■ SYSTEM CONTROL

1. General

This system performs the functions listed below.

Function	Outline
Opener	Upon receiving an on signal from the power back door opener/closer switch or the power back door button on the key with the back door closed, the power back door ECU actuates the opener & closer motor and the power back door motor in order to release the latch of the back door lock and open the power back door.
Closer	Upon receiving an on signal from the power back door opener/closer switch, power back door closer switch with the back door open, or manually closing the back door to a predetermined position or the power back door button on the key, the power back door ECU actuates the power back door motor and the opener & closer motor in order to close the back door and engage the latch of the back door lock.
Jam Protection	Upon receiving the signals from a touch sensor and the Hall ICs of the power back door motor, the power back door ECU detects that an object is jammed in the back door, and reverses the movement of the power back door motor. The power back door buzzer sounds for 0.13 seconds twice when a jammed object is detected.
Reverse Control	During a power back door operation, if the power back door ECU detects an on signal from the power back door opener/closer switch or the power back door button on the key, the power back door ECU sounds the power back door buzzer for approximately 0.2 seconds and reverses the power back door motor in order to reverse the back door to a predetermined position.
Back Door Open/Close Speed Control	In accordance with the signals received from the Hall ICs, the power back door ECU effects the following controls: ● Reduces the closing speed from approximately 200 mm (7.9 in.) before the back door is fully closed, in order to reduce the jamming load. ● Reduces the opening speed from approximately 80 mm (3.1 in.) before the back door is fully open, in order to reduce the shock that occurs when it is fully open.
Others	● If the tail gate is open before an open operation of the power back door, the power back door will not perform an open operation. ● If the tail gate opens while the power back door is being open, the open operation of the power back door continues. ● If the tail gate is open before a close operation of the back door, the power back door will not perform a close operation. ● If the tail gate is open while the power back door is being closed, the close operation of the power back door stops, and performs an open operation.
Diagnosis	If the power back door ECU detects a malfunction in the power back door system, the power back door ECU diagnoses the failed section and stores the DTC (Diagnostic Trouble Code) in the main body ECU via the CAN. For details, refer to the Repair Manual.

(Continued)

Function	Outline
Fail-safe	● If the power back door ECU detects any of the malfunctions listed below during power back door operation, the power back door ECU stops the power back door motor and sounds the warning buzzer simultaneously, then turns off the magnetic clutch and stops the system. – Open circuit in the touch sensor – The power back door motor is operated continuously for 30 sec. or more. – Abnormal back door position signal (Hall IC signal) – Abnormality with position switches on back door with closer lock assembly. ● During a power back door operation, if the shift lever is shifted to a position other than P, the power back door ECU performs the aforementioned fail-safe operation.*

