REAR FINAL DRIVE

REAR FINAL DRIVE

Warnings and Precautions

Warnings

1. It is not recommended to use non-original replacement parts, because they can be damage some units and affect vehicle safety.
2. Do not use non-standard final drive oil to avoid damaging final drive.

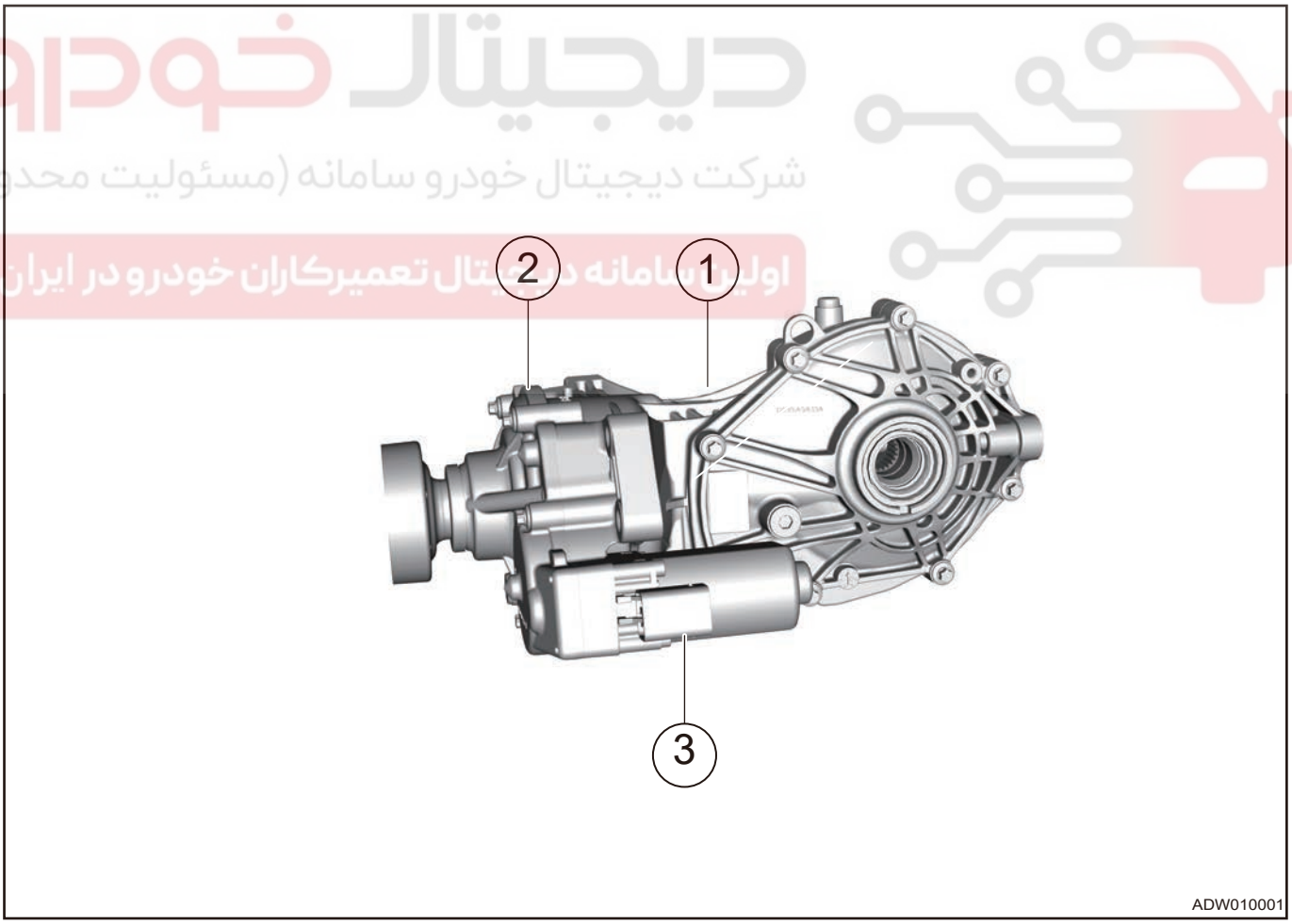
Precautions

1. In order to ensure safe and reliable operation of vehicle and drive shaft, the correct repair and maintenance is very important. Some of these operations need to use some special designed tools, and these tools can only be used in the corresponding repair and maintenance operations.

