

POWER WINDOW SYSTEM

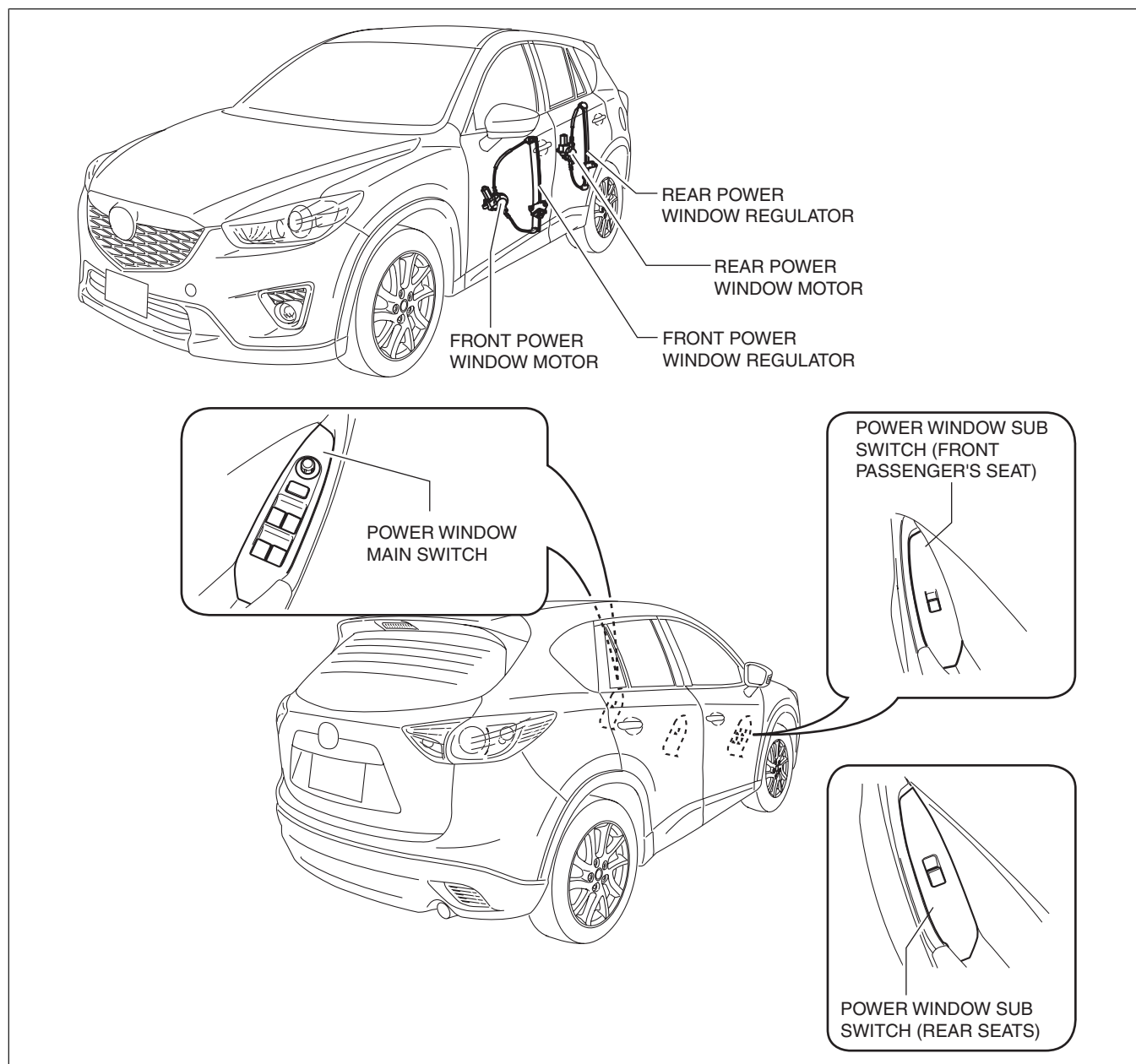
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Outline

- A power window system that enables automatic opening/closing of the door glass has been adopted.
- The driver's side door glass can be opened/closed automatically or manually by operating the power window main switch.
- All the door glass can be opened/closed automatically or manually by operating the power window main switch and the power window sub switches.

