INSTRUMENT CLUSTER

8010-01

GENERAL INFORMATION

1. SPECIFICATIONS

Item		Specifications
Rated voltage		DC 12.0 V
Operating voltage		DC 9 to 16 V
CAN operating voltage		DC 7 to 18 V
Operating temperature		−30˚C to +80˚C
Gauge		Speedometer
		Tachometer
		Fuel gauge
		Temperature gauge
LCD		MONO TFT LCD (supervision type)
		SEGMENT LCD (standard type)
Communication mode	P-CAN	Engine check warning lamp, Engine overheat warning lamp, Winter, Power, ESP ON indicator/warning lamp, ESP OFF indicator, ABS warning lamp, EBD warning lamp, air bag warning lamp, global warning, immobilizer warning lamp, auto cruise indicator, READ indicator, ISG warning and indicator, glow indicator (DSL only), fuel filter indicator (DSL only), 4WD check warning lamp, 4WD LOCK indicator, over speed warning lamp (GCC only)
	B-CAN	Door ajar warning lamp, turn signal lamp/hazard warning lamp, illumination ON indicator, smart key warning lamp, rear fog lamp, ESCL warning lamp, ESCL warning lamp
	Hard-wire	Engine oil pressure warning lamp, charge warning lamp, brake warning lamp, low fuel warning lamp, front fog lamp indicator, headlamp high beam indicator

OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

The instrument cluster is intended to receive the warnings and signals from the various units to inform the driver of the current status of the vehicle through CAN and hard-wire communications. There are two types of instrument cluster: supervision cluster (3.5 inch MONO TFT LCD type) and standard cluster (3.5 inch SEGMENT LCD type). Each instrument cluster is fitted internally with the speaker which makes warning sounds at 5 different intervals and with 3 different sounds.

2. CONFIGURATIONS

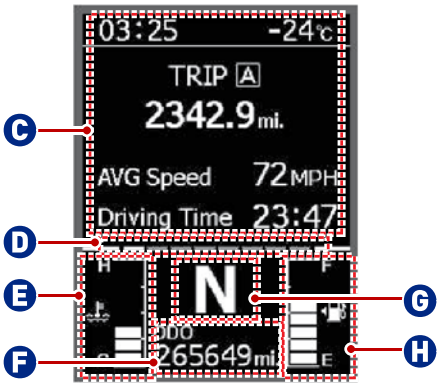
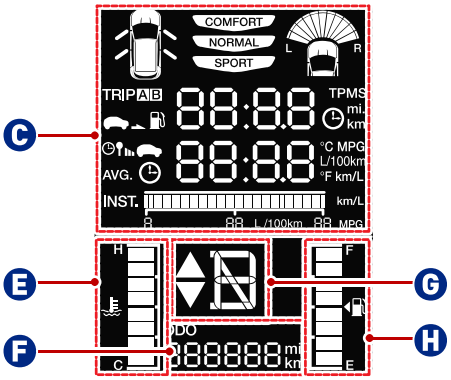
▶ **Instrument cluster wake-up**

The instrument cluster wakes up when the signals, such as door UNLOCK signal, from the REKES key or smart key is input via B-CAN and the ignition is turned on.

▶ **Instrument cluster sleep mode**

The instrument cluster enters sleep mode within 60 seconds when the signals, such as door UNLOCK signal, from the REKES key or smart key is input via B-CAN after the ignition is turned off.

Modification basis	
Application basis	
Affected VIN	

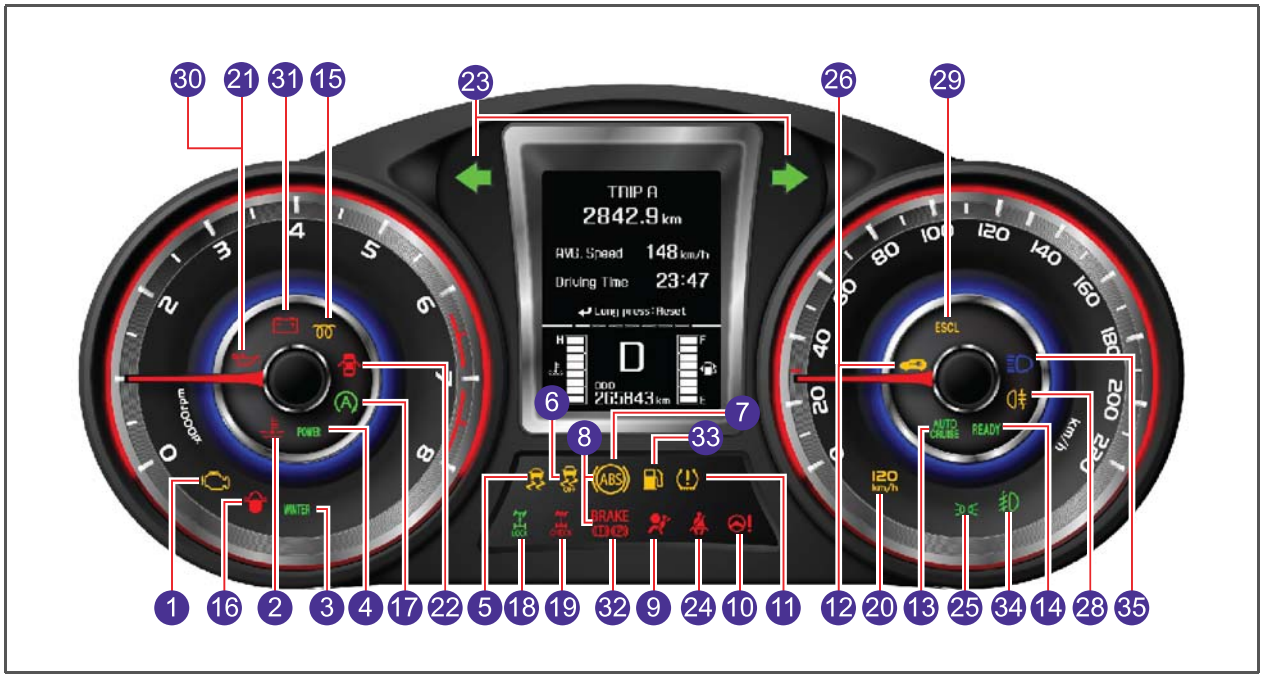
Supervision instrument cluster	Standard instrument cluster
	
3.5" TFT LCD display window	**3.5" SEGMENT LCD display window**
	

	Supervision instrument cluster	Standard instrument cluster
A	GSL: Tachometer: 0 to 8,000 rpm (Operating angle: 240°) DSL: 0 to 6,000 rpm	←
B	Speedometer: 0 to 220 km/h (Operating angle: 240°)	←
C	LCD for General vehicle information/Warnings/Indicators	LCD for General vehicle information/Indicators
D	Trip switch navigator bar	None
E	Engine temperature gauge (8-segment)	←
F	Odometer	←
G	GSI: Gear Shift Indicator	←
H	Fuel gauge (8-segment)	←

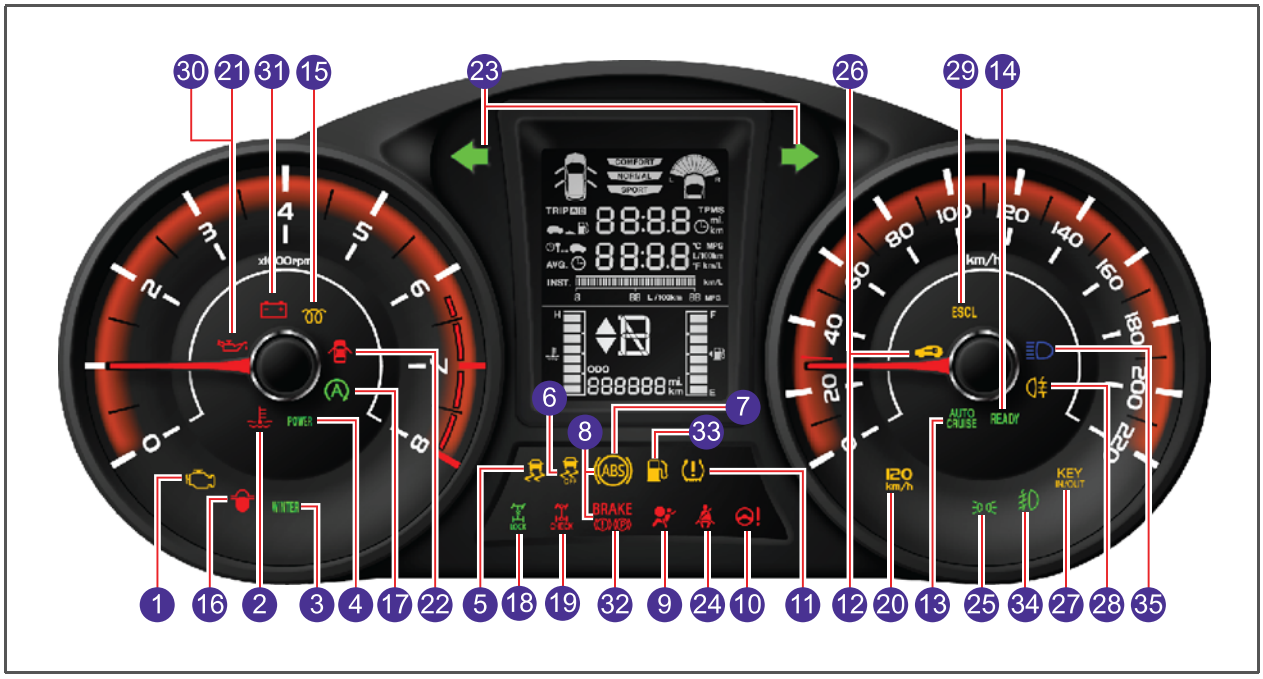
3. WARNING LAMPS AND INDICATORS

1) Configurations

▶ **Supervision instrument cluster**



▶ **Standard instrument cluster**



Modification basis	
Application basis	
Affected VIN	

2) Symbols for P-CAN Communication

No.	Designation	Indicator		Description	Signal value	Pre-warning
1	Engine CHECK warning lam		Yellow	On in the event of ECU or TCU fault	TCU ECU	O
2	Engine overheat warning lam		Red	Flashes when coolant is hot	ECU	-
3	Winter mode indicator	WINTER	Green	On when winter mode activated	TCU	-
4	Power mode indicator	POWER	Green	On when power mode activated	TCU	-
5	ESP ON indicator/ warning lamp		Yellow	ON: faulty ESP system Flash: ESP system working	ESP	O
6	ESP OFF indicator light		Yellow	On when ESP deactivated	ESP	O
7	ABS warning lamp		Yellow	On in the event of ABS malfunction	ESP	O
8	EBD warning lamp		Yellow	On in the event of EBD malfunction	ESP	O
			Red			
9	Air bag warning lamp		Red	On in the event of air bag system malfunction	SDM	-
10	EPS warning lamp		Red	On in the event of EPS malfunction	EPS	O
11	Global warning lamp		Yellow	Faulty TPMS: Flashes for about 70 s and stays on Abnormal tire pressure: Warning lamp ON (low/flat tire)	TPMS	O
12	Immobilizer warning lamp		Yellow	Flashes in the event of immobilizer system fault	ECU (Without SKM)	-

NOTE

- Both the warning lamp on condition and warning lamp flashing condition are met, the lamp flashing condition overrides the lamp on condition.
- Pre-warning: warning lamps and operation indicators come on when ignition is turned on.
- When a system is malfunctioning, the related warning lamp stays on or flashes.

No.	Designation	Indicator		Description	Signal value	Pre-warning
13	Auto cruise ON indicator	AUTO CRUISE	Green	On when auto cruise activated	ECU	-
14	Auto cruise READY indicator	READY	Green	On when auto cruise ready	ECU	-
15	Glow indicator (DSL only)		Yellow	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.	ECU GCU	-
16	Fuel filter indicator (DSL only)		Red	This indicator comes on when the water level in the fuel filter exceeds a certain level.	ECU	O
17	ISG indicator	A	Green	Illuminated when auto start and auto stop of ISG system activated	ECU	-
	ISG warning lamp	A	Yellow	Illuminated in the event of ISG system malfunction	ECU	-
18	4WD LOCK indicator	LOCK	Green	This warning lamp comes on when the 4WD LOCK switch is pressed.	E-coupling unit	O
19	4WD check warning lamp	CHECK	Red	This warning lamp comes on when the 4WD system is defective.	E-coupling unit	O
20	Over speed warning light (GCC only)	120 km/h	Yellow	Illuminated at speed of 120 km/h or higher	ESP	-
21	Engine oil pressure warning light (DSL only)		Red	On in the event of abnormal engine oil pressure	ECU	-

NOTE

- Both the warning lamp on condition and warning lamp flashing condition are met, the lamp flashing condition overrides the lamp on condition.
- Pre-warning: warning lamps and operation indicators come on when ignition is turned on.
- When a system is malfunctioning, the related warning lamp stays on or flashes.

