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2020.0 DEFENDER (LE), 501-11

GLASS, FRAMES AND MECHANISMS (G2342572)

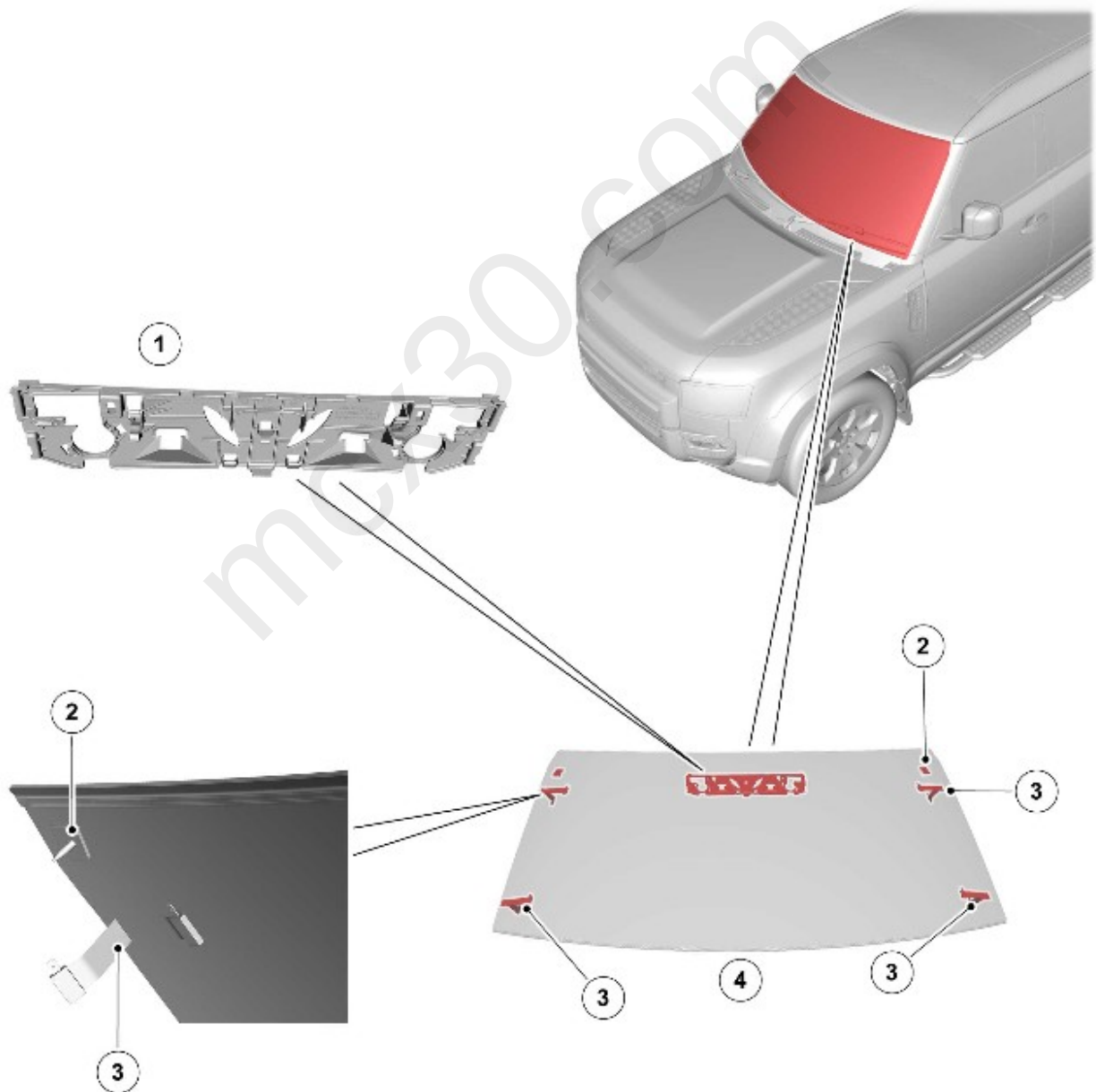
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COMPONENT LOCATION

COMPONENT LOCATION - 1 OF 6 - WINDSHIELD

 NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- The windshield is serviceable as whole assembly only.



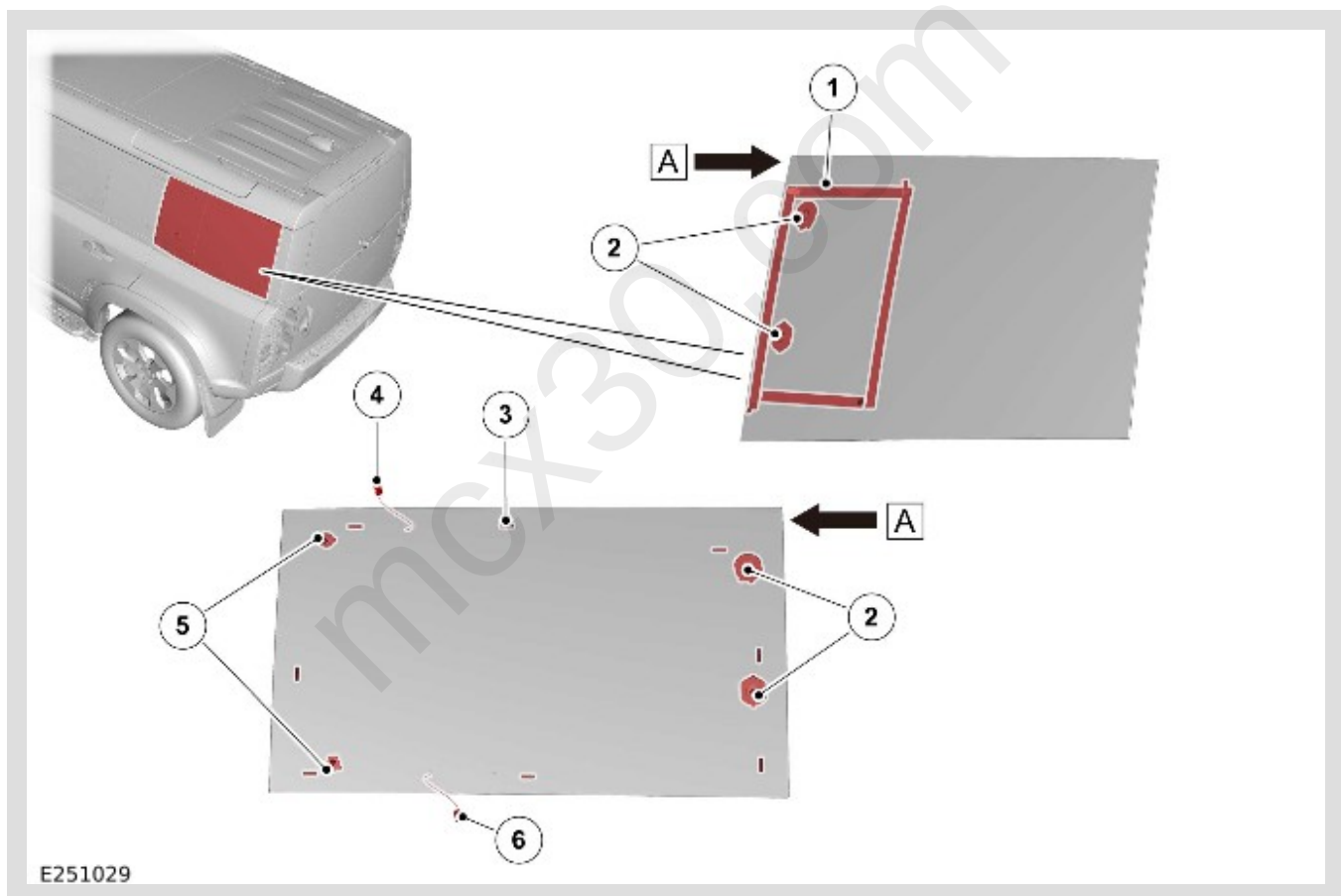
ITEM	DESCRIPTION
1	Bracket - Image Processing Module (IPMA)
2	Locator pin (quantity 2)
3	Windshield heater element connector (if equipped) (quantity 4)
4	Windshield

COMPONENT LOCATION - 2 OF 6 - REAR LEFT QUARTER WINDOW



NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- The rear left quarter window is serviceable as whole assembly only.



