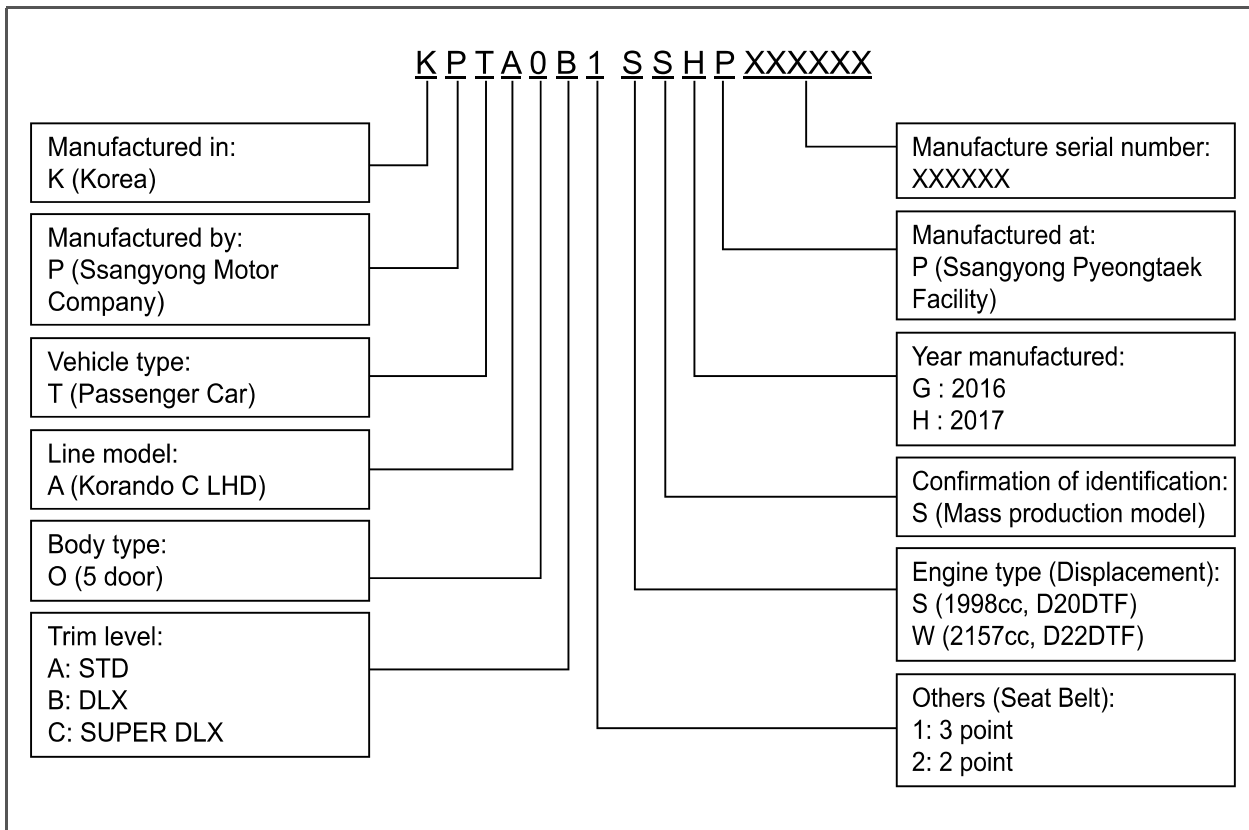
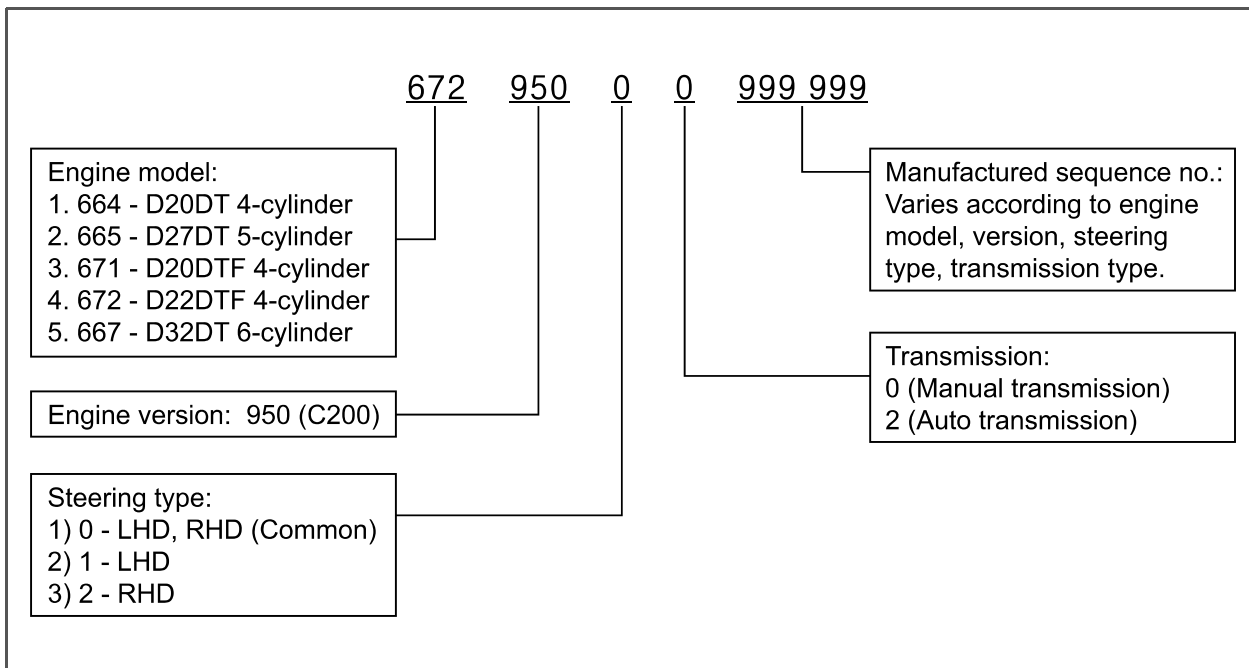