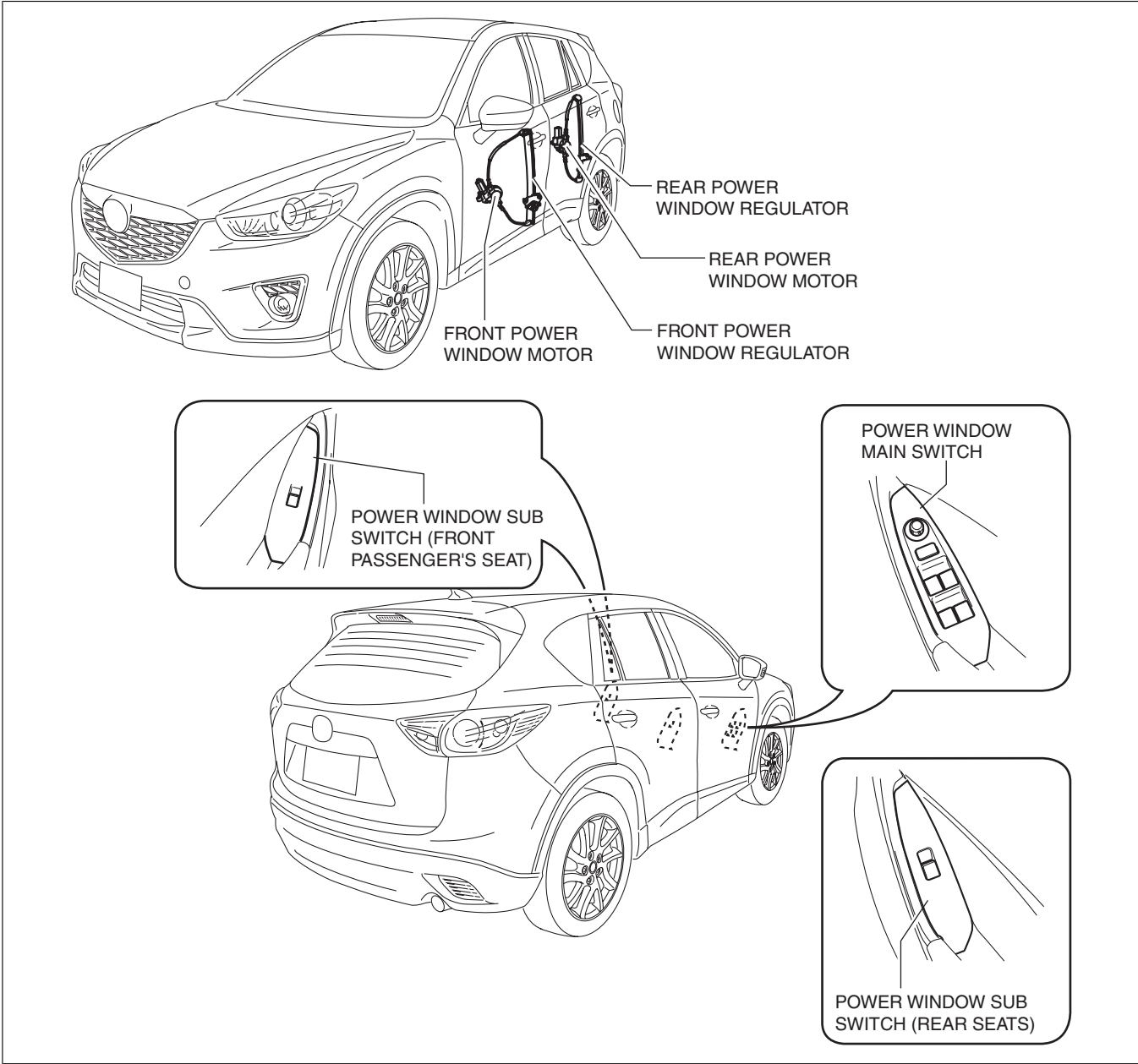
Structural view

L.H.D.

