SECTION PB
PARKING BRAKE SYSTEM

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000013568680

Risk of injury

There is a risk of injury caused by parts becoming projectiles if uncontrolled deployment of air bag or seat belt pre-tensioner occurs, or by storing air bag with the deployment side facing downwards. When scrapping air bag or seat belt pre-tensioner by means of controlled deployment, there is also a danger present if a sufficiently safe distance is not maintained, or if opening using cutting torches or other cutting tools, or due to smelting or if parts that are not yet triggered are exposed to a blaze or a smoldering fire at landfills.

Safety instructions/precautions

- Removed air bag must always be stored with deployment side facing up.
- Acquisition, transportation, storage, testing and assembly work should only be performed or supervised by properly trained personnel.
- Install air bag or seat belt pre-tensioner immediately following retrieval from storage.
- Air bag and seat belt pre-tensioner must be protected from flying sparks, open fires and temperature exceeding 100°C (212°F).
- Never transport air bag and seat belt pre-tensioner in the passenger compartment. Store them securely in the luggage room of the vehicle in their original replacement part packaging and secure them so that they cannot slip around.
- Never allow air bag and seat belt pre-tensioner to come into contact with grease, oil, or cleaning agents.
- Perform system tests using approved testing equipment only, and only when the units are properly installed and the vehicle is unoccupied.
- Before the initial hookup of the battery or an external power supply, the ignition must be switched on and the vehicle unoccupied.
- Air bag and seat belt pre-tensioner that fall from a height of more than 0.5 m must be replaced.
- When scrapping by means of controlled deployment of air bag and seat belt pre-tensioner, a safe distance of at least 10 m must be maintained.
- Before starting work on air bag and seat belt pre-tensioner and work on components that are connected to air bag and seat belt pre-tensioner or require and intervention in their electric circuit (e.g. when removing the steering wheel):

- Disconnect any external power sources (e.g. charger).
- Disconnect and insulate ground line of battery

- Before starting bodywork in combination with welding or retrofitting, during which work is performed on uninsulated, current-carrying lines or require an intervention in their electric circuit (e.g. when removing the steering wheel):

- Disconnect any external power sources (e.g. charger).
- Disconnect and insulate ground line of battery.
- During welding, disconnect plug connection and from control unit of air bag.

- When the air bag deploys, the pyrofuse activates and the power source from the battery is disconnected. This prevents possible fires caused by electric leakage after an accident occurs.

Precautions for Removing Battery Terminal

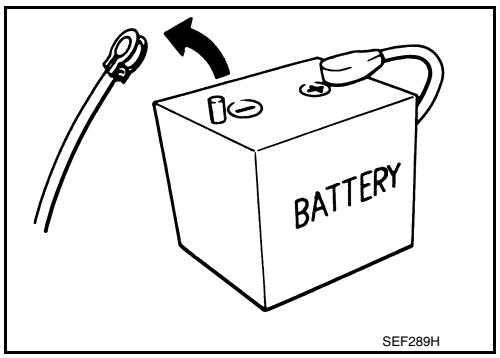
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When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	YD25DDTi	: 2 minutes
D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		



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NOTE:
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:
- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

NOTE:
If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:
The removal of 12V battery may cause a DTC detection error.

Precaution for Parking Brake System

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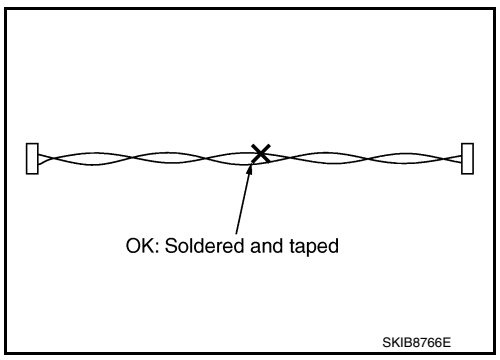
WARNING:
Since dust covering the rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

- When a malfunction occurs in the electric parking brake system, parking brake can be mechanically released. Refer to PB-33, "Description".
- When parking brake must be released while the battery negative terminal is disconnected, mechanically release it. Refer to PB-33, "Description".
- About brake force test, refer to PB-10, "System Description" (“brake test mode”)

Precaution for Harness Repair

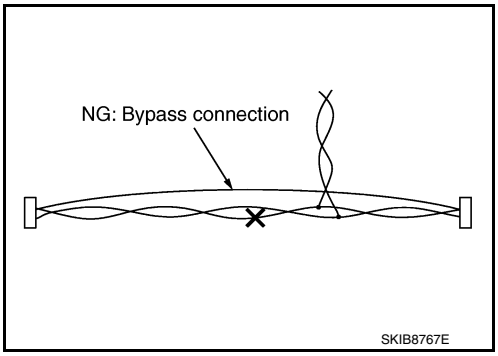
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- Solder the repair part, and wrap it with tape. [Twisted wire fray must be 110 mm (4.33 in) or less.]



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- Never bypass the repair point with wire. (If it is bypassed, the turn-out point cannot be separated and the twisted wire characteristics are lost.)

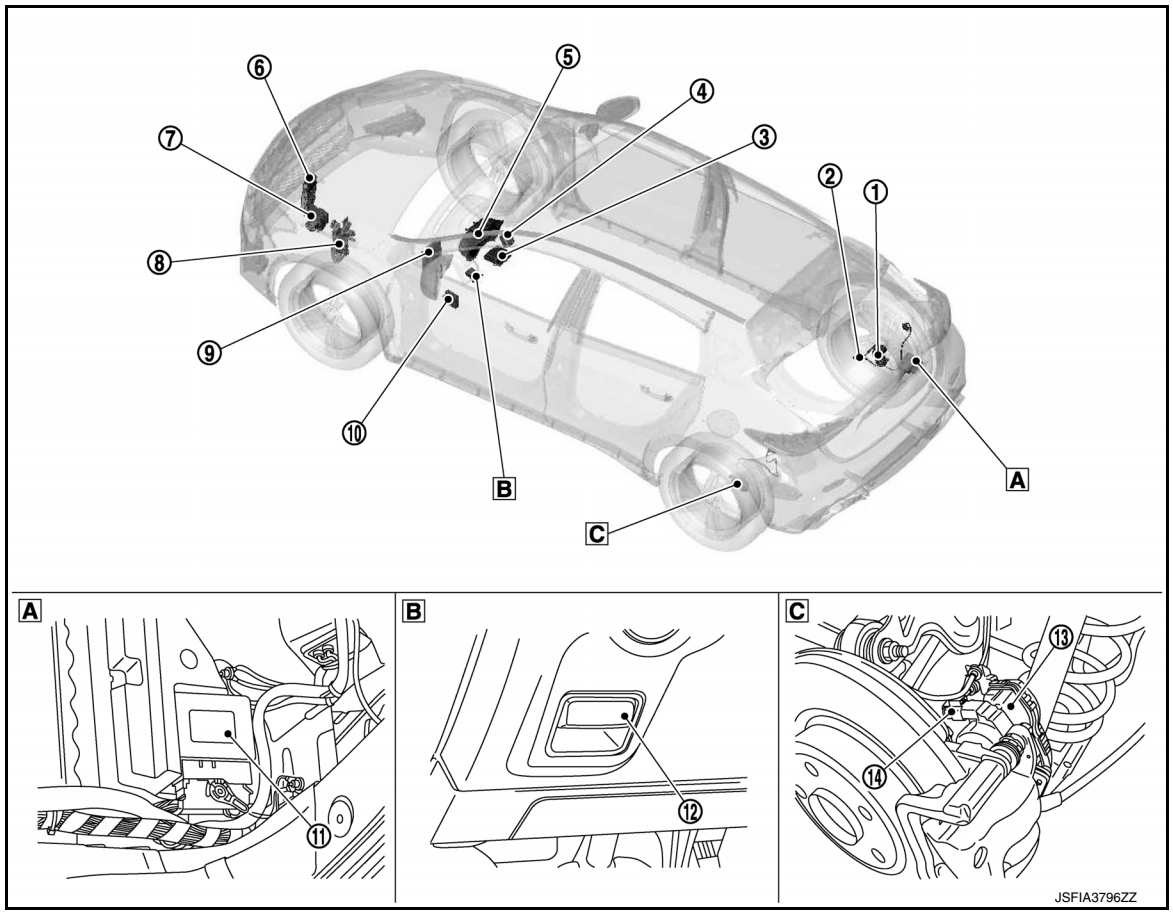


SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

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A Behind the luggage side lower finisher RH B Instrument panel assembly (LH side) C Rear brake caliper (LH)

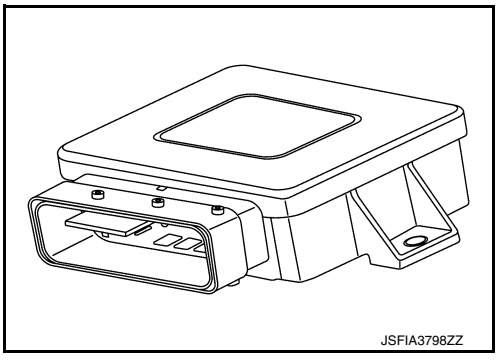
No.	Component part	Function
①	Electric parking brake actuator motor RH	Refer to PB-9, "Electric Parking Brake Actuator Motor"
②	Electric parking brake actuator motor RH harness	
③	Air bag diagnosis sensor unit	Mainly transmits the following signal to electric parking brake control module via CAN communication (via electronic stability program control unit). • Driver seat belt buckle switch signal Refer to SRC-8, "Component Parts Location" for detailed installation location.
④	Electronic ignition switch control unit	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Ignition control status signal Refer to PCS-5, "Component Parts Location" for detailed installation location.

No.	Component part	Function
⑤	Combination meter	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Dynamometer test mode signal Mainly receives the following signal from electric parking brake control module via CAN communication. • Electric parking brake switch status signal • Emergency stop signal • Meter display signal • Parking brake indicator lamp signal • Parking brake warning lamp signal
⑥	ECM	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Drive train and engine running status signal • Drive train operational status signal • Accelerator pedal position signal Refer to EC-27, "Component Parts Location" for detailed installation location.
⑦	Electronic stability program control unit	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Road gradient signal • Wheel speed signal • Enable signal • VDC status signal Mainly receives the following signal from electric parking brake control module via CAN communication. • Initiation of emergency braking signal Refer to BRC-29, "Component Parts Location" for detailed installation location.
⑧	TCM	Mainly transmits the following signal to electric parking brake control module via CAN communication (via ECM). • Shift position signal Refer to TM-17, "Component Parts Location" for detailed installation location.
⑨	BCM	Mainly transmits the following signal to electric parking brake control module via CAN communication (via electric ignition switch control unit). • Back door switch signal Refer to BCS-8, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑩	Left front door control unit	Mainly transmits the following signal to electric parking brake control module via CAN communication (via BCM). • Left front door switch signal Refer to DLK-10, "DOOR LOCK SYSTEM : Component Parts Location" for detailed installation location.
⑪	Electric parking brake control module	Refer to PB-8, "Electric Parking Brake Control Module"
⑫	Parking brake switch	Refer to PB-9, "Electric Parking Brake Switch"
⑬	Electric parking brake actuator motor LH	Refer to PB-9, "Electric Parking Brake Actuator Motor"
⑭	Electric parking brake actuator motor LH harness	

Electric Parking Brake Control Module

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- The electric parking brake control module is on the right on the control unit carrier in the luggage compartment.
- The electric parking brake control module has the following tasks:
- Reading in of signals
- Evaluation of input factors
- Actuation of components


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READING IN OF SIGNALS

The input factors are read in over the following connections:
- Direct line
- CAN communication line

Direct Line

The signals from the following component are read in via direct lines:
- Status of electric parking brake switch

CAN Communication Line

The signals are read in from each control unit via CAN communication. For detail, refer to PB-10, "System Description".

EVALUATION OF INPUT FACTORS

The input factors that have been read in are evaluated by the integrated microprocessor and the relevant components are then actuated.

ACTUATION OF COMPONENTS

The actuation of the components takes place via the following connections:
- Direct line
- CAN communication line

Direct Line

he following components are actuated via a direct line:
- Electric parking brake actuator motor LH
- Electric parking brake actuator motor RH

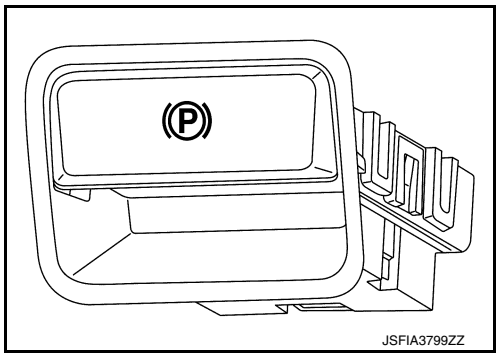
CAN Communication Line

The following components are actuated via CAN communication. For detail, refer to PB-10, "System Description".
- Combination meter
- Electronic stability program control unit

Electric Parking Brake Switch

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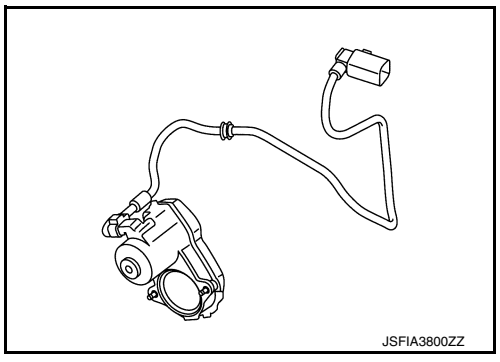
- Pulling the parking brake switch applies the parking brake.
- Pressing the parking brake switch releases the parking brake.



Electric Parking Brake Actuator Motor

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- The parking brake actuator is installed on rear brake caliper.
- The signal from the electric parking brake control module applies and releases the parking brake.



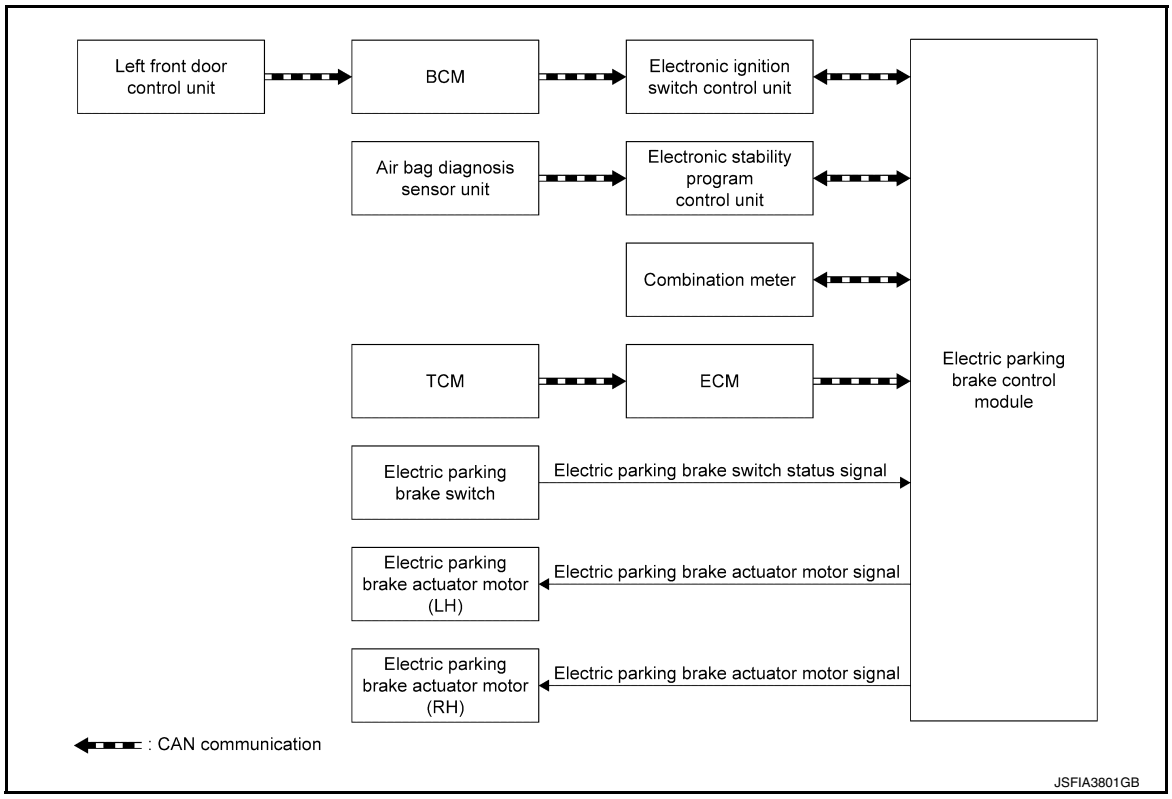
SYSTEM

System Description

INFOID:0000000013568688

- The electronic parking brake makes it possible to hold the vehicle at a standstill on gradients even in the absence of the driver, the braking parts being held de-energized in the brake position by a self-locking mechanical effect.
- The electric parking brake control module actuates the electric parking brake actuator motor LH and the electric parking brake actuator motor RH.
- Activation takes place manually via the electric parking brake switch or automatically depending on the driving condition.
- Depending on the operating condition of the electric parking brake the driver′s wish is converted into a corresponding tension force build up or reduction in the actuator motors.
- The electronic parking brake consists of the following functions:
- Function sequence for release electric parking brake (manually, via electric parking brake switch)
- Function sequence for automatically release electric parking brake
- Function sequence for emergency braking of electronic parking brake
- Function sequence for brake test mode
- Function sequence for child safety lock
- Function sequence for display concept/acoustic signal

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Electronic ignition switch control unit	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Ignition control status signal
Air bag diagnosis sensor unit	Mainly transmits the following signal to electric parking brake control module via CAN communication (via electronic stability program control unit). • Driver seat belt buckle switch signal

Component	Signal description
BCM	Mainly transmits the following signal to electric parking brake control module via CAN communication (via electric ignition switch control unit). • Back door switch signal
Electronic stability program control unit	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Road gradient signal • Wheel speed signal • Enable signal • VDC status signal Mainly receives the following signal from electric parking brake control module via CAN communication. • Initiation of emergency braking signal
Left front door control unit	Mainly transmits the following signal to electric parking brake control module via CAN communication (via BCM). • Left front door switch signal
ECM	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Drive train and engine running status signal • Drive train operational status signal • Accelerator pedal position signal
TCM	Mainly transmits the following signal to electric parking brake control module via CAN communication (via ECM). • Shift position signal
Combination meter	Mainly transmits the following signal to electric parking brake control module via CAN communication. • Dynamometer test mode signal Mainly receives the following signal from electric parking brake control module via CAN communication. • Electric parking brake switch status signal • Emergency stop signal • Meter display signal • Parking brake indicator lamp signal • Parking brake warning lamp signal
Electric parking brake actuator motor LH/RH	Mainly receives the following signal from electric parking brake control module via CAN communication. • Electric parking brake actuator motor actuation signal
Electric parking brake switch	Mainly transmits the following signal to electric parking brake control module. • Electric parking brake switch status signal

FUNCTION DESCRIPTION

Function Sequence For Release Electric Parking Brake (Manually, Via Electric Parking Brake Switch)

- Ignition control status signal required to release the parking brake is sent by the electronic ignition switch control unit to the CAN communication.
- The parking brake release is requested by actuating the electric parking brake switch.
- The electric parking brake control module reads in the status of the electric parking brake switch directly.
- Once the electric parking brake control module has actuated the electric parking brake actuator motor LH and RH at the same time and the electric parking brake is fully released, it generates a signal for the parking brake indicator lamp (red).
- The parking brake indicator lamp (red) in the combination meter then goes off.
- The electric parking brake switch must be actuated for a sufficient length of time for a release to be detected.

Function Sequence For Automatically Release Electric Parking Brake

- The “parking brake automatic release” function is performed as soon as a sufficiently high drive torque exists at the wheels of the front axle in order to overcome the grade resistance for the prevailing road gradient.
- The following signals for the individual control units are sent over each CAN bus to the electric parking brake control unit:

- Accelerator pedal position, drive train and engine running status, from the ECM.
- Road gradient (for vehicle standstill), from electronic stability program control unit.
- Total transmission ratio from the TCM via ECM.
- The driver door status from left front door control unit via BCM.

- Back door status from BCM.
- The BCM forwards all signal to the electronic stability program control unit for evaluation. Together with the required signal from the wheel speeds, the electronic stability program control unit sends this information.
- The electric parking brake control unit is woken by the corresponding CAN signal and releases the parking brake by actuating the integrated electric parking brake actuator motor (LH and RH) on both rear brake calipers. If the electric parking brake is not released as a result of a malfunction, the combination meter outputs the message via the information display and in addition an acoustic warning sounds.

Function Sequence For Emergency Braking Of Electronic Parking Brake

- The emergency braking of electric parking brake is operation if the following conditions are satisfied:
- Vehicle speed: 4 km/h (2.5 MPH) or more
- If the electric parking brake switch is actuated and held down while driving, the electric parking brake control module sends a brake request to the CAN communication.
- The request is received by the following control units:
- Electronic stability program control unit
- Combination meter
- BCM
- The vehicle is now braked via the service brake. The BCM activates the stop lamp actuation. The combination meter issues the message on the information display and a warning buzzer is sounded.
- If the vehicle dynamics control (VDC) malfunctions, brake application occurs only via the electric parking brake control module by means of actuation of the electric parking brake actuator motor (LH and RH) at the rear axle service brake.
- The electric parking brake control module evaluates the rear wheel speeds for this purpose in order to prevent the rear wheels from locking up.
- The request for stop lamp actuation is likewise issued by the electric parking brake control module.