► VIN number



► Engine number





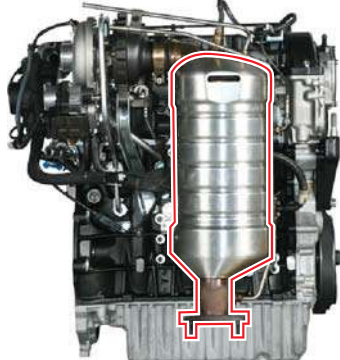
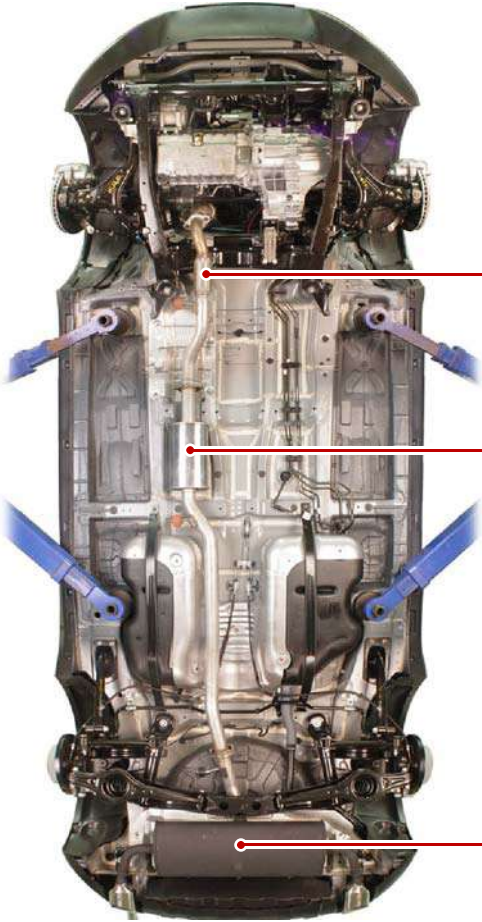



Modification basis	
Application basis	
Affected VIN	

OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

This system purifies the exhaust gas generated by the combustion in the engine to reduce the pollutants and noise during that arise during combustion.

2. COMPONENT

<p>Exhaust manifold</p> 		<p>CDPF assembly</p>  <p>Fore details about the CDPF assembly, refer to Chapter "CDPF System".</p>
	<p>No. 1 exhaust pipe</p> 	
	<p>No. 2 exhaust pipe</p> 	
	<p>No.3 muffler pipe</p> 	

Modification basis	
Application basis	
Affected VIN	

- ENGINE GENERAL
- ENGINE ASSEMBLY
- FUEL SYSTEM
- INTAKE SYSTEM
- EXHAUST SYSTEM
- TURBOCHARGER
- LUBRICATION
- COOLING SYSTEM
- CHARGE SYSTEM
- PRE-HEATING
- STARTING
- CRUISE SYSTEM
- E-GR SYSTEM
- CDPF SYSTEM
- ENGINE CONTROL

► Fuel and engine oil system

The engine oil and fuel damages the painted surfaces and rubber material of the vehicle.

- Disconnect the negative cable from the battery before servicing the fuel system, and prepare the service plug grip.
- When working with the fuel or oil systems in enclosed area, always keep the working area well-ventilated and never allow anybody to smoke.
- Do not allow the gasoline to contact to rubber or leather parts.
- Carefully separate the pipe between high pressure fuel pump and fuel injector so that any fuel can be spilled out.
- Fully release the pressure from the fuel system before removing any parts of fuel system.
- To release the fuel pressure in high pressure line, let the engine fully cool down.
- Gaskets and seals on the fuel and oil systems should be replaced with new ones. All bolts and nuts should be tightened as specified.
- Prolonged exposure to the engine oil make cause a skin cancer or an irritation.
- Used engine cotains the hazardous material that may cause the skin cancer. Do not allow the used engine to make contact with your skin.
- Make sure to wear the protection gloves and goggle when handling the engine oil. If contact happens, rinse affected areas immediately with plenty of water. Do not wash it with gasoline or solvent. If irritation persists, consult a doctor.
- Improperly disposed engine oil can pollute the environment. Dispose the used engine oil and oil filter in accordance with local environmental regulations.
- Make sure to check the connections for leak after installation.

► Electric devices

Extraordinary care should be taken when servicing the electric systems. Currently, the engine uses a lot of electric devices. Short circuit and poor contact may cause the low engine performance, incomplete combustion and other abnormalities.

- To prevent any damage to electric systems, make sure to disconnect the negative (-) cable from the battery and place the ignition switch to OFF position before servicing.
- Use only the specified parts with same ratings when replacing the electric devices. Check the grounds and connections for looseness.

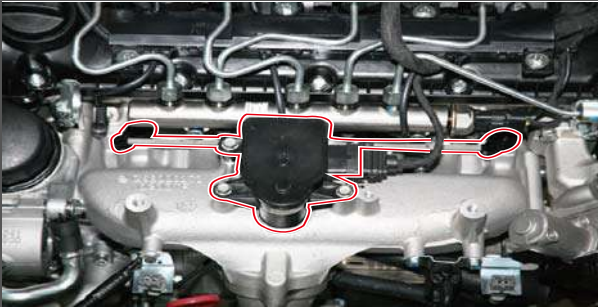

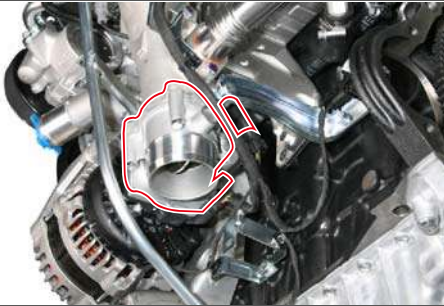
Modification basis	
Application basis	
Affected VIN	

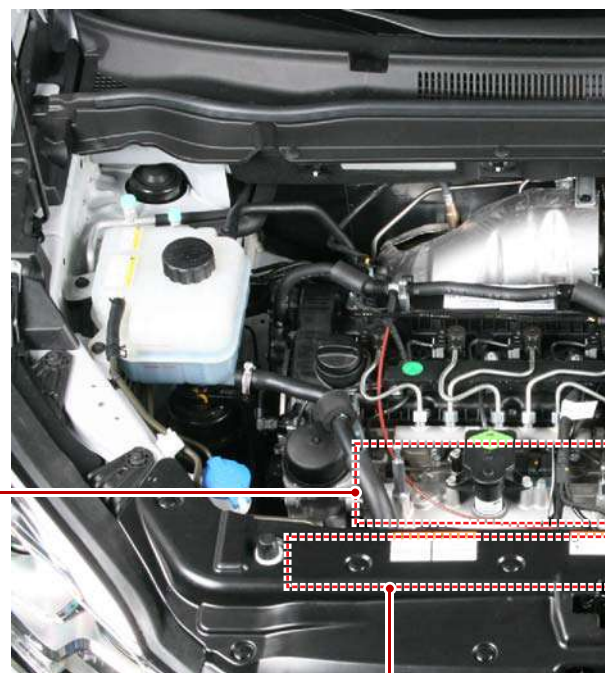
OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

The intake system for D20DTF engine is equipped with an electric throttle body which includes a flap. This flap is controlled by an electrical signal to cut off the intake air entering to the engine when the ignition switch is turned off. To be sure to get the optimized swirl in intake manifold, the swirl valve and dual type port have been adopted. And, the improved HFM sensor has been adopted to control the intake air volume more precisely.