Modification basis	
Application basis	
Affected VIN	

3) Symbols for B-CAN Communication

No.	Designation	Indicator		Description	Signal value	Pre-warning
22	Door ajar warning lamp		Red	- On when any door open and vehicle speed below 10 km/h with IGN on - Flashes and buzzer sounds when any door open and vehicle driven for more than 2 s at speed of 10 km/h or higher with IGN on	BCM	-
23	Turn signal/ hazard warning lamp indicator		Green	- LH or RH turn signal lamp flashes when moving turn signal switch down or up - Both LH and RH turn signal lamps flashes when pressing hazard warning flasher switch	BCM	-
24	Driver seat belt reminder		Red	On when driver seat belt unfastened	BCM	-
25	Illumination ON indicator		Green	On when light switch moved to tail lamp or headlamp position	BCM	-
26	Smart key warning lamp		Yellow	Flashes in the event of SKM fault Flashes when authentication fails	SKM	O
27	Smart key check indicator	KEY IN/OUT	Red	Standard instrument cluster : - On when authenticated smart key missing indoors/outdoors Supervision instrument cluster : - Displayed in LCD display window	SKM	-
28	Rear fog lamp indicator		Yellow	On when rear fog lamp activated	BCM	-
29	ESCL warning lamp	ESCL	Yellow	Illuminated in the event of ESCL system malfunction or bad coding	SKM	-

NOTE

- Both the warning lamp on condition and warning lamp flashing condition are met, the lamp flashing condition overrides the lamp on condition.
- Pre-warning: warning lamps and operation indicators come on when ignition is turned on.
- When a system is malfunctioning, the related warning lamp stays on or flashes.

4) Symbols for Hard Wire Communication

No.	Designation	Indicator		Description	Signal value	Pre-warning
30	Engine oil pressure warning light (GSL only)		Red	On in the event of abnormal engine oil pressure	ECU	-
31	Charge warning light		Red	On in the event of charge system fault	ECU	-
32	Brake warning light		Red	- On when parking brake applied or brake fluid low - Flashes when vehicle driven for more than 2 s at speed of 10 km/h or higher with parking brake applied	Parking brake switch, brake fluid level switch	-
33	Low fuel level warning light		Yellow	On when fuel level is low	Fuel sender	-
34	Front fog lamp indicator		Green	On when front fog lamp activated	Front fog lamp switch	-
35	High beam indicator		Bule	On when headlamp high beam activated	High beam switch	-

NOTE

- Both the warning lamp on condition and warning lamp flashing condition are met, the lamp flashing condition overrides the lamp on condition.
- When a system is malfunctioning, the related warning lamp stays on or flashes.

Modification basis	
Application basis	
Affected VIN	

4. WARNING SOUND DESCRIPTION

1) Overview

The instrument cluster sounds audible alerts at 5 different intervals and with 3 different sounds. The speaker fitted in the instrument cluster outputs 5 types of sounds (warning sound - beep: 4, normal sound: 1) and can output 3 different sounds at a time to inform the driver of vehicle conditions.

2) Warning Buzzer Interval

Normal sound Beep sound

Interval	Warning sound (beep or normal sound)	Remarks
A		- Normal sound (*dynamic client)
B		- Output repeatedly and stops if deactivation condition met - PAS 3-stages output sound
C		- Periodic output for predetermined time
D		- Periodic output until deactivation condition met
E		- Warning buzzer sounds only once and then stops

* Dynamic client: Audible signals which are heard when ignition is turned or off (Pre-Welcome, Welcome, Goodbye).

3) Warning Buzzer Priority

Group	Interval	Priority	Function	Operating condition	Warning buzzer interval ON/OFF	Remarks
1	A	1	Rear Seatbelt Warning	Rear door closed with engine started and rear seat belt unfastened	Continuous	1 times
		2	WELCOME	Driver door closed after theft deterrent mode deactivated	4 sec.	1 times
		3	PRE-WELCOME	Driver door open after theft deterrent mode deactivated	2 sec.	1 times
		4	GOODBYE	Ignition turned off	4 sec.	1 times
	C	5	OVER SPEED Warning	At speed of 120 km/h or higher	Continuous	5 times
	B	6	Front PAS stage 2	Front PAS detects secondary obstacle	65ms/65ms	Continuous
		7	Front PAS stage 3	Front PAS detects tertiary obstacle	Continuous	Continuous
	A	8	ISG Warning	When ISG system is defective	Continuous	Continuous
		9	Message alarm	Different LCD message reminders	1 sec.	1 times
	C	10	Low fuel level warning	Fuel level is low 5 seconds after engine starts	0.5 sec./ 0.5 sec.	3 times
	A	11	Turn signal(Tik)	Turn signal is moved	0.15 sec.	Continuous
		12	Turn signal(Tok)	Turn signal is moved	0.15 sec.	Continuous

Modification basis	
Application basis	
Affected VIN	

Group	Interval	Priority	Function	Operating condition	Warning buzzer interval ON/OFF	Remarks
2	A	1	Normal rear PAS sensor	Rear PAS sensor is normal	65ms	1 times
		2	Abnormal rear PAS sensor	Rear PAS sensor is faulty	3 sec.	1 times
	D	3	Rear PAS stage 1	Rear PAS detects primary obstacle	0.3 sec./ 0.3 sec.	Continuous
	B	4	Rear PAS stage 2	Rear PAS detects secondary obstacle	0.15 sec./ 0.15 sec.	Continuous
		5	Rear PAS stage 3	Rear PAS detects tertiary obstacle	Continuous	Continuous
	A	6	'R' position engaged in M/T	PAS is not activated within 610 ms after 'R' position is engaged	0.1 sec.	1 times
	D	7	Overheating warning	Overheat warning lamp comes on	0.5 sec./ 0.5 sec.	Continuous
	C	8	Fuel filter Warning	Detected water in fuel filter	0.5 sec./ 0.5 sec.	6 times
		9	Door ajar warning	Door open for more than 2 s at speed of 10 km/h or higher	0.5 sec./ 0.5 sec.	6 times
		10	Parking brake	Vehicle is driven for more than 2 s at speed of 10 km/h or higher with parking brake indicator ON	0.5 sec./ 0.5 sec.	6 times
3	D	1	Seat belt reminder	Vehicle speed above 10 km/h with seat belt unfastened	Continuous for 1 sec.	Continuous
	B	6	Key reminder	Door open with key inserted	-	Continuous
	C	7	Smart key detected indoors	Key is found indoors or door is locked with IGN on	0.8 sec./ 0.2 sec.	Continuous
	B	8	Tail lamp warning	Ignition is turned off with exterior lamp on	0.8 sec./ 0.2 sec.	Continuous
	D	9	Sunroof open warning	Ignition is turned off with sunroof open	0.8 sec.	Continuous

*: For supervision version

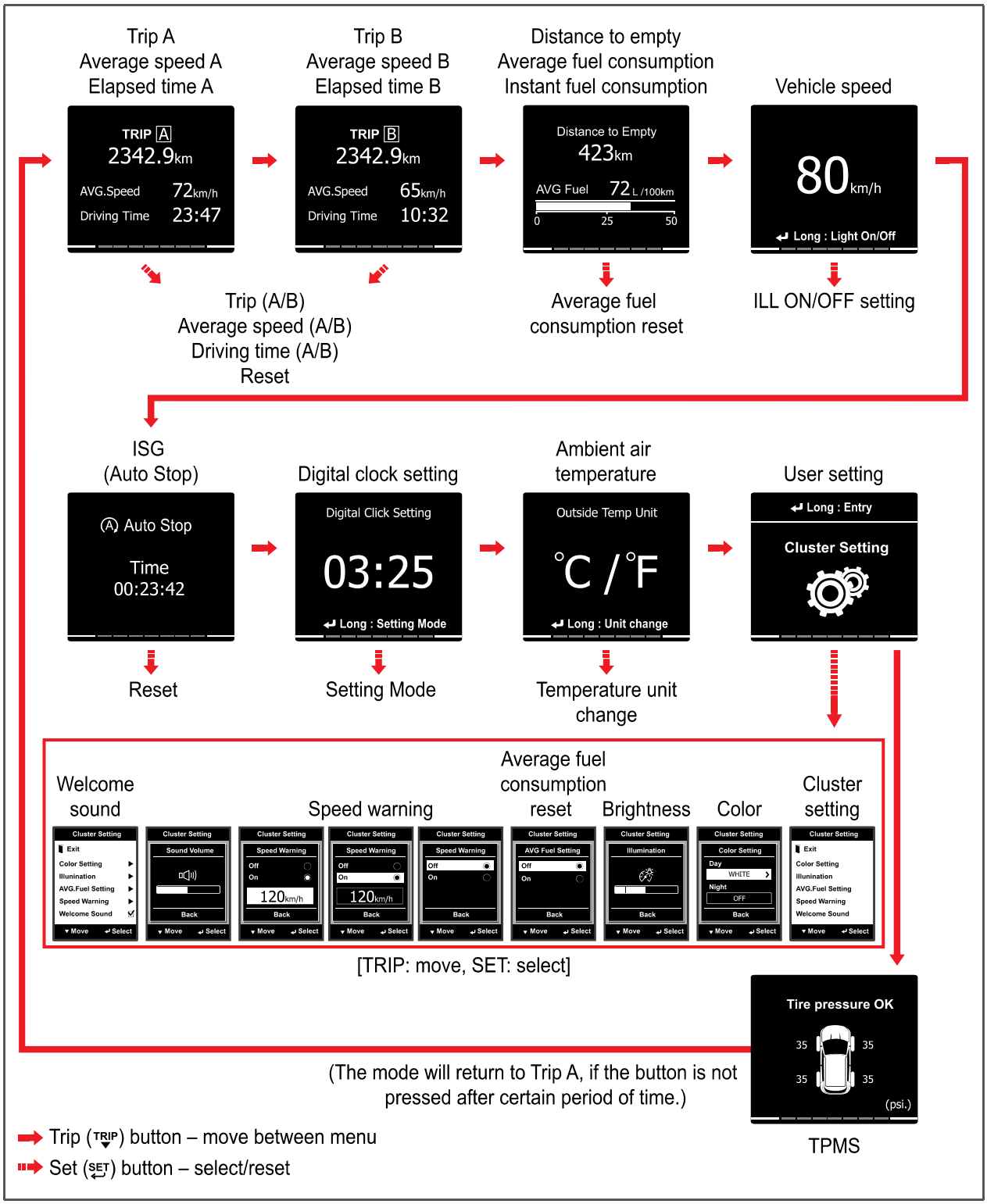
NOTE

The warning buzzers of groups 1, 2, and 3 can sound at the same time.
However, the buzzers within the same group sound as per priorities.

5. TRIP DISPLAY SEQUENCE

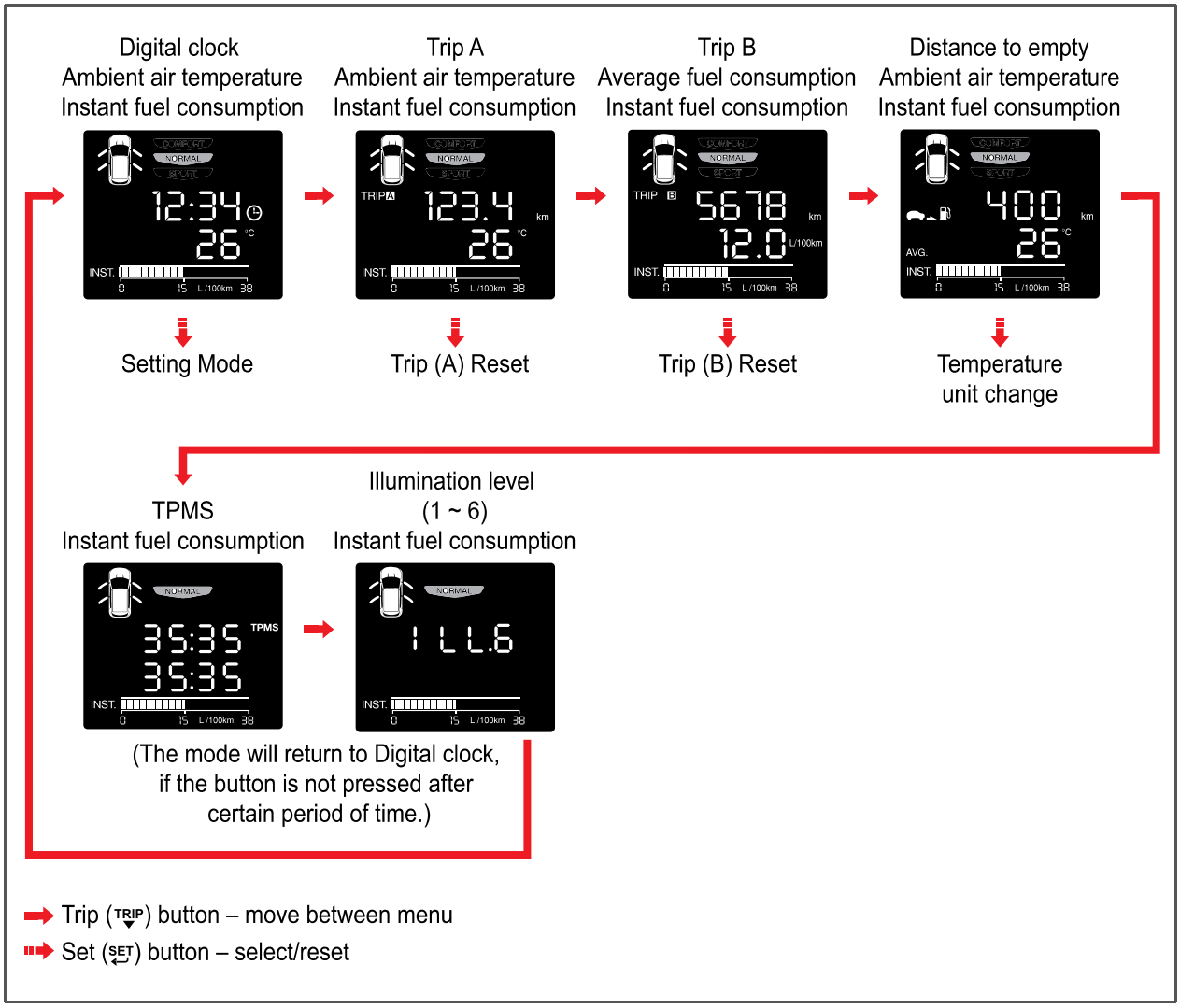
The display mode is set and changed by the TRIP switch and SET switch located on the center fascia switch assembly.

