuator harne	th the self-dia sconnection 79. "Explode	agnosis func <u>d View"</u> .		
YES >> NO >> 3.CHECK I With CON Check the "E Reference V s each data YES >> NO >> Compone 1.CHECK 4 1. Turn the 2. Disconn 3. Check the	Replace 4W GO TO 3. NFORMATION SULT-III DATA MONIT Alue". the standard Check each Replace 4W nt Inspect WAS FROM ignition swite ect 4WAS from the resistance	22" detected AS front con DN TOR" value o d value? harness con AS front con tion (4WA IT MOTOR tch OFF. ont actuator e between 4 nt actuator	trol unit. Re f each DTC nector pin t trol unit. Re <b>S Front N</b> harness cou	fer to <u>STC-1</u> detected with erminal for di fer to <u>STC-1</u> <b>/otor)</b> nnector. ctuator harne Resistance	th the self-dia sconnection 79. "Explode	agnosis func <u>d View"</u> .		
YES >> NO >> 3.CHECK I With CON Check the "E Reference V s each data YES >> NO >> Compone 1.CHECK 4 1. Turn the 2. Disconn 3. Check the	Replace 4W GO TO 3. NFORMATION ISULT-III DATA MONIT Value". the standard Check each Replace 4W nt Inspect WAS FRON ignition swi ect 4WAS fro the resistance 4WAS fro Terminal	22" detected AS front con DN TOR" value o d value? harness con AS front con tion (4WA IT MOTOR tch OFF. ont actuator e between 4 nt actuator	trol unit. Re of each DTC nector pin t trol unit. Re S Front N harness cou WAS front a	fer to <u>STC-1</u> detected with erminal for di fer to <u>STC-1</u> <b>/otor)</b> nnector. ctuator harne Resistance	th the self-dia sconnection 79. "Explode	agnosis func <u>d View"</u> .		

## C1621, C1622 4WAS FRONT ACTUATOR

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4	4WAS]
---------	-------

	4WAS front actuator			
Connector	Terminal	Continuity		
	1 – Ground			
M351	5 – Ground	Not existed		
	6 – Ground			

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WAS front actuator. Refer to <u>STC-181, "Removal and Installation"</u>.

Special Repair Requirement

INFOID:000000004257887

#### AFTER REPLACING 4WAS FRONT ACTUATOR

• Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)".

#### BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

## C1627 4WAS FRONT ACTUATOR

#### < DTC/CIRCUIT DIAGNOSIS >

## C1627 4WAS FRONT ACTUATOR

## Description

- Wiring connected to 4WAS front actuator is integrated with 4WAS front actuator.
- 4WAS front actuator rotates together with steering wheel.
- 4WAS front actuator mainly consists of five components. [4WAS front lock solenoid valve (lock structure), front wheel steering angle sensor, 4WAS front motor, gear shaft, and spiral cable]
- 4WAS front lock solenoid valve (lock structure) is controlled by the 4WAS front control unit, and locks/ unlocks 4WAS front actuator.
- If a strong force (rotation direction) is applied to 4WAS front actuator, the locking mechanism (holder) absorbs the force and locks 4WAS front actuator.
- Front wheel steering angle sensor detects a turning angle of 4WAS front motor.
- 4WAS front motor controls number of revolutions by a command value from the 4WAS front control unit.
- Gear shaft is an output axis of 4WAS front motor. (Gear shaft = 4WAS front motor revolution + steering angle)
- Spiral cables mean the power line and signal lines of 4WAS front motor.

## DTC Logic

#### DTC DETECTION LOGIC

_					STC
	DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	010
_	C1627	ACTUATOR	The indication value from 4WAS front actuator (front wheel angle) differs from the value from 4WAS front control unit.	4WAS front actuator error	Н

### DTC CONFIRMATION PROCEDURE

1.RECHECK DTC

#### With CONSULT-III

1. Start the engine. CAUTION:

#### Stop the vehicle.

2. Steer 360° leftward slowly. Then steer 360° rightward to return the steering wheel to the straight-ahead Κ position. Repeat the same service for 1 minute or more.

## NOTE:

The protection function mode (overheat protection) activates and the system stops if steering repeats for a long time.

Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1627" detected?

YES	>> Proceed to diagnosis procedure. Refer to <u>STC-51, "Diagnosis Procedure"</u> .
NO	>> INSPECTION END

#### Diagnosis Procedure

**1.**PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)

#### With CONSULT-III

Perform 4WAS front control unit self-diagnosis

Is any DTC detected other than "C1627"?

YES >> Check the error system.

NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)

#### With CONSULT-III

Perform 4WAS front control unit self-diagnosis.

Is DTC "C1627" detected?

INFOID:000000004257890

INFOID:000000004257888

INFOID:000000004257889

А

В

Е

M

Ν

## C1627 4WAS FRONT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace 4WAS front actuator. Refer to <u>STC-181, "Removal and Installation"</u>.

NO >> GO TO 3.

## **3.**CHECK INFORMATION

#### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-143.</u> "Reference Value".

Is each data the standard value?

- YES >> Check each harness connector pin terminal for disconnection.
- NO >> Replace 4WAS front actuator. Refer to <u>STC-181, "Removal and Installation"</u>.

#### Special Repair Requirement

INFOID:000000004257891

#### AFTER REPLACING 4WAS FRONT ACTUATOR

• Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS <u>FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)"</u>.

## C1628 4WAS FRONT ACTUATOR

#### < DTC/CIRCUIT DIAGNOSIS >

## C1628 4WAS FRONT ACTUATOR

## Description

- Wiring connected to 4WAS front actuator is integrated with 4WAS front actuator.
- 4WAS front actuator rotates together with steering wheel.
- 4WAS front actuator mainly consists of five components. [4WAS front lock solenoid valve (lock structure), front wheel steering angle sensor, 4WAS front motor, gear shaft, and spiral cable]
- 4WAS front lock solenoid valve (lock structure) is controlled by the 4WAS front control unit, and locks/ unlocks 4WAS front actuator.
- If a strong force (rotation direction) is applied to 4WAS front actuator, the locking mechanism (holder) absorbs the force and locks 4WAS front actuator.
- Front wheel steering angle sensor detects a turning angle of 4WAS front motor.
- 4WAS front motor controls number of revolutions by a command value from the 4WAS front control unit.
- Gear shaft is an output axis of 4WAS front motor. (Gear shaft = 4WAS front motor revolution + steering angle)
- Spiral cables mean the power line and signal lines of 4WAS front motor.

## DTC Logic

#### DTC DETECTION LOGIC

_					STC
	DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	510
_	C1628	ACTUATOR	The front wheel steering angle sensor error is detected.	Front wheel steering an- gle sensor error	Н

#### DTC CONFIRMATION PROCEDURE

## **1.**RECHECK DTC

- 1. Start the engine. CAUTION:
  - Stop the vehicle.
- Steer 360° leftward slowly. Then steer 360° rightward to return the steering wheel to the straight-ahead position. Repeat the same service for 1 minute or more.
   NOTE:

The protection function mode (overheat protection) activates and the system stops if steering repeats for a long time.

3. Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1628" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-53, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

#### Diagnosis Procedure

- **1.**CHECK FRONT WHEEL STEERING ANGLE SENSOR CIRCUIT (1)
- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front control unit harness connector.
- 3. Check the continuity between 4WAS front control unit harness connector and the ground.

	Continuity	
Connector	Terminal	Continuity
M42	18 – Ground	Existed

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace the harnesses and connectors.

INFOID:000000004257892

INFOID:000000004257893

D

Е

А

Κ

L

Μ

Ν

Ρ

INFOID:000000004257894

## C1628 4WAS FRONT ACTUATOR

#### < DTC/CIRCUIT DIAGNOSIS >

# $2. {\sf CHECK \ FRONT \ WHEEL \ STEERING \ ANGLE \ SENSOR \ CIRCUIT \ (2)}$

- 1. Connect 4WAS front control unit harness connector.
- 2. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

 Check the continuity between 4WAS front actuator harness connector and 4WAS front control unit harness connector.

4WAS fro	WAS front actuator 4WAS front contr		t control unit	Continuity
Connector	Terminal	Connector Terminal		Continuity
M351	7	M42	18	Existed

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.

 ${f 3.}$ CHECK FRONT WHEEL STEERING ANGLE SENSOR CIRCUIT (3)

1. Start the engine. CAUTION:

#### Stop the vehicle.

- 2. Steer to the straight-ahead position. Then turn the ignition switch OFF.
- 3. Disconnect 4WAS front actuator harness connector.
- 4. Apply 12 V current between 4WAS front actuator harness connector No. 10 terminal (positive) and NO. 3 terminal (negative). (Release the lock structure.)
  - CAUTION:
  - Never make the terminals short.
  - Connect the fuse between the terminals when applying the voltage.
- 5. Slowly steer rightward and leftward alternately. Check the resistance between 4WAS front actuator harness connectors.

#### **CAUTION:**

#### The steering angle must be within 10° rightward and leftward.

	Resistance (Ap-				
Connector	Terminal	Connector	Terminal	prox.)	
	2	M351	7	1 k – 100 kΩ	
M351	4		7		
	8		7		

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 4WAS front actuator. Refer to STC-181, "Removal and Installation".

4.CHECK FRONT WHEEL STEERING ANGLE SENSOR SIGNAL

#### With CONSULT-III

- T. Connect 4WAS front actuator harness connector.
- 2. Start the engine.

#### CAUTION: Stop the vehicle.

 Rotate the steering wheel slowly. Check "MTR SEN U OUT", "MTR SEN V OUT" and "MTR SEN W OUT" item on "DATA MONITOR" of 4WAS front control unit.

Do all data monitor values indicate "Hi" or "Low" simultaneously?

- YES >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.
- NO >> Check 4WAS front actuator harness connector pin terminal for disconnection.

#### Component Inspection (Front Wheel Steering Angle Sensor)

INFOID:000000004257895

**1.**CHECK FRONT WHEEL STEERING ANGLE SENSOR

## C1628 4WAS FRONT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS] 1. Start the engine. **CAUTION:** А Stop the vehicle. Steer to the straight-ahead position. Then turn the ignition switch OFF. Disconnect 4WAS front actuator harness connector. 4. Apply 12 V current between 4WAS front actuator harness connector No. 10 terminal (positive) and NO. 3 terminal (negative). (Release the lock structure.) CAUTION: Never make the terminals short. Connect the fuse between the terminals when applying the voltage. 5. Slowly steer rightward and leftward alternately. Check the resistance between 4WAS front actuator harness connectors. D **CAUTION:** The steering angle must be within 10° rightward and leftward. Е 4WAS front actuator Resistance (Approx.) Connector Terminal Connector Terminal 2 7 F M351 4 M351 7 1 k – 100 kΩ 7 8 STC Connect 4WAS front actuator harness connector. 6. Is the inspection result normal? YES >> INSPECTION END Н NO >> Replace 4WAS front actuator. Refer to STC-181, "Removal and Installation". Special Repair Requirement INFOID:000000004257896 AFTER REPLACING 4WAS FRONT ACTUATOR Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)". BEFORE REPLACING 4WAS FRONT CONTROL UNIT Record the self-diagnosis results (history). CAUTION: Κ Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis. Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-ues of "DATA MONITOR". AFTER REPLACING 4WAS FRONT CONTROL UNIT Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to STC-29, "4WAS M FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)". Ν

Ρ

## C1631, C1632 4WAS FRONT CONTROL UNIT

#### < DTC/CIRCUIT DIAGNOSIS >

C1631, C1632 4WAS FRONT CONTROL UNIT

## Description

INFOID:000000004257897

**IWITH 4WAS1** 

- Each sensor signal controls 4WAS front actuator.
- The fail-safe functions stops the rear wheel angle function (the front wheel is the steering wheel cutting angle) when the electric components and the mechanical components are malfunctioning.
- The protection function mode stops 4WAS system intermittently when 4WAS system continues high loaded condition and overheat condition or the input signal does not transmit to 4WAS front control unit.
- 4WAS front control unit and 4WAS main control unit control the 4WAS system by 4WAS communication line to optimize control.

#### DTC Logic

INFOID:000000004257898

#### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1631	CONTROL UNIT	An error is detected inside 4WAS front control unit.	4WAS front control unit or 4WAS front control unit power supply error is de- tected.
C1632	CONTROL UNIT	An error is detected inside 4WAS front control unit.	4WAS front control unit or 4WAS front control unit power supply error is de- tected.

#### DTC CONFIRMATION PROCEDURE

## **1.**RECHECK DTC

#### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1631" or "C1632" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>STC-56. "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

#### Diagnosis Procedure

INFOID:000000004257899

1.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front control unit harness connector.
- 3. Check the voltage between 4WAS front control unit harness connector terminal and ground.

4	WAS front control unit	Voltage (Approx.)
Connector	Terminal	vollage (Approx.)
M41	11 – Ground	Battery voltage
M42	15 – Ground	0 V

# 4. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

5. Check the voltage between 4WAS front control unit harness connector terminal and ground.

## C1631, C1632 4WAS FRONT CONTROL UNIT

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

Multiple         Voltage (Approx.)           M41         11 - Ground         Battery voltage           M42         15 - Ground         Battery voltage           Sthe inspection result normal?         YES         > GO TO 2.           NO         >> Check the following items. Repair or replace the malfunctioning parts.         • Ad fusible link (#) open           • Short among 40A fusible link (#) connector, 4WAS front control unit harness connector No. 11 terminal and the ground         • Open between the battery and 4WAS front control unit harness connector No. 15 terminal and the ground           • Open between the battery and 4WAS front control unit harness connector No. 15 terminal and the ground         • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground           • Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal         • Battery or ignition switch           • CHECK 4WAS FRONT CONTROL UNIT GROUND         • Continuity         • Battery or ignition switch           • M41         12 - Ground         Existed         • Sinte inspection result normal?           YES         > GO TO 3.         NO         > Repair or replace the harnesses and connectors.           • CHECK TERMINAL         • Continuity         • Existed           • M41         12 - Ground         Existed           • Schet amoplicable the harnesses connectors.         •		NAS front control unit		-
M41       11 - Ground       Battery voltage         M42       15 - Ground       Battery voltage         sithe inspection result normal?       YES       > SO TO 2.         NO       >> Check the following items. Repair or replace the malfunctioning parts.       • 40A fusible link (#I) open         • Short among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground       • Open between the battery and 4WAS front control unit harness connector No. 11 terminal         • 10A fuse (#3) open       • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground       • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground         • Open between the lightion switch and 4WAS front control unit harness connector No. 15 terminal       • Battery or ignition switch         • Battery or ignition switch       and 4WAS front control unit harness connector No. 15 terminal         • Battery or ignition switch       Continuity         2.CHECK 4WAS FRONT CONTROL UNIT GROUND          Attract and the ground       Existed         3.the inspection result normal?       YES >> GO TO 3.         NO >> Repair or replace the harnesses and connectors.       S.CHECK TERMINAL         2.Net KWAS front control unit harness connector pin terminal and connection for disconnection.       s the inspection result normal?         YES >			Voltage (Approx.)	
M42         15 - Ground         Battery voltage           a the inspection result normal?         YES         >> GO TO 2.           NO         >> Check the following items. Repair or replace the malfunctioning parts.         • 40A fusible link (#I) open           • Short among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground         • Open between the battery and 4WAS front control unit harness connector No. 15 terminal and the ground           • Open between the battery default (#I) connector, 4WAS front control unit harness connector No. 15 terminal and the ground         • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground           • Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal         • Battery or ignition switch           • CHECK 4WAS FRONT CONTROL UNIT GROUND         • Continuity         • Battery or ignition switch           • CHECK 4WAS front control unit         Continuity         • Existed           • M41         12 - Ground         Existed           • M42         18 - Ground         Existed           • M41         12 - Ground         Existed           • M41         12 - Ground         Existed           • Sthe inspection result normal?         YES           YES         > GO TO 3.         NO           NO         >> Repair or replace the				_
the inspection result normal?           YES         >> GO TO 2.           NO         >> Check the following items. Repair or replace the malfunctioning parts.           • 40A fusible link (#I) open         - Shot among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground           • Open between the battery and 4WAS front control unit harness connector No. 11 terminal and the ground         - Shot among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 53 terminal and the ground           • Shot among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground         - Shot among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground           • Open between the bignition switch and 4WAS front control unit harness connector No. 15 terminal         - Shot among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground           • Open between the WAS front control unit harness connector No. 15 terminal         - Shot among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 15 terminal           • Battery or ignition switch         - CHECK 4WAS FRONT CONTROL UNIT GROUND           • Heat inspection result normal?         - Continuity           • YES         > GO TO 3.           NO         >> Repair or replace the harnesses and connectors.           • CHECK TERMINAL           the inspection result normal?			Battery voltage	
YES       >> GO TO 2.         YO       >> Check the following items. Repair or replace the malfunctioning parts.         • 40A fusible link (#I) open       - Short among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground         • Open between the battery and 4WAS front control unit harness connector No. 11 terminal       • 10A fuse (#3) open         • Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground       • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground         • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 15 terminal and the ground       • Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal         • Open between the ignition switch       • CHECK 4WAS FRONT CONTROL UNIT GROUND         • CHECK 4WAS FRONT CONTROL UNIT GROUND       • Continuity         • M41       12 - Ground         • M42       18 - Ground         • M41       12 - Ground         • M42       34 - Ground         • So To 3.       >> Repair or replace the harnesses and connectors.         • CHECK TERMINAL       • Check HTERMINAL         • Existed       • Sequer or replace the specific malfunctioning part.         • CHECK INFORMATION       • CHECK INFORMATION         Check that any item below is applicable whe				-
NO       >> Check the following items. Repair or replace the malfunctioning parts.         • 40A fusible link (#I) open         • Short among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground         • Open between the battery and 4WAS front control unit harness connector No. 11 terminal         • 10A fuse (#3) open         • Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground         • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground         • Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal         • Battery or ignition switch         • CHECK 4WAS FRONT CONTROL UNIT GROUND         heck the continuity between 4WAS front control unit harness connector terminal and the ground. <ul> <li>4WAS front control unit</li> <li>Continuity</li> <li>M41</li> <li>12 - Ground</li> <li>M44</li> <li>13 - Ground</li> <li>Kisted</li> <li>34 - Ground</li> <li>Kisted</li> <li>34 - Ground</li> <li>M42</li> <li>34 - Ground</li> <li>Kisted</li> <li>XO</li> <li>Repair or replace the harnesses and connectors.</li> <li>CHECK TERMINAL</li> <li>heck 4WAS front control unit harness connector pin terminal and connection for disconnection.</li> <li>the inspection result normal?</li> <li>YE S &gt;&gt; GO TO 3.</li> <li>XO &gt;&gt; Repair or replace the specific malfunctioning part.</li> <li>CHECK INFORMATION</li> <li>CHeck that any item below is applicable when the malfunc</li></ul>	•			
<ul> <li>40A fusible link (#) open</li> <li>Short among 40A fusible link (#) connector, 4WAS front control unit harness connector No. 11 terminal and the ground</li> <li>Open between the battery and 4WAS front control unit harness connector No. 11 terminal</li> <li>10A fuse (#3) open</li> <li>Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground</li> <li>Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground</li> <li>Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal</li> <li>Battery or ignition switch</li> <li>CHECK 4WAS FRONT CONTROL UNIT GROUND</li> <li>heak the continuity between 4WAS front control unit harness connector terminal and the ground</li> <li>4WAS front control unit</li> <li>Continuity</li> <li>Continuity</li> <li>M41</li> <li>12 - Ground</li> <li>4WAS front control unit</li> <li>Continuity</li> <li>Continuity</li> <li>44 - Ground</li> <li>45 - Ground</li> <li>46 - Ground</li> <li>47 - Ground</li> <li>47 - Ground</li> <li>48 - Ground</li> <li>40 &gt;&gt; Repair or replace the harnesses and connectors.</li> <li>CHECK TERMINAL</li> <li>Check that function of the specific malfunctioning part.</li> <li>CHECK TERMINAL</li> <li>CHECK INFORMATION</li> <li>Check that any item below is applicable when the malfunctions occur.</li> <li>The engine stall occurs while driving or stopping the vehicle.</li> <li>When detecting the charging system error the item applicable?</li> <li>Yeartom ECM symptom diagnosis. Refer to <u>C-602. "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis. Refer to <u>C-602. "Symptom Table"</u>.</li> </ul>			. Repair or replace	he malfunctioning parts.
terminal and the ground  • Open between the battery and 4WAS front control unit harness connector No. 11 terminal  • 10A fuse (#3) open  • Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 termi- nal and the ground  • Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground  • Open between the ignition switch and 4WAS front control unit harness connector No. 15 termi- nal  • Battery or ignition switch  • CHECK 4WAS FRONT CONTROL UNIT GROUND  • CHECK 4WAS front control unit framess connector terminal and the ground.  • CHECK 4WAS front control unit Continuity  • Battery or ignition switch  • CHECK 4WAS front control unit framess connector terminal and the ground.  • Continuity between 4WAS front control unit harness connector terminal and the ground.  • CHECK Terminal  • Battery or replace the harnesses and connectors.  • CHECK TERMINAL  • Control unit harness connector pin terminal and connection for disconnection.  • the inspection result normal?  * S > S O TO 3.  O >> Repair or replace the harnesses and connectors.  • CHECK TERMINAL  • CHECK INFORMATION  Check that any item below is applicable when the malfunctions occur. The engine stall occurs while driving or stopping the vehicle.  When detecting the charging system error the item applicable?  * Check the error system. • Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u> .	•	• 40A fusible link (#I) open		
<ul> <li>Open between the battery and 4WAS front control unit harness connector No. 11 terminal</li> <li>10A fuse (#3) open</li> <li>Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground</li> <li>Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground</li> <li>Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal</li> <li>Battery or ignition switch</li> <li>CHECK 4WAS FRONT CONTROL UNIT GROUND</li> <li>Terminal</li> <li>Battery or ignition switch</li> <li>CHECK 4WAS front control unit harness connector terminal and the ground.</li> </ul>	-		link (#I) connector,	IWAS front control unit harness connector No. 11
<ul> <li>10A fuse (#3) open</li> <li>Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground</li> <li>Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground</li> <li>Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal</li> <li>Battery or ignition switch</li> <li>CHECK 4WAS FRONT CONTROL UNIT GROUND</li> </ul> AWAS front control unit Connector Terminal Continuity Connector Terminal Continuity Control unit harness connectors. COLECK TERMINAL Control unit harness connector pin terminal and connection for disconnection. the inspection result normal? YES >> GO TO 3. Co >> Repair or replace the harnesses and connectorsCHECK TERMINAL Control unit harness connector pin terminal and connection for disconnection. the inspection result normal? YES >> GO TO 4. Co >> Repair or replace the specific malfunctioning partCHECK INFORMATION Check that any item below is applicable when the malfunctions occur. The engine stall occurs while driving or stopping the vehicle. When detecting the charging system error the item applicable? YES >> Check the error system Perform ECM symptom diagnosis. Refer to EC-602. "Symptom Table" Perform Table" Perform Table".	•		and 4WAS front co	ntrol unit harness connector No. 11 terminal
nal and the ground - Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground - Open between the ignition switch and 4WAS front control unit harness connector No. 15 termi- nal - Battery or ignition switch -CHECK 4WAS FRONT CONTROL UNIT GROUND teck the continuity between 4WAS front control unit harness connector terminal and the ground. 	•	<ul> <li>10A fuse (#3) open</li> </ul>		
<ul> <li>Short among 10A fuse (#3) connector, unified meter and A/C amp harness connector No. 53 terminal and the ground</li> <li>Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal</li> <li>Battery or ignition switch</li> <li>CHECK 4WAS FRONT CONTROL UNIT GROUND</li> <li>Teck the continuity between 4WAS front control unit harness connector terminal and the ground.</li> </ul> <b>WAS front control unit Continuity M41</b>	-		3) connector, 4WAS	front control unit harness connector No. 15 termi-
Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal     Battery or ignition switch CHECK 4WAS FRONT CONTROL UNIT GROUND  Reck the continuity between 4WAS front control unit harness connector terminal and the ground. <u>4WAS front control unit</u> <u>Continuity</u> <u>4WAS front control unit</u> <u>7ES are Go TO 3.</u> <u>10 are replace the harnesses and connectors.</u> <u>CHECK TERMINAL</u> reck 4WAS front control unit harness connector pin terminal and connection for disconnection.     the inspection result normal? <u>YES are Go TO 4.</u> <u>10 are Repair or replace the specific malfunctioning part.</u> <u>.CHECK INFORMATION</u> Check that any item below is applicable when the malfunctions occur. The engine stall occurs while driving or stopping the vehicle. When detecting the charging system error     the item applicable? <u>YES are Check the error system.</u> <u>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.      <u>Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table"</u>. </u>	-		3) connector, unifie	d meter and A/C amp harness connector No. 53
nal       • Battery or ignition switch         • CHECK 4WAS FRONT CONTROL UNIT GROUND         heck the continuity between 4WAS front control unit harness connector terminal and the ground. <ul> <li>4WAS front control unit</li> <li>Continuity</li> <li>Add 12 - Ground</li> <li>Existed</li> </ul> M41         12 - Ground         Existed           M42         34 - Ground           M42         34 - Ground           the inspection result normal?         Existed           VES         >> GO TO 3.               40             >> Repair or replace the harnesses and connectors.               .CHECK TERMINAL               neck 4WAS front control unit harness connector pin terminal and connection for disconnection.               the inspection result normal?               VES <li>&gt;&gt; GO TO 4.</li> <li>&gt;&gt; So O TO 4.</li> <li>&gt;&gt; So So TO 4.</li> <li>&gt;&gt; Sepair or replace the specific malfunctioning part.</li> <li>.CHECK INFORMATION</li> Check that				
Battery or ignition switch .CHECK 4WAS FRONT CONTROL UNIT GROUND heck the continuity between 4WAS front control unit harness connector terminal and the ground.           4WAS front control unit         Continuity           0         4WAS front control unit           Connector         Terminal           0         12 - Ground           M41         12 - Ground           M42         38 - Ground           18 - Ground         Existed           34 - Ground         Existed           XO         >> Repair or replace the harnesses and connectors.           .CHECK TERMINAL	•	•	n switch and 4WAS	rront control unit harness connector No. 15 termi-
.CHECK 4WAS FRONT CONTROL UNIT GROUND         heck the continuity between 4WAS front control unit harness connector terminal and the ground.         Image: transmission of the term of the symptom diagnosis for the charging system. Refer to <u>CHC-19. "Symptom Table".</u>	•			
heck the continuity between 4WAS front control unit harness connector terminal and the ground.          4WAS front control unit       Continuity         Gonnector       Terminal         M41       12 - Ground         M42       18 - Ground         M42       34 - Ground         the inspection result normal?         YES       > GO TO 3.         IO       >> Repair or replace the harnesses and connectors.         .CHECK TERMINAL         neck 4WAS front control unit harness connector pin terminal and connection for disconnection.         the inspection result normal?         YES       >> GO TO 4.         IO       >> Repair or replace the specific malfunctioning part.         .CHECK INFORMATION       Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".			INIT GROUND	
4WAS front control unit       Continuity         Connector       Terminal         M41       12 - Ground         M42       18 - Ground         M42       34 - Ground         the inspection result normal?         (FS)       > GO TO 3.         400       >> Repair or replace the harnesses and connectors.         .CHECK TERMINAL         neck 4WAS front control unit harness connector pin terminal and connection for disconnection.         the inspection result normal?         (FS)       >> GO TO 4.         400       >> Repair or replace the specific malfunctioning part.         .CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         (FS)       >> Check the error system.         • Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".				ss connector terminal and the ground
Connector         Terminal         Continuity           M41         12 – Ground         Existed           M42         18 – Ground         Existed           M42         34 – Ground         Existed           VES         >> GO TO 3.         Existed           JO         >> Repair or replace the harnesses and connectors.         .           .CHECK TERMINAL         Existed         .           the inspection result normal?         .         .           YES         >> GO TO 3.         .         .           O         >> Repair or replace the harnesses and connectors.         .           .CHECK TERMINAL         .         .         .           the inspection result normal?         .         .         .           YES         >> GO TO 4.         .         .         .           VO         >> Repair or replace the specific malfunctioning part.         .         .         .           .CHECK INFORMATION         .         .         .         .         .           Check that any item below is applicable when the malfunctions occur.         .         .         .         .           .Check that any item below is applicable when the malfunctions occur.         .         .         .				ss connector terminar and the ground.
Connector         Terminal         Continuity           M41         12 – Ground         Existed           M42         18 – Ground         Existed           M42         34 – Ground         Existed           Version         Second         Second		4WAS front control unit		-
M41       12 - Ground         M42       18 - Ground         M42       34 - Ground         the inspection result normal?       234 - Ground         YES       >> GO TO 3.         IO       >> Repair or replace the harnesses and connectors.         .CHECK TERMINAL         teck 4WAS front control unit harness connector pin terminal and connection for disconnection.         the inspection result normal?         YES       >> GO TO 4.         IO       >> Repair or replace the specific malfunctioning part.         .CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         • Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".	Connector		Continuity	
M42       18 - Ground       Existed         34 - Ground       34 - Ground       Existed         the inspection result normal?       2         YES       >> GO TO 3.       3         IO       >> Repair or replace the harnesses and connectors.         CHECK TERMINAL	M41	12 – Ground		-
34 - Ground         the inspection result normal?         YES       >> GO TO 3.         YO       >> Repair or replace the harnesses and connectors.         •CHECK TERMINAL         heck 4WAS front control unit harness connector pin terminal and connection for disconnection.         the inspection result normal?         YES       >> GO TO 4.         YO       >> Repair or replace the specific malfunctioning part.         •CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         • Perform ECM symptom diagnosis. Refer to EC-602. "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19. "Symptom Table".		18 – Ground	Existed	
the inspection result normal?         YES       >> GO TO 3.         NO       >> Repair or replace the harnesses and connectors.         •CHECK TERMINAL         heck 4WAS front control unit harness connector pin terminal and connection for disconnection.         the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace the specific malfunctioning part.         •CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         • Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".	M42	 34 – Ground		
YES       >> GO TO 3.         NO       >> Repair or replace the harnesses and connectors.         •.CHECK TERMINAL         heck 4WAS front control unit harness connector pin terminal and connection for disconnection.         the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace the specific malfunctioning part.         •.CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".	the inspec	tion result normal?		-
<ul> <li>CHECK TERMINAL</li> <li>heck 4WAS front control unit harness connector pin terminal and connection for disconnection.</li> <li>the inspection result normal?</li> <li>YES &gt;&gt; GO TO 4.</li> <li>NO &gt;&gt; Repair or replace the specific malfunctioning part.</li> <li>CHECK INFORMATION</li> <li>Check that any item below is applicable when the malfunctions occur.</li> <li>The engine stall occurs while driving or stopping the vehicle.</li> <li>When detecting the charging system error</li> <li>the item applicable?</li> <li>YES &gt;&gt; Check the error system.</li> <li>Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".</li> <li>Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".</li> </ul>				
heck 4WAS front control unit harness connector pin terminal and connection for disconnection. the inspection result normal? YES >> GO TO 4. NO >> Repair or replace the specific malfunctioning part. ••••••••••••••••••••••••••••••••••••			sses and connector	3.
the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace the specific malfunctioning part.         •CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         • Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".	.CHECK T	ERMINAL		
the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace the specific malfunctioning part.         • CHECK INFORMATION         Check that any item below is applicable when the malfunctions occur.         The engine stall occurs while driving or stopping the vehicle.         When detecting the charging system error         the item applicable?         YES       >> Check the error system.         • Perform ECM symptom diagnosis. Refer to EC-602, "Symptom Table".         • Perform the symptom diagnosis for the charging system. Refer to CHG-19, "Symptom Table".	heck 4WAS	S front control unit harness	connector pin termi	al and connection for disconnection.
<ul> <li>NO &gt;&gt; Repair or replace the specific malfunctioning part.</li> <li>CHECK INFORMATION</li> <li>Check that any item below is applicable when the malfunctions occur.</li> <li>The engine stall occurs while driving or stopping the vehicle.</li> <li>When detecting the charging system error</li> <li>the item applicable?</li> <li>(FS &gt;&gt; Check the error system.</li> <li>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>			·	
<ul> <li>CHECK INFORMATION</li> <li>Check that any item below is applicable when the malfunctions occur. The engine stall occurs while driving or stopping the vehicle. When detecting the charging system error</li> <li>the item applicable? (FS &gt;&gt; Check the error system. Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>. Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>	/ES >> (	GO TO 4.		
Check that any item below is applicable when the malfunctions occur. The engine stall occurs while driving or stopping the vehicle. When detecting the charging system error <u>the item applicable?</u> (ES >> Check the error system. • Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u> . • Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u> .			ic malfunctioning pa	rt.
<ul> <li>The engine stall occurs while driving or stopping the vehicle.</li> <li>When detecting the charging system error</li> <li>the item applicable?</li> <li>'ES &gt;&gt; Check the error system.</li> <li>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>	CHECK II	NFORMATION		
<ul> <li>When detecting the charging system error</li> <li><u>the item applicable?</u></li> <li>YES &gt;&gt; Check the error system.</li> <li>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>	Check that	any item below is applicab	le when the malfund	tions occur.
<ul> <li>the item applicable?</li> <li>YES &gt;&gt; Check the error system.</li> <li>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>				e.
<ul> <li>YES &gt;&gt; Check the error system.</li> <li>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>		• • • • •	error	
<ul> <li>Perform ECM symptom diagnosis. Refer to <u>EC-602, "Symptom Table"</u>.</li> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>	•	• •		
<ul> <li>Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.</li> </ul>			iagnosis.Refer to E	C-602, "Symptom Table".
NO >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u> .	•	<ul> <li>Perform the symptom diag</li> </ul>	gnosis for the charg	ng system. Refer to CHG-19, "Symptom Table".
	NO >> I	Replace 4WAS front contro	l unit. Refer to <u>STC</u>	<u>179, "Exploded View"</u> .
pecial Repair Requirement	pecial Re	epair Requirement		INF01D:000000004257900
				т
EFORE REPLACING 4WAS FRONT CONTROL UNIT Record the self-diagnosis results (history).				1
CAUTION:				

• Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.

## **STC-57**

## C1631, C1632 4WAS FRONT CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

• Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS <u>FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)"</u>.