2. COMPONENTS

1719-02	Swirl control valve
	
<p>Operates variably in accordance with the engine load and rpm. * For more information, refer to Chapter "Engine Control".</p>	
1719-01	Intake manifold
	
<p>Passage for intake air during the operation of variable swirl valve</p>	
1719-16	Electric throttle body
	
<p>* For more information, refer to Chapter "Engine Control".</p>	



2330-01	Intercooler assembly
	

Modification basis	
Application basis	
Affected VIN	

5. Service should be conducted according to diagnostic procedure, and replace any parts with malfunctions proved.

Disconnect the negative battery cable.



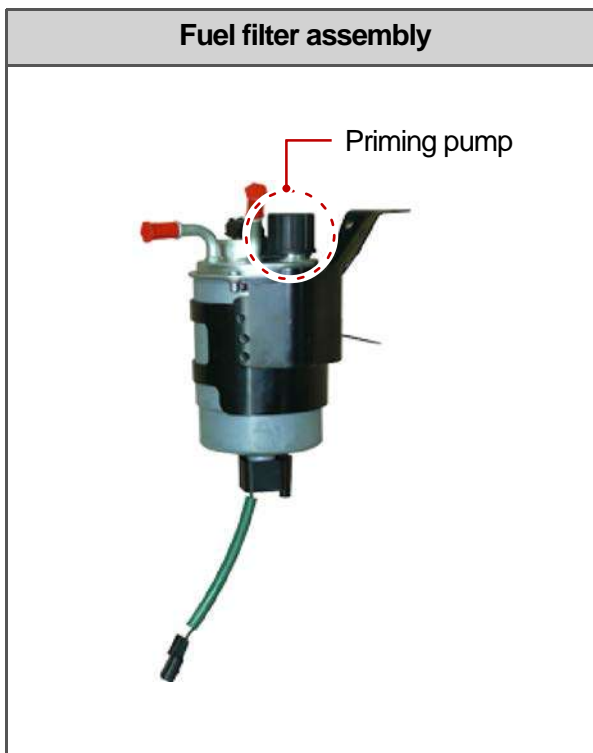
Use special tools and torque wrench to perform the correct works.

In case a fuel pipe of DI engine (between HP pump ~ fuel rail / fuel rail ~ each injector) is removed, be sure to replace it with new one without fail. The new pipe should be installed and tightened with specified torque. In case of over-tightening or under-tightening, there may be breakdown or leakage on connections. Any pipe installed once cannot be installed again as it is deformed under the matching force of tightening.

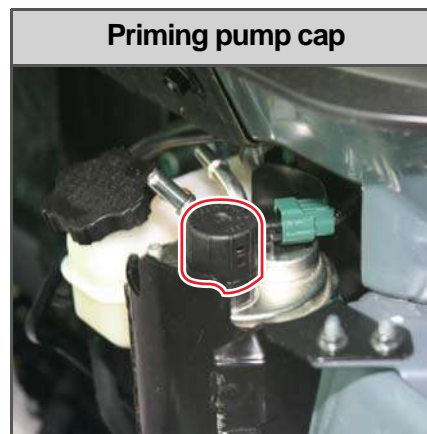
Always replace the copper washer installed to the injector with new one and tighten the injector holder mounting bolt to the specified torque when installing the injector. In case of not observing specified torque, fuel injection positions of the injector may get varied to cause engine hesitations.

Plug the disconnected parts with sealing caps, and remove the caps immediately before replacing the components.

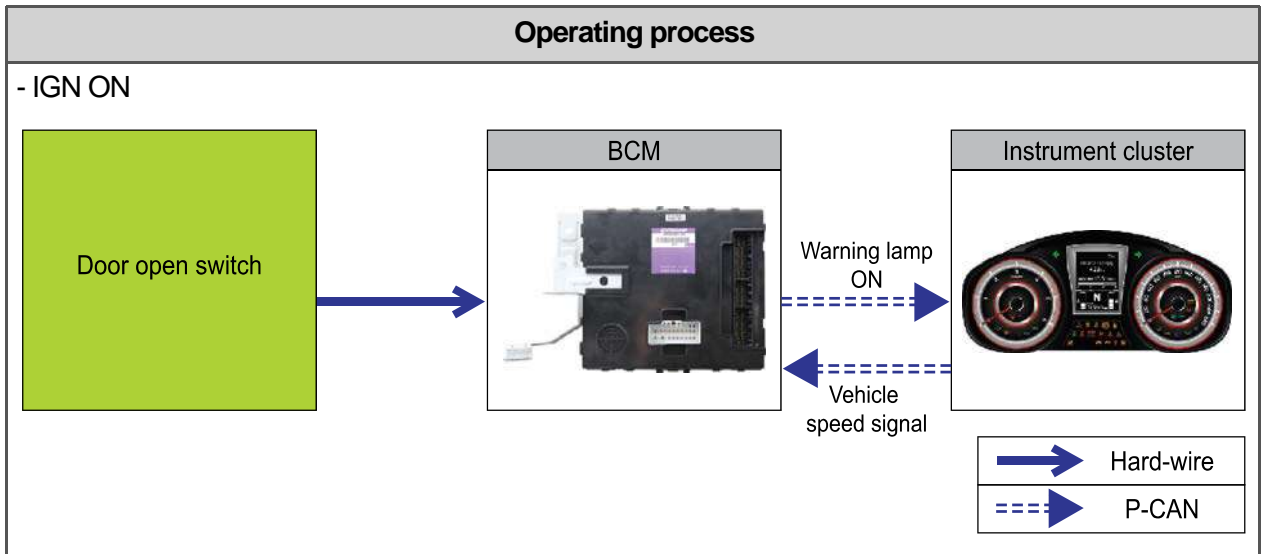
6. Any removed part should be placed with seal cap into a box of a new part to prevent contamination and breakage so that the part can be in the same condition as installation when analyzing the part.



