
BODY ELECTRICAL

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44.1 LIGHTING SYSTEM

1 Warnings and Precautions

1.1 Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

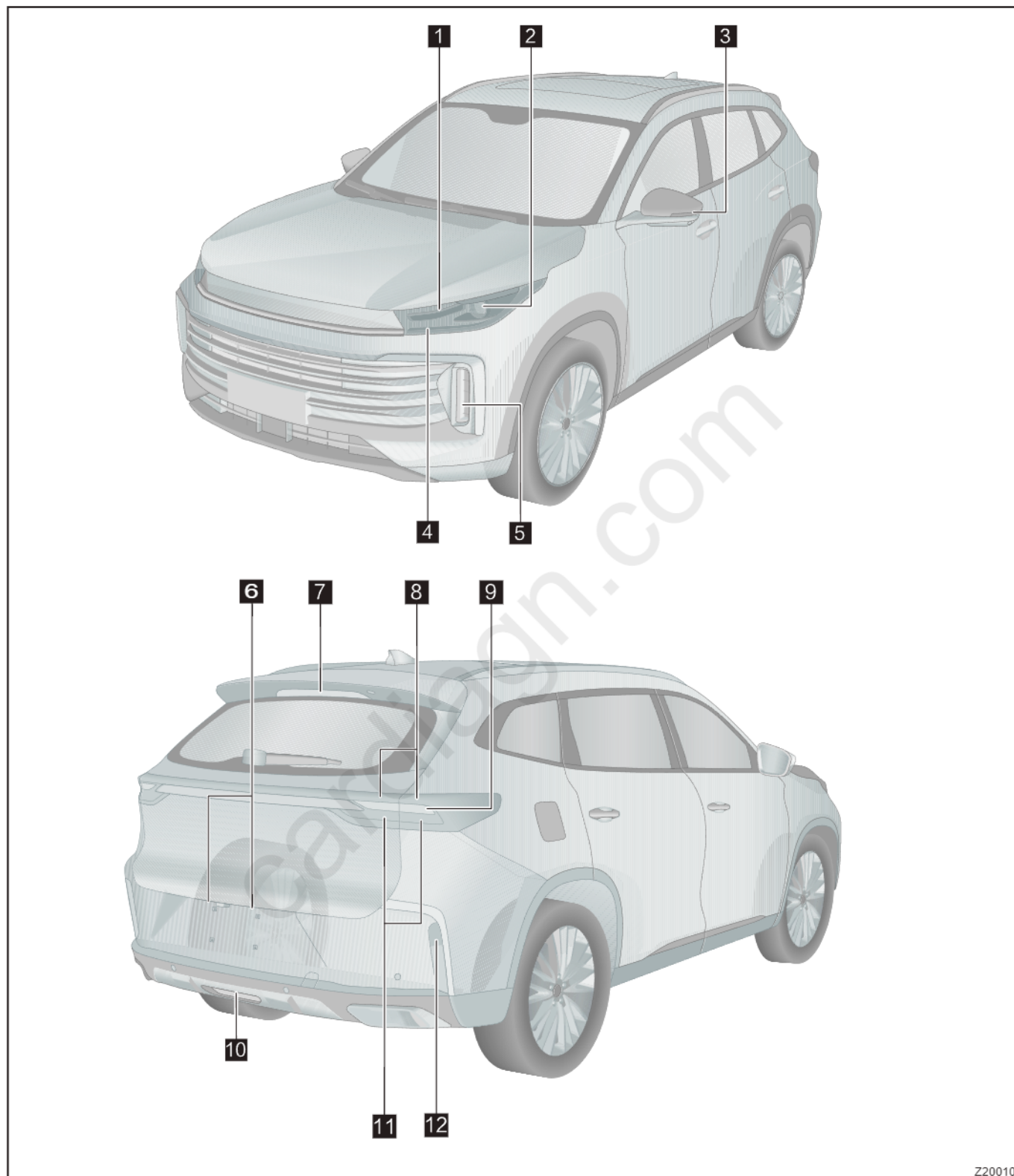
- (1) Be sure to wear safety equipment to prevent accidents, when removing exterior lighting appliance.
- (2) Appropriate force should be applied when removing exterior lighting appliance. Be careful not to operate roughly.
- (3) Try to prevent interior and body paint surface from being scratched, when removing exterior lighting appliance.

2 System Overview

2.1 System Description

Lighting system on this model consists of vehicle lighting device and light signal device, which are used for normal operation of vehicle and ensures safety when driving at night or in fog. Lighting system consists of headlight assembly, front position light, turn signal light, daytime running light, side turn signal light, foot light, rear fog light, back-up light, brake light, license plate light and high mounted stop light.

2.2 System Components Diagram



Z20010

1	Turn Signal Light	2	High/Low Beam Lights
3	Side Turn Signal Light	4	Position Light
5	Front Fog Light	6	License Plate Light

7	High Mounted Stoplight	8	Position Light
9	Turn Signal Light	10	Rear Fog Light
11	Stop Light	12	Back-up Light

2.3 System Principle

■ Brake Light

Power supply for high mounted stop light and brake light are provided by BCM. There is no fuse in the circuit. Depress brake pedal, BCM 1-39 receives high level signal, and BCM 5-08 and 5-11 output 12 V power supply to turn brake light on. **Trigger conditions:**

- When brake switch is pressed, brake switch is a high level self-locking switch.
- CAN signal 'BrakeLightsRequest=1' sent from EPB is received.
- CAN signal "BLRequestController=1" sent from ESP is received.

■ Daytime Running Light

BCM receives the engine speed signal and position light not on signal through CAN network, and BCM 5-15 and 5-14 output 12 V power supply to turn daytime running light on. **Trigger conditions:**

- Engine starts; low and high beam lights and front fog lights are not activated.
- When daytime running light is operating: Flash function does not affect daytime running light operation.

■ Back-up Light

Power supply for back-up light is provided by BCM 4-08. When BCM receives the following trigger conditions, back-up light will come on. **Trigger conditions:**

- After receiving reverse switch signal or CAN signal sent from TCU, BCM turns backup light on.

■ Position Light

Power supply for position light is provided by BCM. When BCM receives the following trigger conditions, back-up light will come on. **Trigger conditions:**

- IGN ON or ACC; position light input or low beam light input is activated.
- BCM should send ParkLightSts =1(Bcan).

■ Foot Light

Foot light on rear view mirror is turned on by using power supply provided by BCM 5-09. **Trigger conditions:**

- With key in OFF/ACC, perform unlock operation through key or remote function, foot light turns on for 15 seconds.
- In OFF status, BCM receives wireless fortifying/remote fortifying/PLG fortifying signal, and vehicle enters fortifying mode successfully, foot light turns on for 15 seconds.
- With key in ON or after counting down for 15 seconds, foot light turns off.
- In OFF/ACC/ON status, open any door, and BCM controls foot light to turn on for 3 minutes.
- Within 3 minutes after foot light is activated: If another door is opened while one door remains open, foot light continues to come on for 3 minutes, and then fades out.
- In OFF/ACC status, foot light comes on, four doors close, BCM controls foot light to come on for 8 seconds and then go off; Turn key to ON within 8 seconds after foot light is on, and foot light turns off immediately.
- When foot light comes on, if key is turned to ON, four doors close and foot light turns off immediately.

■ Rear Fog Light

Power supply for rear fog light is provided by BCM 5-17. When rear fog light switch is turned on, the rear fog lights turn on. **Trigger conditions:**

- Operating conditions for rear fog light: IGN-ON; Front fog light or low beam lights are activated; Rear fog light switch is activated.
- When rear fog light is operating: Rear fog light comes on and send RearFogLightSts=1.
- When rear fog light is operating: When rear fog light switch is activated again, rear fog light turns off.
- When rear fog light is operating: key is switched from IGN ON to ACC or OFF, rear fog light is turned off.
- When rear fog light is operating: When low beam light or front fog light load is turned off, rear fog lights turn off at the same time.

■ Hazard Warning Light

When hazard warning light switch is turned on, BCM 2-14 receives a low level signal. BCM 2-14 will turn on hazard warning light switch, switch indicator turns on, left and right turn signal lights flash at the same time.

Trigger conditions:

- The corresponding bulb is intact, BCM sends LHTurnsignalSts and RHTurnsignalSts and load operating frequency is the same as that of turn signal light; If any 21 W bulb is damaged, the flashing frequency of turn signal light CAN signals (LHTurnsignalSts and RHTurnsignalSts) and hazard warning light will be 2 times of that when bulb is intact.
- When ABM sends a collision signal, hazard warning light function should be activated automatically (CAN signal of left/right turn signal light, indicator and turn signal light). Automatically activated hazard warning light function due to collision can be canceled as key is switched to OFF, then to ON or hazard warning light button is pressed.
- When turn signal light function and hazard warning light function are both effective, BCM should perform the next action.

■ Turn Signal Light

When turn signal light switch signal is received, BCM outputs power supply to turn on the corresponding turn signal light. **Trigger conditions:**

- IGN ON, turn signal light switch is activated.
- The flashing frequency of turn signal light is 400 ms on and 400 ms off.
- Key is turned from ON to OFF, turn signal light stops operating and meter stops flashing.
- When turn signal light is operating: The corresponding bulb is intact, BCM sends LHTurnLightSts (Bcan & Pcan) and the load operating frequency is the same as that of left turn signal light; If the corresponding 21W bulb is damaged, BCM will send LHTurnLightSts and the frequency will be 2 times of that when bulb operates normally. No matter whether the bulb is damaged or not, BCM will send DirectionIndLeft (Bcan & Pcan) signal continuously.

■ Low Beam Light

Power supply for low beam light is provided by the engine compartment fuse and relay box. BCM receives the combination light switch low beam light signal, BCM 1-18 analogs ground, high beam light relay operates to turn on high beam light. **Trigger conditions:**

- IGN ON; Low beam light switch is activated.
- BCM sends LowBeamSts=1.

■ High Beam Light

Power supply for high beam light is provided by the engine compartment fuse and relay box. BCM receives the combination light switch high beam light signal, BCM 1-43 analogs ground, low beam light relay operates to turn on low beam light. **Trigger conditions:**

- Operating conditions for high beam light: IGN ON; low beam lights are activated, high beam light switch is activated.
- When high beam light is operating: High beam lights come on and send HighBeamSts=1.
- When high beam light is operating: When vehicle cranks, high beam lights temporarily stop operating but CAN data will be sent continuously and resume operation after cranking.
- When high beam light is operating: When high beam light switch is deactivated, high beam light turns off.
- When high beam light is operating: When low beam light switch is deactivated, high beam light turns off.
- When high beam lights are operating: key is switched from IGN ON to ACC or OFF, high beam lights are turned off.

2.4 Intelligent Headlight

■ Function description

The main function of intelligent headlight control system is the intelligent low/high beam switching. The system can request high beam ON/OFF according to the traffic and environmental factors. If there are no relevant traffic participants in front, the system will activate high beam; With system activated, if there is a meeting or following vehicle or street lighting, high beam will be turned off.

■ Control principle

After IGN ON, system switch is turned to ON, and headlight is in AUTO, camera will detect vehicle status, surrounding environment and road condition in front. If IHC opening conditions are met, system will request high beam to be turned ON; When followings, oncomings or vehicles related environment (including the

existence of multiple street lights, if external environment brightness is higher than the threshold, etc.) do not meet the LHC open conditions, system will request high beam to be turned off, once the system ON conditions resume, system will follow a certain delay mechanism and send high beam request without interfering with other traffic participants (ECE48 defined vehicles driving in opposite or same directions, ECE50 defined motorbikes driving in opposite or same directions, electric motorcars with light as well as bicycles with light driving in same direction, light size must be more than 150*150 mm and light intensity is greater than 30 cd). The request of low/high beam switching is transmitted to BCM from multi-function front camera via CAN signal, and driver can change lighting state at any time using light rod.

■ System operating precondition

- (1) IGN ON.
- (2) Headlight switch is in AUTO.
- (3) Low beam light turns on automatically.
- (4) BCM judges that all the above conditions are met, then BCM sends corresponding system switch requests according to functional logic. If any condition is not met, it will send HWASW = 0 continuously and system cancels activation requests.

