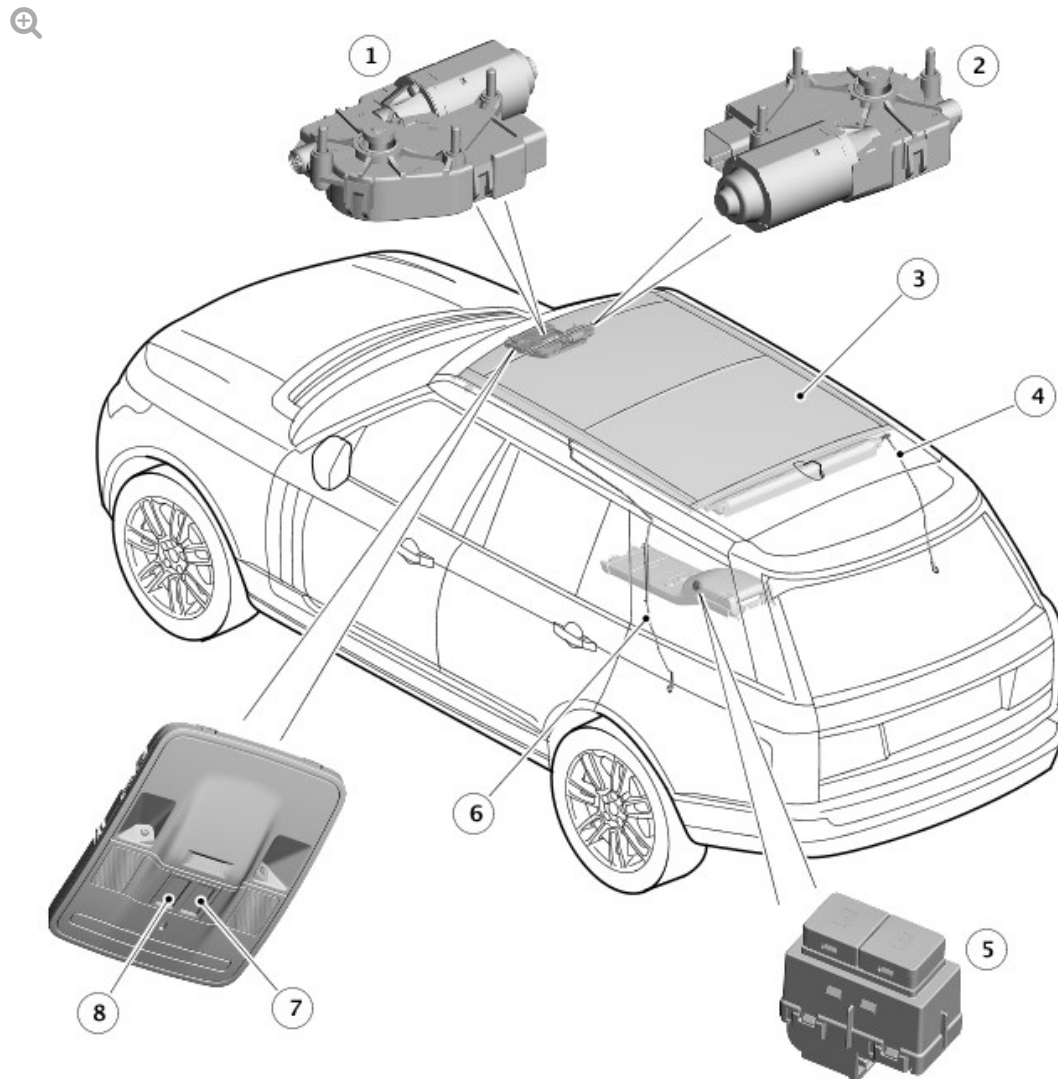


2016.0 RANGE ROVER (LG), 501-17

ROOF OPENING PANEL

DESCRIPTION AND OPERATION

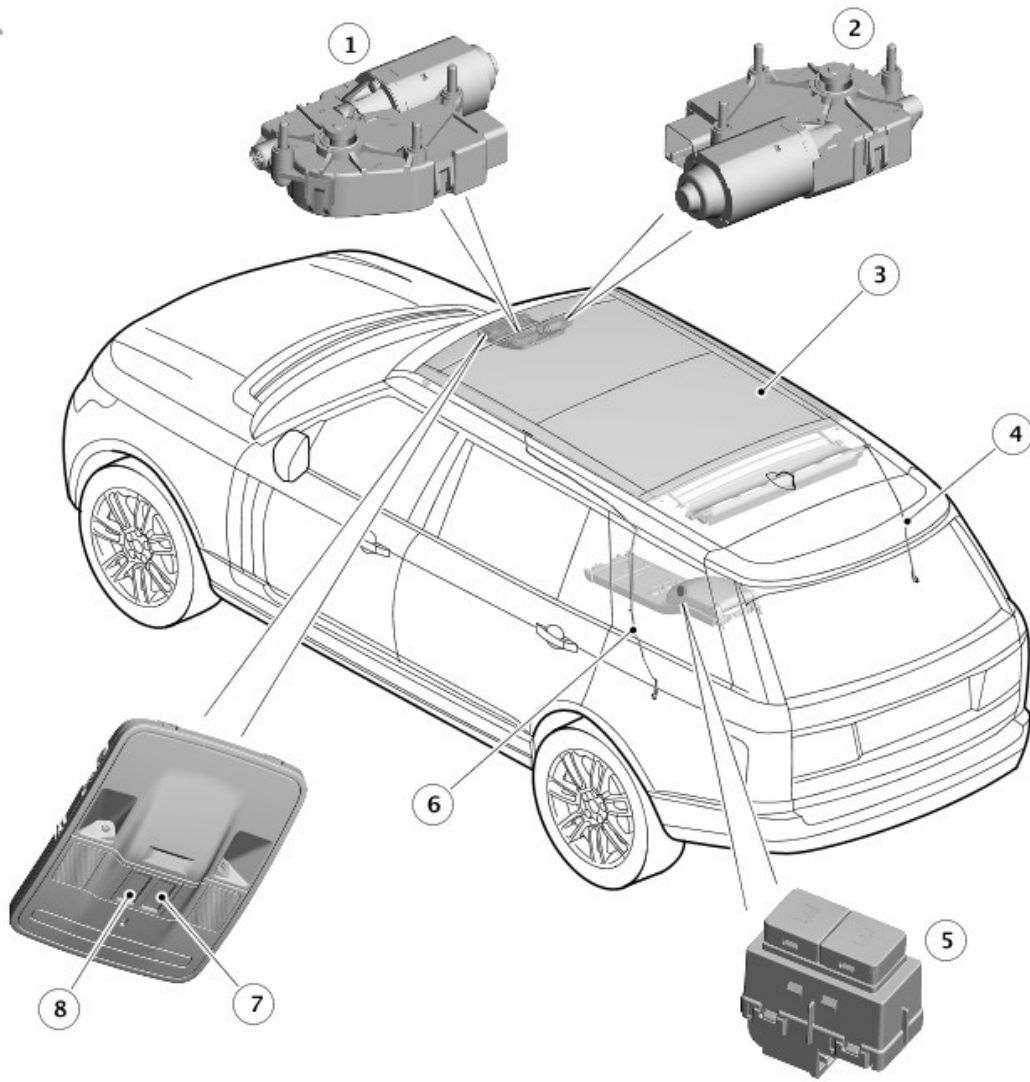
COMPONENT LOCATION - STANDARD WHEELBASE VEHICLES



E156933

ITEM	DESCRIPTION
1	Roof opening panel motor
2	Roof opening panel blind motor
3	Roof opening panel
4	Right drain tube
5	Rear roof opening panel blind switch
6	Left drain tube
7	Front roof opening panel blind switch
8	Roof opening panel switch

COMPONENT LOCATION - LONG
WHEELBASE VEHICLES



E156934

ITEM	DESCRIPTION
1	Roof opening panel motor
2	Roof opening panel blind motor
3	Roof opening panel
4	Right drain tube
5	Rear roof opening panel blind switch
6	Left drain tube
7	Front roof opening panel blind switch
8	Roof opening panel switch

OVERVIEW

The roof opening panel assembly is built into a steel roof opening panel frame and incorporates:

- Two fixed panels
- A roof opening panel
- A roof opening panel blind
- Electric operating motors, mechanisms and wiring harness
- Two drain tubes.