System Overview

System Component Diagram

Rear Final Drive Assembly

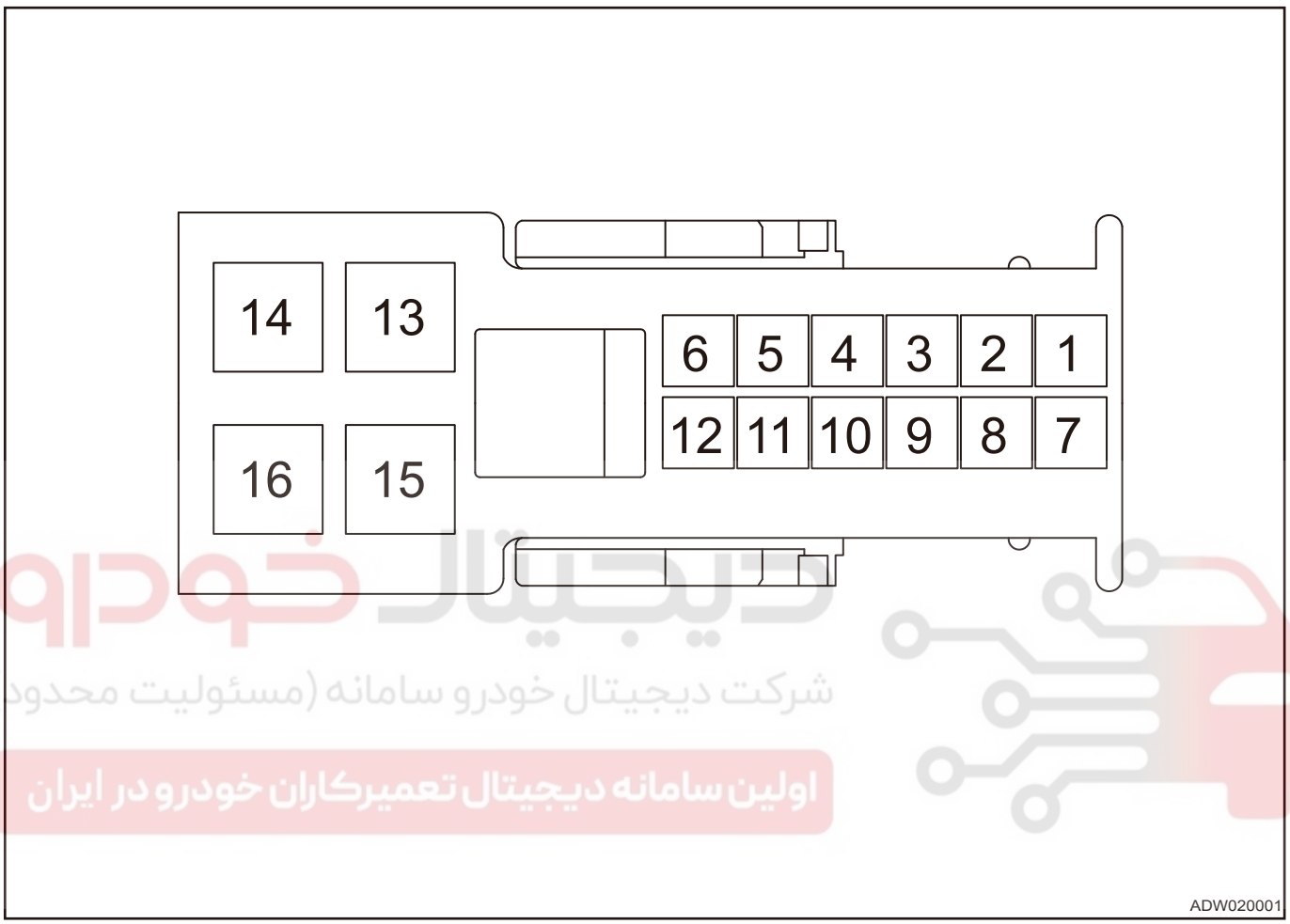


1	Rear Final Drive	2	Clutch Assembly
3	Motor		

System Circuit Diagram

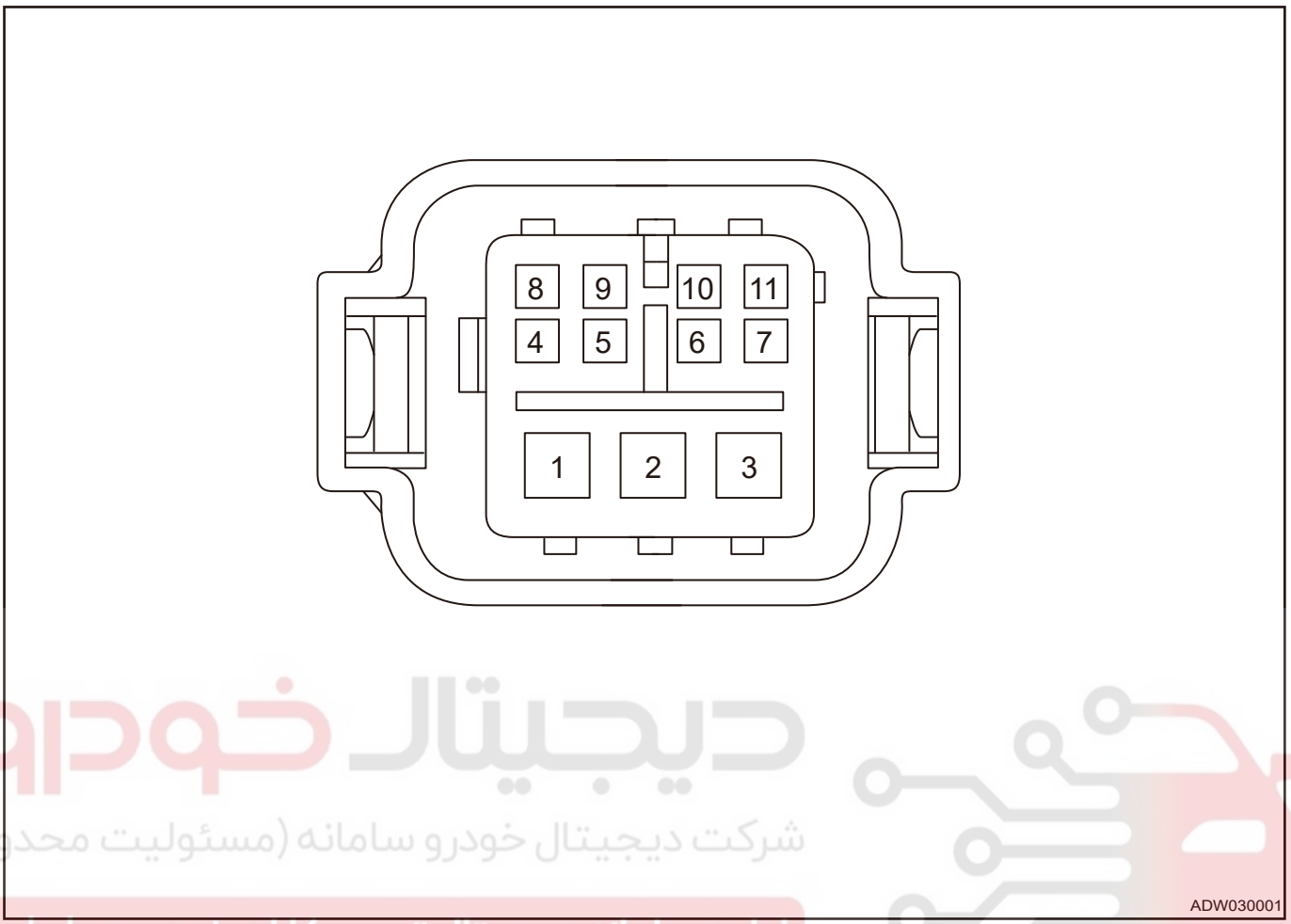
Terminal Definition

4WD Module Terminal Definition



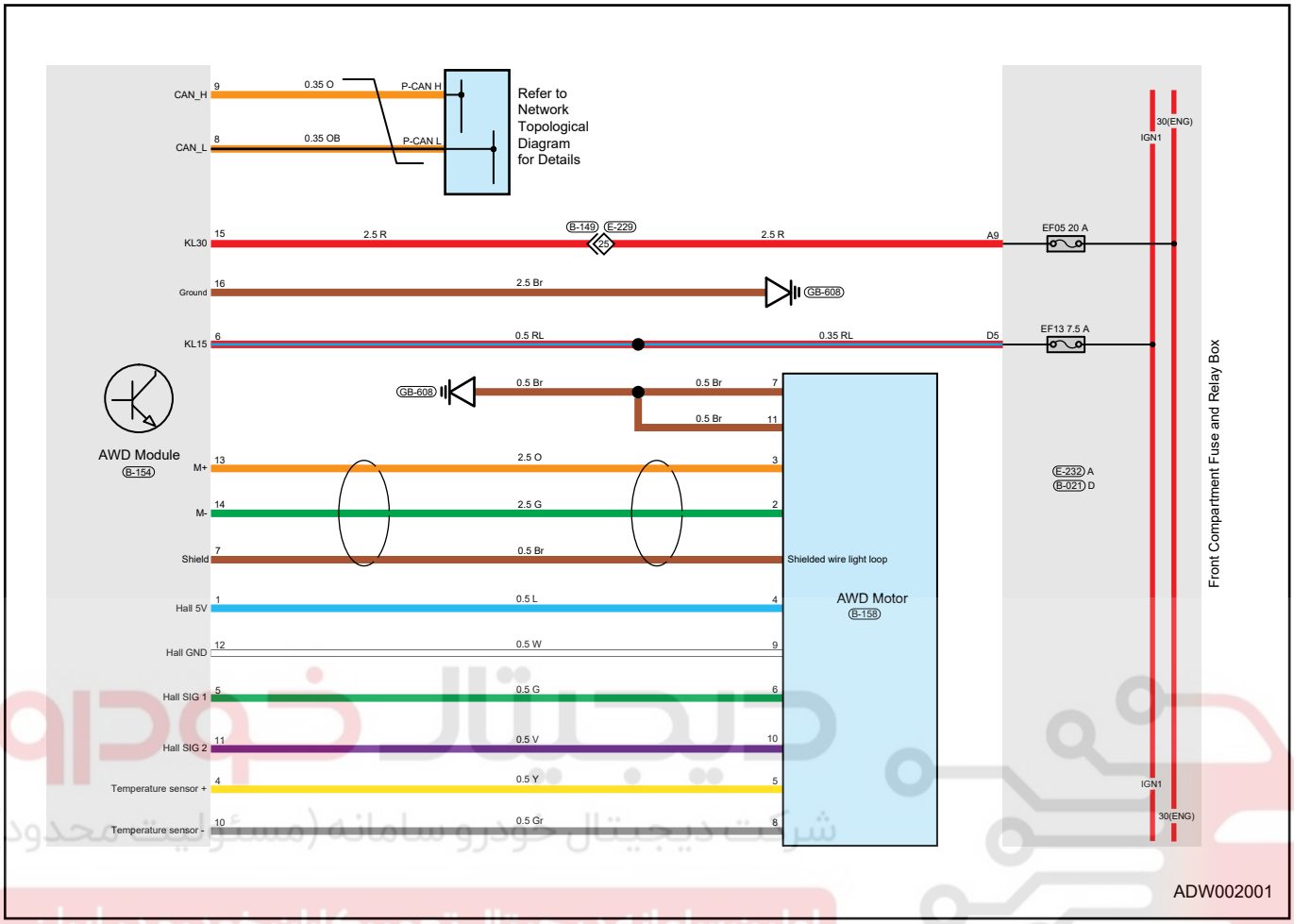
Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	Hall 5V	9	CAN-H
2	—	10	Temperature Sensor-
3	—	11	Hall SIG 2
4	Temperature Sensor+	12	Hall GND
5	Hall SIG 1	13	M+
6	KL15	14	M-
7	Shield	15	KL30
8	CAN-L	16	GND

4WD Motor Terminal Definition



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	—	7	Ground
2	M -	8	Temperature Sensor-
3	M+	9	Hall GND
4	Hall 5V	10	Hall SIG 2
5	Temperature Sensor+	11	Ground
6	Hall SIG 1		

AWD Control System Circuit Diagram



Diagnosis Contents

Problem Symptoms Table

Hint:

- Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
AWD malfunction indicator ON	Motor damage
	AWD module damage
	Abnormal control circuit
	Abnormal vehicle speed signal
	Clutch failure

Diagnosis Procedure

Hint:

- Use following procedures to troubleshoot the rear final drive control system.

1	**Vehicle brought to workshop**

Next

2	Check battery voltage

Check if battery voltage is normal.

NG → Replace battery

OK

3	Customer problem analysis

Next

4	Read DTCs

Check if battery voltage is normal.

NG → Perform repair according to problem symptoms table

OK

5	Read DTCs (current DTC and history DTC)

Check if battery voltage is normal.

NG → Troubleshoot according to Intermittent DTC malfunction procedures

OK

6	Repair according to Diagnostic Trouble Code (DTC) chart

Next

7	Adjust, repair or replace

Next

8	Conduct test and confirm malfunction has been repaired

Check if battery voltage is normal.

Next → End

DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software) to diagnostic interface.
- Turn ENGINE START STOP switch to ON.
- Using diagnostic tester, record and clear DTCs stored in AWD control module assembly.
- Turn the ENGINE START STOP switch to OFF and wait for several seconds.
- Using the diagnostic tester, select Read DTCs.
- If DTC is detected, malfunction indicated by DTC is current. Go to DTC chart, and perform troubleshooting.
- If no DTC is detected, malfunction indicated by DTC is intermittent. Please refer to Intermittent DTC Troubleshooting.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Check for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and body ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common body ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Body Ground Inspection

Body ground points are very important to the proper operation of circuits. Body ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper body ground. A loose or corroded body ground can affect the control circuit. Check the body ground points as follows:

1. Remove body ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall body ground bolt or nut securely.
5. Check if there are add-on accessories that interfere with body ground circuit.
6. If several wire harnesses are crimped into one body ground terminal, check for proper crimps. Make sure all wire harnesses are clean, securely fastened with providing a good body ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
P1FC004	ACM Internal Error
P1FC109	Motor Output Error
P1FC24B	Motor Driver Temperature Too High

DTC	DTC Definition
P1FC34B	Motor Temperature Too High
P1FC44B	Oil Temperature Too High
P1FC54B	Clutch Temperature Too High
P1FC600	4WD System Actuator Initialization Failure
P1FC792	4WD System Position Sensor Circuit Performance Failure
P1FC811	Motor Temperature Sensor Short to Ground
P1FC915	Motor Temperature Sensor Short to Power Supply or Open
P1FCA11	Motor Position Sensor Power Supply Voltage Short to Ground Under Voltage
P1FCB12	Motor Position Sensor Power Supply Voltage Short to Power Supply
P1FCC15	Motor Position Sensor Signal Wire 1: Short to Power Supply or Open
P1FCD14	Motor Position Sensor Signal Wire 1: Short to Ground or Open
P1FCE15	Motor Position Sensor Signal Wire 2: Short to Power Supply or Open
P1FCF14	Motor Position Sensor Signal Wire 2: Short to Ground or Open
P1FD064	Motor Position Sensor Circuit Signal Unreliable
P1FD112	Motor Control Circuit Short to Power Supply
P1FD211	Motor Control Circuit Short to Ground
P1FD313	Motor Control Circuit Open
P1FD419	Motor Control Circuit Over Current
P1FD51D	Motor Circuit Current or Motor Position Out of Range
P1FD707	Clutch Wear Out of Limit
P1FD84B	Controller Overheat
P1FD916	Voltage Too High
P1FDA17	Voltage Too Low
P1FDB16	Function Voltage Too High
P1FDC17	Function Voltage Too Low
U007388	Control Unit Communication Bus Off-line
U010087	Lost Communication with EMS
U010187	Lost Communication with TCU
U012687	Lost Communication with SAM
U012987	Lost Communication with BSM
U014087	Lost Communication with BCM
U024587	Lost Communication with IHU

DTC	DTC Definition
U040181	ESM Invalid Data
U040281	TCU Invalid Data
U041881	BSM Invalid Data
U042881	SAM Invalid Data
U054681	IHU Invalid Data
U130055	Software Configuration Error

DTC Diagnosis Procedure

DTC	P1FC004	ACM Internal Error

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC004	ACM Internal Error	View DTC extended information: 71: adc error module 75 : BIOS not ready	• Power supply system failure • Wire harness or connector failure • Controller failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check battery

(a) Check if battery voltage is normal.

NG → **Replace battery**

OK

2	Check charging system

(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

OK →

3	Check fuse

(a) Check if fuses EF05 (20A) and EF13 (7.5A) in engine compartment fuse and relay box are normal.

NG → **Replace fuse**

OK →

4	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect 4WD module connector B-154, disconnect engine compartment fuse and relay box connectors E-232 and B-021.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

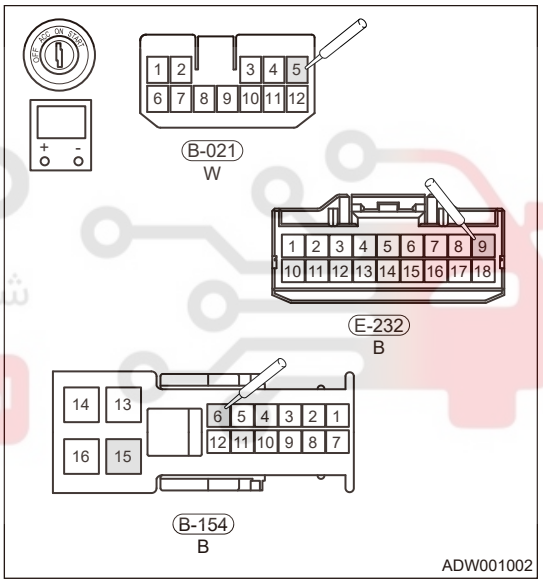
(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

(f) Check for continuity between fuses E-232 (9), B-021 (5) in engine compartment fuse and relay box and connectors B-154 (15, 6) of 4WD module (using a digital multimeter).

Standard Resistance

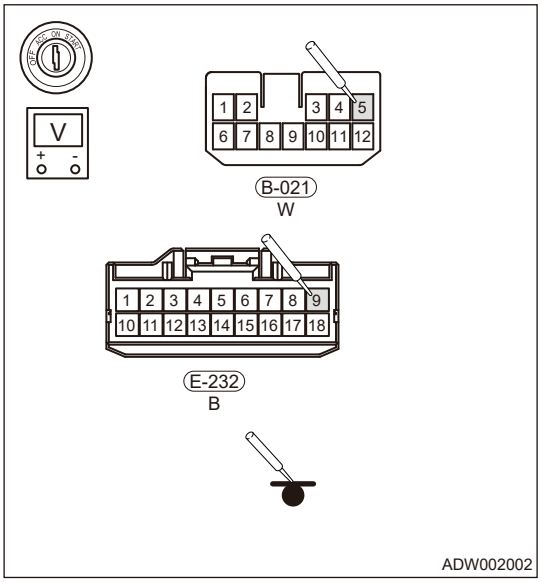
Multimeter Connection	Condition	Specified Condition
B-154 (15) - E-232 (9)	Always	⩽ 1 Ω
B-154 (6) - B-021 (5)	Always	⩽ 1 Ω



(g) Turn ignition switch to ON.

(h) Measure voltages between fuses E-232 (9), B-021 (5) in engine compartment fuse and relay box and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
E-232 (9) - Body ground	Ignition switch ON	⩾ 12V
B-021 (5) - Body ground	Ignition switch ON	⩾ 12V



NG → **Repair or replace wire harness or connector**

OK

5 Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	**P1FD916**	**Voltage Too High**
DTC	**P1FDA17**	**Voltage Too Low**
DTC	**P1FDB16**	**Function Voltage Too High**
DTC	**P1FDC17**	**Function Voltage Too Low**

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FD916	Voltage Too High	The fault occurs when power supply voltage is less than 8.5 V	• Power supply system failure • Wire harness or connector failure • Controller failure
P1FDA17	Voltage Too Low	The fault occurs when power supply voltage is more than 16 V	

DTC	DTC Definition	Detection Condition	Possible Cause
P1FDB16	Function Voltage Too High	The fault occurs when power supply voltage is more than 16 V	
P1FDC17	Function Voltage Too Low	The fault occurs when power supply voltage is less than 8.5 V	

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check battery**

(a) Check if battery voltage is normal.