3 DIAGNOSIS & TEST

3.1 Problem Symptoms Table

Caution

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

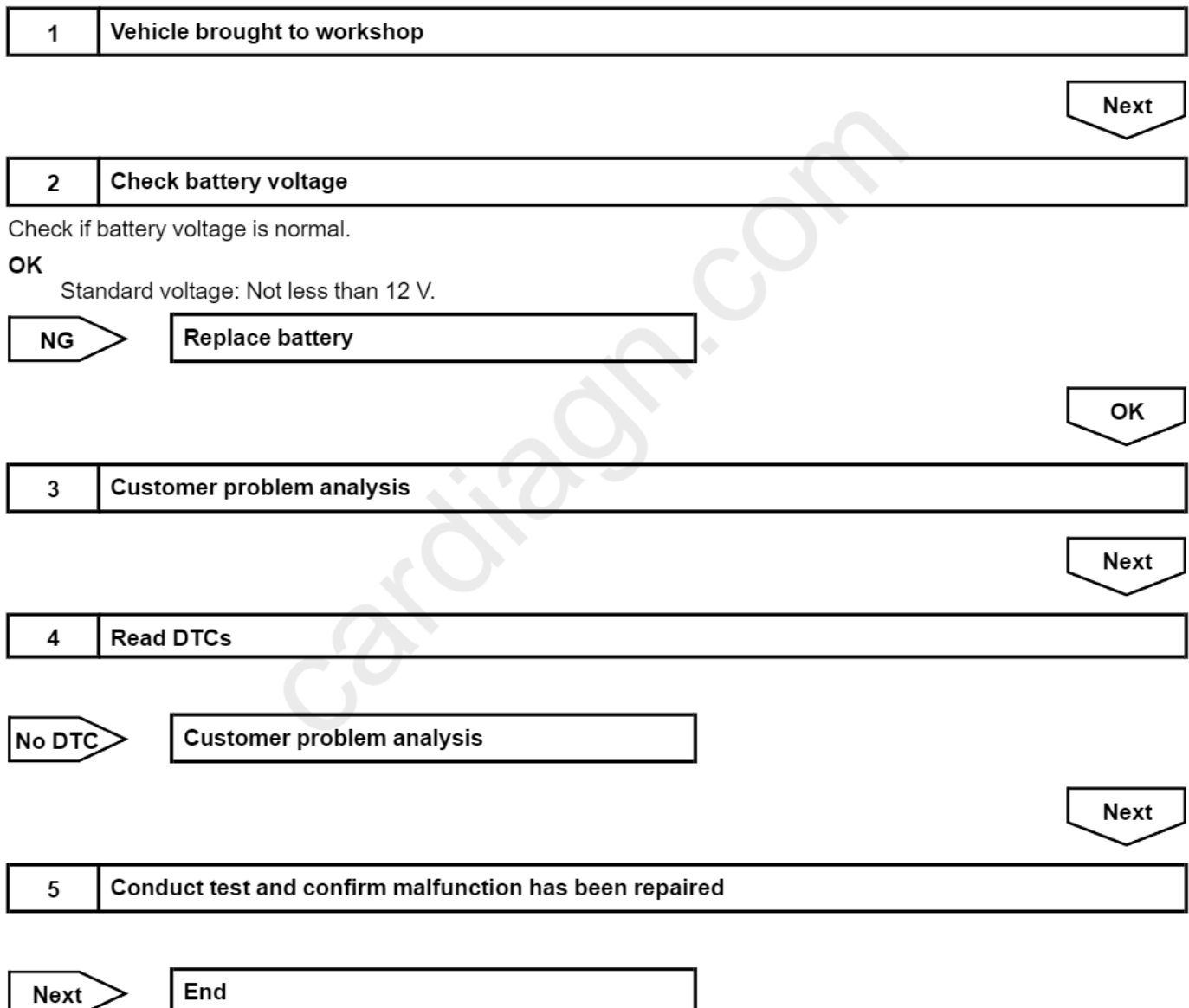
Current Status	Possible Cause
Low beam light does not come on (one side)	Fuse
	Headlight assembly
	Wire harness or connector
Low beam lights do not come on (both sides)	Fuse
	Headlight assembly
	Combination light switch assembly
	Low beam relay
	Wire harness or connector
	Body Control Module (BCM)
High beam light does not come on (one side)	Fuse
	Headlight assembly
	Wire harness or connector
High beam light does not come on (both sides)	Fuse
	Headlight assembly
	Combination light switch assembly
	High beam relay
	Wire harness and connector
	Body Control Module (BCM)
Position light does not come on (one side)	Position light bulb

Current Status	Possible Cause
	Wire harness or connector
Position lights do not come on (both sides)	Position light bulbs (all)
	Wire harness or connector
	Combination light switch assembly
	Body Control Module (BCM)

3.2 Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the lighting system.



3.3 DTC Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to LOCK.
- (2) Connect diagnostic tester (the latest software) to diagnostic interface.
- (3) Connect diagnostic tester (the latest software) to diagnostic interface.

- (4) Use the diagnostic tester to record and clear DTCs stored in the detection system.
- (5) Turn ENGINE START STOP switch to LOCK and wait for a few seconds.
- (6) Turn ENGINE START STOP switch to ON, and then select read DTC.
- (7) If DTC is detected, it indicates current malfunction. Go to inspection procedure - Step 1.
- (8) If no DTC is detected, malfunction indicated by the DTC is intermittent.

3.4 Diagnostic Help

- (1) Connect diagnostic tester X-431 PAD (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- (2) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (3) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (4) Only use a digital multimeter to measure voltage of electronic system.
- (5) Refer to any Technical Bulletin that may apply to this malfunction.
- (6) Visually check related wire harness and connector.
- (7) Check and clean all system grounds related to the latest DTCs.
- (8) If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

3.5 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.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Look for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

3.6 Ground Inspection

Ground points are very important to the proper operation of circuits. 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 grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- (1) Remove 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 ground bolt or nut securely.
- (5) Check if any additional accessories interfere with ground circuit.
- (6) If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

3.7 Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B1000-16	Power Supply Voltage too Low	Battery voltage is less than 9 V	Power supply is not stable, and some loads may decrease suddenly.	• Check fuse • Check charging system • Check wire harness connector • Check BCM
B1000-17	Power Supply Voltage too High	Battery voltage is more than 15 V		
B1002-11	Right Side Turn Lamp Control Circuit Short To Ground	Output current is more than 5 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, turn signal light will output as long as operating conditions of turn signal light are met.) and it is stored as current fault.	• Wire harness connector • Turn signal light • BCM	• Check wire harness connector • Check turn signal light • Check BCM
B1002-13	Open or Short to Power Supply in Right Turn Signal Light	Output current is less than 3 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, turn signal light will output as long as operating conditions of turn signal light are met.)		
B104001	Right Turn Signal Light Feedback Fault	/	• Wire harness connector • Turn signal light • BCM	• Check wire harness connector • Check turn signal light • Check BCM
B104101	Left Turn Signal Light Feedback Fault			
B101E-11	Right Static Assist Illumination Light Short to Ground	Output current is more than 4 A (Time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, back-up light will output as long as operating conditions of back-	Wire harness or load fault	• Check wire harness connector • Check load • Check BCM
B101F-11	Left Static Assist Illumination Light Short to Ground			

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		up light are met.) and it is stored as current fault.		
B101E-13	Open in Right Static Assist Illumination Light	Output current is less than 0.5 A (The error is within a range of 10%, the time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, back-up light will output as long as operating conditions of back-up light are met.)		
B101F-13	Open in Left Static Assist Illumination Light			
B1035-11	Brake Light Short to Ground	Output current is more than 5 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, brake light will output as long as operating conditions of brake light are met.) and it is stored as current fault.	Wire harness or load fault	• Check wire harness connector • Check brake light • Check BCM
B1035-13	Open or Short to Power Supply in Brake Light	Output current is less than 0.5 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, brake light will output as long as operating conditions of brake light are met.)		
B1036-11	High Mounted Stop Light Short to Ground	Output current is more than 2 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position,		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		load will output as long as operating conditions of load are met.) and it is stored as current fault.		
B1036-13	Open or Short to Power Supply in High Mounted Stop Light	Output current is less than 30 mA (The error is within a range of 10%, the time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.)		
B1039-11	Back-up Light Circuit Short to Ground	Output current is less than 0.5 A (The error is within a range of 10%, the time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, back-up light will output as long as operating conditions of back-up light are met.)	Wire harness or load fault	• Check wire harness connector • Check back-up light • Check BCM
B1039-13	Open or Short to Power Supply in Back-up Light Circuit	Output current is more than 4 A (Time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, back-up light will output as long as operating conditions of back-up light are met.) and it is stored as current fault.		
B102211	Short to Ground or Open in Low Beam Light Relay	When output is off and ignition switch is OFF, output voltage is more than 7 V, and it is stored as current fault. (The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS,	Relay or wire harness fault	• Check wire harness connector • Check relay • Check BCM
B102311	Short to Ground or Open in High			

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
	Beam Light Relay Circuit	and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.)		
B102212	Short to Power supply in Low Beam Light Relay Circuit	Output current is more than 5 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of		
B102312	Short to Power supply in High Beam Light Relay Circuit	detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, turn signal light will output as long as operating conditions of turn signal light are met.) and it is stored as current fault.		
B102611	Short to Ground or Open in Front Fog Light Relay	When output is off and ignition switch is OFF, output voltage is more than 7 V, and it is stored as current fault. (The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.)	Relay or wire harness fault	• Check wire harness connector • Check relay • Check BCM
B102612	Short to Power Supply in Front Fog Light Relay	Output current is more than 5 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, turn signal light will output as long as operating conditions of turn signal light are met.) and it is stored as current fault.		

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B102811	Open or Short to Ground in Rear Fog Light Relay	Output current is less than 30 mA (The error is within a range of 10%, the time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.)	Wire harness or load fault	• Check wire harness connector • Check rear fog light • Check BCM
B102813	Rear Fog Light Circuit Short to Power Supply	Output current is more than 2 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.) and it is stored as current fault.		
B102911	Left Daytime Running Light Circuit Short to Ground	Output current is more than 2 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, daytime running light will output as long as operating conditions of daytime running light are met.) and it is stored as current fault.	Wire harness or load fault	• Check wire harness connector • Check daytime running light • Check BCM
B103011	Right Daytime Running Light Circuit Short to Ground			
B102913	Open or Short to Power Supply in Left Daytime Running Light Circuit	Output current is less than 0.1 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, daytime running light will		
B103013	Open or Short to Power Supply in Right Daytime Running Light Circuit			

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		output as long as operating conditions of daytime running light are met.)		
B103111	Open or Short to Ground in Position Light Relay	When output is off and ignition switch is OFF, output voltage is more than 7 V, and it is stored as current fault. (The error is less than 10%, the time of duration is more than 100 MS, the software will detect once every 10MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will be output as long as operating conditions of load are met.)	Relay or wire harness fault	• Check wire harness connector • Check relay • Check BCM
B103113	Position Light Relay Short to Power Supply	Output current is more than 5A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, turn signal light will output as long as operating conditions of turn signal light are met.) and it is stored as current fault.		
B104201	Position Light Feedback Fault	/	• Check wire harness connector • Position light • Check BCM	• Check wire harness connector • Position light • Check BCM
B103813	Open in Back Door Light Load	Output current is less than 30 mA (The error is within a range of 10%, the time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.)	Wire harness or load fault	• Check wire harness connector • Check back door light • Check BCM

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B103811	Back Door Light Load Short to Ground	Output current is more than 2 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.) and it is stored as current fault.		
B105313	Rear View Mirror Foot Light Short to Ground	Output current is less than 30 mA (The error is within a range of 10%, the time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.)	Wire harness or load fault	• Check wire harness connector • Check rear view mirror foot light • Check BCM
B105311	Open or Short to Power Supply in Rear View Mirror Foot Light	Output current is more than 2 A (The time of duration is more than 100 MS, the software will detect once every 20MS, and it will be determined after at least 3 consecutive times of detection. The detection will start after 2 seconds since power supply is turned on. Regardless of key position, load will output as long as operating conditions of load are met.) and it is stored as current fault.		

3.8 DTC Diagnosis Procedure

■ Power supply voltage fault

DTC	B1000-16	Power Supply Voltage too Low
DTC	B1000-17	Power Supply Voltage too High

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.

- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check battery voltage
----------	------------------------------

- (a) Start engine, and use voltage band of multimeter to check if battery voltage is normal. (Rated voltage: Not less than 12 V)

NG →

Repair or replace battery/alternator

OK

2	Check fuse
----------	-------------------

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check for continuity of instrument panel fuses MF03 (125A), RF54 (20A) and RF63 (5A) with a digital multimeter.

