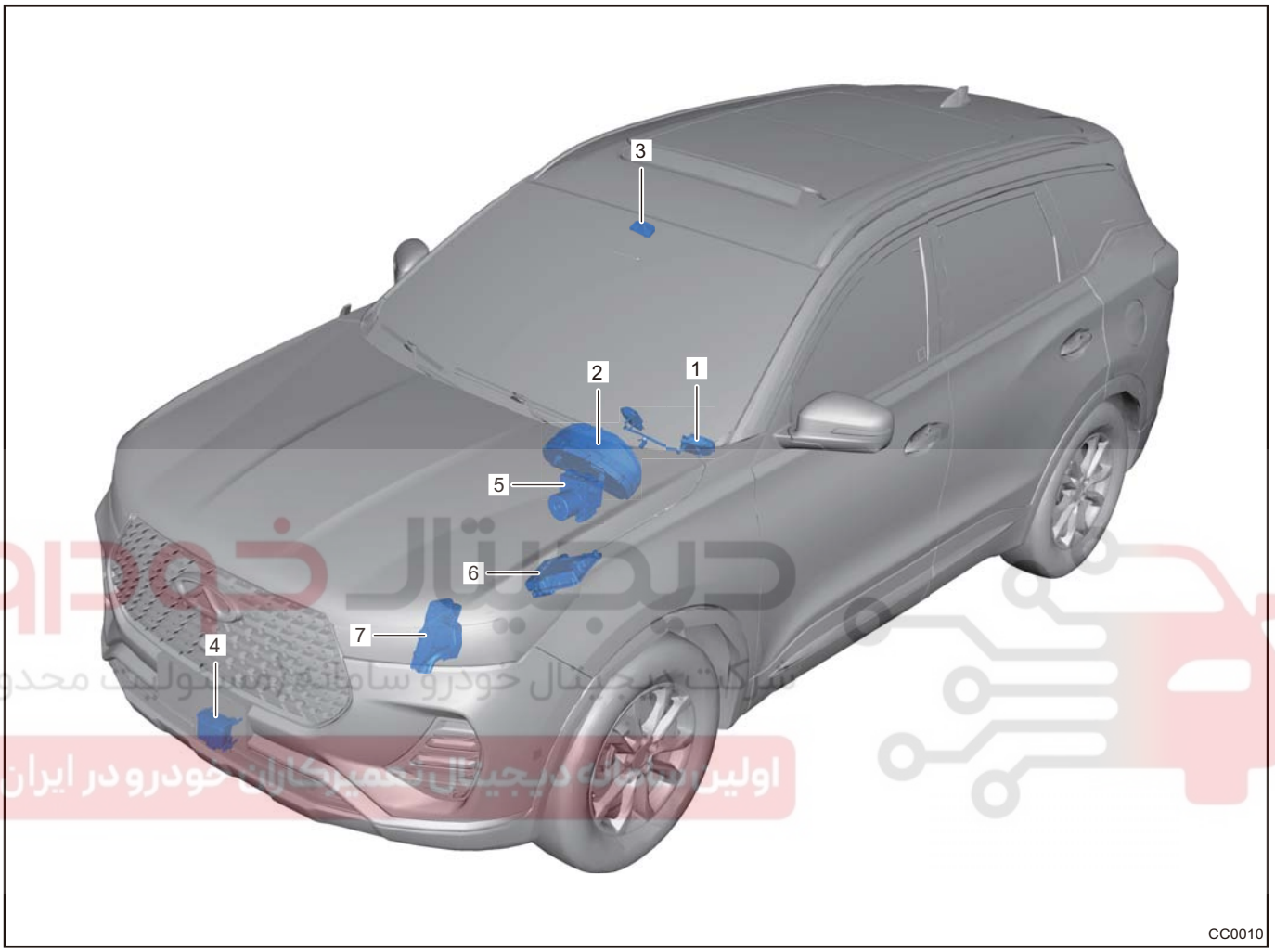
CRUISE CONTROL SYSTEM

CRUISE CONTROL SYSTEM

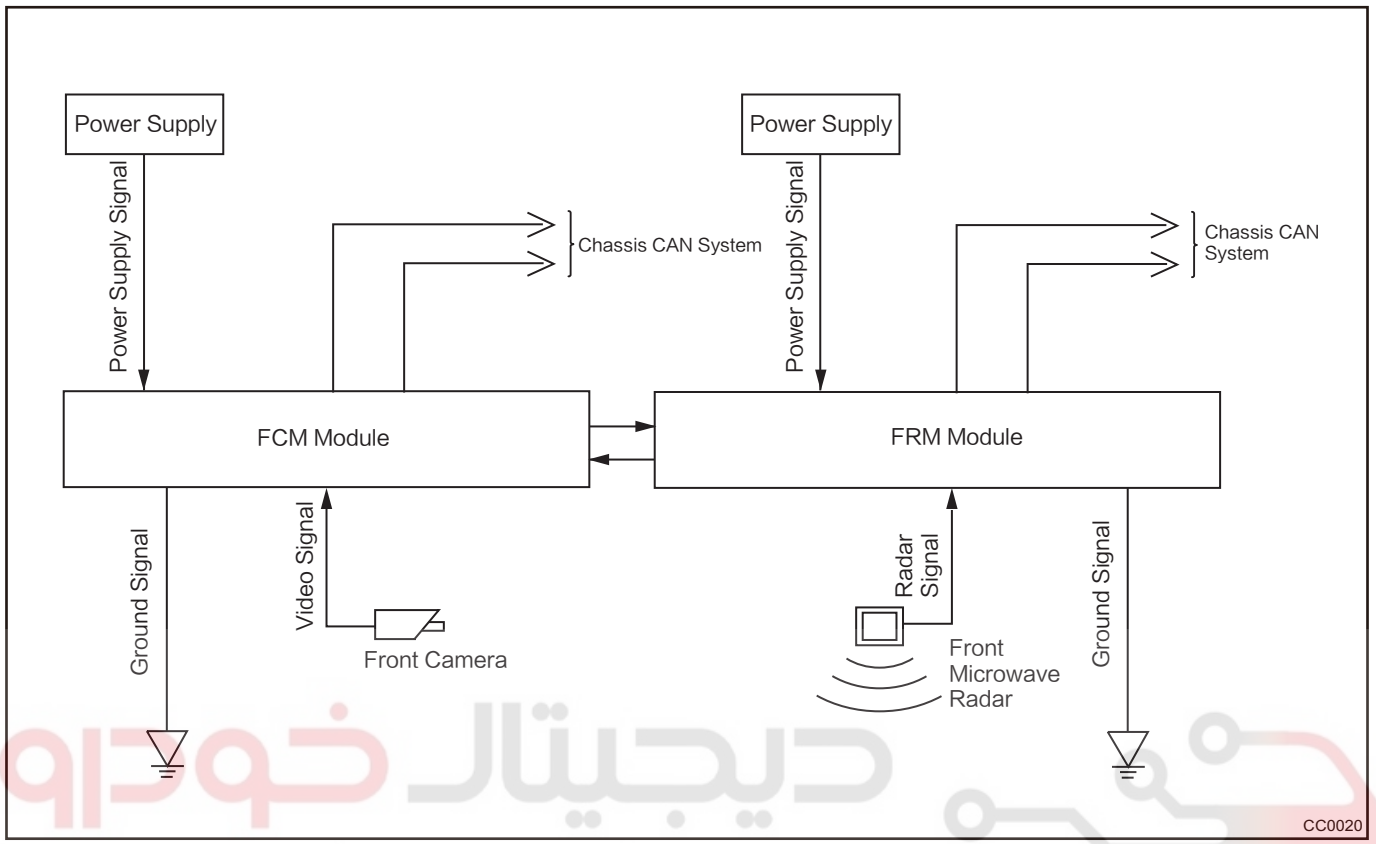
System Overview

Fuel Component Diagram



1	Multi-function Button	2	Instrument Cluster (ICM)
3	Front Camera (FCM)	4	Front Microwave Radar (FRM)
5	EPB Module	6	Engine Control Module (EMS)
7	Transmission Control Unit (TCU)		

System Schematic



Adaptive Cruise System (ACC), Automatic Emergency Braking System (AEB) and Front Collision Warning System (FCW) share a Front Microwave Radar (FRM) and a Front Camera (FCM).

System Function

Constant Speed Cruise

Entering Constant Speed Cruise

1. Turn ignition switch to ON mode, press cruise button to enter pre-cruise state, standby indicator of cruise system on instrument cluster turns on.
2. During cruising, when speed is within the range of 40 to 150 km/h, press SET- button again to set current speed as cruising speed and enter cruising state, and cruise system indicator on instrument cluster turns on.

Exiting Constant Speed Cruise

1. Press cruise button to exit cruise state, cruise system indicator on instrument cluster turns off.
2. Press cruise temporary exiting button to exit cruise state and enter pre-cruise state, standby indicator of cruise system on instrument cluster turns on.
3. During cruising, depress brake pedal (AT model), clutch pedal (MT model) or exit cruise state when performing emergency braking, enter pre-cruise state, standby indicator of cruise system on instrument cluster turns on.

Vehicle Speed Setting

1. During cruising, press RES+ button, set speed increases by 1 km/h.
2. During cruising, long press RES+ button, set speed increases continuously.
3. During cruising, press SET- button, set speed decreases by 1 km/h.
4. During cruising, long press SET- button, set speed decreases continuously.

Caution:

In the following conditions, do not use constant speed cruise system, failure to do may cause an accident as well as injury and death.

- During emergency traction.

- In heavy traffic.
- On winding roads.
- On roads with sharp bends.
- On slippery roads, such as roads covered with rain, ice or snow.
- Vehicle speed may exceed set speed when driving down a steep hill.

Adaptive Cruise System (ACC)

Activation Conditions of Adaptive Cruise System (ACC)

1. Adaptive cruise system can be activated when the following conditions are met simultaneously:
   (a) Brake pedal is not depressed (when driving).
   (b) Driver door is closed.
   (c) Driver seat belt is fastened.
   (d) Transmission is in D position.
   (e) Parking brake is not applied.
   (f) Hill descent function is not turned on.
   (g) Electronic stability control system is turned on.
   (h) Electronic stability control system is not activated.
   (i) Anti-lock braking system is not activated.

Entering Adaptive Cruise

1. Turn power supply to ON mode, press adaptive cruise system button to enter pre-cruise state, standby indicator of adaptive cruise system on instrument cluster turns on.
2. During pre-cruising, when speed is within the range of 30 to 150 km/h, press SET- button again to set current speed as cruise speed and enter cruise state, and adaptive cruise system indicator on instrument cluster turns on.
3. Depress brake pedal and press SET- button with vehicle stopped, release brake pedal within 3 seconds (lightly depress accelerator pedal if the time exceeds 3 seconds) to enter cruise state, adaptive cruise system indicator on instrument cluster turns on and set speed by default is 30 km/h.

Hint:

- When turning on active speed limit function, exit adaptive cruise system.
- There are vehicles ahead in the same lane and driving speed is not higher than set speed of the vehicle, adaptive cruise system will control the vehicle to follow the vehicles ahead.
- There are no vehicles ahead in the same lane, or there are vehicles ahead in the same lane and driving speed is higher than set speed, the vehicle will drive at set speed.
- When parking brake is applied and the vehicle is in pre-cruise state, press SET- button, there is a prompt "Please depress accelerator pedal to activate adaptive cruise system" on instrument cluster, driver will depress accelerator pedal lightly to activate adaptive cruise system according to he prompt.

Exiting Adaptive Cruise

1. Depress brake pedal.
2. Open driver door.
3. Driver seat belt is not fastened.
4. Pull up electronic parking button.
5. Press cruise temporary exiting button.
6. Turn hill descent function on.
7. Electronic stability control system operates.
8. Anti-lock braking system operates.
9. Automatic emergency braking system operates.
10. Electronic stability control system is not turned on.
11. Transmission is not in D position.
12. Driver depresses accelerator pedal more than 15 minutes.
13. After the above conditions that cause function to exit are restored, press RES + button, enter cruise state and resume state set before exiting.

Vehicle Speed Setting

1. During cruising, press RES+ button, set speed increases by 1 km/h.
2. During cruising, long press RES+ button, set speed increases by 5 km/h; when speed exceeds 80 km/h, set speed increases by 10 km/h.
3. During cruising, press SET- button, set speed decreases by 1 km/h.
4. During cruising, long press SET- button, set speed decreases by 5 km/h; when speed exceeds 80 km/h, set speed decreases by 10 km/h.

Hint:

- The adaptive cruise system speed is set to 30 km/h minimum and 150 km/h maximum.
- When driving uphill, speed will be slightly lower than set speed, and when driving downhill, speed will be slightly higher than set speed.

Following Distance

1. During cruising, press following distance adjustment button to adjust following distance, the distance is divided into three grades (minimum distance/standard distance/maximum distance).

Hint:

- Following distance increases with increase of speed.
- If the distance is minimum, the distance from vehicle ahead is very small when following the vehicle ahead at low speed. In view of safety considerations, the maximum distance should be selected when following on slippery road.
- Electronic stability control system continues to brake during decreasing speed following the vehicle ahead, motor rotation can generate operating sound, this is normal and please keep driving.

Exceeding Set Speed

1. During cruising, the driver depresses accelerator pedal to exceed set speed. Release accelerator pedal, return to previous control state. During exceeding set speed, if the distance from vehicle ahead is too small, the instrument cluster will pop up "Ask the driver to take over vehicle", accompanied by rapid alarm sound to remind driver to take a avoidance measures.

Curve Speed Control

1. When driving into a curve during cruising, driving speed will be decreased appropriately to assist the driver to safely pass through the curve.