NG → **Replace battery**

OK ↓

2	**Check charging system**

(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

OK ↓

3	**Check fuse**

(a) Check if fuses EF05 (20A) and EF13 (7.5A) in engine compartment fuse and relay box are normal.

NG → **Replace fuse**

OK

4	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect 4WD module connector B-154, disconnect engine compartment fuse and relay box connectors E-232 and B-021.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

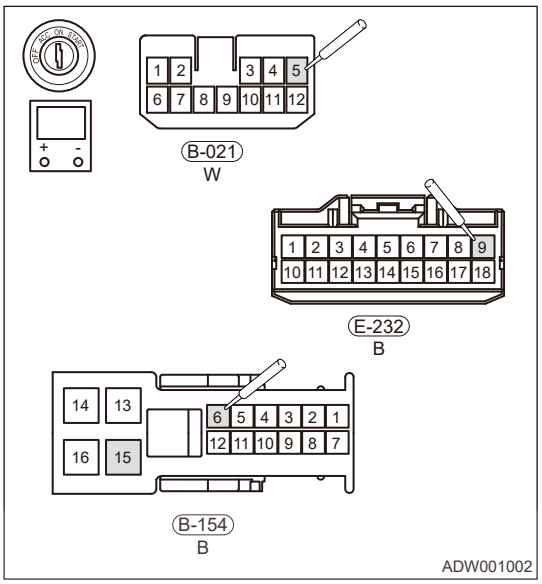
(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

(f) Check for continuity between fuses E-232 (9), B-021 (5) in engine compartment fuse and relay box and connectors B-154 (15, 6) of 4WD module (using a digital multimeter).

Standard Resistance

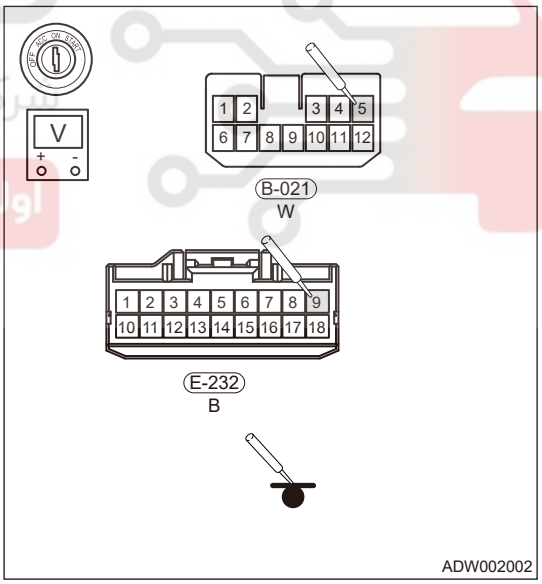
Multimeter Connection	Condition	Specified Condition
B-154 (15) - E-232 (9)	Always	⩽ 1 Ω
B-154 (6) - B-021 (5)	Always	⩽ 1 Ω



(g) Turn ignition switch to ON.

(h) Measure voltage between fuses E-232 (9), B-021(5) in engine compartment fuse and relay box and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
E-232 (9) - Body ground	Ignition switch ON	⩾ 12V
B-021 (5) - Body ground	Ignition switch ON	⩾ 12V



NG

Repair or replace wire harness or connector

OK

5	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK	**System operates normally**
NG	**Replace 4WD module**

DTC	P1FC600	4WD System Actuator Initialization Failure

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC600	4WD System Actuator Initialization Failure	A fault occurs when position change is too small (0°) or too high (500°) for more than 3 times during initialization	• Power supply system failure • Wire harness or connector failure • Actuator failure • Final drive mechanical failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check battery

(a) Check if battery voltage is normal.

NG	**Replace battery**

OK

2	**Check charging system**

(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

OK →

3	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

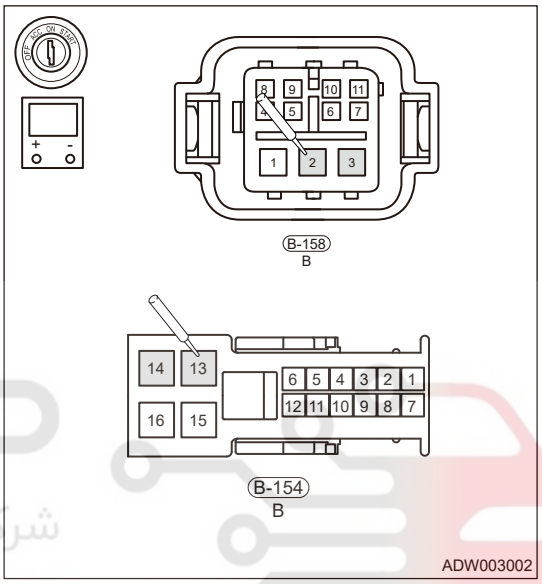
(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

(f) Check for continuity between connectors B-158 (2, 3) of 4WD motor and connectors B-154 (14, 13) of 4WD module (using a digital multimeter).

Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (13) - B-158 (3)	Always	⩽ 1 Ω
B-154 (14) - B-158 (2)	Always	⩽ 1 Ω

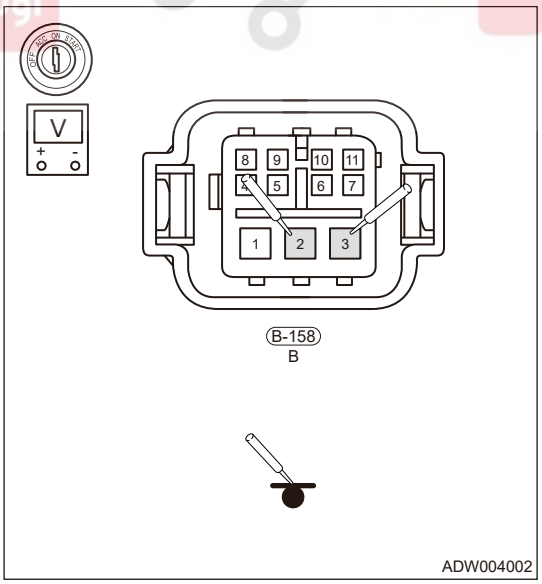


(g) Connect the negative battery cable.

(h) Turn ignition switch to ON.

(i) Check voltage between connectors B - 158 (3, 2) of 4WD motor and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (3) - Body ground	Ignition switch ON	⩾ 12V
B-158 (2) - Body ground	Ignition switch ON	0 V



NG → **Repair or replace wire harness or connector**

OK →

4	Check 4WD motor

- Check if 4WD motor works properly.

NG → **Replace 4WD motor**

OK

5	Check final drive mechanical part

- Check if final drive mechanical part is normal.

NG → **Replace or repair final drive mechanical part**

OK

6	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	P1FC811	Motor Temperature Sensor Short to Ground

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC811	Motor Temperature Sensor Short to Ground	The fault occurs when input voltage is less than 1.9 V	• Wire harness or connector failure • 4WD motor failure • 4WD module failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.

- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

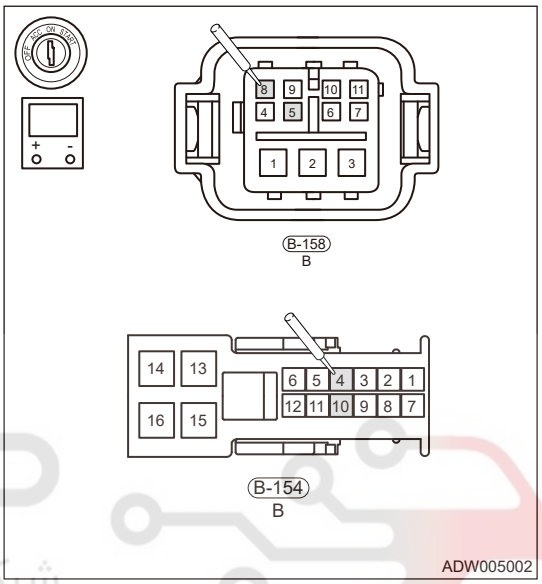
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connectors B-158 (5, 8) of 4WD motor and connectors B-154 (4, 10) of 4WD module (using a digital multimeter).

Standard Resistance

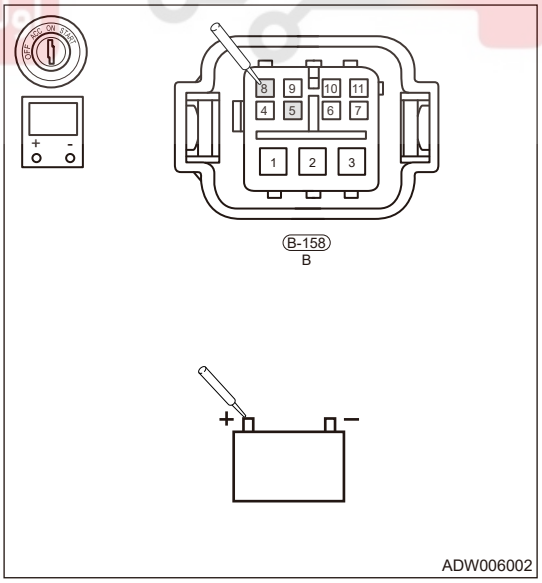
Multimeter Connection	Condition	Specified Condition
B-154 (4) - B-158 (5)	Always	⩽ 1 Ω
B-154 (10) - B-158 (8)	Always	⩽ 1 Ω



(h) Connect 4WD module connector, disconnect 4WD motor connector.

(i) Check for continuity between connectors B-158 (5, 8) of 4WD motor and battery positive and negative (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (5) - Battery positive	Always	∞
B-158 (5) - Battery negative	Always	∞
B-158 (8) - Battery positive	Always	∞
B-158 (8) - Battery negative	Always	∞



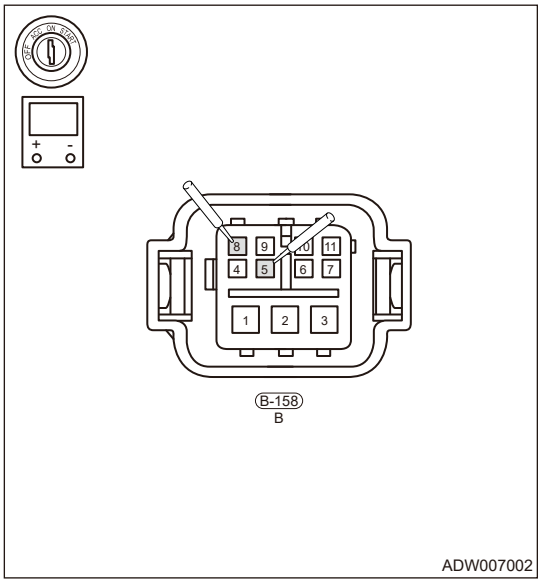
NG → **Repair or replace wire harness or connector**

OK

2	Check motor temperature sensor

- Disconnect the negative battery.
- Disconnect 4WD motor connector B-158.
- Check resistance between terminals 5 and 8 of 4WD motor connector B-158.

Multimeter Connection	Condition	Specified Condition
B-158 (5) - B-158 (8)	Always	The resistance is less than or equal to 1.5 KΩ when temperature is 50°C



NG → **Replace 4WD motor**

OK

3	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	P1FC915	Motor Temperature Sensor Short to Power Supply or Open

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC915	Motor Temperature Sensor Short to Power Supply or Open	The fault occurs when input voltage is more than 4.96 V	• Wire harness or connector failure • 4WD motor failure • 4WD module failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

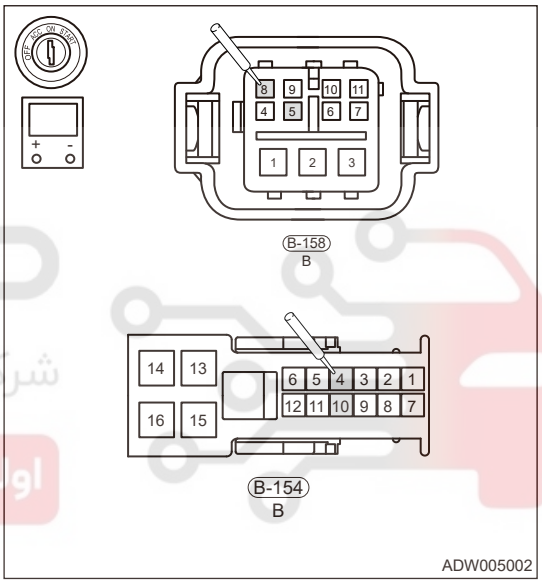
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connectors B-158 (5, 8) of 4WD motor and connectors B-154 (4, 10) of 4WD module (using a digital multimeter).