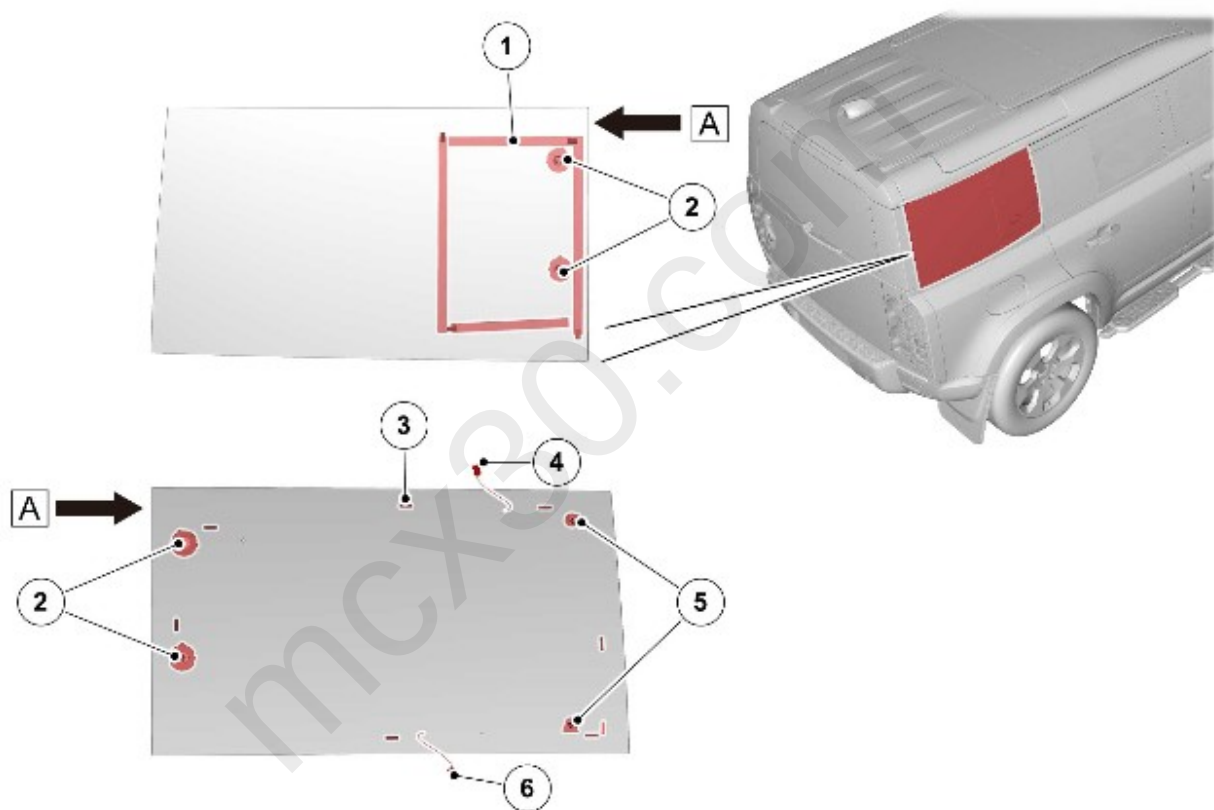
ITEM	DESCRIPTION
A	Front
1	Double-side tape (if equipped)
2	Locator pin (quantity 2)
3	Spacer (quantity 8)

ITEM	DESCRIPTION
4	Antenna fly-lead - Amplitude Modulation/Frequency Modulation (AM/FM)
5	Locator pin (quantity 2)
6	Antenna fly-lead - Digital radio (if equipped)

COMPONENT LOCATION - 3 OF 6 - REAR RIGHT QUARTER WINDOW

NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- The rear right quarter window is serviceable as whole assembly only.



E251030

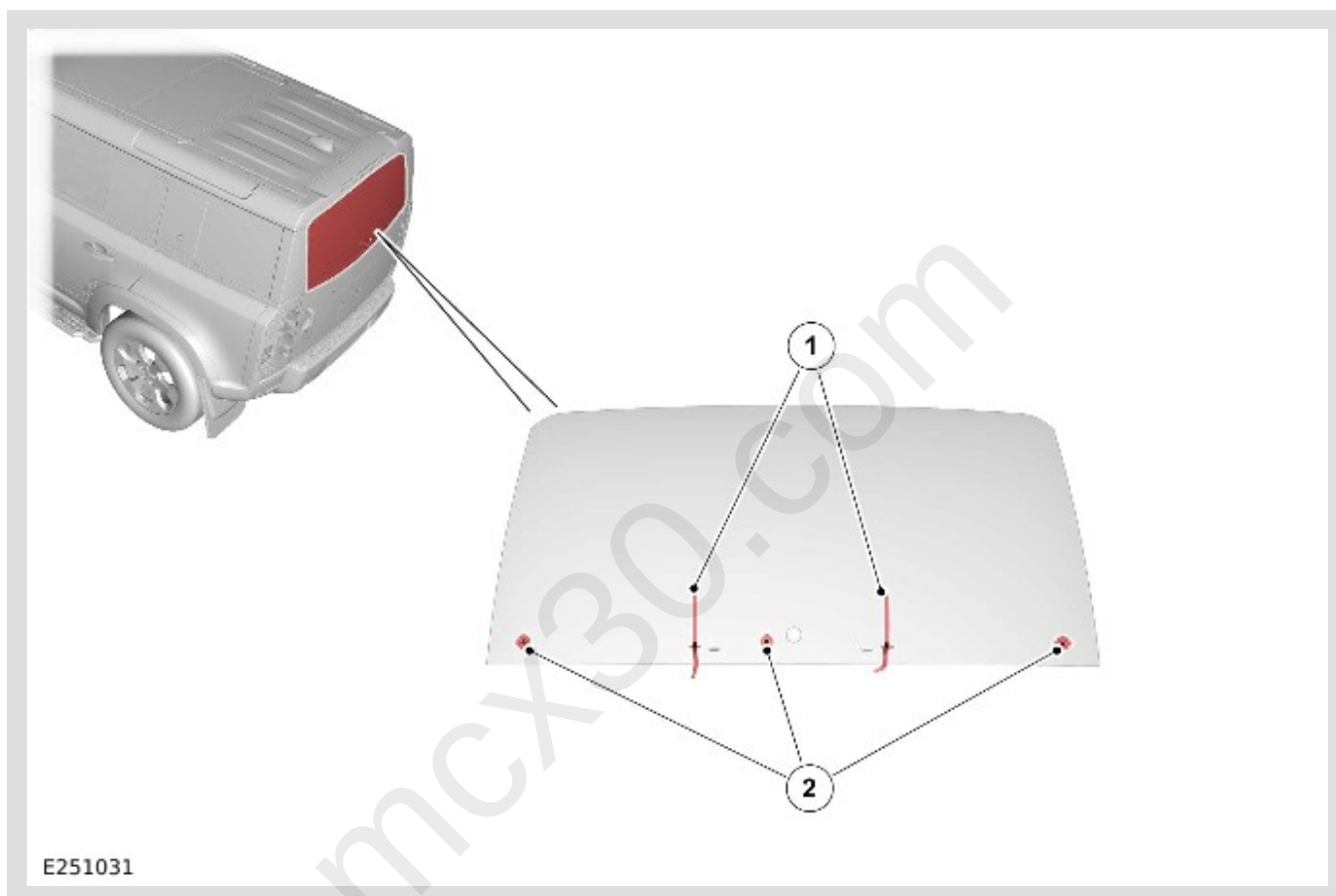
ITEM	DESCRIPTION
A	Front
1	Double-side tape (if equipped)
2	Locator pin (quantity 2)
3	Spacer (quantity 8)
4	Antenna fly-lead - FM/digital radio (if equipped) or FM
5	Locator pin (quantity 2)

ITEM	DESCRIPTION
6	Antenna fly-lead - Telestart (if equipped)

COMPONENT LOCATION - 4 OF 6 - REAR WINDOW

NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- The rear window is serviceable as whole assembly only.

