

Кузов — Стеклоочистители и омыватели

Land Rover Discovery Sport (L550) · Руководство по ремонту

Источник: lrdisc.com · разделов: 17

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Стеклоочистители и омыватели

Wipers and washers

- Headlamp Washer Jet (G1780361) / Removal and Installation
- Rain Sensor (G1780360) / Removal and installation
- Rear Window Wiper Pivot Arm (G1780367) / Removal and Installation
- Windshield Washer Reservoir (G1780365) / Removal and Installation
- Wiper Pivot Arm (G1780362) / Removal and Installation
- Wipers and Washers
- Wipers and Washers / Diagnosis and Testing

ne.

Third Row Seat Head Restraint (G1808277) / Removal and InstallationHeadlamp Washer Jet (G1780361) / Removal and Installation

ne.

Фара омыватель Jet / снятие и установка

Headlamp Washer Jet (G1780361) / Removal and Installation

REMOVAL AND INSTALLATION

REMOVAL

NOTES:

- *Removal steps in this procedure may contain installation details.*
- *Left shown, right is similar.*

WARNING:

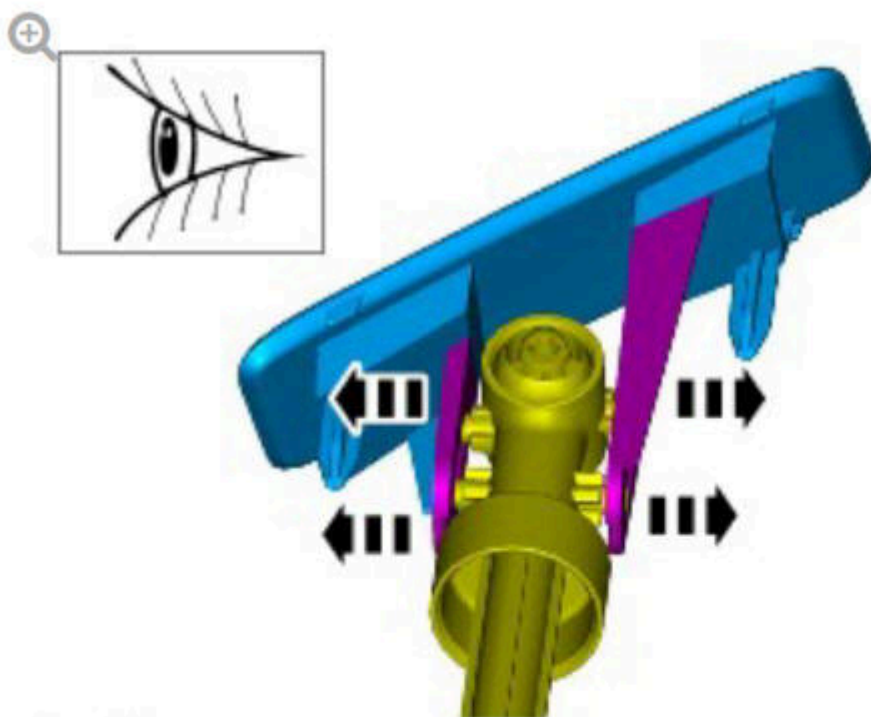
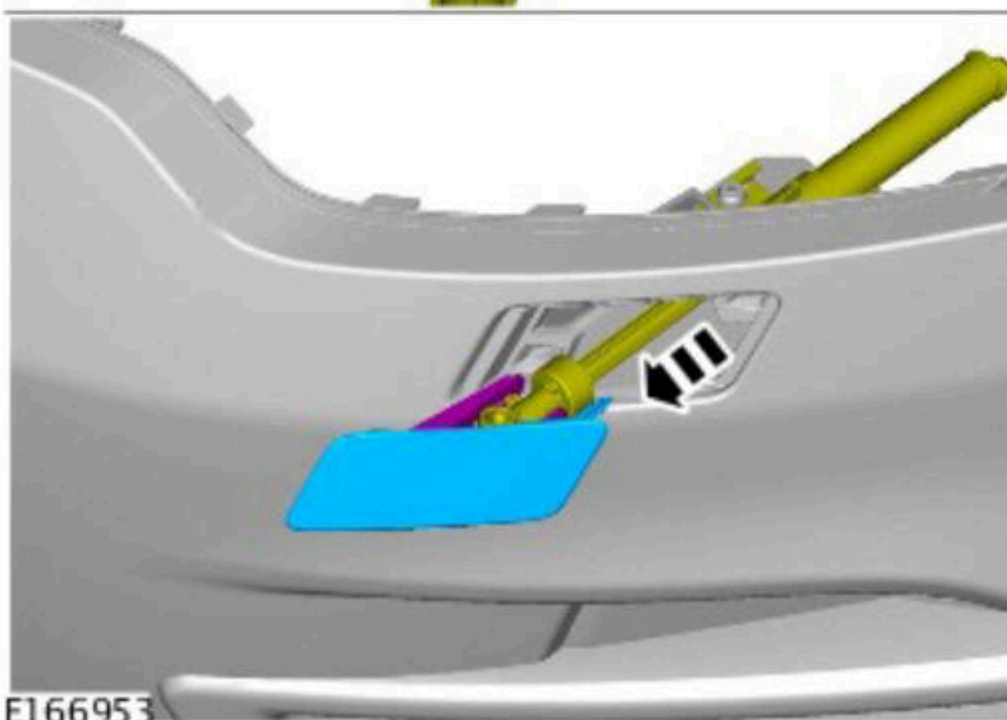
Make sure to support the vehicle with axle stands.