▶ **Supervision instrument cluster**



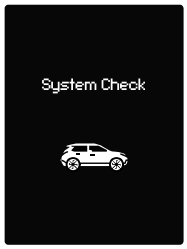
Modification basis	
Application basis	
Affected VIN	

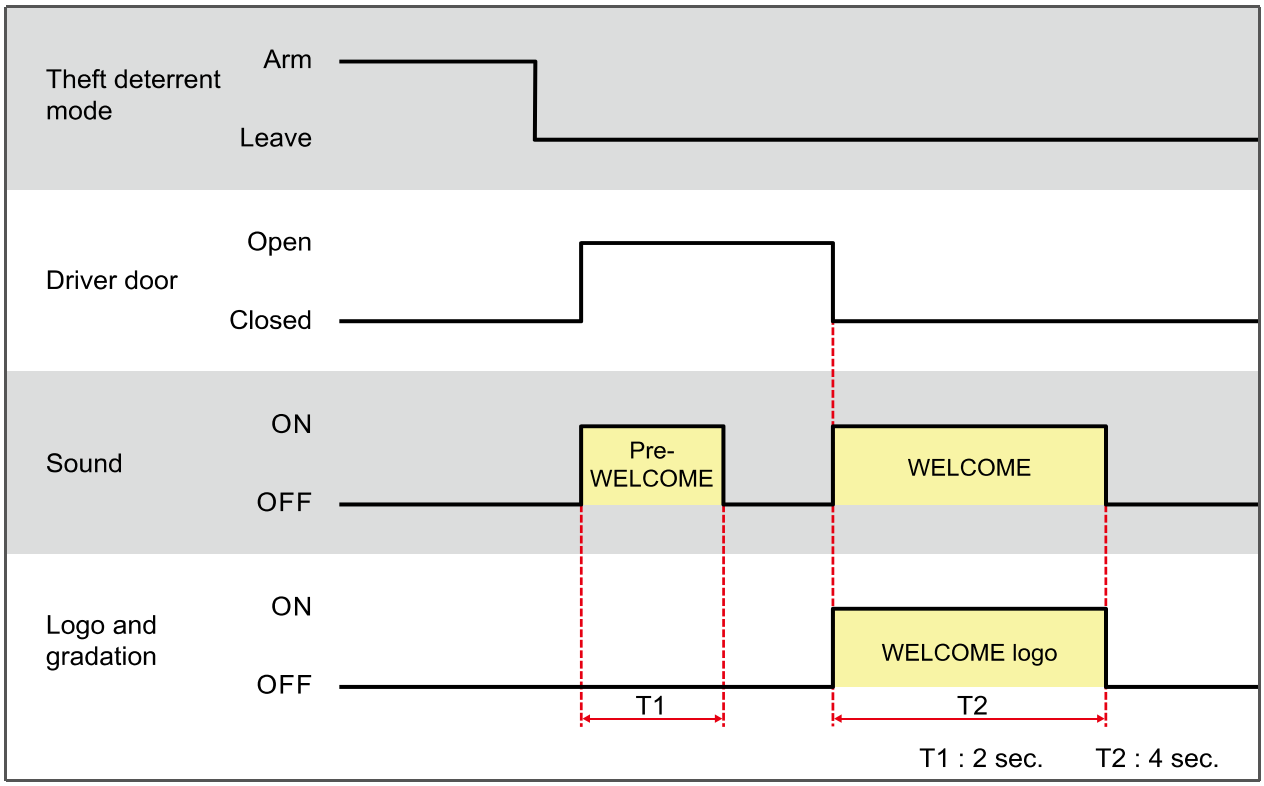
▶ Standard instrument cluster



Modification basis	
Application basis	
Affected VIN	

6. DYNAMIC CLIENT (SUPERVISION CLUSTER)

Display	Operating conditions	Remarks
	**1. Pre-WELCOM sound:** When the driver's door is opened after the theft deterrent mode is deactivated **2. WELCOME sound with logo:** When the open driver's door is closed after the theft deterrent mode is deactivated	**When the ignition is turned on while [WELCOME] is displayed.** - WELCOME sound with logo is activated for the time remaining. - The screen is changed to System Check screen when the ignition is turned on.
	When the ignition is turned off	-
	Performs system check once for 4 seconds when the ignition is turned on.	-

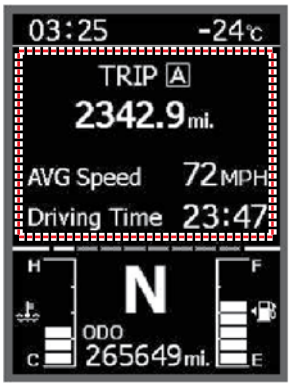
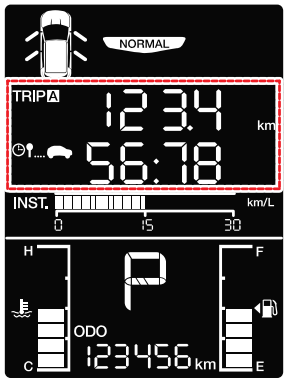


Modification basis	
Application basis	
Affected VIN	

7. DISPLAY

1) Trip Display

▶ **TRIP A / B**

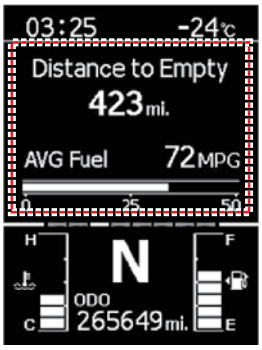
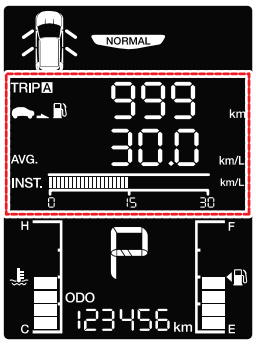
Item		Supervision instrument cluster	Standard instrument cluster
LCD display			
Mileage	TRIP A	0.0 to 9,999.9 (km/mile)	0.0 to 999.9 (km/mile)
	TRIP B		0.0 to 9,999 (km/mile)
Average speed display range		0 to 220 km/h or 140 mph	None
Elapsed time display range		0:00 to 99:59 (minutes)	←
Reset	Mileage (A)	Press the SET button for 1 second or more. When the battery is reset or the instrument cluster is disconnected.	
	Average speed	Press the SET button for 1 second or more. When the battery is reset or the instrument cluster is disconnected.	None
	Elapsed time	Press the SET button for 1 second or more. When the battery is reset or the instrument cluster is disconnected.	

NOTE

Initial calculating condition for average speed

The average speed stars to appear on the screen when the following conditions are met: vehicle is driven for more than 10 sec. and more than 50 m after the ignition is turned on.

▶ **Distance to empty/Average fuel economy/Instantaneous fuel economy**

Item		Supervision instrument cluster	Standard instrument cluster
Display			
Distance to empty display range		0 to 1,500 (km/mile)	←
Average fuel economy display range		-	-
Instantaneous fuel economy display range		0 ~ 30 (km/L, L/100km) 0 ~ 50(mpg)	←
Reset	Distance to empty	Impossible	
	Average fuel economy	Press the SET button for 1 second or more.	
	Instantaneous fuel economy	Impossible	

NOTE

Initial calculating condition for average fuel economy

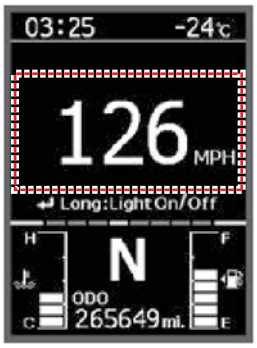
The average fuel economy stars to appear on the screen when the following conditions are met: vehicle is driven for more than 10 sec. and more than 50 m after the ignition is turned on.

Distance to empty display

If the distance to empty is less than 50 km, (---) is displayed on the screen.

Modification basis	
Application basis	
Affected VIN	

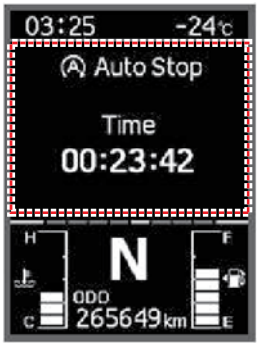
▶ Digital speedometer

Item	Supervision instrument cluster	Standard instrument cluster
Display		Not supported
Speed display range	0 to 220 km/h	

NOTE

- Displays the number corresponding to the current vehicle speed.
- Pressing the SET button for 1 second or more turns on or off all indicators and illuminations except the LCD screen itself.

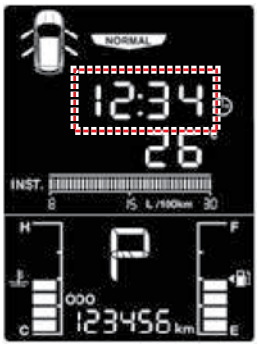
▶ Auto stop

Item	Supervision instrument cluster	Standard instrument cluster
Display		Not supported
Unit	hh:mm:ss	
Reset	Press the SET button for 1 second or more.	

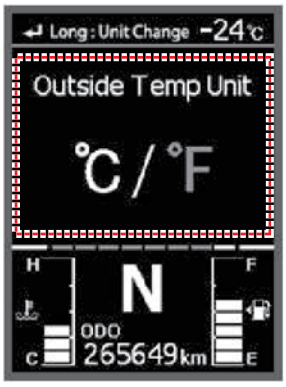
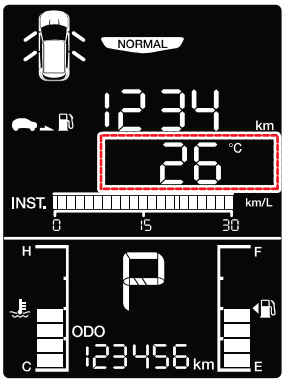
NOTE

Shows accumulated ISG operation time.

▶ Auto stop

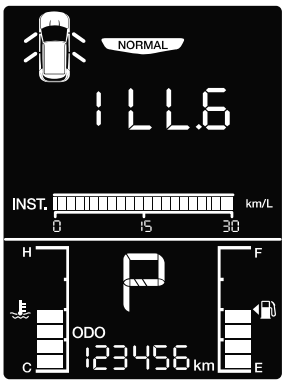
Item	Supervision instrument cluster	Standard instrument cluster
Display		
Unit	hh:mm	
Seting Mode	Press the SET button for 1 second or more.	

▶ Ambient temperature

Item	Supervision instrument cluster	Standard instrument cluster
Display		
Display range	−30˚C to 90˚C −22˚F to 194˚F	←
Unit change	The temperature unit is changes between Celsius degree and Fahrenheit degree each time the SET button is pressed.	

Modification basis	
Application basis	
Affected VIN	

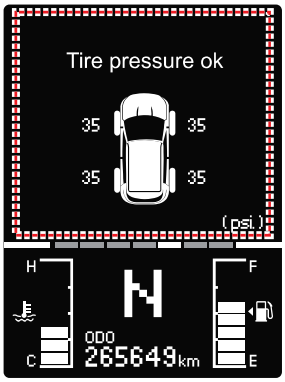
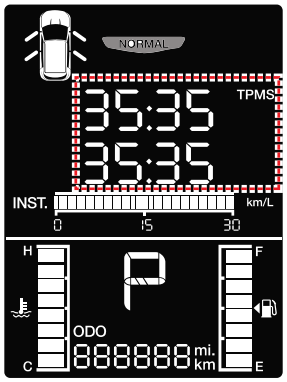
▶ Adjusting illumination brightness

Item	Supervision instrument cluster	Standard instrument cluster
Display	Refer to cluster setting menus	
Illumination brightness adjusting condition		Enter the illumination adjustment mode using the TRIP switch.
Adjusting illumination brightness		The brightness level is changed by one step each time the SET button is pressed briefly in illumination adjustment mode.

NOTE

- The initial illumination brightness is ILL.5 after the B+ power is supplied.
- The illumination adjustment screen is changed to clock seting screen if there is no TRIP switch input for 5 seconds.

▶ TPMS

Item	Supervision instrument cluster	Standard instrument cluster
Display		
Display condition	The wheel sensor sends the RF signal to the TPMS ECU as soon as the vehicle is driven. Once the vehicle has been stopped, the sensor sends messages only for 5 minutes. (The wheel sensor will not send signals 5 minutes after the vehicle is stopped.) The tire pressure check is not available when the ignition is turned from off to on 5 minutes after the vehicle is stopped. The tire pressure will be displayed on the instrument cluster after the vehicle has been driven for 1 minute at 20 km/h or higher.	

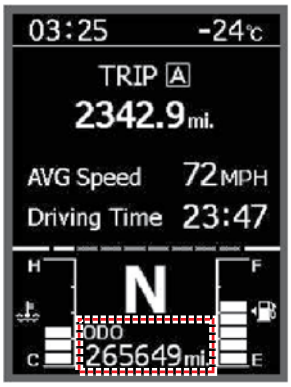
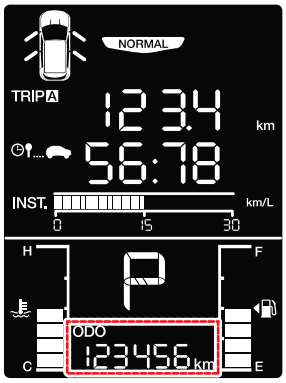
NOTE

If the ignition is not reset when the warning message related to the TPMS is displayed, the warning message remains on the screen even if the normal TPMS signal is input.