SWB (standard wheelbase) and LWB (long wheelbase) vehicles use the same sunroof, but LWB vehicles have a different roof opening panel blind. On LWB vehicles the spring roller of the blind is positioned 200 mm further rearwards than on SWB vehicles, to maintain rear seat head clearance.

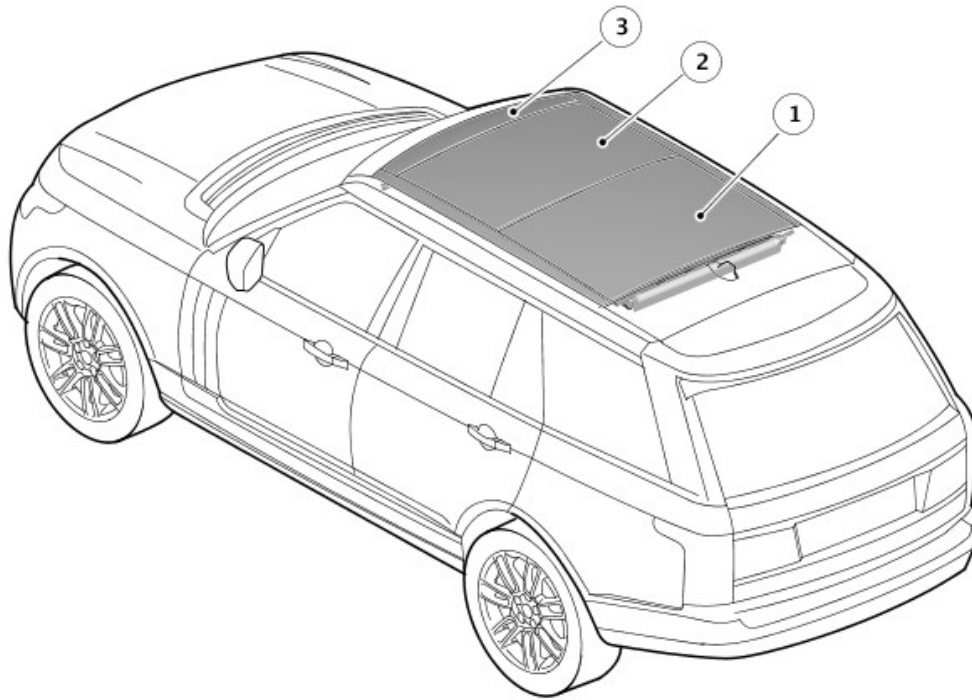
The motors are located at the front of the assembly. One of them powers the roof opening panel blind while the other the roof opening panel. The steel frame is bonded into an aperture extending the full width of the roof, between the cant rails of the vehicle's aluminum body and fixed with 4x M8 nuts and 2x M6 bolts.

A drain tube is connected to each side of the roof opening panel frame and routed down the inside of the C pillar to the rear wheelarch.

The roof opening panel and roof opening panel blind are controlled by switches in the front overhead console. On vehicles with business seats the roof opening panel blind can also be controlled by a switch in the rear floor console. The rear floor console switch function can be disabled by the isolator switch on the driver door switchpack.

DESCRIPTION

GLASS PANELS



E149214

ITEM	DESCRIPTION
1	Fixed rear panel
2	Roof opening panel
3	Fixed front panel

The external surface of the roof opening panel comprises the following three glass elements:

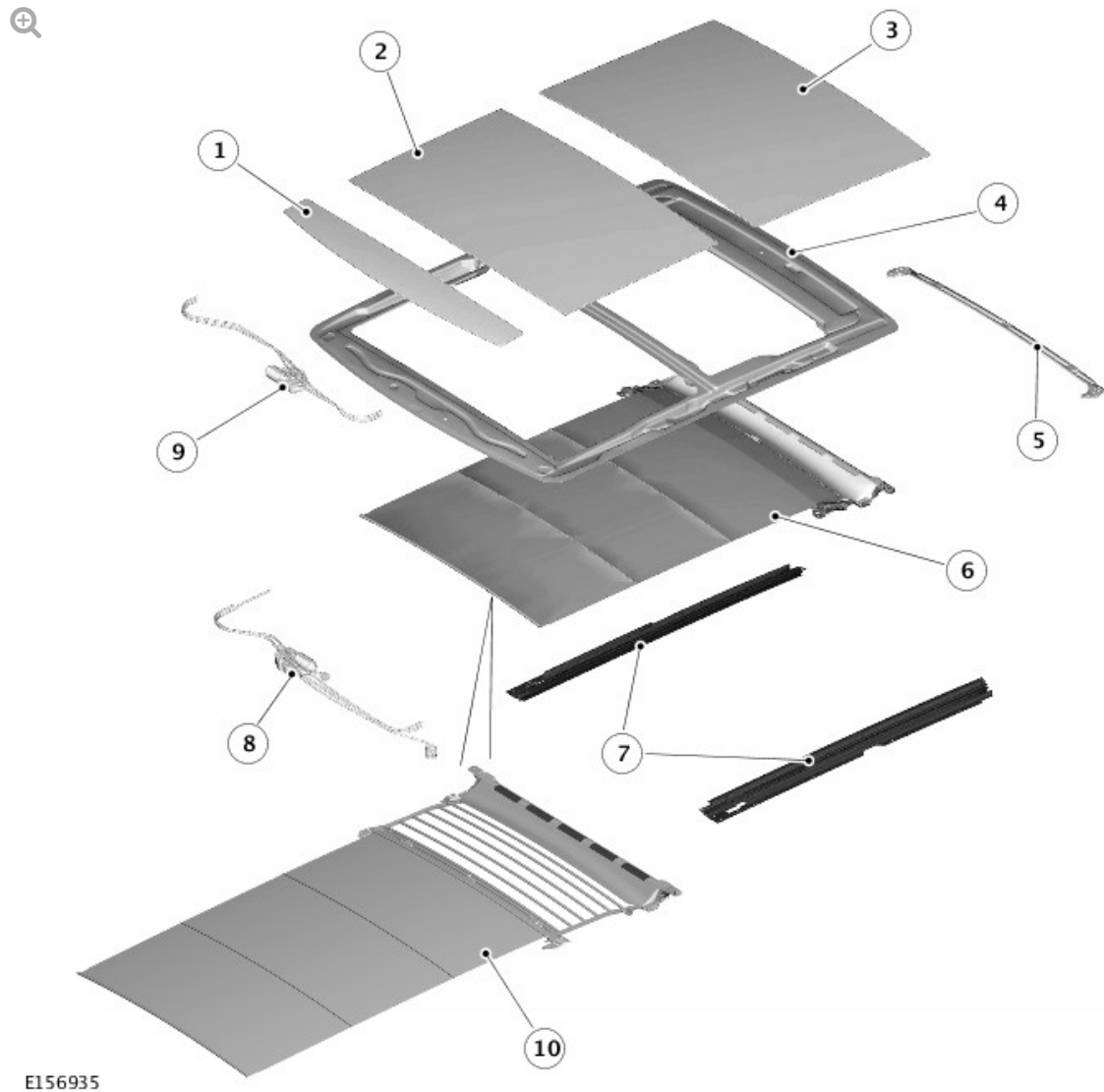
- Fixed front panel (5mm thick)
- Roof opening panel (4mm thick)
- Fixed rear panel (4mm thick).

All three panels are manufactured in a tinted toughened glass and the opening and the rear panel have with a Protec safety film bonded onto the lower surface to prevent shards of glass entering the vehicle cabin in the event of a breakage.

The tinted glass provides a high degree of solar protection allowing only 8.2 percent heat transmission into the vehicle.

The roof opening panel features an electrically powered tilt and slide mechanism. On opening, the rear of the panel tilts upwards before moving rearwards above the fixed rear panel.