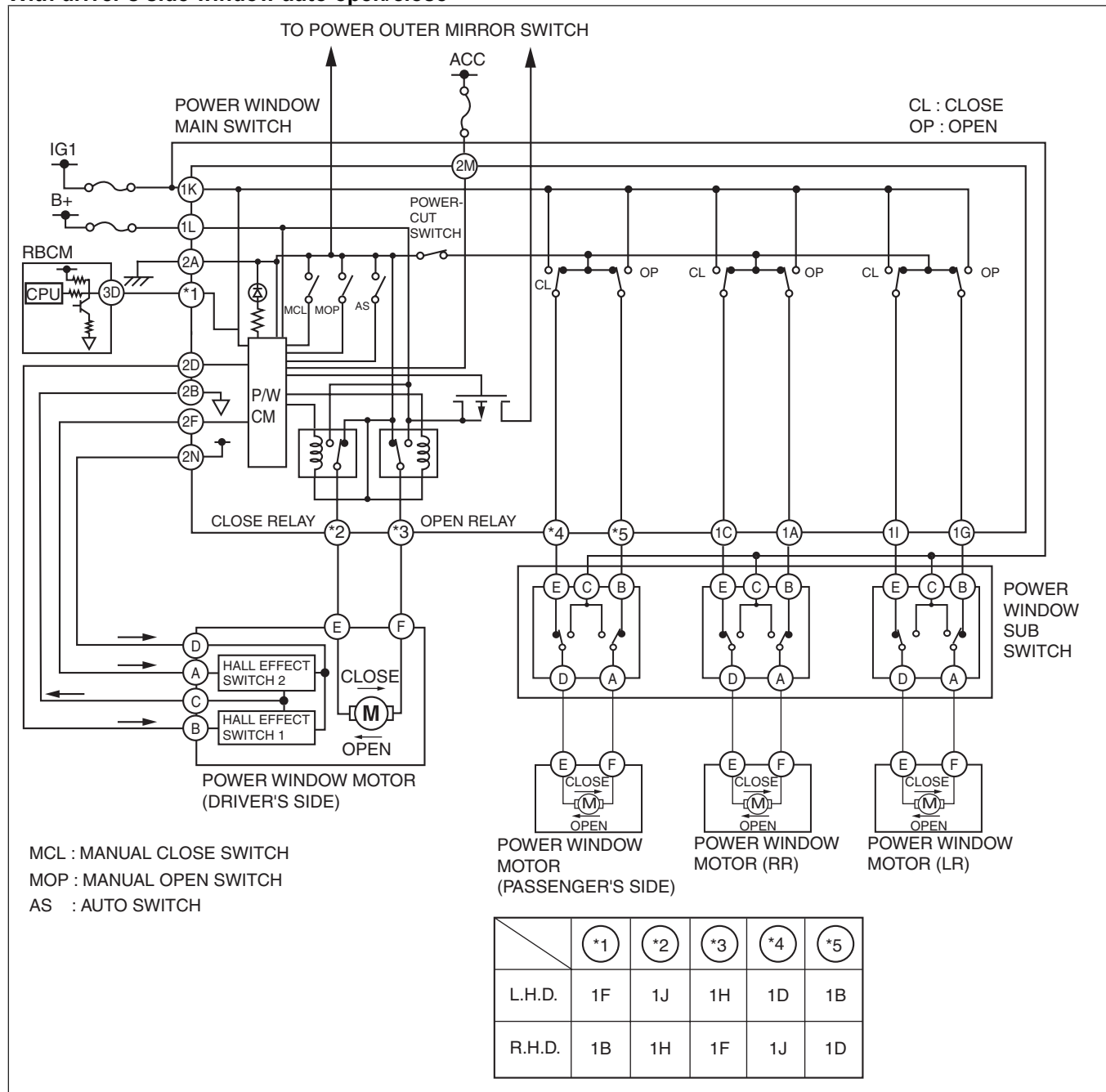


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R.H.D.

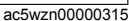
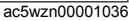


System wiring diagram With driver's side window auto open/close



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With all window auto open/close



Function

Driver's seat

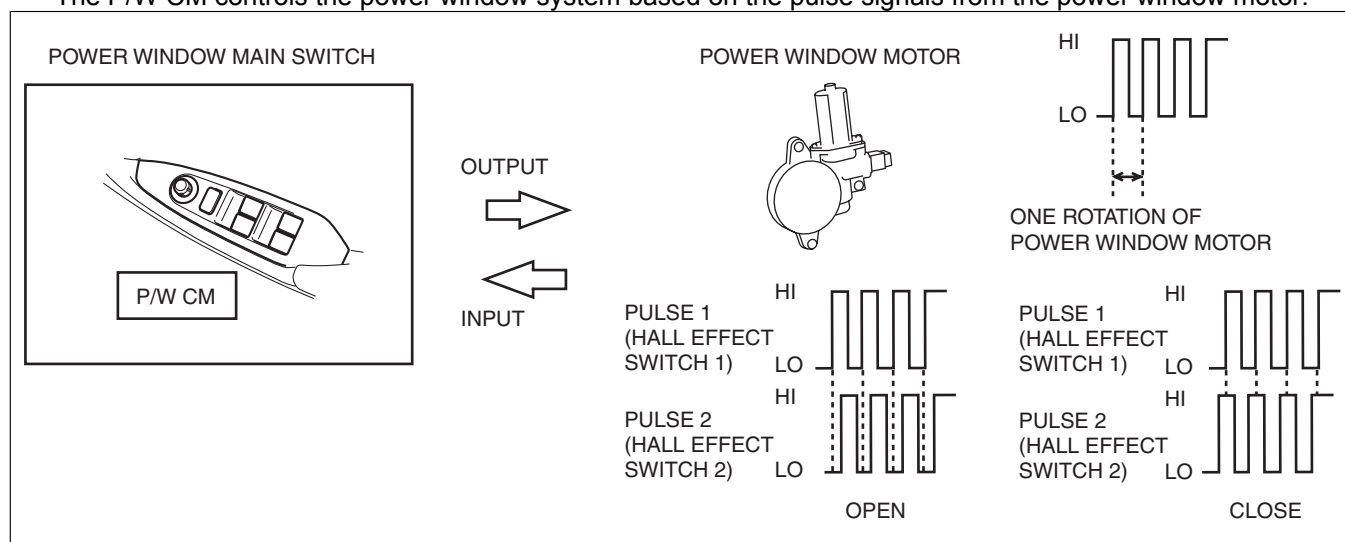
- Manual Open/Close
 - When the power window main switch is operated using the manual operation, the door glass opens/closes manually.
- Auto Open/Close
 - When the power window main switch is operated using the auto operation, the door glass opens/closes automatically.
- Power Window System Initial Setting
 - Records the position of the driver's side door glass.
- Auto Reverse Pinch Protection Function
 - If an obstruction by a foreign object is detected during the auto close operation, the operation changes from close to open.
- IG OFF Timer Function
 - The driver's side power window can be operated using the power window main switch for **approx. 40 s** after the ignition is switched from ON (engine on or off) to ACC or OFF.
- IG OFF timer cancel
 - The IG OFF timer is canceled when **approx. 40 s** or more have elapsed since the ignition was switched to ACC or OFF or any door is opened during IG OFF timer operation.