Modification basis	
Application basis	
Affected VIN	

2) Fixed Display

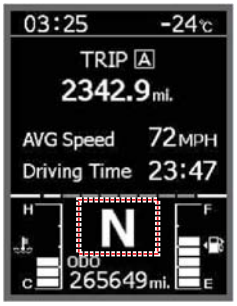
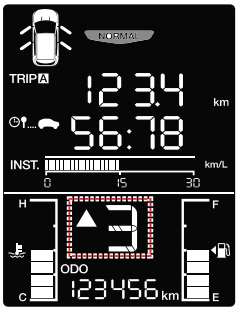
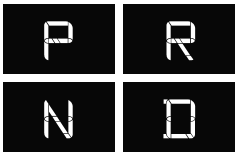
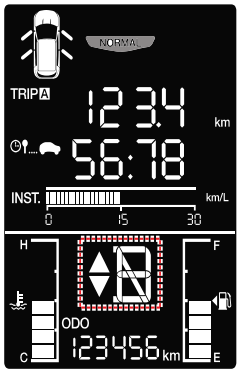
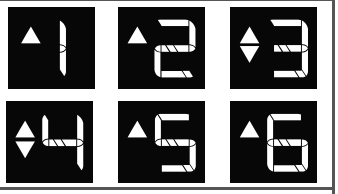
▶ **Odometer**

Item	Supervision instrument cluster	Standard instrument cluster
Input data	Speed signal (ESP)	←
Display type	MONO TFT LCD - 6 lines	SEGMENT LCD - 6 lines
Display range	0 to 999,999 km/mile	←
Unit	1 km	←
Display		

NOTE

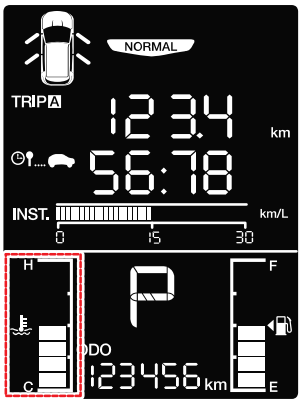
Reset not possible (always displayed after IGN ON)

▶ **Gear**

Item	Supervision instrument cluster	Standard instrument cluster	
Input data	For a vehicle with A/T	←	For a vehicle with M/T
Display type	TCU (P-CAN)	←	ECU (P-CAN) (GSI) Hard-wire (Reverse gear)
Display range	MONO TFT LCD - 6 lines	SEGMENT LCD - 6 lines	←
Unit	P-R-N-D 1-2-3-4-5-6 ▲	←	R 1-2-3-4-5-6 ▲▼
Display	 	 	 
A/T M mode (GSI: Gear Shift Indicator)			-
	 This indicates the most appropriate timing for shifting to the 4th gear (target) when the vehicle is driven in 3rd gear.		
	NOTE When the engine rpm is high, upshift can occur to avoid any damage to the system without changing the gear in time, with forward gears such as 1st, 2nd and 3rd engaged.		
M/T (GSI: Gear Shift Indicator)	-		
	 This indicates the most appropriate timing for shifting to the 3rd gear (target) when the vehicle is driven in 1st to 2nd gear.		
	 This indicates the most appropriate timing for shifting to the 3rd gear (target) when the vehicle is driven in 4th to 6th gear.		

Modification basis	
Application basis	
Affected VIN	

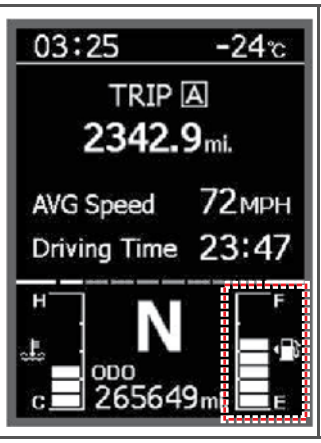
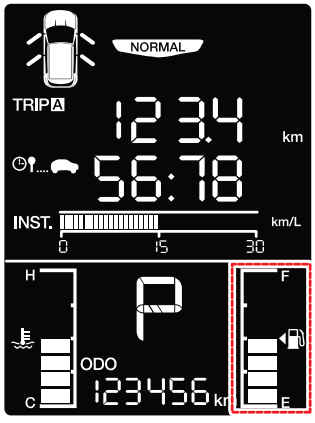
▶ Coolant temperature

Item		Signal		Remarks
		Supervision instrument cluster	Standard instrument cluster	
Input data		ECU P-CAN		-
Display type		Segment		-
Display range	0 segment	38°C to 39°C		-
	1st segment	39°C to 40°C		-
	2nd segment	49°C to 50°C		-
	3rd segment	59°C to 60°C		-
	4th segment	79°C to 110°C		-
	5th segment	113°C to 114°C		-
	6th segment	117°C to 118°C		-
	7th segment	119°C to 120°C		Engine overheat indicator flashing
	8th segment	125°C to 126°C		
Unit		Segment bar		-
Display				-

NOTE

If the engine temperature exceeds 120℃ for 5 seconds, engine overheat indicator flashes (0.5 sec. ON / 0.5 sec. OFF) with a buzzer sound.

▶ Fuel gauge

Item		Signal		Remark
		Supervision instrument cluster	Standard instrument cluster	
Input data		Fuel sender		-
Display range	0 segment	Approx. 5.5 L or less		Low fuel warning lamp ON
	1st segment	Approx. 7.5 L		1st segment flashing
		Approx. 11 L		-
	2nd segment	Approx. 13 to 16 L		-
	3rd segment	Approx. 18 to 21 L		-
	4th segment	Approx. 23 to 26 L		-
	5th segment	Approx. 28 to 31 L		-
	6th segment	Approx. 33 to 36 L		-
	7th segment	Approx. 38 to 41 L		-
	8th segment	Approx. 43 to 47 L		-
Display				-
Automatic recognition - necessity of refueling		- When the IGN OFF or vehicle speed is about 0.2 km/h or less (Displays the average fuel level on the screen by calculating additional fuel level for 3 seconds after 10 minutes have passed since the current fuel level is measured) - If the vehicle speed is 0.2 km or more, the automatic recognition mode (necessity of refueling) is deactivated. - If the ignition is turned off after measuring the fuel level, the system will enter sleep mode.		

Modification basis	
Application basis	
Affected VIN	

Item		Signal		Remark
		Supervision instrument cluster	Standard instrument cluster	
Determining - necessity of refueling	IGN OFF	IGN OFF to ON time ≤ 13 sec.: Previous measured level is displayed. IGN OFF to ON time > 13 sec.: Current measured level is displayed.		
	IGN ON	If the vehicle speed is about 0.2 km/h or less for 13 seconds, the current measured value will be displayed.		

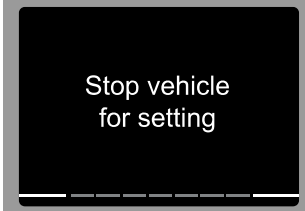
3) Instrument Cluster Setting (Supervision Instrument Cluster)

▶ **Supervision instrument cluster**

Step 1 for setting cluster	Step 2 for setting cluster	Description
 Use the TRIP (▼) switch to move through the menus and SET (◀┘) switch to select setting.		- Sets color of screen illumination for daytime mode: 5 colors - Sets color of screen illumination for nighttime mode: 5 colors - Color White → Red → Yellow → Blue → Sky blue → OFF - Daytime/nighttime illumination setup
		The brightness of the screen illumination is adjusted in 6 steps. The default brightness after the B+ power is supplied is level 5.
		Average fuel economy AUTO reset
		**Overspeed warning ON** - When the vehicle speed is higher than the speed specified the driver, the current illumination flashes. - Set values for overspeed (60 km/h to 120 km/h, in 10 km/h increments).

NOTE

- The WELCOM sound is enabled or disabled during dynamic client operation. Use the check box to enable/disable WELCOM sound.

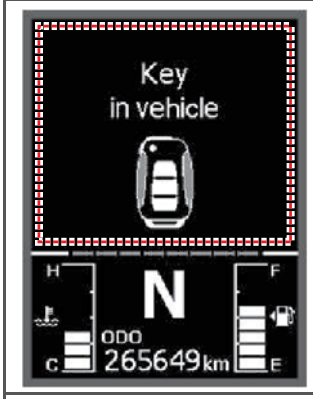
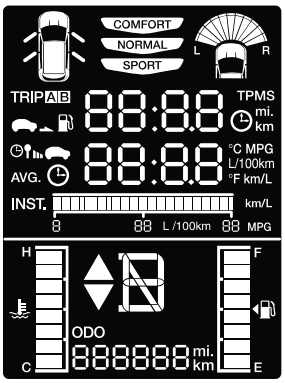


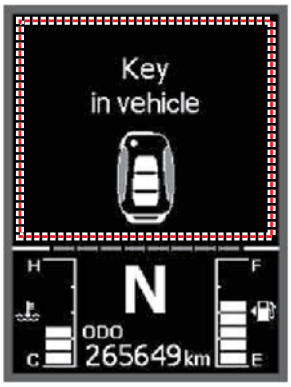
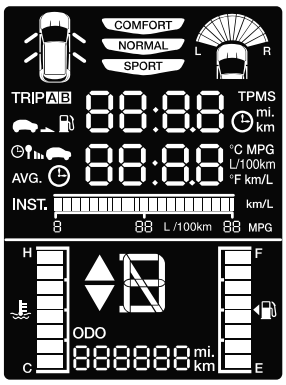
- Step 2 for cluster setting
  1) When the ignition is turned on and the vehicle speed is 2 km/h or lower
  2) When the vehicle speed is 2 km/h or more during step 2 of cluster setting, a warning message is displayed for 4 seconds and the screen returns the step 1 screen of cluster setting.

Modification basis	
Application basis	
Affected VIN	

4) Warnings and Indicators Display

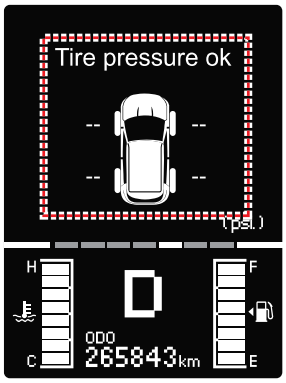
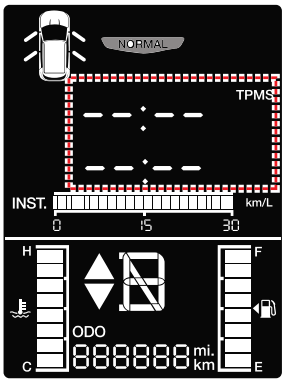
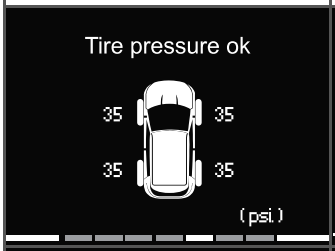
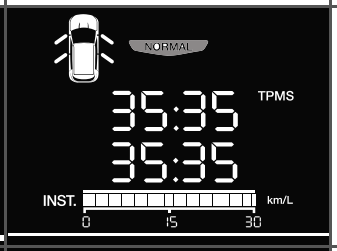
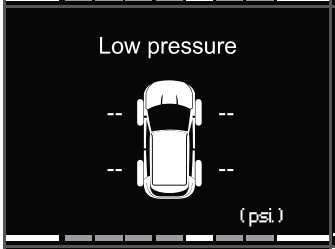
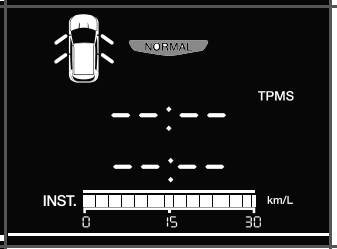
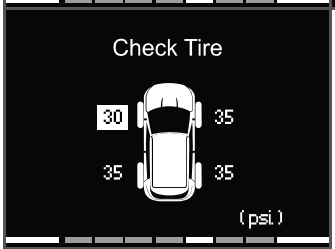
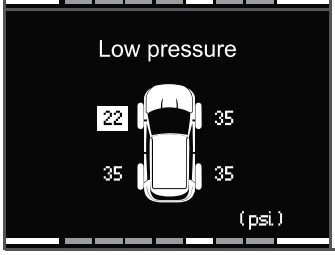
▶ **Smart key warning**

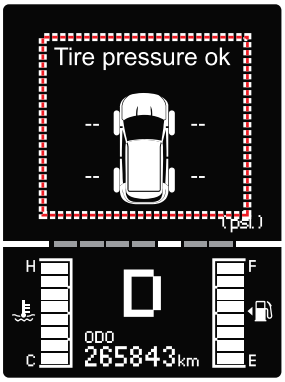
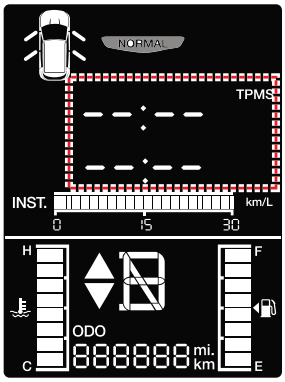
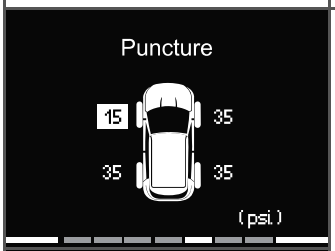
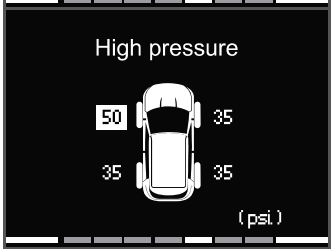
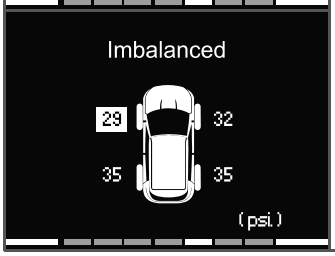
Supervision instrument cluster	Standard instrument cluster	Operating conditions
		-
	Standard instrument cluster: None	If you lock the door using the registered smart key with another registered smart key left inside the vehicle and all doors closed, this message will be displayed for 10 seconds.
		If the smart key is not in the vehicle when the door is opened and then closed with the ignition ON or engine running, this message will be displayed on the screen.
		If the smart key battery is low, this message will be displayed on the screen for 10 seconds.
		If the ignition is cycled once (OFF→ACC→IGN→ACC→OFF) and then the START/STOP switch is pressed and held until the ACC is activated without the brake pedal depressed, this message will be displayed for 10 seconds.
		If the START/STOP switch is pressed when the smart key is not inside the vehicle or the smart key battery is low, this message will be displayed on the screen.

