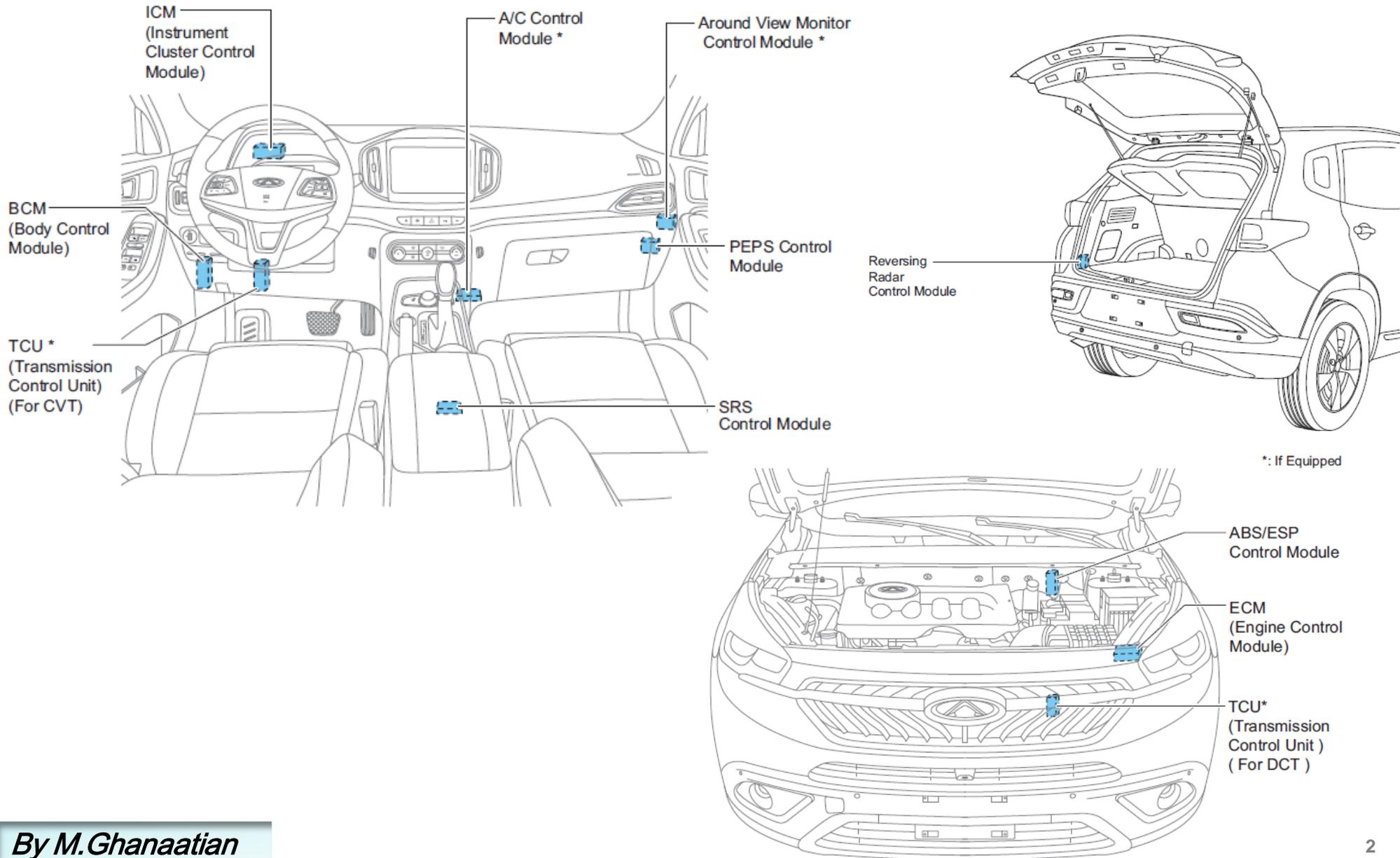
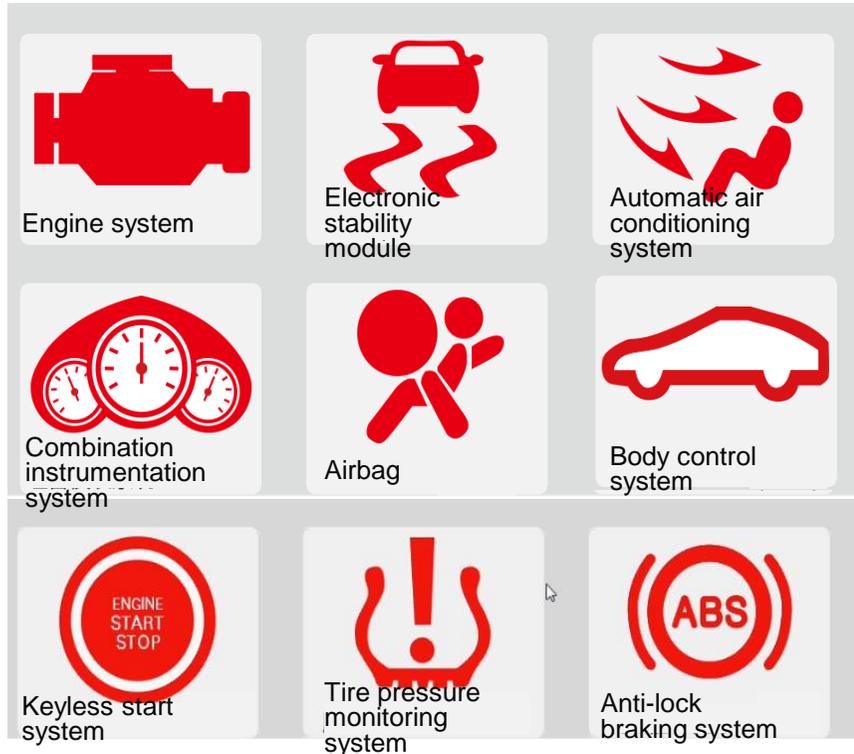




جزوه آموزشی سیستم برق Tiggo7 - کارشناس



Network System overview

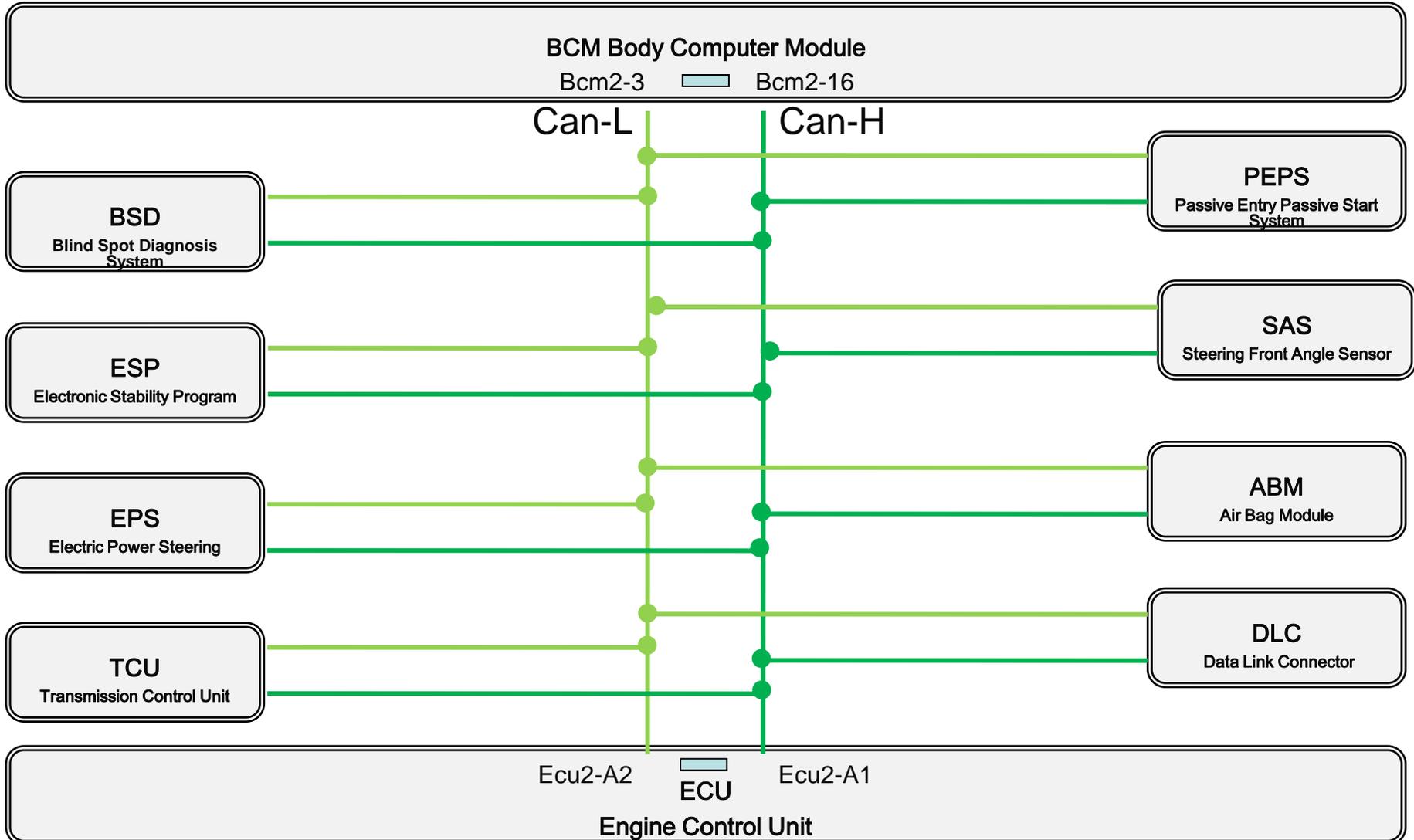


➤The whole car electrical modules of Tiggo 7 is of high integration, which realizes the functions through mutual cooperation of modules, the data information interchange of whole car electrical modules is realized by the communication system composed by following communication methods.

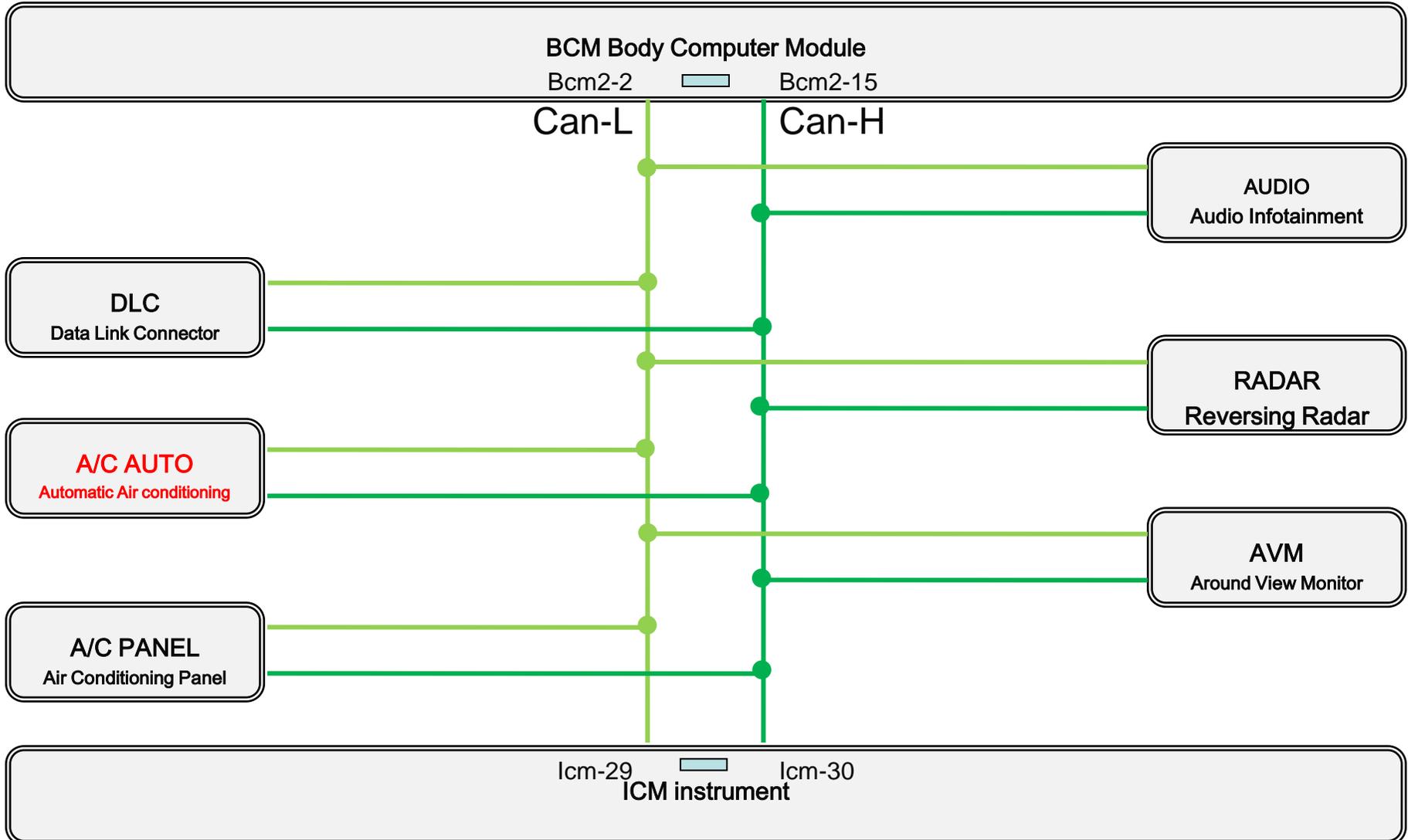
➤ Network communication method of Tiggo 7

- P-CAN
- B-CAN
- LIN

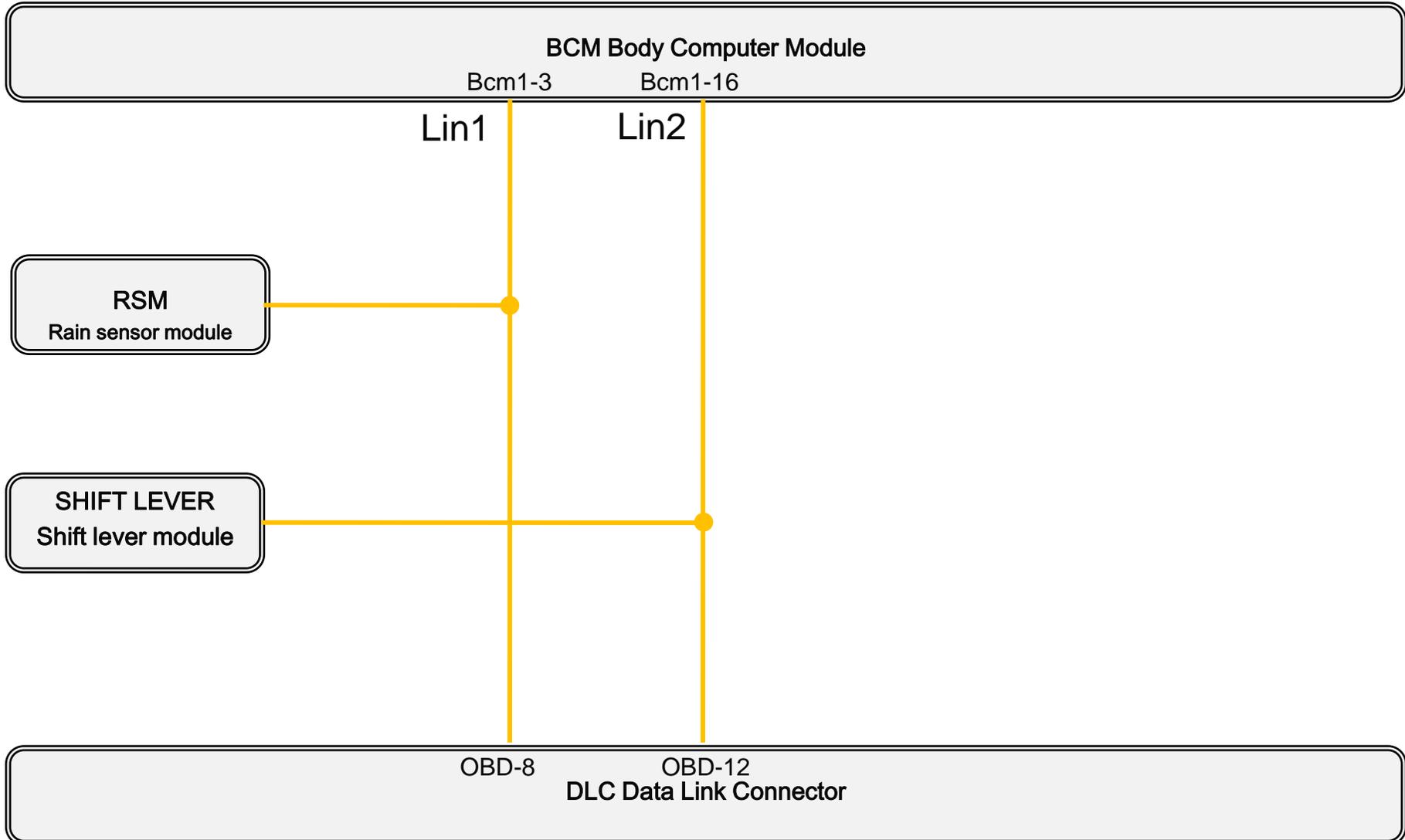
P-CAN network structure of Tiggo 7



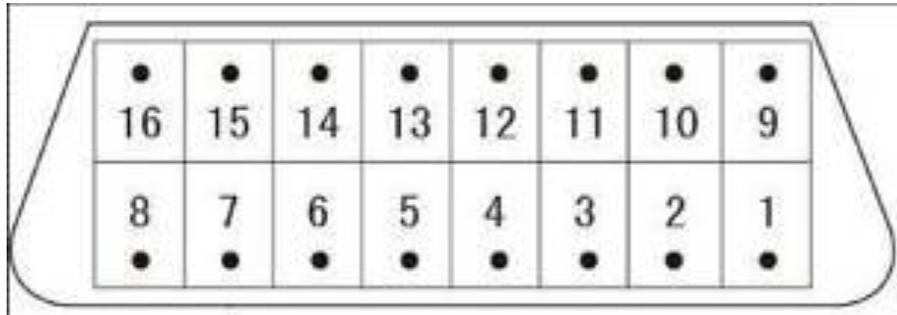
B-CAN network structure of Tiggo 7



LIN Network Structure of Tiggo 7



Car Model Communication Network Diagnosis socket introduction



Pin 16: Positive pole voltage

Pin 4: Negative

Pin 5: Negative

Pin 6: High speed CAN1-H

Pin 14: High speed CAN1-L

Pin 3: High speed CAN2-H

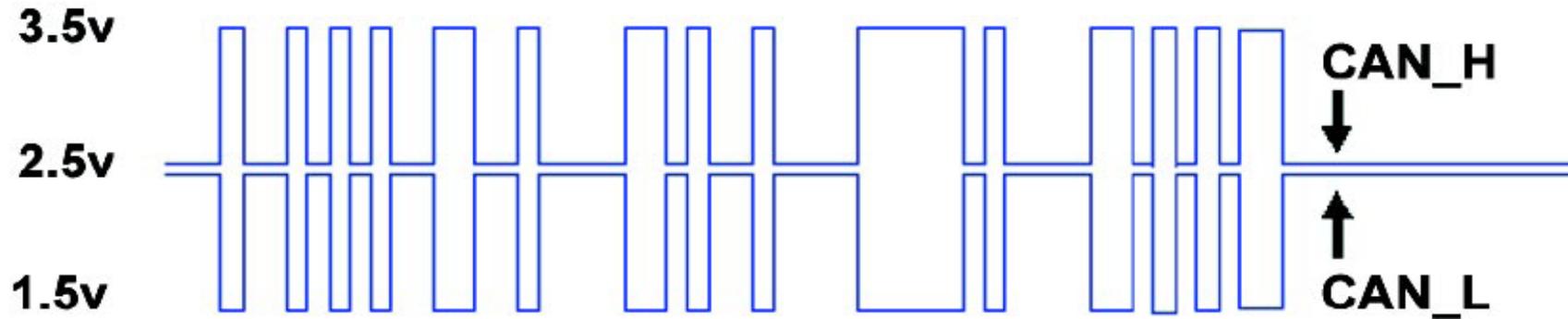
Pin 11: High speed CAN2-L

Pin 8: LIN1

Pin 12: LIN2

CAN bus information structure

- CAN network checking
- Measure terminal resistance: total resistance is around 60Ω
- Measure equivalent voltage



- Disconnect doubtful module or sensor, connector
- Shake the module or wire connectors

Common faults of CAN network

The fault has following features:

- 1) Open circuit: no voltage on bus
- 2) Short circuit to positive pole: no voltage change on bus, bus voltage $U=U$ accumulator
- 3) Short circuit to ground: no voltage change on bus, bus voltage $U=0V$



The reasons may be:

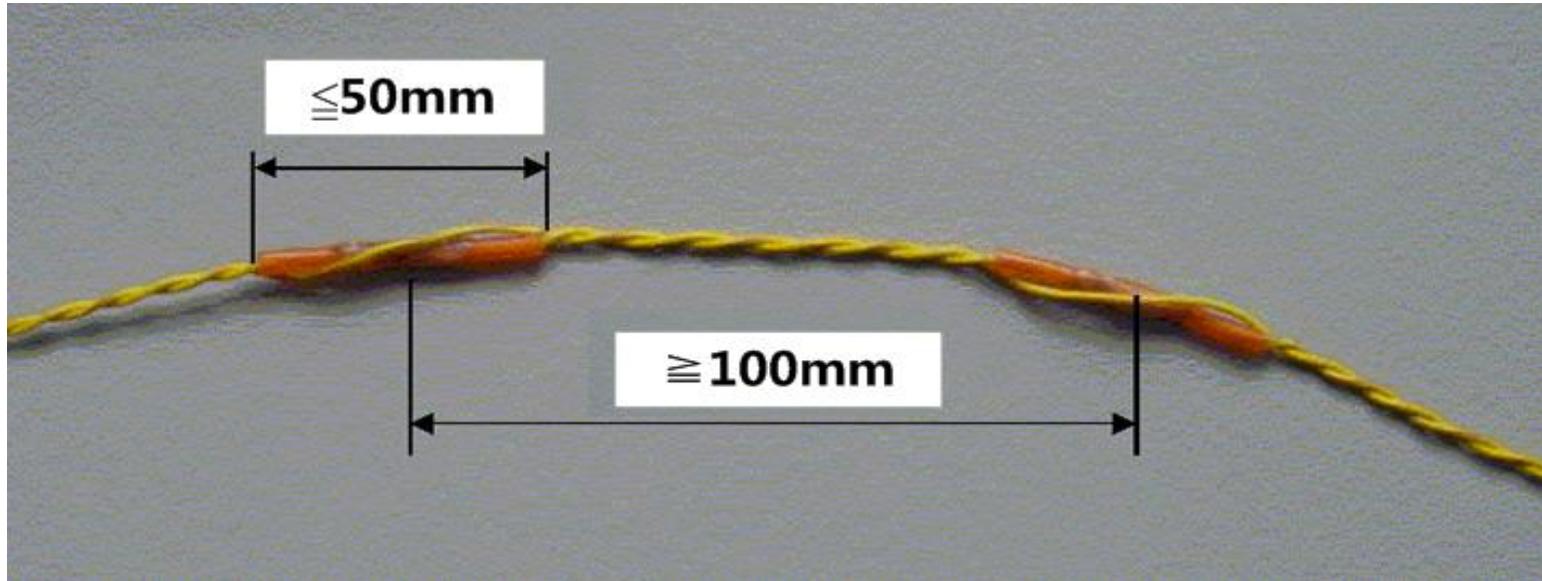
- 1) Wire breaks.
- 2) Wire wears concentrated.
- 3) Connector connection damage/contact damage/dirt, rusting
- 4) Wire burned.
- 5) Power supply of control unit fails.
- 6) Control unit damage.

CAN network diagnosis tool

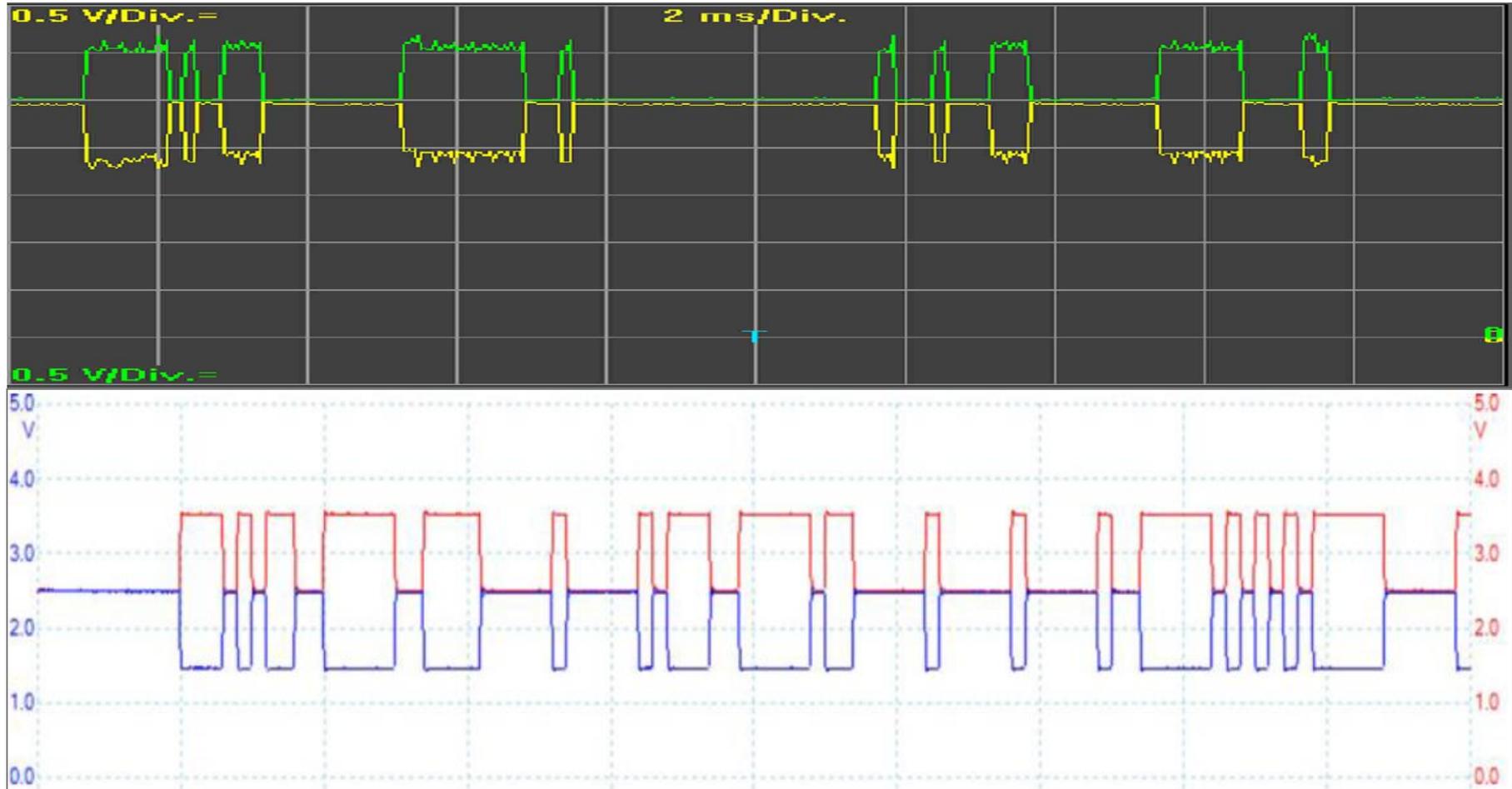
- 1.X-431, PC diagnosis apparatus.
- 2.Multimeter.
- 3.Oscilloscope.