## C1633 4WAS FRONT CONTROL UNIT

#### < DTC/CIRCUIT DIAGNOSIS >

## C1633 4WAS FRONT CONTROL UNIT

## Description

- Each sensor signal controls 4WAS front actuator.
- The fail-safe functions stops the rear wheel angle function (the front wheel is the steering wheel cutting angle) when the electric components and the mechanical components are malfunctioning.
- The protection function stops 4WAS system temporarily when:
- 4WAS system continues being high load/overheat condition.
- The input signal is not transmitted to 4WAS front control unit.
- 4WAS front control unit and 4WAS main control unit control the 4WAS system by 4WAS communication line to optimize control.

## DTC Logic

#### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	F
C1633	CONTROL UNIT	An error is detected inside 4WAS front control unit.	4WAS front control unit error	
DTC CONFI	RMATION PROCEDURE			ST
<b>1</b> .RECHECK	( DTC			Н
2. Perform 4	<b>SULT-III</b> ignition switch from OFF to 4WAS front control unit self- <u>33" detected?</u>			I
	Proceed to diagnosis proced	ure. Refer to <u>STC-59. "Diagnosis Procedure"</u> .		J
Diagnosis	Procedure		INFQID:000000004257903	

**1.**CHECK 4WAS FRONT CONTROL UNIT (1)

#### With CONSULT-III

1. Start the engine. CAUTION:

#### Stop the vehicle.

- 2. Check "THERM TEMP" on "DATA MONITOR" of 4WAS front control unit.
- Steer the steering wheel 360° leftward slowly and then steer 360° rightward. Return the steering wheel to the straight-ahead position. Repeat the same service for 3 minutes.
   Check "THERM TEMP" on "DATA MONITOR" of 4WAS front control unit.
- Is DATA MONITOR value difference between before and after the service 3° or less?
- YES >> Replace 4WAS front control unit. Refer to <u>STC-179. "Exploded View"</u>.
- NO >> GO TO 2.

**2.**CHECK 4WAS FRONT CONTROL UNIT (2)

#### With CONSULT-III

1. Start the engine.

CAUTION:

#### Stop the vehicle.

- 2. Check "THERM TEMP" item on "DATA MONITOR" of 4WAS front control unit.
- 3. Steer the steering wheel 360° leftward slowly and then steer 360° rightward. Return the steering wheel to the straight-ahead position. Repeat the same service for 3 minutes.
- 4. Check "THERM TEMP" item on "DATA MONITOR" of 4WAS front control unit.

## **STC-59**

INFOID:000000004257901

INFOID:000000004257902

D

Е

Κ

L

Ν

Ρ

С

А

## C1633 4WAS FRONT CONTROL UNIT

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

Monitor item	Condition	Display value
THERM TEMP	Engine running (idling)	-40 − 100°C

Is the inspection result normal?

#### YES >> GO TO 3.

NO >> Replace 4WAS front control unit. Refer to <u>STC-179</u>, "Exploded View".

## 3.CHECK INFORMATION

• Check that any item below is applicable when malfunction occurs.

- Entering and exiting the garage (Frequent steering)

- When steering the steering wheel for a long time

#### Is the item applicable?

YES >> 4WAS system protection function mode (overheat protection)(4WAS system temporary stop) NO >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.

#### Special Repair Requirement

INFOID:000000004257904

#### BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history).
  - **CAUTION:**
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

#### < DTC/CIRCUIT DIAGNOSIS >

# C1651 IGNITION POWER SUPPLY

## Description

4WAS system function is controlled by transmitting the ignition switch signal to 4WAS front control unit.

## **DTC Logic**

INFOID:000000004257906

2009 G37 Coupe

## DTC DETECTION LOGIC

C1651       IGN POWER SUPPLY       The ignition voltage signal error is detected.       the ignition power s error is detected.         DTC CONFIRMATION PROCEDURE	DTC	Items (CONSULT-III screen terms)	Dia	gnostic item is d	etected when	Possible cause
<ul> <li>Turn the ignition switch from OFF to ON.</li> <li>Perform 4WAS front control unit self-diagnosis.</li> <li><u>s DTC "C1651" detected?</u></li> <li>YES &gt;&gt; Proceed to diagnosis procedure. Refer to <u>STC-61, "Diagnosis Procedure"</u>.</li> <li>NO &gt;&gt; INSPECTION END</li> <li>Diagnosis Procedure</li> <li>I.CHECK 4WAS FRONT CONTROL UNIT GROUND</li> <li>1. Turn the ignition switch OFF.</li> <li>2. Check the continuity between 4WAS front control unit harness connector and the ground.</li> </ul> <u>4WAS front control unit</u> <u>Connector</u> Terminal <u>M42</u> 18 - Ground       Existed        Ste inspection result normal?       YES >> GO TO 2.       NO >> Repair or replace the harnesses and connectors.       2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY       1. Start the engine. <u>CAUTION:</u> Stop the vehicle.	C1651	IGN POWER SUPPLY	The ignition v	roltage signal err	or is detected.	4WAS front control unit or the ignition power supply error is detected.
With CONSULT-III         1. Turn the ignition switch from OFF to ON.         2. Perform 4WAS front control unit self-diagnosis.         s DTC "C1651" detected?         YES       >> Proceed to diagnosis procedure. Refer to STC-61, "Diagnosis Procedure".         NO       >> INSPECTION END         Diagnosis Procedure       ************************************	DTC CONFI	RMATION PROCEDURE	E			
<ul> <li>2. Perform 4WAS front control unit self-diagnosis.</li> <li>Is DTC "C1651" detected?</li> <li>YES &gt;&gt; Proceed to diagnosis procedure. Refer to STC-61, "Diagnosis Procedure".</li> <li>NO &gt;&gt; INSPECTION END</li> <li>Diagnosis Procedure </li> <li>1. CHECK 4WAS FRONT CONTROL UNIT GROUND </li> <li>1. Turn the ignition switch OFF.</li> <li>2. Check the continuity between 4WAS front control unit harness connector and the ground.</li> <li>4WAS front control unit</li> <li>Continuity</li> <li>M42</li> <li>18 - Ground</li> <li>Existed</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; GO TO 2.</li> <li>NO &gt;&gt; Repair or replace the harnesses and connectors.</li> <li>2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY</li> <li>1. Start the engine.</li> <li>CAUTION:</li> <li>Stop the vehicle.</li> </ul>	<b>1.</b> RECHECK	K DTC				
1. CHECK 4WAS FRONT CONTROL UNIT GROUND         1. Turn the ignition switch OFF.         2. Check the continuity between 4WAS front control unit harness connector and the ground. <u>4WAS front control unit</u> <u>Continuity</u> <u>Connector</u> <u>Terminal</u> <u>M42</u> <u>18 - Ground</u> <u>Existed</u> <u>Is the inspection result normal?</u> YES >> GO TO 2. NO >> Repair or replace the harnesses and connectors. <u>2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY</u> <u>1. Start the engine.</u> <u>CAUTION:</u> Stop the vehicle.	1. Turn the 2. Perform 4 I <u>s DTC "C165</u> YES >> P	ignition switch from OFF to 4WAS front control unit self- 51" detected? Proceed to diagnosis proced	-diagnosis.	o <u>STC-61, "Di</u>	agnosis Procedu	r <u>e"</u> .
2. Check the continuity between 4WAS front control unit harness connector and the ground.           4WAS front control unit         Continuity           Connector         Terminal           M42         18 - Ground           Is the inspection result normal?           YES         >> GO TO 2.           NO         >> Repair or replace the harnesses and connectors.           2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY           1. Start the engine.           CAUTION:           Stop the vehicle.	Diagnosis	Procedure				INFOID:0000000042579
1. Turn the ignition switch OFF.         2. Check the continuity between 4WAS front control unit harness connector and the ground.	<b>1.</b> CHECK 4	WAS FRONT CONTROL UI	NIT GROUN	D		
Connector     Terminal       M42     18 - Ground       Is the inspection result normal?       YES     >> GO TO 2.       NO     >> Repair or replace the harnesses and connectors.       2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY       1. Start the engine.       CAUTION:       Stop the vehicle.		e continuity between 4WAS	front contro	l unit harness	connector and th	ne ground.
Is the inspection result normal?         YES       >> GO TO 2.         NO       >> Repair or replace the harnesses and connectors.         2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY         1. Start the engine.         CAUTION:         Stop the vehicle.	Connector		C	ontinuity		
YES >> GO TO 2. NO >> Repair or replace the harnesses and connectors. 2.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY 1. Start the engine. CAUTION: Stop the vehicle.	M42	18 – Ground	I	Existed		
CAUTION: Stop the vehicle.	YES >> 0 NO >> R 2.CHECK 4	GO TO 2. Repair or replace the harnes WAS FRONT CONTROL UI				
	CAUTIOI Stop the	N: vehicle.	ont control u	nit harness c	onnectors.	
4WAS front control unit	4W	AS front control unit	Voltaga (Ar			
Connector         Terminal	Connector	Terminal	voitage (Ap	ριοχ.)		
M42 15 – 18 Battery voltage	M42	15 – 18	Battery vo	ltage		
Is the measurement value "9 V" or less?	Is the measur	rement value "9 V" or less?				

- Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground
- Short among 10A fuse (#3) connector, unified meter and A/C amp No. 53 terminal and the ground

## STC-61

INFOID:000000004257905

А

В

С

## C1651 IGNITION POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

- Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal
- Ignition switch
- NO >> GO TO 3.

 ${f 3.}$ CHECK 4WAS FRONT CONTROL UNIT SIGNAL

With CONSULT-III

- 1. Start the engine. CAUTION:
  - Stop the vehicle.

2. Check "IGN VOLT" item on "DATA MONITOR" of 4WAS front control unit.

Does the item on "DATA MONITOR" indicate "16 V" or more?

- YES >> Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19. "Symptom Table"</u>.
- NO >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".

### Special Repair Requirement

INFOID:000000004257908

BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history).
  - **CAUTION:**
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

# terminal and the ground Open between the battery and 4WAS front control unit harness connector No. 11 terminal · Battery **STC-63** Revision: 2009 October

Diagnostic item is detected when...

## < DTC/CIRCUIT DIAGNOSIS > C1652 4WAS FRONT MOTOR POWER SUPPLY

## Description

The power supply for 4WAS front motor and 4WAS front control unit.

Items

(CONSULT-III screen terms)

## **DTC** Logic

DTC

INFOID:000000004257910

Possible cause

2009 G37 Coupe

## DTC DETECTION LOGIC

C1652	MOTOR POWER SUPPLY	4WAS front	motor main p	power supply error is detected	4WAS front control unit or 4WAS front motor power supply error is detected.
DTC CONFI	RMATION PROCEDURE	Ξ			
1.RECHECK	< DTC				
	ignition switch from OFF to 4WAS front control unit self				
	52" detected?	alagnoolo.			
	Proceed to diagnosis proced	dure. Refer	to <u>STC-63</u>	<u>, "Diagnosis Procedure"</u> .	
	NSPECTION END				
Jiagnosis	Procedure				INFOID:000000004257911
1.4WAS FR	ONT MOTOR GROUND IN	ISPECTION			
I. Turn the	ignition switch OFF.				
	e continuity between 4WAS	6 front contr	ol unit harr	ness connector and the g	ground.
	4WAS front control unit				
Connector	Terminal		Continuity		
M41	12 – Ground		Existed		
s the inspect	ion result normal?				
YES >> 0	GO TO 2.				
-	Repair or replace the harnes				
2.4WAS FR	ONT MOTOR POWER SUP	PPLY INSPE	ECTION		
<ol> <li>Start the CAUTIO</li> </ol>					
Stop the	vehicle.				
2. Check th	e voltage between 4WAS fr	ront control	unit harne:	ss connectors.	
4\\\	/AS front control unit				
Connector	Terminal	Voltage (A	\pprox.)		
M41	11 – 12	Battery v	/oltage		
s the measu	rement value "9 V" or less?				
YES >>	<b>- -</b>				
	4WAS front control unit ha 40A fusible link (#I) open	irness conn	ector pin te	erminal and connection	
	Short among 40A fusible I	link (#I) con	nector, 4W	AS front control unit ha	rness connector No. 11
	terminal and the ground	-			



INFOID:000000004257909

А

В

С

D

## C1652 4WAS FRONT MOTOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 3.

 $\mathbf{3.4}$  was front control unit signal inspection

#### With CONSULT-III

#### 1. Start the engine.

#### CAUTION: Stop the vehicle.

2. Check "MOTOR VOLT" item on "DATA MONITOR" of 4WAS front control unit.

Does the item on "DATA MONITOR" indicate "16 V" or more?

- YES >> Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>.
- NO >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".

Special Repair Requirement

INFOID:000000004257912

[WITH 4WAS]

BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

## C1654 4WAS FRONT ACTUATOR RELAY

#### < DTC/CIRCUIT DIAGNOSIS >

## C1654 4WAS FRONT ACTUATOR RELAY

## Description

- It performs control inside 4WAS front control unit.
- The actuator relay turns ON when turning the ignition switch ON.
- When turning the ignition switch from ON to OFF, the actuator relay remains ON and is turned OFF after a few minutes due to the 4WAS front control unit control.

## DTC Logic

INFOID:000000004257914

INFOID:000000004257915

## DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	E
C1654	ACTUATOR RELAY	An error is detected on the main relay power supply in- side 4WAS front control unit.	The main relay power supply inside 4WAS front control unit error is de- tected.	F

#### DTC CONFIRMATION PROCEDURE

#### **1.**RECHECK DTC

#### With CONSULT-III

- 1. Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1654" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-65, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

#### Diagnosis Procedure

## 1.4WAS FRONT MOTOR GROUND INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Check the continuity between 4WAS front control unit harness connector and the ground.

	4WAS front control unit	Continuity
Connector	Terminal	Continuity
M41	12 – Ground	Existed

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace the harnesses and connectors.

2.4WAS FRONT MOTOR POWER SUPPLY INSPECTION

# 1. Start the engine. CAUTION:

#### Stop the vehicle.

2. Check the voltage between 4WAS front control unit harness connectors.

4	WAS front control unit	Voltage (Approx.)
Connector	Terminal	
M41	11 – 12	Battery voltage

#### Is the measurement value "9 V" or less?

YES >> Check the following items. Repair or replace the malfunctioning parts.

4WAS front control unit harness connector pin terminal and connection

• 40A fusible link (#I) open

INFOID:000000004257913

А

В

D

STC

Н

Κ

L

M

Ν

Ρ

## C1654 4WAS FRONT ACTUATOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

- [WITH 4WAS]
- Short among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground
- Open between the battery and 4WAS front control unit harness connector No. 11 terminal
- Battery
- NO >> GO TO 3.

3.4 Was front control unit signal inspection

#### With CONSULT-III

- 1. Start the engine.
  - CAUTION:
  - Stop the vehicle.
- 2. Check "MOTOR VOLT" item on "DATA MONITOR" of 4WAS front control unit.

Does the item on "DATA MONITOR" indicate "16 V" or more?

YES >> Perform the symptom diagnosis for the charging system. Refer to <u>CHG-19, "Symptom Table"</u>. NO >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.

#### Special Repair Requirement

INFOID:000000004257916

BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history).
  - **CAUTION:**
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

## **C1655 4WAS FRONT DRIVER**

#### < DTC/CIRCUIT DIAGNOSIS >

## C1655 4WAS FRONT DRIVER

## Description

- It perform control inside 4WAS front control unit.
- The power supply for 4WAS front motor (3-phase motor).

## DTC Logic

## DTC DETECTION LOGIC

C1655       PRE-DRIVER       4WAS front motor 3-phase current error is detected. (Current is not applied to 4WAS front motor)       4WAS front motor powe supply error is detected         DTC CONFIRMATION PROCEDURE       1. RECHECK DTC       #With CONSULT-III       4WAS front control unit self-diagnosis.         1. RECHECK DTC       #With CONSULT-III       1. Trum the ignition switch from OFF to ON.       2. Perform 4WAS front control unit self-diagnosis.         1. DTC "C1655" detected?       YES       >> Proceed to diagnosis procedure. Refer to STC-67. "Diagnosis Procedure". NO >> INSPECTION END       ####################################							
C1655       PRE-DRIVER       4WAS front motor 3-phase current error is detected. (Current is not applied to 4WAS front motor)       4WAS front motor powe supply error is detected         DTC CONFIRMATION PROCEDURE       1. RECHECK DTC       ••••••••••••••••••••••••••••••••••••	DTC			Diagnostic item is detected wh	en	Possible cause	
1.RECHECK DTC         With CONSULT-III         1. Turn the ignition switch from OFF to ON.         2. Perform 4WAS front control unit self-diagnosis.         Is DTC "C1655" detected?         YES         YES         NO       >> INSPECTION END         Diagnosis Procedure         Diagnosis Procedure         1. Turn the ignition switch OFF.         2. Disconnect 4WAS front control unit harness connector.         3. Check the continuity between 4WAS front control unit harness connector and the ground.         4WAS front control unit         Continuity         4WAS front control unit         Continuity         4WAS front control unit         2. On >> Repair or replace the harnesses and connectors.         2. PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         With CONSULT-III         1. Connect 4WAS front control unit harness connector.         2. PerFORM 4WAS front control unit harness connector.         2. PerFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         With CONSULT-III         1. Connect 4WAS front control unit harness connector.         2. Perform 4WAS front control uni	C1655	PRE-DRIVER		•		4WAS front control unit or 4WAS front motor power supply error is detected.	I
With CONSULT-III         1. Turn the ignition switch from OFF to ON.         2. Perform 4WAS front control unit self-diagnosis.         Is DTC "C1655" detected?         YES       >> Proceed to diagnosis procedure. Refer to STC-67, "Diagnosis Procedure".         NO       >> INSPECTION END         Diagnosis Procedure	DTC CONFIR	MATION PROCEDURE	Ξ				
1. Turn the ignition switch from OFF to ON. 2. Perform 4WAS front control unit self-diagnosis. IsDTC "C1655" detected? YES >> Proceed to diagnosis procedure. Refer to STC-67, "Diagnosis Procedure". NO >> INSPECTION END Diagnosis Procedure I.CHECK 4WAS FRONT MOTOR GROUND 1. Turn the ignition switch OFF. 2. Disconnect 4WAS front control unit harness connector. 3. Check the continuity between 4WAS front control unit harness connector and the ground. <b>WAS front control unit</b> Connector <b>WAS front control unit</b> Continuity <b>WAS front control unit</b> Continuity YES >> GO TO 2. NO >> Repair or replace the harnesses and connectors. <b>2.</b> PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT) <b>With CONSULT-III</b> 1. Connect 4WAS front control unit harness connector. 2. Perform 4WAS front control unit harness connector. 2. PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT) <b>With CONSULT-III</b> 1. Connect 4WAS front control unit harness connector. 2. Perform 4WAS front control unit harness connector. 2. Perform 4WAS front control unit harness connector. 3. Perform 4WAS front control unit harness connector. 4. Perform 4WAS front control unit harness connector. 5. Perform 4WAS front control unit harness connector. 5. Perform 4WAS fro	1.RECHECK	DTC					
NO       >> INSPECTION END         Diagnosis Procedure       ************************************	<ol> <li>Turn the ig</li> <li>Perform 4V</li> </ol>	nition switch from OFF to NAS front control unit self-		5.			S
1.CHECK 4WAS FRONT MOTOR GROUND         1. Turn the ignition switch OFF.         2. Disconnect 4WAS front control unit harness connector.         3. Check the continuity between 4WAS front control unit harness connector and the ground.			dure. Refe	r to <u>STC-67, "Diagnosis</u>	Procedure".		
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect 4WAS front control unit harness connector.</li> <li>Check the continuity between 4WAS front control unit harness connector and the ground.</li> <li>4WAS front control unit</li> <li>Continuity</li> <li>Connector</li> <li>Terminal</li> <li>M41</li> <li>12 - Ground</li> <li>Existed</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; GO TO 2.</li> <li>NO &gt;&gt; Repair or replace the harnesses and connectors.</li> <li>PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)</li> <li>With CONSULT-III</li> <li>Connect 4WAS front control unit self-diagnosis.</li> <li>Is DTC "C1622" detected?</li> <li>YES &gt;&gt; Check the error system.</li> <li>NO &gt;&gt; Replace 4WAS front control unit. Refer to STC-179, "Exploded View".</li> </ol>	Diagnosis P	rocedure				INFOID:000000004257919	
<ul> <li>2. Disconnect 4WAS front control unit harness connector.</li> <li>3. Check the continuity between 4WAS front control unit harness connector and the ground.</li> </ul> 4WAS front control unit Continuity <ul> <li> <ul> <li> <u>4WAS front control unit</u></li> <li> <u>Connector</u> Terminal</li> <li> <u>M41</u> 12 - Ground Existed       </li> </ul>      Is the inspection result normal?       YES &gt;&gt; GO TO 2.       NO &gt;&gt; Repair or replace the harnesses and connectors.       <b>2.</b> PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)  </li> </ul> With CONSULT-III       1. Connect 4WAS front control unit harness connector.       2. Perform 4WAS front control unit harness connector.       2. Perform 4WAS front control unit self-diagnosis.       Is DTC "C1622" detected?       YES >> Check the error system.     NO >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".	1.CHECK 4W	AS FRONT MOTOR GRC	DUND				
Connector       Terminal         M41       12 - Ground       Existed         Is the inspection result normal?       YES >> GO TO 2.         NO       >> Repair or replace the harnesses and connectors. <b>2.</b> PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         Image: Connect 4WAS front control unit harness connector.         2. Perform 4WAS front control unit harness connector.         2. Perform 4WAS front control unit self-diagnosis.         Is DTC "C1622" detected?         YES >> Check the error system.         NO >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".	2. Disconnect	t 4WAS front control unit h			or and the g	ground.	
Connector       Terminal         M41       12 - Ground       Existed         Is the inspection result normal?       YES >> GO TO 2.         NO       >> Repair or replace the harnesses and connectors. <b>2.</b> PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         Image: Connect 4WAS front control unit harness connector.         2.       Perform 4WAS front control unit harness connector.         2.       Perform 4WAS front control unit self-diagnosis.         Is DTC "C1622" detected?         YES       >> Check the error system.         NO       >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".		4WAS front control unit					I
Is the inspection result normal?         YES       >> GO TO 2.         NO       >> Repair or replace the harnesses and connectors. <b>2.</b> PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         Image: Connect 4WAS front control unit harness connector.         2.       Perform 4WAS front control unit harness connector.         2.       Perform 4WAS front control unit self-diagnosis.         Is DTC "C1622" detected?         YES       >> Check the error system.         NO       >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".	Connector	Terminal		Continuity			
YES       >> GO TO 2.         NO       >> Repair or replace the harnesses and connectors. <b>2.</b> PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         Image: Connect 4WAS front control unit harness connector.         2.       Perform 4WAS front control unit harness connector.         2.       Perform 4WAS front control unit self-diagnosis.         Is DTC "C1622" detected?         YES       >> Check the error system.         NO       >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".	M41	12 – Ground		Existed			[
NO       >> Repair or replace the harnesses and connectors.         2.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)         Image: Connect 4WAS front control unit harness connector.         2. Perform 4WAS front control unit harness connector.         2. Perform 4WAS front control unit self-diagnosis.         Is DTC "C1622" detected?         YES       >> Check the error system.         NO       >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".							
<ul> <li>With CONSULT-III</li> <li>Connect 4WAS front control unit harness connector.</li> <li>Perform 4WAS front control unit self-diagnosis.</li> <li><u>Is DTC "C1622" detected?</u></li> <li>YES &gt;&gt; Check the error system.</li> <li>NO &gt;&gt; Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.</li> </ul>			sses and o	connectors.			N
<ol> <li>Connect 4WAS front control unit harness connector.</li> <li>Perform 4WAS front control unit self-diagnosis.</li> <li><u>Is DTC "C1622" detected?</u></li> <li>YES &gt;&gt; Check the error system.</li> <li>NO &gt;&gt; Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.</li> </ol>	2.perform	SELF-DIAGNOSIS (4WAS	S FRONT	CONTROL UNIT)			
YES >> Check the error system. NO >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u> .	1. Connect 4	WAS front control unit har					ľ
	YES >> Ch	eck the error system.	unit. Refe	r to STC-179, "Exploded	View".		(
Special Repair Requirement	_					INFOID:000000004257920	

#### BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history).
- **CAUTION:**
- Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.

## **STC-67**

INFOID:000000004257917

INFOID:000000004257918

А

С

В

< DTC/CIRCUIT DIAGNOSIS >

• Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS <u>FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)"</u>.

## C1661 4WAS FRONT LOCK SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

## C1661 4WAS FRONT LOCK SOLENOID VALVE

## Description

- Secure the inside of 4WAS front actuator temporarily. (It operates when performing active test with fail-safe function and CONSULT-III.)
- 4WAS front lock solenoid valve is activated in the active test (lock release). The secured 4WAS front actuator is released.
- 4WAS front control unit controls 4WAS front actuator. 4WAS front actuator releases the lock when the engine speed signal is "ON". 4WAS front actuator applies the lock when the engine speed signal is "OFF".

## **DTC Logic**

INFOID:000000004257922

#### DTC DETECTION LOGIC

DTC	(CONSU	Items LT-III screen term	s)	Diagnostic item is detected when.		Possible cause
C1661	LOCK SC	DLENOID	-	ront lock solenoid valve error is detected.)	ected.	4WAS front control unit or 4WAS front lock solenoid valve error is detected.
DTC CONF	IRMATION	PROCEDU	RE			
<b>1.</b> RECHEC	K DTC					
	ignition swi 4WAS front	tch from OFF control unit se		sis.		
YES >>		diagnosis proc	edure. Re	fer to <u>STC-69, "Diagnosis Pro</u>	ocedure".	
Diagnosis	Procedu	re				INFOID:000000004257923
<b>1.</b> CHECK 4	WAS FROM	IT SOLENOID	VALVE C	IRCUIT		
1. Turn the 2. Disconn	e ignition swi ect 4WAS fr	tch OFF. ont actuator h	arness co			
1. Turn the 2. Disconn	e ignition swi ect 4WAS fr ne resistanc	tch OFF. ont actuator h	arness co	nnector.		
1. Turn the 2. Disconn	e ignition swi ect 4WAS fr ne resistanc	tch OFF. ont actuator h e between 4W	arness co	nnector. Ictuator harness connectors.		
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check the</li> </ol>	e ignition swi ect 4WAS fr ne resistanc 4WAS fro	tch OFF. ont actuator h e between 4W nt actuator	arness co /AS front a	nnector. Ictuator harness connectors.		
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check the</li> <li>Connector</li> <li>M351</li> </ol>	e ignition swi ect 4WAS fr ne resistanc 4WAS fro Terminal 10	tch OFF. ont actuator h e between 4W nt actuator Connector M351	arness col /AS front a Terminal 3	nnector. actuator harness connectors. Resistance (Approx.)	d the grou	ınd.
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check the</li> <li>Connector</li> <li>M351</li> </ol>	e ignition swi ect 4WAS fr ne resistance 4WAS fro 4WAS fro Terminal 10 ne continuity	tch OFF. ont actuator h e between 4W nt actuator Connector M351 v between 4W/	arness col /AS front a Terminal 3	nnector. actuator harness connectors. Resistance (Approx.) $1 - 100 \Omega$	d the grou	ınd.
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check th</li> <li>Connector</li> <li>M351</li> <li>Check th</li> </ol>	e ignition swi ect 4WAS fr ne resistance 4WAS fro 4WAS fro Terminal 10 ne continuity	tch OFF. ont actuator h e between 4W nt actuator Connector M351 v between 4W/ nt actuator	arness col /AS front a Terminal 3	nnector. actuator harness connectors. Resistance (Approx.) $1 - 100 \Omega$	d the grou	ınd.
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check th</li> <li>Connector</li> <li>M351</li> <li>Check th</li> <li>Connector</li> </ol>	e ignition swi ect 4WAS fr ne resistance 4WAS fro 4WAS fro Terminal 10 ne continuity	tch OFF. ont actuator h e between 4W nt actuator Connector M351 v between 4W/	arness col /AS front a Terminal 3	nnector. actuator harness connectors. Resistance (Approx.) $1 - 100 \Omega$ ctuator harness connector an Continuity	d the grou	ınd.
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check th</li> <li>Connector</li> <li>M351</li> <li>Check th</li> </ol>	e ignition swi ect 4WAS fr ne resistance 4WAS fro 4WAS fro Terminal 10 ne continuity	tch OFF. ont actuator h e between 4W nt actuator Connector M351 v between 4W/ nt actuator Terminal	arness col /AS front a Terminal 3	nnector. actuator harness connectors. Resistance (Approx.) $1 - 100 \Omega$ ctuator harness connector an	d the grou	ınd.
<ol> <li>Turn the</li> <li>Disconn</li> <li>Check th</li> <li>Connector</li> <li>M351</li> <li>Check th</li> <li>Connector</li> </ol>	e ignition swi ect 4WAS fro 4WAS fro 4WAS fro Terminal 10 ne continuity 4WAS fro	tch OFF. ont actuator h e between 4W nt actuator Connector M351 v between 4W/ nt actuator Terminal 3 – Ground 10 – Ground	arness col /AS front a Terminal 3	nnector. actuator harness connectors. Resistance (Approx.) $1 - 100 \Omega$ ctuator harness connector an Continuity	d the grou	ınd.
1. Turn the 2. Disconn 3. Check th Connector M351 4. Check th Connector M351 <u>Connector</u> M351 <u>Connector</u> M351 <u>Connector</u> M351 <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u> <u>Connector</u>	e ignition swi ect 4WAS fro 4WAS fro 4WAS fro 10 ne continuity 4WAS fro 20 20 20 20 20 20 20 20 20 20 20 20 20	tch OFF. ont actuator h e between 4W nt actuator Connector M351 v between 4W/ nt actuator Terminal 3 – Ground 10 – Ground ormal?	arness col /AS front a Terminal 3 AS front ac	nnector. actuator harness connectors. Resistance (Approx.) $1 - 100 \Omega$ ctuator harness connector an Continuity	-	

143, "Reference Value".

## **STC-69**

2. Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-

INFOID:000000004257921

А

## C1661 4WAS FRONT LOCK SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

#### Is each data the standard value?

YES >> Check each harness connector pin terminal for disconnection.

NO >> Replace 4WAS front control unit. Refer to <u>STC-179</u>, "Exploded View".

## Component Inspection (4WAS Front Lock Solenoid Valve)

**1.**CHECK 4WAS FRONT SOLENOID VALVE CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front actuator harness connector.

3. Check the resistance between 4WAS front actuator harness connectors.

	Resistance					
Connector	Connector Terminal Connector Terminal					
M351	10	M351	3	1 – 100 Ω		

4. Check the continuity between 4WAS front actuator harness connector and the ground.

	4WAS front actuator	Continuity
Connector	Terminal	Continuity
M351	3 – Ground	Not existed
IVISO I	10 – Ground	NUL EXISIEU

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace 4WAS front actuator. Refer to <u>STC-181, "Removal and Installation"</u>.

Special Repair Requirement

INFOID:000000004257925

#### AFTER REPLACING 4WAS FRONT ACTUATOR

• Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to <u>STC-29</u>, "4WAS <u>FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)"</u>.

BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history).
  - **CAUTION:**
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

INFOID:000000004257924

## C1667 LOCK INSERTION

#### < DTC/CIRCUIT DIAGNOSIS >

## C1667 LOCK INSERTION

## Description

- Wiring connected to 4WAS front actuator is integrated with 4WAS front actuator.
- 4WAS front actuator rotates together with steering wheel.
- 4WAS front actuator mainly consists of five components. [4WAS front lock solenoid valve (lock structure), front wheel steering angle sensor, 4WAS front motor, gear shaft, and spiral cable]
- 4WAS front lock solenoid valve (lock structure) is controlled by the 4WAS front control unit, and locks/ unlocks 4WAS front actuator.
- If a strong force (rotation direction) is applied to 4WAS front actuator, the locking mechanism (holder) absorbs the force and locks 4WAS front actuator.
- Front wheel steering angle sensor detects a turning angle of 4WAS front motor.
- 4WAS front motor controls number of revolutions by a command value from the 4WAS front control unit.
- Gear shaft is an output axis of 4WAS front motor. (Gear shaft = 4WAS front motor revolution + steering angle)
- Spiral cables mean the power line and signal lines of 4WAS front motor.

## DTC Logic

## DTC DETECTION LOGIC

				STC
DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	010
C1667	LOCK INSERTION	4WAS front lock solenoid valve (lock) error is detected. (An error is detected in lock condition.)	The inside 4WAS front actuator error is detected.	Н

## DTC CONFIRMATION PROCEDURE

## 1.RECHECK DTC

#### (P)With CONSULT-III Start the engine. 1. CAUTION: Stop the vehicle. 2. Steer 30° leftward slowly. Steer 30° rightward. Return the steering wheel to the straight-ahead position. 3. Turn the ignition switch OFF. 4. Turn the ignition switch ON. 5. Perform 4WAS front control unit self-diagnosis. Is DTC "C1667" detected? YES >> Proceed to diagnosis procedure. Refer to STC-71, "Diagnosis Procedure". >> INSPECTION END NO Diagnosis Procedure CHECK 4WAS FRONT LOCK SOLENOID VALVE (LOCK STRUCTURE) With CONSULT-III Start the engine. **CAUTION:** Stop the vehicle. 2. Steer 30° leftward slowly. Steer 30° rightward. Return the steering wheel to the straight-ahead position. 3. Turn the ignition switch OFF. 4. Turn the ignition switch ON. 5. Perform 4WAS front control unit self-diagnosis. Is DTC "C1667" detected? YES >> Replace 4WAS front actuator. Refer to STC-181, "Removal and Installation". NO >> GO TO 2. 2. CHECK INFORMATION (P)With CONSULT-III

INFOID:000000004257926

INFOID:000000004257927

В

D

Κ

L

Ν

M INFOID:000000004257928

## **C1667 LOCK INSERTION**

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-143, "Reference Value"</u>.
- 2. Perform 4WAS front control unit self-diagnosis.

Is each data the standard value?

- YES >> GO TO 1.
- NO >> Replace 4WAS front control unit. Refer to <u>STC-179</u>, "Exploded View".

Special Repair Requirement

INFOID:000000004257929

AFTER REPLACING 4WAS FRONT ACTUATOR

• Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)".

