PARKING RADAR SYSTEM

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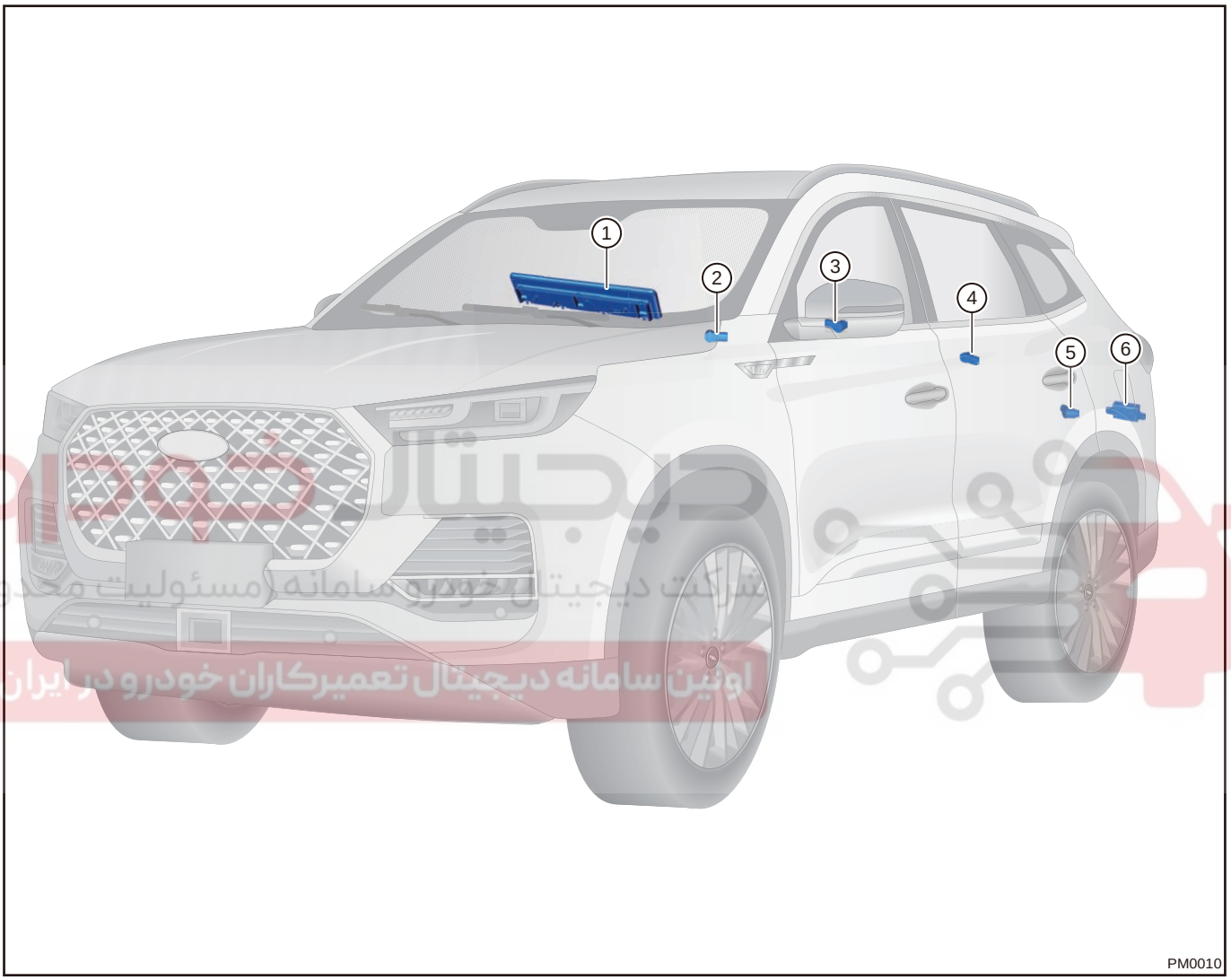
GENERAL INFORMATION

System Overview

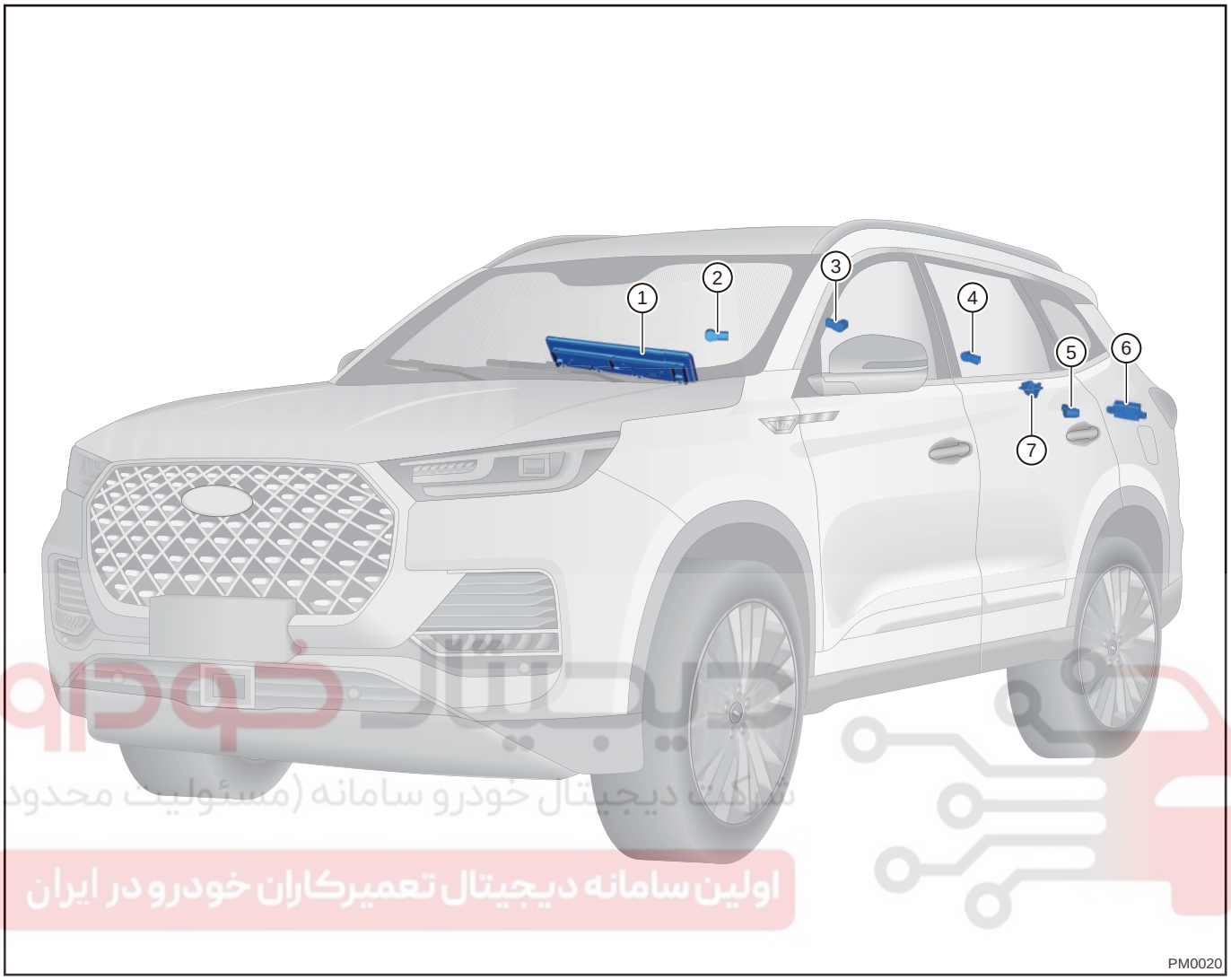
Description

Reversing Radar System



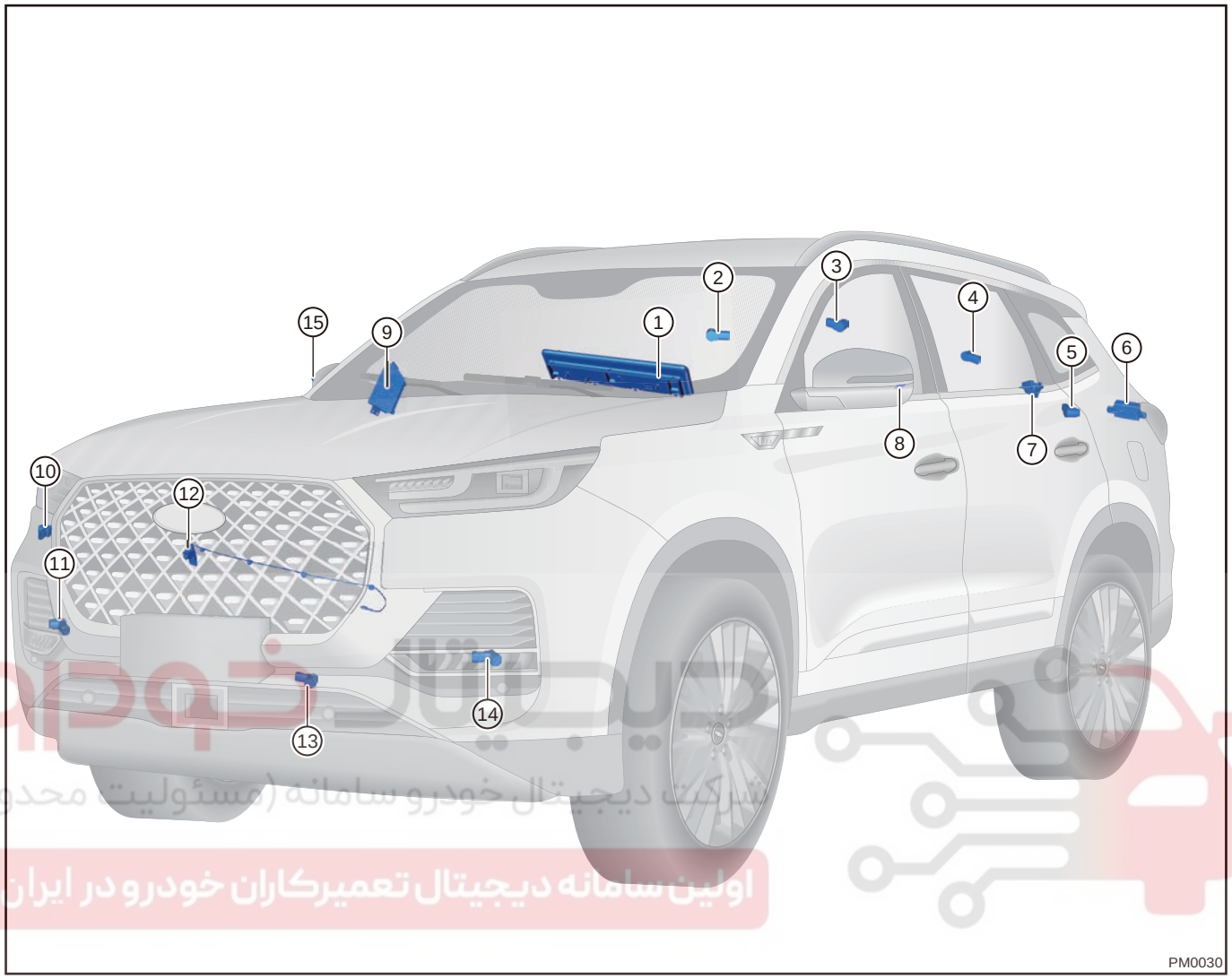
1	Hyperscreen	2	Rear Right Radar Sensor
3	Rear Right Center Radar Sensor	4	Rear Left Center Radar Sensor
5	Rear Left Radar Sensor	6	Reversing Radar Module

Dynamic Track HD Visual Parking Assist System



1	Hyperscreen	2	Rear Right Radar Sensor
3	Rear Right Center Radar Sensor	4	Rear Left Center Radar Sensor
5	Rear Left Radar Sensor	6	Reversing Radar Module
7	Rear Camera Assembly		

360 Panoramic View Monitor System



1	Hyperscreen	2	Rear Right Side Radar Sensor
3	Rear Right Center Radar Sensor	4	Rear Left Center Radar Sensor
5	Rear Left Side Radar Sensor	6	Reversing Radar Module
7	Rear Camera Assembly	8	Left Camera Assembly
9	Panoramic Control System Module (AVM)	10	Front Right Side Radar Sensor
11	Front Right Center Radar Sensor	12	Front Camera Assembly
13	Front Left Center Radar Sensor	14	Front Left Side Radar Sensor
15	Right Camera Assembly		

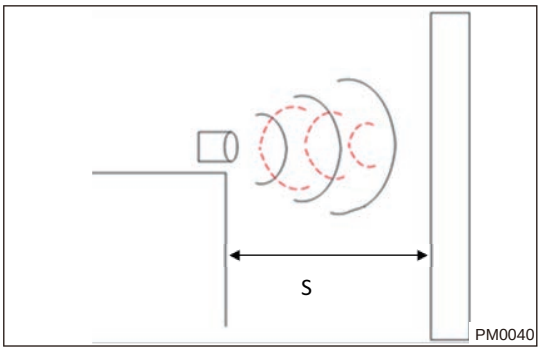
Reversing Radar System

System Schematic Diagram

Parking radar auxiliary system uses digital sensors and ultrasonic technology to measure distance, which can remind the driver of the distance between the rear of vehicle and other objects, and give sound prompts and image display to reduce personnel injury or vehicle damage caused by reversing.