Standard Resistance

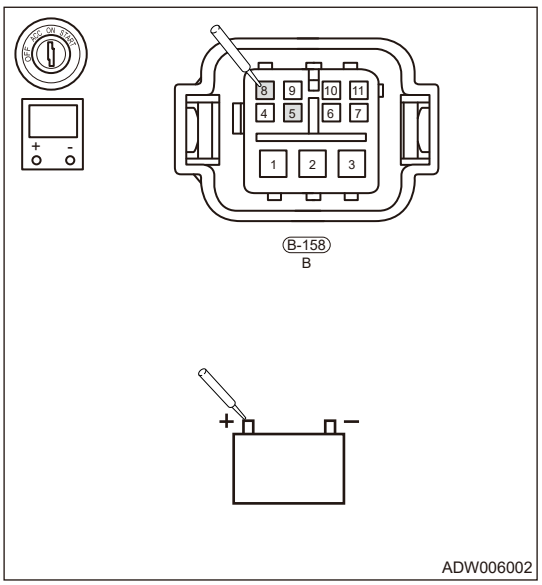
Multimeter Connection	Condition	Specified Condition
B-154 (4) - B-158 (5)	Always	⩽ 1 Ω
B-154 (10) - B-158 (8)	Always	⩽ 1 Ω



(h) Connect 4WD module connector, disconnect 4WD motor connector.

(i) Check for continuity between connectors B-158 (5, 8) of 4WD motor and battery positive and negative (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (5) - Battery positive	Always	∞
B-158 (5) - Battery negative	Always	∞
B-158 (8) - Battery positive	Always	∞
B-158 (8) - Battery negative	Always	∞



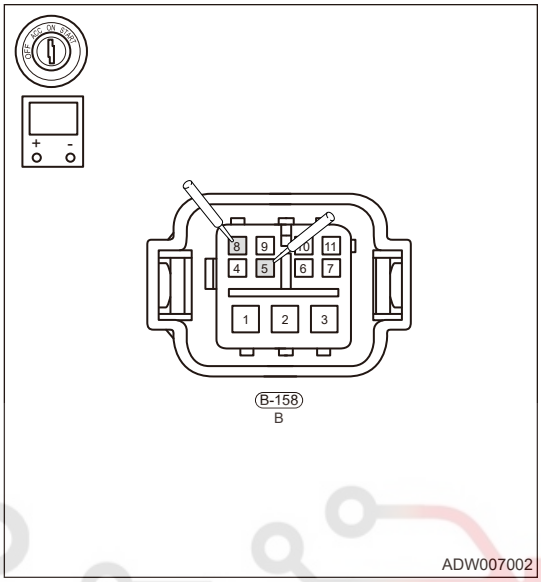
NG → **Repair or replace wire harness or connector**

OK

2	Check motor temperature sensor

- Disconnect the negative battery.
- Disconnect 4WD motor connector B-158.
- Check resistance between terminals 5 and 8 of 4WD motor connector B-158.

Multimeter Connection	Condition	Specified Condition
B-158 (5) - B-158 (8)	Always	The resistance is 5 KΩ when temperature is 20°C, the resistance is 1.7 KΩ when temperature is 50°C



NG → **Replace 4WD motor**

OK

3	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	P1FCA11	Motor Position Sensor Power Supply Voltage Short to Ground Under Voltage

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FCA11	Motor Position Sensor Power Supply Voltage Short to Ground Under Voltage	The fault occurs when input voltage is less than 5.1 V	• Power supply system failure • Wire harness or connector failure • 4WD motor failure • 4WD module failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check battery**

(a) Check if battery voltage is normal.

NG → **Replace battery**

OK

2	**Check charging system**

(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

OK

3	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

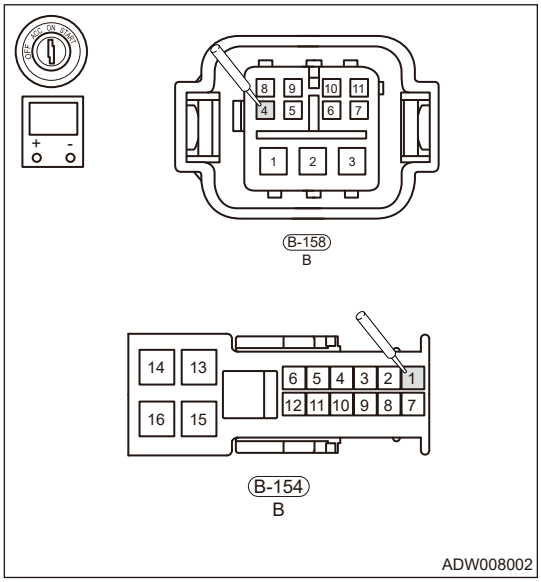
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connector B-158 (4) of 4WD motor and connector B-154 (1) of 4WD module (using a digital multimeter).

Standard Resistance

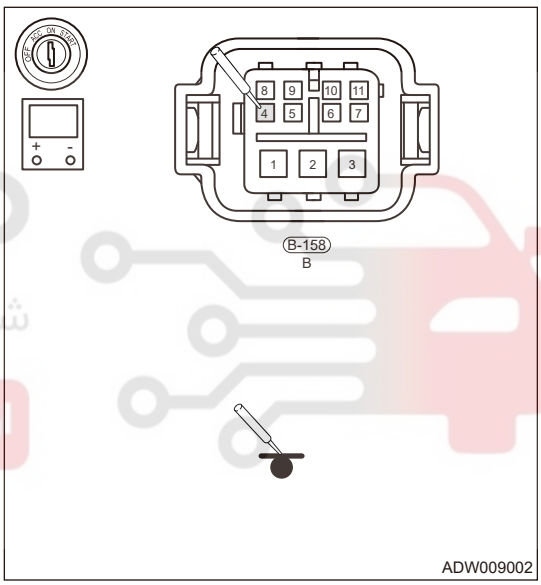
Multimeter Connection	Condition	Specified Condition
B-154 (1) - B-158 (4)	Always	⩽ 1 Ω



(h) Connect 4WD module connector, disconnect 4WD motor connector.

(i) Check for continuity between terminal 4 of 4WD motor connector B-158 and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (4) - Body ground	Always	∞



NG → **Repair or replace wire harness or connector**

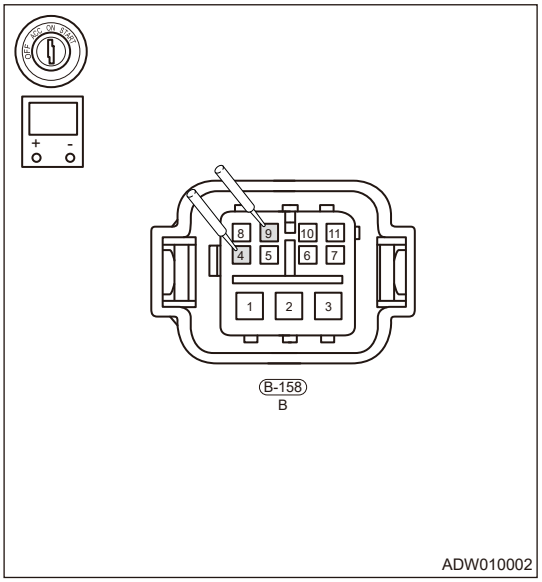
OK

4	**Check motor position sensor**

- Disconnect the negative battery.
- Disconnect 4WD motor connector B-158.
- Check resistance between terminal 4 and terminal 9 of 4WD motor connector B-158.

  Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-158 (4) - B-158 (9)	Always	About 4.5 KΩ



NG → **Replace 4WD motor**

OK

5	**Reconfirm DTCs**

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	P1FCB12	Motor Position Sensor Power Supply Voltage Short to Power Supply

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FCB12	Motor Position Sensor Power Supply Voltage Short to Power Supply	The fault occurs when input voltage is more than 9 V	• Wire harness or connector failure • 4WD module failure

Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

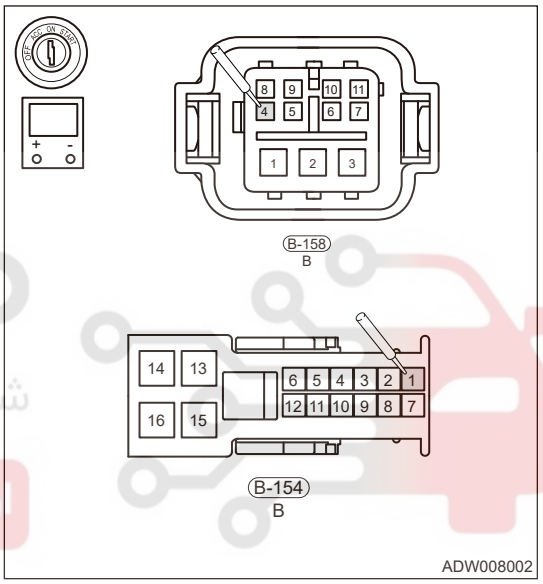
- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery.
(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Check for continuity between connector B-158 (4) of 4WD motor and connector B-154 (1) of 4WD module (using a digital multimeter).

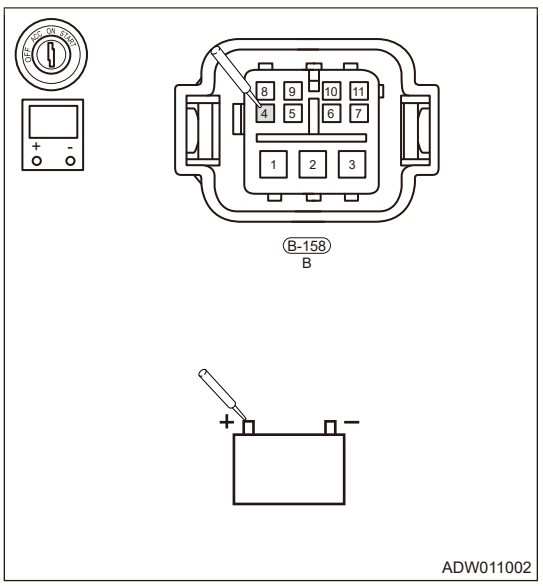
Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (1) - B-158 (4)	Always	⩽ 1 Ω



(h) Connect 4WD module connector.
(i) Check for continuity between terminal 4 of 4WD module B-158 and battery positive (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (4) - Battery positive	Always	∞



NG → **Repair or replace wire harness or connector**

OK

2	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK	**System operates normally**
NG	**Replace 4WD module**

DTC	**P1FCC15**	**Motor Position Sensor Signal Wire 1: Short to Power Supply or Open**
DTC	**P1FCD14**	**Motor Position Sensor Signal Wire 1: Short to Ground or Open**

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FCC15	Motor Position Sensor Signal Wire 1: Short to Power Supply or Open	The fault occurs when input voltage is more than 3.42V	• Wire harness or connector failure • 4WD module failure
P1FCD14	Motor Position Sensor Signal Wire 1: Short to Ground or Open	The fault occurs when input voltage is less than 1.9V	

Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

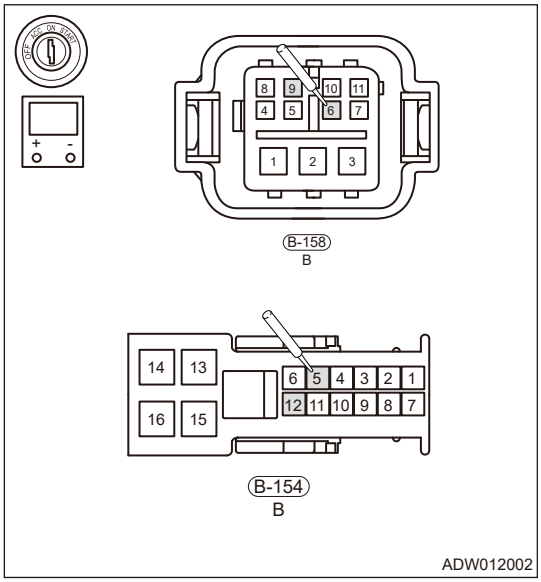
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connectors B-158 (6, 9) of 4WD motor and connectors B-154 (5, 12) of 4WD module (using a digital multimeter).

