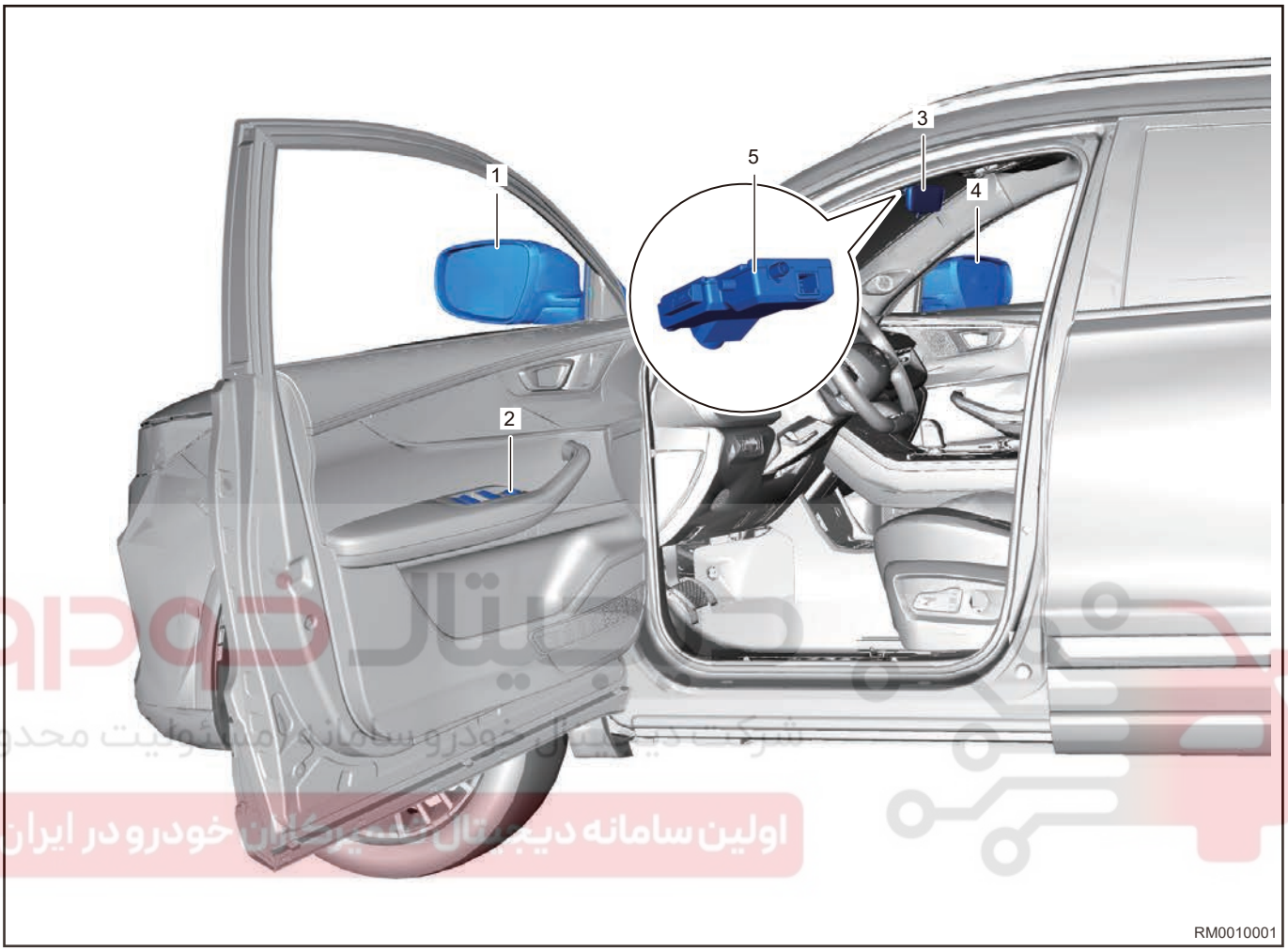
REAR VIEW MIRROR

GENERAL INFORMATION

Description



1	Left Outside Rear View Mirror Assembly	4	Right Outside Rear View Mirror Assembly
2	Rear View Mirror Folding Switch	5	Drive Recorder
3	Inside Rear View Mirror Assembly		

This vehicle is equipped with power outside rear view mirror assembly and inside rear view mirror assembly.

Power outside rear view mirror assembly: Driver can control the rotation of motor by operating the outside rear view mirror adjustment switch in vehicle, thus adjusting the mirror surface to a required visual angle and folding mirror.

Outside rear view mirror adjustment switch: Located on front left door protector. With ENGINE START STOP switch ON, press the outside rear view mirror adjustment switch to “L” or “R” position to select left or right outside rear view mirror assembly, and then press the up or down and left or right button of outside rear view mirror adjustment switch to a required visual angle.

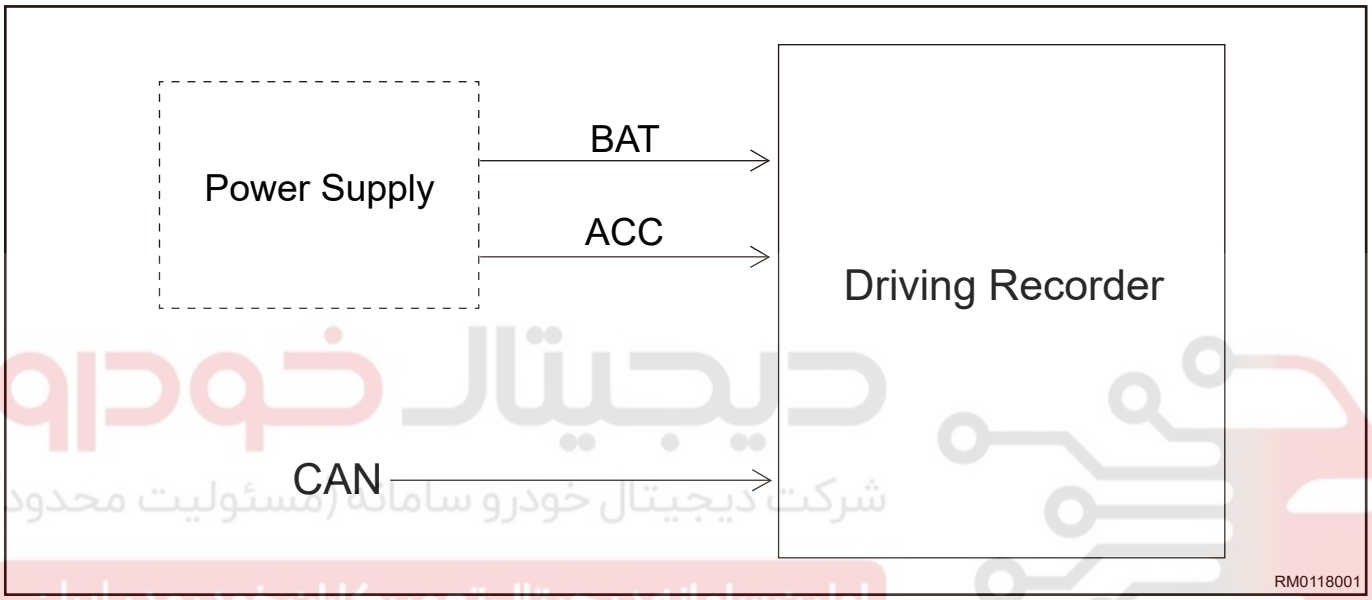
Manual glare-resistant inside rear view mirror assembly: It is necessary to adjust inside rear view mirror to desired direction with hands. When driving at night, to reduce glare, adjust the inside rear view mirror assembly to required angle by pulling glare-resistant rod backward.

Automatic glare-resistant inside rear view mirror assembly (if equipped): It is composed of a special mirror, two photosensitive diodes and an electronic controller. The electronic controller receives the front and

back light signals from the photosensitive diodes. If light shines on the inside rear view mirror, for example if the light behind is brighter than that in front, the electronic controller will output a voltage to the conductive layer. The voltage on conductive layer will change the color of electrochemical layer on mirror surface. The higher the voltage is, the darker the color of electrochemical layer is. At this time, ever if a strong light shines on the rear view mirror, a dark light will be reflected on the driver’ s eyes through the glare-resistant inside rear view mirror assembly, which will not be glaring. The electrochemical layer on mirror surface will change continuously and automatically according to the incident intensity of light behind, thus preventing glare. When reversing the vehicle, the glare-resistant function of glare-resistant inside rear view mirror will be released.

