

INSTRUMENT CLUSTER

8010-01**INDEX****INSTRUMENT CLUSTER****GENERAL INFORMATION**

1. SPECIFICATION.....	3
2. MAJOR CHANGES.....	4

CONFIGURATION AND FUNCTION

8010-01 COMPONENT.....	50
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**OVERVIEW AND OPERATING
PROCESS**

1. OVERVIEW.....	6
2. LAYOUT.....	6
3. DESCRIPTION OF WARNING LAMPS & INDICATORS.....	8
4. OPERATING PROCESS.....	18
5. SELF DIAGNOSIS PROCESS.....	48

REMOVAL AND INSTALLATION

8010-01 INSTRUMENT CLUSTER.....	55
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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



INSTRUMENT CLUSTER**8010-01****GENERAL INFORMATION****1. SPECIFICATION**

Pin No.	Specification
Rated voltage	DC 12.0 V
Operating voltage	DC 9 V ~ 16 V
CAN operating voltage	DC 7 V ~ 18 V
Inspection voltage	DC 13.5 V
Operating temperature	-30°C ~ +80°C
Storage temperature	-40°C ~ +85°C
Dark current	IGN OFF: 1 mA, 12 V Measurement condition (at 25°C): 60 seconds after that ignition is turned off and stabilized data get IGN ON: Max. 2 A, 12 V Measurement condition (at 25°C): during DTC check mode

ELECTRO
NIC

FUSE

BCM

SKM

INSTRUM
ENT

SWITCH

LAMP

WIPER
AND

PAS

AUDIO
SYSTEM

Modification basis	
Application basis	
Affected VIN	

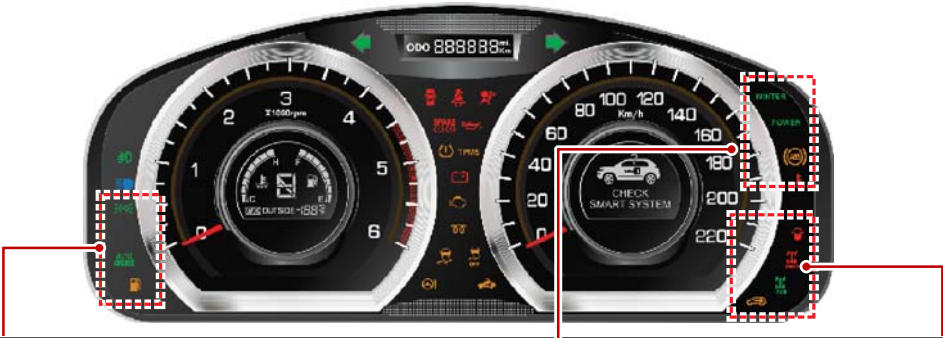
INSTRUMENT CLUSTER



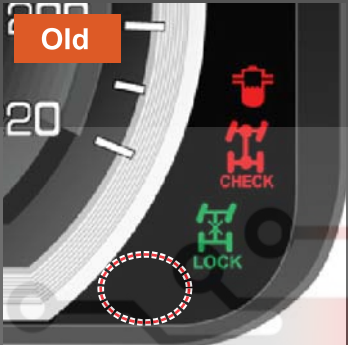
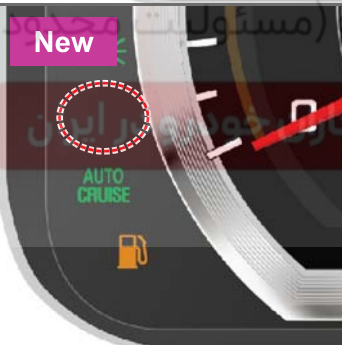
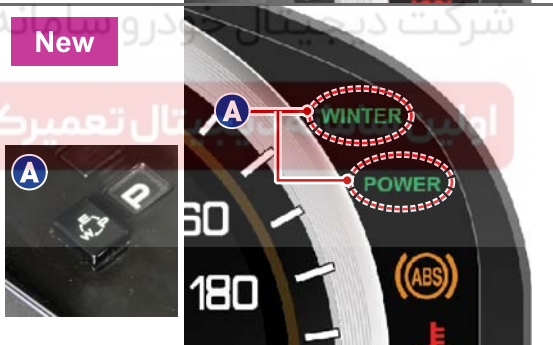
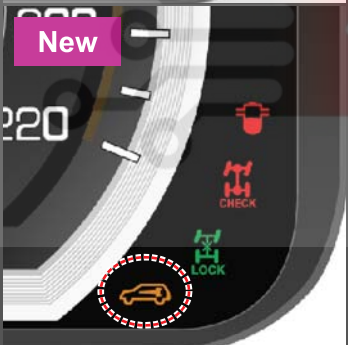
KORANDO 2015.01

2. MAJOR CHANGES

1) Supervision Instrument Cluster

Warning lamp added, deleted and moved




<div>Old</div> 	<div>Old</div> 	<div>Old</div> 
<div>New</div> 	<div>New</div> 	<div>New</div> 
"ECO indicator" deleted	A. Driving mode switch added B. 120 km/h warning lamp added (GCC only)	"Immobilizer indicator light" position moved

Modification basis	
Application basis	
Affected VIN	

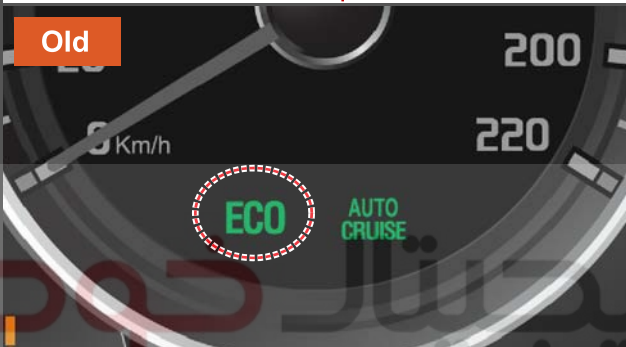
2) Standard Instrument Cluster


Warning lamp added, deleted and moved



Old

New

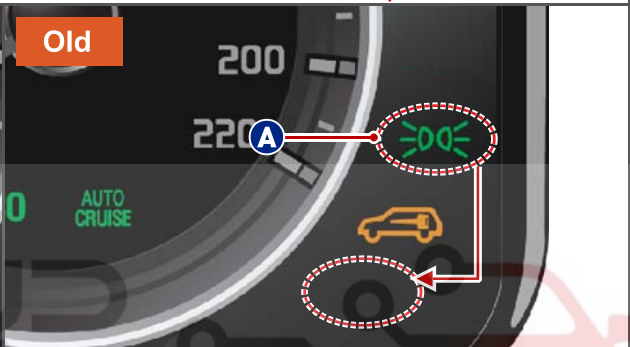


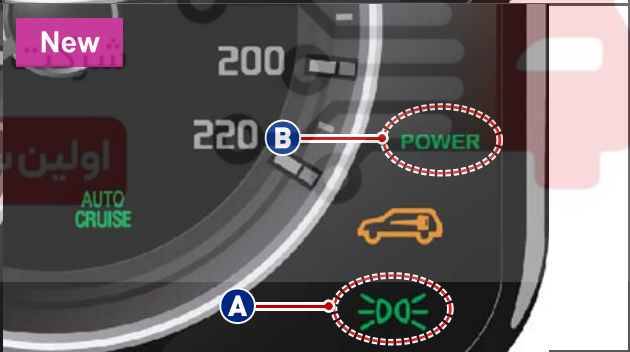


"ECO indicator" deleted

Old

New





A. "Illumination ON indicator light" position moved
B. Driving mode switch added (POWER)

Modification basis	
Application basis	
Affected VIN	

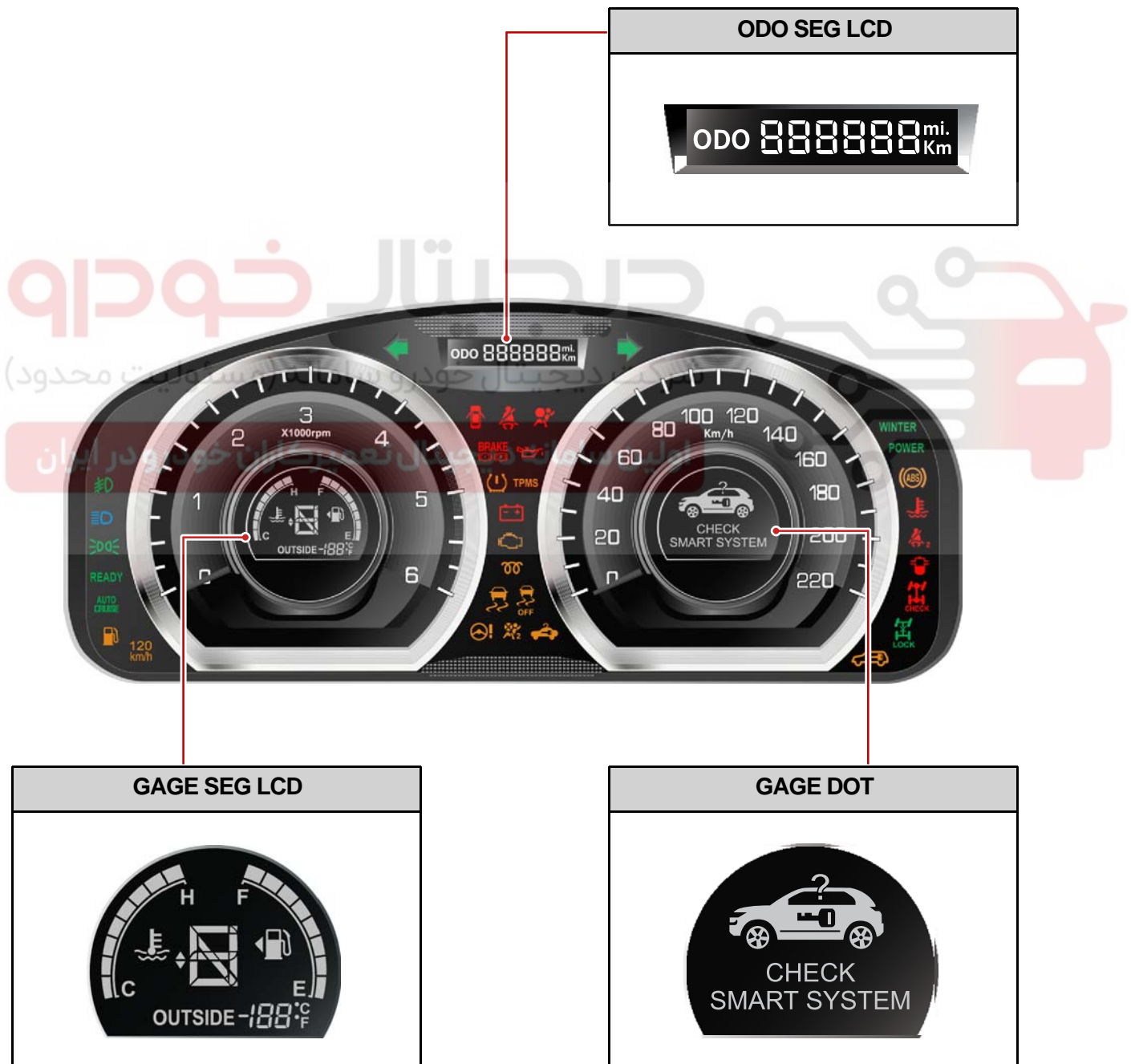
OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

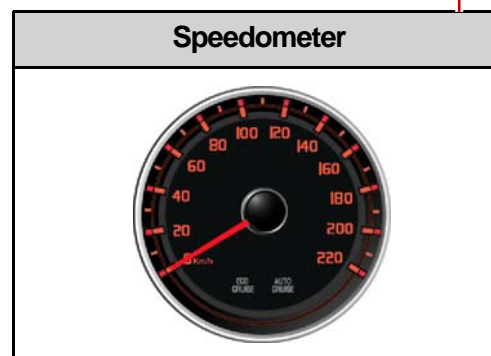
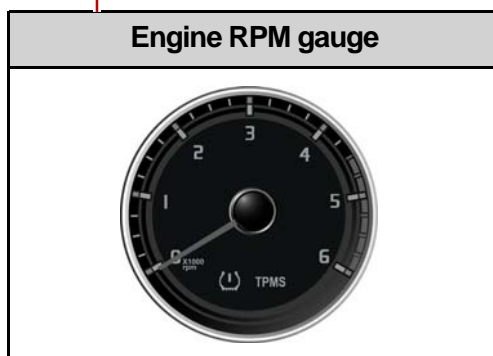
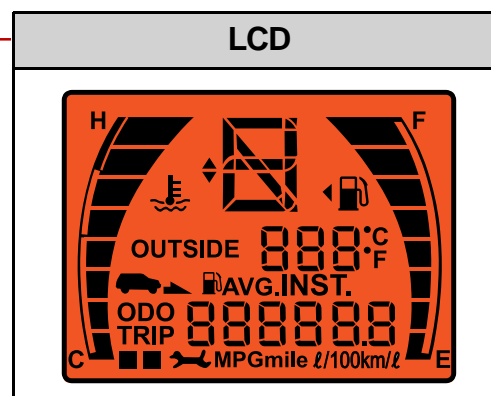
There are two types in the instrument cluster used for KORANDO C: SVC (super vision) and STD (standard). While the SVC type has three LCD screens - <DOT LCD>, <GAGE SEG LCD> and <ODO SEG LCD>, the STD type has one LCD screen.