Operating Principle

Parking radar system uses ultrasonic reflection principle to detect distance. After parking radar sensors send out ultrasonic and receive back wave from obstacle, control module calculates obstacle distance (S= t×340÷2) according to ultrasonic distance measuring principle, and sends data to display terminal to display and alarm.



System Composition

Reversing radar system consists of instrument cluster, 1 radar control module and 4 sensors (digital ultrasonic sensors) or 8 sensors. Sensors adopt separated structure. Sensor bodies are same, but installation angles are different. Parts related to system consist of ENGINE START STOP switch, reverse switch, instrument cluster or DVD, PAS switch and vehicle speed (8 sensors system). ENGINE START STOP switch provides operating power for system; Reverse switch provides operation activation signal for system; Instrument cluster or DVD is end terminal of the system and provides sound alarm prompt and distance display function for driver. The PAS switch and speed signal are only related with the 8 sensors system.

Reversing Radar Normal Alarm Display

When ENGINE START STOP switch is turned on, shift lever is moved to R and vehicle is reversing at a speed below 5 km/h, reversing radar is activated. The corresponding measured message will be displayed on multi-information display and alarms with buzzer in instrument cluster.The response way of reversing radar system is buzzer sounding. The table below shows the correspondence between buzzer response frequency and actual obstacle distance:

Alarm Type	1st Section	2nd Section	3rd Section	4th Section	5th Section
Displayed Area	Safe area	Pre-warning area	Amble area	Park area	Park area
Alarm Distance Range (cm)	＞ 150	95 - 150	65 - 90	40 - 60	⩽ 35
Buzzer Sound Frequency	No sound (OFF)	1Hz (ON 500 ms / OFF 500 ms)	2Hz (ON 250ms / OFF 250 ms)	4Hz (ON 125 ms / OFF 125 ms)	Continuous sound

HINT

- When ignition switch is ON and shift lever is in R, small vehicle screen is displayed on instrument cluster. If no obstacle information is detected (obstacle distance is more than 150 cm), only small vehicle is displayed on instrument cluster, while arc is not displayed.
- If multiple sensors have detected an obstacle, instrument cluster will display distances between each sensor and obstacle, sound alarm will be sound from nearest obstacle, and processed based on signal from radar.

Dynamic Track HD Visual Parking Assist System

Operation

Consists of: Instrument cluster, navigation, camera, 4 rear radar sensors and radar module.Reversing view monitor system consists of radar sensor (sensor), camera, control module and display alarm device etc. After starting vehicle, reversing radar system functions when shifting to reverse gear. When the radars detects an obstacle, multi-information display in instrument cluster will display distance information and buzzer sounds. Navigation system displays color image behind vehicle in real time and provides static or dynamic guidelines for driver reference. By this way, the system can help driver to eliminate blind areas and blurred vision, improving driving safety.

Reversing View Display

CAUTION
In the panoramic view monitor system, rear camera of high configuration model is connected to panoramic view monitor system controller, and rear camera of medium configuration model is connected to navigation system.

1. Description
   - High and medium configuration models are fitted with reversing camera. The camera captures the views behind the vehicle which will be presented to driver by navigation system. Also, navigation system provides static guidelines or dynamic guidelines that move as turning of steering wheel so as to estimate the vehicle’s reversing track lines.
2. Dynamic back guidelines and local view of rear area
   - After entering surrounding + rear view screen by shifting to reverse gear, static/dynamic back guidelines and local view of rear area will be displayed on rear view image.
3. Definition of static back guidelines
   - Red guidelines indicate about 0.5 m away from bumper;
   - Yellow guidelines indicate about 1 m away from bumper;
   - The closer green guidelines indicate about 2 m away from bumper;
   - The far green guidelines indicate about 3 m away from bumper.
4. Dynamic track lines
   - Dynamic track lines are used for prejudging the vehicle’s traveling trace, which varies as the wheel rotation.

360 Panoramic View Monitor System

Function

Composition: Panoramic view monitor system consists of four HD (100W) cameras (front camera, rear camera, left camera and right camera), controller, AVM system switch, LVDS video transmission line and connecting wire harness. Controller and head unit are connected by shielded wire.Function description: Panoramic view monitor system consists of a controller, four ultra wide angle cameras and LVDS video transmission lines, etc. It captures images from four directions (front, rear, left and right) and splices them into an aerial view around the vehicle using image processing algorithms, then displays it on the navigation display. Panoramic view monitor system provides surrounding view + single side view, three-dimensional surrounding view roaming, three-dimensional left/right side view, and dynamic/static reversing track. Side camera is integrated into the outside rear view mirror assembly. Panoramic control system module is located inside the glove box on front passenger side and shares a bracket with central gateway; front camera is located on the middle grille of front bumper and installed on the front bumper; rear camera is located under the back door and installed on the back door open switch assembly.

Function	Description
Single side and birds-eye view	Single side view of front, rear, left and right, and splicing view. Single side view can be switched
3D view and birds-eye view	Click on the birds-eye view to switch the corresponding 3D view, and the 3D view can be switched to any viewpoint by sliding
Wide-angle view	Combine the front view/rear view into a triplet wide-angle view through distortion correction
Panoramic startup animation	When AVM is starting, surround the vehicle all around
Turn signal light activating panoramic	When the turn signal light switch is turned on, the 3D view of rear left or rear right side of vehicle is displayed
Steering wheel steering angle activating panoramic	When steering wheel angle is higher than 180°, the 3D view of rear left or rear right side of vehicle is displayed
Enlarging view	Click on the enlarging view button to display the front/rear enlarged view. When the auto enlarge setting option is turned on, it will receive the ultrasonic radar information, and automatically switch to the front/rear enlarged view when it is less than 30 cm
Virtual door opening view	Receive door signal, engine hood signal and sliding roof signal, and display the corresponding view on the birds-eye view and 3D view when the four doors, engine hood, back door and sliding roof are opened
Vehicle guideline	Click on to select the opening and closing of the vehicle guideline
Visual radar	Ultrasonic radar transmits the distance information to the panoramic controller, and displays the distance or alarm prompt information on the panoramic screen
License plate number setting	Receive the license plate number sent by audio head unit and display it in 3D vehicle icon
3D view switch button	Click the button around the vehicle to switch the corresponding view of 3D view
Front wheel steering	Receive the steering wheel angle signal and accurately display the steering angle of front wheels in 3D view
Real-time wheel speed	Receive the wheel speed signal and accurately display the wheel speed in 3D view
Real-time turn signal light display	Real-time display of turn signal light information when switch the turn signal light switch

Function	Description
RCTA warning information	Integrate BSD radar information, and display warning information in the view when RCTA alarms
Obstacles activating panoramic	Activate the panoramic view monitor after receiving the parking radar information

System Activation and Exiting Mode

CAUTION

- Panoramic view monitor system has professionally calibrated before leaving factory. Any removal and installation behaviors without permission that cause changes in installation position and angle of camera may affect the function and effect of panoramic view monitor system.
- Panoramic view monitor system functions to provide driving assist, however, object in image does not indicate the actual size and distance from it. There is a slight delay and blind spot in image relative to the actual condition, so this function is not a substitute for driver’ s operation and judgment. During on, off and use of the function, driver should pay attention to the surroundings to ensure safe driving.
- Never use panoramic view monitor when outside rear view mirrors are folded. Make sure to close back door securely when operating vehicle using panoramic view monitor.
- Distance from object seen from panoramic view monitor is different from the actual distance.
- Cameras are installed on front grille, outside rear view mirrors and above the rear license plate. Do not put anything on the camera.
- Do not spray water around the camera when washing vehicle with high pressure water. Otherwise, water drop may enter camera and condense on the lens, causing malfunction, fire or electric shock.
- Do not tap the cameras. They are precision instruments. Failure to do so may cause malfunction or damage, leading to fire or electric shock.

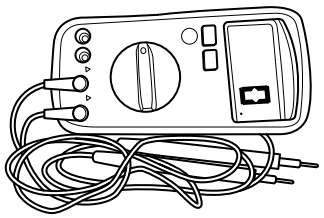
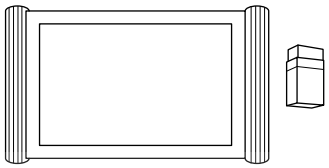
HINT

- Be careful not to scratch the lens when cleaning dirt or snow on the surface of camera.
- Use the displayed route and aerial view as reference. Displayed route and aerial view are greatly affected by numbers of passenger in vehicle, fuel amount, vehicle location, road surface condition and road surface grade.

Activation Condition		System Activation	Exit Condition	
Preconditions	Trigger Condition		Corresponding Exit Condition	Priority Exit Condition
Vehicle speed < 20 km/h	Shift to R	R is activated	Exit R position, the duration is longer than 15 seconds, and there is no effective operation within the duration	Vehicle speed > 30 km/h
	AVM switch is pressed	AVM switch is activated	Press AVM switch again	
			Operate other high priority switches	

Activation Condition		System Activation	Exit Condition	
Preconditions	**Trigger Condition**		**Corresponding Exit Condition**	**Priority Exit Condition**
	Turn on the turn signal light	Turn signal light is activated	Turn off the turn signal light and there is no effective operation within 500 ms	
			Operate other high priority switches	
	Steering wheel angle > 190°	Steering wheel angle is activated	Steering wheel angle is less than 180° and the duration is longer than 1 seconds, and there is no effective operation within the duration time	
			Operate other high priority switches	
D	Parking radar obstacle distance signal is received	Obstacles is activated	Exit after 15 seconds after obstacle-free distance information	Press the AVM switch, operate other high-priority switches, N or P, press the exit button
			N or P	
Vehicle speed = 0KM/h, remote start mode	Remote AVM request to turn on	Remote AVM is activated	Remote AVM request to turn off	Remote start mode is exited

Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
X-431 PAD Diagnostic Tester	 RCH0001006

Torque Specifications

Description	Torque (N · m)
Reversing Radar Control Controller Fixing Bolt	3.5 ± 0.5
4 Fixing Nuts on Panoramic View Controller	7 ± 1

DIAGNOSIS & TESTING

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
After reverse gear is engaged, there is no reversing view monitor and the meter does not display the reverse distance	Observe whether the back-up light is come on: If it is come on, check the reverse signal input of DVD/ navigation system and BCM. If it is not come on, check the back-up light switch and line
After reverse gear is engaged, there is no reversing view monitor and the meter display the reverse distance	Check the reverse signal input of DVD/navigation system, camera and line.
After reverse gear is engaged, there is reversing view monitor (if equipped with reversing view monitor) but the meter does not display the reverse distance	Check the reverse signal input of BCM, the LIN of BCM and reversing radar controller, and check the reversing radar controller
Sensor failure, and instrument cluster send an alarm	Check whether there is dirt on reversing radar sensor. If so, remove the dirt on the sensor and check whether the sensor is damaged. If necessary, replace the inspection sensor wire harness

Module Terminal List

AVM Pin Definition

PIN	Description	PIN	Description
1	–	5	–
2	CAN-H	6	CAN-L
3	IGN1	7	–
4	Ground	8	Power Source

Radar Control Module (4-sensor)

PIN	Description	PIN	Description
1	–	9	–
2	–	10	–
3	Module Power Source	11	Sensor Power Source
4	Center Sensor Signal RR	12	Ground
5	CAN-H	13	CAN-L
6	–	14	–

PIN	Description	PIN	Description
7	Sensor Signal RL	15	Sensor Signal RR
8	Center Sensor Signal RL	16	Ground

Radar Control Module (8-sensor)

PIN	Description	PIN	Description
1	–	13	–
2	–	14	–
3	Module Power Supply	15	Sensor Signal RR
4	Center Sensor Signal RR	16	Ground
5	CAN-H	17	Sensor Signal FL
6	CAN-L	18	Center Sensor Signal FL
7	Sensor Signal RL	19	Center Sensor Signal FR
8	Center Sensor Signal RL	20	Sensor Signal FR
9	–	21	–
10	–	22	–
11	Sensor Power Supply	23	–
12	Ground	24	–

Diagnostic Help

1. Connect diagnostic tester X-431 3G (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 CD 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.

