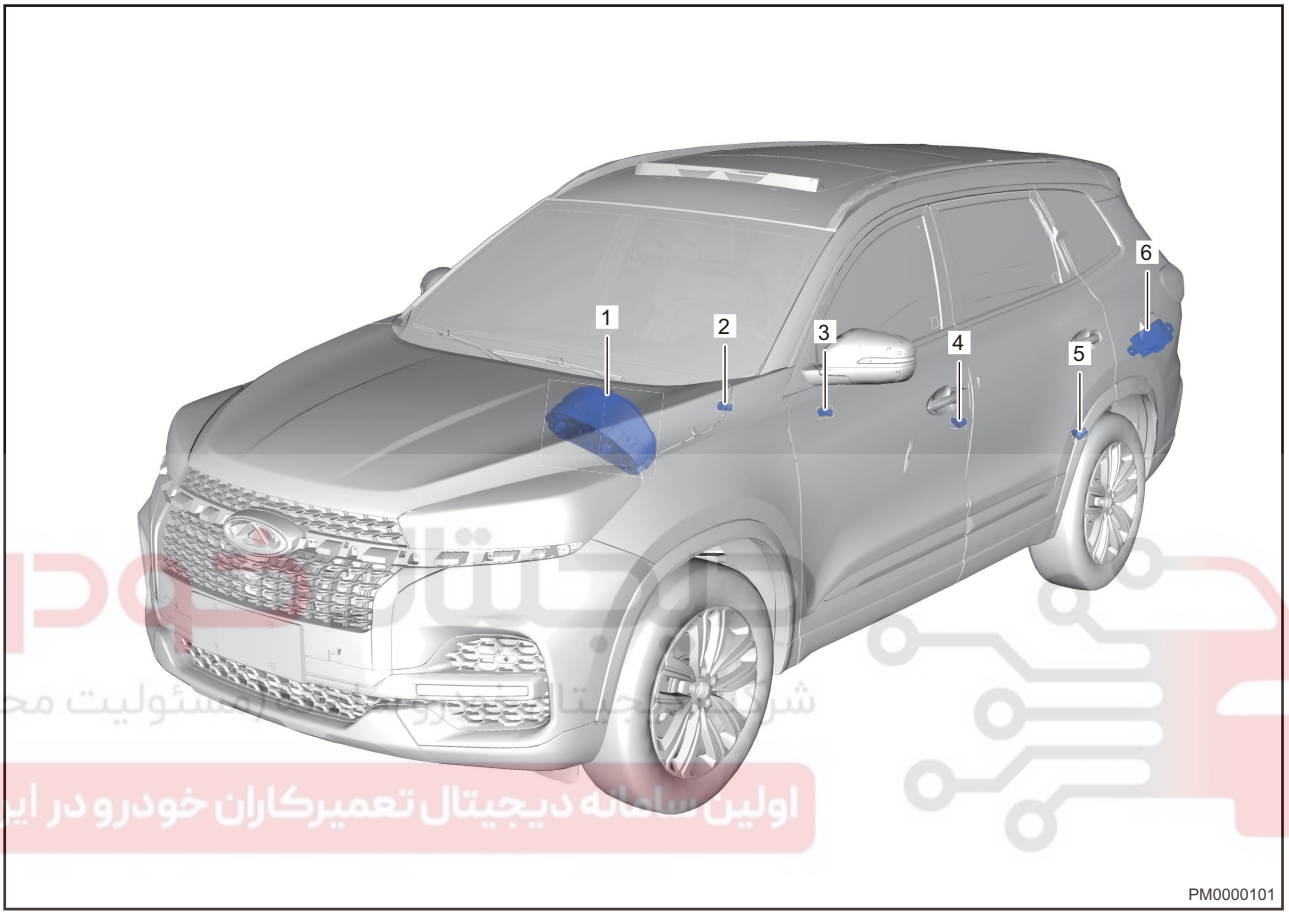
PARKING RADAR SYSTEM

GENERAL INFORMATION

Overview

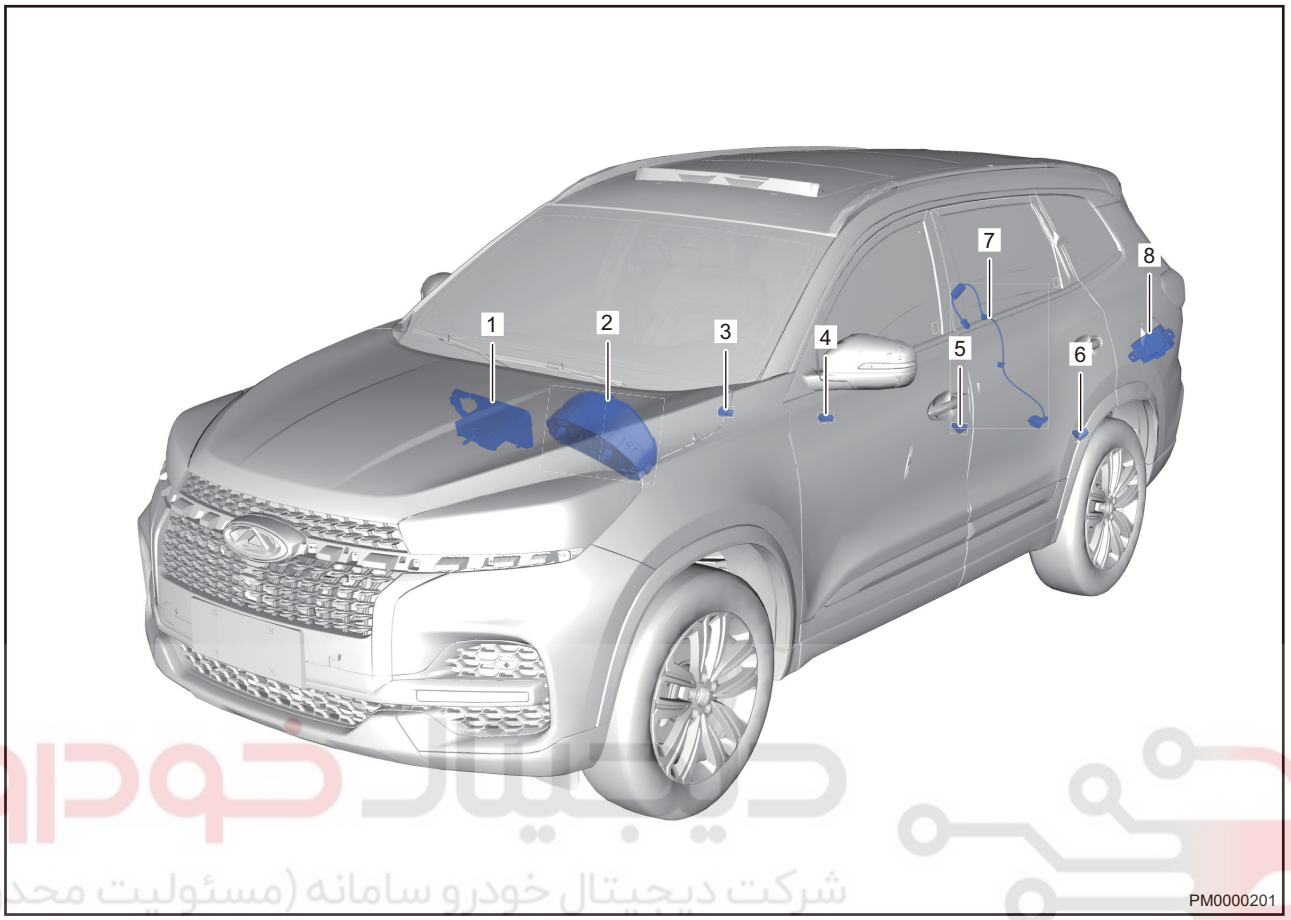
Description

Reversing Radar System



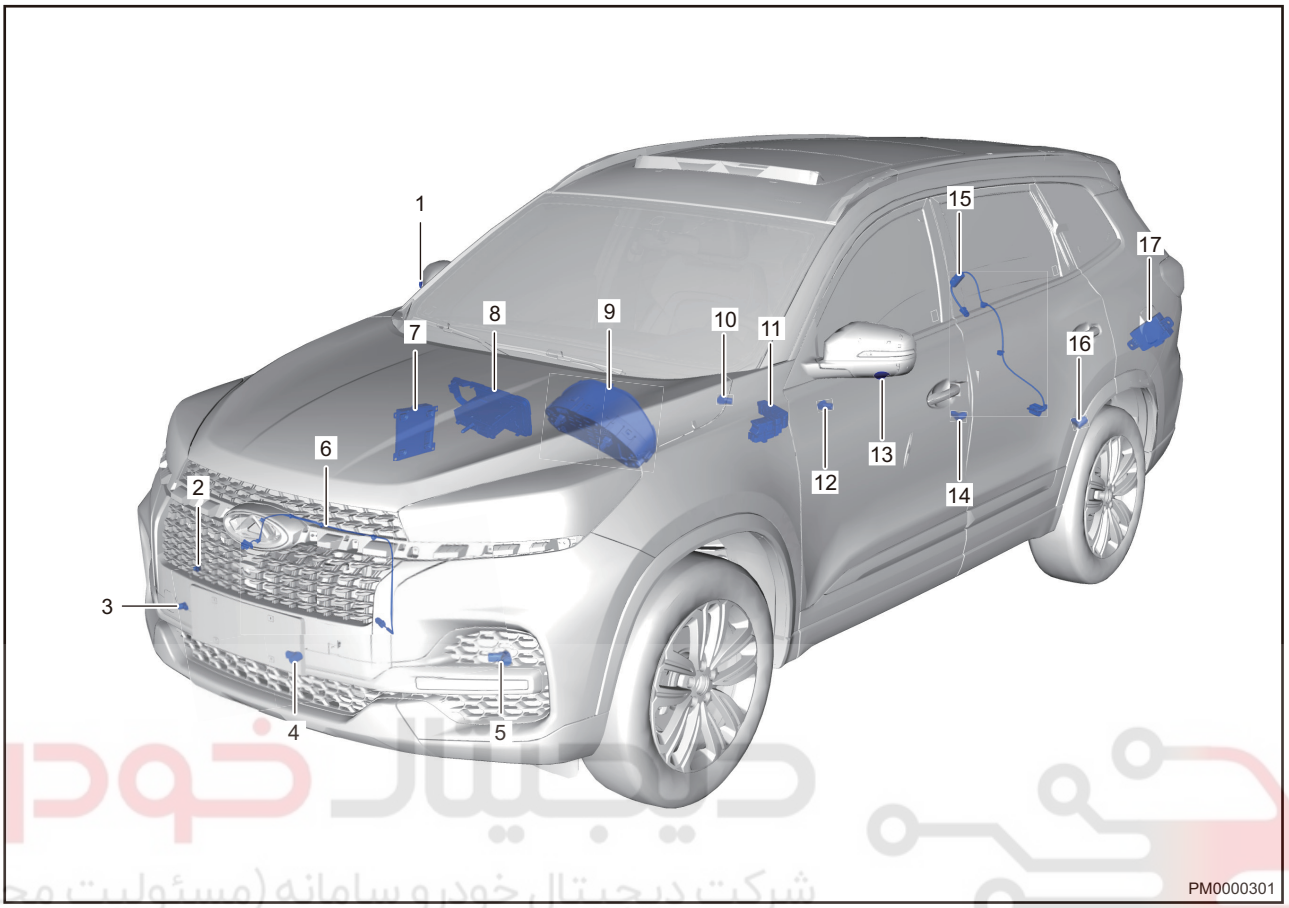
1 - Instrument Cluster (Built-in Buzzer)	2 - Rear Right Radar Sensor
3 - Rear Right Center Radar Sensor	4 - Rear Left Center Radar Sensor
5 - Rear Left Radar Sensor	6 - Reversing Radar Module

Dynamic Track HD Visual Parking Assist System (If equipped)



1 - Wireless Communication Head Unit	2 - Instrument Cluster (Built-in Buzzer)
3 - Rear Right Radar Sensor	4 - Rear Right Center Radar Sensor
5 - Rear Left Center Radar Sensor	6 - Rear Left Radar Sensor
7 - Rear Camera Assembly	8 - Radar Control Module

360° Full-time Panoramic View Monitor System (If equipped)



1 - Right Camera Assembly	2 - Front Right Radar Sensor
3 - Front Right Center Radar Sensor	4 - Front Left Center Radar Sensor
5 - Front Left Radar Sensor	6 - Front Camera Assembly
7 - Panoramic View Controller	8 - Wireless Communication Head Unit
9 - Instrument Cluster (Built-in Buzzer)	10 - Rear Right Radar Sensor
11 - Auxiliary Fascia Console Switch Assembly	12 - Rear Right Center Radar Sensor
13 - Left Camera Assembly	14 - Rear Left Center Radar Sensor
15 - Rear Camera Assembly	16 - Rear Left Radar Sensor
17 - Reversing Radar Module Assembly	

Operation

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 according to ultrasonic distance measuring principle, and sends data to display terminal to display and alarm. This can help driver to eliminate blind area and blurred vision, thus improving the driving safety when reversing.

Parking Radar Assist System (Low Configuration Model)

T18 reversing radar assist system consists of instrument cluster, 1 radar control module (ECU) and 4 sensors (digital ultrasonic 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, and instrument cluster. ENGINE START STOP switch provides operating power for system; Reverse switch provides operation activation signal for system; Instrument cluster is end terminal of the system and provides sound alarm prompt and distance display function for driver.

Parking Radar View Monitor System (Medium Configuration Model)

Consists of: Instrument cluster, navigation, camera, 4 rear radar sensors and radar module.
Parking radar 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.

360° Full-time Panoramic View Monitor System (High Configuration Model)

Composition: Panoramic view monitor system consists of four SD (30W) cameras (front camera, rear camera, left camera and right camera), controller, AVM system switch, CVBS 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 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 view controller is located inside the glove box on front passenger side and shares a bracket with PEPS; 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 license plate light protector.

Functions:

1. Three-dimensional surrounding view roaming;
2. Panoramic splicing;
3. 3D side view;
4. Supports single side view switching;
5. Static/dynamic back guidelines;
6. Off-line automatic calibration and manual calibration.

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.

Warning:

- 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.