2. LAYOUT

► SVC



► STD



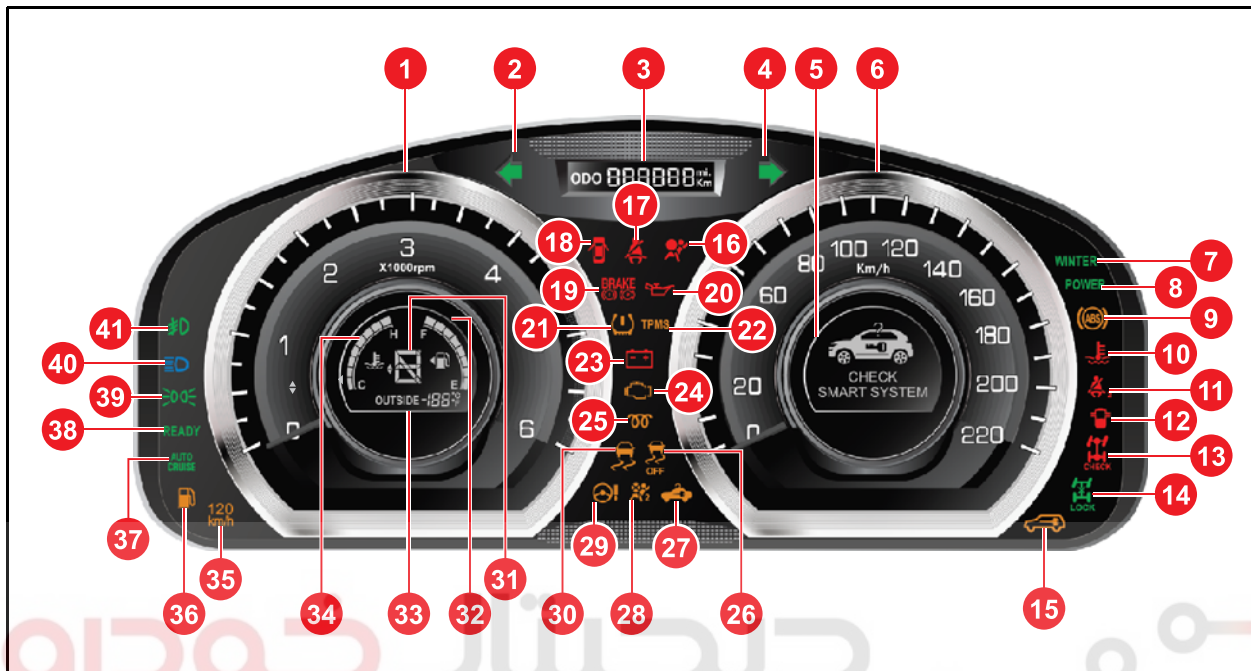
Modification basis	
Application basis	
Affected VIN	

INSTRUMENT CLUSTER

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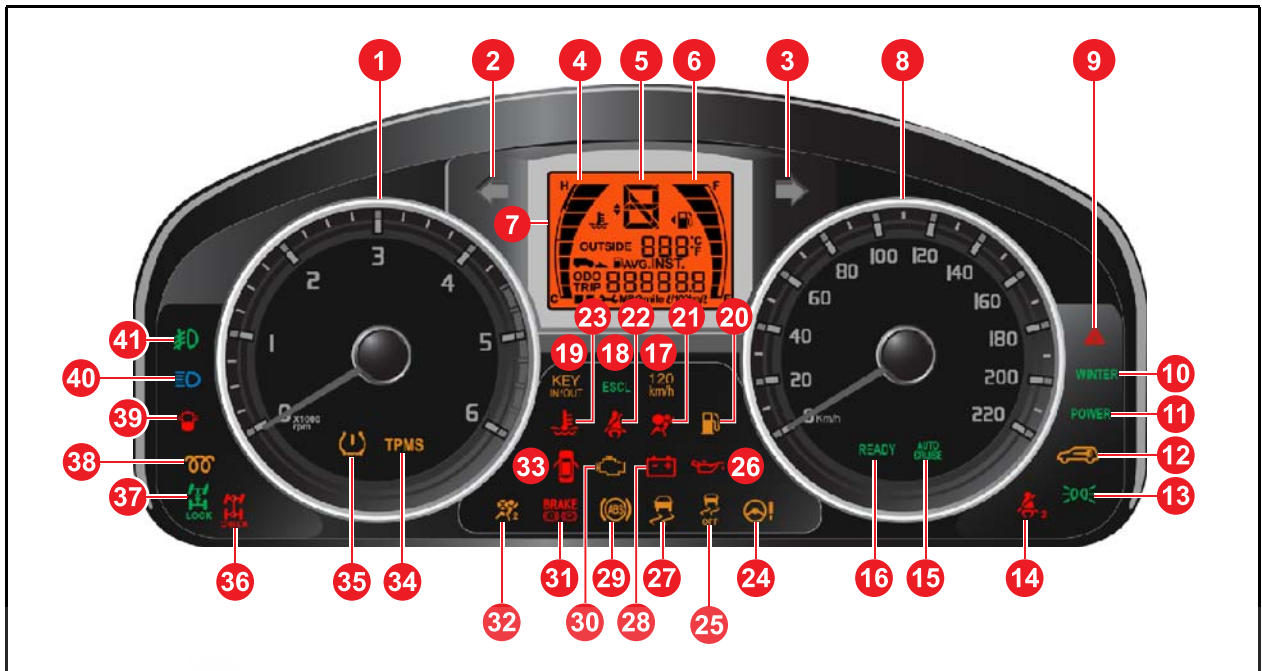
3. DESCRIPTION OF WARNING LAMPS & INDICATORS

1) SVC



No.	Symbol	Description	No.	Symbol	Description	No.	Symbol	Description
1		Tachometer	15		Immobilizer indicator	29		EPS warning light
2		Left turn signal indicator	16		Air bag warning light	30		ESP indicator/warning light
3		Odometer	17		Seat belt reminder (driver's seat)	31		Gear position indicator (for automatic transaxle)
4		Right turn signal indicator	18		Door ajar warning light	32		Fuel gauge
5		LCD display	19		Brake warning light	33		Ambient air temperature indicator
6		Speedometer	20		Engine oil level warning light	34		Coolant temperature gauge
7		Winter mode indicator (DSL)	21		Global warning light	35		Over speed warning light (GCC only)
8		Power mode indicator (DSL 2WD)	22		TPMS warning light	36		Low fuel level warning light
9		ABS warning light	23		Battery charge warning light	37		Auto cruise indicator
10		Engine overheat warning light	24		Engine check warning light	38		READY (GSL)
11		Seat belt reminder (passenger's seat)	25		Glow indicator (DSL)	39		Light indicator
12		Water separator warning light	26		ESP OFF indicator	40		High beam indicator
13		4WD CHECK warning light	27		Smart key check warning light	41		Front fog light indicator
14		4WD LOCK indicator	28		PADL indicator			

2) STD




No.	Symbol	Description	No.	Symbol	Description	No.	Symbol	Description
1		Tachometer	15	AUTO CRUISE	Auto cruise indicator	29	(ABS)	ABS warning light
2	←	Left turn signal indicator	16	READY	READY (GSL)	30		Engine check warning light
3	→	Right turn signal indicator	17	120 km/h	Over speed warning light (GCC only)	31	BRAKE	Brake warning light
4		Coolant temperature gauge	18	ESCL	ESCL warning light	32		PADL indicator
5		Gear position indicator (for automatic transaxle)	19	KEY IN/OUT	Smart key check warning light	33		Door ajar warning light
6		Fuel gauge	20		Low fuel level warning light	34	TPMS	TPMS warning light
7		LCD Display	21		Air bag warning light	35		Global warning light
8		Speedometer	22		Seat belt reminder (driver's seat)	36		4WD CHECK warning light
9	⚠	Hazard Indicator	23		Engine overheat warning light	37		4WD LOCK indicator
10	WINTER	Winter mode indicator (DSL)	24		EPS warning light	38		Glow indicator (DSL)
11	POWER	Power mode indicator (DSL 2WD)	25		ESP OFF indicator	39		Water separator warning light
12		Immobilizer indicator	26		Engine oil level warning light	40		High beam indicator
13	☞☞☞	Light indicator	27		ESP indicator/warning light	41		Front fog light indicator
14		Seat belt reminder (passenger's seat)	28		Battery charge warning light			


Modification basis	
Application basis	
Affected VIN	

3) Details of Warning Lamps and Indicators


► Headlamp high beam indicator

Indicator (blue)	
	This lamp comes on when the headlamp high beam is operated.


► Front fog lamp indicator

Indicator (green)	
	This indicator comes on when the fog lamp switch is operated after the tail lamps comes on.


► Side light indicator

Indicator (green)	
	This indicator comes on when the tail lamp is switched on.


► Glow indicator(DSL only)

Indicator (amber)	
	This indicator comes on when the ignition switch is turned to the "ON" position and will go off when the glow plugs are sufficiently heated.


► Fuel filter indicator(DSL only)

Indicator (red)	
	This indicator comes on when the water level in the fuel filter exceeds a certain level.


► Low fuel level warning lamp

Warning lamp (amber)	<p>This lamp comes on if the fuel level is approx. 10 ℓ or below. However, the fuel level may change slightly depending on vehicle condition, inclination of the road, etc. Also, it blinks if there is a short or open circuit between the fuel level sensor and cluster.</p>
	


► Engine overheat warning lamp

Warning lamp (red)	<p>When the coolant temperature is 120°C or higher, this lamp blinks at an interval of 1 second, a message is displayed, the warning sounds once through the speaker and the buzzer sounds at an interval of 0.5 seconds.</p>
	


► Door ajar

Warning lamp (red)	<p>This lamp comes on when any door is open or not closed completely. (both STD and SVC class)</p>
	

► Seat belt reminder


Warning lamp (red)	<p>This lamp comes on when the ignition switch is pressed ON. It keeps coming on if the driver's seat belt is not fastened.</p>
	

► Air bag


Warning lamp (red)	<p>This lamp comes on when the ignition switch is pressed to the ON mode. Then, it goes off if the system is normal. If this lamp stays on while driving, it means that the air bag system is faulty.</p>
	

Modification basis	
Application basis	
Affected VIN	


► ESP

Indicator (amber)	
	This indicator comes on when the ESP system is faulty.

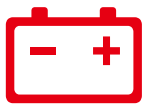
► ESP OFF indicator

Indicator (amber)	
	This indicator comes on when pressing the ESP OFF switch.


► Engine check warning lamp

Indicator (amber)	
	This lamp comes on if any sensor or device related to the engine control is defective.


► Battery charge warning lamp

Indicator (red)	
	This lamp comes on when the start switch is ON or when the battery level is low. (For EEM, warning lamp is controlled according to CAN signal)


► Engine oil level warning lamp

Indicator (red)	
	<ul style="list-style-type: none"> - This lamp comes on when the ignition switch is turned to "ON" position, and then goes off if the engine oil level is normal. - If the engine oil level warning lamp comes on while driving, check the engine oil level and oil leakage.


► Brake warning lamp (brake fluid)

Indicator (red)	
	<ul style="list-style-type: none"> - This lamp comes on when the parking brake is applied or the brake fluid is insufficient. - If this lamp doesn't go off after the parking brake is released, check the brake fluid level first and then fluid leakage.


► ABS warning lamp

Indicator (amber)	
	<ul style="list-style-type: none"> - This warning light comes on when the ignition switch is turned to ON and should go out if the system is normal


► Passenger air bag disable indicator

Indicator (amber)	
	<p>This indicator comes on when the passenger air bag OFF switch is operated.</p>

► EPS


Indicator (red)	
	<p>This indicator comes on when the EPS system is faulty.</p>

► Immobilizer indicator


Indicator (amber)	
	<p>This indicator comes on the immobilizer (transponder) is not certified.</p>

Modification basis	
Application basis	
Affected VIN	


► Hazard indicator

Indicator (red)	
	This indicator comes on when the hazard warning flashers are switched on. (applies to STD class)


► Cruise control indicator

Indicator (green)	
	This indicator comes on when the cruise control system is activated. This indicator goes off when the brake pedal is depressed. (auto cruise deactivated)


► 4WD LOCK indicator

Indicator (green)	
	This warning lamp comes on when the 4WD LOCK switch is pressed. This indicator goes off when pressing the switch again.


► 4WD check warning lamp

Indicator (red)	
	This warning lamp comes on when the 4WD system is defective.


► Passenger seat belt reminder

Indicator (red)	
	This indicator comes on when the ignition switch is turned to the "ON" position and goes off when the passenger's seat belt is fastened.


► Left turn signal indicator

Indicator (green)	The left turn signal indicator blinks if the light switch is pushed down to the left, and both turn signal indicators blink if the hazard warning flasher switch is pressed.
	


► Right turn signal indicator

Indicator (green)	The right turn signal indicator blinks if the light switch is pushed up to the right, and both turn signal indicators blink if the hazard warning flasher switch is pressed.
	


► Winter mode indicator(DSL only)

Indicator (green)	When the mode switch is pressed, the winter mode is selected and the winter mode indicator comes on on the instrument cluster. The winter mode is used to start off on a slippery road with the 2nd gear. If the switch is pressed again, the winter mode is deactivated and system returns to standard mode.
	

► Smart key warning lamp

Indicator (amber)	This lamp comes on when the uncertified transponder or smart key is detected, SKM system is defective or there is no smart key in the vehicle.
	

► Steering wheel heating indicator


Indicator (amber)	This indicator comes on when the steering wheel heating switch is operated with the ignition switch turned on and the engine running. (applies to SVC class)
	

Modification basis	
Application basis	
Affected VIN	




► TPMS WARNING LIGHT

Indicator (amber)	
TPMS	This warning light comes on when the ignition switch is turned to "ON" and should go off in a few seconds. If the TPMS is defective, this warning light comes on.

► GLOBAL WARNING LIGHT

Indicator (amber)	
	This warning light comes on when the ignition switch is turned to "ON" and should go off in a few seconds. If the tire pressure is too low, this warning light blinks for 70 seconds and then ON.

► GSI (GEAR SHIFT INDICATOR)

Indicator (green)	
	This indicator indicates the proper gear shifting time. Ex)  Shift-up to 3rd gear (currently 2nd gear or lower)  Shift-down to 3rd gear (currently 4th gear or higher) If the system is properly working, this indicator is invisible.

► Power mode indicator

Indicator (green)	
POWER	Pressing the mode switch (E → P → W) on the switch panel located to the left of the gear selector lever once turns on the power mode indicator.

► ESCL*(Electrical Steering Column Lock Warning Light)

Indicator (green)	
ESCL	This is the device which has the electronic control of the locking and unlocking of the steering wheel in the vehicle with the smart key. If the ESCL warning lamp comes on, the vehicle may not be started and driven. In this case, have the system checked by a Ssangyong dealer or Ssangyong Authorized Service Center.