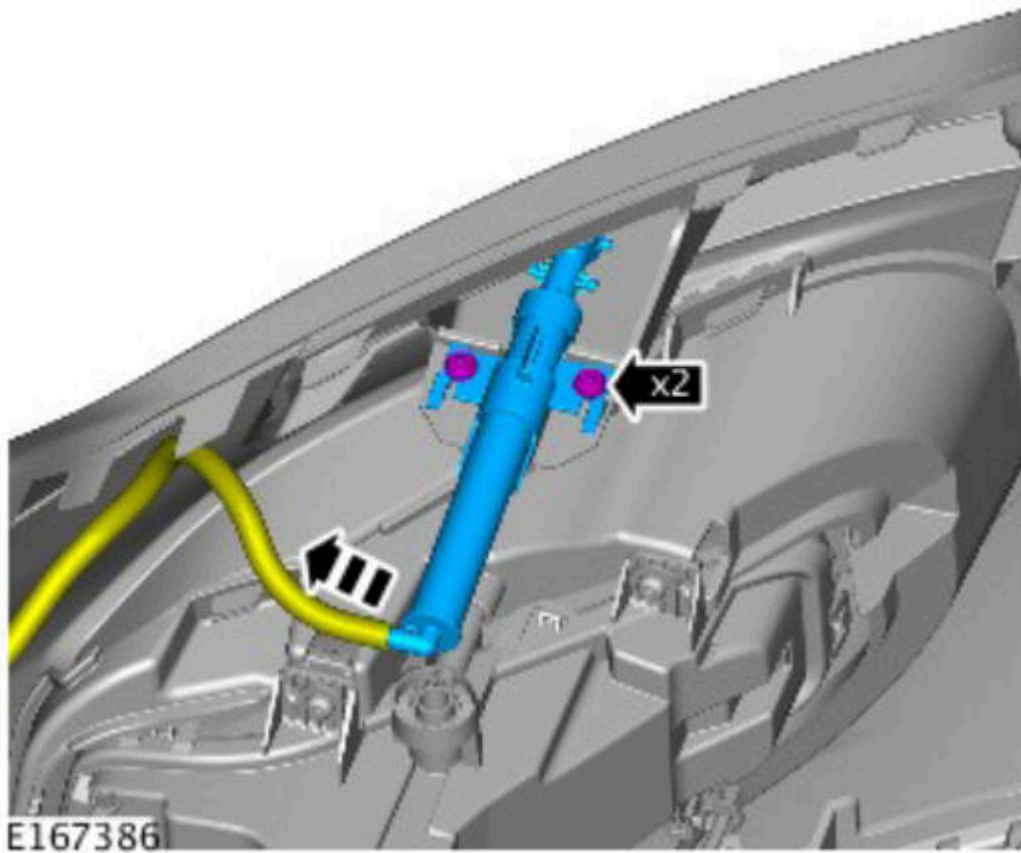
Raise and support the vehicle.

Refer to: Front Bumper Cover (501-19, Removal and Installation).

WARNING:

Carefully release either side of the component to avoid damage.





INSTALLATION

To install, reverse the removal procedure.