System ON/OFF Logic

System ON



The system ON logic is as shown in table below

BAT	ON (KL15)	CAN Communication	Parking Monitoring	System Condition
OK	OFF	Available	ON or OFF	System starts and starts to record automatically
		Not available	ON	When vibration intensity of vehicle exceeds the set threshold, the drive recorder will be waken up by the signal from built-in G-sensor to record 20s video. After recording the video, if there is no continuous G-sensor signal, the system will shut down automatically.

BAT	ON (KL15)	CAN Communication	Parking Monitoring	System Condition
				(There is time watermark, but there is no driving behavior information)
			OFF	Vehicle vibrates and driver recorder cannot be waken up to record video
	ON	Available or Not available	ON or OFF	System starts and starts to record automatically
NG	/	/	/	System cannot start (less than 6 V or more than 18 V)

System OFF

The system OFF logic is as shown in table below

BAT	ON (KL15)	CAN Communication	System Condition
OK	ON	Available	System operates normally
		Interrupted	Driver recorder can record video properly, but CAN related function cannot operate properly
	OFF	Available	System is in normal operating status, recording is normal and system does not turn off
		Interrupted	System off
NG	/	/	System off

Ambient temperature

1. Operating temperature range: -40℃～85℃;
2. Storage temperature: -40℃～95℃.
3. Relative humidity: 0 ~ 85%.

Operating current

1. Single head unit: ⩽ 300 mA

Static current

1. Drive recorder system: ⩽ 0.1mA.

2. Start drive recorder with BATT terminal of head unit connector connected to multimeter (dialed to current band), cuts off the power supply at ON position under normal operating status, and the stable current value measured by multimeter after head unit enter sleep mode (CAN network is turned off and system does not operate) is the static current.

Product Feature

Function overview

Function	Description	Note
DVR Video Output	120° ± 5° in horizontal, 140° ± 5° in diagonal	It is 5G Wi-Fi connection by default, 2.4G Wi-Fi is optional, IHU display realizes display function, time delay ⩽ 500 ms
Frame rate	30fps	
Lens Pixels	⩾1920*1080	
Low-light Level	0.1 lux	
Dynamic Range	＞ 95 dB	
Signal Noise Ratio	＞ 40 dB	
Storage Medium	TF card (8 GB ~ 128 GB supported)	
Record Function	Support	Synchronous sound recording when recording
Parking Monitoring	Support	
Power-off Storage Protection	Support	
ON Position Signal Detection	Support	
Snapshot	Steering wheel drive-by-wire Mode button snapshotting (Mode button is defined as snapshotting), or snapshot by voice control	Sound prompt is necessary when taking photos
File Playback	Support	
General/Emergency Recording	Support	

Function	Description	Note
CAN Communication	Support	
Indicator	Dual color (red and blue) indicator Device operates normally (-normal recording): Blue indicator remains on; Wi Fi connection/data interaction: Blue light flashes slowly; device failure/function abnormality: Red light constants on; recording abnormality/no TF card: Red light flashes slowly; software upgrade: Red and blue lights flash alternately.	Blue light flashes slowly and red light flashes slowly at a frequency of 1Hz; The red and blue lights flash alternately at a frequency of 1Hz. Priority of red light is higher than that of blue light.

System parameter

Function	Description	Note
Drive Recorder	Starts to record automatically after starting	
Recording Resolution	1080P (by default), 720P	
Recording time	1 minute, 3 minutes (by default), 5 minutes	
Driving Information Overlays	ON (by default), OFF	
Recording	ON, OFF (by default)	
Gravity Sensing Sensitivity	High, Medium (by default), Low	
Wide Dynamic	ON (by default), OFF	
Snapshotting	Taking photo, Short video, Taking photo + Short video (by default)	

System features

Primary Function	Secondary Function	Description	Note
General video	Video recording	Video recording is circularly covered during recording, video is saved in TF card;	Folder is full without prompt
	Video recording switch	Video recording switch	ON by default
	Recording resolution	1920*1080@30 frame/ 1280*720@30 frame	1920*1080@30 frame by default
	Sound recording switch	ON/OFF	Sound recording OFF by default

Primary Function	Secondary Function	Description	Note
	Recording file time	1 minute/3 minutes/5 minutes	3 minutes by default
	Driving information overlays	Driving information overlays switch	ON by default
		Driving information is from CAN network;	
		Driving information includes: Vehicle speed, gear position, accelerator, high beam light, low beam light, rear fog light, left turn signal light, right turn signal light, parking brake, foot brake, seat belt	Real-time preview screen does not display
	Time watermark	Current time watermark is on the screen of video file, which can be seen during video playback; The source of time: DVR RTC clock (at each cold start of DVR, CAN is obtained to perform time calibration);	Real-time preview screen does not display
	HDR switch	HDR switch	ON is for DVR function screen by default
Emergency recording	Emergency recording	When vibration is greater than the emergency recording vibration acceleration threshold, save the video 10 seconds before and after the moment of vibration in emergency video area separately; After ignition, get the vehicle acceleration value from CAN; Before ignition, get the vibration value from G sensor of DVR, and emergency video file is overwritten circularly;	When recording is turned off, emergency recording is not turned off; When emergency video folder is full, prompt box that shows “Emergency video folder of driving recorder is full, please remove the file in card timely” will pop up on IHU screen.
	Vibration acceleration induction sensitivity	Three vibration acceleration thresholds: High, medium, low	Medium by default

Primary Function	Secondary Function	Description	Note
	Emergency recording overwriting	If the storage area of emergency recording has been full, new emergency video will replace the oldest emergency video.	
Parking monitoring	Parking monitoring	If vibration is greater than the parking monitoring vibration acceleration threshold with driving recorder turned off, it will turn off after turning on to recored for 20 seconds.	Duration is the same as that of emergency recording video
	Parking monitoring switch	Parking monitoring switch	ON by default
Taking pictures	Taking pictures	• Photograph resolution is the same as current recording resolution; • During photograph, the video recording does not pause; • Photos storage in TF card photo storage area; • The Photos are overwritten circularly;	When photo folder is full, prompt box that shows “Photo folder of driving recorder is full” will pop up on IHU screen.
	Steering wheel button control capturing	If IHU defines steering wheel line control Mode button as “Driving recorder capturing”, it will response to steering wheel button and take picture; Customized capturing setting can be set on setting screen of driving recorder; Capturing option function can be customized. Customized option (- taking pictures, short video, taking pictures + short video). Duration of captured video is 10 seconds, which consists of first 5 seconds and last 5 seconds of video	• During emergency recording, it cannot respond to capturing. If it is in the process of capturing for recording currently, it cannot respond to emergency video recording. • If capturing setting is “short video”, “taking pictures + short video”, it will not respond to the capturing command again during short video recording, until the recording is completed. It will respond to next