Warning:

- When driving into a curve, due to the limitation of radar probe to detect the target, it may not be possible to detect the vehicle ahead of the same driving track in time, in this case, the driver should be ready to take over control of the vehicle at any time.

Stop-and-go Function

1. During driving following the vehicle ahead with adaptive cruise system, if the vehicle ahead decreases speed to stop, the vehicle also decreases speed to stop, after stopping:
   (a) Vehicle ahead starts to drive away within 3 seconds and the vehicle starts automatically to follow vehicle ahead.
   (b) If the vehicle ahead stops for more than 3 seconds, and starts to drive away within 3 seconds to 10 minutes, driver needs to depress accelerator pedal lightly to activate adaptive cruise system.
   (c) During 10 minutes of parking, when driver unfastens seat belt or opens driver door, electrical parking brake system will activate automatically for parking.
   (d) If parking for more than 10 minutes, adaptive cruise system exits and electrical parking brake system will activate automatically for parking.

Warning:

- When driving following the vehicle ahead, always pay attention to whether standby indicator of adaptive cruise system is in green filled state. If it is in non-filled state, it means that the target ahead of adaptive cruise system (ACC) has been lost, and the vehicle will accelerate according to set speed.

Caution:

Be sure to read the following precautions when using adaptive cruise system:

- Adaptive cruise system can not violate the laws of physics and there are some limitations, driver must always control the vehicle and take full responsibility for the vehicle.

- If the vehicle is too close to a vehicle in adjacent lane, adaptive cruise system (ACC) may select the vehicle as a front tracking target to respond.
- Adaptive cruise system can not respond to stationary objects and vehicles, crossing vehicles, oncoming vehicles, pedestrians, bicycles, and animals.
- When adaptive cruise system controls the vehicle to stop for a short time, driver must ensure that there are no obstacles or other traffic participants, such as pedestrians, bicycles, animals, etc. in front of the vehicle.
- When adaptive cruise system function fails, adaptive cruise system malfunction indicator on instrument cluster turns on. At this time, adaptive cruise system will not function. Contact the Chery service station for inspection and repair.
- When the adaptive cruise system controls the vehicle, do not inadvertently step on accelerator pedal, otherwise, adaptive cruise system will not apply brake to vehicle, driver should be ready to brake actively at any time to ensure safety.
- Adaptive cruise system can only realize limited braking, if the vehicle ahead applies emergency braking suddenly, another vehicle cuts in front of the vehicle quickly or the vehicle quickly cut into the rear of the vehicle slower than the vehicle, adaptive cruise system may not be able to respond or respond too slowly, in this case, driver should take over control of the vehicle in time.
- The driver must adjust the appropriate distance between the vehicle and the vehicle ahead according to traffic and weather conditions, and is responsible for the safe vehicle stopping. In severe weather such as rain, snow, fog, etc., adaptive cruise system may not be able to recognize vehicle ahead. In this case, adaptive cruise system should be turned off.
- Adaptive cruise system is suitable for highways and roads in good condition, and is not recommended for urban roads, narrow roads, mountain roads, hills, tunnels, etc. If adaptive cruise system is used on curve, it may cause the loss of vehicle ahead target or delay of target selection due to the limitation of sensor detection range. In these cases, adaptive cruise system will control the vehicle to accelerate to set speed.
- When following the vehicle ahead to stop, adaptive cruise system may not recognize the end of vehicle but the lower or upper part of vehicle (for example, rear axle of truck with a higher chassis, upper part of a lower flat trailer). In these cases, system will not be able to guarantee a proper stopping distance or even lead to collision. Therefore, the driver must be alert and take over control of vehicle at any time during this process
- Two sensors, radar and camera, are mounted on the front area of vehicle and behind the windshield. It should be noted that the field of vision of sensor should not be blocked by pollutants, and there should be no modification or license plate decoration frame in the front or surrounding areas, especially when the snow completely covers the sensor, the adaptive cruise system function will exit. The sensor may also be affected by vibration or collision, resulting in system performance degradation or no function. In this case, contact the Chery service station to recalibrate the sensor.
- All the above precautions do not cover all the situations that may affect normal operation of system function. The system function may not bring expected effect due to other reasons. Driver must always take responsibility for the vehicle control.

Active Speed Limit

Entering Active Speed Limit

1. Turn power supply to ON mode, press active speed limit LIM button to enter pre-speed limit state, standby indicator of active speed limit on instrument cluster turns on;
2. If engine is not started or speed is less than 30 km/h, press SET- button to enter speed limit state, and active speed limit indicator on instrument cluster turns on. Set speed is 30 km/h by default;
3. In the process of speed limit, when speed is within the range of 30 to 200 km/h, press SET- button to set current speed as limit speed and enter speed limit state, active speed limit indicator on instrument cluster turns on.

Exiting Active Speed Limit

1. Press active speed limit LIM button to exit speed limit state, active speed limit indicator on instrument cluster turns off.
2. Press cruise temporary exiting button to exit speed limit state and enter pre-speed limit state, standby indicator of active speed limit on instrument cluster turns on.

3. Press cruise button to exit speed limit state and enter pre-cruise state, standby indicator of cruise system on instrument cluster turns on.
4. Press following distance adjustment button to exit speed limit state and enter pre-cruise state, standby indicator of adaptive cruise system on instrument cluster turns on.

Vehicle Speed Setting

1. In the process of speed limit, press RES+ button, set speed increases by 1 km/h.
2. In the process of speed limit, long press RES+ button, set speed increases by 5 km/h.
3. In the process of speed limit, press SET- button, set speed decreases by 1 km/h.
4. In the process of speed limit, long press SET- button, set speed decreases by 5 km/h.

Driver Overtaking

1. In the process of speed limit, when driver fully depresses the accelerator pedal for overtaking or others to enter pre-speed limit state. Standby indicator of active speed limit on instrument cluster turns on.
2. After overtaking, the speed is higher than previously set speed limit, enter pre-speed limit state and standby indicator of active speed limit on instrument cluster turns on.
3. After overtaking, the speed is lower than previously set speed limit, enter speed limit state and active speed limit indicator on instrument cluster turns on.

Front Collision Warning System (FCW)

Brief Introduction

For front collision warning system (call FCW for short as follow), when FCW system detects that there is a dangerous situation ahead, it will firstly trigger pre-alarm function. If driver does not brake or steer to avoid, the dangerous situation will continue to deteriorate, and FCW system will trigger emergency alarm function. In some sudden situations (such as fast cut in or strong braking of vehicle ahead), both alarms may be triggered at the same time.

Caution:

- Pre-collision system will not sound an alarm when the vehicle speed is lower than 30 km/h. For static target ahead, the system will not sound an alarm when the vehicle speed is higher than 85 km/h.
- FCW and AEB share a same sensor, and detectable target is the same as AEB system. See the description of AEB system below for details.
- When FCW sounds an alarm continuously, if the driver actively depresses brake pedal, it should be depressed with a large force to trigger emergency brake assist function, achieving the best braking effect.
- System does not work if seat belt is not fastened and doors are not closed.
- System does not work if electronic stability system and FCW are not in ON.
- If yellow alarm symbol on instrument cluster comes on, please go to the Chery service station for inspection and repair.

Usage Description

1. Alarm Type
   (a) FCW is ON by default when the vehicle is powered on, if user does not turn off this function and the speed is higher than 30 km/h, when system judges that there is potential collision risk, pre-alarm function will be triggered, an alarm symbol and warning text "Front Collision Warning System ON" pop up on instrument cluster accompanied by rapid alarm sound to remind driver to take avoidance measures.
   (b) If collision risk continues to deteriorate and upgrade, the emergency alarm function will be activated, and a alarm symbol and warning text "Front Collision Warning System ON" also pop up on instrument cluster. At the same time, the system will adopt short brake to remind driver to take avoidance measures.
   (c) When vehicle speed exceeds 65 km/h and is close to the vehicle ahead for a long time, a safety distance alarm message "Attention, vehicle/pedestrian approaches" pops up on instrument cluster to remind driver to adjust following distance properly.
2. System OFF

(a) FCW system and safe distance alarm can be turned on or off through DVD head unit, After setting FCW system, it will still return to ON state at next ignition. After setting safe distance alarm, the previous setting options will be memorized.

Setting Method

Enter "Vehicle Setting" → "Assist Driving Setting" to set options of "Distance Alarm System" and "Front Collision Warning System".

3. Sensitivity Setting

(a) Alarm trigger time can be set on the DVD unit head. When the next ignition is performed after completing setting, system will memorize the last setting options and the setting options are divided into three distance levels: "Long", "Standard" and "Short". Distance level represents the different distance between the vehicle and the potential collision target when alarm function is triggered. If the setting is "Long", the alarm will be triggered earlier.

Setting Method

Enter "Vehicle Setting" → "Assist Driving Setting" to set options of "Front Collision Warning System".

Automatic Emergency Braking System (AEB)

Brief Introduction

For automatic emergency braking system (call AEB for short as follow), after FCW alarm function is activated (there is no FCW alarm when speed is lower than 30 km/h), if driver does not take measures, collision risk will continue to deteriorate, and system will start AEB automatically when the conditions are met, trying to avoid possible collision or reduce the speed during collision and reduce the loss caused by collision.

Usage Description

AEB is ON by default when the vehicle is powered on. It can be turned off on DVD head unit as necessary, but it will still be ON by default at the next ignition. Setting method are as follows: Enter "Vehicle Setting" → "Assist Driving Setting" to set options of "Automatic Emergency Braking System".

Caution:

- System does not work if seat belt is not fastened and doors are not closed.
- System does not work if electronic stability system and AEB are not in ON.
- After vehicle is automatically braked to stop, vehicle will not remain stationary and driver needs to take over the vehicle.
- During the activation of AEB, if driver turns steering wheel quickly or depresses accelerator pedal firmly, AEB function will exit.
- AEB activation speed is higher than 4 km/h, the collision can not be avoided completely if the speed is higher than 40 km/h.
- For stationary vehicle, operating speed range of AEB is 4 km/h to 53 km/h. For pedestrians and cyclists, operating speed range of AEB is 4 km/h to 64 km/h.
- If yellow alarm symbol on instrument cluster turns on, system will not work, please go to the Chery service station for inspection and repair.

Detection Target

1. Vehicle target

(a) Targets can be detected by the system include passenger vehicles, buses and trucks. There are certain limitations in the detection of some restructured vehicles, such as cement tankers, special vehicles with higher or lower chassis, etc.

2. Bicycle target

(a) System can works best when it detects the contours of body and bicycle, as well as movements of normal ride. System does not regard an oncoming cyclist as a target.

3. Pedestrian target

(a) Only when the system detects that people's head, arm and leg swings conform to the characteristics of normal walking can it play its best role. Pedestrians crossing the lane of the vehicle will be regarded as targets. Pedestrians walking vertically in this lane, walking in curves and blocked by other objects may not be regarded as targets by the system.

Caution:

- System can not violate the laws of physics and there are some limitations, driver must always control the vehicle and take full responsibility for the vehicle.
- Driver should control speed and the distance between the vehicle ahead and the vehicle according to weather, road surface and traffic conditions.
- System does not respond to animals or crossing vehicles, as well as oncoming vehicles, bicycles or pedestrians.
- Under some special circumstances, the system may perform unnecessary warning and braking, such as crossing the railroad track, entering the turning of the underground parking lot, etc. Some conditions will affect and weaken sensor detection, such as tunnel, the light of oncoming vehicle, the reflection of wet road surface, etc, affecting related functions of system.
- System performance will be greatly limited to the target that quickly cuts into the lane, the target that is detected after the vehicle changes the lane, and the target in the curve.
- All passengers on the vehicle must fasten their seat belts and secure the loaded objects to avoid danger when AEB system is triggered.
- Two sensors, radar and camera, are mounted on the front area of vehicle and behind the windshield. It should be noted that the field of vision of sensor should not be blocked by pollutants, and there should be no modification or license plate decoration frame in the front or surrounding areas, especially when the snow completely covers the sensor, the system function will exit. The sensor may also be affected by vibration or collision, resulting in system performance degradation or no function. In this case, recalibrate the sensor.
- When system function fails, yellow warning light on instrument cluster turns on, the system will not function at this time and need to be repaired.
- When installing non-full size spare tire, it is recommended to turn off FCW and AEB systems and replace original full size tire in time.
- All the above precautions do not cover all the situations that may affect normal operation of system function. The system function may not bring expected effect due to other reasons. Driver must always take responsibility for the vehicle control.

Traffic Jam Assist System (TJA) and Integrated Cruise Assist System (ICA)

Brief Introduction

1. For traffic jam assist system and integrated cruise assist system (call TJA and ICA for short as follow), TJA and ICA can reduce workload of drivers and provide driving assist function in monotonous driving environment or traffic jam. The function mainly relies on multi-function camera on the front windshield to detect lane lines for both vertical and horizontal control of vehicle.
2. It is called TJA when speed range is below 60 km/h, and vehicle will be kept running near lane center. If no lane line is detected, the vehicle will follow the vehicle ahead as a target. If lane line and vehicle target are not detected, the function will be cancelled.
3. It is called ICA when speed range is 60 km/h - 150 km/h, and vehicle will be kept running near lane center. If no lane line is detected, no matter whether there is a target vehicle ahead, the function will be cancelled.