Headlamp washer pump (G1780366) removal and installation

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

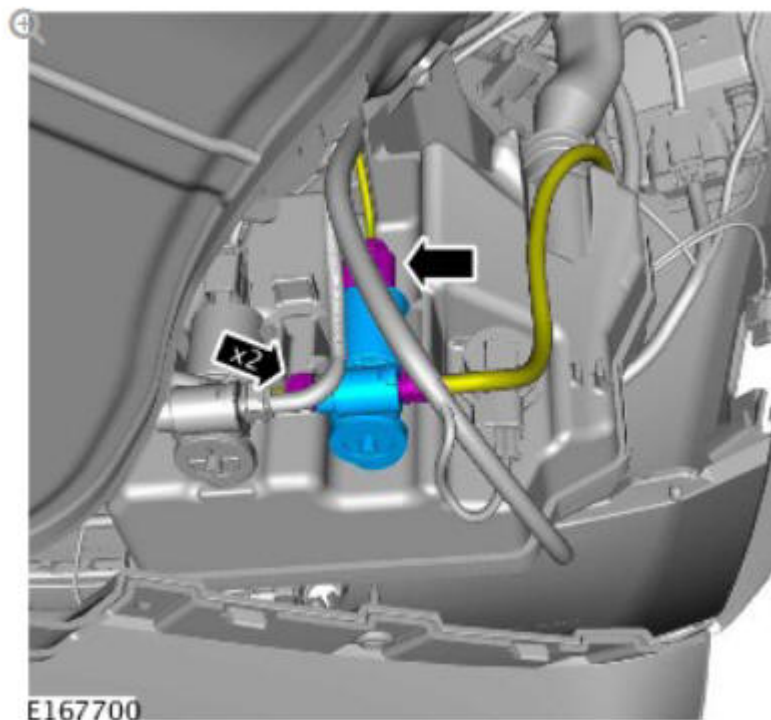
NOTE:

RH side only.

Refer to: Fender Splash Shield (501-02, Removal and Installation).

CAUTION:

Be prepared to collect escaping fluids.



INSTALLATION

To install, reverse the removal procedure.

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Wipers and washersRain Sensor (G1780360) / Removal and installation

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Дождь датчик / снятие и установка

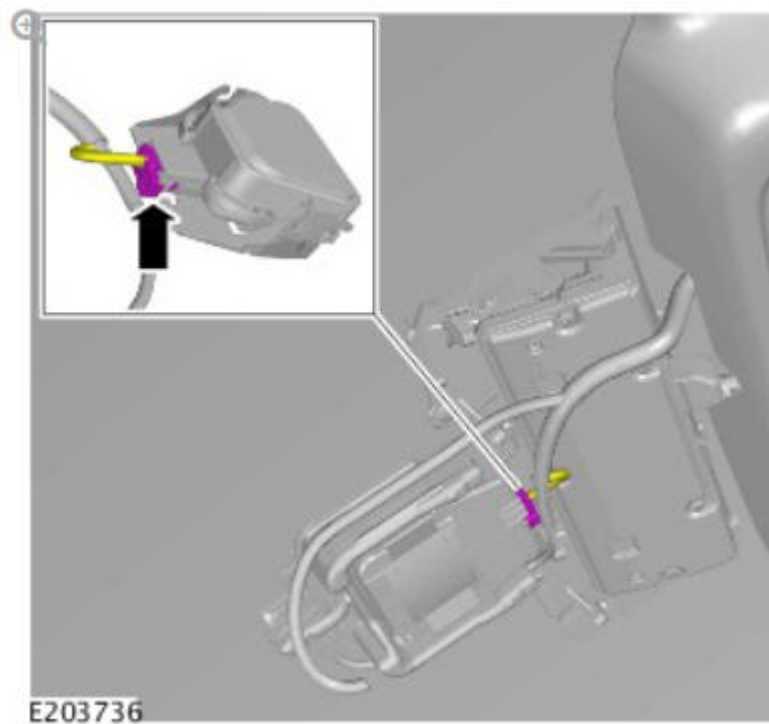
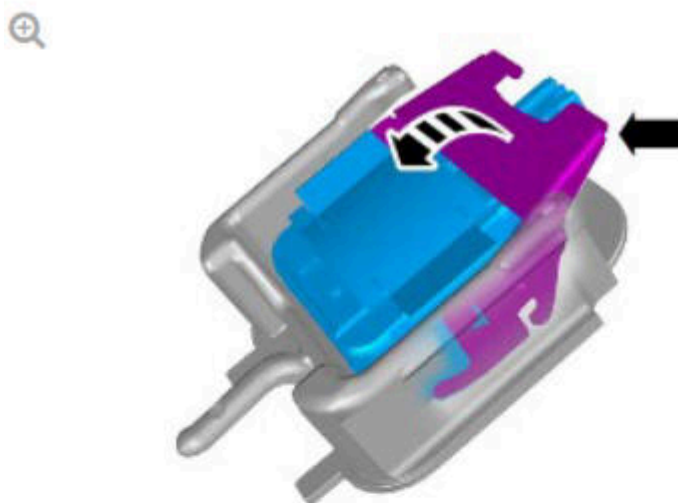
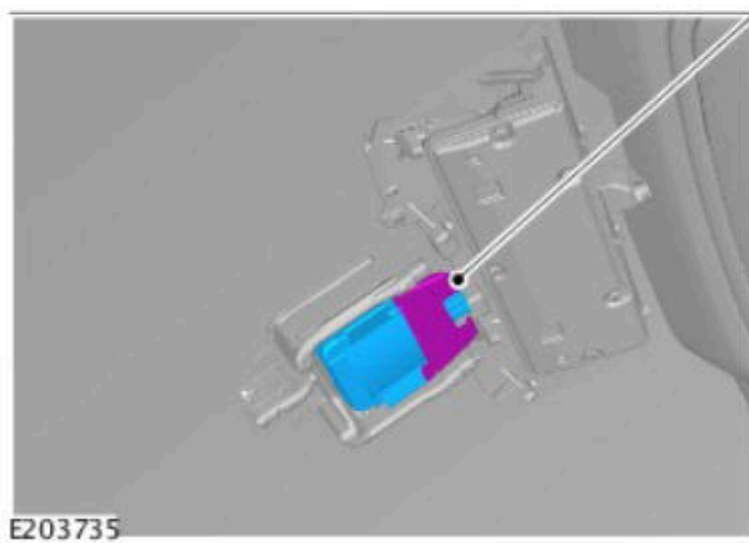
Rain Sensor (G1780360) / Removal and installation