7. After completing installation, press the priming pump several times or even dozens of times to supply fuel up to the low pressure line of high pressure pump. In this case, if the filter is filled with fuel, resistance is increased with the operation of priming pump. If the priming pump is operated consistently, fuel will be leaked through the hole in the priming pump cap.



Modification basis	
Application basis	
Affected VIN	



ELECTRO
NIC

FUSE

BCM

SKM

CLUSTER

SWITCH

LAMP

WIPER

PAS

AUDIO
SYSTEM

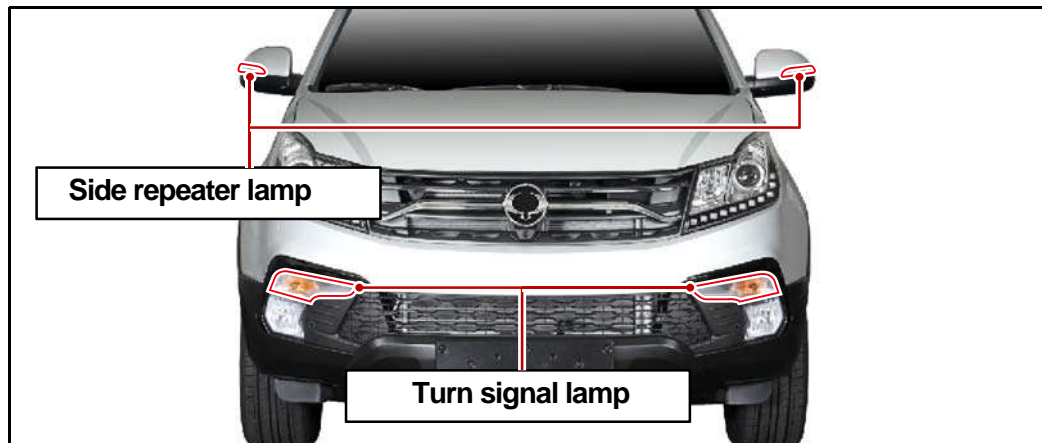
LCD(Sma
rt)AUDIO

AVN
SYSTEM

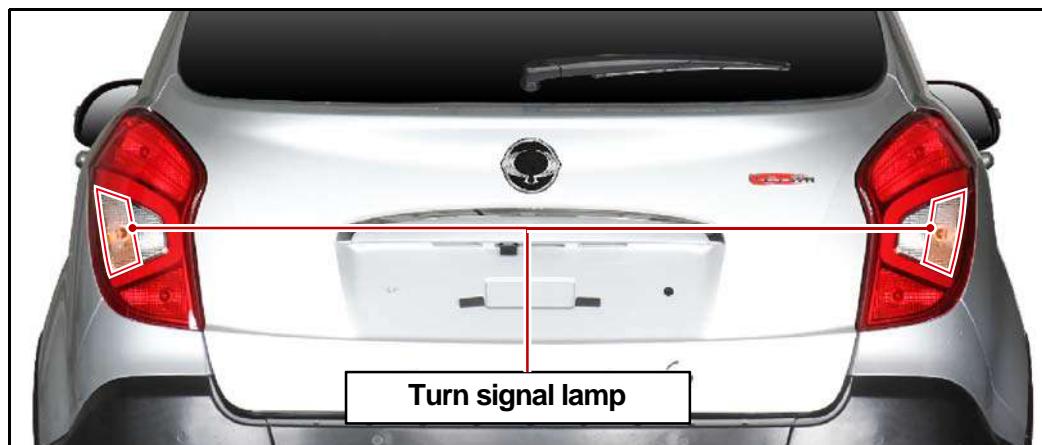
Modification basis	
Application basis	
Affected VIN	

(6) Turn signal lamp / Side repeater lamp

► Front



► Rear



The turn signal lamp is operated by the BCM when the BCM receives a signal from the multifunction switch. The BCM cycles the turn signal lamp and buzzer (ON/OFF) 75 times per minute.

The turn signal lamps are operational only when IGN1 is ON.

If the turn signal lamp fails while it is illuminated, the BCM cycles the lamp and buzzer 100 times per minute.

The BCM determines that there is an open circuit if the load is 3.0 A or less, and there is a short circuit if the load is 7.0 A or more.

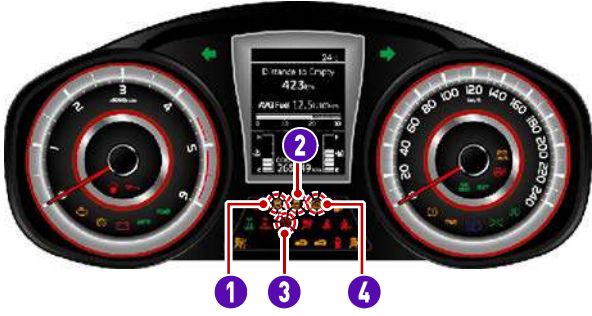

When turning ON the turn signal switch, the lamp blinks 3 times by the BCM. When turning OFF the switch during the operation, the turn signal lamp blinks 3 times and goes off.






When turning OFF and then immediately ON the turn signal switch during auto blinking operation of 3 times, the turn signal lamp blinks additional 3 times.

If one of the turn signal lamp is flashing and the other lamp switch is turned on, the lamp for the activated switch flashes.

Modification basis	
Application basis	
Affected VIN	

4. ESP SYSTEM WARNING LAMPS

Supervision instrument cluster	Standard instrument cluster
	
<p>1. ESP ON indicator/warning lamp 2. ESP OFF indicator 3. Parking brake operating indicator (EBD warning lamp: both parking brake operating indicator and ABS warning lamp come on at the same time) 4. ABS warning lamp</p>	

Warning lamps	Color	Indicator	Operating conditions
ESP ON indicator/warning lamp	Amber		ON: Failure of ESP system Flashing: ESP activated
ESP OFF indicator	Amber		ON: ESP deactivated
Parking brake indicator	Red		ON: Parking brake applied
ABS warning lamp	Amber		ON: Faulty ABS function
EBD warning lamp	Amber + Red		ON: Faulty EBD function

