

■ POWER WINDOW SYSTEM

1. General

The power window system has the following functions:

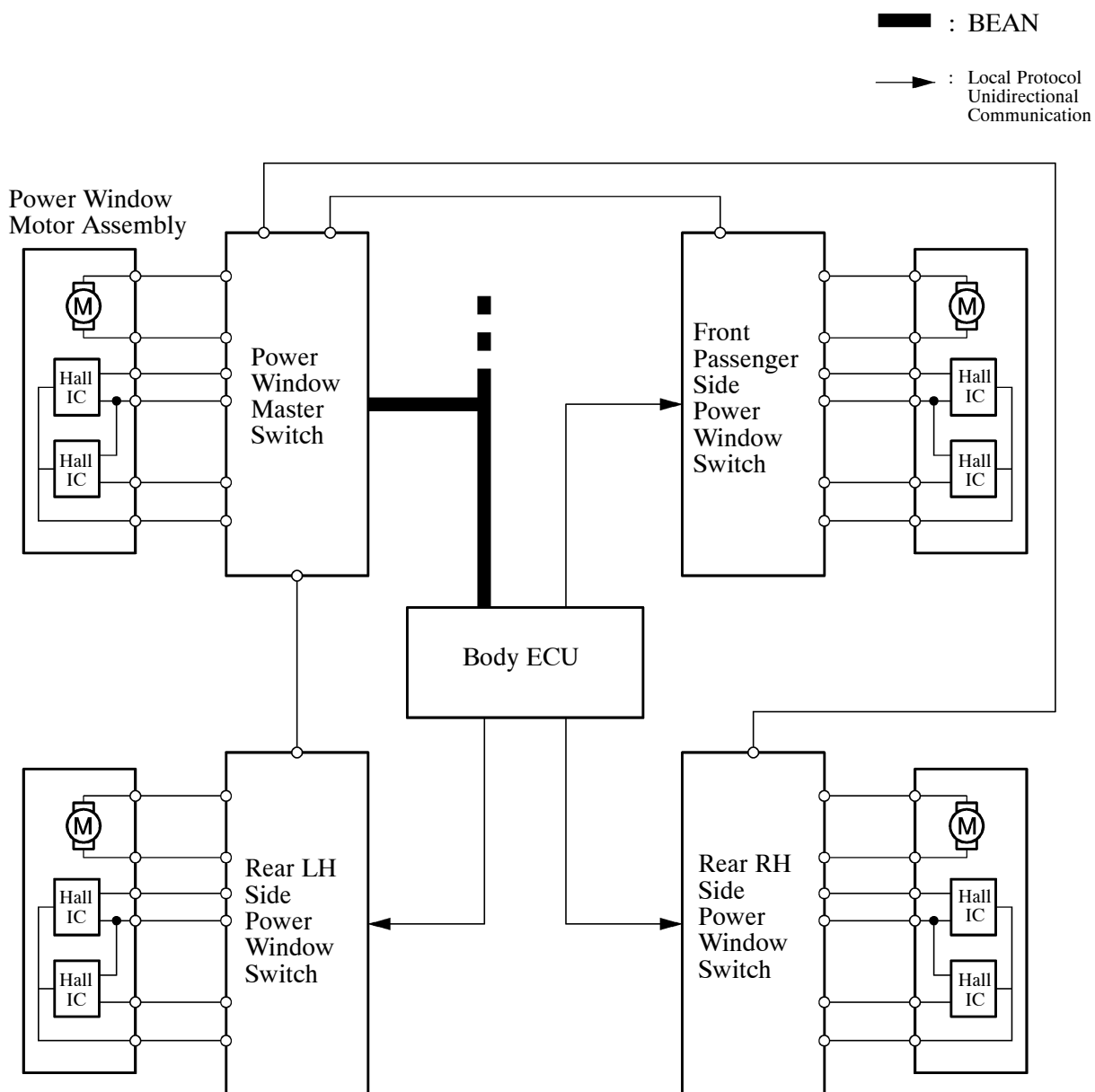
Function	Outline
Manual up-and-down function	This function causes the window to open or close while the power window switch is being pulled halfway up or pushed halfway down. The window stops as soon as the switch is released.
All door one-touch auto up-and-down function* ¹	The all door one-touch auto up-and-down function enables the window of all doors to be fully opened or closed at a touch of the power window switch.
Driver's door one-touch auto down function* ²	The driver's door one-touch auto down function enables the window of driver door to be fully opened at a touch of the power window switch.
Jam protection function* ¹	A jam protection function automatically stops the power window and moves it downward if a foreign object gets jammed in the driver's door window during one-touch auto-up operation.
Remote control function	The up-and-down operations of the front passenger door window and the rear door windows can be controlled by operating the power window master switch.
Key-off operation function* ¹	The driver's door key-off operation function makes it possible to operate the power window for approximately 45 seconds after the ignition switch is turned to the ACC or LOCK position, if the driver's door is not opened.
Diagnosis* ¹	When the power window master switch detects a malfunction in the power window system, the power window master switch makes a diagnosis the failed section. Furthermore, the power window master switch illumination illuminates or blinks to inform the driver. For details, refer to Land Cruiser/Land Cruiser Prado Repair Manual (Pub. No. RM990E).
Fail-Safe* ¹	If the pulse sensor in the power window motor malfunctions, the power window functions will be prohibited for the fail-safe: <ul style="list-style-type: none"> • All door one-touch auto up-and-down function and the remote control function are prohibited. • The manual operation is possible by each power window switch.