REMOVAL

NOTES:

- *Removal steps in this procedure may contain installation details.*
- *Make sure the ignition is OFF at all times during the replacement procedure.*

Refer to: Interior Rear View Mirror (501-09 Rear View Mirrors, Removal and Installation).



INSTALLATION
NOTES:

- *Make sure the rain/light sensor windshield area is clear and clean of any contamination inside and out.*
- *Prior to switch the ignition ON first time after the rain/light sensor replacement please allow at least 10 minutes for the gel pad to adhere to the windshield surface.*
- *If the original rain/light sensor is to be reinstalled, configure and calibrate using Land Rover approved diagnostic equipment.*

To install, reverse the removal procedure.

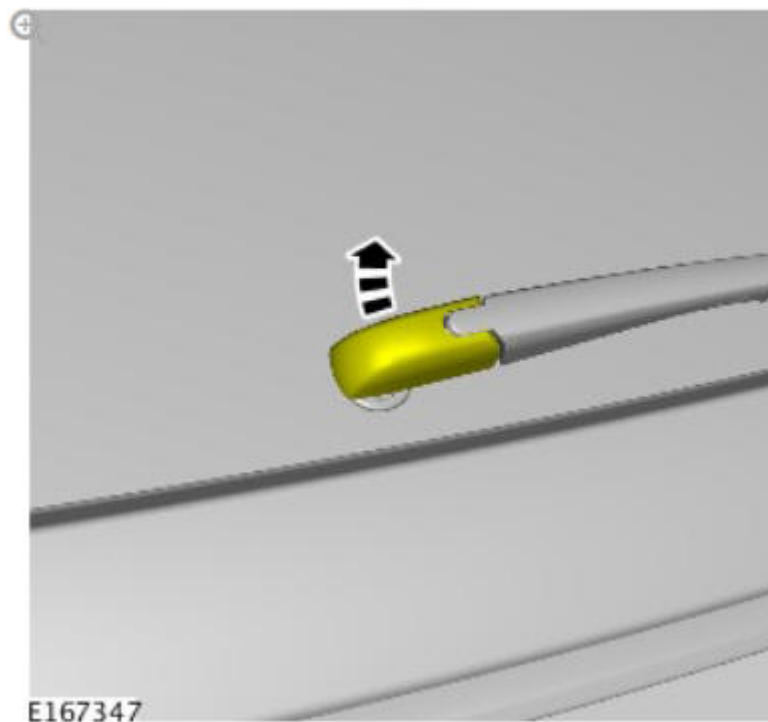
Rear window wiper motor (G1780359) removal and installation