► Over speed warning light (GCC only)

Indicator (amber)	
120 km/h	Sounds warning chime 5 times initially

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ELECTRO
NIC

FUSE

BCM

SKM

INSTRUM
ENT

SWITCH

LAMP

WIPER
AND

PAS

AUDIO
SYSTEM

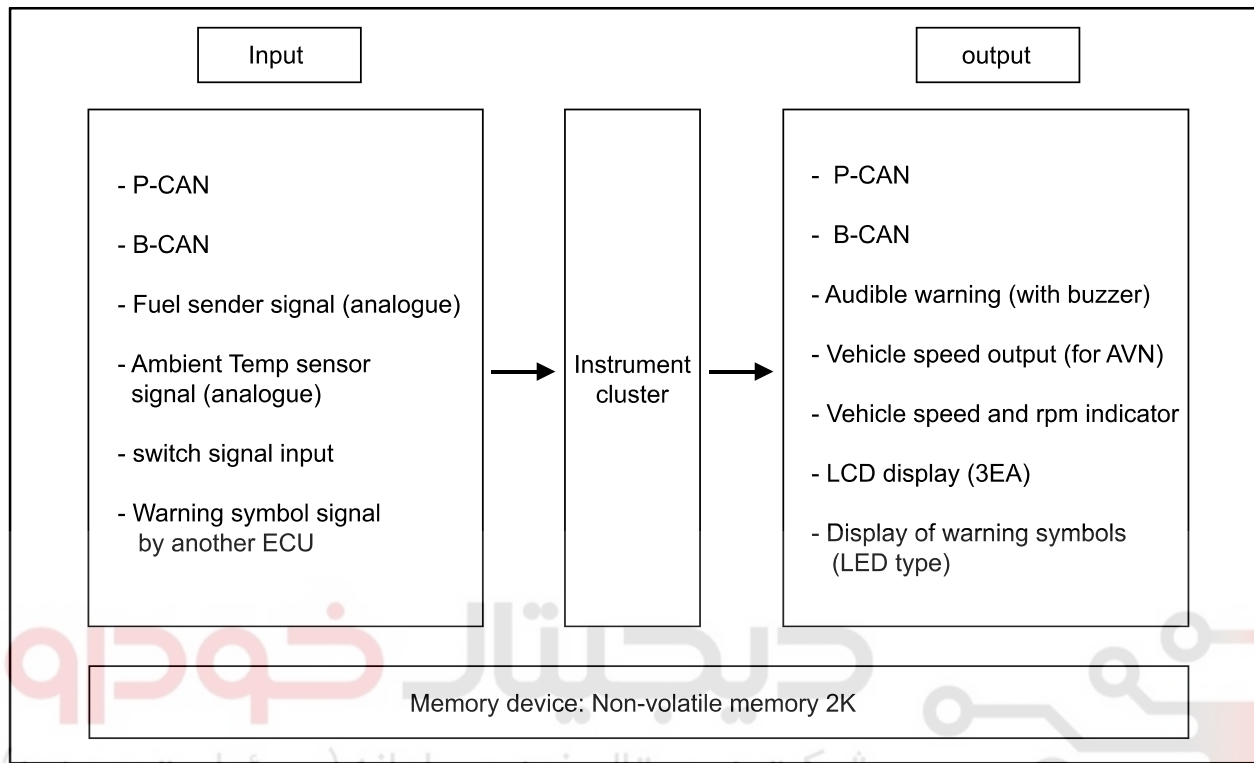
Modification basis	
Application basis	
Affected VIN	

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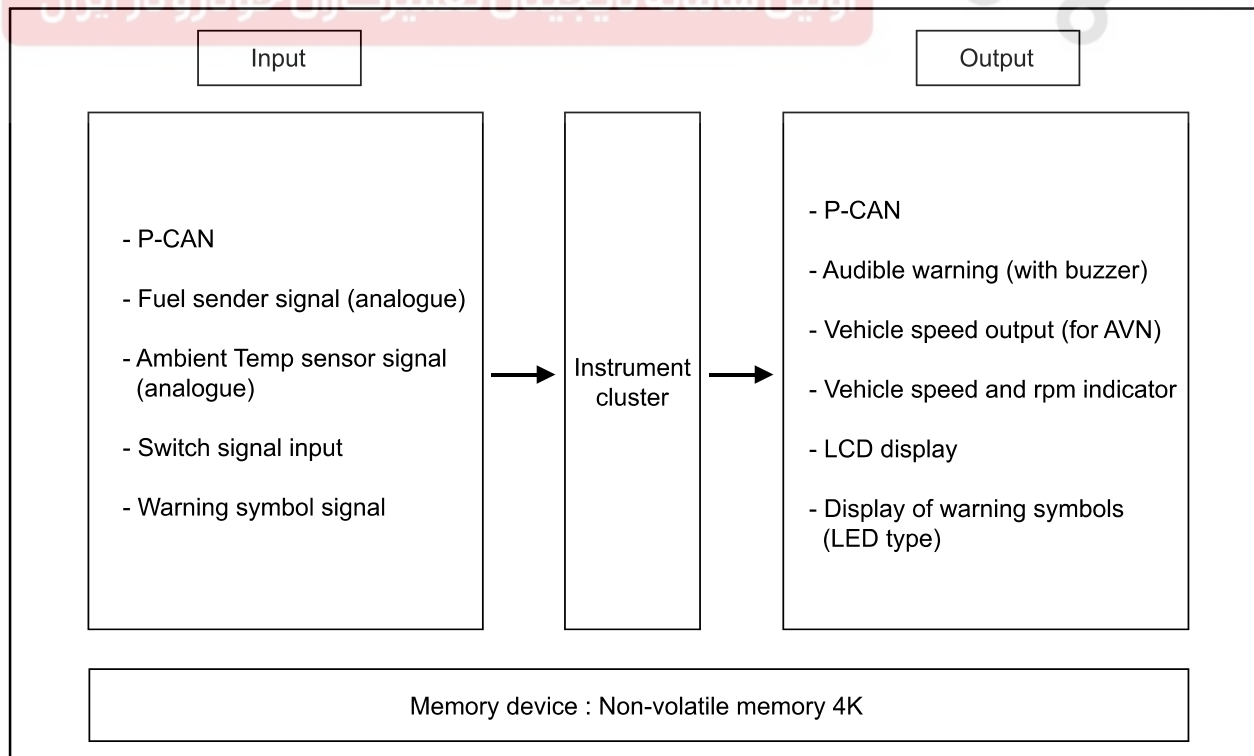
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4. OPERATING PROCESS

1) SVC

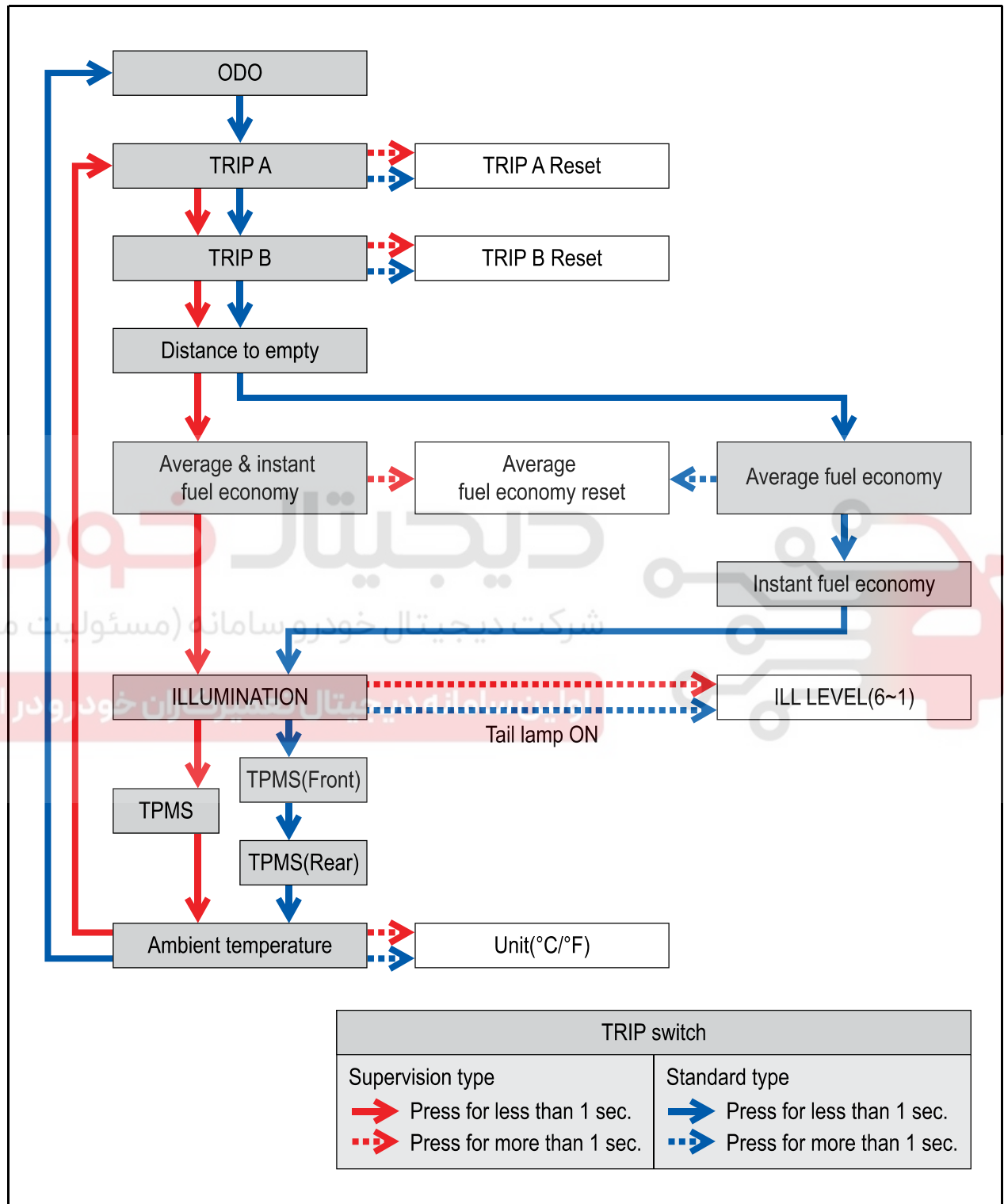


2) STD



3) Display Sequence

► Display sequence for STD main LCD & SVC DOT LCD



Modification basis	
Application basis	
Affected VIN	

Operating time of Trip switch	Function	
Below 1 second (60 to 980 ms)	STD	Mode change (ODO → TRIP A → TRIP B → DTE → AFC → IFC → ILLUMINATION → TPMS(FRONT WHEEL) → TPMS(REAR WHEEL) → OUT TEMP)
	SVC	Mode change (TRIP A → TRIP B → DTE → AFC & IFC → ILLUMINATION → TPMS → OUT TEMP)
Over 1 seconds	Reset function (Trip A, B, AFC) (Illumination (6 to 1 level), unit of outside temperature (°C ↔ °F))	
Over 3 seconds - Ready	Mode change (Illumination → OUT TEMP → ODO)	

* If the Trip/Reset switch is not pressed within 3 seconds after getting into the illumination mode and the ambient air temperature mode, the LCD changes to next mode.

* The factory-setting mode is DTE (Distance To Empty) mode.

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4) Illumination & Brightness

(1) Operations for Power Supply

► Operations for power supply in SVC

CLUSTER ACC / IGN ON SEQUENCE		Time elapsed (sec)											
		1	2	3	4	5	6	7	8	9	10	11	12
LCD DISPLAY	LCD ON	—————→											
	WELCOME	————→											
	SEAT BELT WARNING			————→	————→								
	Priority step 1, 2 3 activated					————→							
ILL	POINTER illumination			————→									
	Dial illumination (lights up gradually for 2 sec. from 0% to USER%)	————→											
SYMBOL	ON and then OFF	————→											
GAUGE SEG,LCD DISPLAY	LCD ON	————→											

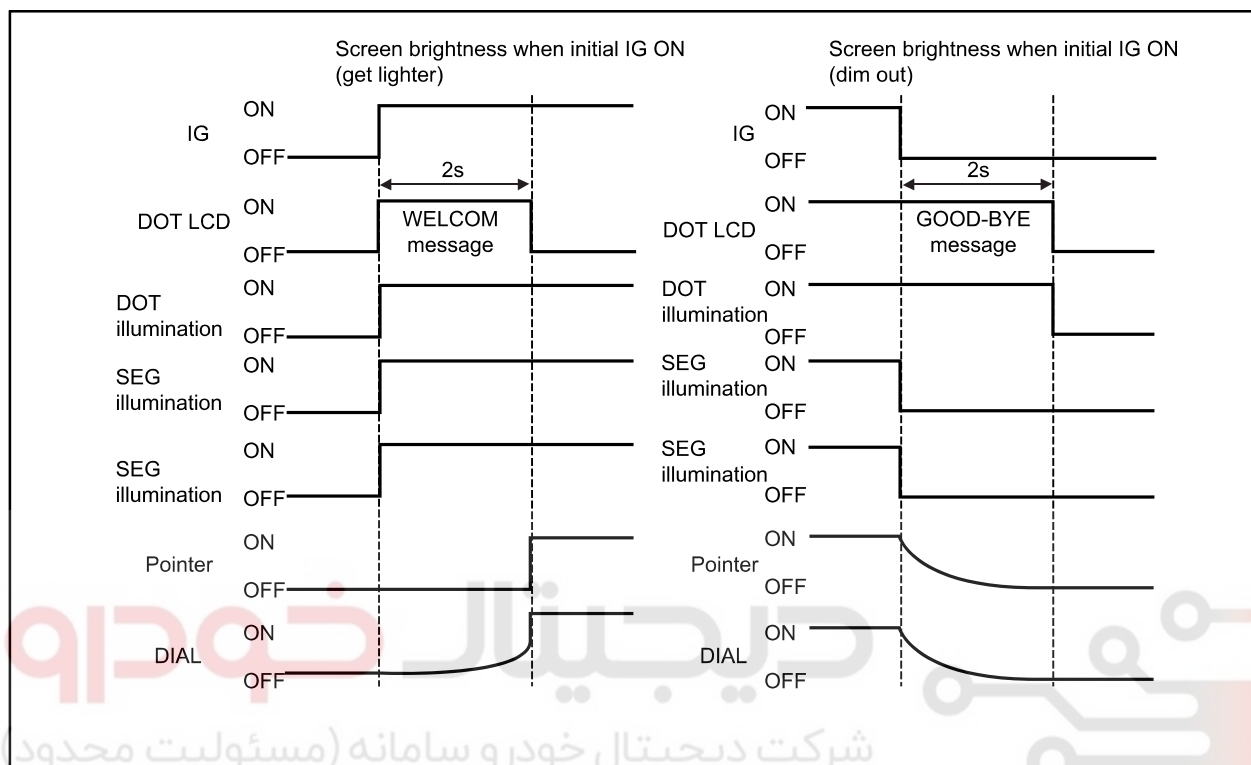
- When the ignition switch is turned to ON position, the message "WELCOME" is displayed for 2 seconds on the DOT LCD and the seat belt reminder comes on for 4 seconds. However, if a signal with higher priority is received, the seat belt reminder comes on only for 2 seconds to display it.
- The pre-warning (system check) indicator comes on for 4 seconds and goes off 0.4 seconds after that the ignition is switched on.
- All input signals can be input 4 seconds after the pre-warning (system check) indicator starts illuminating.
- Only the symbol and DOT LCD are illuminated initially, if the SKM (Smart Key Module) or door (B-CAN) signal is received while B+ power is supplied.
If the ignition is switched on with the LCD illuminated, the DOT LCD and the symbol follow the side fascia panel.
- When the step 1, 2 and 3 are performed after 4 seconds, the seat belt warning lamp is deactivated in advance.
- Dial light ON condition: Lights up gradually for 2 seconds when the ignition is switched on.