Modification basis	
Application basis	
Affected VIN	

S.G.N. **8210-00 CONNECTOR, GROUND / SPLICE PACK**

(1) CONNECTOR, GROUND, SPLICE PACK

► **CONNECTOR**

Connector Number (Pin Number/Color)	Connecting Wiring Harness	Connector Position	Remark
C101	1 Black	W/H Floor(LH) - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box
C102	32 Black	W/H Floor(LH) - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box
C103	40 Gray	W/H Floor(LH) - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box
C104	40 Black	W/H Floor(LH) - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box
C105	8 Black	W/H Floor(LH) - W/H Eng	Upper BATT Tray(Beside Fuel Heater) G20DF
	16 Black	W/H Floor(LH) - W/H Eng	Upper BATT Tray(Beside Fuel Heater) D20DTF
	36 Black	W/H Floor(LH) - W/H Eng	Upper BATT Tray(Beside Fuel Heater) D22DTF
C106	26 Black	W/H Floor(LH) - W/H T/M	Upper T/M(Under BATT Tray) AT(HPT)
	4 Black	W/H Floor(LH) - W/H T/M	Upper T/M(Under BATT Tray) M/T
C107	20 Black	W/H Floor(LH) - W/H Eng EXTN	Inside FRT Bumper(Behind LH Fog Lamp)
C107A	12 Black	W/H Floor(LH) - W/H FRT Bumper	Inside FRT Bumper(Behind LH Fog Lamp)
C109	2 Black	W/H Floor(LH) - W/H BATT(+)	Lower Air Cleaner Duct GSL
	4 Black	W/H Floor(LH) - W/H BATT(+)	Lower Air Cleaner Duct DSL
C110	1 Gray	W/H BATT(+)- Start Solenoid	Beside Starter Motor
C111	4 Black	W/H BATT(+)- Alternator	Beside Alternator
	2 Black	W/H BATT(+)- Alternator	Beside Alternator LOW CO ₂
C201	16 White	W/H Floor(LH) - W/H Roof	Upper Driver Cowl Side Connector Holder
C201-1	6 White	W/H Roof - W/H S/Roof	Upper Room Lamp
C203	58 White	W/H Main - W/H Floor(LH)	Driver Cowl Side Connector Holder
C204	46 Black	W/H Main - W/H Floor(LH)	Driver Cowl Side Connector Holder
C205	56 White	W/H Main - W/H Floor(LH)	Driver Cowl Side Connector Holder
C206	10 Brown	W/H Air Bag - W/H Air Bag EXTN	Driver Cowl Side Connector Holder Curtain/Side A/Bag
	2 Brown	W/H Air Bag - W/H Air Bag EXTN	Driver Cowl Side Connector Holder
C207	58 Gray	W/H Floor(LH) - W/H Floor(RH)	Upper CTR Dash PNL
C208	14 White	W/H Main - W/H Air Bag	Inside I.P(Upper Driver LegRoom)
C209	16 White	W/H Main - W/H Air Con	Inside I.P(Upper CTR Cowl Cross Member)
C210	10 Brown	W/H Air Bag - W/H Air Bag EXTN	Passenger Cowl Side Connector Holder Curtain/Side A/Bag
	2 Brown	W/H Air Bag - W/H Air Bag EXTN	Passenger Cowl Side Connector Holder
C211	8 White	W/H Main - W/H Seat Warmer switch EXTN	Inside Console A/T, M/T DLX
C211A	16 White	W/H Main - W/H Seat Warmer/VENT switch EXTN	Inside Console VENT SW
C212	6 White	W/H Main - W/H Winter Mode switch EXTN	Inside Console A/T, DSL
C213	58 White	W/H Main - W/H Floor(RH)	Passenger Cowl Side Connector Holder
C214	46 Black	W/H Main - W/H Floor(RH)	Passenger Cowl Side Connector Holder
C301	26 White	W/H Floor(LH) - W/H Driver Seat	Under Driver Seat Vent & Power Seat
	8 White	W/H Floor(LH) - W/H Driver Seat	Under Driver Seat S/Warmer, Active
	2 White	W/H Floor(LH) - W/H Driver Seat	Under Driver Seat
C302	8 White	W/H Floor(RH) - W/H Passenger Seat	Under Passenger Seat
C351	19 Gray	W/H Floor(LH) - W/H Driver DR	Under LH A Pillar
C352	19 White	W/H Floor(LH) - W/H Driver DR	Under LH A Pillar
C353	4 Black	W/H Driver DR - W/H Smart Key	Inside Driver DR Smart Key

Connector Number (Pin Number/Color)	Connecting Wiring Harness	Connector Position	Remark
C361	19 White	W/H Floor(RH) - W/H Passenger DR	Under RH A Pillar
C362	19 Gray	W/H Floor(RH) - W/H Passenger DR	Under RH A Pillar
C363	4 Black	W/H Passenger DR - W/H Smart Key	Inside Passenger DR Smart Key
C371	14 White	W/H Floor(LH) - W/H RR LH DR	Under LH B Pillar
C381	14 White	W/H Floor(RH) - W/H RR RH DR	Under RH B Pillar
C401	16 White	W/H Floor(LH) - W/H Tail Gate	Upper Tail Gate LH
C901	4 Black	W/H Floor(LH) - W/H Fuel Sender	FRT Fuel Tank
C902	10 Black	W/H Floor(LH) - W/H RR Bumper	Under RR LH Bumper PAS
C903	6 Black	W/H Floor(LH) - W/H Trailer	Under RR LH Bumper

► **GROUND**

Connector Number	Connecting Wiring Harness	Connector Position	Remark
G101	W/H Floor(LH)	Behind LH Head Lamp	
G102	W/H Floor(LH)	Under BATT Tray	ECU
G103	W/H Eng EXTN	Under BATT Tray	
G104	W/H Eng Main	FRT Intake Valve	
G105	W/H Floor(RH)	Behind RH Head Lamp	
G106	W/H Floor(RH)	Beside ABS/ESP Unit	ABS/ESP
G201	W/H Floor(LH)	Under Driver Cowl Side Connector Holder	
G202	W/H Main	Backside Cluster(LH Cowl Cross Member)	AUDIO
G203	W/H Main	Backside Audio(CTR Cowl Cross Member)	
G204	W/H Main	Inside I.P(RH Glove Box)	
G205	W/H Main	Left Side I.P(Beside CTR Support BRKT)	PTC
G206	W/H Main	Left Under TGS Lever	AIR BAG
G207	W/H Main	Right Under TGS Lever	EPS
G301	W/H Floor(LH)	Under Driver Seat	
G302	W/H Floor(RH)	Under Passenger Seat	
G303	W/H Floor(LH)	Driver QTR PNL	
G304	W/H Floor(RH)	Passenger QTR PNL	
G401	W/H Tail Gate	CTR Under Tail Gate	