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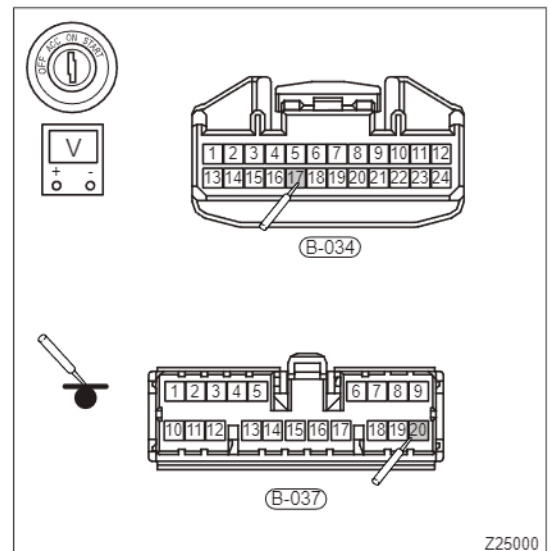
Replace fuse

OK

3	Check interior power supply wire harness
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- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Disconnect the interior wire harness connectors B-034 and B-037.
 (d) Connect the negative battery cable.
 (e) Turn ENGINE START STOP switch to ON.
 (f) Using a digital multimeter, measure voltage between interior wire harness connectors B-034 and B037 and ground, and detect it with a 21 W test lamp according to table below.

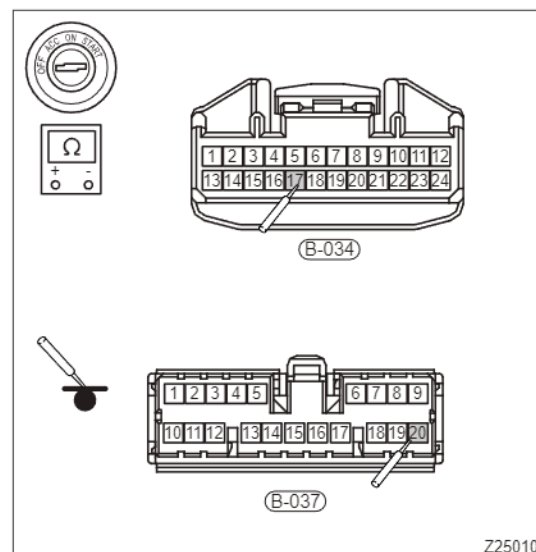
Multimeter Connection	Condition	Specified Condition
B-034 (17) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V
B-037 (20) - Body ground		Not less than 12 V



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- (g) Using a digital multimeter, measure resistance between interior wire harness connectors B-034 and B037 and ground according to table below.

Multimeter Connection	Condition	Specified Condition
B-034 (17) - Body ground	ENGINE START STOP switch "OFF"	∞
B-037 (20) - Body ground		∞



NG

Repair or replace related wire harness

OK

4

Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Start the engine.
 (d) Check if the same DTCs are still output.

NG

Replace BCM

OK

System is normal

■ Turn signal light fault

DTC	B1001-11	Left Turn Signal Light Short to Ground
DTC	B1001-13	Open or Short to Power Supply in Left Turn Signal Light
DTC	B1041-01	Left Turn Signal Light Feedback Fault

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1

Check output voltage of left turn signal light control circuit

- First, confirm the operating status of left turn signal light.
- If only left turn signal light does not turn on, check the output circuit of left turn signal light only.
- If either front left or rear left light does not come on, check node line and turn signal light.
- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect front left turn signal light connector B-053, left side turn signal light connector F-003 and rear left turn signal light connector B-054.
- Connect the negative battery cable, turn ignition switch to ON, and turn on left turn signal light switch.
- Using a multimeter, check output voltage of each turn signal light according to table below.

Multimeter Connection	Condition	Specified Condition
B-053 (1) - Body ground	ENGINE START STOP switch "ON"	Indirect 12 V
B-054 (4) - Body ground		
F-003 (7) - Body ground		

OK

Replace turn signal light

NG

2

Check circuit

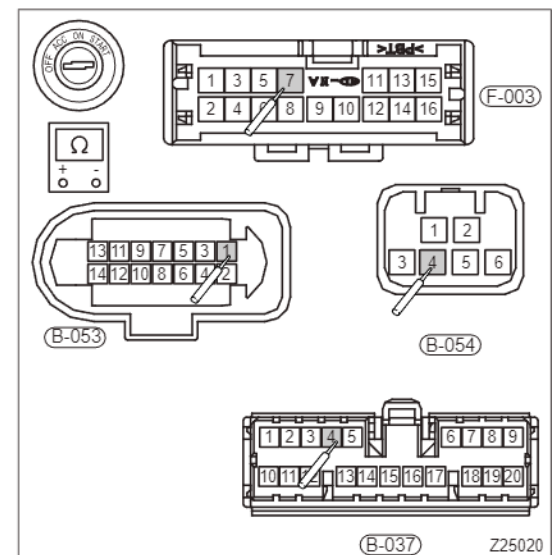
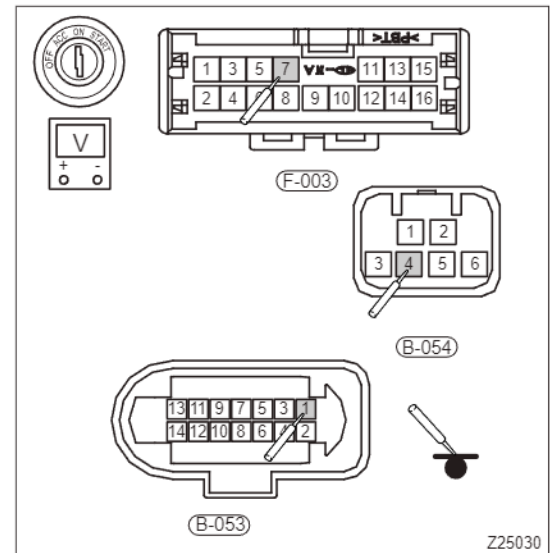
- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-037.
- Disconnect front left turn signal light connector B-053, left side turn signal light connector F-003 and rear left turn signal light connector B-054.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-037 (4) - B-053 (1)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-037 (4) - B-054 (4)		
B-037 (4) - F-003 (7)		

NG

Replace or repair wire harness

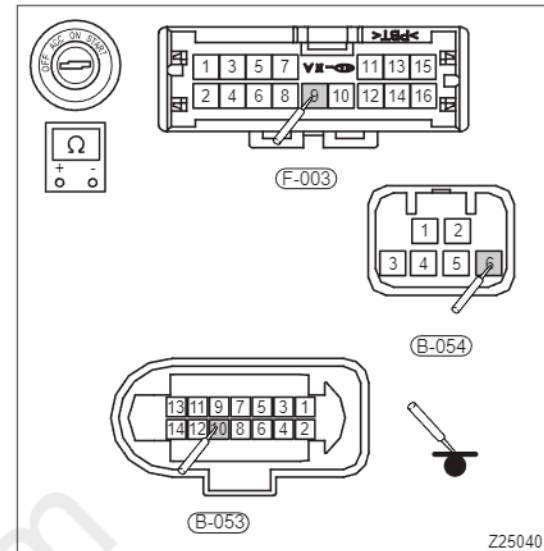
OK



3 Check ground circuit of turn signal light

(a) Using a multimeter, check if ground circuit of turn signal light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
B-053 (10) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-054 (6) - Body ground		
F-003 (9) - Body ground		



NG

Repair ground wire harness

OK

4 Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.

NG

Replace BCM

OK

System operates normally

■ Position light fault

DTC	B1005-11	Open or Short to Ground in Position Light Relay
DTC	B1005-13	Position Light Relay Short to Power Supply
DTC	B1042-01	Position Light Feedback Fault

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1 Check output voltage of position light control circuit

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the engine compartment fuse box connectors B-063 and B-064.
- Connect the negative battery cable, turn ignition switch to ON, and turn on position light switch.
- Using a multimeter, check output voltage of position light according to table below.

Multimeter Connection	Condition	Specified Condition
B-063 (9) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V
B-064 (2) - Body ground		

NG

Check relay and power supply wire harness

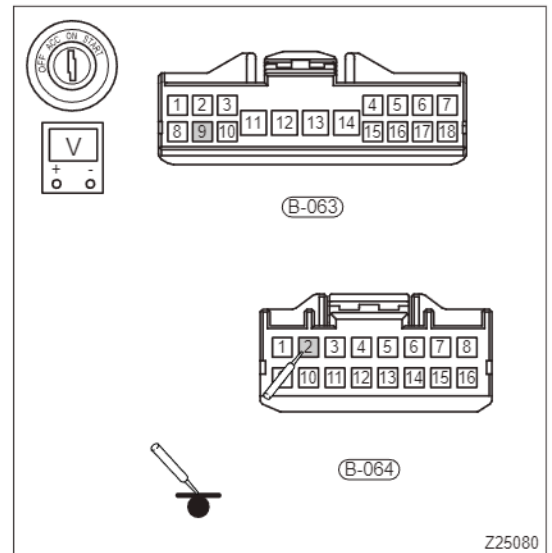
OK

2

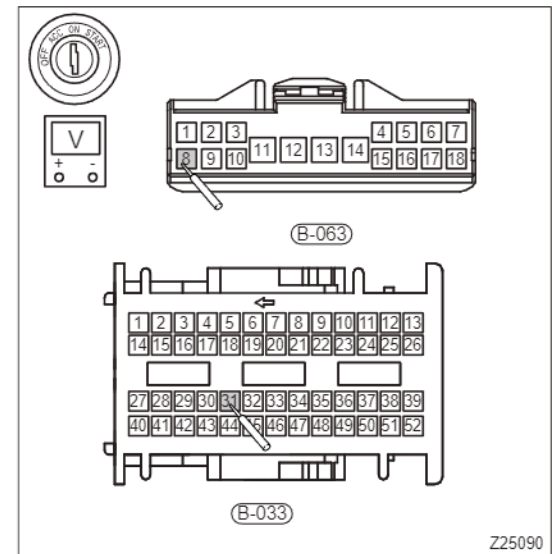
Check circuit

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-033.
- Disconnect the engine compartment fuse box connector B-063.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-063 (8) - B- 033 (31)	ENGINE START STOP switch "OFF"	Not less than 12 V



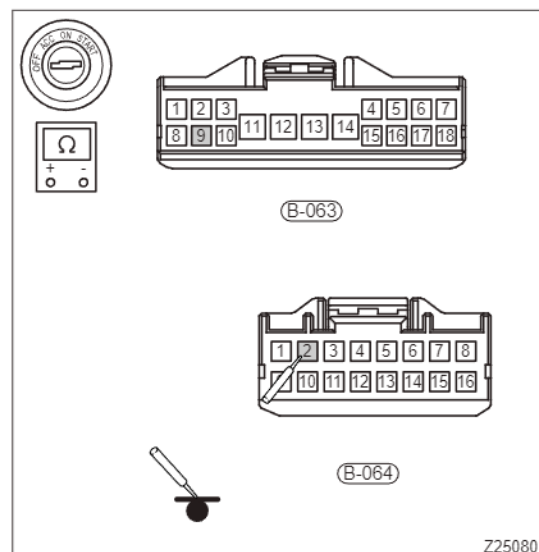
Z25080



Z25090

- (e) Turn on the position light switch.
- (f) Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-063 (9) - Body ground	ENGINE START STOP switch "ON"	$\leq 1 \Omega$
B-064 (2) - Body ground	ENGINE START STOP switch "ON"	$\leq 1 \Omega$



NG

Replace or repair wire harness and position light relay

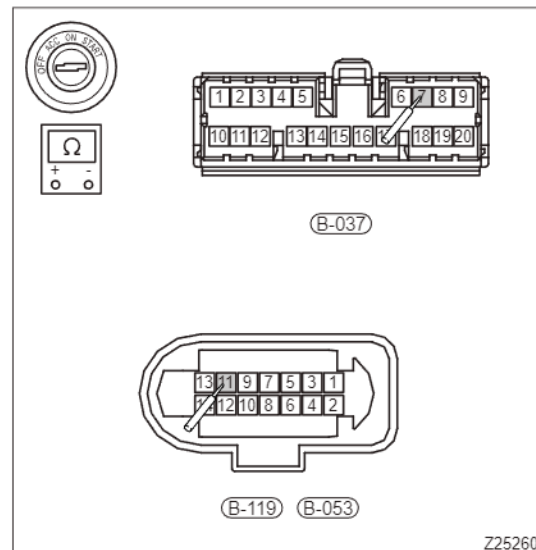
OK

3

Check front position light feedback

- (a) Using a multimeter, check if feedback circuit of front position light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
B-053 (11) - B-037 (7)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-119 (11) - B-037 (7)		



NG

Repair ground wire harness

OK

4

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

NG	Replace BCM
OK	System operates normally

■ Rear fog light fault

DTC	B1028-11	Rear Fog Light Circuit Short to Power Supply
-----	----------	--

■ Description

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

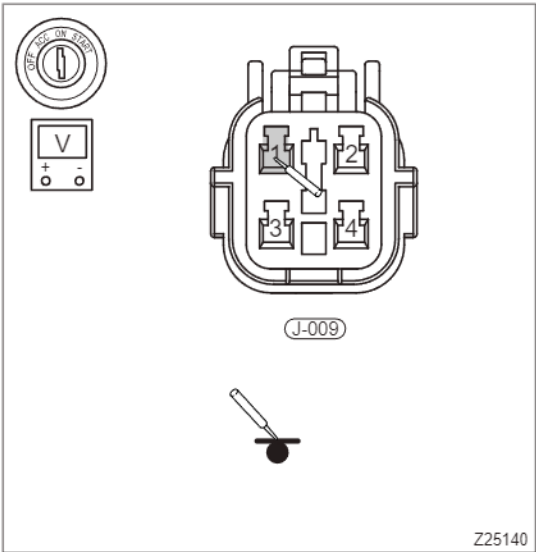
Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check output voltage of rear fog light control circuit
---	--

- (a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- (b) Disconnect the rear fog light connector J-009.
- (c) Connect the negative battery cable, turn ignition switch to ON, and turn on rear fog light switch.
- (d) Using a multimeter, check output voltage of rear fog light according to table below.

