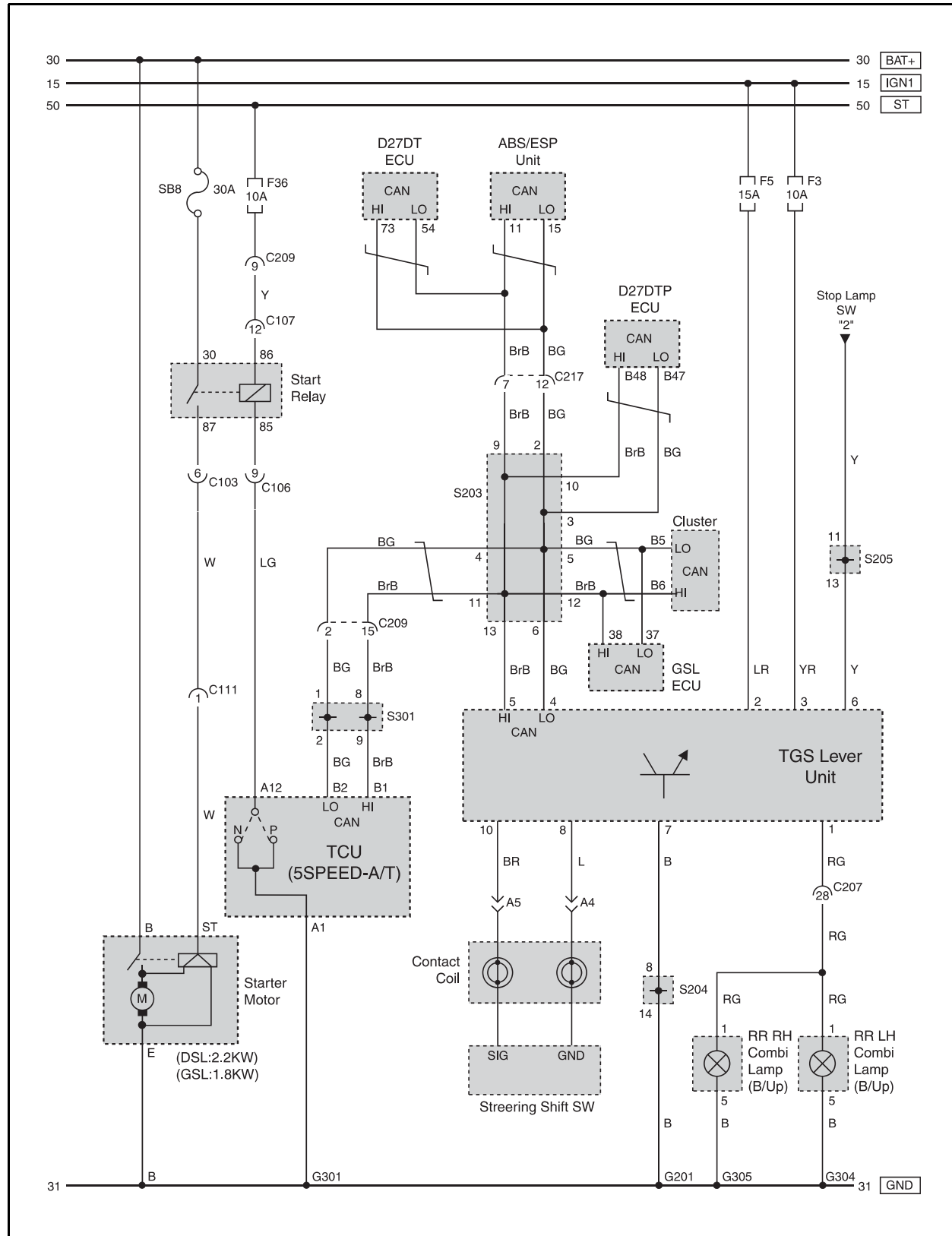


3110-01 TCU (5SPEED - A/T)

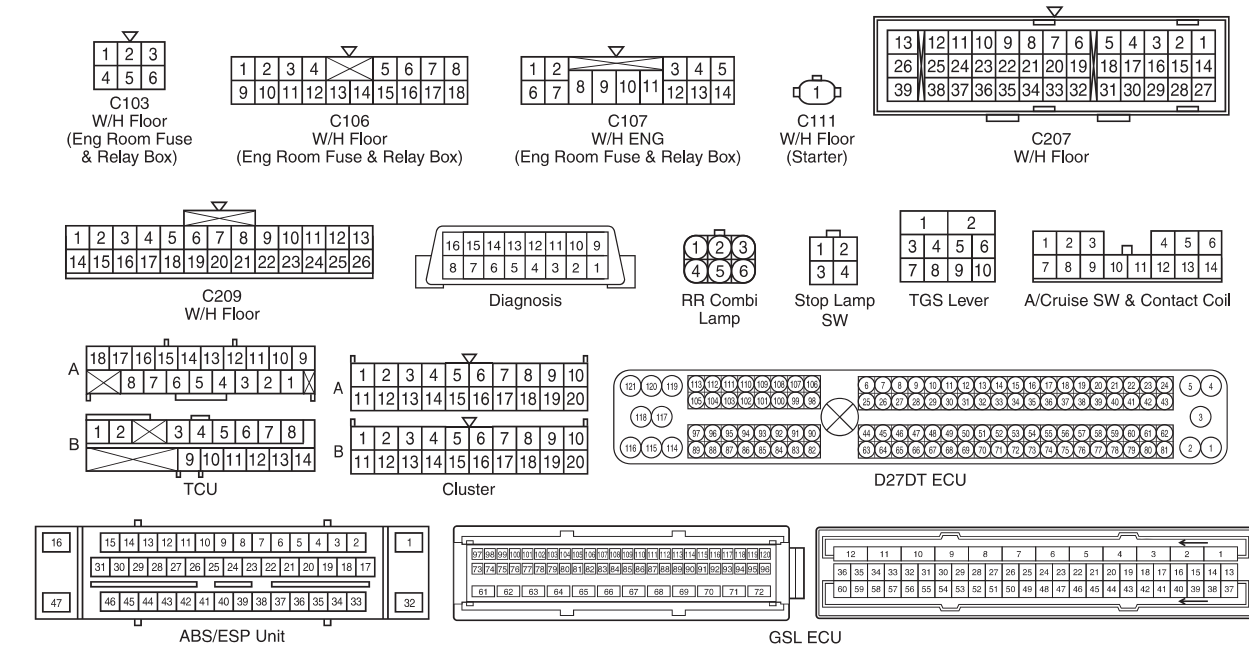
1) START MOTOR, TGS LEVER, CAN LINE



(1) CONNECTOR INFORMATION

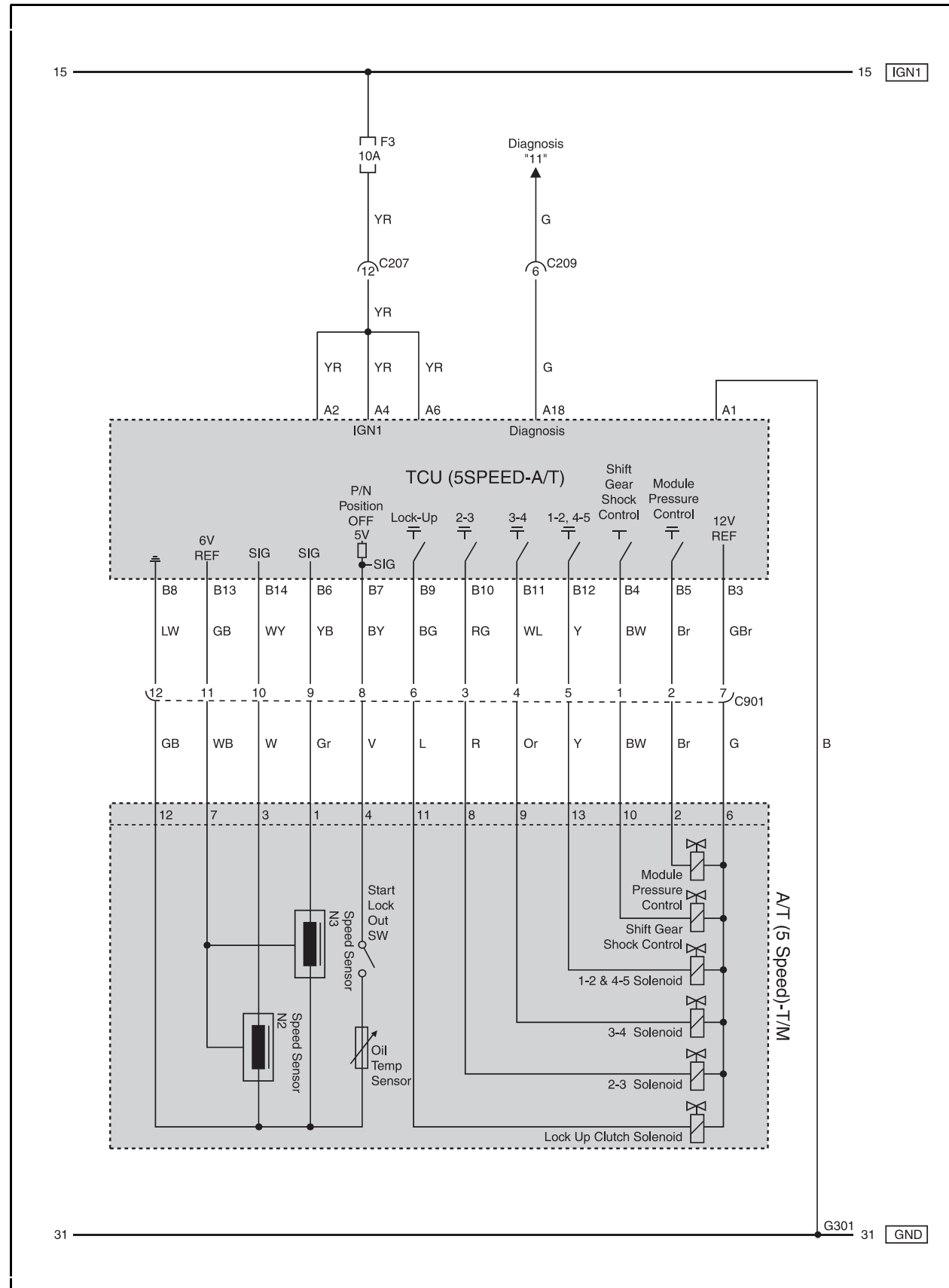
Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C103 (6Pin, Colorless)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C106 (18Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C111 (1Pin, Gray)	W/H Floor - Starter Motor	Under the Preheating Time Relay	Solenoid
C207 (39Pin, Gray)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
G201	W/H Main	Under the Driver Cowl Side PNL	
G301	W/H Floor	Under the Driver Seat	
G304	W/H Floor	Inside the LH QTR GLS Lower	
G305	W/H Floor	Inside the LH QTR GLS Lower	
S203 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	CAN
S204 (14Pin, Black)	W/H Main	Backside A/V Head Unit	GND
S205 (14Pin, Black)	W/H Main	Backside A/V Head Unit	
S301 (14Pin, Black)	W/H Floor	Under the Driver Seat	CAN