Function Sequence For Brake Test Mode

- Function requirements for brake test stand:
- Front wheels “stationary” and rear wheels turn slowly (brake test stand)
- A test must be performed after bedding-in the service brake
- Engine running
- Electric shift selector position “N”
- A brake test mode is integrated into the electric parking brake control module for the purpose of testing the electric parking brake on a brake test stand.
- If the vehicle is on the brake test stand and the test stand rollers are activated, the electric parking brake control module automatically detects this through the rpm difference between the rear wheels and the front wheels and switches to the brake test mode.
- When brake test mode is activated, the inspector can gradually raise the tension force of the electric parking brake by actuating the electric parking brake switch multiple times until the rear axle wheels lift out of the rollers of the brake test stand at a correspondingly high tension force.
- The following variables/values can be evaluated by checking a vehicle on the brake test stand:
- Rolling resistance
- Braking power
- Deviation in brake force between right and left rear wheel
- Start of locking tendency

Function Sequence For Child Safety Lock

- Function requirements for child safety lock:
- Ignition switch OFF
- Ignition key removed
- Pressing the electric parking brake switch with the ignition key removed or ignition switch OFF, will not cause the electric parking brake control module to actuate release of the electric parking brake actuator motor (LH and RH).
- This should prevent unintended deactivation of the electric parking brake and, as such, serves as an additional protection against the vehicle rolling away on slopes or inclines.

Function Sequence For Display Concept/Acoustic Signal

- The following display tools are available for the display of function and condition of the electric parking brake:
- Parking brake indicator lamp (red)
- Parking brake warning lamp (yellow)
- Various status/warning messages over the information display in combination meter
- Warning buzzer

- The different displays and buzzer signals are actuated depending on the current operating condition of the electric parking brake.

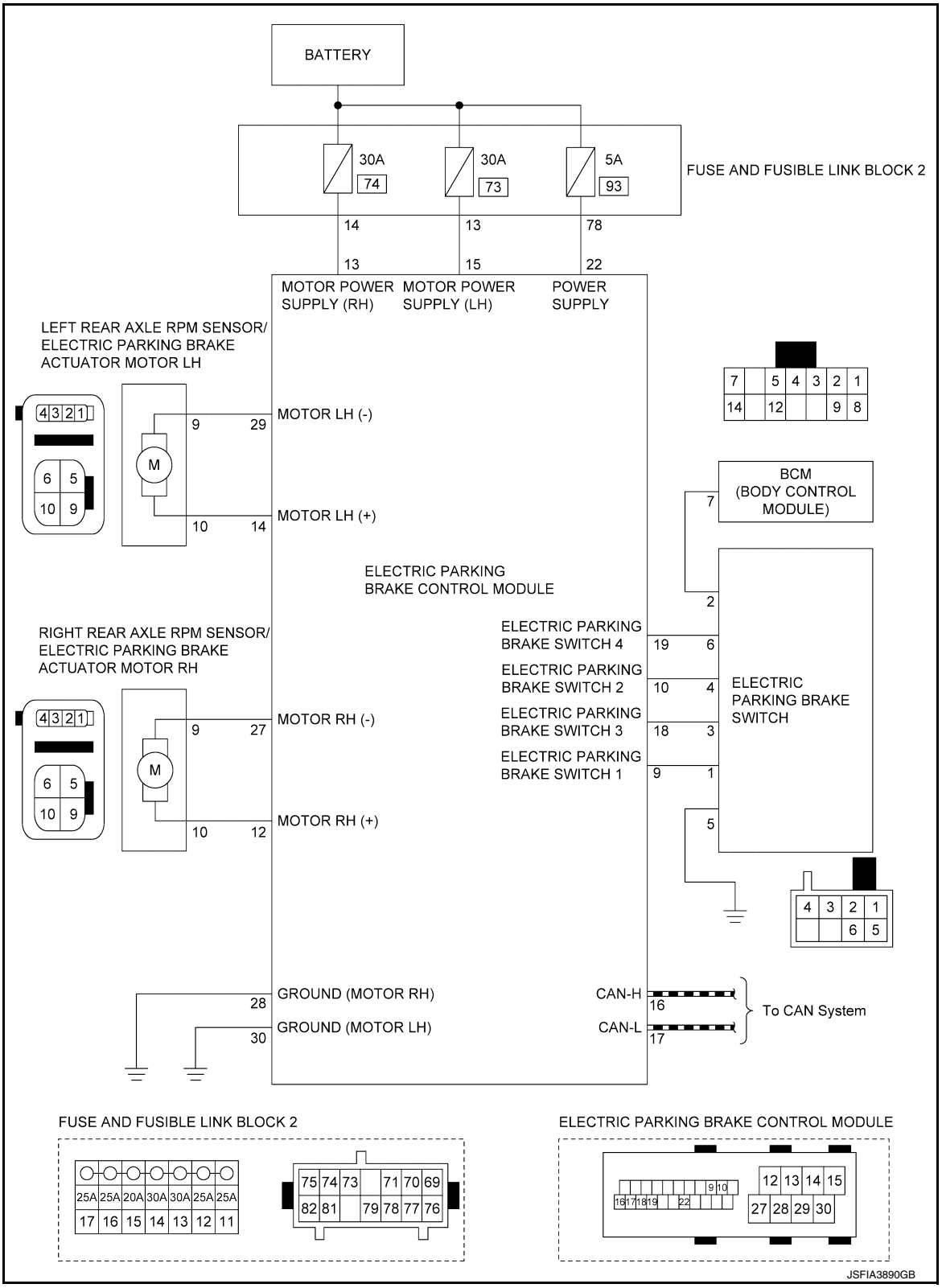
CONDITION FOR TURN ON THE WARNING LAMP, THE INDICATOR LAMP AND INFORMATION DISPLAY

Condition (status)	Parking brake indicator (red)	Parking brake warning lamp (yellow)	Buzzer (combination meter)	Information display
Electric parking brake actuated	ON	OFF	OFF	OFF
Released electric parking brake when ignition switch is OFF	ON	OFF	OFF	 JSNIA9611ZZ “Turn on the ignition to release the parking brake”
Condition for automatic release of the electric parking brake is not fulfilled	Flash	OFF	ON	 JSNIA9611ZZ “Release parking brake”
Emergency stop using the electric parking brake	Flash	OFF	ON	 JSNIA9611ZZ “Release parking brake”
Electric parking brake malfunction (to apply)	OFF/Flash	ON	OFF	 JSNIA9611ZZ “Parking brake See Owner’s Manual”
Electric parking brake malfunction (to release)	ON/Flash	ON	OFF	 JSNIA9611ZZ “Parking brake See Owner’s Manual”

Condition (status)	Parking brake indicator (red)	Parking brake warning lamp (yellow)	Buzzer (combination meter)	Information display
Electric parking brake inoperative	ON	Flash	OFF	 JSNIA9611ZZ “Parking brake inoperative”
Attempted release of electric parking brake in child safety lock mode, ignition must be switched ON	ON	OFF	OFF	 JSNIA9611ZZ “Turn on the ignition to release the parking brake”

Circuit Diagram

INFOID:0000000013568689



Fail-Safe

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- The electric parking brake warning lamp (yellow) and/or electric parking indicator lamp (red) turns ON or blinks when a malfunction with the electric parking brake system occurs.

- The electric parking brake cannot be operated when electric parking brake system is malfunction. It restricts braking and release operations of electric parking brake.

NOTE:
The parking brake can be electric parking brake switch operation or mechanically released.

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

INFOID:0000000013568691

Name	Design	Layout/Function
Electric parking brake indicator lamp (red)		For layout: Refer to MWI-8, "METER SYSTEM : Design". For function: Refer to MWI-22, "WARNING LAMPS/INDICATOR LAMPS : Electric Parking Brake Indicator Lamp".
Electric parking brake warning lamp (yellow)		For layout: Refer to MWI-8, "METER SYSTEM : Design". For function: Refer to MWI-23, "WARNING LAMPS/INDICATOR LAMPS : Electric Parking Brake Warning Lamp".

INFORMATION DISPLAY (COMBINATION METER)

INFORMATION DISPLAY (COMBINATION METER) : Parking Brake Warning

INFOID:0000000013568692

DESIGN/PURPOSE

- The design and message is displayed on the information display when electric parking brake system detected the system malfunction.
- Each electric parking brake system information is displayed on the information display.

Design and Message

Design	Warning Message	Description
 JSNIA9611ZZ	Turn on the ignition to release the parking brake	• Released electric parking brake when ignition switch is OFF • Attempted release of electric parking brake in child safety lock mode, ignition must be switched ON
 JSNIA9611ZZ	Release parking brake	• Condition for automatic release of the electric parking brake is not fulfilled • Emergency stop using the electric parking brake

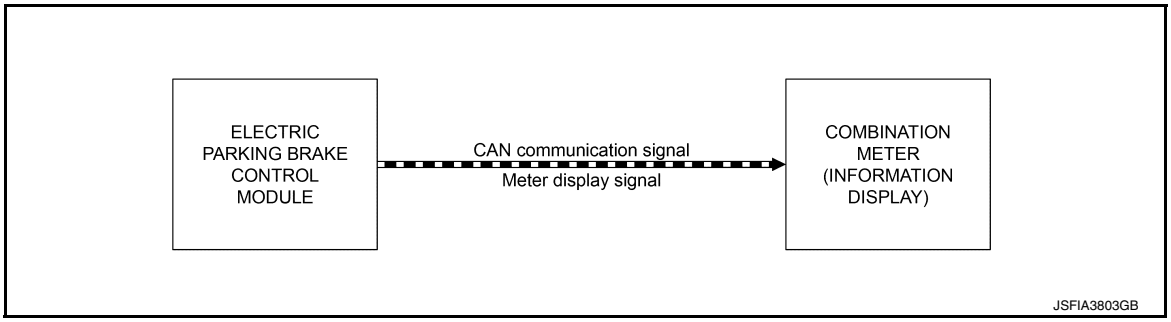
Design	Warning Message	Description
 JSNIA9611ZZ	Parking brake See Owner's Manual	Electric parking brake malfunction
 JSNIA9611ZZ	Parking brake inoperative	Electric parking brake inoperative

SYNCHRONIZATION WITH WARNING BUZZER

Applicable

Refer to PB-10, "System Description".

SYSTEM DIAGRAM



SIGNAL PATH

- The electric parking brake control module transmits a meter display signal to the combination meter through electronic ignition switch control unit via CAN communication.
- The combination meter shows the display on the information display, according to the signal.

WARNING/INDICATOR OPERATING CONDITION

When the following conditions are satisfied (ignition switch ON)

- Condition for automatic release of the electric parking brake is not fulfilled
- Emergency stop using the electric parking brake

DIAGNOSIS SYSTEM (ELECTRIC PARKING BRAKE CONTROL MODULE)

CONSULT Function

INFOID:0000000013568693

APPLICATION ITEM

CONSULT can display each diagnostic item using the diagnostic test modes as follows.

Mode	Function description
ECU identification	Parts number of electric parking brake control module can be read.
Self Diagnostic Results	Self-diagnostic results and freeze frame data can be read and erased quickly.*
DATA MONITOR	Input/Output data in the electric parking brake control module can be read.
Work Support	Components can be quickly and accurately adjusted.
Re/programming, Configuration	Automatically write the vehicle specification when replacing electric parking brake control module.

*: The following diagnosis information is erased by erasing.
- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

Electric parking brake control module part number can be read.

SELF DIAGNOSTIC RESULT

Refer to PB-24, "DTC Index".

When “CRNT” is displayed on self-diagnosis result
- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis result
- System malfunction in the past is detected, but the system is presently normal.

Freeze Frame Data (FFD)
When DTC is detected, a vehicle status shown below is recorded and displayed on CONSULT.

Item name	Indication/Unit	Display item
Original Odometer Value	km	Odometer value stored when the respective DTC is detected for the first time.
Most Recent Odometer Value	km	Odometer value stored or updated when the DTC was detected the last time.
Frequency Counter	—	The frequency counter is defined as the total number of times the DTC status has transitioned from “stored - not active” to “active”.
Ignition cycle counter	—	Indicates the number of consecutive operation cycles recorded since a DTC first became stored - not active and is no longer an active DTC. This information is needed for Self-healing functionality.
Internal malfunction code first occurrence	Yes/No	Displays internal malfunction code first occurrence.
Voltage at circuit first occurrence	V	Displays voltage at circuit first occurrence.
Status of right electric parking brake first occurrence	INITIALIZATION/Static mode/Dynamic mode/Limp home modus	Displays status of right electric parking brake first occurrence.
Internal malfunction code last occurrence	—	Displays internal malfunction code last occurrence.
Voltage at circuit last occurrence	V	Displays voltage at circuit last occurrence.
Status of right electric parking brake last occurrence	Yes/No	Displays status of right electric parking brake last occurrence.

Item name	Indication/Unit	Display item
Status of left electric parking brake last occurrence	Brake left open/Brake left move (open)/Brake status left unknown/Brake left move (close)/Brake left close/Brake status left initialize/Brake left move (assembly)	Displays status of left electric parking brake last occurrence.
Status of right electric parking brake last occurrence	Brake right open/Brake right move (open)/Brake status right unknown/Brake right move (close)/Brake right closed/Brake status right initialize/Brake right move (assembly)	Displays status of right electric parking brake last occurrence.
Internal malfunction code last occurrence	—	Displays internal malfunction code last occurrence.
Internal malfunction code last occurrence	—	Displays internal malfunction code last occurrence.
Status of left electric parking brake last occurrence	—	Displays status of left electric parking brake last occurrence.
Voltage at circuit first occurrence	V	Displays voltage at circuit first occurrence.
Ignition status first occurrence	INITIALIZATION/Key removed/IGN OFF/Key identified/Undefined ignition status/Ignition ON/ENGINE START/Ignition status not available	Displays ignition status first occurrence.
Status of left electric parking brake first occurrence	INVALID/VALID	Displays status of left electric parking brake first occurrence.
Internal malfunction code last occurrence	—	Displays internal malfunction code last occurrence.
Voltage at circuit last occurrence	V	Displays voltage at circuit last occurrence.
Ignition status last occurrence	INITIALIZATION/Key removed/IGN OFF/Key identified/Undefined ignition status/Ignition ON/ENGINE START/Ignition status not available	Displays ignition status last occurrence.

DATA MONITOR

NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Item [Indication/Unit]		Description
Status of electric parking brake	[No end p/INC/DEC/ENGG/RELS/Ndef5/Ndef6/SNA]	Displays the status of electric parking brake system.
Status of EPB switch	[Idle/ENGG/RELS/SNA]	Displays the electric parking brake switch status.
Request to Brake light	[OFF/On/NDEF2/SNA]	Displays the stop lamp turn ON request status.
Parking brake warning lamp	[OFF/CONT/BLINK/SNA]	Displays the electric parking brake warning lamp (yellow) turn ON request status.

Item [Indication/Unit]		Description
Parking brake indicator lamp	[OFF/CONT/BLINK/ SNA]	Displays the electric parking brake indicator lamp (red) turn ON request status.
Calculated temp of PB	—	Displays the calculated temperature of parking brake.
Maximum temp of PB	—	Displays the maximum temperature of parking brake.
Power consumption (RH motor)	—	Displays the power consumption of electric parking brake actuator motor RH.
Power consumption (LH motor)	—	Displays the power consumption of electric parking brake actuator motor LH.
Shutdown current (RH motor)	—	Displays the shutdown current of electric parking brake actuator motor RH.
Shutdown current (LH motor)	—	Displays the shutdown current of electric parking brake actuator motor LH.
Status of circuit 15	[IGN OFF/IGNITION ON/not valid]	Displays the ignition switch ON status.
Status of EPB switch	[NOT ACT/OPEN/Close/ FAULTY]	Displays the electric parking brake switch status.
Status of LH EPB	[Apply 1/Apply 2/Apply 3/ Rels 1/Rels 2/Unknown/ Init/Rels 3/W back]	Displays the status of electric parking brake (LH) system.
Status of RH EPB	[Apply 1/Apply 2/Apply 3/ Rels 1/Rels 2/Unknown/ Init/Rels 3/W back]	Displays the status of electric parking brake (RH) system.
Operating mode	[STATIC/Dynamic/Limp]	Displays the status of electric parking brake operating mode.
LH EPKB act motor temp	[°C]	Display the temperature of electric parking brake actuator motor LH.
RH EPKB act motor temp	[°C]	Display the temperature of electric parking brake actuator motor RH.
Total distance max temp of PB	[km]	Displays the total distance at maximum temperature of parking brake.
VOLTAGE AT CIRCUIT 30	[V]	Displays the power supply voltage.
RH EPKB act motor voltage	[V]	Displays the voltage value applied to the electric parking brake actuator motor RH.
LH EPKB act motor voltage	[V]	Displays the voltage value applied to the electric parking brake actuator motor LH.

WORK SUPPORT

Work support item	Description
VIN REGISTRATION	Registration of the vehicle identification number.
Electrical contact actuator/brake clearance setting	Execute initialization routine.
Calibration of electric parking brake control unit	Perform the calibration of electric parking brake control unit.
Re learning	Perform the learning of electric parking brake control unit.

RE/PROGRAMMING, CONFIGURATION

Refer to PB-32, "Description".

ECU DIAGNOSIS INFORMATION

ELECTRIC PARKING BRAKE CONTROL MODULE

Reference Value

INFOID:0000000013568694

VALUES ON THE DIAGNOSIS TOOL

NOTE:

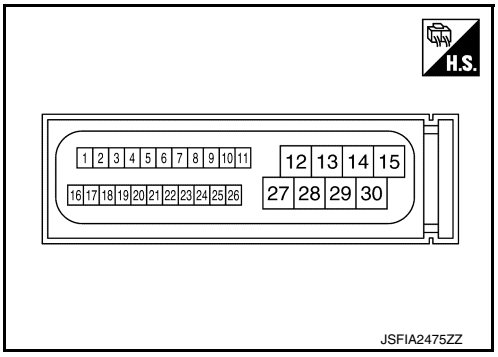
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Condition	Reference values in normal operation
Status of electric parking brake	—	No end p
	—	INC
	—	DEC
	—	ENGG
	When parking brake is release	RELS
	—	Ndef5
	—	Ndef6
	—	SNA
Status of EPB switch	—	Idle
	—	ENGG
	When electric parking brake switch is release	RELS
	—	SNA
Request to Brake light	When stop lamp is turn OFF	OFF
	When stop lamp is turn ON	On
	—	NDEF2
	—	SNA
Parking brake warning lamp*	When parking brake warning lamp is turn OFF	OFF
	When parking brake warning lamp is turn ON	CONT
	When parking brake warning lamp is blinking	BLINK
	—	SNA
Parking brake indicator lamp*	When parking brake indicator lamp is turn OFF	OFF
	When parking brake indicator lamp is turn ON	CONT
	When parking brake indicator lamp is blinking	BLINK
	—	SNA
Calculated temp of PB	Ignition switch ON	—
Maximum temp of PB	Ignition switch ON	—
Power consumption (RH motor)	Ignition switch ON	—
Power consumption (LH motor)	Ignition switch ON	—
Shutdown current (RH motor)	Ignition switch ON	—
Shutdown current (LH motor)	Ignition switch ON	—
Status of circuit 15	Ignition switch OFF	IGN OFF
	Ignition switch ON	IGNITION ON
	Ignition switch is not valid	not valid

Monitor item	Condition	Reference values in normal operation
Status of EPB switch	When electric parking brake switch is inactive	NOT ACT
	When electric parking brake switch is open	OPEN
	When electric parking brake switch is close	Close
	When electric parking brake switch is malfunction	FAULTY
Status of LH EPB	Electric parking brake (LH) is applied	Apply 1
	Electric parking brake (LH) is applying	Apply 2
	Electric parking brake (LH) is fully applied	Apply 3
	Electric parking brake (LH) is released	Rels 1
	Electric parking brake (LH) is releasing	Rels 2
	Electric parking brake (LH) is unknown	Unknown
	Electric parking brake (LH) is initialize	Init
	Electric parking brake (LH) is fully released	Rels 3
	Electric parking brake (LH) is wind back	W back
Status of RH EPB	Electric parking brake (RH) is applied	Apply 1
	Electric parking brake (RH) is applying	Apply 2
	Electric parking brake (RH) is fully applied	Apply 3
	Electric parking brake (RH) is released	Rels 1
	Electric parking brake (RH) is releasing	Rels 2
	Electric parking brake (RH) is unknown	Unknown
	Electric parking brake (RH) is initialize	Init
	Electric parking brake (RH) is fully released	Rels 3
	Electric parking brake (RH) is wind back	W back
Operating mode	Electric parking brake mode is static	STATIC
	Electric parking brake mode is dynamic	Dynamic
	Electric parking brake mode is limp home	Limp
LH EPKB act motor temp	Ignition switch ON	—
RH EPKB act motor temp	Ignition switch ON	—
Total distance max temp of PB	Ignition switch ON	—
VOLTAGE AT CIRCUIT 30	Ignition switch ON	—
RH EPKB act motor voltage	Ignition switch ON	—
LH EPKB act motor voltage	Ignition switch ON	—

*: Refer to PB-10, "System Description" for ON/OFF/BRINK conditions of each warning lamp and each indicator lamp, buzzer and information display in the combination meter.

TERMINAL LAYOUT



PHYSICAL VALUE

Terminal No.		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
9 (G)	Ground	Parking brake switch 1	Input	Ignition switch ON	Parking brake switch is pulling	5.2 V
					Parking brake switch is neutral	4.0 V
					Parking brake switch is pushing	5.2 V
10 (P)	Ground	Parking brake switch 2	Input	Ignition switch ON	Parking brake switch is pulling	3.0 V
					Parking brake switch is neutral	4.0 V
					Parking brake switch is pushing	5.2 V
12 (R)	Ground	Motor RH (+)	Output	Ignition switch ON	Motor is active (apply)	11V
					Motor is active (release)	0 V
13 (W)	Ground	Motor power supply (RH)	Input	—		12 V
14 (R)	Ground	Motor LH (+)	Output	Ignition switch ON	Motor is active (apply)	11 V
					Motor is active (release)	0 V
15 (R)	Ground	Motor power supply (LH)	Input	—		12 V
16 (W)	Ground	CAN-H	Input/ Output	—		—
17 (G)	Ground	CAN-L	Input/ Output	—		—
18 (O)	Ground	Parking brake switch 3	Input	Ignition switch ON	Parking brake switch is pulling	5.2 V
					Parking brake switch is neutral	4.0 V
					Parking brake switch is pushing	5.2 V
19 (G)	Ground	Parking brake switch 4	Input	Ignition switch ON	Parking brake switch is pulling	5.2 V
					Parking brake switch is neutral	4.0 V
					Parking brake switch is pushing	3.0 V
22 (B)	Ground	Power supply	Input	Ignition switch ON		12 V
27 (Y)	Ground	Motor RH (–)	Output	Ignition switch ON	Motor is active (apply)	0 V
					Motor is active (release)	11 V
28 (BR)	Ground	Ground (Motor RH)	—	Ignition switch ON	—	0 V
29 (V)	Ground	Motor LH (–)	Output	Ignition switch ON	Motor is active (apply)	0 V
					Motor is active (release)	11 V
30 (BR)	Ground	Ground (Motor LH)	—	Ignition switch ON	—	0 V

Fail-Safe

INFOID:0000000013568695

- The electric parking brake warning lamp (yellow) and/or electric parking indicator lamp (red) turns ON or blinks when a malfunction with the electric parking brake system occurs.