System On

1. After vehicle starts, click "Traffic Jam Assist /Integrated Cruise Assist" on DVD to turn on it. The operation path is as follows:
   (a) Enter "Vehicle Setting" → "Driving Assist System Setting" → Traffic Jam Assist /Integrated Cruise Assist;
   (b) After the function is turned on, the gray operating indicator on instrument cluster turns on. When the function switch is turned on, no matter whether ACC is turned on, ACC will be turned on automatically at the same time. Similarly, ACC will be automatically turned off when it is turned off. After this function is turned on, the previous on state is not memorized after vehicle is powered off. If the function needs to be turned on again after vehicle is powered on, follow the above method;
   (c) After this function is turned on, do not turn off ACC function that has been turned on by switch, otherwise TJA/ICA function cannot be activated.

System Activation

Just like the method for activating ACC, when all ACC activation conditions are met, press "SET-" button to activate ACC function first. Meanwhile, camera determines if there is a lane line or a vehicle ahead as a target. When activation conditions are met, green operating indicator on instrument cluster turns on, and cruising speed and following distance will be adjusted as ACC system.

Function Exiting

During normal operation of TJA/ICA system, if one or more of the following situations occur, system functions will exit, and icon on instrument cluster will change from green to gray.

1. Any one of conditions for exiting ACC function;
2. Lanes are too wide or too narrow;
3. Curving radius of lane is too small;
4. Lane lines are not detected;
5. Driver actively turns steering wheel;
6. Steering wheel is out of hands;
7. Turn on turn signal light;
8. Turn on hazard warning light;
9. Vehicle speed is lower than 1 km/h.

Caution:

Be sure to carefully read the following precautions when using TJA/ICA system:

- TJA/ICA is a driving assist system and can not violate the laws of physics, there are some limitations, driver must always control of the vehicle and take full responsibility for the vehicle.
- The vertical control of TJA/ICA system is carried out by ACC system, and horizontal control is carried out by Lane Keeping System (LKA). All precautions of ACC and LKA systems are also applicable to this system.
- This system does not provide automatic driving function and does not allow off-hand driving. Under such conditions as turning, crossing, merging and cutting in of vehicles ahead, driver should control the vehicle at all times to ensure the safety of vehicle.
- System performance is affected by weather, illumination and lane line clarity. For example, under the conditions of backlight, sunset, night, snow and ice on the road surface and unclear lane lines due to road wear, the performance will be significantly reduced or even lost.
- When system fails, yellow warning light on instrument cluster turns on, TJA/ICA will not function at this time and contact CHERY service station to check and repair.
- All the above precautions do not cover all the situations that may affect normal operation of system function. The system function may not bring expected effect due to other reasons. Driver must always take responsibility for the vehicle control.

Speed Limit Assist System (SLA)

Brief Introduction

Speed limit assist system can detect speed limit sign information on the road ahead, and combine with speed limit information of navigation system, and notify the driver of the final speed limit information in the form of images, sounds. In case of overspeed, the system can send out an alarm and flash the speed limit icon by providing speed limit information or an overspeed alarm (when speed displayed on instrument cluster exceeds SLA output speed of 5km/h).

Function ON

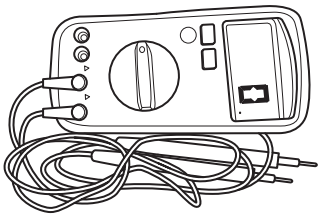
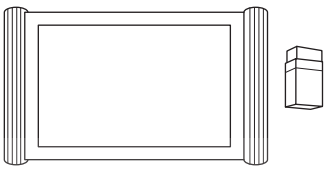
1. SLA will be activated if all of the following conditions are met:
   (a) Driver turns on SLA function by switch, or SLA was turned on in the previous ignition cycle.
   (b) SLA does not detect related faults.

Function OFF

1. SLA will be turned off when any of the following conditions is met:
2. Driver turns off SLA function by switch, or function was turned off in the previous ignition cycle;
3. SLA detects camera and navigation failure;
4. SLA is turned off by vehicle configuration code.

Special Tools and Equipment

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
Diagnostic Tester	 RCH0001006

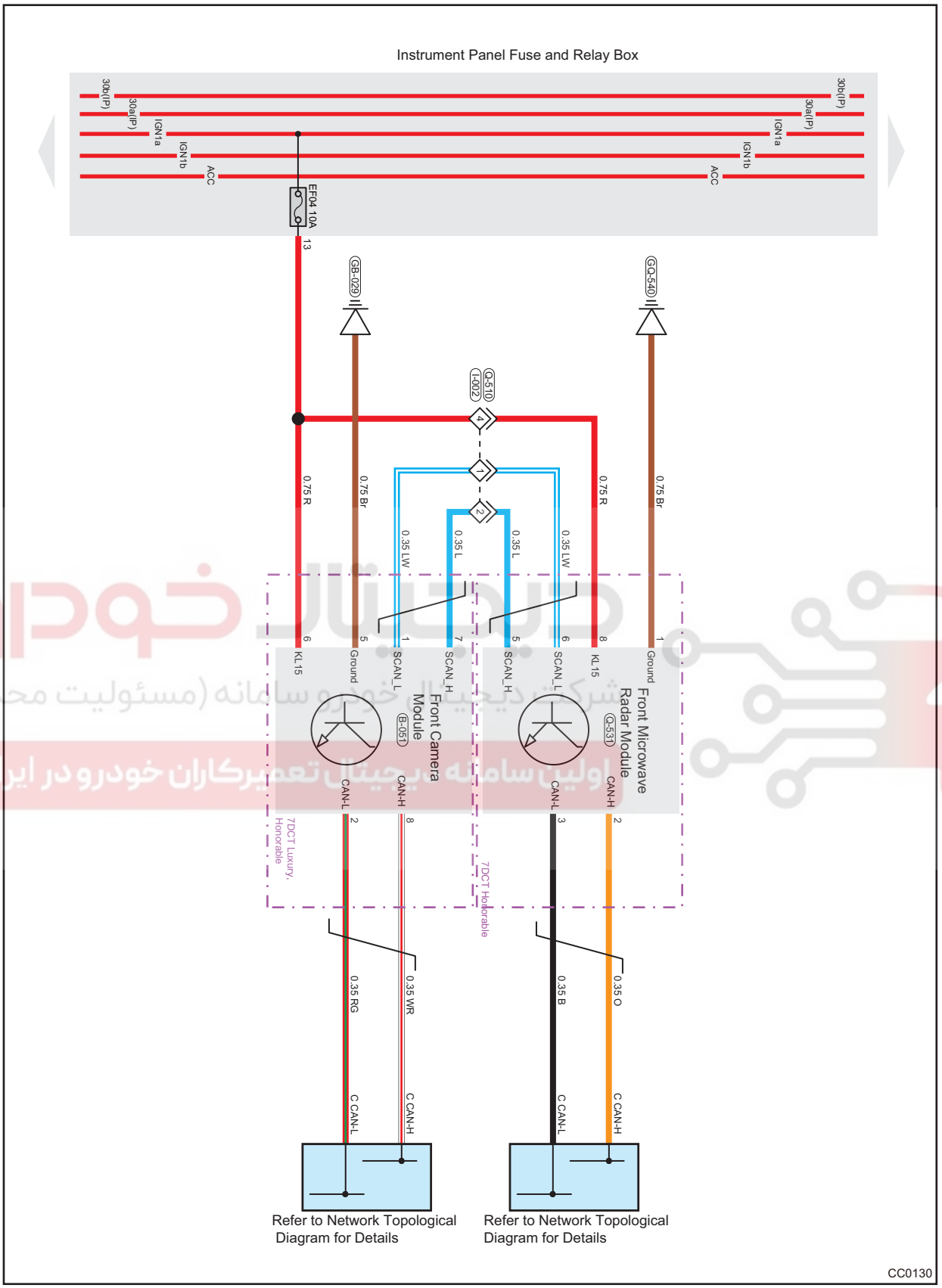
Tightening Torque List

Torque

Description	Tightening Torque
Front Microwave Radar Fixing Bolt	7 ± 1 N·m

System Circuit Diagram

Circuit Diagram of Front Microwave Radar Module (FRM) & Front Camera Module (FCM)


Instrument Panel Fuse and Relay Box
30b(IP)
30a(IP)
IGN1a
IGN1b
ACC
EF04 10A
13
GB-029
GQ-540
C-510
(J02)
4
1
2
0.75 R
0.75 Br
0.35 LW
0.35 L
6
5
1
7
8
KL15
Ground
SCAN_L
SCAN_H
Front Camera Module
B-051
Front Microwave Radar Module
Q-531
CAN-L
CAN-H
2
8
3
7DCT Luxury, Honorable
7DCT Honorable
0.35 RG
0.35 WR
0.35 B
0.35 O
C CAN-L
C CAN-H
Refer to Network Topological Diagram for Details
Refer to Network Topological Diagram for Details
CC0130

Diagnosis Information and Steps

Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the cruise control system.

1	**Vehicle brought to workshop**

NEXT

2	**Check battery voltage**

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

Result

Result	Go to
OK	A
NG	B

B → **Replace battery**

A

3	**Customer problem analysis**

NEXT

4	**Read DTCs**

Result

Result	Go to
DTC	A
No DTC	B

B → **Repair according to Problem Symptoms Table**

A

5	**Read DTCs (current DTC and history DTC)**

Result

Result	Go to
DTC	A
No DTC	B

B → Troubleshoot according to intermittent DTC

A

6	Repair according to Diagnostic Trouble Code (DTC) Chart

NEXT

7	Adjust, repair or replace

NEXT

8	Conduct test and confirm malfunction has been repaired

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 OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and view DTCs stored in system.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

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

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:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contacting is in good condition.
- Reinstall ground bolt or nut securely.
- Check if add-on accessories interfere with ground circuit.

- 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.

Problem Symptoms Table

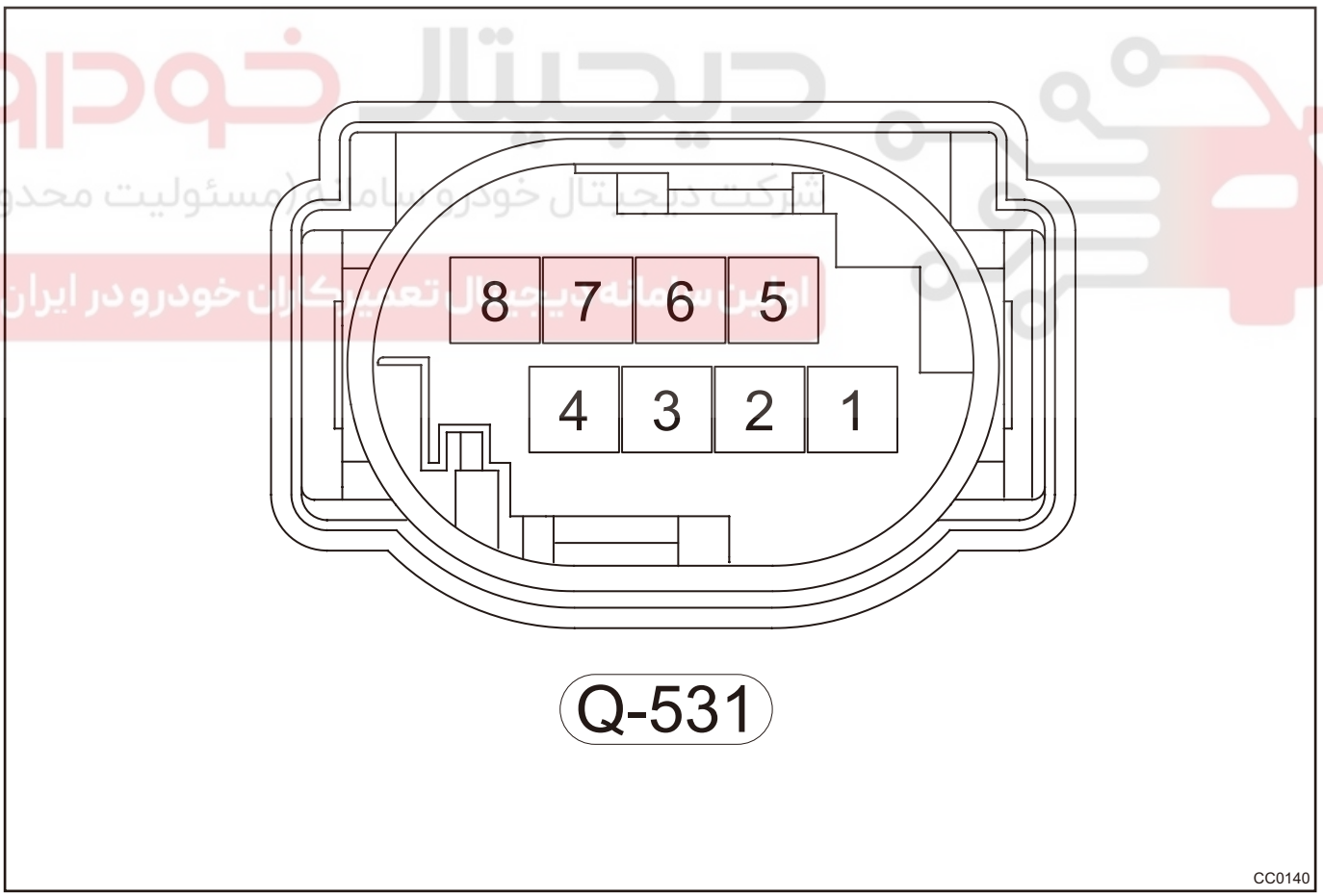
Constant Speed Cruise/Active Speed Limit/Adaptive Cruise

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.