CAN bus maintenance notice

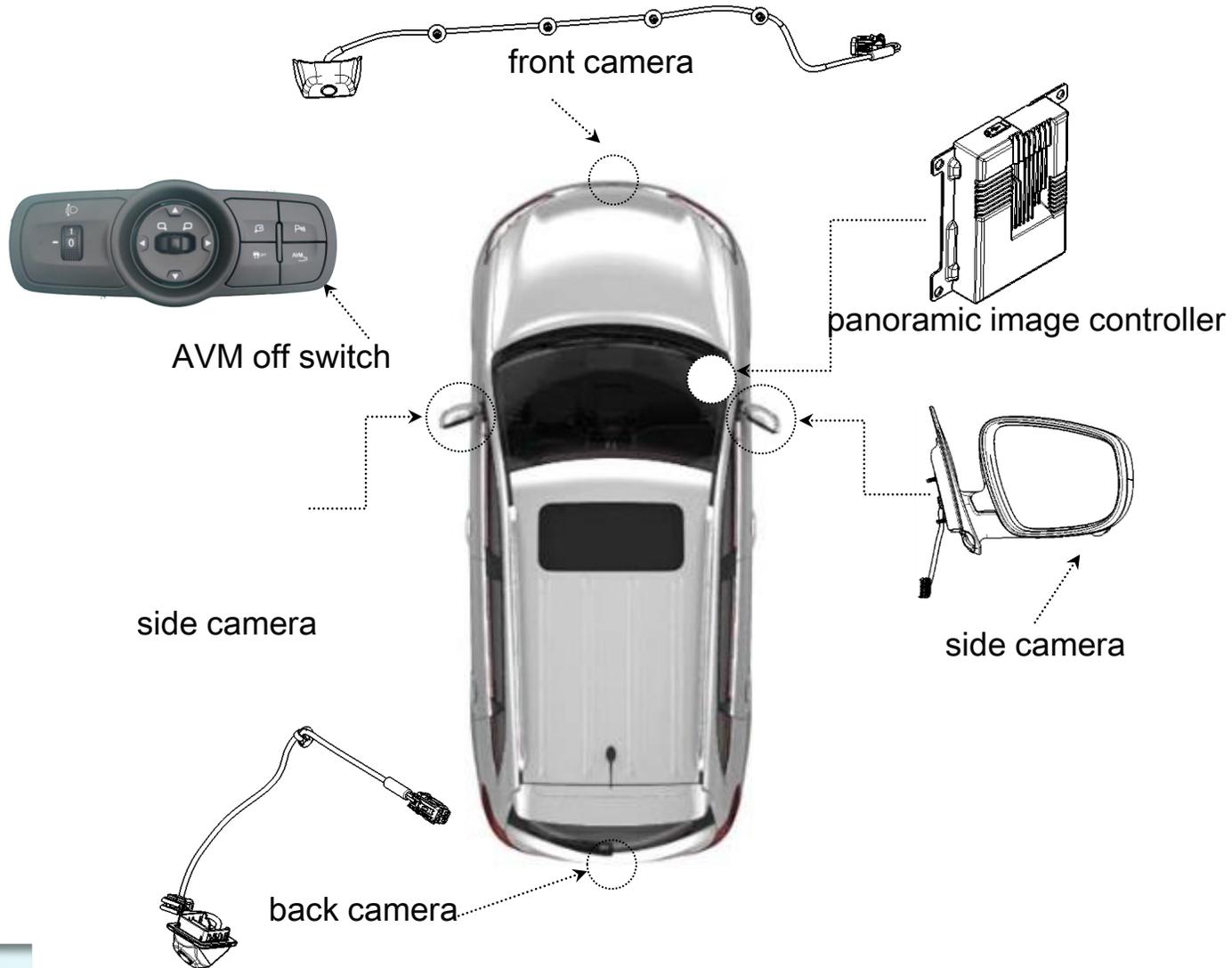


CAN network detection-waveform measurement



360° Panoramic Image System

System components



360° Panoramic Image System

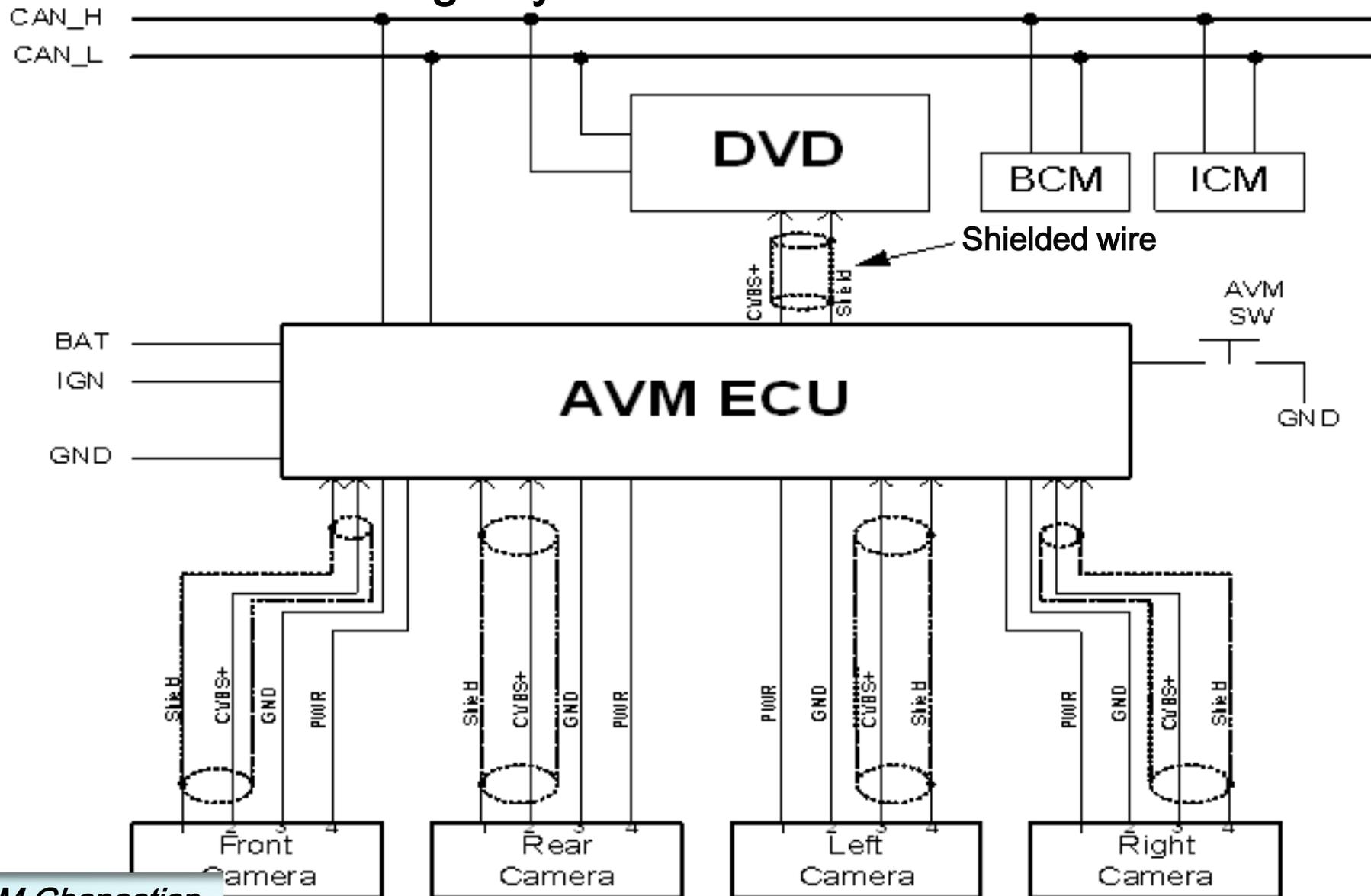
System components

Main components of panoramic image system include:

- panoramic image controller*1.
- front camera*1.
- back camera*1.
- side camera*2 ,
- Side camera integration is in the total integration of the outside rear-view mirror.
- Panoramic image controller locates at the inner side of the co-driver's glove box, shares one support with PEPS; Front camera locates at the middle retainer of the front bumper; Back camera locates under the back door, and is installed on the guard plate of license plate light.



360° Panoramic Image System



360° Panoramic Image System

After sale camera calibration

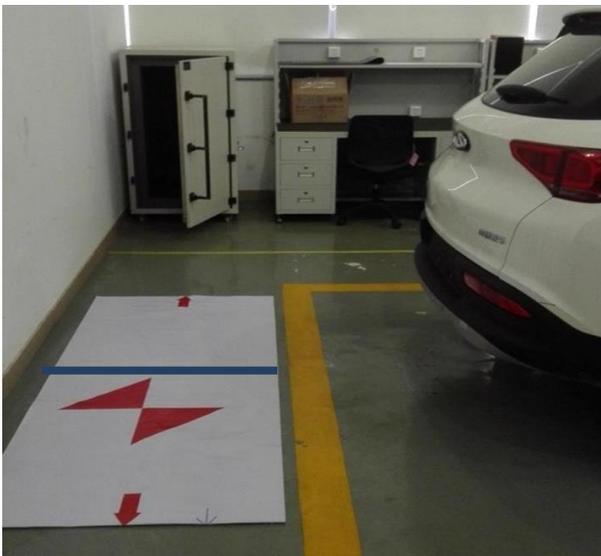
The conditions on which the camera needs to be calibrated

➤ If one of the following condition occurs: service station disassembles the camera or rearview mirror with camera, disassembles front and back bumpers, car accident leads to the position variation of the camera, or change Panoramic image system controller.

360° Panoramic Image System

After sale camera calibration

Offline calibration method



➤Step I: park the car to the fixed location

➤Step II: lay the calibrated cloth (front and back sides) in front of and behind the car.

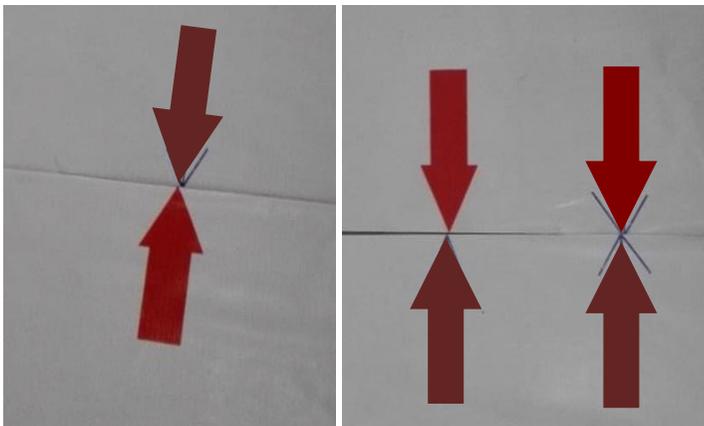
Attention:

a) "middle front" of the calibrated cloth responds to the front side;

b) middle of the calibrated cloth aims at the middle position between the front and the back.

360° Panoramic Image System

After sale camera calibration
Offline calibration method



➤Step III: lay the calibrated cloth (left and right sides) on both sides of the car.

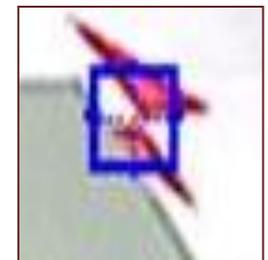
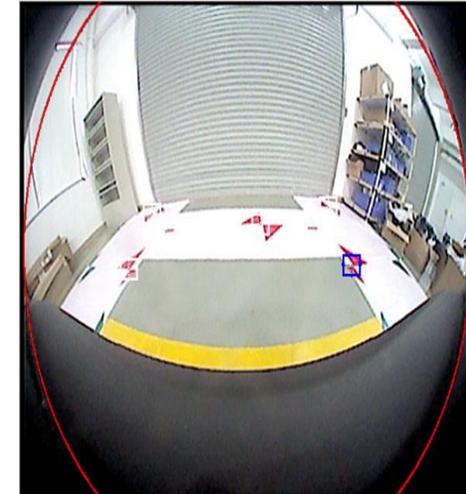
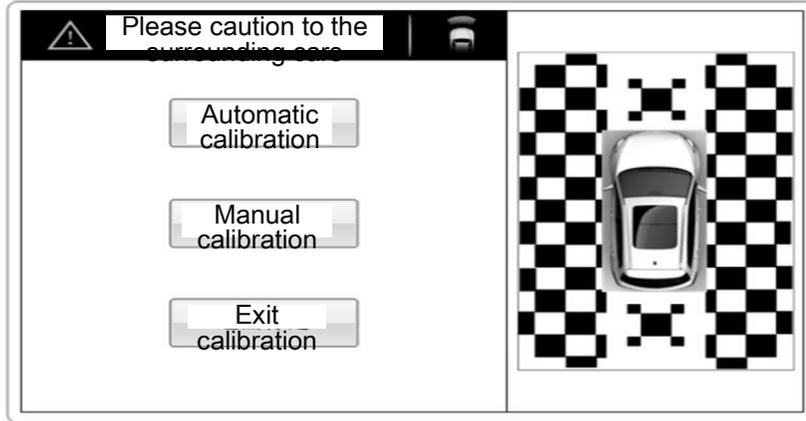
Attention:

- Middle line responds to the position of the front left and front right wheels
- Lay the left & right sides and front & back sides of the calibrated cloth according to the single and double arrows.

360° Panoramic Image System

After sale camera calibration

“HOME+NAVI+SET”



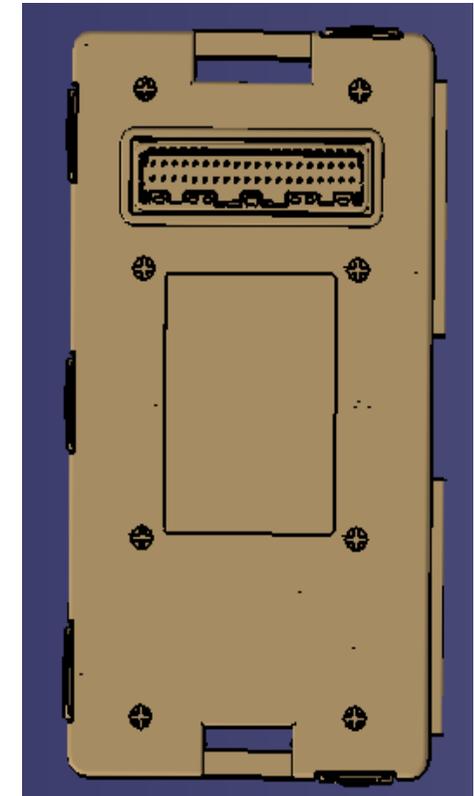
Control Instructions of Auto Air Conditioning

- Automatic control Air Conditioning System has all functions of the electric Air Conditioning and also has other functions like automatic control, memory settings, self-diagnosis and so on.
- In the automatic control mode, the air conditioning controller will set temperature, the temperature inside & outside the vehicle, of the surface of evaporator, the intensity of the sun, the temperature of the tank, the speed parameter of each sensor, cold/hot air valve, air volume, air mode, inside & outside circulation, and the switch for auto control of the compressor.



Automatic Air Conditioning control module

External View



A/C system self-diagnosis

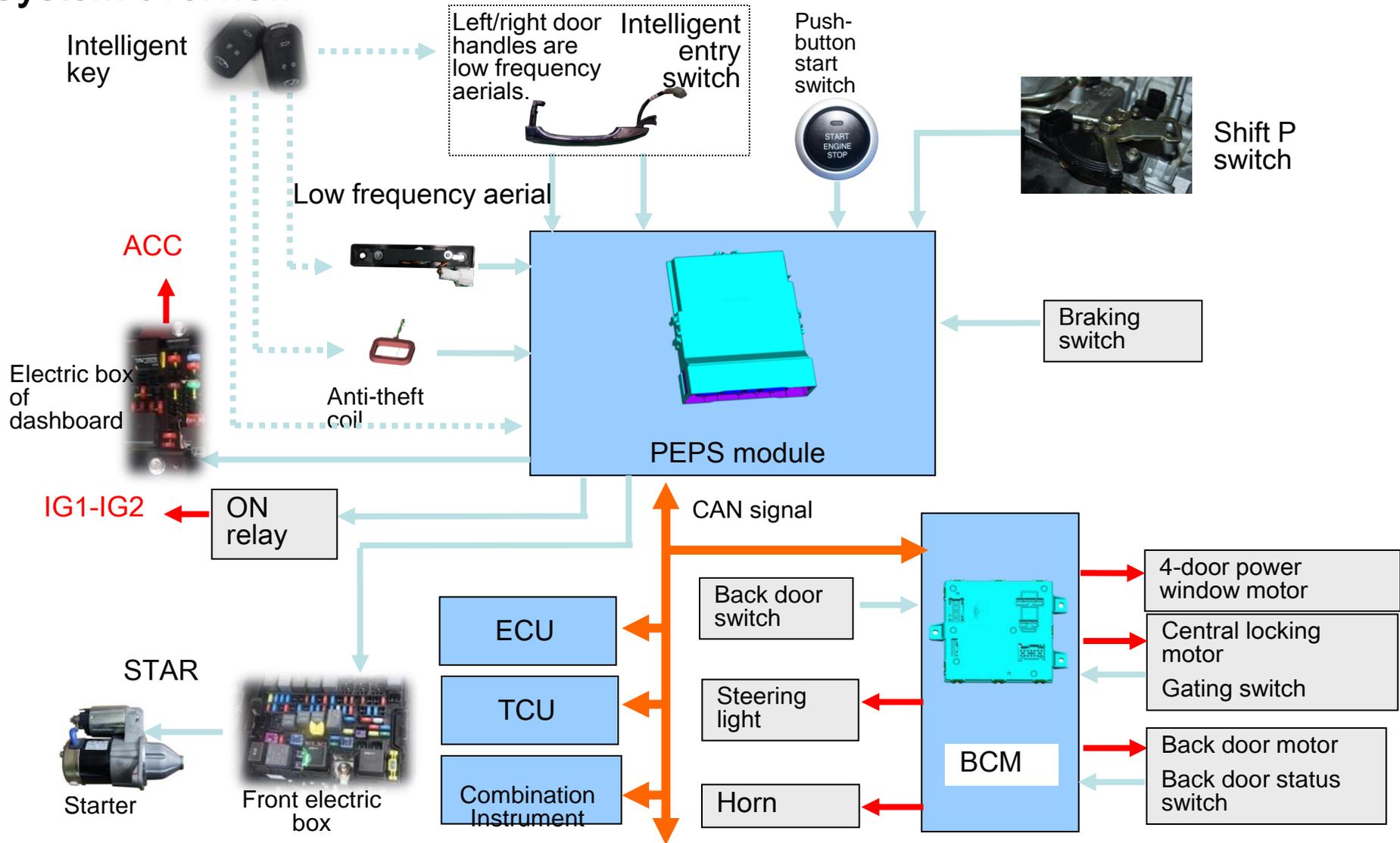
- Enter self-diagnosis button definition: Front defroster + CLIMATE button, starting method: long press combination button 5S.



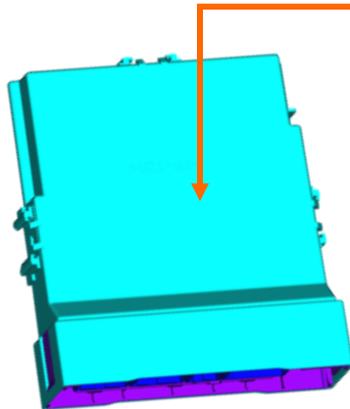
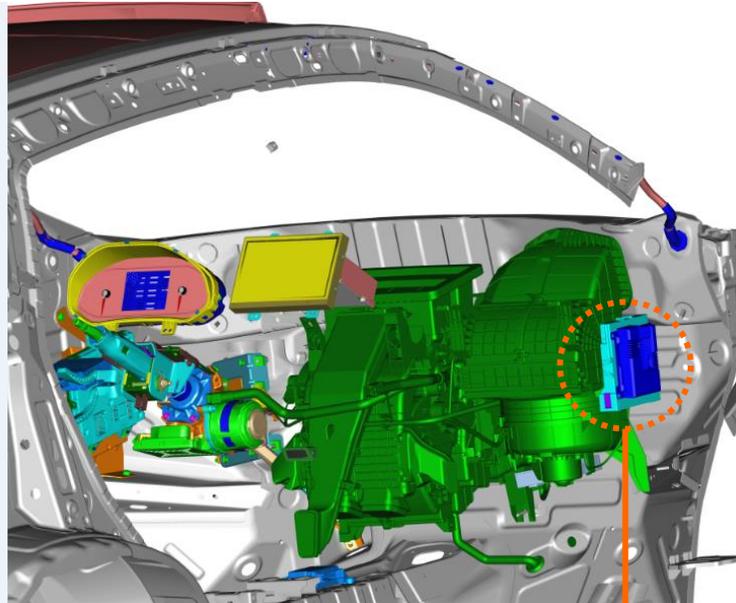
Symbol	Malfunction Content
00	System is normal (power A/C)
01	Outside temperature sensor error (open or short) (power A/C)
02	Room temperature sensor error (open or short)
03	Room right temperature sensor error (open or short)
04	Solar sensor (left) error (open or short)
05	Solar sensor error (open or short)
06	Humidity sensor error
07	Air mass sensor error
08	Evaporator temperature sensor error (short or open) (power A/C)
09	Heater temperature sensor error (short or open) (power A/C)
10	-
11	Blower error (adjustment fails) (power A/C)
12	Circulation damper motor error (adjustment fails) (power A/C)
13	Mode damper motor error (adjustment fails) (power A/C)
14	-
15	Temperature mix damper motor error (adjustment fails) (power A/C)
16	Right temperature mix damper motor error (adjustment fails)
17	-
18	-
19	-
20	-
21	Control panel CAN communication error (CAN communication is interrupted) (power A/C)
22	Communication with BCM error (power A/C)

Passive Entry Passive Start System

System overview



PEPS control module

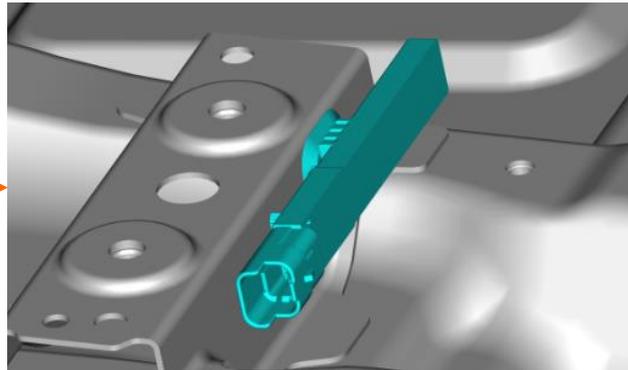
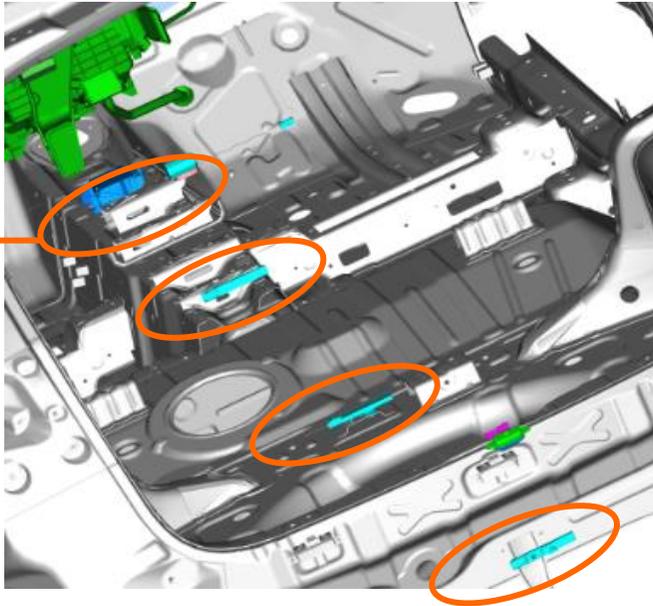


➤ PEPS control module is installed under the FR A pole, which is the main control module of PEPS system.



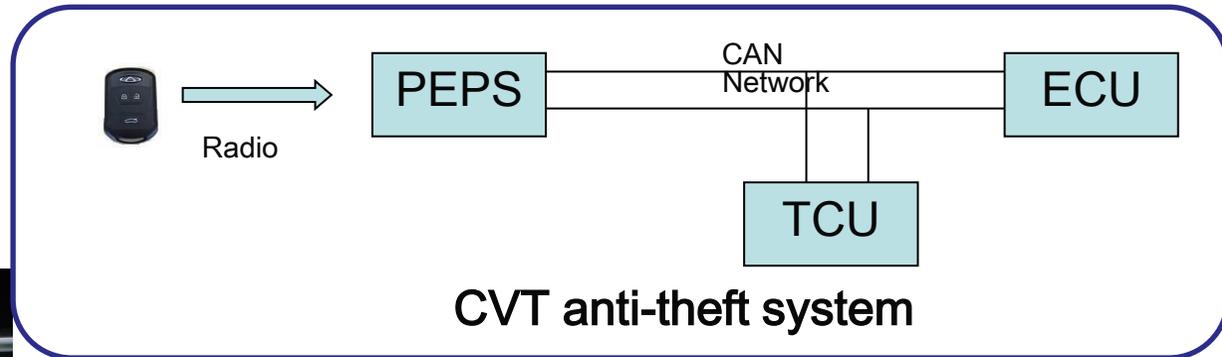
Passive Entry Passive Start System

PEPS Low frequency aerial

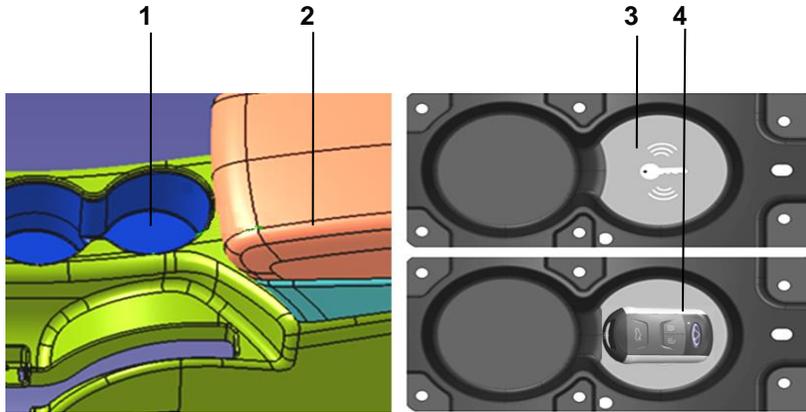


Passive Entry Passive Start System

Intelligent entry switch



System functions of PEPS



- 1 cup tray;
- 2 handrail box;
- 3 on the bottom of the behind cup tray is "Backup start key placement prompt icon";
- 4 smart key.

Dipped Headlight Control Principle

Automatic light	<p>1. Meet the following conditions, activate dipped headlights and the position light</p> <ul style="list-style-type: none">①IGN=ON②The light switch to auto③Receive LIN signal sent by the rainfall sensor.
	<p>2. When the automatic light is activated ,BCM sends the CAN signal to the instrument and position light.</p>
	<p>2.Meet one of the following conditions, close the dipped headlights</p> <ul style="list-style-type: none">①IGN≠ON②The light switch off the auto position.③Rain sensor LIN signal.
	<p>3,Meet one of the following conditions, close the position light</p> <ul style="list-style-type: none">①IGN≠ON②The light switch from the auto position for more than 2S③Rain sensor LIN signal continues for more than 5s.

Follow Me Home Control Principle

Follow Me Home	The lights under manual mode
	1.FMH function activation condition: 2 minutes after switch the key to OFF , activate the overtaking switch, and in 2 minutes, regardless of the FMH function is manually or automatically shut down, it can be activated again (in 2 minutes, while the switch is activated, the high beam light will not be lit).
	2.When the FMH function is activated, the dipped light and the clearance light will be lit.
	3.When the FMH function is activated, the default duration is 30S.Activate the overtaking switch once again in a short period of time, the duration time of each FMH function will increase, increase 30S per time, not more than 8 times.
	4.When the FMH function is activated, overtaking activation reaches 2S, FMH function will be closed manually—— the dipped lights and clearance light immediately extinguish.
	5.When the FMH function is activated, switch the key to ACC or IGN ON, the FMH function will be closed, the lights suddenly extinguish, and the FMH cumulative duration time will be cleared to 0.

Follow Me Home Control Principle

Follow Me Home	6. When the FMH function is activated, the FMH reaches the set time and will automatically shut down, then the dipped lights and clearance light immediately extinguish.
	The lights under automatic mode
	1. When the vehicle has the fortification condition, light combination switch is in the AUTO position, then press the remote control locking button, and the BCM receives the light signal sent by the rainfall sensor, and the dipped light and position light automatically lit for 30S.
	2. After 30S or switch the ignition key to OFF/ON/ACC , or combination of lights switch off the AUTO position, and the dipped light and position light extinguish.

Steering auxiliary lighting

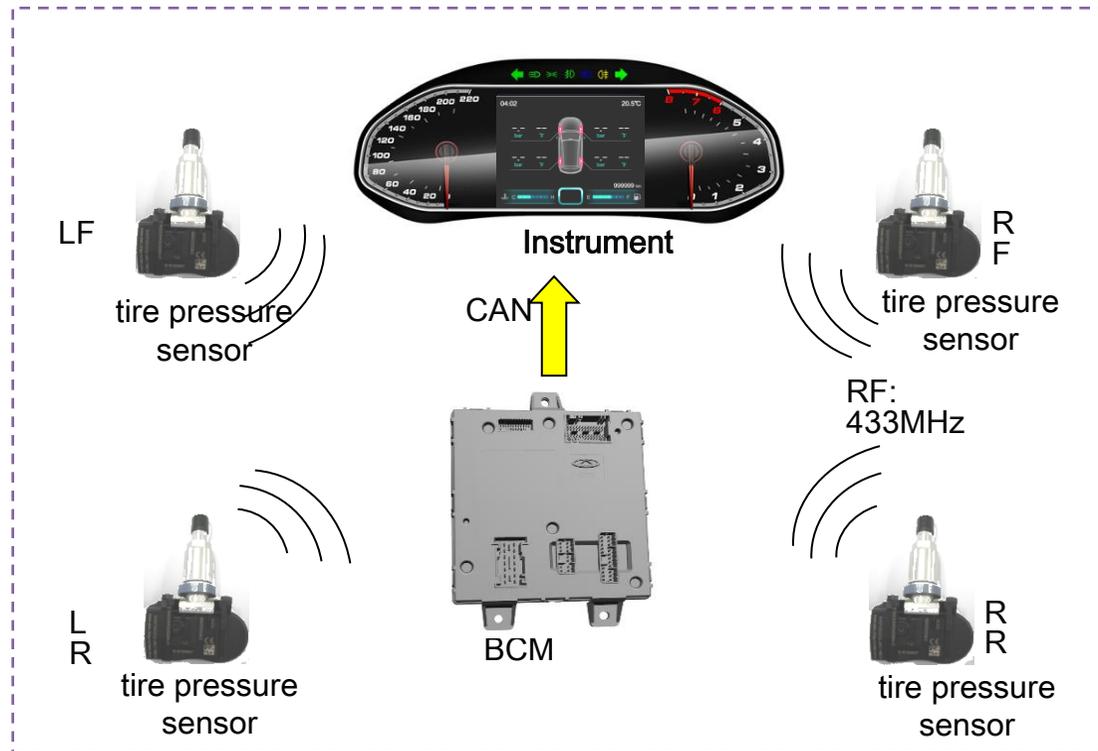
Steering auxiliary lighting	1. Meet the following conditions, open fog auxiliary lighting function:
	①IGN=ON .
	②Turn on the turn signal light or the steering column rotates more than 45 degrees(corresponding to the CAN signal-SteeringAngle.
	③Turn on the dipped headlights .
	④The driving speed is less than 40km/h.
	2. Meet one of the following conditions to close fog auxiliary lighting function:
	①IGN=ACC or OFF .
	②Turn off the turn signal lights , and the steering column rotates below 10 degrees (corresponding to the CAN signal- SteeringAngle).