- The electric parking brake cannot be operated when electric parking brake system is malfunction. It restricts braking and release operations of electric parking brake.

NOTE:
The parking brake can be electric parking brake switch operation or mechanically released.

DTC Index

INFOID:0000000013568696

DTC		Display item		Reference
B210C	16	Supply volt outside permissible range	[CIRC VOLT BELOW THRESHOLD]	PB-39, "DTC Description"
	17	Supply volt outside permissible range	[CIRC VOLT ABOVE THRESHOLD]	
	77	Supply volt outside permissible range	[COMMAND POSI NOT REACHABLE]	
B21F2	00	Circuit malfunction	[NO SUBTYPE INFORMATION]	PB-42, "DTC Description"
B229D	01	Electric parking brake C/U has malf	[ELECTRICAL MALFUNCTION]	PB-44, "DTC Description"
	02	Electric parking brake C/U has malf	[GENERAL ELEC MALFUNCTN]	
	52	Electric parking brake C/U has malf	[NOT ACTIVATED]	
	77	Electric parking brake C/U has malf	[COMMAND POSI NOT REACHABLE]	
B23AA	07	Left brake caliper has malf	[MECHANICAL MALFUNCTION]	PB-52, "DTC Description"
	09	Left brake caliper has malf	[COMPONENT MALFUNCTION]	
	11	Left brake caliper has malf	[CIRCUIT SHORT TO GROUND]	
	12	Left brake caliper has malf	[CIRCUIT SHORT TO BATTERY]	
	13	Left brake caliper has malf	[CIRCUIT OPEN]	
	14	Left brake caliper has malf	[CIRC SHORT TO GRND OR OPEN]	
	15	Left brake caliper has malf	[CIRC SHORT TO BATT OR OPEN]	
	77	Left brake caliper has malf	[COMMAND POSI NOT REACHABLE]	
	95	Left brake caliper has malf	[INCORRECT ASSEMBLY]	
B23AB	07	Right brake caliper has malf	[MECHANICAL MALFUNCTION]	PB-62, "DTC Description"
	09	Right brake caliper has malf	[COMPONENT MALFUNCTION]	
	11	Right brake caliper has malf	[CIRCUIT SHORT TO GROUND]	
	12	Right brake caliper has malf	[CIRCUIT SHORT TO BATTERY]	
	13	Right brake caliper has malf	[CIRCUIT OPEN]	
	14	Right brake caliper has malf	[CIRC SHORT TO GRND OR OPEN]	
	15	Right brake caliper has malf	[CIRC SHORT TO BATT OR OPEN]	
	77	Right brake caliper has malf	[COMMAND POSI NOT REACHABLE]	
	95	Right brake caliper has malf	[INCORRECT ASSEMBLY]	
B23AC	13	Electric parking brake SW has malf	[CIRCUIT OPEN]	PB-72, "DTC Description"
	2A	Electric parking brake SW has malf	[SIGNAL STUCK IN RANGE]	
	64	Electric parking brake SW has malf	[SIGNAL PLAUSIBILITY ERROR]	
C01C5	00	Temp sen on brake caliper has malf	[NO SUBTYPE INFORMATION]	PB-75, "DTC Description"
P0B01	00	EPKB is in assembly position	[NO SUBTYPE INFORMATION]	PB-77, "DTC Description"
P0B02	00	Shutoff due to undervoltage	[NO SUBTYPE INFORMATION]	PB-78, "DTC Description"
P1800	00	CONTROL MODULE	[NO SUBTYPE INFORMATION]	PB-79, "DTC Description"
P1801	00	CONTROL MODULE	[NO SUBTYPE INFORMATION]	PB-81, "DTC Description"
P1802	00	CONTROL MODULE	[NO SUBTYPE INFORMATION]	PB-88, "DTC Description"
U0100	00	Communication error	[NO SUBTYPE INFORMATION]	PB-90, "DTC Description"
U0101	00	COMMUNICATION ERROR (LOST)	[NO SUBTYPE INFORMATION]	PB-93, "DTC Description"
U0121	00	COMMUNICATION ERROR (LOST)	[NO SUBTYPE INFORMATION]	PB-95, "DTC Description"
U0146	00	CAN signal malf	[NO SUBTYPE INFORMATION]	PB-99, "DTC Description"

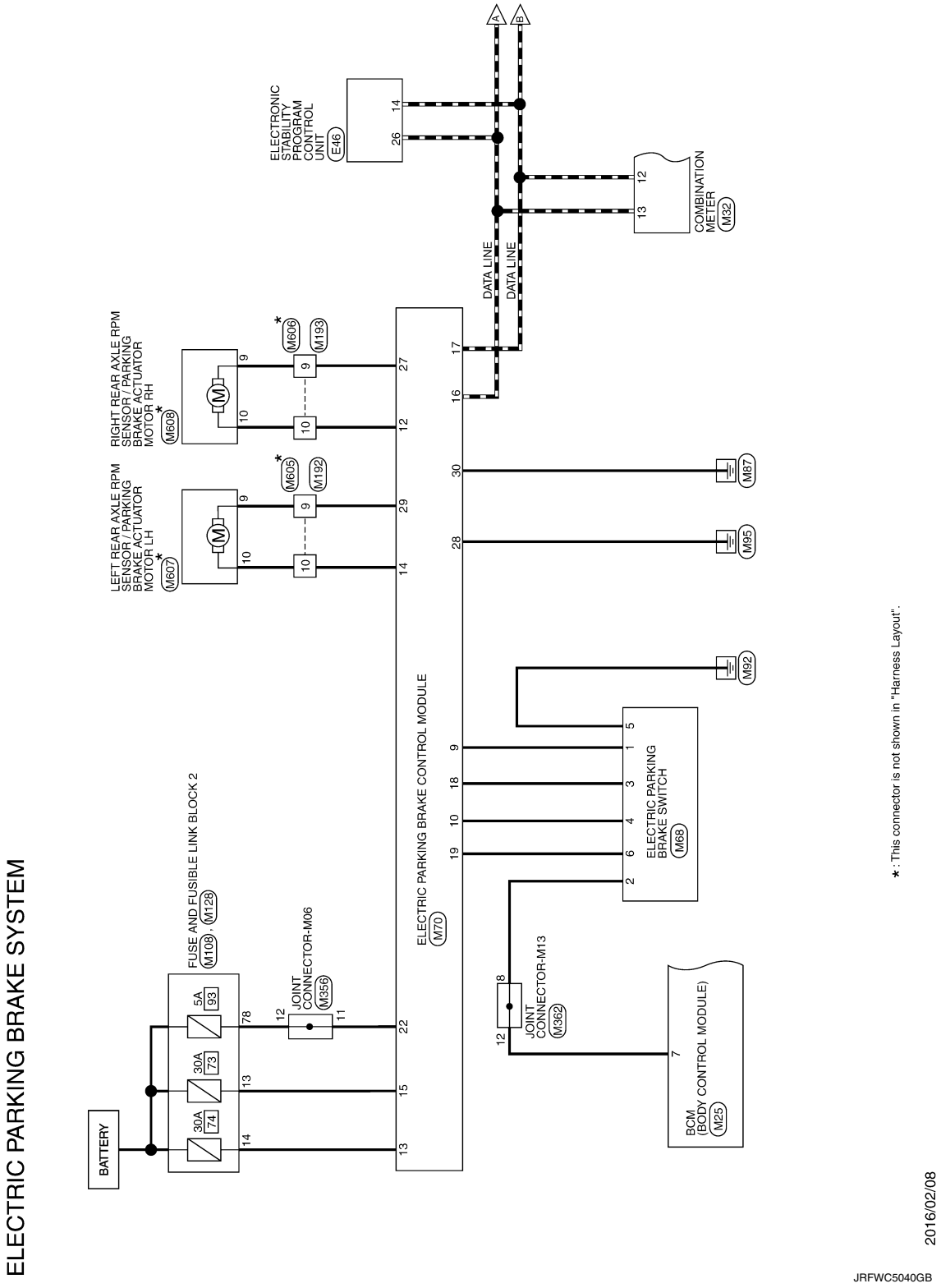
DTC		Display item		Reference
U0155	00	COMMUNICATION ERROR (LOST)	[NO SUBTYPE INFORMATION]	PB-101, "DTC Description"
U0168	00	COMMUNICATION ERROR (LOST)	[NO SUBTYPE INFORMATION]	PB-103, "DTC Description"
U0212	00	OMMUNICATION ERROR (LOST)	[NO SUBTYPE INFORMATION]	PB-105, "DTC Description"
U0401	00	Communication error (invalid)	[NO SUBTYPE INFORMATION]	PB-107, "DTC Description"
U0402	00	COMMUNICATION ERROR (INVALID)	[NO SUBTYPE INFORMATION]	PB-110, "DTC Description"
U0415	00	COMMUNICATION ERROR (INVALID)	[NO SUBTYPE INFORMATION]	PB-112, "DTC Description"
U0423	00	COMMUNICATION ERROR (INVALID)	[NO SUBTYPE INFORMATION]	PB-116, "DTC Description"
U0427	00	COMMUNICATION ERROR (INVALID)	[NO SUBTYPE INFORMATION]	PB-117, "DTC Description"
U0429	00	COMMUNICATION ERROR (INVALID)	[NO SUBTYPE INFORMATION]	PB-119, "DTC Description"
U0447	00	COMMUNICATION ERROR (INVALID)	[NO SUBTYPE INFORMATION]	PB-121, "DTC Description"
U1027	88	Chassis CAN bus OFF malfunction	[BUS OFF]	PB-123, "DTC Description"
U1032	00	Chassis CAN malf	[NO SUBTYPE INFORMATION]	PB-125, "DTC Description"
U140D	00	WHEEL SPEED SIGNAL	[NO SUBTYPE INFORMATION]	PB-127, "DTC Description"

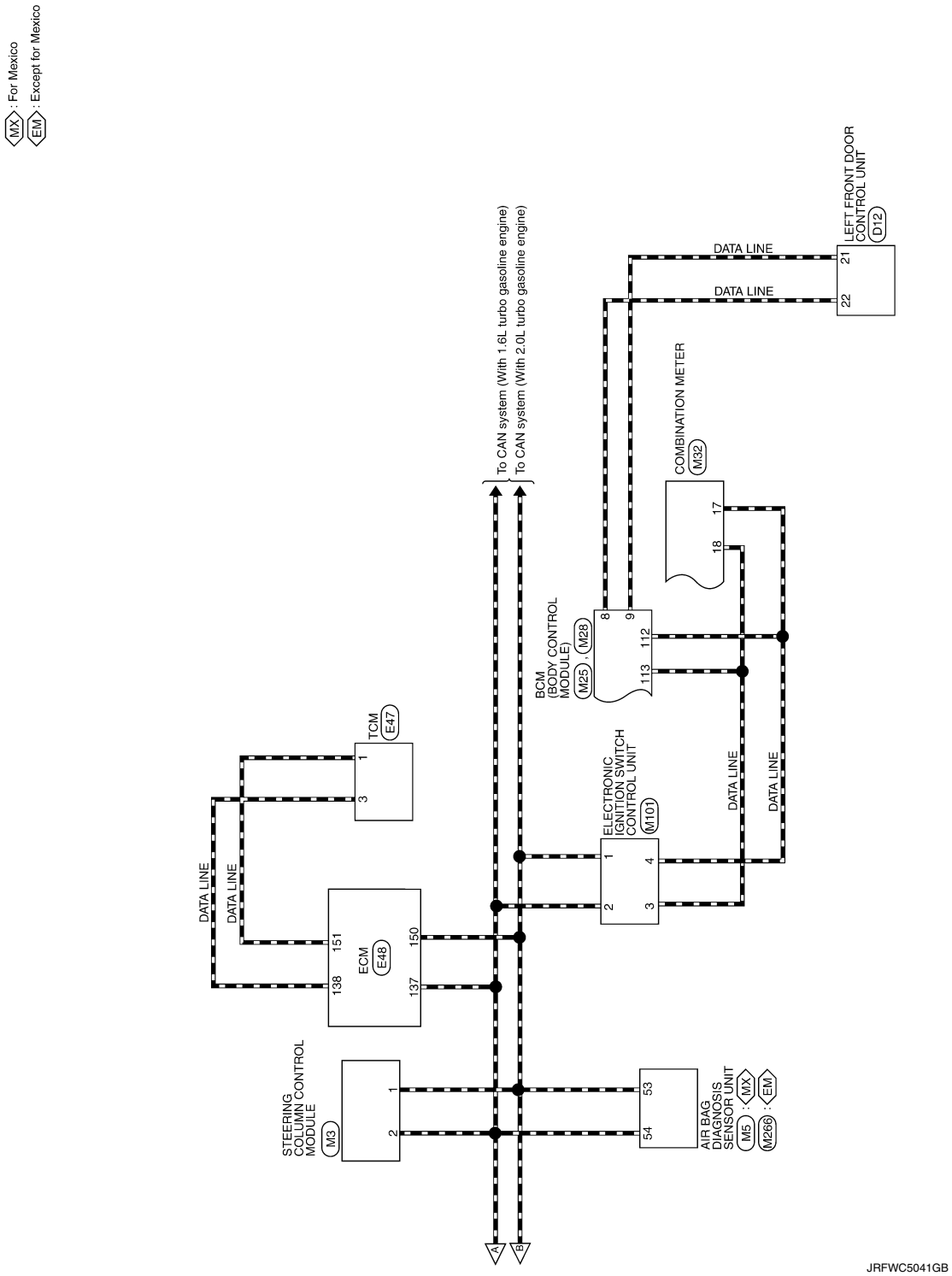
WIRING DIAGRAM

ELECTRIC PARKING BRAKE SYSTEM

Wiring Diagram

INFOID:0000000013568697




MX : For Mexico
EM : Except for Mexico
To CAN system (With 1.6L turbo gasoline engine)
To CAN system (With 2.0L turbo gasoline engine)
LEFT FRONT DOOR CONTROL UNIT
D12
21
22
DATA LINE
DATA LINE
COMBINATION METER
M32
17
18
BCM
(BODY CONTROL MODULE)
M25
M28
8
9
112
113
ELECTRONIC IGNITION SWITCH CONTROL UNIT
M101
1
2
3
4
DATA LINE
DATA LINE
TCM
E47
1
3
DATA LINE
DATA LINE
ECM
E48
151
150
138
137
STEERING COLUMN CONTROL MODULE
M3
1
2
AIR BAG DIAGNOSIS SENSOR UNIT
M5
M266
MX
EM
53
54
A
B
JRFWC5041GB

ELECTRIC PARKING BRAKE SYSTEM

Connector No.	D12
Connector Name	LEFT FRONT DOOR CONTROL UNIT
Connector Type	MB_A0025406281

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
21	BR	BODY CAN 2-L
22	R	BODY CAN 2-H
23	L	ROTARY CATCH SIGNAL
24	BR	GROUND
25	R	BATTERY POWER SUPPLY

Connector No.	E46
Connector Name	ELECTRONIC STABILITY PROGRAM CONTROL UNIT
Connector Type	MB_A2465400581

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	MOTOR POWER SUPPLY
2	W	BRAKE PEDAL
4	P	RIGHT FRONT AXLE RPM SENSOR SIGNAL
5	GR	BRAKE VACUUM SENSOR POWER SUPPLY
6	B	BRAKE LIGHT SWITCH-L
7	R	BATTERY POWER SUPPLY
8	Y	LFET FRONT AXLE RPM SENSOR SIGNAL
10	O	STANDSTILL CONTROL (SSC) STATUS
12	P	BRAKE VACUUM SENSOR SIGNAL
13	BR	GROUND (MOTOR)
14	G	CAN-L
16	B	RIGHT FRONT AXLE RPM SENSOR POWER SUPPLY
17	Y	RIGHT REAR AXLE RPM SENSOR POWER SUPPLY
18	BR	LFET REAR AXLE RPM SENSOR SIGNAL
19	W	LFET FRONT AXLE RPM SENSOR POWER SUPPLY
23	B	BRAKE VACUUM SENSOR GROUND
25	P	VALVE RELAY POWER SUPPLY
26	W	CAN-H
28	R	BATTERY POWER SUPPLY
29	P	RIGHT REAR AXLE RPM SENSOR SIGNAL
30	V	BRAKE LIGHT SWITCH-H
31	GR	LFET REAR AXLE RPM SENSOR POWER SUPPLY
32	L	BRAKE LIGHT SWITCH GROUND
35	R	BRAKE LIGHT SWITCH POWER SUPPLY
38	B	GROUND (VALVE)

Connector No.	E47
Connector Name	TCM
Connector Type	MB_A2465450026

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	CAN-L
2	V	NOT P
3	GR	CAN-H
5	W	BATTERY POWER SUPPLY

Connector No.	E48
Connector Name	ECM
Connector Type	MB_A0075406981

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
97	R	POWER SUPPLY (ECM)
98	BR	ECM GROUND
99	V	POWER SUPPLY (ECM)
100	BR	ECM GROUND
101	R	POWER SUPPLY (ECM)
102	B	ECM GROUND
103	L	COOLING FAN CONTROL SIGNAL
104	R	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
105	G	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
106	BR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR1)
111	B	IGNITION SIGNAL
112	Y	POWER SUPPLY (BATTERY)
116	W	STARTER RELAY-L
119	GR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
120	O	SENSOR GROUND
122	R	HOT START SIGNAL
123	GR	MOTOR RELAY CONTROL SIGNAL
127	O	FUEL PUMP ON SIGNAL
132	G	ACCELERATOR PEDAL POSITION SENSOR 1
136	Y	POWERTRAIN SENSOR CAN-H
137	W	CAN-H
138	GR	POWERTRAIN CAN-H
141	B	WATER PUMP RELAY CONTROL SIGNAL
145	W	ACCELERATOR PEDAL POSITION SENSOR 2
146	G	FUEL TANK PRESSURE SENSOR
147	L	CRASH SIGNAL
148	W	STARTER RELAY-H
149	B	POWERTRAIN SENSOR CAN-L
150	G	CAN-L
151	L	POWERTRAIN CAN-L
152	V	EVAP CANISTER VENT CONTROL VALVE
153	BR	EVAP PURGE CONTROL VALVE

Connector No.	M3
Connector Name	STEERING COLUMN CONTROL MODULE
Connector Type	MB_A2045401281

H.S.