Multimeter Connection	Condition	Specified Condition
J-009 (1) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V



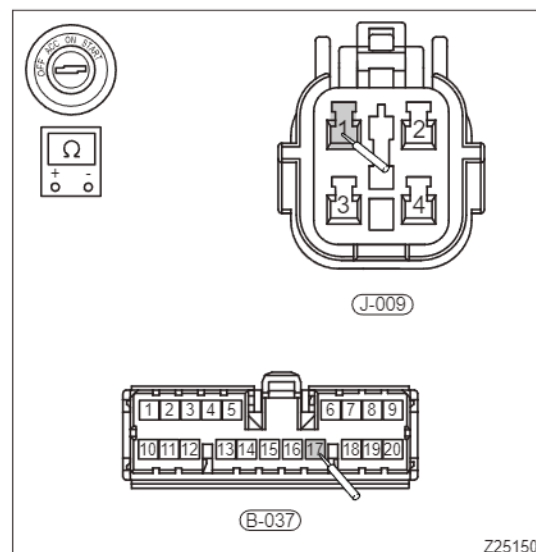
NG	Check power supply wire harness
----	---------------------------------



2	Check circuit
---	---------------

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-037.
- Disconnect the rear fog light connector J-009.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-037 (17) - J-009 (1)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$



NG

Replace or repair wire harness

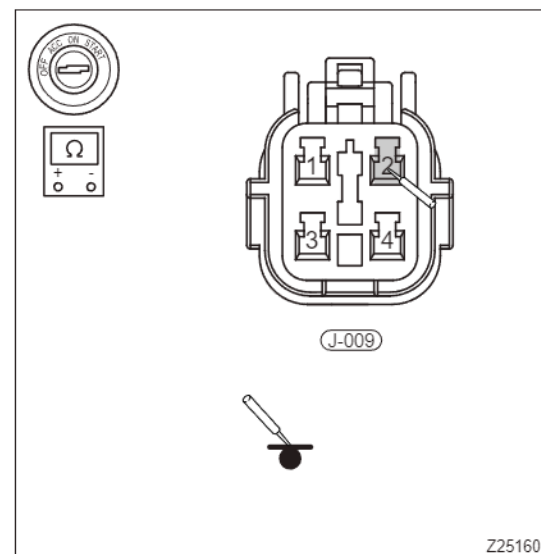
OK

3

Check ground circuit of rear fog light

- Using a multimeter, check if ground circuit of rear fog light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
J-009 (2) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$



NG

Replace or repair wire harness

OK

4

Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.

NG

Replace BCM

OK

System operates normally

■ Daytime running light fault

DTC	B1029-11	Left Daytime Running Light Circuit Short to Ground
DTC	B1029-13	Open or Short to Power Supply in Left Daytime Running Light Circuit
DTC	B1030-11	Right Daytime Running Light Circuit Short to Ground
DTC	B1030-13	Open or Short to Power Supply in Right Daytime Running Light Circuit

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

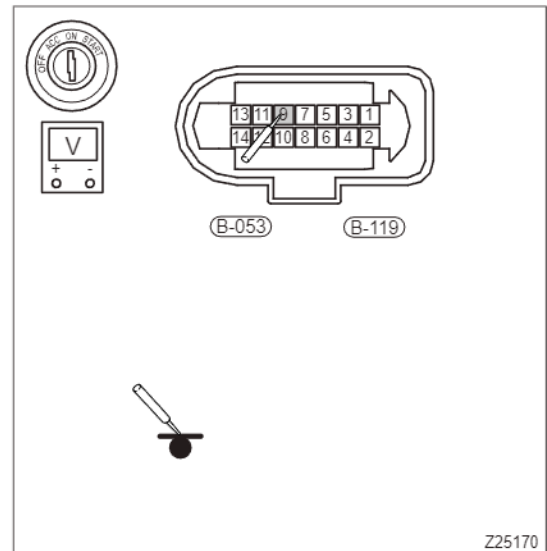
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1

Check output voltage of daytime running light control circuit

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the left daytime running light connector B-053 and right daytime running light connector B-119.
- Connect the negative battery cable, turn ignition switch to ON and start engine.
- Using a multimeter, check output voltage of daytime running light according to table below.

Multimeter Connection	Condition	Specified Condition
B-053 (9) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V
B-119 (9) - Body ground		Not less than 12 V



Z25170

NG

Check power supply wire harness

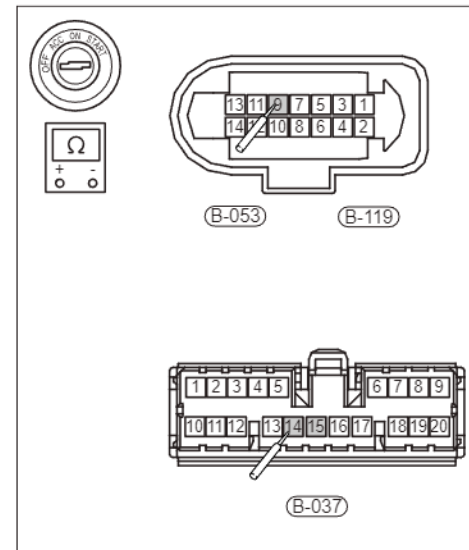
OK

2

Check circuit

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-037.
- Disconnect the left daytime running light connector B-053 and right daytime running light connector B-119.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-053 (9) - B- 037 (14)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-119 (9) - B- 037 (15)		$\leq 1 \Omega$



Z2518

NG

Replace or repair wire harness

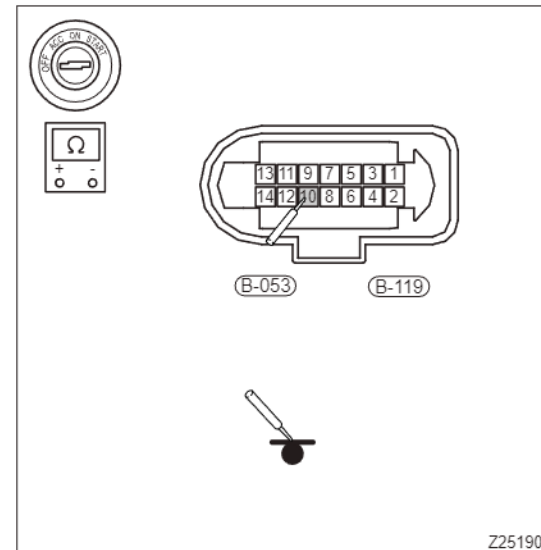
OK

3

Check ground circuit of daytime running light

- Using a multimeter, check if ground circuit of daytime running light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
B-053 (10) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-119 (10) - Body ground		$\leq 1 \Omega$



Z25190

NG

Repair ground wire harness

OK

4

Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.

NG	Replace BCM
OK	System operates normally

■ Brake light fault

DTC	B1035-11	Brake Light Short to Ground
DTC	B1035-13	Open or Short to Power Supply in Brake Light
DTC	B1036-11	High Mounted Stop Light Short to Ground
DTC	B1036-11	Open or Short to Power Supply in High Mounted Stop Light

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

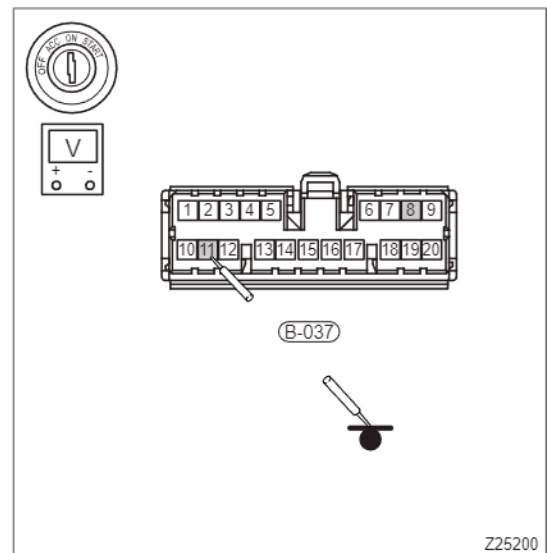
Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

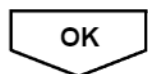
1	Check output voltage of brake light control circuit
---	---

- (a) Turn ignition switch to ON, and depress brake pedal.
- (b) Using a multimeter, check output voltage of brake light from back of BCM connector B-037 according to table below.

Multimeter Connection	Condition	Specified Condition
B-037 (11) - Body ground	Brake pedal depressed	Not less than 12 V
B-037 (8) - Body ground		Not less than 12 V



NG	Check BCM module
----	------------------



2	Check circuit
---	---------------

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-037.
- Disconnect the brake light connectors B-120, T-012, B-054, T-013 and T-014.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-037 (11) - T-012 (2)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-037 (8) - B-054 (3)		
B-037 (8) - B-120 (3)		
B-037 (8) - T-013 (3)		
B-037 (8) - T-014 (3)		

NG

Replace or repair wire harness

OK

3

Check ground circuit of brake light

- Using a multimeter, check if ground circuit of brake light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
T-012 (1) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-054 (1) - Body ground		
B-120 (1) - Body ground		
T-013 (1) - Body ground		
T-014 (1) - Body ground		

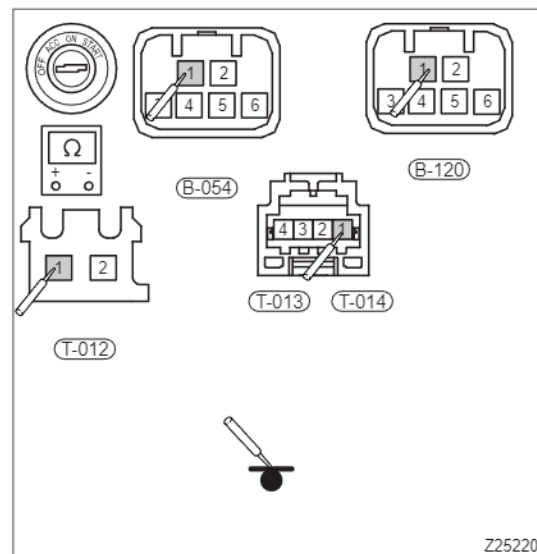
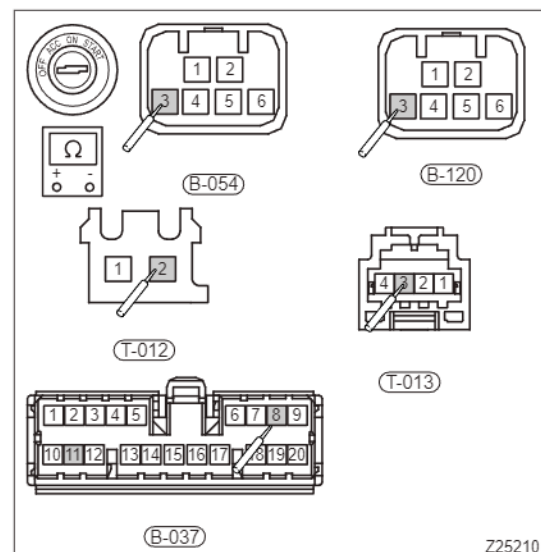
NG

Replace or repair wire harness

OK

4

Reconfirm DTCs



- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

NG	Replace BCM
OK	System operates normally

■ Back-up light fault

DTC	B1039-11	Back-up Light Circuit Short to Ground
DTC	B1039-13	Open or Short to Power Supply in Back-up Light Circuit

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

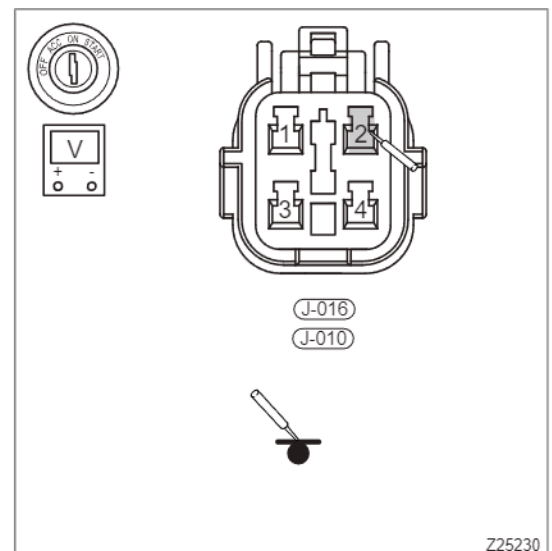
Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check output voltage of back-up light control circuit
---	---

- (a) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- (b) Disconnect the left back-up light connector J-010 and right back-up light connector J-016.
- (c) Connect the negative battery cable, turn ignition switch to ON, and shift the shift lever to reverse gear.
- (d) Using a multimeter, check output voltage of back-up light according to table below.