Standard Resistance

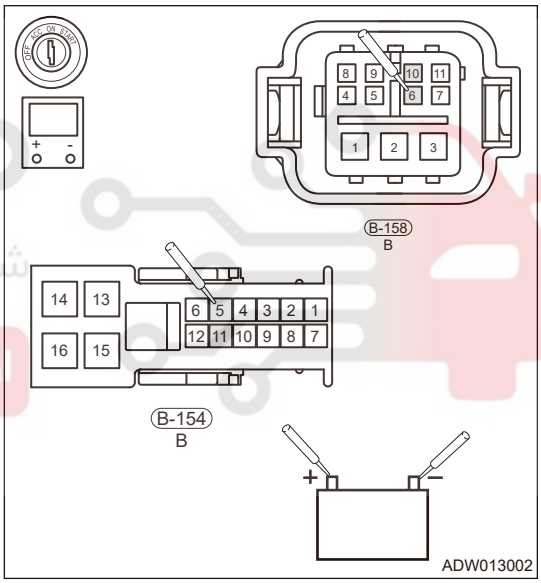
Multimeter Connection	Condition	Specified Condition
B-154 (5) - B-158 (6)	Always	⩽ 1 Ω
B-154 (12) - B-158 (9)	Always	⩽ 1 Ω



(h) Connect 4WD module connector and 4WD motor connector.

(i) Check for continuity between terminal 5 of 4WD module B-154, battery positive and body ground; for continuity between terminal 6 of 4WD motor B-154, battery positive and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-154 (5) - Battery positive	Always	∞
B-154 (5) - Body ground	Always	∞
B-158 (6) - Battery positive	Always	∞
B-158 (6) - Body ground	Always	∞



NG → **Repair or replace wire harness or connector**

OK

2	**Check 4WD motor**

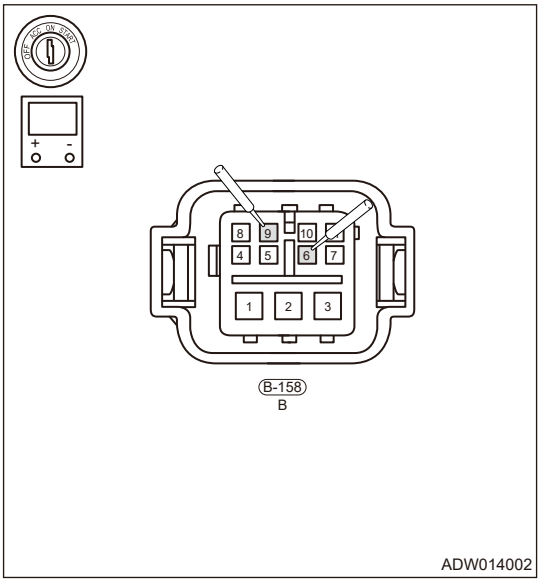
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD motor connector B-158.

(d) Check for continuity between terminal 6 and terminal 9 of 4WD motor B-158 (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (6) - B-158 (9)	Always	About 4.3 KΩ



NG → **Replace 4WD motor**

OK

3 Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	**P1FCE15**	**Motor Position Sensor Signal Wire 2: Short to Power Supply or Open**
DTC	**P1FCF14**	**Motor Position Sensor Signal Wire 2: Short to Ground or Open**

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FCE15	Motor Position Sensor Signal Wire 2: Short to Power Supply or Open	The fault occurs when input voltage is more than 3.42V	• Wire harness or connector failure • 4WD module failure
P1FCF14	Motor Position Sensor Signal Wire 2: Short to Ground or Open	The fault occurs when input voltage is less than 1.9V	

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

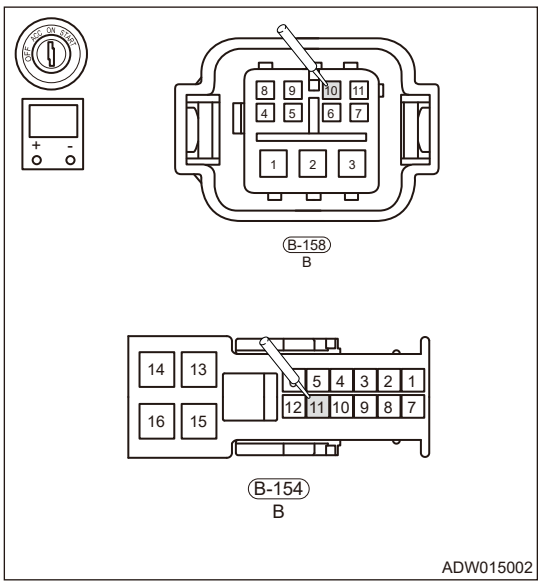
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connector B-158 (10) of 4WD motor and connector B-154 (11) of 4WD module (- using a digital multimeter).

Standard Resistance

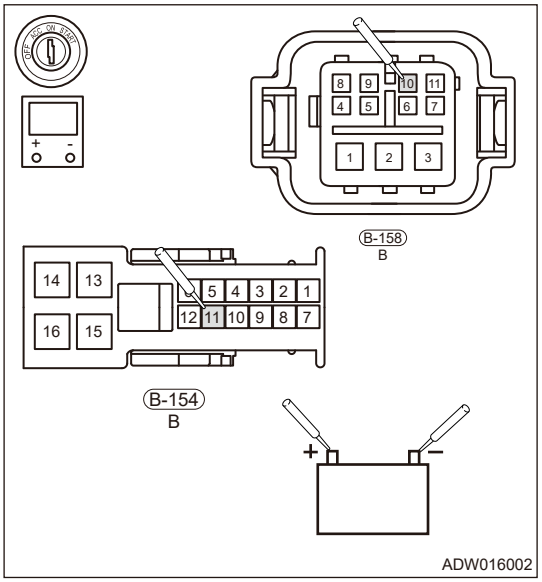
Multimeter Connection	Condition	Specified Condition
B-154 (11) - B-158 (10)	Always	⩽ 1 Ω



(h) Connect 4WD module connector and 4WD motor connector.

(i) Check for continuity between terminal 5 of 4WD module B-154, battery positive and body ground; for continuity between terminal 6 of 4WD motor B-154, battery positive and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-154 (11) - Battery positive	Always	∞
B-154 (11) - Body ground	Always	∞
B-158 (10) - Battery positive	Always	∞
B-158 (10) - Body ground	Always	∞



NG → **Repair or replace wire harness or connector**

OK

2	**Check 4WD motor**

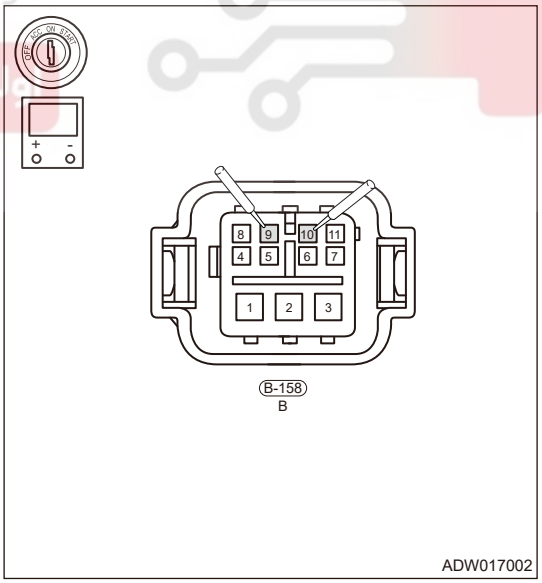
(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD motor connector B-158.

(d) Check for continuity between terminal 4 and terminal 3 of 4WD motor B-158 (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-158 (9) - B-158 (10)	Always	About 4.3 KΩ



NG → **Replace 4WD motor**

OK

3	**Reconfirm DTCs**

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK	**System operates normally**
NG	**Replace 4WD module**

DTC	P1FC972	4WD Module Position Sensor Circuit Performance Failure

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC972	4WD Module Position Sensor Circuit Performance Failure	The deviation between 4WD module position sensor measurement position and theoretical position is +360°/-800°	• Power supply system failure • Wire harness or connector failure • Motor failure • 4WD module failure • Reduction gear mechanical failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check battery

(a) Check if battery voltage is normal.

NG	**Replace battery**

OK

2	Check charging system

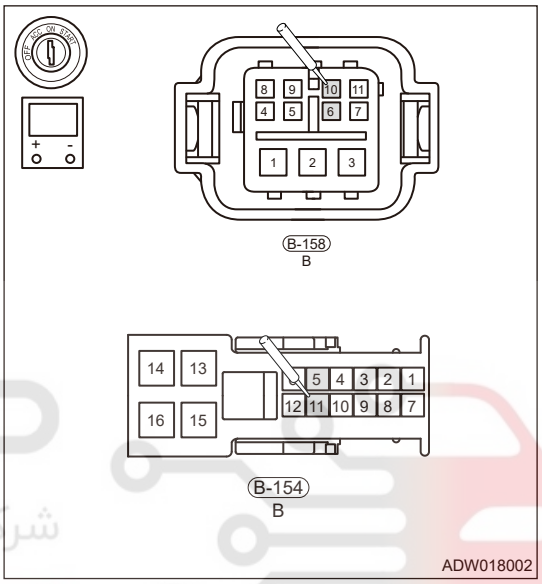
(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

OK ↓

3	Check wire harness and connector

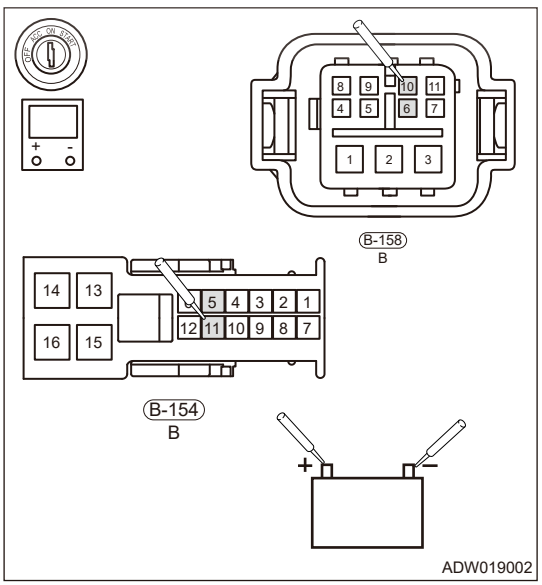
(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery.
(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Check for continuity between connectors B-158 (6, 10) of 4WD motor and connectors B-154 (5, 11) of 4WD module (using a digital multimeter).



Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (5) - B-158 (6)	Always	⩽ 1 Ω
B-154 (11) - B-158 (10)	Always	⩽ 1 Ω

(h) Check for continuity between connectors B-158 (6, 10) of 4WD motor, battery positive and body ground, connectors B-154 (5, 11) of 4WD module, battery positive and body ground (using a digital multimeter).



Multimeter Connection	Condition	Specified Condition
B-154 (5) - Battery positive	Always	∞
B-154 (11) - Body ground	Always	∞
B-158 (6) - Battery positive	Always	∞
B-158 (10) - Body ground	Always	∞

NG → **Repair or replace wire harness or connector**

OK

4	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK	**System operates normally**
NG	**Replace motor**
NG	**Replace 4WD module**
NG	**Repair final drive**

DTC	P1FD064	Motor Position Sensor Circuit Signal Unreliable

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FD064	Motor Position Sensor Circuit Signal Unreliable	Invalid hall signal state is detected, gradient speed is unreasonable, gradient position is unreasonable, range speed is unreasonable, fault occurs when interruption is lost	• Wire harness or connector failure • Motor failure • 4WD module failure

Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	Check wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

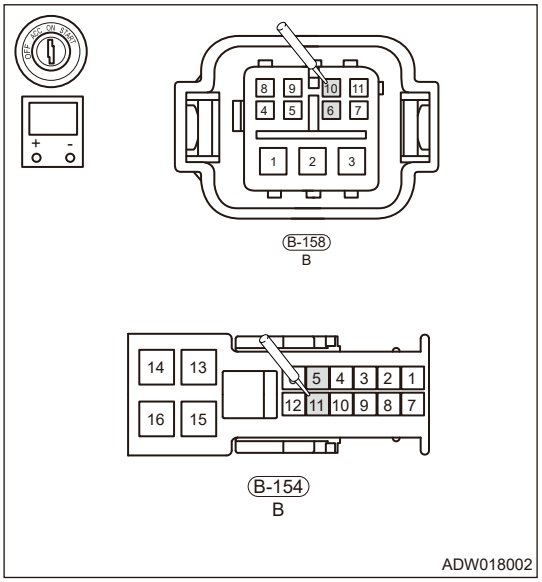
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connectors B-158 (6, 10) of 4WD motor and connectors B-154 (5, 11) of 4WD module (using a digital multimeter).