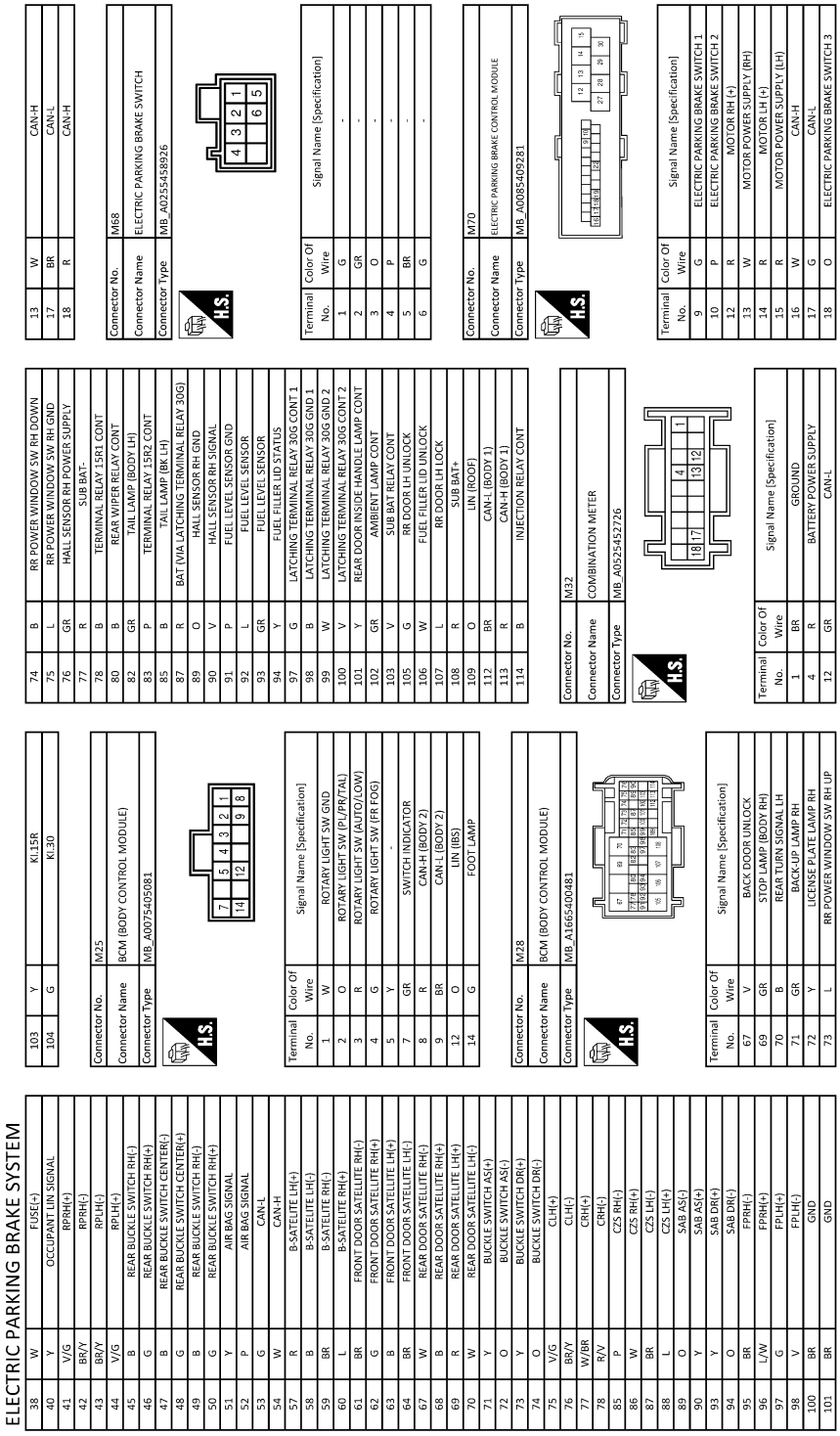
Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	CAN-L (CHASIS)
2	W	CAN-H (CHASIS)
3	BR	GND
4	R	KL30G
6	R	KL30
7	BR	GND
8	L	AB1+
9	Y	AB1-
10	V	AB2+
11	G	AB2-

Connector No.	M5
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	MB_A0095405681

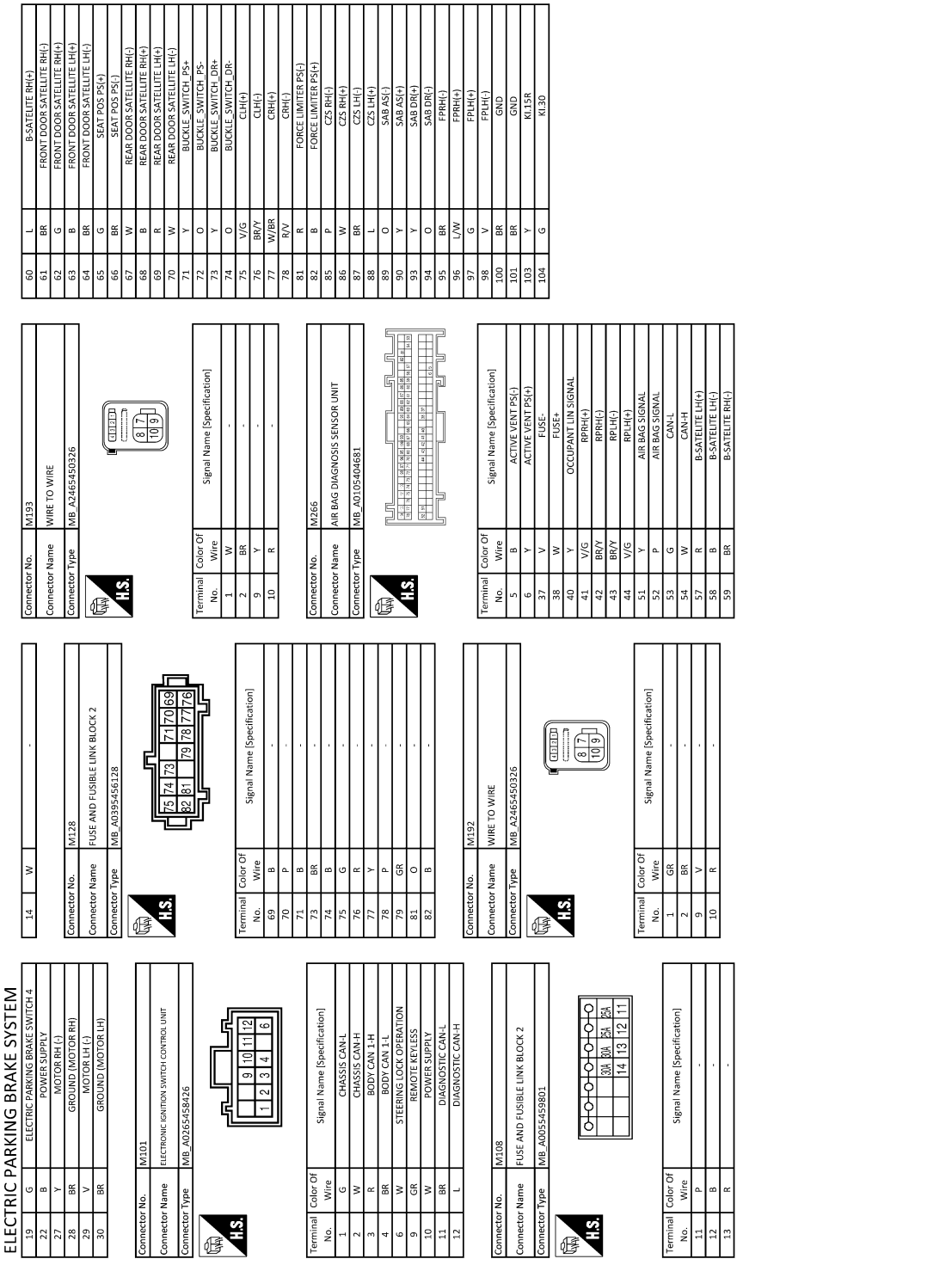
H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	BUMPER SENSOR RH GROUND
2	W	BUMPER SENSOR RH SIGNAL
3	B	BUMPER SENSOR LH SIGNAL
4	W	BUMPER SENSOR LH GROUND
9	L/G	POP-UP ENGINE HOOD ACTUATOR RH (-)
10	BR/B	POP-UP ENGINE HOOD ACTUATOR RH (+)
11	O	POP-UP ENGINE HOOD ACTUATOR LH (+)
12	BR/W	POP-UP ENGINE HOOD ACTUATOR LH (-)
37	V	FUSE(-)

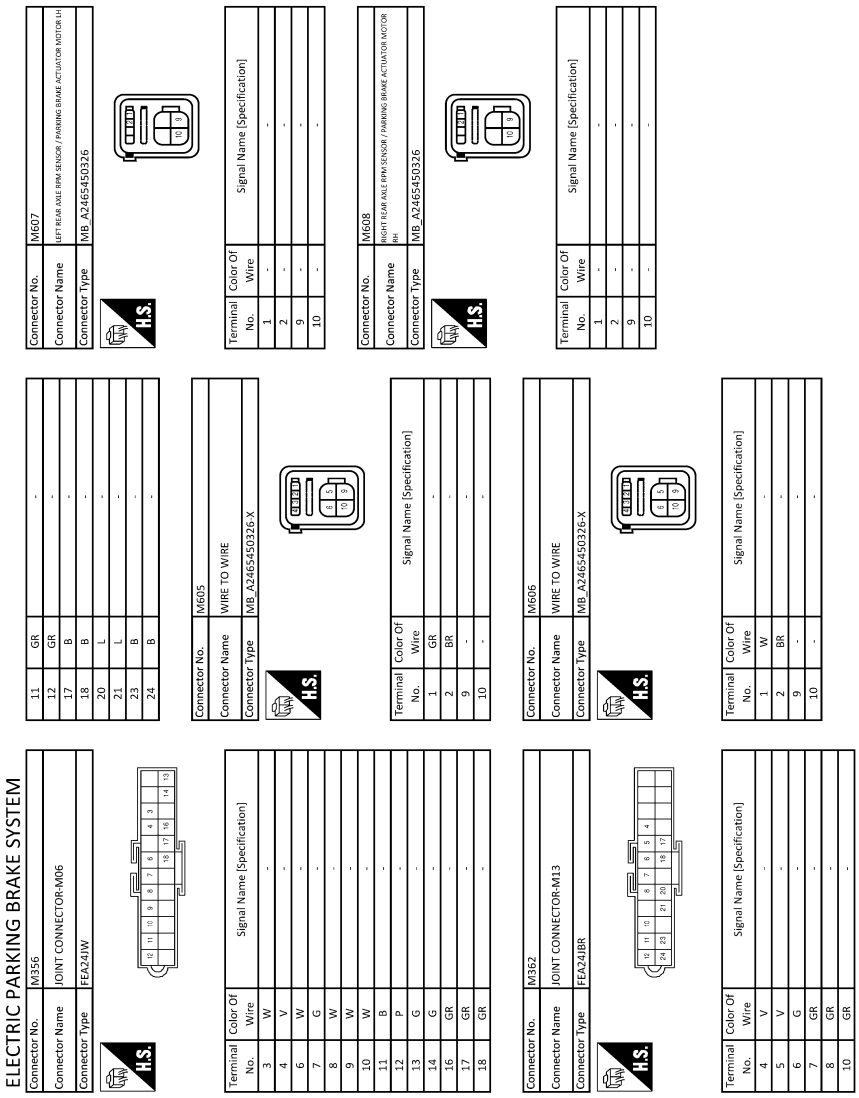
JRFWC5042GB



JRFWC5043GB



JRFWC5044GB



JRFWC5045GB

BASIC INSPECTION

CONFIGURATION (ELECTRIC PARKING BRAKE CONTROL MODULE)

Description

INFOID:0000000013568698

Vehicle specification needs to be written with CONSULT because it is not written after replacing the electric parking brake control module.
The configuration requires network connection. CONSULT connects to network and then it downloads the configuration data from the server. Then CONSULT writes the vehicle specification to the electric parking brake control module.
Refer to PB-32, "Work Procedure".
NOTE:
For details the network connection and operation, refer to “CONSULT Operation Manual”.
The configuration no need to “save” configuration data from the electric parking brake control module. The configuration data is always generated freshly at the server and then downloaded to the CONSULT.
CAUTION:
Follow the instructions listed below.
- **Complete the procedure of “Read / Write Configuration” in order.**
- **If incorrect “Read / Write Configuration”, incidents might occur.**
- **Never perform “Read / Write Configuration” except for new electric parking brake control module.**

Work Procedure

INFOID:0000000013568699

1.WRITING VEHICLE SPECIFICATION

CONSULT Configuration
Perform “WRITE CONFIGURATION” for CONTROL UNIT according to “CONSULT Operation Manual”.
NOTE:
- Log in the network according to CONSULT guidance.
- For details the network connection and operation, refer to “CONSULT Operation Manual”.

>> WORK END

INSTRUCTIONS FOR RELEASING PARKING BRAKE WHERE PARKING BRAKE SWITCH CANNOT BE USED

Description

INFOID:0000000013568700

- The electric parking brake must be manually released if the electrical components of the electric parking brake malfunction when the parking brake is actuated.
- Disconnecting the battery negative terminal with the parking brake on, prevents the parking brake from releasing. Releasing is performed mechanically.
- For work procedure, refer to PB-33, "Work Procedure".

Work Procedure

INFOID:0000000013568701

1.DISCONNECT PARKING BRAKE ACTUATOR HARNESS CONNECTOR

Disconnect the parking brake actuator harness connector from the rear caliper assembly.

>> GO TO 2.

2.REMOVE PARKING BRAKE ACTUATOR

Remove the parking brake actuator from the rear brake caliper assembly. Refer to PB-131, "Removal and Installation".

>> GO TO 3.

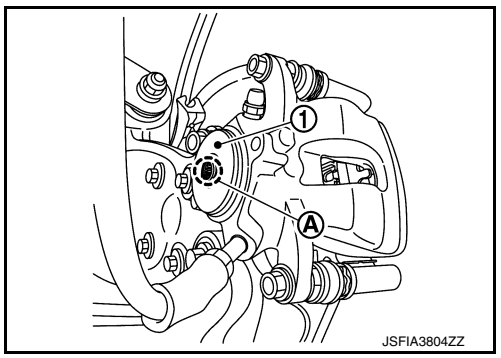
3.RELEASE OF PARKING BRAKE

Rotate the rear brake caliper assembly ① spindle part Ⓐ clockwise.

Is the parking brake released?

YES >> WORK END

NO >> Check the rear brake caliper assembly. Refer to BR-53, "BRAKE CALIPER ASSEMBLY : Inspection".



ADDITIONAL SERVICE WHEN REPLACING ELECTRIC PARKING BRAKE CONTROL MODULE

Work Procedure

INFOID:0000000013568702

When replacing the electric parking brake control module be sure to perform the following procedure.

1.CONFIGURATION

Perform the configuration. Refer to PB-32, "Description".

>> GO TO 2.

2.CALIBRATION OF ELECTRIC PARKING BRAKE CONTROL MODULE

Perform the calibration of electric parking brake control unit. Refer to PB-37, "Description".

>> GO TO 3.

3.ELECTRICAL CONTACT ACTUATOR/BRAKE CLEARANCE SETTING

Perform the electrical contact actuator/brake clearance setting. Refer to PB-36, "Work Procedure".

>> GO TO 4.

4.RE LEARNING

Perform the re learning. Refer to PB-38, "Work Procedure".

>> GO TO 5.

5.PERFORM VIN REGISTRATION

Perform the VIN REGISTRATION. Refer to PB-35, "Description".

>> GO TO 6.

6.CHECK ELECTRIC PARKING BRAKE OPERATION

1. Push electric parking brake switch, and check the electric parking brake is applied.
2. Pull electric parking brake switch, and check the electric parking brake is released.

>> WORK END

VIN REGISTRATION

Description

INFOID:0000000013568703

After replacing electronic parking brake control module, must be perform Vehicle Identification Number (VIN) Registration. Refer to PB-35, "Work Procedure".

Work Procedure

INFOID:0000000013568704

1.CHECK VEHICLE IDENTIFICATION NUMBER (VIN)

Check the VIN of the vehicle and note it. Refer to GI-52, "Information About Identification or Model Code".

>> GO TO 2.

2.PERFORM VIN REGISTRATION

With CONSULT

1. Turn ignition switch ON.
2. Select “EHS/PKB”, “WORK SUPPORT”, and “VIN REGISTRATION” according to this order.
3. Enter the VIN.
4. Touch “START”.

>> WORK END

ELECTRICAL CONTACT ACTUATOR/BRAKE CLEARANCE SETTING

Work Procedure

INFOID:0000000013568705

CAUTION:
When performing the following operations, always use CONSULT. (It cannot be performed by any means other than CONSULT.)

1.PERFORM CALIBRATION

With CONSULT
1. The vehicle must be on a level surface.
2. Release parking brake.
3. Select “EHS/PKB”, “WORK SUPPORT”, and “WORK SUPPORT", and "Electrical contact actuator/brake clearance setting” according to this order.
4. Touch “START”.

Does the “WORK SUPPORT", and "Electrical contact actuator/brake clearance setting” start?

YES >> WORK END
NO >> GO TO 2.

2.CHECK PARKING BRAKE STATUS

NOTE:
When the calibration could not be started, the possible cause is the following:
- The electric parking brake is in the assembly position.
- The parking brake is applied.

1. Release parking brake.
2. Deactivate assembly position.

>> GO TO 1.

CALIBRATION OF ELECTRIC PARKING BRAKE CONTROL MODULE

Description

INFOID:0000000013568706

CAUTION:
When performing the following operations, always use CONSULT, for performing "Calibration of electric parking brake control unit" of "WORK SUPPORT". Refer to PB-37, "Work Procedure".

×: Required —: not required

Procedure	Calibration of electric parking brake control unit
Replacing electric parking brake control module	×
Replacing electric parking brake actuator motor	×

Work Procedure

INFOID:0000000013568707

CAUTION:
When the following operations are performed, always use CONSULT. (It cannot be performed by any means other than CONSULT.)

1.PERFORM CALIBRATION

With CONSULT
1. The vehicle must be on a level surface.
2. Release parking brake.
3. Select "EHS/PKB", "WORK SUPPORT", and "Calibration of electric parking brake control unit" according to this order.
4. Touch "START".

Does the "Calibration of electric parking brake control unit" start?

YES >> WORK END
NO >> GO TO 2.

2.CHECK PARKING BRAKE STATUS

NOTE:
When the calibration could not be started, the possible cause is the following:
- The electric parking brake is in the assembly position.
- The parking brake is applied.

1. Release parking brake.
2. Deactivate assembly position.

>> GO TO 1.

RE LEARNING

Work Procedure

INFOID:0000000013568708

CAUTION:
When performing the following operations, always use CONSULT. (It cannot be performed by any means other than CONSULT.)

1.PERFORM CALIBRATION

With CONSULT
1. The vehicle must be on a level surface.
2. Release parking brake.
3. Select “EHS/PKB”, “WORK SUPPORT”, and “Re learning” according to this order.
4. Touch “START”.

Does the “Re learning” start?

YES >> WORK END
NO >> GO TO 2.

2.CHECK PARKING BRAKE STATUS

NOTE:
When the calibration could not be started, the possible cause is the following:
- The electric parking brake is in the assembly position.
- The parking brake is applied.

1. Release parking brake.
2. Deactivate assembly position.

>> GO TO 1.

DTC/CIRCUIT DIAGNOSIS

B210C POWER SUPPLY CIRCUIT

DTC Description

INFOID:0000000013568709

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B210C	16	Supply volt outside permissible range [The supply voltage for the electric parking brake control unit is outside the permissible range.]	[CIRC VOLT BELOW THRESHOLD]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	Battery power supply
					Threshold	• Battery voltage low limit: 9,000 mV (9,0 – 9,5 V) • Voltage hysteresis: 500 mV • Time hysteresis: 0.1 second
					Diagnosis delay time	60 seconds
B210C	17	Supply volt outside permissible range [The supply voltage for the electric parking brake control unit is outside the permissible range.]	[CIRC VOLT ABOVE THRESHOLD]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	Battery power supply
					Threshold	• Battery voltage high limit: 16500 mV (16,0 – 16,5 V) • Voltage hysteresis: 500 mV • Time hysteresis: 0.1 second
					Diagnosis delay time	60 seconds
B210C	77	Supply volt outside permissible range [The supply voltage for the electric parking brake control unit is outside the permissible range.]	[COMMAND POSI NOT REACHABLE]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	Battery power supply
					Threshold	If the battery voltage is below 9 V for 0.1 second at actuation request the malfunction qualification time is started. If the voltage is still below this threshold after 0.4 seconds, the malfunction is qualified.
					Diagnosis delay time	1 event
B210C	77	Supply volt outside permissible range [The supply voltage for the electric parking brake control unit is outside the permissible range.]	[COMMAND POSI NOT REACHABLE]	2	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	Battery power supply
					Threshold	If the battery voltage drops below 8 V for 0.1 second during actuation the actuation is held. The malfunction is set if the actuation has been held for a total interruption time of more than 2.4 seconds or if the actuation has been interrupted the 2nd time without a new actuation request being present.
					Diagnosis delay time	1 event

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B210C	77	Supply volt outside permissible range [The supply voltage for the electric parking brake control unit is outside the permissible range.]	[COMMAND POSI NOT REACHABLE]	3	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	Battery power supply
					Threshold	• Voltage is > 16.5 V during actuation for > 1.8 seconds (max. 2 interruptions allowed). • Voltage is > 16.5 V if new actuation is pending > 1.8 seconds.
					Diagnosis delay time	1 event

POSSIBLE CAUSE

B210C-16
- Vehicle electrical malfunction (Battery voltage too low)

B210C-17
- Vehicle electrical malfunction (Battery voltage too high)

B210C-77
- Battery voltage supply is out of range
- Battery is malfunctioning
- Malfunctioning circuit to the electric parking brake
- Malfunctioning connector of electric parking brake
- Vehicle electrical malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 60 seconds or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B210C” detected?

YES >> Proceed to PB-40, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568710

B210C-16

1.CHECK THE ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY

Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace power supply circuit.

B210C-17

1.CHECK THE POWER SUPPLY OF OTHER CONTROL UNIT

Check the other control unit power supply voltage.

Is over voltage?

YES >> Check the alternator. Refer to CHG-36, "1.6L/2.0L TURBO ENGINE : Inspection".
NO >> GO TO 2.

2.ERASE SELF-DIAGNOSIS RESULT

With CONSULT
Erase self-diagnosis result for “EHS/PKB”.

>> INSPECTION END

B210C-77

1.CHECK THE ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY

Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace power supply circuit.

B21F2 POWER SUPPLY CIRCUIT

DTC Description

INFOID:0000000013568711

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
B21F2	00	Circuit malfunction [The status 'Circuit 15' is implausible.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	Ignition switch ON
				Signal (terminal)	Battery power supply
				Threshold	CAN message is compared with the ignition input. Whenever the system is in normal voltage range and a difference is detected malfunction will be raised. Malfunction is just recorded when CAN information is available and valid. Otherwise a CAN related DTC is set.
				Diagnosis delay time	5 second periodically

POSSIBLE CAUSE

- CAN communication malfunction
- Battery input open circuit
- Battery input short circuit to ground
- Battery input open circuit to battery
- Malfunction in CAN message source node

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 5 seconds or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B21F2” detected?

YES >> Proceed to PB-42, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568712

1.CHECK THE ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY AND FUSE

Check the electric parking brake control module power supply and fuse. Refer to PB-128, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace power supply circuit or fuse.