7. Activation method of panoramic view monitor system
   (a) With ignition switch ON and vehicle speed less than 20km/h, click AVM switch to enter panoramic view mode.
   (b) With ignition switch ON and vehicle speed less than 20km/h, shift the shift lever to R position to enter panoramic reversing mode.
   (c) With ignition switch ON and vehicle speed less than 20km/h, turn on left/right turn switch to enter panoramic view mode (front/rear view + 3D side view).
8. Exiting method of panoramic view monitor system
   (a) Shift to reverse gear to enter panoramic view mode. When vehicle speed is higher than 30km/h, it exits the panoramic view mode immediately. After exiting the reverse gear, 5s timing begins, if user clicks front, rear, left or right area of panoramic splicing view or single side view within this period of time, the corresponding view will be switched. 5s timing will be recounted after each click operation, if user does not perform any operation within this period of time, panoramic view mode will be exited.
   (b) Turn ignition switch off to exit the panorama view mode immediately.
   (c) If panorama view mode is entered with ignition switch ON and shift lever in a position other than R, turn off AVM switch to exit panoramic view mode.
   (d) Turn on left/right turn light with vehicle speed less than 20 km/h to enter 3D side view screen automatically. After turn light is turned off, it switches to front view + aerial view and 200 ms timing begins, if user clicks front, rear, left or right area of panoramic splicing view or single side view within this period of time, the corresponding view will be switched. 200ms timing will be recounted after each click operation, if user does not perform any operation within this period of time, panoramic view mode will be exited.
9. AVM system and vehicle guideline settings on audio unit
   With ENGINE START STOP switch and audio on, press SET button on panel to set the AVM system.
   Warning:
   ENGINE START STOP switch must be in ON position.
   (a) Click the "Vehicle settings".
   (b) Gray bar indicates off, and blue bar indicates on.
   (c) AVM system can be started by operating steering switch after steering start AVM is turned on. If steering start AVM is turned off, operating steering switch cannot start the AVM system.
   (d) AVM start animation: After it is turned on, there will be a 3D surrounding view animation when starting AVM; after it is turned off, there will be no 3D surrounding view animation when starting AVM.
   (e) Select "Guidelines" and click "Off": No dynamic and static guidelines.
   (f) Click "Static": There is only static guidelines.
   (g) Click "Static + Dynamic": There are dynamic and static guidelines.

Reversing View Display

Warning:
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
   (a) 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
   (a) 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
   (a) Red guidelines indicate about 0.5 m away from bumper;
   (b) Yellow guidelines indicate about 1 m away from bumper,
   (c) The closer green guidelines indicate about 2 m away from bumper,
   (d) The far green guidelines indicate about 3 m away from bumper.
4. Dynamic track lines
   (a) Dynamic track lines are used for prejudging the vehicle's traveling trace, which varies as the wheel rotation.

Reversing Radar Normal Alarm Display

Reversing radar system consists of multiple reversing radar sensors and one reversing radar control module assembly.

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)	Hz (ON 250 ms / 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.

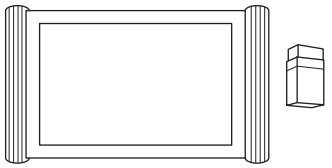
Specifications

Torque Specifications

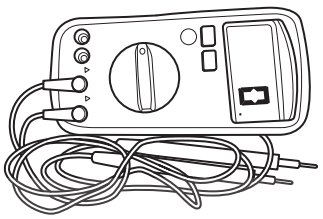
Description	Torque (N·m)
Reversing Radar Control Module Fixing Nut	3.5 ± 0.5
License Plate Light Protector Fixing Screw	2.0 ± 0.5
Front Camera Self-tapping Screw	3 ± 0.5
Start Controller Bracket Fixing Bolt	7 ± 1
4 Fixing Nuts on Panoramic View Controller	7 ± 1

Tools

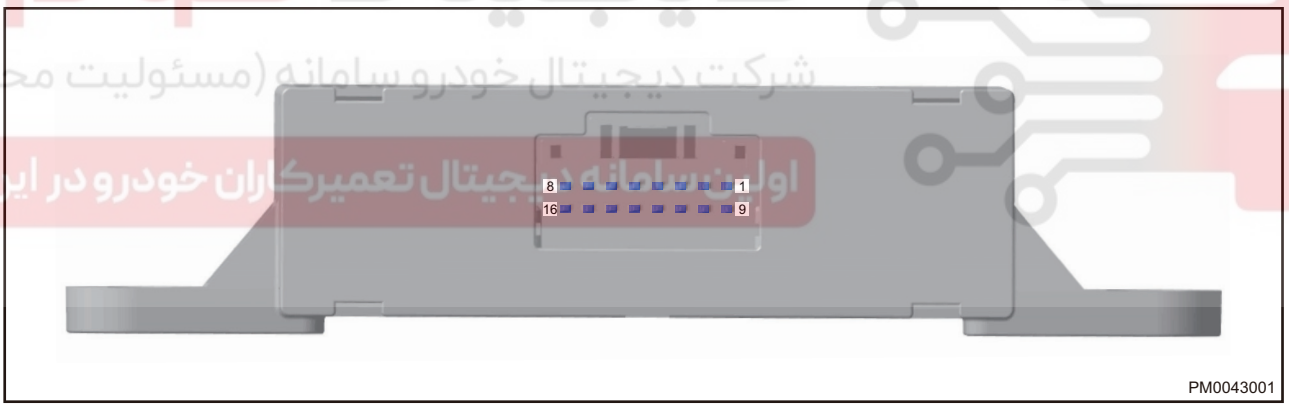
Special Tool

Diagnostic Tester	 001

General Tool

Digital Multimeter	 002

Reversing Radar Module Assembly Terminal List



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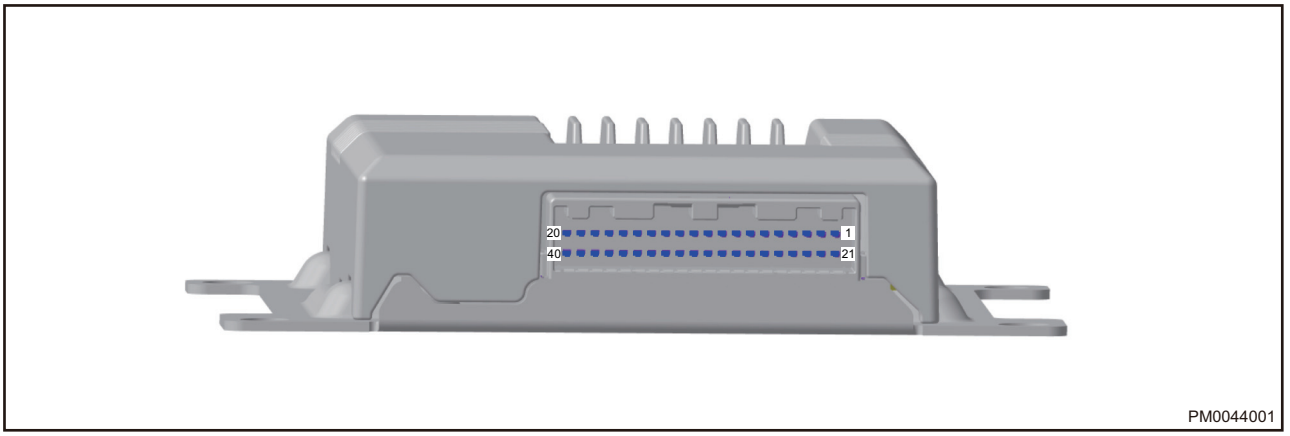
Pin No.	Terminal Definition	Pin No.	Terminal Definition
1	Reversing Signal (Spare)	9	-
2	-	10	-
3	Module Power Supply	11	Sensor Power Supply
4	Rear Right Center Sensor	12	Sensor Ground
5	CAN High	13	CAN Low
6	-	14	Match PIN
7	Rear Left Sensor	15	Rear Right Sensor
8	Rear Left Center Sensor	16	Ground

360° Full-time Panoramic View Monitor System Assembly Terminal List (If equipped)