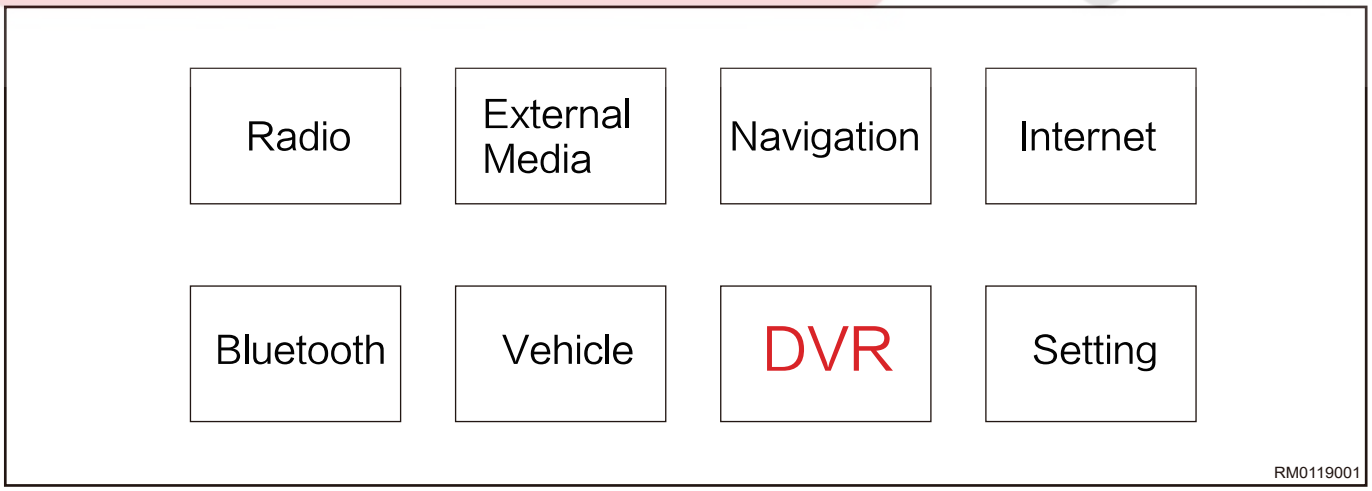
Primary Function	Secondary Function	Description	Note
		that responds to the moment of capturing.	capturing command when “Mode” button is pressed again
Playback	Video playback	Play the video file recorded by driving recorder in TF card on central control navigation head unit.	
	Photo playback	Play the photo file recorded by driving recorder in TF card on central control navigation head unit.	
File management	File management	Manage (delete) the video (common and emergency video) and photo file stored in TF card of DVR on central control navigation head unit.	
	Formatting TF card	Format the TF card by central control navigation screen operation.	
AR Navigation Video Output	AR Navigation Video Output	Intercept 1488*616 (-tentative) resolution video output;	The specific angle shall be subject to the calibration of the actual vehicle
DVR video output and interaction	DVR video output and interaction	DVR outputs video and interacts via Wi-Fi	
		After DVR application is turned on by central control navigation head unit, it connects with Wi-Fi and start to transmit data; After exiting DVR application, it stops data transmission and interaction, central control keeps connected with Wi-Fi of DVR.	When user clicking central control APK with central control AP (hot spot) turned off, AP (hot spot) is turned on by central control automatically.
		Wi-Fi ID and password are transmitted through CAN network.	Wi-Fi ID is unique.
		Use RTSP transport protocol to transmit real-time screen	

Primary Function	Secondary Function	Description	Note
		Function includes: Real-time preview, normal video playback, taking pictures, file management, setting, etc.	
		Switching between Wi-Fi 2.4G and 5G via CAN	DVR Wi-Fi uses 5G frequency band by default, when 2.4G frequency band switching request is received by DVR sent from central control, DVR switches to 2.4G frequency band.
Power management, CAN network	ON position signal response	When power is turned on in ON position, system turns on and starts recording; When power is turned off in ON position and there is no CAN communication, system turns off and stops recording, and save the video file.	
	Video storage protection in case of power off	When it detects that B+ power supply is cut off, start to save the video when stopping recording. Use super capacitor to save power and save the recording file before the moment of power off.	
	CAN network wake-up	System starts after receiving wake-up command from CAN network.	
	Transmit information	1. Vehicle driving information	
		2. Wake-up command	

Primary Function	Secondary Function	Description	Note
Status indication	Indicator	Dual color (red and blue) indicator Device operates normally: Blue indicator remains on Wi-Fi connection/data interaction: Blue indicator blinks slowly Device fault/abnormal function: Red indicator remains on Abnormal recording/no TF card: Red indicator blinks slowly Software upgrading: Red and blue indicator blinks alternately	Blue indicator blinks slowly: Blinks at a frequency of 1Hz Red indicator blinks slowly: Blinks at a frequency of 1Hz Red and blue indicator blinks alternately: Blinks at a frequency of 1Hz

Functional requirement

- Bote: As there are two proportions of central control display: 8:3 and 16:9, so there are two proportions of UI in central control.This specification takes UI of 8:3 as an example, the difference of UI for 16:9 is only the layout and style, function is the same as UI of 8:3. The UI screen diagram in this section is only for assisting function description, specific UI is subject to actual design.
- This product is a two-in-one product of driving recorder and AR navigation camera., and the video display operation of driving recorder and AR navigation video needs to be displayed with the help of central control navigation screen. The operation method of DVR depends on whether central control navigation head unit supports it. The function introduction in this section takes touch method as an example. Button operation method depends on whether there are buttons on button panel that support DVR operation. Driving recorder can be turned on and off and perform capturing through voice command.



Driving recorder connection

- Driving recorder communicates with IHU via Wi-Fi, real-time screen uses RTSP protocol (Real Time Streaming Protocol). IHU acts as Wi-Fi AP (hot spot), and DVR connects with Wi-Fi AP (hot spot) of IHU. IHU Wi-Fi hot spot uses 5G frequency band by default. For some models, IHU Wi-Fi can be switched to 2.4G. After IHU Wi-Fi is set to 2.4G by user, prompt box that shows “Current WiFi hot spot is 2.4G, which will affect the experience. It is recommended to switch to 5G” will pop up when entering DVR screen by clicking driving recorder icon on IHU.

- When user clicking APK, prompt box that shows precautions as followings will pop up.

Caution
1. Please use memory card of Class 10 or later purchased from regular channels. For details, refer to user manual. 2. Memory card is consumable. Please export important files regularly and save them to other storage media to avoid file loss. 3. WiFi of audio system is unavailable during driving recorder connection. (For head unit with dual MAC address function, cancel this prompt).

- If user does not select “Do not prompt any more” and click OK, prompt box will pop up again when clicking APK next time. After selecting “Do not prompt any more” and clicking OK, prompt box will not pop up any more when entering APK next time.
- If Wi-Fi is in AP mode when IHU is turned on, IHU will send SSID and password to DVR via CAN when it is turned on. When clicking IHU DVR APK to enabled it, IHU will send connecting request to DVR via CAN to establish connection between DVR and IHU.
- If Wi-Fi AP is turned off or in STA mode (internet mode) when IHU is turned on, IHU turns on AP automatically and sends SSID, password, connecting request, etc. to DVR to establish connection between DVR and IHU when IHU DVR APK is enabled.
- When exiting APK, if IHU is in AP mode, central control navigation Wi-Fi always keep connected with driving recorder. If user disconnect the Wi-Fi connection of driving recorder and central control manually, for example, IHU Wi-Fi is switched to STA internet mode by user, IHU will switch back to AP mode automatically and send SSID, password, connecting request, etc. to DVR to establish connection between DVR and IHU when IHU DVR APK is enabled again.
- On real-time preview screen, decode and display H.264 video streaming from head unit camera of DVR in real time (there is a certain delay due to video capture, encoding, transmission, decoding and player cache, the delay is less than 500MS).
- If Wi-Fi is disconnected abnormally on any screen of DVR APK, APK will return to real-time preview screen, UI previews black screen of video area and prompts "Driving recorder connection not connected”.
- Click “Back” icon on upper left corner to exit to central control main screen. Wi-Fi will remain connected after exiting.
- In normal conditions (no Wi-Fi interference for external environment), it is required that the first connection time does not exceed 5 seconds.

TF card album folder

1. General video folder
   - Folder name: “NOR”
   - Internal file name: NOR_date_time A.MP4 (NOR_20180723_123233A.MP4)
   - Storage space = (total capacity of TF card - 500M (reserved buffer space) - 200M (photo folder space)) *3/4
2. Emergency video folder
   - Folder name: “EVT”
   - Internal file name: EVT_date_time A.MP4 (EVT_20180723_123233A.MP4)
   - Storage space = (total capacity of TF card - 500M (reserved buffer space) - 200M (photo folder space)) *1/4
3. Photo folder
   - Folder name: “PHO”
   - Internal file name: PHO_date_time A.JPG (PHO_20180723_123233A.JPG)
   - Storage space = 200M

General video

Video interface

1. When B+ and ON signal are powered on, or B+ is powered on and CAN network communication is normal, and voltage and power circuits are normal, driving recorder will automatically start recording.
2. After the central control navigation is connected with driving recorder, it will enter the real-time preview interface to view the real-time image of the recorder. If the driving recorder is recording video normally, there is REC on the interface accompanied with red dot flashing. If the driving recorder is not recording video normally, only one red dot is always ON but not flashing, and there is no REC.