Supervision instrument cluster	Standard instrument cluster	Operating conditions
		-
	Standard instrument cluster: None	If the shift lever is not in the P or N position when the engine is started, this message will be displayed for 10 seconds to inform the driver that the START/STOP switch must be pressed with the shift lever in P or N position.
		If the SKM receives no signals or faulty/incorrect signals from the vehicle power supply control or START/STOP switch, this message will be displayed for 10 seconds.
		This is a temporary malfunction of ESCL and the message is displayed if the vehicle needs to be attempted to start while turning the steering wheel.
		This is a temporary malfunction of ESCL and the message is displayed if the steering column is not locked.
		The message is displayed for about 10 seconds if the system check-up is required since the ESCL system is malfunctioning.
		The message is displayed if ESCL coding check-up is required. (Corresponding signal transmitted, with no coding between SKM and ESCL)

Modification basis	
Application basis	
Affected VIN	

▶ TPMS warning indicator

Supervision instrument cluster	Standard instrument cluster	Operating conditions
		**Warning message display priority** 1. Faulty ECU 2. Wheel sensor malfunction 3. Auto learn disabled 4. RF interference 5. Low inflation pressure (Driving inflation pressure loss is 20%) 6. Low inflation pressure (minimum inflation pressure) 7. Rapid loss of inflation pressure 8. Too high inflation pressure 9. Pressure out of balance, on the left and right sides * For a vehicle with standard instrument cluster, the tire inflation pressure can be checked in only TPMS setting mode.
		When the tire inflation pressure is normal
		The message before turning the ignition off is displayed after turning the ignition on. If the system does not recognize the tire pressure, dashes (--) will be displayed.
	The LCD screen on the standard instrument cluster only displays current tire pressure values and dashes (- -) regardless the warning(inverse shading and flashing).	When the current tire pressure differs a lot from the specified pressure. The global warning lamp flashes every 0.4 seconds for 70 seconds. After that, inverse shading will be displayed on the corresponding tire.
		When the current tire pressure is too low. The global warning lamp stays on. After that, inverse shading will be displayed on the corresponding tire.

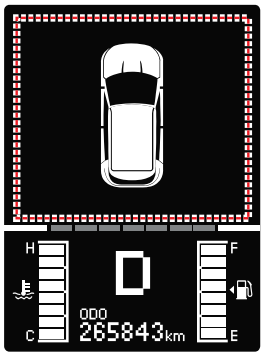
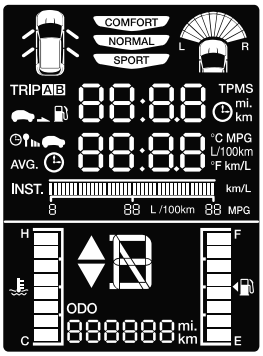
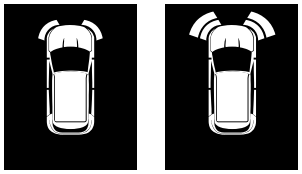
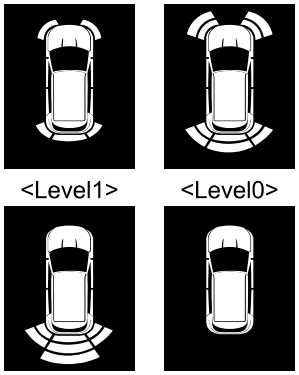
Supervision instrument cluster	Standard instrument cluster	Operating conditions
		**Warning message display priority** 1. Faulty ECU 2. Wheel sensor malfunction 3. Auto learn disabled 4. RF interference 5. Low inflation pressure (Driving inflation pressure loss is 20%) 6. Low inflation pressure (minimum inflation pressure) 7. Rapid loss of inflation pressure 8. Too high inflation pressure 9. Pressure out of balance, on the left and right sides * For a vehicle with standard instrument cluster, the tire inflation pressure can be checked in only TPMS setting mode.
	The LCD screen on the standard instrument cluster only displays current tire pressure values and dashes (- -) regardless the warning(inverse shading and flashing).	When the current tire pressure drops rapidly or when one or more tires are flat. The global warning lamp stays on. After that, inverse shading will be displayed on the corresponding tire.
		When the current tire pressure is too high. The corresponding tire flashes with the shading inverted alternatively.
		When the tire pressure difference between the front and rear tires is great enough to affect the safe driving. The left and right indicators flash every 1 second for 70 seconds with the shading inverted alternatively.

NOTE

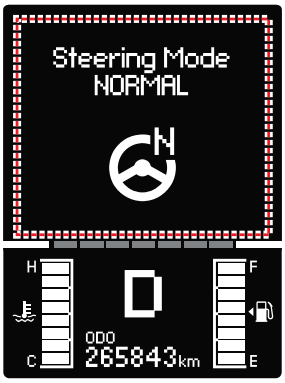
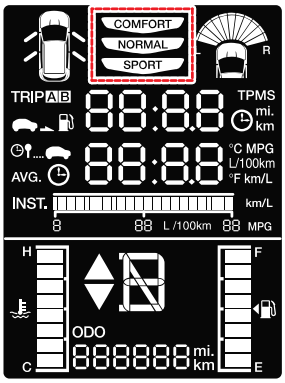
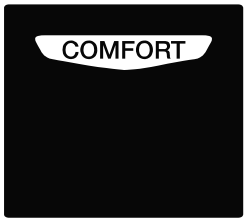
Check the TPMS when the global warning lamp flashes or stays on.

Modification basis	
Application basis	
Affected VIN	

▶ Parking aid system (PAS)

Supervision instrument cluster	Standard instrument cluster	Operating conditions
		-
<Level3> <Level2>  <Level1> <Level0> 	Standard instrument cluster: None	1) Front PAS **If obstacles are detected in front of the vehicle when the shift lever is moved to the D position with the IGN ON:** (a) the existence of the obstacles is displayed in Level 2 and Level 3 indicators according to the distance between the obstacles and the vehicle and the location of the obstacles; (b) no information is displayed within a certain distance (Level 0 and Level 1). (Disabled when the vehicle speed is 15 km/h or higher, Enabled when the vehicle speed is less than 10 km/h)
<Level3> <Level2>  <Level1> <Level0>	Standard instrument cluster: None	2) Rear PAS **When the shift lever is moved to the R position with the IGN ON and the system starts to detect obstacles after a beep sound.** If obstacles are detected behind the vehicle the existence of the obstacles is displayed in 4 levels (Level 0, Level 1, Level 2, Level 3) according to the distance between the obstacles and the vehicle and the location of the obstacles. (Level 1 of rear PAS: Information of front PAS is not displayed. Level 0 of rear PAS: Only the shape of vehicle is displayed.)
	Standard instrument cluster: None	If any error is detected during initial diagnosis, it is displayed as a question mark (?). Other points without errors are displayed in the same way as the PAS mode.

▶ Smart steer mode

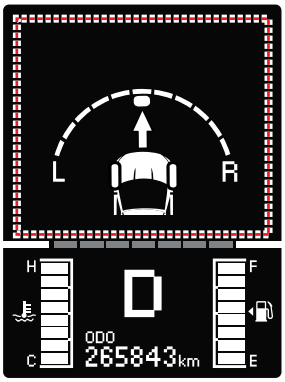
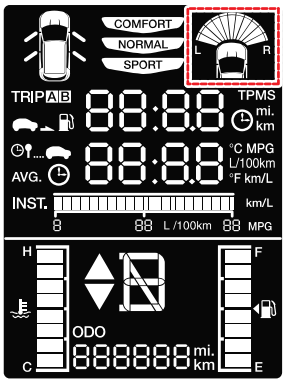
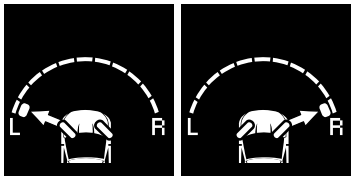
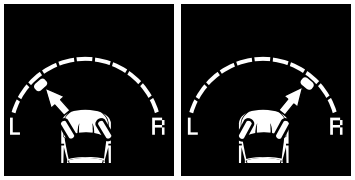
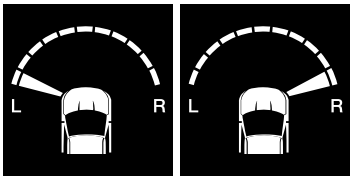
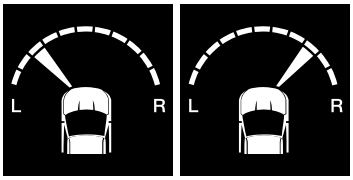
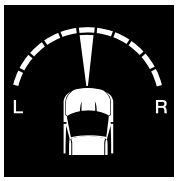
Supervision instrument cluster	Standard instrument cluster	Operating conditions
		Pressing the smart steer switch displays the currently selected steer mode on the screen of the instrument cluster. The mode is changed in the order of COMFORT → NORMAL → SPORT each time the switch is pressed within 4 sec. If the switch is not pressed within 4 sec., the mode returns to the previously selected mode. The selected smart steer mode is maintained even if the ignition switch is turned OFF and ON again.
		The COMFORT mode is used when smoother or more comfortable ride than NORMAL mode is required.
		The NORMAL mode is used for typical driving conditions.
		The SPORT mode is used for heavy steering (heavier than NORMAL mode) and high speed operation.

CAUTION

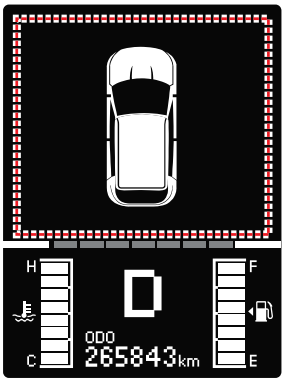
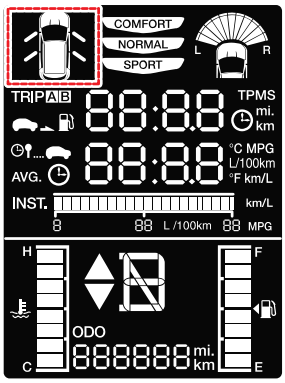
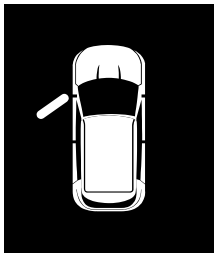
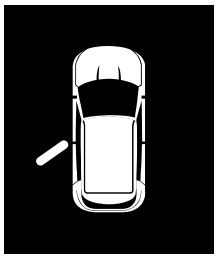
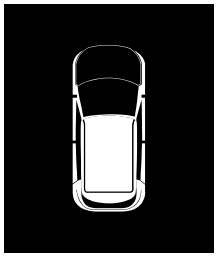
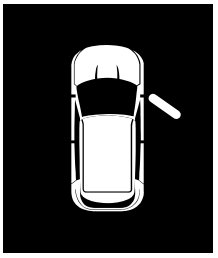
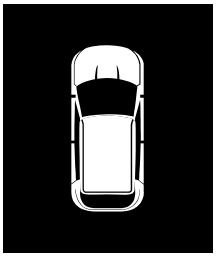
- When changing smart steer mode during driving, all attention should be kept on the roadway ahead.
- When changing the smart steer mode while turning the steering wheel, the selected mode is displayed on the instrument cluster screen, but the steering force may not change immediately. If this is the case, the mode will be changed to the selected mode automatically after the steering wheel has been operated.
- If the EPS system does not operate because of the malfunction in the system, the smart steer mode will not be available.

Modification basis	
Application basis	
Affected VIN	

▶ Tire pressure monitoring system (TPMS)

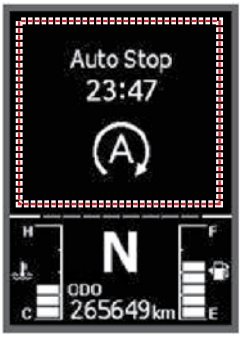
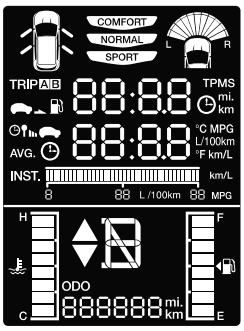
Supervision instrument cluster	Standard instrument cluster	Operating conditions
		This indicator helps the driver to predict the driving direction by showing the tire alignment on the instrument cluster.
<Level5>  <Level3>  <Level0> 	<Level5>  <Level3>  <Level0> 	- Tire alignment is displayed in 6 levels (level 0 to level 5) depending on the alignment degree when the ignition switch is turned to "ON" position from "OFF" position The indicators for up to level 2 are displayed for 5 seconds, while the indicators for level 3 to level 5 stay on. **Display conditions** **1. For a vehicle with A/T:** Gear selector lever in P or N position **2. For a vehicle with M/T:** Gear selector lever in N position and parking brake applied **3. Vehicle speed:** Vehicle stop signal is input The tire alignment indicators are not displayed when the EPS check message is displayed. -

▶ Door open

Supervision instrument cluster	Standard instrument cluster	Operating conditions
		-
Driver door open  Rear door (LH) open  Hood open 	Passenger door open  Rear door (RH) open  Tailgate open 	- These indicators come on to inform the driver of the open door. - When the engine hood is open, the corresponding indicator flashes. - When the tailgate is open, the corresponding indicator flashes.