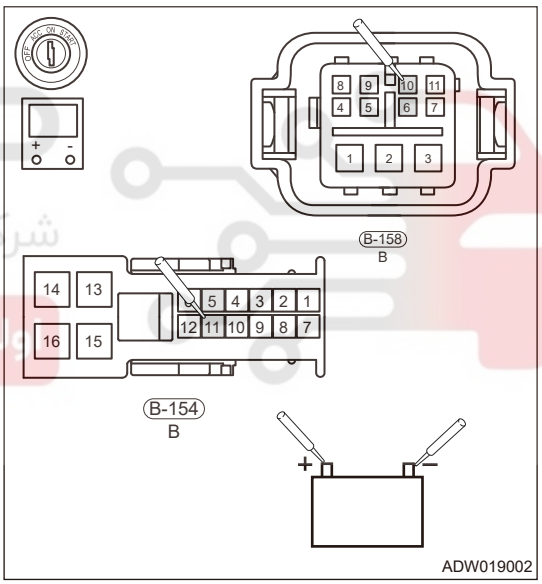
Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (5) - B-158 (6)	Always	⩽ 1 Ω
B-154 (11) - B-158 (10)	Always	⩽ 1 Ω



(h) Check for continuity between connectors B-158 (6, 10) of 4WD motor, battery positive and body ground, connectors B-154 (5, 11) of 4WD module, battery positive and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-154 (5) - Battery positive	Always	∞
B-154 (11) - Body ground	Always	∞
B-158 (6) - Battery positive	Always	∞
B-158 (10) - Body ground	Always	∞



NG → **Repair or replace wire harness or connector**

OK →

2	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK	**System operates normally**
NG	**Replace motor**
NG	**Replace 4WD module**

DTC	P1FD707	Clutch Wear Out of Limit

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FD707	Clutch Wear Out of Limit	Clutch position exceeds the limit position	• Clutch failure • 4WD module failure

Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery.
(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.

NG	**Repair or replace wire harness or connector**

OK

2	**Check clutch**

(a) Check clutch lining for wear.

NG	**Replace clutch lining**

OK

3	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	**P1FC24B**	**Motor Driver Temperature Too High**
DTC	**P1FC34B**	**Motor Temperature Too High**
DTC	**P1FC44B**	**Oil Temperature Too High**
DTC	**P1FC54B**	**Clutch Temperature Too High**
DTC	**P1FD84B**	**Controller Overheat**

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC24B	Motor Driver Temperature Too High	It is detected that fault occurs when motor driver temperature is more than 125°C	• Wire harness or connector failure • 4WD module failure
P1FC34B	Motor Temperature Too High	It is detected that fault occurs when motor temperature is more than 140°C	
P1FC44B	Oil Temperature Too High	It is detected that fault occurs when oil temperature is more than 150°C	
P1FC54B	Clutch Temperature Too High	It is detected that fault occurs when clutch temperature is more than 250°C	
P1FD84B	Controller Overheat	It is detected that controller temperature is no less than 85°C	

Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery.
(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.

NG → **Repair or replace wire harness or connector**

OK

2	**Reconfirm DTCs**

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	**P1FD112**	**Motor Control Circuit Short to Power Supply**
DTC	**P1FD211**	**Motor Control Circuit Short to Ground**
DTC	**P1FD313**	**Motor Control Circuit Open**
DTC	**P1FD419**	**Motor Control Circuit Over Current**

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FD112	Motor Control Circuit Short to Power Supply	It is detected that motor control circuit is short to power supply	• Power supply system failure • Wire harness or connector failure • 4WD module failure
P1FD211	Motor Control Circuit Short to Ground	It is detected that motor control circuit is short to ground	
P1FD313	Motor Control Circuit Open	It is detected that motor control circuit is open	
P1FD419	Motor Control Circuit Over Current	Fault occurs when input current more than 43.8 A	

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check battery**

(a) Check if battery voltage is normal.

NG → **Replace battery**

OK ↓

2	**Check charging system**

(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

OK ↓

3	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery.

(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.

(d) Check if wire harnesses are worn, pierced, pinched or partially broken.

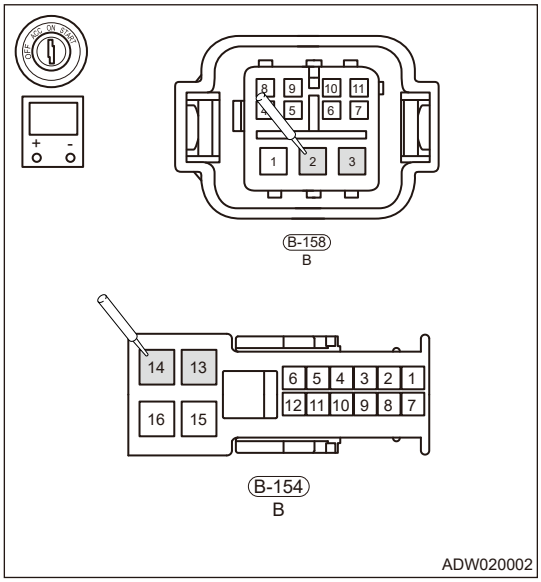
(e) Check for broken, bent, protruded or corroded terminals.

(f) Check if related connector pins are in good condition.

(g) Check for continuity between connectors B-158 (3, 2) of 4WD motor and connectors B-154 (13, 14) of 4WD module (using a digital multimeter).

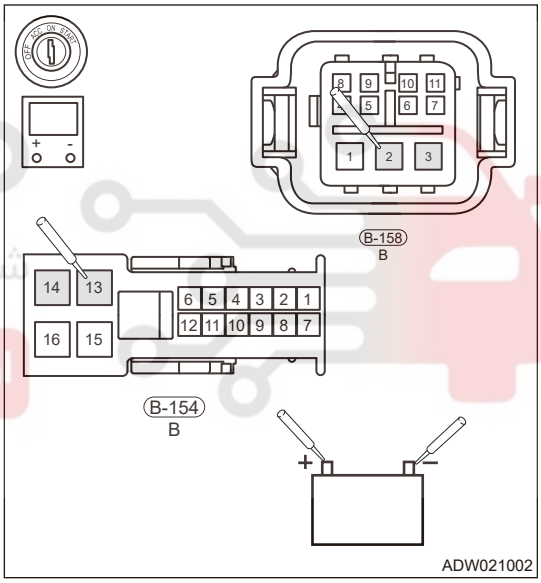
Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (13) - B-158 (3)	Always	⩽ 1 Ω
B-154 (14) - B-158 (2)	Always	⩽ 1 Ω



(h) Check for continuity between B-154 (13, 14) of 4WD motor, battery positive and body ground, B-158 (3, 2) of 4WD motor, battery positive and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-154 (13) - Battery positive	Always	∞
B-154 (14) - Body ground	Always	∞
B-158 (3) - Battery positive	Always	∞
B-158 (2) - Body ground	Always	∞



NG → **Repair or replace wire harness or connector**

OK

4	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG	**Replace 4WD module**

DTC	P1FD51D	Motor Circuit Current or Motor Position Out of Range

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FD51D	Motor Circuit Current or Motor Position Out of Range	Torque rationality check error (current - position - check)	• Power supply system failure • Wire harness or connector failure • 4WD motor failure • 4WD module failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check battery**

(a) Check if battery voltage is normal.

NG	**Replace battery**

OK

2	**Check charging system**

(a) Check if charging system is normal.

NG	**Repair or replace alternator or charging wire harness**

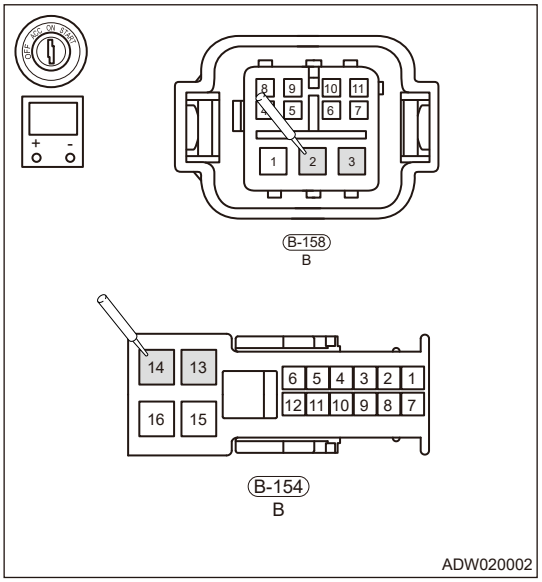
OK

3	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery.
(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Check for continuity between connectors B-158 (3, 2) of 4WD motor and connectors B-154 (13, 14) of 4WD module (using a digital multimeter).

Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (13) - B-158 (3)	Always	⩽ 1 Ω
B-154 (14) - B-158 (2)	Always	⩽ 1 Ω



NG → **Repair or replace wire harness or connector**

OK →

4	Check 4WD motor

(a) Check if 4WD motor works properly.

NG → **Replace 4WD motor**

OK →

5	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	P1FC109	Motor Output Error

Description

DTC	DTC Definition	Detection Condition	Possible Cause
P1FC109	Motor Output Error	Fault occurs when an error (undervoltage, overvoltage, overtemperature, communication error) is identified at the motor output	• Power supply system failure • Wire harness or connector failure • 4WD module failure

Caution
• When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

DTC Confirmation Procedure
Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean the ground point related to the latest (DTC).
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

1	**Check battery**

(a) Check if battery voltage is normal.

NG → **Replace battery**

OK ↓

2	**Check charging system**

(a) Check if charging system is normal.

NG → **Repair or replace alternator or charging wire harness**

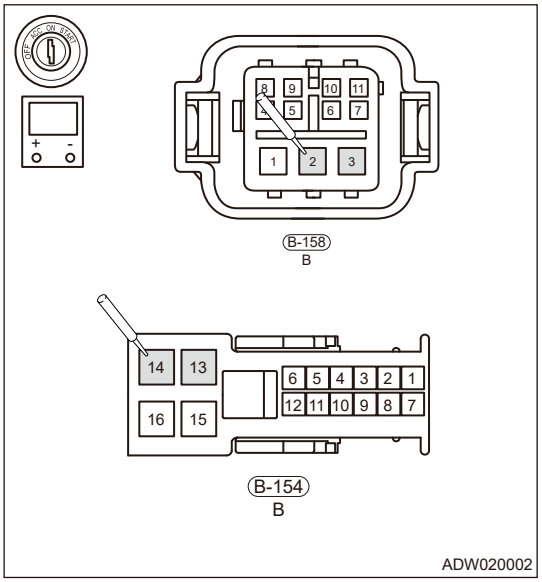
OK ↓

3	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery.
(c) Disconnect 4WD module connector B-154, disconnect 4WD motor connector B-158.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.
(f) Check if related connector pins are in good condition.
(g) Check for continuity between connectors B-158 (3, 2) of 4WD motor and connectors B-154 (13, 14) of 4WD module (using a digital multimeter).

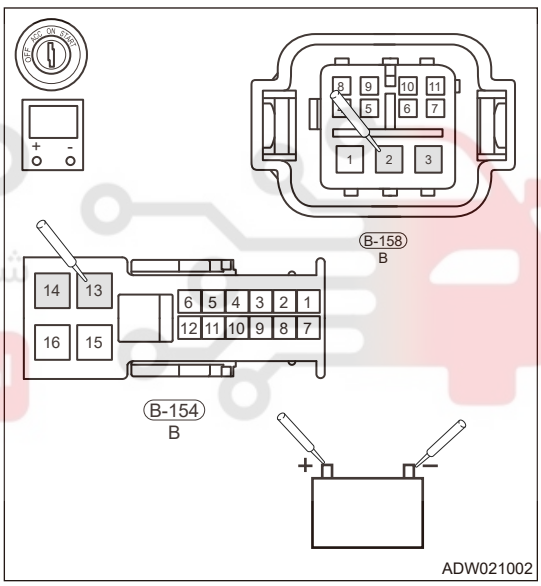
Standard Resistance

Multimeter Connection	Condition	Specified Condition
B-154 (13) - B-158 (3)	Always	⩽ 1 Ω
B-154 (14) - B- 158 (2)	Always	⩽ 1 Ω



(h) Check for continuity between B-154 (13, 14) of 4WD motor, battery positive and body ground, B-158 (3, 2) of 4WD motor, battery positive and body ground (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-154 (13) - Battery positive	Always	∞
B-154 (14) - Body ground	Always	∞
B-158 (3) - Battery positive	Always	∞
B-158 (2) - Body ground	Always	∞



NG → **Repair or replace wire harness or connector**

OK

4	Reconfirm DTCs

- Connect diagnostic tester and clear DTCs.
- Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
- Check if the same DTCs are output.