### C1668 LOCK HOLDER GAP DETECT

#### < DTC/CIRCUIT DIAGNOSIS >

## C1668 LOCK HOLDER GAP DETECT

### Description

- Wiring connected to 4WAS front actuator is integrated with 4WAS front actuator.
- 4WAS front actuator rotates together with steering wheel.
- 4WAS front actuator mainly consists of five components. [4WAS front lock solenoid valve (lock structure), front wheel steering angle sensor, 4WAS front motor, gear shaft, and spiral cable]
- 4WAS front lock solenoid valve (lock structure) is controlled by the 4WAS front control unit, and locks/ unlocks 4WAS front actuator.
- If a strong force (rotation direction) is applied to 4WAS front actuator, the locking mechanism (holder) absorbs the force and locks 4WAS front actuator.
- Front wheel steering angle sensor detects a turning angle of 4WAS front motor.
- 4WAS front motor controls number of revolutions by a command value from the 4WAS front control unit.
- Gear shaft is an output axis of 4WAS front motor. (Gear shaft = 4WAS front motor revolution + steering angle)
- Spiral cables mean the power line and signal lines of 4WAS front motor.

### DTC Logic

### DTC DETECTION LOGIC

				ST
DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	
C1668	LOCK HLD GAP DETCT	4WAS front lock solenoid valve (lock) error is detected. (Excessive force is applied to the lock.)	The inside 4WAS front actuator error is detected.	Н

#### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

I RECHECK DIC	
<ul> <li>With CONSULT-III</li> <li>1. Turn the ignition switch from OFF to ON.</li> <li>2. Perform 4WAS front control unit self-diagnosis.</li> <li>Is DTC "C1668" detected?</li> </ul>	J
YES >> Proceed to diagnosis procedure. Refer to <u>STC-73, "Diagnosis Procedure"</u> . NO >> INSPECTION END	Κ
Diagnosis Procedure	
1.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)	L
<ul> <li>With CONSULT-III</li> <li>Start the engine.</li> <li>CAUTION:</li> <li>Stop the vehicle.</li> </ul>	Μ
<ol> <li>Perform 4WAS front control unit self-diagnosis. Check that DTC "C1668" is detected. CAUTION:</li> </ol>	Ν
<ul> <li>Replace 4WAS front actuator when the diagnosis history remains.</li> <li>Never repair the malfunctioning part in 4WAS front actuator adjustment without replacing 4WAS front actuator.</li> </ul>	0
>> Replace 4WAS front actuator.	Р
Special Repair Requirement	
AFTER REPLACING 4WAS FRONT ACTUATOR	

#### AFTER REPLACING 4WAS FRONT ACTUATOR

• Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to <u>STC-29</u>, "4WAS <u>FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)"</u>.

INFOID:000000004257930

INFOID:000000004257931

В

D

Е

### **C1669 INCOMPLETE LOCK RELEASE**

### < DTC/CIRCUIT DIAGNOSIS >

## C1669 INCOMPLETE LOCK RELEASE

### Description

- Wiring connected to 4WAS front actuator is integrated with 4WAS front actuator.
- 4WAS front actuator rotates together with steering wheel.
- 4WAS front actuator mainly consists of five components. [4WAS front lock solenoid valve (lock structure), front wheel steering angle sensor, 4WAS front motor, gear shaft, and spiral cable]
- 4WAS front lock solenoid valve (lock structure) is controlled by the 4WAS front control unit, and locks/ unlocks 4WAS front actuator.
- If a strong force (rotation direction) is applied to 4WAS front actuator, the locking mechanism (holder) absorbs the force and locks 4WAS front actuator.
- Front wheel steering angle sensor detects a turning angle of 4WAS front motor.
- 4WAS front motor controls number of revolutions by a command value from the 4WAS front control unit.
- Gear shaft is an output axis of 4WAS front motor. (Gear shaft = 4WAS front motor revolution + steering angle)
- Spiral cables mean the power line and signal lines of 4WAS front motor.

### DTC Logic

#### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1669	INCOMP LOCK RELEAS	4WAS front actuator error is detected. (An error is detected in unlock condition.)	The power steering oil pressure or the inside 4WAS front actuator error is detected.

#### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

#### With CONSULT-III

- 1. Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1669" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-74, "Diagnosis Procedure".
- NO >> INSPECTION END

### Diagnosis Procedure

### **1.**CHECK INFORMATION

• Check that any item below is applicable.

- The steering force is heavy when 4WAS warning lamp is ON.

- The power steering system error is detected (oil leakage, belt tension, steering force etc.).

#### Is the item applicable?

- YES >> Perform the symptom diagnosis for the steering system. Refer to <u>ST-3, "NVH Troubleshooting</u> <u>Chart"</u>.
- NO >> Replace 4WAS front actuator. Refer to <u>STC-181, "Removal and Installation"</u>.

#### Special Repair Requirement

#### AFTER REPLACING 4WAS FRONT ACTUATOR

• Perform 4WAS front actuator adjustment after replacing 4WAS front actuator. Refer to <u>STC-29. "4WAS</u> FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)".

INFOID:000000004257935

INFOID:000000004257937

INFOID:000000004257936

## C1671 ACTUATOR ADJUSTMENT NOT PERFORMED

### < DTC/CIRCUIT DIAGNOSIS >

## C1671 ACTUATOR ADJUSTMENT NOT PERFORMED

### Description

• Memorize the neutral position of 4WAS front actuator in 4WAS front control unit.

### **DTC Logic**

INFOID:000000004257939

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1671	ACT ADJ NOT PRFRM	4WAS front actuator adjustment is not performed.	4WAS front actuator ad- justment is not per- formed.
DTC CONFIR	MATION PROCEDURE		
1.RECHECK	DTC		
	nition switch from OFF to VAS front control unit self-		
<u>Is DTC "C1671</u>			
YES >> Pro	ceed to diagnosis proced	ure. Refer to STC-75, "Diagnosis Procedure	<u>."</u> .
-	SPECTION END		
Diagnosis P	rocedure		INFOID:000000004257940
1.PERFORM	SELF-DIAGNOSIS (4WAS	S FRONT CONTROL UNIT)	
		· · ·	
Perform 4WAS	front control unit self-diag		
	er than "C1671" detected?	2	
	eck the error system. ) TO 2.		
•	NT ACTUATOR ADJUST	/IENT	
1. Perform 4	WAS front actuator adjust	stment. Refer to STC-29, "4WAS FRONT	ACTUATOR NEUTRAL
	<u>ADJUSTMENT : Special</u> VAS front control unit self-	<u>Repair Requirement (Pattern 2)"</u> . diagnosis	
	er than "C1671" detected?	0	
•	eck the error system.	-	
•	) TO 3.		
<b>J.</b> PERFORM	SELF-DIAGNOSIS (4WAS	S FRONT CONTROL UNIT)	
With CONSU		nacia	
Is DTC "C1671	front control unit self-diag " detected?	nosis.	
		unit. Refer to STC-179, "Exploded View".	
	SPECTION END		
Special Rep	air Requirement		INFOID:00000000425794
	PLACING 4WAS FRON elf-diagnosis results (histo		
CAUTION:		·y)-	

Revision: 2009 October

after diagnosis.

• Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit

[WITH 4WAS]

INFOID:000000004257938

А

В

С

## C1671 ACTUATOR ADJUSTMENT NOT PERFORMED

< DTC/CIRCUIT DIAGNOSIS >

• Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS <u>FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)"</u>.

#### Memorize the neutral position of 4WAS front actuator in 4WAS front control unit. В DTC Logic INFOID:000000004257943 DTC DETECTION LOGIC Items DTC Possible cause Diagnostic item is detected when... (CONSULT-III screen terms) D 4WAS front actuator ad-C1672 INCOMP ACTUATR ADJ 4WAS front actuator adjustment is incomplete. iustment is incomplete. Е DTC CONFIRMATION PROCEDURE 1.RECHECK DTC F (P)With CONSULT-III Turn the ignition switch from OFF to ON. 1. Perform 4WAS front control unit self-diagnosis. 2. STC Is DTC "C1672" detected? YES >> Proceed to diagnosis procedure. Refer to <u>STC-77, "Diagnosis Procedure"</u>. >> INSPECTION END NO Н Diagnosis Procedure INFOID:00000000425794 1.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT) (P)With CONSULT-III Perform 4WAS front control unit self-diagnosis. Is any DTC other than "C1672" detected? YES >> Check the error system. NO >> GO TO 2. 2.ADJUST 4WAS FRONT ACTUATOR Κ (B)With CONSULT-III Perform 4WAS front actuator adjustment. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 2)". 2. Perform 4WAS front control unit self-diagnosis. Is any error system detected? Μ Replace 4WAS front control unit. Refer to STC-179, "Exploded View". YES >> Perform 4WAS actuator adjustment after replacing 4WAS front control unit. Perform the 4WAS front control unit self-diagnosis again. Replace 4WAS front actuator if DTC "C1672" is detected. Refer to STC-181, "Removal and Installation". Ν NO >> INSPECTION END Special Repair Requirement INFOID:000000004257945 BEFORE REPLACING 4WAS FRONT CONTROL UNIT Record the self-diagnosis results (history). CAUTION: Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis. • Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR". AFTER REPLACING 4WAS FRONT CONTROL UNIT

### C1672 INCOMPLETE ACTUATOR ADJUSTMENT

C1672 INCOMPLETE ACTUATOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

Description

 Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to STC-29, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

### [WITH 4WAS]

INFOID:000000004257942

А

#### < DTC/CIRCUIT DIAGNOSIS >

# C1684, C1685 4WAS MAIN CONTROL UNIT COMMUNICATION

### Description

INFOID:000000004257946

[WITH 4WAS]

- 4WAS front control unit and 4WAS main control unit transmit/receive information to/from each other for optimum control of the 4WAS system with the specified 4WAS system line (4WAS communication line) between 4WAS front control unit and 4WAS main control unit.
- Be careful to repair wirings because 4WAS system specified line adopts twisted-pair wires. Refer to <u>STC-</u> <u>178, "Precautions for Harness Repair"</u>.

### DTC Logic

INFOID:000000004257947

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1684	4WAS MAIN ECU COMM	4WAS communication line* data communication error is detected. (An error signal is detected from 4WAS main control unit.)	4WAS communication line*/4WAS main control unit/4WAS front control unit error
C1685	4WAS MAIN ECU COMM	4WAS communication line* data communication error is detected. (An error signal is detected from 4WAS main control unit.)	4WAS communication line*/4WAS main control unit/4WAS front control unit error

\*: Communication line between 4WAS front control unit and 4WAS main control unit

### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

#### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS front control unit self-diagnosis.

Is DTC "C1684" or "C1685" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-78, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

INFOID:000000004257948

## **1.**CHECK COMMUNICATION LINE (1)

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect yaw rate/side G sensor harness connector.
- 4. Disconnect 4WAS front control unit harness connector.
- 5. Disconnect 4WAS main control unit harness connector.
- 6. Check the continuity between ABS actuator and electric unit (control unit) harness connector and yaw rate/side G sensor harness connector.

ABS actuator and electric unit (control unit)		Yaw rate/side G sensor.		Continuity
Connector	Terminal	Connector	Terminal	
F41	25	M1/3	2	Existed
L41	45	M143	3	LAISIEU

### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.
- **2.**CHECK COMMUNICATION LINE (2)

#### < DTC/CIRCUIT DIAGNOSIS >

Check the continuity between ABS actuator and electric unit (control unit) harness connector and the ground.

ABS a	Continuity	
Connector	Terminal	Continuity
F41	25 – Ground	Not existed
L41	45 – Ground	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair</u>".

### **3.**CHECK COMMUNICATION LINE (3)

Check the continuity between ABS actuator and electric unit (control unit) harness connector.

ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Continuity
E41	25 – 45	Not existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness Repair".

### **4.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check the continuity between ABS actuator and electric unit (control unit) connector. Refer to <u>STC-85, "Component Inspection [ABS Actuator and Electric Unit (Control Unit)]"</u>.

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-102, "Exploded View"</u>.

5.CHECK YAW RATE/SIDE G SENSOR

Check the continuity between yaw rate/side G sensor connector. Refer to <u>BRC-62, "Component Inspection"</u>. Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace yaw rate/side G sensor. Refer to <u>BRC-104, "Exploded View"</u>.

6.CHECK CAN DIAGNOSIS SUPPORT MONITOR (4WAS FRONT CONTROL UNIT)

#### With CONSULT-III

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect yaw rate/side G sensor harness connector.
- 3. Connect 4WAS front control unit harness connector.
- 4. Connect 4WAS main control unit harness connector.
- Start the engine.
   CAUTION:

### Stop the vehicle.

- 6. Perform CAN diagnosis support monitor of 4WAS front control unit.
- 7. Replace 4WAS main control unit error history. Refer to <u>STC-40, "CONSULT-III Function</u> [4WAS(FRONT)]".

#### What is the indicated item?

All items are "OK">>GO TO 7. "TRANSMIT DIAG" is other than "OK">>GO TO 7.

\_4WAS(MAIN)" is other than "OK">>GO TO 8.

### 7.CHECK 4WAS FRONT CONTROL UNIT CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front control unit harness connector.
- 3. Disconnect ABS actuator and electric unit (control unit) harness connector.

### **STC-79**

[WITH 4WAS]

А

В

D

Е

F

STC

Н

Κ

L

M

Ν

C

Ρ

### < DTC/CIRCUIT DIAGNOSIS >

4. Check the continuity between 4WAS front control unit harness connector and ABS actuator and electric unit (control unit) harness connector.

4WAS front control unit			or and electric ntrol unit)	Continuity
Connector	Terminal	Connector	Terminal	
M42	14	F41	25	Existed
10142	25	C41	45	Existed

5. Check that 4WAS front control unit connector No. 14 terminal and No. 25 are connected properly and not deformed.

Is the inspection result normal?

- YES >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.

**8.**CHECK 4WAS MAIN CONTROL UNIT CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS main control unit harness connector.
- 3. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 4. Check the continuity between 4WAS main control unit harness connector and ABS actuator and electric unit (control unit) harness connector.

4WAS main control unit		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
B54	31	F41	45	Existed
D04	32	E41	25	Existed

5. Check that 4WAS main control unit connector No. 31 terminal and No. 32 are connected properly and not deformed.

Is the inspection result normal?

- YES >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.

Component Inspection [ABS Actuator and Electric Unit (Control Unit)]

INFOID:000000004257949

[WITH 4WAS]

## **1.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

- 1. Turn the ignition switch OFF.
- 2. Remove ABS actuator and electric unit (control unit). Refer to BRC-102, "Exploded View".
- 3. Check the resistance between ABS actuator and electric unit (control unit) connector terminals.

ABS actuate	or and electric unit (control unit)	Resistance (Approx.)
Connector	Terminal	
E41	25 – 45	120 Ω

#### Is the inspection result normal?

#### YES >> INSPECTION END

NO >> Replace ABS actuator and electric unit (control unit).

### Component Inspection (Yaw Rate/Side G Sensor)

## 1.CHECK YAW RATE/SIDE G SENSOR

- 1. Turn the ignition switch OFF.
- Remove yaw rate/side G sensor. Refer to <u>BRC-104, "Exploded View"</u>.
- 3. Check the resistance between yaw rate/side G sensor connector terminals.

### **STC-80**

#### 2009 G37 Coupe

INFOID:000000004257950

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

Connector	/side G sensor		
1	Terminal	Resistance (Approx.)	
M143	2 – 3	120 Ω	
	ECTION END		
NO >> Repla	ce yaw rate/side G	sensor.	
Special Repair	r Requirement		INFOID:000000004257951
Record the self-	diagnosis results (I	ONT CONTROL UNIT nistory). ory) of self-diagnosis results when repl	acing 4WAS front control unit
	mory of the self-	diagnosis results (record) after printin	g out or recording all the val-
ues of "DATA	MONITOR". ACING 4WAS MA		
Record the self-	diagnosis results (I <b>he memory (histo</b>		sacing 4WAS main control unit
	mory of the self-	diagnosis results (record) after printin	g out or recording all the val-
Perform 4WAS	front actuator adju	NT CONTROL UNIT stment after replacing 4WAS front contro DSITION ADJUSTMENT : Special Repair	

#### < DTC/CIRCUIT DIAGNOSIS >

## C1686 4WAS MAIN CONTROL UNIT

### Description

• It transmits the value calculated by 4WAS main control unit to 4WAS front control unit with 4WAS communication line (line for 4WAS system). 4WAS front control unit controls 4WAS front actuator according to the received command value.

## DTC Logic

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1686	4WAS MAIN ECU	An error is detected on 4WAS main control unit side. (4WAS main control unit fail-safe mode)	4WAS main control unit fail-safe mode

### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

#### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS front control unit self-diagnosis.

#### Is DTC "C1686" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-82, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

#### Diagnosis Procedure

## **1.**PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)

### With CONSULT-III

Perform 4WAS front control unit self-diagnosis.

Is any DTC other than "C1686" detected?

YES >> Check the error system.

NO >> Perform 4WAS main control unit self-diagnosis.

INFOID:000000004257953

INFOID:000000004257954

### < DTC/CIRCUIT DIAGNOSIS >

## U1000, U1002 4WAS COMMUNICATION CIRCUIT

### Description

- 4WAS front control unit and 4WAS main control unit transmit/receive information to/from each other for optimum control of the 4WAS system with the specified 4WAS system line (4WAS communication line) between 4WAS front control unit and 4WAS main control unit.
- Be careful to repair wirings because 4WAS system specified line adopts twisted-pair wires. Refer to <u>STC-178</u>, "Precautions for Harness Repair".

### DTC Logic

INFOID:000000004257956

D

Н

Ρ

А

В

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	
U1000	CAN COMM CIRCUIT	When 4WAS front control unit is not transmitting or re- ceiving 4WAS communication signal for 2 seconds or more.	4WAS communication line*/4WAS main control unit/4WAS front control unit error	
U1002	SYSTEM COMM(CAN)	When 4WAS front control unit is not transmitting or re- ceiving 4WAS communication signal for 2 seconds or less.	4WAS communication line*/4WAS main control unit/4WAS front control unit error	S

\*: Communication line between 4WAS front control unit and 4WAS main control unit

### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

#### (P)With CONSULT-III Turn the ignition switch from OFF to ON. 1. Perform 4WAS front control unit self-diagnosis. 2. Is DTC "U1000" or "U1002" detected? YES >> Proceed to diagnosis procedure. Refer to STC-83, "Diagnosis Procedure". >> INSPECTION END NO Κ Diagnosis Procedure INFOID:000000004257957 **1.**CHECK COMMUNICATION LINE (1) L 1. Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector. 2. Μ 3. Disconnect yaw rate/side G sensor harness connector. Disconnect 4WAS front control unit harness connector. 5. Disconnect 4WAS main control unit harness connector.

 Check the continuity between ABS actuator and electric unit (control unit) harness connector and yaw rate/side G sensor harness connector.

ABS actuator and electric unit (control unit)		Yaw rate/side G sensor.		Continuity
Connector	Terminal	Connector	Terminal	
F41	25	M143	2	Existed
L+1	45	101145	3	LXISIEU

### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.
- **2.**CHECK COMMUNICATION LINE (2)

INFOID:000000004257955

#### < DTC/CIRCUIT DIAGNOSIS >

Check the continuity between ABS actuator and electric unit (control unit) harness connector and the ground.

ABS a	Continuity		
Connector	nector Terminal		
F41	25 – Ground	Not existed	
L41	45 – Ground		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.

### **3.**CHECK COMMUNICATION LINE (3)

Check the continuity between ABS actuator and electric unit (control unit) harness connector.

ABS a	Continuity			
Connector	Connector Terminal			
E41	25 – 45	Not existed		

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178. "Precautions for Harness</u> <u>Repair"</u>.

### **4.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check the continuity between ABS actuator and electric unit (control unit). Refer to <u>STC-85, "Component</u> Inspection [ABS Actuator and Electric Unit (Control Unit)]".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-102, "Exploded View"</u>.

**5.**CHECK YAW RATE/SIDE G SENSOR

Check the continuity between yaw rate/side G sensor. Refer to <u>STC-85, "Component Inspection (Yaw Rate/</u> <u>Side G Sensor)"</u>.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace yaw rate/side G sensor. Refer to <u>BRC-104</u>, "Exploded View".

 $\mathbf{6}$ . CHECK CAN DIAGNOSIS SUPPORT MONITOR (4WAS FRONT CONTROL UNIT)

#### With CONSULT-III

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect yaw rate/side G sensor harness connector.
- 3. Connect 4WAS front control unit harness connector.
- 4. Connect 4WAS main control unit harness connector.
- 5. Start the engine. CAUTION:

#### Stop the vehicle.

- 6. Perform CAN diagnosis support monitor of 4WAS front control unit.
- 7. Replace 4WAS main control unit error history. Refer to <u>STC-40, "CONSULT-III Function</u> [4WAS(FRONT)]".

What is the indicated item?

All items are "OK">>GO TO 7.

"TRANSMIT DIAG" is other than "OK">>GO TO 7.

"4WAS(MAIN)" is other than "OK">>GO TO 8.

### 7. CHECK 4WAS FRONT CONTROL UNIT CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front control unit harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

3. Disconnect ABS actuator and electric unit (control unit) harness connector.

 Check the continuity between 4WAS front control unit harness connector and ABS actuator and electric A unit (control unit) harness connector.

4WAS front control unit		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M42	14	F41	25	Existed
10142	25	L41	45	LXISIEU

Check that 4WAS front control unit connector No. 14 terminal and No. 25 are connected properly and not deformed.

Is the inspection result normal?

- YES >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness"

## 8.CHECK 4WAS MAIN CONTROL UNIT CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS main control unit harness connector.
- 3. Disconnect ABS actuator and electric unit (control unit) harness connector.
- Disconnect ABS actuator and electric unit (control unit) namess connector.
   Check the continuity between 4WAS main control unit harness connector and ABS actuator and electric unit (control unit) harness connector.

4WAS mair	4WAS main control unit ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal	Connector	Terminal	
B54	31	F41	45	Existed
D34	32	⊑41	25	EXISIED

5. Check that 4WAS main control unit connector No. 31 terminal and No. 32 are connected properly and not deformed.

Is the inspection result normal?

YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>. K NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178, "Precautions for Harness</u> <u>Repair"</u>.

Component Inspection [ABS Actuator and Electric Unit (Control Unit)]

## 1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

1. Turn the ignition switch OFF.

Remove ABS actuator and electric unit (control unit). Refer to <u>BRC-102, "Exploded View"</u>.

3. Check the resistance between ABS actuator and electric unit (control unit) connector terminals.

ABS actuat	or and electric unit (control unit)	Resistance (Approx.)	
Connector	Terminal	Resistance (Approx.)	
E41	25 – 45	120 Ω	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ABS actuator and electric unit (control unit).

### Component Inspection (Yaw Rate/Side G Sensor)

### **1.**CHECK YAW RATE/SIDE G SENSOR

1. Turn the ignition switch OFF.

Remove yaw rate/side G sensor. Refer to <u>BRC-104, "Exploded View"</u>.

INFOID:000000004257959

[WITH 4WAS]

В

F

Н

L

M

Ν

Ρ

INEOID:000000004257958

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

#### 3. Check the resistance between yaw rate/side G sensor connector terminals.

Ya	aw rate/side G sensor	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
M143	2 – 3	120 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace yaw rate/side G sensor.

Special Repair Requirement

INFOID:000000004257960

#### BEFORE REPLACING 4WAS FRONT CONTROL UNIT

- Record the self-diagnosis results (history).
  - **CAUTION:**
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

AFTER REPLACING 4WAS FRONT CONTROL UNIT

• Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

### < DTC/CIRCUIT DIAGNOSIS >

## U1010 4WAS COMMUNICATION CIRCUIT

### Description

- 4WAS front control unit and 4WAS main control unit transmit/receive information to/from each other for optimum control of the 4WAS system with the specified 4WAS system line (4WAS communication line) between 4WAS front control unit and 4WAS main control unit.
- Be careful to repair wirings because 4WAS system specified line adopts twisted-pair wires. Refer to <u>STC-178</u>, "Precautions for Harness Repair".

### DTC Logic

### DTC DETECTION LOGIC

#### Items Ε DTC Diagnostic item is detected when... Possible cause (CONSULT-III screen terms) 4WAS communication When detecting error during the initial diagnosis of line\*/4WAS main control U1010 CONTROL UNIT(CAN) F 4WAS controller of 4WAS front control unit unit/4WAS front control unit error \*: Communication line between 4WAS front control unit and 4WAS main control unit STC DTC CONFIRMATION PROCEDURE **1.**RECHECK DTC Н With CONSULT-III 1 Turn the ignition switch from OFF to ON. 2. Perform 4WAS front control unit self-diagnosis. Is DTC "U1010" detected? YES >> Proceed to diagnosis procedure. Refer to STC-87, "Diagnosis Procedure". >> INSPECTION END NO **Diagnosis** Procedure INFOID:000000004257963 1.4WAS FRONT CONTROL UNIT Κ Check that there is no malfunction in 4WAS front control unit harness connector or disconnection. Is the inspection result normal? YES >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View". NO >> Repair or replace the harnesses and connectors. Refer to STC-178. "Precautions for Harness Repair". Special Repair Requirement M INFOID:000000004257964 **BEFORE REPLACING 4WAS FRONT CONTROL UNIT** Ν Record the self-diagnosis results (history). **CAUTION:** Never erase the memory (history) of self-diagnosis results when replacing 4WAS front control unit after diagnosis. • Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR". AFTER REPLACING 4WAS FRONT CONTROL UNIT Ρ Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29, "4WAS</u> FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

INFOID:000000004257961

INFOID:00000004257962

C

А

В

D

### C1900, C1901, C1906, C1907, C1927, C1933 4WAS MAIN CONTROL UNIT < DTC/CIRCUIT DIAGNOSIS > [WITH 4WAS]

## C1900, C1901, C1906, C1907, C1927, C1933 4WAS MAIN CONTROL UNIT

### Description

INFOID:000000004257965

- 4WAS rear actuator and the power steering solenoid valve is controlled by each sensor signal.
- The fail-safe functions stops the rear wheel angle function (the front wheel is the steering wheel cutting angle) when the electric components and the mechanical components are malfunctioning.
- The protective function stops 4WAS system temporarily when the input signal is not inputted to 4WAS main control unit (When battery-power dose not work temporarily).
- 4WAS front control unit and 4WAS main control unit perform two-way transmitting/receiving signals for optimal control of 4WAS system via 4WAS communication line.

### DTC Logic

INFOID:000000004257966

#### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1900	CONTROL UNIT [ABNORMAL1]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
C1901	CONTROL UNIT [ABNORMAL2]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
C1906	CONTROL UNIT [ABNORMAL5]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
C1907	CONTROL UNIT [ABNORMAL4]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
C1927	CONTROL UNIT [ABNORMAL5]	An error is detected inside 4WAS main control unit.	4WAS main control unit error
C1933	CONTROL UNIT	An error is detected inside 4WAS main control unit.	4WAS main control unit error

#### DTC CONFIRMATION PROCEDURE

## **1.**RECHECK DTC

#### With CONSULT-III

- 1. Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS main control unit self-diagnosis.

Is DTC "C1900", "C1901", "C1906", "C1907", "C1927" or "C1933" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-88, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

### **Diagnosis Procedure**

INFOID:000000004257967

**1.**PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

Is any DTC "C1900", "C1901", "C1906", "C1907", "C1927" or "C1933" detected?

YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

NO >> GO TO 2.

#### 2. CHECK INFORMATION

#### BWith CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157.</u> <u>"Reference Value"</u>.

Is each data the standard value?

YES >> Check each harness connector pin terminal for disconnection.

### **STC-88**

## C1900, C1901, C1906, C1907, C1927, C1933 4WAS MAIN CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

 NO
 >> Replace 4WAS main control unit. Refer to STC-180. "Exploded View".
 A

 Special Repair Requirement
 NFOID:0000004257968
 A

 BEFORE REPLACING 4WAS MAIN CONTROL UNIT
 B

 • Record the self-diagnosis results (history).
 B

 CAUTION:
 • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
 C

 • Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".
 D

STC

Н

J

Κ

L

Μ

Ν

0

Ρ

Ε

F

[WITH 4WAS]

### C1902, C1903, C1904, C1910, C1913 4WAS REAR MOTOR OUTPUT < DTC/CIRCUIT DIAGNOSIS > [WITH 4WAS]

## C1902, C1903, C1904, C1910, C1913 4WAS REAR MOTOR OUTPUT

### Description

INFOID:000000004257969

- 4WAS rear motor activates 4WAS rear actuator.
- Maintain the toe-stiffness of rear wheels against the road external force because the irreversible sufficiency performance hypoid gear is used.

### DTC Logic

INFOID:000000004257970

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1902	MOTOR OUTPUT [REV CURRENT]	4WAS rear motor current error is detected. (4WAS rear motor current output direction differs.)	4WAS rear motor error
C1903	MOTOR OUTPUT [NO CURRENT]	4WAS rear motor current error is detected. (Current is input to 4WAS main control unit if 4WAS main control unit output is "OFF".)	4WAS rear motor error
C1904	MOTOR OUTPUT [OVERCURRENT]	4WAS rear motor current error is detected. (4WAS rear motor output is overcurrent.)	4WAS rear motor error
C1910	MOTOR OUTPUT [MOTOR LOCK]	4WAS rear motor inside error is detected. (4WAS rear motor does not move or the rear wheel an- gle sensor does not change if 4WAS main control unit output is 14A or more.)	4WAS rear motor error
C1913	MOTOR OUTPUT [ABNORML SIG]	4WAS rear motor current error is detected. (4WAS rear motor does not move or the rear wheel an- gle sensor output does not change when 4WAS main control unit output is 18A or more, and 4WAS main mo- tor output is low.)	4WAS rear motor error

### DTC CONFIRMATION PROCEDURE

## **1.**RECHECK DTC

#### BWith CONSULT-III

 Perform "SELF DIAGNOSTIC MODE" item on "ACTIVE TEST" of 4WAS main control unit. CAUTION:

#### Perform the active test while stopping the vehicle.

2. Perform 4WAS main control unit self-diagnosis.

Is DTC "C1902", "C1903", "C1904", "C1910" or "C1913" detected?

- YES >> Proceed to diagnosis procedure. Refer to STC-90. "Diagnosis Procedure".
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000004257971

## **1.**CHECK 4WAS REAR MOTOR CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS main control unit harness connector.
- 3. Disconnect 4WAS rear motor harness connector.
- 4. Check the continuity between 4WAS main control unit harness connector and 4WAS rear motor harness connector.

4WAS main control unit		4WAS rear motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
B54	38	B36	1	Existed
D04	39	630	2	Existed

<u>Is the inspection re</u> YES >> GO TO	DIAGNOSIS >		
	r or replace the harnesses and	connectors.	
2.CHECK 4WAS	REAR MOTOR		
Check the continu	ty between 4WAS rear motor of	connector terminals.	
	WAS rear motor		
Connector	Terminal	Continuity	
B36	1-2	Existed	
Is the inspection re		Existed	
YES >> GO T			
	ace 4WAS rear actuator. Refer	to STC-182, "Exploded View"	<u>_</u>
<b>3.</b> PERFORM AC	TIVE TEST (4WAS MAIN CON	ITROL UNIT)	
		,	
With CONSULT Connect 4WA	-III S main control unit harness co	nnector.	
2. Connect 4WA	S rear motor harness connecto	or.	
	F DIAGNOSTIC MODE" item of	n "ACTIVE TEST" of 4WAS r	nain control unit.
CAUTION: Perform the a	active test while vehicle is st	opped.	
4. Check "MOTO	OR VOLTAGE", "MOTOR CUF	RENT" and "MTR CRNT OF	PE" while performing the active
test.			
Monitor item	Condition	Display value	
MOTOR VOLTAGE	Ignition switch: ON	Battery voltage	
MOTOR CURRENT	4WAS rear motor running	0 – 20 A	
MTR CRNT OPE	4WAS rear actuator neutral conditio and vehicle straight-ahead position	n Approx. –2 – 2 A	
	4WAS rear motor running	Approx. –20 – 20 A	
Is "MONITOR" the	standard value?		
YES >> GO TO	<b>)</b> 4.		
NO >> Repla	ace 4WAS rear actuator. Refer		<u>_</u>
4	LF-DIAGNOSIS (4WAS MAIN	CONTROL UNIT)	
4.PERFORM SE			
	-111		
	<b>-III</b> iin control unit self-diagnosis.		
With CONSULT     Perform 4WAS ma     Is any DTC "C190	ain control unit self-diagnosis. 2", "C1903", "C1904", "C1910"		
With CONSULT Perform 4WAS ma     Is any DTC "C190     YES >> Repla	in control unit self-diagnosis. <u>2", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re		ew".
With CONSULT Perform 4WAS ma <u>Is any DTC "C190</u> YES >> Repla NO >> GO TO	in control unit self-diagnosis. 2 <u>", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5.		<u>ew"</u> .
With CONSULT Perform 4WAS ma     Is any DTC "C190     YES >> Repla	in control unit self-diagnosis. 2 <u>", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5.		<u>ew"</u> .
With CONSULT Perform 4WAS ma Is any DTC "C190 YES >> Repla NO >> GO TO 5.CHECK INFOR With CONSULT	ain control unit self-diagnosis. 2 <u>", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5. MATION <b>-III</b>	fer to <u>STC-180, "Exploded Vi</u>	
With CONSULT         Perform 4WAS mains         Is any DTC "C190         YES       >> Repla         NO       >> GO TO         5.CHECK INFOR         With CONSULT         Check the "DATA	ain control unit self-diagnosis. <u>2", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5. MATION -III MONITOR" value of each DTC	fer to <u>STC-180, "Exploded Vi</u>	<u>ew"</u> . osis function. Refer to <u>STC-157,</u>
With CONSULT Perform 4WAS ma Is any DTC "C190 YES >> Repla NO >> GO TO 5.CHECK INFOR With CONSULT Check the "DATA "Reference Value"	ain control unit self-diagnosis. <u>2", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5. MATION <b>-III</b> MONITOR" value of each DTC	fer to <u>STC-180, "Exploded Vi</u>	
With CONSULT Perform 4WAS mains Is any DTC "C190 YES >> Repla NO >> GO TO 5.CHECK INFOR With CONSULT Check the "DATA "Reference Value" Is each data the st	ain control unit self-diagnosis. <u>2", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5. MATION <b>-III</b> MONITOR" value of each DTC andard value?	fer to <u>STC-180, "Exploded Vi</u> detected with the self-diagno	
With CONSULT Perform 4WAS matched to the second state of the sec	ain control unit self-diagnosis. <u>2", "C1903", "C1904", "C1910"</u> ce 4WAS main control unit. Re D 5. MATION <b>-III</b> MONITOR" value of each DTC <u>andard value?</u> aceach harness connector pin to	fer to <u>STC-180, "Exploded Vi</u> detected with the self-diagno	osis function. Refer to <u>STC-157,</u>
With CONSULT Perform 4WAS matched to the second state of the sec	ain control unit self-diagnosis. 2", "C1903", "C1904", "C1910" ce 4WAS main control unit. Re D 5. MATION -III MONITOR" value of each DTC andard value? a each harness connector pin to ce 4WAS main control unit. Re	fer to <u>STC-180, "Exploded Vi</u> detected with the self-diagno erminal for disconnection. fer to <u>STC-180, "Exploded Vi</u>	osis function. Refer to <u>STC-157,</u> <u>ew"</u> .
With CONSULT Perform 4WAS ma Is any DTC "C190 YES >> Repla NO >> GO TO 5.CHECK INFOR With CONSULT Check the "DATA I "Reference Value" Is each data the st YES >> Check NO >> Repla Component International	ain control unit self-diagnosis. 2", "C1903", "C1904", "C1910" ce 4WAS main control unit. Re 5. MATION -III MONITOR" value of each DTC andard value? aceach harness connector pin to ce 4WAS main control unit. Re spection (4WAS Rear N	fer to <u>STC-180, "Exploded Vi</u> detected with the self-diagno erminal for disconnection. fer to <u>STC-180, "Exploded Vi</u>	osis function. Refer to <u>STC-157,</u>
With CONSULT Perform 4WAS matched to the second state of the sec	ain control unit self-diagnosis. 2", "C1903", "C1904", "C1910" ce 4WAS main control unit. Re 5. MATION -III MONITOR" value of each DTC andard value? aceach harness connector pin to ce 4WAS main control unit. Re spection (4WAS Rear N	fer to <u>STC-180, "Exploded Vi</u> detected with the self-diagno erminal for disconnection. fer to <u>STC-180, "Exploded Vi</u>	osis function. Refer to <u>STC-157,</u> <u>ew"</u> .