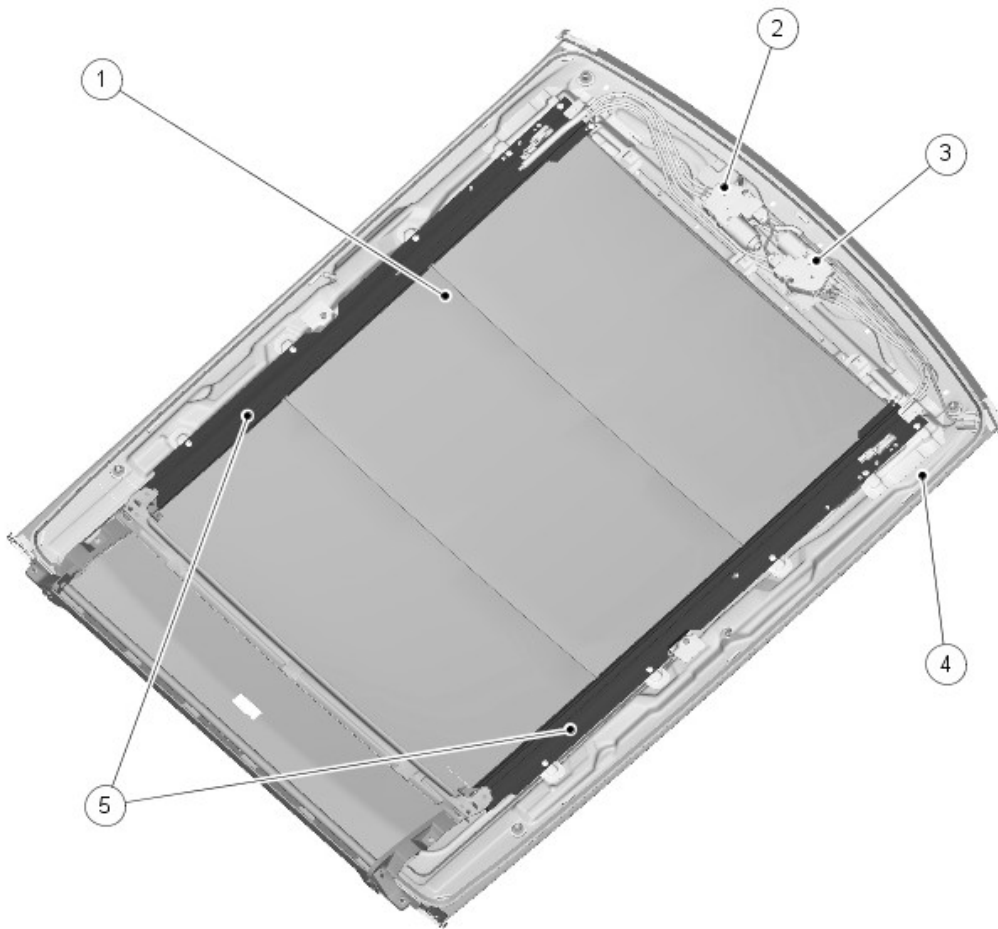
ROOF OPENING PANEL COMPONENTS



ITEM	DESCRIPTION
1	Fixed front panel
2	Roof opening panel
3	Fixed rear panel
4	Roof opening panel frame
5	Roof opening panel blind support bracket
6	Roof opening panel blind assembly (standard wheelbase vehicles)

7	Guide rails
8	Roof opening panel blind drive assembly
9	Roof opening panel drive assembly
10	Roof opening panel blind assembly (long wheelbase vehicles)

Roof Opening Panel Components - Interior View



E149215

ITEM	DESCRIPTION
1	Roof opening panel blind
2	Roof opening panel motor
3	Roof opening panel blind motor
4	Roof opening panel frame

The roof opening panel assembly features an electrically powered roof opening panel blind. Guided by side rails, the blind rolls to-and-from the front of the roof opening panel.

CONTROL MODULE AND MOTOR

The opening and closing function of the roof opening panel and the roof opening panel blind are controlled by the roof module which is integral with the roof opening panel blind motor. The module receives a permanent battery power supply from the CJB (central junction box).

To open or close the roof opening panel and the roof opening panel blind the module receives hardwired 'open/close' inputs from the switches located in the overhead console and the rear floor console.

The control module has a non-volatile memory. If battery power to the module is lost, the roof opening panel and roof opening panel blind positions are retained and the one-touch feature does not require re-initializing. However, due to the software condition, if the battery power to the control module is interrupted while the ignition is on, the one-touch feature must be re-initialized.

Once the power supply is restored, reset the roof mechanism as follows:

- 1** Start the engine.
- 2** The roof opening panel and roof opening panel blind must both be in the closed position (if not, use the overhead console switches to close both).
- 3** Press the front of the roof opening panel switch for 20 seconds until the roof opening panel blind actuates rearwards and then forwards about 10 mm.
- 4** Release the roof opening panel switch, then press the front of the switch again within 5 sec and keep pressed until the following

sequence has completed.