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 wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect airbag components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- 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.

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.

Matching Learning

Panoramic Control System (AVM)

Calibration scenario

In the following scenarios, the panoramic view monitor system needs to be calibrated:

- Removal an installation of camera;
- Removal an installation of view mirror with camera;
- Removal an installation of rear bumpers;
- Camera position changes due to vehicle accident;
- After replacing panoramic view monitor system controller.

Preparation before alignment

In order to ensure the success rate and effect of the calibration, the following status should be confirmed before calibration:

1. All components on vehicle have been installed (including: spare tires, on-board tools, etc.), and all liquids have been filled to the state of leaving the factory (such as: brake fluid, coolant, washer fluid, gasoline, etc.);
2. The vehicle has completed the calibration of steering system and four-wheel aligN·ment, and has passed the inspection;
3. The grid of calibration site are not obviously damaged/dirty, the guide rails are not loose or poorly fixed, and the lights above the site have been turned on;
4. There are no people, vehicles or other obstacles in the area of the calibration site;
5. There is no malfunction prompt of panoramic view monitor or camera in the vehicle instrument cluster;
6. Four cameras (front/rear/left/right) lens surface is not covered by plastic protective film or has been removed;

7. During the calibration process, please make sure that there is no other person on the vehicle, and only the driver is allowed to perform calibration operations on driver seat.

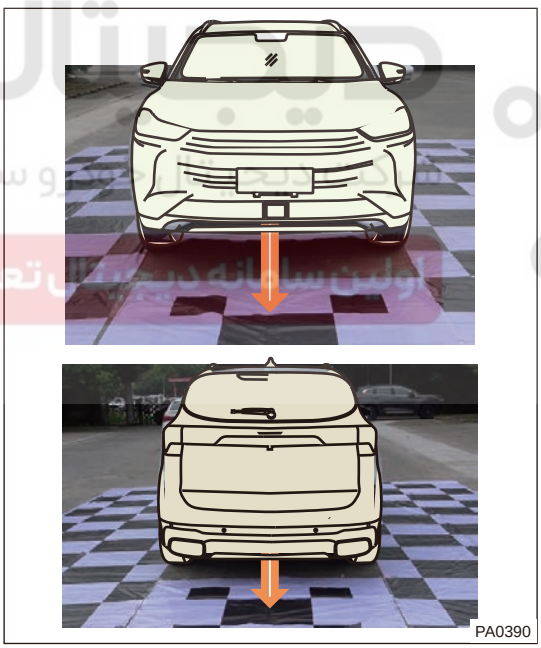
⚠ Caution

- When parts are supplied, in order to avoid accidental wear on the surface of panoramic view monitor system camera lens, a plastic protective film is usually attached to the lens. Please confirm whether it has been removed before calibration? If it is not removed, please remove the protective film before performing the calibration operation.

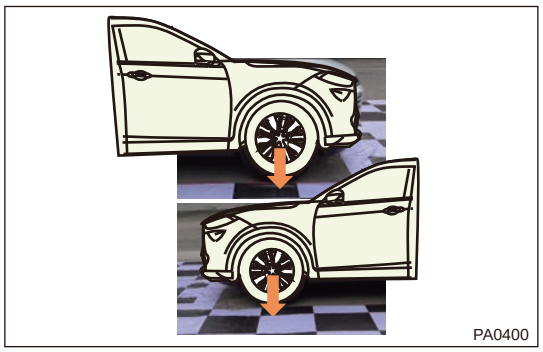
Manual calibration process

Hint:
Manual calibration process are generally used for self-calibration cloth in 4S shop.

1. Calibration method:
   a. Park vehicle at the fixed location.
   b. Lay calibration cloth (front, rear, left and right sides) around the vehicle.
      - “Center line position of front bumper” of calibration cloth corresponds to the front side of vehicle.
      - “Center line position of rear bumper” of calibration cloth corresponds to the rear side of vehicle.

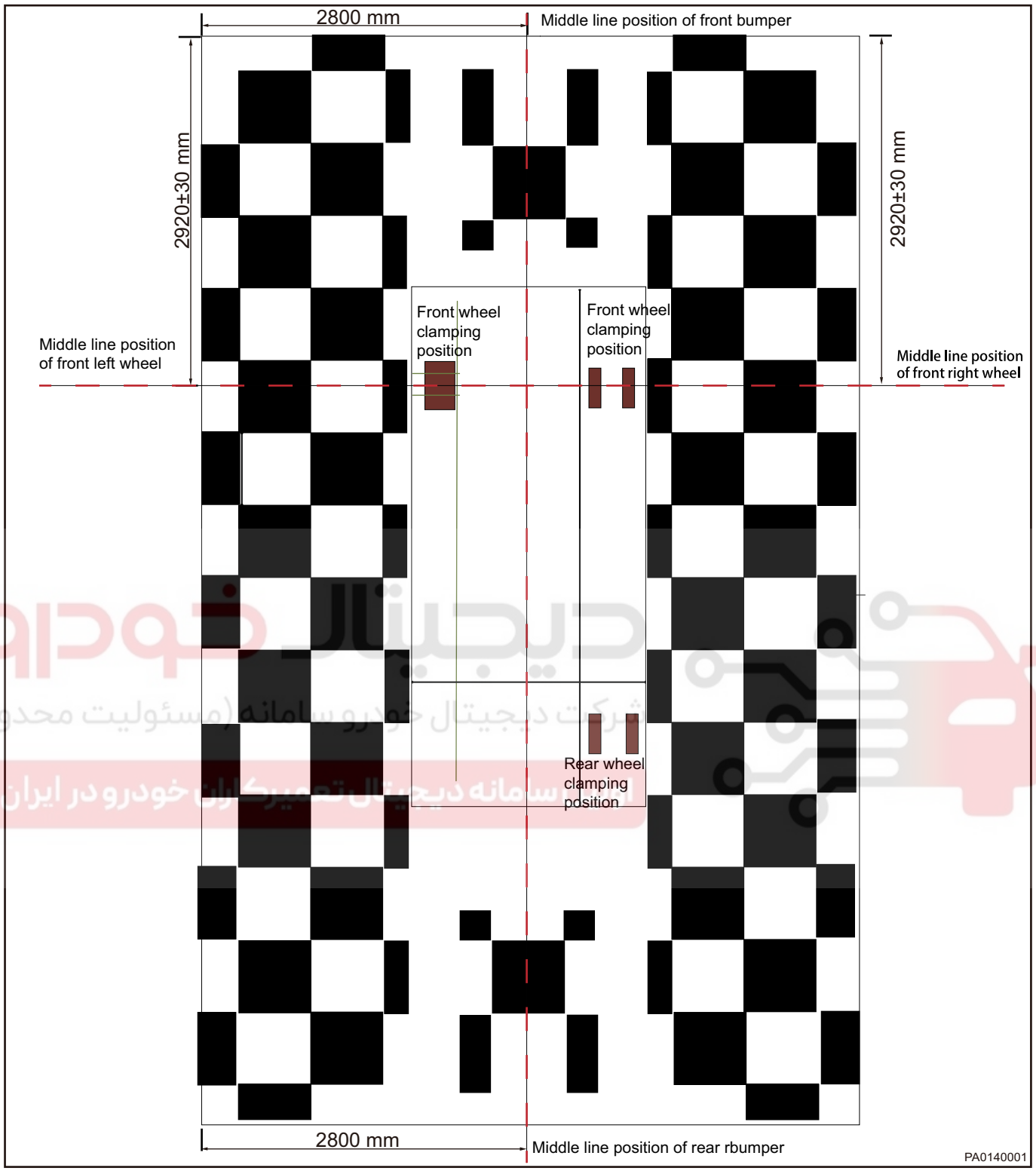


      - Unfold calibration cloth (left and right sides) and lay it onto both sides of vehicle.
      - Center line corresponds to front left and right wheel positions.
      - Left and right sides and front and rear sides of calibration cloth should be placed in accordance with single and double arrow marks respectively.

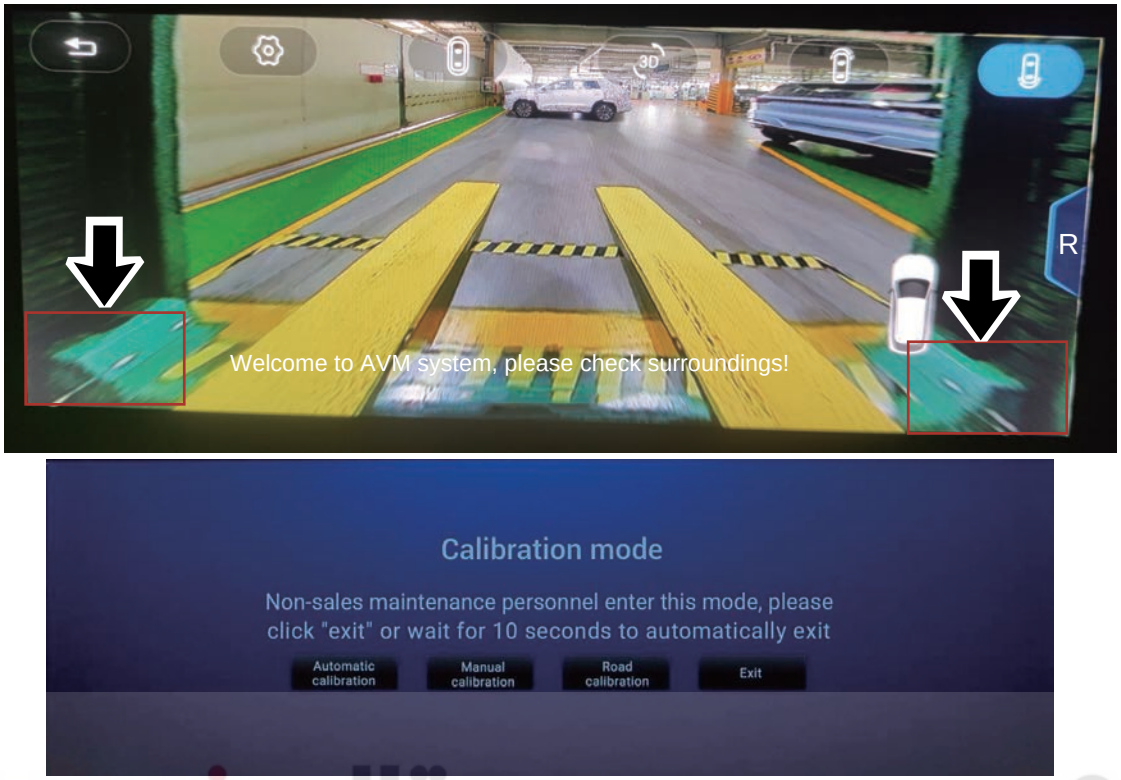


c. Marking positions on the front, rear, left and right sides of the calibration cloth.