► **SPLICE PACK**

Connector Number (Pin Number/Color)	Connecting Wiring Harness	Connector Position	Remark
S101	8	W/H Floor(LH)	Under Eng Room Fuse & Relay Box P-CAN(DSL-A/T)
	6	W/H Floor(LH)	Under Eng Room Fuse & Relay Box P-CAN(DSL-MT,GSL)
S102	6	W/H Floor(RH)	Inside RH Fender P-CAN
S201	8	W/H Main	Backside Cluster(LH Cowl Cross Member) B-CAN
S202	20	W/H Main	Backside Cluster(LH Cowl Cross Member) P-CAN
S203	20	W/H Main	Backside Cluster(LH Cowl Cross Member) ILL+
S204	20	W/H Main	Backside Cluster(Upper ICM Relay Box) GND
S205	8	W/H Main	Backside Audio(CTR Cowl Cross Member) P-CAN
S206	14	W/H Floor(LH)	Under Driver Seat P-CAN
S301	14	W/H Floor(LH)	Under Driver Seat
S401	8	W/H Floor(LH)	Beside PAS Unit(Inside LH QTR Trim) P-CAN

Modification basis	
Application basis	
Affected VIN	

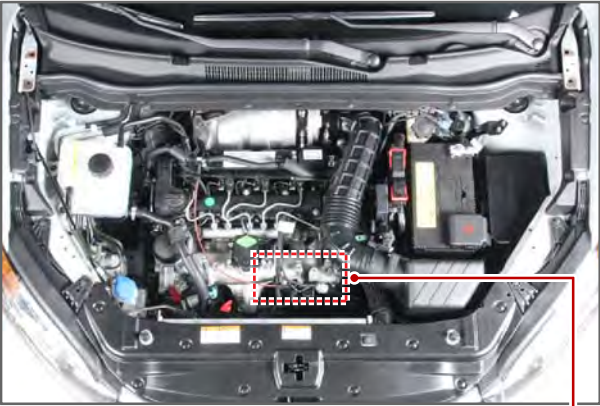
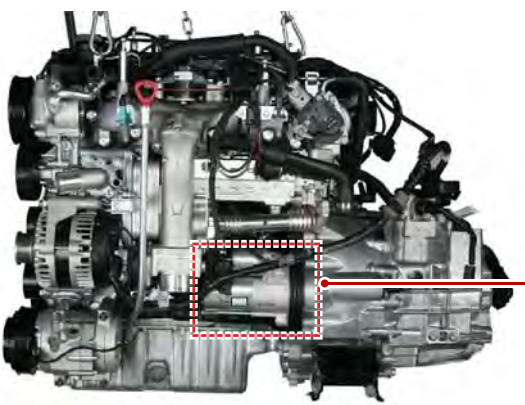
OVERVIEW AND OPERATING PROCESS

1. SYSTEM DESCRIPTION


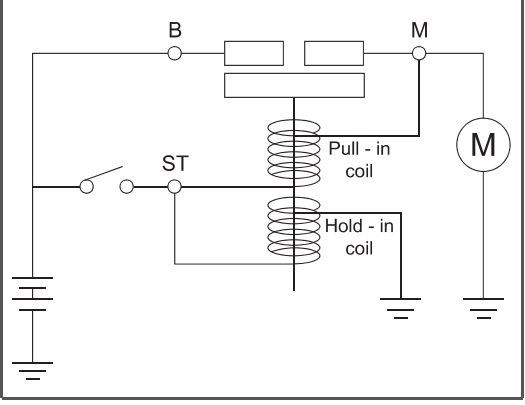
The starter (start motor) starts the engine with rotational power by converting the electric energy to the mechanical energy.

When the engine is cranking, the pinion gear meshes with the ring gear. If the ring gear overruns, the pinion gear clutch overruns to protect the pinion gear.

► System Configuration

Start motor assembly

Modification basis	
Application basis	
Affected VIN	

2) Cleanness

(1) Cleanness of DI engine fuel system

► Cleanness of DI engine fuel system and service procedures

The fuel system for DI engine consists of transfer (low pressure) line and high pressure line. Its highest pressure reaches over 1,600 bar.

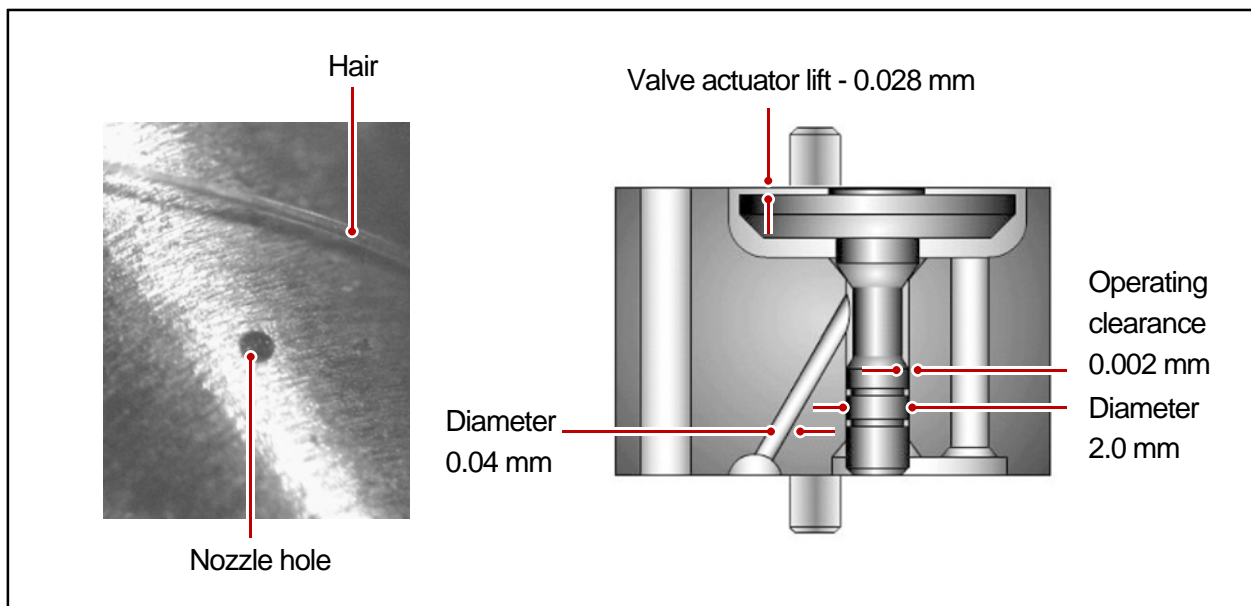
Some components in injector and HP pump are machined at the micrometer 100 μ m of preciseness.