Pin No.	Terminal Definition	Pin No.	Terminal Definition
1	Video Output Signal Ground	21	Video Output Signal
2	Rear Camera Video Signal	22	Rear Camera Video Ground
3	Rear Camera Power Supply	23	Rear Camera Power Supply Ground
4	Front Camera Video Signal	24	Front Camera Video Ground
5	Front Camera Power Supply	25	Front Camera Power Supply Ground
6	Right Camera Video Signal	26	Right Camera Video Ground
7	Right Camera Power Supply	27	Right Camera Power Supply Ground
8	Left Camera Video Signal	28	Left Camera Video Ground
9	Left Camera Power Supply	29	Left Camera Power Supply Ground
10	-	30	-
11	-	31	-
12	-	32	-
13	-	33	-
14	-	34	-
15	CAN Low	35	CAN High
16	-	36	-
17	-	37	-
18	-	38	-
19	IGN (For Logical Judgment)	39	Switch/Point Contact Type/Low Effective
20	AVM Power Supply	40	Power Supply Ground

DIAGNOSIS & TESTING

Diagnosis Content

Problem Symptoms Table

Hint:

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

Symptom	Suspected Area
Reversing radar system does not function (buzzer in instrument cluster does not sound)	Back-up light switch
	Reversing radar sensor
	Radar control module assembly
	Instrument cluster
	Wire harness and connector

Diagnosis Procedure

Procedure

Use following procedures to troubleshoot the parking radar system.

1	Vehicle brought to workshop

Result

Proceed to
NEXT

NEXT

2	Check battery voltage

Check if battery voltage is normal.

OK

Standard voltage: No less than 12 V

Result

Proceed to
OK
NG

NG → Recharge or replace battery

OK

3	Diagnostic Trouble Code (DTC) Chart

Result

Proceed to
No DTC
Current DTC
History DTC

History DTC

4	Problem repair (no DTC), then go to step 7

Result

Proceed to
NEXT

NEXT → Go to step 7

5	Troubleshoot according to Diagnostic Trouble Code (DTC) chart, then go to step 7

Result

Proceed to
NEXT

NEXT → Go to step 7

6	Troubleshoot according to Problem Symptoms Table, then go to step 7

Result

Proceed to
NEXT

NEXT

7	Adjust, repair or replace

Result

Proceed to
NEXT

NEXT

8	Clear DTCs (current and history DTC)

Result

Proceed to
NEXT

NEXT

9	Check DTCs (current and history DTC)

Result

Proceed to
NEXT

NEXT

10	Confirm test

Result

Proceed to
NEXT

NEXT → End

DTC Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to LOCK.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in supplemental restraint system.
- Turn ENGINE START STOP switch to LOCK and wait for a few seconds.
- Turn ENGINE START STOP switch to ON, and then select read DTC.
- If DTC is detected, it indicates current malfunction. Go to diagnosis procedure - Step 1.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

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 parking radar system 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 works. Circuits are very sensitive to proper grounding. A loose or corroded ground can 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 contacting is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if add-on accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure that all wire harnesses are clean and securely fastened while providing a good ground path.

Camera Calibration

1. Situations needs to perform camera calibration

- When service station removes or installs camera or rear view mirror with camera.
- When removing and installing front and rear bumpers.
- When camera position changes due to vehicle accident.
- After replacing panoramic view monitor system controller.

2. Calibration method

(a) Park vehicle at the fixed location.


PM0030002

(b) Lay calibration cloth (front and rear sides) at front and rear of vehicle.

Caution:

- "Front center" of calibration cloth corresponds to the front side of vehicle.
- Center line position of calibration cloth should align with the middle position of front and rear of vehicle.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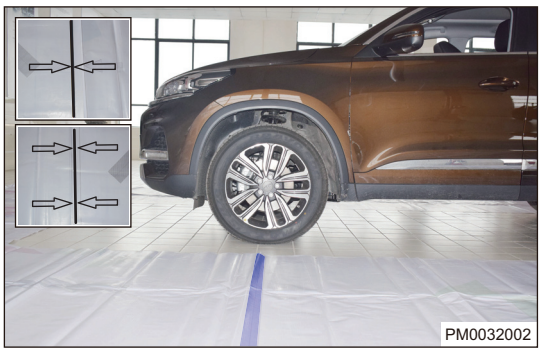
PM0032002

(c) 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.


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(d) Entering calibration mode (calibration function activated)
With IGN-ON or panoramic view monitor system turned on by pressing AVM switch, press "HOME+NAVI+SET" buttons on the head unit at the same time and then release them, if the operation is valid, audio display will display the screen shown in illustration. "Automatic Calibration" is used for production line, and "Manual Calibration" is used for after-sales calibration.

PM0033002

Caution:

- A command is valid only when three buttons are pressed at the same time and then released. If the first operation is unsuccessful, repeat the operation several times until above screen prompt appears.

3. 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" 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 black 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 color lump to the focus of two triangles, and click " √ " after completing to save.

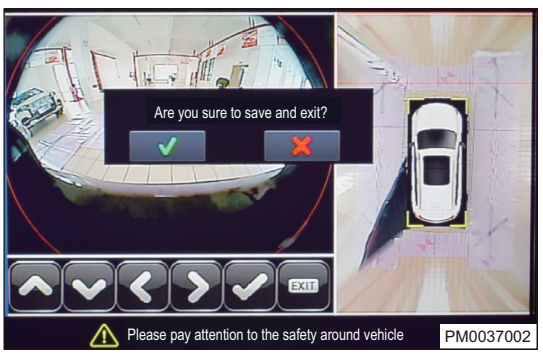
Caution:

It is necessary to adjust the corresponding red triangle focus for front and rear views, and green triangle focus for left and right views.

(c) According to the previous step, make 5 color lumps correspond to the 5 different triangle 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.