Steering auxiliary lighting

Steering auxiliary lighting	③ Turn on the dipped headlights.
	④ The driving speed is higher than 40km/h.
	3. When the fog lamp auxiliary lighting is activated, do not activate the instrument indicating lights.
	4. This function can be made online configuration.

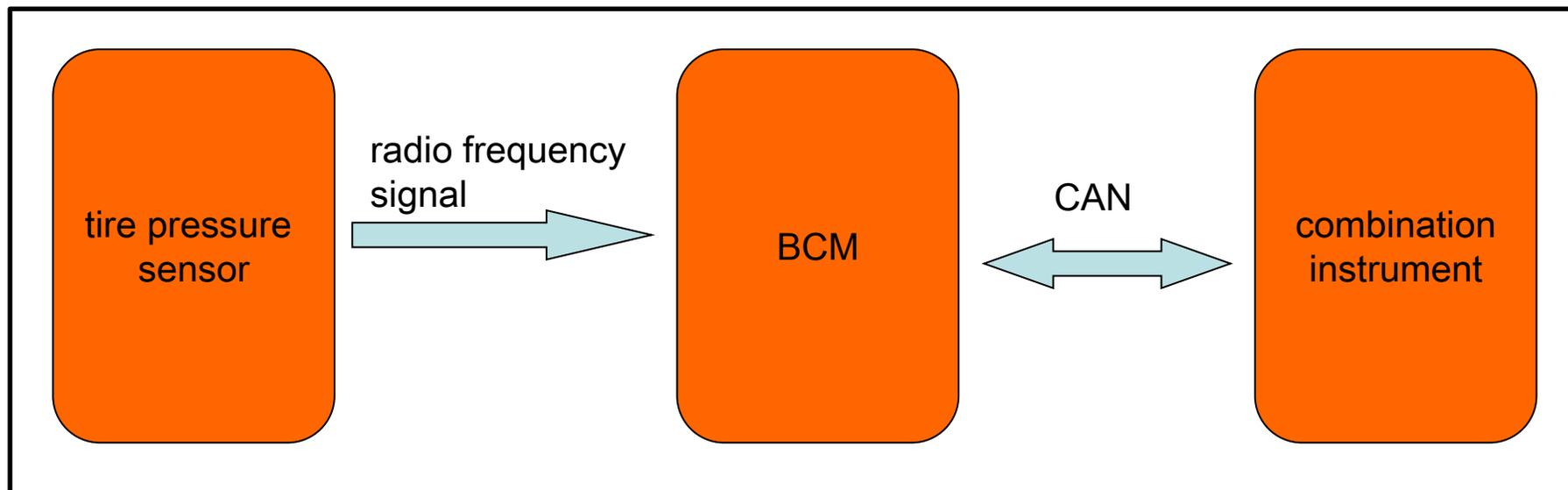
System summary

TPMS (TPMS) belongs to active safety configuration. TPMS can monitor tire pressure and temperature in real time and can display via instrument. When tire pressure and temperature is abnormal, TPMS will alarm to remind the driver the danger of car driving.



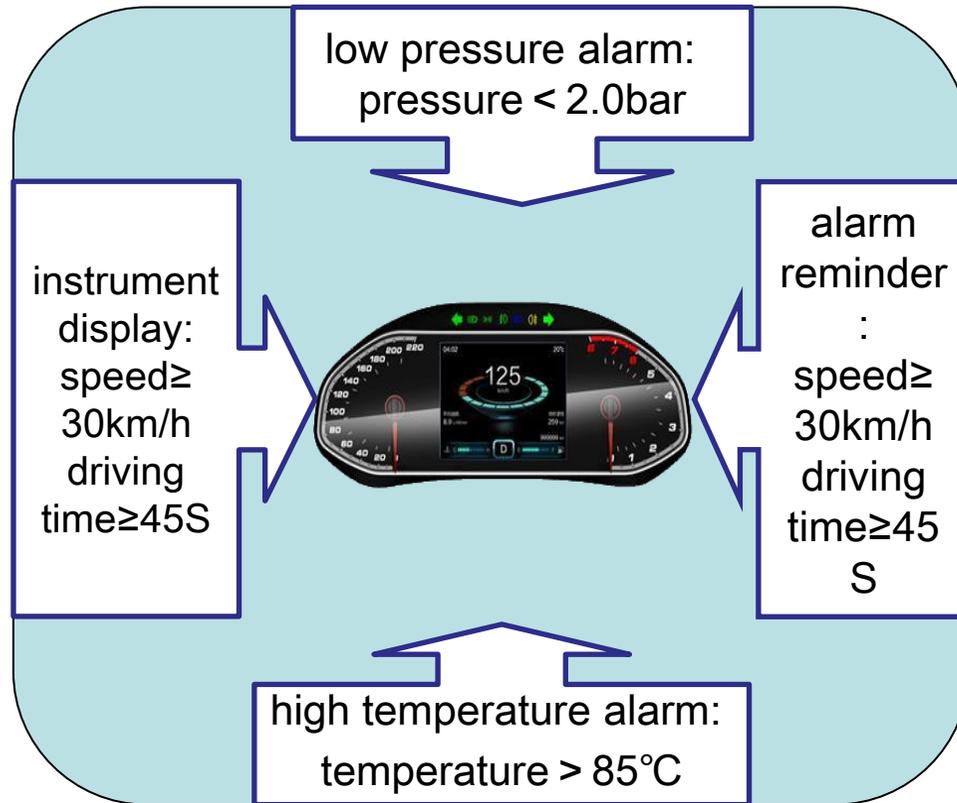
System working principle

Car body controller receives the radio frequency signal sent by tire pressure sensor, and processing the data. After the car body controller processes the tire pressure sensor data, it sends to the instrument through CAN total line. The instrument displays the pressure and temperature data through CAN total line signal.



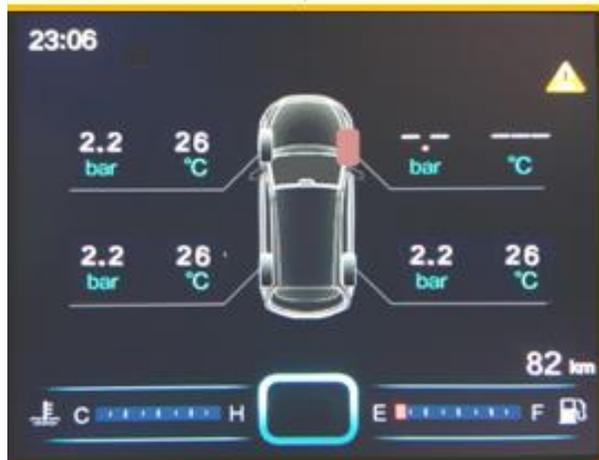
Remark: The wireless communication frequency of tire pressure sensor and car body controller is 433MHz.

System control strategy



When tire pressure is lower or the temperature is higher than the alarm value, low pressure or high temperature alarm will happen, and the corresponding wheel sign will flicker, displaying the pressure and temperature values, and the tire pressure alarm light  is normally on.

System breakdown

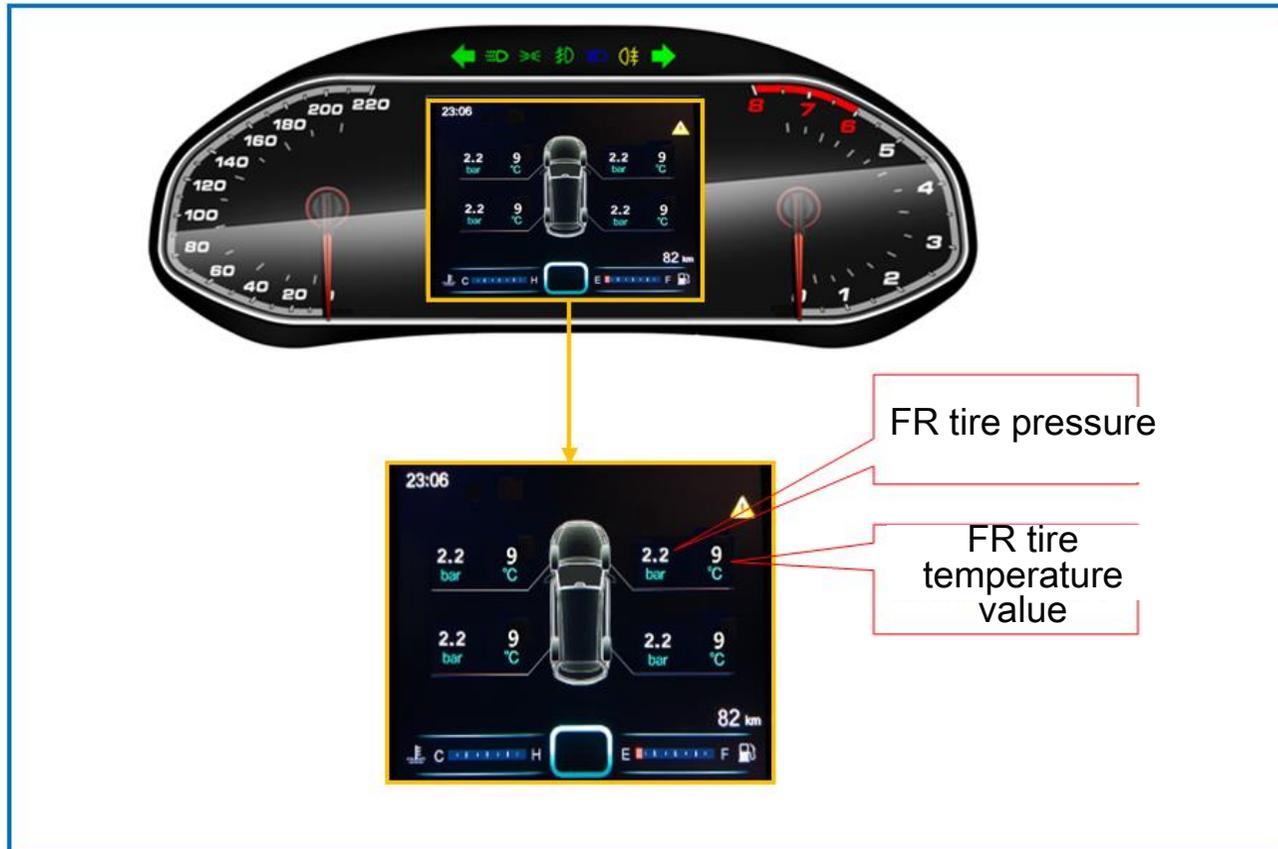


When the speed $> 30\text{km/h}$, if the TPMS does not receive one or more radio frequency signal after 10 min, then TPMS will do system breakdown alarm. The instrument will display “Please check TPMS.” At the same time, indicating sign will flicker for 75s and then be normally on.

Installation speed and moment	Manual torque wrench
Tightening speed	≤ 30 rpm
Assembly torque	$8 \pm 1\text{N.m}$

Instrument display

TPMS instrument display picture



All the tire pressure information not showing

Reasons list of all the tire pressure information not showing

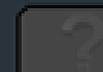
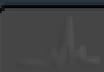
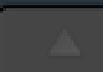
All the tire pressure information does not show, probably with system fault alarming, the reasons show as below:

No.	Fault cause
1	Not reaching the display state(car speed > 30km/h, and keeps for 45s)
2	The sensor does not study
3	BCM is damaged
4	All the four sensors are not installed or damaged(the probability is very low)

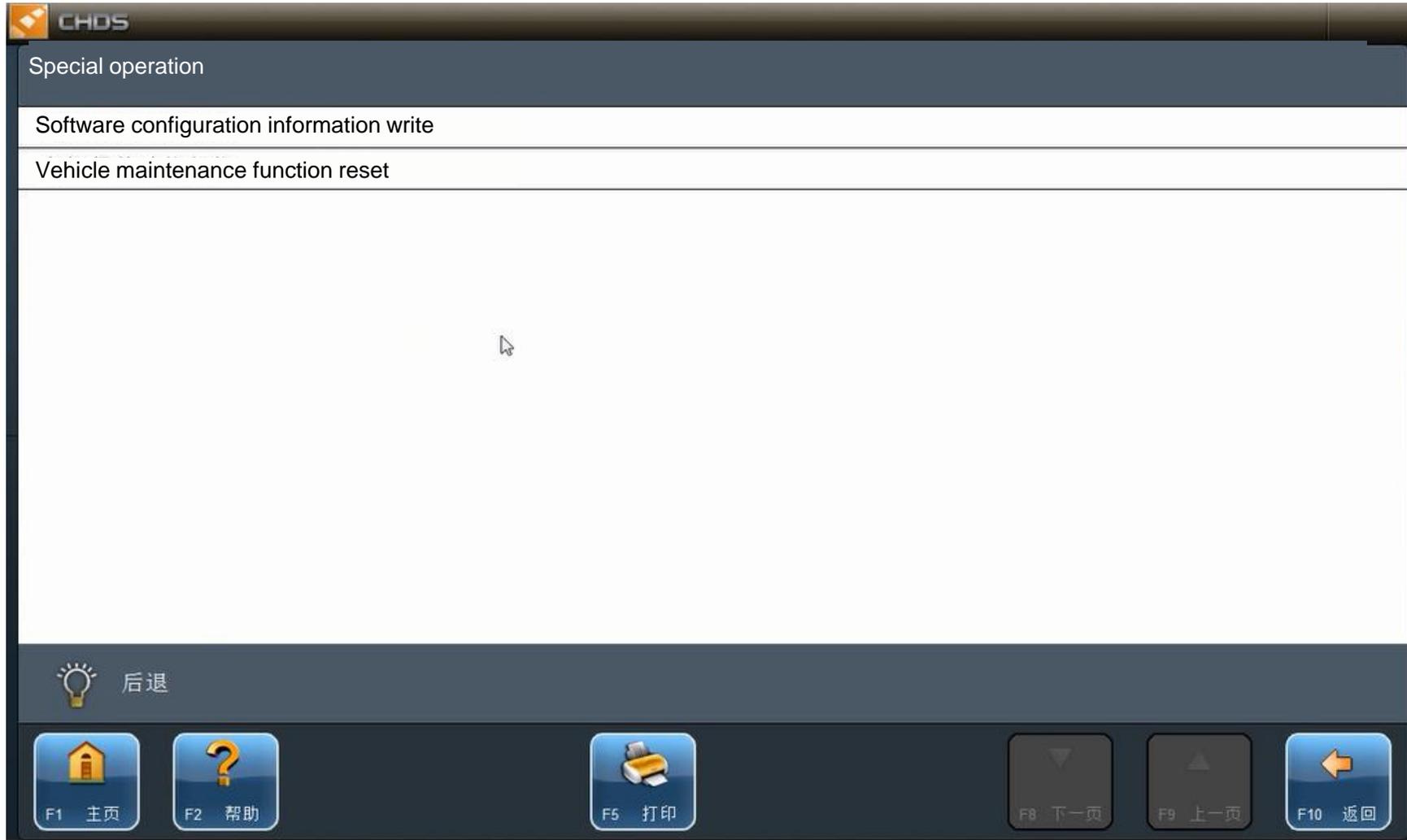
Read data flow

Model selection>>Tiggo 7>>Manual selection>>Tire pressure detection system>>Read data stream		
Name	Current value	Unit
FL sensor ID	4E33A689	
FR sensor ID	4D1598CA	
RL sensor ID	4E33BD7E	
RR sensor ID	4E33A67A	
FL sensor pressure	351.900	kPa
FR sensor pressure	351.900	kPa
RL sensor pressure	351.900	kPa
RR sensor pressure	351.900	kPa
FL sensor temperature	125.7500	deg C
FR sensor temperature	125.7500	deg C
RL sensor temperature	125.7500	deg C
RR sensor temperature	125.7500	deg C
FL sensor learning status	Learning success	
FR sensor learning status	Learning success	
RL sensor learning status	Learning success	
RR sensor learning status	Learning success	



 F1 主页	 F2 帮助	 F3 录制	 F4 回放	 F5 打印	 F6 波形	 F9 上一页	 F10 返回
--	--	--	--	---	--	---	---

Combination Instrument Data Stream Software Configuration Write

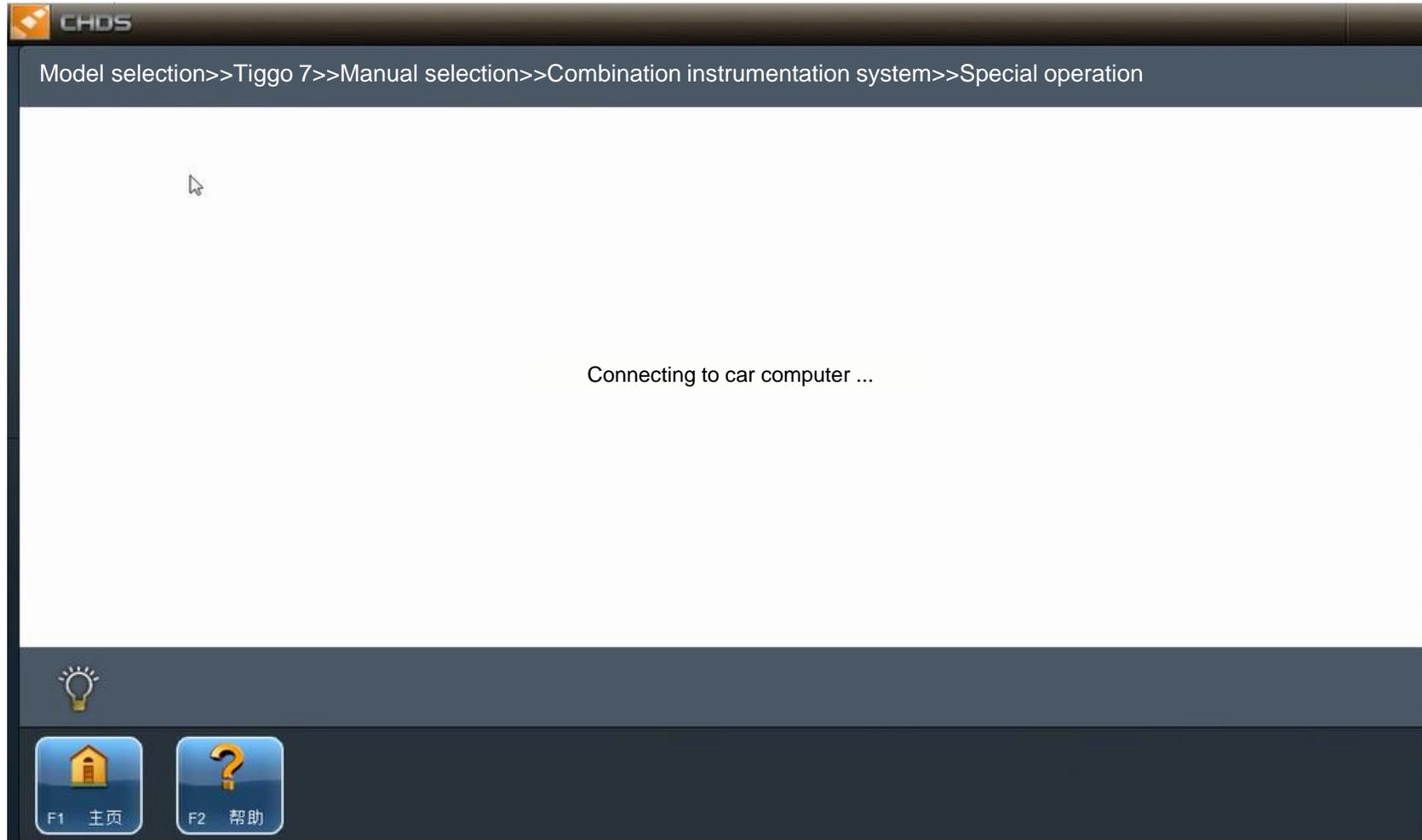


Combination Instrument Data Stream

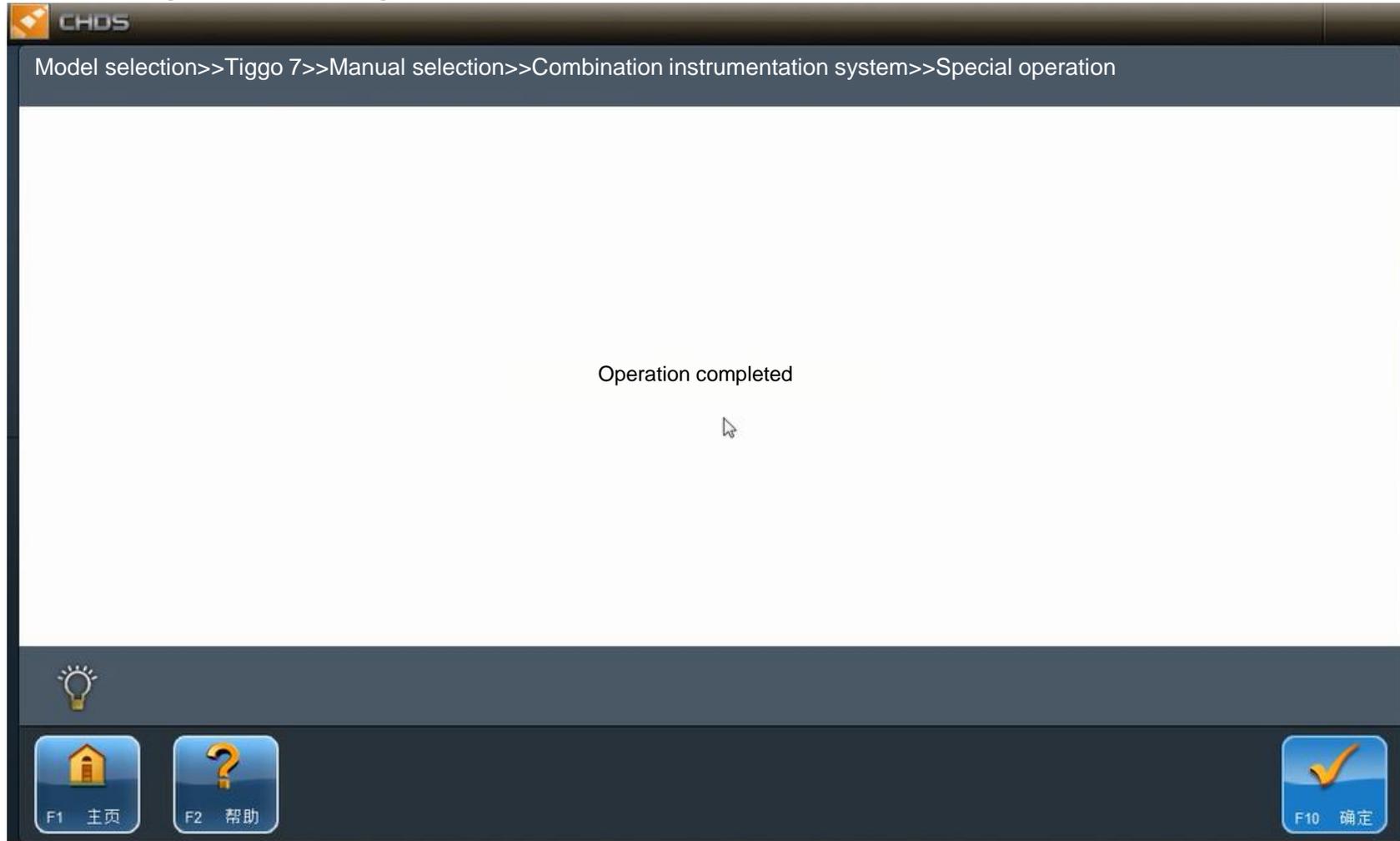
Software Configuration Write (no necessary after sale)



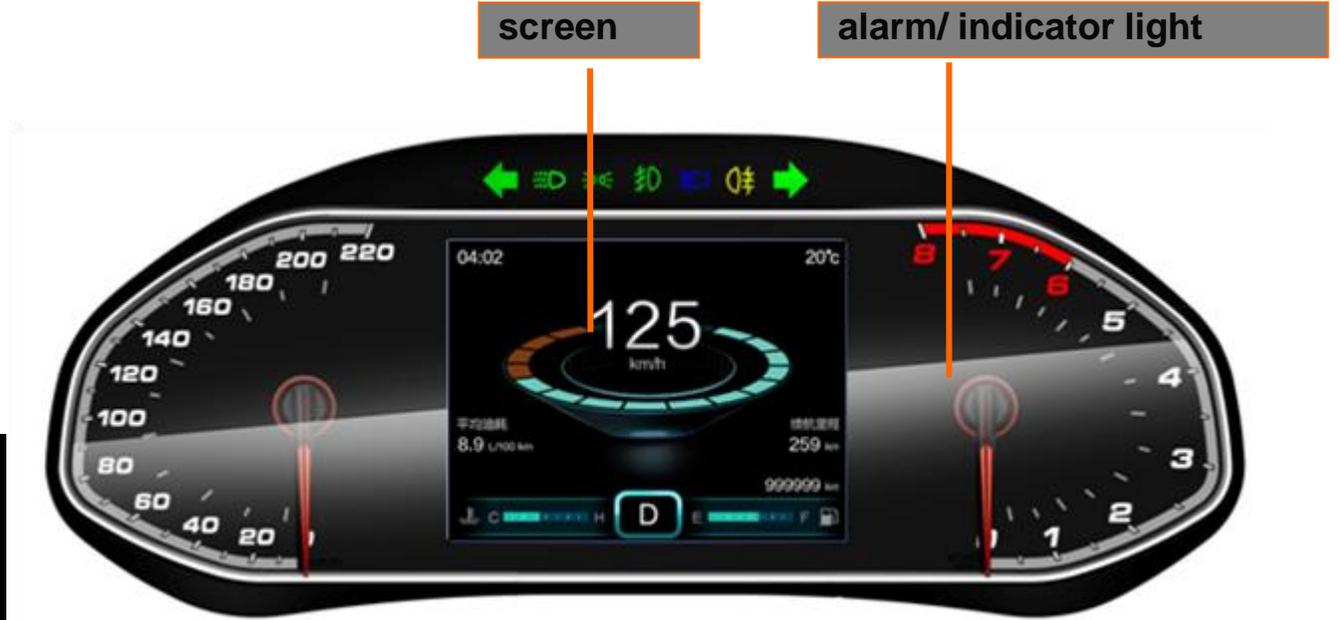
Combination Instrument Data Stream Service Light Resetting

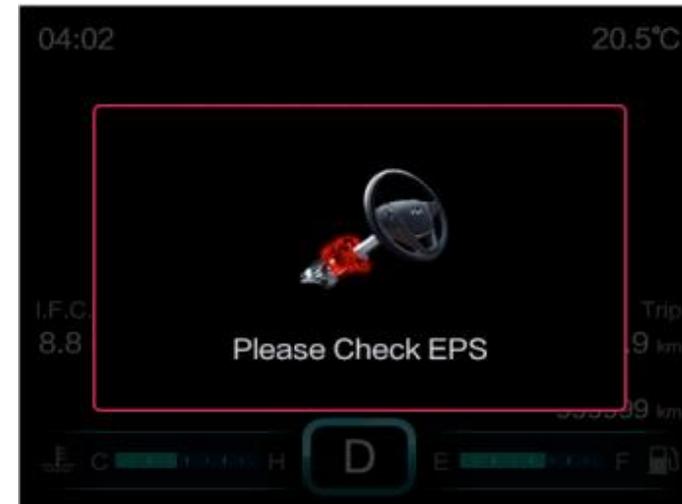
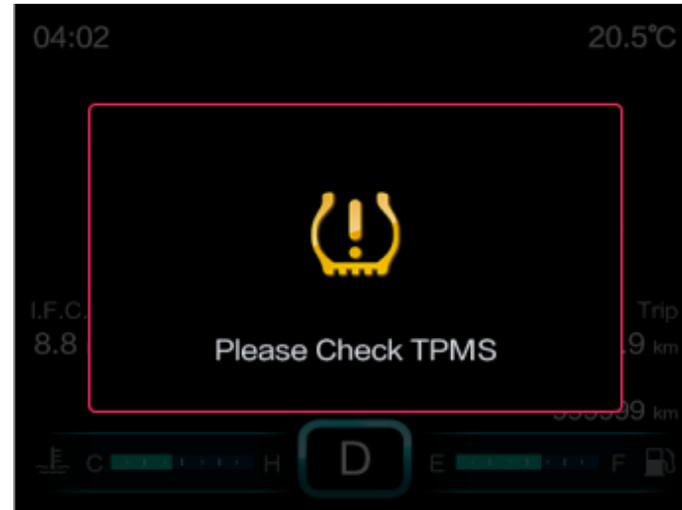