Front passenger's seat and rear seats

- Manual Open/Close
 - When the power window main switch or power window subswitches is operated using the manual operation, the door glass opens/closes manually.
- Auto Open/Close (With all window auto open/close)
 - When the power window main switch or power window subswitches is operated using the auto operation, the door glass opens/closes automatically.
- IG OFF Timer Function
 - The front passenger's seat and rear seats power window can be operated using the power window subswitches for **approx. 40 s** after the ignition is switched from ON (engine on or off) to ACC or OFF.
- IG OFF timer cancel
 - The IG OFF timer is canceled when **approx. 40 s** or more have elapsed since the ignition was switched to ACC or OFF or any door is opened during IG OFF timer operation.

Construction

- A P/W CM is integrated in the power window main switch.
- The P/W CM controls the power window system based on the pulse signals from the power window motor.



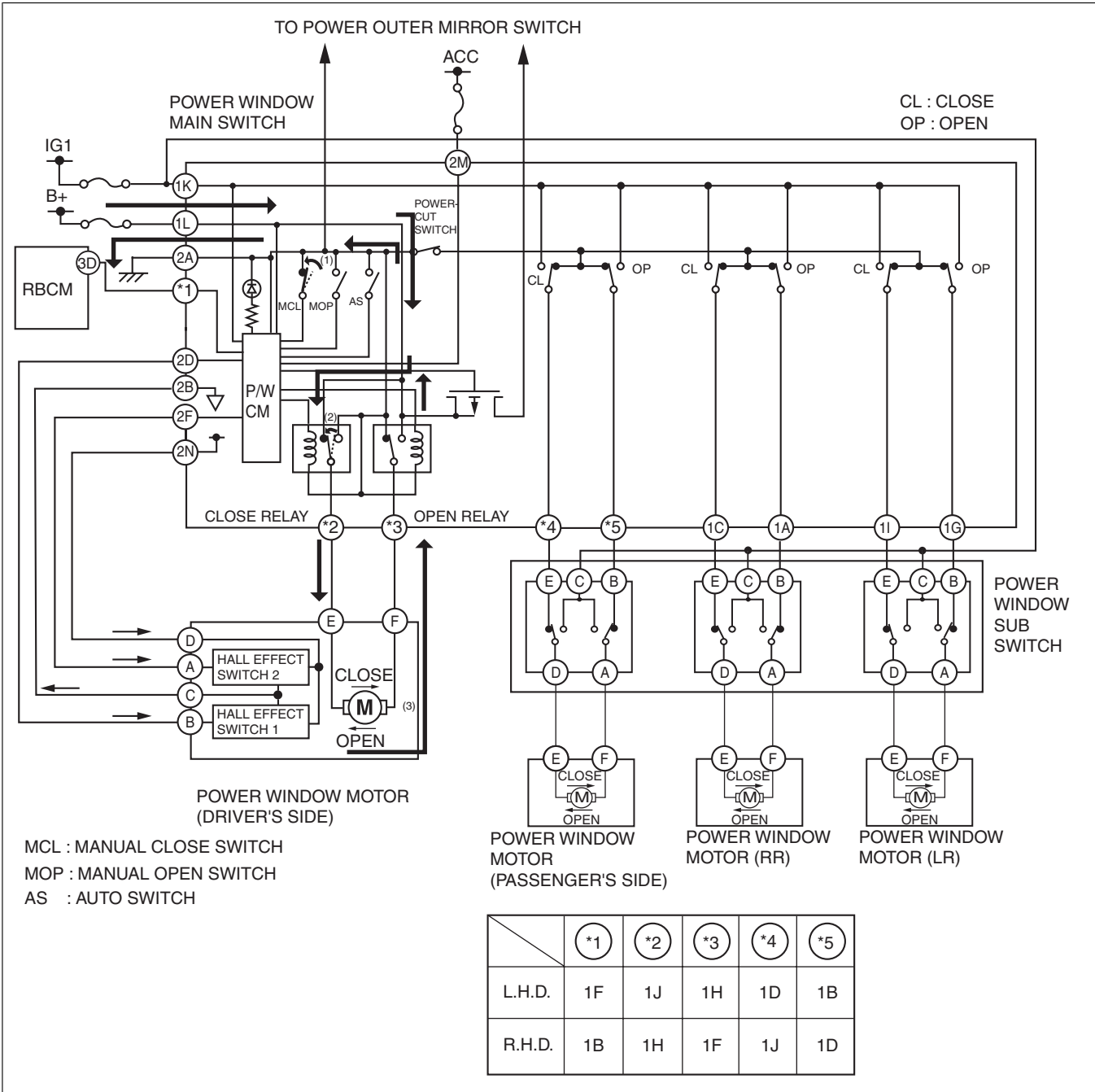
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Operation