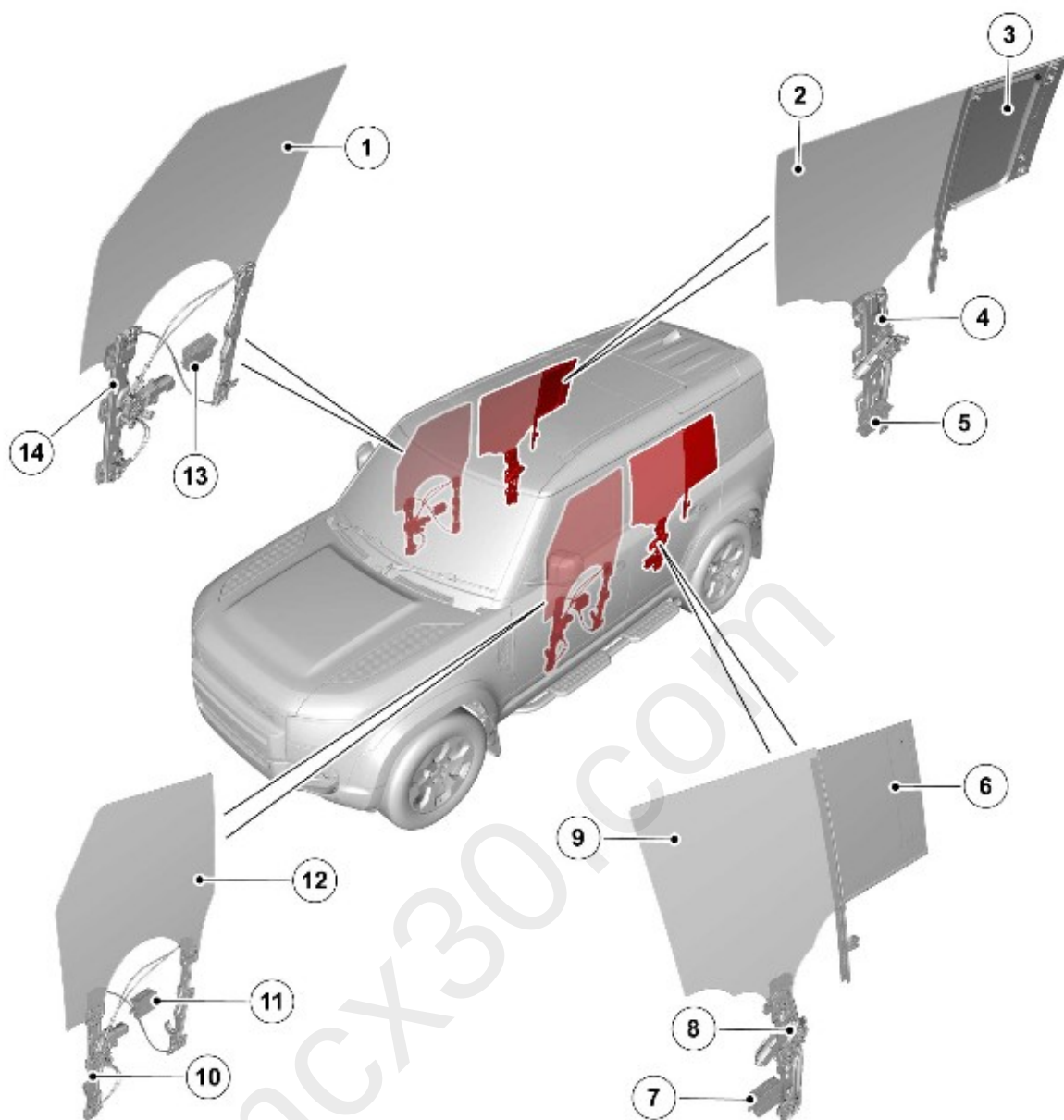


ITEM	DESCRIPTION
1	Rear window heater element connector (quantity 2)
2	Locator pin (quantity 3)

COMPONENT LOCATION - 5 OF 6 - DOOR WINDOW REGULATORS

NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- RHD is shown, LHD is similar.



E251032

ITEM	DESCRIPTION
1	Front right door window
2	Rear right door window - Vehicle with 5 doors only
3	Quarter glass - Rear right door - Vehicle with 5 doors only
4	Rear right door window regulator - Vehicle with 5 doors only
5	Driver Rear Door Module (DRDM) - Vehicle with 5 doors only
6	Quarter glass - Rear left door - Vehicle with 5 doors only
7	Passenger Rear Door Module (PRDM) - Vehicle with 5 doors only
8	Rear left door window regulator - Vehicle with 5 doors only

ITEM	DESCRIPTION
9	Rear left door window - Vehicle with 5 doors only
10	Front left door window regulator
11	Passenger Door Control Module (PDM)
12	Front left door window
13	Driver Door Control Module (DDM)
14	Front right door window regulator

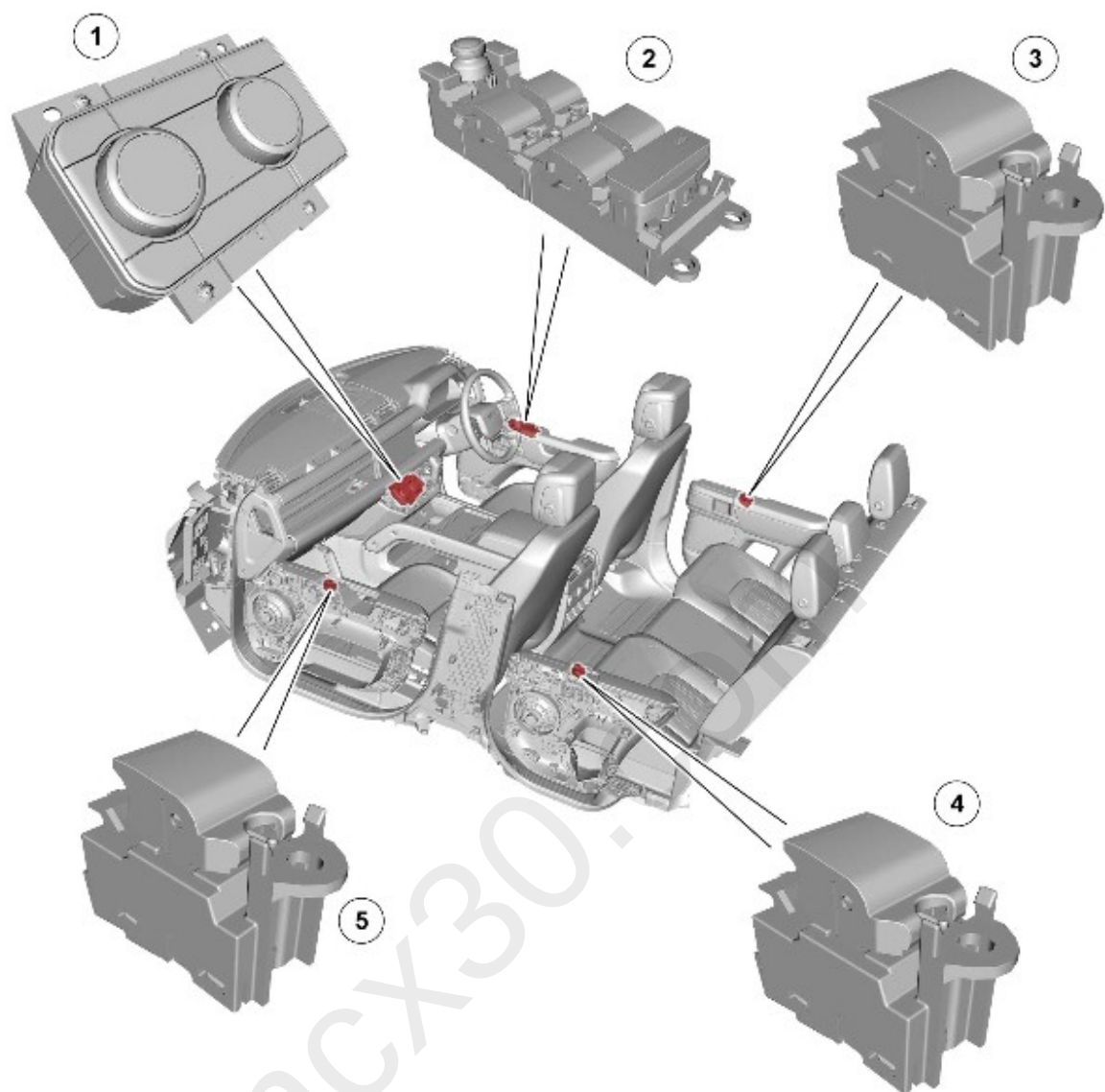
COMPONENT LOCATION - 6 OF 6 - DOOR WINDOW SWITCHES



NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- RHD is shown, LHD is similar.

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E251033

ITEM	DESCRIPTION
1	Integrated Control Panel (FCIM)
2	Driver door switchpack
3	Rear right door switchpack - Vehicle with 5 doors only
4	Rear left door switchpack - Vehicle with 5 doors only
5	Passenger door switchpack

OVERVIEW

DOOR WINDOWS

Operation of the window lift system is controlled by the Body Control Module (BCM)/ Gateway Control Module (GWM) in conjunction with the:

- DDM
- PDM
- PRDM - Vehicle with 5 doors only
- DRDM - Vehicle with 5 doors only.