2. Disconnect 4WAS main control unit harness connector and 4WAS rear motor harness connector.

3. Check the continuity between 4WAS rear motor connector terminals.

### **STC-91**

### C1902, C1903, C1904, C1910, C1913 4WAS REAR MOTOR OUTPUT < DTC/CIRCUIT DIAGNOSIS > [WITH 4WAS]

4WAS rear motor		Continuity
Connector	Terminal	Continuity
B36	1 – 2	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WAS rear actuator. Refer to <u>STC-182, "Exploded View"</u>.

Special Repair Requirement

INFOID:000000004257973

### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

### C1905, C1908, C1922, C1925, C1928 4WAS MAIN CONTROL UNIT < DTC/CIRCUIT DIAGNOSIS > [WITH 4WAS]

## C1905, C1908, C1922, C1925, C1928 4WAS MAIN CONTROL UNIT

### Description

INFOID:000000004257974

- 4WAS rear actuator and the power steering solenoid valve is controlled by each sensor signal.
- The fail-safe functions stops the rear wheel angle function (the front wheel is the steering wheel cutting angle) when the electric components and the mechanical components are malfunctioning.
- The protective function stops 4WAS system temporarily when the input signal is not inputted to 4WAS main control unit (When battery-power dose not work temporarily).
- 4WAS front control unit and 4WAS main control unit perform two-way transmitting/receiving signals for optimal control of 4WAS system via 4WAS communication line.

### DTC Logic

INFOID:000000004257975

А

D

Е

### DTC DETECTION LOGIC

				_
DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	
C1905	CONTROL UNIT [ABNORMAL3]	An error is detected inside 4WAS main control unit.	4WAS main control unit error	F
C1908	CONTROL UNIT [ABNORMAL7]	An error is detected inside 4WAS main control unit.	4WAS main control unit error	STC
C1922	CONTROL UNIT [ABNORMAL8]	An error is detected inside 4WAS main control unit.	4WAS main control unit error	-
C1925	AD CONVERTER	An error is detected inside 4WAS main control unit.	4WAS main control unit error	Н
C1928	CONTROL UNIT [ABNORMAL9]	An error is detected inside 4WAS main control unit.	4WAS main control unit error	

#### DTC CONFIRMATION PROCEDURE

1.RECHECK DTC	J
<ul> <li>With CONSULT-III</li> <li>1. Turn the ignition switch from OFF to ON.</li> <li>2. Perform 4WAS main control unit self-diagnosis.</li> </ul>	K
<u>Is any DTC "C1905", "C1908", "C1922", "C1925" or "C1928" detected?</u> YES >> Proceed to diagnosis procedure. Refer to <u>STC-93, "Diagnosis Procedure"</u> . NO >> INSPECTION END	L
Diagnosis Procedure	M
1. PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)	
With CONSULT-III Perform 4WAS main control unit self-diagnosis.	Ν
<u>Is any DTC "C1905", "C1908", "C1922", "C1925" or "C1928" detected?</u> YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u> . NO >> GO TO 2.	0
2. CHECK INFORMATION	
With CONSULT-III Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157</u> ,	Ρ

"Reference Value".

Is each data the standard value?

YES >> Check each harness connector pin terminal for disconnection.

NO >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".

## C1905, C1908, C1922, C1925, C1928 4WAS MAIN CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

INFOID:000000004257977

[WITH 4WAS]

BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

### C1909 4WAS MAIN CONTROL UNIT

#### < DTC/CIRCUIT DIAGNOSIS >

### C1909 4WAS MAIN CONTROL UNIT

### Description

4WAS rear actuator and the power steering solenoid valve is controlled by each sensor signal.

- The fail-safe functions stops the rear wheel angle function (the front wheel is the steering wheel cutting angle) when the electric components and the mechanical components are malfunctioning.
- The protective function stops 4WAS system temporarily when the input signal is not inputted to 4WAS main control unit (When battery-power dose not work temporarily).
- 4WAS front control unit and 4WAS main control unit perform two-way transmitting/receiving signals for optimal control of 4WAS system via 4WAS communication line.

### DTC Logic

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1909	CONTROL UNIT [ABNORMAL6]	An error is detected inside 4WAS main control unit.	4WAS main control unit

#### DTC CONFIRMATION PROCEDURE

1	.RECHECK DTC	

4

#### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS main control unit self-diagnosis.

#### Is DTC "C1909" detected?

- >> Proceed to diagnosis procedure. Refer to STC-95, "Diagnosis Procedure". YES
- >> INSPECTION END NO

### **Diagnosis** Procedure

### 1. CHECK 4WAS MAIN CONTROL UNIT POWER SUPPLY

- 1. Turn the ignition switch OFF.
- Disconnect 4WAS main control unit harness connector. 2.
- Check the voltage between 4WAS main control unit harness connector terminal and the ground. 3.

4	WAS main control unit	Voltage (Approx.)
Connector	Terminal	Vollage (Applox.)
B54	27 – Ground	0 V

4. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

5. Check the voltage between 4WAS main control unit harness connector terminal and the ground.

4WAS main control unit		Voltage (Approx.)
Connector Terminal		Vollage (Approx.)
B54	27 – Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

- NG >> Check the following items. Repair or replace the malfunctioning parts.
  - 10A fuse (#45) open
  - Short among 10A fuse (#45) connector, 4WAS main control unit harness connector No. 27 terminal and the ground

### **STC-95**

INFOID:000000004257978

INFOID:000000004257979

Ε

F

STC

Н

D

А

INFOID:000000004257980

Κ

Ν

M

Ρ

### C1909 4WAS MAIN CONTROL UNIT

#### < DTC/CIRCUIT DIAGNOSIS >

- Open between the ignition switch and 4WAS main control unit harness connector No. 27 terminal
- Ignition switch

### 2.CHECK 4WAS MAIN CONTROL UNIT GROUND

Check the continuity between 4WAS main control unit harness connector and the ground.

4WAS main control unit		Continuity
Connector Terminal		Continuity
B54	34 – Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.

NG >> Repair or replace the harnesses and connectors.

**3.** PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

- 1. Connect 4WAS main control unit harness connector.
- 2. Perform 4WAS main control unit self-diagnosis.

#### Is DTC "C1909" detected?

YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

NO >> GO TO 4.

**4.**CHECK INFORMATION

#### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157,</u> <u>"Reference Value"</u>.

Is each data the standard value?

YES >> Check each harness connector pin terminal for disconnection.

NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

### Special Repair Requirement

INFOID:000000004257981

#### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

• Record the self-diagnosis results (history).

- CAUTION:
- Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
- Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

< DTC/CIRCUIT DIAGNOSIS >

# C1911, C1912 4WAS REAR MOTOR POWER SUPPLY

### Description

The power supply for 4WAS rear motor.

### DTC Logic

INFOID:000000004257983

INFOID:000000004257982

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	Ē
C1911	MOTOR VOLTAGE [LOW VOLTAGE]	4WAS rear motor voltage error is detected. (4WAS rear motor voltage is low.)	4WAS rear motor power supply error	_
C1912	MOTOR VOLTAGE [BAD OBSTRCT]	4WAS rear motor voltage error is detected. (Voltage is applied to 4WAS main motor when 4WAS main control unit output is "OFF".)	4WAS rear motor power supply error	E

### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

1.	Turn the ignition switch from OFF to ON.
	CAUTION:
	Stop the vehicle. Wait 15 minutes or more.
2.	Perform 4WAS main control unit self-diagnosis.
ls D	DTC "C1911" or "C1912" detected?
YE	S >> Proceed to diagnosis procedure. Refer to <u>STC-97, "Diagnosis Procedure"</u> .
N	>> INSPECTION END

### **Diagnosis Procedure**

## 1.CHECK 4WAS MAIN CONTROL UNIT POWER SUPPLY

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS main control unit harness connector.
- 3. Check the voltage between 4WAS main control unit harness connectors and the ground.

4WAS main control unit		Voltage (Approx.)
Connector	Terminal	voltage (Approx.)
B54	27 – Ground	0 V

4. Turn the ignition switch ON. CAUTION:

### Never start the engine.

5. Check the voltage between 4WAS main control unit harness connectors and the ground.

4	WAS main control unit	Voltage (Approx.)	
Connector Terminal		Vollage (Applox.)	
B54	27 – Ground	Battery voltage	

#### Is the inspection result normal?

YES >> GO TO 2.

NO

- >> Check the following items. Repair or replace the malfunctioning parts.
  - 10A fuse (#45) open
  - Short among 10Å fuse (#45) connector, 4WAS main control unit harness connector No. 27 terminal and the ground
  - Open between the ignition switch and 4WAS main control unit harness connector No. 27 terminal

### **STC-97**

### [WITH 4WAS]

В

А

 $\sim$ 

F

STC

Н

Κ

L

Μ

Ν

Ρ

INFOID:000000004257984

< DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

· Ignition switch

**2.**CHECK 4WAS REAR MOTOR POWER SUPPLY CIRCUIT (1)

- 1. Turn the ignition switch OFF.
- 2. Remove 4WAS rear motor relay.
- 3. Check the continuity between 4WAS rear motor relay harness connector terminal and the ground.

	Continuity			
Connector	onnector Terminal			
B53	1 – Ground	Not existed		
D00	2 – Ground	Existed		

4. Check the continuity between 4WAS rear motor relay harness connector terminal and 4WAS main control unit harness connector terminal.

4WAS rear motor relay		4WAS main control uni		Continuity
Connector	Terminal	Connector Terminal		Continuity
B53	1	B54	25	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the harnesses and connectors.

**3.**CHECK 4WAS REAR MOTOR POWER SUPPLY CIRCUIT (2)

Check the voltage between 4WAS rear motor relay harness connector terminal and the ground.

4	WAS rear motor relay	Voltage (Approx.)	
Connector	Terminal	vollage (Applox.)	
B53	3 – Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4. NO >> Check th

- >> Check the following items. Repair or replace the malfunctioning parts.
  - 20A fuse (#37) open
  - Short among 20A fuse (#37) connector, 4WAS rear motor relay harness connector No. 3 terminal and the ground
  - Open between the battery and 4WAS rear motor relay harness connector No. 3 terminal

#### **4.**CHECK 4WAS REAR MOTOR POWER SUPPLY CIRCUIT (3)

1. Remove the noise suppressor.

2. Check continuity between the noise suppressor harness connector terminal and the ground.

	Noise suppressor			
Connector	Terminal	Continuity		
B51	3 – Ground	Not existed		
ICD	5 – Ground			
B52	1 – Ground	Not existed		
	2 – Ground	Existed		

3. Check the continuity between the noise suppressor harness connector terminal and 4WAS rear motor relay harness connector terminal.

Noise suppressor		4WAS rear motor relay		Continuity
Connector	Terminal	Connector Terminal		Continuity
B52	1	B53	5	Existed

#### < DTC/CIRCUIT DIAGNOSIS >

4. Check the continuity between the noise suppressor harness connector terminal and 4WAS main control unit harness connector terminal.

unit nan					ŀ	-
Noise su	Ippressor	4WAS main c	ontrol unit			
Connector	Terminal	Connector	Terminal	Continuity	E	В
	3	DC (	37	Existed		
B51	5	B54	40	Existed	C	0
Is the inspec	ction result n	ormal?		I		ر
	GO TO 5.					
_	•	place the harn				$\supset$
<b>5.</b> CHECK 4	IWAS REAF	R MOTOR POV	VER SUP	PLY CIRCUI	Г (4)	
		n control unit h	arness co	nnector.	F	
2. Turn the CAUTIC	e ignition swi	tch ON.			L	-
Never s	tart the eng					
3. Check tl	he voltage b	etween 4WAS	main cont	rol unit harn	ess connectors and the ground.	-
	VAS main cont	rolunit			_	
Connector		erminal	Voltag	e (Approx.)	S	тс
B54		- Ground	Batte	ery voltage		
	e ignition swi		Datio	i y voltage		
Is the inspec	•				ŀ	-
•	<u>GO TO 6.</u>	<u>ormar.</u>				
		AS main contr	ol unit. Re	fer to <u>STC-1</u>	80, "Exploded View".	1
6.CHECK	WAS REAF	R MOTOR REL	AY			1
1. Apply 12	2 V to 4WAS	rear motor rel	ay conned	tor No. 1 ter	minal and No. 2 terminal.	
CAUTIC	DN:		•		· · · · · · · · · · · · · · · · · · ·	J
		erminals shor		when annly	ving the voltage.	
					a star tarminala	<
						-
	4WAS rear	motor relay		Continuity		
Connector	Terminal	Conditi	on	Continuity	L	-
		Apply the voltag No. 1 terminal a		Eviptod		
		minal.	ia No. 2 ter-	Existed	Ν	M
B53	3 – 5	Do not apply the	voltage be-			/ 1
		tween No. 1 terr	-	Not existed		
		No. 2 terminal.				N
3. Check tl	ne resistanc	e between 4w	AS rear m	otor relay co	nnector terminals.	
4	WAS rear moto	or relav			C	2
Connector	-	erminal	Resistar	nce (Approx.)		
B53		1-2		50 Ω		
Is the inspec					F	Þ
	GO TO 7.					
		AS rear motor	relay.			
7.CHECK	NOISE SUP	PRESSOR				

Check continuity between the noise suppressor connector terminals.

[WITH 4WAS]

А

### < DTC/CIRCUIT DIAGNOSIS >

	Continuity			
Connector	Terminal	Connector	Terminal	Continuity
B51	3	B52	1	Existed
B51	3	B51	5	Not existed
B51	3	B52	2	Not existed
B51	5	B52	2	Existed
B51	5	B52	1	Not existed

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace the noise suppressor.

## 8. CHECK 4WAS REAR MOTOR POWER SUPPLY

1. Install 4WAS rear motor relay.

- 2. Install the noise suppressor.
- 3. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

4. Check the voltage between 4WAS main control unit harness connectors and the ground.

4	WAS main control unit	Voltage (Approx.)	
Connector	Terminal	vollage (Applox.)	
B54	37 – Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

9. PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

Is DTC "C1911" or "C1912" detected?

YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

NO >> GO TO 10.

**10.**CHECK INFORMATION

#### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157,</u> <u>"Reference Value"</u>.

#### Is each data the standard value?

YES >> Check each harness connector pin terminal for disconnection.

NO >> Replace 4WAS main control unit. Refer to STC-180. "Exploded View".

### Component Inspection (4WAS Rear Motor Relay)

INFOID:000000004257985

[WITH 4WAS]

## 1.CHECK 4WAS REAR MOTOR RELAY

- 1. Turn the ignition switch OFF.
- 2. Remove 4WAS rear motor relay connector.
- 3. Apply 12 V to 4WAS rear motor relay connector No. 1 terminal and No. 2 terminal. CAUTION:
  - Never make the terminals short.
  - Connect the fuse between the terminals when applying the voltage.
- 4. Check the continuity between 4WAS rear motor relay connector terminals.

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

А

В

D

Е

F

STC

Н

Κ

L

Μ

Ν

INFOID:000000004257987

INFOID:000000004257986

	4WAS rear motor relay			
Connector	Terminal	Condition	- Continuity	
P52	2 5	Apply the voltage between No. 1 terminal and No. 2 ter- minal.	Existed	
B53 3 – 5	Do not apply the voltage be- tween No. 1 terminal and No. 2 terminal.	Not existed		

#### 5. Check the resistance between 4WAS rear motor relay connector terminals.

4	WAS rear motor relay	Resistance (Approx.)
Connector	Terminal	
B53	1 – 2	50 Ω

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WAS rear motor relay.

### Component Inspection (Noise Suppressor)

### **1.**NOISE SUPPRESSOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Remove the noise suppressor.
- 3. Check continuity between the noise suppressor connector terminals.

	Continuity			
Connector	Terminal	Connector	Terminal	Continuity
B51	3	B52	1	Existed
B51	3	B51	5	Not existed
B51	3	B52	2	Not existed
B51	5	B52	2	Existed
B51	5	B52	1	Not existed

#### Is the inspection result normal?

YES	>> INSPECTION END
10	

NO >> Replace the noise suppressor.

#### Special Repair Requirement

#### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
- Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
- Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

Ρ

#### < DTC/CIRCUIT DIAGNOSIS >

## C1914 REAR WHEEL STEERING ANGLE SENSOR

### Description

- It detects the steering angle condition of rear wheel.
- 2 systems (main and sub sensor) are equipped.

### DTC Logic

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1914	RR ST ANGLE SENSOR [ABNORML VOL]	The rear wheel angle sensor power supply error is detected.	Rear wheel steering sen- sor power supply error

#### DTC CONFIRMATION PROCEDURE

### **1.**RECHECK DTC

#### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS main control unit self-diagnosis.

#### Is DTC "C1914" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-102, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000004257990

## 1. CHECK REAR WHEEL STEERING ANGLE SENSOR POWER SUPPLY

1. Turn the ignition switch OFF.

2. Check the voltage between 4WAS main control unit harness connector terminal and the ground.

4	WAS main control unit	Voltage (Approx.)		
Connector	Terminal	- voliage (Approx.)		
B54	5 – Ground	0 V		

Turn the ignition switch ON.
 CAUTION:

#### Never start the engine.

4. Check the voltage between 4WAS main control unit harness connector terminal and the ground.

4\	WAS main control unit	Value (Approx.)
Connector	Terminal	
B54	5 – Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

- 2.CHECK REAR WHEEL STEERING ANGLE SENSOR
- 1. Turn the ignition switch OFF.
- 2. Disconnect the rear wheel steering angle sensor harness connector.
- 3. Check the resistance between the rear wheel steering angle sensor connector terminals.

INFOID:000000004257988

INFOID-000000004257989

## C1914 REAR WHEEL STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

А

В

D

E

тс

Rear w	heel steering angle sensor	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
	1 – 3	1 kΩ
B58	1 – 2	1.2 – 1.5 kΩ
	1 – 4	1.2 – 1.5 kΩ

Is the inspection result normal?

YES >> GO TO 3.

>> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View". NO

3.CHECK REAR WHEEL STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect 4WAS main control unit harness connector.

2. Check the continuity between 4WAS main control unit harness connector terminal and the rear wheel steering angle sensor harness connector terminal.

	4WAS mair	control unit		steering angle	Continuity
-	Connector	Terminal	Connector	Terminal	
-	B54	5	B58	1	Existed
-	B54	5	B58	3	Not existed
	B54	4	B58	3	Existed
	B54	4	B58	1	Not existed

#### Is the inspection result normal?

YES >> GO TO 4. NO >> Repair or replace the harnesses and connectors. 4.PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT) With CONSULT-III Connect 4WAS main control unit harness connector. Connect the rear wheel steering angle sensor harness connector. 2. Perform 4WAS main control unit self-diagnosis. 3. Κ Is DTC "C1914" detected? YES >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View". NO >> GO TO 5. 5. CHECK INFORMATION With CONSULT-III Μ Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-157. "Reference Value". Is each data the standard value? Ν YES >> Check each harness connector pin terminal for disconnection. >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View". NO Component Inspection INFOID:000000004257991 1.CHECK REAR WHEEL STEERING ANGLE SENSOR 1. Turn the ignition switch OFF. Ρ Disconnect rear wheel steering angle sensor harness connector. 2.

3. Check the resistance between rear wheel steering angle sensor connector terminals.

## C1914 REAR WHEEL STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

<b>INVITH</b>	4WAS]
	HUAD

Rear w	heel steering angle sensor	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
	1 – 3	1 kΩ
B58	1 – 2	1.2 – 1.5 kΩ
	1 – 4	1.2 – 1.5 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WAS rear actuator. Refer to <u>STC-182, "Exploded View"</u>.

Special Repair Requirement

INFOID:000000004257992

#### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

## C1915, C1916 REAR WHEEL STEERING ANGLE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

## C1915, C1916 REAR WHEEL STEERING ANGLE SENSOR

### Description

- It detects the steering angle condition of rear wheel.
- 2 systems (main and sub sensor) are equipped.

### DTC Logic

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	D
C1915	RR ST ANGLE SENSOR [MAIN SIGNAL]	The rear wheel angle sensor signal (main) error is detected.	Rear wheel steering sen- sor output voltage error	E
C1916	RR ST ANGLE SENSOR [SUB SIGNAL]	If the rear wheel angle sensor signal (sub) error is detected.	Rear wheel steering sen- sor output voltage error	

### DTC CONFIRMATION PROCEDURE

### **1**.RECHECK DTC

#### (P)With CONSULT-III

- Turn the ignition switch from OFF to ON. 1
- Perform 4WAS main control unit self-diagnosis. 2.

#### Is DTC "C1915" or "C1916" detected?

- >> Proceed to diagnosis procedure. Refer to STC-105, "Diagnosis Procedure". YES
- >> INSPECTION END NO

### **Diagnosis** Procedure

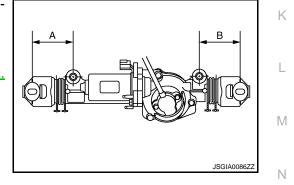
### **1.**CHECK 4WAS REAR ACTUATOR

- 1. Turn the ignition switch OFF.
- Measure "A" and "B" of 4WAS rear actuator as shown in the fig-2. ure.

#### Is the differential of "A" and "B" 5.8 mm (0.228 in) or less?

YES >> GO TO 2.

NO >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".



## **2.**CHECK REAR WHEEL STEERING ANGLE SENSOR (1)

#### (P)With CONSULT-III

- Start engine. 1 CAUTION: Check condition with the vehicle stopped.
- Check DATA MONITOR "RR ST ANG-MAI" and "RR ST ANG-SUB" value of 4WAS main control unit. 2.

Monitored item	Condition	Display value
RR ST ANG-MAI	Straight-ahead	Approx. 2.4 V
RR ST ANG-SUB	Straight-ahead	Approx. 2.6 V
	<b>0</b>	

Is the inspection result normal?

YES >> GO TO 3.

### STC-105

INFOID:000000004257993

INFOID:000000004257994

INFOID:000000004257995

В

А

STC

Н

Ρ

## C1915, C1916 REAR WHEEL STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

#### NO >> Replace 4WAS rear actuator. Refer to <u>STC-182, "Exploded View"</u>.

## **3.**CHECK REAR WHEEL STEERING ANGLE SENSOR (2)

Check the voltage between 4WAS main control unit harness connector terminal and ground.

	Voltage (Approx.)	
Connector	voltage (Approx.)	
B54	15 – Ground	2.4 V
D04	7 – Ground	2.6 V

Is the differential between terminal voltage No. 4 and No.7 approximately 1 V or more?

YES >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".

NO >> GO TO 4.

### **4.**CHECK REAR WHEEL STEERING ANGLE SENSOR (3)

- 1. Turn the ignition switch OFF.
- 2. Disconnect rear wheel steering angle sensor harness connector.
- 3. Check the resistance between rear wheel steering angle sensor connector terminals.

R	ear wheel steering angle sensor	Resistance (Approx.)
Connector	Resistance (Approx.)	
	1 – 3	1 kΩ
B58	1 – 2	1.2 – 1.5 kΩ
	1 – 4	1.2 – 1.5 kΩ

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".

5.check rear wheel steering angle sensor ground circuit

1. Disconnect 4WAS main control unit harness connector.

2. Check for continuity between 4WAS main control unit harness connector terminal and rear wheel steering angle sensor harness connector terminal.

4WAS main control unit		Rear wheel steering angle sensor		Continuity
Connector	Terminal	Connector	Terminal	
B54	15	B58	1, 2, 3	Not existed
B54	15	B58	4	Existed
B54	7	B58	1, 3, 4	Not existed
B54	7	B58	2	Existed
B54	5	B58	1	Existed
B54	5	B58	2, 3, 4	Not existed
B54	4	B58	1, 2, 4	Not existed
B54	4	B58	3	Existed

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace each harness and connector.

 $\mathbf{6}$ .PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

#### With CONSULT-III

- 1. Connect 4WAS main control unit harness connector.
- 2. Connect rear wheel steering angle sensor harness connector.
- 3. Perform 4WAS main control unit self-diagnosis.

YES       >> Replace 4WAS main control unit. Refer to STC-180. "Exploded View".         NO       >> GOTO 7.         YECK       >> GOTO 7.         YECK       NO >> GOTO 7.         With CONSULT-III       Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-157.         Reference Value".       seach data standard?         YES       >> Check pin terminal and connection of each harness connector for non-standard conditions.         NO       >> Replace 4WAS main control unit. Refer to STC-180. "Exploded View".         Component Inspection       wroncocconcerrer         I. CHECK REAR WHEEL STEERING ANGLE SENSOR       .         I. Turn the ignition switch OFF.       Disconnect rear wheel steering angle sensor harness connector.         Bisconnect rear wheel steering angle sensor       Resistance (Approx.)         Connector       Terminal         1 - 3       1 kΩ         B58       1 - 2       1.2 - 1.5 kΩ         is the inspection result normal?       YES       > INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182. "Exploded View".         Special Repair Requirement       Nocccccccccccccccccccccccccccccccccccc	<u>s DTC "C19</u> 15	" or "C1916" detected?		
CHECK INFORMATION         With CONSULT-III         Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-157.         Reference Value'.         seach data standard?         YES       > Check pin terminal and connection of each harness connector for non-standard conditions.         NO       >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".         Component Inspection	YES >> Re	place 4WAS main contro	ol unit. Refer to <u>STC-18</u>	30, "Exploded View".
With CONSULT-III         Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-157.         Reference Value".         s each data standard?         YES       >> Check pin terminal and connection of each harness connector for non-standard conditions.         NO       >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".         Component Inspection	-			
Procession       State         Reference Value       No         seach data standard?       YES         YES       >> Check pin terminal and connection of each harness connector for non-standard conditions.         NO       >> Replace 4WAS main control unit. Refer to STC-180. "Exploded View".         Component Inspection       Moreoreance         1. CHECK REAR WHEEL STEERING ANGLE SENSOR       Moreoreance         1. Turn the ignition switch OFF.       Disconnect rear wheel steering angle sensor harness connector.         3. Check the resistance between rear wheel steering angle sensor connector terminals.       Resistance (Approx.)         Connector       Terminal         1 - 3       1 kΩ         B58       1 - 2       1.2 - 1.5 kΩ         s the inspection result normal?       YES         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182. "Exploded View".         Special Repair Requirement       Moreoreance         Mercer result he self-diagnosis results (history).       CAUTION:         Proce concesses       More result on the self-diagnosis results (here or).         CAUTION:       No       >> Replace the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis. <td>CHECK INF</td> <td>ORMATION</td> <td></td> <td></td>	CHECK INF	ORMATION		
Seach data standard?         YES       >> Check pin terminal and connection of each harness connector for non-standard conditions.         NO       >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".         Component Inspection	heck the "DA	TA MONITOR" value of e	each DTC detected wit	h the self-diagnosis function. Refer to <u>STC-157.</u>
YES       >> Check pin terminal and connection of each harness connector for non-standard conditions.         NO       >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".         Component Inspection       www.exerceded View".         CHECK REAR WHEEL STEERING ANGLE SENSOR       .         . Turn the ignition switch OFF.       .         Disconnect rear wheel steering angle sensor harness connector.       .         Check the resistance between rear wheel steering angle sensor connector terminals.         Connector       Terminal         0       1 - 3       1 kΩ         0       1 - 4       1.2 - 1.5 kΩ         1       1 - 4       1.2 - 1.5 kΩ         Sthe inspection result normal?       YES         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         EFORE REPLACING 4WAS MAIN CONTROL UNIT         Record the self-diagnosis results (history).         CA				
NO       >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".         Component Inspection       ************************************			naction of each harno	es connector for non standard conditions
.CHECK REAR WHEEL STEERING ANGLE SENSOR         . Turn the ignition switch OFF.         Disconnect rear wheel steering angle sensor harness connector.         Check the resistance between rear wheel steering angle sensor connector terminals.         Rear wheel steering angle sensor         Connector       Terminal         1 - 3       1 kΩ         B58       1 - 2       1.2 - 1.5 kΩ         1 - 4       1.2 - 1.5 kΩ         sthe inspection result normal?       YES         YES       > INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       Monoconcestrer         BEFORE REPLACING 4WAS MAIN CONTROL UNIT       Record the self-diagnosis results (history).         CAUTION:       • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Never erase the memory of the self-diagnosis results (record) after printing out or recording all the val-				
CHECK REAR WHEEL STEERING ANGLE SENSOR         1. Turn the ignition switch OFF.         2. Disconnect rear wheel steering angle sensor harness connector.         3. Check the resistance between rear wheel steering angle sensor connector terminals.         Rear wheel steering angle sensor         Resistance (Approx.)         0         0         0         1         2         1         2         3         4         1         4         5         1         4         1         5         6         7         7         7         8         7         8				· · · · ·
1. Turn the ignition switch OFF.         2. Disconnect rear wheel steering angle sensor harness connector.         3. Check the resistance between rear wheel steering angle sensor connector terminals.         Rear wheel steering angle sensor         Connector       Terminal         0       1 - 3         0       1 - 3         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         0       1 - 4         1 - 4       1 - 2 - 1 - 1.5 kΩ         sthe inspection result normal?         YES       > INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       wrous-accueres         BEFORE REPLACING 4WAS MAIN CONTROL UNIT         Record the self-d	omponom	nopeetion		114-012:00000004251996
2. Disconnect rear wheel steering angle sensor harness connector.         3. Check the resistance between rear wheel steering angle sensor connector terminals.         Rear wheel steering angle sensor         Rear wheel steering angle sensor         Resistance (Approx.)         1-3       1 kΩ         858       1-2       1.2 - 1.5 kΩ         1-4       1.2 - 1.5 kΩ         s the inspection result normal?         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       MFOLD.cocconceters7997         BEFORE REPLACING 4WAS MAIN CONTROL UNIT       Record the self-diagnosis results (history).         CAUTION:       • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	.CHECK RE	AR WHEEL STEERING A	ANGLE SENSOR	
2. Disconnect rear wheel steering angle sensor harness connector.         3. Check the resistance between rear wheel steering angle sensor connector terminals.         Image: Connector Image: Co	. Turn the ig	nition switch OFF.		
Rear wheel steering angle sensor       Resistance (Approx.)         Connector       Terminal         1-3       1 kΩ         B58       1-2       1.2 - 1.5 kΩ         a the inspection result normal?       YES         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       MFOID-0000004257997         BEFORE REPLACING 4WAS MAIN CONTROL UNIT       Record the self-diagnosis results (history).         CAUTION:       • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	. Disconnec	t rear wheel steering ang		
Connector       Terminal       Resistance (Approx.)         B58       1 - 3       1 kΩ         B58       1 - 2       1.2 - 1.5 kΩ         1 - 4       1.2 - 1.5 kΩ         Sthe inspection result normal?         YES       > INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       Instrument         VEFORE REPLACING 4WAS MAIN CONTROL UNIT         Record the self-diagnosis results (history).         CAUTION:         • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	. Check the	resistance between rear	wheel steering angle s	sensor connector terminals.
Connector       Terminal       Resistance (Approx.)         0       1 - 3       1 kΩ         B58       1 - 2       1.2 - 1.5 kΩ         1 - 4       1.2 - 1.5 kΩ         ithe inspection result normal?         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         pecial Repair Requirement       INFOLD.0000004257997         EFORE REPLACING 4WAS MAIN CONTROL UNIT         Record the self-diagnosis results (history).         CAUTION:         • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	Poorwho			
B58       1-3       1 kΩ         B58       1-2       1.2 - 1.5 kΩ         1-4       1.2 - 1.5 kΩ         sthe inspection result normal?         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement         SEFORE REPLACING 4WAS MAIN CONTROL UNIT         Record the self-diagnosis results (history).         CAUTION:         • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-			Resistance (Approx.)	
B58       1-2       1.2 - 1.5 kΩ         i the inspection result normal?         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         appecial Repair Requirement         EFORE REPLACING 4WAS MAIN CONTROL UNIT         Record the self-diagnosis results (history).         CAUTION:         • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	Connector	reminal	1	
1-4       1.2 - 1.5 kΩ         a the inspection result normal?         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       INFOID:0000004257997         VEFORE REPLACING 4WAS MAIN CONTROL UNIT       Record the self-diagnosis results (history).         CAUTION:       • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-		1 0	140	
s the inspection result normal?         YES       >> INSPECTION END         NO       >> Replace 4WAS rear actuator. Refer to STC-182, "Exploded View".         Special Repair Requirement       INFOID:0000004257997         BEFORE REPLACING 4WAS MAIN CONTROL UNIT       Record the self-diagnosis results (history).         CAUTION:       • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.         • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-				
YES >> INSPECTION END NO >> Replace 4WAS rear actuator. Refer to <u>STC-182</u> , " <u>Exploded View</u> ". Special Repair Requirement BEFORE REPLACING 4WAS MAIN CONTROL UNIT Record the self-diagnosis results (history). CAUTION: • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis. • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-		1 – 2	1.2 – 1.5 kΩ	
<ul> <li>NO &gt;&gt; Replace 4WAS rear actuator. Refer to <u>STC-182, "Exploded View"</u>.</li> <li>Special Repair Requirement INFOLD:</li> <li>BEFORE REPLACING 4WAS MAIN CONTROL UNIT</li> <li>Record the self-diagnosis results (history).</li> <li>CAUTION:</li> <li>Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-</li> </ul>	B58	1 – 2 1 – 4	1.2 – 1.5 kΩ	
Special Repair Requirement BEFORE REPLACING 4WAS MAIN CONTROL UNIT Record the self-diagnosis results (history). CAUTION: • Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis. • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	B58	1 – 2 1 – 4 n result normal?	1.2 – 1.5 kΩ	
<ul> <li>BEFORE REPLACING 4WAS MAIN CONTROL UNIT Record the self-diagnosis results (history).</li> <li>CAUTION:</li> <li>Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-</li> </ul>	B58 the inspection YES >> IN	1 – 2 1 – 4 In result normal? SPECTION END	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ	Exploded View".
<ul> <li>Record the self-diagnosis results (history).</li> <li>CAUTION:</li> <li>Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-</li> </ul>	B58 the inspection YES >> IN NO >> References	1 – 2 1 – 4 <u>n result normal?</u> SPECTION END place 4WAS rear actuato	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ	· · · · · · · · · · · · · · · · · · ·
<ul> <li>CAUTION:</li> <li>Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-</li> </ul>	B58 the inspection YES >> IN NO >> References	1 – 2 1 – 4 <u>n result normal?</u> SPECTION END place 4WAS rear actuato	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ	· · · · · · · · · · · · · · · · · · ·
<ul> <li>Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-</li> </ul>	B58 S the inspection YES >> IN NO >> Re Special Rep	1 – 2 1 – 4 <u>In result normal?</u> SPECTION END place 4WAS rear actuato pair Requirement	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ or. Refer to <u>STC-182,</u> "	· · · · · · · · · · · · · · · · · · ·
after diagnosis. • Erase the memory of the self-diagnosis results (record) after printing out or recording all the val-	B58 the inspection YES >> IN NO >> Re Special Rep EFORE REF Record the s	1 – 2 1 – 4 <u>n result normal?</u> SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ or. Refer to <u>STC-182,</u> " CONTROL UNIT	· · · · · · · · · · · · · · · · · · ·
	B58 the inspection YES >> IN NO >> Re Special Rep EFORE REF Record the s CAUTION:	1 – 2 1 – 4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (hist	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ or. Refer to <u>STC-182,</u> " CONTROL UNIT ory).	INFOID:00000004257997
ues of "DATA MONITOR".	B58 the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never eras	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history)	1.2 – 1.5 kΩ 1.2 – 1.5 kΩ or. Refer to <u>STC-182,</u> " CONTROL UNIT ory).	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 S the inspectic YES >> IN: NO >> Re Special Rep EFORE REF Record the s CAUTION: • Never erass after diagr • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997
	B58 the inspection YES >> IN: NO >> Ref pecial Rep EFORE REF Record the s CAUTION: • Never erass after diagn • Erase the	1-2 1-4 n result normal? SPECTION END place 4WAS rear actuato pair Requirement PLACING 4WAS MAIN elf-diagnosis results (history) posis. memory of the self-diag	1.2 – 1.5 kΩ         1.2 – 1.5 kΩ         or. Refer to STC-182, "         CONTROL UNIT ory).         of self-diagnosis res	INFOID:00000004257997

## C1917, C1918 REAR WHEEL STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## C1917, C1918 REAR WHEEL STEERING ANGLE SENSOR

### Description

• It detects the steering angle condition of rear wheel.