Modification basis	
Application basis	
Affected VIN	

7. When the ignition is switched off, the message "GOOD-BYE" is displayed for 2 seconds and disappears.

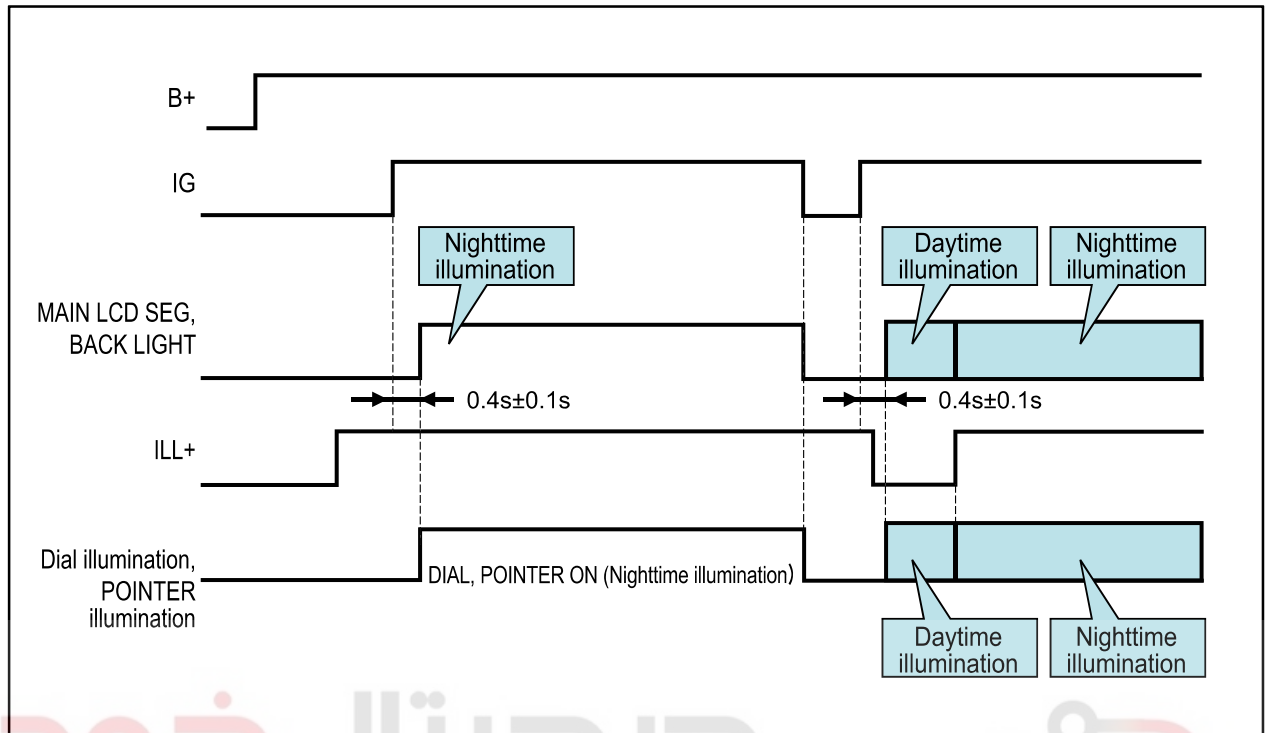
The other LCDs go off as soon as the ignition is switched off.

The dial and pointer dim down for 2 seconds and go off at the same time when the DOT LCD goes off.



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► Operations for power supply in STD



- The operation input before the LCD backlight is illuminated, right after the ignition is turned OFF or ON, is ignored.
- The LCD backlight and other lamps are illuminated 0.4 ± 0.1 second after the ignition ON is detected.
- The LCD display, LCD backlight, dial lamp and indicator lamp are turned on or off by the ignition switch ON/OFF operation.

Modification basis	
Application basis	
Affected VIN	

(2) Illumination Level

► Brightness in SVC

Operating power		Illumination level	DOT LCD		ODO, gauge LCD, dial pointer	
			Day	Night	Day	Night
B+(B-CAN Wake UP)	Initial time	-	Level 6	Level 6	OFF (however, level 6 for initial operation with B+ & IGN1 ON)	
	After initial time		Maintain previous level	Maintain previous level	OFF (however, maintains previous level for initial operation with B+ & IGN1 ON)	
IGN 1		Level 1	25%	5%	25%	5%
		Level 2	40%	12%	40%	12%
		Level 3	55%	19%	55%	19%
		Level 4	70%	26%	70%	26%
		Level 5	85%	33%	85%	33%
		Level 6	100%	40%	100%	40%

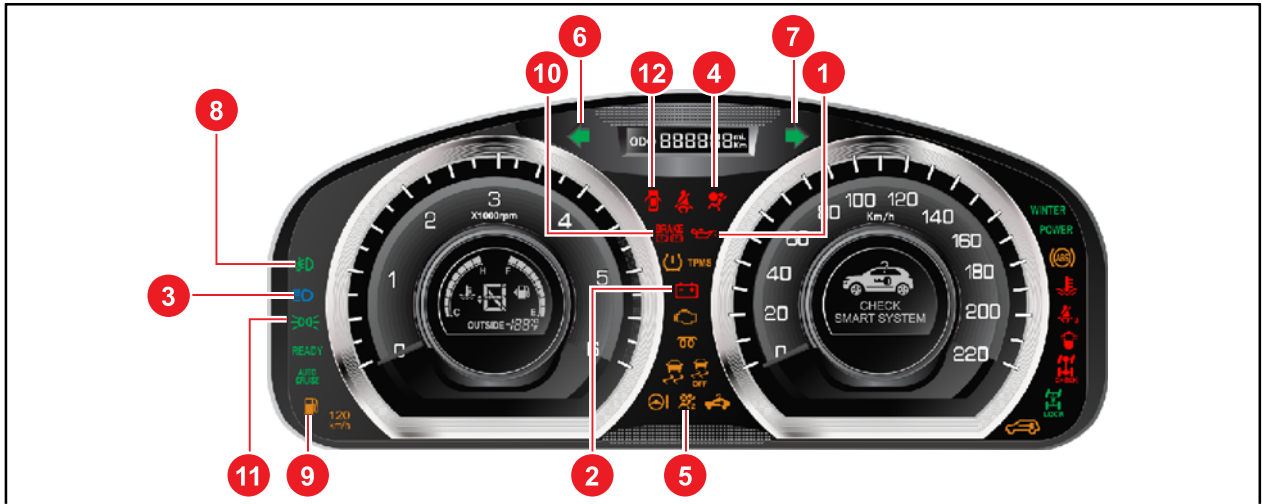
► Brightness in STD

Operating power	Illumination level	Main LCD, dial point	
		Day	Night
B+ (B-CAN Wake UP)	-	OFF	OFF
IGN 1	Level 1	100%	20%
	Level 2	100%	30%
	Level 3	100%	40%
	Level 4	100%	50%
	Level 5	100%	60%
	Level 6	100%	70%

5) System Analysis

(1) SVC

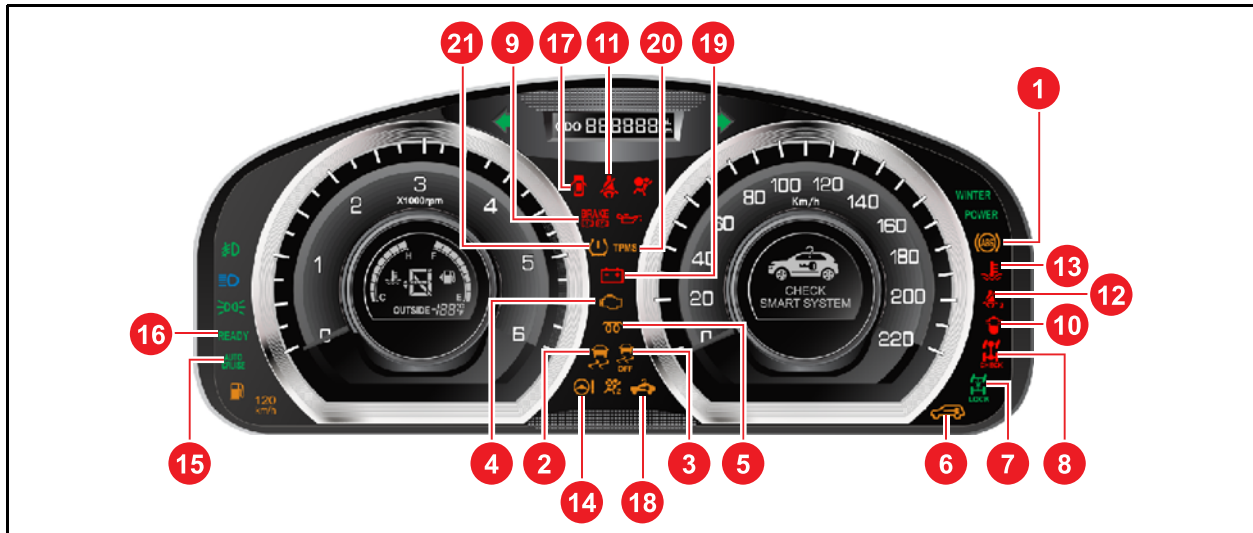
► Symbols in SVC










NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	SIGNAL SOURCE	Signal Value	Operation STATE
1	OIL PRESSURE		RED	By micom	Oil Pressure Switch	GROUND	IGN ON
2	CHARGE		RED	By micom	Alternator	GROUND	IGN ON
3	HIGH BEAM		BLUE	By wire	High-beam Switch	H/B(+) : HIGH	IGN ON
4	AIR BAG		RED	By wire	SDM	GROUND	IGN ON
5	PADL		AMBER	By wire	SDM	GROUND	IGN ON
6	TURN-L		GREEN	By wire	BCM	HIGH	B+/IGN ON
7	TURN-R		GREEN	By wire	BCM	HIGH	B+/IGN ON
8	FRT FOG		GREEN	By wire	Front Fog Switch	HIGH	B+/IGN ON
9	LOW FUEL WARNING		AMBER	By micom	FUEL SENDER	Analogue signal	IGN ON
10	PARKING BRAKE (BRAKE FLUIDE) (4s±0.2s)		RED	By micom	P/BRAKE SW	GROUND (Circuit input signal takes priority over CAN signal.)	IGN ON
11	SIDE LIGHT		GREEN	By micom	ILL	HIGH	IGN ON
12	DOOR OPEN (ALL SVC)		RED	By micom	Door switch	GROUND	B+/IGN ON

Modification basis	
Application basis	
Affected VIN	

► Symbols in SVC (via CAN)



NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	TIMEOUT (3.5Times)
1	ABS (4s±0.2s)		AMBER	By micom	ON
2	ESP (4s±0.2s)		AMBER	By micom	ON
3	ESP OFF (4s±0.2s)		AMBER	By micom	OFF
4	ENGINE CHECK (4s±0.2s)		AMBER	By micom	HOLD
5	GLOW(DSL)		AMBER	By micom	OFF
6	IMMOBILIZER		AMBER	By micom	OFF
7	4WD LOCK (4s±0.2s)		GREEN	By micom	OFF
8	4WD CHECK (4s±0.2s)		RED	By micom	HOLD
9	EBD		RED	By micom	ON
			AMBER		
10	FUEL FILTER (4s±0.2s)		RED	By micom	OFF
11	DRIVER SEAT BELT		RED	By micom	OFF

NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	TIMEOUT (3.5Times)
12	PASSENGER SEAT BELT		RED	By micom	OFF
13	TEMP HIGH (Pre-warning removed)		RED	By micom	OFF
14	EPS (4s±0.2s)		RED	By micom	ON
15	AUTO CRUISE	AUTO CRUISE	GREEN	By micom	OFF
16	READY(GSL)	READY	GREEN	By micom	OFF
17	DOOR OPEN (Operates regardless of interior lamp ON signal)		RED	By micom	HOLD
18	SMART KEY		AMBER	By micom	ON
19	CHARGE		RED	By micom	ON
20	TPMS	TPMS	AMBER	By micom	ON
21	GLOBAL		AMBER	By micom	Blinks and comes on

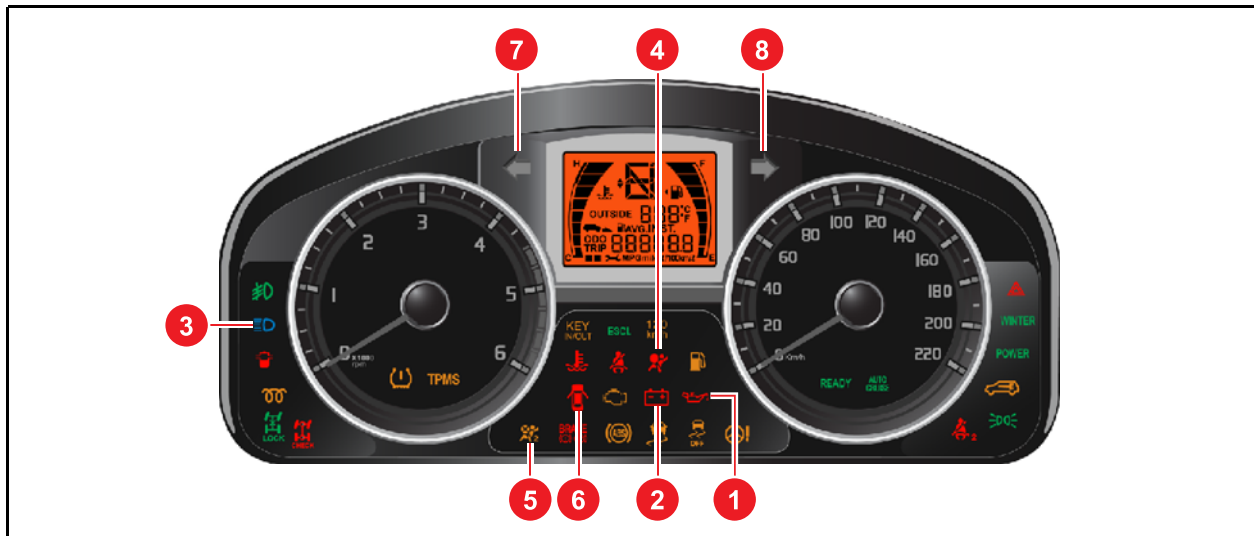
The pre-warning is performed for 4 seconds after turning the ignition switch to ON position. BCM checks that the warning lamps (ABS, ESP, ESP OFF, 4WD CHECK, 4WD LOCK) are matched with CAN signals.

The pre-warning is performed by the variant code.