Multimeter Connection	Condition	Specified Condition
J-010 (2) - Body ground	Brake pedal depressed	Not less than 12 V
J-016 (2) - Body ground		Not less than 12 V



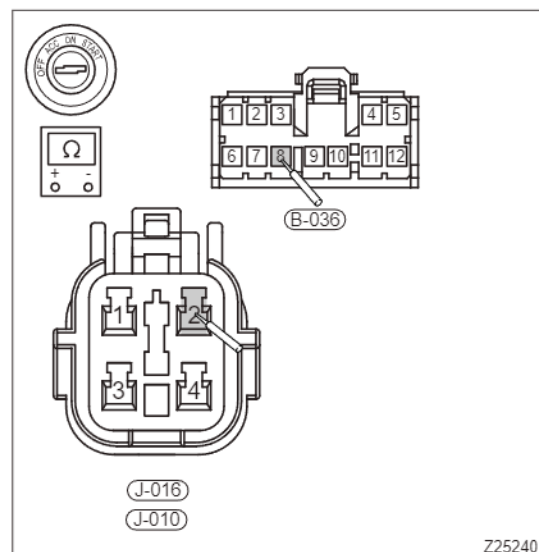
NG	Check power supply wire harness
----	---------------------------------

OK

2	Check circuit
---	---------------

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-036.
- Disconnect the left back-up light connector J-010 and right back-up light connector J-016.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
J-010 (2) - B- 036 (8)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
J-016 (2) - B- 36 (8)		



NG

Replace or repair wire harness

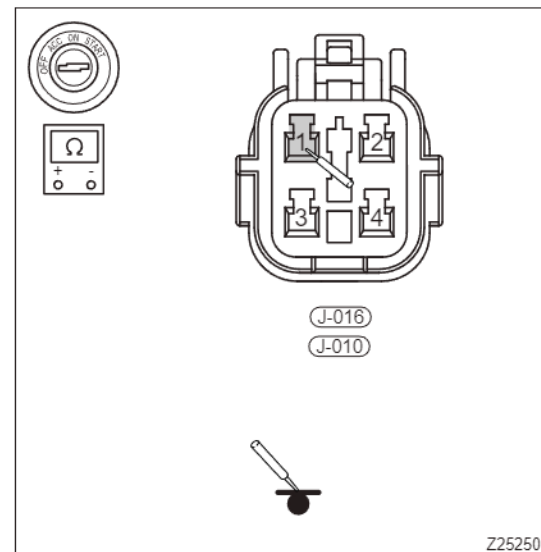
OK

3

Check ground circuit of back-up light

- Using a multimeter, check if ground circuit of back-up light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
J-010 (1) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
J-016 (1) - Body ground		



NG

Repair ground wire harness

OK

4

Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.

NG	Replace BCM
OK	System operates normally

■ Front fog light fault

DTC	B1026-11	Short to Ground or Open in Front Fog Light Relay
DTC	B1026-12	Short to Power Supply in Front Fog Light Relay

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

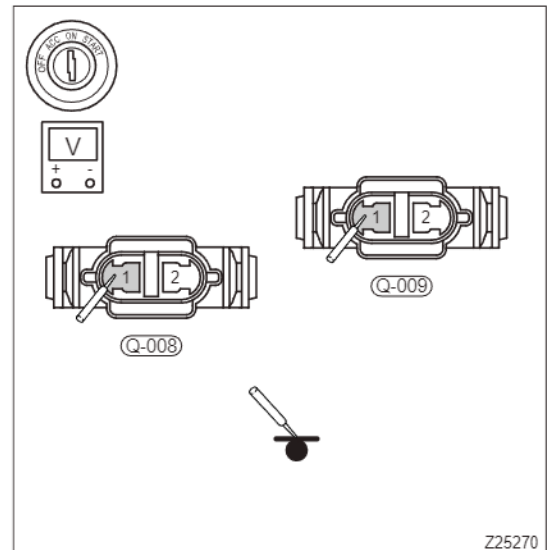
Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check output voltage of front fog light control circuit
---	---

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect front left fog light connector Q-008 and front right fog light connector Q-009.
- Connect the negative battery cable, turn ignition switch to ON, and turn on front fog light switch.
- Using a multimeter, check output voltage of front fog light according to table below.

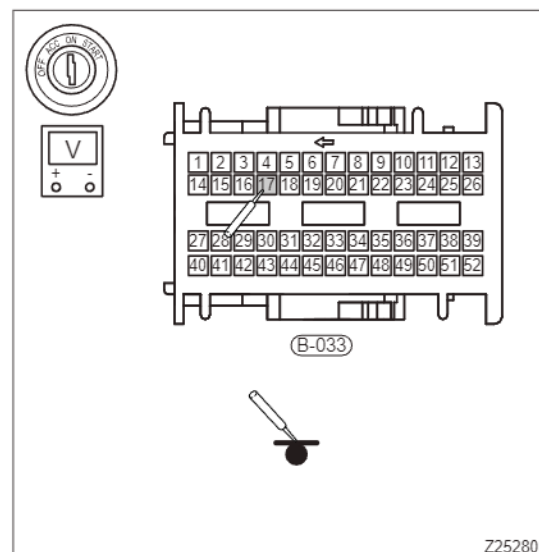
Multimeter Connection	Condition	Specified Condition
Q-008 (1) - Body ground	Front fog light switch ON	Not less than 12 V
Q-009 (1) - Body ground		Not less than 12 V



Z25270

- (e) Disconnect BCM connector B-033, and check voltage of primary coil for front fog light relay.

Multimeter Connection	Condition	Specified Condition
B-033 (17) - Body ground	Front fog light switch ON	Not less than 12 V



NG

Check power supply wire harness and relay

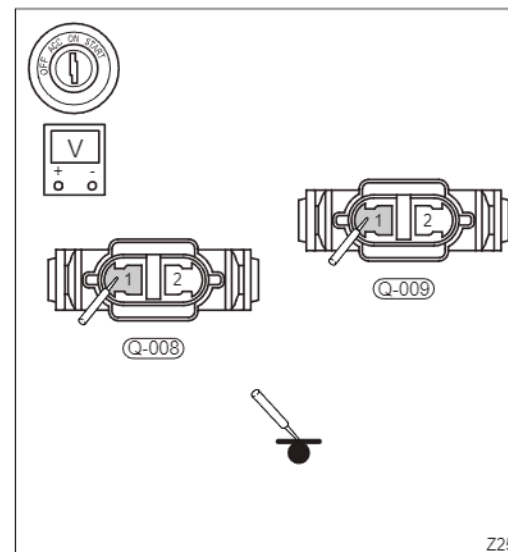
OK

2

Check circuit

- (a) Turn ENGINE START STOP switch to ON, and turn off front fog light switch.
- (b) Disconnect front left fog light connector Q-008 and front right fog light connector Q-009.
- (c) Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
Q-008 (1) - Body ground	Front fog light switch OFF	0 V
Q-009 (1) - Body ground		



NG

Check for short to power supply in front fog light power supply.

OK

3

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

NG	Replace BCM
OK	System operates normally

■ Right turn signal light fault

DTC	B1002-11	Right Turn Signal Light Short to Ground
DTC	B1002-13	Open or Short to Power Supply in Right Turn Signal Light
DTC	B1040-01	Right Turn Signal Light Feedback Fault

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check output voltage of right turn signal light control circuit
---	---

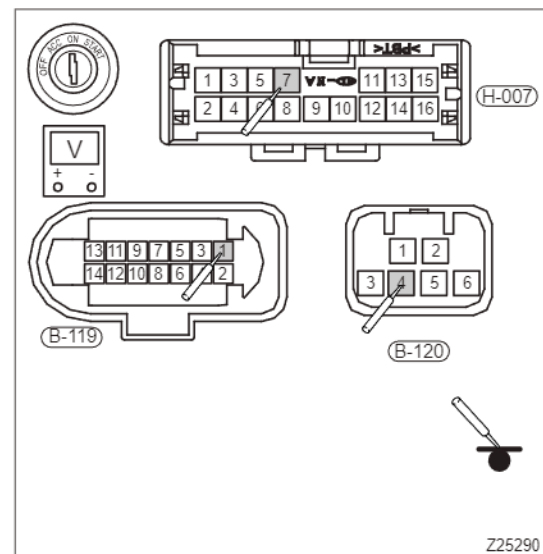
- First confirm the working state of right turn signal light.
- If only right turn signal light does not turn on, check the output circuit of right turn signal light only.
- If either front right or rear right light does not come on, check node line and turn signal light.
- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect front right turn signal light connector B-119, right side turn signal light connector H-007 and rear right turn signal light connector B-120.
- Connect the negative battery cable, turn ignition switch to ON, and turn on right turn signal light switch.
- Using a multimeter, check output voltage of each turn signal light according to table below.

Multimeter Connection	Condition	Specified Condition
B-119 (1) - Body ground	ENGINE START STOP switch "ON"	Indirect 12 V
B-120 (4) - Body ground		
H-007 (7) - Body ground		

OK	Replace turn signal light
----	---------------------------

NG

2	Check circuit
---	---------------



- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-033.
- Disconnect front right turn signal light connector B-119, right side turn signal light connector H-007 and rear right turn signal light connector B-120.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-037 (05) - B-119 (1)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-037 (05) - B-120 (4)		
B-037 (05) - H-007 (07)		

NG

Replace or repair wire harness

OK

3

Check ground circuit of turn signal light

- Using a multimeter, check if ground circuit of turn signal light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
B-119 (10) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-120 (6) - Body ground		
H-007 (9) - Body ground		

NG

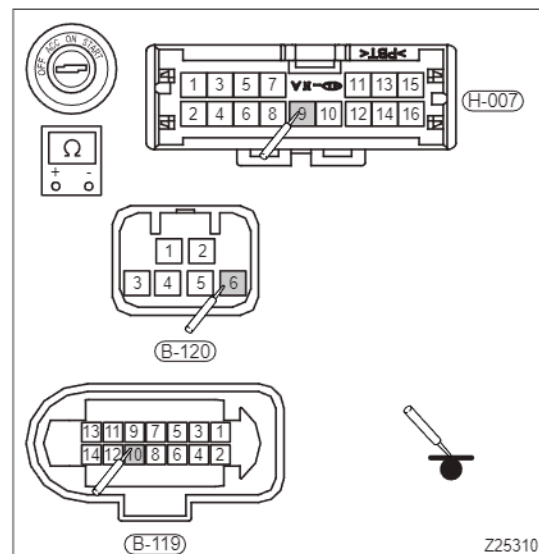
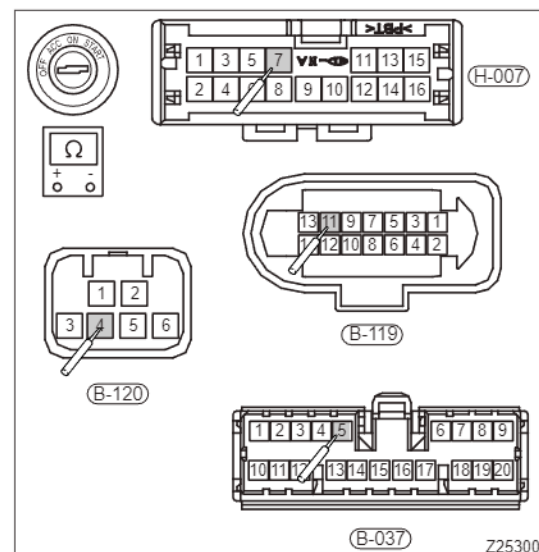
Repair ground wire harness

OK

4

Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.