B229D CONTROL MODULE

DTC Description

INFOID:0000000013568713

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Enable relay drive circuit to be off but at startup. With relays energized motor voltages are above VB - 3.3 V on both sides of the motor.
					Diagnosis delay time	0.2 seconds from power startup when the motor is Idle or in 0.02 ms after the 1st actuation/relay tests.
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	2	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	The detection takes place only during an actuation. If the voltage drop after 0.001 second, (after turning the field effect transistor on) is on both motor circuit is ≥ 90% of the according motor supply voltage and the measured current is below the allowed threshold of 1 A, there is a malfunction in the motor-driver.
					Diagnosis condition	0.1 second
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	3	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Depending on the Information received from the motor controller. (The enable relay drive line was requested, but was not available for more than 100 ms)
					Diagnosis condition	0.1 second
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	4	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Enable relay drive monitor has requested the enable relay drive circuit, but the enable relay drive circuit is still off.
					Diagnosis condition	0.1 second

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	5	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Safety critical state variables are stored with hamming coding. The monitor detects if the variable has a state which is not a member of the defined state type.
					Diagnosis condition	1 event
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	6	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	In the interrupt vector table of main micro, a routine is used as interrupt handler which sets the above mentioned malfunction code and resets the main micro.
					Diagnosis condition	1 event
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	7	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Malfunction is set if one of the serial peripheral interface users indicates an ongoing serial peripheral interface transfer by having a busy flag set.
					Diagnosis condition	0.2 second
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	8	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Malfunction is set if one of the serial peripheral interface users indicates an ongoing serial peripheral interface transfer.
					Diagnosis condition	0.2 second when serial peripheral interface is not available or immediate.
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	9	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	The deterministically executed functionality increases a counter. Those counters are compared with nominal values in a cyclic function.
					Diagnosis condition	0.02 seconds

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	10	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	At startup, address circuit check. Each RAM cell is filled with its inverted address. Complete RAM is read back and compared with its expected content. Data check. Complete RAM is filled with different test patterns and read back at runtime. Consecutively, RAM cells are filled with test patterns and read back data check. Complete RAM is filled with different test patterns and read back at runtime. Consecutively, RAM cells are filled with test patterns and read back.
					Diagnosis condition	0.005 seconds
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	11	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	With disabled interrupts, the execution time of a defined code sequence (a for loop) is measured by a hardware timer. If this time shows a deviation out of a defined time window, the test is considered as error and leads to soft lock
					Diagnosis condition	Immediate on detection (only on startup)
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	12	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Safety critical variables are stored at two different locations of which one contains the inverted value. Before use, they are compared and in case of mismatch, the malfunction is set.
					Diagnosis condition	1 event
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	13	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Below and above the stack memory area, 16 bit RAM cells are written with a pattern. In case of a stack malfunction, this pattern will be overwritten and very likely changed by that. The patterns are periodically checked that they are not changed
					Diagnosis condition	0.005 seconds

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	14	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Two mechanisms are used in parallel. The flash controller in hardware stores redundant data to be able to do error correction coding. This can correct all single bit and detect all double bit malfunctions. On startup, the complete ROM is checked by accessing each byte, so the mechanism checks the complete Flash memory
					Diagnosis condition	1 second
B229D	01	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[ELECTRICAL MALFUNCTION]	15	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	All micro controller functional registers have been analyzed to find used functionality which can only be written once and which always will have the same defined value. Those registers are periodically read and compared with the value with which they have been initialized.
					Diagnosis condition	0.005 seconds
B229D	02	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[GENERAL ELEC MALFUNCTN]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Malfunction is raised when the main micro controller disagree about the position of the driver demand switch.
					Diagnosis condition	0.5 seconds
B229D	02	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[GENERAL ELEC MALFUNCTN]	2	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Electric parking brake switch pattern detected from that detected in main micro.
					Diagnosis condition	0.5 seconds
B229D	52	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[NOT ACTIVATED]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Assembly check not done
					Diagnosis condition	—

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B229D	52	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[NOT ACTIVATED]	2	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	If the VIN value in EEPROM is “FF FF ... FF FF FF” (17 Bytes). This means that the VIN has not been written via diagnostics or the EEPROM content has been reset (EEPROM map version change after flash, EEPROM reset via diagnostics).
					Diagnosis condition	Periodically
B229D	52	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[NOT ACTIVATED]	3	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	If a valid VIN has been received that is different to VIN Original for 10 times (VIN Original = VIN that is written to electric parking brake control module in production with service VIN Original). Every VIN value that is different to VIN Default (“FF FF ... FF FF FF” 17 Bytes) must be accepted as a valid VIN. If no VIN is received, malfunction is not allowed to be set.
					Diagnosis condition	Periodically
B229D	52	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[NOT ACTIVATED]	4	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	VIN MISMATCH is active
					Diagnosis condition	Periodically
B229D	52	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[NOT ACTIVATED]	5	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	If one CODING value in EEPROM has a “default” value.
					Diagnosis condition	Periodically
B229D	77	Electric parking brake C/U has malf [Control unit 'Electric parking brake' has a malfunction.]	[COMMAND POSI NOT REACHABLE]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Malfunction is set when at least one brake is in brake status “unknown” or brakes are incoherent (one brake is applied or fully applied while the other brake is released or fully released)
					Diagnosis condition	1 second (periodically)

POSSIBLE CAUSE

B229D-01
- Address decoding malfunction
- Addressing malfunctions
- Corruption of processor peripheral configuration registers
- Electric parking brake control module internal connection malfunction
- Electric parking brake control module malfunction

- Fail-safe micro controller conditions not fulfilled.
- Field effect transistor is not switching
- High processor load
- Instruction execution malfunction
- Main micro program counter corruption
- Main micro RAM malfunction
- Main micro scheduling malfunction
- Main micro timer malfunction
- Main micro wrong program execution
- Micro controller internal malfunction
- Processor hardware malfunction
- Task scheduling not correct
- Timing malfunction
- RAM corruption
- Unreliable access to flash memory (ROM)

B229D-02

- Connector malfunction
- Electric parking brake switch malfunction
- Internal electric parking brake control module malfunction
- Harness

NOTE:
If the DTC code is only stored and “Frequency Counter” is 3 or less, erase the diagnostic result.

B229D-52

- Assembly check not done
- Electric parking brake control module was set into a different car

B229D-77

- Electric parking brake actuator motor malfunction on one side
- Wrong or unknown brake state in EEPROM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 second or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B229D” detected?

YES >> Proceed to PB-49, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident"
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568714

B229D-01

1.REPLACE ELECTRIC PARKING BRAKE CONTROL MODULE

Replace the electric parking brake control module. Refer to PB-130, "Removal and Installation".

>> INSPECTION END

B229D-02

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake switch harness connector.
3. Check the electric parking brake switch harness connector for disconnection or looseness.
4. Check the electric parking brake switch harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK ELECTRIC PARKING BRAKE SWITCH CIRCUIT

Check the continuity between electric parking brake switch harness connector and electric parking brake control module harness connector.

Electric parking brake switch		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M68	1	M70	9	Existed
	3		18	
	4		10	
	6		19	

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair/replace harness connector or terminal.

3.PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Connect the electric parking brake switch harness connector.
2. Connect the electric parking brake control module harness connector.
3. Turn the ignition switch ON.
4. Erase self-diagnosis result for “EHS/PKB”.
5. Operate the electric parking brake switch several times.
6. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B229D-02” detected?

YES >> Replace the electric parking brake switch. Refer to PB-134, "Removal and Installation", and GO TO 4.
NO >> INSPECTION END

4.PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Turn the ignition switch ON.
2. Erase self-diagnosis result for “EHS/PKB”.
3. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B229D-02” detected?

YES >> Replace the electric parking brake control module. Refer to PB-134, "Removal and Installation".
NO >> INSPECTION END

B229D-52

1.ADDITIONAL SERVICE WHEN REPLACING ELECTRIC PARKING BRAKE CONTROL MODULE

Perform additional service when replacing electric parking brake control module. Refer to PB-34, "Work Procedure".

>> INSPECTION END

B229D-77

1.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch ON.
2. Erase self-diagnosis result for “EHS/PKB”.
3. Operate the electric parking brake switch several times.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B229D-77” detected?

YES >> GO TO 2.
NO >> INSPECTION END

2.CHECK BRAKE PAD

1. Turn the ignition switch OFF.
2. Check the rear brake pad. Refer to BR-46, "BRAKE PAD : Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace rear brake pad. Refer to BR-41, "BRAKE PAD : Removal and Installation".

3.REPLACE ELECTRIC PARKING BRAKE ACTUATOR MOTOR

Replace the electric parking brake actuator motor (malfunction side). Refer to PB-131, "Removal and Installation".

>> GO TO 4.

4.PERFORM BRAKE TEST

Perform brake test on the brake tester.

>> INSPECTION END

B23AA ELECTRIC PARKING BRAKE ACTUATOR MOTOR (LEFT)

DTC Description

INFOID:0000000013568715

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B23AA	07	Left brake caliper has malf [The left brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	1	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	If the electric parking brake actuator motor (left side) runs for longer than 25 seconds without the measured current exceeding the disc contact threshold (free run current + 0.8 A), this malfunction will be raised.
					Diagnosis delay time	25 seconds
B23AA	07	Left brake caliper has malf [The left brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	2	Diagnosis condition	During release, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	If motor current is lower then 1.5 A 0.2 second after start of releasing an internal apply demand is generated. If the disk contact threshold is detected the system will automatically release and no malfunction is raised. If the electric parking brake actuator motor (left side) runs for longer than 3 seconds without the measured current exceeding the disc contact threshold, this malfunction will be raised.
					Diagnosis delay time	3 seconds
B23AA	07	Left brake caliper has malf [The left brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	3	Diagnosis condition	During release, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Electric parking brake actuator motor (left side) runs wind back longer then 25 seconds.
					Diagnosis delay time	3 seconds
B23AA	07	Left brake caliper has malf [The left brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	4	Diagnosis condition	During apply, voltage between 8.5 V and 17 V
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Malfunction is detected if the minimum electric parking brake actuator motor (left side) current measured for this side is more than 50% greater than the minimum current measured for the other side. A minimum difference of 5 A is required.
					Diagnosis delay time	At end of apply sequence.

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B23AA	09	Left brake caliper has malf [The left brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	1	Diagnosis condition	Any wake up electric parking brake actuator motor not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	The detection takes place if the motor controller is in state motor controller stopped. The measurement is performed using VCC voltage pulses which are supplied for 0.02 ms. It consists of three independent detection methods.
					Diagnosis delay time	5 events
B23AA	09	Left brake caliper has malf [The left brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	2	Diagnosis condition	Any wake up electric parking brake actuator motor (left side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	“CheckNtcOsScConditions” is performed every two seconds during VCC is supplied. The voltage has to be below 0.1 V or above 3.6 V.
					Diagnosis delay time	5 events
B23AA	09	Left brake caliper has malf [The left brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	3	Diagnosis condition	Any wake up electric parking brake actuator motor (left side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	“NtcCrossCheck” is performed every two seconds. It is only performed if the voltage measured on the right side was below 0.1 V in the previous cycle. VCC is supplied for the left side. The test is error if the voltage on the right side is above 1 V.
					Diagnosis delay time	5 events
B23AA	09	Left brake caliper has malf [The left brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	4	Diagnosis condition	Any wake up electric parking brake actuator motor (left side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	“NtcWrongVoltageSourceCheck” is performed in between the battery voltage pulses if there is no test current measurement or relay test active and the last actuation was at least 0.06 seconds ago. 32 samples are gathered. The test is error if more than 4 sampled values showing a voltage above 1 V.
					Diagnosis delay time	5 events
B23AA	11	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRCUIT SHORT TO GROUND]	1	Diagnosis condition	During motor idle.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Normally motor circuit are 0 V. A motor test pulse of 5 V is done every 0.12 seconds. If the voltage during the pulse is < 3.1 V malfunction is set because electric parking brake actuator motor (left side) is short to ground (with relays off). Qualification is 0.1 second because when a test pulse was not successful it is done again after 0.02 seconds. If 5 pulses were not successful, malfunction is raised.
					Diagnosis delay time	0.1 second

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B23AA	12	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRCUIT SHORT TO BATTERY]	1	Diagnosis condition	During motor idle.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Either high side or low side is > 0.5 – 0.7 V with relays and test transistor off.
					Diagnosis delay time	0.1 second
B23AA	13	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRCUIT OPEN]	1	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Supply voltage of the motor is correct and the current is < 0.2 A + correction current (± 0.512 A) depending on the end of line calibration in EEPROM (correction current is electric parking brake control module specific and is written end of line at the electric parking brake control module manufacturer). So the current on the motor circuit has to be 0 - 0.712 A.
					Diagnosis delay time	0.1 second
B23AA	13	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRCUIT OPEN]	2	Diagnosis condition	During relay test or actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	During engaged relays if high side of the motor is > battery voltage - 3.3 V and low side is < 4 V.
					Diagnosis delay time	0.16 seconds
B23AA	14	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRC SHORT TO GRND OR OPEN]	1	Diagnosis condition	—
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Malfunction is set when the supply voltage of the electric parking brake actuator motor (left side) is < 2 V or when there is no supply voltage through the relays to the electric parking brake actuator motor (left side) circuit during the relay test or actuation startup.
					Diagnosis delay time	0.16 seconds
B23AA	14	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRC SHORT TO GRND OR OPEN]	2	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	During closing: Voltage on V+ line of the electric parking brake actuator motor (left side) is < supply voltage of the electric parking brake actuator motor (left side) – 1.2 V.
					Diagnosis delay time	0.1 second

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B23AA	14	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRC SHORT TO GRND OR OPEN]	3	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	During opening: Voltage on V – line of the motor is < supply voltage of the electric parking brake actuator motor (left side) – 1.2 V.
					Diagnosis delay time	0.1 second
B23AA	15	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRC SHORT TO BATT OR OPEN]	1	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	The detection takes place only during an actuation. The relay will be engaged and before turning the field effect transistor on a snapshot of the motor high side voltage will be taken for comparison later on. Then the field effect transistor is engaged.
					Diagnosis delay time	0.1 second
B23AA	15	Left brake caliper has malf [The left brake caliper has a malfunction.]	[CIRC SHORT TO BATT OR OPEN]	2	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	If the voltage on the low-side did not drop below 1.4 V within 1 ms. the actual motor high side voltage will be compared against 80% of the previously measured snapshot motor high side voltage the motor current is more than 24 A during actuation
					Diagnosis delay time	0.1 second
B23AA	77	Left brake caliper has malf [The left brake caliper has a malfunction.]	[COMMAND POSI NOT REACHABLE]	1	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	This malfunction will be raised after detecting disk contact and the full clamp force has not been achieved within 3 seconds of the brake apply.
					Diagnosis delay time	28 seconds
B23AA	77	Left brake caliper has malf [The left brake caliper has a malfunction.]	[COMMAND POSI NOT REACHABLE]	2	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	This malfunction will be raised if the system detects disk contact and the target clamp force is not achieved within 25 seconds from the start of the brake apply.
					Diagnosis delay time	28 seconds

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B23AA	95	Left brake caliper has malf [The left brake caliper has a malfunction.]	[INCORRECT ASSEMBLY]	1	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Malfunction is set when the free run current is higher then 7.5 A during apply of the brake.
					Diagnosis delay time	At point of disc contact - motor current is 0.8 A higher then free run current

POSSIBLE CAUSE

B23AA-07
- Low supply voltage (Low energy - low current)
- No discs or pads, broken electric parking brake actuator motor (left side)
- Mechanical malfunction of the electric parking brake actuator motor (left side)
- Damaged electric parking brake actuator motor (left side)
- Damaged gearbox
- Damaged bearings
- Broken spindle
- Broken tooth-belt

B23AA-09
- Negative temperature coefficient hardware malfunction

B23AA-11
- Electric parking brake actuator motor (left side) or harness short circuit to ground
- Electric parking brake control module malfunction

B23AA-12
- Electric parking brake actuator motor (left side) or harness short circuit to battery voltage

B23AA-13
- Electric parking brake actuator motor (left side) harness open circuit
- Electric parking brake actuator motor (left side) electrical malfunction
- Electric parking brake control module malfunction

B23AA-14
- Supply Fuse
- Harness malfunction
- Electric parking brake actuator motor (left side) short circuit
- High resistance in harness or connector (high side of motor)
- Electric parking brake control module malfunction

B23AA-15
- Electric parking brake actuator motor (left side) short circuit
- Electric parking brake actuator motor (left side) short circuit
- Electric parking brake actuator motor (left side) connector short circuit
- Electric parking brake control module connector short circuit

B23AA-77
- Low supply voltage (Low energy – low current)
- High impedance connection from electric parking brake control module to electric parking brake actuator motor (left side)
- Malfunction electric parking brake actuator motor (left side) (broken tooth belt, spindle etc.)

B23AA-95
- High mechanical resistance in electric parking brake actuator motor (left side) (stall)
- Incorrect initialization of electric parking brake actuator motor (left side) (wrong electric parking brake status – think it is released while it is applied physically)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the parking brake switch.
   CAUTION:
   - **Put the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the parking brake switch.
4. Repeat step 2 to 3 five or more times.
5. Wait at least 30 seconds or more.
6. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B23AA” detected?

YES >> Proceed to PB-57, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568716

B23AA-07, B23AA-95

1.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch ON.
2. Operate the electric parking brake switch several times.
3. Erase self-diagnosis result for “EHS/PKB”.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B23AA-07” or “B23AA-95” detected?

YES >> GO TO 2.
NO >> INSPECTION END

2.CHECK BRAKE PAD

1. Turn the ignition switch OFF.
2. Check the rear brake pad. Refer to BR-46, "BRAKE PAD : Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace rear brake pad. Refer to BR-41, "BRAKE PAD : Removal and Installation".

3.REPLACE ELECTRIC PARKING BRAKE ACTUATOR MOTOR

Replace the electric parking brake actuator motor LH. Refer to PB-131, "Removal and Installation".

>> GO TO 4.

4.PERFORM BRAKE TEST

Perform brake test on the brake tester.

>> INSPECTION END

B23AA-09

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake actuator motor LH harness connector.
3. Check the electric parking brake actuator motor LH harness connector for disconnection or looseness.
4. Check the electric parking brake actuator motor LH harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR LH CIRCUIT

1. Check the continuity between electric parking brake actuator motor LH harness connector and electric parking brake control module harness connector.

Left rear axle rpm sensor / electric parking brake actuator motor LH		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M607	9	M70	29	Existed
	10		14	

2. Check the continuity electric parking brake actuator motor LH harness connector and ground.

Left rear axle rpm sensor / electric parking brake actuator motor LH		Ground	Continuity
Connector	Terminal		
M607	9	—	Not existed
	10		

3. Check the voltage electric parking brake actuator motor LH harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(−)	
Left rear axle rpm sensor / electric parking brake actuator motor LH		Ground	
Connector	Terminal		
M607	9	—	0 V
	10		

Is the inspection result normal?

YES >> Replace the electric parking brake actuator motor LH. Refer to PB-131, "Removal and Installation".
NO >> Repair/replace harness connector or terminal.

B23AA-11, B23AA-12, B23AA-13, B23AA-77

1.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR POWER SUPPLY

1. The vehicle must be at a standstill.
   CAUTION:
   Secure the vehicle to prevent it rolling away.
2. Turn the ignition switch OFF.
3. Disconnect the electric parking brake actuator motor LH harness connector.
4. Turn the ignition switch ON.
5. Check the voltage between electric parking brake actuator motor LH harness connector and ground when operating electric parking brake switch.
   NOTE:
   The actuation is not possible until all actual values are in their specified value ranges.

Electric parking brake switch operation	+		–	Voltage
	Left rear axle rpm sensor / electric parking brake actuator motor LH			
	Connector	Terminal		
Push (electric parking brake is apply)	M607	9	Ground	More than 6 V
Pull (electric parking brake is release)		10		

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

2.CHECK DATA MONITOR

With CONSULT
1. Turn the ignition switch OFF.
2. Connect the electric parking brake actuator motor LH harness connector
3. Turn the ignition switch ON
4. Select “EHS/PKB”, “DATA MONITOR”, “Shutdown current (LH motor)” and “Status of LH EPB” according to this order.
5. Check the value. Refer to PB-21, "Reference Value".
   NOTE:
   When the operation of parking brake switch is finished, the actual values “Status of LH EPB” and ‘“Status of RH EPB” must match, otherwise the vehicle is not roadworthy.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake actuator motor LH harness connector.
3. Check the electric parking brake actuator motor LH harness connector for disconnection or looseness.
4. Check the electric parking brake actuator motor LH harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal.

4.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR LH CIRCUIT

1. Check the continuity between electric parking brake actuator motor LH harness connector and electric parking brake control module harness connector.

Left rear axle rpm sensor / electric parking brake actuator motor LH		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M607	9	M70	29	Existed
	10		14	

2. Check the continuity electric parking brake actuator motor LH harness connector and ground.

Left rear axle rpm sensor / electric parking brake actuator motor LH		Ground	Continuity
Connector	Terminal		
M607	9	—	Not existed
	10		

3. Check the voltage electric parking brake actuator motor LH harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(−)	
Left rear axle rpm sensor / electric parking brake actuator motor LH		Ground	
Connector	Terminal		
M607	9	—	0 V
	10		

Is the inspection result normal?

YES >> Replace the electric parking brake actuator motor LH. Refer to PB-131, "Removal and Installation".
NO >> Repair/replace harness connector or terminal.

B23AA-14

1.CHECK ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY

Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Perform trouble diagnosis for battery power supply.

B23AA-15

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake actuator motor LH harness connector.
3. Check the electric parking brake actuator motor LH harness connector for disconnection or looseness.
4. Check the electric parking brake actuator motor LH harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR LH CIRCUIT

1. Check the continuity between electric parking brake actuator motor LH harness connector and electric parking brake control module harness connector.

Left rear axle rpm sensor / electric parking brake actuator motor LH		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M607	9	M70	29	Existed
	10		14	

2. Check the continuity electric parking brake actuator motor LH harness connector and ground.

Left rear axle rpm sensor / electric parking brake actuator motor LH		Ground	Continuity
Connector	Terminal		
M607	9	—	Not existed
	10		

3. Check the voltage electric parking brake actuator motor LH harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(−)	
Left rear axle rpm sensor / electric parking brake actuator motor LH		Ground	
Connector	Terminal		
M607	9	—	0 V
	10		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair/replace harness connector or terminal.

3.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR LH

1. Check the resistance between electric parking brake actuator motor LH terminals.

Left rear axle rpm sensor / electric parking brake actuator motor LH	Resistance
Terminal	
9 – 10	Approx 1 Ω or less

2. Check the continuity electric parking brake actuator motor LH and ground.

Left rear axle rpm sensor / electric parking brake actuator motor LH	Ground	Continuity
Terminal		
9	—	Not existed
10		

3. Check the voltage electric parking brake actuator motor LH and ground.

Terminals		Voltage (Approx.)
(+)	(−)	
Left rear axle rpm sensor / electric parking brake actuator motor LH	Ground	
Terminal		
9	—	0 V
10		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the electric parking brake actuator motor LH. Refer to PB-131, "Removal and Installation".