The door modules are installed in the door of their respective windows. All door modules communicate through the High Speed (HS) Controller Area Network (CAN) body systems bus.

The window lift system features 1 shot up and down operation, plus an anti-trap feature for all door windows.

WINDSHIELD AND REAR WINDOW



NOTE:

The bracket of the IPMA is not serviceable and it is glued to the windshield. When the bracket is broken, the whole windshield must be replaced.

The windshield is bonded and sealed to the body aperture using polyurethane adhesive.

The toughened rear window is also bonded and sealed to the tailgate aperture using polyurethane adhesive. A single heating element is printed on the inner surface of the rear window.

REAR QUARTER WINDOWS

The rear quarter windows are bonded and sealed to the body aperture using polyurethane adhesive. The AM, FM, digital radio and telestart antennas are located in the rear quarter windows.

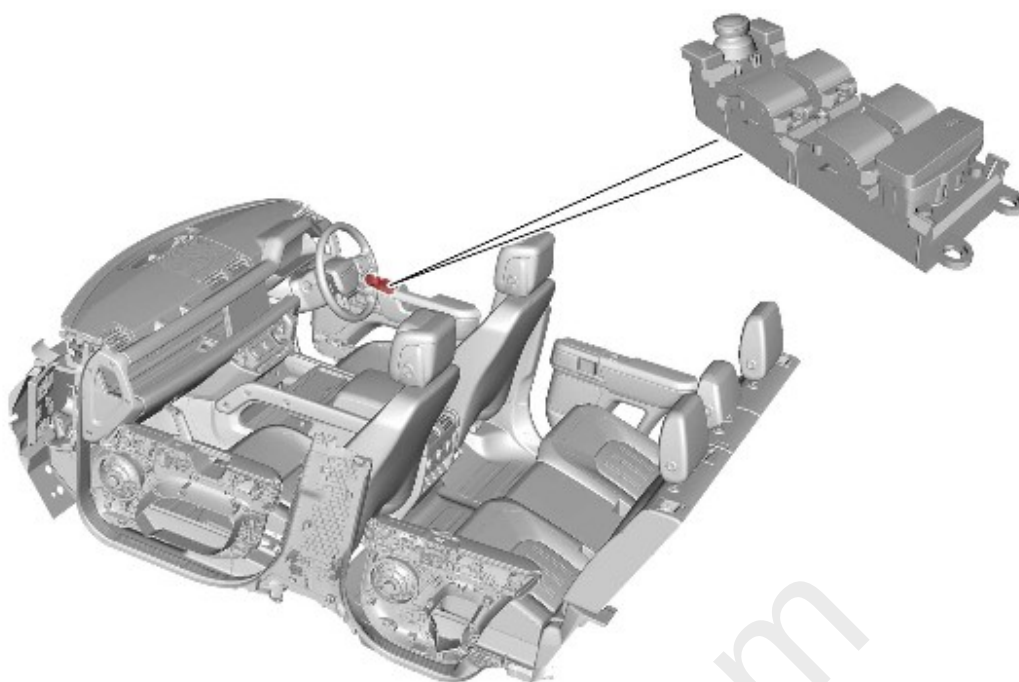
DESCRIPTION

DRIVER DOOR SWITCHPACK



NOTE:

RHD is shown, LHD is similar.



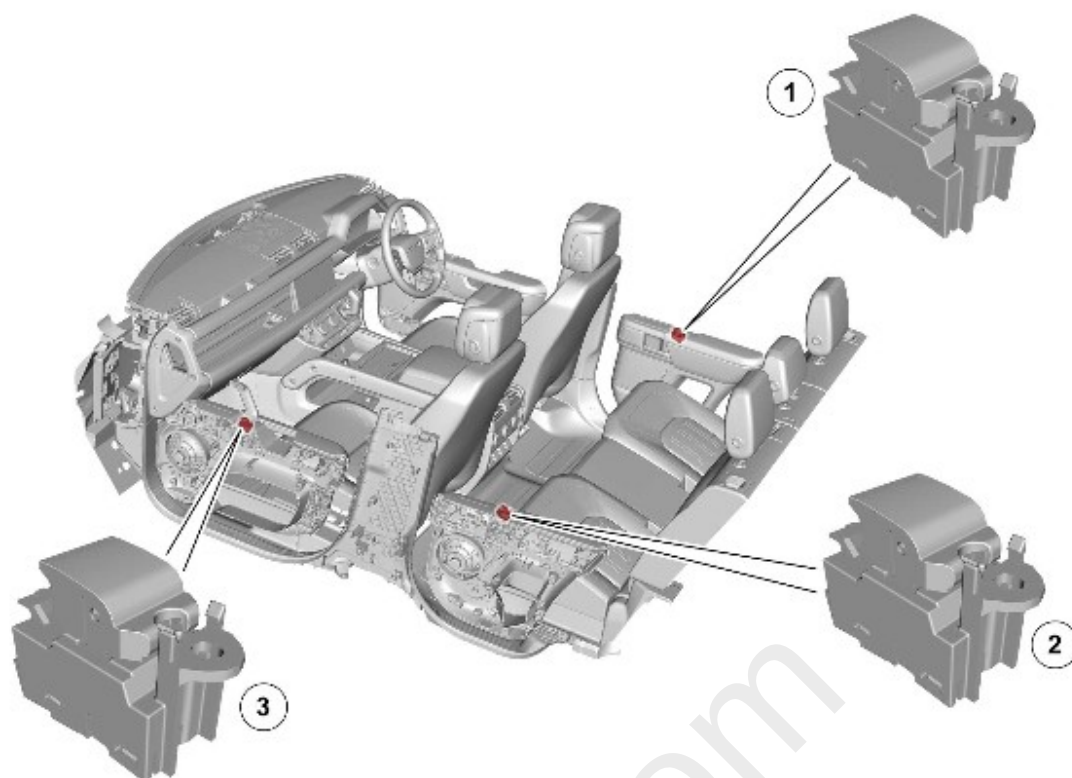
E251034

The driver door switchpack is powered by the DDM. When the switches in the driver door switchpack are used, the switchpack translates the switch movement into a Local Interconnect Network (LIN) message. A LIN connects the driver door switchpack to the DDM. Each passenger window switch is hardwired to the related door module.

PASSENGER DOOR SWITCHPACK AND REAR DOOR SWITCHPACK

NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- RHD is shown, LHD is similar.



E251035

ITEM	DESCRIPTION
1	Rear right door switchpack - Vehicle with 5 doors only
2	Rear left door switchpack - Vehicle with 5 doors only
3	Passenger door switchpack

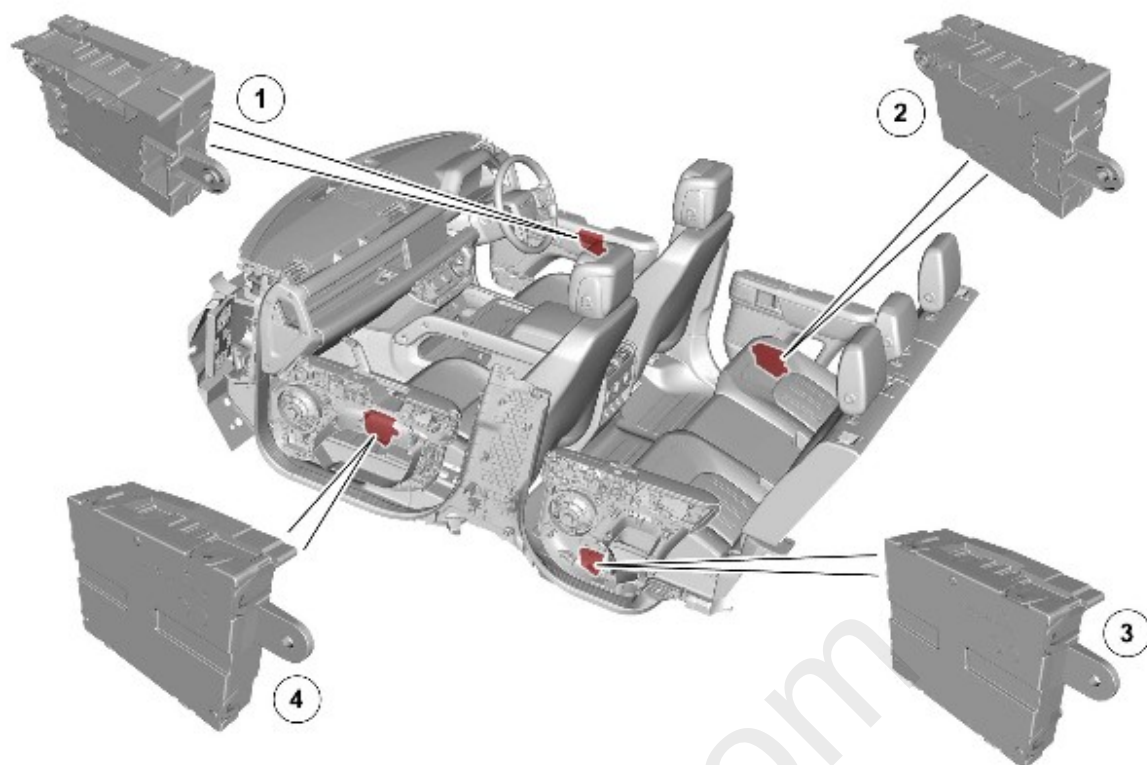
Individual window switches are installed in each of the 3 doors. Window switches for all of the windows and a rear door window isolation switch are installed in the driver door switchpack.