Video operation

1. When the driving recorder is in the pause state, click ICON to continue recording; ICON changes to , with REC logo and red dot flashing (1Hz frequency). When the driving recorder is in the recording state, click ICON to pause recording; ICON changes to , without REC logo and red dot flashing.
2. The driving recorder is equipped with MIC, which can record audio synchronously while recording video. The user can turn off or turn on the sound recording through the central control navigation screen. Sound recording is OFF by default. In the real-time preview interface, click ICON to turn on sound recording, ICON changes to . Click ICON to turn off sound recording, ICON changes to .

Video recording

1. The video recording of the driving recorder has been continuing. Due to the limited capacity of the TF card, the memory card will be full after the TF card is recorded for a period of time. The driving recorder adopts the logic of cyclic storage of video. When the memory card is full, the latest video will cover the earliest recorded video in the folder.
2. The recorder supports up to 1080P resolution video, and the default is 1920*1080@30 frame; the user can change the resolution to 1280*720@30 frame through the central control navigation screen. After changing to 1280* 720@30 frame, it can also be manually changed back to 1920*1080@30 frame.
3. The length of the recorded video segment is 3 minutes.
4. The recorded video is stored by time segment. The system default is 3 minutes, which can be manually changed to 1 minute or 5 minutes.

Emergency video recording

Emergency video trigger

1. There are two sources of signals that trigger emergency recording: G-sensor of driving recorder and acceleration value of vehicle body. The vehicle transmits the key position status to driving recorder through CAN. When the driving recorder receives the key position status (ignition action) sent by the vehicle, it triggers the emergency recording by judging whether the body gravity acceleration value exceeds the set threshold value (the threshold value needs to be set according to the actual vehicle verification).
2. When the driving recorder receives the vehicle key position state turns to ON position signal disconnection state after ignition, during ON position signal disconnection and next ignition state, the driving recorder triggers emergency recording through its own G-sensor signal. When the acceleration of vibration exceeds the threshold set by G-sensor, the recorder will be triggered to store an emergency video.
3. The inductive sensitivity of G-sensor can be set to "high", "medium" and "low” through the large screen navigation of central control. The default is "medium".

Emergency video storage mechanism

1. The emergency video is a 20s video, which is stored in the "emergency video" folder. The 20s video consists of 10s video before and after the time when the vibration is sensed. The resolution of the emergency video is the same as that of the normal video currently set. If the normal video is set to 1080P or 720P, the resolution of the emergency video is also 1080P or 720P.

2. Due to the space of the "emergency video" folder is also limited, the memory card in "emergency video" folder will also be full, so the emergency video folder also adopts the mechanism of circular coverage. When the “emergency video” folder is full, the newly generated emergency video will cover the earliest recorded emergency video. When the “emergency video” folder is full, a prompt box will pop up on the IHU interface: “Emergency video folder of recorder is full".

Time watermark

1. The time watermark is corrected by CAN, and it will be corrected once when starting up. The time watermark contains date and time information in the format of "year-month-day hour: minute: second". The time watermark is not displayed in the real-time preview interface, and is visible in the upper left corner of the video during playback.

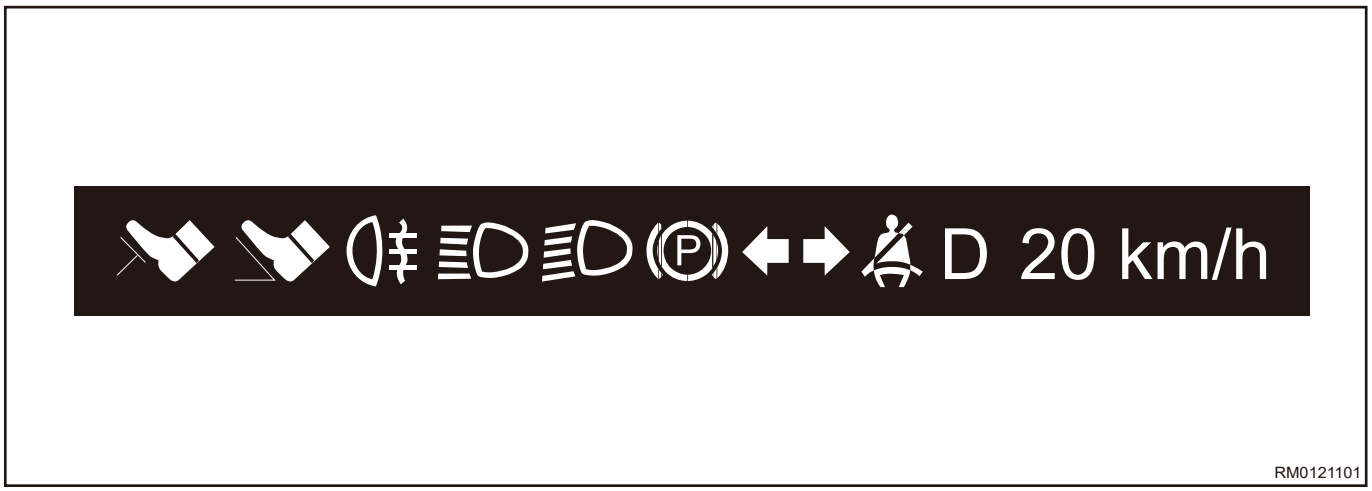
Driving information overlays

1. DVR will receive the vehicle driving information from CAN network and save it in the video recording file in the form of watermark icon. The information watermark of DVR is acquired according to the CAN signal. When there is no CAN signal, the information watermark will not be displayed and CAN network will not actively wake up other ECU.

   See the table below for driving information.

Display composite information	Vehicle speed	20km/h
	Gear position	D
	Accelerator pedal	
	High beam lights	
	Low beam lights	
	Rear fog lights	
	Right turn signal light	
	Left turn signal light	
	Hand brake	
	Foot brake	
	Safety belt warning status (-consistent with instrument warning light status)	

2. The watermarks of light, brake and seat belt display as follows:



Driving information comes from CAN network. When the vehicle performs corresponding actions and the driving recorder receives corresponding CAN information, the corresponding icon will be highlighted; if the corresponding actions are not performed, the corresponding icon will be grayed out; if the high beam light is turned on, the high beam light icon will be highlighted; if the high beam light is turned off, the high beam light icon will be grayed out. Vehicle speed information display: Numbers km / h.

3. These vehicle status information is not visible on real-time preview interface, but it will be superimposed and recorded on the video stored in TF card. When the user plays back the recorded video, the vehicle driving information can be seen.
4. If a configuration is abnormal and the corresponding CAN message is not received during use, the corresponding watermark will be displayed as "-” .

Video storage protection in case of power off

1. Under the condition of B+ power normal working, when the system detects the shutdown command (ON power off), the system will immediately stop recording and start video saving, and use the battery to complete the saving of the video file before shutdown.
2. The driving recorder has built-in super capacitor. When driving recorder works normally, it will start to charge, and it will be full for about 1 minute. When the driving recorder B+ is abnormal or disconnected and the super capacitor is fully charged, the super capacitor will supply power to driving recorder to complete the saving of the video file before shutdown, and the video saving time is about 2s.

Parking monitoring

1. If the user sets the parking monitoring function as ON, when the vehicle stops and stalls, the ON gear is power off, and the driving recorder is shut down, if the vehicle vibrates and the vibration acceleration value exceeds the threshold value of G-sensor, the driving recorder will be awakened and recorded for a period of 20s video after awakening, which is stored in the "emergency video" folder. After recording this video, if G-sensor continues to sense vibration exceeding the threshold value, it will continue to record a 20s video. If the G-sensor does not continue to sense vibration exceeding the threshold value, the driving recorder will shutdown. The CAN network of the whole vehicle cannot be woken up during the parking monitor awakens recorder.
2. When the parking monitor function is turned on, if the system detects that the battery voltage is lower than 12V, the stall state can only be awakened for 3 times.
3. The parking monitor function is ON by default. The user can turn off or turn on the parking monitor function through the central control navigation.

Photograph operation and control

1. With driving recorder ON, such as the “Snapshot Setting” is set to “Photograph” via driving recorder, you can take photos quickly through photograph button (Mode button) on drive-by-wire of steering wheel. Button signal is transfered via CAN for high configuration models, and hard line is adopted for low configuration models. Take a photo each time you press the button. Sound prompt is

necessary when taking photos. You can take photos by clicking ICON in UI interface of central control navigation. The minimum response interval between two consecutive photographing commands is 500 ms.