REMOVAL

NOTE:

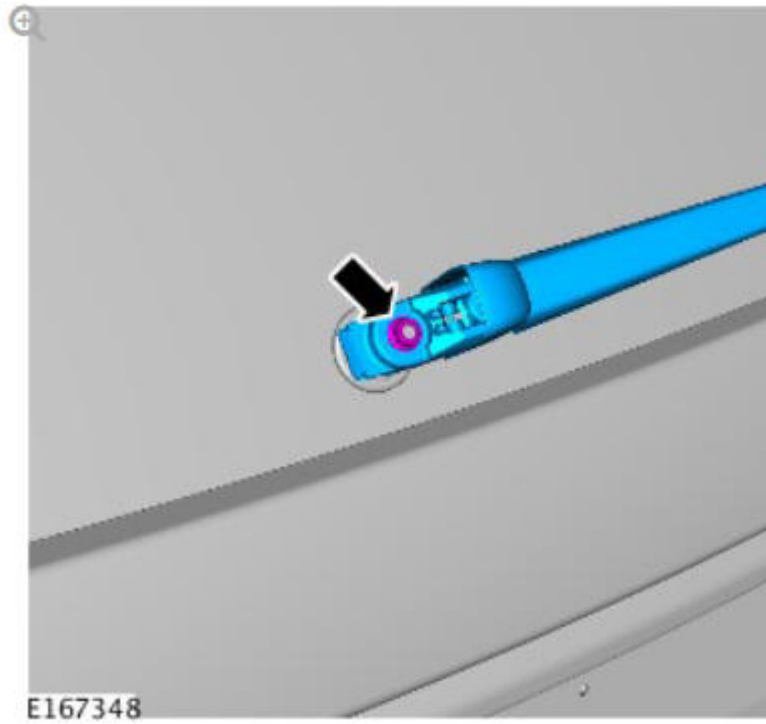
Removal steps in this procedure may contain installation details.

Refer to: Liftgate Trim Panel (501-05, Removal and Installation).

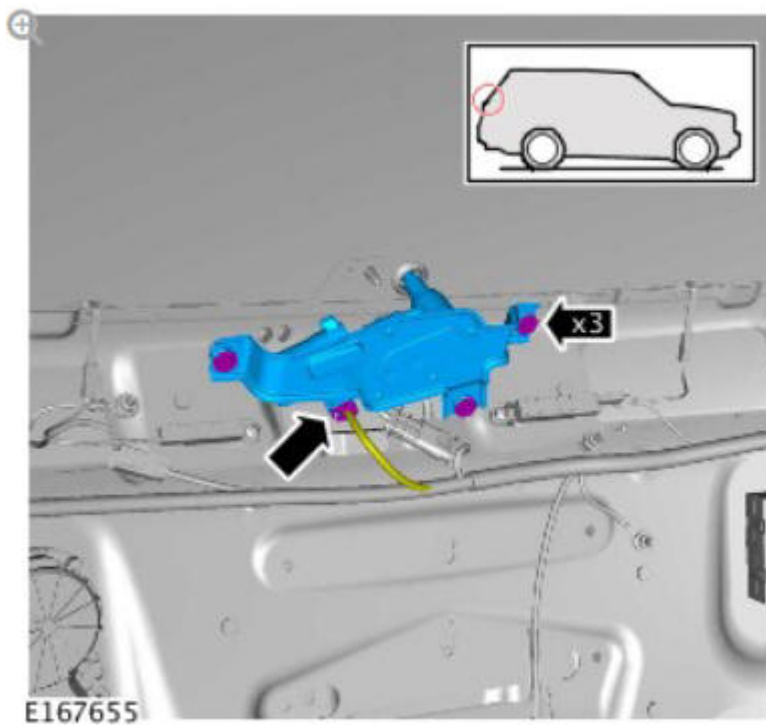


NOTE:

Make sure that this component is installed to the noted removal position.



Torque: 5.4 Nm



Torque: 5.4 Nm

INSTALLATION

To install, reverse the removal procedure.