• 2 systems (main and sub sensor) are equipped.

## DTC Logic

INFOID:000000004257999

INFOID:000000004257998

[WITH 4WAS]

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1917	RR ST ANGLE SENSOR [OFFSET SIG1]	The rear wheel angle sensor signal (main and sub) er- ror is detected. (The output signal value differs temporarily between main and sub.)	Rear wheel steering sen- sor (main and sub) output signal value error signal
C1918	RR ST ANGLE SENSOR [OFFSET SIG2]	The rear wheel angle sensor signal (main and sub) er- ror is detected. (The output signal value differs between main and sub.)	Rear wheel steering sen- sor (main and sub) output signal error

### DTC CONFIRMATION PROCEDURE

## **1**.RECHECK DTC

#### With CONSULT-III

- 1. Start the engine. CAUTION:
  - Stop the vehicle.
- 2. Perform the active test.
- 3. Perform 4WAS main control unit self-diagnosis.

#### Is DTC "C1917" or "C1918" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-108, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

### **Diagnosis** Procedure

INFOID:000000004258000

## **1.**CHECK REAR WHEEL STEERING ANGLE SENSOR (1)

#### With CONSULT-III

1. Start engine.

### CAUTION:

#### Check the condition with the vehicle stopped.

2. Check "RR ST ANG-MAI" and "RR ST ANG-SUB" item on "DATA MONITOR" of 4WAS main control unit.

Monitored item	Condition	Display value
RR ST ANG-MAI	Straight-ahead	Approx. 2.4 V
RR ST ANG-SUB	Straight-ahead	Approx. 2.6 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace 4WAS rear actuator. Refer to <u>STC-182, "Exploded View"</u>.

**2.**CHECK REAR WHEEL STEERING ANGLE SENSOR (2)

Check the voltage between 4WAS main control unit harness connector terminal and ground.

# C1917, C1918 REAR WHEEL STEERING ANGLE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

	4)4/A C. main				
Connector	40040 main	control unit		Voltage (Approx.)	
Connector				2.41/	
B54		4 – Ground 7 – Ground		2.4 V	
. (   <b>:</b> ((	- t'- L h - t		ltere Ne - 4	2.6 V and No.7 approximately 1 V or more?	
YES >>   NO >> (	Replace 4W GO TO 3.		trol unit. Re	efer to <u>STC-180, "Exploded View"</u> .	
. Turn the . Disconn	ignition swi ect rear whe	tch OFF. el steering a	ngle senso	r harness connector. eering angle sensor connector terminals.	
Re	ar wheel steer	ing angle senso	r		
Connector		Terminal		Resistance (Approx.)	
		1 – 3		1 kΩ	
B58		1 – 2		1.2 – 1.5 kΩ	
-		1 – 4		1.2 – 1.5 kΩ	
. Disconn 2. Check fo	ect 4WAS m or continuity nsor harnes	nain control u	nit harness AS main co terminal.	SENSOR GROUND CIRCUIT connector. ontrol unit harness connector terminal and r	ear wheel ste
		sen		Continuity	
Connector	Terminal	Connector	Terminal	Net evident	
B54 B54	15 15	B58 B58	1, 2, 3	Not existed           Existed	
B54	7	B58	1, 3, 4	Not existed	
B54	7	B58	2	Existed	
B54	5	B58	1	Existed	
B54	5	B58	2, 3, 4	Not existed	
B54	4	B58	1, 2, 4	Not existed	
B54	4	B58	3	Existed	
s the inspec	<u>tion result</u> n			1	
-	GO TO 5.	place each h	arness and		
NO >>	•	AGNOSIS (4)	WAS MAIN	CONTROL UNIT)	

# C1917, C1918 REAR WHEEL STEERING ANGLE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

# 6.CHECK INFORMATION

#### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157.</u> "Reference Value".

Is each data standard?

- YES >> Check the pin terminal and connection of each harness connector for non-standard conditions.
- NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

### Component Inspection

INFOID:000000004258001

# 1.CHECK REAR WHEEL STEERING ANGLE SENSOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect rear wheel steering angle sensor harness connector.
- 3. Check the resistance between rear wheel steering angle sensor connector terminals.

Rear w	heel steering angle sensor	Resistance (Approx.)	
Connector Terminal			
	1 – 3	1 kΩ	
B58	1 – 2	1.2 – 1.5 kΩ	
	1 – 4	1.2 – 1.5 kΩ	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WAS rear actuator. Refer to <u>STC-182</u>, "Exploded View".

Special Repair Requirement

INFOID:000000004258002

### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history).
- **CAUTION:**
- Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
- Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

# **C1919 VEHICLE SPEED SIGNAL**

Items

(CONSULT-III screen terms)

VEHICLE SPEED SEN

# Description

The vehicle speed signal is transmitted from ABS actuator and electric unit (control unit) to 4WAS main control В unit via CAN communication.

Diagnostic item is detected when...

Malfunction is detected in vehicle speed signal that is

output from ABS actuator and electric unit (control unit)

# DTC Logic

DTC

INEOID:000000004258004

Possible cause

INFOID:000000004258003

## DTC DETECTION LOGIC

C1919	[NO SIGNAL]	via CAN communication. (Improper signal inputs while driving.)	Vehicle speed signal error
DTC CONFI	RMATION PROCEDURE	1	
1.RECHECK	DTC		
2. Perform 4	gnition switch from OFF to WAS main control unit self		
		dure. Refer to <u>STC-111, "Diagnosis Procedure"</u>	
Diagnosis I	Procedure		INFOID:000000004258005
1.perform	ABS ACTUATOR AND EI	LECTRIC UNIT (CONTROL UNIT) SELF-DIAG	NOSIS
		t (control unit) self-diagnosis.	
YES >> C NO >> G	heck the error system. O TO 2.		
	SELF-DIAGNOSIS (4WA	S MAIN CONTROL UNIT)	
<u>Is DTC "U100</u> YES >> C	<b>SULT-III</b> S main control unit self-dia <u>0" or "U1010" detected?</u> heck the error system. O TO 3.	gnosis.	
3.perform	SELF-DIAGNOSIS (4WA	S MAIN CONTROL UNIT)	
With CONS Perform 4WAS Is DTC "C1919	S main control unit self-dia	gnosis.	
YES >> R NO >> G	eplace 4WAS main control O TO 4.	unit. Refer to <u>STC-180, "Exploded View"</u> .	
4.INFORMAT	TION CHECK		
With CONS Check the "DA		ach DTC detected with the self-diagnosis funct	ion Refer to $STC_{-}157$

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-157. "Reference Value".

Is each data the standard value?

А

С

D

Ε

# **C1919 VEHICLE SPEED SIGNAL**

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

- YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.
- NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

# Special Repair Requirement

INFOID:000000004258006

### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

# C1920 STEERING ANGLE SEN

Items

(CONSULT-III screen terms)

# Description

Steering angle sensor signal is transmitted from steering angle sensor to 4WAS main control unit via CAN В communication.

Diagnostic item is detected when...

Malfunction is detected in steering angle sensor signal

# DTC Logic

DTC

INEOID:000000004258008

Possible cause

INFOID:000000004258007

## DTC DETECTION LOGIC

C1920	STEERING ANGLE SEN [NO SIGNAL]	that is output from steering angle sensor via CAN com- munication. (No transmission from the steering angle sensor)	Steering angle sensor in- put signal error
DTC CONFIR	MATION PROCEDURE		
1.RECHECK	DTC		
With CONSI	JLT-III nition switch from OFF to	ON.	
2. Perform 4V	VAS main control unit self		
Is DTC "C1920			
	oceed to diagnosis proced SPECTION END	lure. Refer to <u>STC-113, "Diagnosis Procedure"</u>	
Diagnosis P	rocedure		INFOID:000000004258009
<b>1.</b> PERFORM	ABS ACTUATOR AND EL	ECTRIC UNIT (CONTROL UNIT) SELF-DIAG	NOSIS
With CONSU Perform ABS a		control unit) self-diagnosis.	
	stem detected?		
	eck the error system.		
<b>^</b>	) TO 2.		
<b>Z</b> .PERFORM	SELF-DIAGNOSIS (4WAS	S MAIN CONTROL UNIT)	
With CONSU Perform 4WAS	JLT-III main control unit self-diag	inosis	
	" or "U1010" detected?	ynosis.	
YES >> Ch	eck the error system.		
•	) TO 3.		
		S MAIN CONTROL UNIT)	
With CONSU	JLT-III main control unit self-diag	nacio	
Is DTC "C1920		JIIOSIS.	
YES >> Re		unit. Refer to STC-180, "Exploded View".	
4.INFORMATI	ON CHECK		
With CONSU Check the "DA"		ach DTC detected with the self-diagnosis funct	ion Refer to STC-157

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to STC-157. "Reference Value".

Is each data the standard value?

С

D

# **C1920 STEERING ANGLE SEN**

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

- YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.
- NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

### Special Repair Requirement

INFOID:000000004258010

### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history).
  - **CAUTION:**
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

### AFTER REPLACING STEERING ANGLE SENSOR

# **1.**PERFORM ACTIVE TEST (LOCK OPERATION)

### With CONSULT-III

- T. Stop vehicle with front wheels in the straight-ahead position.
- 2. Turn the ignition switch ON. CAUTION: Never start engine.
- 3. Select "LOCK OPERATION" item on "ACTIVE" of 4WAS front control unit.
- 4. Perform "RELEASE" of "ACTIVE TEST".
- CAUTION:
  - Turn steering wheel 90°, and then check that front tire does not move.
  - Never turn steering wheel 1 turn or more while performing "RELEASE".
- 5. Place steering wheel in neutral position.
- 6. Perform "LOCK" item on "ACTIVE TEST" of 4WAS front control unit.
- 7. Steer 30° leftward slowly. Steer 30° rightward and return the steering wheel to the straight-ahead position.
- 8. Complete active test of 4WAS front control unit.

### >> GO TO 2.

### 2.steering angle sensor neutral position adjustment

### With CONSULT-III

- 1. Adjust steering angle sensor neutral position. Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE <u>SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.
- 2. Turn the ignition switch OFF.

### >> GO TO 3.

 ${f 3.}$  RETURN TO 4WAS FRONT ACTUATOR INITIAL POSITION

1. Start engine. CAUTION:

### Check condition with the vehicle stopped.

- 2. Turn steering wheel to the left by 90° slowly, and then turn to the right by 90°.
- 3. Again, turn steering wheel to the left by 90° slowly, and then turn to the right by 90° so that it faces straight ahead.
- 4. Stop vehicle with front wheels in the straight-ahead position after driving vehicle for a short time. (Engine starting)

>> GO TO 4.

**4.**CHECK 4WAS FRONT ACTUATOR

### With CONSULT-III

1. Check "4WAS STR ANG" item on "DATA MONITOR" of 4WAS front control unit. CAUTION:

Never touch steering wheel while performing.

4WAS STR ANG : –3.5 – 3.5deg	А
<ol> <li>Turn the ignition switch OFF.</li> <li>Is the inspection result normal?</li> </ol>	
YES >> GO TO 5.	В
NO $>>$ GO TO 1.	
5.PERFORM ACTIVE TEST (SLOW MODE)	С
With CONSULT-III Start engine.	
CAUTION:	D
<ul><li>Check condition with the vehicle stopped.</li><li>2. Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.</li></ul>	
<ol> <li>Perform "MODE START" of "ACTIVE TEST".</li> <li>Turn steering wheel to the left slowly until it stops.</li> </ol>	Е
5. Turn steering wheel to the right slowly until it stops.	_
Does "OK" display on both the left and right sides on "SLOW MODE" items of the monitor?	_
YES >> GO TO 6. NO >> Refer to <u>STC-31, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special</u>	F
Repair Requirement (Pattern 4)".	
6.PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)	STC
With CONSULT-III	
Perform 4WAS front control unit self-diagnosis. Is malfunction detected?	Н
YES >> Check malfunctioning circuit.	
NO >> GO TO 7.	
7.ERASE ERROR RECORD	
With CONSULT-III     Erase memories of self-diagnosis results for 4WAS front control unit and 4WAS main control unit.	J
>> END	K
	L
	Μ
	Ν
	0
	Ρ

# **C1921 ENGINE SPEED SIGNAL**

### < DTC/CIRCUIT DIAGNOSIS >

# C1921 ENGINE SPEED SIGNAL

# Description

The engine speed signal is transmitted to 4WAS main control unit via CAN communication.

# DTC Logic

INFOID:000000004258012

INFOID:000000004258013

INFOID:000000004258011

## DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1921	ENG REV SIGNAL	Malfunction is detected in engine speed signal that is output from ECM via CAN communication. (Improper signal is input engine speed.)	Engine speed signal error

## DTC CONFIRMATION PROCEDURE

# **1.**RECHECK DTC

### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS main control unit self-diagnosis.

### Is DTC "C1921" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>STC-116, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

## Diagnosis Procedure

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

### With CONSULT-III

Perform ECM self-diagnosis.

### Is any error system detected?

### YES >> Check the error system.

NO >> GO TO 2.

# 2. PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

### Is DTC "U1000" or "U1010" detected?

- YES >> Check the error system.
- NO >> GO TO 3.

**3.** PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

#### Is DTC "C1921" detected?

YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

NO >> GO TO 4.

### **4.**INFORMATION CHECK

### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157,</u> "Reference Value".

#### Is each data the standard value?

- YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.
- NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

# STC-116

Special Repair Requirement	INFOID:000000004258014	А
<ul> <li>BEFORE REPLACING 4WAS MAIN CONTROL UNIT</li> <li>Record the self-diagnosis results (history).</li> <li>CAUTION:</li> <li>Never erase the memory (history) of self-diagnosis results when replacing 4WAS magnetic</li> </ul>	ain control unit	В
<ul> <li>after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing out or record ues of "DATA MONITOR".</li> </ul>	ing all the val-	С
		D

STC

Е

F

J

Κ

L

Μ

Ν

Ο

Ρ

# C1923 STEERING ANGLE SEN

# Description

Steering angle sensor signal is transmitted from steering angle sensor to 4WAS main control unit via CAN communication.

# DTC Logic

INFOID:000000004258016

# DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1923	STEERING ANGLE SEN [NO CHANGE]	Malfunction is detected in steering angle sensor signal that is output from steering angle sensor via CAN com- munication. [Steering angle sensor input signal error is detected when driving at 60 km/h (37MPH) or more.]	Steering angle sensor in- put signal error

# DTC CONFIRMATION PROCEDURE

# **1.**RECHECK DTC

### With CONSULT-III

- 1. Drive at 60 km/h (38MPH) or more for 3 minutes or more.
- 2. Perform 4WAS main control unit self-diagnosis.

### Is DTC "C1923" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>STC-118, "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

# Diagnosis Procedure

INFOID:000000004258017

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

### With CONSULT-III

Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is any error system detected?

YES >> Check the error system.

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

Is DTC "U1000" or "U1010" detected?

- YES >> Check the error system.
- NO >> GO TO 3.

**3.** PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

### With CONSULT-III

Perform 4WAS main control unit self-diagnosis.

### Is DTC "C1923" detected?

YES >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

NO >> GO TO 4.

**4.**INFORMATION CHECK

### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157.</u> <u>"Reference Value"</u>.

Is each data the standard value?

INFOID:000000004258015

# **C1923 STEERING ANGLE SEN**

C 1923 STEERING ANGLE SEN	
< DTC/CIRCUIT DIAGNOSIS >	[WITH 4WAS]
YES >> Check that there is no malfunction in each harness connector pin term >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u> .	inal or disconnection.
Special Repair Requirement	INFOID:00000004258018
<ul> <li>BEFORE REPLACING 4WAS MAIN CONTROL UNIT</li> <li>Record the self-diagnosis results (history). CAUTION:</li> <li>Never erase the memory (history) of self-diagnosis results when replacing after diagnosis.</li> <li>Erase the memory of the self-diagnosis results (record) after printing our ues of "DATA MONITOR".</li> </ul>	-
AFTER REPLACING STEERING ANGLE SENSOR	
<b>1.</b> PERFORM ACTIVE TEST (LOCK OPERATION)	
<ul> <li>With CONSULT-III</li> <li>Stop vehicle with front wheels in the straight-ahead position.</li> <li>Turn the ignition switch ON. CAUTION: Never start engine.</li> <li>Select "LOCK OPERATION" item on "ACTIVE" of 4WAS front control unit.</li> </ul>	
<ol> <li>Perform "RELEASE" of "ACTIVE TEST". CAUTION:         <ul> <li>Turn steering wheel 90°, and then check that front tire does not move.</li> <li>Never turn steering wheel 1 turn or more while performing "RELEASE".</li> </ul> </li> <li>Place steering wheel in neutral position.</li> <li>Perform "LOCK" item on "ACTIVE TEST" of 4WAS front control unit.</li> <li>Steer 30° leftward slowly. Steer 30° rightward and return the steering wheel to the steering wheel of 4WAS front control unit.</li> </ol>	
>> GO TO 2. <b>2.</b> STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT	
<ul> <li>With CONSULT-III</li> <li>Adjust steering angle sensor neutral position. Refer to <u>BRC-8</u>, "ADJUSTMEN <u>SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.</li> <li>Turn the ignition switch OFF.</li> </ul>	IT OF STEERING ANGLE
>> GO TO 3.	
<b>3.</b> RETURN TO 4WAS FRONT ACTUATOR INITIAL POSITION	
<ol> <li>Start engine. CAUTION: Check condition with the vehicle stopped.</li> <li>Turn steering wheel to the left by 90° slowly, and then turn to the right by 90°.</li> <li>Again, turn steering wheel to the left by 90° slowly, and then turn to the right by</li> </ol>	90° so that it faces straight
<ul><li>ahead.</li><li>4. Stop vehicle with front wheels in the straight-ahead position after driving vehic starting)</li></ul>	le for a short time. (Engine
>> GO TO 4.	

CAUTION:

Never touch steering wheel while performing.

### 4WAS STR ANG : -3.5 - 3.5deg

2. Turn the ignition switch OFF.

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 1.

5.PERFORM ACTIVE TEST (SLOW MODE)

### With CONSULT-III

Start engine.

1.

### Check condition with the vehicle stopped.

- 2. Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.
- 3. Perform "MODE START" of "ACTIVE TEST".
- 4. Turn steering wheel to the left slowly until it stops.
- 5. Turn steering wheel to the right slowly until it stops.

Does "OK" display on both the left and right sides on "SLOW MODE" items of the monitor?

YES >> GO TO 6.

NO >> Refer to <u>STC-31</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special <u>Repair Requirement (Pattern 4)"</u>.

**6.**PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)

### With CONSULT-III

Perform 4WAS front control unit self-diagnosis.

Is malfunction detected?

YES >> Check malfunctioning circuit.

NO >> GO TO 7.

**7.**ERASE ERROR RECORD

### With CONSULT-III

Erase memories of self-diagnosis results for 4WAS front control unit and 4WAS main control unit.

>> END

# C1924 STEERING ANGLE SEN

# Description

Steering angle sensor signal is transmitted from steering angle sensor to 4WAS main control unit via CAN  $_{\mbox{\scriptsize B}}$  communication.

# DTC Logic

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause	D
C1924	STEERING ANGLE SEN [NO NEUT STATE]	Driving continuously at 10 km (6 mile) or more while the steering angle sensor value is not L10° - R10°. (Not detected in 4WAS front control unit fail-safe mode)	Steering angle sensor in- put signal error	E
DTC CONFIRMATION PROCEDURE				

# **1.**RECHECK DTC

I.RECHECK DIC	
<ul> <li>With CONSULT-III</li> <li>Drive continuously for 10 km (6 mile) or more.</li> <li>Perform 4WAS main control unit self-diagnosis.</li> </ul>	STC
Is DTC "C1924" detected?	Н
<ul> <li>YES &gt;&gt; Proceed to diagnosis procedure. Refer to <u>STC-121, "Diagnosis Procedure"</u>.</li> <li>NO &gt;&gt; INSPECTION END</li> </ul>	
Diagnosis Procedure	
1.CHECK DRIVING	
Drive for a short time.	J
Does the vehicle drive with front wheels in the straight-ahead position?	
YES >> GO TO 2.	К
NO >> Adjust the wheel alignment. Refer to <u>FSU-8, "Inspection"</u> .	N
<b>2.</b> PERFORM SELF-DIAGNOSIS OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	
With CONSULT-III     Perform ABS actuator and electric unit (control unit) self-diagnosis.	L
Is malfunction detected?	
YES >> Check malfunctioning circuit. NO >> GO TO 3.	Μ
<b>3.</b> PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)	NI
With CONSULT-III	IN
Perform 4WAS main control unit self-diagnosis.	
Is DTC "U1000" or "U1010" detected?	0
YES >> Check malfunctioning circuit. NO >> GO TO 4.	
<b>4.</b> PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)	Ρ
With CONSULT-III     Perform 4WAS main control unit self-diagnosis.	
Is DTC "C1924" detected?	
<ul> <li>YES &gt;&gt; Replace 4WAS main control unit. Refer to <u>STC-180. "Exploded View"</u>.</li> <li>NO &gt;&gt; GO TO 5.</li> </ul>	

# STC-121

INFOID:000000004258019

INFOID:000000004258020

А

С

### 5. CHECK INFORMATION

### With CONSULT-III

Check the "DATA MONITOR" value of each DTC detected with the self-diagnosis function. Refer to <u>STC-157.</u> <u>"Reference Value"</u>.

#### Is each data standard?

- YES >> Check pin terminal and connection of each harness connector for non-standard conditions.
- NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

### Special Repair Requirement

INFOID:000000004258022

### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

### AFTER REPLACING STEERING ANGLE SENSOR

### **1.**PERFORM ACTIVE TEST (LOCK OPERATION)

#### With CONSULT-III

- 1. Stop vehicle with front wheels in the straight-ahead position.
- 2. Turn the ignition switch ON.

#### CAUTION: Never start engine.

- 3. Select "LOCK OPERATION" item on "ACTIVE" of 4WAS front control unit.
- 4. Perform "RELEASE" of "ACTIVE TEST". CAUTION:
  - Turn steering wheel 90°, and then check that front tire does not move.
  - Never turn steering wheel 1 turn or more while performing "RELEASE".
- 5. Place steering wheel in neutral position.
- 6. Perform "LOCK" item on "ACTIVE TEST" of 4WAS front control unit.
- 7. Steer 30° leftward slowly. Steer 30° rightward and return the steering wheel to the straight-ahead position.
- 8. Complete active test of 4WAS front control unit.

### >> GO TO 2.

# 2. STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT

### With CONSULT-III

- 1. Adjust steering angle sensor neutral position. Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE <u>SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.
- 2. Turn the ignition switch OFF.

### >> GO TO 3.

# **3.** RETURN TO 4WAS FRONT ACTUATOR INITIAL POSITION

#### 1. Start engine. CAUTION:

### Check condition with the vehicle stopped.

- 2. Turn steering wheel to the left by 90° slowly, and then turn to the right by 90°.
- 3. Again, turn steering wheel to the left by 90° slowly, and then turn to the right by 90° so that it faces straight ahead.
- 4. Stop vehicle with front wheels in the straight-ahead position after driving vehicle for a short time. (Engine starting)

>> GO TO 4.

# **C1924 STEERING ANGLE SEN**

< DTC/CIRCUIT DIAGNOSIS >	[WITH 4WAS]
4.CHECK 4WAS FRONT ACTUATOR	
<ul> <li>With CONSULT-III</li> <li>Check "4WAS STR ANG" item on "DATA MONITOR" of 4WAS front control unit. CAUTION: Never touch steering wheel while performing.</li> </ul>	
4WAS STR ANG : -3.5 - 3.5deg	
2. Turn the ignition switch OFF. <u>Is the inspection result normal?</u>	
YES >> GO TO 5.	
NO >> GO TO 1.	
5.PERFORM ACTIVE TEST (SLOW MODE)	
With CONSULT-III	
1. Start engine. CAUTION:	
<ol> <li>Check condition with the vehicle stopped.</li> <li>Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.</li> </ol>	
3. Perform "MODE START" of "ACTIVE TEST".	
4. Turn steering wheel to the left slowly until it stops.	
<ol><li>Turn steering wheel to the right slowly until it stops.</li></ol> Does "OK" display on both the left and right sides on "SLOW MODE" items of the monitor.	or?
YES >> GO TO 6.	<u>//</u>
NO >> Refer to <u>STC-31, "4WAS FRONT ACTUATOR NEUTRAL POSITION AD</u> Repair Requirement (Pattern 4)".	<u>JUSTMENT : Special</u>
6. PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)	
(P)With CONSULT-III	
Perform 4WAS front control unit self-diagnosis.	
Is malfunction detected?	
YES >> Check malfunctioning circuit. NO >> GO TO 7.	
7.erase error record	
With CONSULT-III     Erase memories of self-diagnosis results for 4WAS front control unit and 4WAS main co	ntrol unit.
>> END	

# C1926, C1932 STEERING ANGLE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# C1926, C1932 STEERING ANGLE SENSOR

# Description

Steering angle sensor signal is transmitted from steering angle sensor to 4WAS main control unit via CAN communication.

# DTC Logic

INFOID:000000004258024

INFOID:000000004258023

# DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1926	STEERING ANGLE SEN	Malfunction is detected in steering angle sensor signal that is output from steering angle sensor via CAN com- munication. (When improper signal inputs to steering angle sensor and steering angle sensor itself detects the malfunc- tion)	Steering angle sensor er- ror
C1932	STEERING ANGLE SEN	If the steering angle sensor error is detected. (Steering angle sensor output value is abnormal.)	Steering angle sensor in- put signal error

# DTC CONFIRMATION PROCEDURE

# **1.**RECHECK DTC

### With CONSULT-III

. Start the engine.

#### CAUTION: Stop the vehicle.

- 2. Turn the steering wheel leftward slowly. Steer until the turning stops.
- 3. Turn the steering wheel rightward slowly. Steer to the straight-forward position.
- 4. Perform 4WAS main control unit self-diagnosis.

### Is DTC "C1926" or "C1932" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>STC-124, "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

### Diagnosis Procedure

INFOID:000000004258025

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

### With CONSULT-III

Perform ABS actuator and electrical unit (control unit) self-diagnosis.

### Is any error system detected?

YES >> Check the error system.

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

### With CONSULT-III

Perform 4WAS main control unit self-diagnosis

Is DTC "U1000" or "U1010" detected?

YES >> Check the error system.

NO >> GO TO 3.

**3.** PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

### With CONSULT-III

Perform 4WAS main control unit self-diagnosis

Is DTC "C1926" or "C1932" detected?

C1926 >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

# STC-124

# C1926, C1932 STEERING ANGLE SENSOR

< D	TC/CIRCUIT DIAGNOSIS >	[WITH 4WAS]
C1 NC	<ul> <li>932 &gt;&gt; Replace steering angle sensor. Refer to <u>BRC-105. "Exploded View"</u>.</li> <li>&gt;&gt; GO TO 4.</li> </ul>	ļ.
4.	NFORMATION CHECK	
Che <u>"Ref</u>		C
_	ecial Repair Requirement	INFOID:000000004258026
• Re C/ • I	FORE REPLACING 4WAS MAIN CONTROL UNIT ecord the self-diagnosis results (history). AUTION: Never erase the memory (history) of self-diagnosis results when replacing 4WAS i after diagnosis. Erase the memory of the self-diagnosis results (record) after printing out or reco ues of "DATA MONITOR".	г
AFT	ER REPLACING STEERING ANGLE SENSOR	ST
<b>1.</b> F	PERFORM ACTIVE TEST (LOCK OPERATION)	5
1. 2. 3. 4. 5. 6. 7.	<ul> <li><i>Vith CONSULT-III</i></li> <li>Stop vehicle with front wheels in the straight-ahead position.</li> <li>Turn the ignition switch ON.</li> <li>CAUTION:</li> <li>Never start engine.</li> <li>Select "LOCK OPERATION" item on "ACTIVE" of 4WAS front control unit.</li> <li>Perform "RELEASE" of "ACTIVE TEST".</li> <li>CAUTION:</li> <li>Turn steering wheel 90°, and then check that front tire does not move.</li> <li>Never turn steering wheel 1 turn or more while performing "RELEASE".</li> <li>Place steering wheel in neutral position.</li> <li>Perform "LOCK" item on "ACTIVE TEST" of 4WAS front control unit.</li> <li>Steer 30° leftward slowly. Steer 30° rightward and return the steering wheel to the straig Complete active test of 4WAS front control unit.</li> </ul>	ht-ahead position.
2 -	>> GO TO 2. STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT	L
<b>•W</b> 1.	Adjust steering angle sensor neutral position. Refer to <u>BRC-8, "ADJUSTMENT OF S</u> <u>SENSOR NEUTRAL POSITION : Special Repair Requirement</u> ".         Turn the ignition switch OFF.	TEERING ANGLE
	>> GO TO 3.	
<b>3.</b> F	RETURN TO 4WAS FRONT ACTUATOR INITIAL POSITION	C
2. 3. 4.	Start engine. CAUTION: Check condition with the vehicle stopped. Turn steering wheel to the left by 90° slowly, and then turn to the right by 90°. Again, turn steering wheel to the left by 90° slowly, and then turn to the right by 90° so the ahead. Stop vehicle with front wheels in the straight-ahead position after driving vehicle for a s starting)	-

# C1926, C1932 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

>> GO TO 4.

**4.**CHECK 4WAS FRONT ACTUATOR

### With CONSULT-III

 Check "4WAS STR ANG" item on "DATA MONITOR" of 4WAS front control unit. CAUTION:

Never touch steering wheel while performing.

### 4WAS STR ANG : -3.5 - 3.5deg

2. Turn the ignition switch OFF.

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 1.

**5.**PERFORM ACTIVE TEST (SLOW MODE)

### With CONSULT-III

# Start engine.

1.

### Check condition with the vehicle stopped.

- 2. Select "SLOW MODE" item on "ACTIVE TEST" of 4WAS front control unit.
- 3. Perform "MODE START" of "ACTIVE TEST".
- 4. Turn steering wheel to the left slowly until it stops.
- 5. Turn steering wheel to the right slowly until it stops.

### Does "OK" display on both the left and right sides on "SLOW MODE" items of the monitor?

- YES >> GO TO 6.
- NO >> Refer to <u>STC-31. "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special</u> <u>Repair Requirement (Pattern 4)"</u>.