(2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

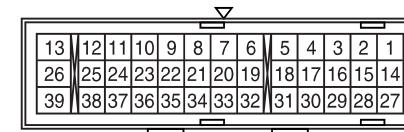
2) SOLENOID, OIL TEMP SENSOR, SPEED SENSOR (N2, N3)



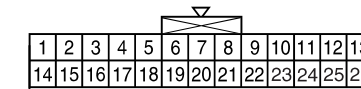
(1) CONNECTOR INFORMATION

Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C207 (39Pin, Gray)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C901	(12Pin, Black)	W/H Floor - W/H T/M	Upper the T/M
	(4Pin, Black)	W/H Floor - W/H T/M	Upper the T/M
G301	W/H Floor	Under the Driver Seat	

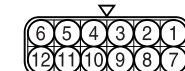
(2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



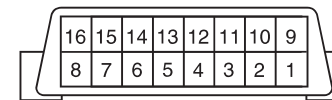
C207
W/H Floor



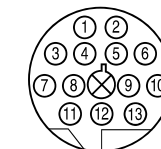
C209
W/H Floor



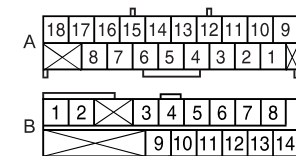
C901
W/H T/M (A/T)



Diagnosis



5Speed Auto T/M



TCU

Modification basis	
Application basis	
Affected VIN	

(3) CIRCUIT DESCRIPTION

A. FUNCTION

TCU controls the gear groups according to the driving conditions. It receives the driving data from many sensors and switches as input signals. It is also connected with ECU, HECU, instrument panel and selector lever control unit.

▶ Shifting Method

Basic shift operation includes up-shift and down-shift for all gear groups. The shift control unit determines driving resistance, accelerator pedal position, vehicle speed and some parameters (road surface condition, up hill and down hill gradients, trailer driving conditions, catalytic converter conditions, driving habits and automatic transmission oil temperature) to select a shift gear.

▶ Down Shift

When engine speed increases excessively, the down shift does not occur. To get an engine brake effect during downhill driving, the current gear is maintained in speed control mode.

▶ Engine RPM Adjustment

During shifting, the engine torque is reduced to optimize the shift operation by delaying the ignition time.

▶ Lock-Up Clutch Control

The lockup clutch in torque converter is activated in 3rd, 4th and 5th gear and operates in sequence via PWM solenoid valve.

▶ Others

The transmission is automatically controlled to compensate durability and wear. The shift control values such as shifting point, shifting time, pressure during shifting, and lockup clutch control are permanently saved and the diagnosis is partially available.

B. MODE SWITCH

▶ Function

The mode switch is installed beside the selector lever and it has two modes of "S" mode (Standard Mode) and "W" mode (Winter Mode).

- "S" mode is used in normal driving (starts off with 1st gear). TCU (Transmission Control Unit) provides pleasant driving by changing the shifting pattern according to the driving habits (downhill gripping: approx. 11 ~ 13.5 %)
- When "W" mode is selected, the Winter mode indicator in meter cluster comes on, and the vehicle starts off with 2nd gear to achieve smooth starting on the icy or slippery road.

In winter mode, the up shift becomes faster and the down shift becomes slower for improving fuel consumption. The "W" mode is automatically changed to "S" mode in full throttle or kick-down operation. The vehicle can start off with 2nd reverse gear (gear ratio: 1.92 ~ 1.93) when the "W" mode is selected. It is very useful on icy and slippery road. However, in this case, the "W" switch should be selected before placing the selector lever to "R" position.

Even though "W" mode is selected, the vehicle starts off with 1st gear in following: When the system recognizes the mode switch operation, the selector lever control unit sends the control signal TCU via CAN communication.

- When the selector lever is in "1" position.
- When fully depressing the accelerator pedal or when starting off with kick-down condition.

C. REVERSE/PARKING (R/P) LOCK SYSTEM

Reverse (R) lock system is a safety system that prevents the selector lever from shifting to “P” or “R” position by activating the solenoid valve when the selector lever unit determines that the vehicle speed exceeds 10 km/h by checking the speed signal from wheel speed sensor via CAN communication. Parking (P) lock system uses the signals from brake switch other than conventional cable system to shift to other positions. The wiring harness for detecting brake switch operation is connected to selector lever control unit.

D. STARTER LOCK-OUT CONTACT SWITC

The starter lock-out contact is installed beside oil temperature sensor and is actuated by a cam rail, which is located on the latching plate. In the selector lever positions “P” and “N”, the permanent magnet is moved away from the reed contact. This opens the reed contact and the transmission control module receives an electrical signal. The transmission control module activates the starter lock-out relay module. This closes the electrical circuit to the starter in selector lever positions “P” and “N” via the starter lock-out relay module. In other words, when the selector lever is in driving positions, the contact is closed and the starter cannot be operated.

E. OIL TEMPERATURE SENSOR

The oil temperature sensor is installed in hydraulic control unit and is connected in series with the starter lock-out contact. This means that the temperature signal is transferred to TCU when the starter lock-out contact is closed. The oil temperature has a considerable effect on the shifting time and therefore the shift quality. By measuring the oil temperature, shift operations can be optimized in all temperature ranges.

F. SPEED SENSOR

The speed sensors are fixed to the shell of the hydraulic control unit via the contact tabs. A leaf spring, which rests against the valve body, presses the speed sensors against the transmission housing. This ensures a precise distance between speed sensors and impulse rings. speed sensor (n3) detects the speed of the front sun gear and speed sensor (n2) detects the speed of the front planetary carrier. If the speed sensor is defective, the transmission is operated in emergency driving mode. Below table shows the detection of speed sensor.

Gear	N2	N3
1	●	-
2	●	●
3	●	●
4	●	●
5	●	-
R (S mode)	●	-
R (W mode)	●	●

G. LOCKUP SOLENOID VALVE

This valve activates and releases the lockup clutch by adjusting the current to solenoid valve according to engine throttle opening value and output shaft speed. The lockup clutch operates in 3rd, 4th and 5th gear with steps to reduce shift shocks.

Working Current	1.5 ~ 2.0 A
Operating distance	0.2 mm
Resistance	2.5 ± 0.2 Ω (25°C)
Operating range	3, 4, 5 shift

H. MODULATING PRESSURE (MP) AND SHIFT PRESSURE (SP) CONTROL SOLENOID VALVE

These valves control the modulating pressure and the shift pressure by applying appropriate electric current to solenoid valves according to driving condition of engine and transmission. When the electric current from TCU is high/low, the regulated pressure decreases/increases.

Working Curren	0 ~ 1.0 A
Operating distance	0.6 mm
Resistance	5 ± 0.2 Ω (25°C)

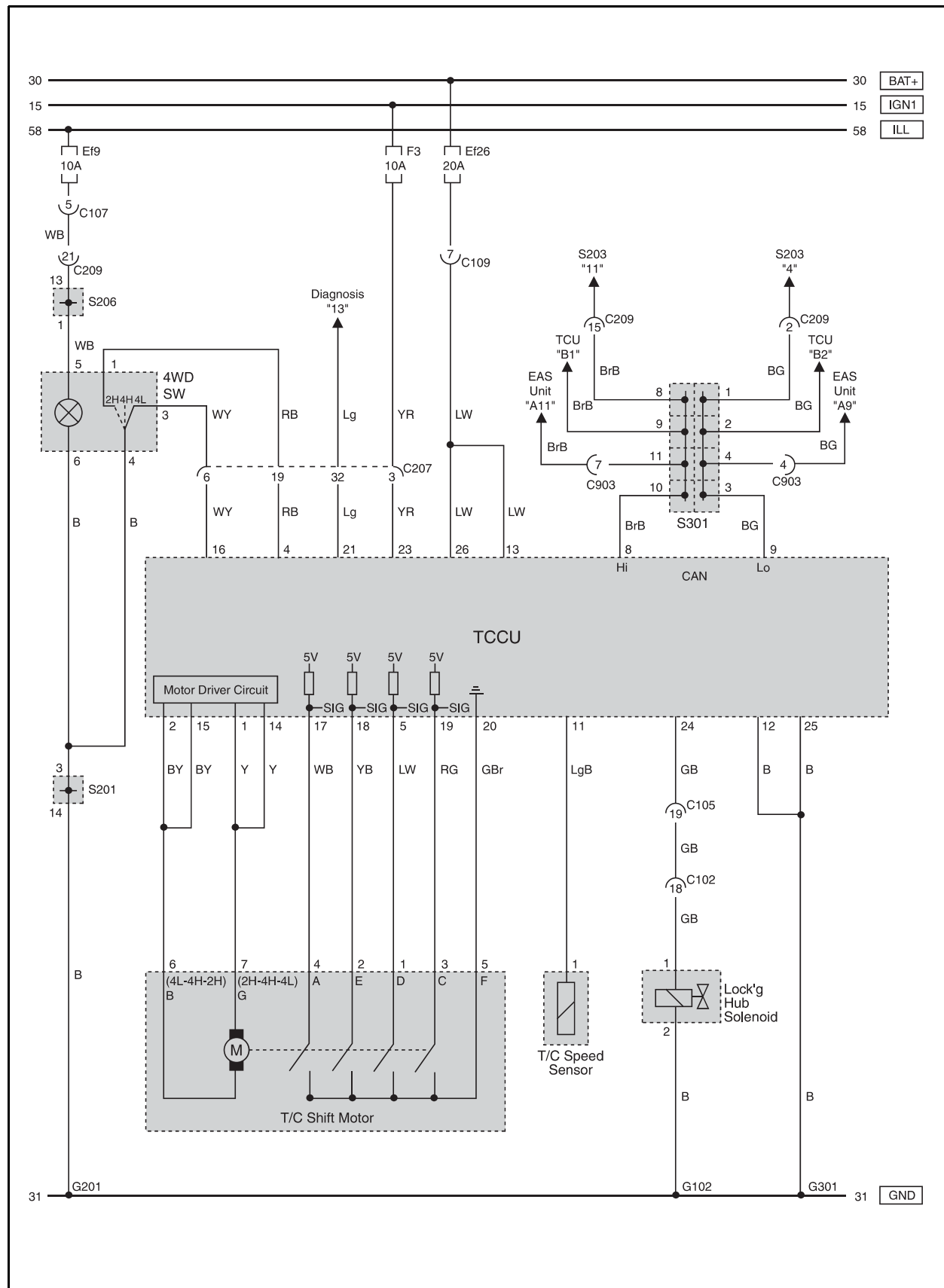
I. CHARACTERISTICS OF UP/DOWNSHIFT SOLENOID VALVE

The solenoid valve remains energized and therefore open until the shift process is completed according to the engine and transmission conditions. If a solenoid valve is energized, it opens and transmits shift valve pressure to the corresponding command valve.