Hint:
Hint: Schematic description of calibration cloth spreading: It is recommended to have a certain clearance (about 5 cm) between calibration cloth and the left and right sides of the vehicle.



d. Start: Panoramic AVM screen, single-channel view, three clicks in the lower left corner and the lower right corner respectively.



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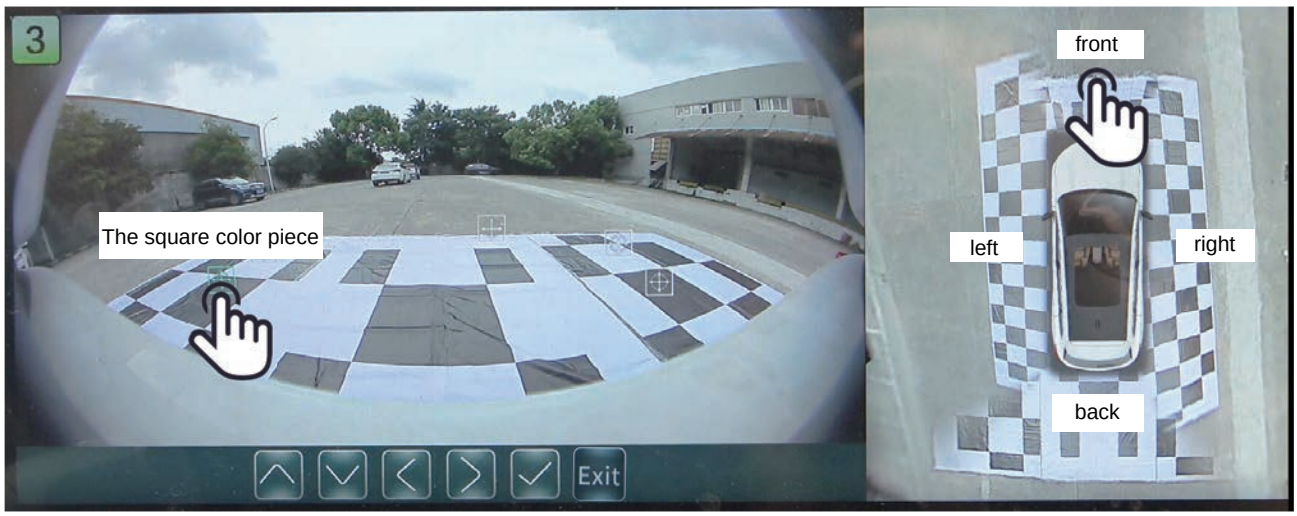
⚠ Caution

- It is relatively difficult for users to access hidden functions.

2. Manual calibration process: After entering the manual calibration screen in the previous step, it is necessary to manually calibrate the front, right, rear and left views. Front view calibration operation is taken as an example:
   a. Manually click “front side” view of panorama view on right side, and 5 square color lumps in the single side view can be seen. The selected color lump is green and unselected color lump is white.
   b. Manually click to select the color lump, and perform adjustment by up, down, left and right buttons. Adjust the center of the color block to the focal point of the two black blocks in the corresponding point of the calibration, and click “ √ ” after completing to save.



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c. According to the previous step, make 5 color lumps correspond to the 5 different block focus in illustration respectively, thus the calibration operation of “front” view is completed. Then, perform calibrations for “left”, “right” and “rear” views in accordance with the procedures above.

d. After calibration of 4 directions are completed, it is necessary to observe if panoramic view screen on right side is displayed smoothly without misalignment, which can be determined by lines on calibration cloth. If the line is straight without any misalignment or twist, it is determined that the calibration is OK.

e. After calibration is confirmed, click Exit” button to exit, then select “ √ ” in the pop-up dialog box to complete the whole calibration operation.

⚠ Caution

- The premise of clicking save, you need to ensure that the image on the right window is normal.

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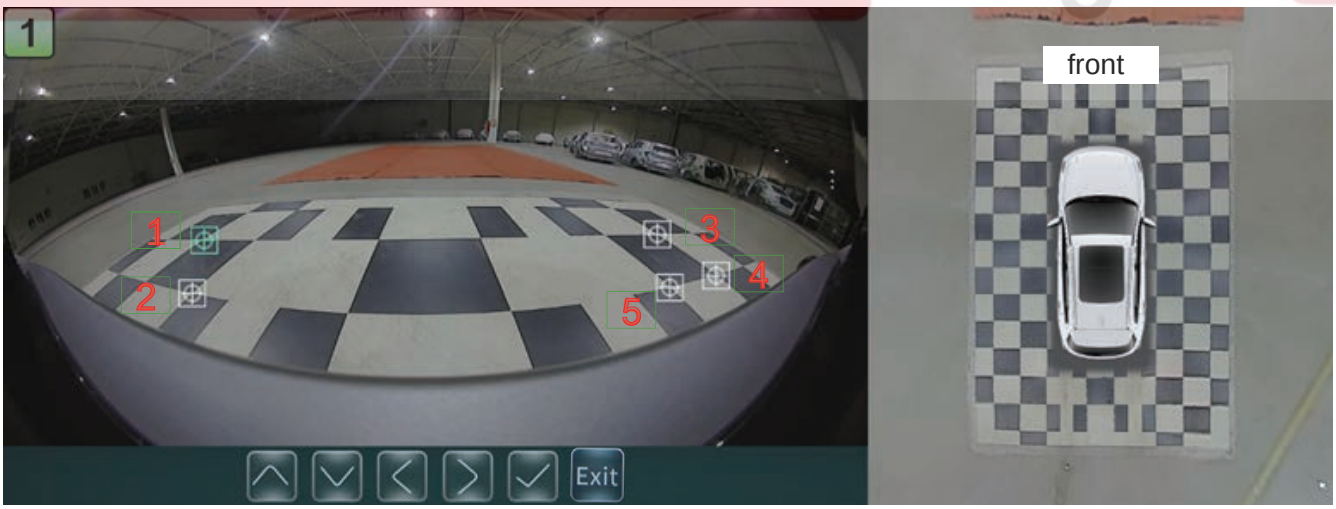
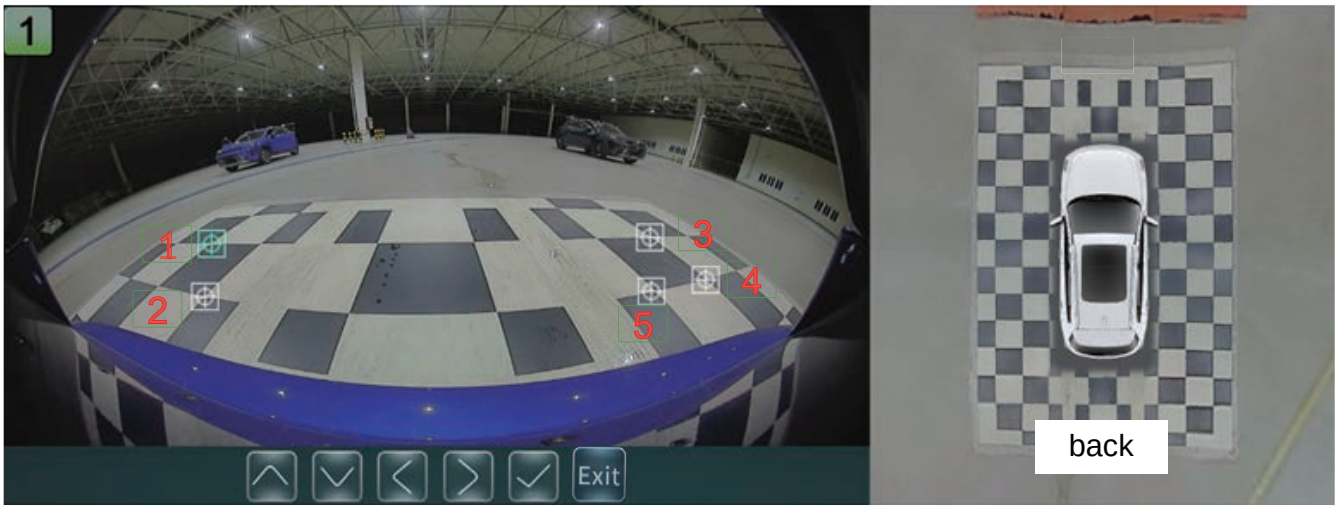
Calibration corresponding point

- Front corresponding calibration point



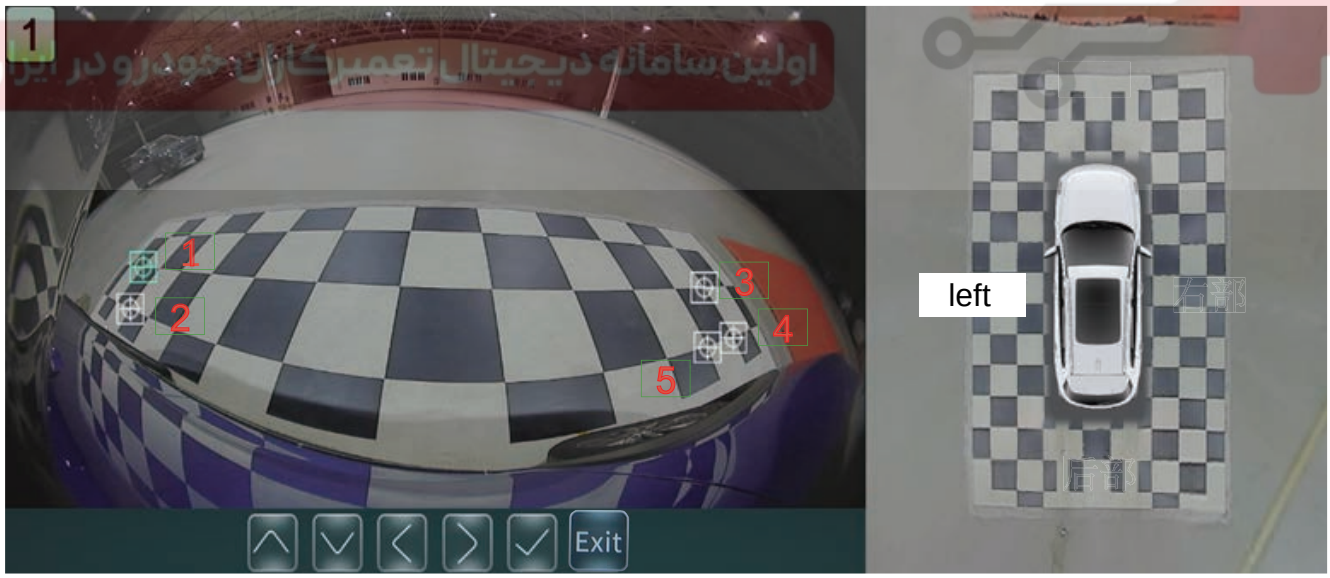
PA0100001

- Rear corresponding calibration point



PA0110001

- Left corresponding calibration point



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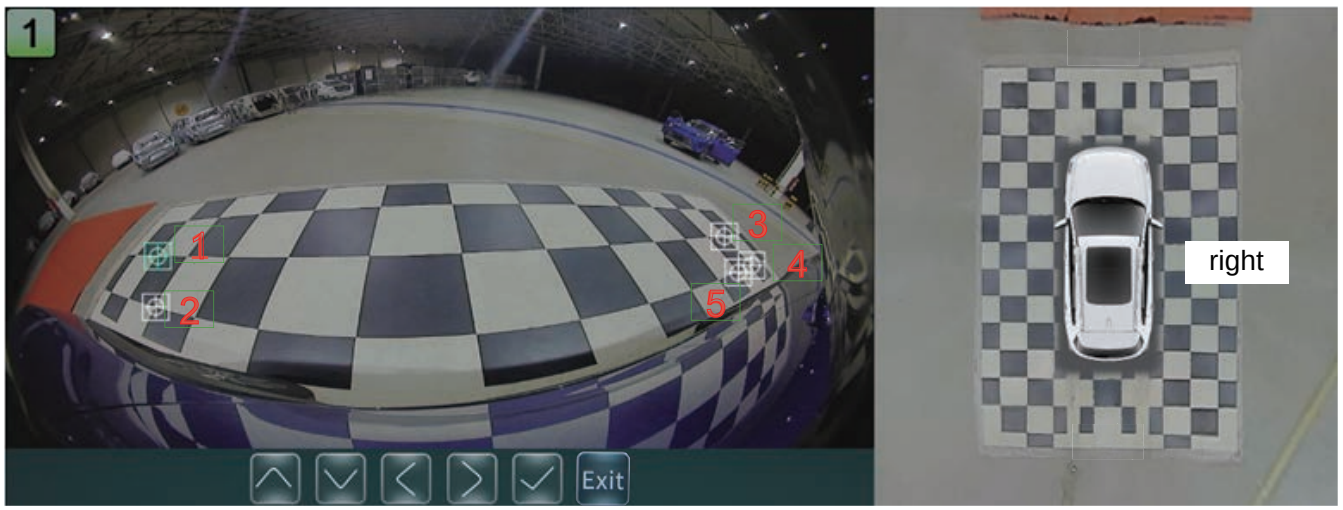
- Right corresponding calibration point



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3. Calibration environment requirement
   a. Site requirement: Calibration site size: About 5.6 m in width and 8.4 m in length, which can accommodate the vehicle driving and calibration cloth laying.
   b. Ground flatness and calibration cloth laying requirement:
      - To ensure the calibration effect, calibration site requires the ground as flat as possible, and calibration cloth has no any obvious bumps after laying;
      - When laying a calibration cloth, pay attention that it is fully unfolded and laid smoothly, and each piece should be corresponded according to requirement.
   c. Lighting conditions: There is no special requirement for light environment of calibration site. Make sure each positioning point and its focus can be clearly seen during calibration.
   d. Storage of calibration cloth: Calibration cloth should be rolled up smoothly (with left and right sides separated) after use for safekeeping.