All window switches are of the non-latching rocker type. The switches have 2 switching positions in each direction, inch up/down and one-shot up/down. Operating the switch to the second detent position activates the one-shot feature.

DOOR MODULES

NOTES:

- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.
- RHD is shown, LHD is similar.



E251036

ITEM	DESCRIPTION
1	DDM
2	DRDM - Vehicle with 5 doors only
3	PRDM - Vehicle with 5 doors only
4	PDM

The door modules are installed in the door of their respective windows. Each door module controls the following door window operation features in the respective door:

- Door window open and close.
- One-shot open and close.
- Closing anti-trap protection.

In addition to controlling the window lift system, the front door modules also control:

- Door locking.
 - For additional information, refer to: [Handles, Locks, Latches and Entry Systems](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).
- Door mirror adjustment and heating (front doors only).
 - For additional information, refer to: [Rear View Mirrors](#) (501-09 Rear View Mirrors, Description and Operation).

- Door mirror lamps (front doors only).
 - For additional information, refer to: [Interior Lighting](#) (417-02 Interior Lighting, Description and Operation).
- Mirror proximity cameras (front doors only).
 - For additional information, refer to: [Parking Aid](#) (413-13 Parking Aid, Description and Operation).

When the driver door switchpack is used, it outputs a request message to the DDM through the LIN. The message is for the passenger door window or rear door windows. The DDM relays the message to the relevant door module through the HS CAN body systems bus.

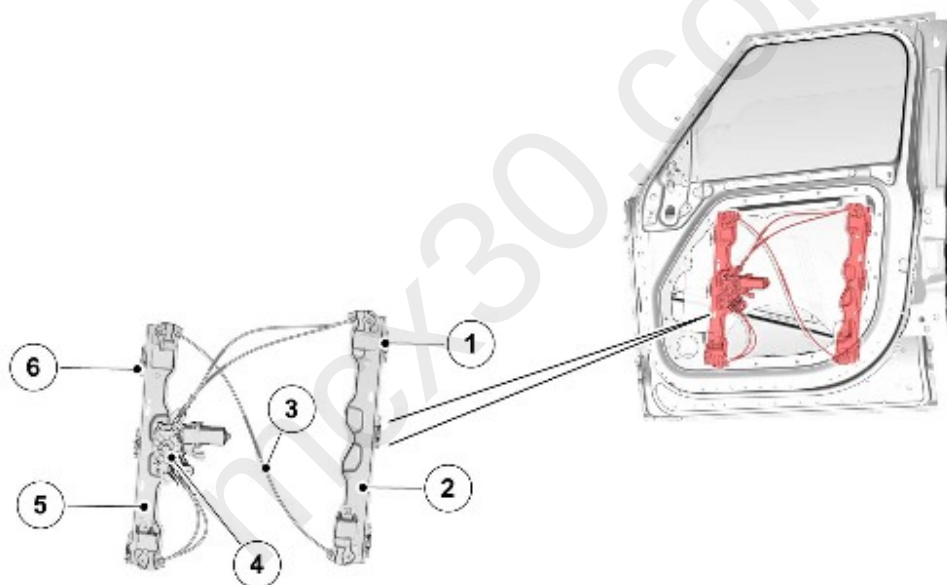
WINDOW REGULATORS

Front Door Window Regulators



NOTE:

Vehicle with 5 doors is shown, vehicle with 3 doors is similar.

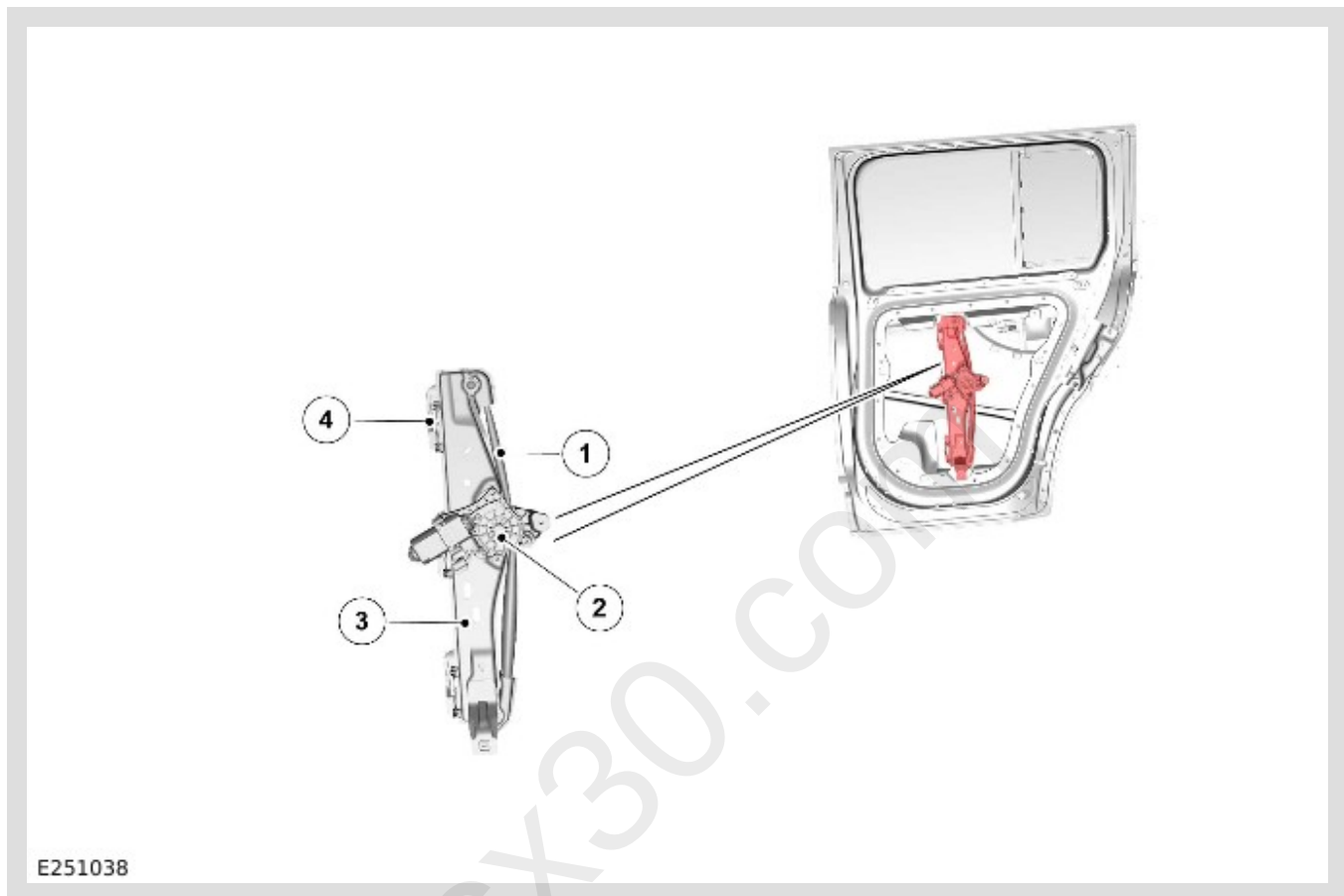


E251037

ITEM	DESCRIPTION
1	Rear rail carrier
2	Rear rail
3	Cable
4	Motor assembly

ITEM	DESCRIPTION
5	Front rail
6	Front rail carrier

Rear Door Window Regulators - Vehicle with 5 doors only



ITEM	DESCRIPTION
1	Cable
2	Motor assembly
3	Rail
4	Rail carrier

The door window regulators are supplied as assemblies and are handed.