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Headlamp Washer Jet (G1780361) / Removal and InstallationRear Window Wiper Pivot Arm (G1780367) / Removal and Installation

ne

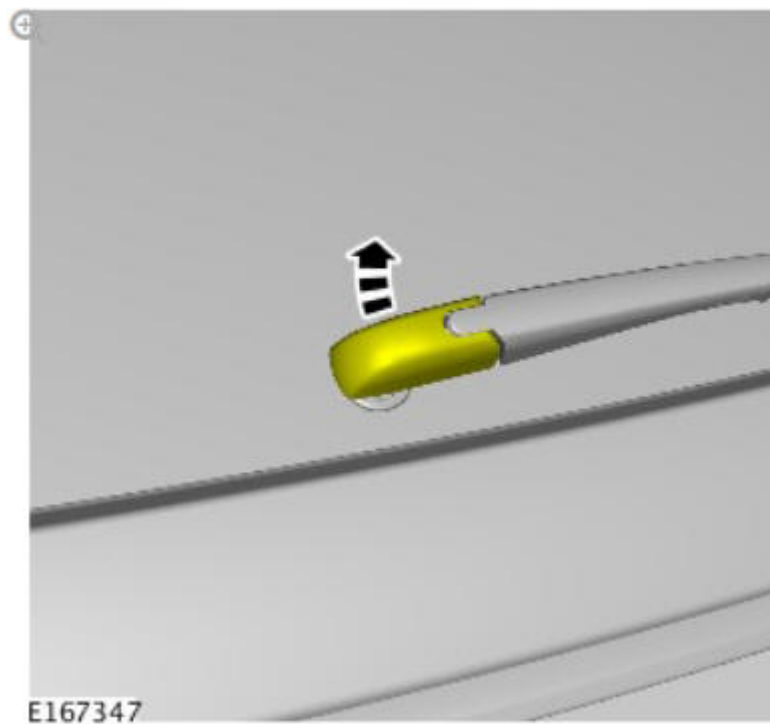
Задний стекло стеклоочиститель ось рычаг / снятие и установка

Rear Window Wiper Pivot Arm (G1780367) / Removal and Installation

REMOVAL

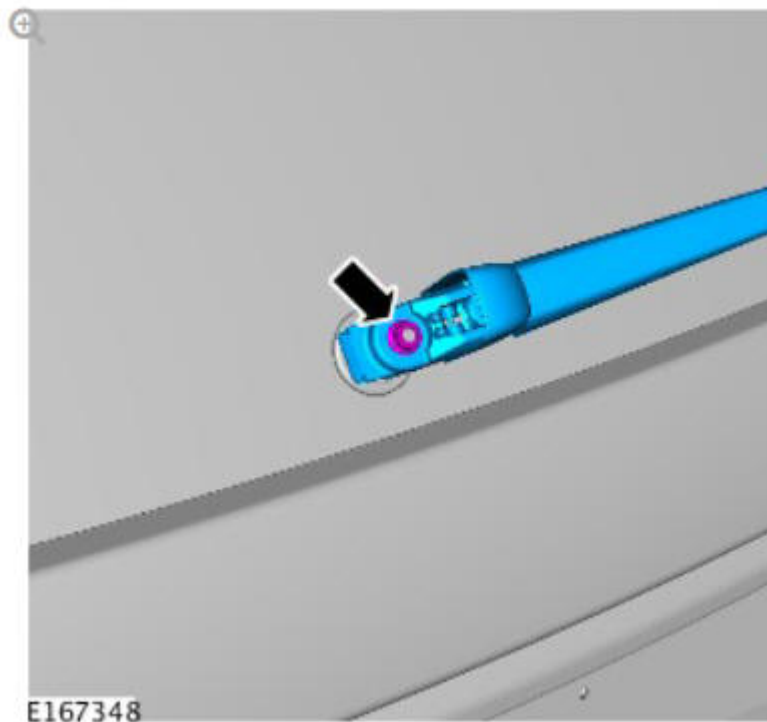
NOTE:

Removal steps in this procedure may contain installation details.