Working Curren	1.5 ~ 2.0 A
Operating distance	0.2 mm
Resistance	3.8 ± 0.2 Ω (25°C)

Modification basis	
Application basis	
Affected VIN	

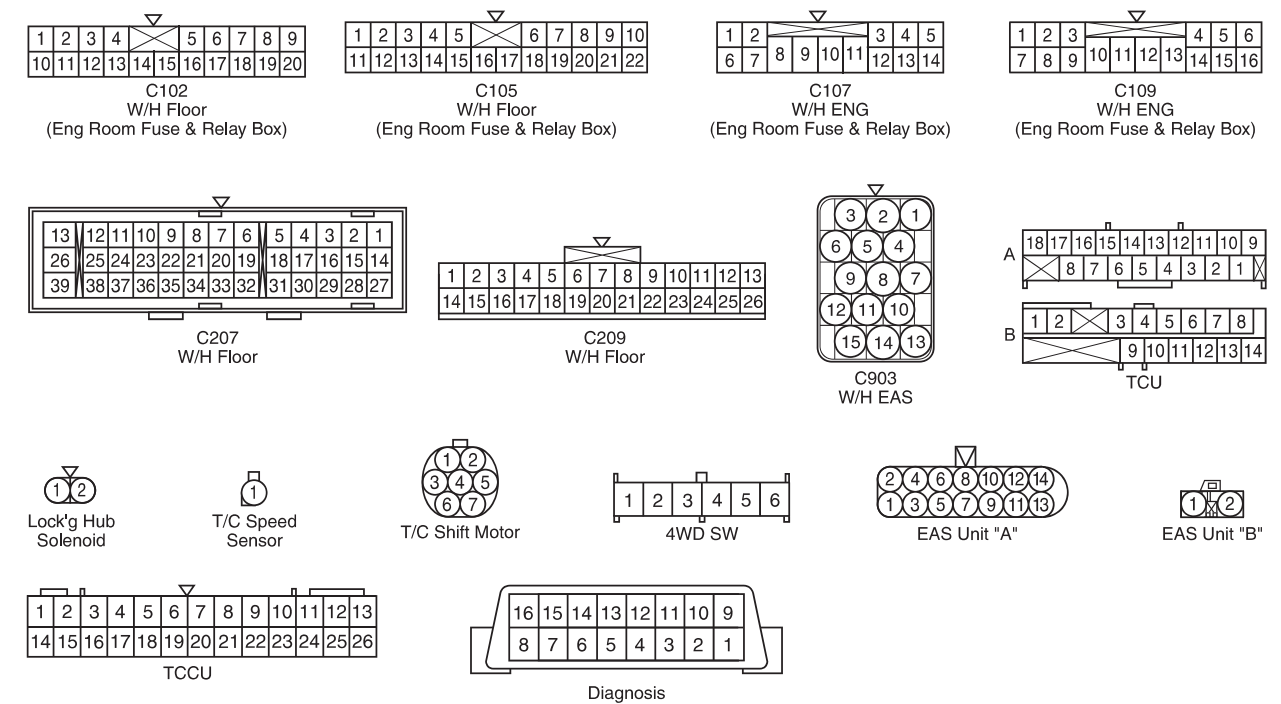
3410-01 TCCU



1) CONNECTOR INFORMATION

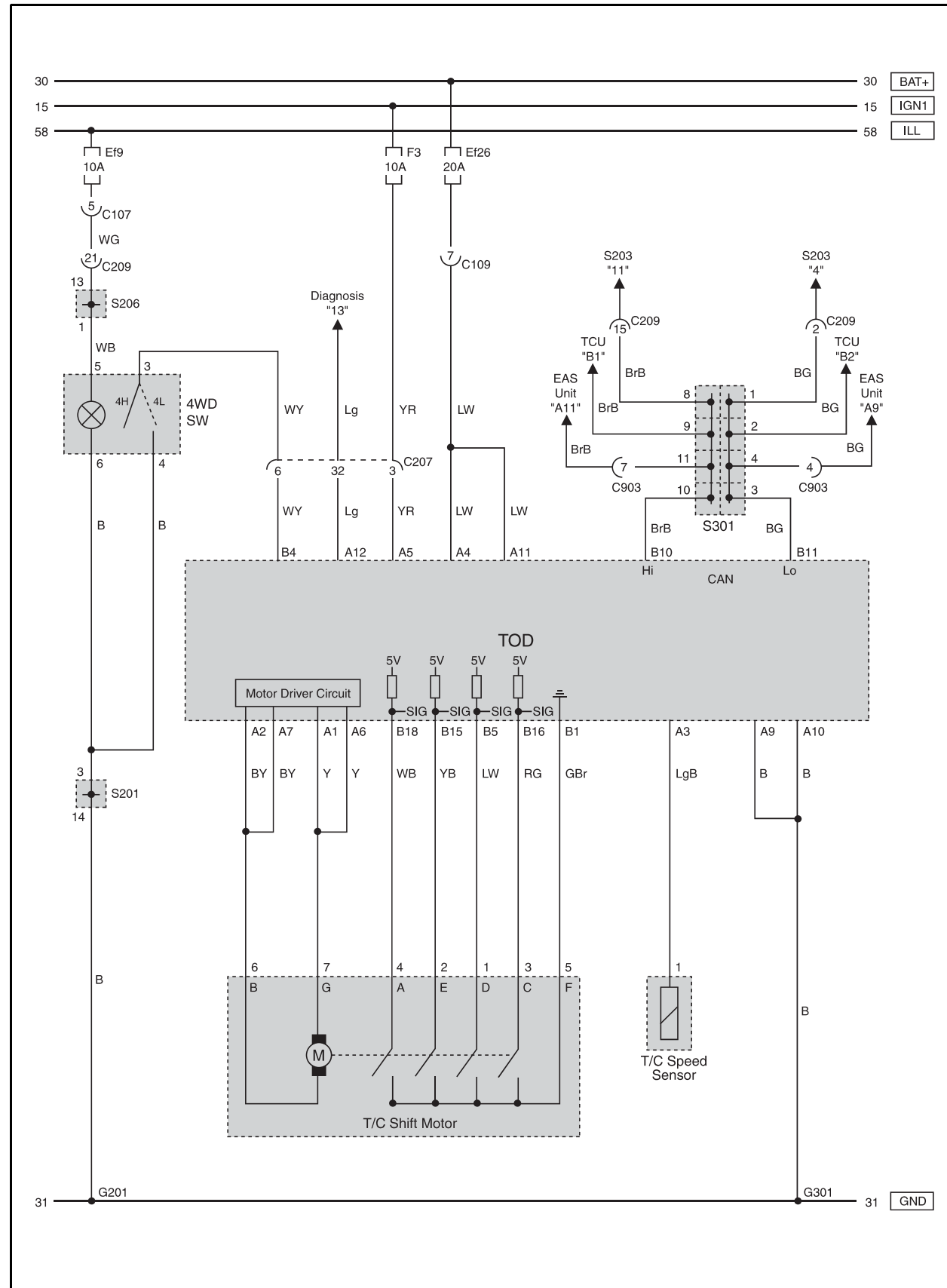
Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C102 (20Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C105 (22Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C109 (16Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C207 (39Pin, Gray)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C903 (15Pin, Black)	W/H Floor - W/H EAS	Lower the Passenger	
G102	W/H Eng	Center the Eng BATT	
G201	W/H Main	Under the Driver Cowl Side PNL	
G301	W/H Floor	Under the Driver Seat	
S201 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	GND
S203 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	CAN
S206 (14Pin, Black)	W/H Main	Backside A/V Head Unit	ILL