Driver's side manual open/close operation (Example: close operation)

1. When the power window main switch is operated for manual close operation, the P/W CM receives a manual close signal. (1)
2. When the P/W CM receives a manual close signal, it turns on the close relay. (2)
3. When the close relay is turned on, the power window motor (RF) starts manual close operation. (3)

With driver's side window auto open/close

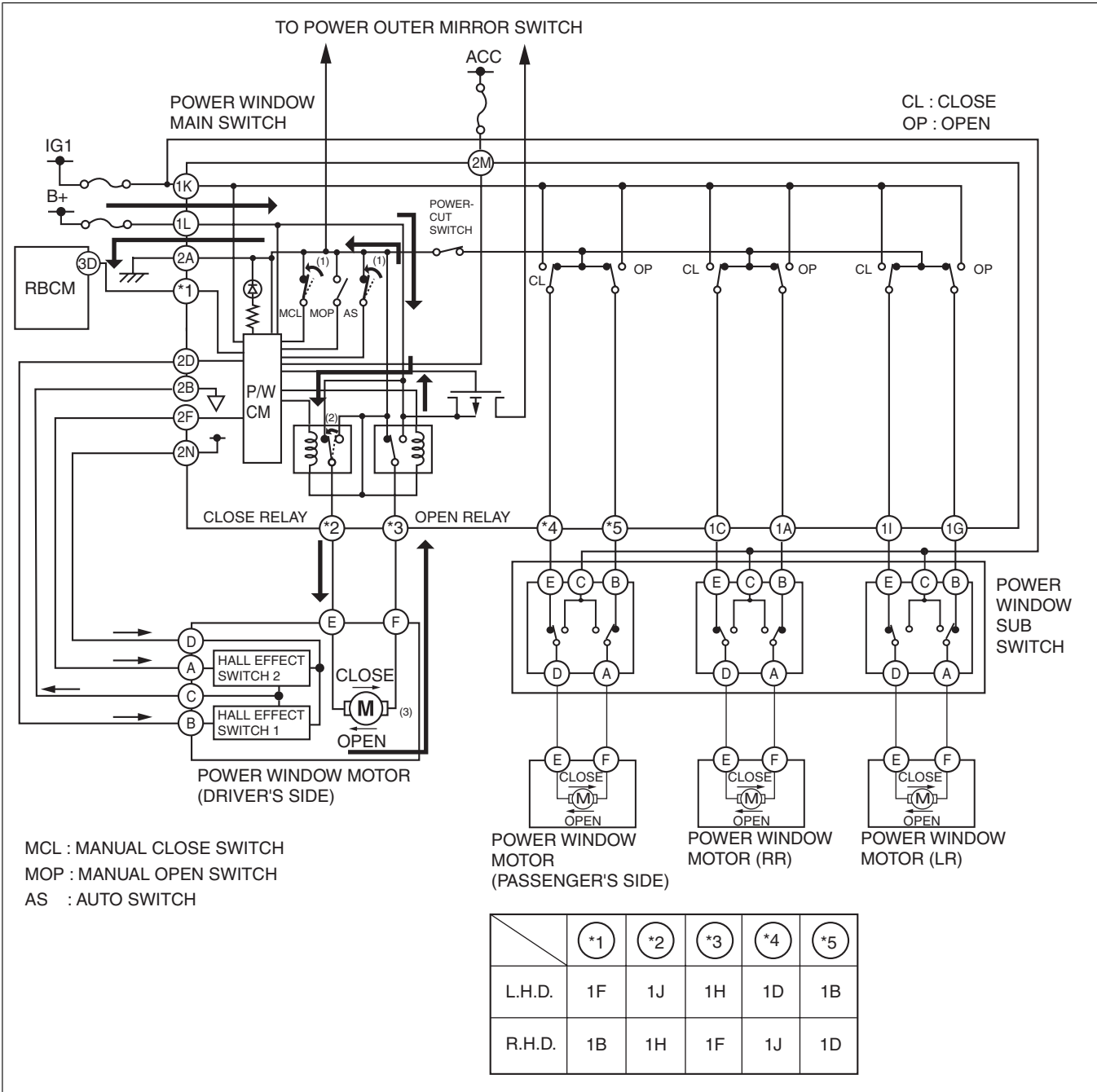


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1. When the power window main switch is operated for auto close operation, the P/W CM receives an auto close signal. (1)
2. When the P/W CM receives an auto close signal, it turns on the close relay. (2)
3. When the close relay is turned on, the power window motor (RF) starts auto close operation.(3)

With driver's side window auto open/close



ACC TO POWER OUTER MIRROR SWITCH

TO POWER WINDOW SUB SWITCH

POWER WINDOW MAIN SWITCH

IG1

B+

1G

1B

1K

3D

RBCM

1E

2F

1I

2D

1A

P/W CM

CLOSE (1)

OPEN (1)

AUTO (1)

CLOSE (2)