NG	Replace BCM
OK	System operates normally

■ Rear view mirror foot light fault

DTC	B1053-11	Rear View Mirror Foot Light Short to Ground
DTC	B1053-13	Open or Short to Power Supply in Rear View Mirror Foot Light

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check output voltage of rear view mirror foot light control circuit
---	---

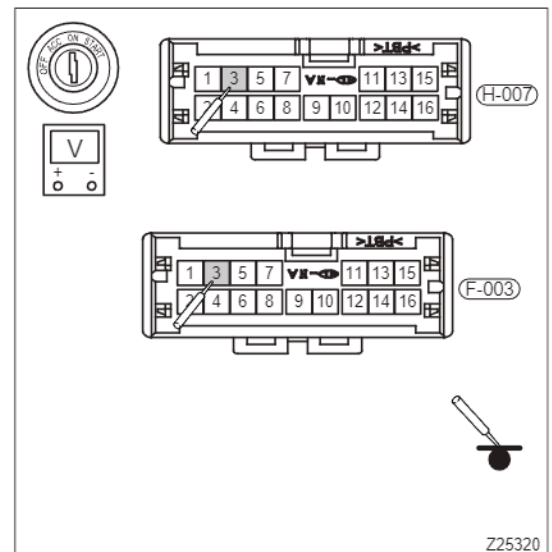
- First confirm the working state of rear view mirror foot light.
- If only right rear view mirror foot light does not turn on, check the output circuit of right rear view mirror foot light only.
- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect right rear view mirror foot light connector H-007 and left rear view mirror foot light connector F-003.
- Connect the negative battery cable, and unlock the vehicle (foot light will turn on).
- Using a multimeter, check output voltage of each rear view mirror foot light according to table below.

Multimeter Connection	Condition	Specified Condition
H-007 (3) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V
F-003 (3) - Body ground		

NG	Check module and power wire harness
----	-------------------------------------

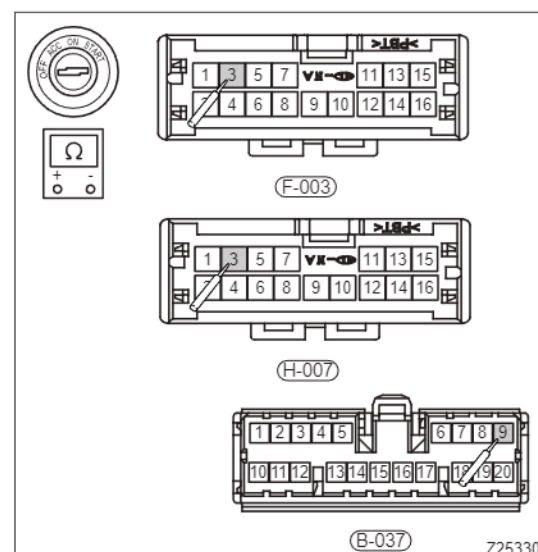
OK

2	Check circuit
---	---------------



- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the body controller connector B-037.
- Disconnect right rear view mirror foot light connector H-007 and left rear view mirror foot light connector F-003.
- Using a digital multimeter, check for normal continuity between connector terminals according to table below.

Multimeter Connection	Condition	Specified Condition
B-037 (09) - H-007 (03)	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-037 (09) - F-003 (03)		



NG

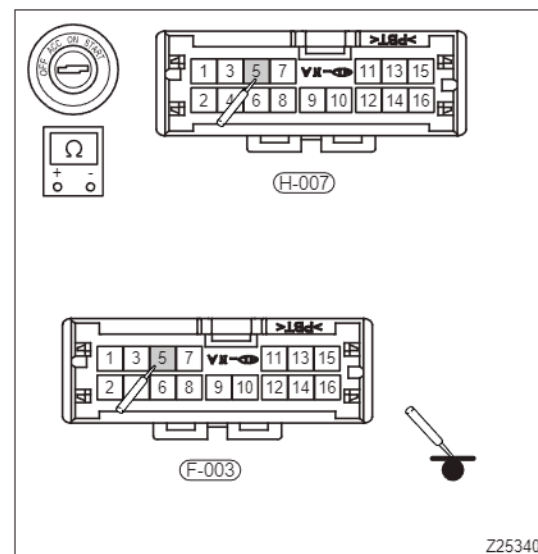
Replace or repair wire harness

OK

3 Check ground circuit of rear view mirror foot light

- Using a multimeter, check if ground circuit of rear view mirror foot light is normal according to table below.

Multimeter Connection	Condition	Specified Condition
H-007 (5) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
F-003 (5) - Body ground		



NG

Repair ground wire harness

OK

4 Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.

NG

Replace BCM

OK

System operates normally

■ Low beam light relay circuit fault

DTC	B1022-11	Short to Ground or Open in Low Beam Light Relay
DTC	B1022-12	Short to Power supply in Low Beam Light Relay Circuit

■ DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1

Check power supply fuse

- (a) Check if fuses EF02 (10A) and EF03 (10A) in engine compartment fuse and relay box are normal.

NG

Check and replace fuse

OK

2

Check circuit of primary coil for low beam light relay

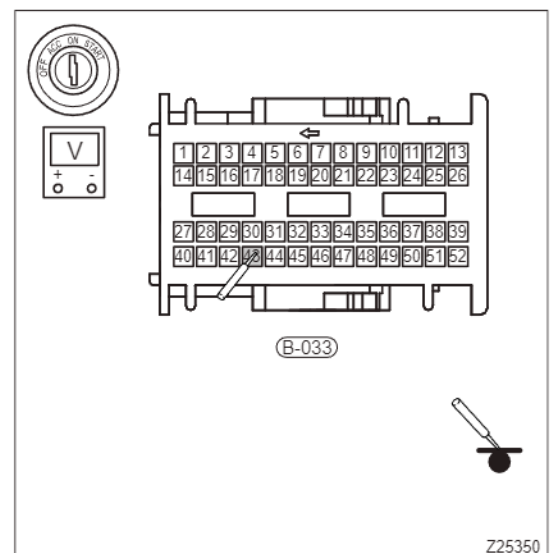
- (a) Turn on low beam light switch and check if there is engaging sound from low beam light relay.
- (b) If not, turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- (c) Disconnect the BCM connector B-033.
- (d) Connect the negative battery cable, and turn ENGINE START STOP switch to ON.
- (e) Using a multimeter, check for power supply voltage of primary coil for low beam light relay according to the table below.

Multimeter Connection	Condition	Specified Condition
B-033 (43) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V

OK

Check module, power supply wire harness and relay

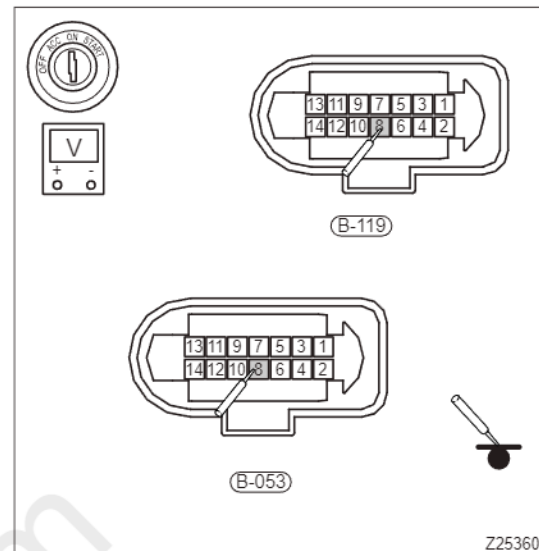
NG



3 Check low beam light relay output power supply circuit

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Connect the body controller connector B-033.
- Disconnect left headlight assembly connector B-053 and right headlight connector B-119.
- Connect the negative battery cable, turn ENGINE START STOP switch to ON, and turn on low beam light switch.
- Using a digital multimeter, check if low beam light power supply if normal with a 21W test light according to the table below.

Multimeter Connection	Condition	Specified Condition
B-053 (8) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-119 (8) - Body ground		

**NG****Replace or repair wire harness and relay****OK****4 Reconfirm DTCs**

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Check if the same DTCs are still output.

NG**Replace BCM****OK****System operates normally****High beam light relay circuit fault**

DTC	B1023-11	Short to Ground or Open in High Beam Light Relay Circuit
DTC	B1023-12	Short to Power supply in High Beam Light Relay Circuit

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1 Check power supply fuse

- Check if fuse EF06 (5A) in engine compartment fuse and relay box is normal.

NG

Check and replace fuse

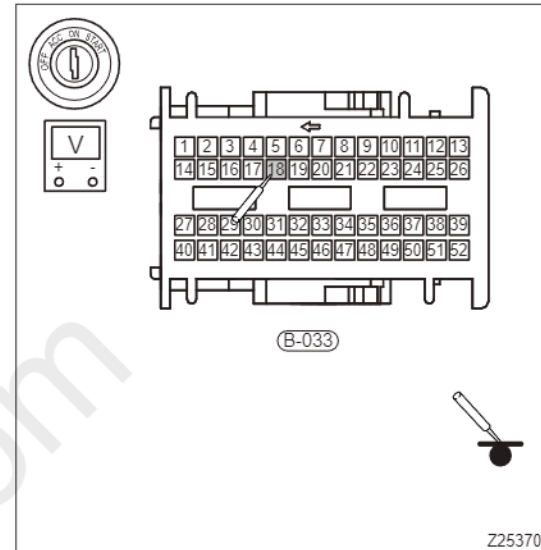
OK

2

Check circuit of primary coil for low beam light relay

- Turn on low beam light switch and check if there is engaging sound from low beam light relay.
- If not, turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Disconnect the BCM connector B-033.
- Connect the negative battery cable, and turn ENGINE START STOP switch to ON.
- Using a multimeter, check for power supply voltage of primary coil for low beam light relay according to the table below.

Multimeter Connection	Condition	Specified Condition
B-033 (18) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V



Z25370

NG

Check module, power supply wire harness and relay

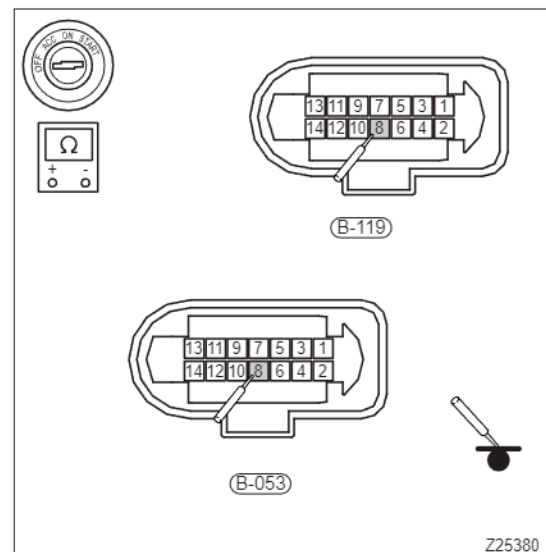
OK

3

Check low beam light relay output power supply circuit

- Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.
- Connect the body controller connector B-033.
- Disconnect left headlight assembly connector B-053 and right headlight connector B-119.
- Connect the negative battery cable, turn ENGINE START STOP switch to ON, and turn on high beam light switch.
- Using a digital multimeter, check if low beam light power supply if normal with a 21W test light according to the table below.