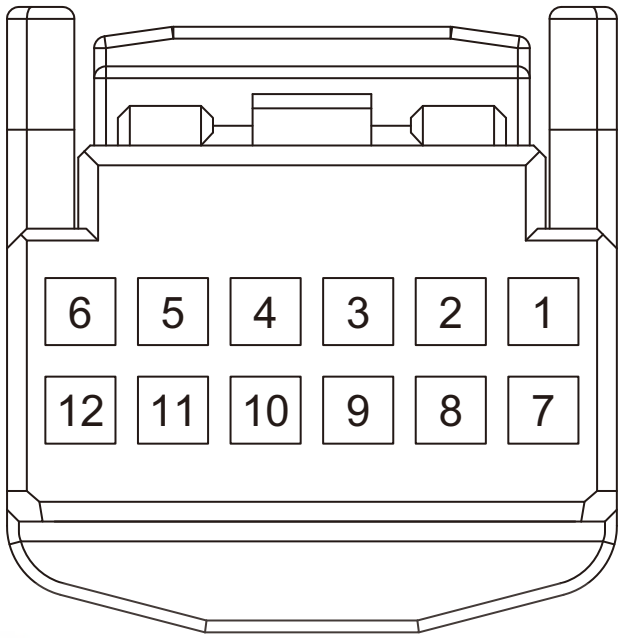
Symptom	Suspected Area
Vehicle speed can not be set (Meter indicator does not illuminate)	Wire harness or connector
	Engine Control Module (EMS)
	Instrument cluster
Vehicle speed can not be set (Meter indicator comes on normally)	Multi-function switch
	Wire harness or connector
	Brake switch
	EPB module
	Body Control Module (BCM)
	Engine Control Module (EMS)

Front Microwave Radar Module (FRM) Terminal List



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	Ground	5	SCAN-H
2	CAN1-H	6	SCAN-L
3	CAN1-L	7	-
4	-	8	IGN1

Front Camera Module (FCM) Terminal List



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	SCAN-L	7	SCAN-H
2	CAN-L	8	CAN-H
3	-	9	-
4	-	10	-
5	Ground	11	-
6	KL15	12	-

Front Camera Module (FCM) Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
C190016	Supply Voltage Error - Low Voltage
C190017	Supply Voltage Error - High Voltage
C190116	Circuit Voltage Error - Below Threshold
C190117	Circuit Voltage Error - Above Threshold
C190244	Parameter Error - Dataset Error
C190354	Parameter Error - Initial Calibration Data Missing
C190346	Parameter Error - Initial Calibration Data Out of Range
C190446	Parameter Error - Online Calibration Data Out of Range
C190594	Process Error - Initial Calibration Timeout
C19064B	Temperature Error - ECU Temperature Out of Range
C190797	Electronic Error - Camera Blindness
C190749	Electronic Error - Internal Electronic Failure Temporary
C190709	Electronic Error - Internal Electronic Failure Permanent

DTC	DTC Definition
U007388	CAN Communication Error - Vehicle CAN Controller BusOff Error
U12A188	CAN Communication Error - Private CAN Controller BusOff Error
U012987	CAN Communication Error - Lost Communication with BSM
U014087	CAN Communication Error - Lost Communication with BCM
U300051	Control Module-Not Programmed
U010087	CAN Communication Error - Lost Communication with EMS
U013187	CAN Communication Error - Lost Communication with EPS
U015587	CAN Communication Error - Lost Communication with ICM
U024587	CAN Communication Error - Lost Communication with IHU
U012687	CAN Communication Error - Lost Communication with SAM
U012387	CAN Communication Error - Lost Communication with YAS
U12E187	CAN Communication Error - Lost Communication with FRM
U041881	CAN Communication Error - Invalid Data from Brake System Control Module
U042281	CAN Communication Error - Invalid Data from BCM
U044781	CAN Communication Error - Invalid Data Received from Gateway "A"
U040181	CAN Communication Error - Invalid Data from EMS
U042081	CAN Communication Error - Invalid Data from EPS
U042381	CAN Communication Error - Invalid Data from ICM
U0546-81	CAN Communication Error - Invalid Data from IHU
U0428-81	CAN Communication Error - Invalid Data from SAM
U051381	CAN Communication Error - Invalid Data from YAS
U140981	CAN communication error - Invalid Data from Cruise Control Front Distance Range Sensor
U3000-51	Control Module-Not Programmed

DTC	C190244	Parameter Error - Dataset Error

DTC	C190749	Electronic Error - Internal Electronic Failure Temporary

DTC	C190709	Electronic Error - Internal Electronic Failure Permanent

Description

DTC	DTC Definition	Possible Cause
C190244	Parameter Error - Dataset Error	Front camera module is damaged
C190749	Electronic Error - Internal Electronic Failure Temporary	
C190709	Electronic Error - Internal Electronic Failure Permanent	

1	Check for DTCs

(a) Using diagnostic tester to clear DTC, and read front camera module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	B
NG	A

B → **System is normal**

A

2	Check if front camera module operates normally

Result

Result	Go to
OK	B
NG	A

B → **Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again**

A → **Replace front camera module**

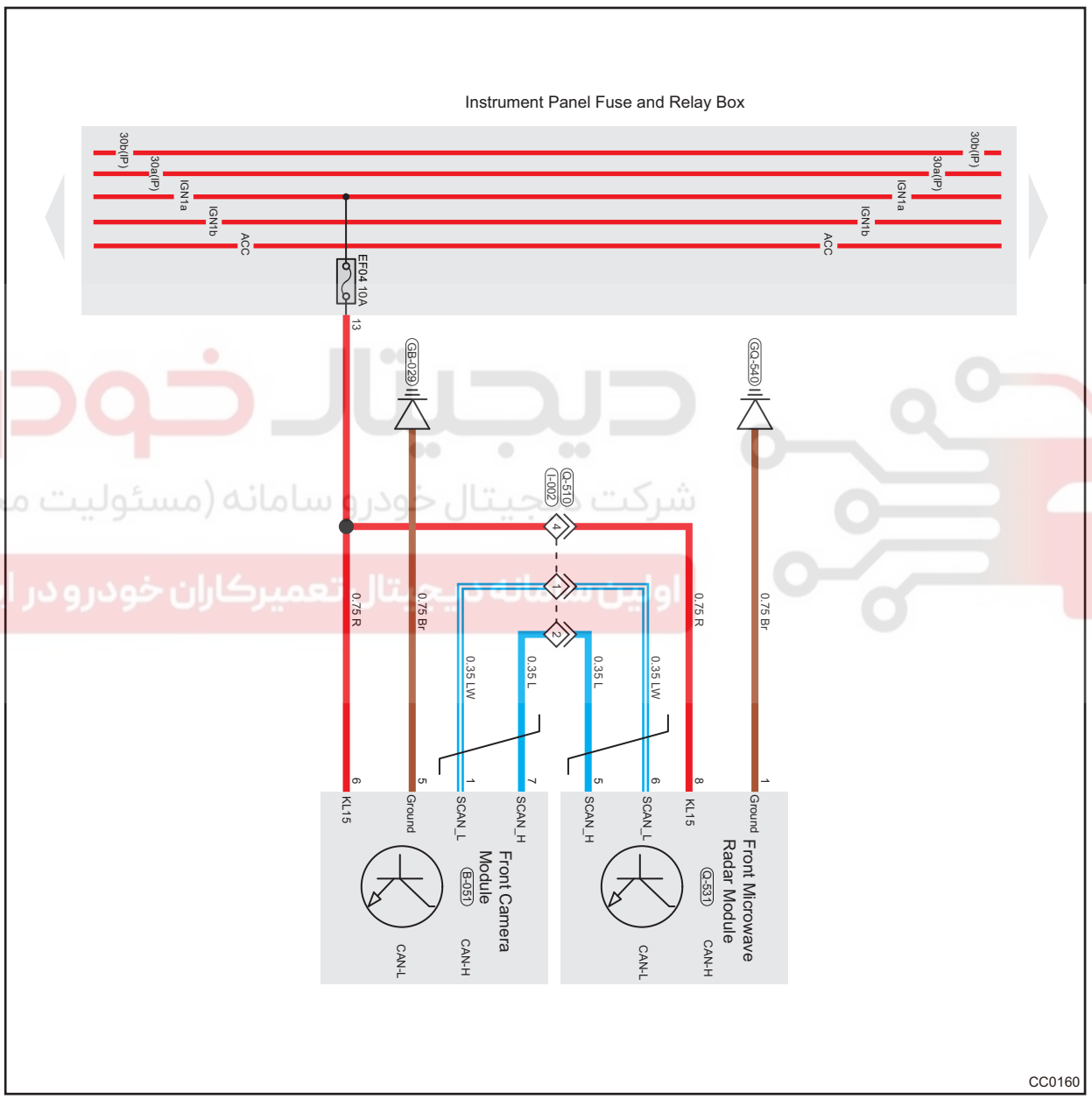
DTC	C190116	Circuit Voltage Error - Below Threshold

DTC	C190117	Circuit Voltage Error - Above Threshold

DTC	C190016	Supply Voltage Error - Low Voltage

DTC	C190017	Supply Voltage Error - High Voltage

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C190116	Circuit Voltage Error - Below Threshold	Front camera module is damaged Wire harness
C190117	Circuit Voltage Error - Above Threshold	
C190016	Supply Voltage Error - Low Voltage	
C190017	Supply Voltage Error - High Voltage	

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

Confirmation Procedure
Confirm that battery voltage is 9 to 14.5 V under starting state before performing following procedures.

1	Check fuse

(a) Check if fuse EF04 10A of engine compartment fuse and relay box is blown.

Result

Result	Go to
OK	B
NG	A

A → Replace fuse

B

2	Check instrument panel fuse box output voltage

(a) Turn ignition switch to ON.
(b) Measure voltage between terminal (13) of instrument panel fuse and relay box connector I-004 and body ground (using digital multimeter).

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-004 (13) and body ground	ON	9 - 14.5 V

Result

Result	Go to
OK	B
NG	A

A → Replace instrument panel fuse and relay box

B

3	Check wire harness for open

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the front camera module connector B-051.

(d) Using ohm band of digital multimeter, measure if resistance between terminal (13) of connector I-004 and terminal (6) of connector B-051 of instrument panel fuse and relay box is normal to check wire harness for open.

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-004 (13) - B-051 (6)	ENGINE START STOP switch OFF	⩽ 1 Ω

Result

Result	Go to
OK	B
NG	A

B → **Replace front camera module**

A → **Repair related wire harness**

DTC	C190797	Electronic Error - Camera Blindness

Description

DTC	DTC Definition	Possible Cause
C190797	Electronic Error - Camera Blindness	Front camera module is damaged

1	Check for DTCs

(a) Using diagnostic tester to clear DTC, and read front camera module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	B
NG	A

B → **System is normal**

A

2	Check if front camera module is covered by foreign matters and clean dirt on the surface of front camera module

Result

Result	Go to
OK	B
NG	A

B → **Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again**

A → **Replace front camera module assembly**

DTC	C19064B	Temperature Error - ECU Temperature Out of Range

Description

DTC	DTC Definition	Possible Cause
C19064B	Temperature Error - ECU Temperature Out of Range	Overheat protection

1	Clear DTC to relieve overheat protection

DTC	C190346	Parameter Error - Initial Calibration Data Out of Range

DTC	C190354	Parameter Error - Initial Calibration Data Missing

DTC	C1905-94	Process Error - Initial Calibration Timeout

DTC	C1904-46	Parameter Error - Online Calibration Data Out of Range

Description

DTC	DTC Definition	Possible Cause
C190346	Parameter Error - Initial Calibration Data Out of Range	Recalibration
C190354	Parameter Error - Initial Calibration Data Missing	
C190594	Process Error - Initial Calibration Timeout	
C190446	Parameter Error - Online Calibration Data Out of Range	

Caution:

Possible cause of malfunction: Front camera module calibration is not performed or corresponding calibration conditions are not met.

1	**Refer to calibration method of front camera module and perform recalibration**

DTC	U130055	Control Module-Not Programmed

Description

DTC	DTC Definition	Possible Cause
U130055	Control Module-Not Programmed	Rewrite configuration data

Caution:
Possible cause of malfunction: Configuration data is not written into module.

1	Rewrite configuration data

(a) Use diagnostic tester to enter "Special function" of the system to write configuration data.