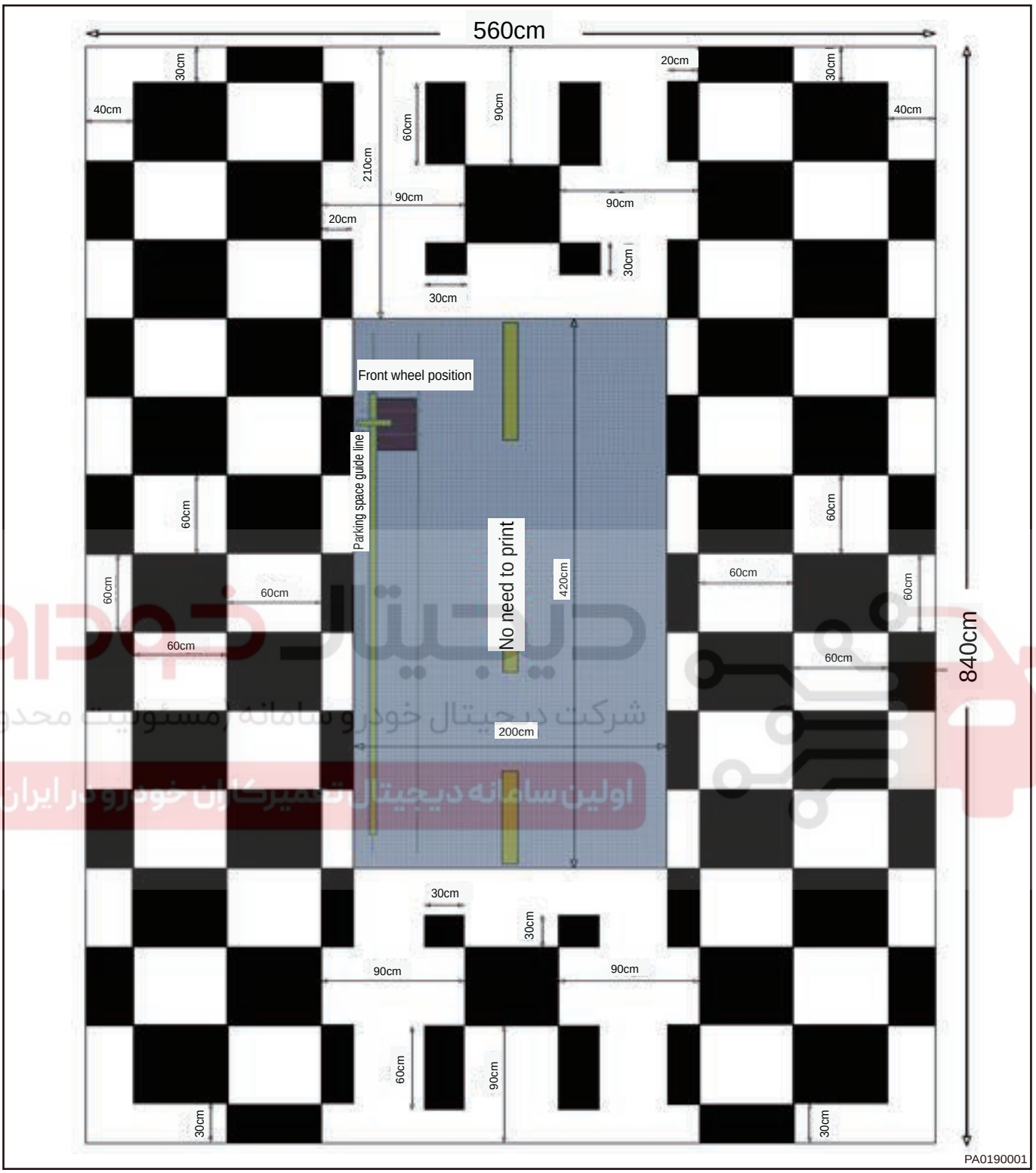
⚠ Caution

- If calibration cloth is wet, please dry it and then roll it up. Avoid wrinkles during rolling, so as not to affect the subsequent use.

Calibration EnviroN·ment Requirement and Condition Layout

Site Requirement

Calibration site size: about 5.6 meters wide and about 8.4 meters long. The black blocks in picture are 60 cm*60 cm, 30 cm*30 cm, 20 cm*60 cm, 30 cm*60 cm, 40 cm*60 cm, and the accuracy is controlled within +/-5 mm. Make sure the black block is on the corresponding straight line with the deviation within 5mm on one side of the line. The vertical and vertical extension lines of any black square intersect at 90° with an deviation of ± 0.5°. Please refer to the illustration below for detailed dimensions.



⚠ Caution

- The calibration site can be adapted to the vehicle size: length of 4.4m ~ 4.95 m, width of less than 2 m.

Ground Flatness Requirement
In order to ensure the calibration effect, the flatness of the ground after laying is required to be high, the flatness deviation is required to be within the maximum deviation of +/-10mm for any 2 meters length. If the construction conditions permit, it is recommended to be controlled within +/-5 mm.

Light Condition
The ambient lighting requirements of the calibration site are mainly diffuse light, LED lighting (LED tube specification: 1.2 meters long, 6500 K color temperature, power above 16 W), using LED tube vertical lighting, requiring ambient brightness between 300 lux and 1000 lux (It is recommended to use at least three rows of LED tubes, and at least 7 LED tubes in each row). The lighting LED tubes should be installed at a height of 3 to 5 meters directly above the calibration field. In order to prevent sunlight from entering the calibration field through doors and windows, it is required the doors and windows around the field are covered with thick white cloth or shading plates.

Reversing Radar System Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
B1A0125	Front Left Sensor Failure - Waveform Failure
B1A0225	Front Left Center Sensor Failure - Waveform Failure
B1A0325	Front Right Center Sensor Failure - Waveform Failure
B1A0425	Front Right Sensor Failure - Waveform Failure
B1A0525	Rear Left Sensor Failure - Waveform Failure
B1A0625	Rear Left Center Sensor Failure - Waveform Failure
B1A0725	Rear Right Center Sensor Failure - Waveform Failure
B1A0825	Rear Right Sensor Failure - Waveform Failure
U014087	Lost Communication with Body Control Module - Message Missing
U012987	Lost Communication with Brake System Controller - Message Missing
U015587	Lost Communication with Instrument Cluster Controller - Message Missing

DTC Diagnosis Procedure

DTC	**B1A0125**	**Front Left Sensor Failure - Waveform Failure**
DTC	**B1A0225**	**Front Left Center Sensor Failure - Waveform Failure**
DTC	**B1A0325**	**Front Right Center Sensor Failure - Waveform Failure**
DTC	**B1A0425**	**Front Right Sensor Failure - Waveform Failure**
DTC	**B1A0525**	**Rear Left Sensor Failure - Waveform Failure**
DTC	**B1A0625**	**Rear Left Center Sensor Failure - Waveform Failure**

DTC	**B1A0725**	**Rear Right Center Sensor Failure - Waveform Failure**
DTC	**B1A0825**	**Rear Right Sensor Failure - Waveform Failure**

DTC	DTC Definition	Possible Cause
B1A0125	Front Left Sensor Failure - Waveform Failure	• Signal or wire harness connector • Reversing radar module
B1A0225	Front Left Center Sensor Failure - Waveform Failure	
B1A0325	Front Right Center Sensor Failure - Waveform Failure	
B1A0425	Front Right Sensor Failure - Waveform Failure	
B1A0525	Rear Left Sensor Failure - Waveform Failure	
B1A0625	Rear Left Center Sensor Failure - Waveform Failure	
B1A0725	Rear Right Center Sensor Failure - Waveform Failure	
B1A0825	Rear Right Sensor Failure - Waveform Failure	

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 radar sensor**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace radar sensor with a new one, connect negative battery cable, turn ENGINE START STOP switch to ON and turn on parking radar system. Using diagnostic tester, read DTC and observe if DTC still exists.

OK → **Replace radar sensor**

NG

2	**Check wire harness and connector**

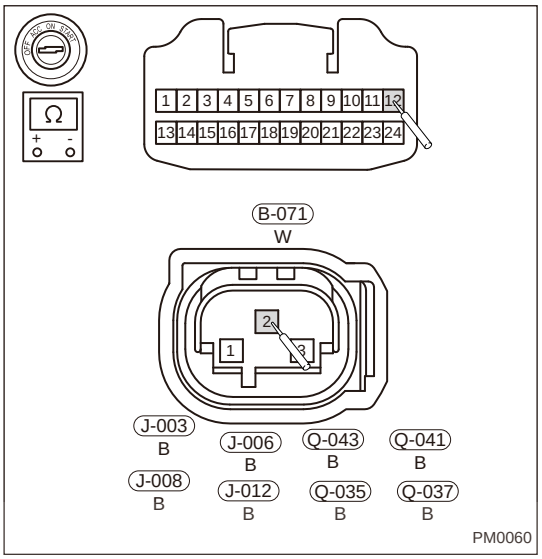
Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect reversing radar module connector B-071 and each radar sensor connector.

Use circuit diagram as a guide to perform the following inspection procedures:

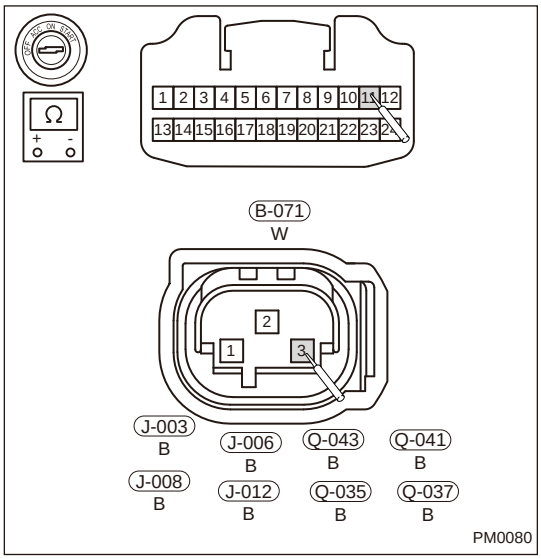
(c) Using ohm band of multimeter, check for continuity between reversing radar module ground output and 8 sensors separately: B-071 (12) - J-004 (2); B-071 (12) - J-006 (2); B-071 (12) - J-008 (2); B-071 (12) - J-012 (2); B-071 (12) - Q-043 (2); B-071 (12) - Q-041 (2); B-071 (12) - Q-035 (2); B-071 (12) - Q-037 (2).