Photograph storage

1. The photos taken are consistent with the currently set video resolution, such as if the set video is 1080P or 720P, and the photos taken are also 1080P or 720P. Photographs are taken during the video recording process, and the video recording is not affected. Photograph storage uses the logic of circular overlay. When the "Photograph" folder is full, the latest photograph will overwrite the earliest photograph.

Playback and deleting of video in TF card

1. On video list interface in TF card, press and hold one video in list, there will be a small circle at top right corner of the video thumbnail, it indicates that this video is selected when there is a “√”. Click the small circle in front of “XXX files in total”, you can check all or cancel all selections. Click “Delete” to delete from the earliest recorded video, and the deleted video cannot be recovered.
2. On video list interface in TF card, select one video and click “” to start playing the current video.
3. Time watermark and driving status information (such as “driving information” setting is on during video capture) can be displayed on the video playback interface. Click ICON to pause playback, ICON will change to , click ICON to play continues; ICON will change to . Drag the time progress bar to quickly locate the video playback time.
4. Click “” or “” ICON, it will change to previous (recorded earlier) or next video (recorded later).
5. Click the non-touch area of video to enter full screen interface, the ratio of video is 16:9. It cannot be fully displayed on the 8:3 display screen in full screen, and the area above the screen will be intercepted to cover the display screen. Click “” to exit full screen playback interface, click “” again to exit playback interface to return to DVR main interface.

Playback and deleting of photos in TF card

1. On photo list interface in TF card, press and hold one photo in list, there will be a small circle at top right corner of the video thumbnail, it indicates that this photo is selected when there is a “√”. Click the small circle in front of “XXX files in total”, you can check all or cancel all selections. Click “Delete” to delete from the earliest photo taken, and the deleted photo cannot be recovered.
2. On photo list interface in TF card, click one photo, this photo will be displayed at left area of screen.
3. Time watermark and driving information (such as “driving information” setting is on during photo taking) can be displayed on the photo playback interface. Click ICON, the photos will be played automatically at speed of 3s per photo from the current photo, ICON will change to , click will pause automatic play, ICON returns to .
4. Click “” or “” ICON, it will change to previous (recorded earlier) or next video (recorded later).
5. Click the non-touch area of photo to enter full screen interface, the ratio of photo taked by DVR is 16:9. It cannot be fully displayed on the 8:3 display screen in full screen, and the area above the screen will be intercepted to cover the display screen. Click “” to exit full screen playback interface, click “” again to exit playback interface to return to DVR main interface.

Setting

1. On the real-time preview interface, click setting ICON to enter setting menu interface of driving recorder, setting items of driving recorder contains the following:

   Driving information overlays: ON (by default) and OFF

   Resolution: 1080P (default) and 720P

   Video duration: 1 minute, 3 minutes (default) and 5 minutes

   Vibration sensitivity: High, Medium (default) and Low

Wide dynamic: ON (default) and OFF

Parking monitoring: ON (default) and OFF

Snapshot: Photo taking, short video and photo taking + short video (default)

Recorder memory card: TF capacity and operable formatted TF card are displayed

As for recorder: Displays the hardware version number and software version number of the recorder, and can operate and upgrade the driving recorder software

Factory reset: Restore the factory default settings of the recorder

Caution
a. The target market is domestic models and supports Chinese and English system voice. When the central control IHU changes the system language, the APK of DVR changes synchronously with the system language of the central control IHU. The target market is international models, Chery provides translation in minority languages, and Skyworth adapts that to APK. b. On “As for recorder” interface, click the text position of version number continuously for 10 times to enter factory mode to view version number of APK. The version number rule is APP: YY.ZZ.WW build (A), for example, APP: 00.01.02 build (8). Rule of YY.ZZ.WW is the same as software version rule of Chery, build (8) indicates the 8th official release version. When any digit in YY.ZZ.WW is changed, the number in build (A) is not zeroed, this number in build (A) is accumulated with the number of APK releases during the whole APK development process. If the APK is not officially released but is only an internal temporary version, this number is not accumulated, only YY.ZZ.WW changes.

AR navigation video output

When the DVR is on, the video stream of AR navigation is always transmitting; if the DVR detects that the ON position signal is off and the CAN network is closed, the DVR turns off the AR navigation video output.

AR navigation video requirement

1. DVR host intercepts camera center range video with a resolution of 1488*616 (tentative) and transmits it to the central navigation host via LVDS for analysis and processing of AR navigation maps; the output video frame rate requires 30 fps.
2. If the user changes the video resolution from 1080P to 720P in the recorder setting interface, a pop-up box will appear: "720P does not support AR navigation, the resolution will automatically return to 1080P when AR navigation is turned on".
3. When the user starts AR navigation, an alert box will pop up: "Automatically switch to HD mode for you, please wait".
4. Note: After exiting AR navigation, the resolution remains 1080P.

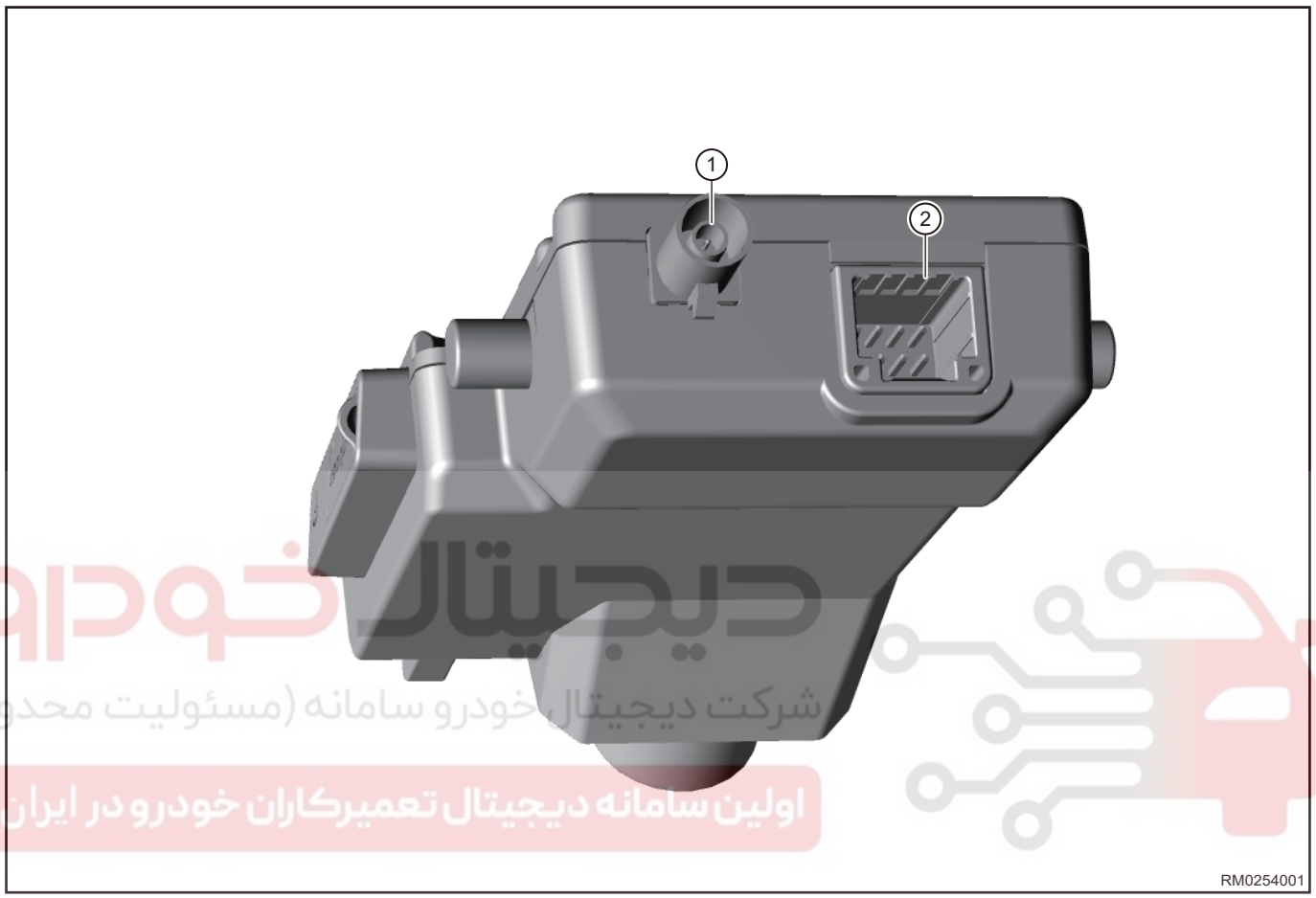
Status indication

Status indicator is located next to the TF card slot, indicator is red-blue indicator.
Blue indicator constant on indicates that device operates normally.
Blue indicator flashes slowly, that is, blue indicator flashes at a frequency of 1HZ, indicating that the Wi-Fi connection is successful.
Red indicator constant on indicates that device failure or abnormal function, including abnormal TF card or low card speed, video stopping and machine fault.
Red indicator flashes slowly, that is, blue indicator flashes at a frequency of 1HZ, indicating that video is abnormal or there is no TF card.
Alternating red and blue flashes indicate that the software is being upgraded.