B23AB ELECTRIC PARKING BRAKE ACTUATOR MOTOR (RIGHT)

DTC Description

INFOID:0000000013568717

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B23AB	07	Right brake caliper has malf [The right brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	1	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	If the electric parking brake actuator motor (right side) runs for longer than 25 seconds without the measured current exceeding the disc contact threshold (free run current + 0.8 A), this malfunction will be raised.
					Diagnosis delay time	25 seconds
B23AB	07	Right brake caliper has malf [The right brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	2	Diagnosis condition	During release, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	If motor current is lower then 1.5 A 0.2 seconds after start of releasing an internal apply demand is generated. If the disk contact threshold is detected the system will automatically release and no malfunction is raised. If the electric parking brake actuator motor (right side) runs for longer than 3 seconds without the measured current exceeding the disc contact threshold, this malfunction will be raised.
					Diagnosis delay time	3 seconds
B23AB	07	Right brake caliper has malf [The right brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	3	Diagnosis condition	During release, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Electric parking brake actuator motor (right side) runs wind back longer then 25 seconds.
					Diagnosis delay time	3 seconds
B23AB	07	Right brake caliper has malf [The right brake caliper has a malfunction.]	[MECHANICAL MALFUNCTION]	4	Diagnosis condition	During apply, voltage between 8.5 V and 17 V
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Malfunction is detected if the minimum electric parking brake actuator motor (right side) current measured for this side is more than 50% greater than the minimum current measured for the other side. A minimum difference of 5 A is required.
					Diagnosis delay time	At end of apply sequence.

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B23AB	09	Right brake caliper has malf [The right brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	1	Diagnosis condition	Any electric parking brake actuator motor (right side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	The detection takes place if the motor controller is in state motor controller stopped. The measurement is performed using VCC voltage pulses which are supplied for 0.02 seconds. It consists of three independent detection methods.
					Diagnosis delay time	5 events
B23AB	09	Right brake caliper has malf [The right brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	2	Diagnosis condition	Any electric parking brake actuator motor (right side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	“CheckNtcOsScConditions” is performed every two seconds during VCC is supplied. The voltage has to be below 0.1 V or above 3.6 V.
					Diagnosis delay time	5 events
B23AB	09	Right brake caliper has malf [The right brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	3	Diagnosis condition	Any electric parking brake actuator motor (right side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	“NtcCrossCheck” is performed every two seconds. It is only performed if the voltage measured on the right side was below 0.1 V in the previous cycle. VCC is supplied for the right side. The test is error if the voltage on the right side is above 1 V.
					Diagnosis delay time	5 events
B23AB	09	Right brake caliper has malf [The right brake caliper has a malfunction.]	[COMPONENT MALFUNCTION]	4	Diagnosis condition	Any electric parking brake actuator motor (right side) not activated.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	“NtcWrongVoltageSourceCheck” is performed in between the VCC voltage pulses if there is no test current measurement or relay test active and the last actuation was at least 60 ms ago. 32 samples are gathered. The test is error if more than 4 sampled values showing a voltage above 1 V.
					Diagnosis delay time	5 events
B23AB	11	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRCUIT SHORT TO GROUND]	1	Diagnosis condition	During motor idle.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Normally motor circuit are 0 V. A motor test pulse of 5 V is done every 0.12 seconds. If the voltage during the pulse is < 3.1 V malfunction is set because electric parking brake actuator motor (right side) is short to ground (with relays off). Qualification is 100 ms because when a test pulse was not successful it is done again after 0.02 seconds. If 5 pulses were not successful, malfunction is raised.
					Diagnosis delay time	0.1 second

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
B23AB	12	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRCUIT SHORT TO BATTERY]	1	Diagnosis condition	During motor idle.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Either high side or low side is > 0.5 (VB-0.7 V), with relays and test transistor off.
					Diagnosis delay time	0.1 second
B23AB	13	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRCUIT OPEN]	1	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Supply voltage of the motor is correct and the current is < 0.2 A + correction current (± 0.512 A) depending on the end of line calibration in EEPROM (correction current is electric parking brake control module specific and is written end of line at the electric parking brake control module manufacturer). So the current on the motor circuit has to be 0 - 0.712 A.
					Diagnosis delay time	0.1 second
B23AB	13	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRCUIT OPEN]	2	Diagnosis condition	During relay test or actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	During engaged relays if high side of the motor is > battery voltage - 3.3 V and low side is < 4 V.
					Diagnosis delay time	0.16 second
B23AB	14	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRC SHORT TO GRND OR OPEN]	1	Diagnosis condition	—
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Malfunction is set when the supply voltage of the electric parking brake actuator motor (right side) is < 2 V or when there is no supply voltage through the relays to the electric parking brake actuator motor (right side) circuit during the relay test or actuation startup (V+/V- < VB-3.3 V)
					Diagnosis delay time	0.16 second
B23AB	14	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRC SHORT TO GRND OR OPEN]	2	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	During closing: Voltage on V+ line of the electric parking brake actuator motor is < supply voltage of the electric parking brake actuator motor (right side) – 1.2 V.
					Diagnosis delay time	0.1 second

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B23AB	14	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRC SHORT TO GRND OR OPEN]	3	Diagnosis condition	Any walk up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	During opening: Voltage on V – line of the motor is < supply voltage of the electric parking brake actuator motor (right side) – 1.2 V.
					Diagnosis delay time	0.1 second
B23AB	15	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRC SHORT TO BATT OR OPEN]	1	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	The detection takes place only during an actuation. The relay will be engaged and before turning the field effect transistor on a snapshot of the motor high side voltage will be taken for comparison later on. Then the field effect transistor is engaged.
					Diagnosis delay time	0.1 second
B23AB	15	Right brake caliper has malf [The right brake caliper has a malfunction.]	[CIRC SHORT TO BATT OR OPEN]	2	Diagnosis condition	Any wake up actuation request.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	If the voltage on the low-side did not drop below 1.4 V within 1 ms. the actual motor high side voltage will be compared against 80% of the previously measured snapshot motor high side voltage the motor current is more than 24 A during actuation
					Diagnosis delay time	0.1 second
B23AB	77	Right brake caliper has malf [The right brake caliper has a malfunction.]	[COMMAND POSI NOT REACHABLE]	1	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	This malfunction will be raised after detecting disk contact and the full clamp force has not been achieved within 3 seconds of the brake apply.
					Diagnosis delay time	28 seconds
B23AB	77	Right brake caliper has malf [The right brake caliper has a malfunction.]	[COMMAND POSI NOT REACHABLE]	2	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	This malfunction will be raised if the system detects disk contact and the target clamp force is not achieved within 25 seconds from the start of the brake apply.
					Diagnosis delay time	28 seconds

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
B23AB	95	Right brake caliper has malf [The right brake caliper has a malfunction.]	[INCORRECT ASSEMBLY]	1	Diagnosis condition	During apply, voltage between 8.5 V and 17 V.
					Signal (terminal)	Electric parking brake actuator motor
					Threshold	Malfunction is set when the free run current is higher then 7.5 A during apply of the brake.
					Diagnosis delay time	At point of disc contact - motor current is 0.8 A higher then free run current

POSSIBLE CAUSE

B23AB-07
- Low supply voltage (Low energy - low current)
- No discs or pads, broken electric parking brake actuator motor (right side)
- Mechanical malfunction of the electric parking brake actuator motor (right side)
- Damaged electric parking brake actuator motor (right side)
- Damaged gearbox
- Damaged bearings
- Broken spindle
- Broken tooth-belt

B23AB-09
- Negative temperature coefficient hardware malfunction

B23AB-11
- Electric parking brake actuator motor (right side) or harness short circuit to ground
- Electric parking brake control module malfunction

B23AB-12
- Electric parking brake actuator motor (right side) or harness short circuit to battery voltage

B23AB-13
- Electric parking brake actuator motor (right side) harness open circuit
- Electric parking brake actuator motor (right side) electrical malfunction
- Electric parking brake control module malfunction

B23AB-14
- Supply Fuse
- Harness malfunction
- Electric parking brake actuator motor (right side) short circuit
- High resistance in harness or connector (high side of motor)
- Electric parking brake control module malfunction

B23AB-15
- Electric parking brake actuator motor (right side) short circuit
- Electric parking brake actuator motor (right side) short circuit
- Electric parking brake actuator motor (right side) connector short circuit
- Electric parking brake control module connector short circuit

B23AB-77
- Low supply voltage (Low energy – low current)
- High impedance connection from electric parking brake control module to electric parking brake actuator motor (right side)
- Malfunction electric parking brake actuator motor (right side) (broken tooth belt, spindle etc.)

B23AB-95
- High mechanical resistance in electric parking brake actuator motor (right side) (stall)
- Incorrect initialization of electric parking brake actuator motor (right side) (wrong electric parking brake status – think it is released while it is applied physically)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Put the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Repeat step 2 to 3 five or more times.
5. Wait at least 30 seconds or more.
6. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B23AB” detected?

YES >> Proceed to PB-67, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568718

B23AB-07, B23AB-95

1.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch ON.
2. Operate the electric parking brake switch several times.
3. Erase self-diagnosis result for “EHS/PKB”.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B23AB-07” or “B23AB-95” detected?

YES >> GO TO 2.
NO >> INSPECTION END

2.CHECK BRAKE PAD

1. Turn the ignition switch OFF.
2. Check the rear brake pad. Refer to BR-46, "BRAKE PAD : Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace rear brake pad. Refer to BR-41, "BRAKE PAD : Removal and Installation".

3.REPLACE ELECTRIC PARKING BRAKE ACTUATOR MOTOR

Replace the electric parking brake actuator motor RH. Refer to PB-131, "Removal and Installation".

>> GO TO 4.

4.PERFORM BRAKE TEST

Perform brake test on the brake tester.

>> INSPECTION END

B23AB-09

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake actuator motor RH harness connector.
3. Check the electric parking brake actuator motor RH harness connector for disconnection or looseness.
4. Check the electric parking brake actuator motor RH harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR RH CIRCUIT

1. Check the continuity between electric parking brake actuator motor RH harness connector and electric parking brake control module harness connector.

Right rear axle rpm sensor / electric parking brake actuator motor RH		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M608	9	M70	27	Existed
	10		12	

2. Check the continuity electric parking brake actuator motor RH harness connector and ground.

Right rear axle rpm sensor / electric parking brake actuator motor RH		Ground	Continuity
Connector	Terminal		
M608	9	—	Not existed
	10		

3. Check the voltage electric parking brake actuator motor RH harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(−)	
Right rear axle rpm sensor / electric parking brake actuator motor RH		Ground	
Connector	Terminal		
M608	9	—	0 V
	10		

Is the inspection result normal?

YES >> Replace the electric parking brake actuator motor RH. Refer to PB-131, "Removal and Installation".
NO >> Repair/replace harness connector or terminal.

B23AB-11, B23AB-12, B23AB-13, B23AB-77

1.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR POWER SUPPLY

1. The vehicle must be at a standstill.
   CAUTION:
   Secure the vehicle to prevent it rolling away.
2. Turn the ignition switch OFF.
3. Disconnect the electric parking brake actuator motor RH harness connector.
4. Turn the ignition switch ON.
5. Check the voltage between electric parking brake actuator motor RH harness connector and ground when operating electric parking brake switch.
   NOTE:
   The actuation is not possible until all actual values are in their specified value ranges.

Electric parking brake switch operation	+		–	Voltage
	Right rear axle rpm sensor / electric parking brake actuator motor RH			
	Connector	Terminal		
Push (electric parking brake is apply)	M608	9	Ground	More than 6 V
Pull (electric parking brake is release)		10		

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

2.CHECK DATA MONITOR

With CONSULT
1. Turn the ignition switch OFF.
2. Connect the electric parking brake actuator motor RH harness connector
3. Turn the ignition switch ON
4. Select “EHS/PKB”, “DATA MONITOR”, “Shutdown current (RH motor)” and “Status of RH EPB” according to this order.
5. Check the value. Refer to PB-21, "Reference Value".
   NOTE:
   When the operation of parking brake switch is finished, the actual values “Status of LH EPB” and '“Status of RH EPB” must match, otherwise the vehicle is not roadworthy.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake actuator motor RH harness connector.
3. Check the electric parking brake actuator motor RH harness connector for disconnection or looseness.
4. Check the electric parking brake actuator motor RH harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair/replace harness connector or terminal.

4.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR RH CIRCUIT

1. Check the continuity between electric parking brake actuator motor RH harness connector and electric parking brake control module harness connector.

Right rear axle rpm sensor / electric parking brake actuator motor RH		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M608	9	M70	27	Existed
	10		12	

2. Check the continuity electric parking brake actuator motor RH harness connector and ground.

Right rear axle rpm sensor / electric parking brake actuator motor RH		Ground	Continuity
Connector	Terminal		
M608	9	—	Not existed
	10		

3. Check the voltage electric parking brake actuator motor RH harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(−)	
Right rear axle rpm sensor / electric parking brake actuator motor RH		Ground	
Connector	Terminal		
M608	9	—	0 V
	10		

Is the inspection result normal?

YES >> Replace the electric parking brake actuator motor RH. Refer to PB-131, "Removal and Installation".
NO >> Repair/replace harness connector or terminal.

B23AB-14

1.CHECK ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY

Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Perform trouble diagnosis for battery power supply.

B23AB-15

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake actuator motor RH harness connector.
3. Check the electric parking brake actuator motor RH harness connector for disconnection or looseness.
4. Check the electric parking brake actuator motor RH harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR RH CIRCUIT (1)

1. Check the continuity between electric parking brake actuator motor RH harness connector and electric parking brake control module harness connector.

Electric parking brake control module		Right rear axle rpm sensor / electric parking brake actuator motor RH		Continuity
Connector	Terminal	Connector	Terminal	
M70	12	M608	10	Existed
	27		9	

2. Check the continuity electric parking brake actuator motor RH harness connector and ground.

Right rear axle rpm sensor / electric parking brake actuator motor RH		Ground	Continuity
Connector	Terminal		
M608	9	—	Not existed
	10		

3. Check the voltage electric parking brake actuator motor RH harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(−)	
Right rear axle rpm sensor / electric parking brake actuator motor RH		Ground	
Connector	Terminal		
M608	9	—	0 V
	10		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair/replace harness connector or terminal.

3. CHECK ELECTRIC PARKING BRAKE ACTUATOR MOTOR RH

1. Check the resistance between electric parking brake actuator motor RH terminals.

Right rear axle rpm sensor / electric parking brake actuator motor RH	Resistance
Terminal	
9 – 10	Approx 1 Ω or less

2. Check the continuity electric parking brake actuator motor RH and ground.

Right rear axle rpm sensor / electric parking brake actuator motor RH	Ground	Continuity
Terminal		
9	—	Not existed
10		

3. Check the voltage electric parking brake actuator motor RH and ground.

Terminals		Voltage (Approx.)
(+)	(−)	
Right rear axle rpm sensor / electric parking brake actuator motor RH	Ground	
Terminal		
9	—	0 V
10		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the electric parking brake actuator motor RH. Refer to PB-131, "Removal and Installation".

B23AC ELECTRIC PARKING BRAKE SWITCH

DTC Description

INFOID:0000000013568719

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition	
		[Trouble diagnosis content]	[Malfunction type]		
B23AC	13	Electric parking brake SW has malf [The switch 'Electric parking brake' has a malfunction.]	[CIRCUIT OPEN]	Diagnosis condition	Electric parking brake control module is active.
				Signal (terminal)	Electric parking brake switch
				Threshold	Malfunction is set when the electric parking brake switch is disconnected for a certain time.
				Diagnosis delay time	0.2 seconds
B23AC	2A	Electric parking brake SW has malf [The switch 'Electric parking brake' has a malfunction.]	[SIGNAL STUCK IN RANGE]	Diagnosis condition	Electric parking brake control module is active.
				Signal (terminal)	Electric parking brake switch
				Threshold	Electric parking brake switch in activated position (apply or release) for longer than time out (see detection time). Exception: In order to detect a switch stuck in “apply” position, the vehicle needs to be in static mode (not moving).
				Diagnosis delay time	90 seconds
B23AC	64	Electric parking brake SW has malf [The switch 'Electric parking brake' has a malfunction.]	[SIGNAL PLAUSIBILITY ERROR]	Diagnosis condition	Electric parking brake control module is active.
				Signal (terminal)	Electric parking brake switch
				Threshold	Electric parking brake switch inputs are compared with the expected pattern. Malfunction is set when the states “applied”, “released” or “neutral” can't be read. The detection time distinguishes in subject to the last valid switch position. If the last valid switch position was “idle” the detection time is 0.650 seconds, otherwise it is 1.65 seconds.
				Diagnosis delay time	1.65 seconds

POSSIBLE CAUSE

B23AC-13
- Harness or connector malfunction
- Electric parking brake switch malfunction
- Internal electric parking brake control module malfunction

NOTE:
If the DTC code is only stored and “Frequency Counter” is 3 or less, erase the diagnostic result.

B23AC-2A
- Electric parking brake switch was operated for more than 90 seconds.
- Electric parking brake switch stuck in apply position
- Electric parking brake switch stuck in release position
- Automotive harness malfunction

B23AC-64
- Electric parking brake switch components malfunction
- Electric parking brake switch wires broken
- Electric parking brake switch contacts malfunction
- Electric parking brake switch enable drivers on electric parking brake control module malfunction
- Electric parking brake control module input pins/contacts not ok

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 90 seconds or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B23AC” detected?

YES >> Proceed to PB-73, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568720

B23AC-13, B23AC-64

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake switch harness connector.
3. Check the electric parking brake switch harness connector for disconnection or looseness.
4. Check the electric parking brake switch harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK ELECTRIC PARKING BRAKE SWITCH CIRCUIT

Check the continuity between electric parking brake switch harness connector and electric parking brake control module harness connector.

Electric parking brake switch		Electric parking brake control module		Continuity
Connector	Terminal	Connector	Terminal	
M68	1	M70	9	Existed
	3		18	
	4		10	
	6		19	

Is the inspection result normal?

YES >> Replace the electric parking brake switch. Refer to PB-134, "Removal and Installation".
NO >> Repair/replace harness connector or terminal.

B23AC-2A

1.PERFORM SELF-DIAGNOSIS

With CONSULT
1. Erase self-diagnosis result for “EHS/PKB”.
2. Operate the electric parking brake switch several times.
3. Wait at least 90 seconds or more.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “B23AC-2A” detected?

YES >> Replace the electric parking brake switch. Refer to PB-134, "Removal and Installation".
NO >> INSPECTION END

C10C5 TEMPERATURE SENSOR

DTC Description

INFOID:0000000013568721

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
C10C5	00	Temp sen on brake caliper has malf [One of the temperature sensors on the brake caliper has a malfunction.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	Electric parking brake control module is active
				Signal (terminal)	Temperature sensor
				Threshold	Temperature difference > – 243°C (–405°F) between left and right negative temperature coefficient and vehicle ref speed > 5 km/h (3.1 MPH) leads to malfunction qualification. If the vehicle ref speed falls below 5 km/h (3.1 MPH) the qualification is interrupted until it is above 5 km/h (3.1 MPH) again. If the temperature difference falls below – 243°C (–405°F) the qualification is aborted. After the qualification time (10 minutes) drifting is detected. The DTC is then set if at least one brake is applied and not broken while drifting is detected.
				Diagnosis delay time	20 seconds

POSSIBLE CAUSE

- Dirty electric parking brake actuator motor connectors
- Dirty electric parking brake control module connectors
- Oxidized electric parking brake actuator motor connectors
- Oxidized electric parking brake control module connectors

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 20 seconds or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “C10C5” detected?

YES >> Proceed to PB-75, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568722

1.ADDITIONAL SERVICE WHEN REPLACING ELECTRIC PARKING BRAKE CONTROL MODULE

Perform additional service when replacing electric parking brake control module. Refer to PB-34, "Work Procedure".

>> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis for “EHS/PKB”.

Is DTC “C10C5-00” detected?

YES >> Replace the electric parking brake control module. Refer to PB-130, "Removal and Installation".
NO >> INSPECTION END

P0B01 BRAKE CALIPER ASSEMBLY POSITION

DTC Description

INFOID:0000000013568723

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
P0B01	00	EPKB is in assembly position [The electric parking brake is in the assembly position.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	Electric parking brake control module is active
				Signal (terminal)	Brake caliper position
				Threshold	Malfunction is raised when maintenance mode is entered via diagnostics.
				Diagnosis delay time	0.020 seconds

POSSIBLE CAUSE

- Electric parking brake system is in maintenance mode

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “P0B01” detected?

YES >> Proceed to PB-77, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568724

1.CHECK DATA MONITOR

With CONSULT

1. Turn the ignition switch ON.
2. Release parking brake.
3. Select “EHS/PKB”, “DATA MONITOR”, “Status of LH EPB” and “Status of RH EPB” according to this order.
4. Check the value. Refer to PB-21, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the electric parking brake actuator motor. Refer to PB-131, "Removal and Installation".

P0B02 POWER SUPPLY CIRCUIT

DTC Description

INFOID:0000000013568725

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
P0B02	00	Shutoff due to undervoltage [Shutoff due to undervoltage]	[NO SUBTYPE INFORMATION]	Diagnosis condition	System startup
				Signal (terminal)	Power supply
				Threshold	malfunction is raised as an indication that system had an abnormal shutdown (e.g. battery disconnection) when brakes are in progress or data is different in 3 copies of the mirror.
				Diagnosis delay time	On start up

POSSIBLE CAUSE

- Weak battery
- Battery disconnected
- Electric parking brake control module circuit

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “P0B02” detected?

YES >> Proceed to PB-78, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568726

1.CHECK THE ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY

Check the electric parking brake control module power supply. Refer to PB-128, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace power supply circuit.

P1800 CONTROL MODULE

DTC Description

INFOID:0000000013568727

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]		DTC detection condition	
P1800	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Data cross-check on triplicated EEPROM data blocks on electric parking brake control module start up. If errors can not be recovered (all three copies of data vary), the malfunction is raised. This malfunction is raised when VEHICLE CONFIGURATION DATA is corrupted (please reference to EEPROM Map document for details).
					Diagnosis delay time	Periodically
P1800	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Max number of EEPROM programming retries exceeded. (Time out of state writing data to EEPROM, Time out: 5 seconds.)
					Diagnosis delay time	Periodically
P1800	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	If an E2 malfunction has been detected which does not fulfill the conditions defined.
					Diagnosis delay time	Periodically

POSSIBLE CAUSE

- EEPROM malfunction
- Serial peripheral interface communication is busy/error for longer then 5 seconds.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.