OPEN (2)

AUTO (2)

CLOSE (3)

OPEN (3)

AUTO (3)

POWER-CUT SWITCH

1L

CLOSE RELAY

OPEN RELAY

1F

1D

POWER WINDOW MOTOR (DRIVER'S SIDE)

D

B

C

A

*1

*2

E

F

CLOSE

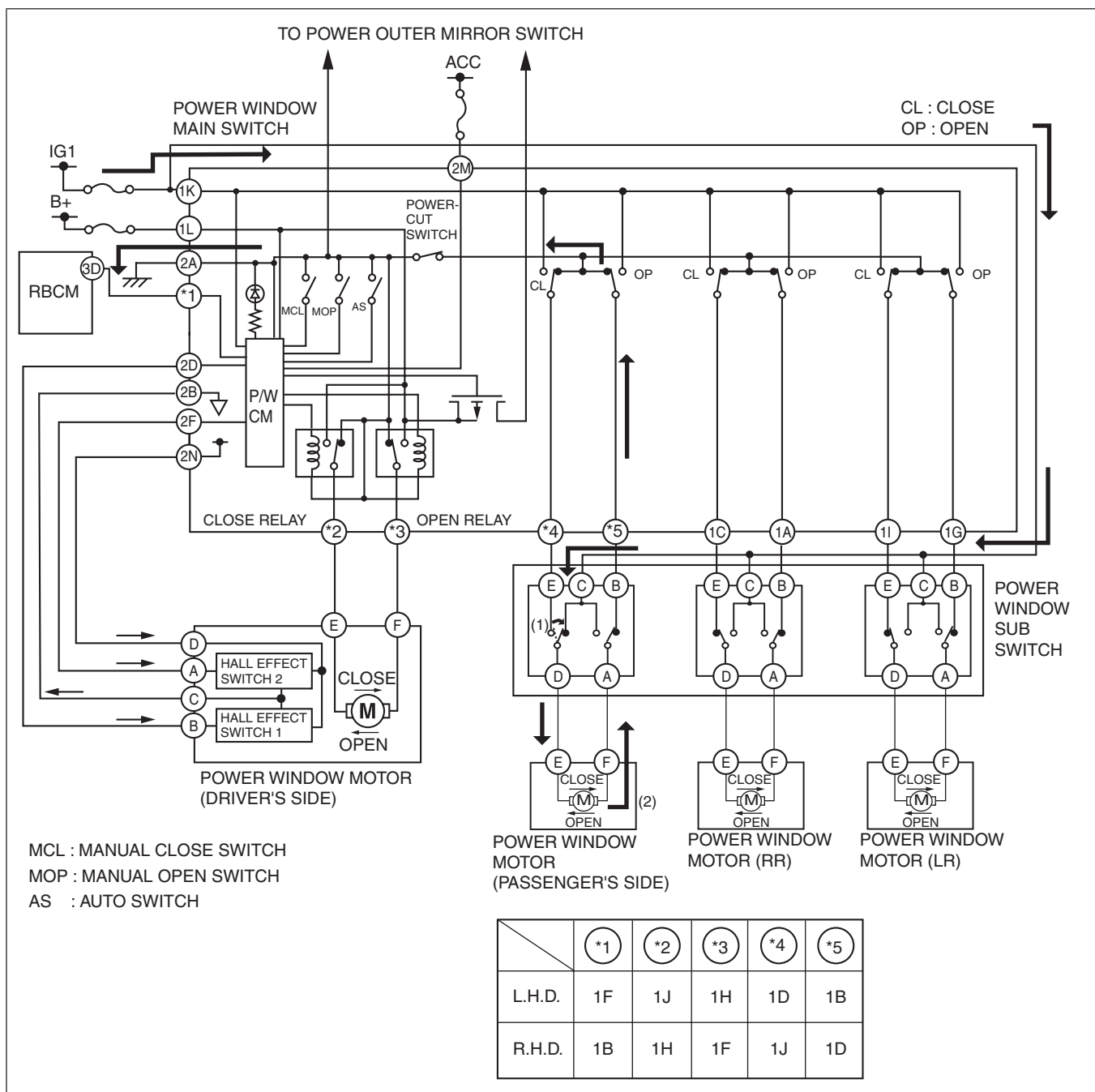
OPEN

(3)