Modification basis	
Application basis	
Affected VIN	

▶ Auto Stop(ISG System Massage)

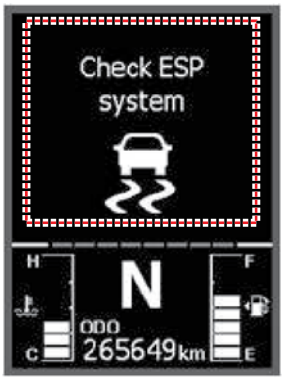
Supervision instrument cluster	Standard instrument cluster	Operating conditions
		-
	Standard instrument cluster: None	The message is displayed when the ISG system's auto stop (automatic engine shutdown) is activated.
		The message is displayed when the ISG system's auto start (automatic engine restart) is activated.
		The message is displayed for about 5 seconds when you press the ISG OFF switch to turn the system off.
		The message is displayed when the ISG system operating conditions are not met.
		The message is displayed when the ISG system is deactivated.
		The message is displayed for about 5 seconds if the system check-up is required since the ISG system is malfunctioning.

NOTE

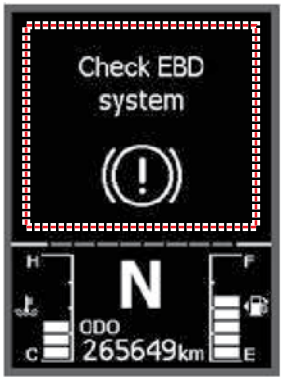
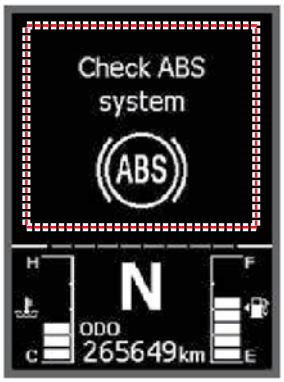
Priorities of ISG system messages

ISG system malfunction → ISG system deactivated → ISG system operating conditions not met → ISG system off → ISG START → ISG STOP

▶ **ESP**

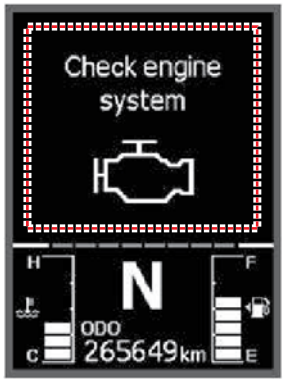
Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	This message comes on when the ESP system is faulty.

▶ **ABS**

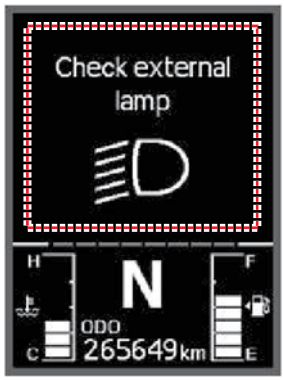
Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	This message comes on when the EBD system is faulty.
		This message comes on when the ABS system is faulty.

Modification basis	
Application basis	
Affected VIN	

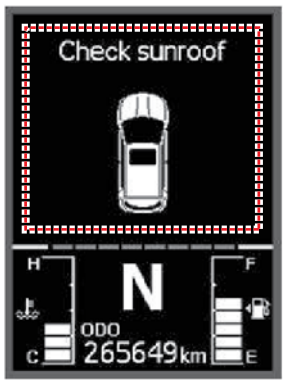
▶ Engine check

Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	This message is displayed when the engine check warning lamp is turned on.

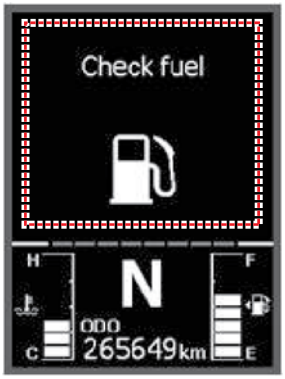
▶ Exterior lamp

Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	This message comes on when the tail lamps are ON with the ignition in the "OFF" or "ACC" position

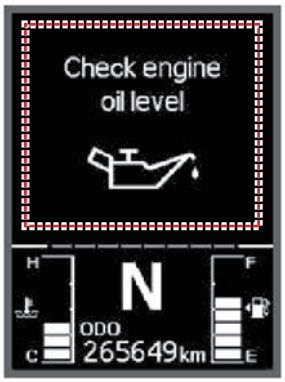
▶ Sunroof

Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	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 message comes on when the sunroof is open with the ignition in the "OFF" position and the key removed.

▶ **Fuel**

Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	When the low fuel level warning lamp is ON

▶ **Engine oil pressure**

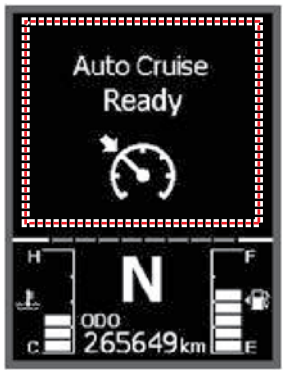
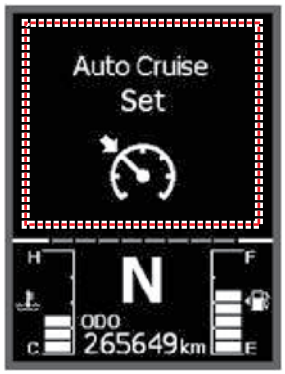
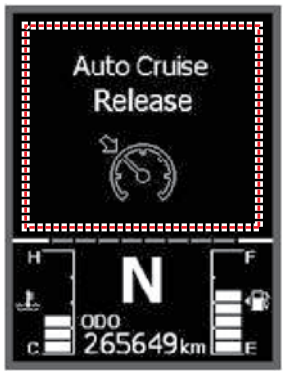
Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	When the engine oil pressure warning light is ON

NOTE

The messages regarding the ABS, ESP, EBD, engine check, and low fuel level are displayed 5 seconds after the engine start even when the conditions are met at the time of IGN ON.

Modification basis	
Application basis	
Affected VIN	

▶ Cruise

Supervision instrument cluster	Standard instrument cluster	Operating conditions
	Standard instrument cluster: None	The message is displayed each time the READY indicator is turned on.
		The message is displayed each time the CRUISE indicator is turned on.
		The message is displayed when the READY or CRUISE indicator is turned off.

8. ILLUMINATION AND BRIGHTNESS

1) Instrument Cluster Illumination

Supervision instrument cluster		Standard instrument cluster
		
A	MONO TFT LCD	SEGMENT LCD
B	Dial	Dial
C	Pointer	Pointer
D	Gradation	-

NOTE

- When the tail lamp is turned on, the nighttime illumination is set and the brightness decreases.
- The default brightness after the battery reset is level 5.
- When the ignition is turned from off to on, the brightness of the instrument cluster illumination returns to the level previously set.

Modification basis	
Application basis	
Affected VIN	

(2) Illumination Setup

Setup method
- Supervision instrument cluster: Set through the cluster setting menu
- Standard instrument cluster: Set through the display TRIP menu

▶ Daytime illumination

Illumination level	Set value (PWM duty)					
	Supervision instrument cluster			Standard instrument cluster		
	Dial	Pointer	LCD	Dial	Pointer	LCD
Level 1	100%	100%	100%	100%	100%	100%
Level 2	90%	90%	90%	90%	90%	90%
Level 3	70%	70%	70%	70%	70%	70%
Level 4	50%	50%	50%	50%	50%	50%
Level 5	30%	30%	30%	30%	30%	30%
Level 6	20%	20%	20%	20%	20%	20%

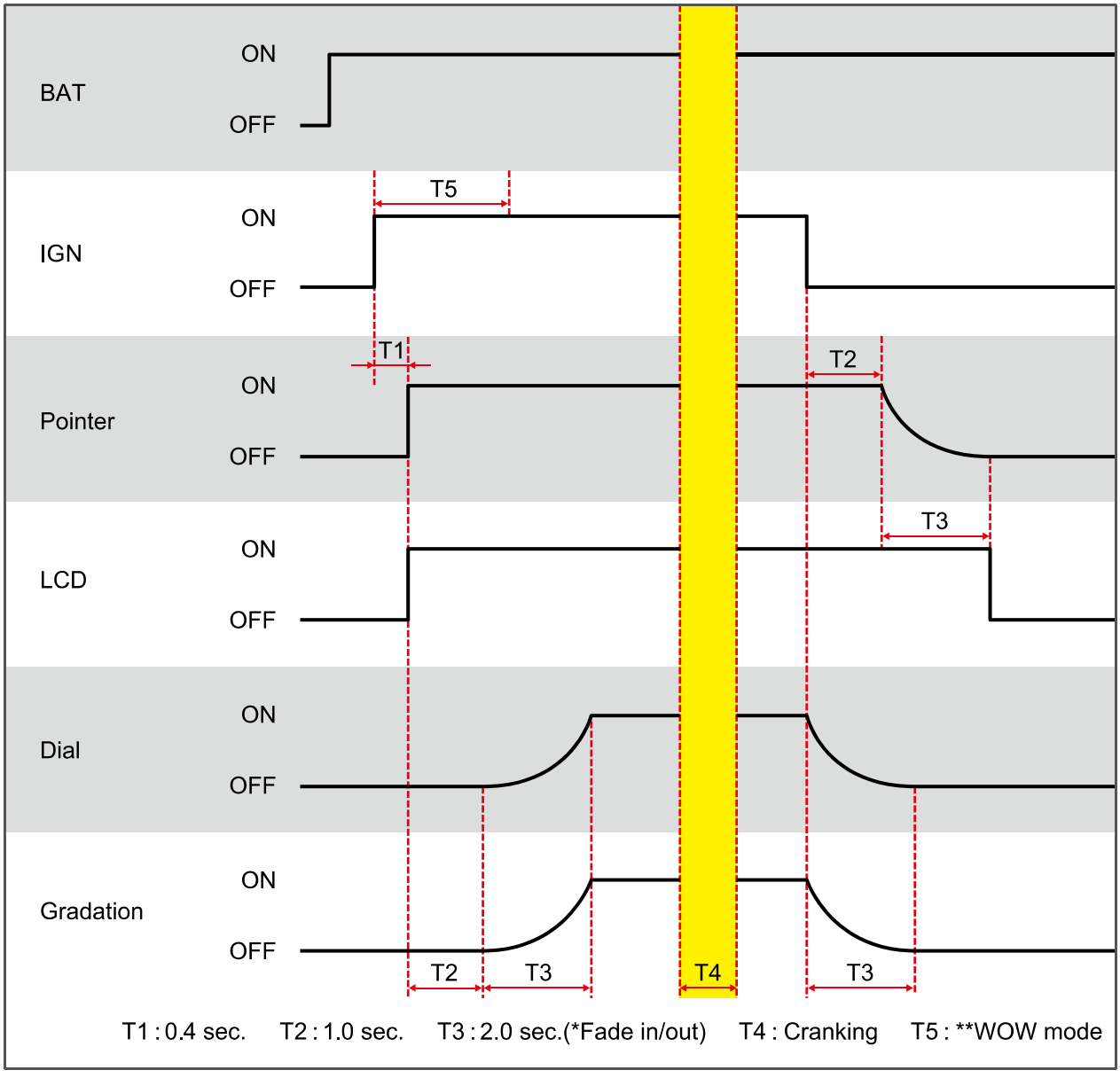
▶ Nighttime illumination

Illumination level	Set value (PWM duty)					
	Supervision instrument cluster			Standard instrument cluster		
	Dial	Pointer	LCD	Dial	Pointer	LCD
Level 1	100%	100%	100%	100%	100%	100%
Level 2	40%	40%	40%	20%	20%	40%
Level 3	30%	30%	30%	15%	15%	32%
Level 4	20%	20%	20%	10%	10%	24%
Level 5	10%	10%	10%	5%	5%	18%
Level 6	5%	5%	5%	2%	2%	10%