- The pre-warning of the MICOM control warning is performed 400 ms after turning the ignition switch to ON position.
- IGN ON detecting time: 40~80 ms after turning ignition switch to ON position






Modification basis	
Application basis	
Affected VIN	

(2) STD



► Symbols in STD

NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	SIGNAL SOURCE	Signal Value	Operation STATE
1	OIL PRESSURE		RED	By micom	Oil Pressure Switch	GROUND	IGN ON
2	CHARGE		RED	By micom	Alternator	GROUND(Other than EEM)	IGN ON
3	HIGH BEAM		BLUE	By wire	High-beam Switch	H/B(+) : HIGH	IGN ON
4	AIR BAG		RED	By wire	SDM	GROUND	IGN ON
5	PADL		AMBER	By wire	SDM	GROUND	IGN ON
6	DOOR OPEN (STD ALL)		RED	By micom	Door switch	GROUND	B+/IGN ON
7	TURN-L		GREEN	By wire	BCM	HIGH	B+/IGN ON
8	TURN-R		GREEN	By wire	BCM	HIGH	B+/IGN ON

NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	SIGNAL SOURCE	Signal Value	Operation STATE
9	FRT FOG		GREEN	By wire	Front Fog Switch	HIGH	B+/IGN ON
10	LOW FUEL WARNING		AMBER	By micom	FUEL SENDER	Analogue signal	IGN ON
11	PARKING BRAKE (BRAKE FLUIDE) (4s±0.2s)		RED	By micom	P/BRAKE SW & BRAKE OIL LEVEL SENSOR	GROUND (Circuit input signal takes priority over CAN signal.)	IGN ON
12	SIDE LIGHT		GREEN	By micom	ILL	HIGH	IGN ON
13	HAZARD		RED	By wire	BCM	HIGH	B+/IGN ON

The pre-warning is performed for 4 seconds after turning the ignition switch to ON position. BCM checks that the warning lamps (ABS, ESP, ESP OFF, 4WD CHECK, 4WD LOCK) are matched with CAN signals.

The pre-warning is performed by the variant code.

- The pre-warning of the MICOM control warning is performed 400 ms after turning the ignition switch to ON position.
- IGN ON detecting time: 40~80 ms after turning ignition switch to ON position

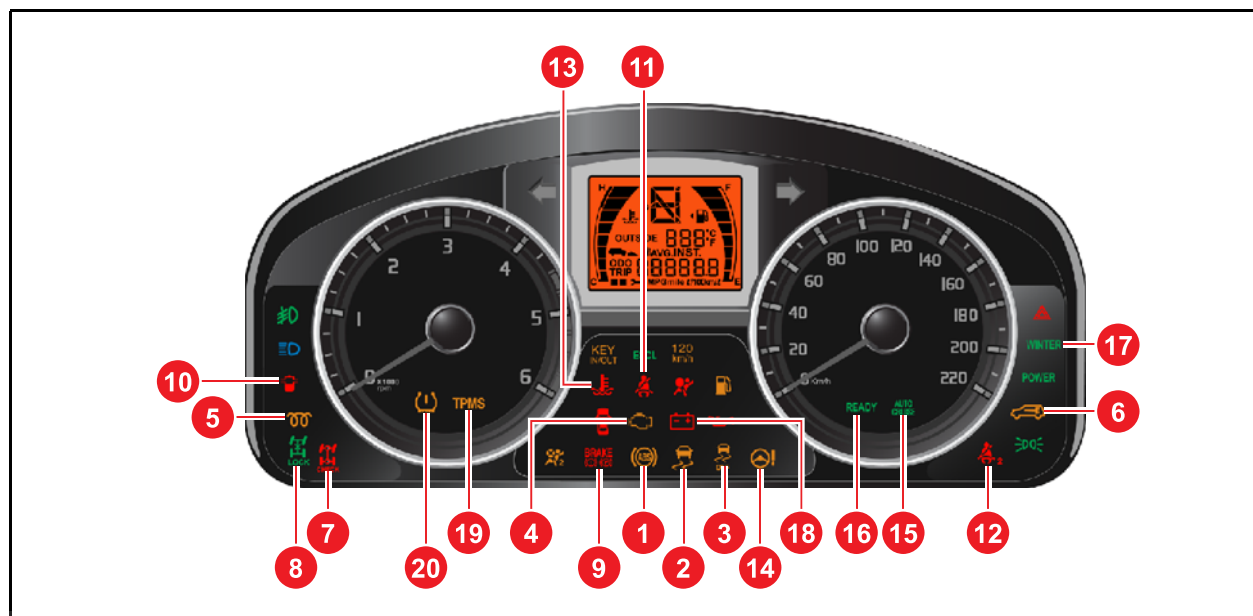
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

Modification basis	
Application basis	
Affected VIN	















INSTRUMENT CLUSTER

KORANDO 2015.01

► Symbols in STD (via CAN)



NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	TIMEOUT (3, 5Times)
1	ABS (4s±0.2s)		AMBER	By micom	ON
2	ESP (4s±0.2s)		AMBER	By micom	ON
3	ESP OFF		AMBER	By micom	OFF
4	EINGINE CHECK (4s±0.2s)		AMBER	By micom	HOLD
5	GLOW(DSL)		AMBER	By micom	OFF
6	IMMOBILIZER		AMBER	By micom	OFF
7	4WD LOCK		GREEN	By micom	OFF

NO	NAME / Pre-Warning	SYMBOL	COLOR	CTRL	TIMEOUT (3, 5Times)
8	4WD CHECK (4s±0.2s)		RED	By micom	HOLD
					HOLD
9	EBD		RED	By micom	ON
			AMBER	By micom	ON
10	FUEL FILTER (4s±0.2s)		RED	By micom	OFF
11	DRIVER SEAT BELT		RED	By micom	OFF
12	PASSENGER SEAT BELT		RED	By micom	OFF
13	TEMP HIGH (Pre-warning removed)		RED	By micom	OFF
14	EPS (4s±0.2s)		AMBER	By micom	ON
15	AUTO CRUISE		GREEN	By micom	OFF
16	READY(GSL)		GREEN	By micom	OFF
17	WINTER		GREEN	By micom	OFF
18	CHARGE		RED	By micom	ON
19	TPMS		AMBER	By micom	ON
20	GLOBAL		AMBER	By micom	Blinks and comes on

Modification basis	
Application basis	
Affected VIN	

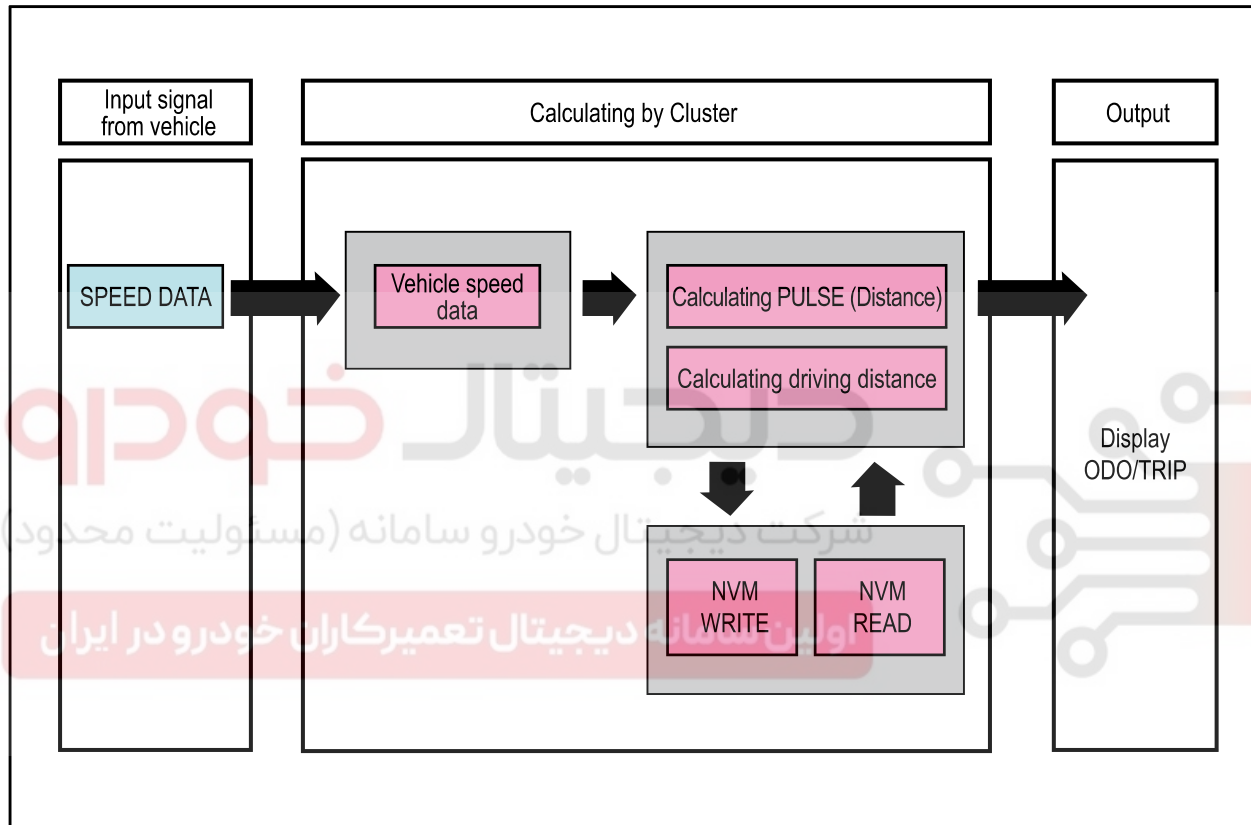
INSTRUMENT CLUSTER

KORANDO 2015.01

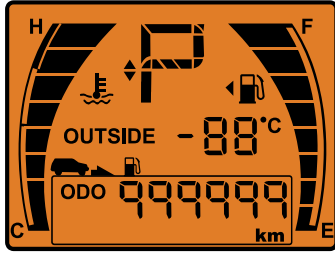

6) Odometer (ODO) and Trip Meter (TRIP)

The total driving distance (0 to 999,999 km or 0 to 999,999 miles) and the trip distance (0.0 to 999.9 km or 0.0 to 9,999.9 miles) are calculated by using the value of pulse per 1 km which is programmed in the EEPROM.

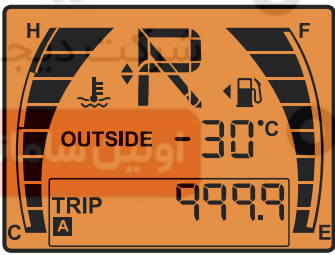
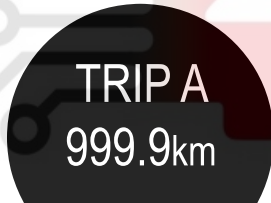
Applicable maximum driving speed is 300 km/h. If the vehicle speed goes over the limit, ODO and Trip meter does not operate any more and the pointer indicates the maximum km/h (MPH). The pulse count information is sent from the speed module according to the speed CAN data that matches the speed frequency.



► STD Class Odometer Display & Data Storage

Function	Signal	Remark	
Input data	Speed signal		
Display type	6 digits LCD		
Display range	0~999999 km(mile) Hold		
Resolution	1 km (mile)		
Maximum Odo value	If the signal indicating actual vehicle speed above 300 km/h is received, the data is not accumulated.		
		<STD>	<SVC>

► STD Class Tripmeter Display

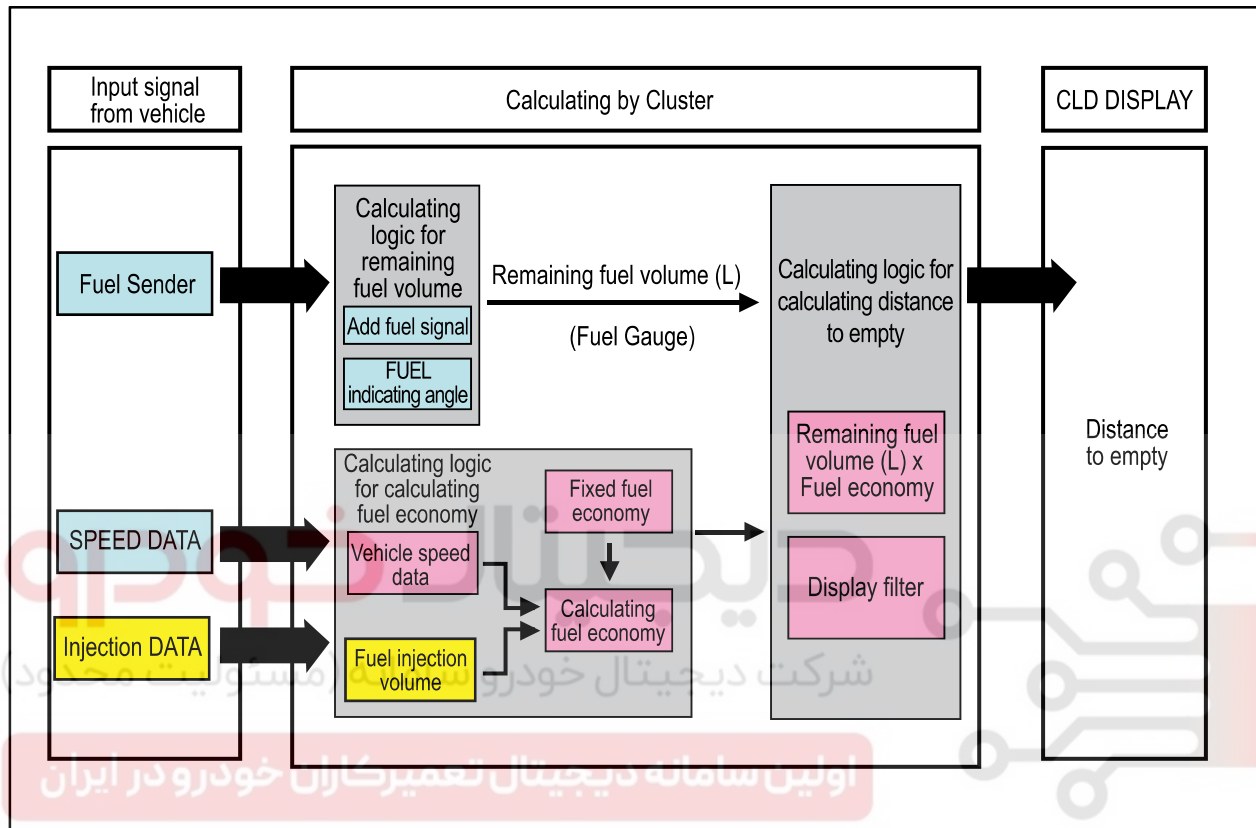
Function	Signal	Remark	
Input data	Speed signal		
Display type	4 digits LCD		
Display range	A: 0.0 ~ 999.9 km (mile) B: 0.0 ~ 9999.9 km (mile)		
Resolution	0.1 km (mile)		
Maximum Odo value	A: 0.0 → 999.9 → 0.0 km B: 0.0 → 9999.9 → 0.0 km		
		<STD>	<SVC>
IGN OFF	Memorize and maintain previous trip distance		
Data clear	Supply B+ voltage for the first time Press and hold mode switch for more than 1 sec.		
Maximum Odo value	If the signal indicating actual vehicle speed above 300 km/h is received, the data is not accumulated.		

Modification basis	
Application basis	
Affected VIN	

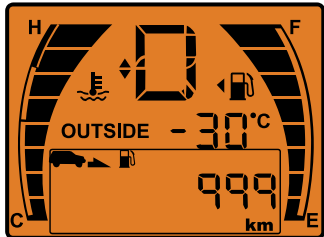

7) Display Mode

(1) DTE (Distance To Empty) Mode

The DTE (distance to empty) function is an estimation on how much further the vehicle can be driven with the fuel remaining in the tank, based on the previous driving pattern (fuel economy).