CAUTION:
- **Set the select lever in the P position.**
- **Depress the brake pedal.**

3. Push the electric parking brake switch.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “P1800” detected?

YES >> Proceed to PB-80, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident"
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568728

1.REPLACE ELECTRIC PARKING BRAKE CONTROL MODULE

Replace the electric parking brake control module. Refer to PB-130, "Removal and Installation".

>> INSPECTION END

P1801 CONTROL MODULE

DTC Description

INFOID:0000000013568729

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	This checksum is compared with the corresponding checksum contained in the calculated by the fail-safe micro controller. The malfunction is set if the checksum do not match.
					Diagnosis delay time	0.050 seconds
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	The Main micro controller′s ADC reference is out of range (5 V ±4%), the malfunction is set.
					Diagnosis delay time	0.5 seconds
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	While electric parking brake system awake and synchronization
					Signal (terminal)	—
					Threshold	If three tries to reset and re-establish communication have not been successful, the malfunction is set. (Internal electric parking brake control module malfunction)
					Diagnosis delay time	3 events
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	4	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	The Inter processor communication message communication Identifier does not match with the expected value.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	5	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	If the main micro detects that the counter of the messages received from the fail-safe micro is not increased as expected.
					Diagnosis delay time	0.02 seconds

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	6	Diagnosis condition	Malfunction is detected during an actuation
					Signal (terminal)	—
					Threshold	The instruction set test consists of a sequence of assembler instructions which calculates a certain result based on two different start values. The sequence of assembler instructions is designed in a way to cover relevant instructions and addressing modes of the CPU. It is split in small chunks which are designed in a way that they need to be executed in the right order. Malfunction to execute one chunk or executing any chunk in the wrong order leads to a different instruction set test result. The instruction set test results are exchanged via inter processor communication between both processors. This monitor crosschecks the Fail-safe micro instruction set test result and will set a malfunction if it does not have the expected value. The results of both processors have a toggling expected value for each exchanged value
					Diagnosis delay time	0.05 seconds
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	7	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	The Inter processor Communication message Communication Identifier does not match with the expected value.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	8	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	If the Fail-safe Micro detects that the counter of the messages received from the Main micro is not increased as expected (it is stuck indicating no new message content or it jumps indicating lost messages or main micro processing malfunctions).
					Diagnosis delay time	0.02 seconds
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	9	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	This checksum is compared with the corresponding checksum contained in the calculated by the main micro controller. The malfunction is set if the checksum do not match set if the checksum don not match.
					Diagnosis delay time	0.05 seconds

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	10	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	Internal malfunction
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	11	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	It is set if the fail-safe micro detects multiple successive malfunction in the Inter processor communication. Those malfunction can be a data malfunction or a timing violation
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	12	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	Each RAM cell is consecutively written with test patterns, read back and compared with the expected value. In case of a disagreement, the malfunction is set at startup, the complete RAM is checked this way, during cyclic operation the RAM is checked cell by cell in the idle loop (complete check < 1 second in normal operation, 17 seconds in sleep mode).
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	13	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	If that does not match with the stored checksum, the malfunction is set the complete ROM is checked during startup, it is consecutively checked during normal operation (complete check takes 1.28 seconds) and in sleep mode (complete check takes approx. 60 seconds)
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	14	Diagnosis condition	When Inter processor communication is running
					Signal (terminal)	—
					Threshold	External ADC supply voltage is compared with the internal band gap voltage taking into account the specified range of the internal band gap, the external voltage, ADC conversion precision. If that comparison shows a mismatch, the malfunction is set
					Diagnosis delay time	0.5 seconds

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	15	Diagnosis condition	Malfunction is detected during an actuation
					Signal (terminal)	—
					Threshold	The instruction set test consists of a sequence of assembler instructions which calculates a certain result based on two different start values. The sequence of assembler instructions is designed in a way to cover relevant instructions and addressing modes of the CPU. It is split in small chunks which are designed in a way that they need to be executed in the right order. Malfunction to execute one chunk or executing any chunk in the wrong order leads to a different instruction set test result.
					Diagnosis delay time	0.05 seconds
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	16	Diagnosis condition	Malfunction is detected during an actuation
					Signal (terminal)	—
					Threshold	With a software variable, it is crosschecked that the enable relay drive circuit stays high when expected to stay high and low when expected to stay low.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	17	Diagnosis condition	Malfunction is detected during an actuation. The inter-processor-communication between main micro and fail-safe micro must be successfully running
					Signal (terminal)	—
					Threshold	The actuation direction is determined based on Vminus voltage (Apply: Vminus $\leq$ 1 V, Release: Vminus $\geq$ 6 V). The actuator movement is detected based on actuator current (threshold: 600 mA). The actuation request consists among others of the demand active event which can be associated with a direction.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	18	Diagnosis condition	Malfunction is detected during an actuation. The inter-processor-communication between main micro and fail-safe micro must be successfully running
					Signal (terminal)	—
					Threshold	Current measurement to detect actuation direction is crosschecked with actuation request from main micro. The actuator movement is detected based on actuator current (threshold: 600 mA). If the current measurement detects an actuation but there is no valid request from main micro, the malfunction is set.
					Diagnosis delay time	0.01 second

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	19	Diagnosis condition	Malfunction is detected when an actuation is started. The inter-processor-communication between main micro and fail-safe micro must be successfully running
					Signal (terminal)	—
					Threshold	The fail-safe micro observes that the switch is in a wrong position to allow the main micro actuation request.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	20	Diagnosis condition	Malfunction is detected when an actuation is started. The inter-processor-communication between main micro and fail-safe micro must be successfully running
					Signal (terminal)	—
					Threshold	The vehicle speed is not matching with the necessary criteria for the main micro actuation request defined.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	21	Diagnosis condition	Malfunction is detected when an actuation is started. The inter-processor-communication between main micro and fail-safe micro must be successfully running
					Signal (terminal)	—
					Threshold	A defined condition based on main micro actuation request is not matching with the necessary criteria defined.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	22	Diagnosis condition	Malfunction is detected during an actuation
					Signal (terminal)	—
					Threshold	State machine variables are hamming coded. When they are accessed, they are checked that they have a plausible value. In case of a corruption, the malfunction is set the instruction set test result is compared with an expected value. In case of a deviation, the malfunction is set.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	23	Diagnosis condition	Malfunction is detected during an actuation.
					Signal (terminal)	—
					Threshold	In the interrupt vector table, a routine is used as interrupt handler which sets the fail-safe micro into soft lock with the above mentioned malfunction code.
					Diagnosis delay time	10 events

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	24	Diagnosis condition	Malfunction is detected during an actuation
					Signal (terminal)	—
					Threshold	RAM cells are written with a pattern. In case of a stack malfunction, this pattern will be overwritten and very likely changed by that. All patterns are periodically checked that they are not changed.
					Diagnosis delay time	0.01 second
P1801	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	35	Diagnosis condition	Malfunction is detected during an actuation
					Signal (terminal)	—
					Threshold	The watchdog time out will occur.
					Diagnosis delay time	0.01 second

POSSIBLE CAUSE

- Addressing malfunction
- Electric parking brake control module electrical malfunction
- Electric parking brake control module internal malfunction (voltage regulator for internal voltages)
- Electric parking brake control module internal malfunction (electronic component malfunction)
- Electric parking brake control module internal malfunction (soldering contacts)
- Electromagnetic compatibility
- Fail-safe micro processor malfunction
- Fail-safe micro RAM malfunction
- Fail-safe micro wrong program execution
- Hardware malfunction
- Instruction execution malfunction
- Main micro serial peripheral interface malfunction
- Main micro processing malfunction
- Main micro processor malfunction
- Main micro timing/scheduling
- Processor malfunction
- RAM corruption
- Serial peripheral interface malfunction
- Wrong relay drive

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**

3. Push the electric parking brake switch.
4. Repeat step 2 to 3 three or more times.
5. Wait at least 1 second or more.
6. Perform self-diagnosis for “EHS/PKB”.

Is DTC “P1801” detected?

YES >> Proceed to PB-87, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident"
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568730

1.REPLACE ELECTRIC PARKING BRAKE CONTROL MODULE

Replace the electric parking brake control module. Refer to PB-130, "Removal and Installation".

>> INSPECTION END

P1802 CONTROL MODULE

DTC Description

INFOID:0000000013568731

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
P1802	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Electric parking brake control module is active, no electric parking brake actuation.
					Signal (terminal)	—
					Threshold	The high-side driver for the test current is engaged. By actuating the appropriate low-side field effect transistor the test current will flow and can be read at the current feedback inputs malfunction will be set if the motor current value, measured during the pulse, is far (±10%) from the expected value. To determine the expected value, the battery voltage is measured and converted to a test current with stored calibration values which are determined during electric parking brake control module end of line. (General: This malfunction is set if no plausible current measurement is possible). A test pulse is done for each side, if 3 consecutive tests are error, malfunction is set.
					Diagnosis delay time	3 minutes
P1802	00	CONTROL MODULE [The control unit has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Electric parking brake control module is active
					Signal (terminal)	—
					Threshold	Electric parking brake control module hardware end of line calibration data not programmed or not available in case EEPROM chip is broken
					Diagnosis delay time	On startup

POSSIBLE CAUSE

- Electric parking brake control module malfunction in the measurement chain
- Circuit component values have changed
- The stored current calibration factor is incorrect

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.

4. Wait at least 3 minutes or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “P1802” detected?

YES >> Proceed to PB-89, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident"
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568732

1.REPLACE ELECTRIC PARKING BRAKE CONTROL MODULE

Replace the electric parking brake control module. Refer to PB-130, "Removal and Installation".

>> INSPECTION END

U0100 ECM COMMUNICATION

DTC Description

INFOID:0000000013568733

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0100	00	Communication error [Communication with the control unit 'combustion engine' has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	At least on cyclic electric parking brake control module message received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.2 seconds
U0100	00	Communication error [Communication with the control unit 'combustion engine' has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Only in Stop-Start configuration. At least on cyclic electric parking brake control module message received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.2 seconds
U0100	00	Communication error [Communication with the control unit 'combustion engine' has a malfunction.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Engine system message received.
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.2 seconds
U0100	00	Communication error [Communication with the control unit 'combustion engine' has a malfunction.]	[NO SUBTYPE INFORMATION]	4	Diagnosis condition	Engine system message received.
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	After 10 x received

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0100	00	Communication error [Communication with the control unit 'combustion engine' has a malfunction.]	[NO SUBTYPE INFORMATION]	5	Diagnosis condition	Any wake up.
					Signal (terminal)	CAN communication
					Threshold	Every test period loop it will be checked if the message ECM was received within last test period or not. If the message was not received the malfunction gets qualified.
					Diagnosis delay time	1 second
U0100	00	Communication error [Communication with the control unit 'combustion engine' has a malfunction.]	[NO SUBTYPE INFORMATION]	6	Diagnosis condition	This FC is currently disabled.
					Signal (terminal)	CAN communication
					Threshold	If the evaluated signal Clutch pedal position is equal to “signal not available” the malfunction gets qualified
					Diagnosis delay time	10 events

POSSIBLE CAUSE

- ECM malfunction
- CAN communication line malfunction
- Clutch Sensor malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Repeat step 2 to 3 ten or more times.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0100” detected?

YES >> Proceed to PB-91, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568734

1.ERASE SELF-DIAGNOSIS RESULT

With CONSULT
Ignore DTC code and erase self-diagnosis result for “EHS/PKB”.

>> INSPECTION END

U0101 TCM COMMUNICATION

DTC Description

INFOID:0000000013568735

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0101	00	COMMUNICATION ERROR (LOST) [Communication with control unit “Transmission” has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Transmission variant is any automatic transmission. At least on cyclic electric parking brake control module message received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.2 seconds
U0101	00	COMMUNICATION ERROR (LOST) [Communication with control unit “Transmission” has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Transmission variant is any automatic transmission.
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which“signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.2 seconds

POSSIBLE CAUSE

- TCM malfunction
- ECM malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0101” detected?

YES >> Proceed to PB-94, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568736

1.CAN COMMUNICATION SYSTEM DIAGNOSIS

Perform the trouble diagnosis for CAN communication system. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace the malfunctioning parts.

2.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the TCM harness connector.
3. Check the TCM harness connector for disconnection or looseness.
4. Check the TCM harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal.

U0121 ELECTRONIC STABILITY PROGRAM CONTROL UNIT COMMUNICATION

DTC Description

INFOID:0000000013568737

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	At least on cyclic electric parking brake control module message received
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.2 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	At least on cyclic electric parking brake control module message received
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.16 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	At least on cyclic electric parking brake control module message received
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.3 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	4	Diagnosis condition	At least on cyclic electric parking brake control module message received
					Signal (terminal)	CAN communication
					Threshold	Every cycle without receive message electronic stability program control unit was received within, a time out counter will be increased. If the defined time out time has been reached the malfunction is qualified.
					Diagnosis delay time	0.3 seconds

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	5	Diagnosis condition	Electronic stability program control unit message received
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.2 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	6	Diagnosis condition	Electronic stability program control unit message received
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” or 'signal not defined ' value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.2 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	7	Diagnosis condition	Any wake up. Electronic stability program control unit message received
					Signal (terminal)	CAN communication
					Threshold	If the evaluated signal is equal to “signal not available” the malfunction get qualified
					Diagnosis delay time	10 consecutive received messages with signal
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	8	Diagnosis condition	Electronic stability program control unit message received
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.2 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	9	Diagnosis condition	Electronic stability program control unit message received
					Signal (terminal)	CAN communication
					Threshold	If the evaluated signal is equal to “signal not available” the malfunction gets qualified.
					Diagnosis delay time	15 events

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	10	Diagnosis condition	Electronic stability program control unit message received
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.3 seconds
U0121	00	COMMUNICATION ERROR (LOST) [Communication with ESP has a malfunction.]	[NO SUBTYPE INFORMATION]	11	Diagnosis condition	Any wake up
					Signal (terminal)	CAN communication
					Threshold	Brakes will apply if the valid flags of following signals drops to invalid or mode changes from static to limp home (wheel speeds missing) or Brake status becomes missing or corrupt and vehicle is hydraulically hold.
					Diagnosis delay time	1 event

POSSIBLE CAUSE

- CAN communication line malfunction
- Electronic stability program control unit malfunction
- Wheel speed sensor malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Repeat step 2 to 3 fifteen or more times.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0121” detected?

YES >> Proceed to PB-98, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568738

1. CAN COMMUNICATION SYSTEM DIAGNOSIS

Perform the trouble diagnosis for CAN communication system. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace the malfunctioning parts.

2. CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electronic stability program control unit harness connector.
3. Check the electronic stability program control unit harness connector for disconnection or looseness.
4. Check the electronic stability program control unit harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal.

U0146 ELECTRONIC IGNITION SWITCH CONTROL UNIT COMMUNICATION

DTC Description

INFOID:0000000013568739

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
U0146	00	CAN signal malf [CAN signal 'Outside temperature' from control unit (SAM control unit) or CAN signal 'Reverse gear' from control unit 'Engine' is implausible.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	At least on cyclic electric parking brake message received.
				Signal (terminal)	CAN communication
				Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
				Diagnosis delay time	1 second

POSSIBLE CAUSE

- Electronic ignition switch control unit malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at 1 second or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0146” detected?

YES >> Proceed to PB-99, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568740

1.PERFORM SELF-DIAGNOSIS (BCM)

Perform self-diagnosis for “BCM”. Refer to BCS-24, "CONSULT Function (BCM)".

Is DTC detected?

YES >> Check the DTC. Refer to BCS-51, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS (LEFT FRONT DOOR CONTROL UNIT)

Perform self-diagnosis for “Left front door control unit”. Refer to DLK-31, "CONSULT Function (Left Front Door Control Unit)".

Is DTC detected?

YES >> Check the DTC. Refer to DLK-60, "DTC Index". GO TO 3.
NO >> GO TO 3.

3.PERFORM SELF-DIAGNOSIS (ECM)

Perform self-diagnosis for “ENGINE”. Refer to EC-97, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to EC-142, "DTC Index".
NO >> INSPECTION END

U0155 COMBINATION METER COMMUNICATION

DTC Description

INFOID:0000000013568741

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0155	00	COMMUNICATION ERROR (LOST) [Communication with the instrument cluster has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	At least on cyclic electric parking brake control module message received
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	10 seconds
U0155	00	COMMUNICATION ERROR (LOST) [Communication with the instrument cluster has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Combination meter message received
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 0.01 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	10 seconds

POSSIBLE CAUSE

- Combination meter malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 10 seconds or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0155” detected?

YES >> Proceed to PB-102, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568742

1.CAN COMMUNICATION SYSTEM DIAGNOSIS

Perform the trouble diagnosis for CAN communication system. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace the malfunctioning parts.

2.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the combination meter harness connector.
3. Check the combination meter harness connector for disconnection or looseness.
4. Check the combination meter harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal.

U0168 ELECTRIC IGNITION LOCK SYSTEM

DTC Description

INFOID:0000000013568743

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]			DTC detection condition
U0168	00	COMMUNICATION ERROR (LOST) [Communication with the electronic ignition lock has a malfunction.	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	At least on cyclic electric parking brake control module message received
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	1 second
U0168	00	COMMUNICATION ERROR (LOST) [Communication with the electronic ignition lock has a malfunction.	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Electronic ignition switch control unit message received
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 0.01 second by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	1 second

POSSIBLE CAUSE

- Electronic ignition switch control unit malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 second or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0168” detected?

YES >> Proceed to PB-104, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568744

1.CAN COMMUNICATION SYSTEM DIAGNOSIS

Perform the trouble diagnosis for CAN communication system. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace the malfunctioning parts.

2.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electronic ignition switch control unit harness connector.
3. Check the electronic ignition switch control unit harness connector for disconnection or looseness.
4. Check the electronic ignition switch control unit harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal.

U0212 STEERING COLUMN CONTROL MODULE COMMUNICATION

DTC Description

INFOID:0000000013568745

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0212	00	COMMUNICATION ERROR (LOST) [Communication with the steering column module has a malfunction.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Transmission variant is electric shift selector-steering column control module. At least on cyclic electric parking brake control module message received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a flag in global array is set in CAN receive interrupt if that particular message is received. In a periodic function these flags are checked for all the messages and time out is said to be detected for the messages for which the flags are false.
					Diagnosis delay time	0.2 seconds
U0212	00	COMMUNICATION ERROR (LOST) [Communication with the steering column module has a malfunction.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Transmission variant is electric shift selector-steering column control module. Steering column control module message received.
					Signal (terminal)	CAN communication
					Threshold	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Diagnosis delay time	0.2 seconds

POSSIBLE CAUSE

- Steering column control module malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 second or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0212” detected?

YES >> Proceed to PB-106, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568746

1.CAN COMMUNICATION SYSTEM DIAGNOSIS

Perform the trouble diagnosis for CAN communication system. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace the malfunctioning parts.

2.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the steering column control module harness connector.
3. Check the steering column control module harness connector for disconnection or looseness.
4. Check the steering column control module harness connector pin terminals for damage or loose connection with harness connector.
5. Disconnect the electric parking brake control module harness connector.
6. Check the electric parking brake control module harness connector for disconnection or looseness.
7. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal.

U0401 ECM SIGNAL

DTC Description

INFOID:0000000013568747

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	CAN bus diagnostic enabled, ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with to short DLC.
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	CAN bus diagnostic enabled, ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with invalid counter steps.
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	CAN bus diagnostic enabled, ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with wrong checksum.
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	4	Diagnosis condition	Only in Stop-Start configuration, ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with to short DLC.

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	5	Diagnosis condition	Only in Stop-Start configuration, ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with invalid counter steps.
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	6	Diagnosis condition	Only in Stop-Start configuration, ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with wrong checksum.
U0401	00	Communication error (invalid) [Implausible data were received from control unit 'combustion engine'.]	[NO SUBTYPE INFORMATION]	7	Diagnosis condition	Any wake up.
					Signal (terminal)	CAN communication
					Threshold	For every received message it will be checked if the message was received with the correct DLC or not. Correct DLC means that the received DLC has to be at least as long that the last required Signal of this message could be received.
					Diagnosis delay time	0.01 second

POSSIBLE CAUSE

- ECM malfunction
- Engine malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**

3. Push the electric parking brake switch.
4. Wait at least 1 minute or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0401” detected?

YES >> Proceed to PB-109, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568748

1.PERFORM SELF-DIAGNOSIS (ECM)

Perform self-diagnosis for “ENGINE”. Refer to EC-97, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to EC-142, "DTC Index".
NO >> INSPECTION END

U0402 TCM SIGNAL

DTC Description

INFOID:0000000013568749

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0402	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'Transmission'.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Transmission variant is any TCM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with to short DLC.
U0402	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'Transmission'.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Transmission variant is any TCM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with invalid counter steps.
U0402	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'Transmission'.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Transmission variant is any TCM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with wrong checksum.

POSSIBLE CAUSE

- ECM malfunction
- TCM malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 minute or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0402” detected?

YES >> Proceed to PB-111, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568750

1.PERFORM SELF-DIAGNOSIS (TCM)

Perform self-diagnosis for “TRANSMISSION”. Refer to TM-36, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to TM-45, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS (ECM)

Perform self-diagnosis for “ENGINE”. Refer to EC-97, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to EC-142, "DTC Index".
NO >> INSPECTION END

U0415 ELECTRONIC STABILITY PROGRAM CONTROL UNIT SIGNAL

DTC Description

INFOID:0000000013568751

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with to short DLC.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with invalid counter steps.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with wrong checksum.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	4	Diagnosis condition	ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with to short DLC.

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	5	Diagnosis condition	ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with invalid counter steps.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	6	Diagnosis condition	ECM message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with wrong checksum.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	7	Diagnosis condition	Electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	8 consecutive received messages with to short DLC.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	8	Diagnosis condition	CAN bus diagnostic enabled, electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	8 consecutive received messages with invalid counter steps.