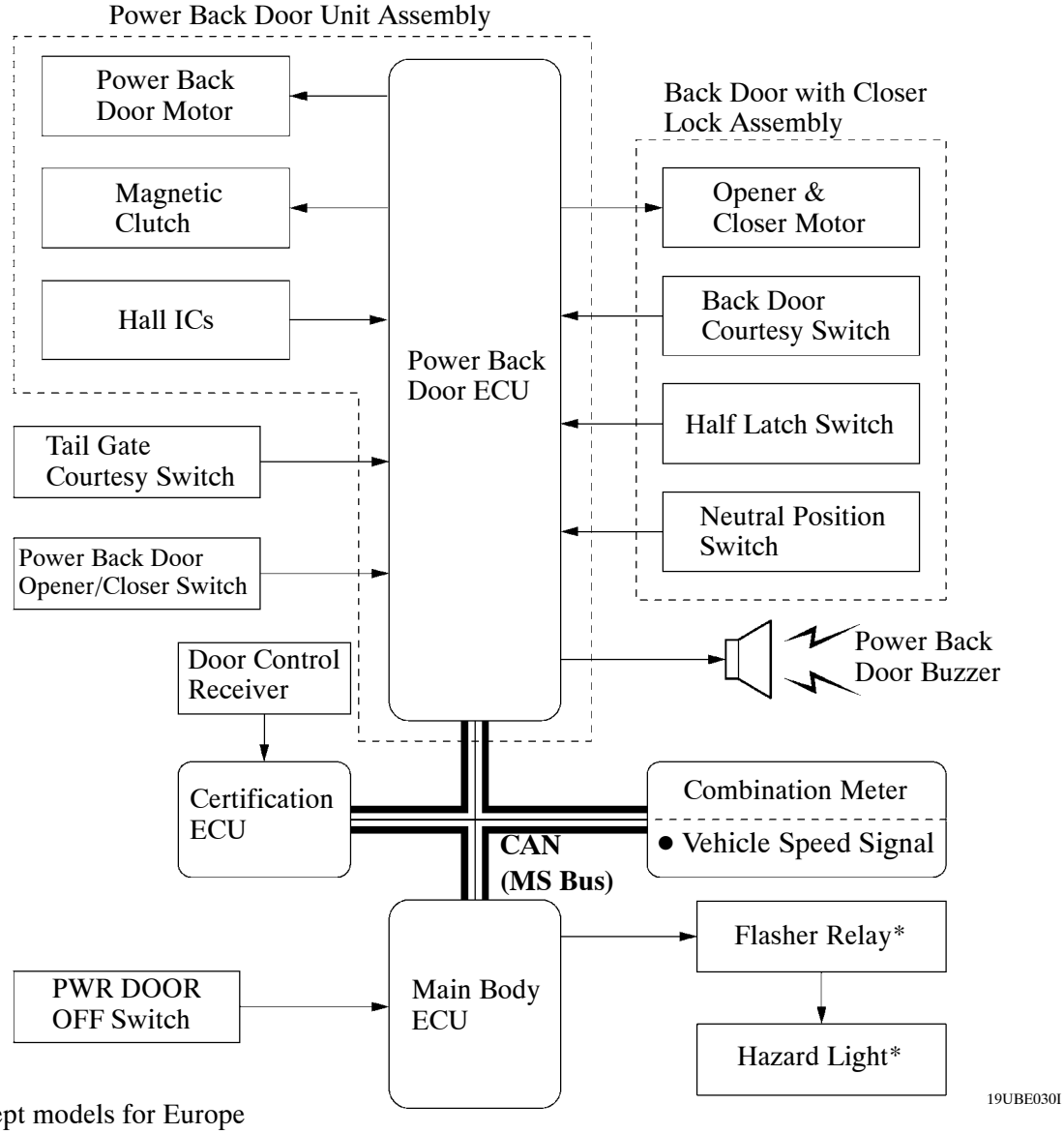
*: Only for the opener operation

2. Opener Function

The operation of the power back door opener function is described below.

1. The power back door opener/closer switch or the power back door button on the key is turned ON for 0.3 second or more with the back door and tail gate closed.
2. The buzzer sound for 0.8 seconds while the power back door button has been pressed for a certain time. The hazard lights will flash twice simultaneously with the start of the operation*.
3. The opener & closer motor operates to unlock the latch.
4. Through the state of the back door courtesy switch, the power back door ECU detects that the latch has been released, and actuates the power back door motor to start opening the back door.
5. Through the state of the half latch switch, the power back door ECU detects that the back door is open, and reverses the opener & closer motor to its initial position.
6. Through the state of the neutral position switch, the power back door ECU detects that the motor has reverted to its initial position. Then, it stops the opener & closer motor.
7. Through the Hall ICs of the power back door motor, the power back door ECU detects the back door position, and stops the power back door motor just before the back door is in its full open position, and turns OFF the magnetic clutch.