The front door window regulator assembly comprises of front and rear guide rails, cables and a motor assembly. The door window is located in 2 carriers, which are located in tracks in the guide rails.

The rear door window regulator assembly comprises of guide rail, cable and a motor assembly. The door window is located in carrier, which is located in track in the guide rail.

Each carrier is attached to the cable, which is wrapped around a drum driven by the motor. When the motor is operated the drum pulls the cable in the required direction to raise or lower the carrier(s).

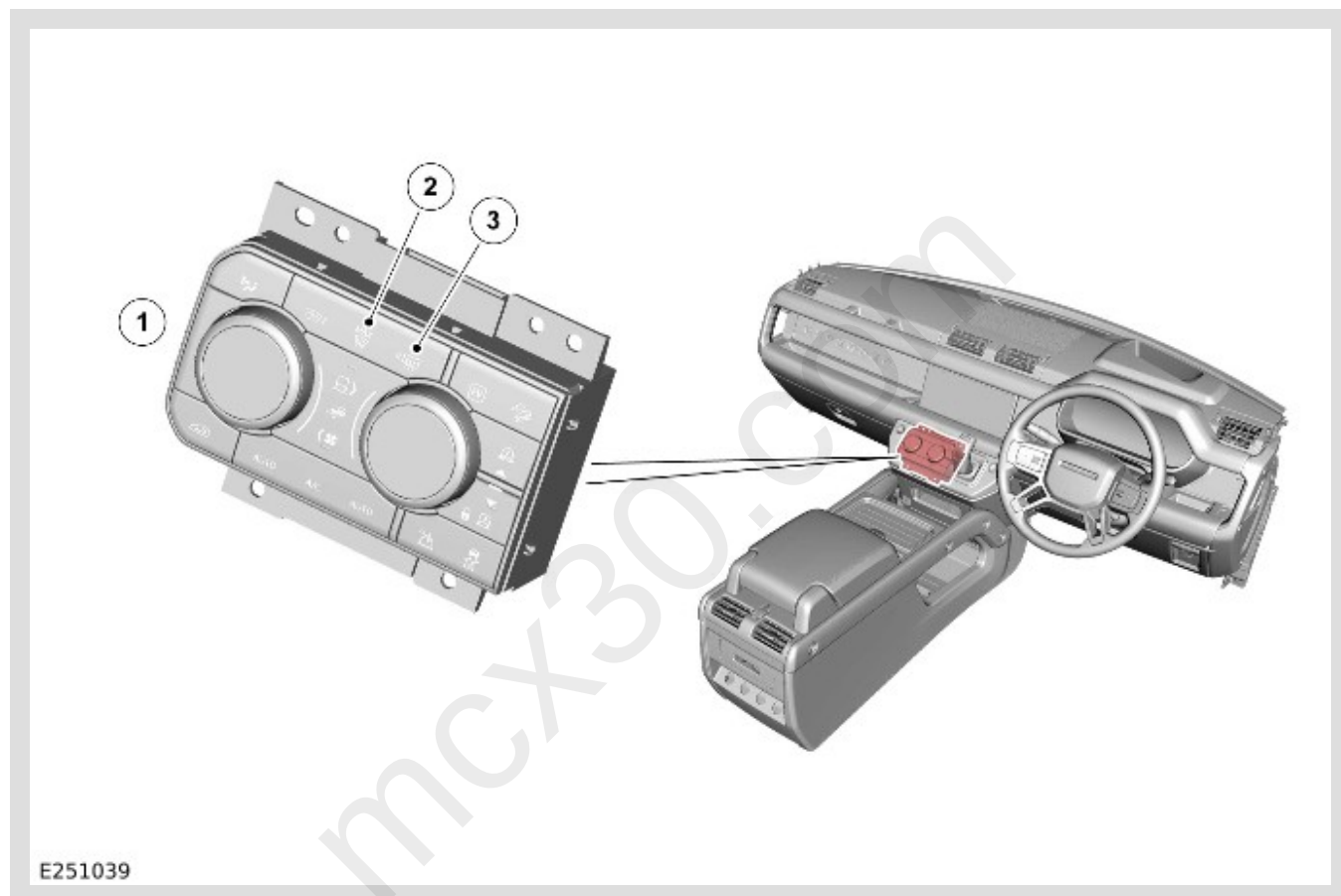
Each door window regulator motor is connected to the related door module. The door module provides the power outputs to drive the motor and receives position inputs from 2 position sensors located in the motor.

FCIM



NOTE:

RHD is shown, LHD is similar.



ITEM	DESCRIPTION
1	FCIM
2	Heated windshield switch (if equipped)
3	Heated rear window switch

The FCIM communicates with Heating, ventilation, and air conditioning (HVAC) through private CAN bus.

The door window operates with the ignition in either Power Mode 4 (accessory) or Power Mode 6 (ignition ON). The door window operates after the ignition is switched OFF, for 5 minutes or until a door is opened.

A window open or close selection is made on a door switchpack. The related door module supplies power to the door window regulator motor to drive it in the appropriate direction. In the inch mode, the motor stops when the switch is released or the window reaches the end of its travel. In the one-shot mode, the motor stops when the switch is operated again (either up or down) or the window reaches the end of its travel.

One-shot up operation causes a door window to fully close unless an object is detected. When the anti-trap algorithm detects an object, the window drops fully open or to 200 mm (7.9 in) below the obstruction.

When the passenger window switches are used, they produce an open or close request to the relevant door module through a hardwired circuit.

One of the passenger doors window has opposing up and down requests from 1 of the passenger door switchpacks and the driver door switchpack. The operation of the door window discontinued until 1 of the switches is released.

GLOBAL OPENING AND CLOSING

When the smart key unlocked or locked switch is pressed and held for 3 seconds, the vehicle unlocks or locks. At the same time, the vehicle alarm disarms or arms and the windows of all doors open or close.

Global opening and closing requests from the smart key are detected by the Radio Frequency (RF) receiver and verified by the Remote Function Actuator (RFA). The BCM/ GWM then sends the request to all door modules. The request is sent through the HS CAN body systems bus.

ONE-SHOT WINDOW OPERATION RESET

When the startup battery is disconnected, the window lift system requires calibrating on battery re-connection. To calibrate the system the following routine must be completed.

With the ignition in Power Mode 6 (ignition ON):

- 1 Fully close the door window and release the switch.
- 2 Re-apply the switch to close the door window and hold for approximately 2 seconds.
- 3 Fully open the door window and release the switch.
- 4 Re-apply the switch to open the door window and hold for approximately 2 seconds.
- 5 Repeat for all remaining windows.

ANTI-TRAP PROTECTION

The anti-trap feature is incorporated for the door window in both the inching and one-shot modes. When the anti-trap function is activated while a window is closing, the window reverses by approximately 200 mm (7.9 in).

Each window motor has 2 position sensors to enable the related door module to monitor the motor speed. When the motor speed decreases below a set threshold, indicating an obstruction, the power feed to the motor is reversed so the window goes back down.

When it is necessary to raise the window, the anti-trap protection can be overridden by attempting to close the window at intervals of less than 10 seconds. On the third attempt the window moves up with anti-trap protection disabled to overcome the obstruction.

HEATED REAR WINDOW

Heated rear window operation is only enabled when in Power Mode 7 (engine running). The FCIM controls operation of the heated rear window using a relay in the Rear Junction Box (BCMB).

When a request is made for heated rear window operation, the FCIM broadcasts a message to the HVAC. The HVAC sends the message to the BCM/ GWM. The message is sent through the HS CAN Human Machine Interface (HMI) systems bus. On receipt of this message, the BCM/ GWM energizes the relay by providing a ground path for the relay coil. The relay coil allows a battery feed to flow across the relay to power the heater element.

There are 2 modes of heated rear window operation, which are manual and automatic.

Manual operation is activated by pressing the heated rear window switch. When the switch is pressed, the status Light Emitting Diode (LED) in the switch illuminates and the rear window heater element is energized. Manual operation is discontinued when the heated rear window switch is pressed a second time. The length of operation is between 5 and 21 minutes (dependent on ambient air temperature). The heated rear window stops when the engine stops. When manual operation is discontinued by the engine stopping, the previous heating phase is resumed when the engine is re-started within 30 seconds.