Multimeter Connection	Condition	Specified Condition
B-053 (8) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$
B-119 (8) - Body ground		



Z25380

NG

Replace or repair wire harness and relay

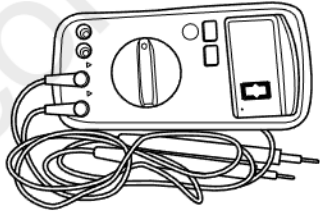
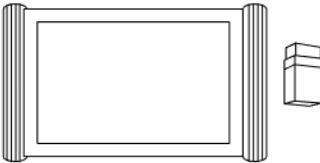
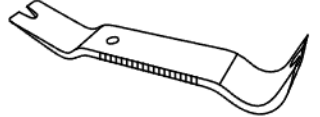
OK

4

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

NG**Replace BCM****OK****System operates normally****4 ON-VEHICLE SERVICE****4.1 Tools****■ General Tools**

Tool Name	Tool Drawing
Digital Multimeter	 S00002
X-431 PAD Diagnostic Tester	 S00001
Interior Crow Plate	 S00020

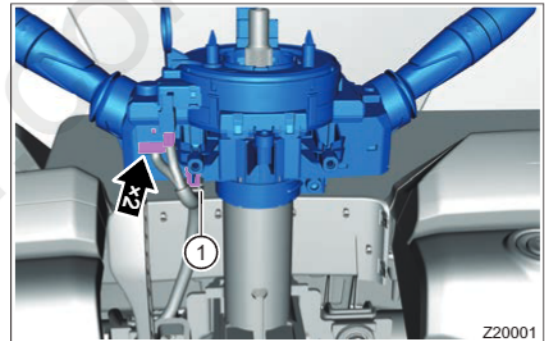
4.2 Replacement of Steering Column Module

■ Removal

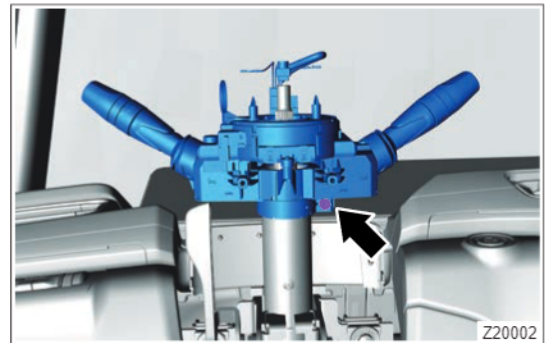
Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing steering column module.
- Appropriate force should be applied when removing steering column module. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing steering column module.
- Disconnect the negative battery cable for more than 90 seconds, when removing airbag.

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the combination switch upper cover assembly.
- (4) Remove the combination switch lower cover assembly.
- (5) Remove the driver airbag.
- (6) Remove the steering wheel assembly.
- (7) Disconnect 2 connectors from steering column module, and detach wire harness clip (1).



- (8) Remove 1 fixing screw from steering column module.



■ Installation

Caution

- Always operate carefully to prevent components from being damaged, when installing steering column module.
- Install connector in place when installing steering column module.
- Check switch for proper operation after installing steering column module.

- (1) Install 1 fixing screw to steering column module.
- (2) Install the steering column module connector.
- (3) Install the combination switch lower cover assembly.
- (4) Install the steering wheel assembly.

- (5) Install the driver airbag.
- (6) Connect the negative battery cable.

4.3 Replacement of Headlight Assembly

■ Removal

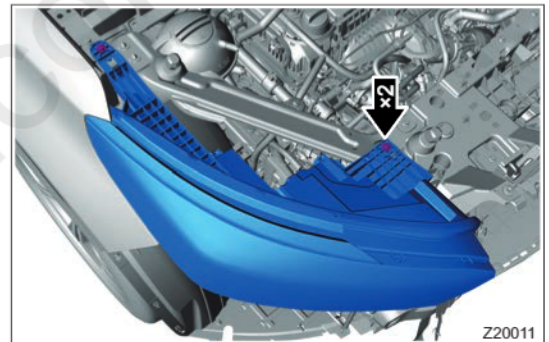
Hint

- Use same procedures for right headlight assembly and left headlight assembly.
- Removal and installation procedures listed below are for right headlight assembly.

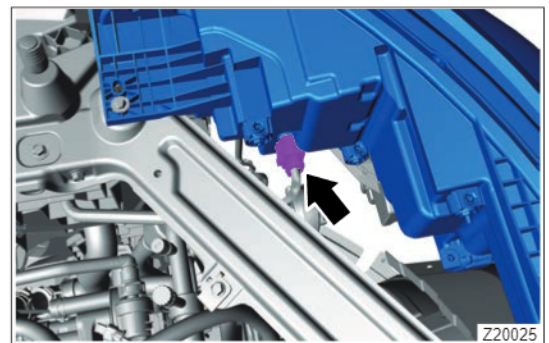
Caution

- Be sure to wear safety equipment to prevent accidents, when removing headlight assembly.
- Try to prevent body paint surface from being scratched, when removing headlight assembly.

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the front bumper assembly.
- (4) Remove 2 fixing bolts from headlight.



- (5) Disconnect headlight assembly wire harness connector and remove headlight assembly.



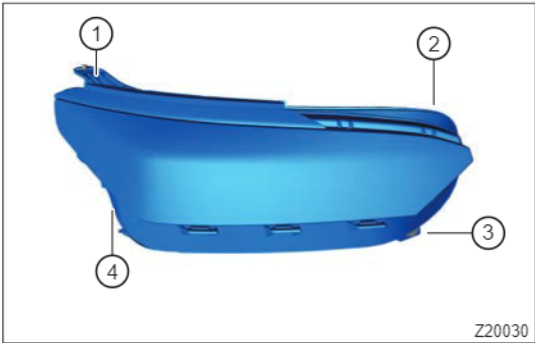
■ Installation

Caution

- When installing headlight assembly, make sure headlight assembly is well fitted with hood, front wing and front bumper. Adjust it as necessary.
- Make sure that headlight assembly operates properly after installing.

- (1) Install the left headlight assembly wire harness connector.

- (2) Tighten fixing bolts in order shown in illustration.
Tightening torque: $3.5 \pm 0.5 \text{ N}\cdot\text{m}$



- (3) Install the front bumper assembly.
(4) Connect the negative battery cable.

■ Adjustment

Preparations:

- (1) Tire inflation pressure comes up to standard.
(2) Vehicle is unloaded (besides spare tire and tool kit, it is generally specified to include the weight of driver).
(3) Park vehicle on a level ground or in workplace.
(4) Keep lens surface of headlight free from dirt.
(5) Check if power supply operates normally and bulbs are installed correctly.
(6) Headlight leveling can be adjusted according to the number of passengers and loading condition of vehicle. It can be adjusted by adjustment switch, and there are 4 adjustment bands to select: 0, 1, 2, 3.

Adjust the light level according to table below:

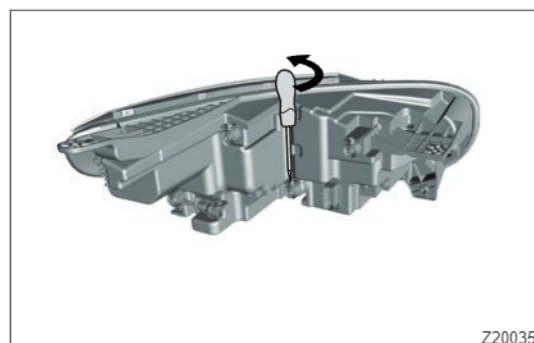
Occupant and Luggage Loading Condition		Knob Position
Occupant	Luggage Loading	
Driver	None	0
Driver + Front Passenger	None	1
Full Occupied	None	2
Full Occupied	Full-loaded Luggage	3
Driver	Full-loaded Luggage	2

Warning
Whether headlight leveling is correct or not will directly affects driving safety. Be sure to adjust the beam with special tool according to related specification.

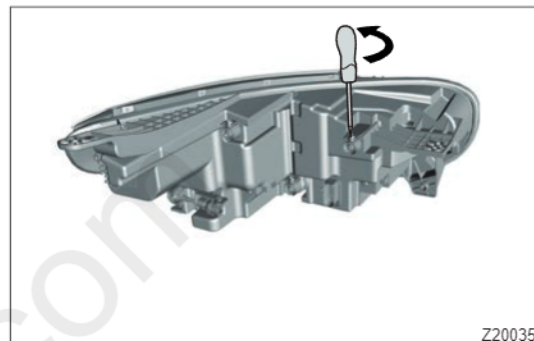
Manual headlight leveling: The headlight leveling can be changed by adjusting the following areas manually as shown in illustration. Take left headlight beam adjustment as an example.

- (1) High beam light left/right adjustment:

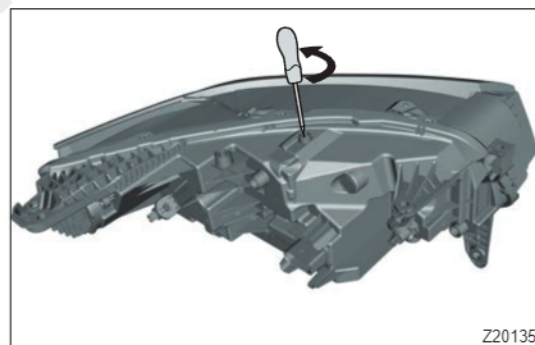
- 1) When rotating inner hexagon clockwise: Beam moves right;
- 2) When rotating inner hexagon counterclockwise: Beam moves left;



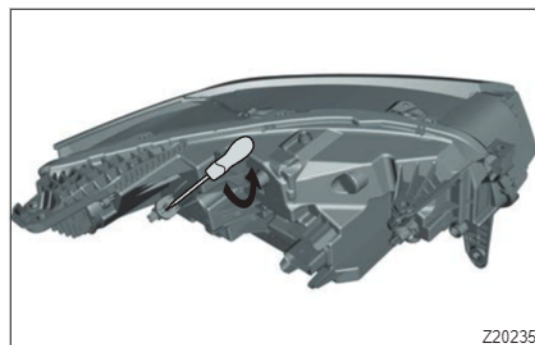
- (2) High beam light up/down adjustment:
 - 1) When rotating inner hexagon clockwise: Beam moves down;
 - 2) When rotating inner hexagon counterclockwise: Beam moves up;



- (3) Low beam light up/down adjustment:
 - 1) When rotating inner hexagon clockwise: Beam moves down;
 - 2) When rotating inner hexagon counterclockwise: Beam moves left;



- (4) Low beam light left/right adjustment:
 - 1) When rotating inner hexagon clockwise: Beam moves right;
 - 2) When rotating inner hexagon counterclockwise: Beam moves left;



The adjustment direction of left and right headlight beams are shown in following table:

Light Adjustment Direction	Rotation Direction for Screwdriver	Headlight Adjustment Direction	
		Left Headlight	Right Headlight
Left-and-right direction	Clockwise	Right	Left

Light Adjustment Direction	Rotation Direction for Screwdriver	Headlight Adjustment Direction	
		Left Headlight	Right Headlight
	Counterclockwise	Left	Right
Up-and-down direction	Clockwise	Up	Up
	Counterclockwise	Down	Down

Low/High Beam Detection Equipment Parameter Table:

Equipment Name	Basis Parameter Required	M31T Headlight	Note
Headlight Tester	Base center height of headlight low beam	919 mm	Confirm followings when adjusting light: (1) Headlight leveling switch is in "0" position; (2) Distance between light detection screen and lampwick is 10 m; (3) Interference between lens and trim ring or even falling of dimming mechanism due to improper dimming method is not allowed; (4) After adjusting low beam up and down, high beam is not adjusted up and down, left and right low and high beams can be adjusted separately.
	Base center distance between both low beam lights	1515 mm	
	Up and down value of low beam	Cutoff line corner height: 789 mm to 829 mm	
	Left and right value of low beam	Offset for left and right low beam: Left $\leq$ 150 mm, right $\leq$ 300 mm	
	Base center height of headlight high beam	906 mm	
	Base center distance between both high beam lights	1206 mm	
	Up and down value of high beam	Height is 759 to 859 mm (- After adjusting low beam up and down, high beam is not adjusted up and down)	
	Left and right value of high beam	Offset for left high beam: Left $\leq$ 150 mm, right $\leq$ 300 mm Offset for right high beam: Left $\leq$ 300 mm, right $\leq$ 300 mm	
	High beam light intensity detection	Light intensity is higher than 18000 cd	

Low beam detection on screen with a distance of 10 m should be performed according to GB7258 requirements:

Configuration	Function	Up and Down Values	Left Offset Values (LHD)	Right Offset Values (LHD)
LED headlight	Left low beam light	669--829 mm	No more than 170 mm	No more than 350 mm
	Right low beam light	669--829 mm	No more than 170 mm	No more than 350 mm

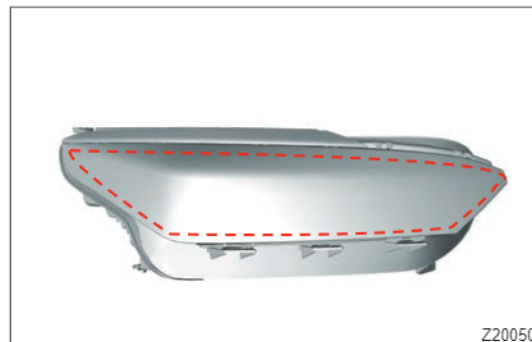
■ Headlight Fogging Judgment Area:

Hint:

- Inside the dashed box are functional areas.
- Outside the dashed box are non-functional areas.