**6.**PERFORM SELF-DIAGNOSIS (4WAS FRONT CONTROL UNIT)

### With CONSULT-III

Perform 4WAS front control unit self-diagnosis.

Is malfunction detected?

YES >> Check malfunctioning circuit.

NO >> GO TO 7.

**I**.ERASE ERROR RECORD

### With CONSULT-III

Erase memories of self-diagnosis results for 4WAS front control unit and 4WAS main control unit.

>> END

# C1930 4WAS FRONT CONTROL UNIT

# Description

It transmits the value calculated by 4WAS main control unit to 4WAS front control unit via 4WAS communication line (line for 4WAS system only). 4WAS front control unit controls 4WAS front actuator according to the received command value.

# DTC Logic

INFOID:000000004258028

А

# DTC DETECTION LOGIC

DTC         Items (CONSULT-III screen terms)         Diagnostic item is detected when         Possible cause           C1930         4WAS FRONT ECU         An error is detected on 4WAS front control unit side         4WAS front control unit (4WAS front control unit fail-safe mode)         4WAS front control unit fail-safe mode           DTC CONFIRMATION PROCEDURE .RECHECK DTC         An error is detected on 4WAS front control unit fail-safe mode)         4WAS front control unit fail-safe mode           With CONSULT-III         Turn the ignition switch from OFF to ON.         Perform 4WAS main control unit self-diagnosis.         50TC 'C1930'' detected?           YES         > Proceed to diagnosis procedure. Refer to STC-127. "Diagnosis Procedure". NO         >> INSPECTION END           Diagnosis Procedure					
C1930       4WAS FRONT ECU       (4WAS front control unit fail-safe mode)       fail-safe mode         OTC CONFIRMATION PROCEDURE	DTC		Diagnostic item is detected when	Possible cause	
.RECHECK DTC         With CONSULT-III         . Turn the ignition switch from OFF to ON.         2. Perform 4WAS main control unit self-diagnosis.         s DTC "C1930" detected?         YES       >> Proceed to diagnosis procedure. Refer to STC-127. "Diagnosis Procedure".         NO       >> INSPECTION END         Diagnosis Procedure       Information of the self-diagnosis.         .PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)         With CONSULT-III         Perform 4WAS main control unit self-diagnosis.         s any DTC other than "C1930" detected?         YES       >> Check the error system.	C1930	4WAS FRONT ECU			E
With CONSULT-III         I. Turn the ignition switch from OFF to ON.         2. Perform 4WAS main control unit self-diagnosis.         s DTC "C1930" detected?         YES       >> Proceed to diagnosis procedure. Refer to STC-127. "Diagnosis Procedure".         NO       >> INSPECTION END         Diagnosis Procedure       INFOLD.0000004258029         PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)       INFOLD.0000004258029         With CONSULT-III       Perform 4WAS main control unit self-diagnosis.         s any DTC other than "C1930" detected?         YES       >> Check the error system.	DTC CONFIR	MATION PROCEDURE			
<ul> <li>Turn the ignition switch from OFF to ON.</li> <li>Perform 4WAS main control unit self-diagnosis.</li> <li><u>s DTC "C1930" detected?</u></li> <li>YES &gt;&gt; Proceed to diagnosis procedure. Refer to <u>STC-127. "Diagnosis Procedure"</u>.</li> <li>NO &gt;&gt; INSPECTION END</li> <li>Diagnosis Procedure</li> <li>IPERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)</li> <li>With CONSULT-III</li> <li>Perform 4WAS main control unit self-diagnosis.</li> <li><u>s any DTC other than "C1930" detected?</u></li> <li>YES &gt;&gt; Check the error system.</li> </ul>	<b>1</b> .RECHECK	DTC			F
Diagnosis Procedure       INFOID:0000004258029         I.PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)         With CONSULT-III         Perform 4WAS main control unit self-diagnosis.         s any DTC other than "C1930" detected?         YES       >> Check the error system.	I. Turn the ig 2. Perform 4\ <u>s DTC "C1930</u> YES >> Pro	nition switch from OFF to NAS main control unit self <u>" detected?</u> oceed to diagnosis proced	-diagnosis.		S1
PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)  With CONSULT-III Perform 4WAS main control unit self-diagnosis. s any DTC other than "C1930" detected? YES >> Check the error system.				INFOID:000000004258029	
Perform 4WAS main control unit self-diagnosis. <u>s any DTC other than "C1930" detected?</u> YES >> Check the error system.			S MAIN CONTROL UNIT)		
s any DTC other than "C1930" detected? YES >> Check the error system.			nnosis		L.
			-		
			unit self-diagnosis.		k
					1
					L
					Ν
					Ν
					(

Ρ

INFOID:000000004258027

### < DTC/CIRCUIT DIAGNOSIS >

# C1931 4WAS FRONT CONTROL UNIT COMMUNICATION

# Description

INFOID:000000004258030

[WITH 4WAS]

- 4WAS front control unit and 4WAS main control unit transmit/receive information to/from each other for optimum control of the 4WAS system with the specified 4WAS system line (4WAS communication line) between 4WAS front control unit and 4WAS main control unit.
- Be careful to repair wirings because 4WAS system specified line adopts twisted-pair wires. Refer to <u>STC-</u> <u>178, "Precautions for Harness Repair"</u>.

### DTC Logic

INFOID:000000004258031

INFOID:000000004258032

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
C1931	4WAS FRONT ECU COMM	4WAS communication line* data communication error is detected. (An error signal is detected from 4WAS front control unit.)	4WAS communication line*/4WAS front control unit/4WAS main control unit error

\*: Communication line between 4WAS front control unit and 4WAS main control unit.

## DTC CONFIRMATION PROCEDURE

# **1**.RECHECK DTC

### With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS main control unit self-diagnosis.

### Is DTC "C1931" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-128. "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

### Diagnosis Procedure

# **1.**CHECK COMMUNICATION LINE (1)

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect yaw rate/side G sensor harness connector.
- 4. Disconnect 4WAS front control unit harness connector.
- 5. Disconnect 4WAS main control unit harness connector.
- 6. Check the continuity between ABS actuator and electric unit (control unit) harness connector and yaw rate/side G sensor harness connector.

ABS actuator and electric unit (control unit)		Yaw rate/side G sensor.		Continuity
Connector	Terminal	Connector	Terminal	
F41	25	M143	2	Existed
L41	45	111143	3	LAISIEU

### Is the inspection result normal?

YES >> GO TO 2.

- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.
- 2. CHECK COMMUNICATION LINE (2)

Check the continuity between ABS actuator and electric unit (control unit) harness connector and the ground.

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

			А
	tor and electric unit (control unit)	- Continuity	
Connector	Terminal		
E41	25 – Ground	Not existed	В
	45 – Ground		
Is the inspection			0
		nd connectors. Refer to STC-178, "Precautions for Harness	С
3.CHECK CON	MUNICATION LINE (3)		D
		electric unit (control unit) harness connector.	
ABS actua	tor and electric unit (control unit)		E
Connector	Terminal	Continuity	
E41	25 – 45	Not existed	F
Is the inspection	n result normal?		
YES >> GO			
	pair or replace the harnesses ar pair".	nd connectors. Refer to <u>STC-178, "Precautions for Harness</u>	ST
4.CHECK ABS	ACTUATOR AND ELECTRIC U	NIT (CONTROL UNIT)	
	nuity between ABS actuator and on [ABS Actuator and Electric Un	electric unit (control unit) connector. Refer to <u>STC-85</u> , "Com-	Η
Is the inspection			
YES >> GO			
		init (control unit). Refer to <u>BRC-102, "Exploded View"</u> .	
5.CHECK YAW	/ RATE/SIDE G SENSOR		J
		sensor connector. Refer to STC-85, "Component Inspection	
(Yaw Rate/Side			
Is the inspection YES >> GO			K
		fer to <u>BRC-104, "Exploded View"</u> .	
<b>^</b>	-	FOR (4WAS FRONT CONTROL UNIT)	L
With CONSU Connect AE	S actuator and electric unit (cont	trol unit) harness connector	
	w rate/side G sensor harness co		N
	VAS front control unit harness co		
<ol> <li>Connect 4V</li> <li>Start the en</li> </ol>	VAS main control unit harness co gine	nnector.	Ν
CAUTION:	gillo		
Stop the ve			
		or history. Refer to <u>STC-40. "CONSULT-III Function</u>	С
What is the indi			_
	DK">>GO TO 7.		Ρ
	IAG" is other than "OK">>GO TO ' is other than "OK">>GO TO 8.	)7.	
7.CHECK 4WA	S FRONT CONTROL UNIT CIR	CUIT	
	nition switch OFF. 4WAS front control unit harness	connector.	

Disconnect 4WAS front control unit harness connector.
 Disconnect ABS actuator and electric unit (control unit) harness connector.

# STC-129

### < DTC/CIRCUIT DIAGNOSIS >

4. Check the continuity between 4WAS front control unit harness connector and ABS actuator and electric unit (control unit) harness connector.

4WAS front control unit		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M42	14	F41	25	Existed
10142	25	C41	45	Existed

5. Check that 4WAS front control unit connector No. 14 terminal and No. 25 are connected properly and not deformed.

Is the inspection result normal?

- YES >> Replace 4WAS front control unit. Refer to STC-179, "Exploded View".
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.

**8.**CHECK 4WAS MAIN CONTROL UNIT CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS main control unit harness connector.
- 3. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 4. Check the continuity between 4WAS main control unit harness connector and ABS actuator and electric unit (control unit) harness connector.

4WAS main control unit ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal	Connector	Terminal	
B54	31	F41	45	Existed
D04	32	C41	25	Existed

5. Check that 4WAS main control unit connector No. 31 terminal and No. 32 are connected properly and not deformed.

Is the inspection result normal?

- YES >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".
- NO >> Repair or replace the harnesses and connectors. Refer to <u>STC-178</u>, "Precautions for Harness <u>Repair"</u>.

Component Inspection [ABS Actuator and Electric Unit (Control Unit)]

**1.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

1. Turn the ignition switch OFF.

2. Remove ABS actuator and electric unit (control unit). Refer to <u>BRC-102, "Exploded View"</u>.

3. Check the resistance between ABS actuator and electric unit (control unit) connector terminals.

ABS actuate	or and electric unit (control unit)	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
E41	25 – 45	120 Ω

#### Is the inspection result normal?

#### YES >> INSPECTION END

NO >> Replace ABS actuator and electric unit (control unit).

### Component Inspection (Yaw Rate/Side G Sensor)

# **1.**CHECK YAW RATE/SIDE G SENSOR

- 1. Turn the ignition switch OFF.
- 2. Remove yaw rate/side G sensor. Refer to BRC-104, "Exploded View".
- 3. Check the resistance between yaw rate/side G sensor connector terminals.

### **STC-130**

INFOID:000000004258034

INFOID:000000004258033

[WITH 4WAS]

### < DTC/CIRCUIT DIAGNOSIS >

[WITH 4WAS]

Yaw r	ate/side G sensor	Resistance (Approx.)	
Connector	Terminal		
M143	2-3	120 Ω	
	n result normal?		
	SPECTION END place yaw rate/side G	sensor	
	-		
pecial Rep	air Requirement		INFOID:000000004258035
FORE REP	LACING 4WAS FRO	ONT CONTROL UNIT	
	elf-diagnosis results (h	nistory).	
CAUTION: • Never erase	e the memory (histo	ry) of self-diagnosis results when re	eplacing 4WAS front control unit
after diagn	osis.		
	nemory of the self-d TA MONITOR".	diagnosis results (record) after print	ting out or recording all the val-
		IN CONTROL UNIT	
Record the se	elf-diagnosis results (h		
CAUTION:	o tho momory (histor	ry) of self-diagnosis results when re	placing AWAS main control unit
after diagn		ry) of self-diagnosis results when re	placing 4WAS main control unit
	nomory of the solf-d	diagnosis results (record) after print	ting out or recording all the val-
ues of "DA	TA MONITOR".		
ues of "DA TER REPL	<b>TA MONITOR".</b> ACING 4WAS FROM	NT CONTROL UNIT	
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus		trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>
ues of "DA TER REPL Perform 4WA	<b>TA MONITOR".</b> ACING 4WAS FROM S front actuator adjus	NT CONTROL UNIT stment after replacing 4WAS front con	trol unit. Refer to <u>STC-29, "4WAS</u>

# U1000 CAN COMM CIRCUIT

# Description

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

# DTC Logic

INFOID:000000004258037

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
U1000	CAN COMM	When 4WAS main control unit is not transmitting or re- ceiving CAN communication signal for 2 seconds or more.	CAN communication er- ror

### DTC CONFIRMATION PROCEDURE

## **1.**RECHECK DTC

### (B) With CONSULT-III

- Turn the ignition switch from OFF to ON.
- 2. Perform 4WAS main control unit self-diagnosis.

### Is DTC "U1000" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>STC-132, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

### Diagnosis Procedure

### **1.**PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

Perform 4WAS main control unit self-diagnosis.

### Is DTC "U1000" detected?

- YES >> Perform CAN diagnosis.
- NO >> INSPECTION END

Special Repair Requirement

INFOID:000000004258039

INFOID:000000004258038

### BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

INFOID:000000004258036

# U1010 CONTROL UNIT (CAN)

# 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 transmits/receives data but selectively reads required data only.

# DTC Logic

### DTC DETECTION LOGIC

DTC	Items (CONSULT-III screen terms)	Diagnostic item is detected when	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of 4WAS main control unit.	CAN communication line/ 4WAS main control unit/ ECM/ABS actuator and electric unit (control unit) error
DTC CONFIR	MATION PROCEDURE		
1.RECHECK	DTC		
2. Perform 4 <u>Is DTC "U1010</u> YES >> Pr	nition switch from OFF to WAS main control unit self <u>)" detected?</u>		
Diagnosis F	Procedure		INFOID:000000004258042
1.4WAS MAIN	N CONTROL UNIT		
		AS main control unit harness connector or disc	connection.
YES >> Re NO >> Re		unit. Refer to <u>STC-180, "Exploded View"</u> . sses and connectors. Refer to <u>STC-178, "Pr</u>	ecautions for Harness
Special Rep	pair Requirement		INFOID:000000004258043
	PLACING 4WAS MAIN ( elf-diagnosis results (histo		
		of self-diagnosis results when replacing 4W	AS main control unit
• Erase the		nosis results (record) after printing out or	recording all the val-

INFOID:000000004258040

INFOID:000000004258041

А

D

# Description

4WAS system power supply

## Diagnosis Procedure (4WAS Front Control Unit)

1.CHECK 4WAS FRONT CONTROL UNIT POWER SUPPLY

- 1. Turn the ignition switch OFF.
- 2. Disconnect 4WAS front control unit harness connector.
- 3. Check the voltage between 4WAS front control unit harness connectors and the ground.

4	WAS front control unit	Voltage (Approx.)
Connector	Terminal	vollage (Applox.)
M41	11 – Ground	Battery voltage
M42	15 – Ground	0 V

4. Turn the ignition switch ON. CAUTION:

### Never start the engine.

5. Check the voltage between 4WAS front control unit harness connectors and the ground.

4	WAS front control unit	Voltage (Approx.)
Connector	Terminal	vollage (Approx.)
M41	11 – Ground	Patton voltago
M42	15 – Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO

- >> Check the following items. Repair or replace the malfunctioning parts.
  - 40A fusible link (#I) open
  - Short among 40A fusible link (#I) connector, 4WAS front control unit harness connector No. 11 terminal and the ground
  - Open between the battery and 4WAS front control unit harness connector No. 11 terminal
  - 10A fuse (#3) open
  - Short among 10A fuse (#3) connector, 4WAS front control unit harness connector No. 15 terminal and the ground
  - Short among 10A fuse (#3) connector, unified meter and A/C amp No. 53 terminal and the ground
  - Open between the ignition switch and 4WAS front control unit harness connector No. 15 terminal
  - Battery or ignition switch

2.CHECK 4WAS FRONT CONTROL UNIT GROUND

Check the continuity between 4WAS front control unit harness connector and the ground.

	4WAS front control unit				
Connector	Terminal	Continuity			
M41	12 – Ground				
M42	18 – Ground	Existed			
10142	34 – Ground				

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace the harnesses and connectors.

INFOID:000000004258044

INFOID:000000004258045

	IT DIAGNOSIS >	Inin Car	tral l lo:t)		
Plagnosis P	Procedure (4WAS N	Viain Con	troi Unit)		INFOID:00000000425804
.CHECK 4W	AS MAIN CONTROL UI		R SUPPLY		
. Disconnec	nition switch OFF. t 4WAS main control un voltage between 4WAS			ors and the grour	nd.
414/4					
	S main control unit	Voltage	(Approx.)		
Connector	Terminal				
B54	27 – Ground nition switch ON.	(			
Check the	r <b>t the engine.</b> voltage between 4WAS	main contro	ol unit harness connect	ors and the grour	nd.
Connector	Terminal	Voltage	(Approx.)		
B54	27 – Ground	Batter	y voltage		
-	n result normal?	Dattor	yvollago		
NO >> 0 • 1 - 5 n • 0	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (i ninal and the ground Dpen between the ignition nal gnition switch	#45) conne	ctor, 4WAS main contro	ol unit harness co	
NO >> 0 • 1 - 5 • 0 • 0 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (# ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF.	#45) conne	ctor, 4WAS main contro	ol unit harness co	
NO >> 0 • 1 - 5 n • 0 r • 1 • 1 • • 1 • • 1 • • 1 • • 1 • • 1 • • 0 • • 1 • • 1 • • 1 • • 1 • • 1 • • • • •	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse ( ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV	#45) conne on switch ar VER SUPP	ctor, 4WAS main contro nd 4WAS main control LY CIRCUIT (1)	bl unit harness co unit harness conr	nector No. 27 termi-
NO >> 0 • 1 - 5 n • 0 r • 1 • 1 • • 1 • • 1 • • 1 • • 1 • • 1 • • 0 • • 1 • • 1 • • 1 • • 1 • • 1 • • • • •	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (ininal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF. WAS rear motor relay.	#45) conne on switch ar VER SUPP	ctor, 4WAS main contro nd 4WAS main control LY CIRCUIT (1) or relay harness conne	bl unit harness co unit harness conr	nector No. 27 termi-
NO >> 0 • 1 - 5 • 0 • 0 • 1 • 1 • 5 • 1 • 0 • 1 • 5 • 1 • 5 • 1 • 6 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse ( ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF. WAS rear motor relay. continuity between 4WA	#45) conne on switch ar VER SUPP	ctor, 4WAS main contro nd 4WAS main control LY CIRCUIT (1)	bl unit harness co unit harness conr	nector No. 27 termi-
NO >> C 1 - S n • C r • I CHECK 4W • Turn the ig Remove 4 • Check the Connector	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (in ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF. WAS rear motor relay. continuity between 4WA	#45) conne on switch ar VER SUPP	ctor, 4WAS main contro nd 4WAS main control LY CIRCUIT (1) or relay harness conne	bl unit harness co unit harness conr	nector No. 27 termi-
NO >> 0 • 1 - S n • 0 r • 1 • 0 r • 1 • 0 r • 1 • 0 r • 1 • 0 r • 1 • 0 • 1 • 0 • 1 • 0 • 0 • 1 • 0 • 0 • 1 • 0 • 1 • 0 • 0 • 1 • 0 • 0 • 1 • 0 • 0 • 0 • 0 • 0 • 0 • 0 • 0	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (i ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF. WAS rear motor relay. continuity between 4WA 4WAS rear motor relay Terminal 1 – Ground 2 – Ground	#45) conne on switch ar VER SUPP	ctor, 4WAS main control nd 4WAS main control LY CIRCUIT (1) or relay harness conne	bl unit harness co unit harness conr	nector No. 27 termi-
NO >> C • 1 • 2 • 1 • 2 • 1 • 2 • 1 • 1 • 0 • 1 • 1 • 1 • 1 • 1 • 1 • 1 • 1	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (in ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF. WAS rear motor relay. continuity between 4WA 4WAS rear motor relay Terminal 1 – Ground	#45) conner on switch ar VER SUPP AS rear mot esses and o VER SUPP	ctor, 4WAS main control nd 4WAS main control LY CIRCUIT (1) or relay harness conne Continuity Not existed Existed connectors. LY CIRCUIT (2)	ol unit harness co unit harness conr ctor and the grou	nector No. 27 termi-
NO >> 0 • 1 • 2 • 2 • 2 • 2 • 2 • 2 • 2 • 2	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (in inal and the ground Open between the ignition al gnition switch AS REAR MOTOR POW nition switch OFF. WAS rear motor relay. Continuity between 4WA 4WAS rear motor relay 4WAS rear motor relay Terminal 1 – Ground 2 – Ground in result normal? D TO 3. pair or replace the harn AS REAR MOTOR POW age between 4WAS rear	#45) conner on switch ar VER SUPP AS rear mot esses and o VER SUPP	ctor, 4WAS main control nd 4WAS main control LY CIRCUIT (1) or relay harness conne Continuity Not existed Existed connectors. LY CIRCUIT (2)	ol unit harness co unit harness conr ctor and the grou	nector No. 27 termi-
NO >> 0 1 - 5 n - 6 n - 6 n - 6 n - 1 - 6 n - 6 - 1 - 6 - 1 - 6 - 1 - 6 - 1 - 1 - 6 - 1 - 6 - 1 - 6 - 1 - 6 - 1 - 1 - 6 - 1 - 7 - 1 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7	2 TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (i ninal and the ground Open between the ignition al gnition switch AS REAR MOTOR POV nition switch OFF. WAS rear motor relay. continuity between 4WA 4WAS rear motor relay Terminal 1 – Ground 2 – Ground in result normal? O TO 3. spair or replace the harn AS REAR MOTOR POV age between 4WAS rear S rear motor relay	#45) conner on switch ar VER SUPP AS rear mot esses and of VER SUPP	ctor, 4WAS main control nd 4WAS main control LY CIRCUIT (1) or relay harness conne Continuity Not existed Existed connectors. LY CIRCUIT (2)	ol unit harness co unit harness conr ctor and the grou	nector No. 27 termi-
NO $>> 0$ 1 2.CHECK 4W CHECK 4W CHECK 4W Check the Connector B53 S the inspection YES $>>$ GC NO $>>$ Re CHECK 4W Check the volta	D TO 2. Check the following item OA fuse (#45) open Short among 10A fuse (in inal and the ground Open between the ignition al gnition switch AS REAR MOTOR POW nition switch OFF. WAS rear motor relay. Continuity between 4WA 4WAS rear motor relay 4WAS rear motor relay Terminal 1 – Ground 2 – Ground in result normal? D TO 3. pair or replace the harn AS REAR MOTOR POW age between 4WAS rear	#45) conner on switch ar VER SUPP AS rear mot esses and of VER SUPP motor relation Voltage	ctor, 4WAS main control and 4WAS main control LY CIRCUIT (1) or relay harness conne <u>Continuity</u> Not existed Existed connectors. LY CIRCUIT (2) y harness connector ar	ol unit harness co unit harness conr ctor and the grou	nector No. 27 termi-

One of the following items. Repair or replace the malfunctioning parts.
20A fuse (#37) open
Short among 20A fuse (#37) connector, 4WAS rear motor relay harness connector No. 3 terminal and the ground

# STC-135

### < DTC/CIRCUIT DIAGNOSIS >

#### • Open between the battery and 4WAS rear motor relay harness connector No. 3 terminal

**4.**CHECK 4WAS REAR MOTOR POWER SUPPLY CIRCUIT (3)

- 1. Remove the noise suppressor.
- 2. Check continuity between the noise suppressor harness connector and the ground.

	Noise suppressor				
Connector	Terminal	Continuity			
B51	3 – Ground	Not existed			
001	5 – Ground				
B52	1 – Ground	Not existed			
	2 – Ground	Existed			

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace the harnesses and connectors.

**5.**CHECK 4WAS REAR MOTOR POWER SUPPLY CIRCUIT (4)

1. Connect 4WAS main control unit harness connector.

2. Turn the ignition switch ON. CAUTION:

#### Never start the engine.

3. Check the voltage between 4WAS main control unit harness connectors.

4	WAS main control unit	Voltage (Approx.)
Connector	Terminal	vollage (Applox.)
B54	25 – Ground	Battery voltage

4. Turn the ignition switch OFF.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace 4WAS main control unit. Refer to <u>STC-180, "Exploded View"</u>.

**6.**CHECK 4WAS REAR MOTOR RELAY

 Apply 12 V to 4WAS rear motor relay connector No. 1 terminal and No. 2 terminal. CAUTION:

• Never make the terminals short.

• Connect the fuse between the terminals when applying the voltage.

2. Check the continuity between 4WAS rear motor relay connector terminals.

	Continuity		
Connector	Terminal	Condition	Continuity
B53	3-5	Apply the voltage between No. 1 terminal and No. 2 ter- minal.	Existed
	5-5	Do not apply the voltage be- tween No. 1 terminal and No. 2 terminal.	Not existed

3. Check the resistance between 4WAS rear motor relay connector terminals.

4	WAS rear motor relay	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
B53	1 – 2	50 Ω

Is the inspection result normal?

YES >> GO TO 7.

7.снески	, NOISE SUP	PRESSOR	,				A
Check conti	nuity betwee	en the noise sup	pressor o	connector tern	ninals.		
							E
	Noise s	uppressor		Continuity			
Connector	Terminal	Connector	Terminal	Continuity			
B51	3	B52	1	Existed			(
B51	3	B51	5	Not existed			
B51	3	B52	2	Not existed			Γ
B51	5	B52	2	Existed			
B51	5	B52	1	Not existed			
NO >>	•	e noise suppress R MOTOR POW		PLY			
2. Install 4 3. Install th	WAS rear m ne noise sup e ignition swi	pressor.	Irness co	nnector.			S
Never s	start the eng		nain con	trol unit harne	ss connectors and the	ground.	ŀ
4	WAS main cont	trol unit	Voltar	je (Approx.)			
Connector	Т	erminal	vonag				
B54	37 -	– Ground	Batte	ery voltage			
YES >> NO >>	•	N END.			30. "Exploded View". )	INFCID:00000004258047	ł
.CHECK	4WAS REAF	R MOTOR RELA	Y				L
. Turn the 2. Remove	e ignition swi e 4WAS rear 2 V to 4WAS	itch OFF. <sup>-</sup> motor relay cor	nnector.	ctor No. 1 tern	ninal and No. 2 termina	al.	Ν
<ul><li>Never</li><li>Conne</li></ul>	<sup>•</sup> make the t ect the fuse		erminals		i <b>ng the voltage.</b> nector terminals.		Ν
	4WAS real	r motor relay					_
Connector	Terminal	Conditio	n	Continuity			C
		Apply the voltage No. 1 terminal and minal.		Existed			F
B53	3 – 5	Do not apply the v tween No. 1 term		Not existed			

5. Check the resistance between 4WAS rear motor relay connector terminals.

No. 2 terminal.

< DTC/CIRCUIT DIAGNOSIS >

NO

>> Replace 4WAS rear motor relay.

[WITH 4WAS]

### < DTC/CIRCUIT DIAGNOSIS >

4	WAS rear motor relay	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
B53	1 – 2	50 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WAS rear motor relay.

# Component Inspection (Noise Suppressor)

# 1.NOISE SUPPRESSOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Remove the noise suppressor.

3. Check continuity between the noise suppressor connector terminals.

	Continuity			
Connector	Terminal	Connector	Terminal	Continuity
B51	3	B52	1	Existed
B51	3	B51	5	Not existed
B51	3	B52	2	Not existed
B51	5	B52	2	Existed
B51	5	B52	1	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the noise suppressor.

INFOID:000000004258048

		POWE	R STEERI		DID VALVE	
< DTC/CIRC	CUIT DIAG	NOSIS >			[WITH 4WAS]	
POWER	STEER	ING SOL	ENOID V	ALVE		А
Descriptio	n				INF01D:000000004258049	
The power	steering o	l pressure in t	he gear hous	ing assembly is	controlled.	В
Diagnosis	Procedu	ıre			INF01D:000000004258050	
1.СНЕСК Р	POWER ST	EERING SOL	ENOID VALV	E SIGNAL		С
With CONS 1. Start the 2. Check "	engine.	FR SOL" item	on "DATA MC	ONITOR" of 4WA	AS main control unit.	D
Monitor ite	em	Condit	ion	Display value		Ε
POWER STR	( <b>F</b>	cle speed: 0 km/h ine is running)	(0 MPH)	Approx. 1.10	<i>_</i>	
FOWER ST		cle speed: 100 kr	n/h (62 MPH)	Approx. 0.42		F
	-	Detween 4WA	S main contro		onnector and the ground.	ST(
Connector	Terminal		ondition	Voltage (Ap- prox.)		
		(Engine is runi	: 0 km/h (0 MPH) ning)	) 4.4 – 6.6 V	-	I
B54	36 – Ground	Vehicle speed MPH)	: 100 km/h (62	2.4 – 3.6 V	_	
<u>Is the inspec</u> YES >>	<u>xtion result</u> GO TO 2.	normal?			narness connector or disconnection.	J
<b>^</b>	-	EERING SOL				
<ol> <li>Turn the</li> <li>Disconn</li> </ol>	e ignition sv ect 4WAS	ritch OFF. main control u	nit harness co		tor	L
4. Check t		ty between 4			ess connector and power steering solenoid	M
4WAS main	o control unit	Power steer		Continuity		Ν
Connector	Terminal	Connector	Terminal			
B54 5. Check th	36 he continui	F45 v between por	1 wer steering s	Existed solenoid valve h	arness connector and the ground.	0
	Power steeri	ng solenoid valve		Continuity		Ρ
Connector		Terminal		Eviated		

Is the inspection result normal?

YES >> GO TO 3.

F45

>> Repair or replace the harnesses and connectors. NO

2 – Ground

Existed

[WITH 4WAS]

# **3.**CHECK POWER STEERING SOLENOID VALVE

1. Check the resistance between power steering solenoid valve connector terminals.

Power steering solenoid valve		Resistance (Approx.)
Connector	Terminal	
F45	1 – 2	4 – 6 Ω

 Check for click sound (power steering solenoid valve activation sound) when applying approximately 12 V between the power steering solenoid valve connector terminals.
 CAUTION:

- Never make the terminals short.
- Assign the positive terminal to No. 1 terminal, and the negative terminal to No. 2 terminal. Connect the fuse between the terminals when applying the voltage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair the steering gear. Refer to <u>ST-30, "2WD : Exploded View"</u>.

### Component Inspection

INFOID:000000004258051

### **1.**POWER STEERING SOLENOID VALVE INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the power steering solenoid valve harness connector.
- 3. Check the resistance between power steering solenoid valve connector terminals.

Powe	er steering solenoid valve	Resistance (Approx.)
Connector	Terminal	Resistance (Approx.)
F45	1 – 2	4 – 6 Ω

4. Check for click sound (power steering solenoid valve activation sound) when applying approximately 12 V between the power steering solenoid valve connector terminals.

CAUTION:

Never make the terminals short.

• Assign the positive terminal to No. 1 terminal, and the negative terminal to No. 2 terminal. Connect the fuse between the terminals when applying the voltage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair the steering gear.<u>ST-30. "2WD : Exploded View"</u>.

# **4WAS WARNING LAMP**

[WITH 4WAS] А INFOID:000000004258052 Turn 4WAS warning lamp ON when ignition switch turns ON from OFF. Then, turn 4WAS warning lamp OFF В 4WAS system stops (error) when turning 4WAS warning lamp ON. INFOID:000000004258053 **1.**PERFORM UNIFIED METER AND A/C AMP. SELF-DIAGNOSIS D Perform the self-diagnosis of the unified meter and A/C amp. Е F STC Н

2. Disconnect the unified meter and A/C amp. harness connector. 3. Disconnect the combination meter harness connector. 4. Check the continuity between the unified meter and A/C amp. harness connector and the combination meter harness connector terminal.

Unified meter and A/C amp.		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M66	7	M53	3	Existed
M66	27	M53	2	

Is the inspection result normal? YES >> GO TO 4. NO >> Repair or replace the harnesses and connectors. 4.CHECK 4WAS WARNING LAMP SIGNAL With CONSULT-III 1. Connect the unified meter and A/C amp. harness connector. 2. Connect the combination meter harness connector. Disconnect 4WAS front control unit harness connector. 4. Turn the ignition switch ON. CAUTION: Never start the engine.

5. Check "WARNING LAMP" item on DATA MONITOR of 4WAS main control unit.

Does the item on "DATA MONITOR" indicate "On"?

YES >> GO TO 5.

NO >> Replace 4WAS main control unit. Refer to STC-180, "Exploded View".

**5**.CHECK COMBINATION METER

### (P)With CONSULT-III

Κ

Μ

Ν

Ρ

< DTC/CIRCUIT DIAGNOSIS >

# **4WAS WARNING LAMP**

after the engine is started.

**Diagnosis** Procedure

The check of 4WAS system is performed.

# Description

Is any error system detected? YES >> Check the error system. NO >> GO TO 2.

With CONSULT-III

YES

NO

1.

(P)With CONSULT-III

**2.**PERFORM SELF-DIAGNOSIS (4WAS MAIN CONTROL UNIT)

Perform 4WAS main control unit self-diagnosis.

>> Check the error system.

3. PERFORM COMBINATION METER CIRCUIT

Is DTC "U1000" or "U1010" detected?

Turn the ignition switch OFF.

>> GO TO 3.

# 4WAS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

Perform the trouble diagnosis of the combination meter. Refer to <u>MWI-50, "COMBINATION METER : Diagnosis Procedure"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the combination meter. Refer to <u>MWI-125</u>, "Exploded View".

Special Repair Requirement

INFOID:000000004258054

BEFORE REPLACING 4WAS MAIN CONTROL UNIT

- Record the self-diagnosis results (history). CAUTION:
  - Never erase the memory (history) of self-diagnosis results when replacing 4WAS main control unit after diagnosis.
  - Erase the memory of the self-diagnosis results (record) after printing out or recording all the values of "DATA MONITOR".