OK

Same DTCs are not output

OK → **System operates normally**

NG → **Replace 4WD module**

DTC	**U007388**	**Control Unit Communication Bus Off-line**
DTC	**U010087**	**Lost Communication with EMS**
DTC	**U010187**	**Lost Communication with TCU**
DTC	**U012687**	**Lost Communication with SAM**
DTC	**U012987**	**Lost Communication with BSM**
DTC	**U014087**	**Lost Communication with BCM**
DTC	**U016487**	**Lost Communication with CLM**
DTC	**U024587**	**Lost Communication with IHU**
DTC	**U040181**	**ESM Invalid Data**
DTC	**U040281**	**TCU Invalid Data**
DTC	**U041881**	**BSM Invalid Data**
DTC	**U042881**	**SAM Invalid Data**
DTC	**U054681**	**IHU Invalid Data**
DTC	**U130055**	**Software Configuration Error**

Description

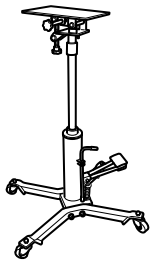
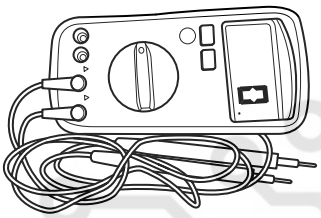
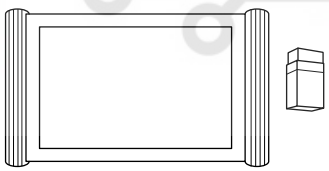
DTC	DTC Definition
U007388	Control Unit Communication Bus Off-line
U010087	Lost Communication with EMS
U010187	Lost Communication with TCU
U012687	Lost Communication with SAM
U012987	Lost Communication with BSM
U014087	Lost Communication with BCM
U024587	Lost Communication with IHU
U040181	ESM Invalid Data
U040281	TCU Invalid Data
U041881	BSM Invalid Data
U042881	SAM Invalid Data
U054681	IHU Invalid Data
U130055	Software Configuration Error

1	**Refer to “CAN Network System” for troubleshooting**

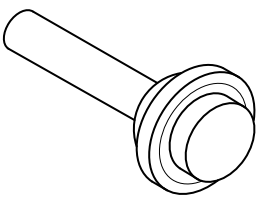
ON-VEHICLE SERVICE

Tools

General Tools

Tool Name	Tool Drawing
Carrier	 S00004
Digital Multimeter	 S00002
X-431 PAD Diagnostic Tester	 S00001

Special Tool

Tool Name	Tool Drawing
Final Drive Oil Seal Assembly Fixture	 S00096006

Specifications

Torque Specification

Part Name	Torque (N•m)	Quantity
Torque Manager Control Unit Fixing Bolt	6 ± 1	2
Rear Final Drive Bracket Fixing Bolt	140 ± 10	3
Drive Shaft Self-locking Nut	270 ± 20	2
Coupling Bolt Between Propeller Intermediate Shaft and Rear Final Drive Input End Flange	30 ± 3	6
Filler Plug/Drain Plug	35 ± 3.5	1
Motor Fixing Bolt	8 ± 0.8	2
Clutch Front Cover Bolt	Torque: 30 - 50 (pre-tightening 10 ± 2 continued rotation angle: 90° ± 5°)	5

Fluid Specifications

Oil Type	Total Capacity (After-sales Maintenance Oil Capacity)
SAF CARBON MOD	0.6 L

Maintenance-free (except for the cause of failure).

Rear Final Drive Oil Replacement

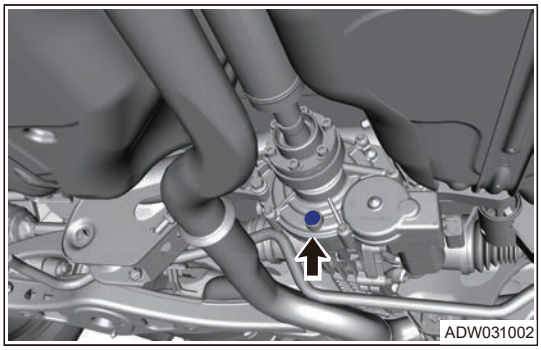
Caution
• Replace rear final drive oil only when engine stops and rear final drive cools down.

Rear Final Drive Oil Draining

1. Park vehicle on a level ground.
2. Start the vehicle, heat final drive to operating temperature.
3. Turn off all electrical equipment and the ENGINE START STOP switch.
4. Raise the vehicle to a proper height.
5. Put a recovering container under transmission drain hole.

6. Remove filler plug (with magnet) (arrow) with a tool.

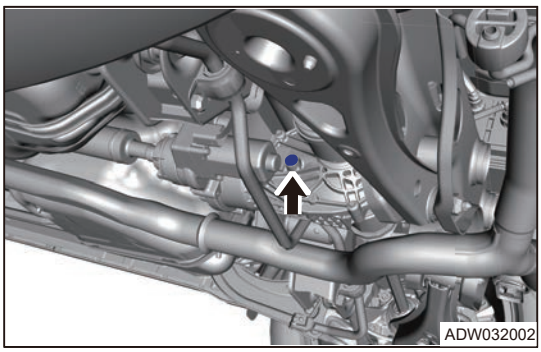
   Tightening torque: 35 ± 3.5 N·m



Rear Final Drive Oil Filling

Caution
• Gear oil type: SAF CARBON MOD gear oil, oil capacity: 0.6 L.

1. After draining final drive oil, make sure rear final drive drain plug is tightened in place.
2. Remove filler plug (with magnet) (arrow).



3. Fill new SAF Carbon Mod oil from oil filler until oil level reaches the bottom of filler plug hole.

Caution
• After filling is completed for 5 minutes, wait for oil to fully flow into RDU, check the level, observe whether it is necessary to fill oil to meet the requirements.

4. Tighten filler plug after filling.

   Tightening torque: 35 ± 3.5 N·m

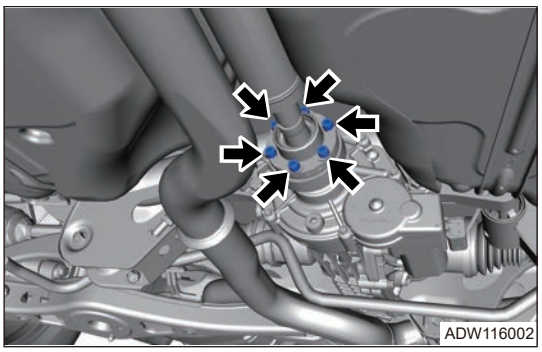
Rear Final Drive Assembly

Removal

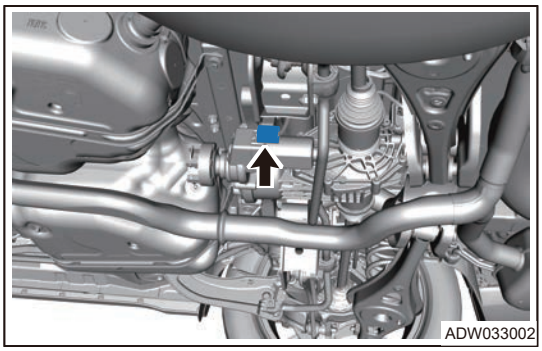
Caution
• If gear loaded housing is submerged in water, especially if it exceeds the breather valve, it is recommended to drain gear lubricant daily and check internal components for any damage and/or contamination caused by water. • Clean, test and replace damaged parts before assembly and refilling of specified gear lubricant.

1. Disconnect the negative battery cable.
2. Remove the rear left and rear right wheels.
3. Drain the rear final drive oil.
4. Remove the rear left drive shaft assembly.
5. Remove the rear right drive shaft assembly.

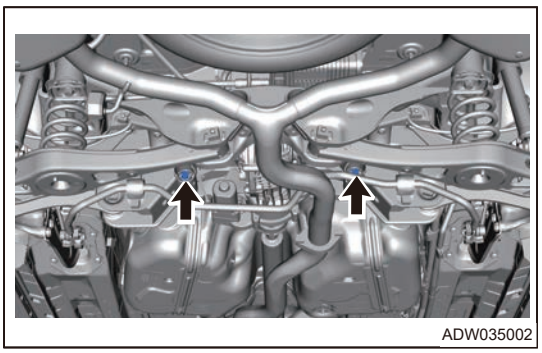
6. Remove the rear final drive assembly.
   a. Remove 6 fixing bolts (arrow) between propeller shaft and final drive flange surface.



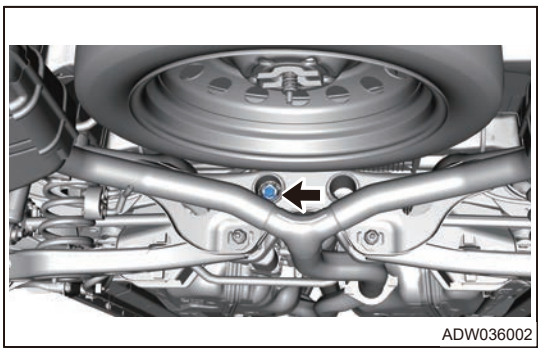
   b. Disconnect the motor connector (arrow).



   c. Place jack firmly in a proper position under rear final drive assembly.
   d. Remove 2 fixing bolts (arrow) between rear final drive bracket and lower part of rear sub frame.



   e. Remove 1 fixing bolt (arrow) between rear final drive and upper part of rear sub frame.



   f. Remove the rear final drive assembly.

Installation

Caution
• Flange green accent mark should match propeller shaft light mark when installing intermediate propeller shaft.

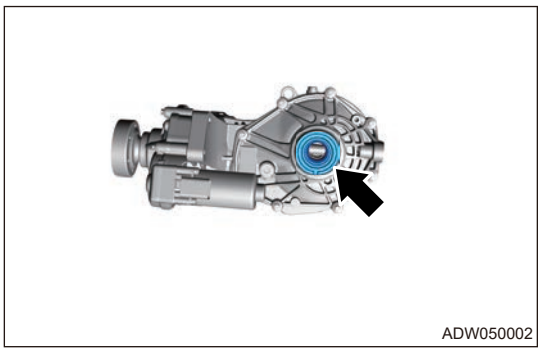
1. Install the rear final drive assembly.
2. Install 2 fixing bolts (arrow) between rear final drive bracket and lower part of rear sub frame.
   Tightening torque: 140 ± 10 N·m
3. Install 1 fixing bolt (arrow) between rear final drive and upper part of rear sub frame.
   Tightening torque: 140 ± 10 N·m
4. Connect the motor connector.
5. Install 6 fixing bolts between propeller shaft and final drive flange surface.
   Tightening torque: 30 ± 3 N·m
6. Install left and right drive shafts.
7. Install left and right drive shaft self-locking nut and washer.
   Tightening torque: 270 ± 20 N·m
8. Fill appropriate amount of rear final drive oil.
9. Install rear left and rear right wheels.

Rear Final Drive Oil Seal Replacement

Removal

Warning
• Be sure to wear necessary safety equipment to prevent accidents. • Make sure that safety lock of lifter has been locked, when removing and installing chassis parts.

1. Turn ignition switch to OFF.
2. Disconnect the negative battery.
3. Drain the rear final drive oil.
4. Remove the rear final drive assembly.
5. Remove the rear final oil seal.