2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

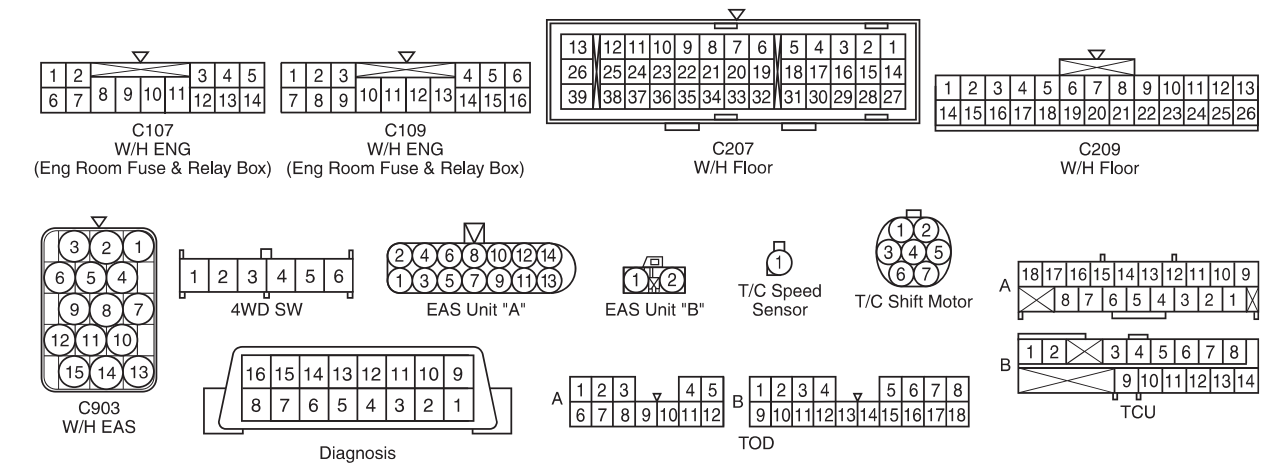
S.G.N
3410-01 TOD



1) CONNECTOR INFORMATION

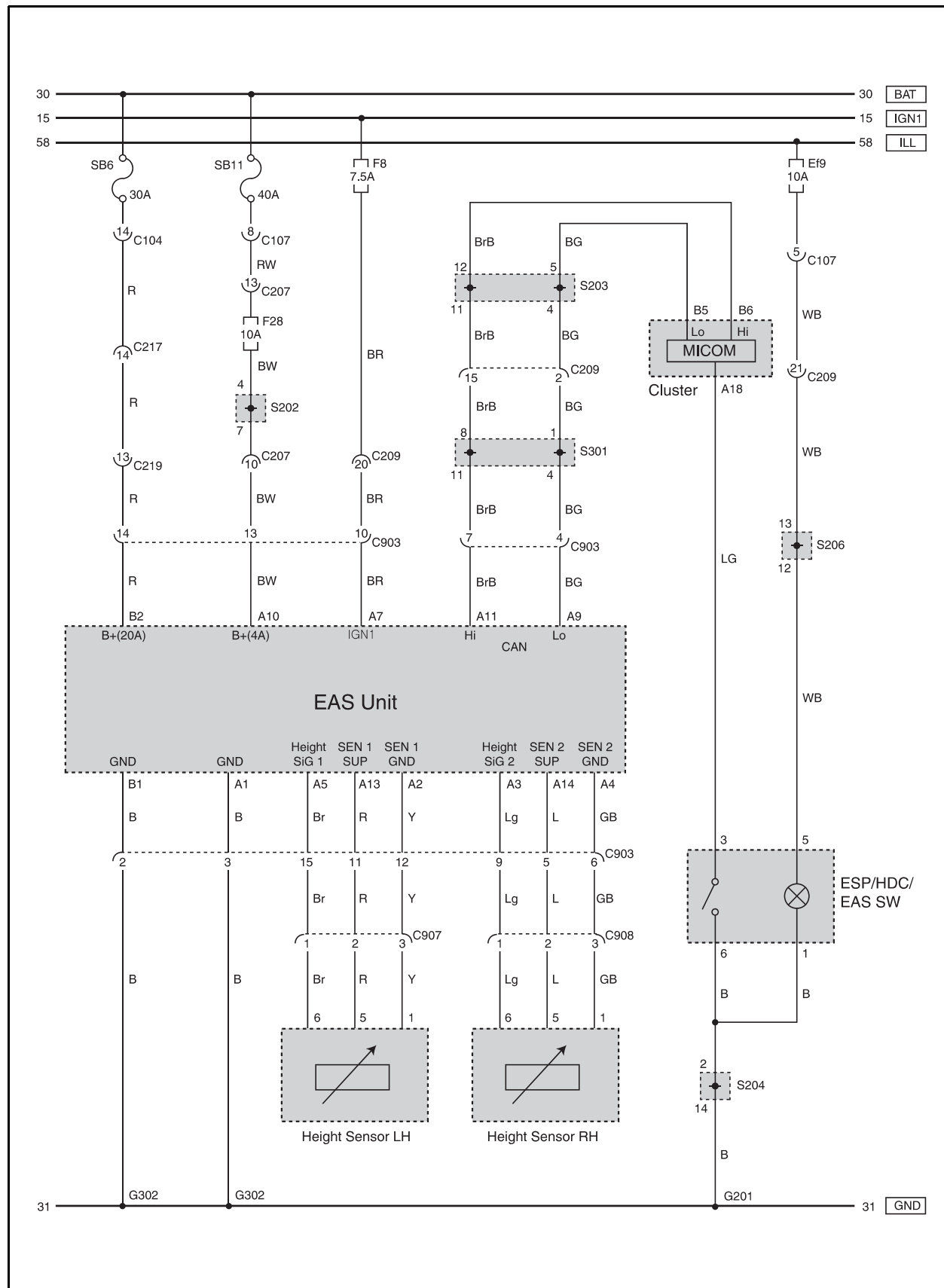
Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C109 (16Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C207 (39Pin, Gray)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C903 (15Pin, Black)	W/H Floor - W/H EAS	Lower the Passenger	
G201	W/H Main	Under the Driver Cowl Side PNL	
G301	W/H Floor	Under the Driver Seat	
S201 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	GND
S203 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	CAN
S206 (14Pin, Black)	W/H Main	Backside A/V Head Unit	ILL
S301 (14Pin, Black)	W/H Floor	Under the Driver Seat	CAN

2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

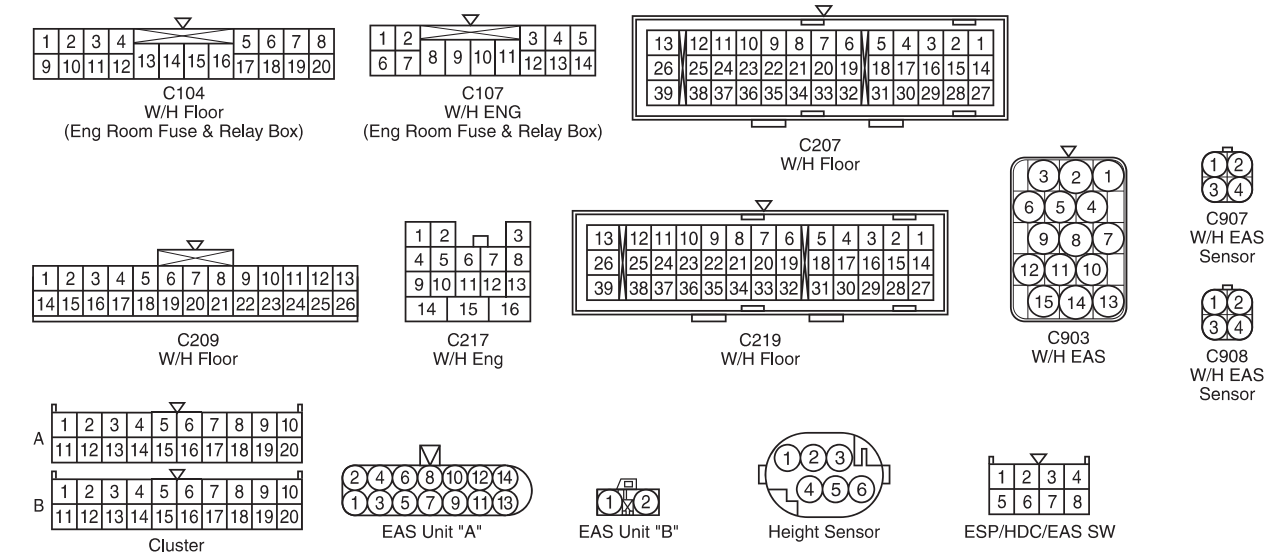
4480-01 EAS



1) CONNECTOR INFORMATION

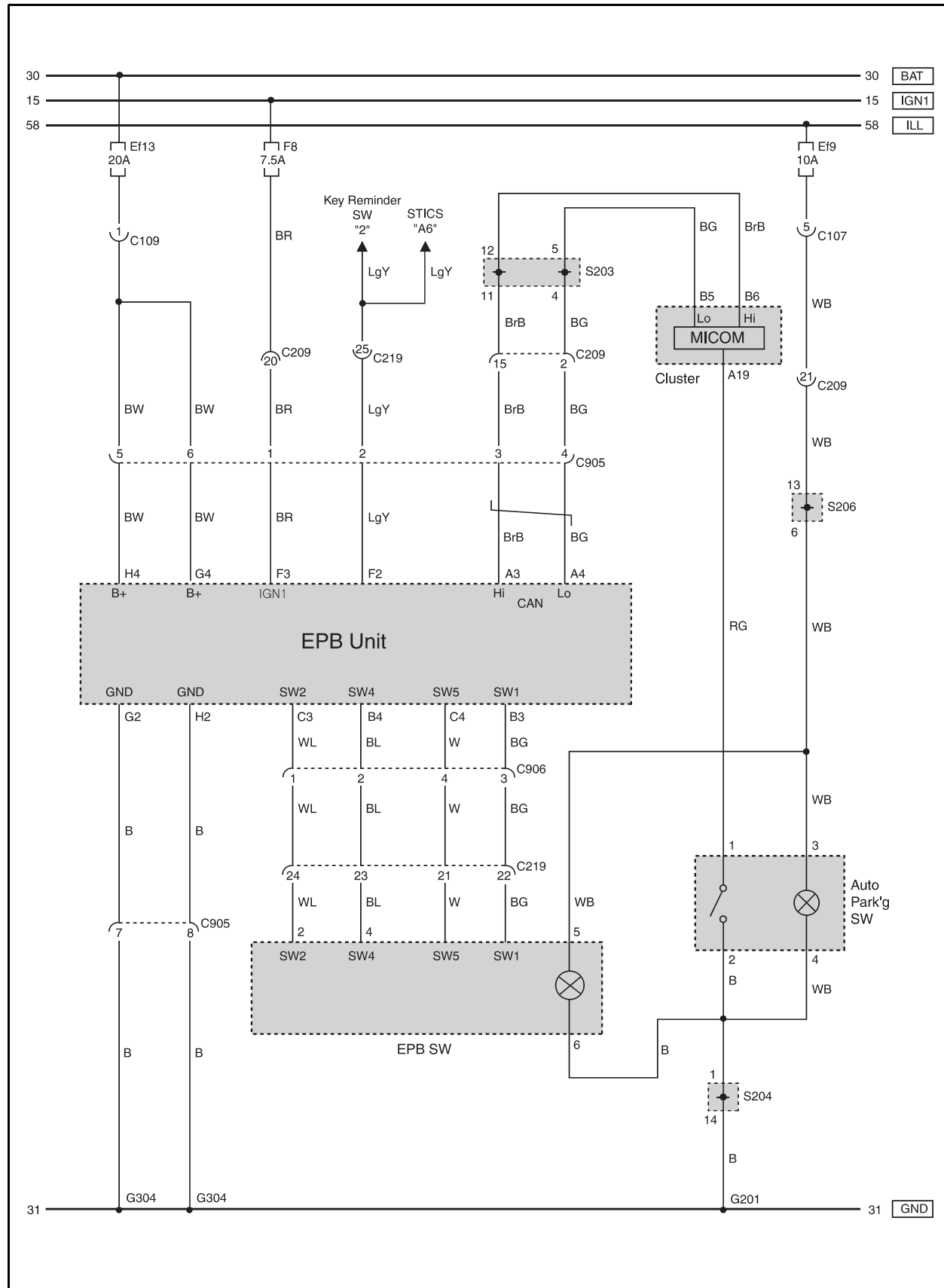
Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C104 (20Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C207 (39Pin, Gray)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C217 (16Pin, White)	W/H Main - W/H Eng	Passenger Cowl Side C/Holder	C/Holder
C219 (39Pin, Gray)	W/H Main - W/H Floor	Passenger Cowl Side C/Holder	C/Holder
C903 (15Pin, Black)	W/H Floor - W/H EAS	Lower the Passenger	
C907 (4Pin, Black)	W/H Floor - W/H EAS Sensor	Under the RR Bumper (LH)	
C908 (4Pin, Black)	W/H Floor - W/H EAS Sensor	Under the RR Bumper (RH)	
G201	W/H Main	Under the Driver Cowl Side PNL	
G302	W/H Floor	Under the Passenger Seat	
S202 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	
S203 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	CAN
S204 (14Pin, Black)	W/H Main	Backside A/V Head Unit	GND
S206 (14Pin, Black)	W/H Main	Backside A/V Head Unit	ILL
S301 (14Pin, Black)	W/H Floor	Under the Driver Seat	CAN