# ECU DIAGNOSIS INFORMATION **4WAS FRONT CONTROL UNIT**

# **Reference Value**

# VALUES ON THE DIAGNOSIS TOOL

#### CONSULT-III MONITOR ITEM

Monitor item		Condition	Value/Status	
	Steering wheel turned	Steering wheel turned right		
4WAS STR ANG	Straight-ahead		Approx. 0 deg	
	Steering wheel turned	left	Approx. 0 – –550 deg	
	Vehicle stopped	0 km/h (0 MPH)		
VEHICLE SPEED	Vehicle running CAUTION: Check air pressure of tire under standard conditions.		Approximately equal to the indication on speedometer (Inside of $\pm 10\%$ )	
	The steering wheel is r	The steering wheel is not steered.		
MOTOR CURRENT	The steering wheel is s	steering.	Approx. 0 – 60 A	
	The steering wheel is r	not steered.	Approx. 0 – 1 A	
MTR CRNT ESTM	The steering wheel is s	steering.	Approx. 0 – 60 A	
	Steering wheel turned	to the right (with vehicle stopped).	Approx. 0 – 60 deg	
ACTR ROTA ANG	Straight-ahead		Approx. 0 deg	
	Steering wheel turned	Steering wheel turned to the left (with vehicle stopped).		
LG VOLT	Engine running (idling)		Approx. 0 – 16 V	
THERM TEMP	Engine running (idling)		_40 − 100°C	
		Engine running (idling)	Battery voltage	
MOTOR VOLT	Ignition switch: ON	Engine stopped.	Battery voltage	
		Engine running (idling)	Battery voltage	
IGN VOLT	Ignition switch: ON	Engine stopped.	Battery voltage	
	Steering wheel turned	Steering wheel turned to the right (with vehicle stopped).		
ACTR ANG COMM	Straight-ahead	Approx. 0 deg		
	Steering wheel turned	Approx. 0 – –60 deg		
	The steering wheel is r	The steering wheel is not steered.		
ACTR ROTA SPD	The steering wheel is s	The steering wheel is steering.		
DUTY COMMAND	Engine running (idling)			
LOCK DTY COMM	Engine running (idling)		0 – 100%	
		Engine running (idling)	Approx. 0 – 20 V	
MTR U VOLT	Ignition switch: ON	Engine stopped.	0 V	
	Ignition switch: ON	Engine running (idling)	Approx. 0 – 20 V	
MTR V VOLT		Engine stopped.	0 V	
		Engine running (idling)	Approx. 0 – 20 V	
MTR W VOLT	Ignition switch: ON	Engine stopped.	0 V	
ACT TEMP ESTM	Engine running (idling)		_40 − 100°C	
MTR PHZ CRNT	The steering wheel is steering.		Approx. 0 – 20 A	
ACTR DEVI ANG	The steering wheel is steering.		Approx. –10 – 10 deg	

INFOID:000000004258055

А

В

# **4WAS FRONT CONTROL UNIT**

### < ECU DIAGNOSIS INFORMATION >

### [WITH 4WAS]

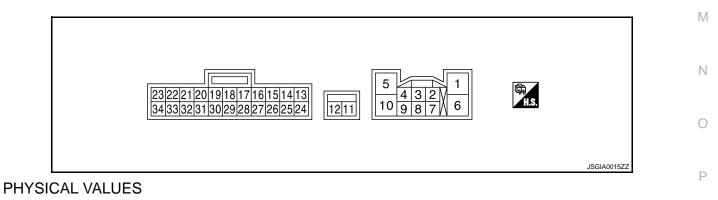
Monitor item	Condition	Value/Status
ACTR ANGL SUB	Steer the steering wheel leftward slowly. Steer until the steering stops.	Approx. 0 – –60 deg
ACTR ANGE SUB	Steer the steering wheel rightward slowly. Steer until the steering stops.	Approx. 0 – 60 deg
	The steering wheel is not steered.	0 deg/s
STR ANGL SPD	The steering wheel is steering.	Other than 0 deg/s
OVRLD JDG TMG	It displays record of 4WAS system (entire 4WAS system) high load. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
ACT PRTCT TMG	It displays record of 4WAS system (4WAS front actuator) over- heating. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
ECU PRTCT TMG	It displays record of 4WAS system (4WAS front control unit) over- heating. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
DRV TMPO TMG	It displays record of 4WAS system (terminal power supply convert- er of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
MTR PW TMP TM	It displays record of 4WAS system (terminal voltage of 4WAS front motor) intermittent abnormal. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
LOW VOLT TMG	It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) low voltage. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
HIGH VOLT TMG	It displays record of 4WAS system (terminal voltage of 4WAS front control unit and 4WAS front actuator) extreme voltage. (It displays time of occurrence before turning ignition switch ON.)	0 – 39
	4WAS system (the entire 4WAS system) heavy load condition judgment (Condition detected in past and present.)	On
OVRLD JDG FLG	4WAS system (the entire 4WAS system) heavy load condition judgment (Condition not detected in past and present.)*	Off
ACT PRTCT FLG	4WAS front actuator overheat condition judgment (Condition detected in past and present.)	On
	4WAS front actuator overheat condition judgment (Condition not detected in past and present.)*	Off
ECU PRTCT FLG	4WAS front control unit overheat condition judgment (Condition detected in past and present.)	On
	4WAS front control unit overheat condition judgment (Condition not detected in past and present.)*	Off
DRV TMPO FLG	4WAS system (4WAS front motor terminal power supply convert- er) intermittent error. (Condition detected in past and present.)	On
DRV IMPO FLG	4WAS system (4WAS front motor terminal power supply convert- er) intermittent error. (Condition not detected in past and present.)*	Off
	4WAS system (4WAS front motor terminal voltage) intermittent er- ror. (Condition detected in past and present.)	On
MTR PW TMP FL	4WAS system (4WAS front motor terminal voltage) intermittent er- ror. (Condition not detected in past and present.)*	Off

#### < ECU DIAGNOSIS INFORMATION >

### [WITH 4WAS]

Monitor item		Condition	Value/Status	-		
LOW VOLT FLG	4WAS system (4WAS t terminal voltage) voltage (Condition detected in		On			
LOW VOLT FLG	4WAS system (4WAS f terminal voltage) voltage (Condition not detected		Off	_		
HIGH VOLT FLG	4WAS system (4WAS t terminal voltage) over-v (Condition detected in		On			
	4WAS system (4WAS t terminal voltage) over-v (Condition not detected		Off			
MTR SEN U OUT	The steering wheel is s	The steering wheel is steering.				
MTR SEN V OUT	The steering wheel is s	$Hi \Leftrightarrow Low$	_			
MTR SEN W OUT	The steering wheel is s	The steering wheel is steering.				
	4WAS main control uni	t fail-safe mode	On	_		
MAIN ECU FAIL	4WAS system is in the (When 4WAS main cor	normal condition. htrol unit is the normal condition.)	Off			
	4WAS main control uni	On				
M-ECU TMPO FL	4WAS system is in the (When 4WAS main cor	normal condition. htrol unit is the normal condition.)	Off	_		
	4WAS front lock sole-	Lock released condition	0	_		
LOCK MODE	noid valve (lock struc- ture) condition	Lock condition	1, 2, 3, 4, 5			
NEUTRAL OUT	4WAS front actuator m trolled.	isaligned angle adjustment control is con-	On	_		
	4WAS front actuator mi	saligned angle adjustment is not controlled.	Off			
EX OPERAT		4WAS system enters in the protection function due to the heavy load condition and temporarily abnormal voltage.		_		
	4WAS system is in the	normal condition.	Off			
		MODE" judgment condition	Ok	_		
SLOW MODE	(Steer the steering whe the turning stops.)	el rightward and leftward slowly. Steer until	_	_		

#### **TERMINAL LAYOUT**



#### < ECU DIAGNOSIS INFORMATION >

[WITH 4WAS]

Termi	inal No.	Wire	Description			
+	-	color	Signal name	Input/ Output	Condition	Value (Approx.)
1	_	G	4WAS front motor V terminal	_	_	_
2	Ground	W	Front wheel angle sensor W terminal voltage	Output	Ignition switch: ON	0 – 5 V
3		В	4WAS front lock so- lenoid valve ground	_	_	_
4	Ground	Y	Front wheel angle sensor U terminal voltage	Output	Ignition switch: ON	0 – 5 V
5	_	BR	4WAS front motor U terminal	_	_	_
6	_	L	4WAS front motor W terminal	_	_	—
7	_	GR	Front wheel angle sensor ground	_	_	—
8	Ground	G/R	Front wheel angle sensor V terminal voltage	Output	Ignition switch: ON	0 – 5 V
			4WAS front lock so-		Ignition switch: ON	Battery voltage
10	Ground	R	lenoid valve power supply	Output	Ignition switch: OFF (Wait 10 min. or more.)	0 V
11	Ground	R	Power supply	Input	Ignition switch: ON	Battery voltage
	Cibuna	IX.		mput	Ignition switch: OFF	Battery voltage
12	Ground	В	4WAS front motor ground	—	Always	0 V
14	—	Y	BUS-L	—	—	—
15	Ground	G	Ignition switch pow- er supply	Input	Ignition switch: ON	Battery voltage
10	Origina -				Ignition switch: OFF	0 V
18	Ground	B	Ground		Always	0 V
25	-	SB	BUS-H	_		
34	Ground	В	Ground	_	Always	0 V

#### CAUTION:

When using circuit tester to measure voltage for inspection, never forcibly extend any connector terminals.

< ECU DIAGNOSIS INFORMATION >

#### [WITH 4WAS]

А

В

С

D

Ε

F

Н

J

Κ

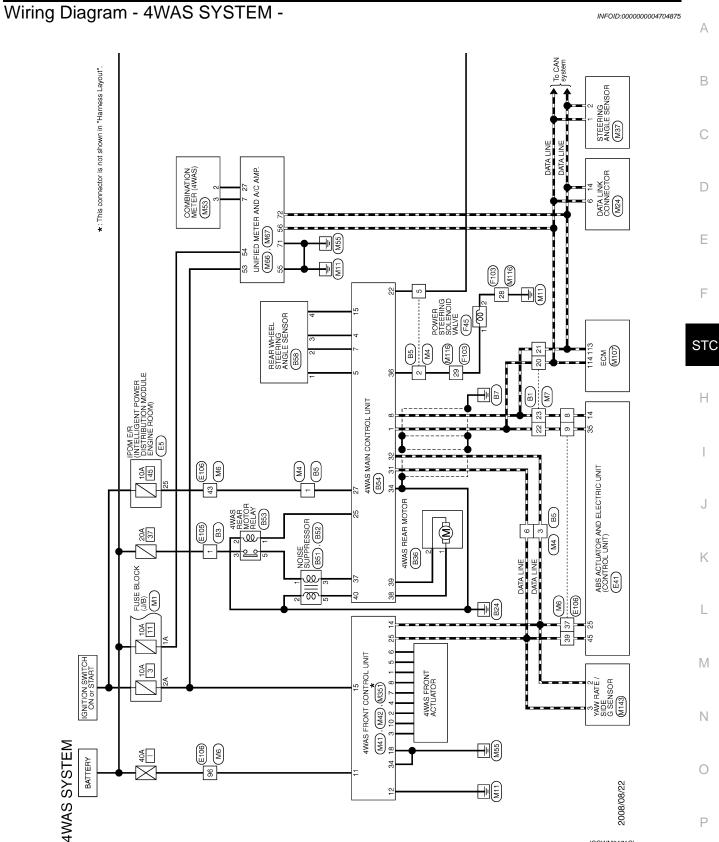
L

Μ

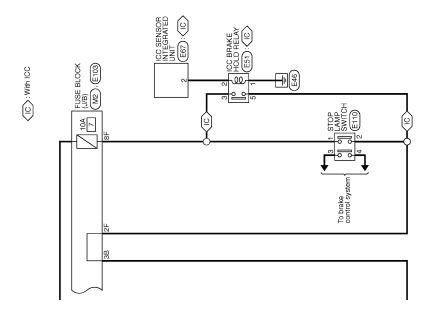
Ν

Ο

Ρ



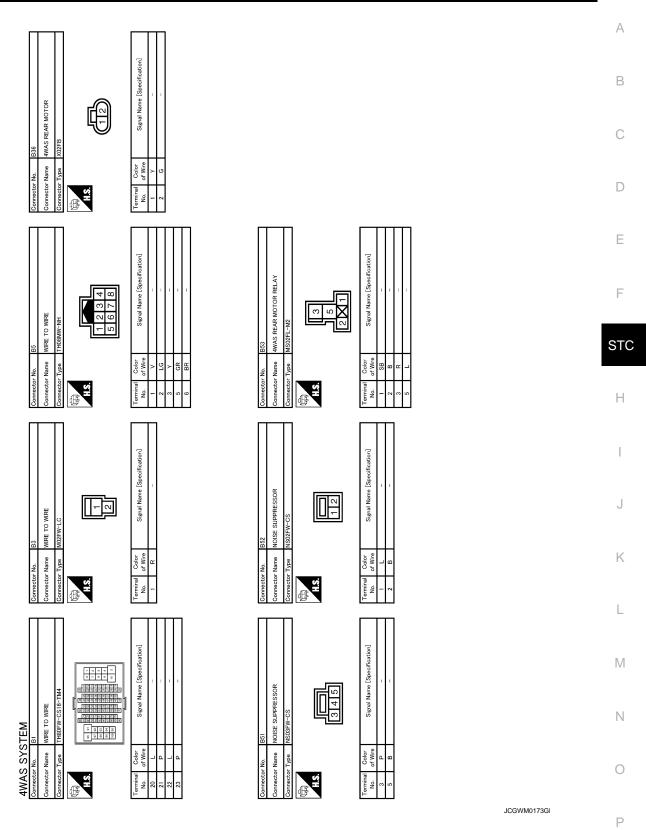
JCGWM0171GI



JCGWM0172G

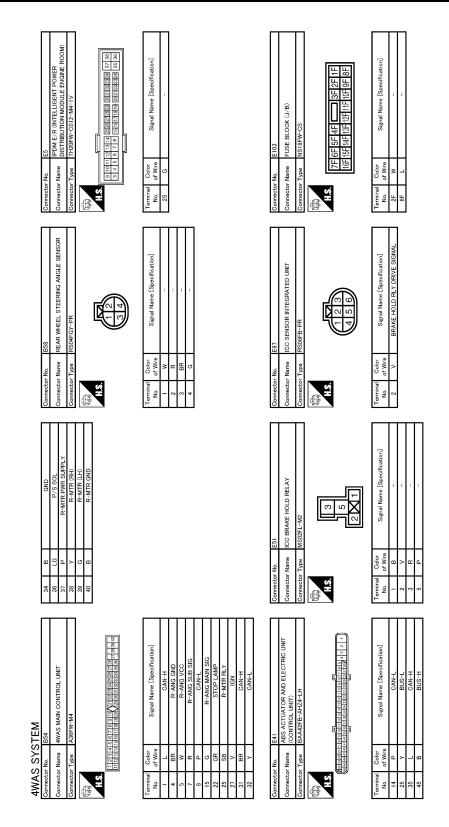
#### < ECU DIAGNOSIS INFORMATION >

[WITH 4WAS]



#### < ECU DIAGNOSIS INFORMATION >

[WITH 4WAS]

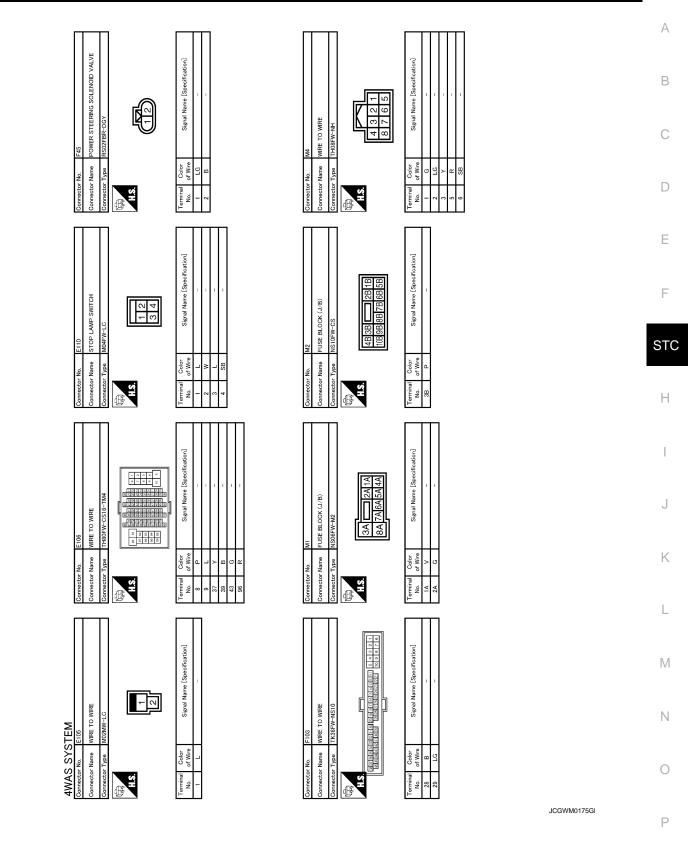


JCGWM0174G



# < ECU DIAGNOSIS INFORMATION >

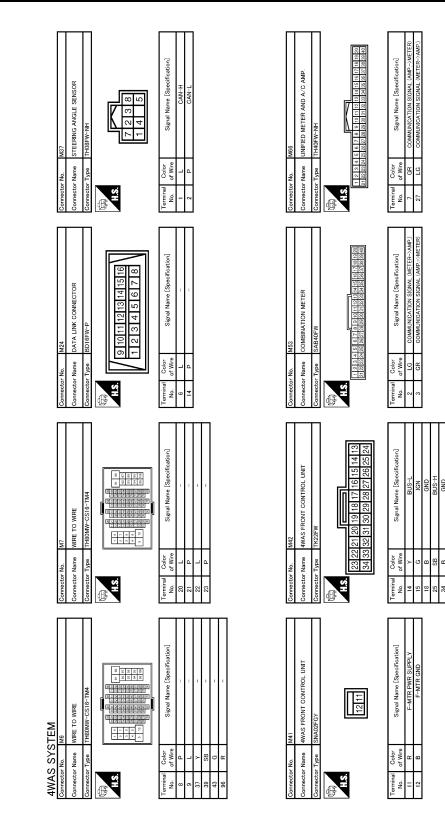
[WITH 4WAS]





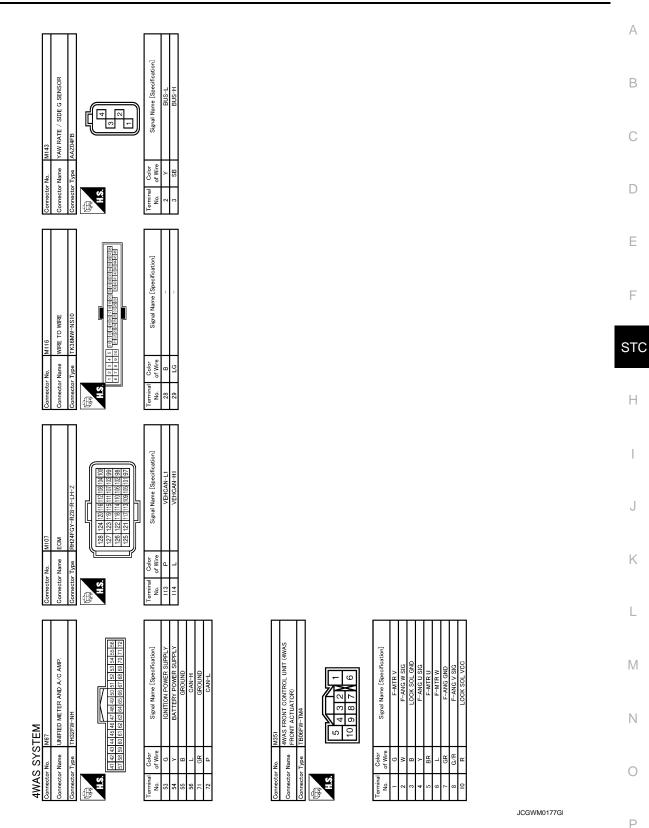
#### < ECU DIAGNOSIS INFORMATION >

[WITH 4WAS]



JCGWM0176G

34 25



# Fail Safe

INFOID:000000004258057

#### 4WAS system (front)

- 4WAS system enters in the fail-safe mode (4WAS system is stopped), and 4WAS warning lamp turns ON if an error is detected in 4WAS system (4WAS front control unit and 4WAS main control unit) component part.
- 4WAS system enters in the protection function mode (4WAS system is temporarily stopped) if 4WAS system continues the heavy load condition and the overheat condition.4WAS system reactivates automatically if the

# **4WAS FRONT CONTROL UNIT**

#### < ECU DIAGNOSIS INFORMATION >

#### < ECU DIAGNOSIS INFORMATION >

heavy load condition and the overheat condition are resolved.4WAS warning lamp continues turning OFF in the protection function mode.

Mode	Warn- ing Iamp	DTC	Detected area (Error area)	Error area and root cause
	Turn- OFF	_	4WAS front control unit	4WAS front control unit overheat condition
Protec- tion function	Turn- OFF	_	4WAS front actuator	4WAS front actuator overheat condition
lanoton	Turn- OFF	_	4WAS front control unit	4WAS front control unit heavy load condition
	Turn- ON	C1621 C1622	4WAS front actuator	4WAS front control unit or 4WAS front motor error is detected.
	Turn- ON	C1627	4WAS front actuator	4WAS front actuator error
	Turn- ON	C1628	Front wheel steering angle sensor	Front wheel steering angle sensor error
	Turn- ON	C1631 C1632	4WAS front control unit	4WAS front control unit or 4WAS front control unit power supply error is detected.
	Turn- OFF	C1633	4WAS front control unit	4WAS front control unit error
	Turn- ON	C1651	4WAS front control unit	4WAS front control unit or the ignition power supply error is detected.
	Turn- ON	C1652	4WAS front control unit	4WAS front control unit or 4WAS front motor power supply error is detected.
	Turn- ON	C1654	4WAS front control unit	The main relay power supply inside 4WAS front control unit error is detected.
	Turn- ON	C1655	4WAS front control unit	4WAS front control unit or 4WAS front motor power supply error is detected.
Fail-safe	Turn- ON	C1661	4WAS front lock solenoid valve (lock structure)	4WAS front control unit or 4WAS front lock solenoid valve error is detected.
	Turn- ON	C1667	4WAS front actuator	The inside 4WAS front actuator error is detected.
	Turn- ON	C1668	4WAS front actuator	The inside 4WAS front actuator error is detected.
	Turn- ON	C1669	4WAS front actuator	The power steering oil pressure or the inside 4WAS front actuator error is detected.
	Turn- ON	C1671	4WAS front actuator	4WAS front actuator adjustment is not performed.
	Turn- ON	C1672	4WAS main actuator	4WAS front actuator adjustment is incomplete.
	Turn- ON	C1684 C1685 U1000 U1002 U1010	4WAS communication line*/ 4WAS main control unit/4WAS front control unit	4WAS communication line*/4WAS main control unit/4WAS front control unit error
	Turn- ON	C1686	4WAS main control unit	4WAS main control unit fail-safe mode

\*: Communication line between 4WAS front control unit and 4WAS main control unit.

### **DTC Inspection Priority Chart**

INFOID:000000004258058

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

#### < ECU DIAGNOSIS INFORMATION >

# [WITH 4WAS]

Priority	Detected items (DTC)	A
1	<ul> <li>U1000 CANCOMM CIRCUIT*</li> <li>U1002 SYSTEM COMM(CAN)*</li> <li>U1010 CONTROL UNIT(CAN)*</li> </ul>	В
2	C1671 ACT ADJ NOT PRFRM     C1672 INCOMP ACTUATR ADJ	
3	C1631 CONTROL UNIT     C1632 CONTROL UNIT	С
4	<ul> <li>C1651 IGN POWER SUPPLY</li> <li>C1652 MOTOR POWER SUPPLY</li> <li>C1654 ACTUATOR RELAY</li> <li>C1655 PRE-DRIVER</li> </ul>	D
5	<ul> <li>C1621 ACTUATOR</li> <li>C1622 ACTUATOR</li> <li>C1627 ACTUATOR</li> <li>C1628 ACTUATOR</li> <li>C1661 LOCK SOLENOID</li> </ul>	E
	<ul> <li>C1667 LOCK INSERTION</li> <li>C1668 LOCK HLD GAP DETCT</li> <li>C1669 INCOMP LOCK RELEAS</li> </ul>	F
6	C1684 4WAS MAIN ECU COMM     C1685 4WAS MAIN ECU COMM     C1686 4WAS MAIN ECU	STO
7	C1633 CONTROL UNIT	Н

\*: 4WAS communication line

# **DTC** Index

INFOID:000000004258059

DTC	Items (CONSULT-III screen terms)	Reference
C1621	ACTUATOR	STC-48, "DTC Logic"
C1622	ACTUATOR	STC-48, "DTC Logic"
C1627	ACTUATOR	STC-51, "DTC Logic"
C1628	ACTUATOR	STC-53, "DTC Logic"
C1631	CONTROL UNIT	STC-56, "DTC Logic"
C1632	CONTROL UNIT	STC-56, "DTC Logic"
C1633	CONTROL UNIT	STC-59, "DTC Logic"
C1651	IGN POWER SUPPLY	STC-61, "DTC Logic"
C1652	MOTOR POWER SUPPLY	STC-63, "DTC Logic"
C1654	ACTUATOR RELAY	STC-65, "DTC Logic"
C1655	PRE-DRIVER	STC-67, "DTC Logic"
C1661	LOCK SOLENOID	STC-69, "DTC Logic"
C1667	LOCK INSERTION	STC-71, "DTC Logic"
C1668	LOCK HLD GAP DETCT	STC-73, "DTC Logic"
C1669	INCOMP LOCK RELEAS	STC-74, "DTC Logic"
C1671	ACT ADJ NOT PRFRM	STC-75, "DTC Logic"
C1672	INCOMP ACTUATR ADJ	STC-77, "DTC Logic"
C1684	4WAS MAIN ECU COMM	STC-78, "DTC Logic"
C1685	4WAS MAIN ECU COMM	STC-78, "DTC Logic"
C1686	4WAS MAIN ECU	STC-82, "DTC Logic"
U1000	CAN COMM CIRCUIT	STC-83, "DTC Logic"

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 4WAS]

DTC	Items (CONSULT-III screen terms)	Reference
U1002	SYSTEM COMM(CAN)	STC-83, "DTC Logic"
U1010	CONTROL UNIT (CAN)	STC-87, "DTC Logic"

# < ECU DIAGNOSIS INFORMATION >

**4WAS MAIN CONTROL UNIT** 

# **Reference Value**

#### VALUES ON THE DIAGNOSIS TOOL

#### CONSULT-III MONITOR ITEM

Monitor item	Condition	Value/Status	
	Vehicle stopped	0 km/h (0 MPH)	С
VHCL SPEED SE	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%)	D
	Steering wheel turned right	Approx. 0 – R550°	
STEERING ANG	Straight-ahead	Approx. 0°	Е
	Steering wheel turned left	Approx. 0 – L550°	
	Engine stopped	0 rpm	
ENGINE SPEED	Engine running (Engine speed: 400 rpm or more)	Approximately equal to the indi- cation on tachometer	F
STR ANGL SPD	The steering wheel is not steered.	0 deg/s	
STR ANGE SPD	The steering wheel is steering.	1 – 3,000 deg/s	STC
POWER STR SOL	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	Approx. 1.10 A	
	Vehicle speed: 100 km/h (62 MPH)	Approx. 0.42 A	Н
	4WAS rear actuator turns right completely	Approx. 4.4 V	
RR ST ANG-MAI	4WAS rear actuator is neutral	Approx. 2.4 V	
	4WAS rear actuator turns left completely	Approx. 0.4 V	
	4WAS rear actuator turns right completely	Approx. 4.4 V	
RR ST ANG-SUB	4WAS rear actuator is neutral	Approx. 2.6 V	J
	4WAS rear actuator turns left completely	Approx. 0.4 V	
RR ST ANG-VOL	Ignition switch: ON	Approx. 5 V	К
C/U VOLTAGE	Ignition switch: ON	Battery voltage	IX
MOTOR VOLTAGE	Ignition switch: ON	Battery voltage	
MOTOR CURRENT	4WAS rear motor running	0 – 20 A	L
MTR CRNT OPE	4WAS rear actuator neutral condition and vehicle straight-ahead position.	Approx. –2 – 2 A	
	4WAS rear motor running	Approx. –20 – 20 A	M
	4WAS rear actuator turned right	Approx. 0 – 1 deg	
RR ANGLE OPE	4WAS rear actuator is neutral	Approx. 0 deg	Ν
	4WAS rear actuator turned left	Approx. 0 – –1 deg	IN
	Steering wheel turned to the right (with vehicle stopped).	Approx. 0 – R60°	
FR ANGLE OPE	Straight-ahead	Approx. 0°	0
	Steering wheel turned to the left (with vehicle stopped).	Approx. 0 – L60°	
STOP LAMP SW	Brake pedal: Depressed	On	Р
STOI LAWI SW	Brake pedal: Released	Off	P
HICAS RELAY	Ignition switch: ON	On	
FAIL SAFE	Fail-safe condition	On	
	Normal	Off	
WARNING LAMP	4WAS warning lamp: ON	On	
	4WAS warning lamp: OFF	Off	

INFOID:000000004258060

В

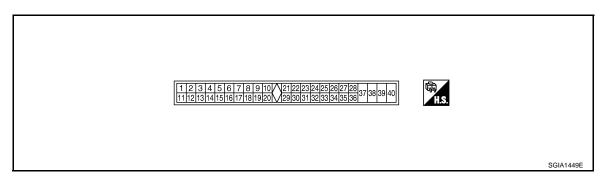
А

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 4WAS]

Monitor item	Condition	Value/Status
FRNT ECU FAIL	4WAS front control unit fail-safe mode	On
FRINT EGO FAIL	Normal	Off
FRNT ECU EX	4WAS front control unit enters in the protection function mode	On
	Normal	Off

#### **TERMINAL LAYOUT**



#### PHYSICAL VALUES

Term	inal No.	Wire	Description							
+	-	color	Signal name	Input/ Output	Condition	Value (Approx.)				
1	_	L	CAN-H	_		_				
4	Ground	BR	Rear wheel steering angle sensor ground	_	Always	0 V				
_			Rear wheel steering		Ignition switch: ON	5 V				
5	Ground	W	angle sensor power supply	Output	Ignition switch: OFF	0 V				
			_		4WAS rear actuator assembly turns right completely.	4.4 V				
7	Ground	R	Rear wheel steering angle sensor (sub) output voltage	Output	4WAS rear actuator assembly is neu- tral	2.6 V				
		oupur voltage		4WAS rear actuator assembly turns left completely.	0.4 V					
8	_	Р	CAN-L	—		_				
		G	G	G	G	G			4WAS rear actuator assembly turns right completely.	4.4 V
15	Ground						G	G	Rear wheel steering angle sensor (main) output voltage	Output
			output tolidgo		4WAS rear actuator assembly turns left completely.	0.4 V				
22	Ground	GR	Oton Jama owitch	lanut	Brake pedal: Depressed	Battery voltage				
22	Ground	GR	Stop lamp switch	Input	Brake pedal: Released	0 V				
25	Ground	SB	4WAS rear motor	Input	Ignition switch: ON	Battery voltage				
25	Giouna	50	relay	input	Ignition switch: OFF	0 V				
27	Ground	V	Ignition switch	Input	Ignition switch: ON	Battery voltage				
21	Ciound	v	ignition switch	input	Ignition switch: OFF	0 V				
31		BR	4WAS communica- tion-H	_	_	_				
32	_	Y	4WAS communica- tion-L	—	_	_				

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 4WAS]

Termi	Terminal No.		Description			
+	-	Wire color	Signal name	Input/ Output	Condition	Value (Approx.)
34	Ground	В	Ground	—	Always	0 V
36	Ground	LG	Power steering so- lenoid valve	Output	Vehicle speed: 0 km/h (0 MPH) (Engine is running)	4.4 – 6.6 V
					Vehicle speed: 100 km/h (62 MPH)	2.4 – 3.6 V
37	Ground	Р	4WAS rear motor	Input	Ignition switch: ON	Battery voltage
57	Ground	Р	power supply	Input	Ignition switch: OFF	0 V
38	Ground	Y	4WAS rear motor	Output	While 4WAS rear motor activates rightward	Battery voltage
30	Ground	I	output voltage (right)	Output	While 4WAS rear motor activates left- ward	0 V
39	Ground	G	4WAS rear motor output voltage	Output	While 4WAS rear motor activates rightward	0 V
55	Ground	9	(left)	Juiput	While 4WAS rear motor activates left- ward	Battery voltage
40	Ground	В	4WAS rear motor ground	_	Always	0 V

#### **CAUTION:**

When using circuit tester to measure voltage for inspection, never forcibly extend any connector terminals.