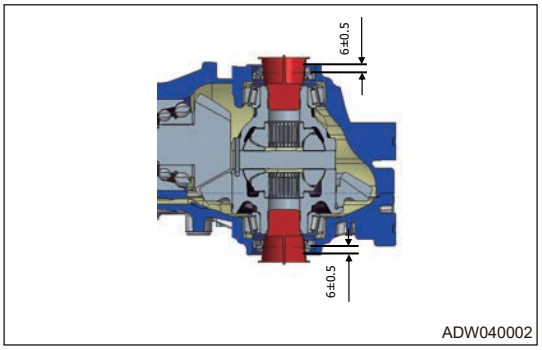

ADW050002

Caution
• The removed oil seal cannot be reused.

Installation

1. Clean housing oil seal mounting surface with alcohol.
2. Apply Fuchs RENOLIT 283 EP2 Fuchs grease to new oil seal (apply about 50% grease between oil seal lip and dust lip).
3. Install new oil seal with fixture.

4. Oil seal installation should be flat, oil seal installation depth should be 6 ± 0.5 mm.



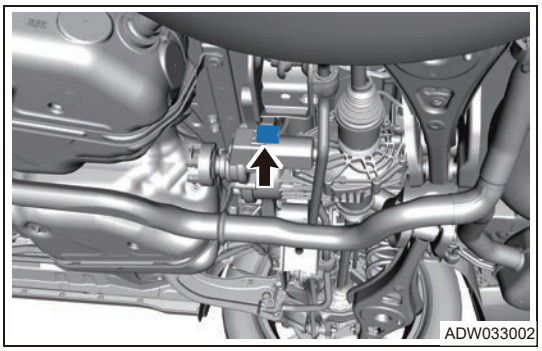
5. Install the rear final drive.
6. Fill appropriate amount of final drive oil.

Caution
• Flange green accent mark should match propeller shaft light mark when installing intermediate propeller shaft. • Make sure that all sealing surfaces are clean and free of burrs or damage, sharp installation tools are not allowed during installation.

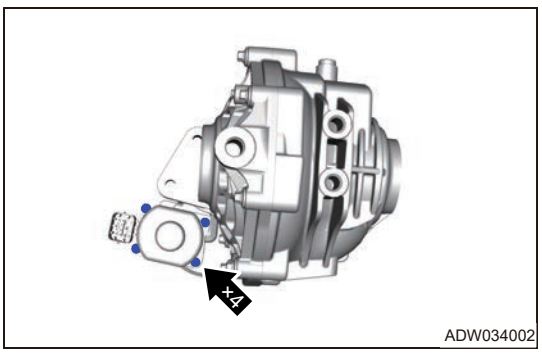
Motor Replacement

Removal

1. Turn ignition switch to OFF.
2. Disconnect the negative battery.
3. Drain the rear final drive oil.
4. Disconnect the motor connector.



5. Remove 4 fixing bolts between motor and rear final drive.



6. Remove motor and O-ring.

Installation

1. Install motor to a proper position, and tighten 4 fixing bolts.

   Tightening torque: 8 ± 0.8 N·m

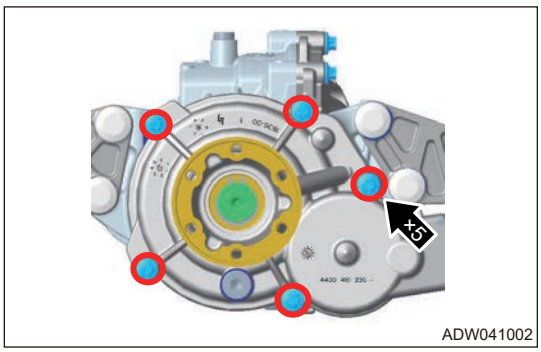
2. Connect the motor connector.
3. Fill rear final drive oil.
4. Connect the negative battery cable.

Caution
• Motor and O-ring need to be replaced when it is removed, and they cannot be reused. • Before installing motor and O-ring, apply SAF CARBON MOD oil to new O-ring to prevent damage to O-ring. • Make sure that all sealing surfaces are clean and free of burrs or damage before installing motor, sharp installation tools are not allowed during installation.

Clutch Plate Set Replacement

Warning
• Be sure to wear necessary safety equipment to prevent accidents. • Make sure that safety lock of lifter has been locked, when removing and installing chassis parts.

1. Turn ignition switch to OFF.
2. Disconnect the negative battery.
3. Drain the rear final drive oil.
4. Remove the rear final drive assembly.
5. Remove the motor assembly.
6. Remove 5 bolts (arrow) from clutch end cover.



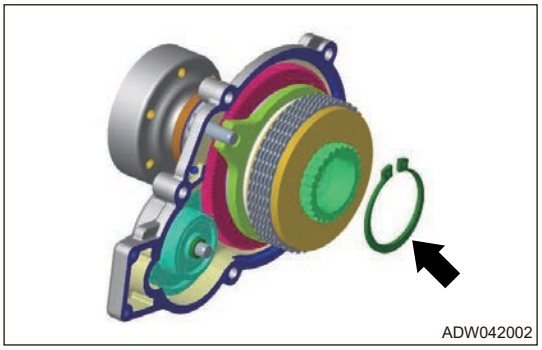
ADW041002

Caution
• Clutch end cover bolt cannot be reused.

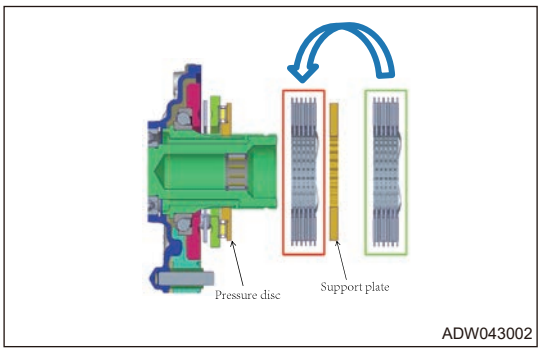
7. Remove the clutch assembly.

Caution
• A slight tap and appropriate force may be required during removing.

8. Remove fix snap spring (arrow) from clutch plate.


ADW042002

9. Remove the lining set.

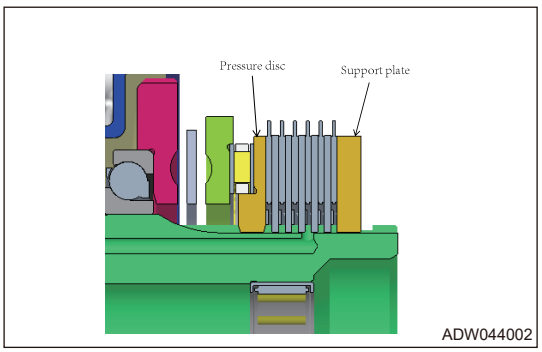


ADW043002

10. Replace new lining set (including 6X outer lining, 5X inner lining and 6X wave spring).

Caution
• Check whether pressure plate and support plate are in good condition and without damage, otherwise replace them together.

11. Assemble new lining set on inner cage.

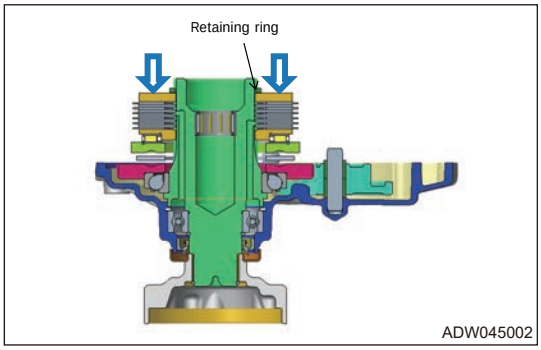


ADW044002

Caution
• Apply SAF Carbon mod oil when installing lining. • Correct installation order: Pressure plate, (outer lining + wave spring + inner lining) X5 + outer lining + wave spring, support plate.

12. Install snap spring into slot.

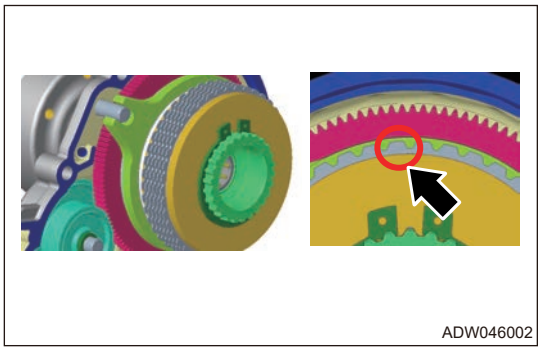
    Down pressure preload: 500 N



Caution

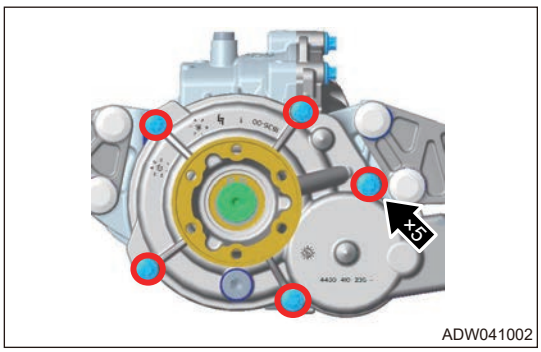
- Select the thickest snap spring that can be installed when installing snap spring:
  0730.304.912 h = 2.3 mm
  0730.304.914 h = 2.5mm
  0730.304.916 h = 2.7mm
  0730.304.918 h = 2.9mm

13. Set outer lining teeth to the same position (as shown).



14. Install clutch assembly to rear final drive, tighten 5 fixing bolts (arrow) (preload is 10 ± 2 N·m, and then continue to rotate 90° ± °).

    Tightening torque: 30 - 50 N·m



Caution

- Before installing clutch cover, clean sealant on sealing surface of clutch cover and final drive housing.
- Before installing clutch cover, make sure that sealing surface is not damaged.
- Before installing clutch cover, apply Loctite 5910 glue to sealing surface.
- Clutch end cover bolt cannot be reused and needs to be replaced after removing.
- Clutch end cover needs to be assembled back to final drive within 15 minutes after applying glue.
- When assembling, pay attention to the position of outer lining to ensure that it is correctly installed in outer cage.

15. Tighten 2 fixing bolts when installing motor assembly.

Tightening torque: 8 ± 0.8 N·m

Caution
• After the installation is completed, wait for 15 minutes for Loctite glue to dry, and then perform an air tightness test: pressure is 0.4 bar, pressure is maintained for 7.5 s, and leakage should be less than 15 ml/min.

16. Install rear final drive to the vehicle.

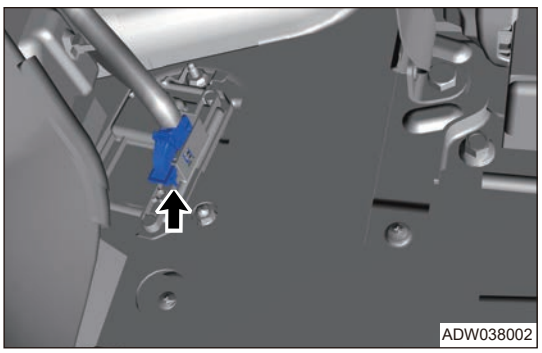
Caution
• Loading needs to wait 2 hours until Loctite glue is completely dry. • Flange green accent mark should match propeller shaft light mark when rear final drive is installed to the vehicle

17. Fill appropriate amount of final drive oil.

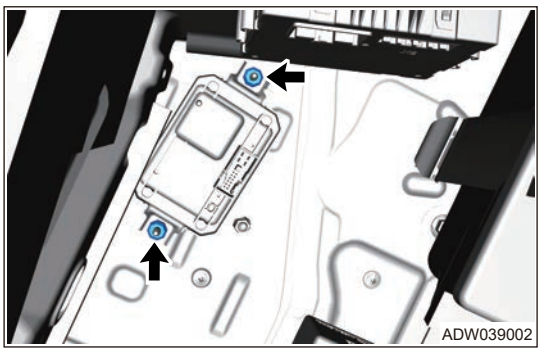
Torque Manager Control Unit

Removal

1. Disconnect the negative battery cable.
2. Remove the rear left wheel house assembly.
3. Remove the torque manager control unit.
   a. Disconnect the torque manager control unit connector (arrow).



   b. Remove 2 fixing nuts (arrow) from torque manager control unit.



   c. Remove the torque manager control unit.

Installation

1. Install the torque manager control unit.
2. Install 2 fixing nuts to torque manager control unit.

   Tightening torque: 6 ± 1 N·m

3. Install the torque manager control unit connector.
4. Connect the negative battery cable.