Electrical requirement

System connector definition

Connector model



There are 2 external connectors for the product: the main connector and the LVDS connector (refer to the circuit diagram of the driving recorder system for details).

Name	Model	Supplier
Main connector	GT25H2-8DP-2.2H (8PIN)	HRS
LVDS connector	59S2AQ-40MT5- K-1	Rosenberger

Main connector pin function definition

Main connector						
			DVR terminal	GT25H2-8DP-2.2H (8PIN)		
			Wire terminal	HS'G: 1717103-1 TM'L: 1674311-1		
Pin	Function	Rated Current	Minimum Value Imin	Maximum Value Imax	Signal Type	Note
1	B+ (Battery Positive)	300MA	0.1MA	500MA	Power supply	

2	IGN (ON Signal)	10MA	0MA	10MA	Signal Wire	
3	CAN_H (CAN Bus Positive)	100MA	10uA	100MA	Signal Wire	
4	SWC+ (-Photograph Button Positive)	10MA	0MA	10MA	Signal Wire	Reserved
5	GND (-Battery Negative)	300MA	0.1MA	500MA	GND	
6	NC (Vacant)					
7	CAN_L (CAN Bus Negative)	100MA	10uA	100MA	Signal Wire	
8	SWC- (-Photograph Button Negative)	10MA	0MA	10MA	Signal Wire	Reserved

LVDS connector pin function definition

Main connector						
			DVR terminal	59S2AQ-40MT5- K-1		
			Wire terminal	HS'G: 59Z113-000-K TM'L: 59K16B-102T4		
Pin	Function	Rated Current	Minimum Value Imin	Maximum Value Imax	Signal Type	Note
1	LVDS+	100MA	0.1MA	100MA	High Speed Signal Wire	
2	GND	100MA	0.1MA	100MA	GND	

Indicator light color definition

LED Light	Red	Blue

Drive-by-wire button definition

“Mode” button on steering wheel is the user-customizable button, which can be defined by the user as: sound source switching or driving recorder snapshot. If it is defined as driving recorder snapshot, you can perform driving recorder snapshot function by pressing Mode button. User can customize the snapshot in the setting interface of the driving recorder: Photo taking, short video and photo taking + short video (default).

Interaction between DVR and central control

Driving recorder function involves the interaction among central control IHU, central control APK and driving recorder.
Main functions of central control are:

1. As a hot spot, central control needs to support DVR Wi-Fi access.
2. It is necessary to provide CAN writing interface to send CAN data for central control APK.
3. It is necessary to provide CAN data callback interface, notify APK when central control receives relevant CAN data.
4. DVR interface display and interactive operation.

Main functions implemented by APK:

1. Interact with the DVR through Wi-Fi
2. Notify the DVR of some central control information (such as Wi-Fi SSID, etc.) through the CAN writing interface provided by the central control
3. Feedback the CAN information (such as TFC card status, etc.) received by the central control from DVR

Main functions implemented by DVR:

1. Basic functions of driving recorder
2. Report DVR status and other information through CAN
3. Respond APK by requirements sent from CAN (such as TF card status, etc.)

The CAN command interacting with DVR is an event message, and the time interval between two messages is not less than 20 ms. Like a CAN message which is composed of multiple frames, the sending interval of two frames is 20 ms.
The main protocols for CAN interaction between central console and DVR are as follows.

Command Type	Parameter Length	Sending Timing	Note
MAC Address	6 Byte	1. Sending as IHU Opening 2. Sending as changing 3. Sending when DVR sends requirements and IHU responds (as DVR opening)	Such as: 00:23: DE:2C:34:DF, sending from start to end; parameter length (6 Byte) + 1 (1 Byte check digit) is the total data length.
Wi-Fi Name	64 Bytemax	1. Sending as IHU Opening 2. Sending as changing 3. Sending as DVR sends requirements and IHU responds 4. Sending as IHU turns on AP	Wi-Fi name is variable length. When the overall length of data is more than 6, it is necessary to send it by frame.
Wi-Fi Password	64 Bytemax	1. Sending as IHU Opening 2. Sending as changing 3. Sending as DVR sends requirements and IHU responds 4. Sending as IHU turns on AP	Wi-Fi name is variable length. When the overall length of data is more than 6, it is necessary to send it by frame.
Wi-Fi Connection	1 Byte	When DVR APK Starts/ Exits	

Command Type	Parameter Length	Sending Timing	Note
UDP UDP broadcast terminal number	2 Byte	1. When head unit APK starts 2. When DVR requests actively	Used for notifying APK to connect with DVR by DVR broadcasting
TF Card Status	1 Byte	1. DVR sends actively when TF status changes 2. DVR is sent passively when APK requires actively (when APK starts)	The status of card includes: 1. TF card status is normal 2. Card is not inserted (- displayed in IHU: storage card is not inserted in driving recorder) 3. TF card is not formatted (displayed in IHU: storage card is not inserted in driving recorder) 4. Card is abnormal (- displayed in IHU: storage card of driving recorder is abnormal)
DVR Status	1 Byte	1. DVR sends actively when DVR status changes 2. DVR is sent passively when APK requires actively (when central console starts)	Status includes the followings: 1. DVR status is normal 2. DVR status is abnormal
Photo folder status	1 Byte	1. DVR sends actively when photo space is full 2. DVR is sent passively when APK requires actively	Status includes the followings: 1. Photo space is not full 2. Photo space is full (- displayed in IHU: the photo folder of driving recorder has been full)
Emergency video folder status	1 Byte	1. DVR sends actively when emergency video space is full 2. DVR is sent passively when APK requires actively	Status includes the followings: 1. Emergency video space is not full 2. Emergency video space is full (displayed in IHU: the photo folder of driving recorder has been full)

Command Type	Parameter Length	Sending Timing	Note
DVR Requirement	1 Byte	When DVR needs to actively acquire the central console information	SSID information and others needs to be known when DVR starts
APK Requirement	1 Byte	When DVR needs to actively acquire the DVR status	APK requires actively. After DVR receives this requirement, TF status, DVR status, photo space status and emergency video space status information is sent by CAN

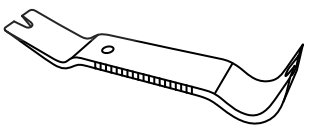
Specifications

Torque Specifications

Description	Torque (N·m)
Outside Rear View Mirror Fixing Bolt	7.0 ± 1.5 N m
Inside Rear View Mirror Fixing Bolt	1.5 ± 0.5 N m

Tool

General Tool

Tool Name	Tool Drawing
Interior Crow Plate	 S00020

DIAGNOSIS & TESTING

Problem Symptoms Table

Hint:

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

Symptom	Suspected Area	Recommended Repair Method
Outside rear view mirror angle cannot be adjusted	Fuse	Check if fuse is blown
	Outside rear view mirror switch	Check the outside rear view mirror switch for damage
	Outside rear view mirror motor	Check the outside rear view mirror motor for damage
	Wire harness or connector	Check whether wire harness or connector is normal
Outside rear view mirror cannot defrost and defog	Fuse and relay	Check whether fuse and relay are normal
	Outside rear view mirror defrost switch	Check the outside rear view mirror defrost switch for damage
	Outside rear view mirror heating wire	Check whether the outside rear view mirror heating wire is normal
	Wire harness or connector	Check whether wire harness or connector is normal
	Body Control Module (BCM)	Check whether the body control module (BCM) is normal

Diagnostic Help

- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.