*¹: except General Countries Models

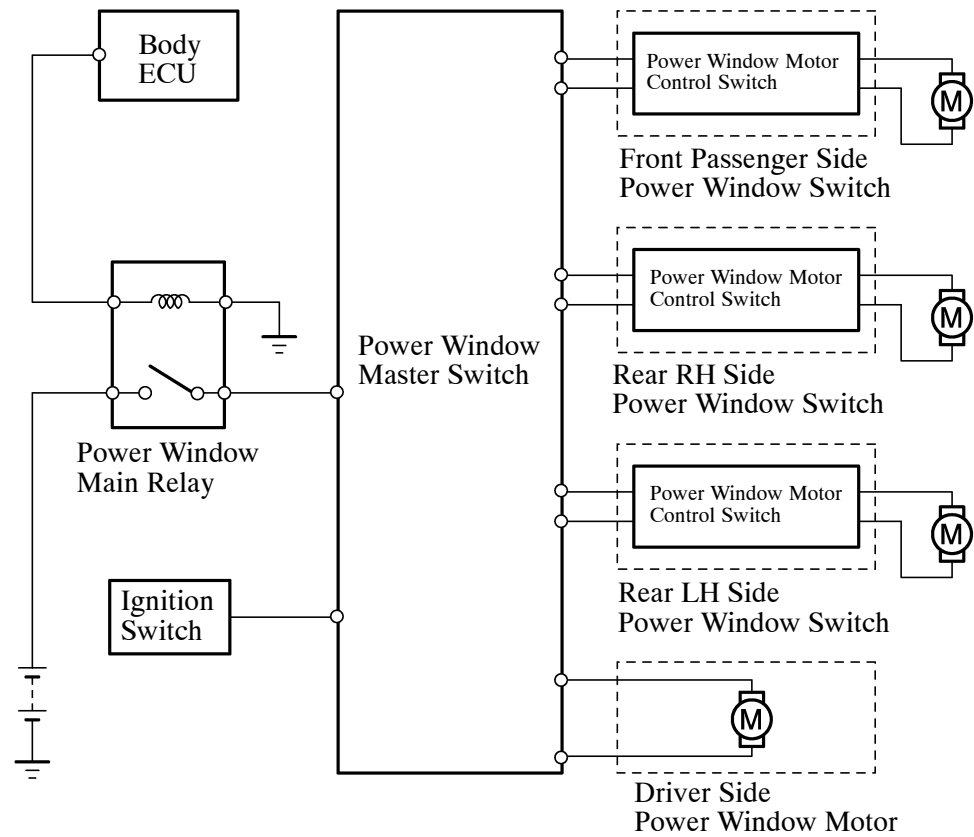
*²: Only for General Countries Models

2. System Diagram

► for Europe, Australia and G.C.C. Countries Models ◀

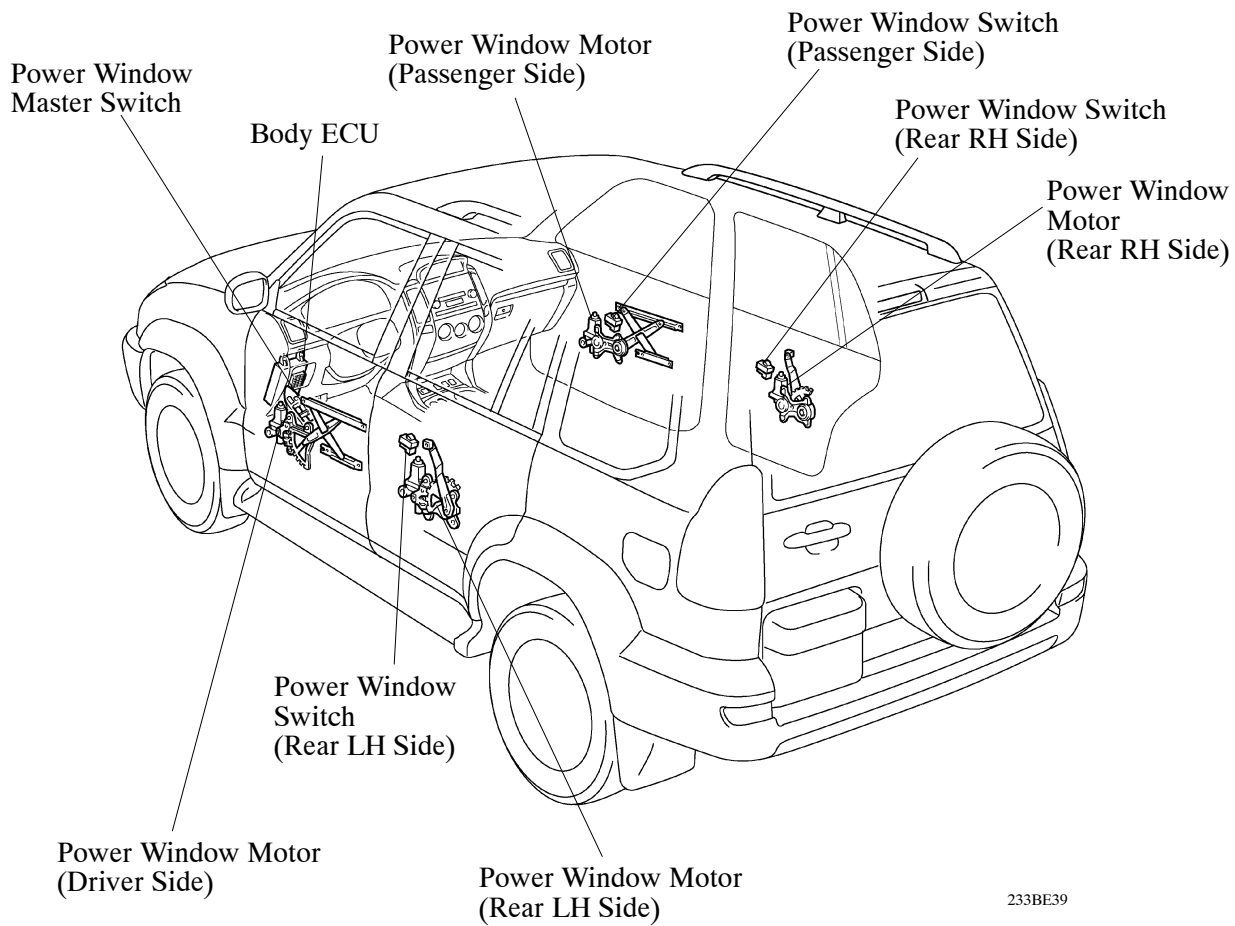


► for General Countries Models ◀



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3. Layout of Main Component



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4. Jam Protection Function

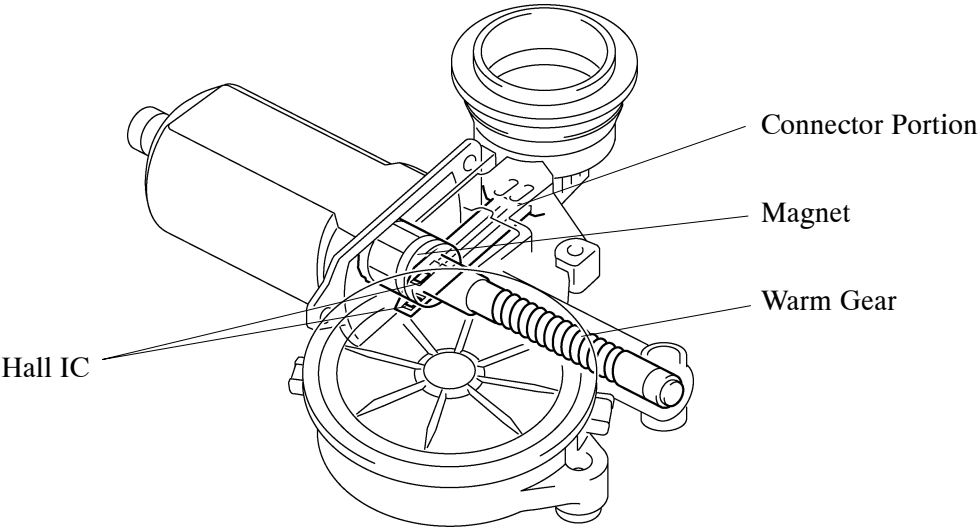
General

- A jam protection function automatically stops the power window and moves it downward if a foreign object gets jammed in the door window during one-touch auto-up operation.
- On the previous model, the jamming of the driver's door power window was detected by the limit switch and pulse sensor (Hall IC). On the new model, this has been changed to the two pulse sensors that are integrated in the driver's power window motor.
- The activation of the jam protection function is described below.