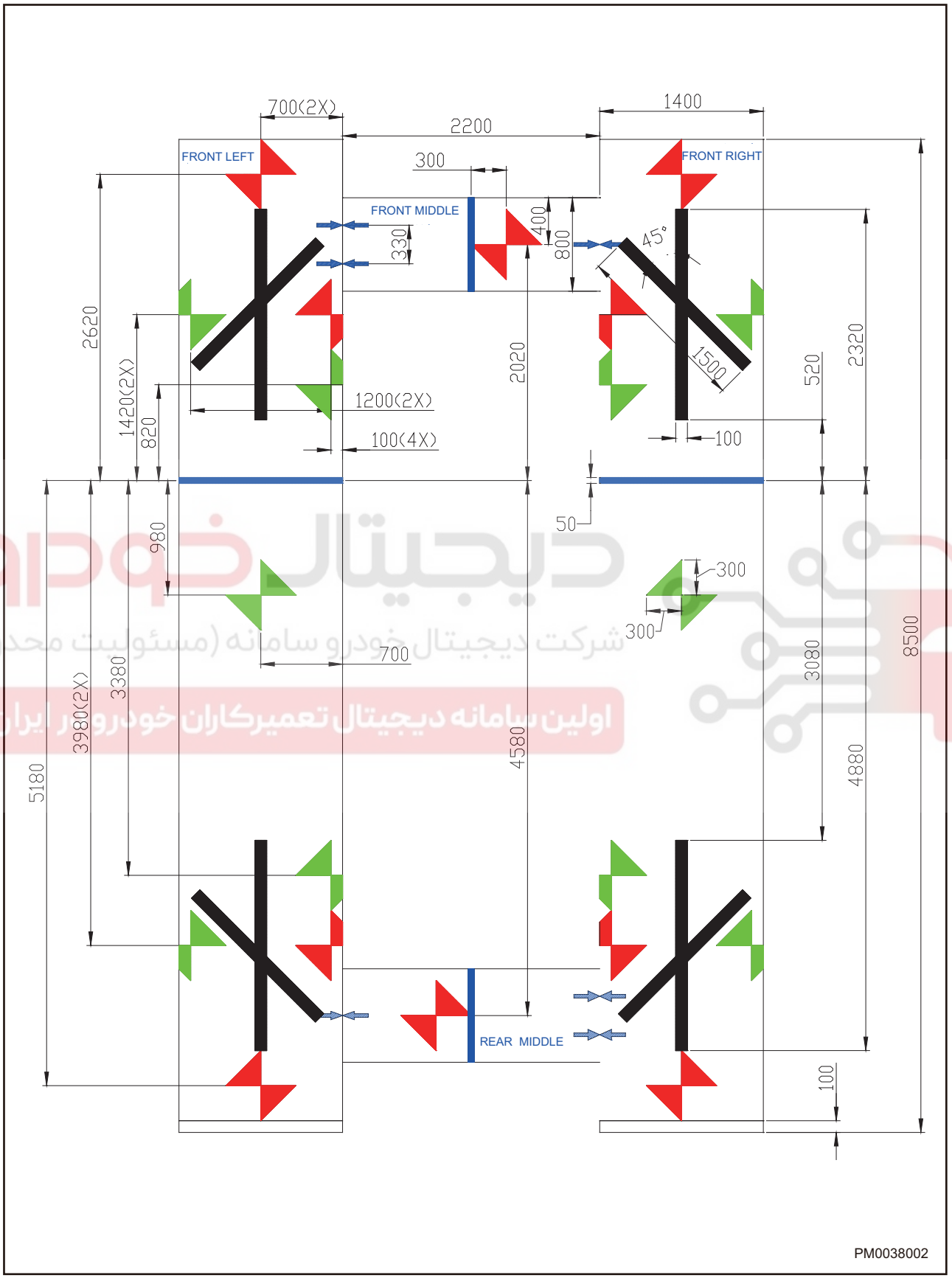
4. Calibration environment requirement
   (a) Site requirement
   Calibration site size: About 5.6 m in width and 8.4 m in length, which can accommodate the vehicle driving and calibration cloth laying.
   (b) Ground flatness and calibration cloth laying requirement
   - To ensure the calibration effect, 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 opened and laid smoothly, and corresponds according to requirement.

   (c) Light condition
   - There is no special requirement for light environment of calibration site. Make sure each positioning triangle and its focus can be clearly seen during calibration.

   (d) Calibration cloth storage
   - 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.

5. Calibration cloth drawing



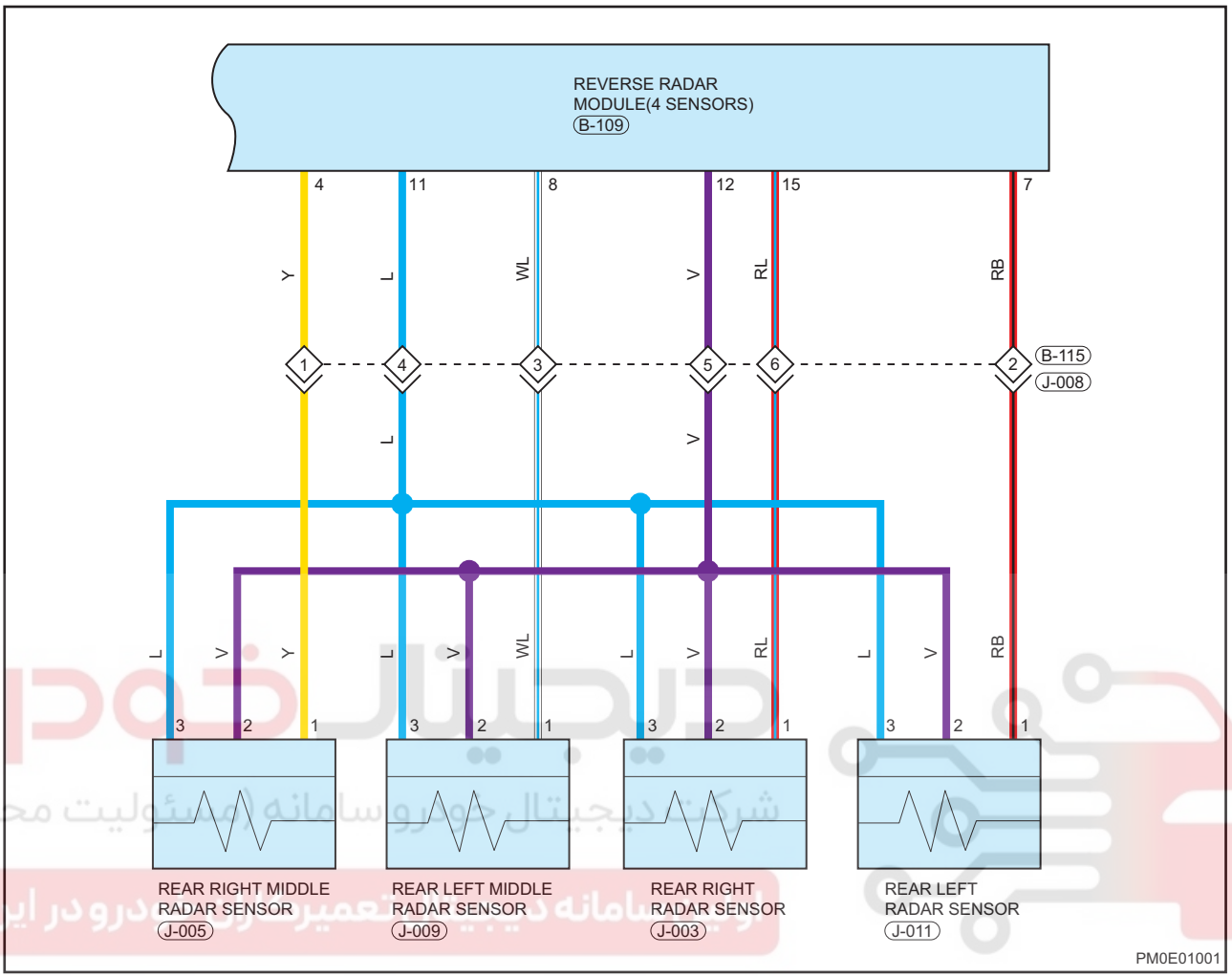
Diagnostic Trouble Code (DTC) Chart

Fault Type	Description
00	No Subtype Information
11	Circuit Short to Ground
13	Circuit Open
25	Circuit Short to Ground or Open
87	Lost Communication