Combination Instrument Data Stream Service Light Resetting



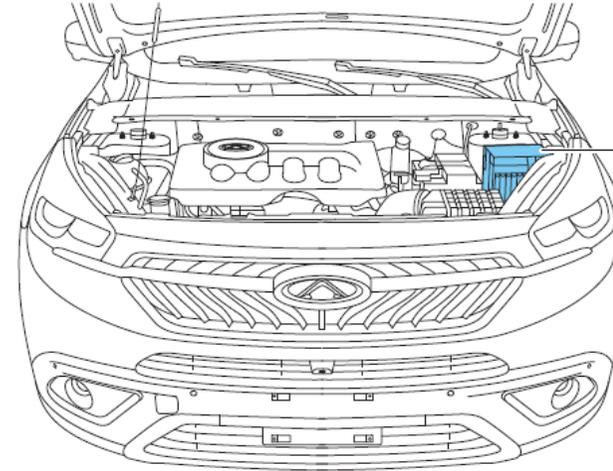
Combination Instrument System





Electric box

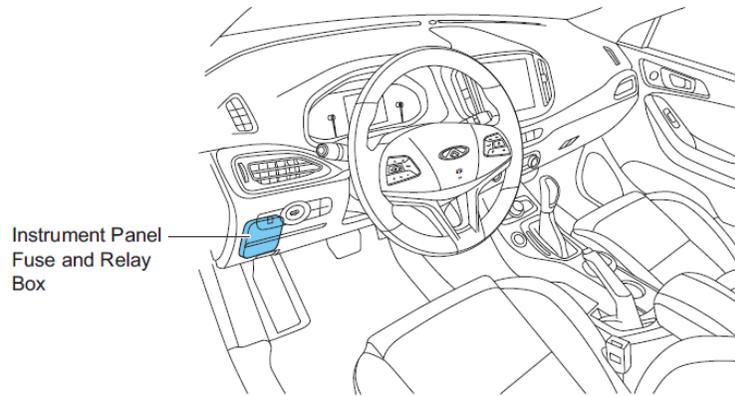
Front electric box



Engine
Compartment
Fuse and
Relay Box

Electric box of dashboard

Location of Instrument Panel Fuse and Relay Box

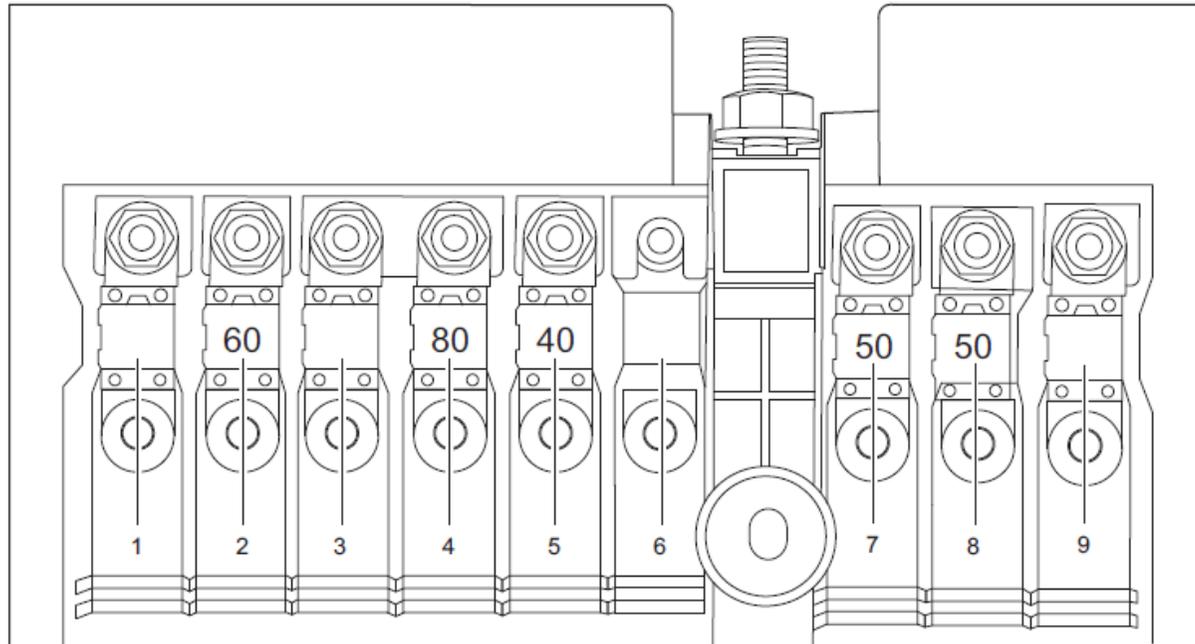


Instrument Panel
Fuse and Relay
Box



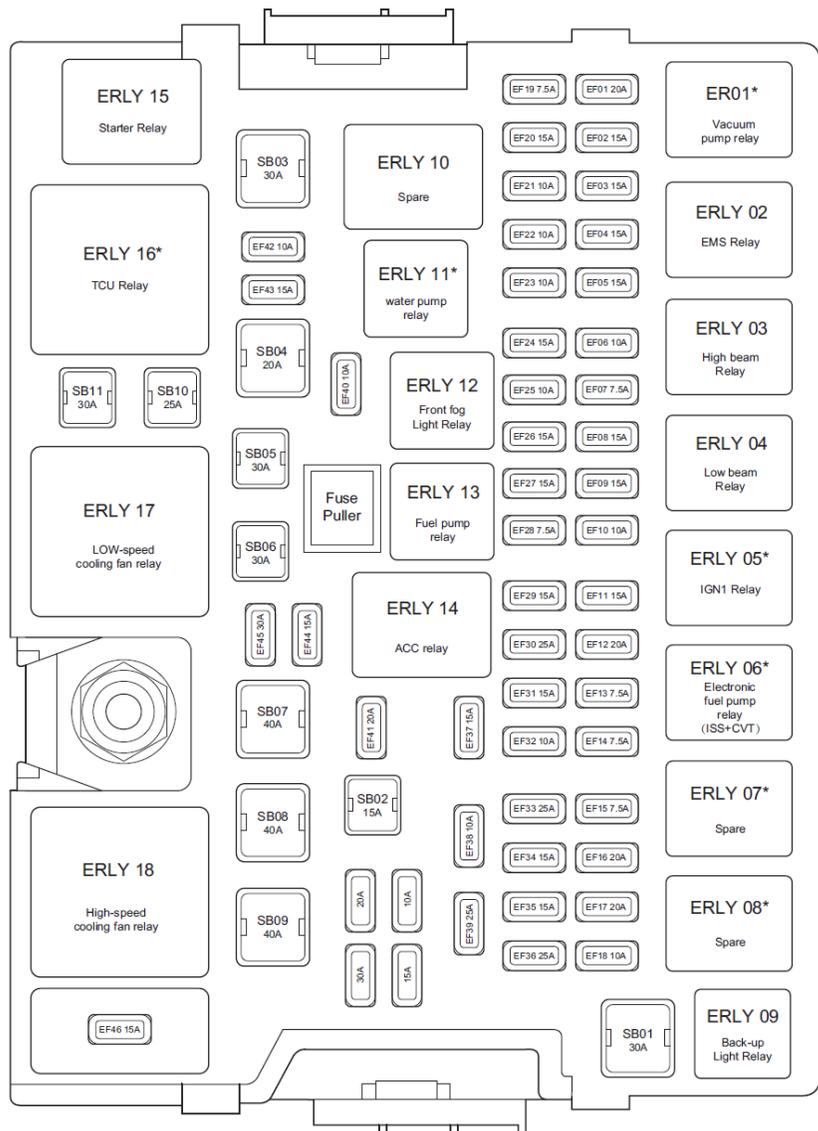
Circuit and Power Supply Distribution Instruction

Fuse Layout in Power Fuse Box

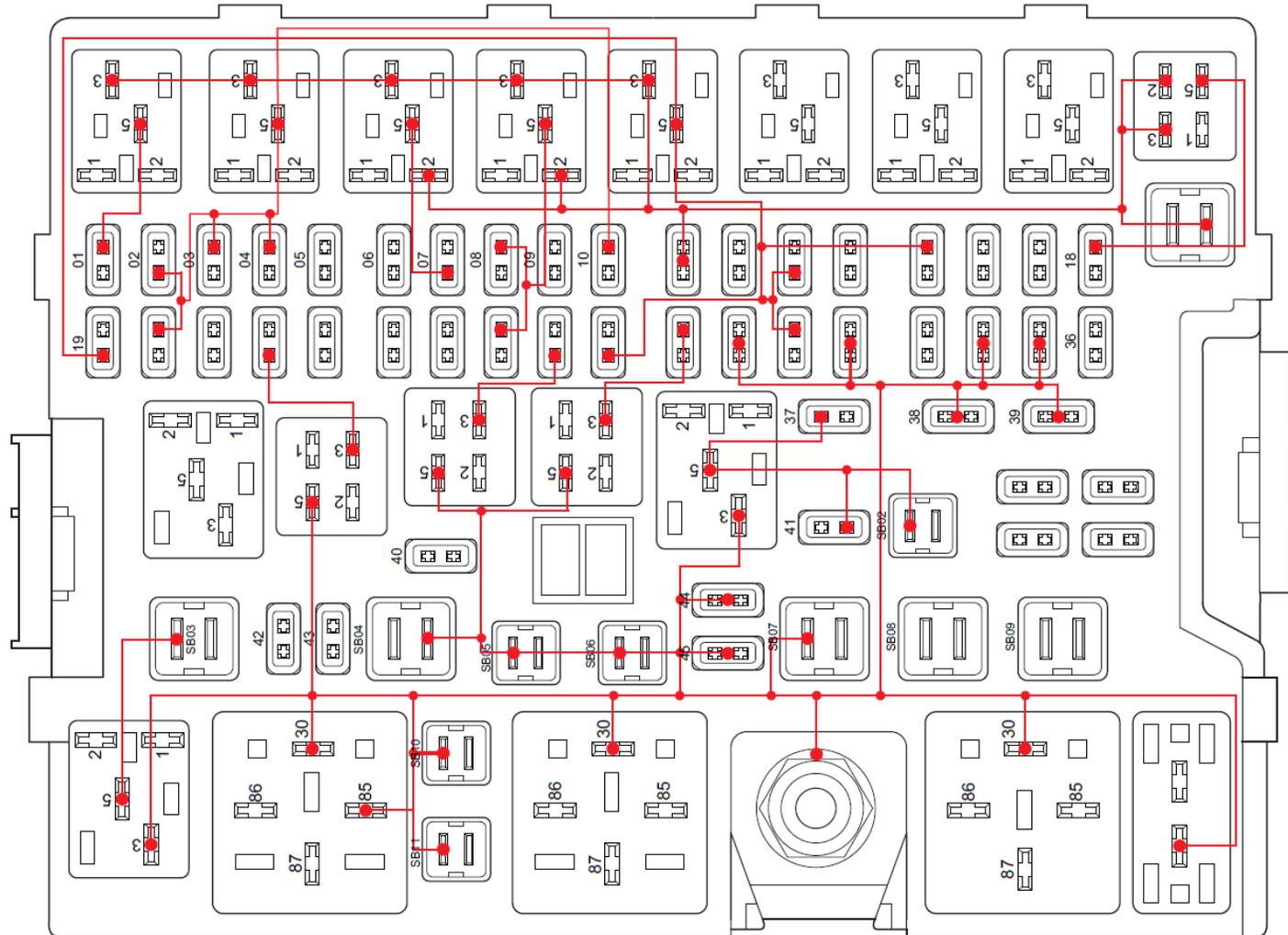


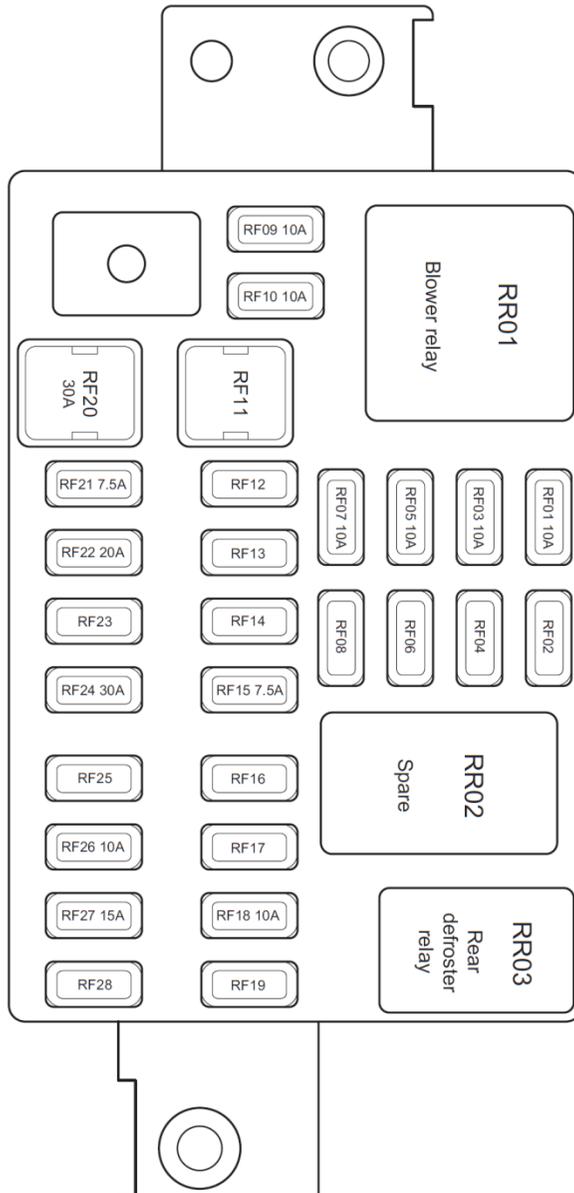
Power Fuse Description

No.	Fuse	Description	No.	Fuse	Description
1	-	-	6	-	-
2	EF47	IP Fuse and Relay Box	7	EF49	Alternator
3	-	-	8	EF53	High-speed Cooling Fan
4	EF48	EPS	9	-	-
5	EF52	Low-speed Cooling Fan			



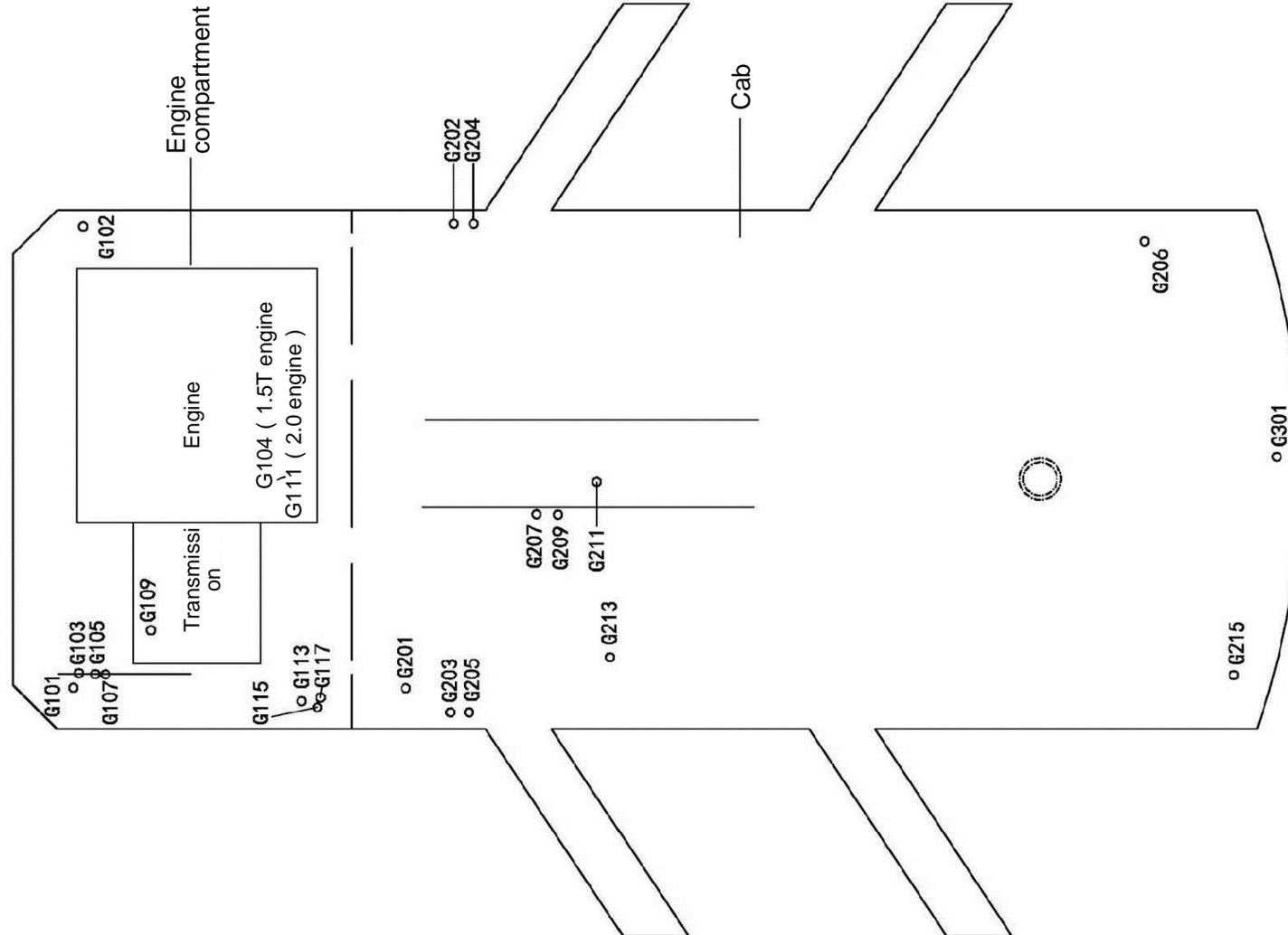
No.	Description	No.	Description
SB01	Reserve	EF19	Alternator excitation
SB02	ACC	EF20	Injector
SB03	Starter/drive chain	EF21	Reserve
SB04	TCU/DCT	EF22	Water pump*
SB05	BCM 2	EF23	POD & PPD & EAC*
SB06	BCM 1	EF24	Horn
SB07	ESP/ABS	EF25	Left headlight high beam*
SB08	EPB*	EF26	Right headlight low beam
SB09	ACM/EPB*	EF27	Front fog light
SB10	ESP/ABS	EF28	ESP & ABS & ACM*
SB11	Seat adjustment SEAT*	EF29	Fuel pump
EF01	Vacuum pump*	EF30	BCM 6
EF02	Oxygen sensor	EF31	IGN 1*
EF03	Ignition coil 3#	EF32	Brake switch & PEPS & DCT 30+
EF04	ECU solenoid valve	EF33	ACM*
EF05	PPD & HVH	EF34	BCM 5
EF06	Reserve	EF35	BCM 3
EF07	Right headlight high beam	EF36	Reserve*
EF08	Left headlight low beam	EF37	Spare power 2
EF09	Reserve*	EF38	ECU & TCU 30+
EF10	ECU & fan controller with hybrid system	EF39	Wiper
EF11	PEPS*	EF40	4WD & IPU
EF12	LT & PTC water pump*	EF41	Seat heating*
EF13	ECU & TCU brake switch 15+ & reversing sensor&IPU with hybridsystem	EF42	Air conditioning compressor
EF14	Inner mirror & A/C pressure switch& reversing radar	EF43	Reserve*
EF15	PEPS & 4WD*	EF44	BCM 4
EF16	Electronic oil pump*	EF45	Sunroof*
EF17	Reserve*	EF46	Marine insurance
EF18	Back-up light	EF51	-

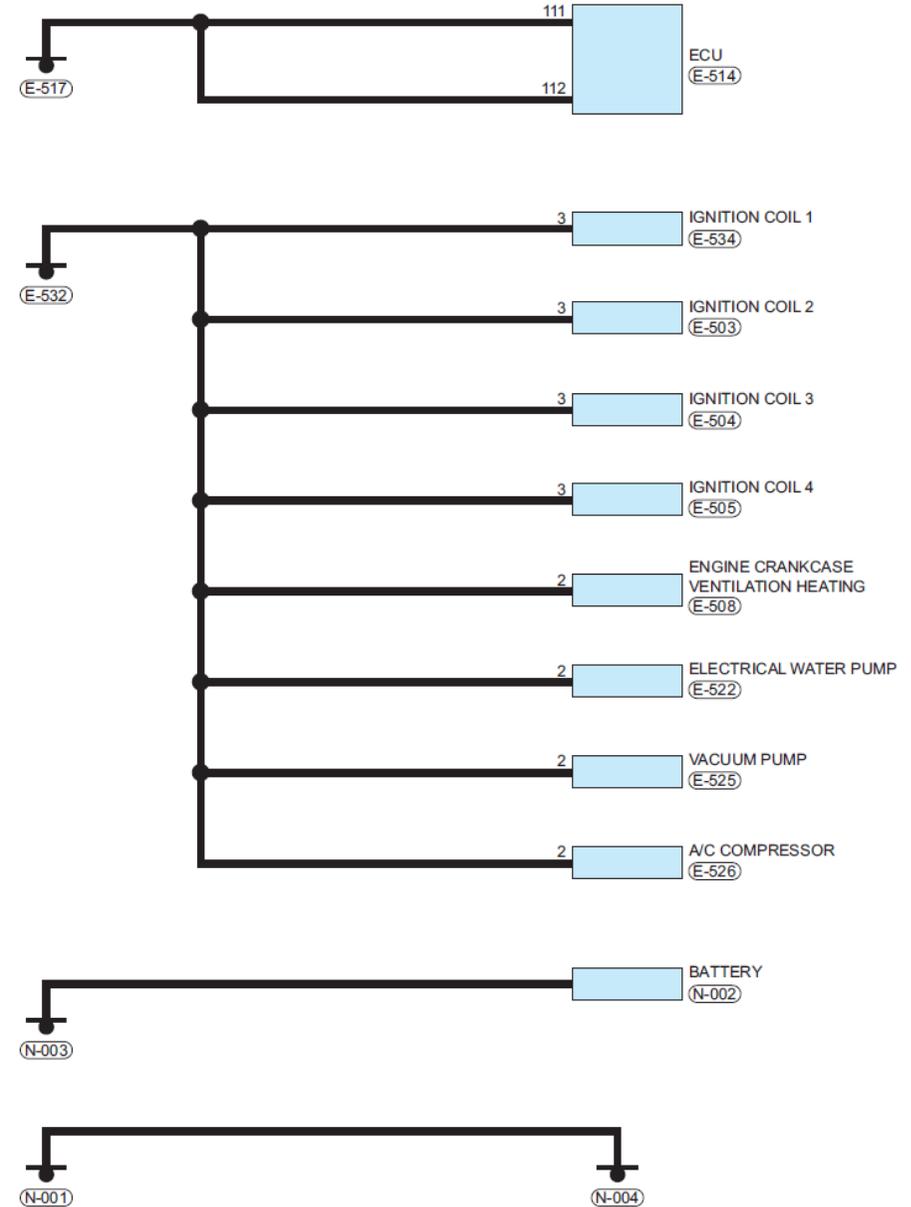
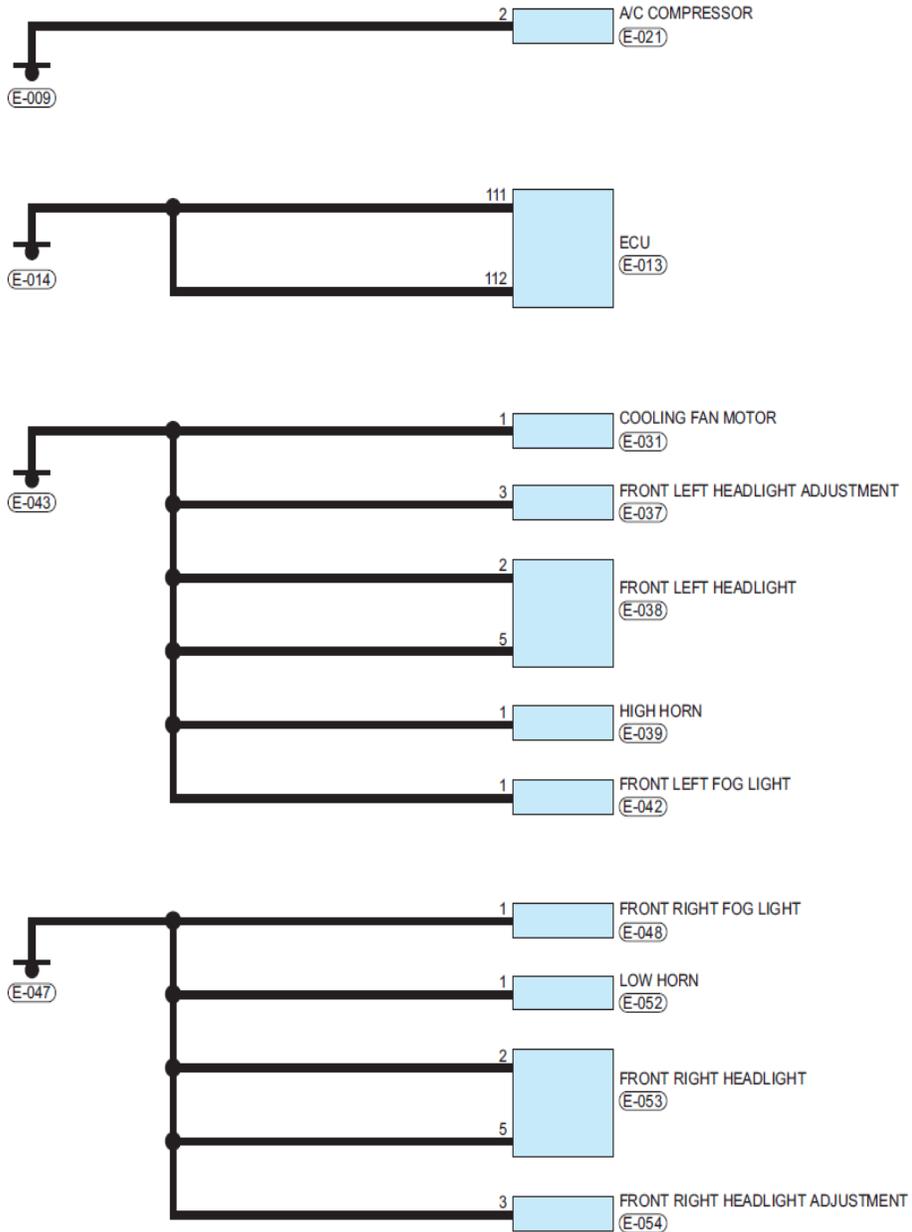