Multimeter Connection	Condition	Specified Condition
B-071 (12) - J-006 (2)	Always	⩽ 1 Ω
B-071 (12) - J-008 (2)		⩽ 1 Ω
B-071 (12) - J-003 (2)		⩽ 1 Ω
B-071 (12) - J-012 (2)		⩽ 1 Ω
B-071 (12) - Q-037 (2)		⩽ 1 Ω
B-071 (12) - Q-035 (2)		⩽ 1 Ω
B-071 (12) - Q-041 (2)		⩽ 1 Ω
B-071 (12) - Q-043 (2)		⩽ 1 Ω

Use circuit diagram as a guide to perform the following inspection procedures:

(d) Using ohm band of multimeter, check for continuity between reversing radar module (8-sensor) power supply output and 8 sensors separately: B-071 (11) - J-008 (3); B-071 (11) - J-006 (3); B-071 (11) - J-003 (3); B-071 (11) - J-012 (3); B-071 (11) - Q-043 (3); B-071 (11) - Q-041 (3); B-071 (11) - Q-035 (3); B-071 (11) - Q-037 (3).



Multimeter Connection	Condition	Specified Condition
B-071 (11) - J-003 (3)	Always	⩽ 1 Ω
B-071 (11) - J-006 (3)		⩽ 1 Ω
B-071 (11) - J-008 (3)		⩽ 1 Ω
B-071 (11) - J-012 (3)		⩽ 1 Ω
B-071 (11) - Q-043 (3)		⩽ 1 Ω
B-071 (11) - Q-041 (3)		⩽ 1 Ω
B-071 (11) - Q-035 (3)		⩽ 1 Ω
B-071 (11) - Q-037 (3)		⩽ 1 Ω

NG → **Replace wire harness and connector**

OK →

3	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace reversing radar module**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**U014087**	**Lost Communication with BCM**
DTC	**U012987**	**Lost Communication with Brake System Control Module**
DTC	**U015587**	**Lost Communication with ICM**

DTC Confirmation Procedure
Refer to CAN communication system

Panoramic Control System (AVM) Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
B1A2013	AVM Front Camera LVDS Cable Open
B1A2113	AVM Rear Camera LVDS Cable Open
B1A2213	AVM Left Camera LVDS Cable Open
B1A2313	AVM Right Camera LVDS Cable Open
B1A2011	AVM Front Camera Power Short to Ground
B1A2012	AVM Front Camera Power Short to Battery
B1A2111	AVM Rear Camera Power Short to Ground
B1A2112	AVM Rear Camera Power Short to Battery
B1A2211	AVM Left Camera Power Short to Ground
B1A2212	AVM Left Camera Power Short to Battery
B1A2311	AVM Right Camera Power Short to Ground
B1A2312	AVM Right Camera Power Short to Battery
B1A2404	AVM ECU Trouble
B1A2517	Control Module Input Power High
B1A2516	Control Module Input Power Low
B1A2654	AVM No Calibration
B1A2771	AVM On/Off Switch Mechanical Adhesion
U014087	Lost Communication with BCM
U015587	Lost Communication With ICM
U014187	Lost Communication with Reversing Radar
U012687	Lost Communication with SAM
U024587	Lost Communication with MMI (RRM)
U010187	Lost Communication with Transmission
U010087	Lost Communication with EMS
U012987	Lost Communication with ESC
U007388	CAN Bus Off

DTC Diagnosis Procedure

DTC	**B1A25-17**	**Control Module Input Power High**
DTC	**B1A25-16**	**Control Module Input Power Low**

DTC	DTC Definition	Possible Cause
B1A25-17	Control Module Input Power High	• Battery • AVM module • Wire harness and connector
B1A25-16	Control Module Input Power Low	

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**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Check battery voltage (not less than 12 V) with a digital multimeter.

NG → **Replace battery**

OK ↓

2	**Check charging system**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check positive and negative battery cables for broken or damage.

(c) Turn ENGINE START STOP switch to ON.

(d) Start the engine.

(e) Check if voltage of positive and negative battery is normal with a digital multimeter (13.5V-14.8V).

NG → **Repair or replace positive and negative battery cables and alternator**

OK ↓

3	**Check AVM module power supply fuse**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check if AVM module power supply fuse RF08 10A is blown.

NG → **Replace power supply fuse**

OK

4	Check engine compartment fuse and relay box

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the engine compartment fuse and relay box connector.

(c) Using digital multimeter, check for continuity between fuse RF08 and Pin 21 of engine compartment fuse and relay box.

NG → **Replace engine compartment fuse and relay box**

OK

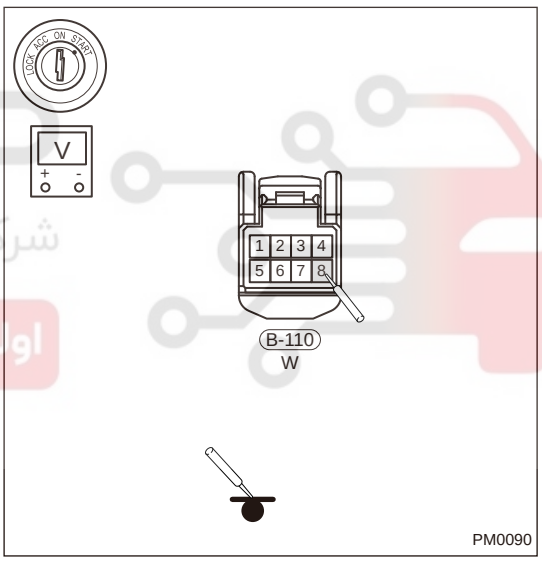
5	Check AVM module power supply wire harness

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the AVM connector B-110.

(c) Using a digital multimeter, check if the voltage between terminal B-110 (A8) and body ground is normal.

Multimeter Connection	Condition	Specified Condition
B-110 (A8) - Body ground	Always	Not less than 12 V



(d) Using digital multimeter, check for continuity between terminal A8 of AVM module connector B-110 and terminal 21 of engine compartment fuse and relay box to check for open in power supply wire harness.

NG → **Repair or replace wire harness**

OK

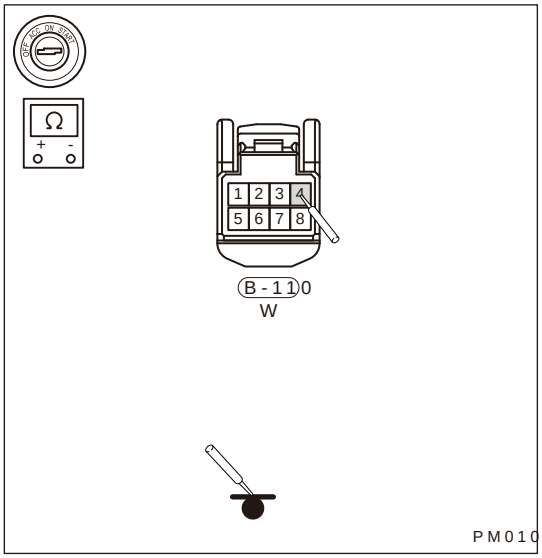
6	Check AVM module ground circuit

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect AVM module connector.

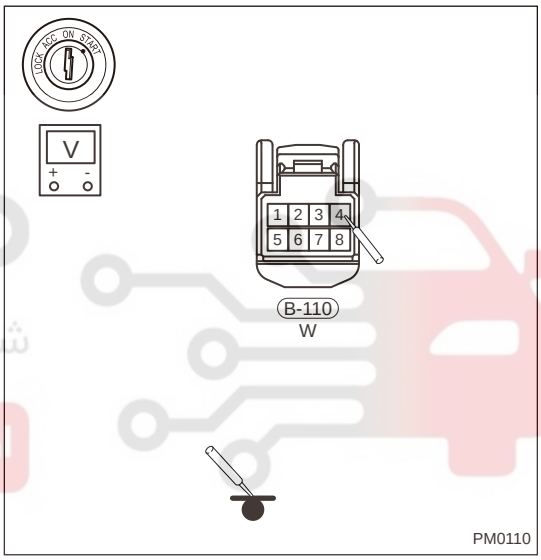
(c) Using digital multimeter, check for continuity between terminals A4 of B-110 and ground wire harness connector GB-610 to check for open in ground wire harness.

Multimeter Connection	Condition	Specified Condition
B-110 (A4) - GB-610	Always	⩽ 1 Ω



(d) Using voltage band of digital multimeter, measure voltage between B-110 (A4) and body ground to check for short to power supply.

Multimeter Connection	Condition	Specified Condition
B-110 (A4) - GB-610	Always	0V



NG → **Repair or replace wire harness**

OK

7	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace AVM module**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1A2013**	**AVM Front Camera LVDS Cable Open**
DTC	**B1A2011**	**AVM Front Camera Power Short to Ground**
DTC	**B1A2012**	**AVM Front Camera Power Short to Battery**

DTC	DTC Definition	Possible Cause
B1A2013	AVM Front Camera LVDS Cable Open	• Camera • Wire harness • AVM module
B1A2011	AVM Front Camera Power Short to Ground	
B1A2012	AVM Front Camera Power Short to Battery	

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	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace front camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace front camera**

NG

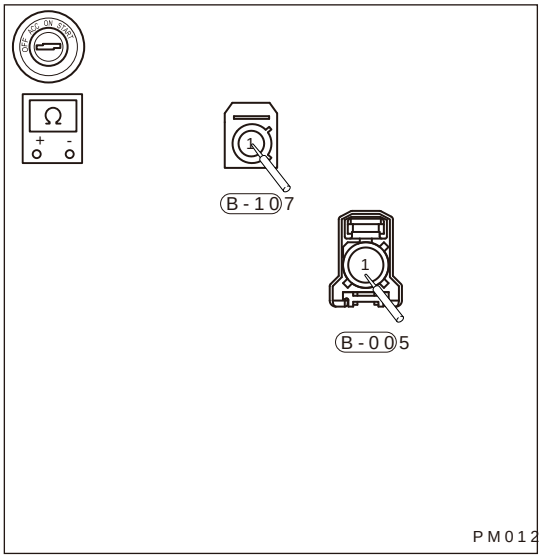
2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect panoramic view monitor control module connector B-107 and front camera connector B-005.

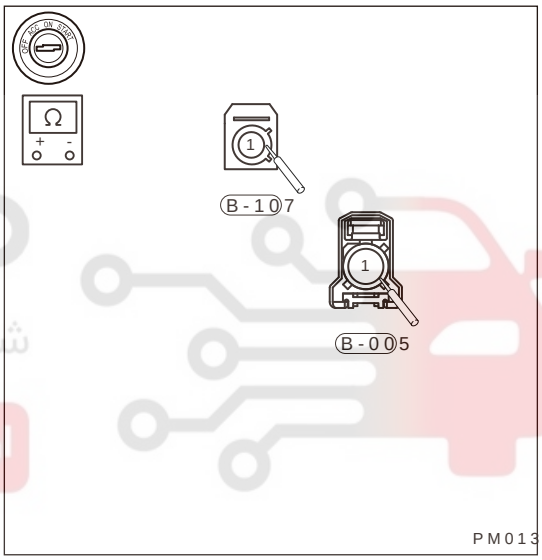
(c) Using ohm band of multimeter, check for continuity between B-107 (D1) and B-005 (1).

Multimeter Connection	Condition	Specified Condition
B-107 (D1) - B-005 (1)	Always	⩽ 1 Ω



(d) Using ohm band of multimeter, check for continuity between B-107 (D2) and B-005 (2).

Multimeter Connection	Condition	Specified Condition
B-107 (D2) - B-005 (2)	Always	⩽ 1 Ω



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

OK →

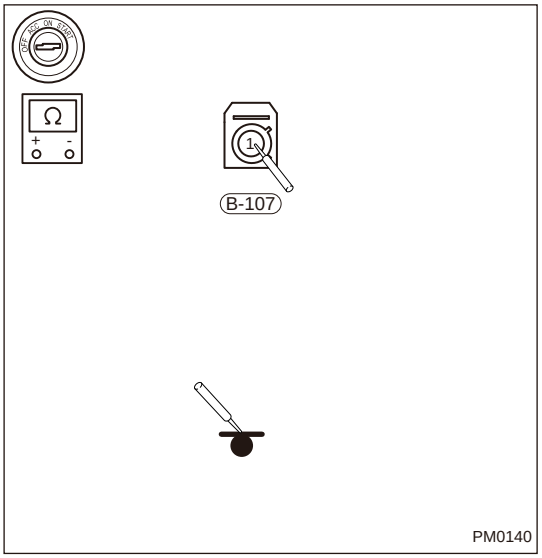
3	**Check for short to ground in wire harness or connector.**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect panoramic view monitor control module connector B-107 and front camera connector B-005.