The pressure regulation and injector operation are done by electric source from engine ECU.

Accordingly, if the internal valve is stuck due to foreign materials, injector remains open.

Even in this case, the HP pump still operates to supply high pressurized fuel. This increases the pressure to combustion chamber (over 250 bar) and may cause fatal damage to engine.

You can compare the thickness of injector nozzle hole and hair as shown in below figure (left side). The below figure shows the clearance between internal operating elements.



The core elements of fuel system has very high preciseness that is easily affected by dust or very small foreign material. Therefore, make sure to keep the preliminary works and job procedures in next pages. If not, lots of system problems and claims may arise.

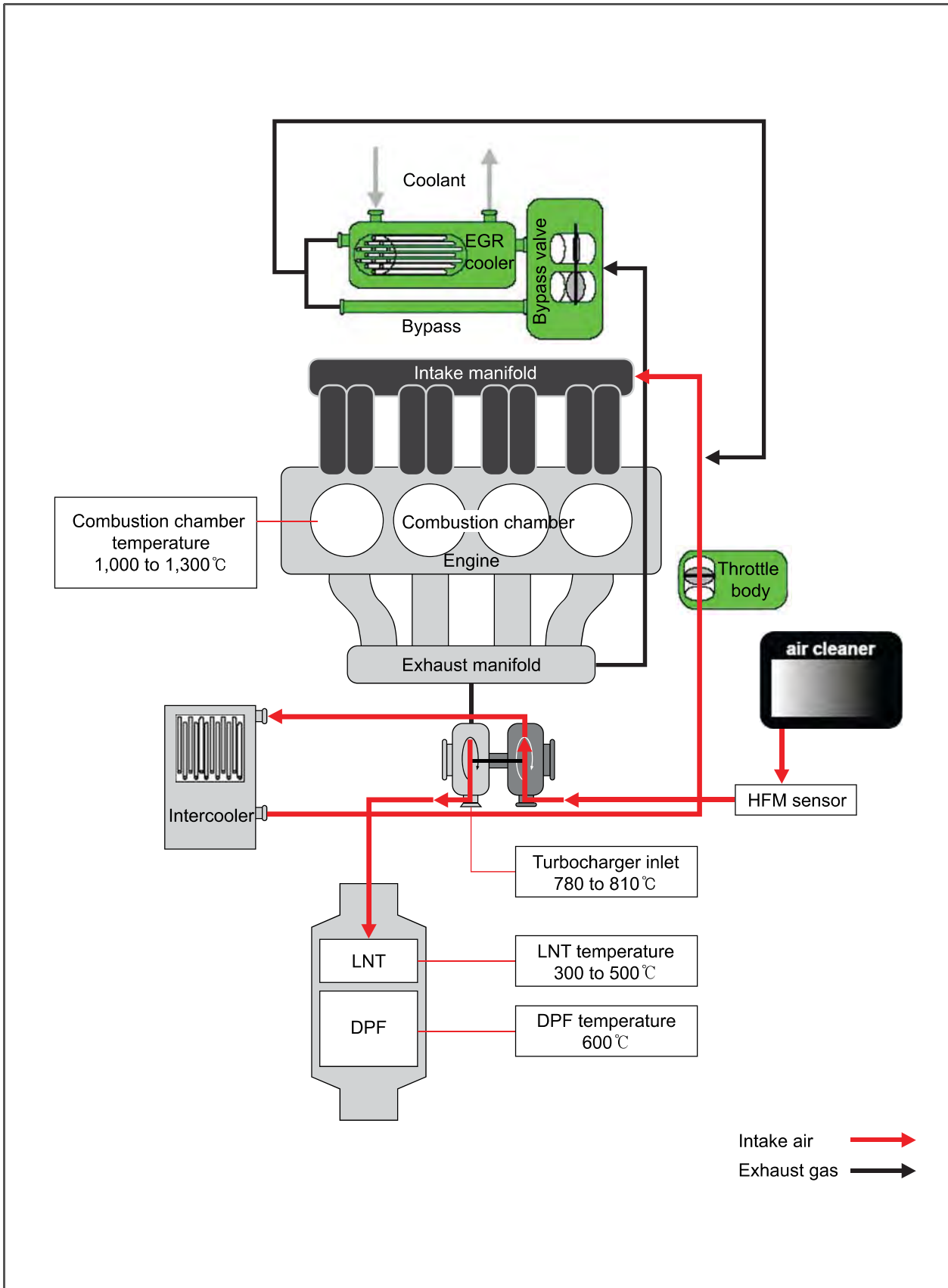
► General

Items	Option	Description	Remarks
Additional Heater	NO	Select "YES" since Additional Heater is a standard feature	-
	YES		Select
Glow-plug	RELAY(K-LINE)	Use GCU which communicates with ECU via CAN bus. Select "AQGS (CAN)"	-
	AQGS(CAN)		Select
Gearbox	5 speed manual	Select "6 speed manual" or "6 speed auto(AISIN 6AT)" depending on specifications	-
	6 speed manual		Select
	6 speed auto (AISIN 6AT)		Select
	6 speed auto (MB)		-
A/C	NO	Select "YES" since Air-Conditioner is a standard feature	-
	YES		Select
Immobilizer	NO	Select "YES" or "NO" depending on specifications	Select
	YES		Select
Vehicle speed sensor	CAN	Select "CAN" since it transmits vehicle speed signal via CAN communication	Select
	WIRE		-
FAN	2 Relay	Select "2 Relay" since it is 2 relay type	Select
	PWM		-
Cruise Control	NO	Select "Cruise Control" since Cruise Control is a standard feature	-
	Cruise Control		Select
G-sensor	NO	ESP : Select "NO" ABS : Select "YES"	Select
	YES		Select
SKM Key	NO	Select "YES" or "NO" depending on specifications	Select
	YES		Select
EEM	NO	Select "NO" since non-eem is a standard feature	Select
	YES		-
ISG	NO	Select "YES" or "NO" depending on specifications	Select
	YES		Select
Variable Oil Pump	NO	Select "YES" since variable oil pump is a standard feature	-
	YES		Select

Modification basis	
Application basis	
Affected VIN	

ENGINE GENERAL
ENGINE ASSEMBLY
FUEL SYSTEM
INTAKE SYSTEM
EXHAUST SYSTEM
TURBOCHARGER
LUBRICATION
COOLING SYSTEM
CHARGE SYSTEM
PRE-HEATING
STARTING
CRUISE SYSTEM
E-GR SYSTEM
LNT & DPF
ENGINE CONTROL
EEM