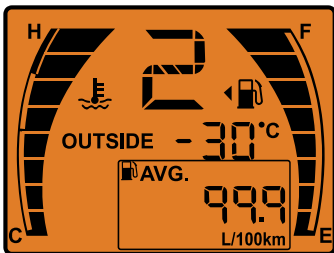
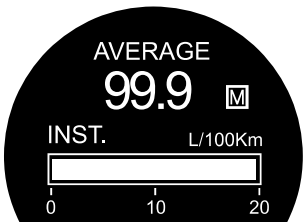


► STD Class Odometer Display & Data Storage

Function	Signal	Remark	
Display type	3 digits LCD	 <STD>	 <SVC>
Display range	50 km ~ 999 km (30 miles ~ 999 miles)		
Resolution	1 km (mile)		
Display interval	every 1 seconds		

(2) Average Fuel Consumption Mode

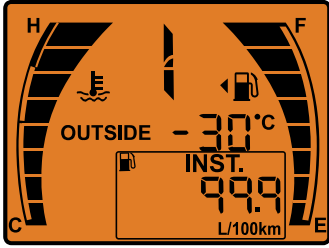
The LCD display indicates average fuel consumption calculated based on total driving distance and total fuel consumption since B+ power supply or data reset.

Function	Signal	Remark	
Display type	3 digits LCD		
Display range	0.0 km ~ 99.9 km (0 miles~99.9 miles)		
Resolution	0.1 km (mile)		
Display interval	every 10 seconds		
Data clear	<ul style="list-style-type: none">- Disconnect B+ voltage- Press and hold Reset switch for more than 1 sec.- Reset automatically when refilling		
<p>Standard type</p> <ul style="list-style-type: none">- Drives at speed of 1 km/h or higher after refueling- Press TRIP switch for more than 1 sec. <p>Supervision type</p> <ul style="list-style-type: none">- To set reset ON/OFF when driving at speed of 1 km/h or higher after refuelingA) For auto reset<ul style="list-style-type: none">- Drive at speed of 1 km/h or higher after refueling- Menu is not reset when pressing TRIP switch for more than 1 sec.- Changed to manual setting when pressing TRIP switch for more than 5 sec.B) For manual reset<ul style="list-style-type: none">- Menu is not reset when driving at speed or 1 km/h or higher after refueling- Menu is reset when pressing TRIP switch for more than 1 sec.- Changed to automatic setting when pressing TRIP switch for more than 5 sec.			

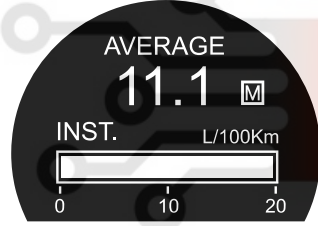
Modification basis	
Application basis	
Affected VIN	

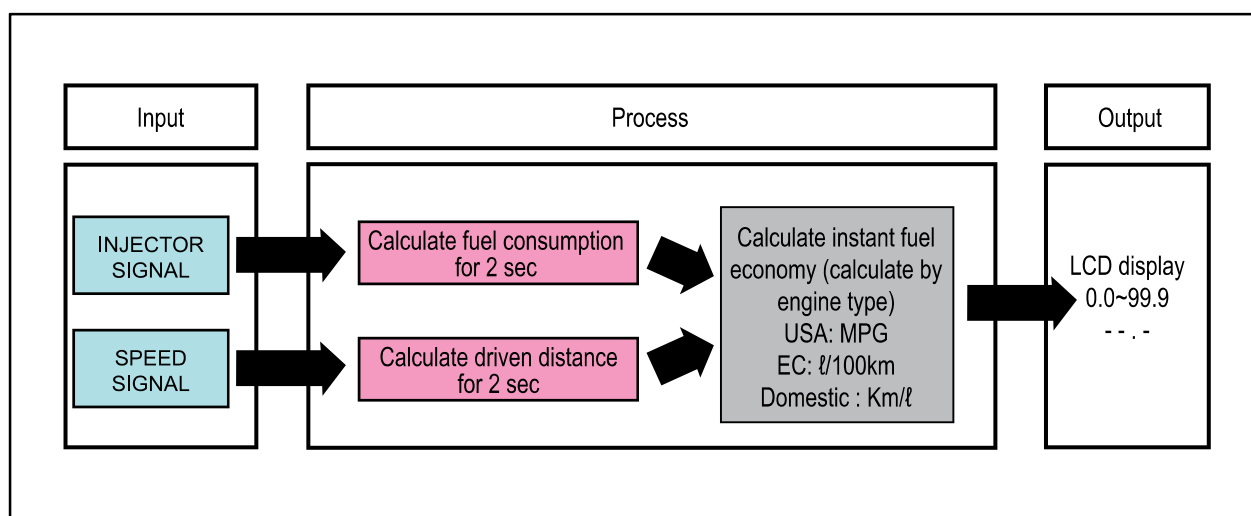
(3) Instant Fuel Consumption Mode

The LCD display indicates the instant fuel consumption (for 2 seconds) calculated based on driving distance and fuel consumption for last 2 seconds.

Function	Signal	Remark
Display type	3 digits LCD	 <p><STD></p>
Display range	0.0 ~ 99.9 (MPG, l/100 km, km/l)	
Resolution	0.1 km (mile)	
Display interval	every 2 seconds	

- When the ignition is switched on and the vehicle is driven more than 10 km, average fuel consumption is displayed at every 200 ms, based on the fuel consumption and driving distance for 600 ms.

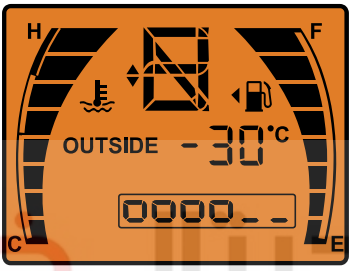
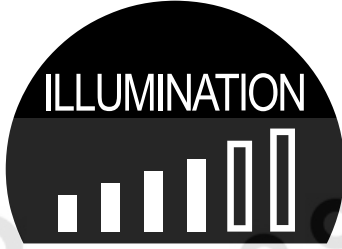
Function	Signal	Remark
Display type	DOT BAR TYPE(92DOT)	 <p><SVC></p>
Display range	0.0 ~ 20(l/100km, km/l)/ 0.0 ~ 50(MPG)	
Resolution (DOT)	0.2174(l/100km, km/l per Bar), 0.5435(MPG per Bar)	
Display interval	every 200ms(25°C)	



(4) Illumination Mode

► TRIP/RESET switch

- Press for less than 1 second: change to next mode
- Press for more than 1 second:
: Enter into illumination level mode
→ Level changes by 1 step up and down when pressing the switch for more than 1 second on consecutively illumination mode
(e.g. Level 4 → 5 → 6 → 5 → 4 → 3 → 2 → 1)
- If the Trip/Reset switch is not pressed within 3 seconds after getting into the illumination mode, the LCD changes to next mode.

SVC class instrument cluster	STD class instrument cluster
	

(5) TPMS mode

- The TPMS (Tire Pressure Monitoring System) monitors each tire's status and warns a driver for dangerous situations.
- At initial start (more than 20 minutes have elapsed after ignition off), the tire pressure is not determined. It can be displayed after 10 minutes of driving at speed of 20 km/h or higher.

► Standard type

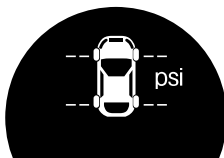






Pressing the TRIP switch at the illumination brightness mode shows the items in the following order: TPMS (front)->TPMS (rear).

Status	Operating conditions	Display
Tire pressure display	At initial start (more than 20 minutes have elapsed after ignition off), the tire pressure is not determined. It can be displayed after 10 minutes of driving at speed of 20 km/h or higher.	F 32 32
		R 32 32
FR - display RR - display	If the tire pressure is abnormal when it is not detected, '--' is displayed. The standard type instrument cluster shows only tire pressure and '--'.	F 32 --
		R 32 --

Modification basis	
Application basis	
Affected VIN	

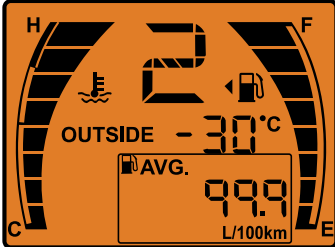

► Supervision type

- Pressing the TRIP switch at the illumination brightness mode changes the screen to the tire pressure display mode.
- If the tire pressure is normal, "Tire Pressure OK" is displayed. If the tire pressure is abnormal, the tire in question blinks then comes on depending on how the abnormality is severe on the display screen.

Status	Message	Operating condition
Impossible to determine tire pressure		Pressure of the tire displayed as "--" when not possible to determine tire pressure correctly * At initial start, the tire pressure can be displayed after 10 minutes of driving at speed of 20 km/h or higher
Correct tire pressure		The specified tire pressure is based on a cold tire with the vehicle unloaded (no occupant); 32 psi at 20°C.
Lower than minimum tire pressure		Corresponding status lamp comes on if tire pressure is 24 psi or less
Excessive tire pressure		Corresponding status lamp blinks with shading reverse at interval of 0.4 seconds if tire pressure is 50 psi or higher
Low tire pressure		Corresponding status lamp comes on if tire pressure is 24 psi or less
Sudden tire pressure loss		Corresponding status lamp blinks with shading reverse at interval of 0.4 seconds if tire pressure changes more than 3 psi per 1 minute at speed of 0 km/h or above.
Imbalance between left and right tire pressure		Corresponding status lamps blink alternately at interval of 1.0 second if tire pressure differs by more than 4 psi in the left and right tires while driving for more than 10 minutes

(6) Ambient Air Temperature Mode

- The ambient air temperature is calculated and displayed.
- This is displayed on both STD and SVC class, regardless of FATC type (automatic or manual).
- For SVC class, the driver set only the unit between °C and °F on the DOT LCD, the ambient temperature is displayed on the SEG LCD.

Function	Signal	Remark	
Display type	3 digits LCD	 <STD>	 <SVC>
Display range	- -30°C ~ 90°C (-22°F ~ 194°F) - -31°C ~ -33°C : maintain 30°C - 91°C ~ 93°C : maintain 90°C		
Resolution	1°C (1°F)		

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Modification basis	
Application basis	
Affected VIN	

8) Buzzer

► Specifications

Function	Signal
Part name	PKM17EPP-2002-B0 (MURATA, Piezoelectric Sound Components)
Permitted input voltage	25 VP-P or less
Operating temperature	-20°C to +70°C
Storage temperature	-30°C to +80°C
Sound pressure level	70 dB/min (3 Vp-p, 2 kHz, square wave, 10 cm)
Capacitance	19.0 nF ±30% (120 Hz)

► Priority of instrument cluster buzzer output

Priority	Item	Buzzer output time		Operating condition
		ON	OFF	
1	PAS			See PAS
2	ESP	0.1sec	0.1sec	Instrument cluster buzzer output signal is received from ABS/ESP
3	Engine overheat warning lamp	0.5sec	0.5sec	Engine overheats (120°C or higher)
4	Water separator warning light	0.5sec	0.5sec	Water separator warning light ON with IGN ON
5	Parking brake	2.8sec	1.5sec	Parking brake applied depending on vehicle speed



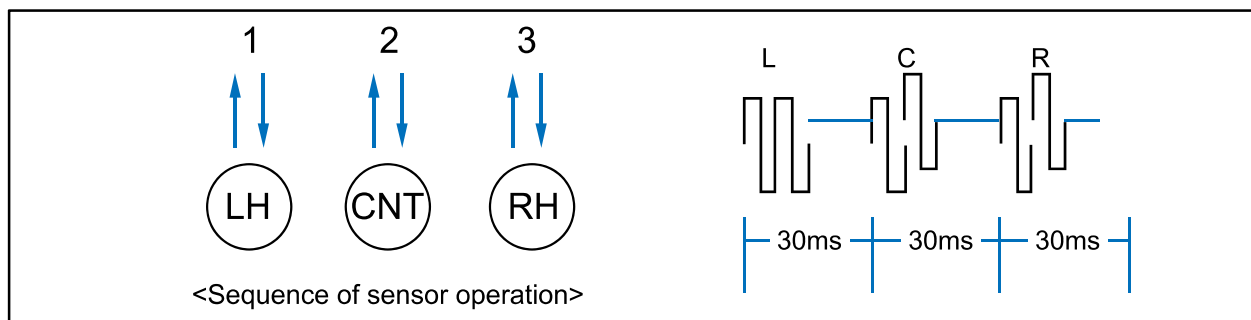
NOTE

If there are multiple signals at a time, the operation should be completed by the priority.

9) PAS (Parking Aid System)

(1) Sensor Operating Process

The ultrasonic sensors transmit ultrasonic waves and receive the reflected waves from an obstacle to detect it in the following order: L → C → R.



(2) Self Diagnosis Mode

► Operating conditions

Self diagnosis is performed once when the ignition is switched on (gear shift lever in "R" position). If the system is defective (Fail) due to open sensor or communication problem, the information for the failed sensor is sent to the instrument cluster.

- Fail condition (However, no obstacle should be within 30 cm)

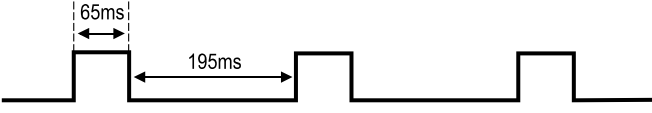


1. The signal wire is open
2. The power wire (+ and -) is open

► Buzzer interval during self diagnosis

MODE	Alarm interval (msec)
Normal	
LEFT	
CENTER	
RIGHT	
2 or more sensors	

Modification basis	
Application basis	
Affected VIN	

► Buzzer interval when measuring distance

Step	L / R	CENTER	Alarm Interval (msec)
Step 1	80~100 (cm)	80~120 (cm)	
Step 2	50~80 (cm)		
Step 3	25~50 (cm)		
Tolerance	±10 (cm)		±10 (cm)

- Exception/error handling

1. Timeout processing time for buzzer interval after measuring distance/self diagnosis: 600 ms

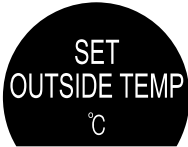

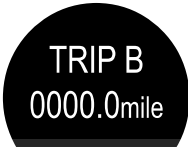

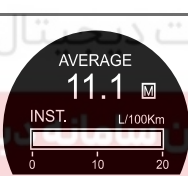
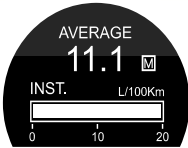



- If timeout is reached, the PAS returns to undetected condition.

2. Process while re-inputting









After timeout, the process is performed normally if the signal required for display is received from beginning to end.