Н

J

Κ

L

Μ

Ν

Ο

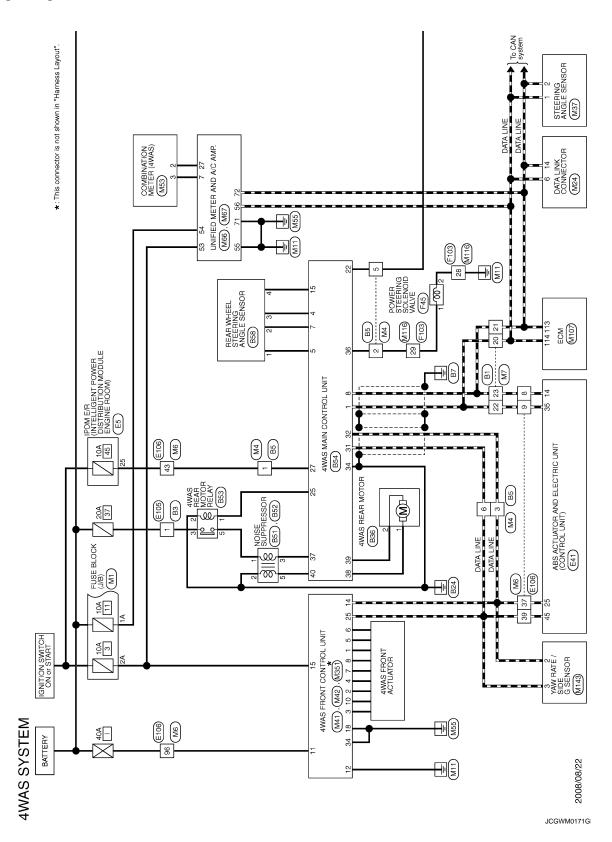
Ρ

# < ECU DIAGNOSIS INFORMATION >

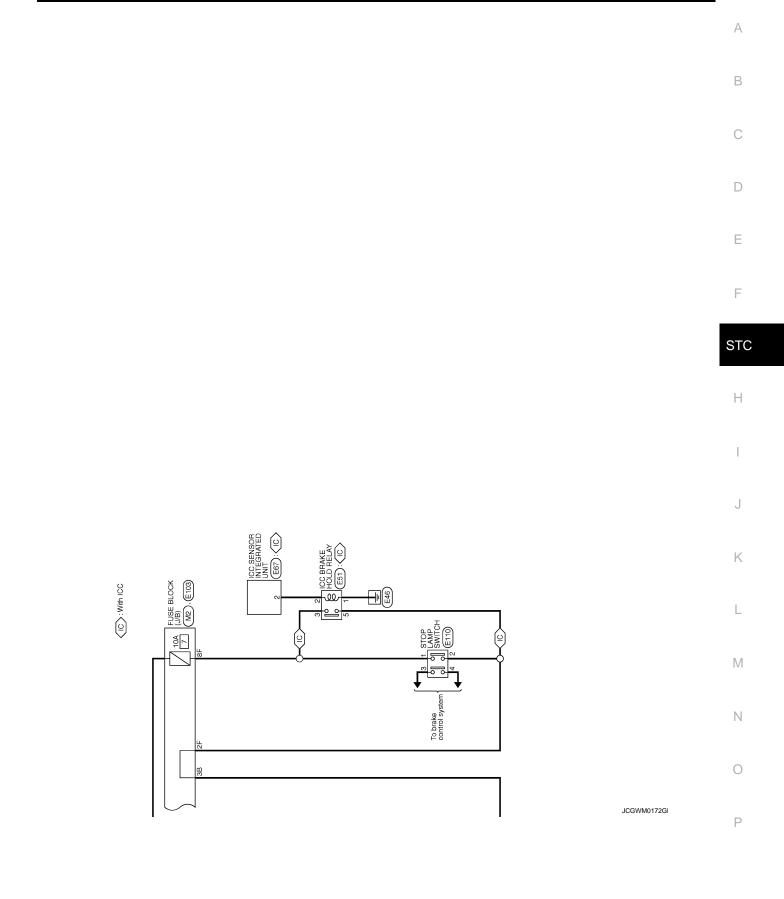
# Wiring Diagram - 4WAS SYSTEM -

INFOID:000000004258061

[WITH 4WAS]

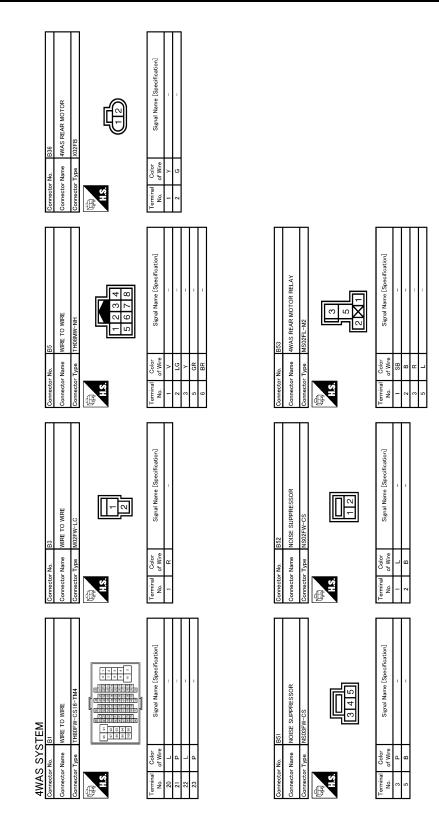


#### < ECU DIAGNOSIS INFORMATION >



#### < ECU DIAGNOSIS INFORMATION >

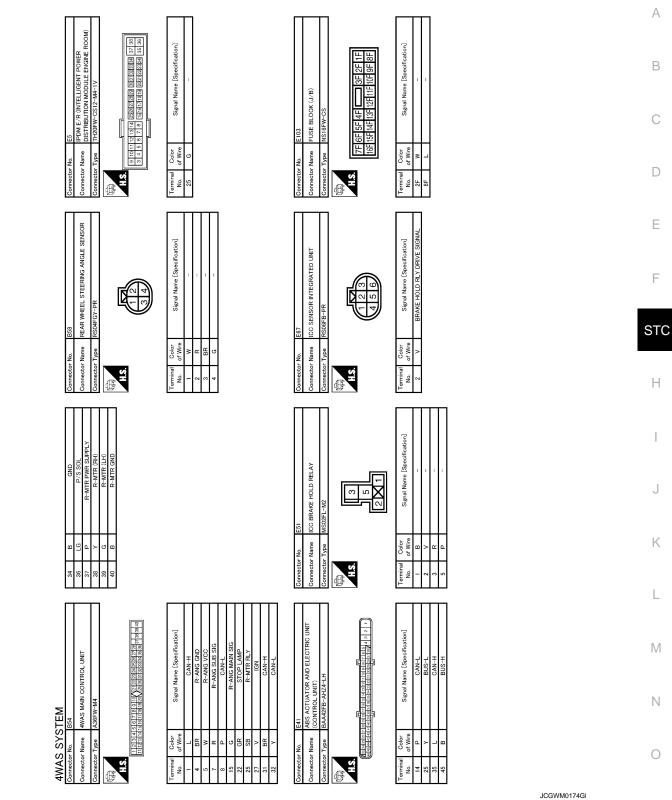
[WITH 4WAS]



JCGWM0173G

#### < ECU DIAGNOSIS INFORMATION >

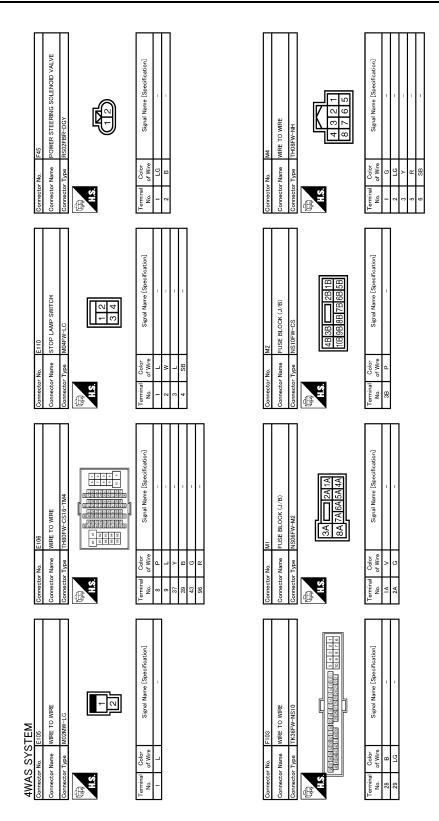
[WITH 4WAS]



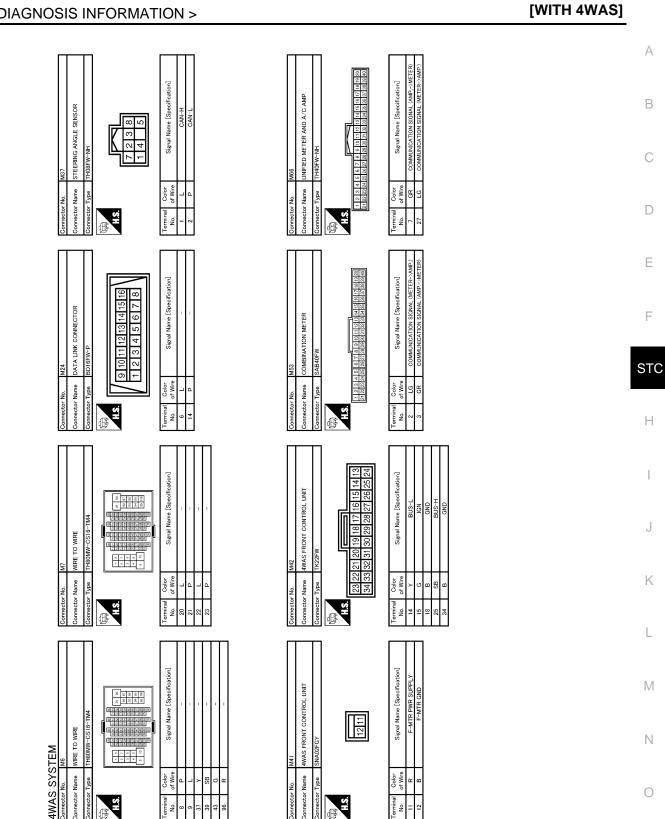
Ρ

#### < ECU DIAGNOSIS INFORMATION >

[WITH 4WAS]



JCGWM0175G



#### < ECU DIAGNOSIS INFORMATION >

Connector Name nnector Type

HIS.

倨

Color of Wire

erminal No.

۲

96

Connector Name

nnector Type

H.S.

Color of Wire R

erminal No.

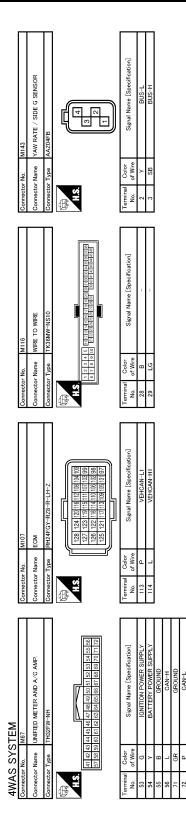
JCGWM0176GI

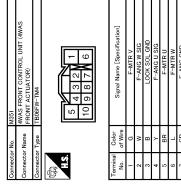
Ο

Ρ

#### < ECU DIAGNOSIS INFORMATION >

[WITH 4WAS]





JCGWM0177G

INFOID:000000004258062

# 4WAS system (Main)

Fail Safe

- 4WAS system enters in the fail-safe mode (4WAS system stopped) and 4WAS warning lamp turns ON if an error is detected in 4WAS system (4WAS main control unit) component part.
- 4WAS system enters in the protection function mode (4WAS system temporarily stopped) if 4WAS system continues the heavy load condition or the sensor self-check condition. (4WAS system reactivates automati-

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 4WAS]

А

cally if the heavy load condition and the self-check condition are resolved.) 4WAS warning lamp stays OFF in the protection function mode.

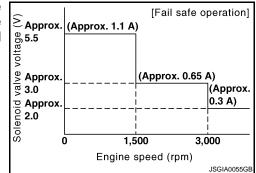
Mode	Warn- ing lamp	DTC	Detected area (Error area)	Error area and root cause
	Turn- ON	C1900 C1901 C1905 C1906 C1907 C1908 C1922 C1925 C1925 C1927 C1928 C1933	4WAS main control unit	4WAS main control unit error
	Turn- ON	C1902 C1903 C1904 C1910 C1913	4WAS rear motor	4WAS rear motor error
	Turn- ON	C1909	4WAS main control unit	4WAS main control unit
	Turn- ON	C1911 C1912	4WAS rear motor	4WAS rear motor power supply error
	Turn- ON	C1914	Rear wheel steering sensor	Rear wheel steering sensor power supply error
	Turn- ON	C1915 C1916	Rear wheel steering sensor	Rear wheel steering sensor output voltage error
- ail-safe	Turn- OFF	C1917	Rear wheel steering sensor	Rear wheel steering sensor (main and sub) output signal value error signal
	Turn- ON	C1918	Rear wheel steering sensor	Rear wheel steering sensor (main and sub) output signal error
	Turn- ON	C1919	ABS actuator and electric unit (control unit)	Vehicle speed signal error
	Turn- ON	C1920 C1923 C1924	Steering angle sensor	Steering angle sensor input signal error
	Turn- ON	C1921	ECM	Engine speed signal error
	Turn- ON	C1926	Steering angle sensor	Steering angle sensor error
	Turn- ON	C1930	4WAS front control unit	4WAS front control unit fail-safe mode
	Turn- ON	C1931	4WAS communication line*/ 4WAS front control unit/4WAS main control unit	4WAS communication line*/4WAS front control unit/4WAS main control unit error
-	Turn- ON	C1932	Steering angle sensor	Steering angle sensor input signal error
	Turn- ON	U1000	CAN communication line*	CAN communication error
	Turn- ON	U1010	CAN communication line*/ 4WAS main control unit/ECM/ ABS actuator and electric unit (control unit)	CAN communication line/4WAS main control unit/ECM/ABS actua- tor and electric unit (control unit) error

\*: Communication line between 4WAS front control unit and 4WAS main control unit.

# < ECU DIAGNOSIS INFORMATION >

#### EPS system

• EPS system (4WAS main control unit) enters the fail-safe mode (that allows the steering force to be controlled without impairing the drive ability) if the input from each sensor is not within the specified range. Then, 4WAS warning lamp turns ON.



Mode	Warn- ing Iamp	DTC	Detected area (Error area)	Error part and root cause
Fail-safe	Turn- ON	C1919	ABS actuator and electronic unit (control unit)	Vehicle speed signal error

# **DTC Inspection Priority Chart**

INFOID:000000004258063

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	U1000 CAN COMM     U1010 CONTROL UNIT (CAN)
2	<ul> <li>C1900 CONTROL UNIT [ABNORMAL1]</li> <li>C1901 CONTROL UNIT [ABNORMAL2]</li> <li>C1905 CONTROL UNIT [ABNORMAL3]</li> <li>C1906 CONTROL UNIT [ABNORMAL5]</li> <li>C1907 CONTROL UNIT [ABNORMAL4]</li> <li>C1908 CONTROL UNIT [ABNORMAL7]</li> <li>C1909 CONTROL UNIT [ABNORMAL6]</li> <li>C1922 CONTROL UNIT [ABNORMAL8]</li> <li>C1925 AD CONVERTER</li> <li>C1927 CONTROL UNIT [ABNORMAL5]</li> <li>C1928 CONTROL UNIT [ABNORMAL9]</li> <li>C1933 CONTROL UNIT</li> </ul>
3	<ul> <li>C1902 MOTOR OUTPUT [REV CURRENT]</li> <li>C1903 MOTOR OUTPUT [NO CURRENT]</li> <li>C1904 MOTOR OUTPUT [OVERCURRENT]</li> <li>C1910 MOTOR OUTPUT [OVERCURRENT]</li> <li>C1911 MOTOR VOLTAGE [LOW VOLTAGE]</li> <li>C1912 MOTOR VOLTAGE [BAD OBSTRCT]</li> <li>C1913 MOTOR OUTPUT [ABNORML SIG]</li> <li>C1914 RR ST ANGLE SENSOR [ABNORML VOL]</li> <li>C1915 RR ST ANGLE SENSOR [MAIN SIGNAL]</li> <li>C1916 RR ST ANGLE SENSOR [OFFSET SIG1]</li> <li>C1918 RR ST ANGLE SENSOR [OFFSET SIG2]</li> </ul>
4	<ul> <li>C1919 VEHICLE SPEED SEN [NO SIGNAL]</li> <li>C1920 STEERING ANGLE SEN [NO SIGNAL]</li> <li>C1921 ENG REV SIGNAL</li> <li>C1923 STEERING ANGLE SEN [NO CHANGE]</li> <li>C1924 STEERING ANGLE SEN [NO NEUT STATE]</li> <li>C1926 STEERING ANGLE SEN</li> <li>C1932 STEERING ANGLE SEN</li> </ul>
5	C1930 4WAS FRONT ECU     C1931 4WAS FRONT ECU COMM

< ECU DIAGNOSIS INFORMATION >

# DTC Index

INFOID:000000004258064

[WITH 4WAS]

А

DTC	Items (CONSULT-III screen terms)	Reference
C1900	CONTROL UNIT [ABNORMAL1]	STC-88, "DTC Logic"
C1901	CONTROL UNIT [ABNORMAL2]	STC-88, "DTC Logic"
C1902	MOTOR OUTPUT [REV CURRENT]	STC-90, "DTC Logic"
C1903	MOTOR OUTPUT [NO CURRENT]	STC-90, "DTC Logic"
C1904	MOTOR OUTPUT [OVERCURRENT]	STC-90, "DTC Logic"
C1905	CONTROL UNIT [ABNORMAL3]	STC-93, "DTC Logic"
C1906	CONTROL UNIT [ABNORMAL5]	STC-88, "DTC Logic"
C1907	CONTROL UNIT [ABNORMAL4]	STC-88, "DTC Logic"
C1908	CONTROL UNIT [ABNORMAL7]	STC-93, "DTC Logic"
C1909	CONTROL UNIT [ABNORMAL6]	STC-95, "DTC Logic"
C1910	MOTOR OUTPUT [MOTOR LOCK]	STC-90, "DTC Logic"
C1911	MOTOR VOLTAGE [LOW VOLTAGE]	STC-97, "DTC Logic"
C1912	MOTOR VOLTAGE [BAD OBSTRCT]	STC-97, "DTC Logic"
C1913	MOTOR OUTPUT [ABNORML SIG]	STC-90, "DTC Logic"
C1914	RR ST ANGLE SENSOR [ABNORML VOL]	STC-102, "DTC Logic"
C1915	RR ST ANGLE SENSOR [MAIN SIGNAL]	STC-105, "DTC Logic"
C1916	RR ST ANGLE SENSOR [SUB SIGNAL]	STC-105. "DTC Logic"
C1917	RR ST ANGLE SENSOR [OFFSET SIG1]	STC-108. "DTC Logic"
C1918	RR ST ANGLE SENSOR [OFFSET SIG2]	STC-108, "DTC Logic"
C1919	VEHICLE SPEED SEN [NO SIGNAL]	STC-111, "DTC Logic"
C1920	STEERING ANGLE SEN [NO SIGNAL]	STC-113, "DTC Logic"
C1921	ENG REV SIGNAL	STC-116, "DTC Logic"
C1922	CONTROL UNIT [ABNORMAL8]	STC-93, "DTC Logic"
C1923	STEERING ANGLE SEN [NO CHANGE]	STC-118, "DTC Logic"
C1924	STEERING ANGLE SEN [NO NEUT STATE]	STC-121, "DTC Logic"

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 4WAS]

DTC	Items (CONSULT-III screen terms)	Reference
C1925	AD CONVERTER	STC-93, "DTC Logic"
C1926	STEERING ANGLE SEN	STC-124, "DTC Logic"
C1927	CONTROL UNIT [ABNORMAL5]	STC-88, "DTC Logic"
C1928	CONTROL UNIT [ABNORMAL9]	STC-93, "DTC Logic"
C1930	4WAS FRONT ECU	STC-127, "DTC Logic"
C1931	4WAS FRONT ECU COMM	STC-128, "DTC Logic"
C1932	STEERING ANGLE SEN	STC-124, "DTC Logic"
C1933	CONTROL UNIT	STC-88, "DTC Logic"
U1000	CAN COMM	STC-132, "DTC Logic"
U1010	CONTROL UNIT (CAN)	STC-133, "DTC Logic"

4WAS WARNING LAMP DOES NOT TURN ON	
< SYMPTOM DIAGNOSIS > [WITH 4WAS]	
SYMPTOM DIAGNOSIS	A
4WAS WARNING LAMP DOES NOT TURN ON	
Description	<sup>56</sup> B
<ul> <li>4WAS warning lamp does not turn ON when turning ignition switch ON from OFF.</li> </ul>	
Diagnosis Procedure	77 C
1. CHECK 4WAS SYSTEM POWER SUPPLY AND GROUND CIRCUIT	
With CONSULT-III     Perform the trouble diagnosis of the power supply and ground circuit.	D
Is the inspection result normal?	E
YES >> GO TO 2. NO >> Repair or replace the specific malfunctioning part.	
2.CHECK 4WAS WARNING LAMP	F
With CONSULT-III     Perform the trouble diagnosis of 4WAS warning lamp. Refer to <u>STC-141, "Diagnosis Procedure"</u> .	
Is the inspection result normal?	STC
YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection. NO >> Repair or replace the specific malfunctioning part.	
	Ц

J

Κ

L

Μ

Ν

0

Ρ

[WITH 4WAS]
INFOID:000000004258068
INFOID:000000004258069
-

**4WAS WARNING LAMP DOES NOT TURN OFF** 

NO >> Check that there is no malfunction in each harness connector pin terminal or disconnection.

# STEERING WHEEL MISS ALIGNMENT

# < SYMPTOM DIAGNOSIS > STEERING WHEEL MISS ALIGNMENT

#### А Description INFOID:000000004258070 The steering wheel position (center) is in the wrong position at driving. В 4WAS system stops temporarily. NOTE: • The steering wheel position (center) is in the wrong position under the following condition. (4WAS system is in the protection mode. This is normal status.) - When steering frequently - When driving on a rough road - When the assist of power steering is not sufficient D - When the battery voltage is weak - When driving under the status that there is a difference in the steering wheel Diagnosis Procedure E INFOID:00000000425807 1.CHECK SYMPTOM F Stop the vehicle in the straight-ahead position after driving for a period of time. Does the steering wheel position (center) misalign? YES >> INSPECTION END (Entered in 4WAS system protection function mode in past. 4WAS system is STC normal at present.) NO >> GO TO 2. 2.4was front actuator initialization Н 1. Start the engine. CAUTION: Stop the vehicle. 2. Steer 90° leftward slowly. Steer 90° rightward and return the steering wheel to the straight-ahead position. Repeat the above 10 times. 3. Stop the vehicle in the straight-ahead position after driving for a period of time. Does the steering wheel position (center) misalign? >> INSPECTION END (Entered in 4WAS system protection function mode in past. 4WAS system is YES normal at present.) NO >> GO TO 3. Κ 3.4was system condition (B)With CONSULT-III L 1. Start the engine. **CAUTION:** Stop the vehicle. M Check "EX OPERAT" item on "DATA MONITOR" of 4WAS front control unit. Does the item on "DATA MONITOR" indicate "On"? YES >> GO TO 7. Ν NO >> GO TO 4. 4.CHECK STEERING SYSTEM Check the steering system. Refer to ST-14, "Inspection". Is the inspection result normal? YES >> GO TO 5. NO >> Repair or replace the specific malfunctioning part. Ρ **5.**CHECK WHEEL ALIGNMENT Check the wheel alignment. Refer to FSU-8, "Inspection" (front side), RSU-6, "Inspection" (rear side). Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace the specific malfunctioning part.

# STEERING WHEEL MISS ALIGNMENT

< SYMPTOM DIAGNOSIS >

### 6.PERFORM 4WAS FRONT ACTUATOR ADJUSTMENT

- 1. Perform 4WAS front actuator adjustment. Refer to <u>STC-29</u>, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".
- 2. Stop the vehicle in the straight-ahead position after driving for a period of time.

Does the steering wheel position (center) misalign?

YES >> INSPECTION END.

NO >> GO TO 7.

**7.**CHECK 4WAS SYSTEM IGNITION POWER SUPPLY

Perform the trouble diagnosis of the ignition power supply. Refer to STC-61. "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace the specific malfunctioning part.

8.CHECK 4WAS SYSTEM 4WAS FRONT MOTOR POWER SUPPLY

Perform the trouble diagnosis of 4WAS front motor power supply. Refer to STC-63, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace the specific malfunctioning part.

**9.**CHECK 4WAS SYSTEM HISTORY

#### With CONSULT-III

Turn the ignition switch OFF.
 CAUTION:

#### Wait 30 minutes or more after turning the ignition switch OFF.

2. Start the engine. CAUTION:

Stop the vehicle.

3. Check "EX OPERAT" on 4WAS front control unit "DATA MONITOR".

Monitor item	Condition	Display value
EX OPERAT	4WAS system enters in the protection function due to the heavy load condition and temporarily abnormal voltage.	On

Is the value of DATA MONITOR "On"?

YES >> Replace 4WAS front control unit. Refer to <u>STC-179, "Exploded View"</u>.

 Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-</u> 29. "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

NO >> INSPECTION END

# STEERING SYSTEM VIBRATION AND NOISE

STEERING SYSTEM VIBRATION AND NOISE
< SYMPTOM DIAGNOSIS > [WITH 4WAS]
STEERING SYSTEM VIBRATION AND NOISE
Description INFOID:00000004258072
<ul> <li>Vibration or noise occurs in the steering wheel while driving the vehicle.</li> <li>NOTE:</li> </ul>
<ul> <li>Vibration or noise occurs in the steering wheel in the following conditions. (4WAS system is not malfunc- tion.)</li> </ul>
<ul> <li>4WAS system starts and ends (when the engine speed is ON⇔OFF).</li> <li>System protection mode</li> <li>When steering frequently</li> </ul>
<ul> <li>When driving on a rough road</li> <li>When the assist of power steering is not sufficient</li> <li>When the battery voltage is weak</li> </ul>
Diagnosis Procedure
1.CHECK 4WAS SYSTEM
With CONSULT-III Start the engine. CAUTION:
<ul> <li>Stop the vehicle.</li> <li>2. Check "OVRLD JDG FLG", "ACT PRTCT FLG", "ECU PRTCT FLG", "LOW VOLT FLG", "HIGH VOLT FLG", "EX OPERAT" items on "DATA MONITOR" of 4WAS front control unit.</li> </ul>
<u>Does all items on "DATA MONITOR" indicate "Off"?</u> YES >> INSPECTION END (Vibration and sound occurs in 4WAS system protection function mode. This is normal.)
NO >> GO TO 2. 2.STOP 4WAS FRONT ACTUATOR CONTROL
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect 4WAS front actuator harness connector.</li> </ol>
CAUTION: Disconnect 4WAS front actuator harness connector 10 minutes after turning the ignition switch OFF.
<ol> <li>Drive the vehicle for a period of time. Check the symptom.</li> <li>CAUTION:</li> </ol>
Erase the self-diagnosis memory after the inspection is completed to detect 4WAS front control unit DTC "C1661". [Erase the self diagnosis memory of 4WAS main control unit, ABS actuator and electric unit (control unit) and ICC sensor integrated simultaneously.]
Does symptom not occur?
<ul> <li>YES &gt;&gt; Replace 4WAS front actuator. Refer to <u>STC-181, "Removal and Installation"</u>.</li> <li>NO &gt;&gt; Perform the symptom diagnosis for the steering system. Refer to <u>ST-3, "NVH Troubleshooting Chart"</u>.</li> </ul>

Ρ

#### UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION) < SYMPTOM DIAGNOSIS > [WITH 4WAS]

# UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIA-TION)

# Description

INFOID:000000004258074

- The steering force does not change smoothly according to the vehicle speed.
- The steering force is heavy when steering.
- The steering force is light when driving at high speed.

# **Diagnosis Procedure**

INFOID:000000004258075

**1.**CHECK 4WAS SYSTEM VEHICLE SPEED SIGNAL

Perform the trouble diagnosis of the vehicle speed signal. Refer to <u>STC-111, "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2.

NO >> Repair or replace the specific malfunctioning part.

2.CHECK STEERING SYSTEM

Check the steering system. Refer to ST-14, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the specific malfunctioning part.

3.CHECK 4WAS SYSTEM POWER STEERING SOLENOID VALVE

Perform the trouble diagnosis of the power steering solenoid valve. Refer to <u>STC-139, "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u>

YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.

NO >> Repair or replace the specific malfunctioning part.

А

В

Е

F

Н

L

Ρ

# < 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:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIR BAG".
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this STC Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### WARNING:

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000004258077 K

#### NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work.
   If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation pro-

#### OPERATION PROCEDURE

1. Connect both battery cables. NOTE:

Supply power using jumper cables if battery is discharged.

- 2. Turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
- 3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
- 4. Perform the necessary repair operation.

# PRECAUTIONS

< PRECAUTION >

- 5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
- 6. Perform self-diagnosis check of all control units using CONSULT-III.

Precautions for Removal and Installation of 4WAS Components

INFOID:000000004258078

INFOID:000000004258079

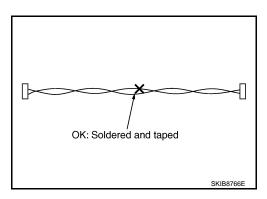
- Set the vehicle to the straight-ahead position when checking 4WAS and removing each component.
- Remove the battery terminal 10 minutes after turning the ignition switch OFF from ON and perform the removal of each component when removing the 4WAS front control unit.
- Perform the neutral position adjustment for the steering angle sensor after the replacement of steering angle sensor. Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special <u>Repair Requirement</u>".
- Refer to <u>STC-28, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Description"</u> for the replacement of 4WAS front control unit.
- Refer to <u>STC-28, "4WAS FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Description"</u> for the replacement of 4WAS front actuator.

#### Precautions for Harness Repair

#### 4WAS COMMUNICATION LINE

• Solder the repaired area and wrap tape around the soldered area. **NOTE:** 

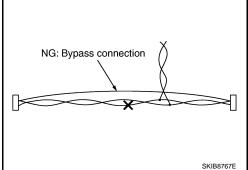
A fray of twisted lines must be within 110 mm (4.33 in).



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

Bypass connection may cause 4WAS 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 4WAS communication line.



# **REMOVAL AND INSTALLATION 4WAS FRONT CONTROL UNIT**

А

Е

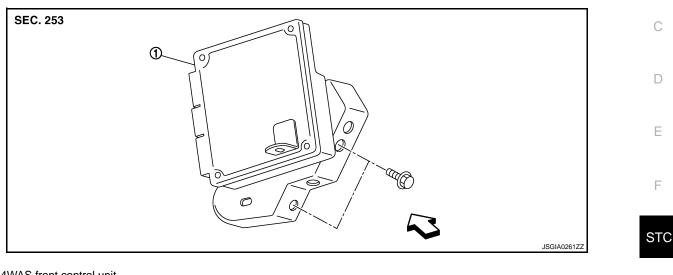
F

Н

Κ

INFOID:000000004258081

INFOID:000000004258080 В



1. 4WAS front control unit

C:Vehicle front Refer to GI-4, "Components" for symbols in the figure.

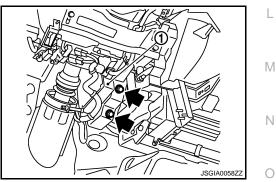
# Removal and Installation

#### REMOVAL

- 1. Turn the ignition switch OFF.
- Remove the instrument driver lower panel. Refer to IP-11, "Exploded View". 2.
- 3. Disconnect 4WAS front control unit connectors. **CAUTION:**

#### Disconnect 4WAS front control unit connectors 10 minutes after turning the ignition switch OFF.

- 4. Remove the bolts of 4WAS front control unit.
- 5. Remove the 4WAS front control unit (1).



#### INSTALLATION

Note following, and install in the reverse order of removal.

 Perform 4WAS front actuator adjustment after replacing 4WAS front control unit. Refer to <u>STC-29, "4WAS</u> Ρ FRONT ACTUATOR NEUTRAL POSITION ADJUSTMENT : Special Repair Requirement (Pattern 3)".

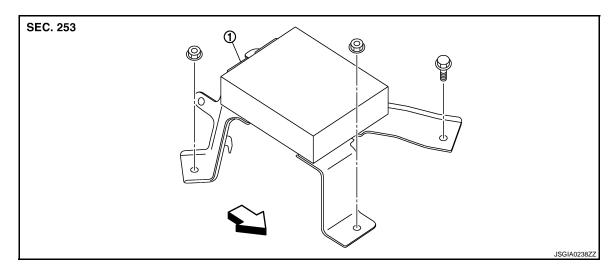
# < REMOVAL AND INSTALLATION >

# **4WAS MAIN CONTROL UNIT**

# Exploded View

INFOID:000000004258082

[WITH 4WAS]



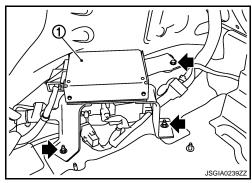
#### 1. 4WAS main control unit

C:Vehicle front Refer to <u>GI-4, "Components"</u> for symbols in the figure.

#### Removal and Installation

INFOID:000000004258083

- 1. Turn the ignition switch OFF.
- 2. Remove the rear wheel house finisher. Refer to INT-27, "Exploded View".
- 3. Disconnect 4WAS main control unit connectors, 4WAS rear motor relay connector and noise suppressor connectors.
- 4. Remove the 4WAS main control unit bolt and nuts.
- 5. Remove the 4WAS main control unit (1).



INSTALLATION Install in the reverse order of removal.

# 4WAS FRONT ACTUATOR ASSEMBLY < REMOVAL AND INSTALLATION >

# [WITH 4WAS]

# 4WAS FRONT ACTUATOR ASSEMBLY A Removal and Installation NOTITION ASSEMBLY Refer to ST section for installation/removal. Refer to ST-26, "WITH 4WAS : Removal and Installation". B C D E F STC STC

Н

J

Κ

L

Μ

Ν

Ο

Ρ

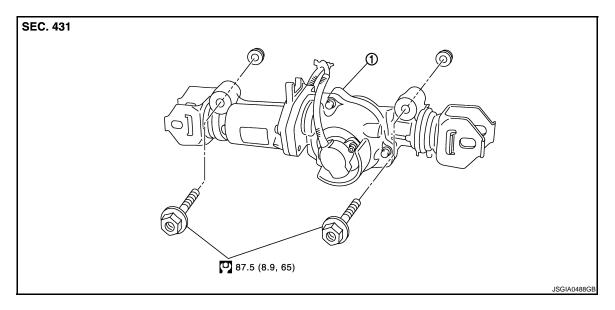
# < REMOVAL AND INSTALLATION >

# 4WAS REAR ACTUATOR ASSEMBLY

# Exploded View

INFOID:000000004258085

[WITH 4WAS]



1. 4WAS rear actuator assembly

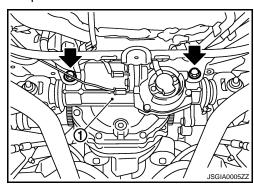
Refer to GI-4, "Components" for symbols in the figure.

#### Removal and Installation

INFOID:000000004258086

#### REMOVAL

- 1. Remove coil spring and lower link. Refer to <u>RSU-8, "Exploded View"</u>.
- 2. Disconnect harness connector from 4WAS rear actuator and rear suspension member.
- 3. Remove fixing bolts and nuts of 4WAS rear actuator (1), and then remove 4WAS rear actuator from rear suspension member.



#### INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing 4WAS rear actuator to rear suspension member, check the mounting surfaces of 4WAS rear actuator and rear suspension member for oil, dirt, sand, or other foreign materials.
- Check rear wheel alignment. Refer to RSU-6. "Inspection".