There are 2 variants of automatic operation, which are automatic operation at the start of a journey and automatic operation during a journey.

Automatic operation at the start of a journey is initiated for between 5 and 21 minutes (dependent on ambient air temperature). The warmer the ambient air temperature, the shorter the time. In this instance, the switch LED is illuminated and the heater element is energized. In addition to shorter operating times in temperate winter conditions. There are condition qualifiers to prevent subsequent operations when the passenger compartment or engine is warm, or there is a significant sun load. Automatic operation is discontinued when the heated rear window switch is pressed or the engine stops.



NOTE:

The heated rear window feature can be selected ON and OFF on the settings page of the 'CLIMATE' menu in the Touch Screen (FCDIM).

Automatic operation during a journey is initiated when low ambient air temperatures are experienced. Automatic operation during a journey is initiated when the vehicle has been traveling for a set period of time above a threshold speed. In this instance, no feedback is given to inform the driver that the heated rear window is operational (the switch LED is not illuminated). The duration of operation is variable depending upon the ambient air temperature, vehicle speed and the amount of time the vehicle has been traveling.

HEATED WINDSHIELD (IF EQUIPPED)

Heated windshield operation is only enabled when in Power Mode 7 (engine running). The FCIM controls operation of the heated windshield using 2 relays in the Engine Junction Box (EJB).

When a request is made for heated windshield operation, the FCIM broadcasts a message to the HVAC. The HVAC sends the message to the BCM/ GWM. The message is sent through the HS CAN HMI systems bus. When receipt the message, the BCM/ GWM energizes the relays by providing a ground path for the relay coil. The relay coil allows a battery feed to flow across the relays to power the left and right heater elements.

There are 2 modes of heated windshield operation, which are manual and automatic.

Manual operation is activated by pressing the heated windshield switch. When the switch is pressed, the status LED in the switch illuminates and the windshield heater elements are energized. Manual operation is discontinued when the heated windshield switch is pressed a second time. The length of operation is between 2 and 5 minutes (dependent on ambient air temperature). The heated windshield stops when the engine stops. When manual operation is discontinued by the engine stopping, the previous heating phase is resumed when the engine is re-started within 30 seconds.

There are 2 variants of automatic operation which are automatic operation at the start of a journey and automatic operation during a journey.

Automatic operation at the start of a journey is initiated for between 2 and 5 minutes (dependent on ambient air temperature). The warmer the ambient air temperature, the shorter the time. In this instance, the switch LED is illuminated and the heater elements are energized. In addition to shorter operating times in temperate winter conditions. There are condition qualifiers to prevent subsequent operations when the passenger compartment, engine or screen is warm, or there is a significant sun load. Automatic operation is discontinued when the heated windshield switch is pressed or the engine stops.



NOTE:

The heated windshield feature can be selected ON and OFF on the settings page of the 'CLIMATE' menu in the FCDIM.

Automatic operation during a journey is initiated when low ambient air temperatures are experienced. Automatic operation during a journey is initiated when the vehicle has been traveling for a set period of time above a threshold speed. In this instance, no feedback is given to inform the driver that the heated windshield is operational (the switch LED is not illuminated). The duration of operation is variable depending upon the ambient air temperature, vehicle speed and the amount of time the vehicle has been traveling.

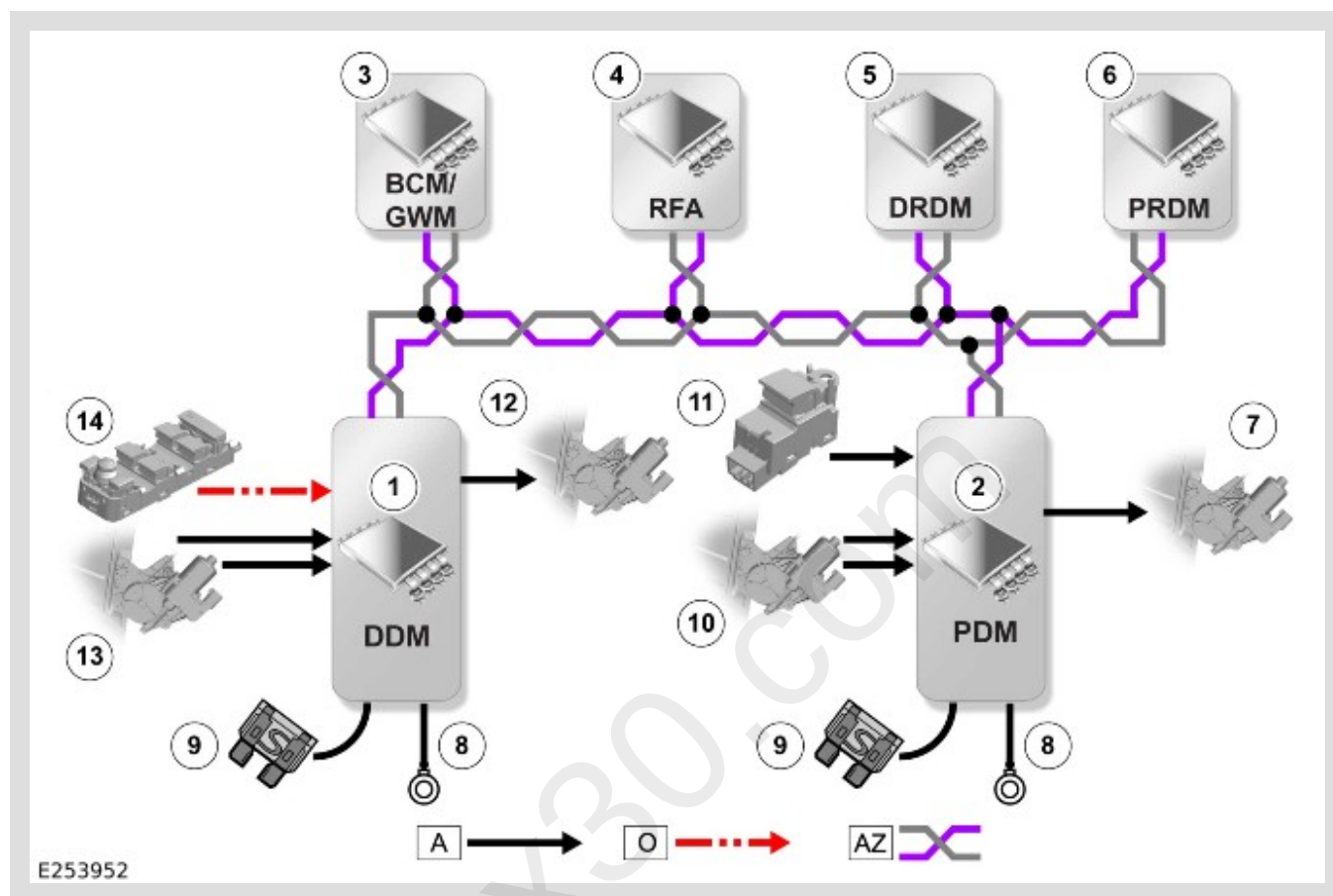
DIAGNOSTICS

The door modules record any Diagnostic Trouble Code (DTC)s and related data. Read the DTCs and related data with the JLR approved diagnostic equipment.

The JLR approved diagnostic equipment can read live data and activate certain components.

CONTROL DIAGRAM

CONTROL DIAGRAM - 1 OF 3 - FRONT DOOR WINDOWS



A = HARDWIRED: O = LIN: AZ = HS CAN BODY SYSTEMS BUS.