*1: HALL EFFECT SWITCH 1
*2: HALL EFFECT SWITCH 2

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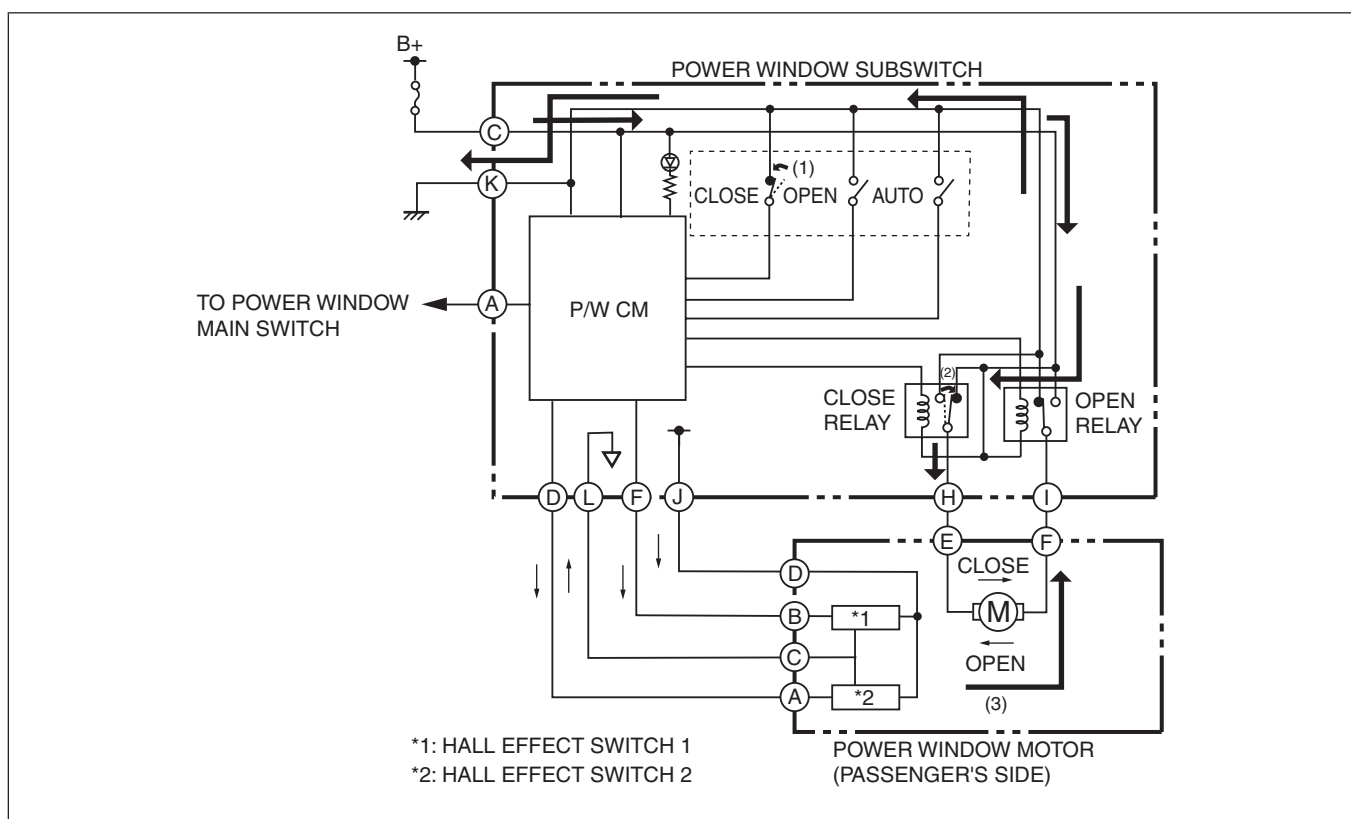
1. When the power window subswitch is operated for manual close operation, the power window motor (LF) starts manual close operation.(2)



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Passenger's side and rear side manual open/close operation (With all window auto open/close) (Example: Passenger's side close operation)

1. When the power window subswitch is operated for manual close operation, the power window motor (LF) starts manual close operation.(2)
2. When the P/W CM receives a manual close signal, it turns on the close relay. (2)
3. When the close relay is turned on, the power window motor (RF) starts manual close operation.(3)



Power Window System Initial Setting

1. The P/W CM records the driver's side door glass position when the switch is pulled and held **approx. 2 s** after the driver's side door glass is fully closed from the fully opened position with the ignition is switched ON (engine off or on).
 - Performing the following procedures will reset the initial setting and disables auto operation. Re-perform the initial setting.
 - Negative battery cable is disconnected
 - Power window main switch connector is disconnected
 - Power window system power supply fuse is removed

Auto Reverse Pinch Protection

1. When the P/W CM detects a change in the pulse signal from the power window motor for **0.3 s or more** during the auto close operation, it reverses the power window motor and the door glass opens **approx. 200 mm {7.87 in}** automatically.

IG OFF Timer (Example: Manual close operation)

1. When the ignition is switched from ON (engine off or on) to ACC or OFF, the IG OFF timer function of the P/W CM is turned on and the power window main switch can be operated for **approx. 40 s** after IG OFF is detected.
2. When the power window main switch is operated for manual close operation while the IG OFF timer is on, the P/W CM receives a manual close signal.(1)
3. When the P/W CM receives a manual close signal, it turns on the close relay. (2)
4. When the close relay is turned on, the power window motor (RF) starts manual close operation.(3)
5. The P/W CM turns off the IG OFF timer function when **approx. 40 s** has elapsed since IG OFF is detected.