(1) Fogging judgment for outside light after raining:

- If fogging area in functional area is less than 1/3 of total area of the region, or fogging area in non-functional area is more than 1/3 of the total area of the region, vehicle is idling (ambient temperature is not lower than 23 °C), and all functions are on for 15 minutes; If fog in the functional area dissipates and fog in the non-functional area is less than 1/3 of the total area of the region, it is judged to be qualified; if not, it is unqualified.



Z20050

(2) Water entering and fogging judgment:

- Fogging: Inner surface of light cover, less than one third of the functional area or the non-functional area is coated with a sheet of mist or condensation, there is no water drops and there is no sagging when tapping lightly, all others symptoms indicate that there is a water inflowing.

Hint

- Mist is a thin layer of opaque water vapor formed on the inner surface of light cover.
- Condensation is water drop formed on the inner surface of light cover.

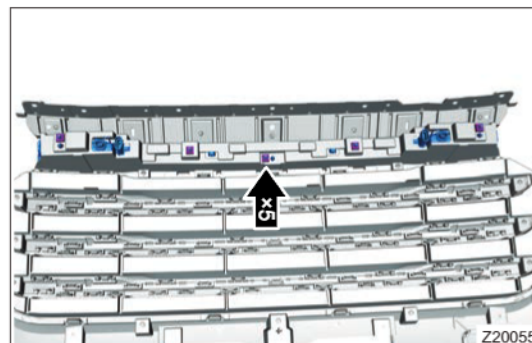
4.4 Replacement of Front Position Light

■ Removal

Caution

- Be sure to wear safety equipment to prevent accidents, when removing front position light.
- Try to prevent body paint surface from being scratched, when removing front position light.

- (1) Remove the front bumper assembly.
- (2) Remove the front bumper grille upper strip.
- (3) Remove 5 fixing screws between front position light and radiator grille housing.



Z20055

- (4) Remove front position light from grille.

■ Installation

Caution

Make sure that front position light functions properly after installing.

- (1) Install front position light to grille.

- (2) Install 5 fixing screws between front position light and radiator grille housing.

Tightening torque: $3.5 \pm 0.5 \text{ N}\cdot\text{m}$

- (3) Install the front bumper grille upper strip.
- (4) Install the front bumper.

4.5 Replacement of Rear Combination Light (Body Part)

■ Removal

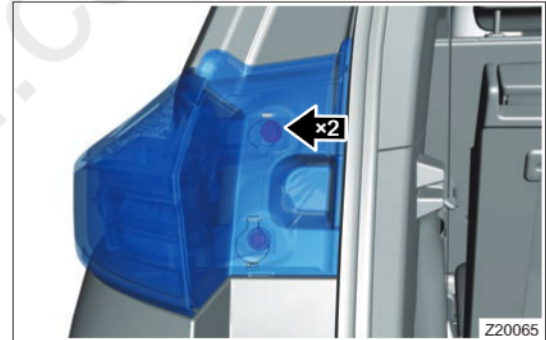
Hint:

Use same procedures for right and left headlight assembly. Removal procedures listed below are for left side.

Caution

- **Be sure to wear necessary safety equipment to prevent accidents, when removing rear combination light (body part).**
- **Try to prevent body paint surface from being scratched, when removing rear combination light (body part).**

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Using an interior crow plate, pry off 2 fixing bolt covers of rear left combination light, remove 2 fixing bolts from rear left combination light, disconnect rear left combination light connector, and remove rear left combination light.



■ Installation

Caution

- **Make sure that rear combination light (body part) functions properly after installing.**
- **When pushing rear combination light assembly (body part) toward front of vehicle, note that the positioning pin on combination light is aligned with the corresponding hole in sheet metal.**

- (1) Connect the rear left combination light wire harness connector.
- (2) Install 2 fixing bolts to rear left combination light assembly.

Tightening torque: $2.5 \pm 0.5 \text{ N}\cdot\text{m}$

- (3) Install the rear left combination light bolt cover.
- (4) Connect the negative battery cable.

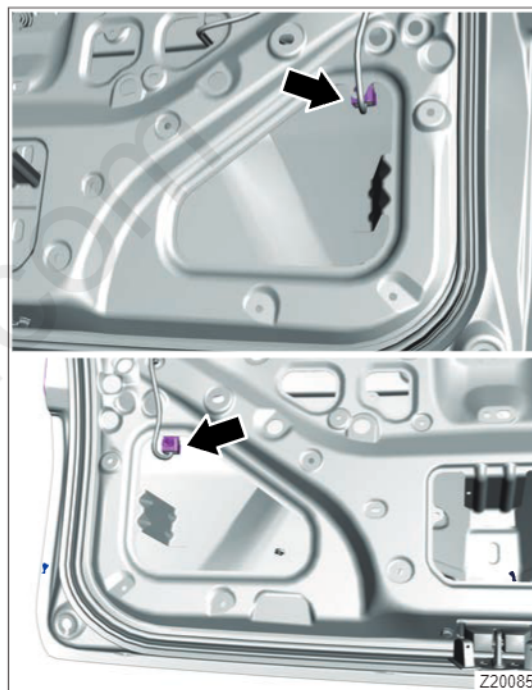
4.6 Replacement of Rear Combination Light Assembly (Back Door Part)

■ Removal

Caution

- **Be sure to wear necessary safety equipment to prevent accidents, when removing rear combination light assembly (back door part).**
- **Try to prevent body paint surface from being scratched, when removing rear combination light assembly (back door part).**

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the back door protector assembly.
- (4) Disconnect connectors on both sides of rear combination light assembly.



- (5) Remove 8 fixing nuts from rear combination light assembly in order shown in illustration.



- (6) Remove the rear combination light assembly (back door part).

■ Installation

Caution

Make sure that rear combination light assembly (back door part) functions properly after installing.

- (1) Push rear combination light assembly (back door part) into corresponding groove on back door.

- (2) Install 8 fixing nuts to rear combination light assembly.

Tightening torque: $3.5 \pm 0.5 \text{ N}\cdot\text{m}$

- (3) Install connectors on both sides of rear combination light assembly.
- (4) Install the back door protector assembly.
- (5) Connect the negative battery cable.

■ Rear Combination Light Fogging Judgment Area

Hint:

- Inside the dashed box are functional areas.
- Outside the dashed box are non-functional areas.

- (1) Fogging judgment for outside light after raining:

- Vehicle is idling (ambient temperature is not lower than 23°C), all functions are on for 15 minutes, then fog in the functional area dissipates, or if fog in the functional area dissipates or fog in the non-functional area is less than 1/3 of the total area of the region, it is judged to be qualified; if not, it is unqualified.

- (2) Water entering and fogging judgment:

- Fogging: Inner surface of light cover, less than one third of the functional area or the non-functional area is coated with a sheet of mist or condensation, there is no water drops and there is no sagging when tapping lightly, all others symptoms indicate that there is a water inflowing.



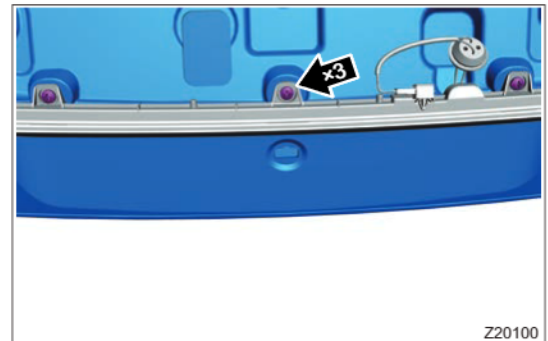
Hint

- Mist is a thin layer of opaque water vapor formed on the inner surface of light cover.
- Condensation is water drop formed on the inner surface of light cover.

4.7 Replacement of High Mounted Stop Light Assembly

■ Removal

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the rear spoiler assembly.
- (4) Remove 3 fixing screws from high mounted stop light.



- (5) Remove the high mounted stop light assembly.

■ Installation

Caution

Make sure that high mounted stop light assembly functions properly after installing.

- (1) Install 4 fixing nuts to high mounted stop light.

Tightening torque: $1.5 \pm 0.5 \text{ N}\cdot\text{m}$

- (2) Install the rear spoiler assembly.
- (3) Connect the negative battery cable.

4.8 Replacement of License Plate Light Assembly

■ Removal

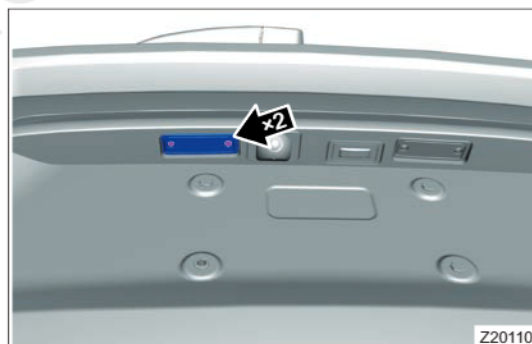
Hint

- Operation steps of right license plate light are same as that of left license plate light.
- Procedures listed below are for left side.

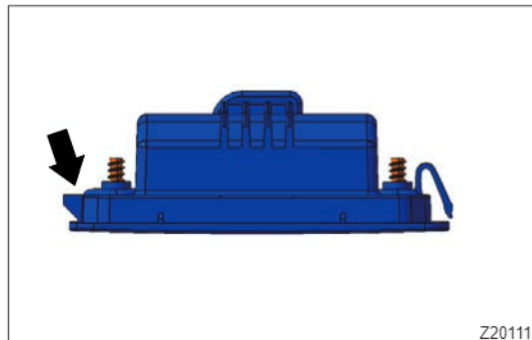
Caution

- Be sure to wear safety equipment to prevent accidents, when removing license plate light assembly.
- Try to prevent interior and body paint surface from being scratched, when removing license plate light assembly.

- (1) Open the back door.
- (2) Turn off all electrical equipment and ENGINE START STOP switch.
- (3) Disconnect the negative battery cable.
- (4) Removal 2 fixing screws (if equipped) from left license plate light.



- (5) Push the license plate light to the right (in +Y direction) until the left clip is exposed, push out license plate light downward, disconnect the connector and remove left license plate light assembly.



■ Installation

Caution

Make sure that license plate light assembly functions properly after installing.

- (1) Connect left license plate light connector. When installing, clip the right side into protector first and then push the left side.

- (2) Install 2 fixing screws (if equipped) to left license plate light.

Tightening torque: $1.5 \pm 0.5 \text{ N}\cdot\text{m}$

- (3) Connect the negative battery cable.

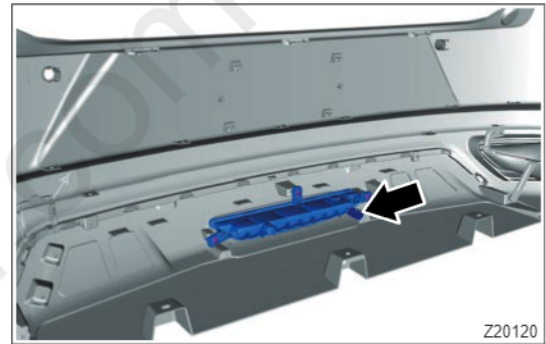
4.9 Replacement of Rear Fog Light Assembly

■ Removal

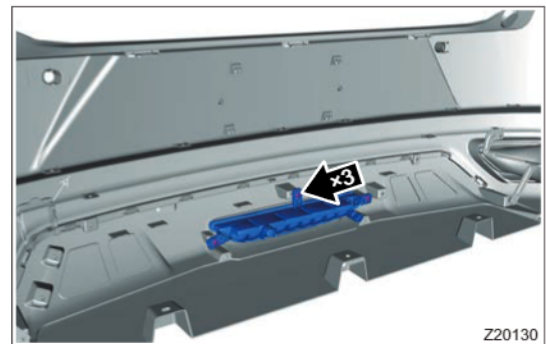
Caution

- **Be sure to wear safety equipment to prevent accidents, when removing rear fog light assembly.**
- **Try to prevent interior and body paint surface from being scratched, when removing rear fog light assembly.**

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the rear bumper assembly.
- (4) Disconnect the rear fog light assembly connector.



- (5) Remove 3 fixing screws from rear fog light assembly.



- (6) Remove rear fog light assembly from rear bumper assembly.

■ Installation

Caution

Make sure that rear fog light assembly functions properly after installing.

- (1) Set rear fog light assembly to a proper position on rear bumper, and install 3 fixing screws to rear fog light assembly.

Tightening torque: $1.5 \pm 0.5 \text{ N}\cdot\text{m}$

- (2) Connect the rear fog light assembly connector.
- (3) Install the rear bumper assembly.
- (4) Connect the negative battery cable.