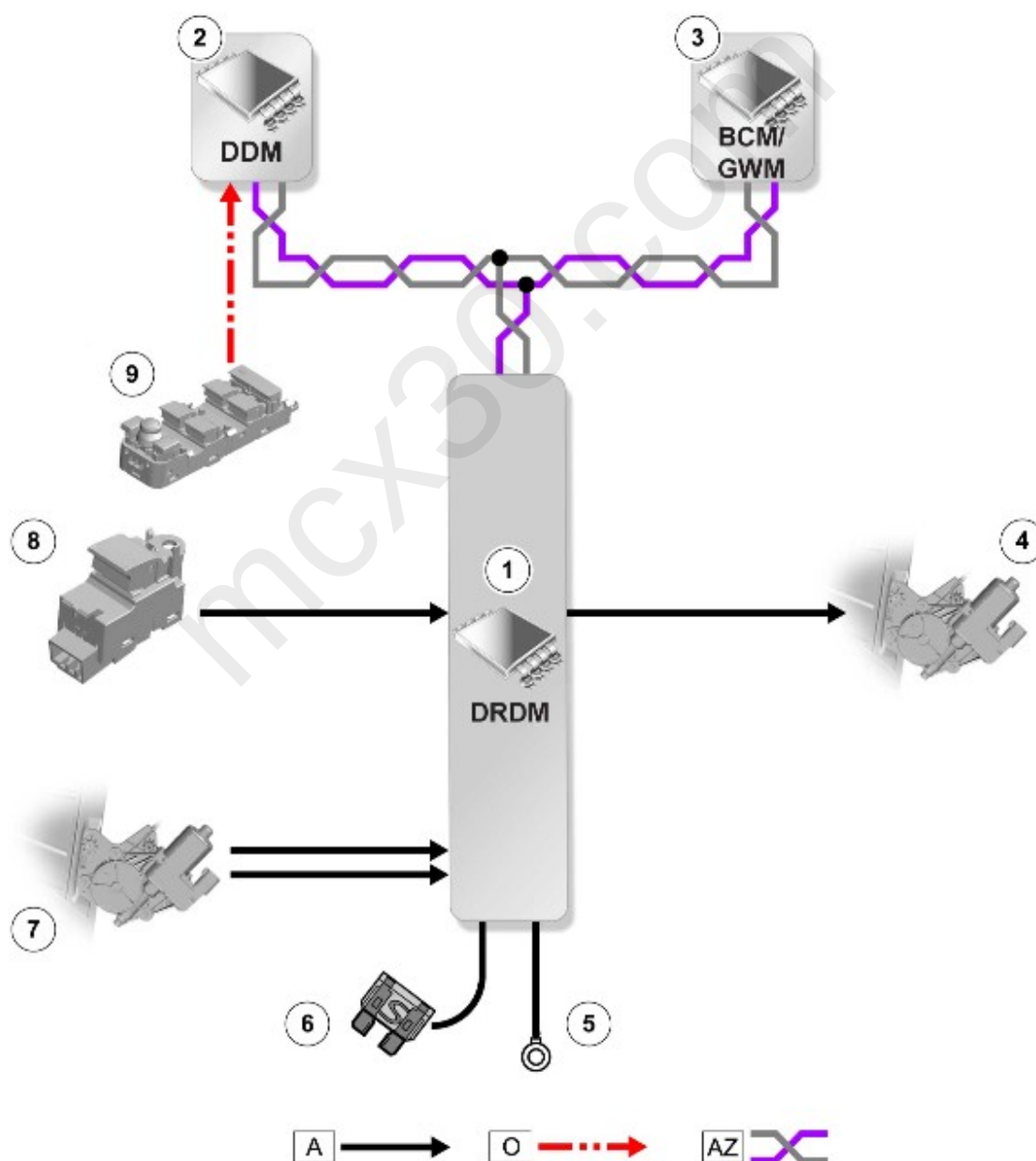
ITEM	DESCRIPTION
1	DDM
2	PDM
3	BCM/ GWM
4	RFA
5	DRDM - Vehicle with 5 doors only
6	PRDM - Vehicle with 5 doors only
7	Front left door window regulator motor
8	Ground
9	Power supply
10	Front left door window regulator motor position sensor (quantity 2)

ITEM	DESCRIPTION
11	Passenger door switchpack
12	Front right door window regulator motor
13	Front right door window regulator motor position sensor (quantity 2)
14	Driver door switchpack

CONTROL DIAGRAM - 2 OF 3 - REAR DOOR WINDOWS - VEHICLE WITH 5 DOORS ONLY

 **NOTE:**

Rear right door is shown, rear left door is similar.

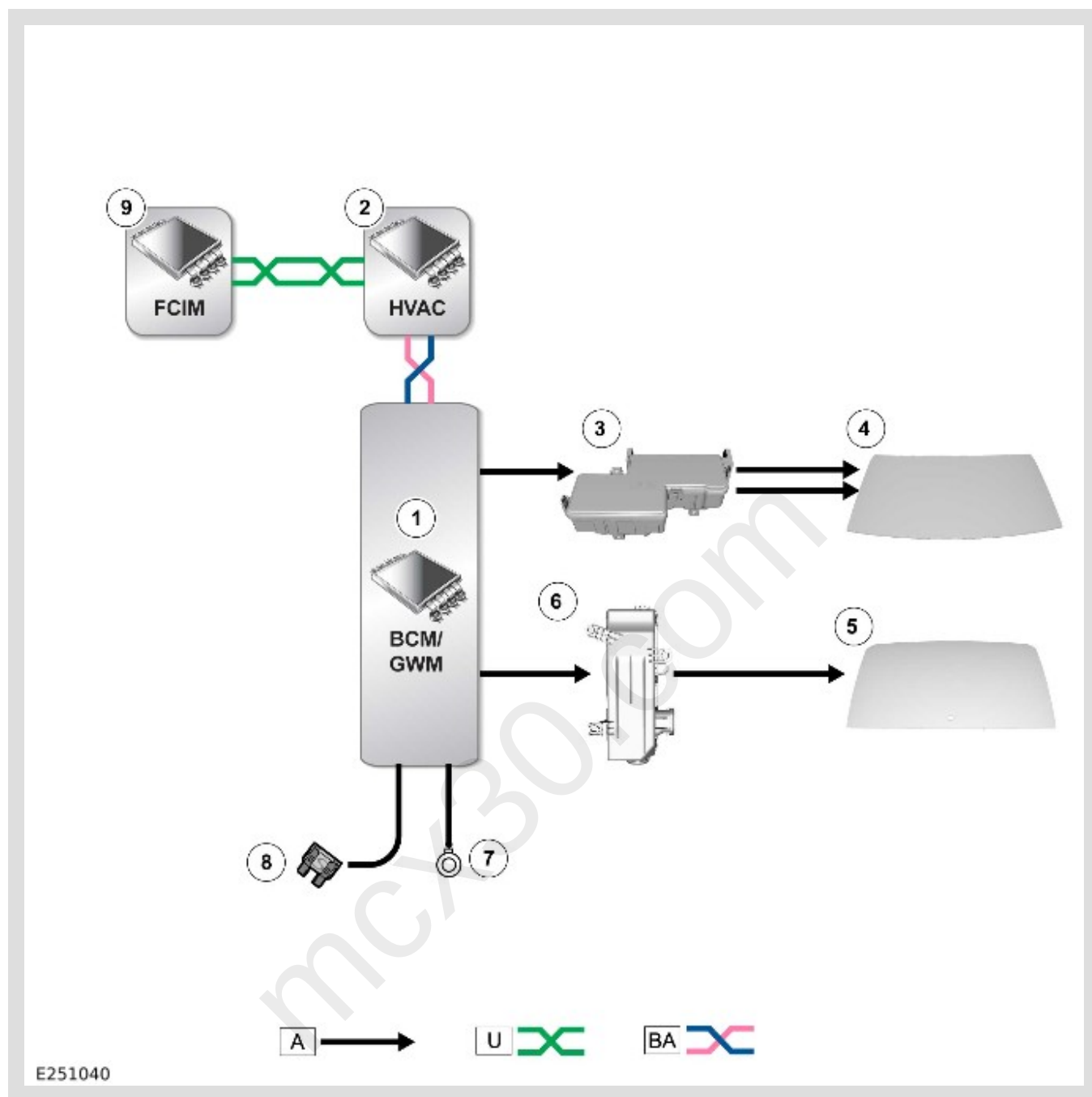


A = HARDWIRED: O = LIN: AZ = HS CAN BODY SYSTEMS BUS.

ITEM	DESCRIPTION
1	DRDM
2	DDM
3	BCM/ GWM
4	Rear right door window regulator motor
5	Ground
6	Power supply
7	Rear right door window regulator motor position sensor (quantity 2)
8	Rear right door switchpack
9	Driver door switchpack

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CONTROL DIAGRAM – 3 OF 3 – HEATED REAR WINDOW AND HEATED WINDSHIELD



A = HARDWIRED: U = PRIVATE CAN BUS: BA = HS CAN HMI SYSTEMS BUS.

ITEM	DESCRIPTION
1	BCM/ GWM
2	HVAC
3	EJB
4	Windshield heater element (quantity 2) (if equipped)
5	Rear window heater element

ITEM	DESCRIPTION
6	BCMB
7	Ground
8	Power supply
9	FCIM

cmIjaGFyZG1vcnRvbjsyMDIwLTAsLTE4VDEyOjM1QjUwLjE4Ni7OTIuNDAuMTg5LjUwOw==

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