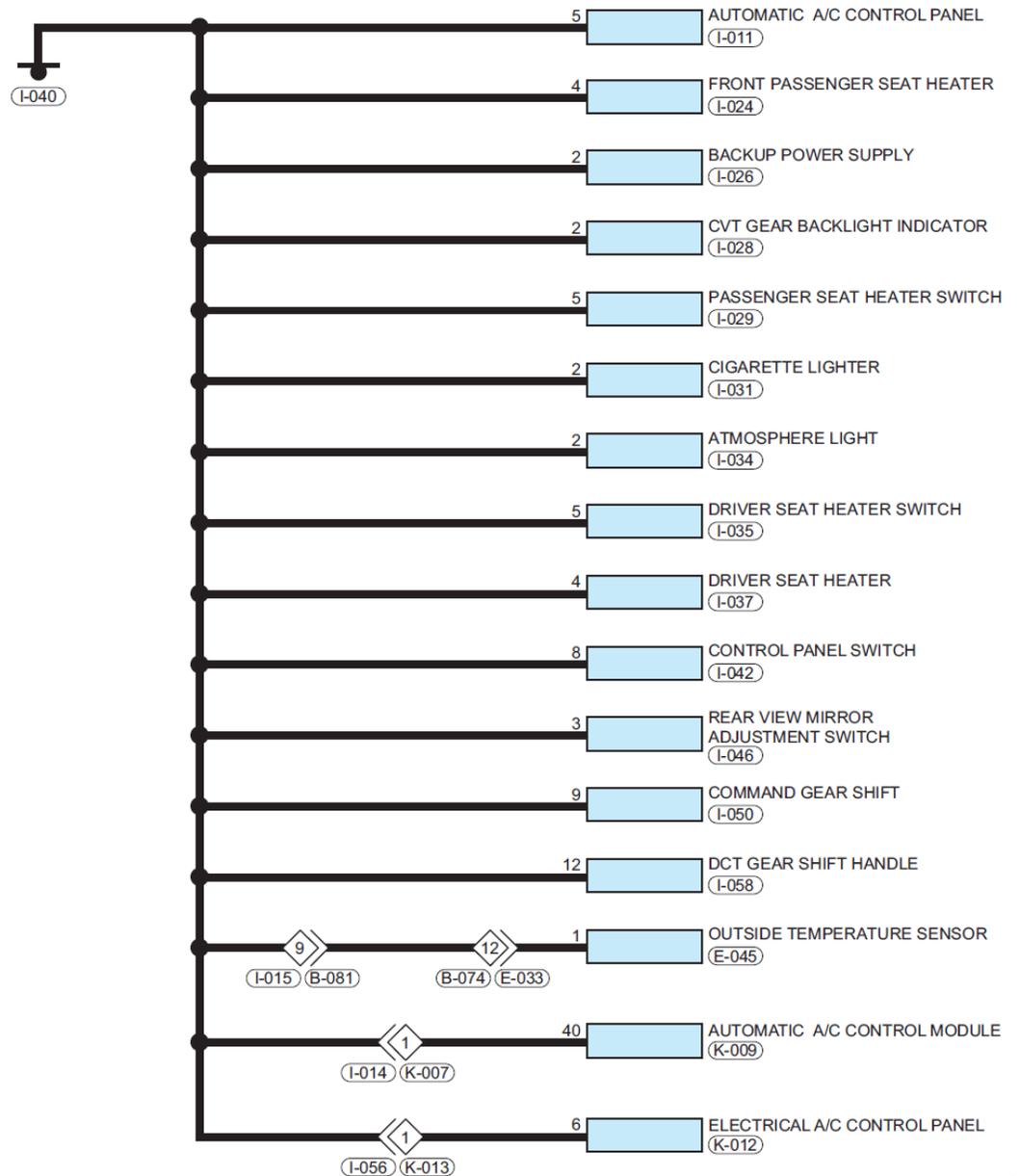
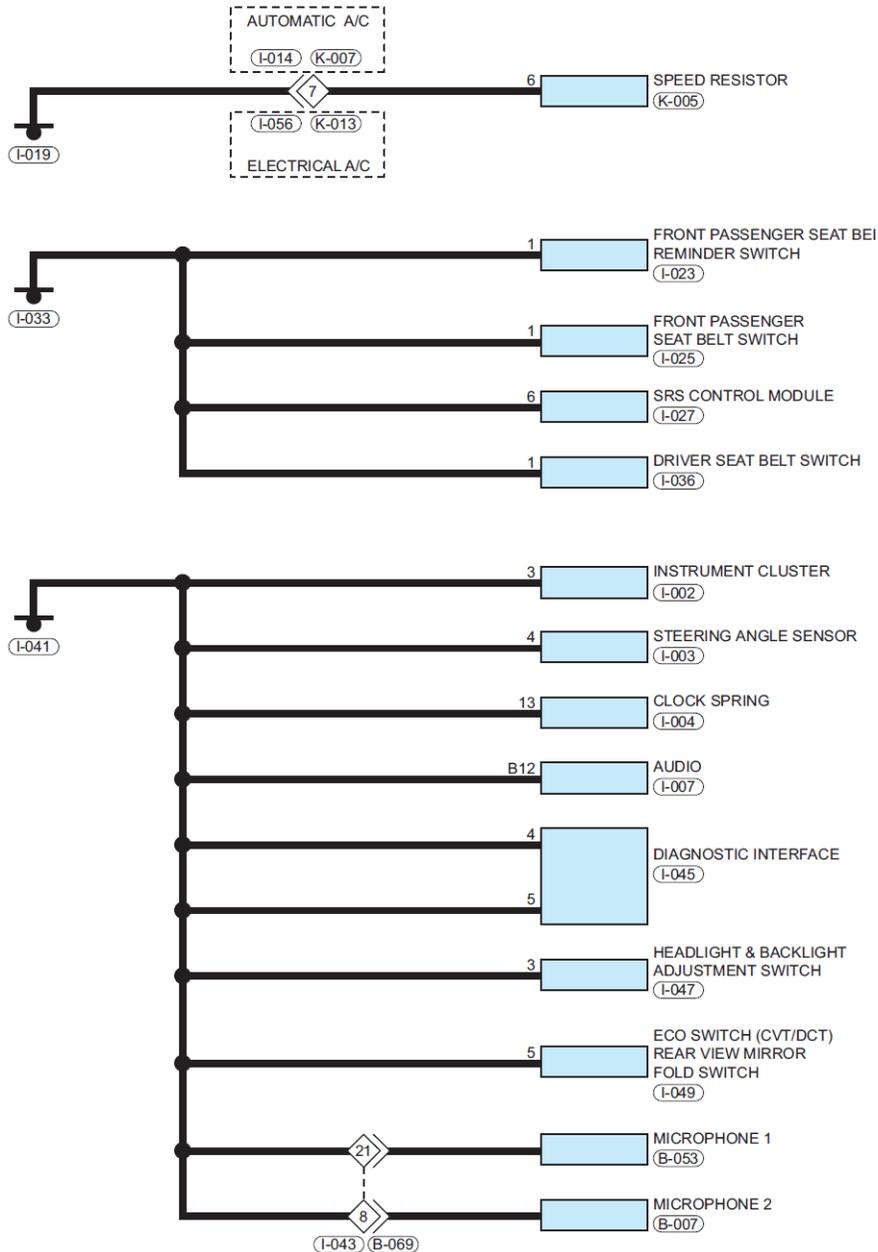


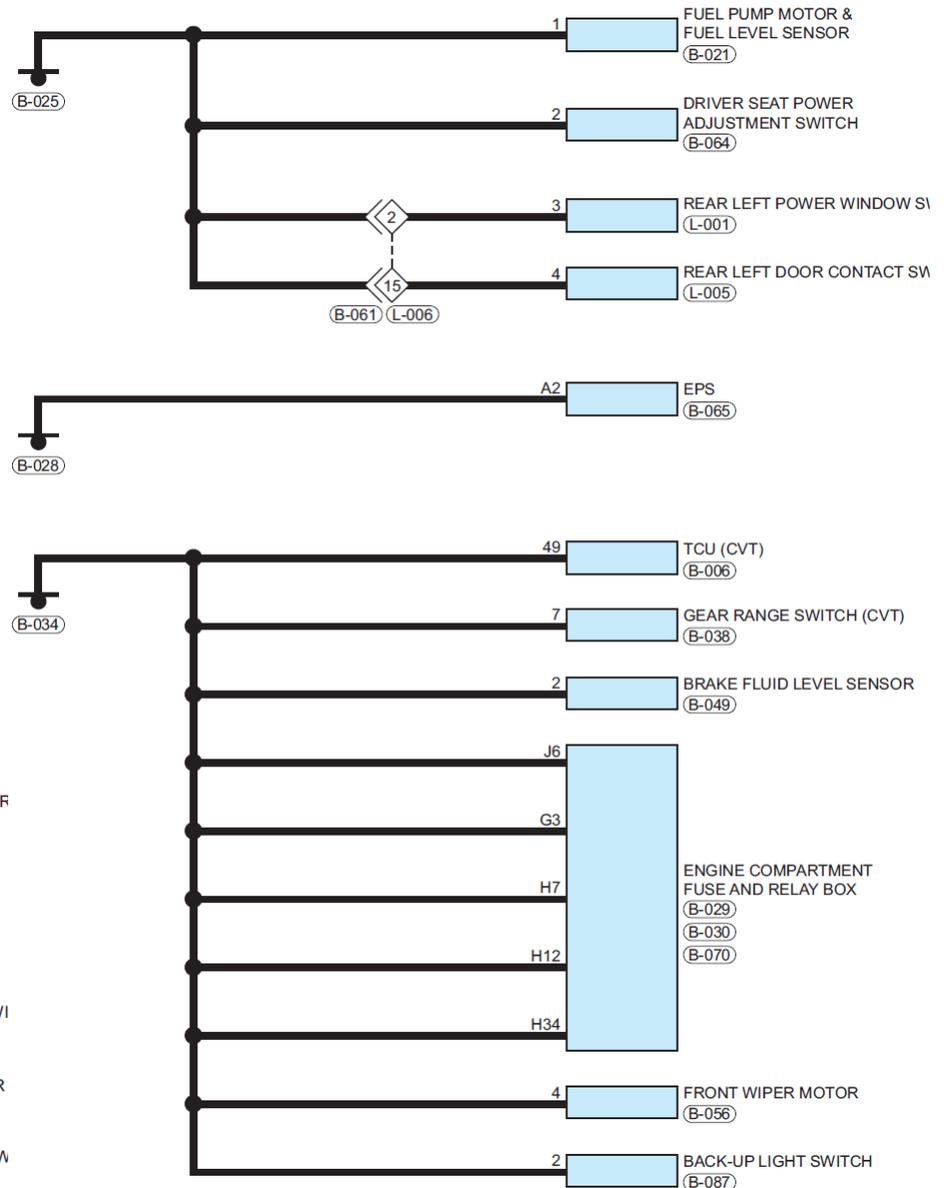
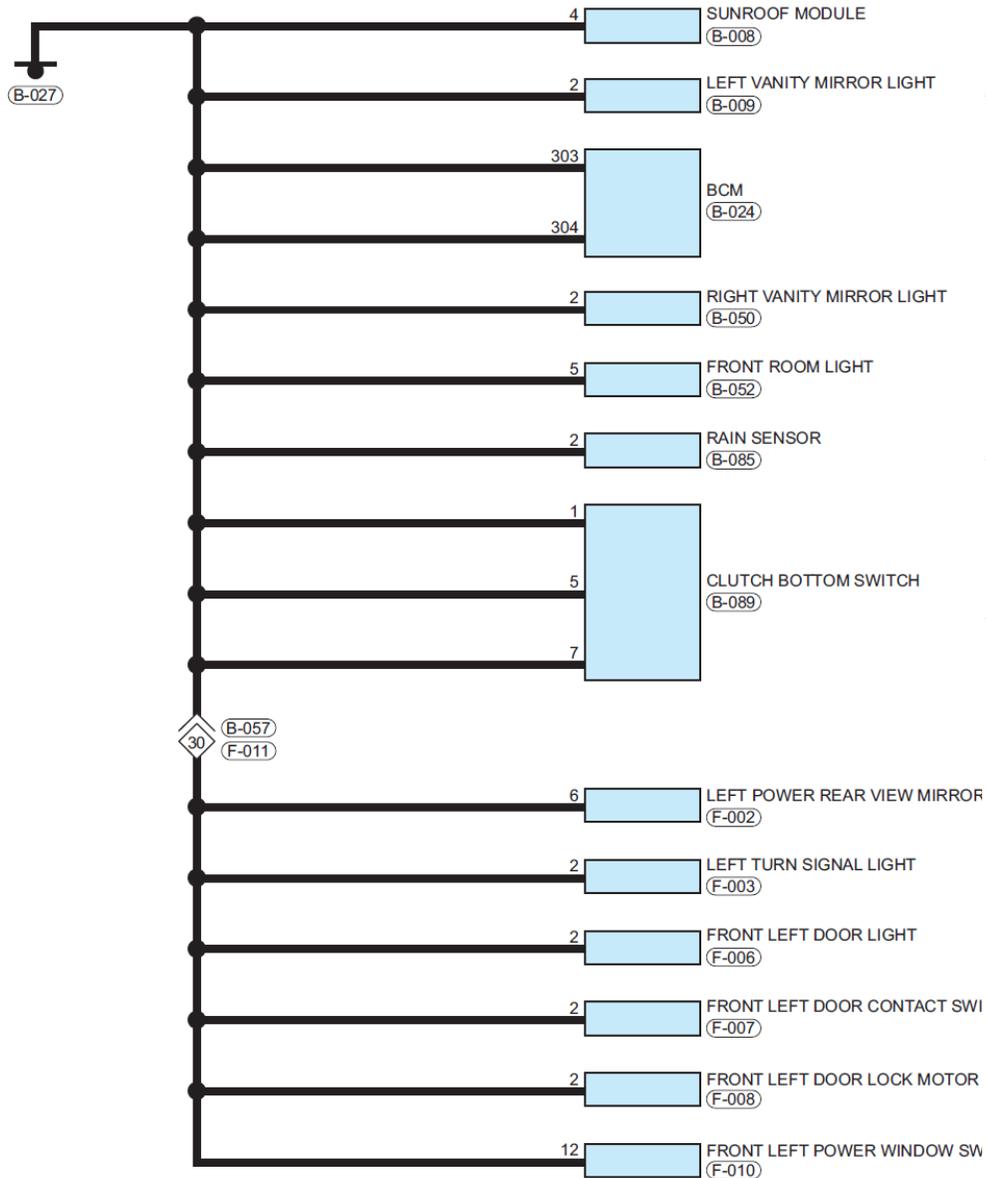
No.	Description	No.	Description
RF01	BCM 2-17#	RF15	Around View Monitor 20#
RF02	-	RF16	-
RF03	Steering Wheel Rotation Angle Sensor 3#, EPS 1#	RF17	-
RF04	Main Blind Spot Monitor Radar 5#, Auxiliary Blind Spot Monitor Radar 5#	RF18	A/C Panel 14#, Left/Right Outside Rear View Mirror 5#, A/C Wire Harness Interface 14#
RF05	Airbag Module 5#	RF19	-
RF06	-	RF20	Power Supply of Blower Relay Output Terminal
RF07	A/C Wire Harness Interface 13#, Audio Head Unit C2#, Automatic A/C Panel 6#, Headlight Adjustment Switch 6#, DCT Shift Mechanism 6#	RF21	-
RF08	-	RF22	-
RF09	A/C Wire Harness Interface 11#, Audio Head Unit C2#, Audio Head Unit B15#, Automatic A/C Panel 4#	RF23	-
RF10	Instrument Cluster 11#, Rain Sensor 1#	RF24	Power Supply of Rear DEF Relay Output Terminal
RF11	-	RF25	-
RF12	-	RF26	Mirror Adjustment Switch 7#, BCM2-5#, Sunroof 2#
RF13	-	RF27	Cigarette Lighter 1#
RF14	-	RF28	-

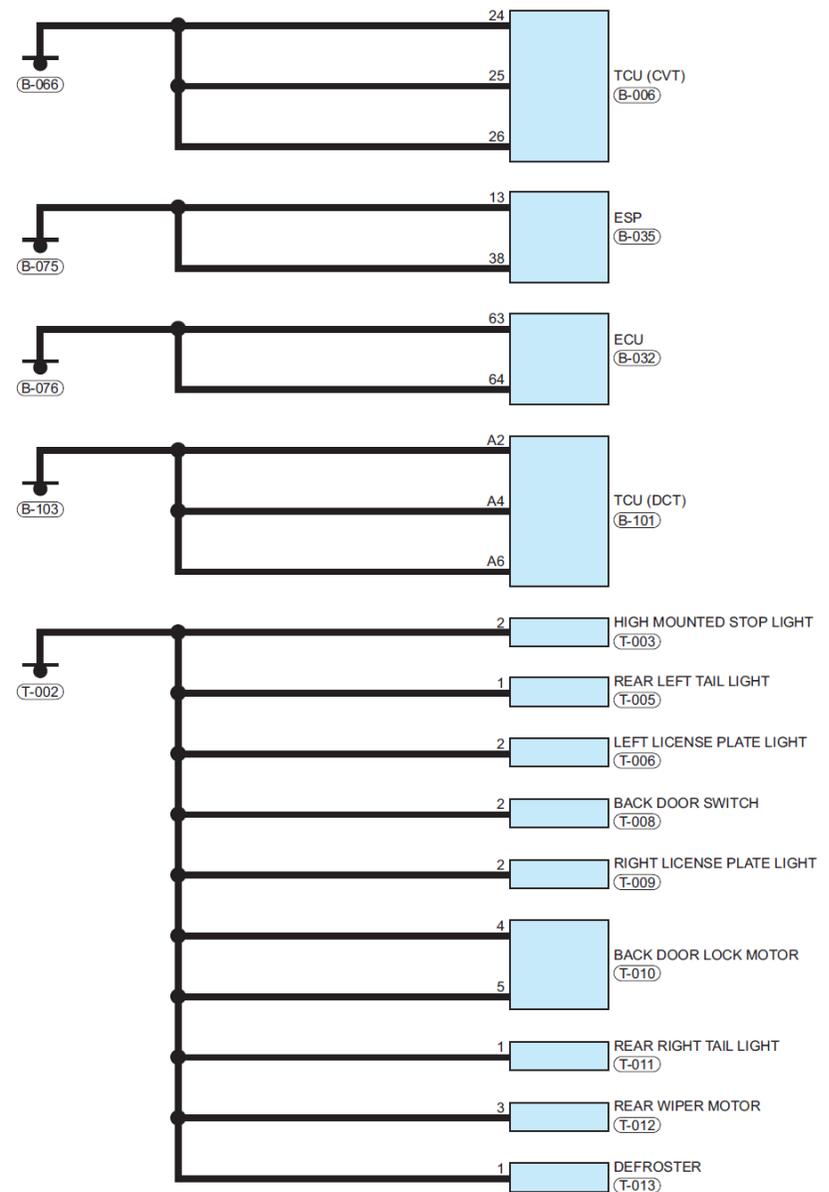
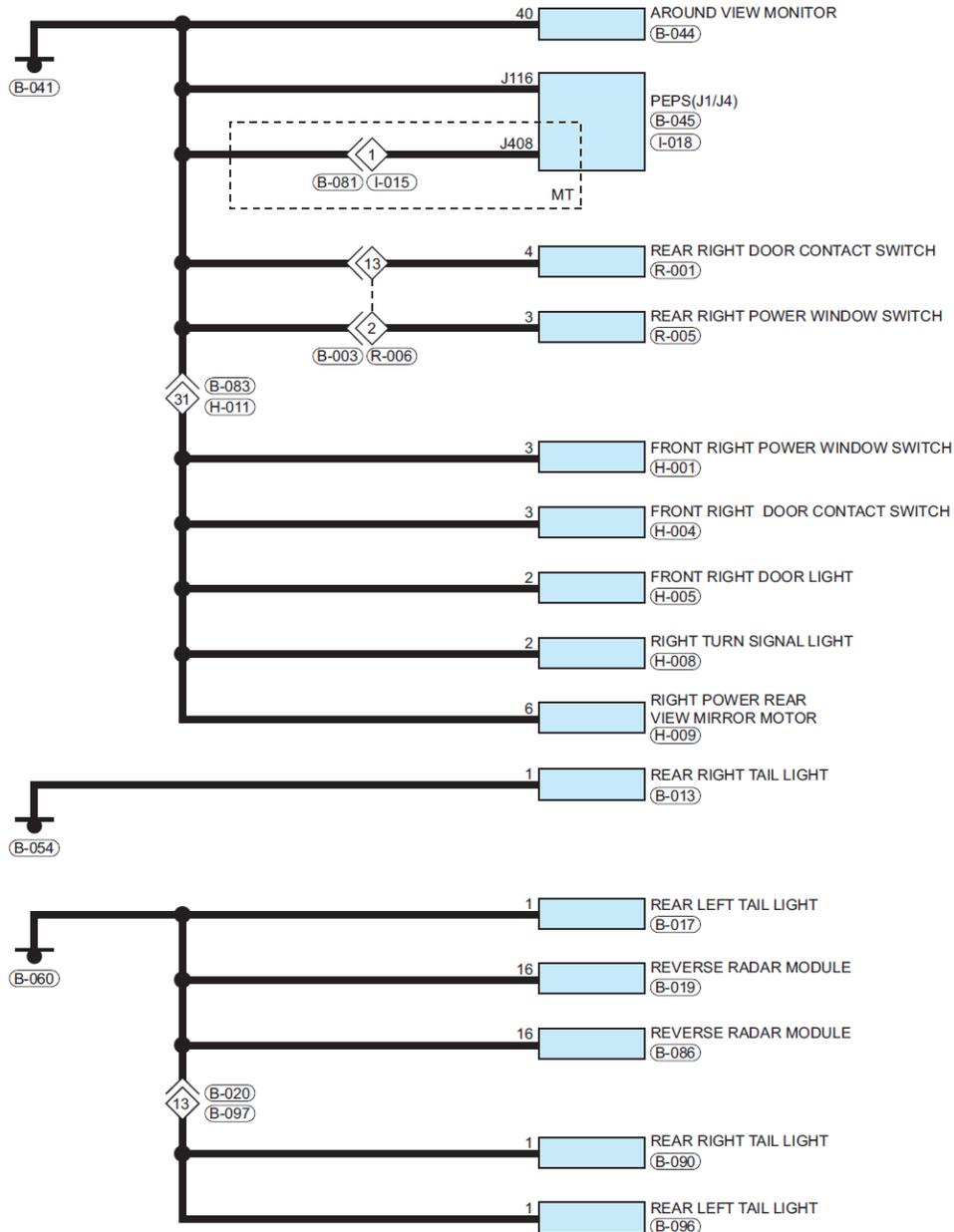
Whole car grounding points