4) Illumination Order

(1) Supervision instrument cluster

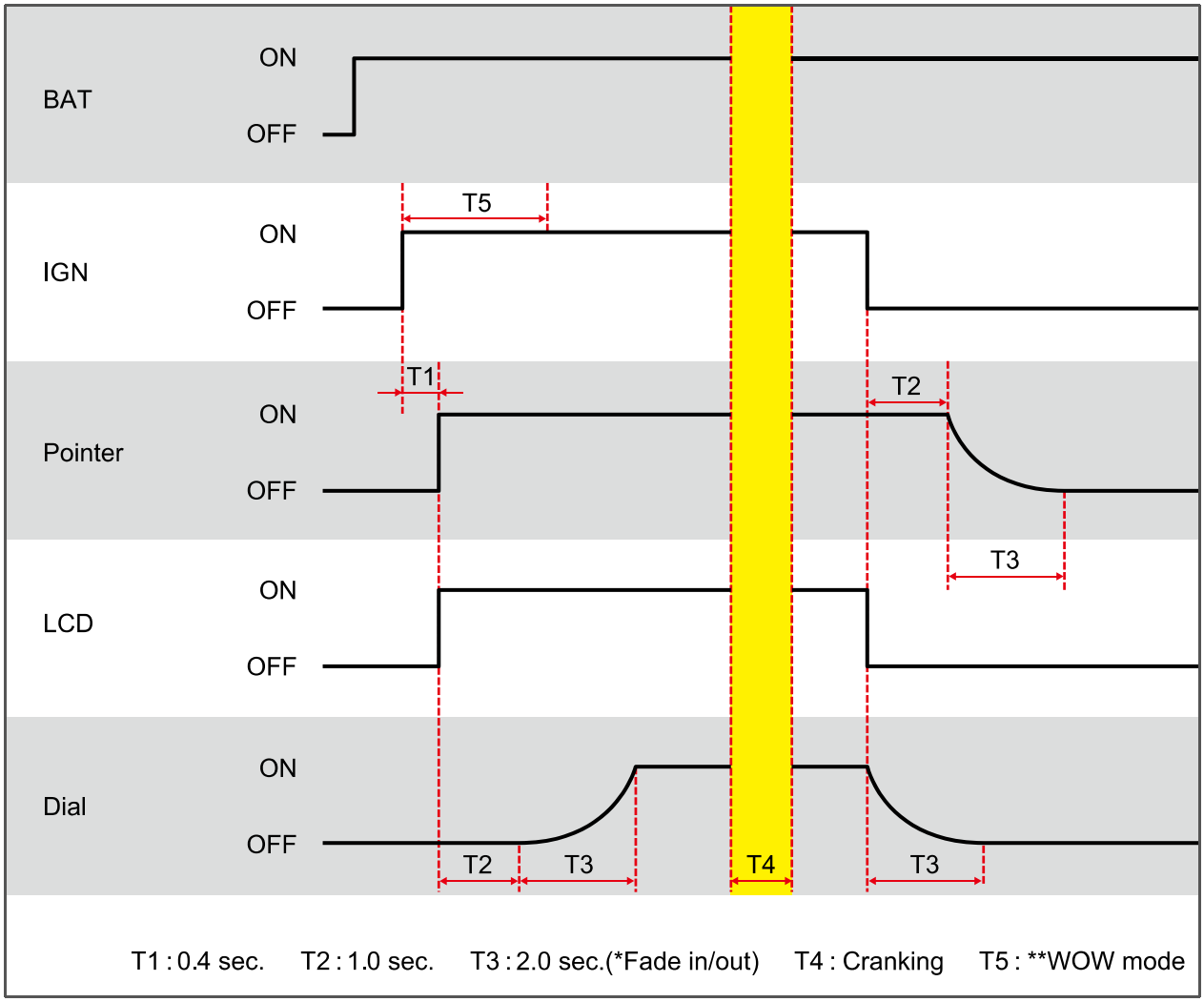
A. When the ignition is turned on, the WOW mode is activated and the pointer illumination and LCD illumination are turned on within 0.4 seconds (T1).
B. After 1 second (T2), the dial illumination and gradation fade in over 2 seconds (T3).
C. After the ignition is turned off, the dial illumination and gradation fade out over 2 seconds (T3).
D. After 1 second (T2), the pointer illumination fades out over 2 seconds (T3).
E. The LCD screen is turned off at the time of the pointer illumination off.



Modification basis	
Application basis	
Affected VIN	

(2) Standard instrument cluster

A. When the ignition is turned on, the WOW mode is activated and the pointer illumination and LCD illumination are turned on within 0.4 seconds (T1).
B. After 1 second (T2), the dial illumination fades in over 2 seconds (T3).
C. After the ignition is turned off, the dial illumination fades out over 2 seconds (T3) and the LCD screen illumination goes out immediately.
D. After 1 second (T2), the pointer illumination fades out over 2 seconds (T3).



NOTE

* **Fade in/Fade out?**
  - Fade in: The illumination becomes bright gradually.
  - Fade out: The illumination becomes dark gradually.

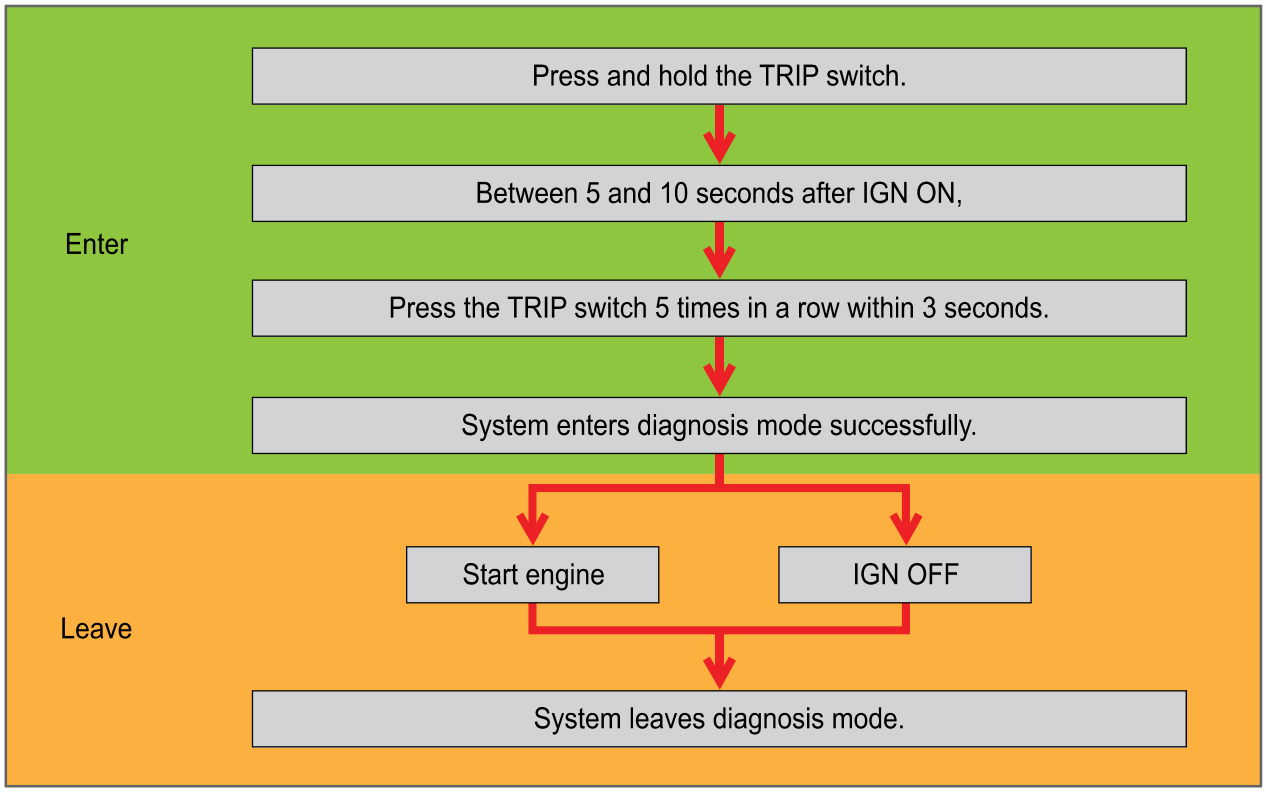
* **What is WOW mode?**
  When the ignition is turned on, the speedometer and tachometer and fuel and coolant temperature level segments move as follows. This moving/operation pattern of these gauges is called WOW mode.
  - Speedometer and tachometer: pointer moves from the lowest point to the highest point.
  - Fuel and coolant temperature level segments: The segments come on one after another (from the lowest one to highest one) and then go out in reverse order.

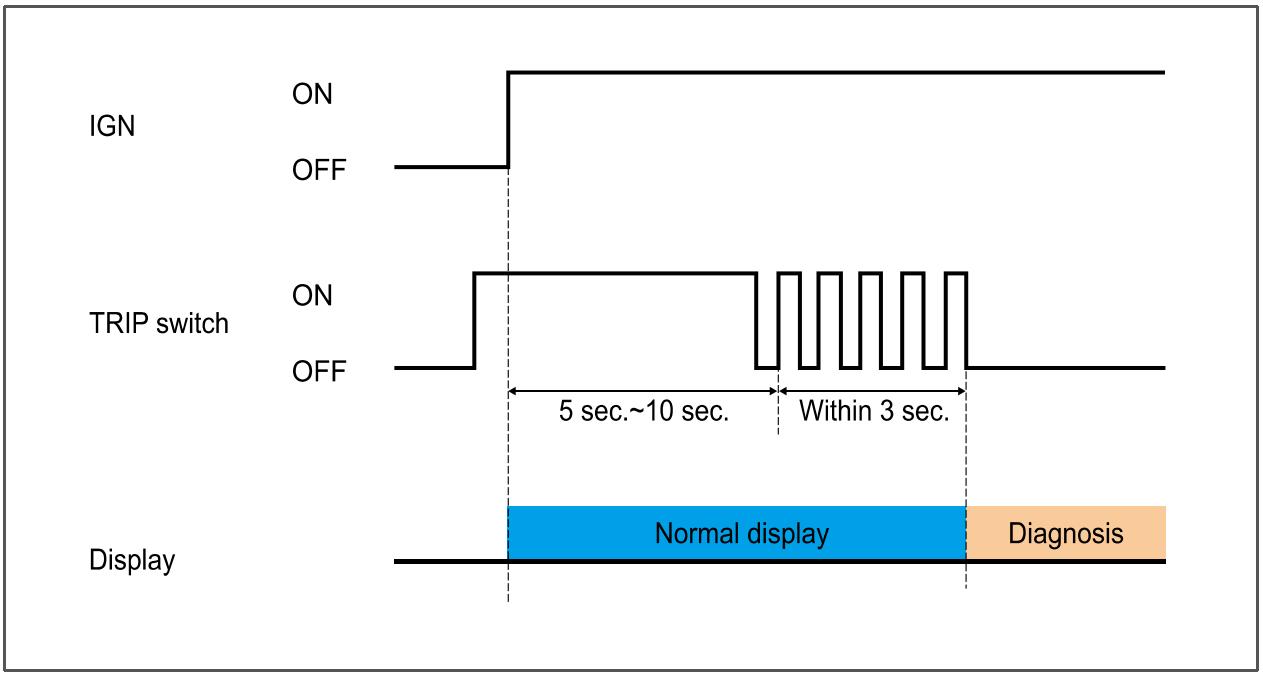
  After the WOW mode is completed, each gauge returns to the normal mode.
  The WOW mode is not activated when the ignition is turned on during fade out (IGN OFF).

Modification basis	
Application basis	
Affected VIN	

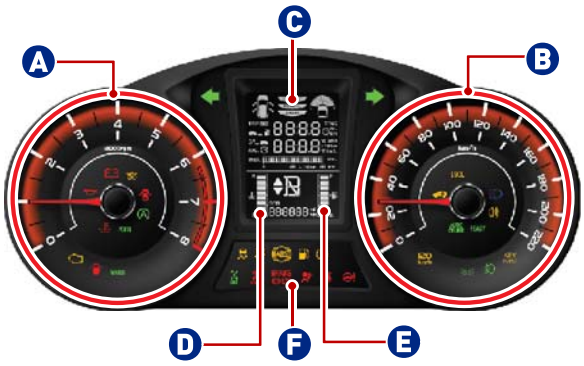
9. SELF DIAGNOSIS

1) Self Diagnosis Process Mode





2) Self Diagnosis Display Items

Supervision instrument cluster	Standard instrument cluster
	

	Item	Supervision instrument cluster	Standard instrument cluster
A	Tachometer	Moves between the lowest point and the highest point repeatedly.	
B	Speedometer		
C	LCD	Self diagnosis screen	All segments are turned on
D	Thermometer		
E	Fuel gauge		
F	Warning lamp and indicator	- All the warning lamps and indicators controlled by MICOM control (CAN communication) come on. - The symbols for timeout and the symbols which do not need variant coding flash.	
G	Others	- The illumination output of instrument cluster is 100% (maximum brightness). - The chime sounds at regular intervals.	

NOTE

* The symbol for [CAN Time Out] flashes. When the timeout is over and the system returns to normal state, then the symbol stays on.