(c) Using ohm band of multimeter, check for continuity between B-107 (D1) and ground, B-107 (D2) and ground separately.

Multimeter Connection	Condition	Specified Condition
B-107 (D1) - Body ground	Always	No continuity
B-107 (D2) - Body ground	Always	No continuity



NG → **Repair or replace connector or wire harness that is shorted to ground**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace AVM module**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1A2113**	**AVM Rear Camera LVDS Cable Open**
DTC	**B1A2111**	**AVM Rear Camera Power Short to Ground**
DTC	**B1A2112**	**AVM Rear Camera Power Short to Battery**

DTC	DTC Definition	Possible Cause
B1A2113	AVM Rear Camera LVDS Cable Open	• Camera • Wire harness • AVM module
B1A2111	AVM Rear Camera Power Short to Ground	
B1A2112	AVM Rear Camera Power Short to Battery	

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	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace rear camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace rear camera**

NG

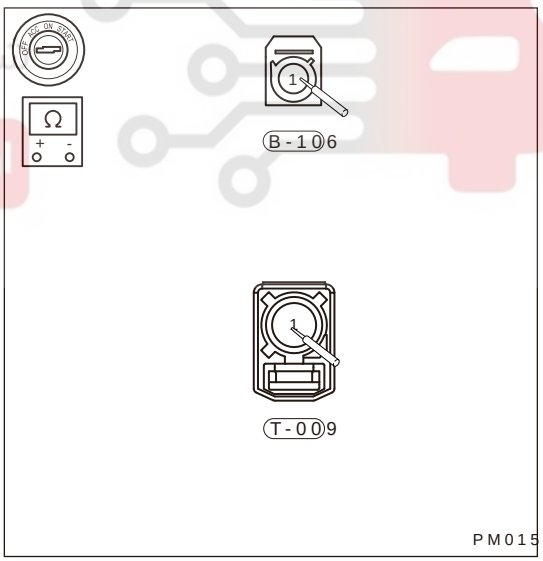
2	**Check wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect panoramic view monitor control module connector B-106 and rear camera connector T-009.

(c) Using ohm band of multimeter, check for continuity between B-106 (C1) and T-009 (1), B-106 (C2) and T-009 (2) separately.

Multimeter Connection	Condition	Specified Condition
B-106 (C1) - T-009 (1)	Always	⩽ 1 Ω
B-106 (C2) - T-009 (2)	Always	⩽ 1 Ω



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

OK

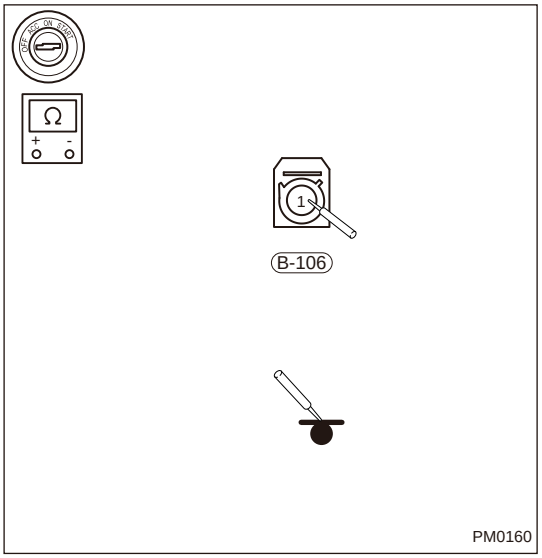
3	**Check for short to ground in wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the panoramic view monitor control module connector B-106.

(c) Using ohm band of multimeter, check for continuity between B-106 (C1) and body ground, B-106 (C2) and body ground separately.

Multimeter Connection	Condition	Specified Condition
B-106 (C1) - Body ground	Always	No continuity
B-106 (C2) - Body ground	Always	No continuity



NG → **Repair or replace connector or wire harness that is shorted to ground**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace AVM module**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1A2213**	**AVM Left Camera LVDS Cable Open**
DTC	**B1A2211**	**AVM Left Camera Power Short to Ground**
DTC	**B1A2212**	**AVM Left Camera Power Short to Battery**

DTC	DTC Definition	Possible Cause
B1A2213	AVM Left Camera LVDS Cable Open	• Camera • Wire harness • AVM module
B1A2211	AVM Left Camera Power Short to Ground	
B1A2212	AVM Left Camera Power Short to Battery	

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	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace left camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace left camera**

NG

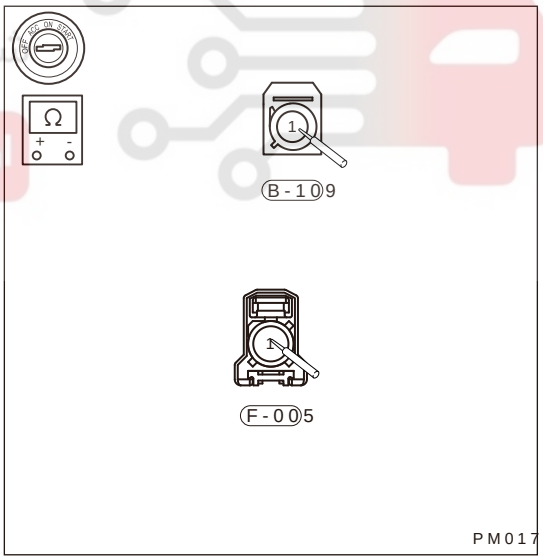
2	**Check wire harness and connector for open**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect panoramic view monitor control module connector B-109 and left rear view mirror camera connector F-005.

(c) Using ohm band of multimeter, check for continuity between B-109 (F1) and F-005 (1), B-109 (F2) and F-005 (2) separately.

Multimeter Connection	Condition	Specified Condition
B-109 (F1) - F-005 (1)	Always	⩽ 1 Ω
B-109 (F2) - F-005 (2)	Always	⩽ 1 Ω



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

OK

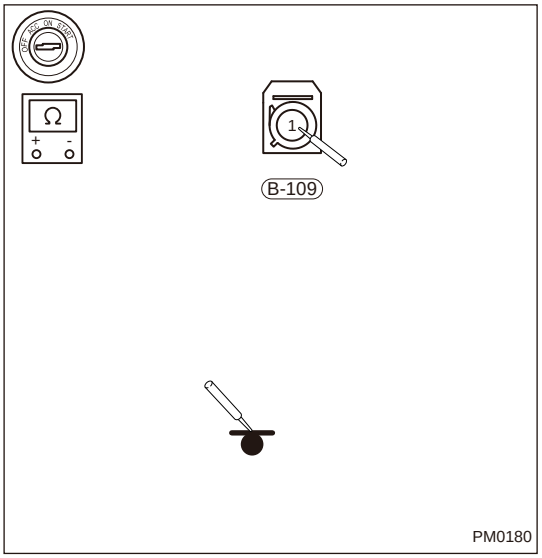
3	**Check for short to ground in wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the panoramic view monitor control module connector B-109.

(c) Using ohm band of multimeter, check for continuity between B-109 (F1) and body ground, B-109 (F2) and body ground separately.

Multimeter Connection	Condition	Specified Condition
B-109 (F1) - Body ground	Always	No continuity
B-109 (F2) - Body ground	Always	No continuity



NG → **Repair or replace connector or wire harness that is shorted to ground**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace AVM module**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1A2313**	**AVM Right Camera LVDS Cable Open**
DTC	**B1A2311**	**AVM Right Camera Power Short to Ground**
DTC	**B1A2312**	**AVM Right Camera Power Short to Battery**

DTC	DTC Definition	Possible Cause
B1A2313	AVM Right Camera LVDS Cable Open	• Camera • Wire harness • AVM module
B1A2311	AVM Right Camera Power Short to Ground	
B1A2312	AVM Right Camera Power Short to Battery	

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	**Replace camera with a new one**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Replace right camera with a new one, connect negative battery cable, and turn ENGINE START STOP switch to ON. Start panoramic view monitor system and observe if the camera is working properly.

OK → **Replace right camera**

NG

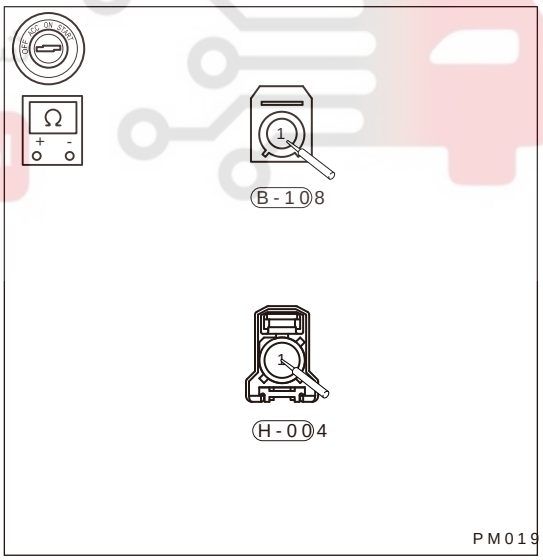
2	**Check wire harness and connector for open**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect panoramic view monitor control module connector B-108 and right rear view mirror camera connector H-004.

(c) Using ohm band of multimeter, check for continuity between B-108 (E1) and H-004 (1), B-108 (E2) and H-004 (2) separately.

Multimeter Connection	Condition	Specified Condition
B-108 (E1) - H-004 (1)	Always	⩽ 1 Ω
B-108 (E2) - H-004 (2)	Always	⩽ 1 Ω



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

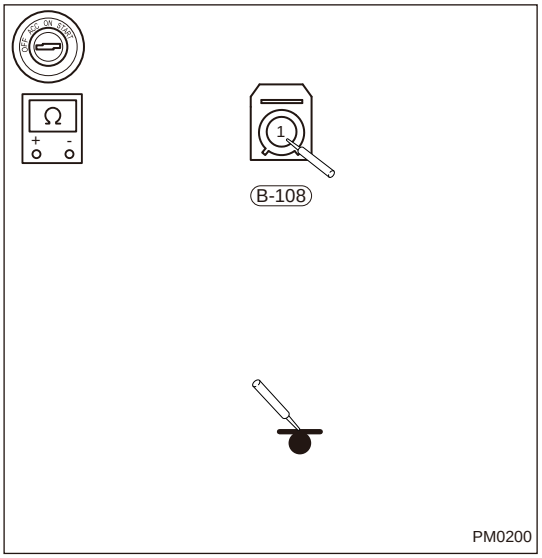
OK

3	**Check for short to ground in wire harness and connector**

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect the panoramic view monitor control module connector B-108.

(c) Using ohm band of multimeter, check for continuity between B-108 (E1) and ground, B-108 (E2) and ground separately.



Multimeter Connection	Condition	Specified Condition
B-108 (E1) - Body ground	Always	No continuity
B-108 (E2) - Body ground	Always	No continuity

NG → **Repair or replace connector or wire harness that is shorted to ground**

OK

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace AVM module**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**U014087**	**Lost Communication with BCM**
DTC	**U015587**	**Lost Communication With ICM**
DTC	**U014187**	**Lost Communication with Reversing Radar**
DTC	**U012687**	**Lost Communication with SAM**
DTC	**U024587**	**Lost Communication with MMI (RRM)**
DTC	**U010187**	**Lost Communication with Transmission**
DTC	**U010087**	**Lost Communication with EMS**
DTC	**U012987**	**Lost Communication with ESC**
DTC	**U007388**	**CAN Bus Off**

DTC Confirmation Procedure
Refer to CAN communication system

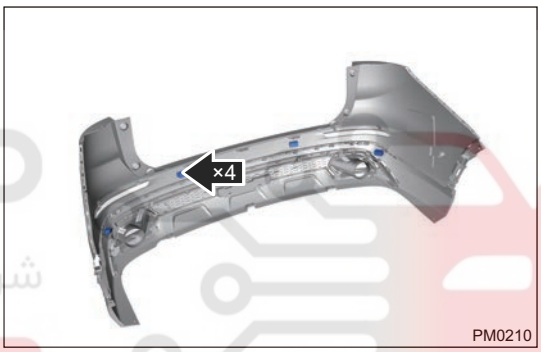
ON-VEHICLE SERVICE

Reversing Radar Sensor

Removal

WARNING
• Be sure to wear necessary safety equipment to prevent accidents, when removing reversing radar sensors. • Operate carefully to avoid damaging reversing radar sensors, when removing reversing radar sensors.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear bumper.
4. Disconnect the reversing radar sensor connector.