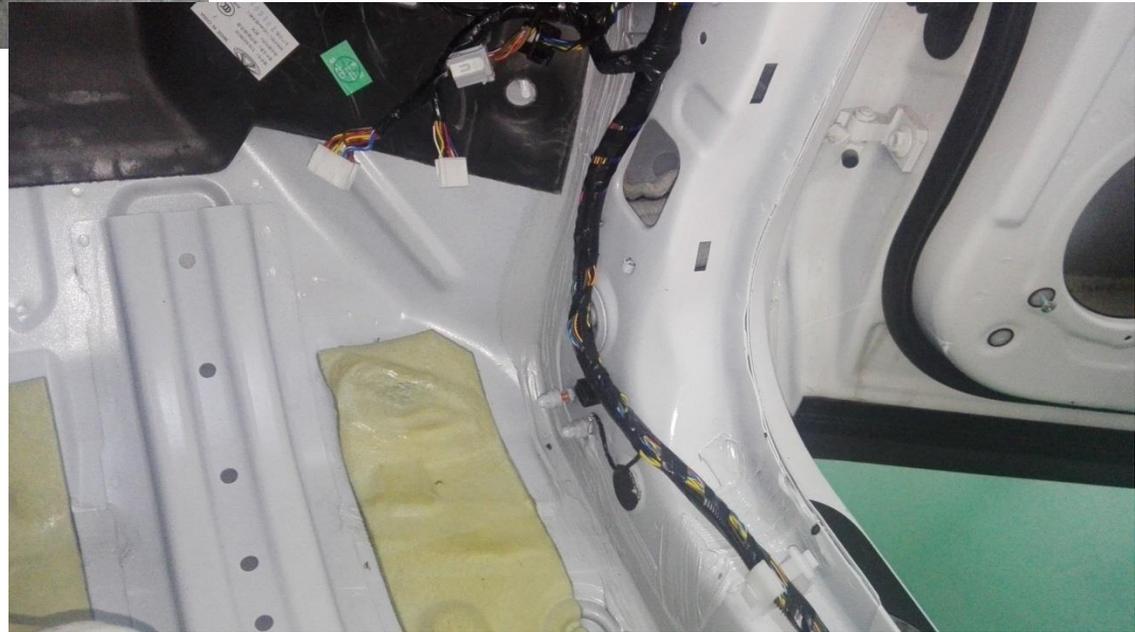


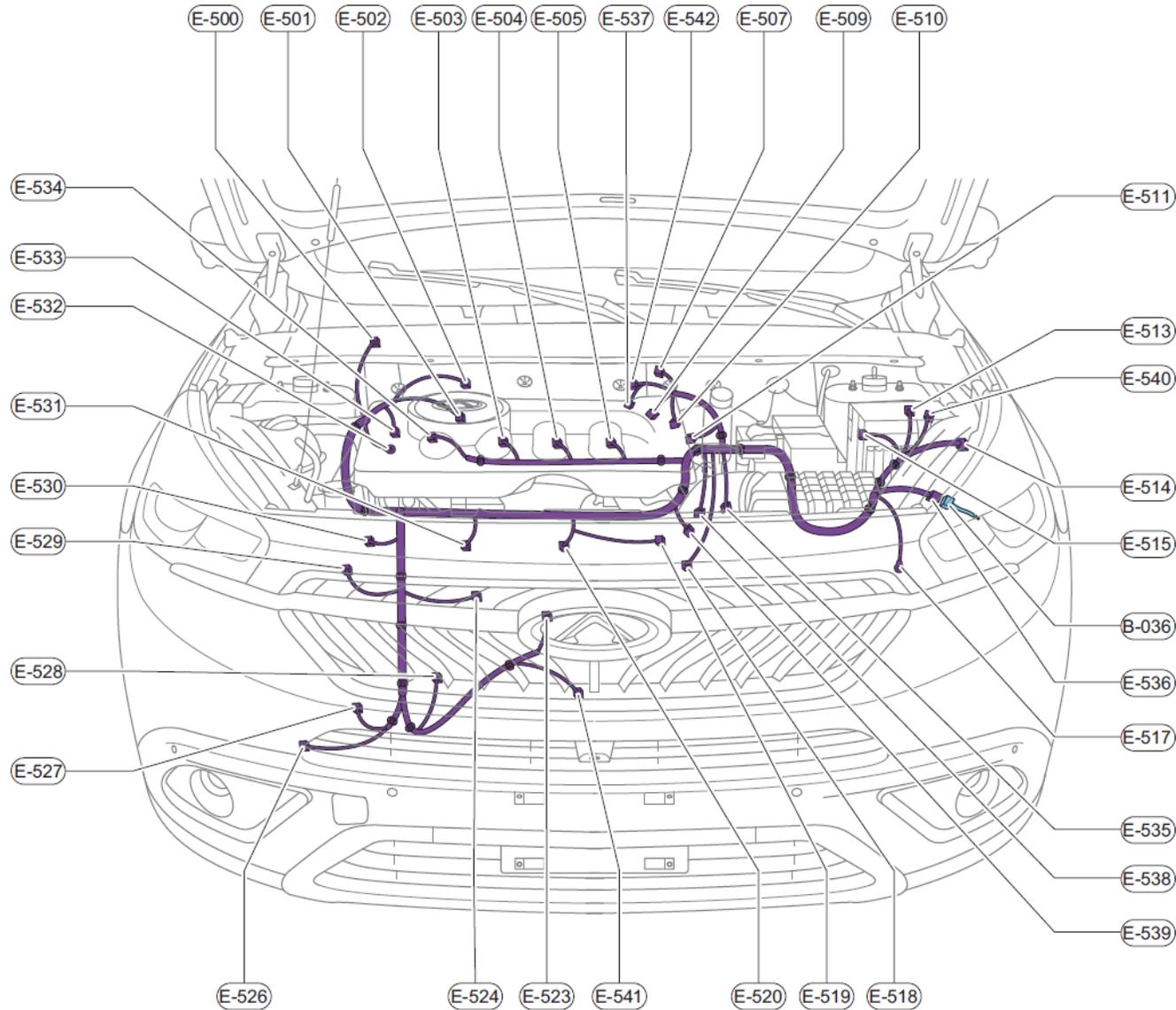


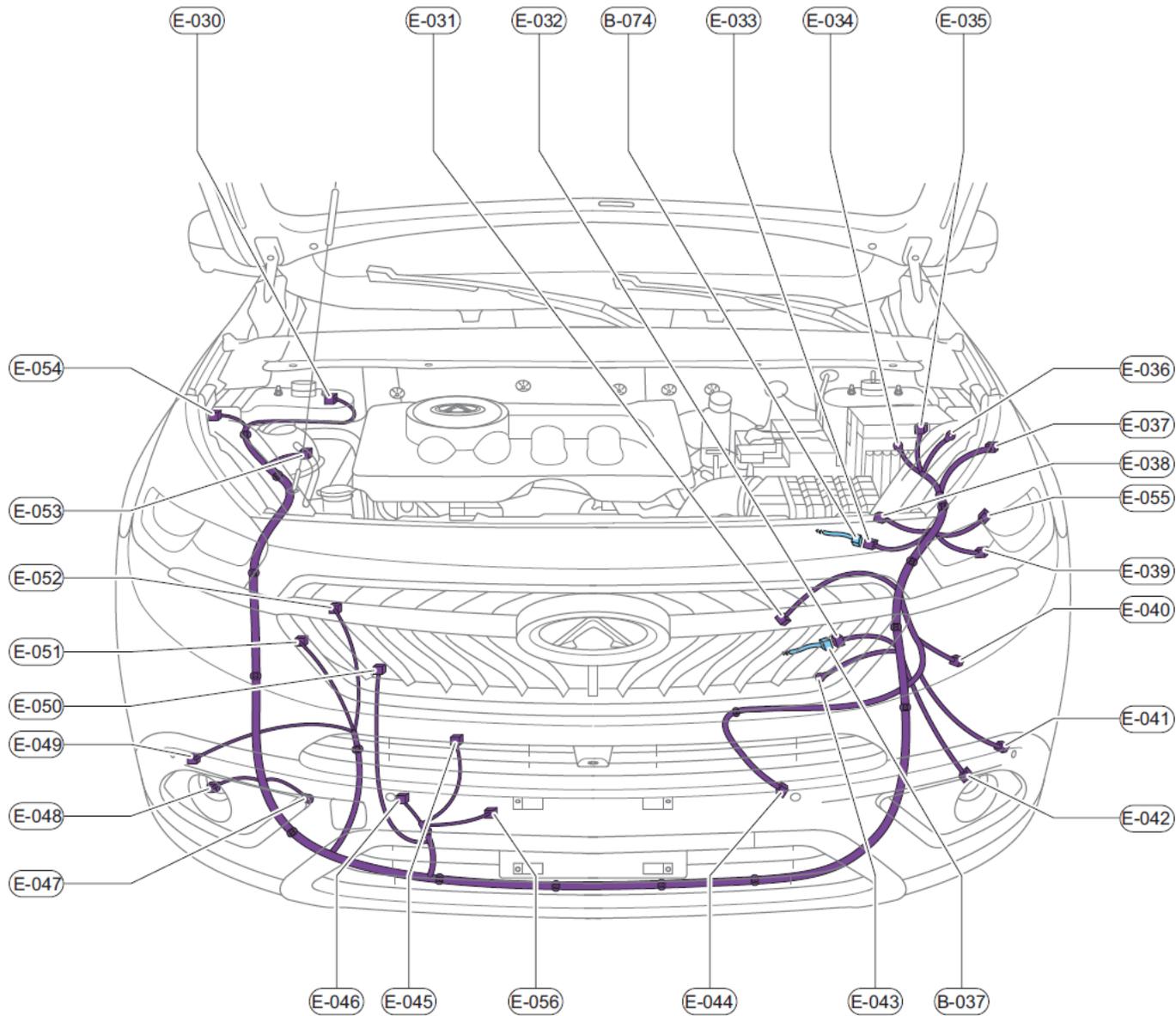


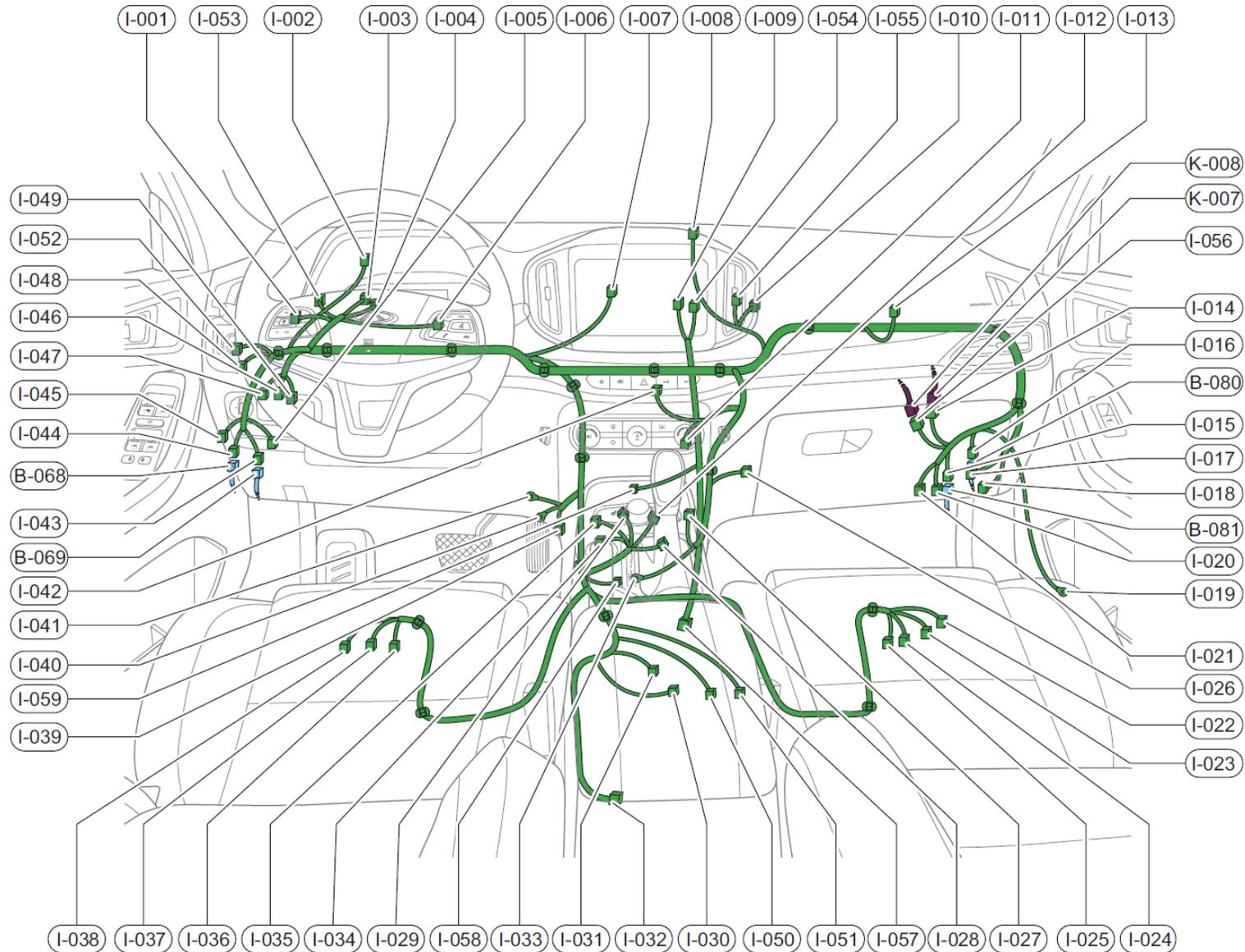


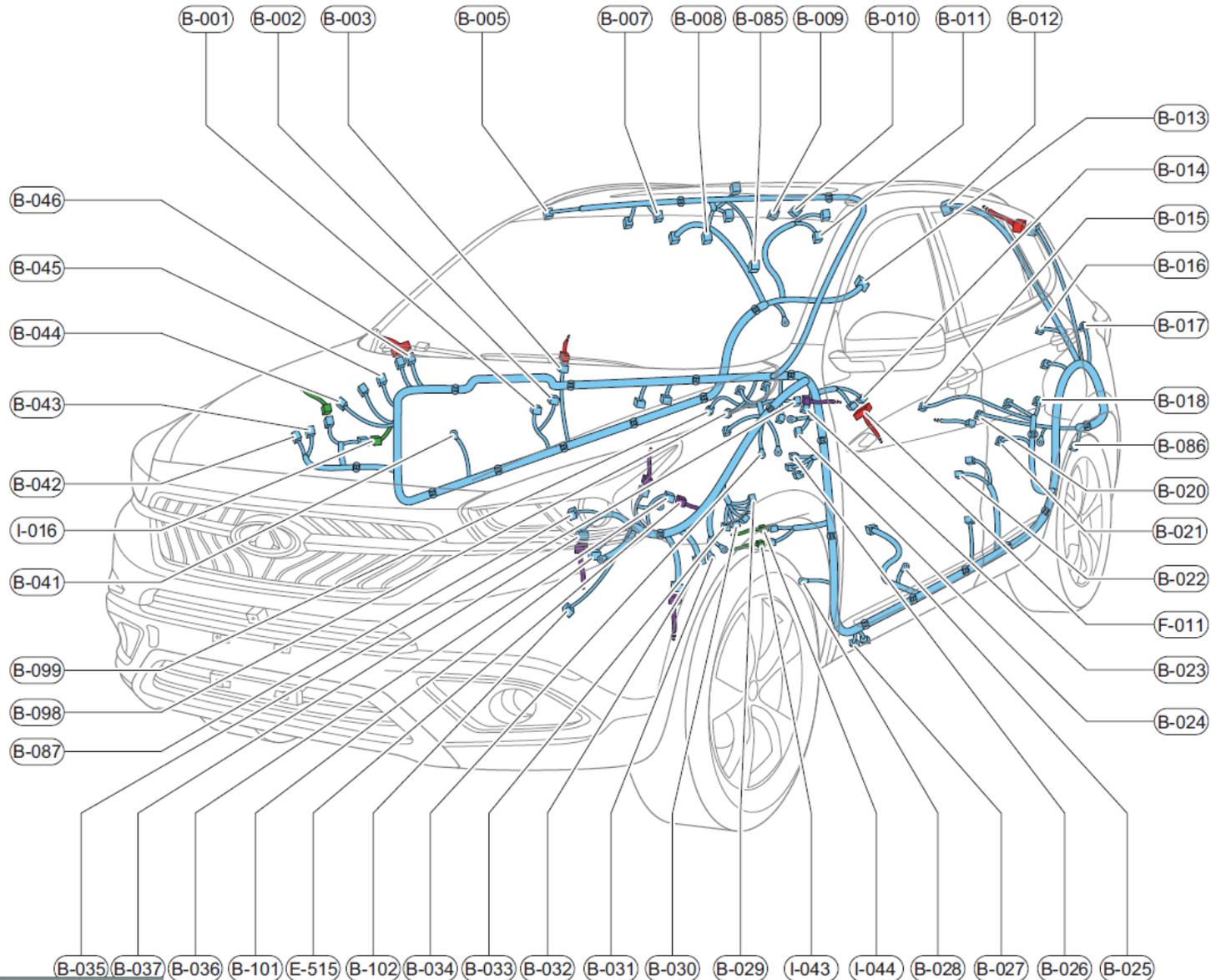


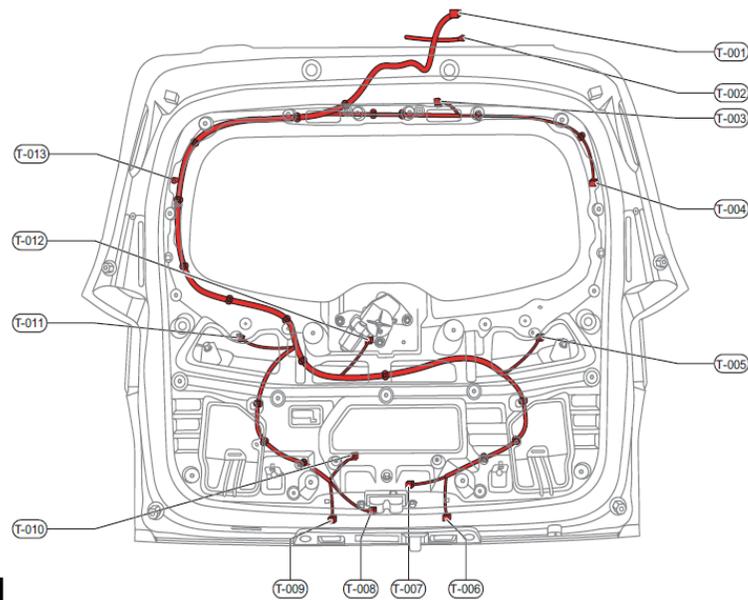
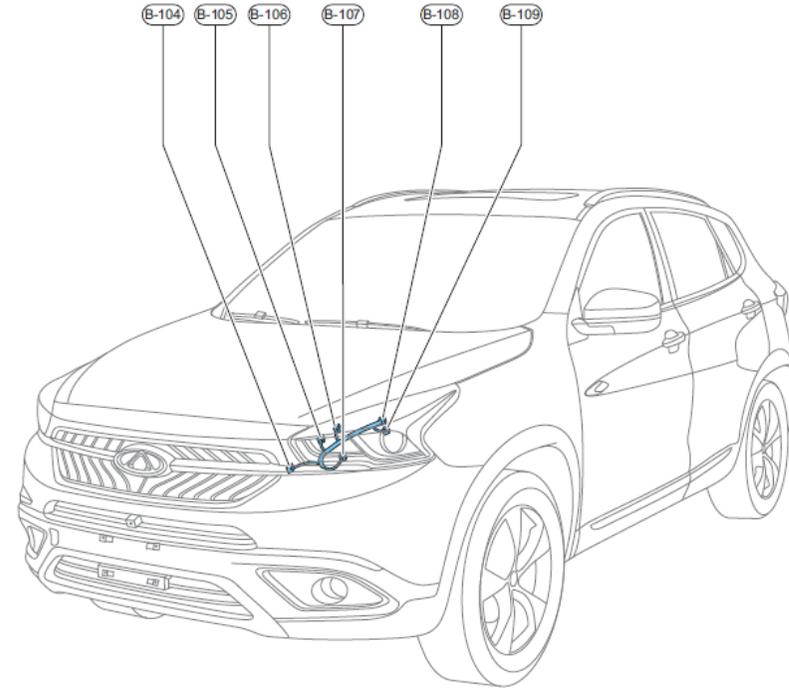
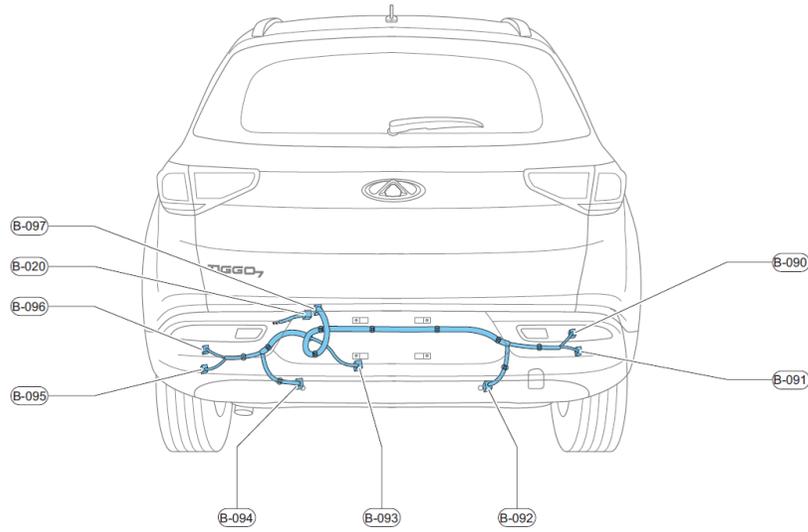