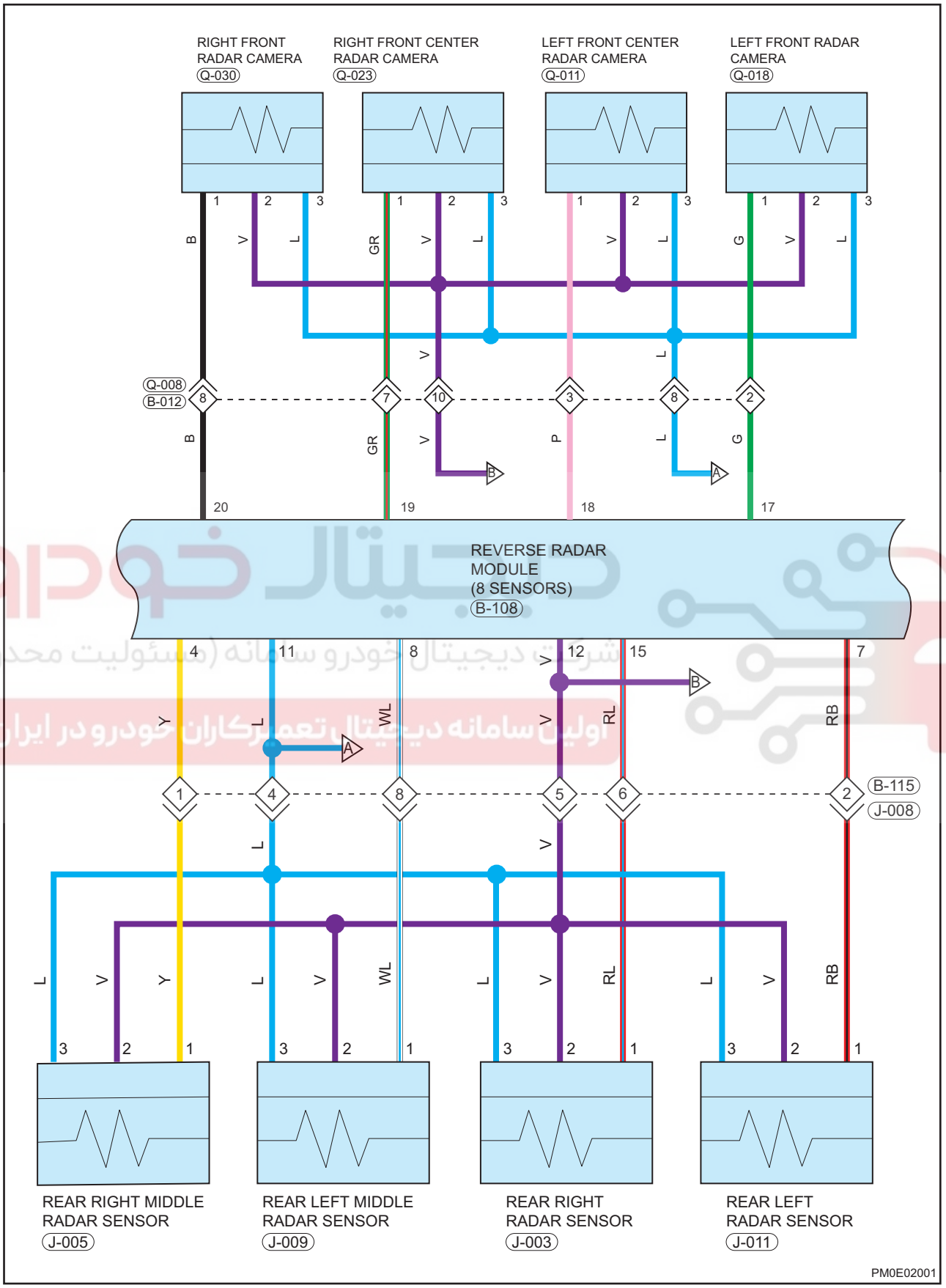
DTC	DTC Definition
B1A05-25	The Left of Back Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
B1A06-25	The Left of Back Medium Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
B1A07-25	The Right of Back Medium Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
B1A08-25	The Right of Back Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
B1A20-13	Front Camera
B1A20-11	Front Camera
B1A21-13	Rear Camera
B1A21-11	Rear Camera
B1A22-13	Left Camera
B1A22-11	Left Camera
B1A23-13	Right Camera
B1A23-11	Right Camera
B1A24-04	Around View Monitor Module
U0140-87	Lost Communication with Body Control Module, Missing Message
U0129-87	Lost Communication with Brake System Control Module, Missing Message
U0155-87	Lost Communication with Instrument Cluster Module - Missing Message

DTC	B1A01-25	The Left of Front Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A02-25	The Left of Front Medium Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A03-25	The Right of Front Medium Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A04-25	The Right of Front Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A05-25	The Left of Back Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A06-25	The Left of Back Medium Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A07-25	The Right of Back Medium Ultrasonic Sensor Failure, Signal Shape/Waveform Failure
DTC	B1A08-25	The Right of Back Ultrasonic Sensor Failure, Signal Shape/Waveform Failure

Circuit Diagram
4-Sensor



8-Sensor



Description

DTC is stored when stopping high voltage DC output is detected.

DTC	DTC Definition	DTC Detection Condition	DTC Set Condition	Possible Cause
B1A01-25	The Left of Front Ultrasonic Sensor Failure, Signal Shape/Waveform Failure	Shift lever is in R and parking radar is turned on	Radar fault is displayed on instrument cluster	Signal or wire harness connector
B1A02-25	The Left of Front Medium Ultrasonic Sensor Failure, Signal Shape/ Waveform Failure			
B1A03-25	The Right of Front Medium Ultrasonic Sensor Failure, Signal Shape/ Waveform Failure			
B1A04-25	The Right of Front Ultrasonic Sensor Failure, Signal Shape/Waveform Failure			
B1A05-25	The Left of Back Ultrasonic Sensor Failure, Signal Shape/Waveform Failure			
B1A06-25	The Left of Back Medium Ultrasonic Sensor Failure, Signal Shape/ Waveform Failure			
B1A07-25	The Right of Back Medium Ultrasonic Sensor Failure, Signal Shape/ Waveform Failure			
B1A08-25	The Right of Back Ultrasonic Sensor Failure, Signal Shape/Waveform Failure			

Caution:

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

Warning/Caution/Hint

Caution:

Carefully read all the contents in Precaution about precaution of related high voltage operations, safety operating procedures of disconnecting / connecting high voltage circuit and precaution when using diagnostic tester.

Procedure

1	**Check radar sensor**

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

(a) Turn ENGINE START STOP switch to OFF, 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.

Result

Proceed to
OK
NG

OK → **Replace radar sensor**

NG

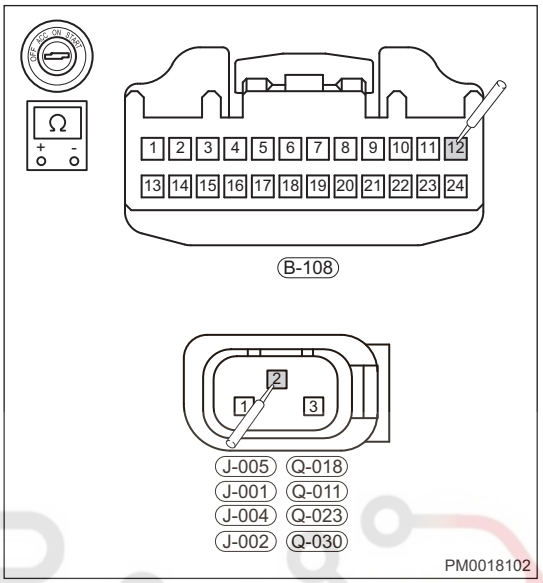
2	Check wire harness and connector

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

(a) Separately disconnect reversing radar module connector B-108 (8-sensor) and each radar sensor connector.