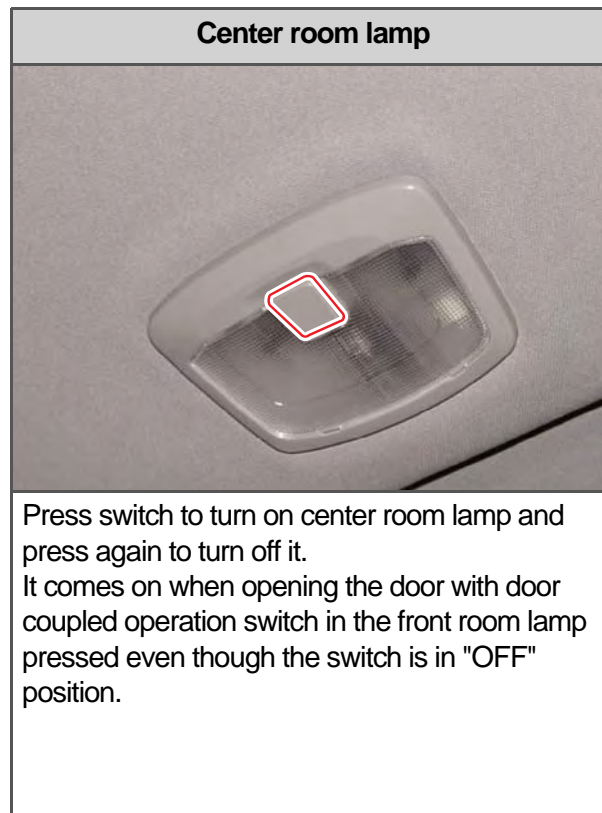
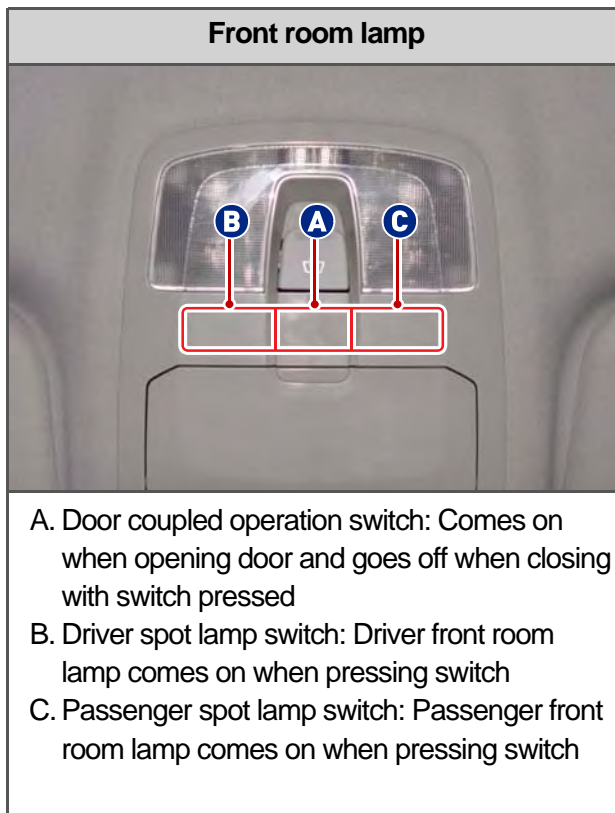
5. OPERATING TEMPERATURE



Modification basis	
Application basis	
Affected VIN	

2) Operation

(1) Front room lamp/Center room lamp



Operating the front room lamp and center room lamp switches illuminates the driver/passenger side lamps and center room lamp.

► Room lamp control by door coupled room lamp operation

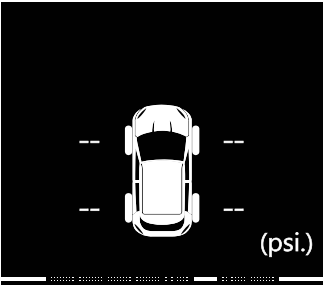

1. If a door except the tailgate is opened after the ignition is turned off, provided that door coupled front room lamp switch is pressed, the front room lamp and center room lamp are illuminated for 2 sec. and then fade out for 3 sec.
 If a door except the tailgate is opened and then closed while the room lamp is fading out, the room lamp is illuminated for 2 sec. and then fades out for 3 sec. If the ignition is turned on, the room lamp goes off immediately.
2. The front room lamp and center room lamp are illuminated for 30 sec. when the door is unlocked by the REKES or passive door UNLOCK function with IGN OFF and the ignition key removed. If the REKES or passive door UNLOCK signal is received again, the room lamps are illuminated for another 30 sec.
3. The room lamp goes off immediately when the REKES or passive door LOCK signal is received or the ignition switch is turned to ON position.
4. If the room lamp is turned on after the ignition key is removed (door open or room lamp switch is pressed), it is turned off after 10 minutes by the BCM.
5. When the door open state is changed or the ignition is turned on after the room lamp has been turned off automatically, the battery saver feature is reset.

Modification basis	
Application basis	
Affected VIN	

3. CAUTIONS

⚠ CAUTION

- The tire pressure values displayed on the instrument cluster are sent from the wheel modules after the vehicle is driven for a period of time. Therefore, they are not displayed at initial start (more than 20 minutes have elapsed after ignition off). It can be displayed after 10 minutes of driving at speed of 20 km/h or higher.

At initial start	Display pressure value after detecting position automatically
Standard type	
F -- --	F32 32
R -- --	R32 32
Supervision type	
 <p style="text-align: right;">(psi.)</p>	 <p style="text-align: right;">(psi.)</p>

- The TPMS uses a radio frequency and a high frequency band between the wheel module and the TPMS ECU for communication. Therefore, if the vehicle is equipped with the electronic equipment such as mobile camera monitor or the vehicle is passing through the area with a strong electromagnetic field, the system may not operate normally.
- For the vehicle equipped with the TPMS, the TPMS warning lamp on the instrument cluster comes on and pressure values on the EL display is displayed as bars (--) after driving for a certain period of time if a newly installed tire is not equipped with the wheel module.

Modification basis	
Application basis	
Affected VIN	

CHASSIS GENERAL
 AISIN 6 AT
 HPT 6AT
 6 MT
 CLUTCH
 PROPELLER
 DRIVE SHAFT &
 SUSPENSION
 AWD
 BRAKE SYSTEM
 ABS
 ESP
 POWER STEERING
 EPS
 WHEEL AND TIRE
 SUB FRAME
 TPMS