*: Except models for Europe



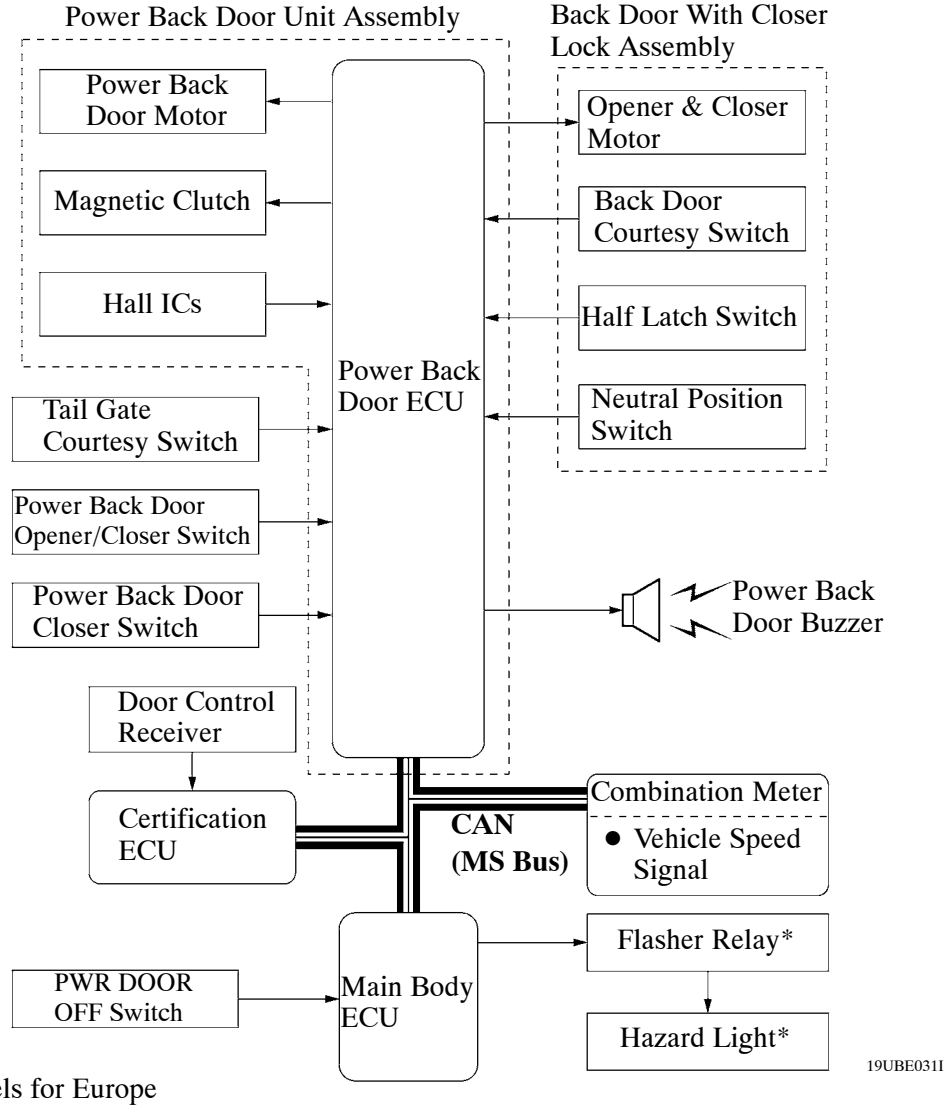
*: Except models for Europe

3. Closer Function

The operation of the power back door closer function is described below.

1. The power back door opener/closer switch, the power back door closer switch, or the power back door button on the transmitter is turned on for 0.3 second or more with the back door open and tail gate close, or the back door is manually closed to a predetermined position.
2. The buzzer sounds for 0.8 seconds while the power back door button has been pressed for a certain time. The hazard lights will flash twice simultaneously with the start of the operation.*
3. The power back door ECU actuates the power back door motor to start closing the back door.
4. Upon detecting that the latch is disengaged through the state of the half latch switch, the power back door ECU actuates the opener & closer motor to engage the latch.
5. Upon detecting that the back door has closed through the state of the back door courtesy switch, the power back door ECU stops the magnetic clutch and the power back door motor.
6. Upon detecting that the latch has been engaged through the state of the half latch switch (on → off), the power back door ECU operates the opener & closer motor forward in order to fully close the power back door.
7. If the power back door ECU detects that the half latch switch has been turned on again after the back door has fully closed, it stops the opener & closer motor. Then, it operates the opener & closer motor in reverse in order to return the sector gear to its initial position, until the neutral position switch turns on.

*: Except models for Europe

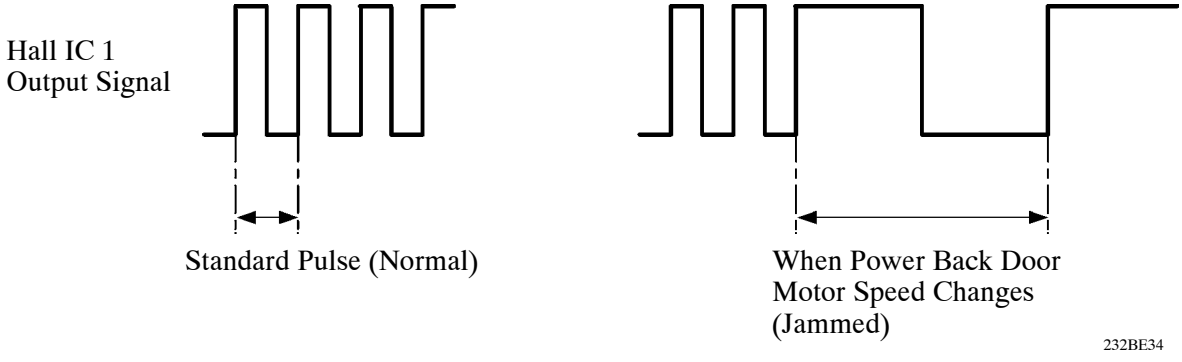


*: Except models for Europe

4. Jam Protection Function

- The power back door ECU determines the jamming of the back door upon receiving the signals from a touch sensor and the Hall ICs of the power back door motor.
- The power back door ECU determines the back door movement amount and the back door opening/closing speed (back door foreign object jamming) from the pulse signals from the Hall IC of the power back door motor, and the back door position (back door movement direction) from the phase difference between the pulses from Hall IC 1 and Hall IC 2 of the power back door motor.
- If a foreign object has been jammed during opening or closing of the power back door, the pulse width of the output signal from Hall IC of the back door motor changes. The power back door ECU judges this change in pulse width as jamming, reversing the power back door motor.
- If jamming is detected again during this reversal operation, the power back door ECU again reverses the power back door motor. However, if jamming is detected during the second closing operation or more, the power back door ECU turns off the magnetic clutch of the power back door motor, then sounds the power back door buzzer and stops power back door system operation. After the system is stopped, power back door system operation is restored by fully closing the back door manually.
- If either of the touch sensors located on each side of the back door is compressed by a jammed foreign object while the back door is closing, the resistance of the sensor changes. The power back door ECU judges this resistance change as jamming, and reverses the power back door motor.

▶ Judgment of Amount of Movement and Opening/Closing Speed ◀



▶ Judgment of Back Door Moving Direction ◀