DTC		CONSULT screen terms		DTC detection condition		
		[Trouble diagnosis content]	[Malfunction type]			
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	9	Diagnosis condition	CAN bus diagnostic enabled, electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	15 consecutive received messages with to short DLC.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	10	Diagnosis condition	CAN bus diagnostic enabled, electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	15 consecutive received messages with invalid counter steps.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	11	Diagnosis condition	CAN bus diagnostic enabled, electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	15 consecutive received messages with wrong checksum.
U0415	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from control unit 'ESP®'.]	[NO SUBTYPE INFORMATION]	12	Diagnosis condition	CAN bus diagnostic enabled, electronic stability program control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	A counter will be increased with every received message with a data length less than specified for this message in CAN Matrix.
					Diagnosis delay time	15 consecutive received messages with to short DLC.

POSSIBLE CAUSE

- Electronic stability program control unit malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 minute or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0415” detected?

YES >> Proceed to PB-115, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568752

1.PERFORM SELF-DIAGNOSIS (ELECTRONIC STABILITY PROGRAM CONTROL UNIT)

Perform self-diagnosis for “ABS”. Refer to BRC-49, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to BRC-59, "DTC Index".
NO >> INSPECTION END

U0423 COMBINATION METER SIGNAL

DTC Description

INFOID:0000000013568753

DTC DETECTION LOGIC

DTC		CONSULT screen terms		DTC detection condition	
		[Trouble diagnosis content]	[Malfunction type]		
U0423	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the instrument cluster.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	Combination meter message was received.
				Signal (terminal)	
				Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
				Diagnosis delay time	10 consecutive received messages with to short DLC.

POSSIBLE CAUSE

- Combination meter malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Push the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Pull the electric parking brake switch.
4. Wait at least 1 minute or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0423” detected?

YES >> Proceed to PB-116, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568754

1.PERFORM SELF-DIAGNOSIS (COMBINATION METER)

Perform self-diagnosis for “METER / M&A”. Refer to MWI-68, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to BRC-59, "DTC Index".
NO >> INSPECTION END

U0427 ELECTRONIC IGNITION SWITCH CONTROL UNIT SIGNAL

DTC Description

INFOID:0000000013568755

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0427	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the electronic ignition lock.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Electronic ignition switch control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with to short DLC.
U0427	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the electronic ignition lock.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Electronic ignition switch control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with invalid counter steps.
U0427	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the electronic ignition lock.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Electronic ignition switch control unit message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	10 consecutive received messages with wrong checksum.

POSSIBLE CAUSE

- Electronic ignition switch control unit malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.

CAUTION:
Be sure to wait for 10 seconds after turning ignition switch OFF or ON.

2. Pull the electric parking brake switch.

CAUTION:
- **Set the select lever in the P position.**
- **Depress the brake pedal.**

3. Push the electric parking brake switch.
4. Wait at least 1 minute or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0427” detected?

YES >> Proceed to PB-118, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568756

1.PERFORM SELF-DIAGNOSIS (ELECTRONIC IGNITION SWITCH CONTROL UNIT)

Perform self-diagnosis for “Electric ign control unit”. Refer to PCS-8, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to PCS-12, "DTC Index".
NO >> INSPECTION END

U0429 STEERING COLUMN CONTROL MODULE SIGNAL

DTC Description

INFOID:0000000013568757

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0429	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the steering column module.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Steering column control module message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	20 consecutive received messages with to short DLC.
U0429	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the steering column module.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Steering column control module message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a update counter error counter is increased in the CAN receive interrupt if message with incorrect update counter is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	20 consecutive received messages with invalid counter steps.
U0429	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the steering column module.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Steering column control module message was received.
					Signal (terminal)	CAN communication
					Threshold	For every message, a checksum error counter is increased in the CAN receive interrupt if message with incorrect checksum is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Diagnosis delay time	20 consecutive received messages with wrong checksum.

POSSIBLE CAUSE

- Steering column control module malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.

CAUTION:
Be sure to wait for 10 seconds after turning ignition switch OFF or ON.

2. Pull the electric parking brake switch.

CAUTION:
- **Set the select lever in the P position.**
- **Depress the brake pedal.**

3. Push the electric parking brake switch.
4. Wait at least 1 minute or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0429” detected?

YES >> Proceed to PB-120, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568758

1.PERFORM SELF-DIAGNOSIS (STEERING COLUMN CONTROL MODULE)

Perform self-diagnosis for “Steering column cont module”. Refer to BCS-30, "CONSULT Function (Steering Column Control Module)".

Is DTC detected?

YES >> Check the DTC. Refer to BCS-61, "DTC Index".
NO >> INSPECTION END

U0447 ELECTRONIC IGNITION SWITCH CONTROL UNIT SIGNAL

DTC Description

INFOID:0000000013568759

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition		
U0447	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the central gateway.]	[NO SUBTYPE INFORMATION]	1	Diagnosis condition	Electronic ignition switch control unit message was received.
					Signal (terminal)	For every message, a DLC error counter is increased in the CAN receive interrupt if message with incorrect data length is received. This error counter is compared against a predefined threshold value in a periodic function and malfunction is logged if threshold is breached.
					Threshold	CAN communication
					Diagnosis delay time	10 consecutive received messages with to short DLC.
U0447	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the central gateway.]	[NO SUBTYPE INFORMATION]	2	Diagnosis condition	Transmission variant is manual transmission. Electronic ignition switch control unit message received.
					Signal (terminal)	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Threshold	CAN communication
					Diagnosis delay time	1 second
U0447	00	COMMUNICATION ERROR (INVALID) [Implausible data were received from the central gateway.]	[NO SUBTYPE INFORMATION]	3	Diagnosis condition	Electronic ignition switch control unit message received.
					Signal (terminal)	Periodically, for every message that were received in last 10 ms by application, all the expected signal values are checked for their relevant “signal not available” value and malfunction logging is initiated for signals for which “signal not available” value is detected. Malfunction is logged after detection time or qualification time.
					Threshold	CAN communication
					Diagnosis delay time	1 second

POSSIBLE CAUSE

- Electronic ignition switch control unit malfunction
- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.

CAUTION:

Be sure to wait for 10 seconds after turning ignition switch OFF or ON.

2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 second or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U0447” detected?

YES >> Proceed to PB-122, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568760

1.PERFORM SELF-DIAGNOSIS (ELECTRONIC IGNITION SWITCH CONTROL UNIT)

Perform self-diagnosis for “Electric ign control unit”. Refer to PCS-8, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to PCS-12, "DTC Index".
NO >> INSPECTION END

U1027 CAN COMMUNICATION

DTC Description

INFOID:0000000013568761

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
U1027	88	Chassis CAN bus OFF malfunction [Chassis CAN bus OFF fault]	[BUS OFF]	Diagnosis condition	—
				Signal (terminal)	CAN communication
				Threshold	Bus-off flag of CAN transceiver is set
				Diagnosis delay time	First occurrence / on error

POSSIBLE CAUSE

- CAN communication has a malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U1027” detected?

YES >> Proceed to PB-123, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568762

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake control module harness connector.
3. Check the electric parking brake control module harness connector for disconnection or looseness.
4. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK CAN COMMUNICATION

Check the CAN communication. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal, and erase self-diagnosis result for “EHS/PKB”.

U1032 CAN COMMUNICATION

DTC Description

INFOID:0000000013568763

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
U1032	00	Chassis CAN malf [Chassis CAN communication has a malfunction.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	—
				Signal (terminal)	CAN communication
				Threshold	If no CAN message is received then, a global flag which is normally set to through in the CAN receive interrupt would remain False.
				Diagnosis delay time	0.15 seconds

POSSIBLE CAUSE

- CAN communication line malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 1 second or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U1032” detected?

YES >> Proceed to PB-125, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568764

1.CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake control module harness connector.
3. Check the electric parking brake control module harness connector for disconnection or looseness.
4. Check the electric parking brake control module harness connector pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair/replace harness connector or terminal.

2.CHECK CAN COMMUNICATION

Check the CAN communication. Refer to LAN-58, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness connector or terminal, and erase self-diagnosis result for “EHS/PKB”.

U140D WHEEL SPEED SIGNAL

DTC Description

INFOID:0000000013568765

DTC DETECTION LOGIC

DTC		CONSULT screen terms [Trouble diagnosis content]	CONSULT screen terms [Malfunction type]	DTC detection condition	
U140D	00	WHEEL SPEED SIGNAL [An implausible wheel speed signal was received.]	[NO SUBTYPE INFORMATION]	Diagnosis condition	Any wake up.
				Signal (terminal)	CAN communication
				Threshold	Calculate a wheel speed out of the wheel pulse counter values and out of the RPM values and perform the following check: Check if one of them is > 5 km/h (3.1 MPH) and the other is ≤ 5 km/h (3.1 MPH). Check if the difference between them is ≥ 10 km/h (6.2 MPH). If all conditions are fulfilled for more than three seconds the malfunction is detected.
				Diagnosis delay time	3 seconds

POSSIBLE CAUSE

- The vehicle dynamics control (VDC) node sends a wheel rpm (revolutions per minute) value which is not plausible compared to the corresponding wheel pulse counter values.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.
   CAUTION:
   Be sure to wait for 10 seconds after turning ignition switch OFF or ON.
2. Pull the electric parking brake switch.
   CAUTION:
   - **Set the select lever in the P position.**
   - **Depress the brake pedal.**
3. Push the electric parking brake switch.
4. Wait at least 3 seconds or more.
5. Perform self-diagnosis for “EHS/PKB”.

Is DTC “U140D” detected?

YES >> Proceed to PB-127, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013568766

1.PERFORM SELF-DIAGNOSIS (ELECTRONIC STABILITY PROGRAM CONTROL UNIT)

Perform self-diagnosis for “ABS”. Refer to BRC-49, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC. Refer to BRC-59, "DTC Index".
NO >> INSPECTION END

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000013568767

1.CHECK ELECTRIC PARKING BRAKE CONTROL MODULE POWER SUPPLY

1. Turn the ignition switch OFF.
2. Check the voltage between electric parking brake control module harness connector and ground.

+		–	Voltage
Electric parking brake control module			
Connector	Terminal		
M70	13	Ground	11 – 15.5 V
	15		
	22		

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK MOTOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 30A fuse (#74), 30A fuse (#73) and 5A fuse (#93).
3. Disconnect the electric parking brake control module harness connector.
4. Disconnect the fuse and fusible link block 2 harness connector.
5. Check for continuity between electric parking brake control module harness connector and the fuse and fusible link block 2 harness connector.

Electric parking brake control module		Fuse and fusible link block 2		Continuity
Connector	terminal	Connector	Terminal	
M70	13	M108	14	Existed
	15		13	
	22	M128	78	

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.
NO >> Repair/replace harness, connector or fuse.

3.CHECK ELECTRIC PARKING BRAKE CONTROL MODULE GROUND CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect the electric parking brake control module harness connector.
3. Check for continuity between electric parking brake control module harness connector and the ground.

Electric parking brake control module		—	Continuity
Connector	Terminal		
M70	28	Ground	Existed
	30		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair/replace harness or connector.

4.CHECK TERMINAL

Check electric parking brake control module pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair/replace harness or connector.

REMOVAL AND INSTALLATION

ELECTRIC PARKING BRAKE CONTROL MODULE

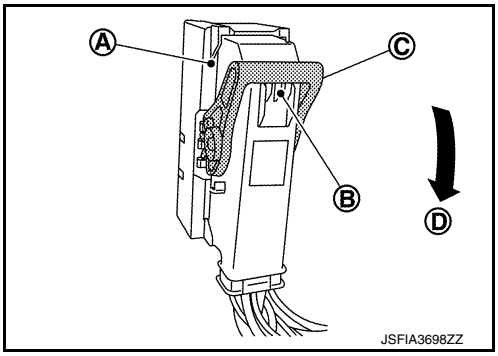
Removal and Installation

INFOID:0000000013568768

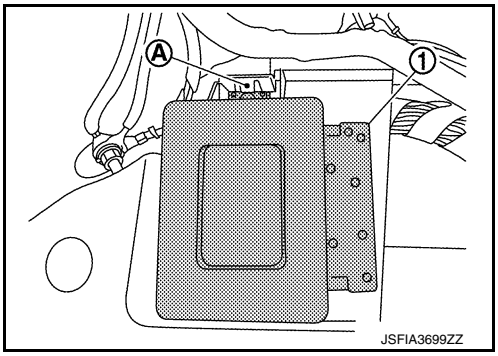
REMOVAL

1. Turn the ignition switch OFF.
2. Remove luggage side lower finisher RH. Refer to INT-40, "LUGGAGE SIDE LOWER FINISHER : Removal and Installation".
3. Disconnect electric parking brake control module harness connector Ⓐ, follow the procedure below.

a. Push the pawl Ⓑ.
b. Move the lever Ⓒ in the direction Ⓓ until locked.
c. Disconnect electric parking brake control module harness connector.



4. Push the pawl Ⓐ and remove electric parking brake control module ①.



INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Make sure that no electric parking brake control module harness are pinched when inserting the electric parking brake control module.

- Perform inspection after installation. Refer to PB-130, "Inspection".

Inspection

INFOID:0000000013568769

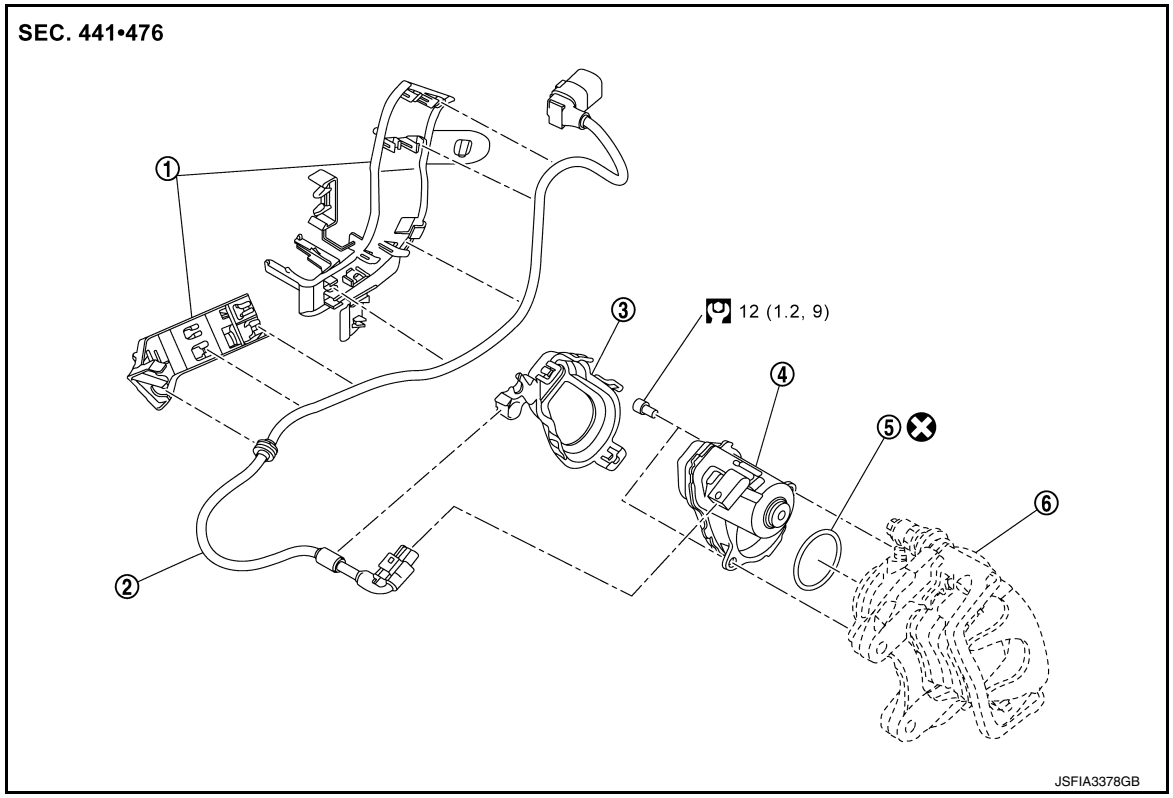
INSPECTION AFTER INSTALLATION

- Perform additional service when replacing electric parking brake control module. Refer to PB-34, "Work Procedure".

ERECTRIC PARKING BRAKE ACTUATOR MOTOR

Exploded View

INFOID:0000000013568770



① Harness bracket
② Electric parking brake actuator motor harness
③ Retaining frame
④ Electric parking brake actuator motor
⑤ Sealing ling
⑥ Brake caliper assembly

⊗: Always replace after every disassembly.

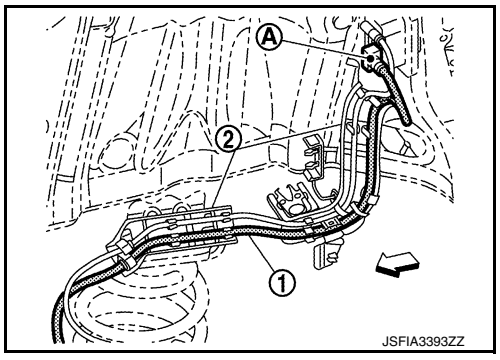
: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000013568771

REMOVAL

1. Turn the ignition switch OFF.
2. Disconnect electric parking brake actuator motor harness connector Ⓐ, and remove electric parking brake actuator motor harness ① from harness brackets ②.

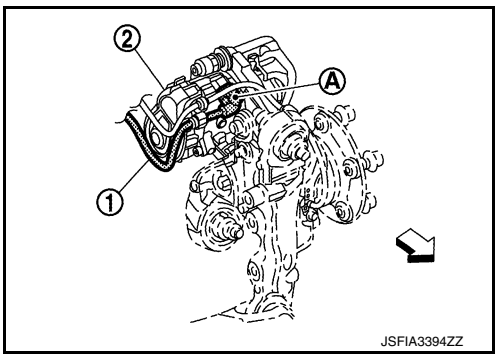


⇦ : Vehicle front

3. Remove harness brackets.

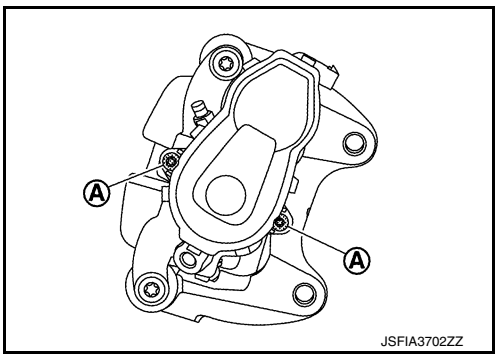
4. Disconnect electric parking brake actuator motor harness connector Ⓐ, and remove electric parking brake actuator motor harness ① from retaining frame ②.

⇦ : Vehicle front



5. Remove retaining frame.

6. Remove electric parking brake actuator motor mounting bolts Ⓐ.
7. Remove electric parking brake actuator motor and sealing ling.



INSTALLATION

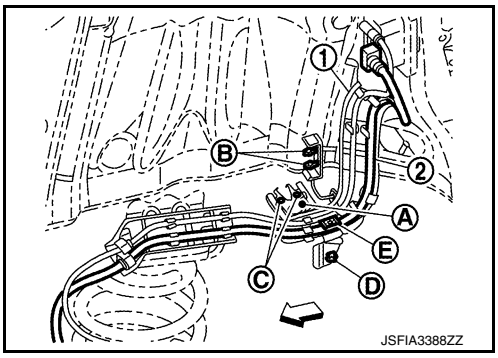
Note the following, and install in the reverse order of removal.

CAUTION:

Never reuse sealing ling.

- Install harness bracket, follow the procedure below.
- Set harness bracket ① to the brake hose bracket Ⓐ.

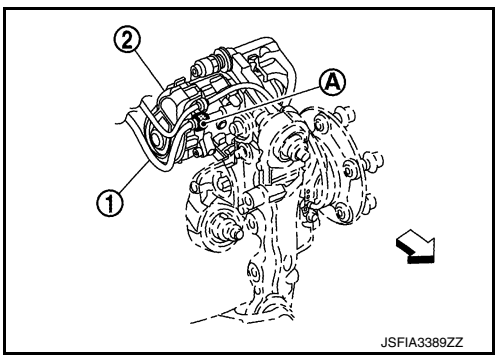
⇦ : Vehicle front



- Insert pins Ⓑ of harness bracket to holes Ⓒ of brake hose bracket until locks.
- After installing the electric parking brake actuator motor harness ②, and Insert part Ⓓ of harness bracket to part Ⓔ of harness bracket until locks.

- After installing the electric parking brake actuator motor harness ①, Insert part Ⓐ of retaining frame ② to part until locks.

⇦ : Vehicle front



- Perform inspection after installation. Refer to PB-132, "Inspection".

Inspection

INFOID:0000000013568772

INSPECTION AFTER INSTALLATION

- Check electric parking brake operation with the following procedure.
- Push electric parking brake switch, and check the electric parking brake is applied.
- Pull electric parking brake switch, and check the electric parking brake is released.

- Perform brake test on the brake tester.

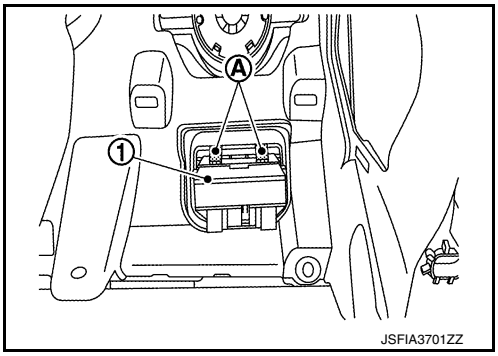
ELECTRIC PARKING BRAKE SWITCH

Removal and Installation

INFOID:0000000013568773

REMOVAL

1. Turn the ignition switch OFF, and remove transmitter key.
2. Remove knee air bag module. Refer to SR-27, "Removal and Installation".
3. Disconnect electric parking brake switch harness connector.
4. Push the pawl Ⓐ and remove electric parking brake switch ①.



INSTALLATION

Note the following, and install in the reverse order of removal.

- Perform inspection after installation. Refer to PB-134, "Inspection".

Inspection

INFOID:0000000013568774

INSPECTION AFTER INSTALLATION

- Check electric parking brake operation with the following procedure.

- Push electric parking brake switch, and check the electric parking brake is applied.
- Pull electric parking brake switch, and check the electric parking brake is released.