Intermittent Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- Check for broken, bent, protruded or corroded terminals.
- Inspect the mounting conditions of rear view mirror assembly, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to malfunction.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to normal operation of circuit, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. In such cases, the circuit operation will be seriously affected. Circuit is sensitive to ground. A loose or corroded ground can seriously 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 contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the rear view mirror control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts.**

OK

3	**Using a diagnostic tester, read related DTC and data stream information.**

Result

Result	Go to
No DTC	A
DTC is output	B

A → **Troubleshoot according to Diagnostic Trouble Code (DTC) chart**

B

4	**Troubleshoot according to Diagnostic Trouble Code (DTC) chart**

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to rear view mirror system malfunction repair completion inspection and delivery, confirm that malfunction is resolved**

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

ON-VEHICLE SERVICE

Outside Rear View Mirror Assembly

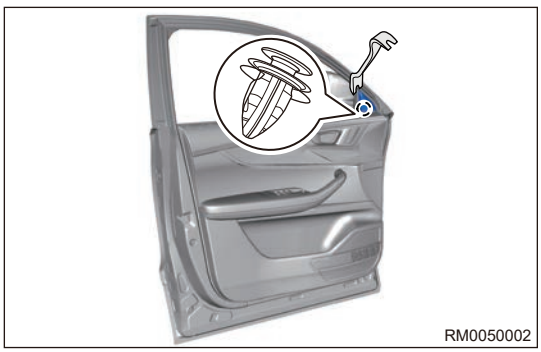
Removal

Hint:

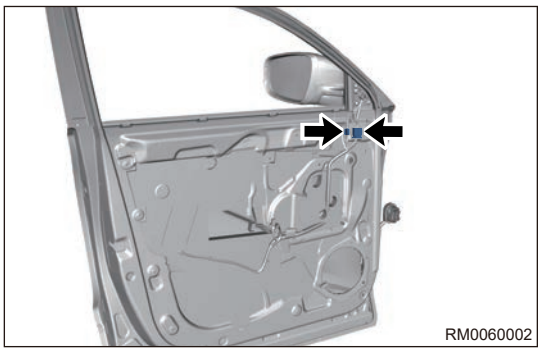
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

Caution
• Be sure to wear necessary safety equipment to prevent accidents, when removing outside rear view mirror assembly. • Operate carefully to prevent components from being damaged, when removing outside rear view mirror assembly. • Try to prevent interior and body paint from being scratched when removing outside rear view mirror assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left outside rear view mirror inner triangular block.
   a. Using an interior crow plate, pry off clips from outside rear view mirror inner triangular block, and remove the left outside rear view mirror inner triangular block.

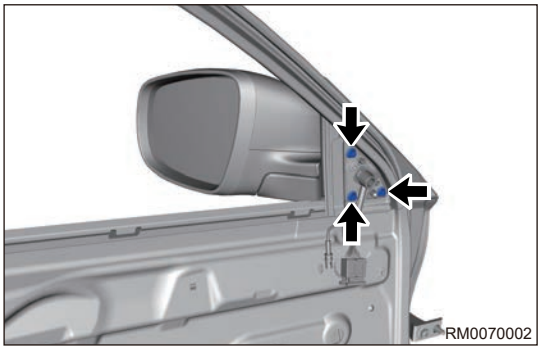

RM0050002

4. Remove the front left door inner protector assembly.
5. Remove the left outside rear view mirror assembly.
   a. Disconnect the left outside rear view mirror assembly connector (arrow).


RM0060002

b. Remove 3 fixing bolts (arrow) from left outside rear view mirror assembly.

Tightening torque: 7.0 ± 1.5 N•m



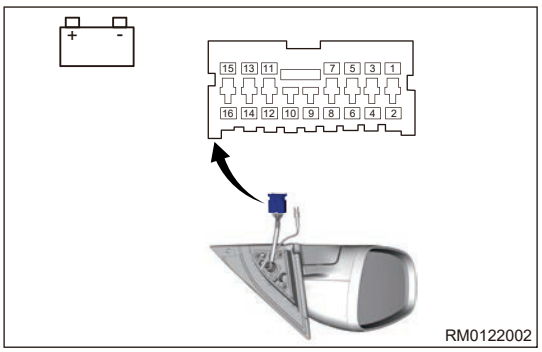
c. Remove the left outside rear view mirror assembly.

Inspection

1. Check the outside rear view mirror assembly.

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

a. Apply battery voltage to terminals of outside rear view mirror assembly connector and check operation of outside rear view mirror assembly according to table below.



Measurement Condition	Specified Condition
Battery positive (+) → Terminal 12 Battery negative (-) → Terminal 3	UP
Battery positive (+) → Terminal 3 Battery negative (-) → Terminal 12	DOWN
Battery positive (+) → Terminal 4 Battery negative (-) → Terminal 12	LEFT
Battery positive (+) → Terminal 12 Battery negative (-) → Terminal 4	RIGHT

2. If result is not as specified, replace, check or repair outside rear view mirror assembly.

Installation

1. Installation is in the reverse order of removal.

Caution
• Install connector in place and tighten fixing bolts to specified torque when installing outside rear view mirror assembly. • Make sure outside rear view mirror assembly can move smoothly, flexibly and reliably after installation. • After installing outside rear view mirror assembly, it is necessary to perform panoramic image calibration (if equipped).

Outside Rear View Mirror Lens Assembly

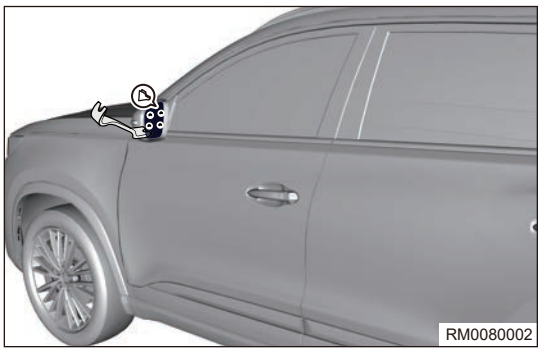
Removal

Hint:

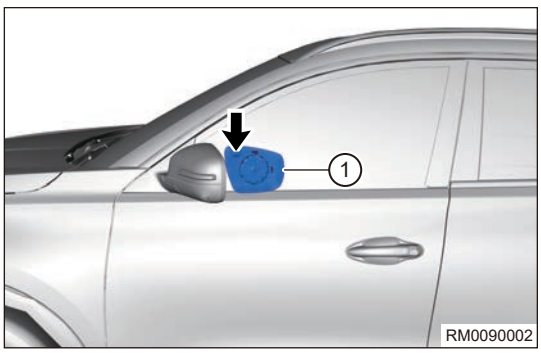
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

Caution
• Avoid breaking claws when removing outside rear view mirror lens assembly. • Avoid damaging lens due to dropping when removing outside rear view mirror lens assembly. • Try to prevent body paint surface from being scratched when removing outside rear view mirror lens assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the left outside rear view mirror lens assembly.
   a. Press outside rear view mirror surface to tilt it.
   b. Apply protective tape around exterior frame of outside rear view mirror.
   c. Using an interior crow plate, pry off the claws of outside rear view mirror lens assembly.



   d. Disconnect the connector (arrow) from rear view mirror lens assembly, and remove the left outside rear view mirror lens assembly (1) (if equipped with rear view mirror heater).



Inspection

1. Check the outside rear view mirror lens assembly. (If equipped with rear mirror heater)

a. Apply battery voltage to terminals of outside rear view mirror lens assembly connector, and check operation of outside rear view mirror lens assembly according to table below.

Measurement Condition		Specified Condition
Battery positive (+)	Battery negative (-)	Outside rear view mirror lens becomes warm

2. If result is not as specified, replace outside rear view mirror lens assembly.

Installation

1. Installation is in the reverse order of removal.

Caution
• Make sure outside rear view mirror lens assembly can move smoothly, flexibly and reliably after installation.