CAN Time Out conditions

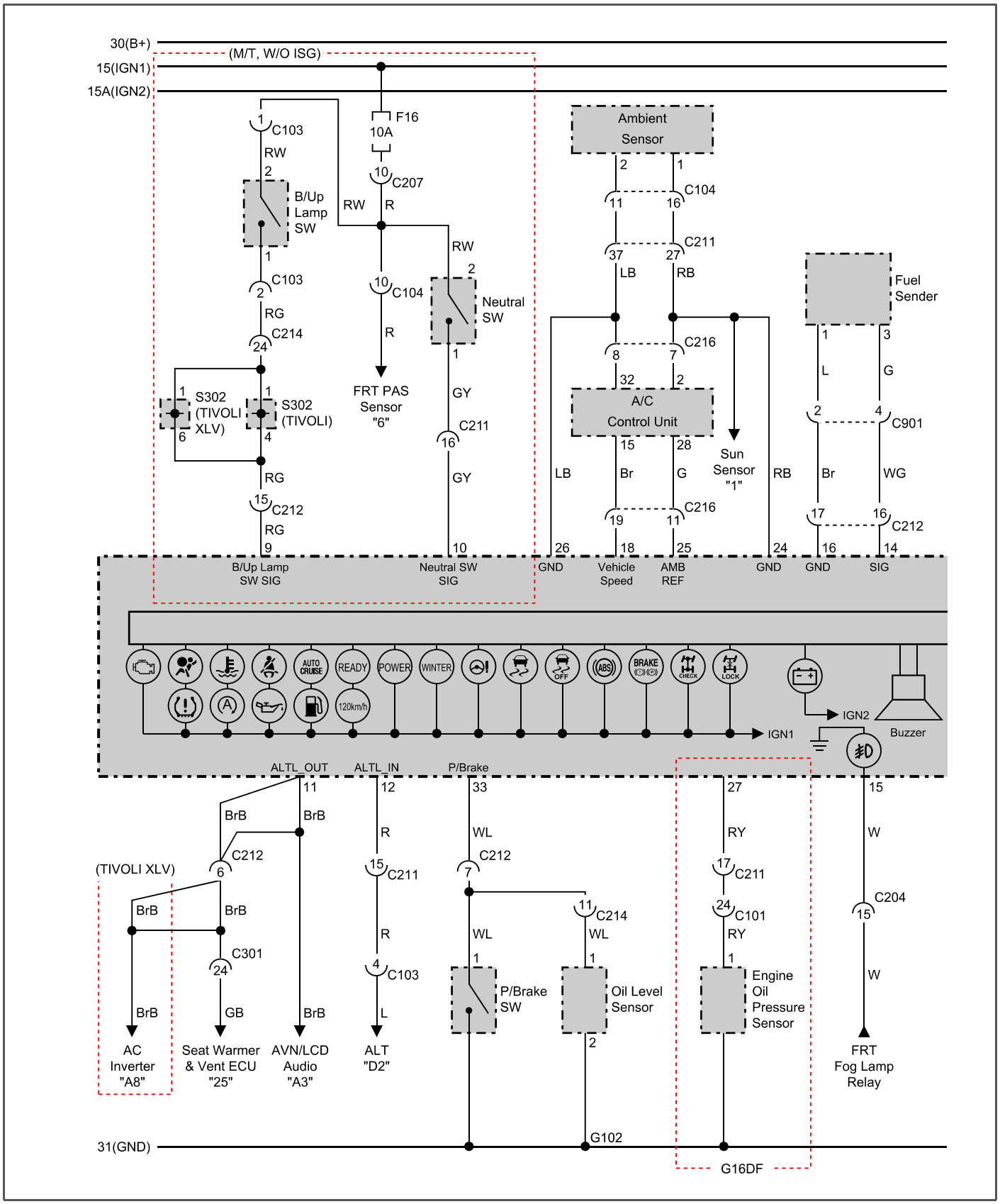
- P-CAN: The CAN signal cannot be received 10 times in a row with IGN ON.
- B-CAN: The CAN signal cannot be received 3.5 times in a row with IGN ON.
- Time-Out (Hole): The previous status (ON/OFF) of the warning lamp is maintained.

* The timeout symbols operate with their logic after the self diagnosis mode is deactivated.

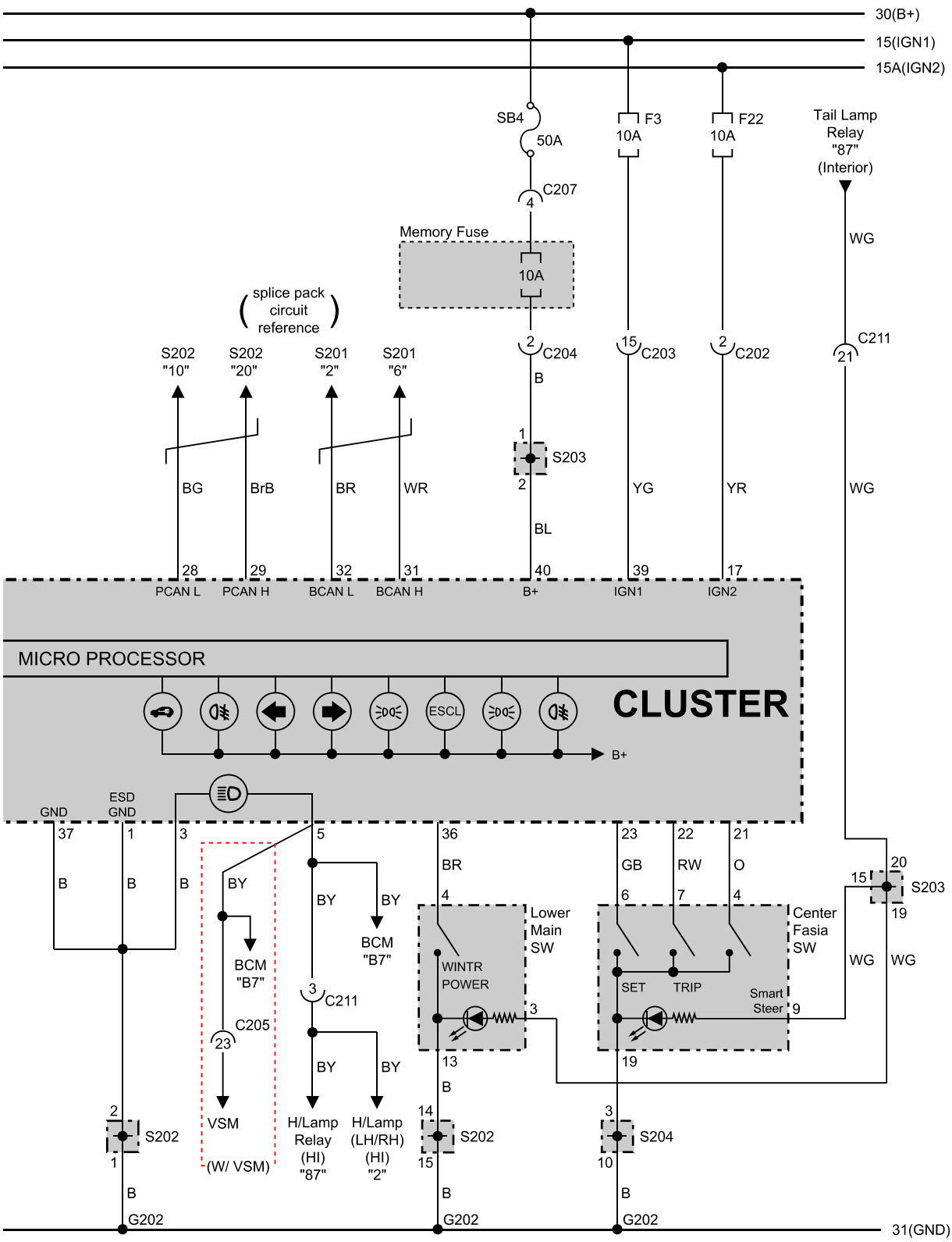
Modification basis	
Application basis	
Affected VIN	

Memo

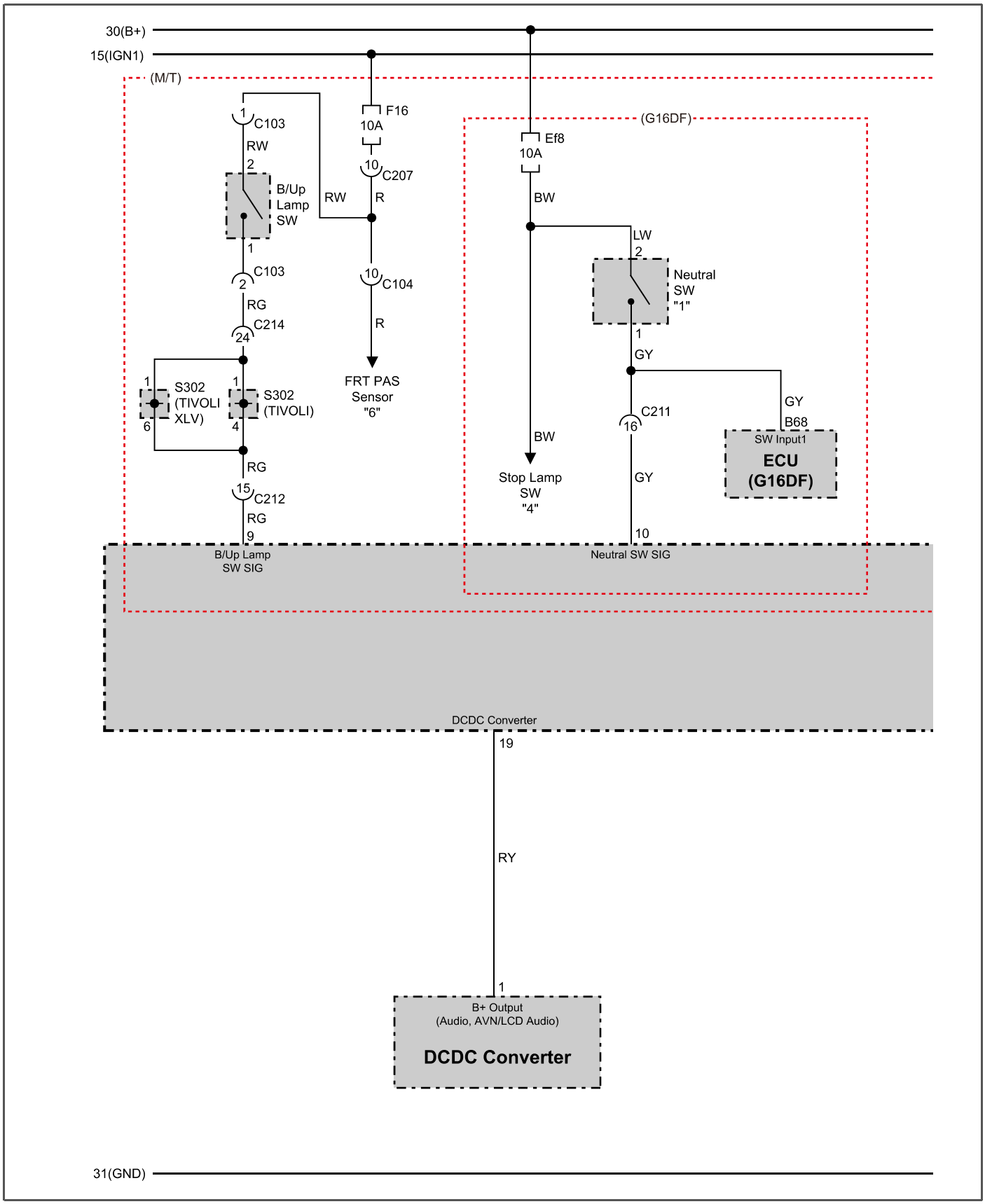
10. CIRCUIT DIAGRAM



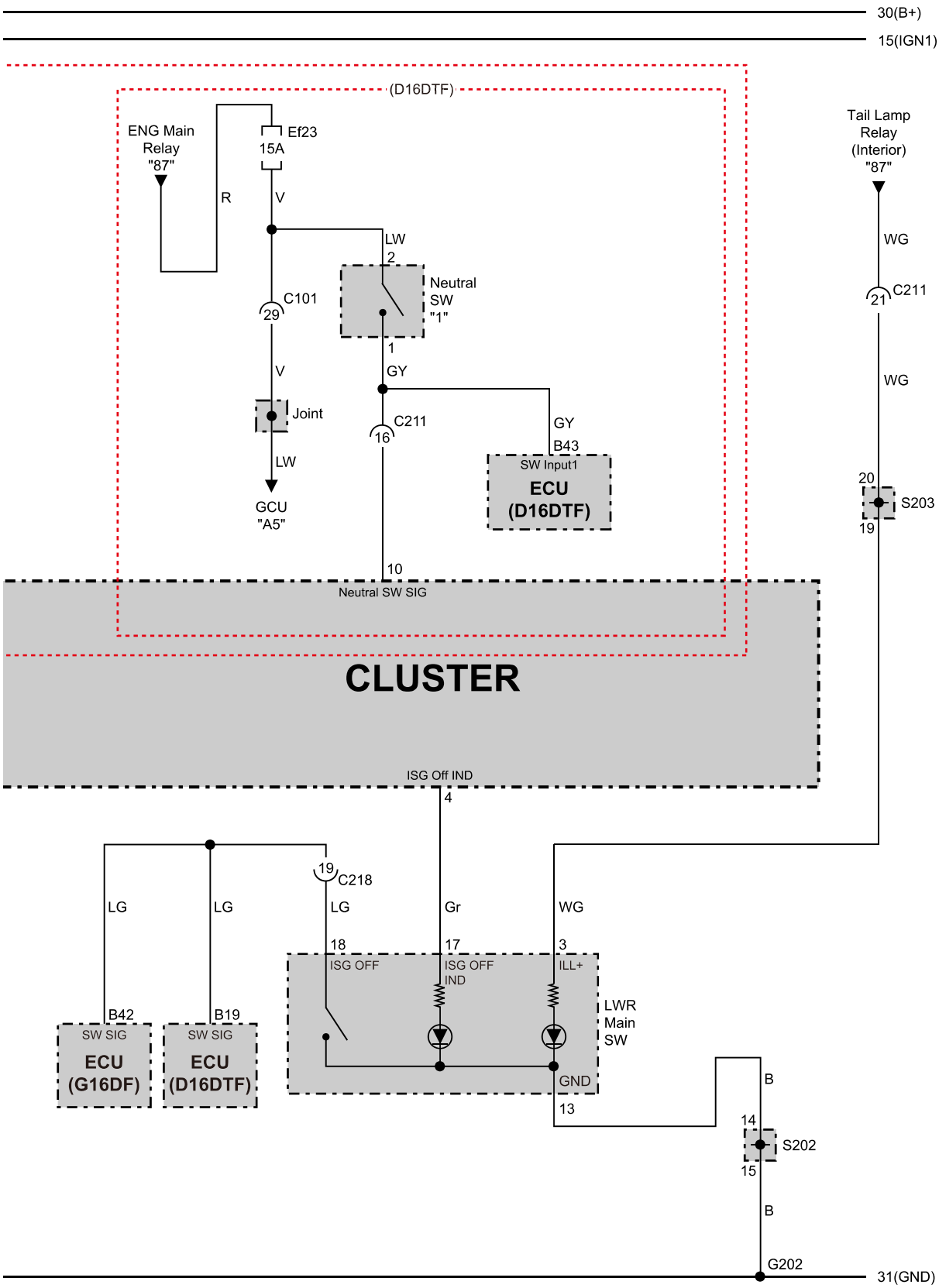
Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	