Result

Result	Go to
OK	B
NG	A

B → **Perform running test after clearing DTCs**

DTC	U007388	CAN Communication Error - Vehicle CAN Controller BusOff Error
DTC	U12A188	CAN Communication Error - Private CAN Controller BusOff Error
DTC	U012987	CAN Communication Error - Lost Communication with BSM
DTC	U014087	CAN Communication Error - Lost Communication with BCM
DTC	U300051	Control Module-Not Programmed
DTC	U010087	CAN Communication Error - Lost Communication with EMS
DTC	U013187	CAN Communication Error - Lost Communication with EPS
DTC	U015587	CAN Communication Error - Lost Communication with ICM
DTC	U024587	CAN Communication Error - Lost Communication with IHU
DTC	U012687	CAN Communication Error - Lost Communication with SAM
DTC	U012387	CAN Communication Error - Lost Communication with YAS
DTC	U12E187	CAN Communication Error - Lost Communication with FRM
DTC	U041881	CAN Communication Error - Invalid Data from Brake System Control Module
DTC	U042281	CAN Communication Error - Invalid Data from BCM
DTC	U044781	CAN Communication Error - Invalid Data Received from Gateway "A"

DTC	U040181	CAN Communication Error - Invalid Data from EMS
DTC	U042081	CAN Communication Error - Invalid Data from EPS
DTC	U042381	CAN Communication Error - Invalid Data from ICM
DTC	U0546-81	CAN Communication Error - Invalid Data from IHU
DTC	U0428-81	CAN Communication Error - Invalid Data from SAM
DTC	U051381	CAN Communication Error - Invalid Data from YAS
DTC	U140981	CAN communication error - Invalid Data from Cruise Control Front Distance Range Sensor
DTC	U3000-51	Control Module-Not Programmed

Refer to CAN communication system

Front Microwave Radar Module (FRM) Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
C192000	FCM Shutdown/Init State
C192100	FCM Position Out of Range State
C192200	FCM Position Error State
C106017	Supply Voltage Error - High Voltage
C106016	Supply Voltage Error - Low Voltage
C193009	DTC_Communication_Failure
C193102	DTC_Sensor_Interference
C19324B	DTC_Temperature_Too_High
C193317	DTC_Internal_Voltage_Low
C193405	DTC_Sensor_HW_SW_Mismatch
C193604	DTC_External_Plausi_STA
C193707	DTC_External_Plausi_Tire_Size
C193804	DTC_Sensor_Radar_Modulation
C193978	DTC_Sensor_Misaligned_Horizontal
C193A78	DTC_Sensor_Misaligned_Vertical
C193B76	DTC_MRR_System_Blind
C193C09	DTC_Sensor_DSP_Power
C193D04	DTC_HW_Failure
C193E78	DTC_Alignment_Not_Done
C193F53	DTC_Production_Mode_Active
C193C76	DTC_MRR_Sensor_Blind
C193E76	DTC_Sensor_No_Free_Sight
C193F76	DTC_System_No_Free_Sight
C193D76	DTC_System_Disturbed
C193076	DTC_Radar_Unavailable
U007388	CAN Communication Error - Communication BusOff Error (Public CAN)

DTC	DTC Definition
U003888	CAN Communication Error - Communication BusOff Error (Private CAN)
U012687	CAN Communication Error - Lost Communication with SAM
U012987	CAN Communication Error - Lost Communication with ESP
U015587	CAN Communication Error - Lost Communication with ICM
U014087	CAN Communication Error - Lost Communication with BCM
U014687	CAN Communication Error - Lost Communication with CGW
U010087	CAN Communication Error - Lost Communication with EMS
U010187	CAN Communication Error - Lost Communication with TCU
U12E087	CAN Communication Error - Lost Communication with FCM
U0428-81	CAN Communication Error - Invalid Data Received from SAM
U041881	CAN Communication Error - Invalid Data from Brake System Control Module
U059B81	CAN Communication Error - Invalid Data Received from MFS
U042381	CAN Communication Error - Invalid Data Received from ICM
U042281	CAN Communication Error - Invalid Data from BCM
U044781	CAN Communication Error - Invalid Data Received from CGW
U040181	CAN Communication Error - Invalid Data Received from EMS
U040281	CAN cOMMUNICATION ERROR - Invalid Data Received from TCU
U1407-81	CAN Communication Error - Invalid Data from Front Camera Module
U300051	Control Module-Not Programmed

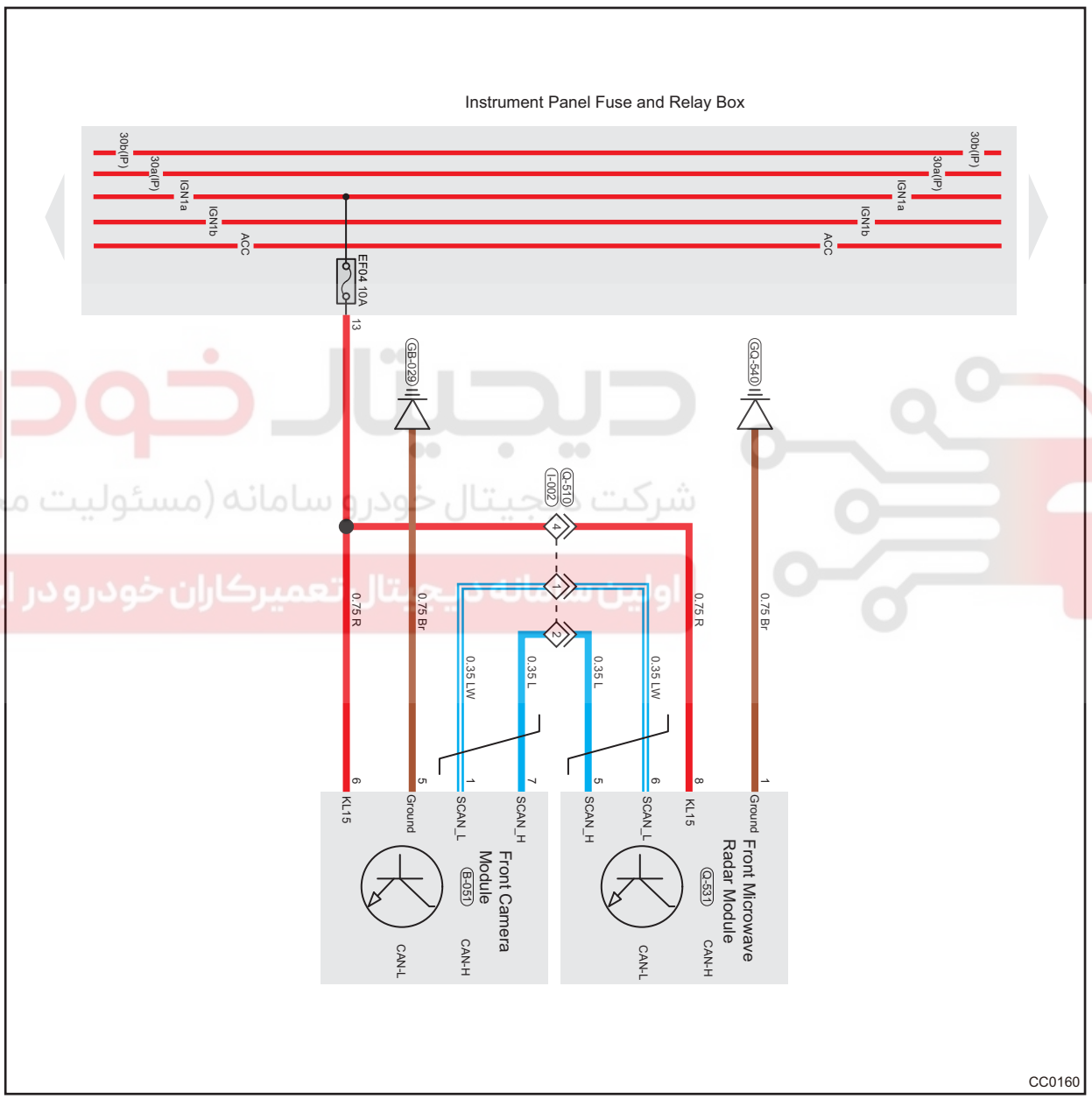
DTC	C106017	Supply Voltage Error - High Voltage

DTC	C106016	Supply Voltage Error - Low Voltage

DTC	C193317	DTC_Internal_Voltage_Low

DTC	530801	DTC_Voltage_Failure

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C106017	Supply Voltage Error - High Voltage	Battery Wire harness Front microwave radar module
C106016	Supply Voltage Error - Low Voltage	
C193317	DTC_Internal_Voltage_Low	
530801	DTC_Voltage_Failure	

1	Check voltage

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check battery voltage (Not less than 12 V) with a digital multimeter.

Result

Result	Go to
OK	A
NG	B

B → **Replace battery**

A

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) Using a digital multimeter, check if voltage between positive and negative battery cables is normal (12.5 V - 14.8 V).

Result

Result	Go to
OK	A
NG	B

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

A

3	Check fuse

(a) Check if fuse EF04 10A is blown.

Result

Result	Go to
OK	A
NG	B

B → **Replace fuse**

A

4	Check engine compartment fuse and relay box output voltage

(a) Turn ignition switch to ON.

(b) Measure voltage between instrument panel fuse and relay box I-004 (13) and body ground (using a digital multimeter).

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-004 (13) and body ground	ON	9 - 14.5 V

Result

Result	Go to
OK	A
NG	B

B → **Replace instrument panel fuse and relay box**

A

5	Check wire harness for open

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the front microwave radar module connector Q-531.
(d) Using ohm band of digital multimeter, measure if resistance between terminal (13) of connector I-004 and terminal (8) of connector Q-531 of instrument panel fuse and relay box is normal to check wire harness for open.

Standard Condition

Multimeter Connection	Condition	Normal Condition
I-004 (13) - Q-531 (8)	ENGINE START STOP switch OFF	⩽ 1 Ω

Result

Result	Go to
OK	A
NG	B

A → **Replace front microwave radar module**

B → **Repair related wire harness**

DTC	C193604	DTC_External_Plausi_STA

Description

DTC	DTC Definition	Possible Cause
C193604	DTC_External_Plausi_STA	Steering angle position is not calibrated

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read front microwave radar module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	A
NG	B

A → **System is normal**

B

2	Check steering angle position

Result

Result	Go to
OK	A
NG	B

A → **Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again**

B → **Refer to calibrated steering angle position of steering system**

DTC	C193707	DTC_External_Plausi_Tire_Size

Description

DTC	DTC Definition	Possible Cause
C193707	DTC_External_Plausi_Tire_Size	Different tire type

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read front microwave radar module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	A
NG	B

A → **System is normal**

B

2	Check if the tire size is the same as original tire size

Result

Result	Go to
OK	A
NG	B

A → **Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again**

B → **Replace tire of same type**

DTC	C193102	DTC_Sensor_Interference

DTC	C193D76	DTC_System_Disturbed

Description

DTC	DTC Definition	Possible Cause
C193102	DTC_Sensor_Interference	The vehicle may be equipped with other interference components
C193D76	DTC_System_Disturbed	

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read front microwave radar module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	A
NG	B

A → System is normal

B

2	Check if the vehicle is equipped with other interference components

Result

Result	Go to
OK	A
NG	B

A → Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again

B → Remove add-on components and test function

DTC	C193B76	DTC_System_No_Free_Sight

DTC	C193C76	DTC_System_No_Free_Sight

DTC	C193E76	DTC_System_No_Free_Sight

DTC	C193F76	DTC_System_No_Free_Sight

Description

DTC	DTC Definition	Possible Cause
C193B76	DTC_System_No_Free_Sight	•Front microwave radar module assembly •There is dirt on radar surface
C193C76	DTC_System_No_Free_Sight	
C193E76	DTC_System_No_Free_Sight	
C193F76	DTC_System_No_Free_Sight	

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read front microwave radar module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	A
NG	B

A → System is normal

B

2	Check if front radar is covered by foreign matters and clean dirt on the surface of front radar

43

Result

Result	Go to
OK	A
NG	B

A → Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again

B → Replace front microwave radar module assembly

DTC	C19324B	DTC_Temperature_Too_High

Description

DTC	DTC Definition	Possible Cause
C19324B	DTC_Temperature_Too_High	Overheat protection

1	**Clear DTC to relieve overheat protection**

DTC	C193804	DTC_Sensor_Radar_Modulation

DTC	C193978	DTC_Sensor_Misaligned_Horizontal

DTC	C193A78	DTC_Sensor_Misaligned_Vertical

DTC	C193E78	DTC_Alignment_Not_Done

Description

DTC	DTC Definition	Possible Cause
C193804	DTC_Sensor_Radar_Modulation	Recalibration
C193978	DTC_Sensor_Misaligned_Horizontal	
C193A78	DTC_Sensor_Misaligned_Vertical	
C193E78	DTC_Alignment_Not_Done	

Caution:

Possible cause of malfunction: Front radar calibration is not performed or corresponding calibration conditions are not met.

1	**Refer to calibration method of front microwave radar and perform recalibration**

DTC	982700	DTC_Coding_Incomplete

DTC	U300051	Control Module-Not Programmed

Description

DTC	DTC Definition	Possible Cause
982700	DTC_Coding_Incomplete	Configuration data is not written into module
U300051	Control Module-Not Programmed	

Caution:
Possible cause of malfunction: Configuration data is not written into module.

1	Rewrite configuration data

(a) Use diagnostic tester to enter "Special function" of the system to write configuration data.

Result

Result	Go to
OK	A

A → **Perform running test after clearing DTCs**

DTC	C193F53	DTC_Production_Mode_Active

Description

DTC	DTC Definition	Possible Cause
C193F53	DTC_Production_Mode_Active	Production mode turns on

1	Turn production mode off

(a) Use diagnostic tester to enter "Special function" of the system to turn off production mode.

Result

Result	Go to
OK	A

A → **Perform running test after clearing DTCs**

DTC	C193009	DTC_Communication_Failure
DTC	C193405	DTC_Sensor_HW_SW_Mismatch
DTC	C193804	DTC_Sensor_Radar_Modulation
DTC	C193C09	DTC_Sensor_DSP_Power
DTC	530204	DTC_Reference_Velocity_Not_Available
DTC	53134B	DTC_Tempmon_Failure
DTC	531210	DTC_Lense_Heating_Failure

Description

DTC	DTC Definition	Possible Cause
53134B	DTC_Tempmon_Failure	Front microwave radar module or wire harness is damaged
C193009	DTC_Communication_Failure	
C193405	DTC_Sensor_HW_SW_Mismatch	
C193804	DTC_Sensor_Radar_Modulation	
C193C09	DTC_Sensor_DSP_Power	
530204	DTC_Reference_Velocity_Not_Available	
531210	DTC_Lense_Heating_Failure	

1	**Check for DTCs**

(a) Using diagnostic tester, clear DTC and read front microwave radar module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	A
NG	B

A → **System is normal**

B

2	**Check if front radar operates normally**

Result

Result	Go to
OK	A
NG	B

A → **Turn off vehicle power supply (disconnect the negative battery cable), then clear DTC again**

B	Replace front microwave radar module

DTC	530104	DTC_HW_Defect

DTC	C193076	DTC_Radar_Unavailable

DTC	C193D04	DTC_HW_Failure

Description

DTC	DTC Definition	Possible Cause
530104	DTC_HW_Failure	•Front microwave radar module
C193076	DTC_Radar_Unavailable	
C193D04	DTC_HW_Failure	

1	Check for DTCs

(a) Using diagnostic tester, clear DTC and read front microwave radar module DTC again.
(b) Check if DTCs occur again.