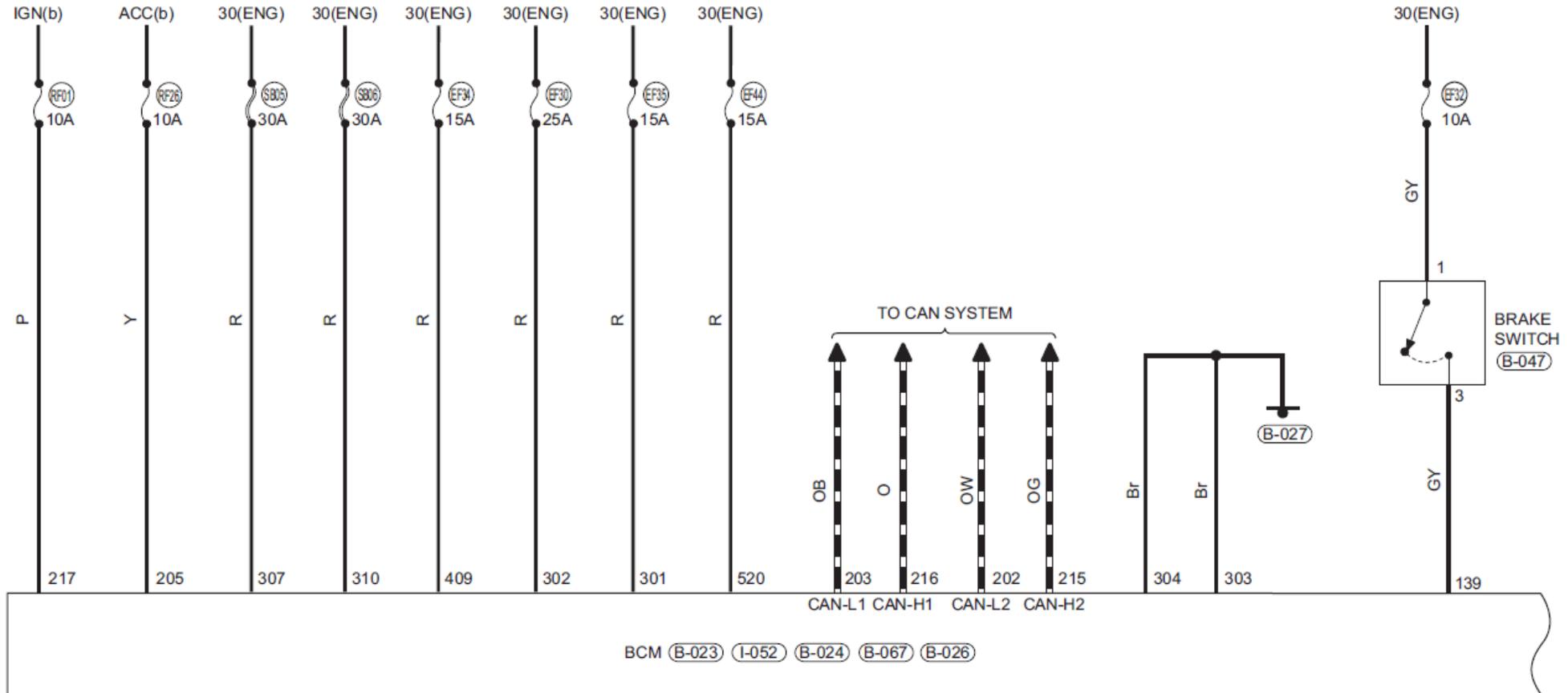


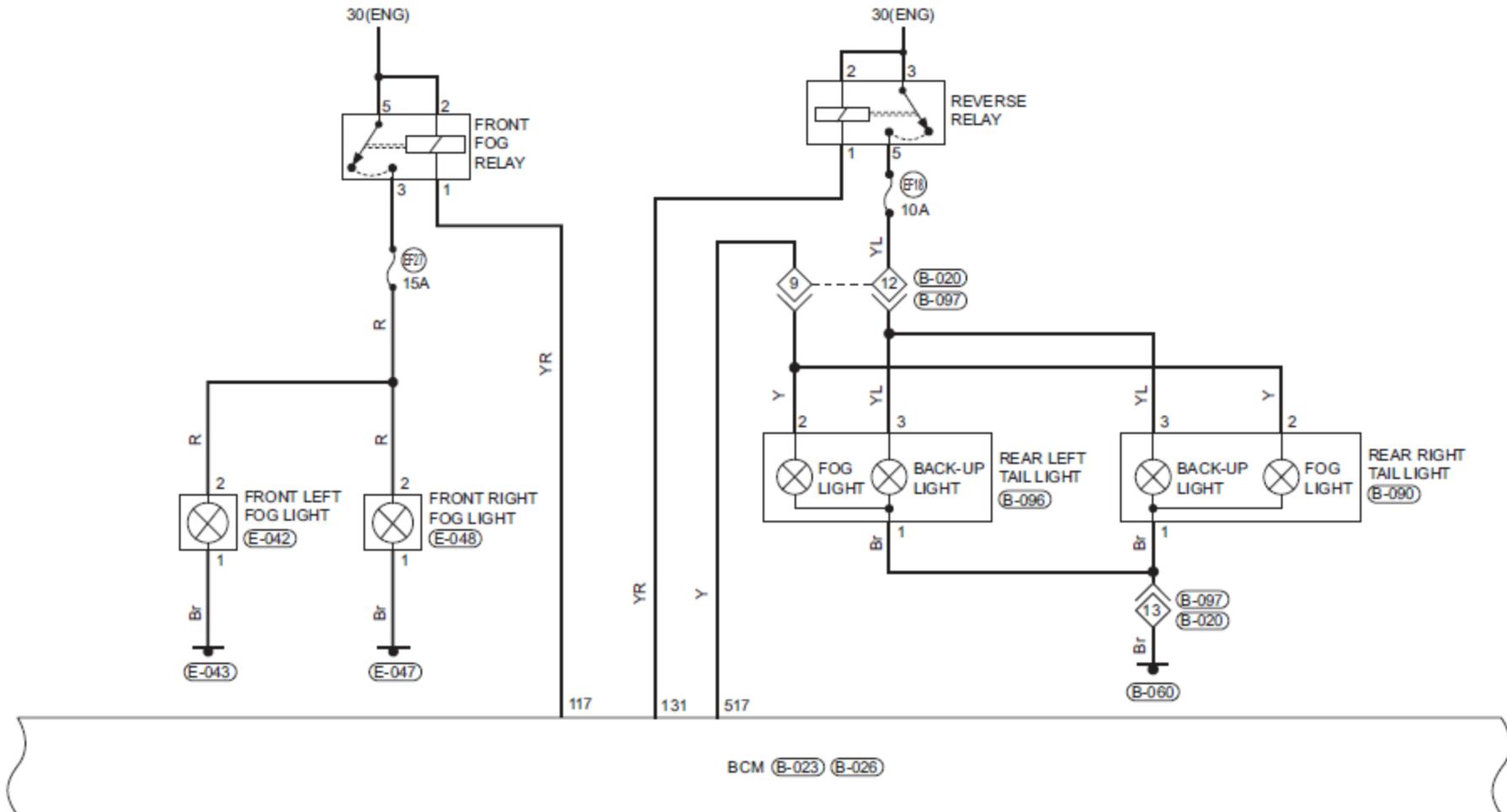


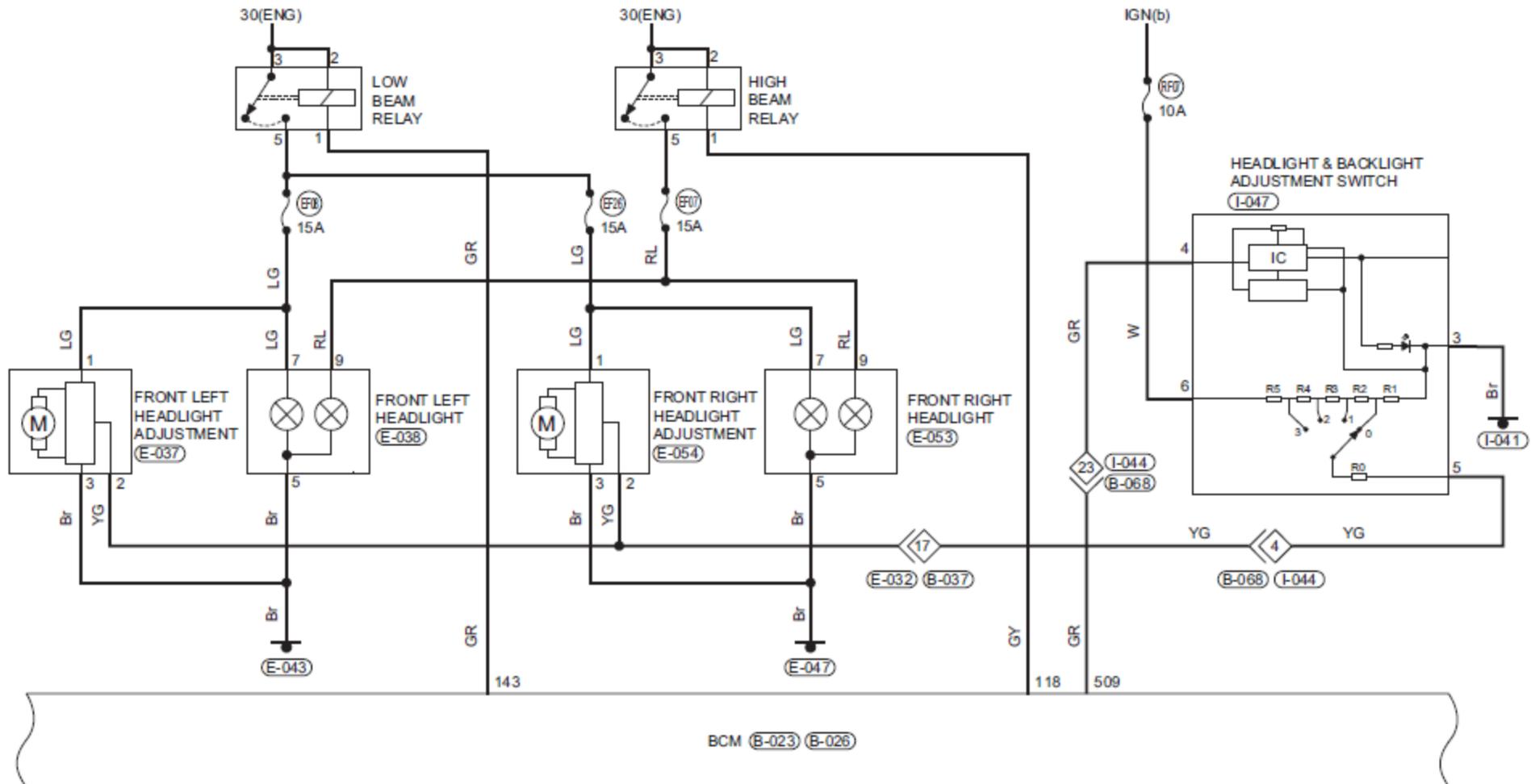


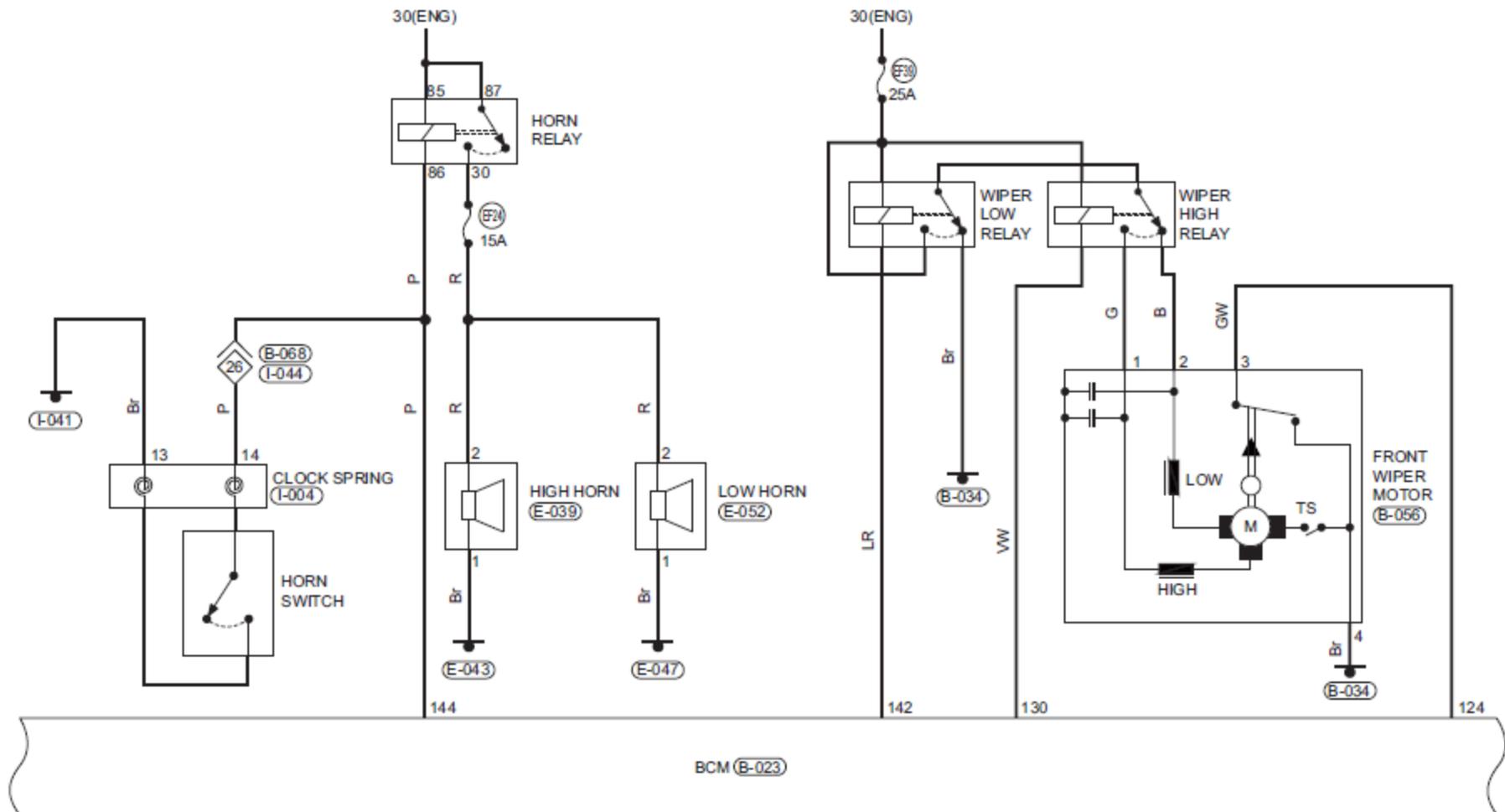


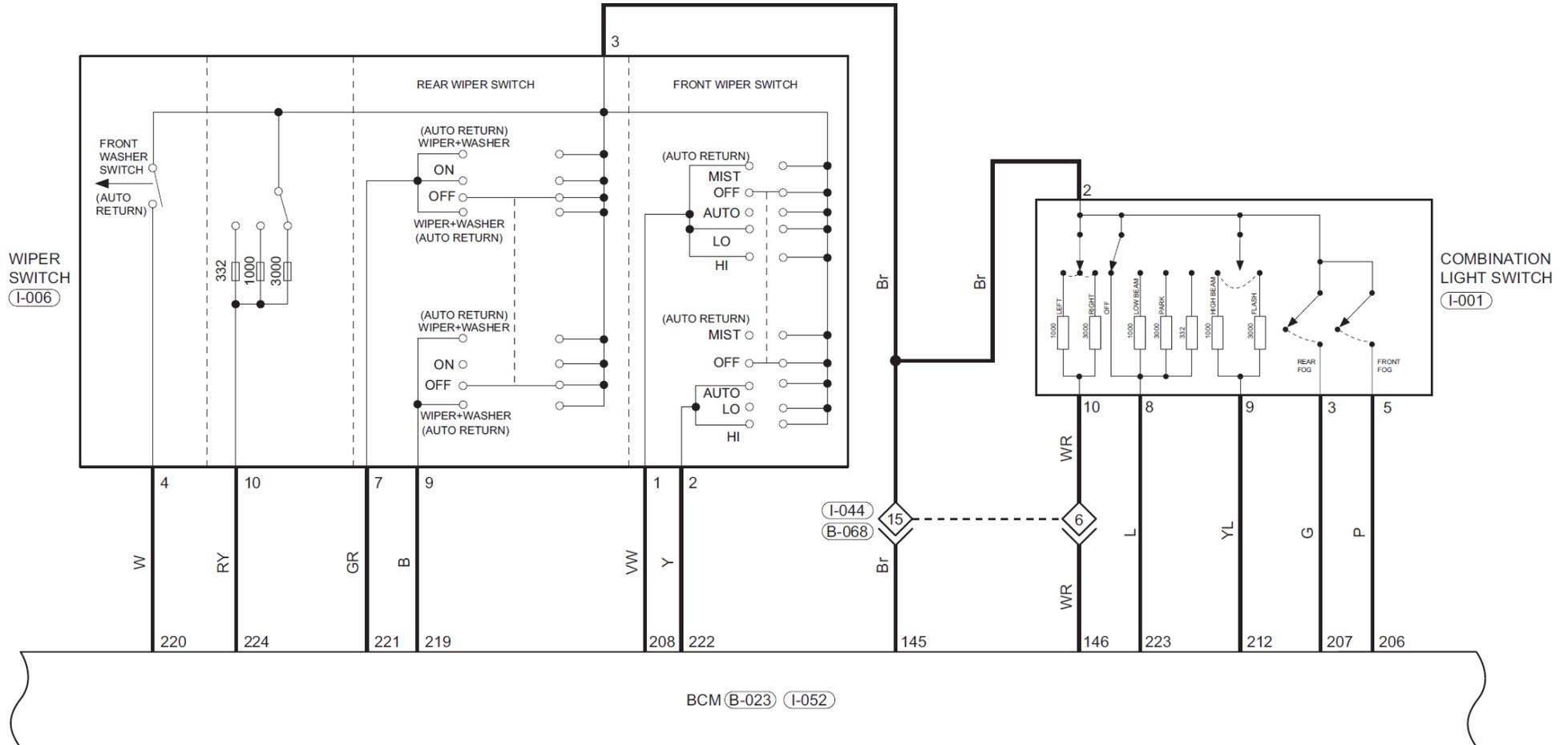




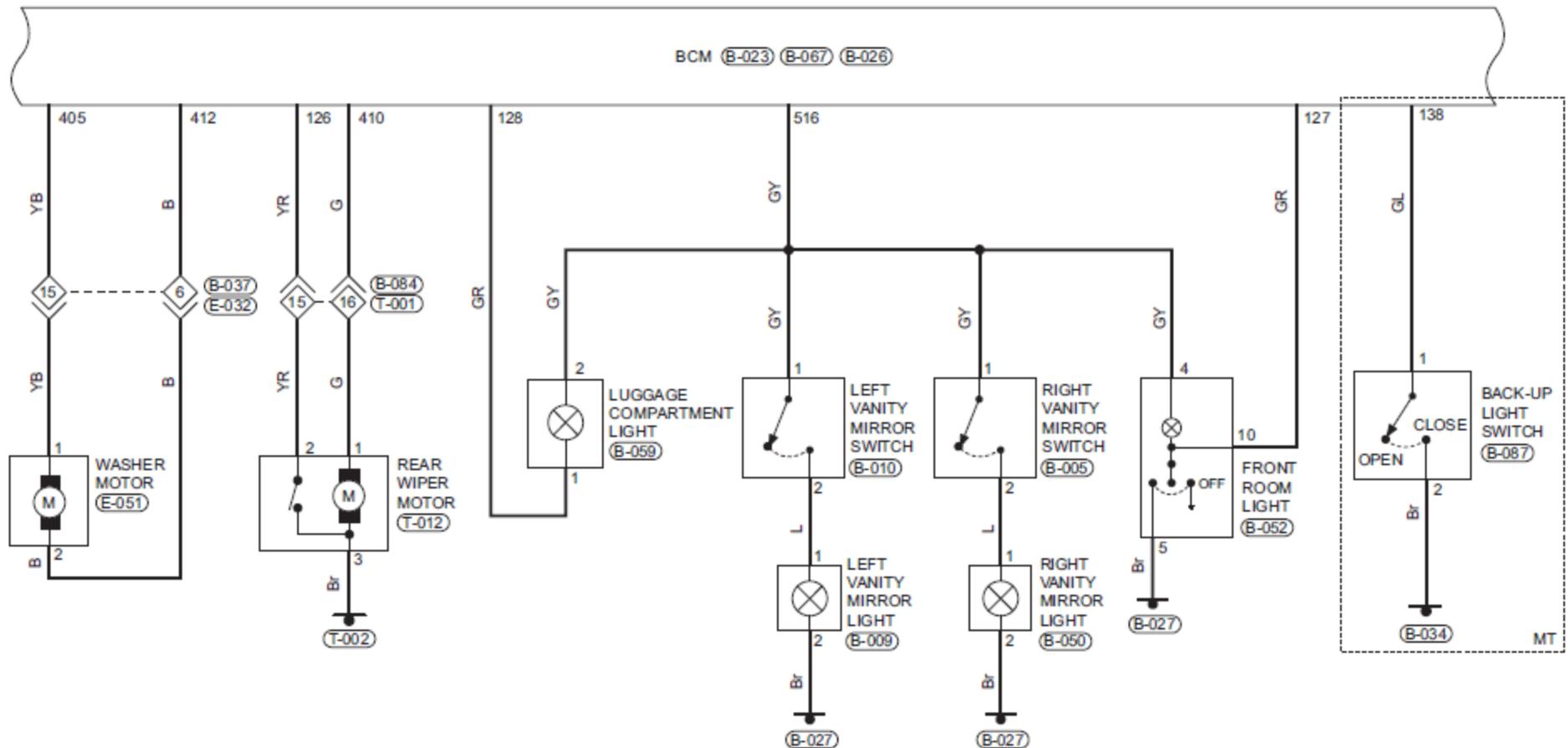


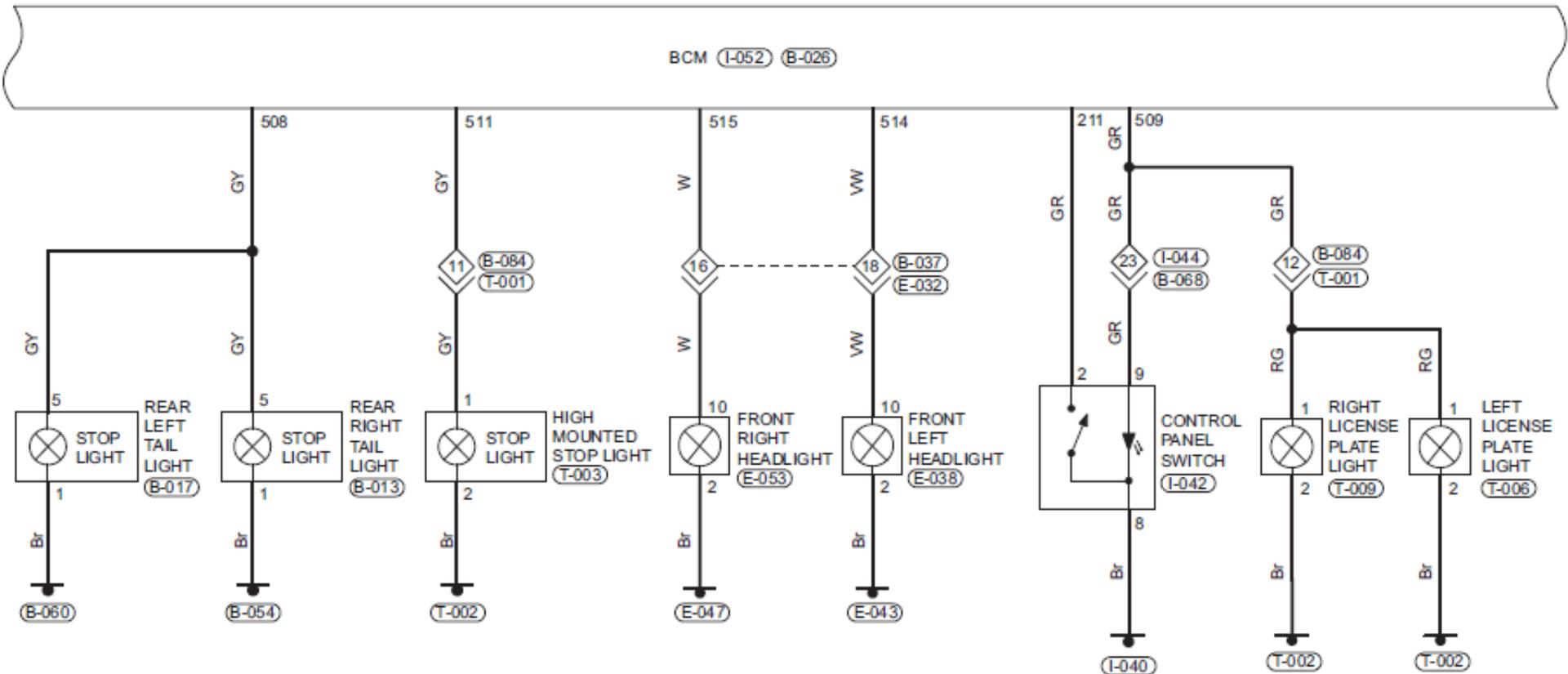


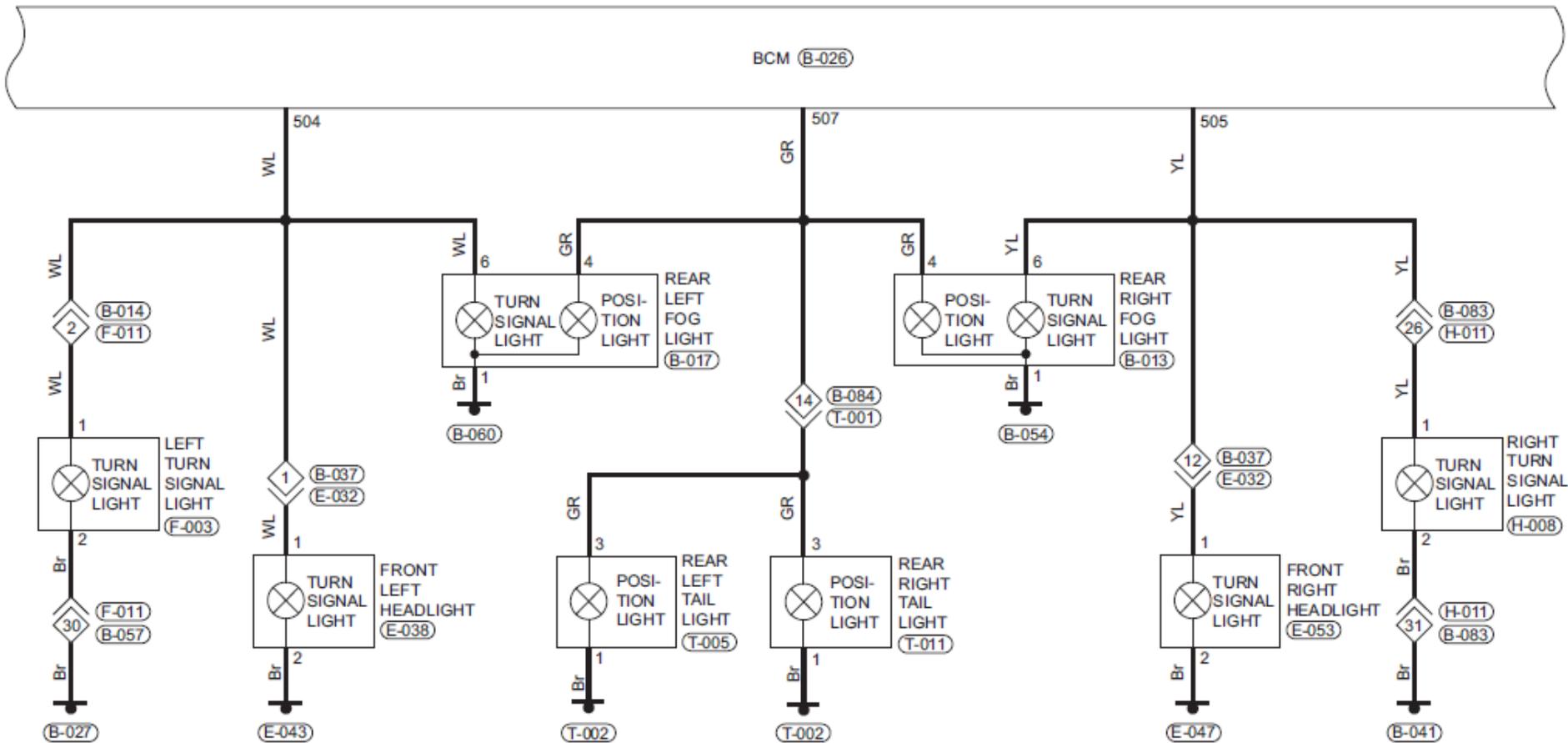


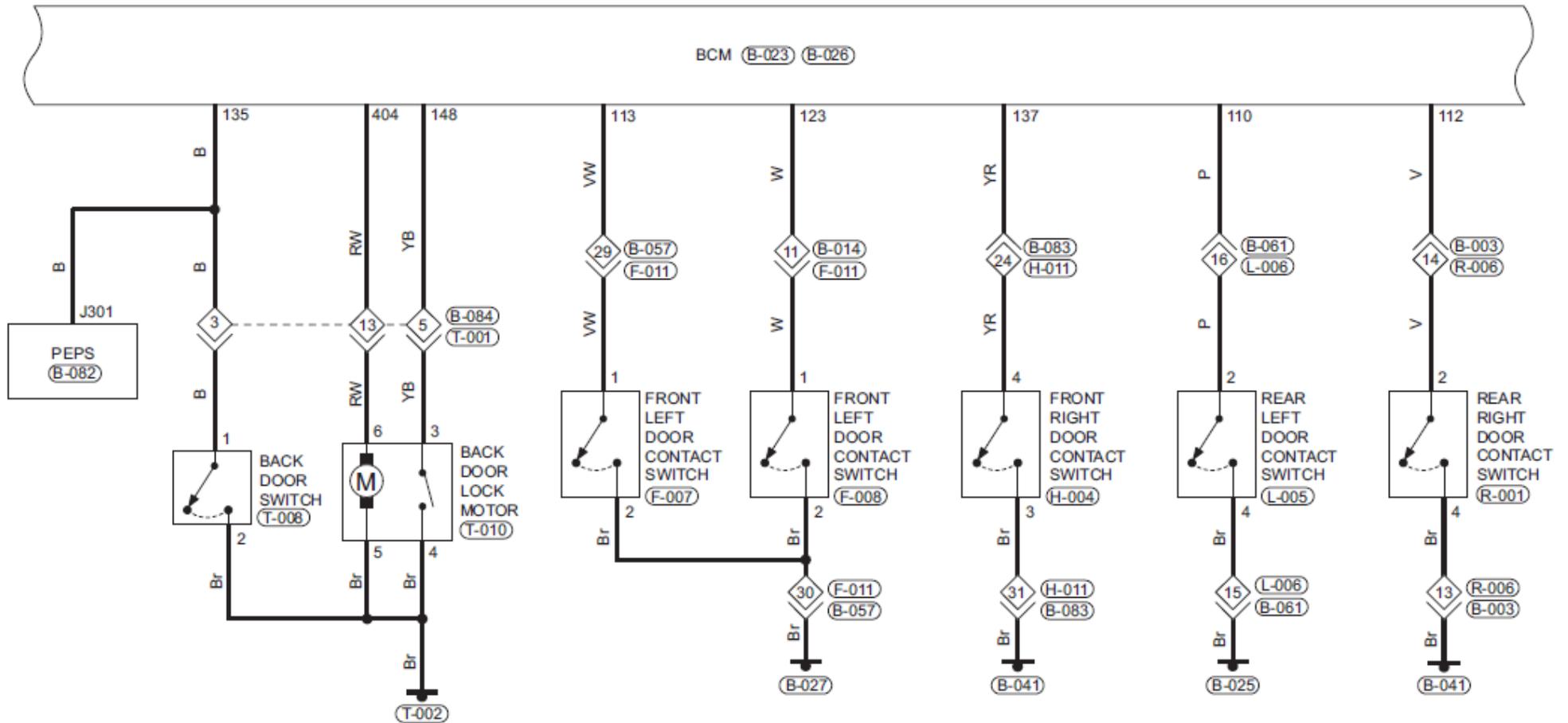


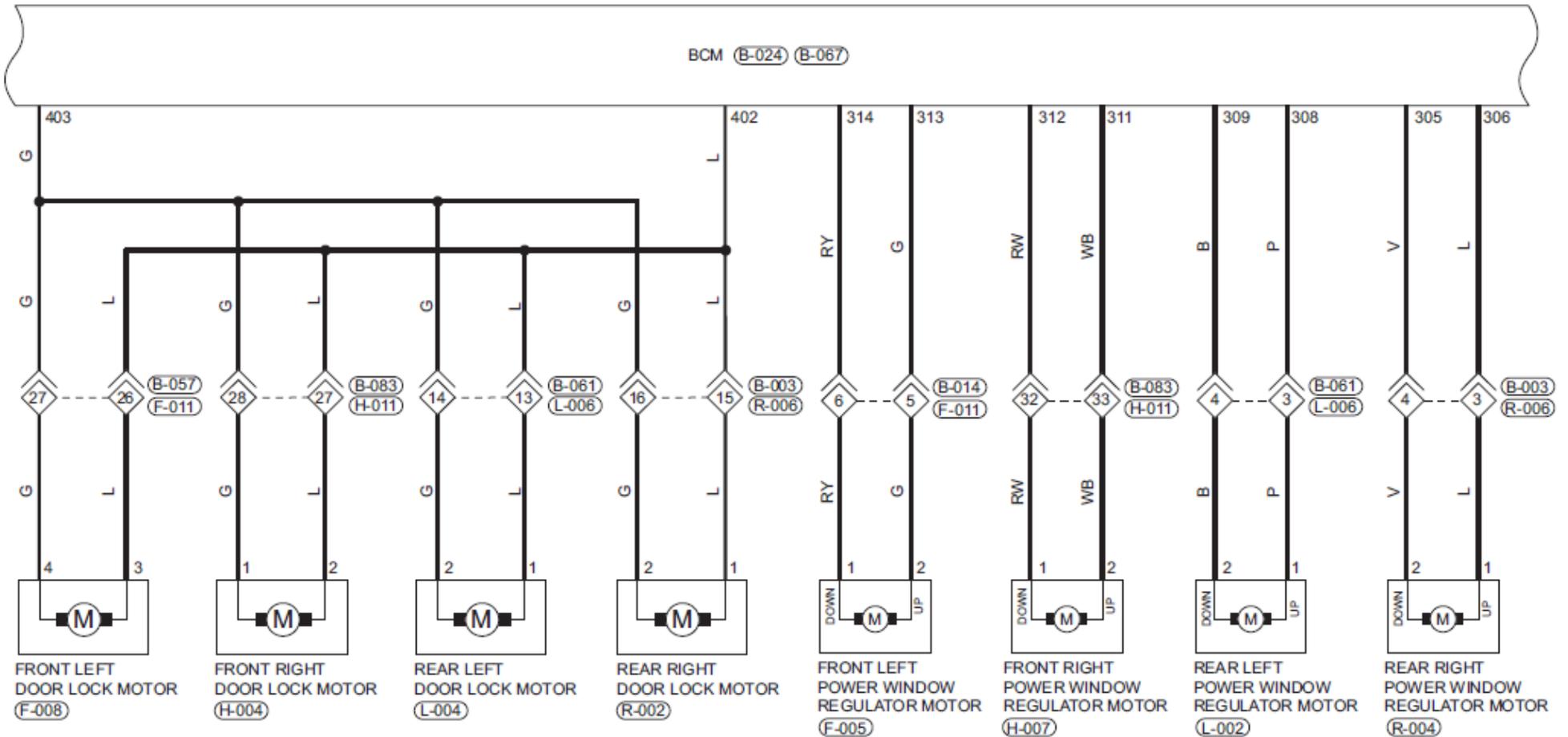
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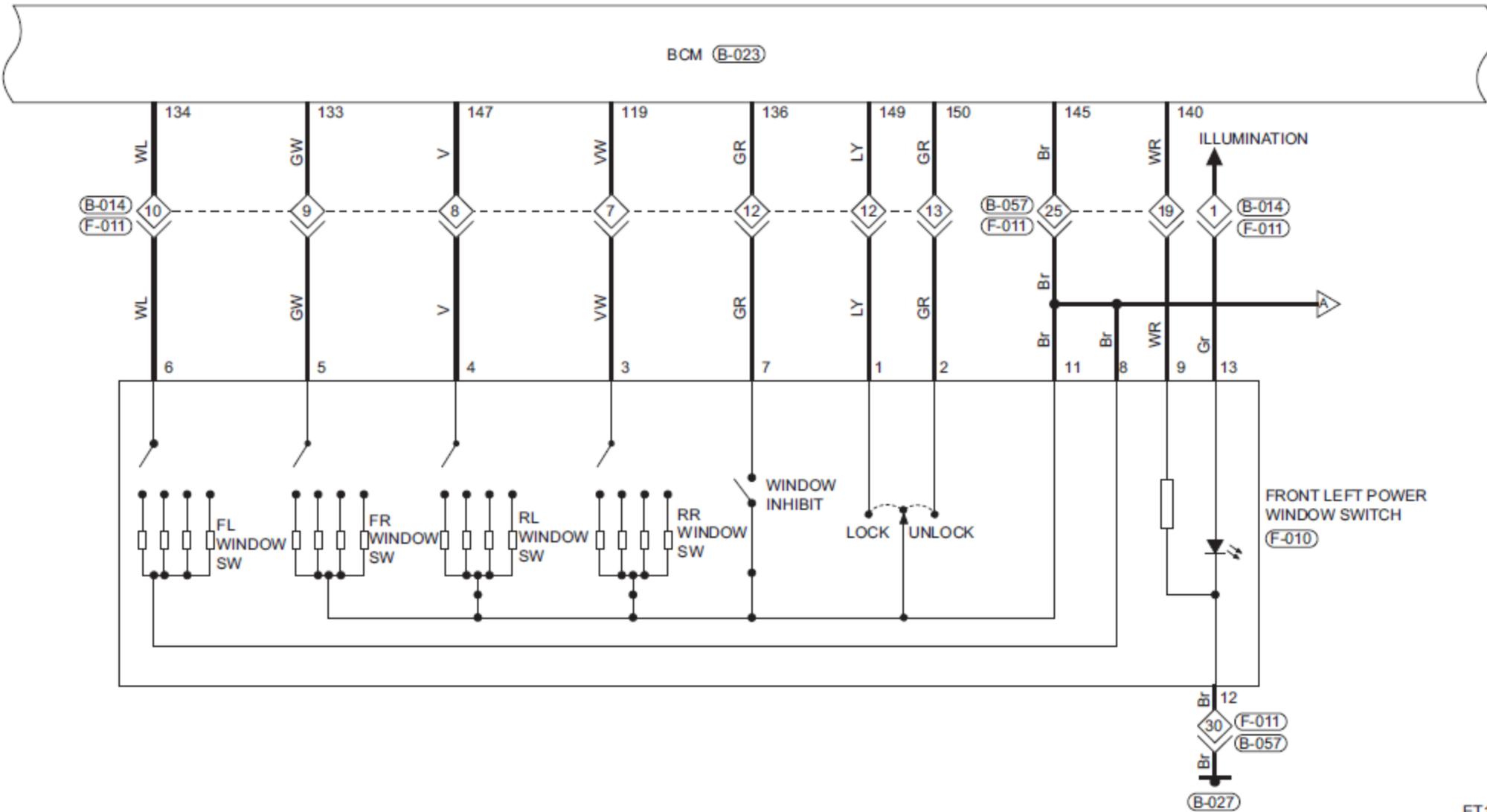