2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

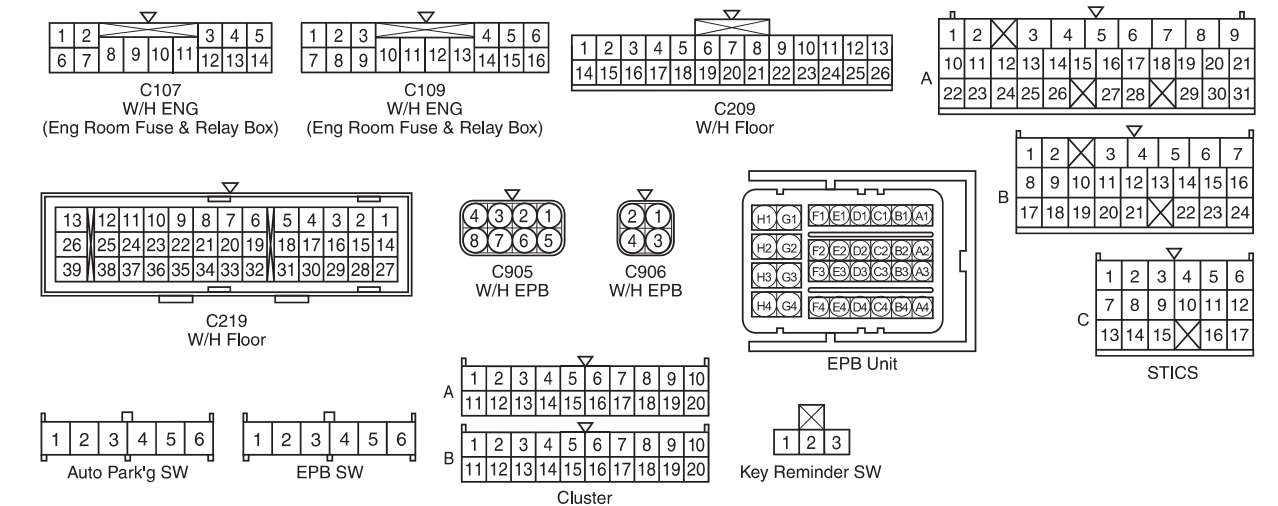
4920-01 EPB



1) CONNECTOR INFORMATION

Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C109 (16Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C219 (39Pin, Gray)	W/H Main - W/H Floor	Passenger Cowl Side C/Holder	C/Holder
C905 (8Pin, Black)	W/H Floor - W/H EPB	Under the RR Bumper (LH)	
C906 (4Pin, Black)	W/H Floor - W/H EPB	Under the RR Bumper (LH)	
G201	W/H Main	Under the Driver Cowl Side PNL	
G304	W/H Floor	Inside the LH QTR GLS Lower	
S203 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	CAN
S204 (14Pin, Black)	W/H Main	Backside A/V Head Unit	GND
S206 (14Pin, Black)	W/H Main	Backside A/V Head Unit	ILL

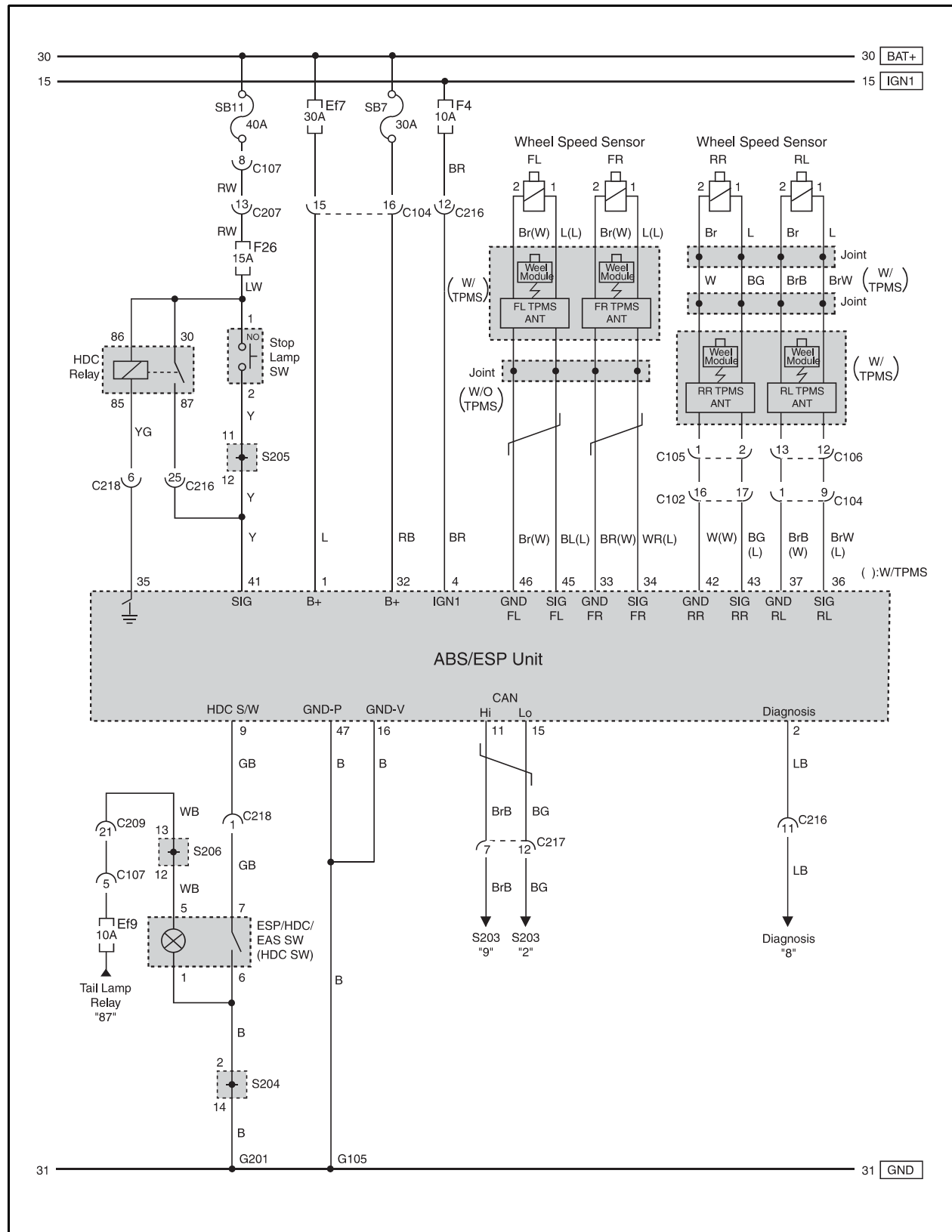
2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