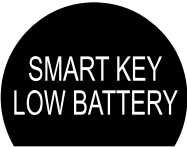







(not detectable if the signal is received in the midst of process)

► DOT LCD message display


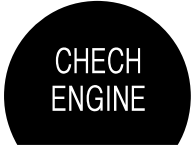






Pin No.	Message	Operating condition
Ambient temperature: indicates air temperature outside control		TRIP switch
Trip A		Reset: Press and hold the Trip switch for more than 1 second
Trip B		Reset: Press and hold the Trip switch for more than 1 second
Distance to empty: indicates a distance can be driven with the fuel remaining control		Factory-setting mode
Average fuel consumption: indicates average fuel control		Reset: Press and hold the Trip switch for more than 1 second
Instant fuel consumption: indicates fuel consumption for a short periods		TRIP switch
Illumination brightness: indicates tail lamp brightness control		Brightness control: Press and hold the Trip switch for more than 1 second
Start-up screen		LCD display shows this message for 2 seconds after ignition ON.
Driver's seat belt reminder		LCD display shows this message for 4 seconds after "WELCOME" message.





Modification basis	
Application basis	
Affected VIN	

Pin No.	Message	Operating condition
Smart key warning		This message comes on the LCD display, if the smart key is not in the vehicle when the door is open and closed in the ignition ON or ACC mode.
		This message comes on the LCD display for approx. 10 seconds, if the ignition switch is pressed when the smart key is not in the vehicle.
		This message comes on the LCD display for approx. 10 seconds, if the smart key verification fails after inserting the smart key into the key holder.
		LCD display shows this message and Smart key reminder sounds for 10 seconds when you open the driver's door with engine OFF and Smart key inserted in the Smart key holder.
		This message informs the driver that the brake pedal should be depressed and the ignition switch be pressed in order to start the engine, if the ignition is switched to ACC mode for more than one time when the driver keeps pressing the ignition switch without depressing the brake pedal.
		LCD display shows this message when you press the ignition switch without depressing the clutch pedal.
		This message comes on for approx. 10 seconds to inform the driver that the ignition switch should be pressed with the shift lever in P in order to start the engine.
		When a Smart key is inside the vehicle and all doors are closed, LCD display shows this message if you press the Lock button on the other Smart key.

Pin No.	Message	Operating condition
Smart key warning		LCD display shows this message for 10 seconds when the ignition switch or Smart key system is defective.
		This message comes on for approx. 10 seconds if the low smart key battery is detected when the ignition switch is pressed or the engine is started.
Door/PAS		LCD display shows this message when the door, engine hood or tailgate is open.
		
Tailgate		If the tailgate is open, open status messages are displayed in 4-step graphics.
Parking aid system		If any obstacle is detected in the rear of the vehicle when the shift lever is moved to "R" position with IGN ON, each sensor shows its position and distance.
		If any error is detected during initial diagnosis, it is displayed as "?". Other than that is operated in the same way as the PAS distance measurement mode.
Cruise control		This message comes on when the cruise control system is activated.
		This message comes on when the cruise control system is deactivated.

Modification basis	
Application basis	
Affected VIN	

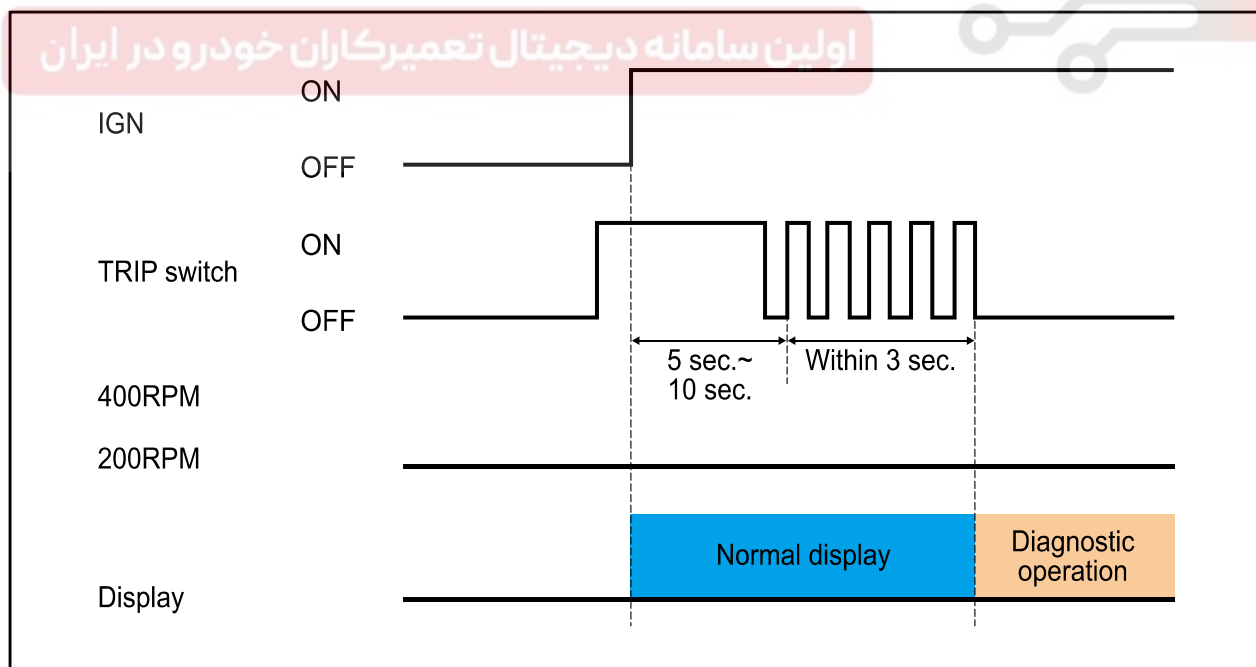
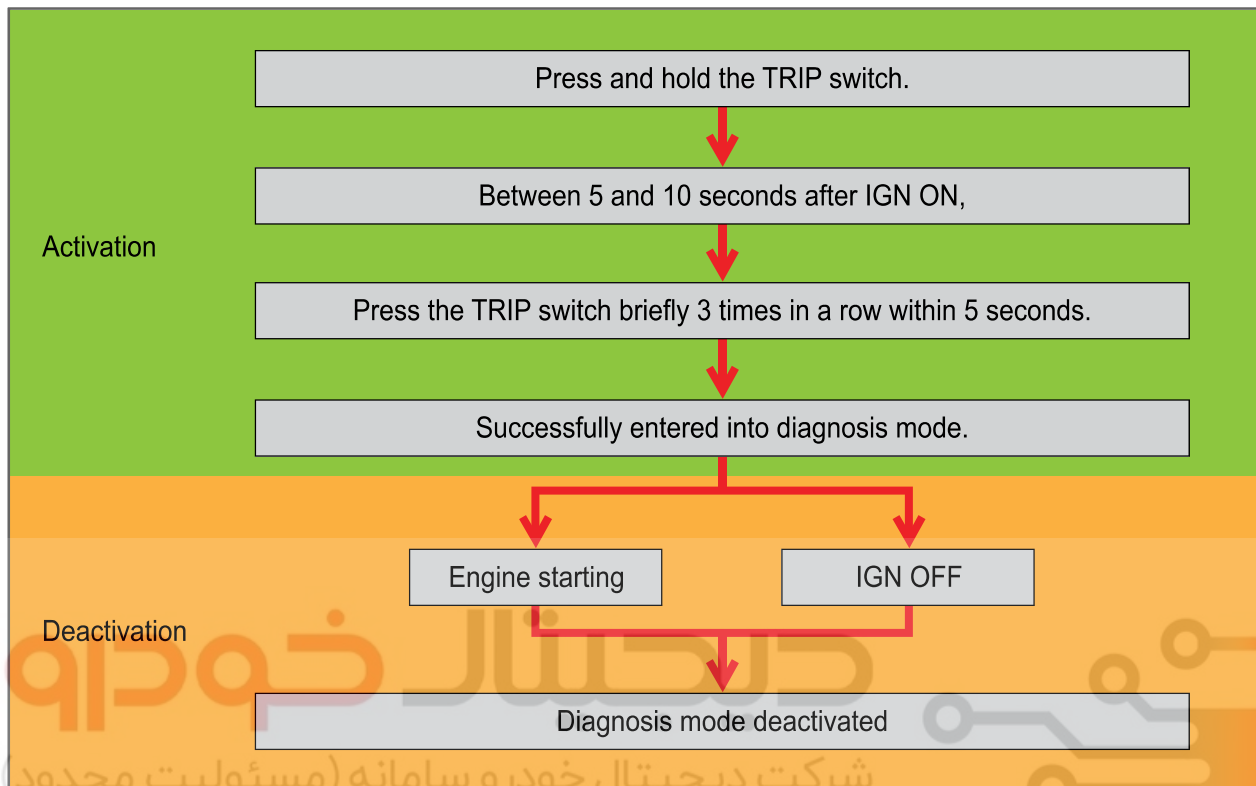
Pin No.	Message	Operating condition
Auto cruise		LCD display shows this message when turning on the cruise control switch with ignition ON or engine running. This message disappears when activating the cruise control by operating "ACCEL" switch on the cruise control lever.
EMS		This message comes on when the engine is faulty.
Lamp		This message comes on when the tail lamps are ON with the ignition in the "OFF" or "ACC" position.
SUNROOF SYSTEM		For the vehicle with SKM, this message comes on when the sunroof is open with the ignition in the "OFF" or "ACC" position. For the vehicle without SKM, this comes on when the sunroof is open with the ignition in the "OFF" position and the key removed.
Low fuel level		This message comes on when the remaining fuel is insufficient.
ESP check		This message comes on when the ESP system is faulty.
ABS check		This message comes on when the ABS system is faulty.
Engine oil level check		LCD display shows this message when the engine oil level is low. Have the system checked at Ssangyong Authorized Service Center.

Pin No.	Message	Operating condition
Tire alignment (applies to vehicle with EPS)	<div> <div><Level 0></div> <div><Level 1></div> <div><Level 2></div> <div><Level 3></div> <div><Level 4></div> <div><Level 5></div> </div>	<ul style="list-style-type: none"> - This message helps the driver to predict the driving direction since the tire alignment is displayed on the instrument cluster. - The images on the left show that the tires are aligned to the left. When the tires are aligned to the right, the image is symmetrical vertically. - Tire alignment is displayed between level 0 and level 5 depending on the alignment degree when the ignition switch is turned to "ON" position from "OFF" position with the shift lever in "P" or "N" position. While the images up to level 2 comes on for 5 seconds, the images from level 3 stay on. - These messages are not displayed when the EPS check message is displayed.
CAN scan		(This message goes off when all the CAN signal inputs are normal)
ESCL		<p>LCD display shows this message when ESCL (Electric Steering Column Lock) system is defective. There is no specific ESCL warning light on the instrument cluster.</p> <p>This problem could be temporary. Turn the ignition off and then on again to check if this message will be disappeared.</p>
		
		

Modification basis	
Application basis	
Affected VIN	

5. SELF DIAGNOSIS PROCESS

1) Self Diagnosis Process Mode



2) What Is Shown On Instrument Cluster

► Supervision type



► Standard type



(1) Self diagnosis for gauge

- Speedometer/tachometer (RPM): Oscillates between lower mark and upper mark repeatedly.

(2) Self diagnosis for warning lamp and indicator lamp

- All the warning lamps and indicator lamps come on by MICOM control (CAN communication) and they blink if faulty.
(However, the wired type symbols such as air bag, LH/RH turn signal indicators, hazard warning flasher, high beam, front fog lamp do not come on.)

(3) Miscellaneous

- When entering into the self diagnosis mode, the instrument cluster illumination output will be 100%. All the segments are ON.

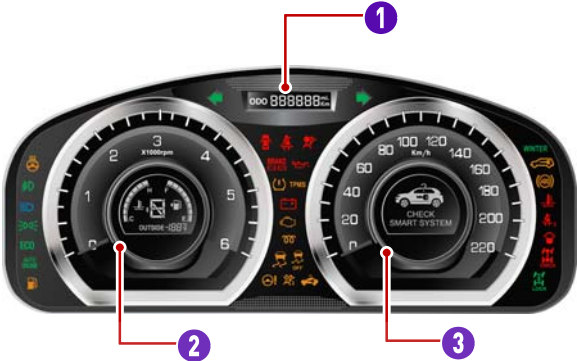
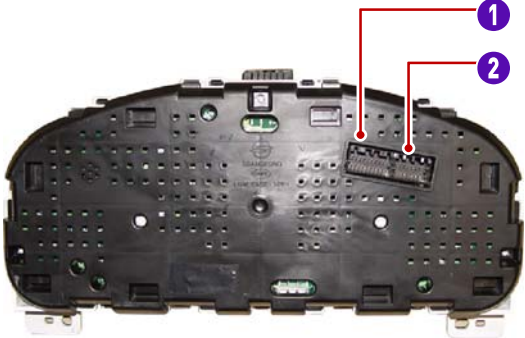
Modification basis	
Application basis	
Affected VIN	

CONFIGURATION AND FUNCTION

S.G.N.