5. Remove reversing radar sensor from slots of rear bumper assembly.

Installation

WARNING
When installing reversing radar sensor, align the boss at end of reversing radar sensor with the slot on rear bumper assembly, and then firmly install reversing radar sensor.

CAUTION
• Install connectors in place when installing reversing radar sensors. • Check reversing radar system for proper operation, after installing reversing radar sensors.

1. Installation is in the reverse order of removal.

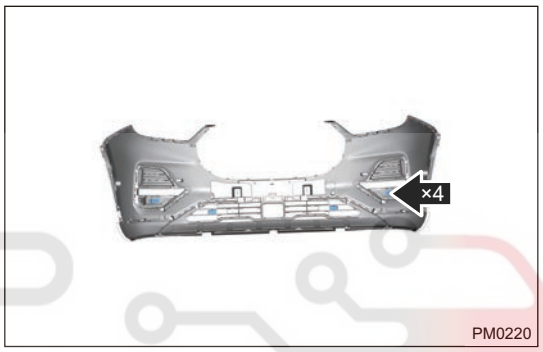
Front Radar Sensor (If Equipped)

Removal

WARNING

- Be sure to wear necessary safety equipment to prevent accidents, when removing front radar sensor.
- Operate carefully to avoid damaging reversing radar sensor, when removing front radar sensor.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Disconnect the front radar sensor connector.



5. Remove front radar sensor from slots of front bumper assembly.

Installation

CAUTION

- Install connectors in place when installing front radar sensor.
- Check front radar system for proper operation, after installing front radar sensor.

1. Installation is in the reverse order of removal.

Rear Camera Assembly (If Equipped)

Removal

WARNING

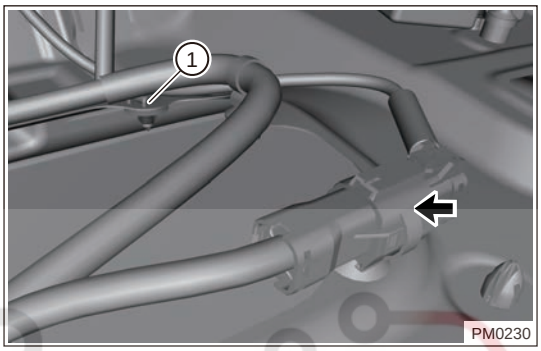
- Be sure to wear necessary safety equipment to prevent accidents, when removing rear camera assembly.
- Appropriate force should be applied when removing rear camera assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable

3. Remove the back door lower protector assembly.

4. Pry off rear camera from outside with an interior crow plate.

5. Disconnect rear camera connector, pry up fixing clip (1) from camera connector and remove rear camera.



6. Remove rear camera assembly

Installation

1. Installation is in the reverse order of removal.

Front Camera Assembly (If Equipped)

Removal

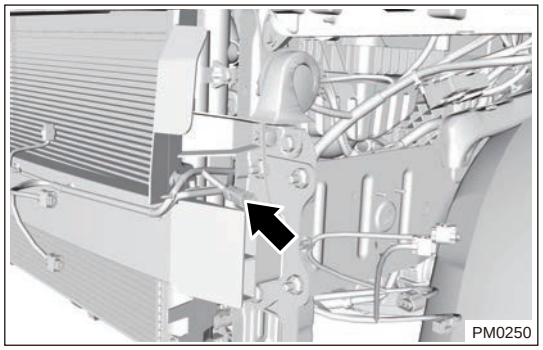
WARNING
• Be sure to wear necessary safety equipment to prevent accidents, when removing front camera assembly. • Appropriate force should be applied when removing front camera assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.

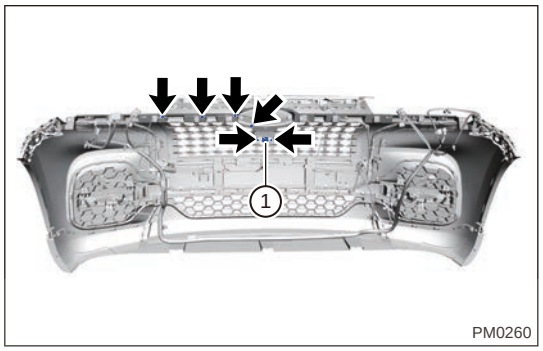
2. Disconnect the negative battery cable

3. Remove the bumper assembly.

4. Remove connector (arrow) from front camera.



5. Remove bumper and remove 2 fixing bolts (arrow) from camera with a cross screwdriver, then pry off clips and remove camera (1).



Installation

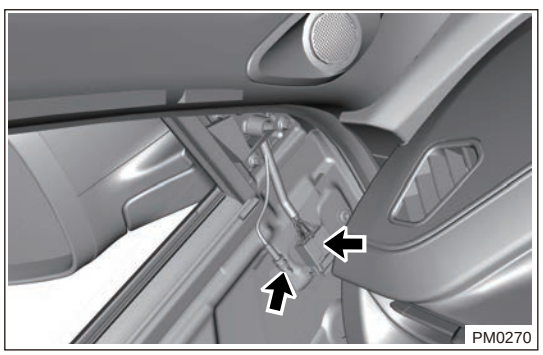
1. Installation is in the reverse order of removal.

Side Camera Assembly (Both Sides) (If Equipped)

Removal (Take left side as an example)

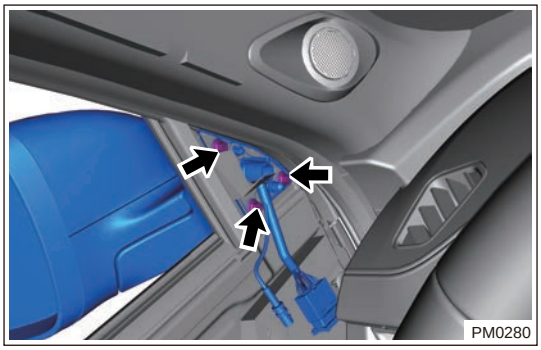
WARNING
As side camera is installed inside the outside rear view mirror assembly, it must be replaced together with outside rear view mirror assembly when damaged.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable
3. Remove triangular block assembly from front Left door
4. Remove the front left door protector assembly.
5. Disconnect the left outside rear view mirror connector.



6. Remove 3 fixing bolts from left outside rear view mirror.

   Tightening Torque
   7 ± 1 N·m



7. Remove the left outside rear view mirror assembly.

Installation

CAUTION

- Install connector in place and tighten fixing nuts to the specified torque, when installing the outside rear view mirror assembly.
- Make sure the outside rear view mirror assembly can move smoothly, flexibly and reliably after installing.
- After installing outside rear view mirror assembly, it is necessary to perform panoramic image calibration.

1. Installation is in the reverse order of removal.

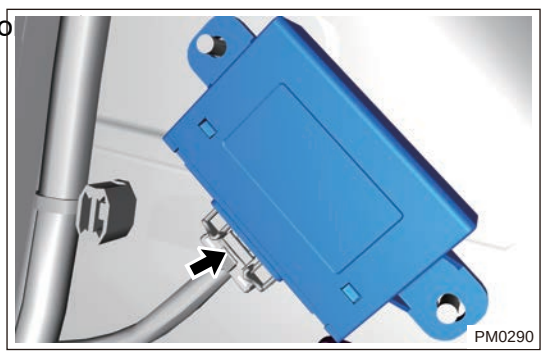
Reversing Radar Control Module Assembly

Removal

WARNING

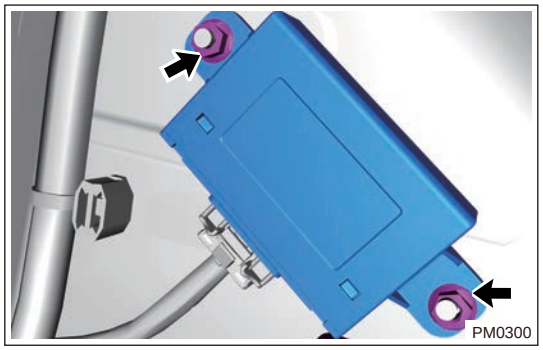
- Be sure to wear necessary safety equipment to prevent accidents, when removing reversing radar control module assembly.
- Appropriate force should be applied when removing reversing radar control module assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable
3. Remove the luggage compartment left wheel house assembly
4. Disconnect the reversing radar control module assembly co



5. Remove 2 fixing bolts between reversing radar control module assembly and vehicle body

   Tightening torque
   3.5 ± 0.5 N·m



6. Remove the reversing radar control module assembly

Installation

WARNING

- Tighten fixing bolts to the specified torque, when installing reversing radar control module assembly.
- Install connector in place when installing reversing radar control module assembly.
- Check reversing radar system for proper operation, after installing reversing radar control module assembly.

1. Installation is in the reverse order of removal.

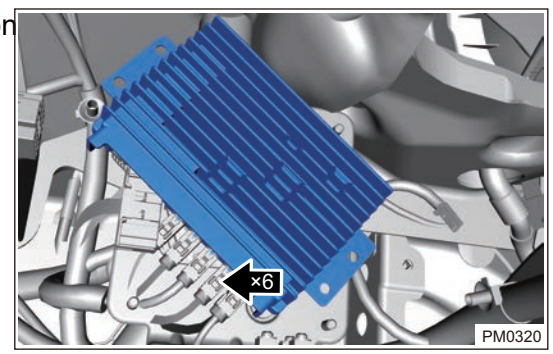
Panoramic Control System Module (If Equipped)

Removal

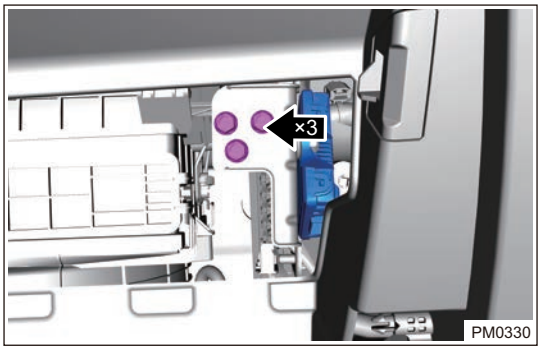
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents, when removing panoramic control system module assembly.
- Appropriate force should be applied, when removing panoramic control system module assembly. Be careful not to operate roughly.

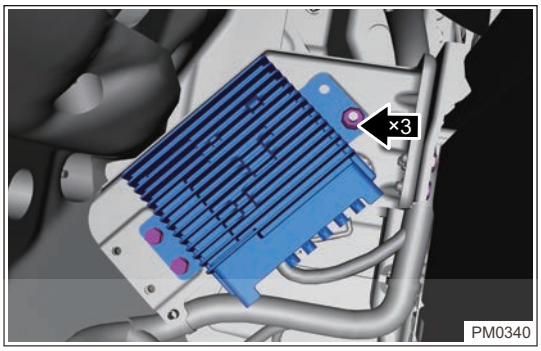
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Disconnect the panoramic view monitor control module con



5. Remove 3 fixing bolts from panoramic control system module bracket.



6. Remove panoramic view monitor control module and bracket assembly, then remove 3 fixing bolts from panoramic view monitor control module and remove panoramic view monitor control module assembly.



Installation

CAUTION

- Tighten fixing bolts to the specified torque, when installing panoramic view monitor control module assembly.
- Install connector in place when installing panoramic view monitor control module assembly.
- Check reversing radar system for proper operation, after installing panoramic view monitor control module assembly.

1. Installation is in the reverse order of removal.