Result

Result	Go to
OK	A
NG	B

A → **System is normal**

B

2	Replace front microwave radar module

(a) Replace the front microwave radar module.
(b) Perform running test after clearing DTCs.

Result

Result	Go to
OK	A
NG	B

A → **System is normal**

B → **Replace front microwave radar module**

DTC	U007388	CAN Communication Error - Vehicle CAN Controller BusOff Error
DTC	U003888	CAN Communication Error - Communication BusOff Error (Private CAN)
DTC	U012687	CAN Communication Error - Lost Communication with SAM
DTC	U012987	CAN Communication Error - Lost Communication with ESP
DTC	U015587	CAN Communication Error - Lost Communication with ICM
DTC	U014087	CAN Communication Error - Lost Communication with BCM
DTC	U014687	CAN Communication Error - Lost Communication with CGW
DTC	U010087	CAN Communication Error - Lost Communication with EMS
DTC	U010187	CAN Communication Error - Lost Communication with TCU
DTC	U12E087	CAN Communication Error - Lost Communication with FCM
DTC	U0428-81	CAN Communication Error - Invalid Data Received from SAM
DTC	U041881	CAN Communication Error - Invalid Data from Brake System Control Module
DTC	U059B81	CAN Communication Error - Invalid Data Received from MFS
DTC	U042381	CAN Communication Error - Invalid Data Received from ICM

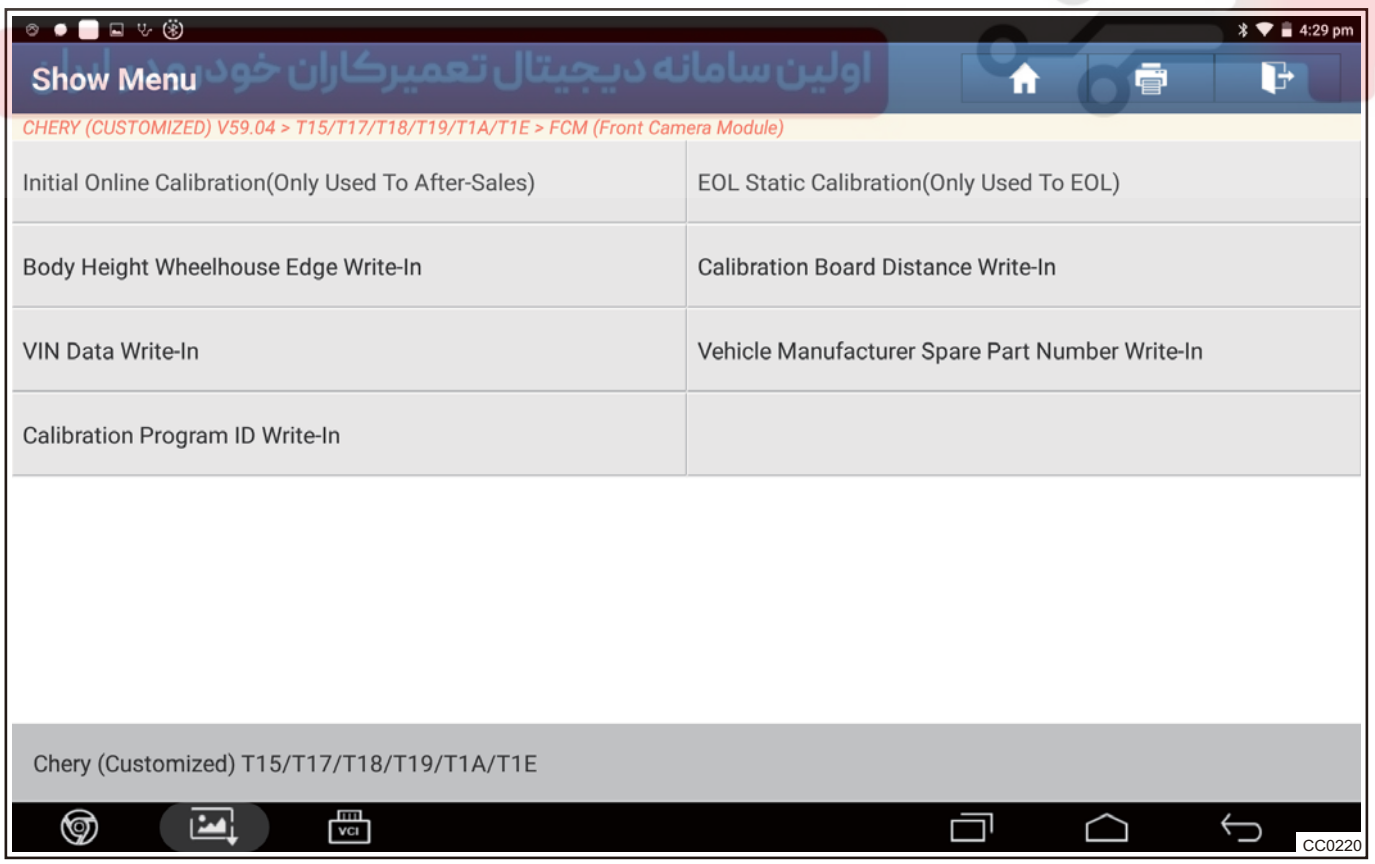
DTC	U042281	CAN Communication Error - Invalid Data from BCM
DTC	U044781	CAN Communication Error - Invalid Data Received from CGW
DTC	U040181	CAN Communication Error - Invalid Data Received from EMS
DTC	U040281	CAN cOMMUNICATION ERROR - Invalid Data Received from TCU
DTC	U1407-81	CAN Communication Error - Invalid Data from Front Camera Module
DTC	U300051	Control Module-Not Programmed

Refer to CAN communication system

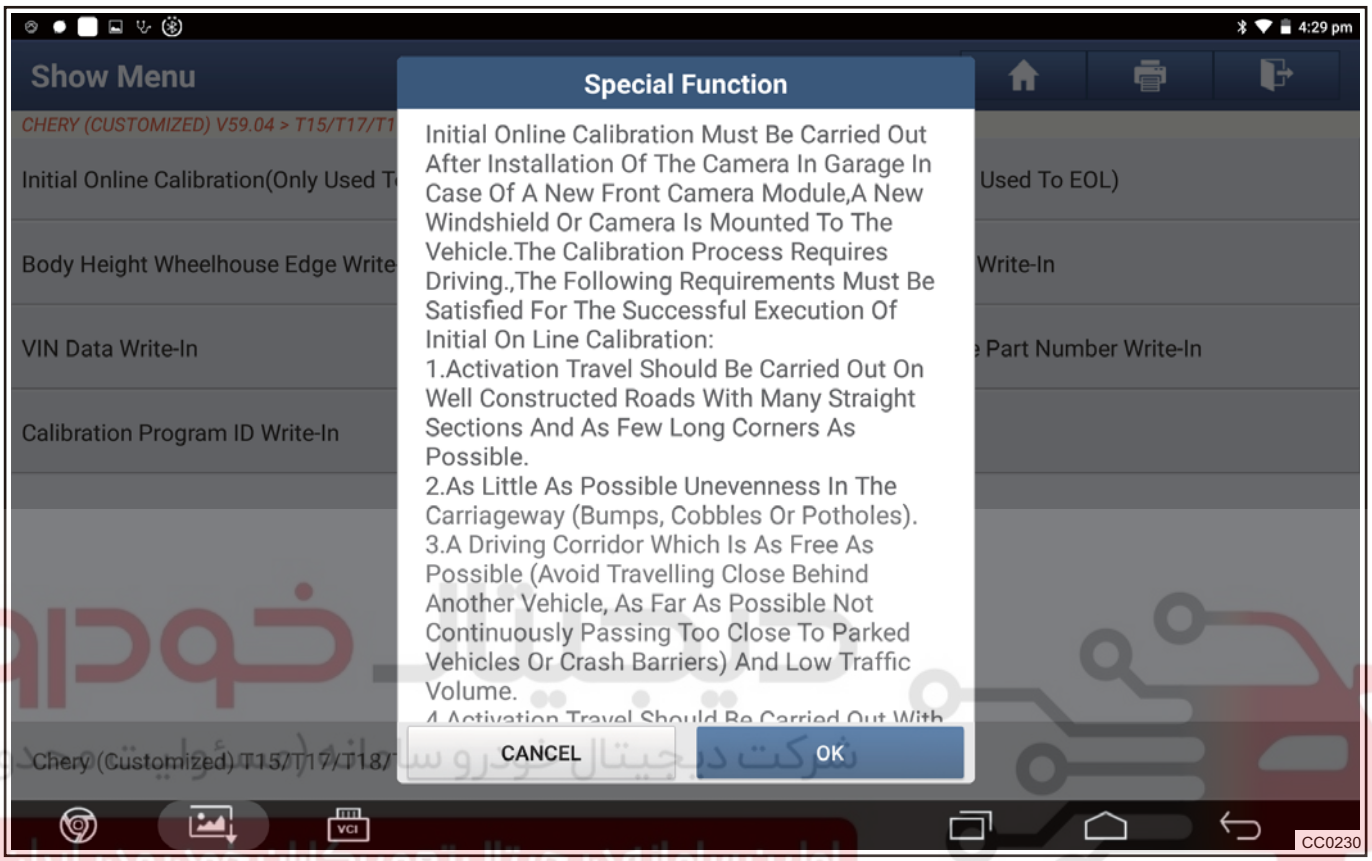
Match Learning

Front Camera Module (FCM) Calibration

1. Click "FCM (Front Camera Module)".
2. Click "Special Function".
3. Click "Online Initialization Calibration (Only for After-Sales)".



4. Read precautions, confirm and click "Yes".
   Calibration description: As a method of after-sales calibration, the initial online calibration can be used to calibrate the camera without a calibration board. The initial online calibration is performed during driving, so it is necessary to measure wheel house height accurately before calibrating, and write it into camera through diagnostic instructions.



5. Drive the vehicle for about 6 minutes and countdown is displayed, after countdown is over, there is a prompt "Calibration Complete - Successful".

Front Microwave Radar Module (FRM) Calibration

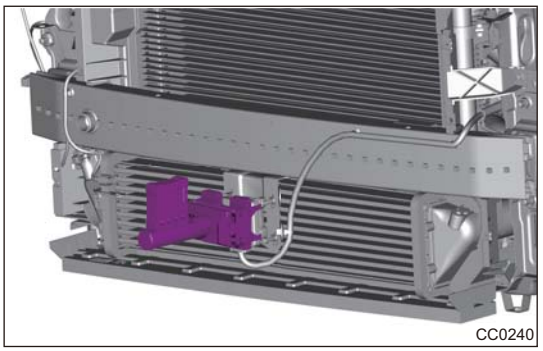
Calibration Condition

Use a spirit level to calibrate the vertical direction of radar. The requirements for calibration are as follows:

- Calibration site for parking vehicle must be horizontal, with an inclination of -0.3 ～ 0.3°, or inclination of calibration site can be measured.
- Keep the radar surface clean, especially ensure the positioning accuracy of three installation positioning points of the spirit level.
- Use SDA to calibrate the horizontal direction of radar. Environmental requirements for calibration are as follows.
  - Keep the radar surface clean and free of snow, soil and other objects.
  - Avoid calibration in rainy and snowy weather.
  - There should be stationary metal targets on both sides of road, such as lampposts, signboards, etc. Highway or elevated road with metal railings are recommended. When driving calibration is started, the vehicle must drive under certain conditions to gradually increase the progress bar of driving calibration to 100% and complete the driving calibration process. The driving conditions of calibration are as follows:

Limitations	Threshold	Out of Limit Hint
Minimum speed	40 km/h	Speed is too low
Maximum speed	120 km/h	Speed is too high
Minimum longitudinal acceleration	-0.5 m/s2	Longitudinal acceleration is too low

Limitations	Threshold	Out of Limit Hint
Maximum longitudinal acceleration	1.0 m/s2	Longitudinal acceleration is too high
Maximum lateral acceleration	2.0 m/s2	Lateral acceleration is too high
Maximum steering qulv	0.001 /m	Curvature is too large
ABS, ASR, ESP, MSR trigger		Vehicle dynamic condition interference (ABS, ASR, ESP, MSR, etc. trigger)


CC0240

After sales calibration of medium distance radar is performed by combining level calibration and driving calibration. Use a spirit level to calibrate the vertical direction firstly, then use driving calibration service to calibrate the horizontal direction, and finally make the deviation between driving axis and radar axis within a certain range. Radar calibration is required when:

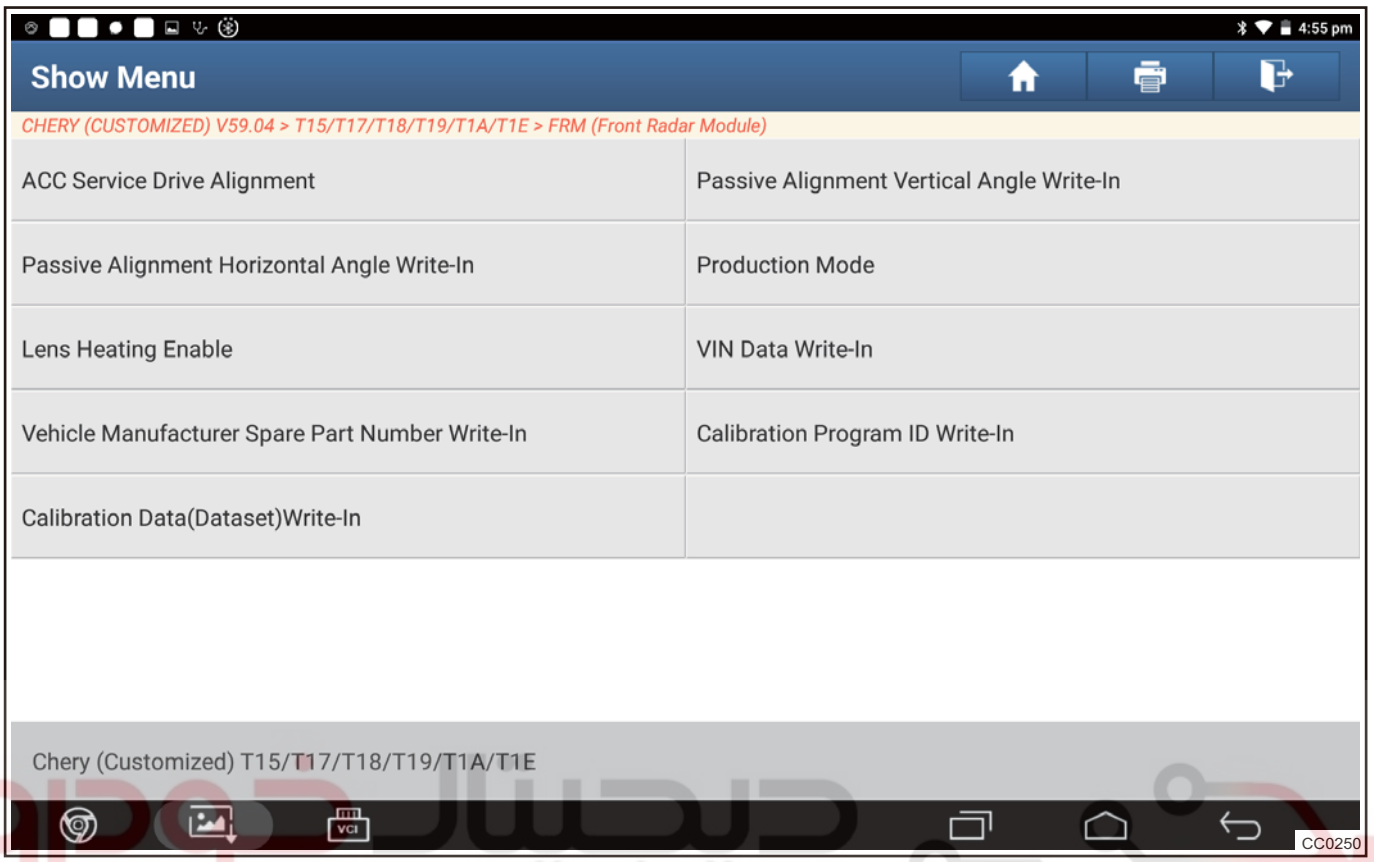
- When replacing radar assembly with a new one, for example, replace radar or radar bracket.
- When the driving axis of the vehicle changes, for example, four-wheel alignment was performed again, etc.
- When the radar reports an error and reads the error code as "Front Radar not Calibrated" by diagnostic equipment.

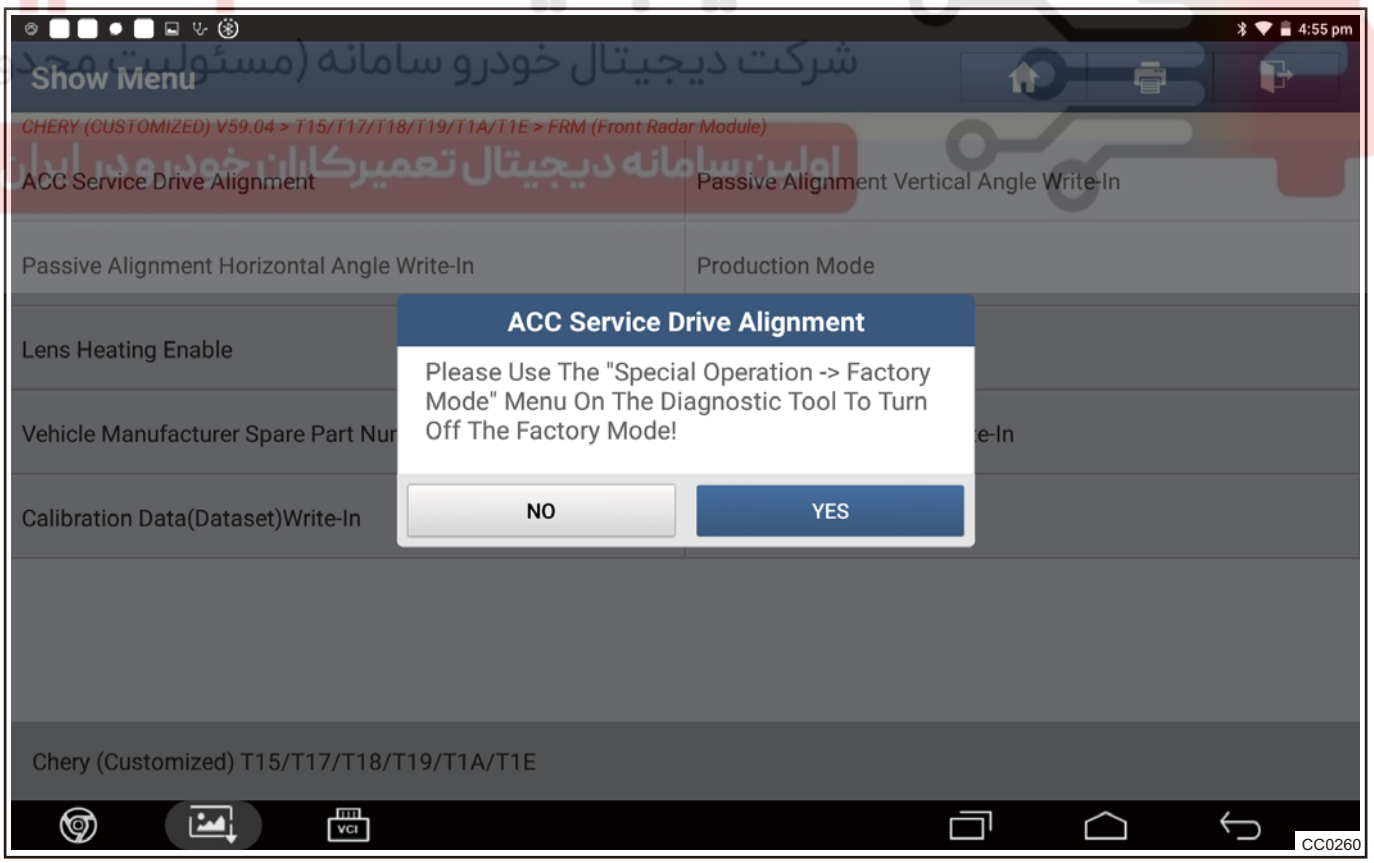
Park the vehicle in a horizontal area, remove components around radar, front bumper and front radar cover, install front collision warning tool correctly, observe data showed on display of front collision warning tool. Adjust calibration bolt (right lower bolt) vertically so that data showed on display is close to 0°.

Warning:

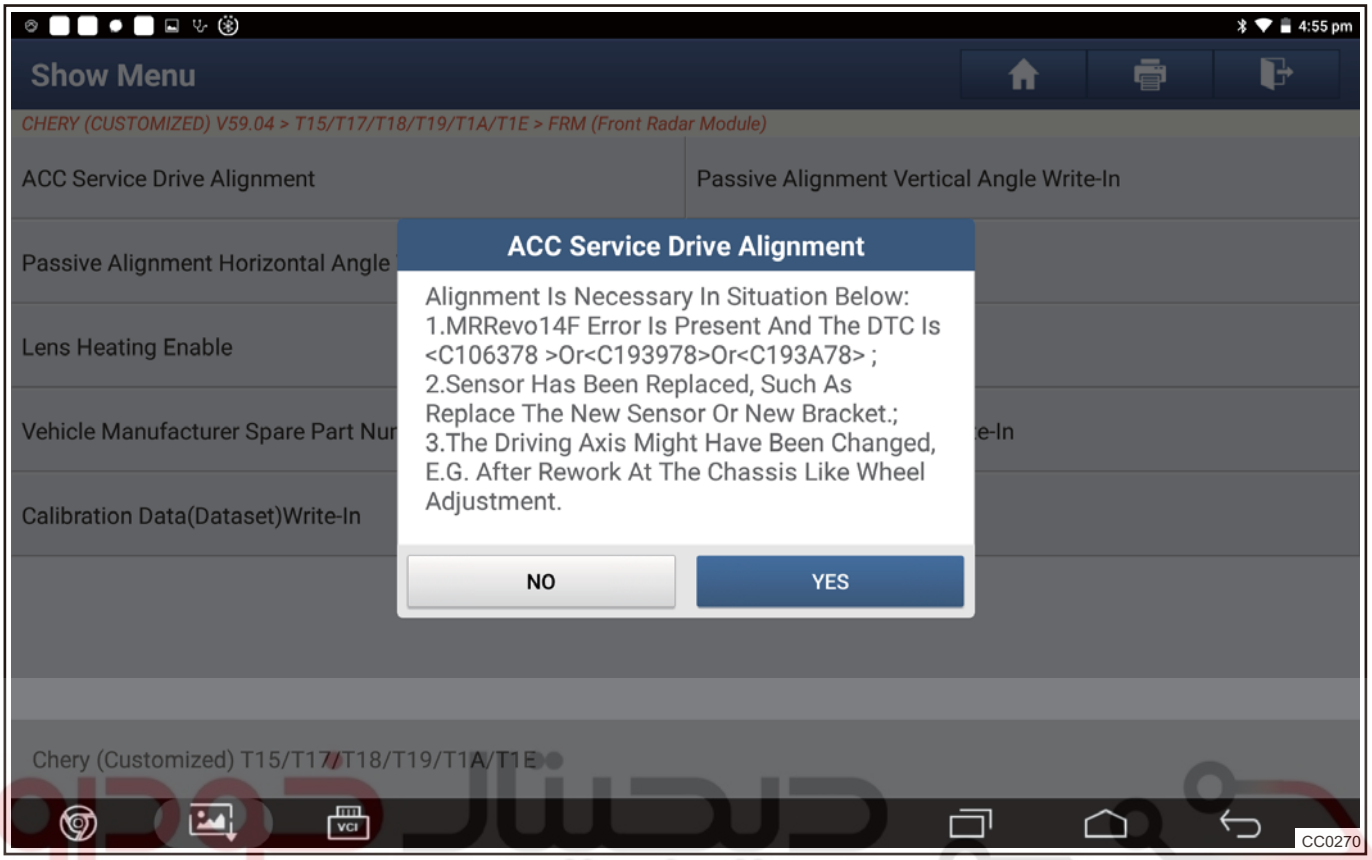
Turn off factory mode before calibrating.

1. Click "FRM (Front Radar Module)".
2. Click "Special Function".
3. Click "Front Radar After-sales Driving Calibration".