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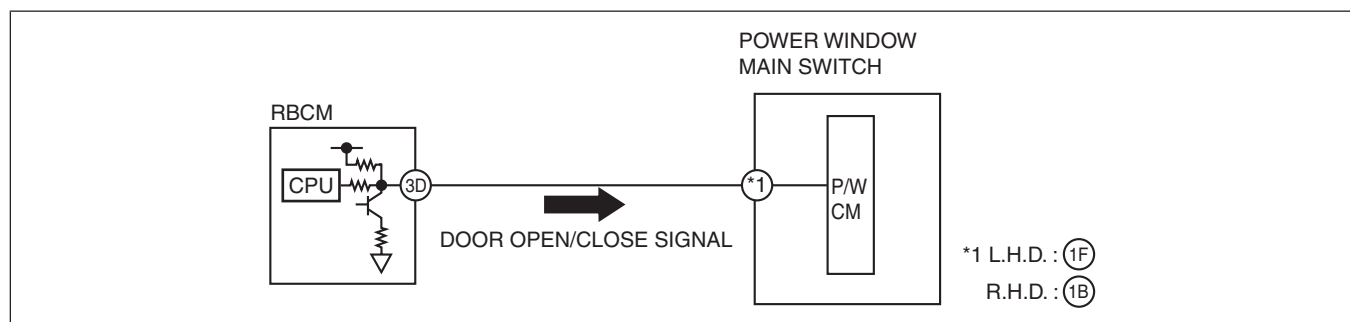
The diagram illustrates the electrical circuit for the driver's side power window. Key components include:

- Power Source:** ACC (Accessory) and B+ (Battery Positive) terminals.
- Switches:** POWER WINDOW MAIN SWITCH, POWER-CUT SWITCH, and a series of individual window switches (CLOSE, OPEN, AUTO) for multiple windows.
- Relays:** CLOSE RELAY and OPEN RELAY, which control the motor's direction.
- Motor:** POWER WINDOW MOTOR (DRIVER'S SIDE), which is controlled by the relays and hall effect switches (*1 and *2).
- Wiring:** The diagram shows the flow of current from the battery through the switches and relays to the motor, with various ground connections and signal lines.

Legend:

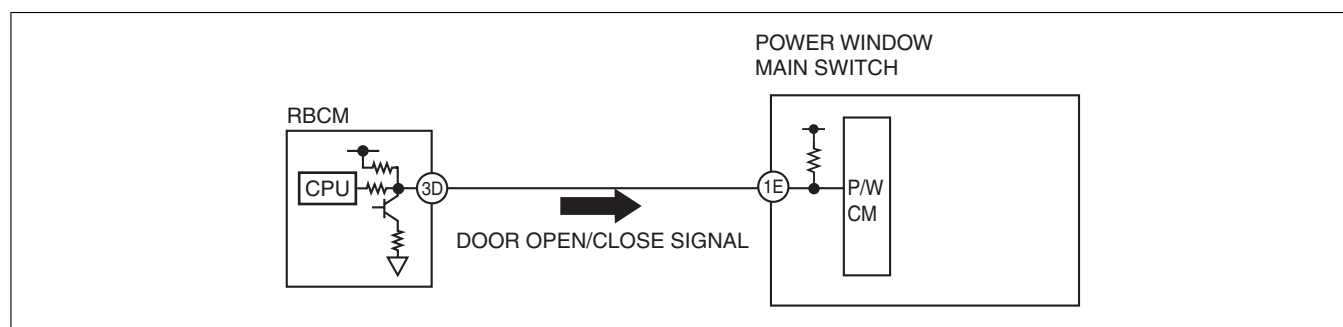
- *1: HALL EFFECT SWITCH 1
- *2: HALL EFFECT SWITCH 2

With driver's side window auto open/close



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With all window auto open/close



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Fail-safe

- When the P/W CM detects an error in the pulse signal (Hall effect switch), it switches the power window system to fail-safe mode to prevent incorrect operation.

Malfunction condition	Ignition is switched ON (engine on or off)	Ignition switched OFF	Recovery condition
P/W CM detected pulse 1 error (for pinching and door glass position detection) stop malfunction	Auto operation is prohibited (Manual operation is enabled) Operation of power window main switch except for the driver's seat is prohibited	Auto and manual operations are prohibited	Pulse signals 1 and 2 detected normally during close operation, and re-detection of fully-closed position return/non-return ranges
• Pulse 2 detected but pulse 1 is not detected during close or open operation			
P/W CM detected pulse 2 error (for door glass direction detection) stop malfunction			
• Pulse 1 detected but pulse 2 is not detected during close or open operation			
P/W CM detected pulse signal error (inversion of pulse 1 and pulse 2 input signals or large phase deviation between pulses 1 and 2)			
• Difference detected between the direction detected by the signals of pulses 1 and 2, and the actual direction during close or open operation			
P/W CM detected pulse 1 error (Non-return range lowering malfunction)			
• During close operation, a pulse 1 signal from the power window motor is detected more than the number of set times even after the window reaches the fully-closed position recorded by the power window main switch.			
P/W CM detected pulse 1 and 2 stop malfunction			
• Pulse signals 1 and 2 are not detected for 1 s after the open operation is started from the fully closed position			