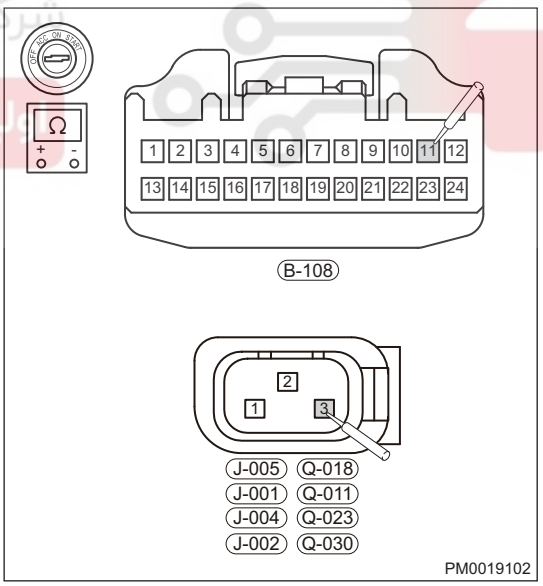
(b) Use ohm band of multimeter, check for continuity between separately.
Standard Condition

Multimeter Connection	Condition	Standard Condition
B-108 (12) - J-005 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - J-009 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - J-003 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - J-011 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - Q-018 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - Q-011 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - Q-023 (2)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (12) - Q-030 (2)	ENGINE START STOP switch OFF	≤ 1 Ω



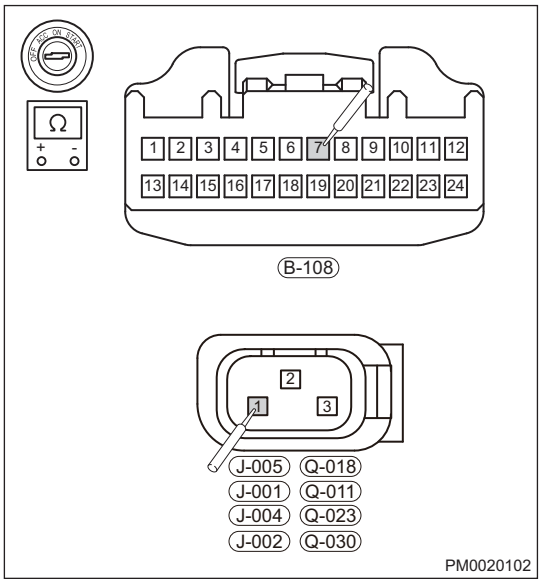
(c) Use ohm band of multimeter, check for continuity between separately.
Standard Condition

Multimeter Connection	Condition	Standard Condition
B-108 (11) - J-005 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - J-009 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - J-003 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - J-011 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - Q-018 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - Q-011 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - Q-023 (3)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) - Q-030 (3)	ENGINE START STOP switch OFF	≤ 1 Ω



(d) Use ohm band of multimeter, check for continuity between separately.
Standard Condition

Multimeter Connection	Condition	Standard Condition
B-108 (4) -J-005 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (11) -J-009 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (15) -J-003 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (7) -J-011 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (17) -Q-018 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (18) -Q-011 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (19) -Q-023 (1)	ENGINE START STOP switch OFF	≤ 1 Ω
B-108 (20) -Q-030 (1)	ENGINE START STOP switch OFF	≤ 1 Ω



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Result

Proceed to
OK
NG

OK → **Replace reversing radar module**

NG → **Replace wire harness and connector**

ON-VEHICLE SERVICE

Reversing Radar Sensor

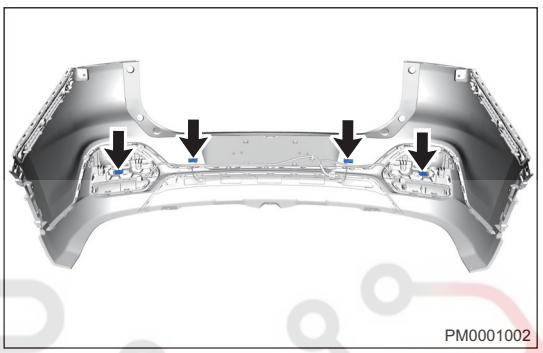
Removal

Warning:

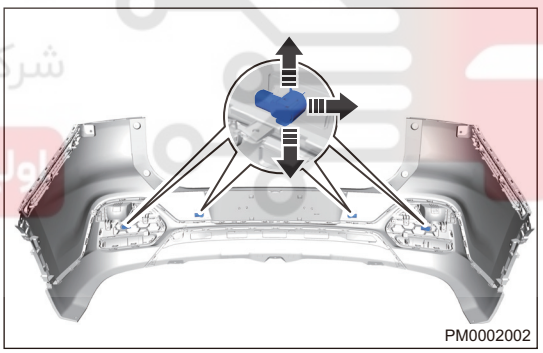
Be sure to wear necessary safety equipment to prevent accidents, when removing reversing radar sensors.

Operate carefully to avoid damaging reversing radar sensors, when removing reversing radar sensors.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear bumper assembly (See page 45-25).
4. Remove the reversing radar sensor.
   (a) Disconnect the reversing radar sensor connectors (arrow).


PM0001002

   (b) Detach clamping portion on reversing radar sensor outward in direction of arrow as shown in illustration.


PM0002002

   (c) Remove reversing radar sensor from slot of rear bumper assembly.

Installation

Warning/Caution/Hint

- 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.

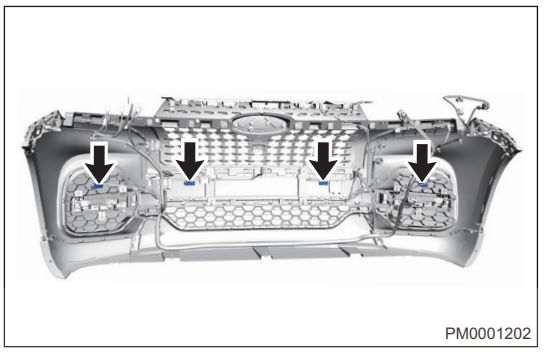
Front Radar Sensor (If Equipped)

Removal

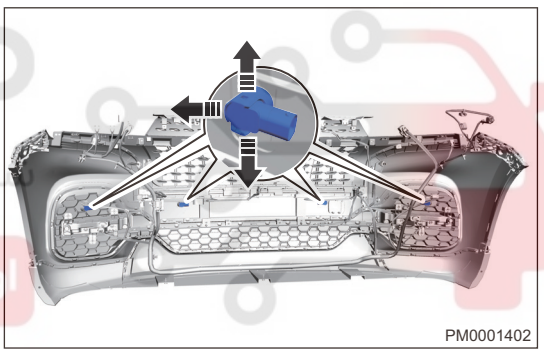
Warning:

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

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly (See page 45-11).
4. Remove the front radar sensor.
   (a) Disconnect the front radar sensor connectors (arrow).


PM0001202

   (b) Detach clamping portion on front radar sensor outward in direction of arrow as shown in illustration.


PM0001402

   (c) Remove front radar sensor from slot of rear bumper assembly.

Installation

Warning/Caution/Hint

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

Caution:

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

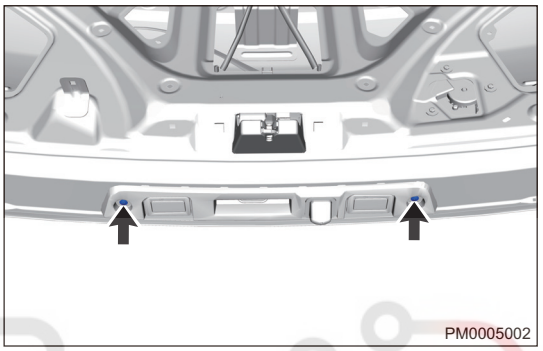
Rear Camera Assembly (If Equipped)

Removal

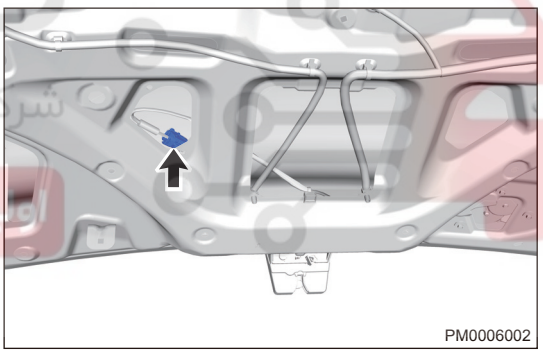
Warning:

- 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.