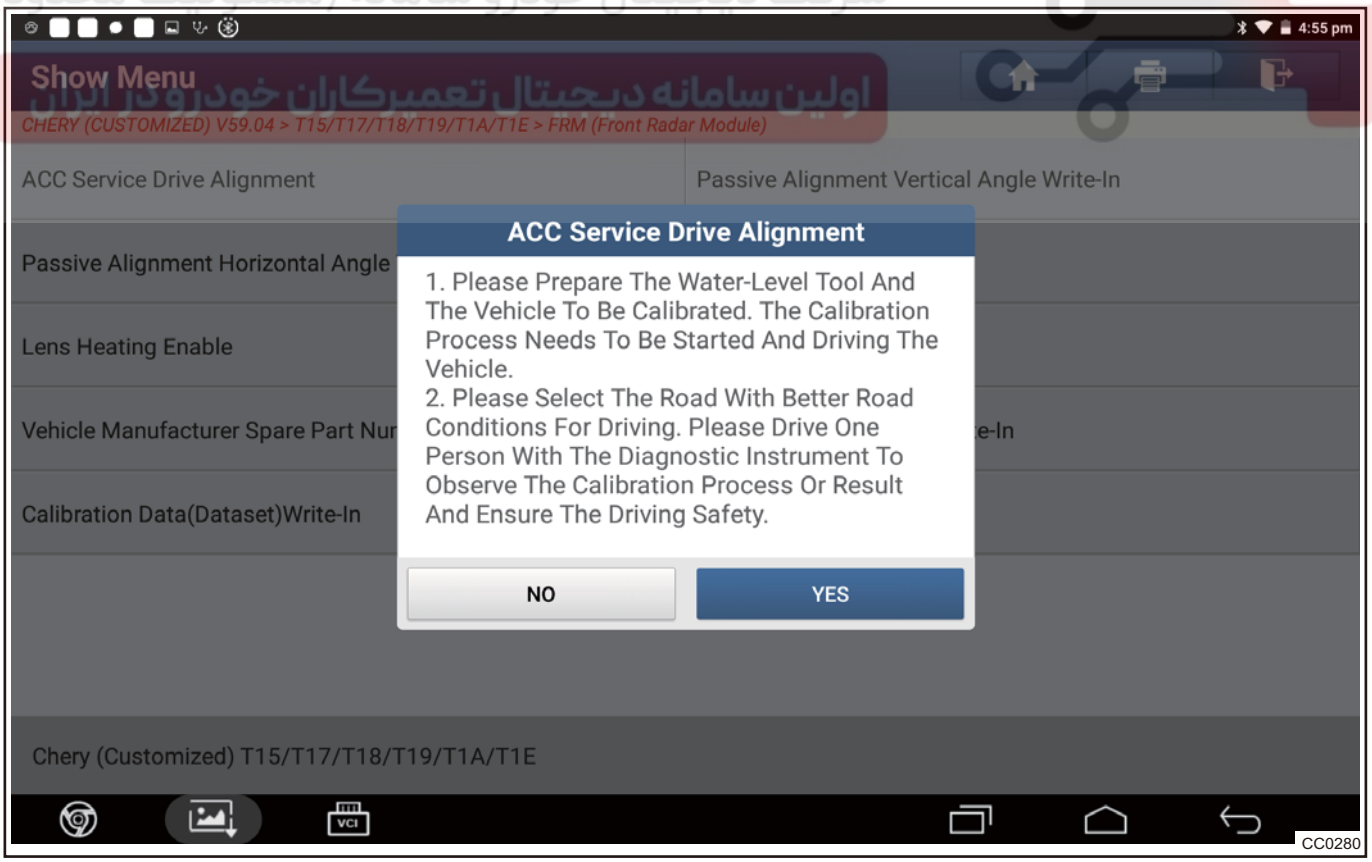


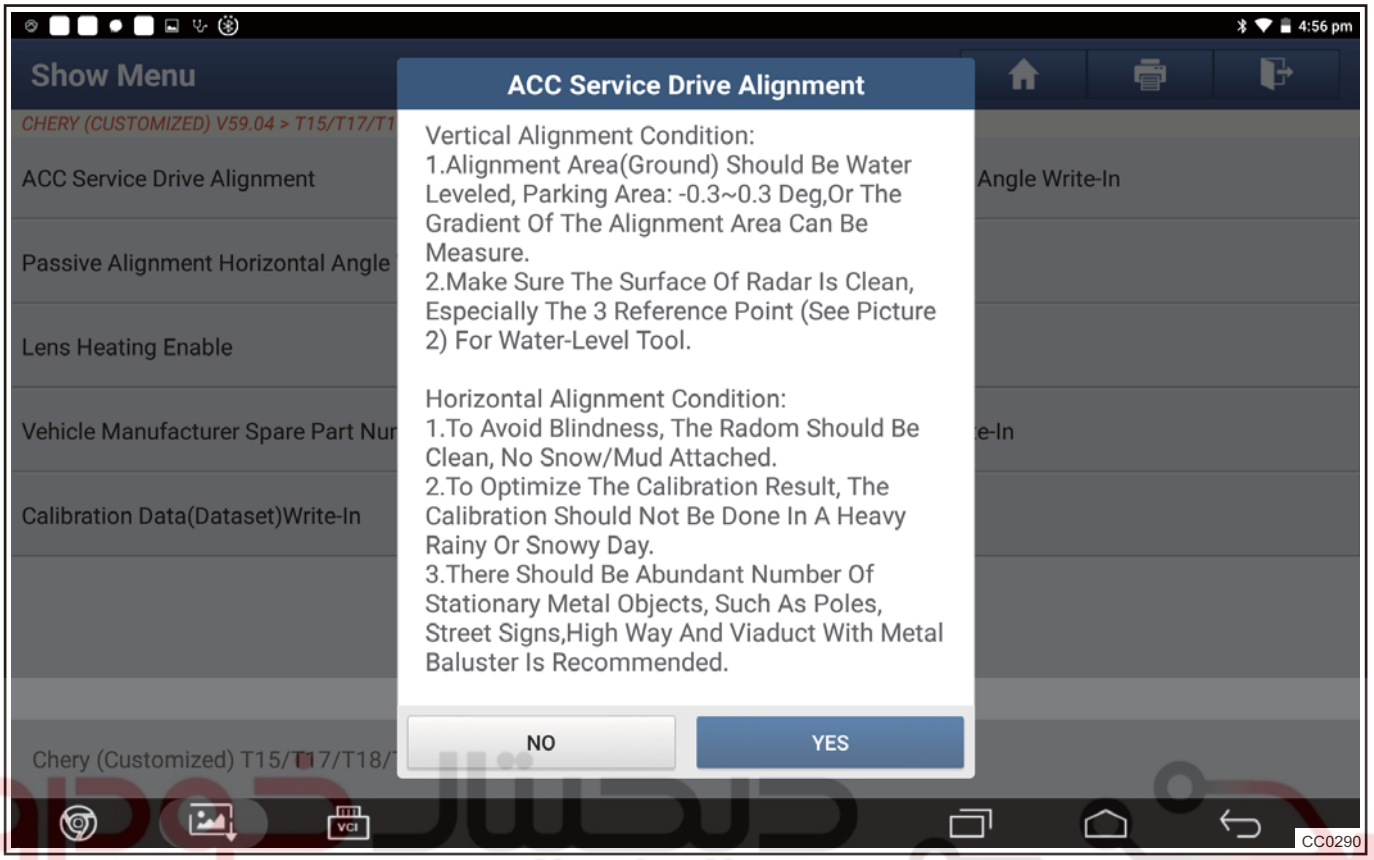


4. Read precautions, confirm and click "Yes".

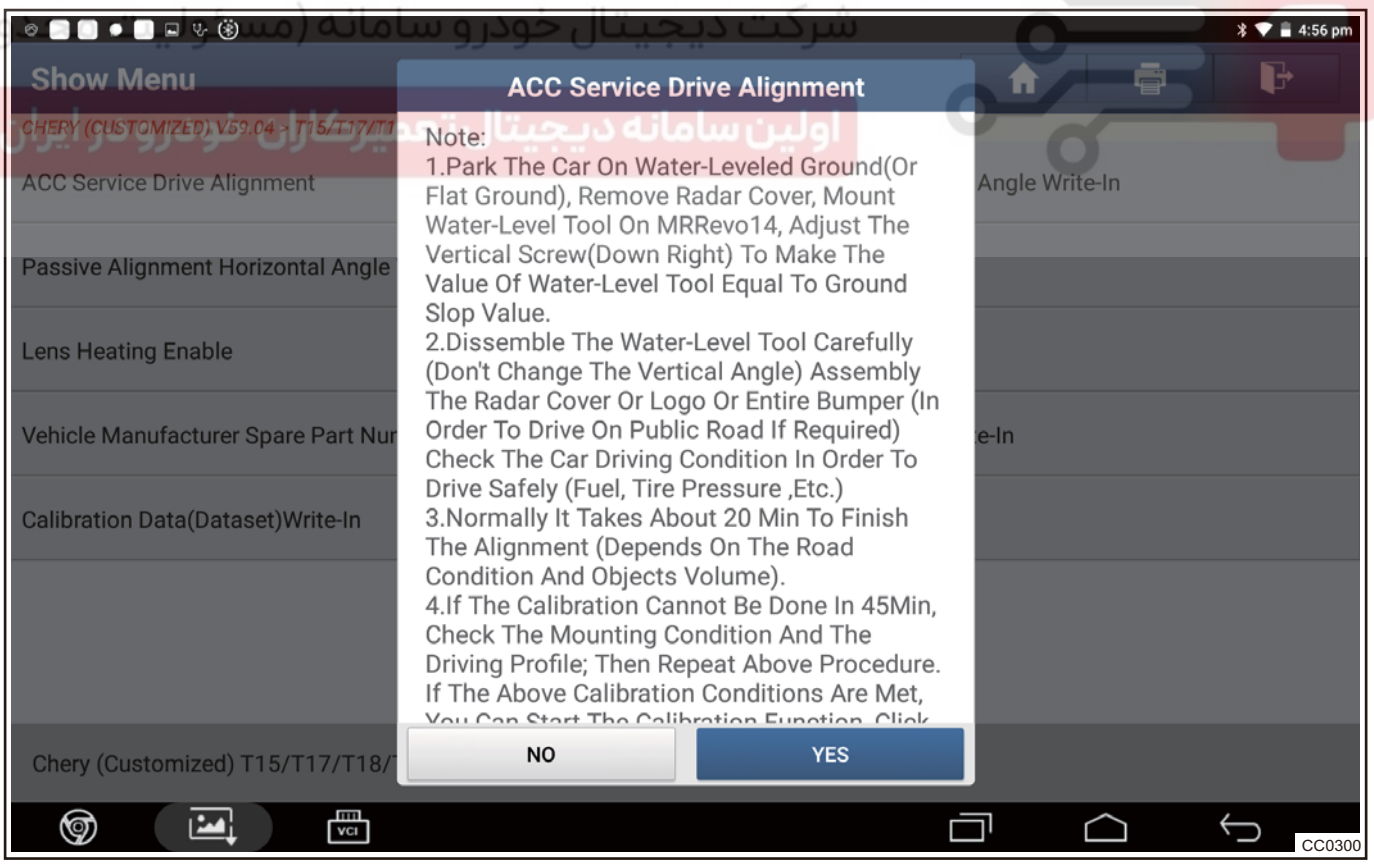


5. Use front collision warning tool to calibrate vertical direction, and click "Yes" after completing items prompted by diagnostic tester.





6. Calibrate horizontal direction with driving calibration, and click "Yes".



7. Start driving calibration and drive according to driving conditions until the calibration progress bar reaches 100%.

Hint:

Adjust horizontal calibration bolt according to requirements of calibration result; If the result exceeds threshold once, after adjusting calibration bolt, perform driving calibration again to ensure the calibration is completed.

Caution:

Calibration may fail if following conditions occur:

- Driving conditions always do not meet requirements: Surrounding references, road conditions.
- Communication between diagnostic tester and body is interrupted during calibration.
- Installation deviation of radar is too large.

Warning:

- The calibration progress bar of 100% usually takes less than 20 minutes, which depends on road conditions and target quantity.
- If calibration still is not completed after more than 45 minutes, it is necessary to check whether calibration environment, driving conditions, installation position etc. are correct, and whether the driving calibration requirements are followed; after confirmation, repeat the above steps.

Removal & Installation

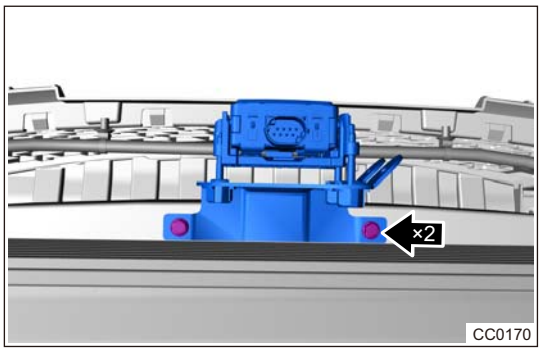
Front Microwave Radar

Removal

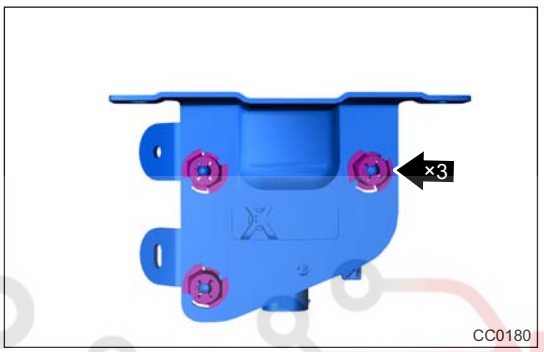
Warning:

- Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper assembly.
- Appropriate force should be applied, when removing front bumper assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front bumper assembly.
- Avoid breaking claws, when disassembling front bumper assembly.
- Avoid damage when detaching fixing clip of microwave radar.

1. Turn ENGINE START STOP switch to OFF.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly (See page 61-6).
4. Disconnect the front microwave radar connector.
5. Remove 2 fixing bolts between front microwave radar and bracket.
   Torque: 7 ± 1 N•m



6. Rotate counterclockwise to remove radar clip.



7. Remove the front microwave radar.

Installation

Installation is in the reverse order of removal.

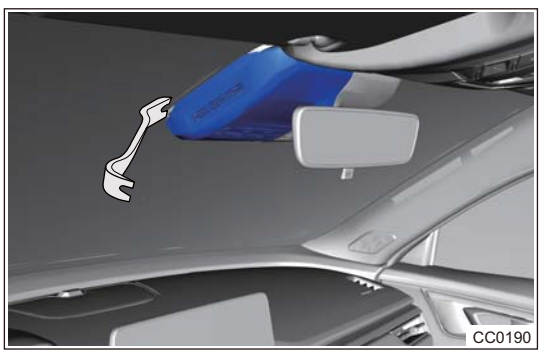
Front Camera

Removal

Warning:

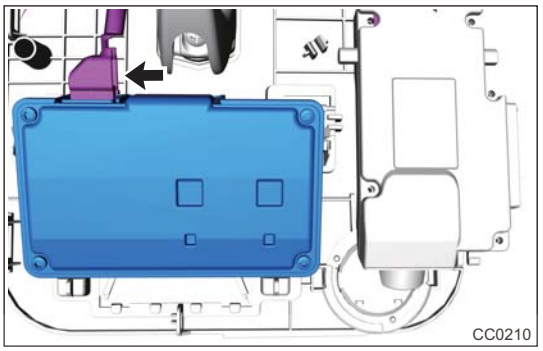
- Be sure to wear necessary safety equipment to prevent accidents, when removing front camera.
- Appropriate force should be applied when removing front camera. Be careful not to operate roughly.
- Remove front camera to perform matching calibration.

1. Turn ENGINE START STOP switch to OFF.
2. Disconnect the negative battery cable.
3. Remove the inside rear view mirror left cover.



4. Remove the inside rear view mirror right cover.

5. Disconnect the front camera connector.



6. Push metal spring on bracket back, and take out front camera to lower back at the same time.

Installation

Installation is in the reverse order of removal.