4892-01 ABS/ESP

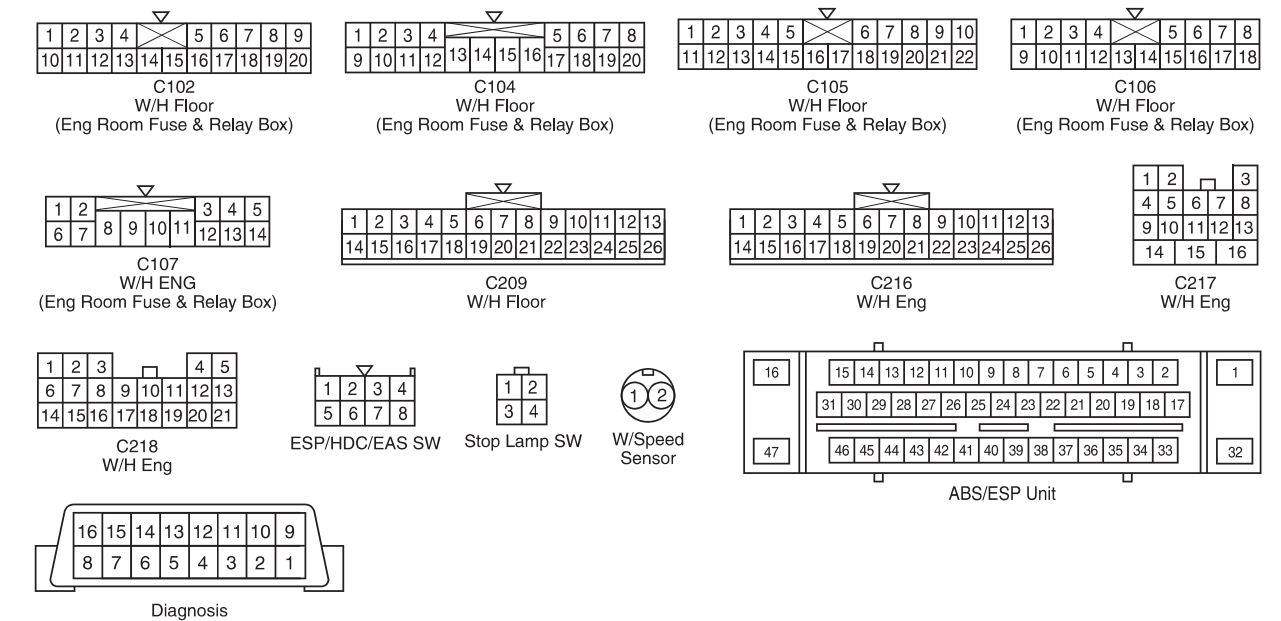
1) W/SPEED SENSOR, STOP LAMP SW, DIAGNOSIS, HDC, TPMS



(1) CONNECTOR INFORMATION

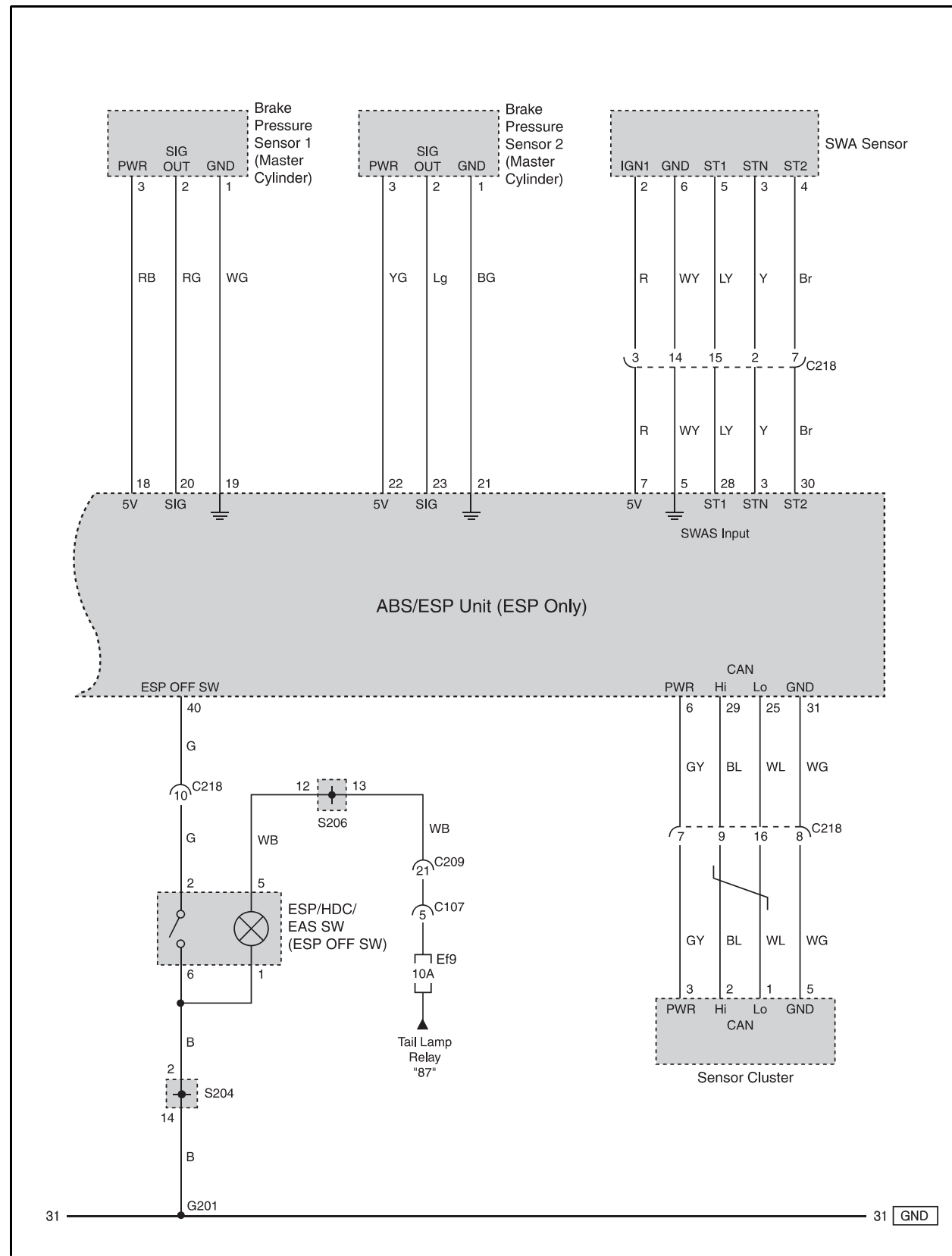
Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C102 (20Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C104 (20Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C105 (22Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C106 (18Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C216 (26Pin, White)	W/H Main - W/H Eng	Passenger Cowl Side C/Holder	C/Holder
C217 (16Pin, White)	W/H Main - W/H Eng	Passenger Cowl Side C/Holder	C/Holder
C218 (21Pin, White)	W/H Main - W/H Eng	Passenger Cowl Side C/Holder	C/Holder
G105	W/H Eng	Beside Coolant Reserve Tank	ABS/ESP
G201	W/H Main	Under the Driver Cowl Side PNL	
S204 (14Pin, Black)	W/H Main	Backside A/V Head Unit	GND
S205 (14Pin, Black)	W/H Main	Backside A/V Head Unit	
S206 (14Pin, Black)	W/H Main	Backside A/V Head Unit	ILL

(2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

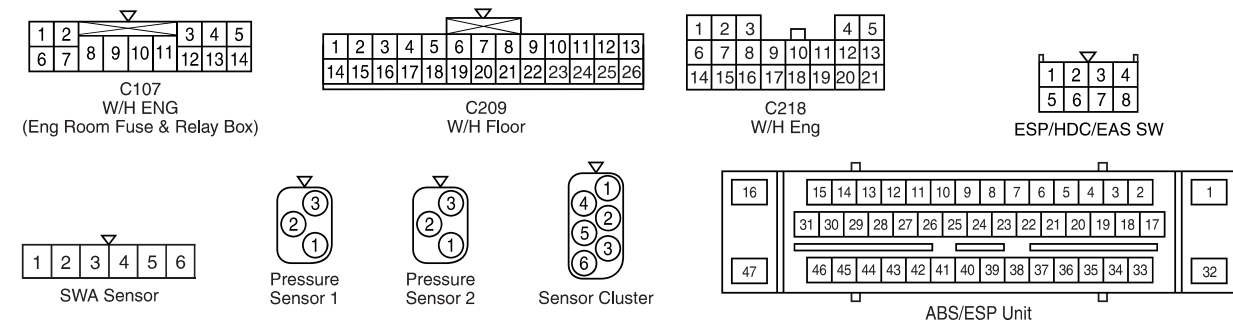
2) PRESSURE SENSOR, S.W.A SENSOR, SENSOR CLUSTER, ESP OFF SW



(1) CONNECTOR INFORMATION

Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C107 (14Pin, White)	W/H Eng - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C218 (21Pin, White)	W/H Main - W/H Eng	Passenger Cowl Side C/Holder	C/Holder
G201	W/H Main	Under the Driver Cowl Side PNL	
S204 (14Pin, Black)	W/H Main	Backside A/V Head Unit	GND
S206 (14Pin, Black)	W/H Main	Backside A/V Head Unit	ILL

(2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

(3) CIRCUIT DESCRIPTION

A. ABS COMPONENTS

Newly introduced ABS has a different shape of integrated hydraulic modulator and HECU (Hydraulic and Electronic Control Unit) compared to existing ABS. And, the wheel speed sensor uses different method to detect wheel speed. The basic function of the ABS that maintains the vehicle stability by controlling the steerability of the vehicle when braking has not been changed.

B. ACTIVE WHEEL SPEED SENSOR

The speed sensor used in traditional ABS is made of permanent magnet and transmits the output voltage that changes as the wheel rotor rotates to the HECU system. New wheel speed sensor detects the wheel speed through the current value that depends on the resistance that changes according to the magnetic field by using four resistors and supplying the 12 V power supply to the sensor.

► Specifications

Item	Specifications	Reference
Supplying voltage	DC 12V	
Air gap	Front: 0.335 ~ 0.945 mm	Cannot measure the air gap
	Rear: 0.309 ~ 0.958 mm	
Output current (vehicle speed: at 2.75 km/h)	7mA (Lo) ~ 14mA (Hi) +20 % / -16 %	
Tightening torque	Front: 19 ~ 25 Nm	7.5 ~ 20 V
	Rear: 6 ~ 10 Nm	

C. HBA (HYDRAULIC BRAKE ASSIST SYSTEM)

HBA (Hydraulic Brake Assist) system helps in an emergency braking situation when the driver applies the brake fast, but not with sufficient pressure, which leads to dangerously long braking distance. ECU recognizes the attempt at full braking and transmits the signal calling for full brake pressure from the hydraulic booster. An inexperienced, elderly or physically weak driver may suffer from the accident by not fully pressing the brake pedal when hard braking is required under emergency. The HBA System increases the braking force under urgent situations to enhance the inputted braking force from the driver.

D. SWAS : STEERING WHEEL ANGLE SENSOR

The steering wheel angle sensor is located between clock spring and multifunction switch. This sensor is used for recognition of driver's intends. If the sensor is replaced with new one, it can detect the neutral position after the vehicle is moving over 20 km/h for more than 5 seconds.

Working voltage	9 ~ 16 V	ST1	V High	
Number of pulse per revolution	45 Pulses / 1rev		V Low	
Duty	Approx. 50 %	ST2	V High	
High - V	3.0 ~ 4.1 V		V Low	
Low - V	1.3 ~ 2.0 V	STN	V High	
ST1 and ST2	Detects steering wheel angle and angular velocity as an average value		V Low	
STN	Detects the center value of steering wheel			

E. HDC (Hill Descent Control) SYSTEM

When the slope level exceeds 10%, the HDC operates until the vehicle reaches the speed condition given in step (4).