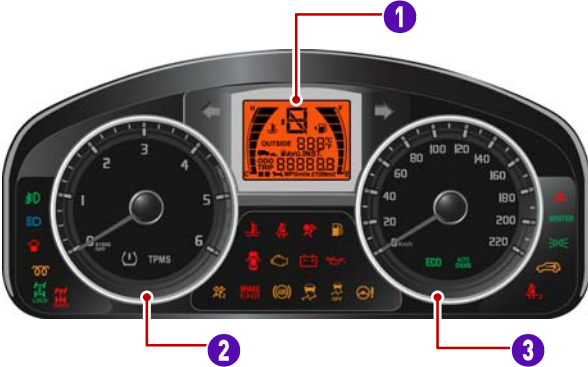
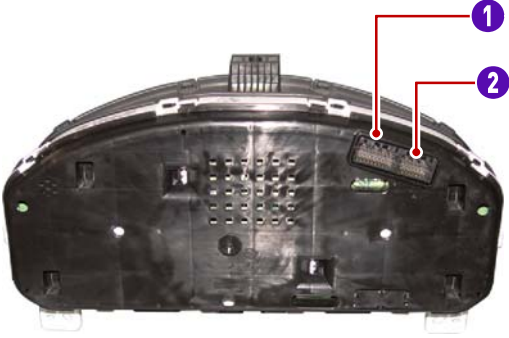
8010-01 COMPONENT

1) SVC Class Instrument Cluster

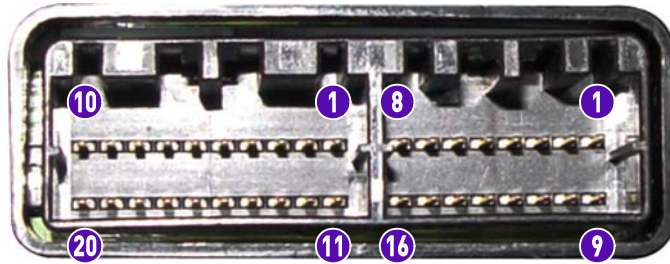
Front view	Rear view
	
1. ODO LCD 2. GAGE LCD 3. DOT LCD	1. Connector A 2. Connector B

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2) STD Class Instrument Cluster

Front view	Rear view
	
1. LCD 2. Engine RPM gauge 3. Speedometer	1. Connector A 2. Connector B

3) Connector Functions



Pin No.	Functions (Connector A)	
	STD	SVC
1	High beam (+)	
2	Left turn signal	
3	Right turn signal	
4	IGN2	
5	Mode/Reset switch	
6	ILL (+)	
7	IGN (+)	
8	B (+)	
9	Fuel	
10	CAN HIGH	
11	Charge (Alternator)	
12	Oil pressure	
13	Parking brake switch	
14	MICOM ground	
15	Signal ground (ground for power)	
16	Fuel ground	
17	CAN LOW	
18	-	
19	Speed signal output	
20	Front fog lamp	

Pin No.	Functions (B)	
	STD	SVC
1	Passenger air bag OFF switch	
2	Hazard warning lamp	NC
3	"R" gear	
4	"N" gear	
5	Parking aid system	
6	-	
7	Door ajar	
8	Air bag	
9	-	Steering wheel heating
10	-	
11	SMART key	-
12	-	
13	NC	CAN HIGH (B-CAN)
14	NC	CAN LOW (B-CAN)
15	Ambient temperature sensor (+)	
16	Ambient temperature sensor (-)	

Modification basis	
Application basis	
Affected VIN	

Memo

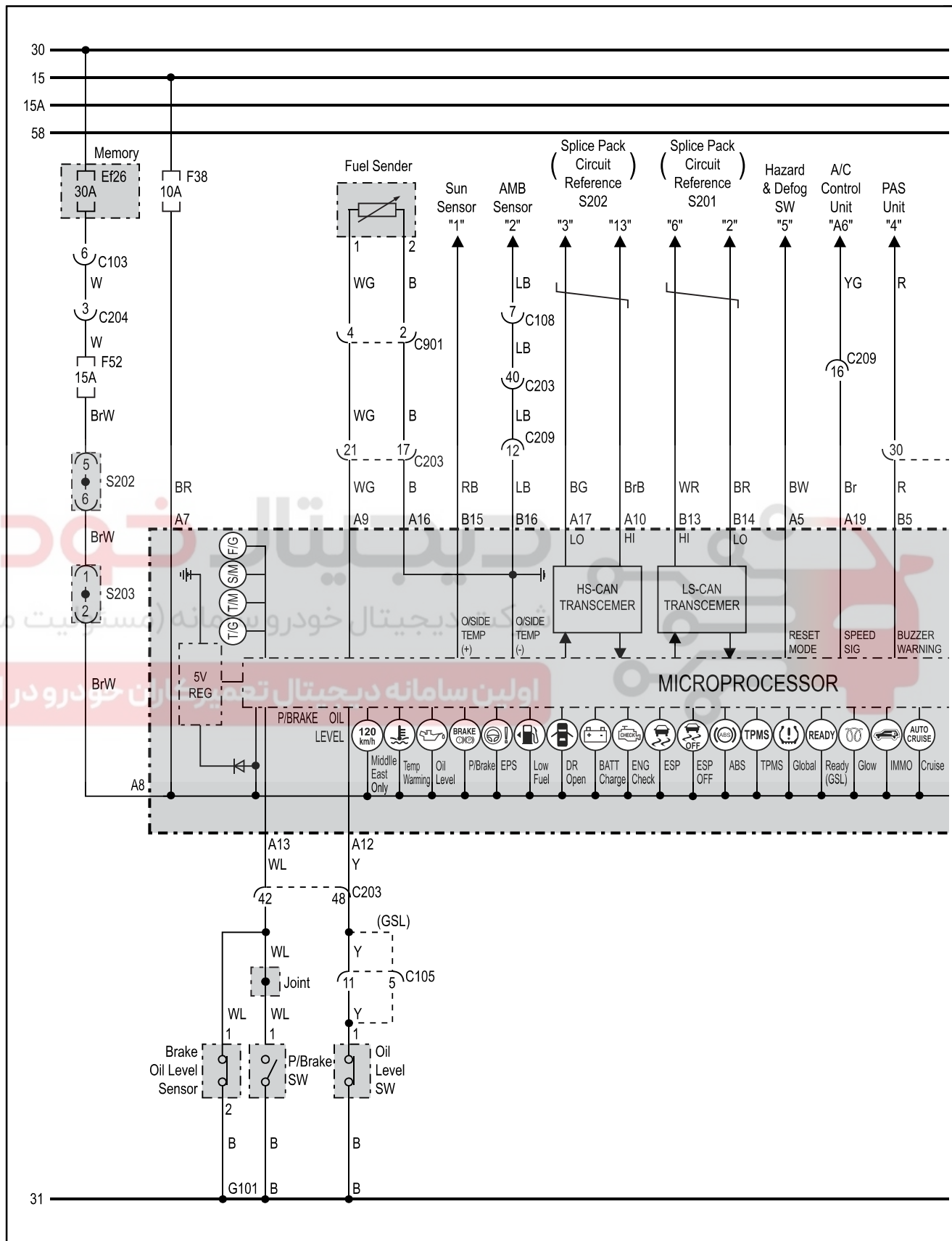
دیجیتال خودرو

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اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



4) Circuit Diagram



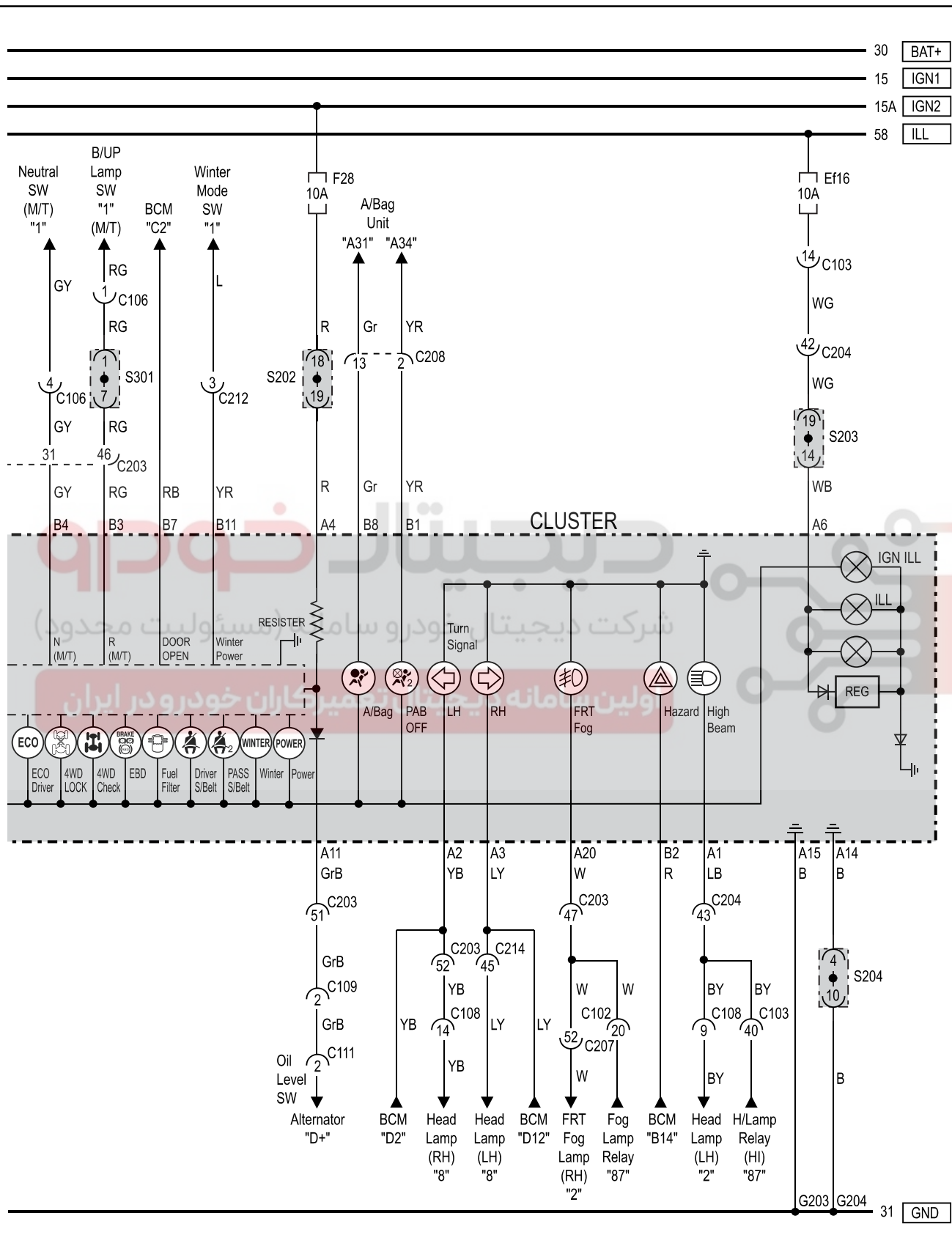
Modification basis	
Application basis	
Affected VIN	

INSTRUMENT CLUSTER

KORANDO 2015.01

05-54 8010-01

KORANDO



INSTRUMENT CLUSTER

KORANDO 2015.01

Modification basis	
Application basis	
Affected VIN	

REMOVAL AND INSTALLATION

S.G.N.

8010-01 INSTRUMENT CLUSTER

Preceding work - Disconnect the negative battery cable.



1. Remove the lower main panel assembly.

NOTE

Refer to "LOWER MAIN PANEL" under "REMOVAL AND INSTALLATION" in "BODY INTERIOR" chapter.



2. Remove the center fascia panel molding (A).



Modification basis	
Application basis	
Affected VIN	

INSTRUMENT CLUSTER

KORANDO 2015.01



3. Unscrew the LH center fascia panel mounting screw.

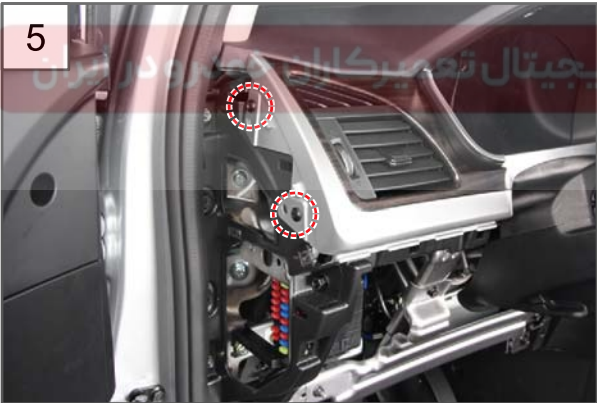


4. Remove the LH center fascia panel.

 **NOTE**

Two fixing positions






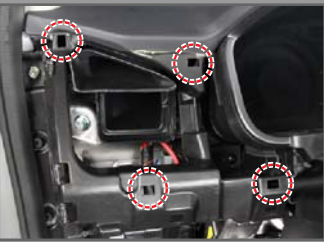
5. Unscrew the two LH side fascia panel mounting screws.



6. Remove the LH side fascia panel.

 **NOTE**

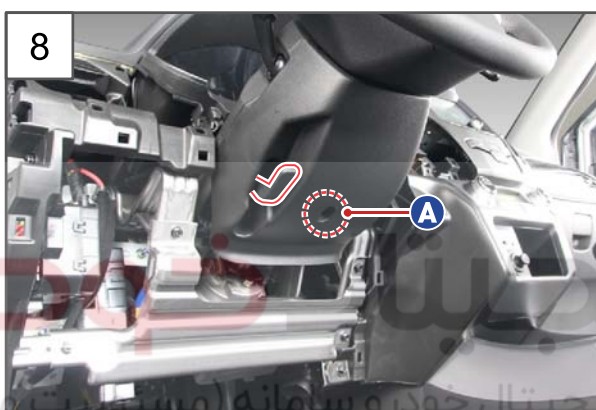
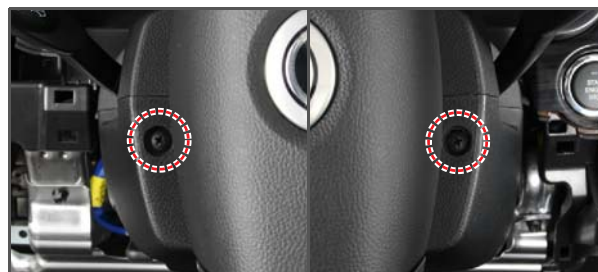
Four fixing positions



Modification basis	
Application basis	
Affected VIN	



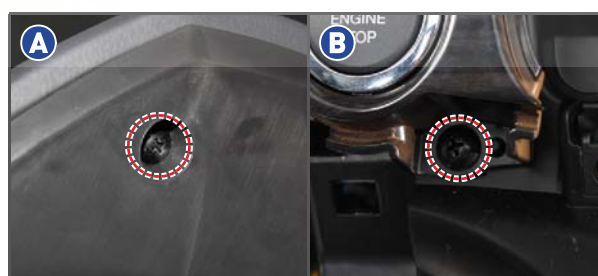
7. Unscrew the two shroud upper cover assembly mounting screws by turning the steering wheel.



8. Unscrew the one shroud lower cover mounting screw (A), lower the column tilting lever and remove the shroud lower cover.



9. Unscrew the mounting screws (two for A, one for B) on the instrument cluster fascia panel assembly.



10. Detach the instrument cluster fascia panel assembly to disconnect the START/STOP switch connector.

Modification basis	
Application basis	
Affected VIN	



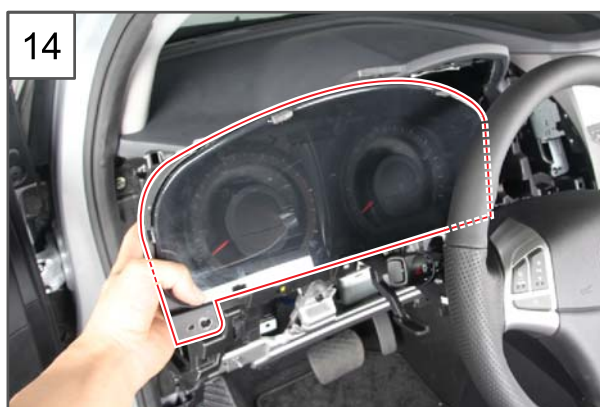
11. Remove the instrument cluster fascia panel assembly.



12. Unscrew the 3 mounting screws on the instrument cluster.



13. Pry off the instrument cluster to remove the connectors A and B.



14. Remove the instrument cluster.

15



15. Install in the reverse order of removal.

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ELECTRONIC

FUSE

BCM

SKM

INSTRUMENT

SWITCH

LAMP

WIPER AND

PAS

AUDIO SYSTEM

Modification basis	
Application basis	
Affected VIN	

INSTRUMENT CLUSTER

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Memo

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