Door Window Position from Full Close	Operation of Jam Protection Function
200 mm (7.87 in.) or more	Down operation of 50 mm (1.97 in.) or 1 sec.
200 mm (7.87 in.) or less	Down operation until door window opening of 200 mm (7.87 in.) is reached or 5 sec.

Jammed Window Detection Mechanism

- The jammed window detection mechanism consists of a magnet that is provided on the worm gear of the power window motor assembly and the two Hall IC that are provided on the connector.

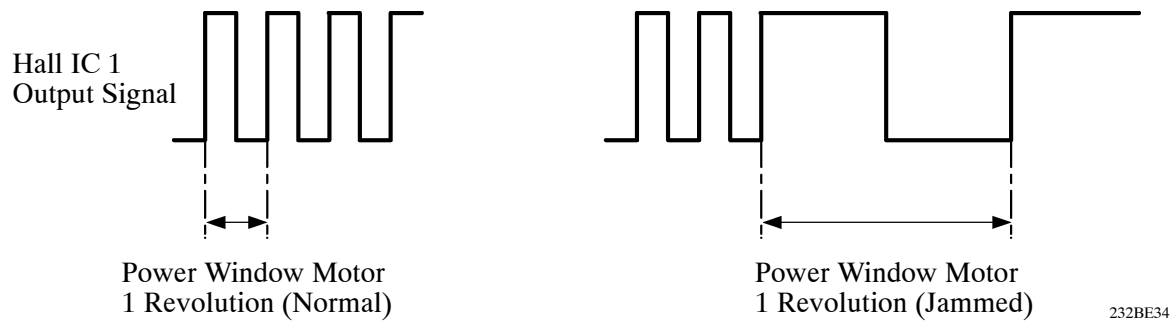


Power Window Motor Assembly

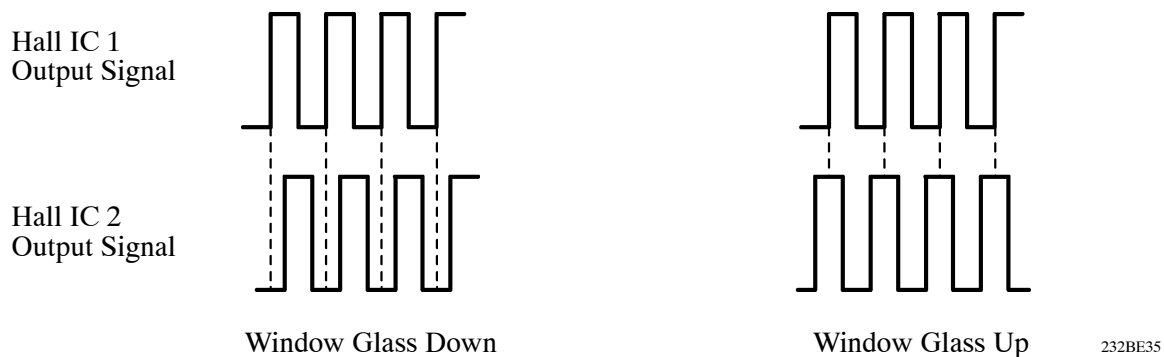
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- The Hall IC converts the changes in the magnetic flux that occur through the rotation of the worm gear into pulse signals and outputs them to the power window master switch/power window switch.
- To control the jam protection function, the power window master switch/power window switch determines the amount of movement and the jamming of the window glass from the pulse signals from the Hall IC1; and the moving direction of the window glass from the phase difference between the pulses from the Hall IC1 and Hall IC2.

► Judgment of Amount of Movement and Jamming of Window Glass ◀



► Judgment of Window Glass Moving Direction ◀



Service Tip

The power window master switch and each power window switch memorize the initial position of the each door window. This data will be lost if a battery terminal, fuse, or each power window switch is disconnected, allowing only a manual operation. Therefore, after reconnecting the battery terminal, fuse, or each power window switch initialize the system by performing the steps described below.

- (1) Open the door window a minimum of 1/4.
- (2) Press and hold the power window switch UP. By keeping the switch pressed UP for approximately 1 second after the door window is fully closed, the power window master switch memorizes the initial position of the door window.

For details, refer to Land Cruiser/Land Cruiser Prado Repair Manual (Pub. No. RM990E).