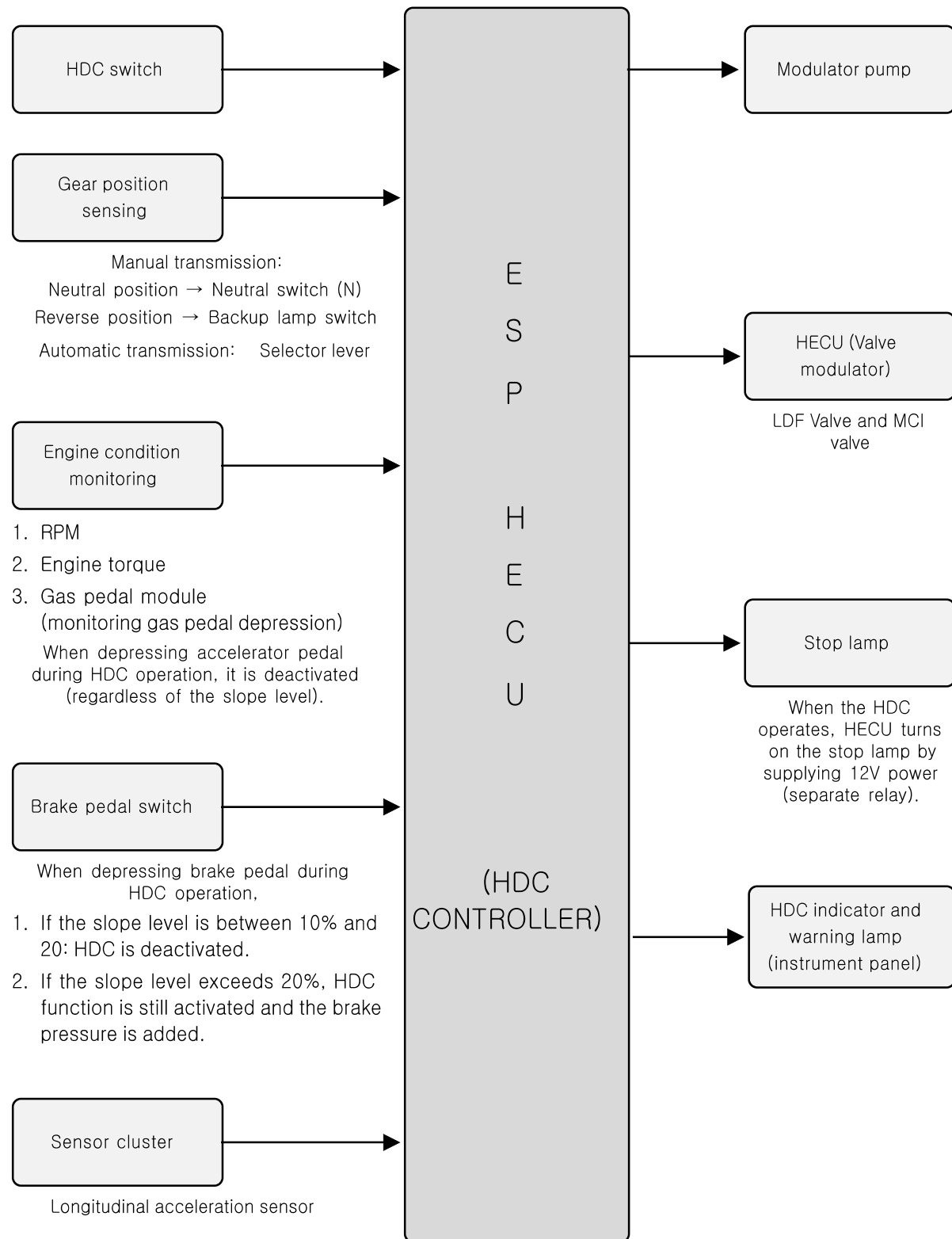
► When the slope level is between 10% and 20% during the HDC operation

When depressing the accelerator pedal or brake pedal, HDC system is changed to stand-by mode. When depressing the accelerator pedal again, HDC starts its operation again. Therefore, drivers can control the vehicle speed to a desired level by operating the accelerator pedal.

► When the slope level exceeds 20% during the HDC operation

When depressing the accelerator pedal, HDC system is changed to stand-by mode. When depressing the brake pedal, HDC continues its operation and the braking power is increased. In this case, HECU sounds an abnormal noise and brake pedal may be very rigid, but this is a normal condition due to HDC operation.

F. INPUT/OUTPUT SIGNALS FOR HDC OPERATION



G. OPERATION OF HDC INDICATOR CONTROLLER

This table describes the coming-on and blinking mode of HDC indicator according to the HDC switch operation (ON/OFF). The HDC indicator on the instrument panel has two modes; green (function lamp) and red (warning lamp). The HDC switch is a push & self return type switch ? when you press it once, it starts to operate and when you press it again, it stops the operation.

HDC Operation Mode		HDC Indicator	HDC Warning Lamp
		Green	Red
		HDC	HDC
Initial ignition ON (From hence, this signifies operation mode after the engine starts. Even when HDC switch is ON, if the ignition is OFF, HDC operation stops automatically.)		OFF	ON (goes off after 1.8 seconds)
Not available	HDC switch OFF	OFF	OFF
	HDC system error	OFF	ON
Stand-by	HDC switch ON	ON	OFF
	The HDC switch is turned ON, but HDC system is in stand-by mode because the operating requirements are not met.		
In operation	HDC system is operating.	Blinking (0.5 seconds of interval)	OFF
	The HDC switch is turned ON, and the operating requirements are met. HDC is operating with operating sound.		
System overheat	High brake system temperature (over 350°C)	HDC stand-by mode	OFF
		HDC is operating	Blinking
	Too high brake system temperature (over 450°C)		Alternate blinking of green and red lamp (0.5 seconds of interval)
There is no specific temperature sensor in the system, but a programmed logic inside the HECU predicts the temperature based on the operating numbers and conditions of HDC (HDC cannot be operated).		OFF	ON

H. ESP (ELECTRONIC STABILITY PROGRAM)

ESP (Electronic Stability Program) recognizes critical driving conditions, such as panic reactions in dangerous situations, and stabilizes the vehicle by wheel-individual braking and engine control intervention with no need for actuating the brake. This system is developed to help the driver avoid the danger of losing the control of the vehicle stability due to under-steering or over-steering during cornering.

Modification basis	
Application basis	
Affected VIN	

I. SENSOR CLUSTER (YAW RATE SENSOR + LATERAL ACCELERATION SENSOR + LONGITUDINAL ACCELERATION SENSOR)

Descriptions	Specifications
Supplying voltage	Approx. 5 V (4.75 ~ 5.25 V)
Output voltage when stop	Approx. 2.5 V (Ignition switch "ON")
Output range	0.2 ~ 4.8 V
Operation start speed	-75°/s ~ +75°/s

J. PRESSURE SENSOR

► **Specifcatons**

Descriptions	Specifications
Supplying voltage	4.75 ~ 5.25 V
Output range	0.25 ~ 4.75 V
Output voltage when stop	2.5 V

K. ESP WARNING LAMP BLINKING IN CONTROL

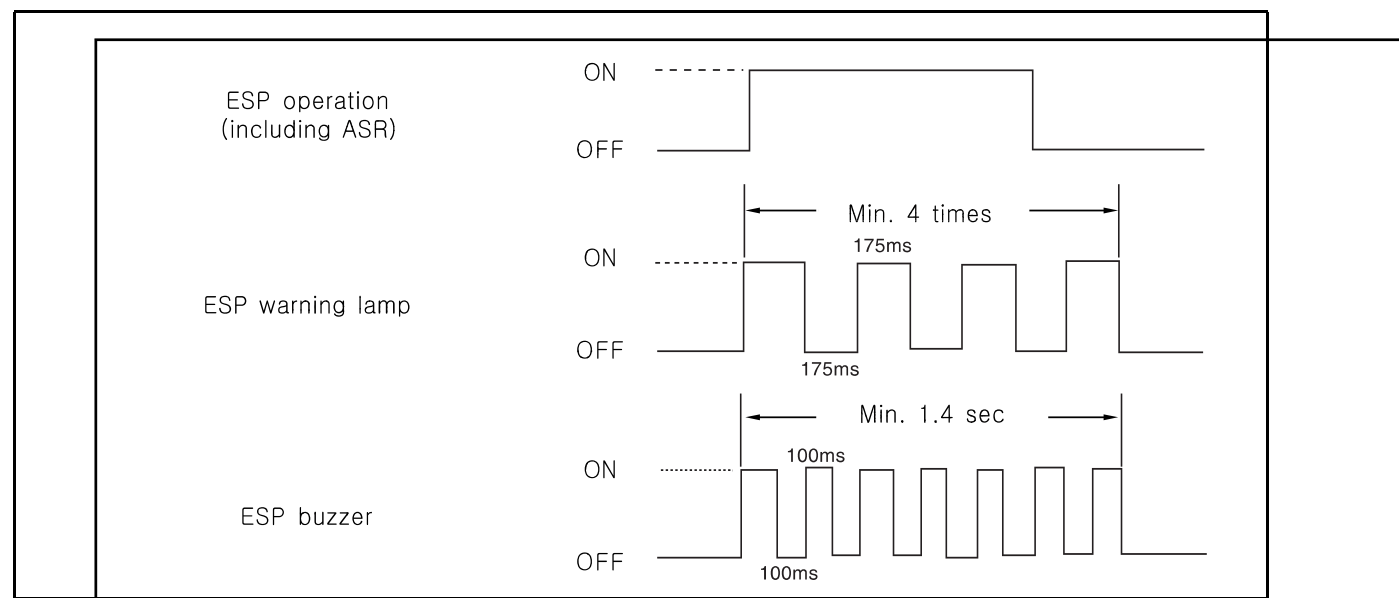
ESP warning lamp blinks when ESP control is activated. If the activation reaches a certain limitation, a beep sounds to warn the driver. The ESP warning lamp goes off when ESP function is deactivated. Even when the ESP is operated for a very short period of time, the ESP warning lamp blinks minimum of 4 times every 175 milliseconds and the buzzer sounds for at least 1.4 seconds with 100 ms interval.

L. ESP SYSTEM CANCELLATION USING THE ESP OFF SWITCH

When the ESP switch at the center switch panel is pushed (for over approximately 150 ms), the ESP system will be cancelled and the vehicle will be driven regardless of the output values from the corresponding sensors. Then, the ESP warning lamp on the instrument panel comes on.