- Roof opening panel blind opens fully.
- Roof opening panel opens fully.
- Roof opening panel closes fully.
- Roof opening panel blind closes fully.

5 Release the roof opening panel switch. The roof opening panel is now fully initialized.

The motor that operates the roof opening panel uses a drive gear which engages and drives two cables within a sleeved tube. Each cable is linked to the roof opening panel's open and close mechanism located either side of the panel. The rotation of the motor drives the cables in the required direction. Signals from a Hall effect sensor located in the motor enables the control module to calculate the exact position and operating speed of the roof opening panel.

The Hall effect sensor is also an operational component of the anti-trap function. The control module uses the operating speed of the roof opening panel and the current draw of the motor to detect an obstruction. If the roof opening panel closing speed decreases below a set threshold and the current draw from the motor increases, the power feed to the motor is reversed. This will then open the roof opening panel a set distance in the opposite direction of travel. In an emergency the anti-trap function can be overridden by holding the operating switch in the close position.

Depending on vehicle speed, the closing threshold of the anti-trap function is adjusted to counteract the force of air pressure acting upon the roof opening panel. Vehicle speed signal is transmitted from the ABS (anti-lock brake system) control module via the high speed CAN (controller area network) bus to the CJB where the signal is processed and transmitted over a LIN (local interconnect network) bus connection to the roof module. As vehicle speed increases, air pressure forces acting upon the sliding panel simultaneously increase, affecting the anti-trap functionality. The vehicle speed signal is used by the control module to re-calibrate the anti-trap

algorithm, accounting for the extra force acting on the roof opening panel. This function adapts the roof opening panel closing speed threshold of the anti-trap function, dependent on vehicle speed.

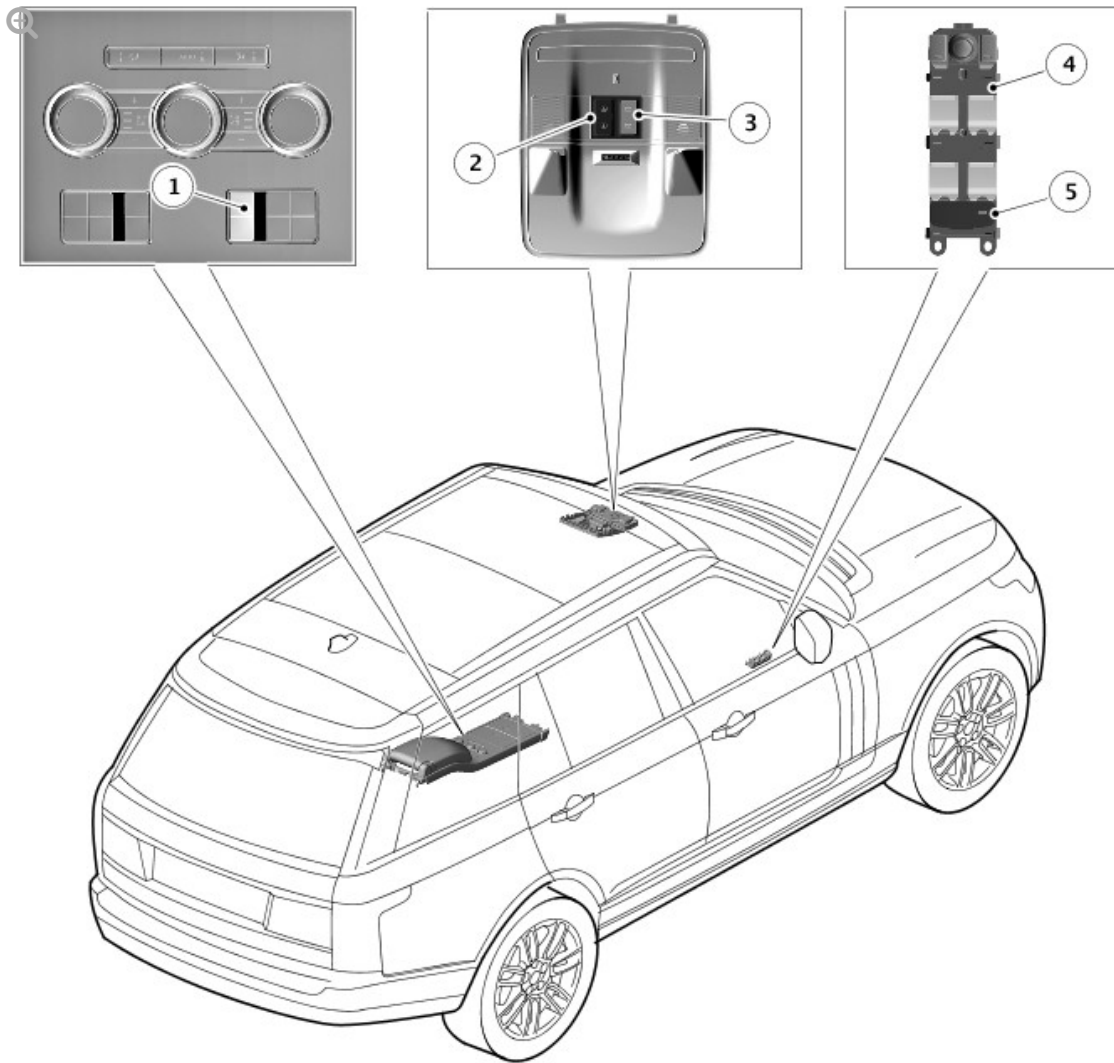
Both the roof opening panel and the roof opening panel blind motors have a thermal protection device built into the control module software to protect them from overheating. The operating parameters are as follows:

- If the motor temperature is between 60 and 77 °C, the roof operation is restricted to a close only function.
- If the motor temperature exceeds 77 °C during the closing function, the movement will not be interrupted.
- If the motor temperature exceeds 77 °C when the roof is closed, movement will be inhibited.
- If the anti-trap function is operational when closing, the reverse movement of the motor will complete its movement regardless of motor temperature.

Thermal protection for the roof opening panel motor and the roof opening panel blind motor are functioned in unison, therefore if one motor exceeds 60 or 77 °C, the same restrictions, as defined above, will apply to both motors. For example, if the blind cannot be opened due to thermal protection, the roof opening panel will also ignore the opening command.

OPERATION

ROOF OPENING PANEL SWITCHES



E149213

ITEM	DESCRIPTION
1	Rear roof opening panel blind switch (rear floor console)
2	Front roof opening panel blind switch (overhead console)
3	Roof opening panel switch
4	Driver door switchpack
5	Isolator switch

A rocker switch in the overhead console controls the opening and closing of the roof opening panel with a one-touch function in the direction required:

- Press lightly at the rear of the switch to tilt the roof opening panel. Once tilted, lightly press again to open the roof opening panel.

- From the fully open position, press lightly at the front of the switch to close to the tilt position, then press lightly again to close fully.
- For one-touch open and close, press firmly at the front or rear of the switch and release.
- Roof opening panel movement can be halted at any time by pressing the roof opening panel switch again.

NOTE:

The roof opening panel will operate for 30 seconds after the ignition is turned off, provided that a front door is not opened.

ANTI-TRAP MECHANISM

If the roof opening panel encounters resistance when closing, it will stop and then open a set distance. This is to prevent serious injury or damage to the mechanism. The anti-trap mechanism can be overridden to allow the roof to be closed when movement is restricted, by dirt for example. To override the anti-trap mechanism, press and hold the front of the switch until the roof opening panel reaches the closed position.

ROOF OPENING PANEL BLIND

CAUTION:

To prevent damage to the roof opening panel blind mechanism the blind must not be operated manually.

NOTE:

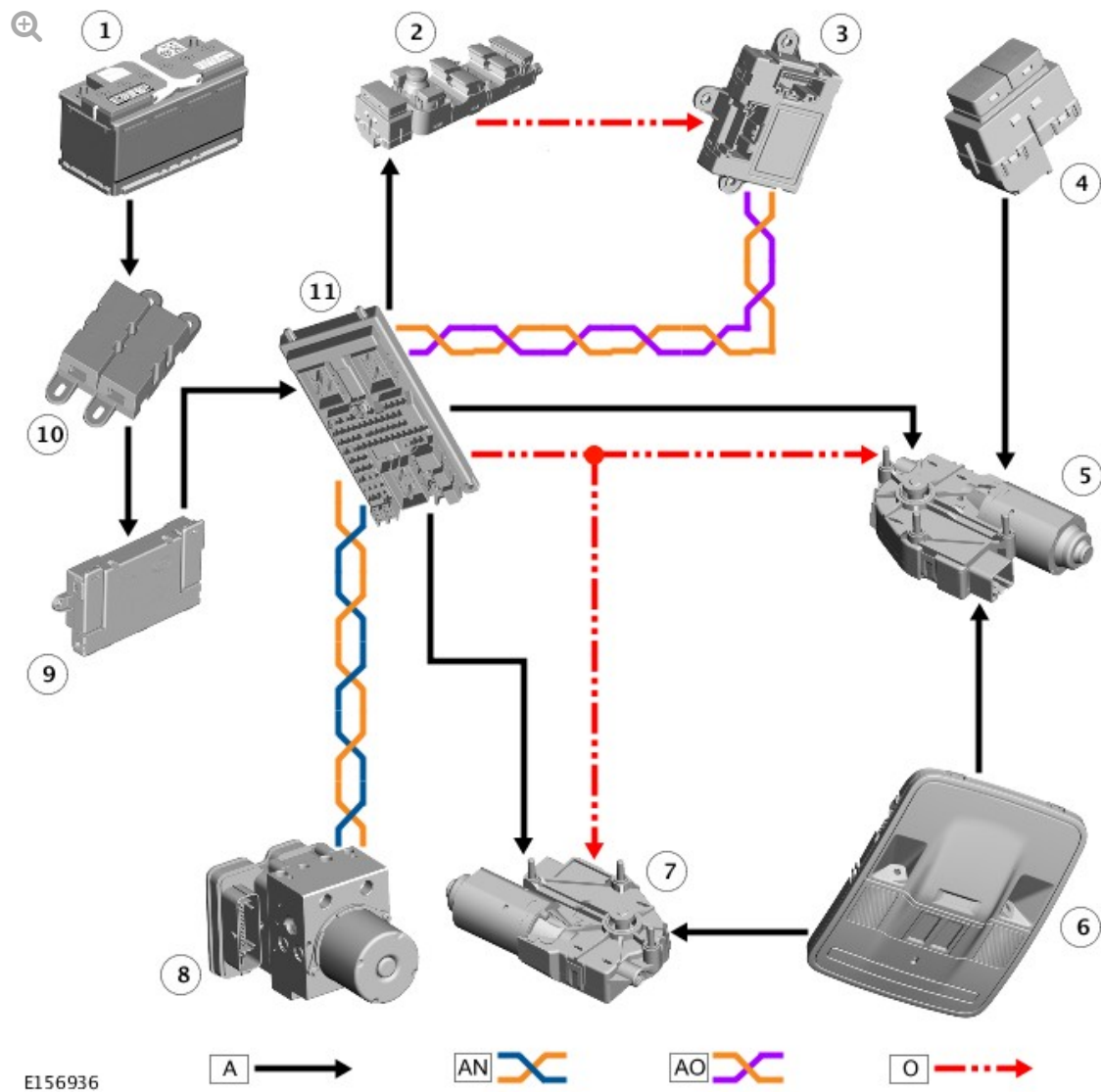
Global open/close functionality is enabled on the roof module.

One push of the front or rear roof opening panel blind switch will fully open

or close the blind. The blind is either fully open or closed and cannot be halted part way.

The roof opening panel blind opens automatically as the roof opening panel is opened, preventing wind affecting the blind. The blind cannot be closed fully when the roof opening panel is open.

CONTROL DIAGRAM



A = HARDWIRED CONNECTION; AN = HIGH SPEED CAN POWERTRAIN SYSTEMS; AO = MEDIUM SPEED CAN BODY SYSTEMS; O = LIN BUS.

ITEM	DESCRIPTION
1	Battery
2	Driver door switchpack

3	Driver door module
4	Rear roof opening panel blind switch
5	Roof opening panel blind motor
6	Front roof opening panel blind switch and roof opening panel switch
7	Roof opening panel motor
8	Anti-lock brake system control module
9	Battery junction box
10	Battery junction box 2
11	Central junction box