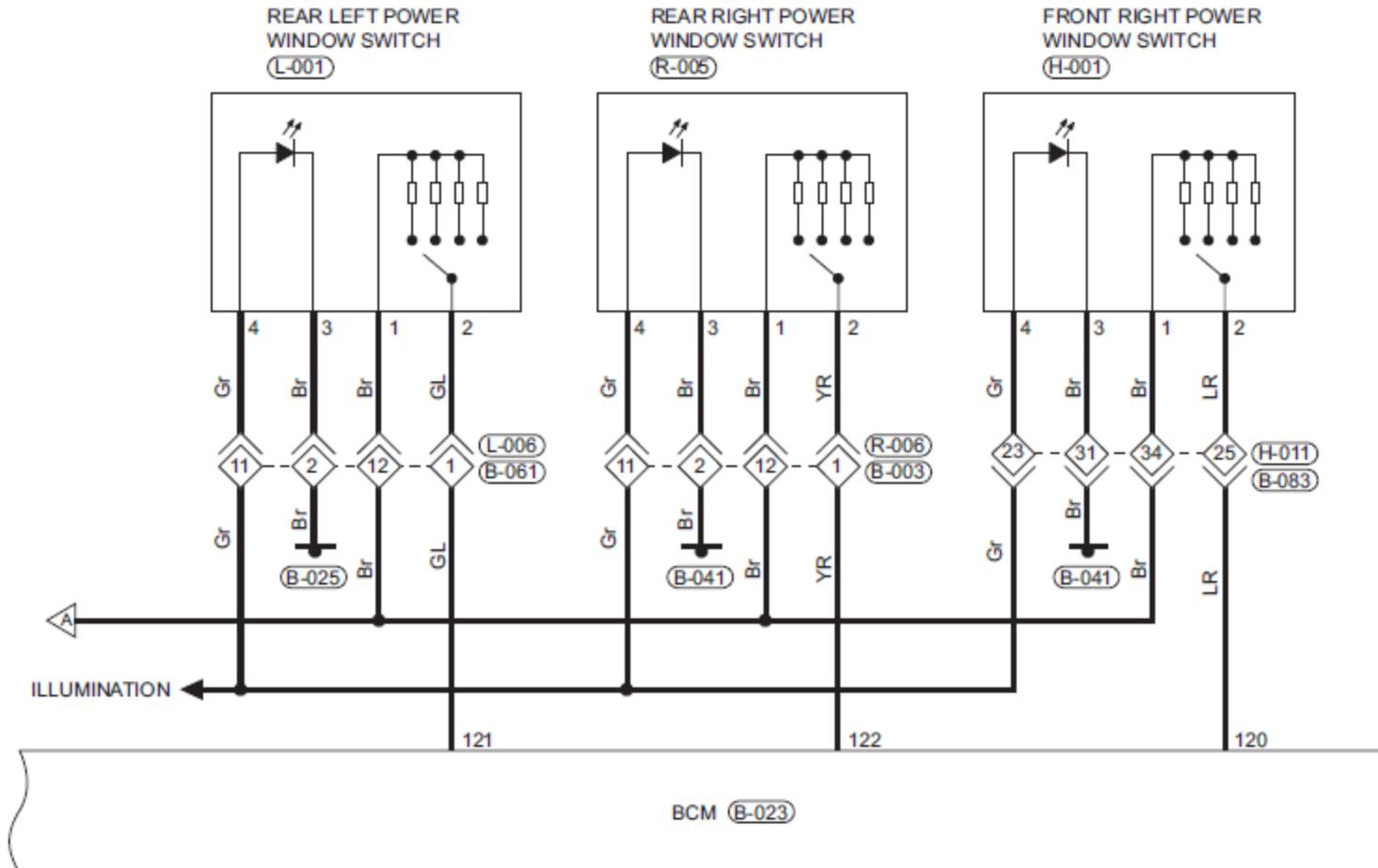


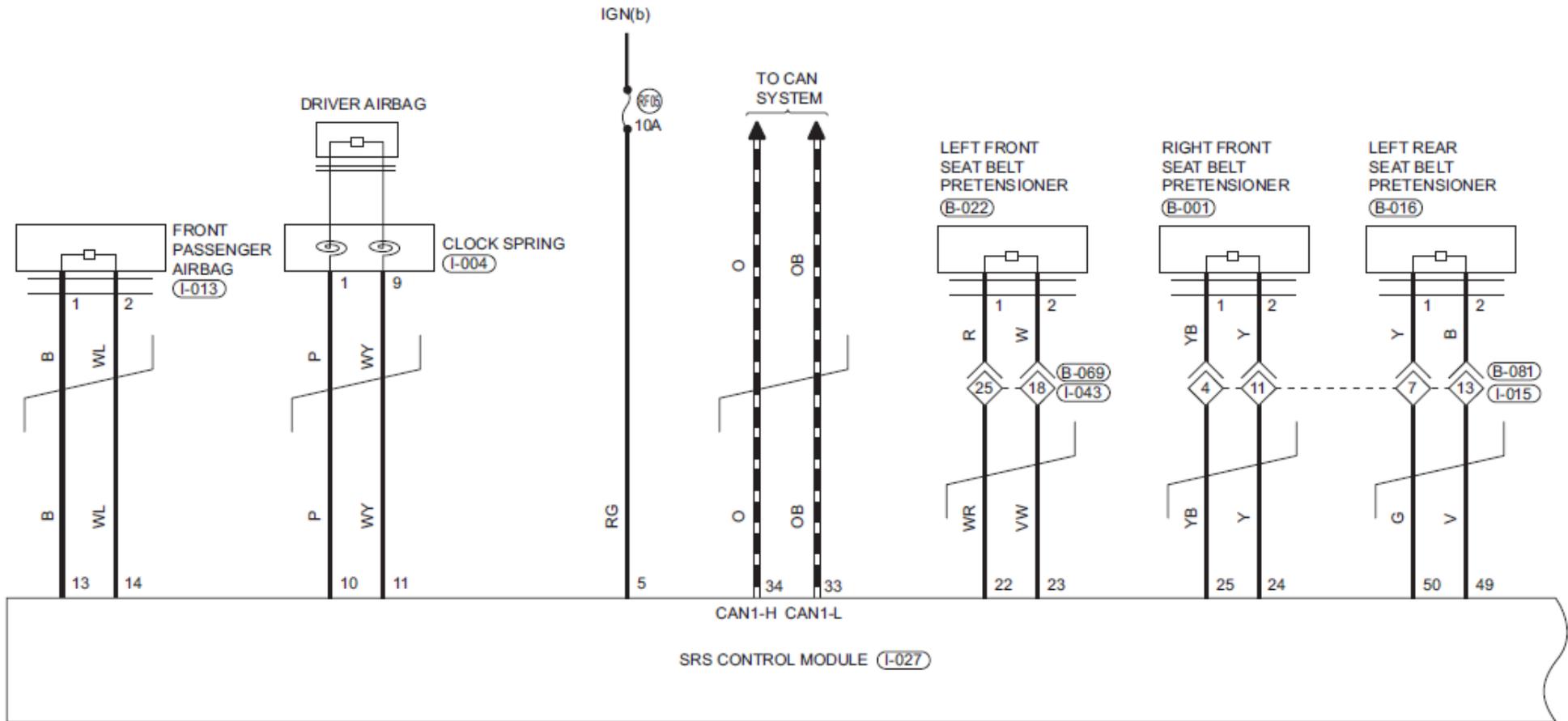


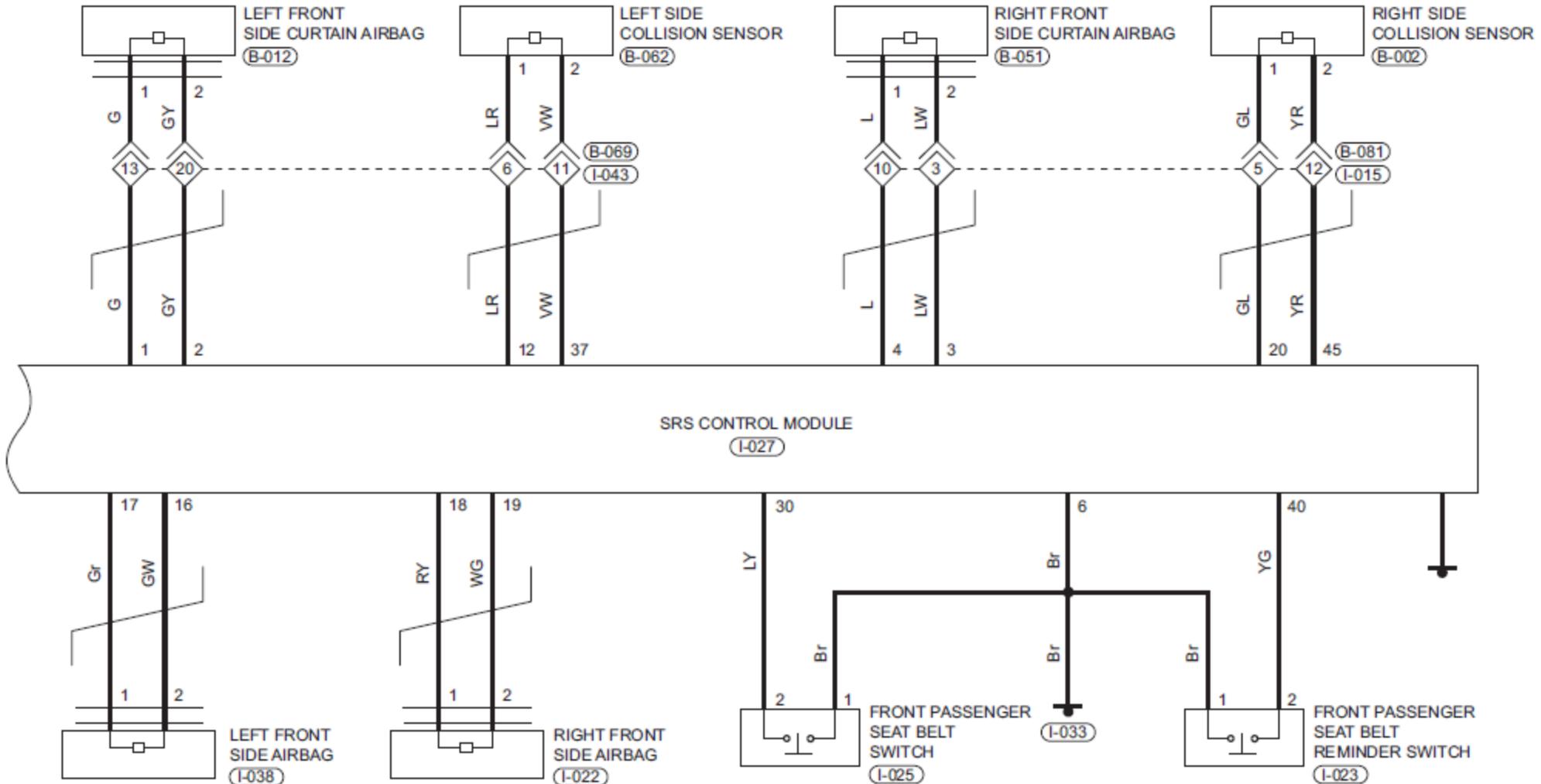


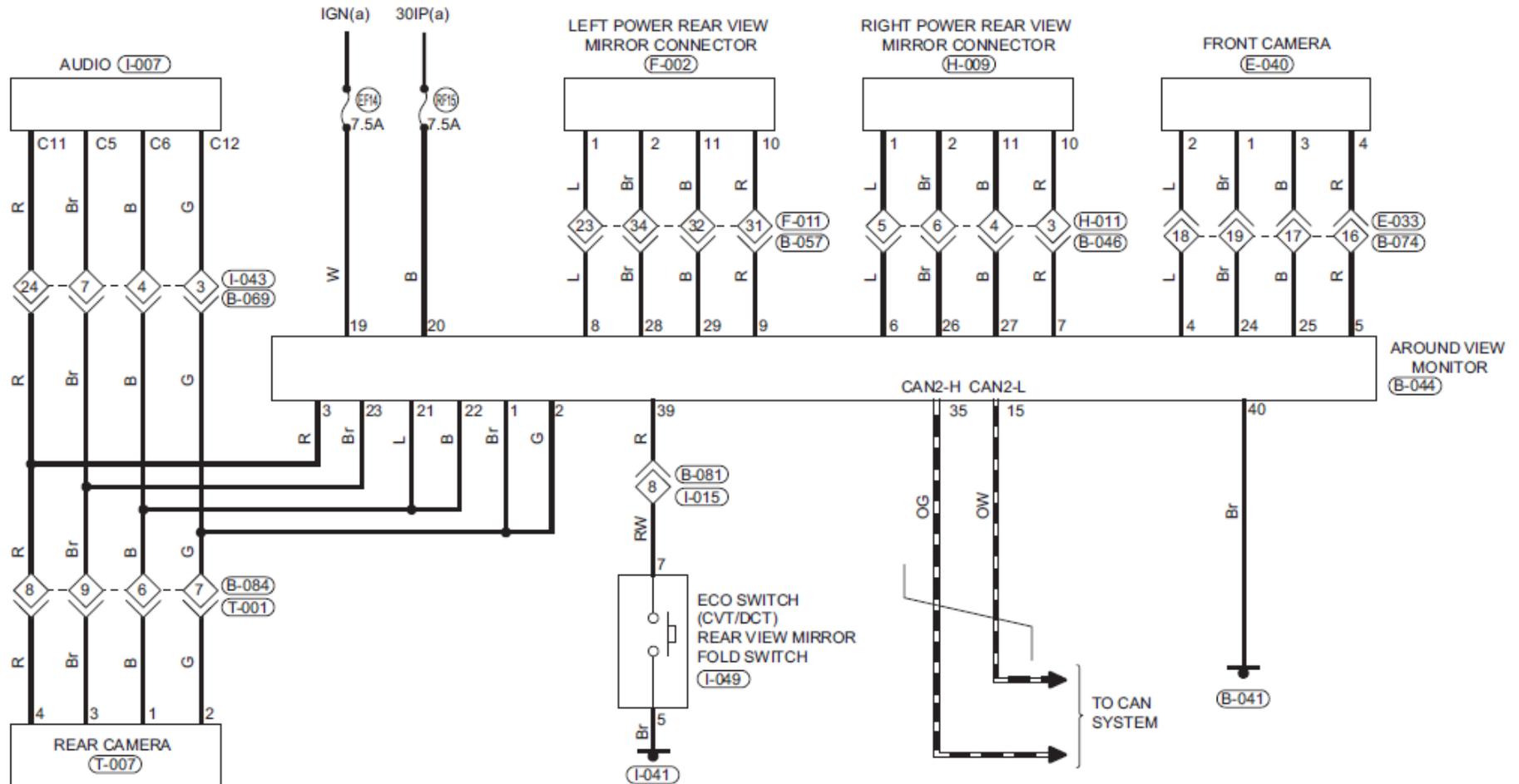


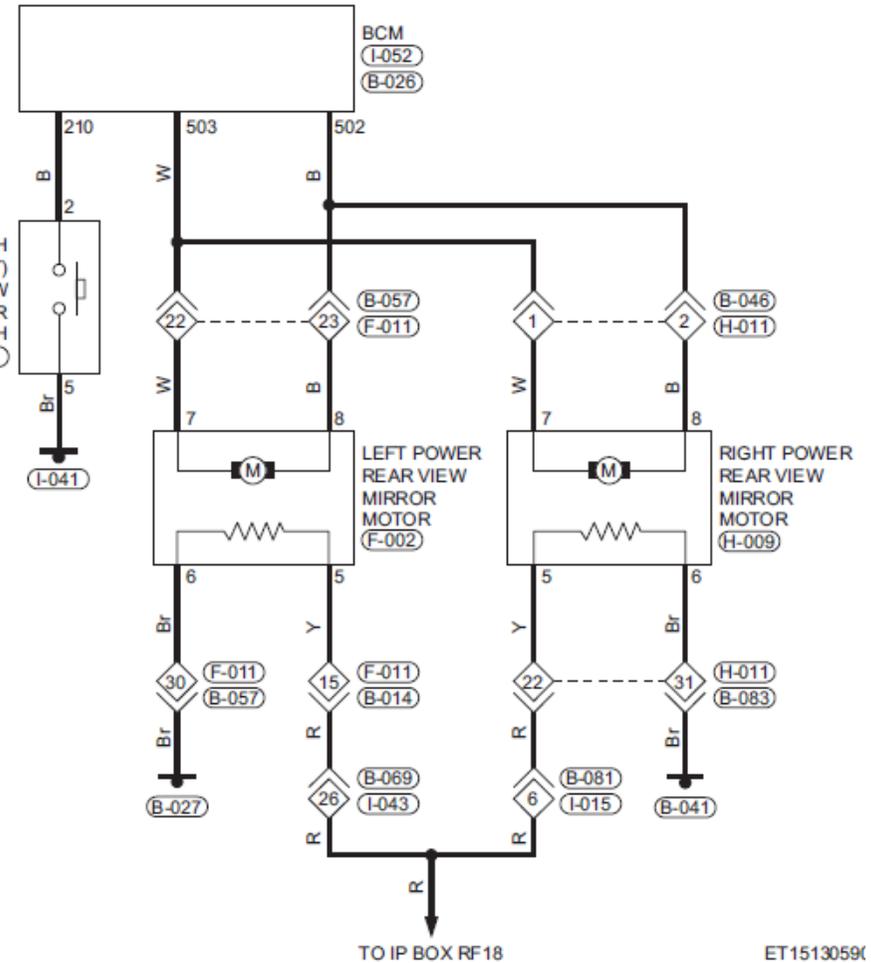
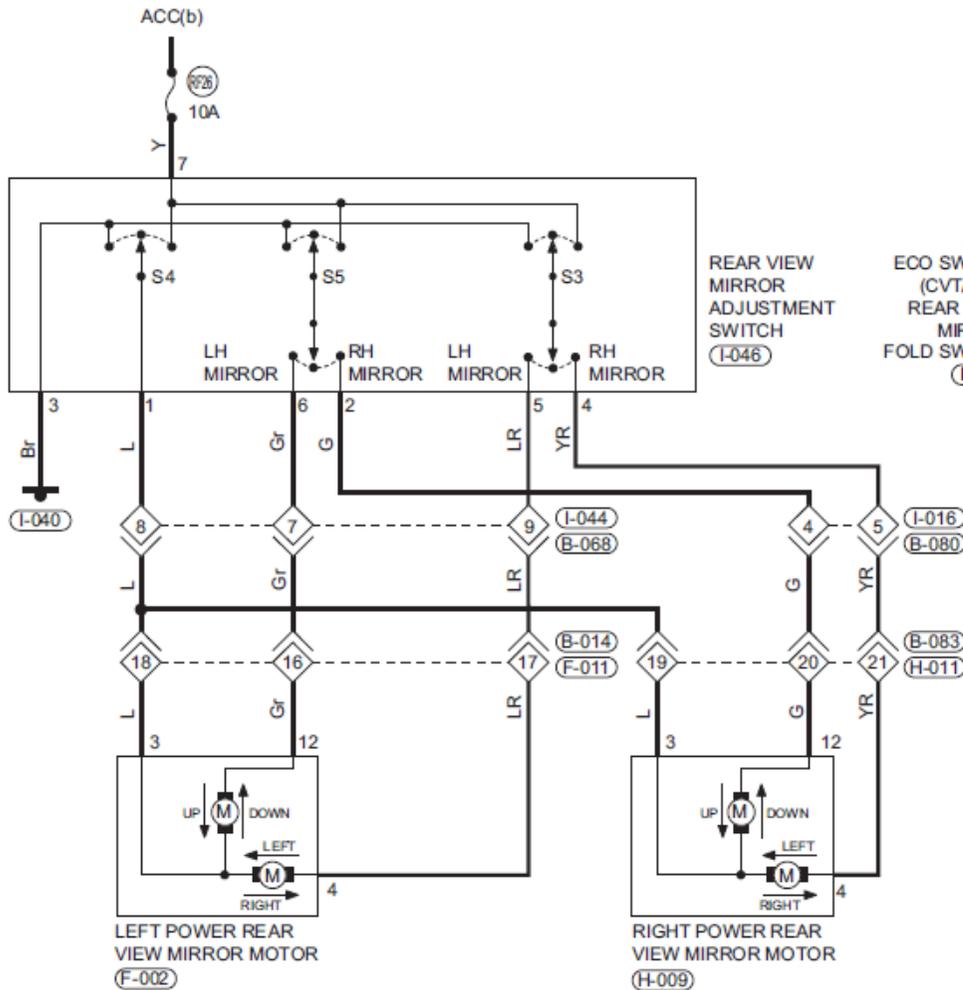




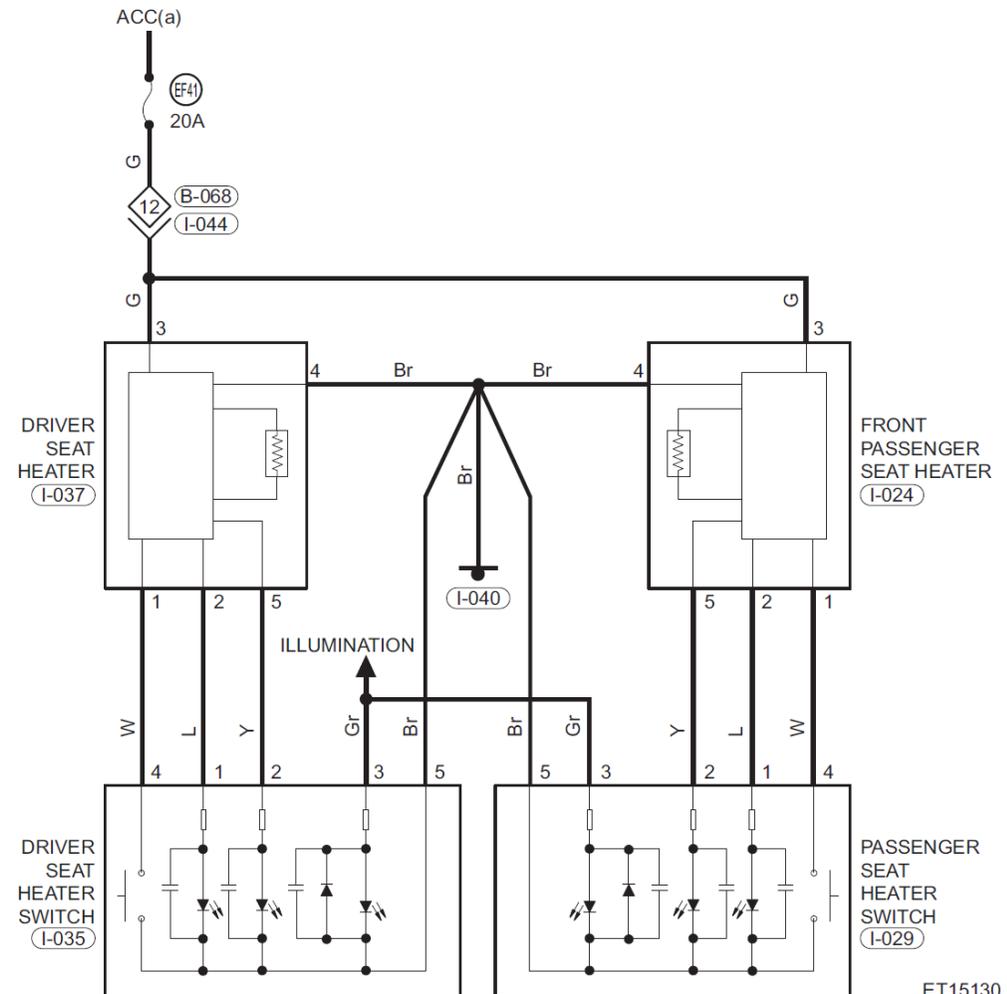
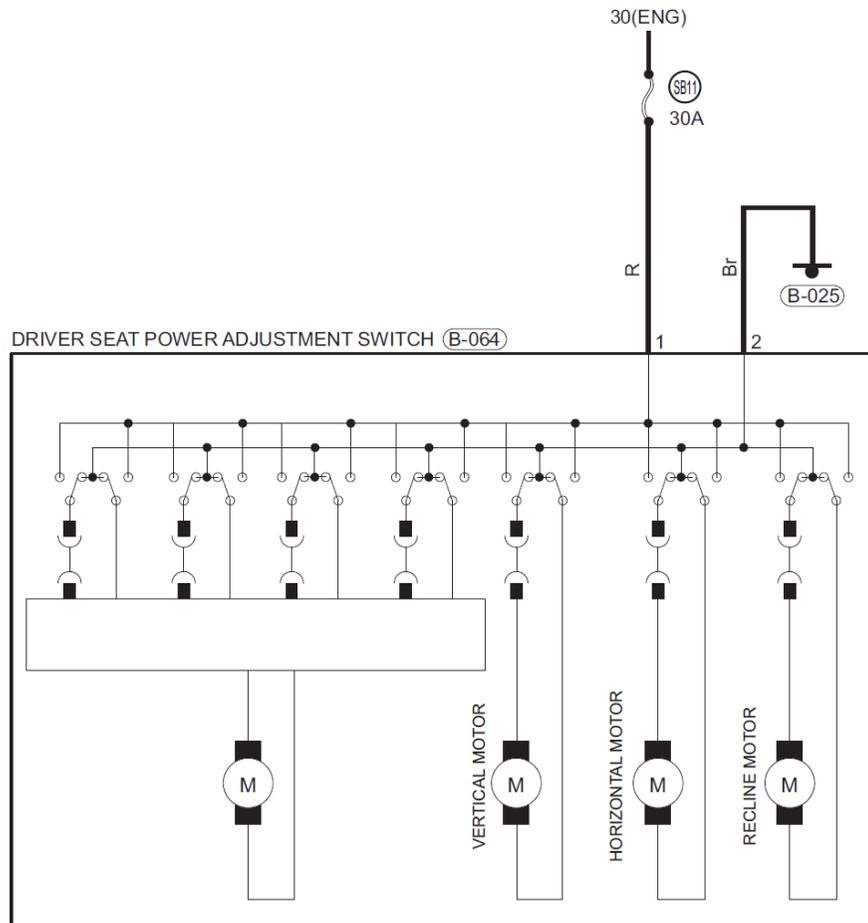




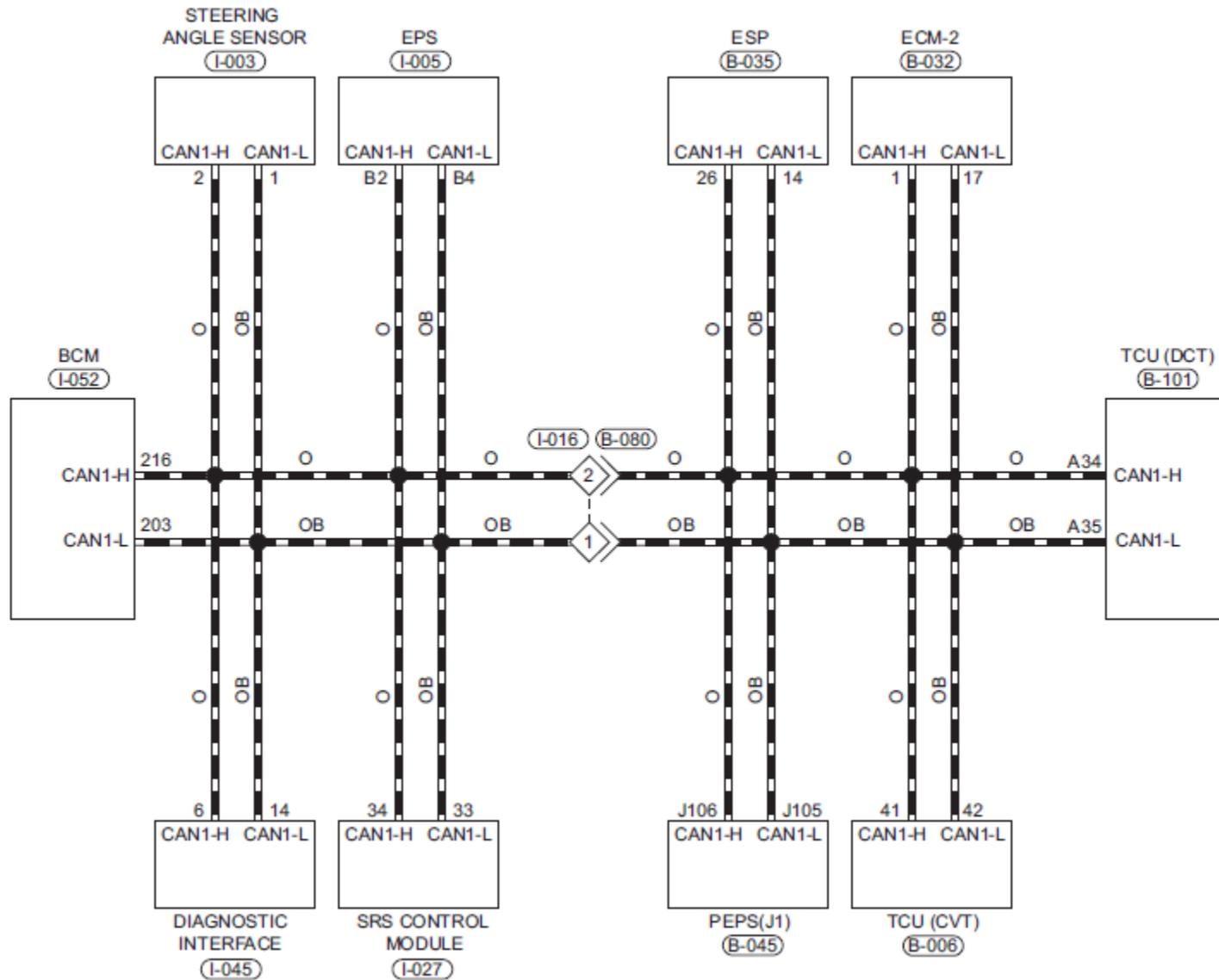


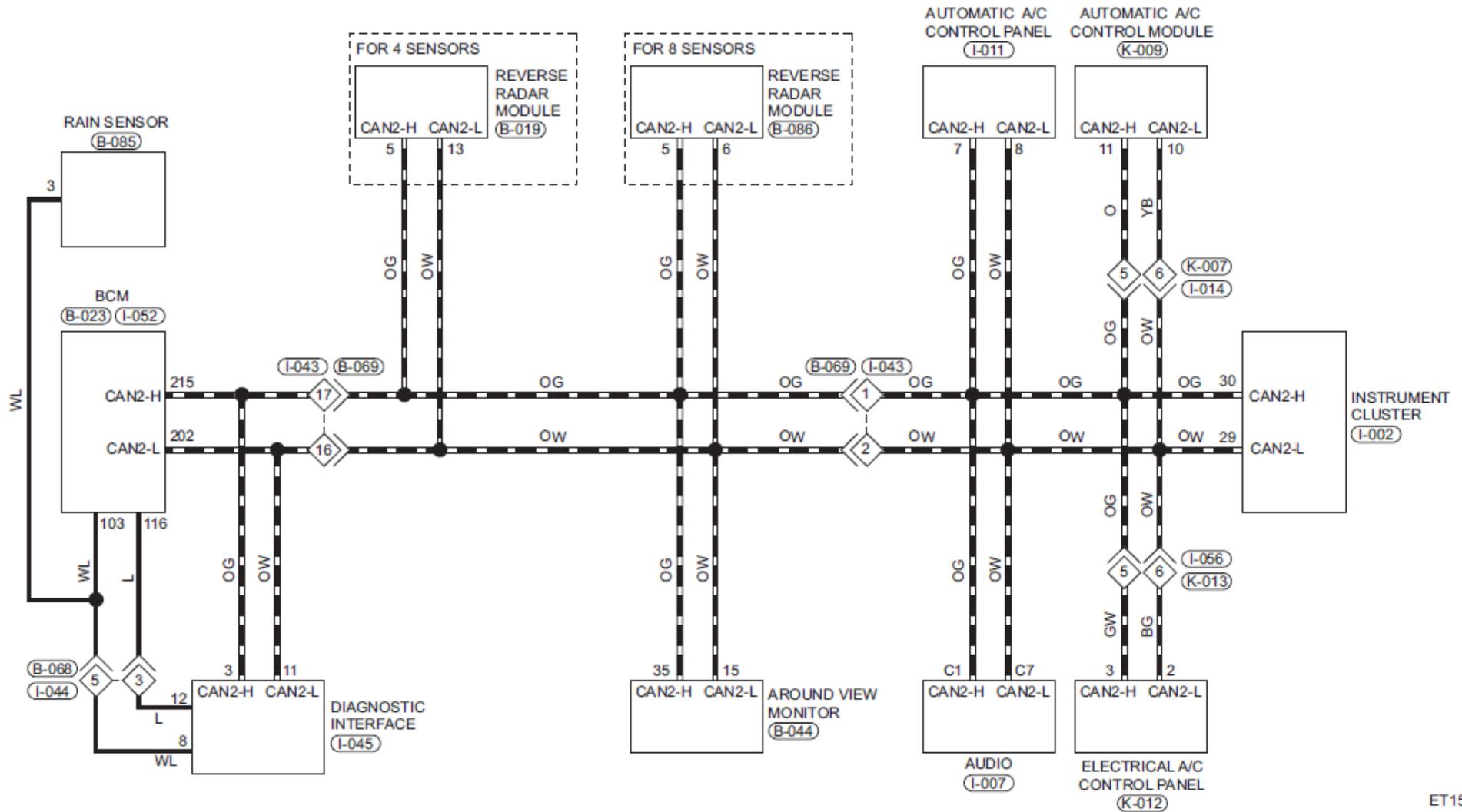


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