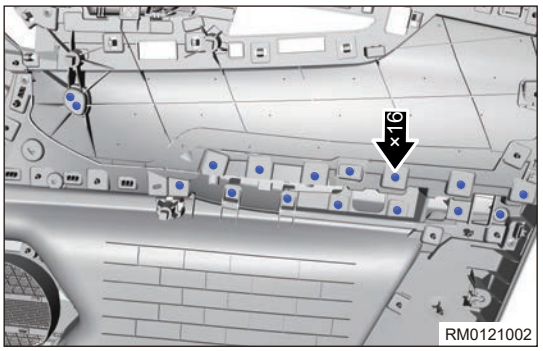
Outside Rear View Mirror Adjustment Switch

Removal

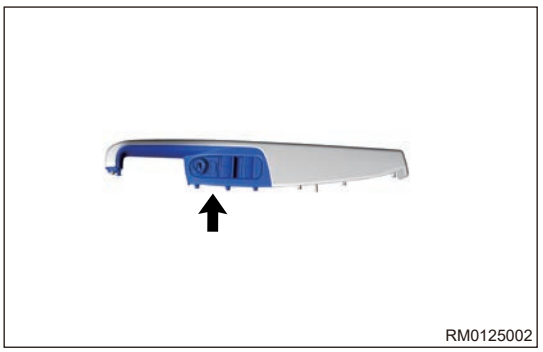
Caution
• Be sure to wear safety equipment to prevent accidents, when removing outside rear view mirror adjustment switch. • Try to prevent instrument panel assembly from being scratched when removing outside rear view mirror adjustment switch.

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

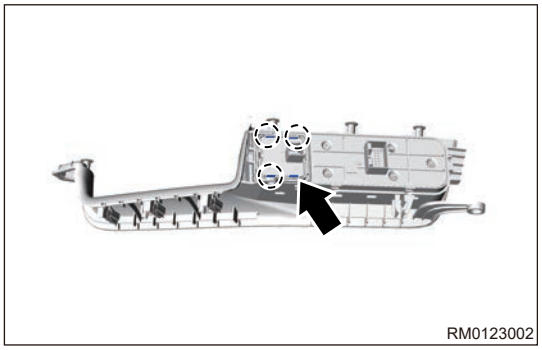
a. Remove 16 fixing screws (arrow) of power glass regulator switch assembly that fixed on door protector assembly.



b. Separate the power glass regulator switch (arrow).



c. Using an interior crow plate, pry off claws (arrow) and remove the outside rear view mirror adjustment switch.



Installation

1. Installation is in the reverse order of removal.

Caution
• Operate carefully to prevent damage to other components when installing outside rear view mirror adjustment switch. • Install connectors in place, when installing outside rear view mirror adjustment switch. • Check that switch can operate normally after installing outside rear view mirror adjustment switch.

Inside Rear View Mirror Assembly (Low Configuration)

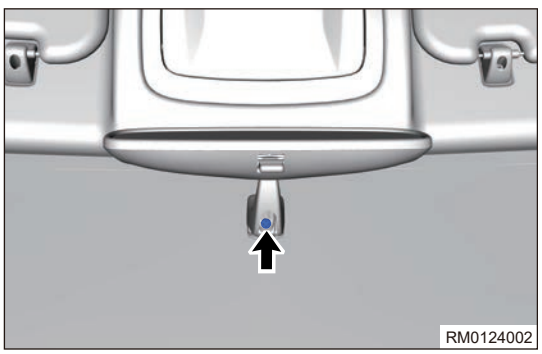
Removal

Caution
• Appropriate force should be applied when removing inside rear view mirror assembly. Be careful not to operate roughly. • Try to prevent front windshield assembly from being scratched when removing inside rear view mirror assembly.

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

a. Remove inner hexagon head bolts (arrow) from inner rear view mirror base and remove inner rear view mirror assembly.

Tightening torque: 1.5 ± 0.5 N•m



Installation

1. Installation is in the reverse order of removal.

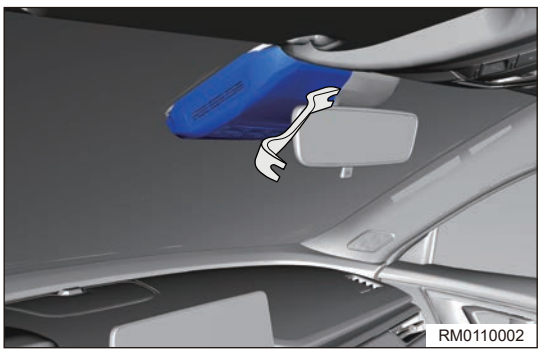
Caution
• Before installation, check if there is any obvious appearance defects (such as scratches, material missing, damage, etc.) and select the qualified parts. • Check that the inside rear view mirror should be within the normal range required by view and the lens assembly should be matched with lens base assembly firmly without any looseness.

Inside Rear View Mirror Assembly (High Configuration) (If Equipped)

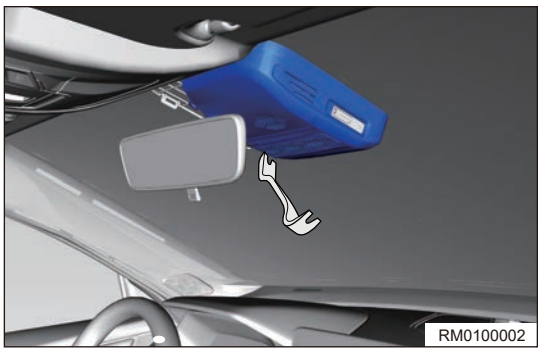
Removal

Caution
• Appropriate force should be applied when removing inside rear view mirror assembly. Be careful not to operate roughly. • Try to prevent front windshield assembly from being scratched when removing inside rear view mirror assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the inside rear view mirror assembly.
   a. Using an interior crow plate, pry off the inner rear view mirror left protective cover.

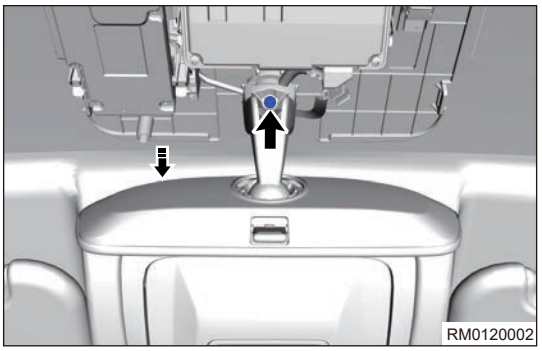


   b. Using an interior crow plate, pry up the inner rear view mirror right protective cover.



   c. Remove screws (arrow) from inner rear view mirror base and remove inner rear view mirror assembly in direction of arrow.

      Tightening torque: 1.5 ± 0.5 N•m



Installation

1. Installation is in the reverse order of removal.

Caution
• Before installation, check if there is any obvious appearance defects (such as scratches, material missing, damage, etc.) and select the qualified parts. • The inside rear view mirror should be within the normal range required by view and the lens assembly should be matched with lens base assembly firmly without any looseness. • Driving recorder SD card interface position should be matched correctly with the gap between left and right covers.

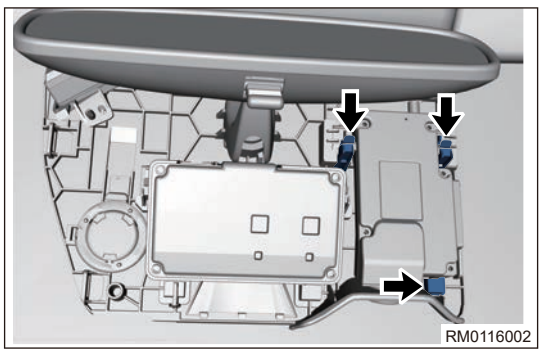
Drive Recorder (If Equipped)

Removal

Caution
• Appropriate force should be applied when removing drive recorder. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the inside rear view mirror left protective cover.
4. Remove the inside rear view mirror right protective cover.
5. Remove the drive recorder.
   a. Remove the driving recorder connector (arrow).

   b. Remove the fixing columns (arrow) on both sides of driving recorder along the upward direction of bracket base, and take out the lens of driving recorder and front end pin, and finally remove driving recorder.



Installation

1. Installation is in the reverse order of removal.