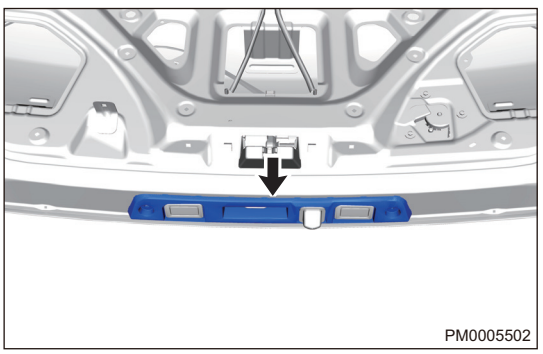
1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear camera assembly.
   (a) Remove the back door lower protector assembly.
   (b) Remove 2 fixing bolts (arrow) from rear camera cover.


PM0005002

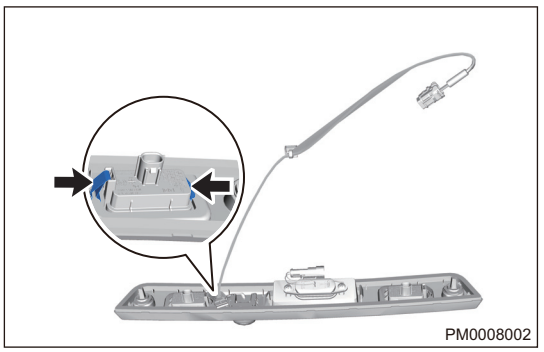
   (c) Disconnect the rear camera connector (arrow).


PM0006002

   (d) Pry off rear camera mounting cover from outside with an interior crow plate.


PM0005502

(e) Using a small flathead screwdriver, pry off fixing clips (arrow) to separate camera and cover plate.



Installation

1. Installation is in the reverse order of removal.

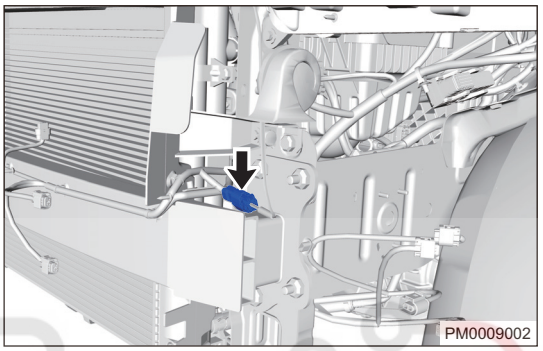
Front Camera Assembly (If Equipped)

Removal

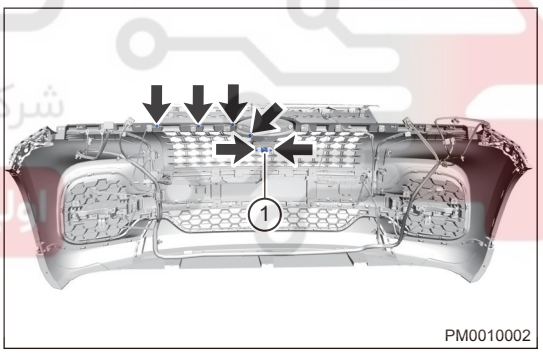
Warning/Caution/Hint

- 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 the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the bumper assembly (See page 45-11).
4. Remove the front camera assembly.
   (a) Remove connector (arrow) from front camera.



   (b) 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/Caution/Hint

- As side camera is installed inside the rear view mirror assembly, it must be replaced together with rear view mirror assembly.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left rear view mirror assembly.

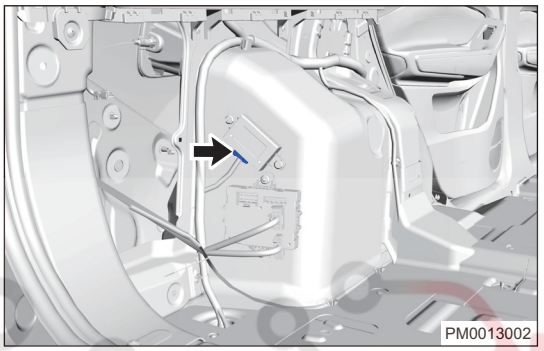
Reversing Radar Control Module Assembly

Removal

Warning/Caution/Hint

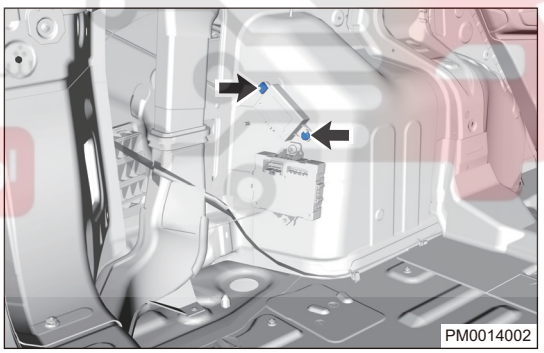
- Be sure to wear necessary safety equipment to prevent accidents, when removing reversing radar control module assembly.
- Appropriate force should be applied when removing reversing radar control module assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the tonneau cover assembly.
4. Remove the C-pillar protector assembly (See page 46-17).
5. Remove the reversing radar control module assembly.
   (a) Disconnect the reversing radar control module assembly connector (arrow).



   (b) Remove 2 fixing bolts (arrow) between reversing radar control module assembly and body, and remove reversing radar control module assembly.

   Tightening torque:
   5 ± 1 N·m



Installation

Warning/Caution/Hint

- 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 View Controller (If Equipped)

Removal

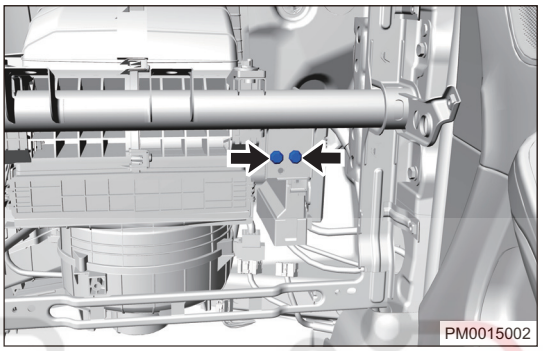
Warning/Caution/Hint

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

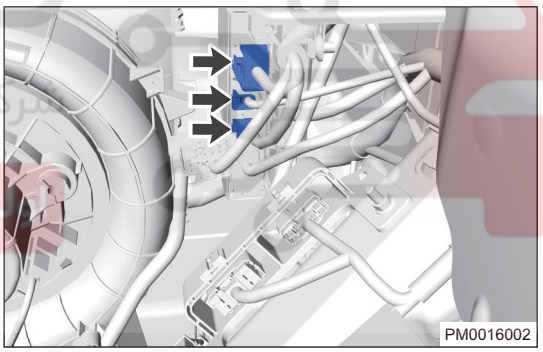
1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly (See page 42-15).
4. Remove the panoramic view controller.

(a) Remove 2 fixing bolts (arrow) from panoramic view controller bracket.

Tightening torque:
7 ± 1 N·m



(b) Move panoramic view control module away and remove PEPS module connector and panoramic view monitor control module connector (arrow).



(c) Remove 4 fixing bolts (arrow) between panoramic view control module and PEPS module and separate 2 module assemblies.