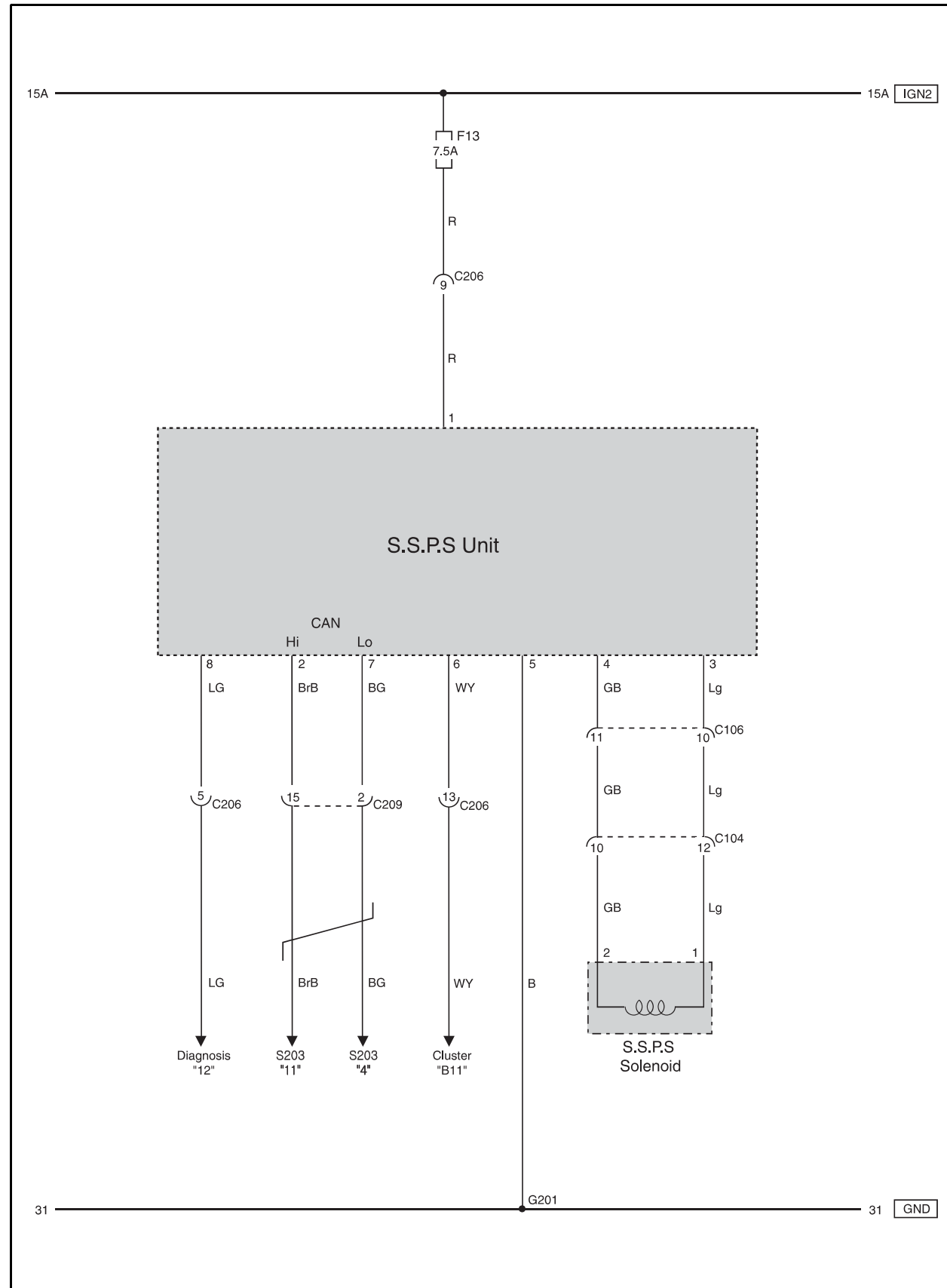
M. RESUMING THE ESP SYSTEM BY USING THE ESP OFF SWITCH

The ESP system will be resumed and the ESP warning lamp at the instrument panel goes off when the ESP switch at the center switch panel is pushed (for over approximately 150 ms) while the ESP system is not operating.



Modification basis	
Application basis	
Affected VIN	

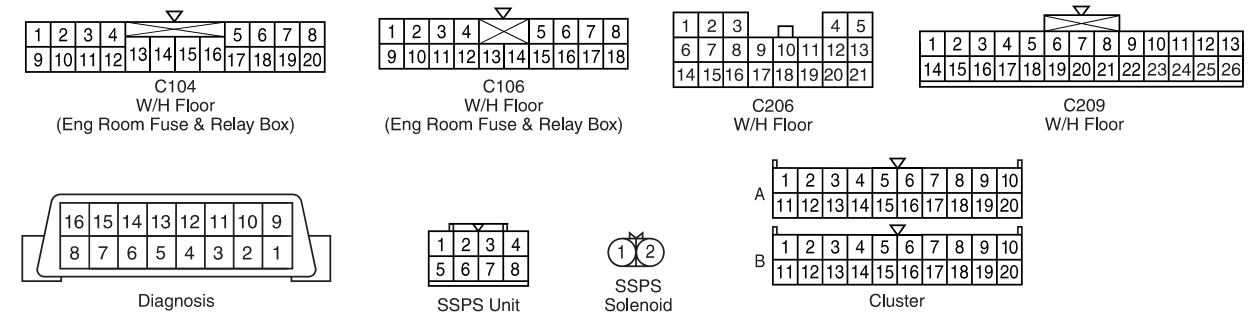
4620-12 S.S.P.S (SPEED SENSITIVE POWER STEERING)



1) CONNECTOR INFORMATION

Connector Number (Pin Number, Color)	Connecting Wiring Harness	Connector Position	Remark
C104 (20Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C106 (18Pin, White)	W/H Floor - Eng Room Fuse & Relay Box	Eng Room Fuse & Relay Box	
C206 (21Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
C209 (26Pin, Black)	W/H Main - W/H Floor	Driver Cowl Side C/Holder	C/Holder
G201	W/H Main	Under the Driver Cowl Side PNL	
S203 (14Pin, Black)	W/H Main	Upper the I/P Relay Box	CAN

2) CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



Modification basis	
Application basis	
Affected VIN	

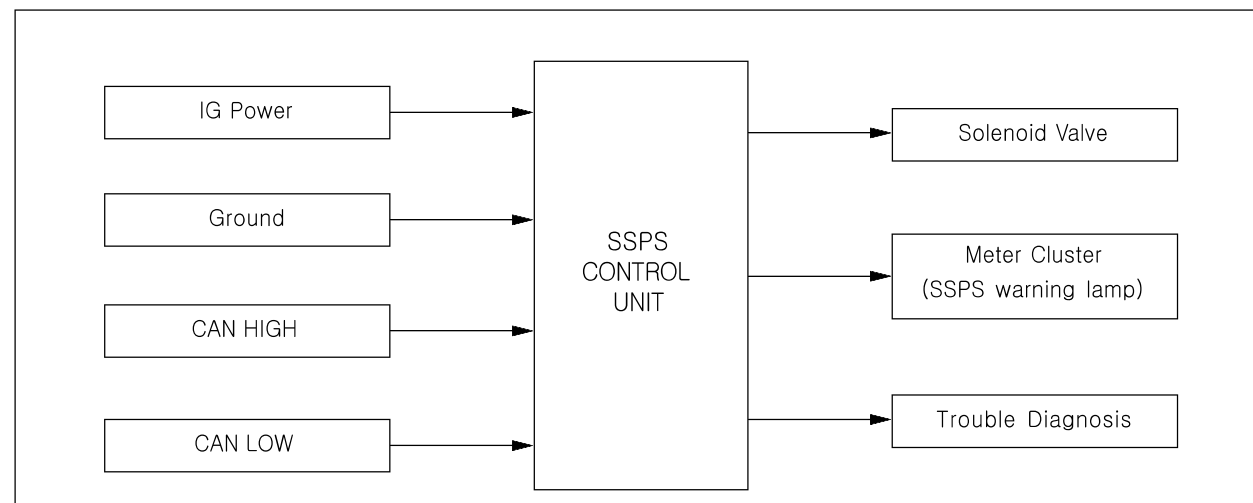
3) CIRCUIT DESCRIPTION

(1) SSPS (SPEED SENSITIVE POWER STEERING)

In the conventional constant power assist steering system, the steerability gets lighter as vehicle speed rises, and this may cause a dangerous situation. Where as having heavy steerability in high speed driving makes it difficult to manipulate the steering wheel when vehicle is in stop. This steering system solves this problem as the steerability is changed according to the vehicle speed, which is called Speed Sensitive Power Steering (SSPS).

SSPS, by providing appropriate steerability to a driver according to the changes of vehicle speed, gives steering stability. The power steering control unit adjusts the hydraulic pressure to reaction plunger by controlling the pressure solenoid valve located in the gear box to optimize the steerability. In other words, the steering wheel gets lighter by adjusting steerability in stop or low speed and provides steering stability by adjusting steering wheel to become heavier in high speed.

(2) INPUT/OUTPUT OF SSPS CONTROL UNIT



(3) SSPS CONFIGURATION

A. PCV (Pressure Control Valve)

This valve controls the hydraulic pressure supplied to reaction device by moving the spool valve according to the changes of solenoid valve.

B. Reaction device

This device increases the steerability effect by binding the input shaft with supplied hydraulic pressure from PCV.

C. Solenoid valve

The SSPS control unit controls the amount of electric current to the solenoid valve according to the vehicle speed. In other words, the solenoid valve controls the hydraulic pressure applied to reaction plunger by changing the valve spool position that is linked with solenoid valve according to the amount of electric current. The changes of hydraulic pressure applied to input shaft according to the pressure changes applied to the reaction plunger provide proper steerability based on the amount of electric current.

► Specifications

Description	Specification
Voltage Rating	DC 12 V
Current Rating	1.0 A
Resistance	6.7 ± 1 Ω

► Electric Current Check

- Disconnect the solenoid valve connector (waterproof connector) and install the ammeter between the solenoid valve connector and the wiring harness.



NOTE

- Do not ground the solenoid terminal.

- When the vehicle speed is at 0 km/h, check whether the electric current for solenoid is in specified range and check that the current is reduced as the vehicle speed increases.

Current	0.9 ~ 1.1 A (vehicle speed at 0 km/h)
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D. SSPS Control Unit

- To provide proper steerability to a driver, the SSPS control unit controls the solenoid valve by receiving the vehicle speed and the throttle position data via CAN - communication.

The SSPS control unit controls the working current for the solenoid valve with PWM type duty ratio of 333 Hz frequency and sets the target current to 1A during 1 second after the - ignition is "ON".

When a trouble occurs in the system, the SSPS control unit generates a trouble code using fail safe function.