NOTE:

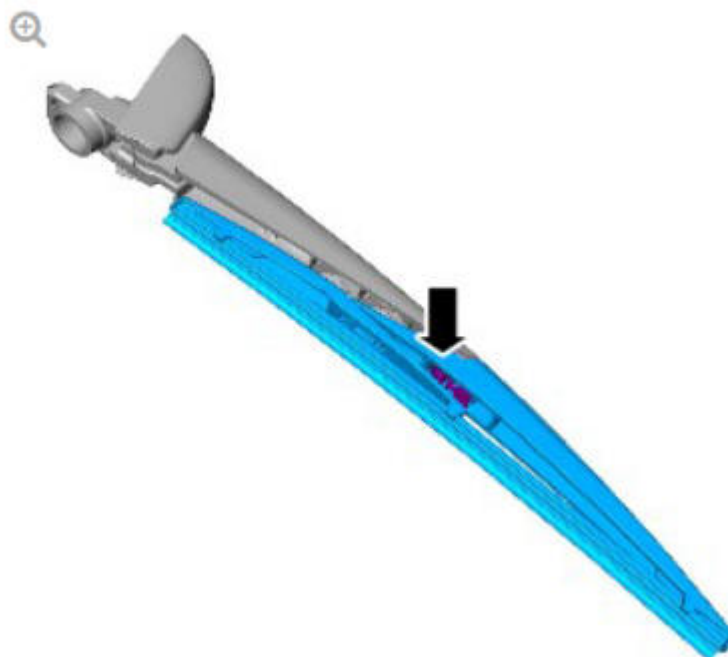
Make sure that this component is installed to the noted removal position.



Torque: 5.4 Nm

NOTE:

Do not disassemble further if the component is removed for access only.



INSTALLATION

To install, reverse the removal procedure.

Windshield washer pump (G1780364) removal and installation

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

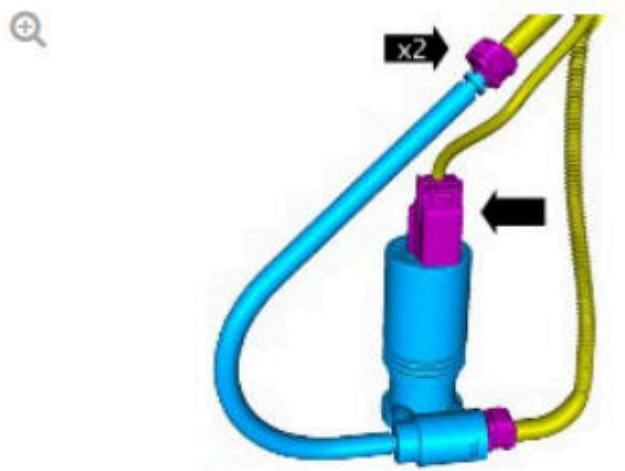
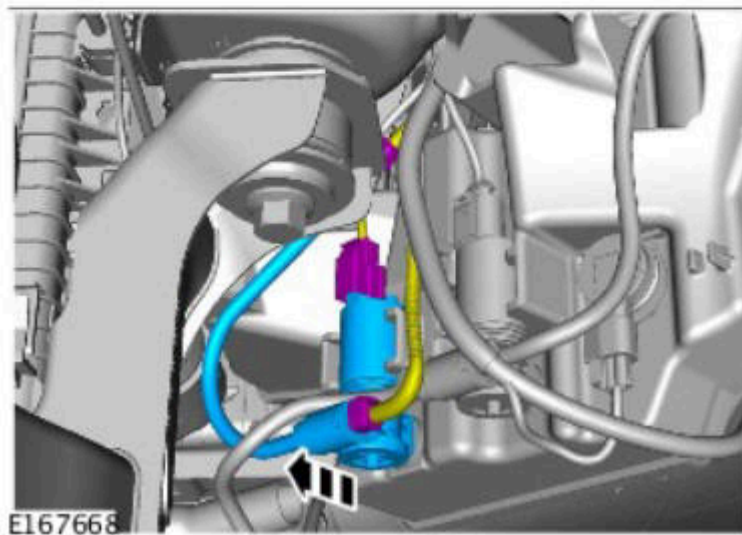
NOTE:

Right side only.

Refer to: Fender Splash Shield (501-02, Removal and Installation).

CAUTION:

Be prepared to collect escaping fluids.



INSTALLATION

To install, reverse the removal procedure.

ne

Rain Sensor (G1780360) / Removal and installation
Windshield Washer Reservoir (G1780365) / Removal and Installation

ne

Лобовое стекло бачок омывателя / снятие и установка

Windshield Washer Reservoir (G1780365) / Removal and Installation

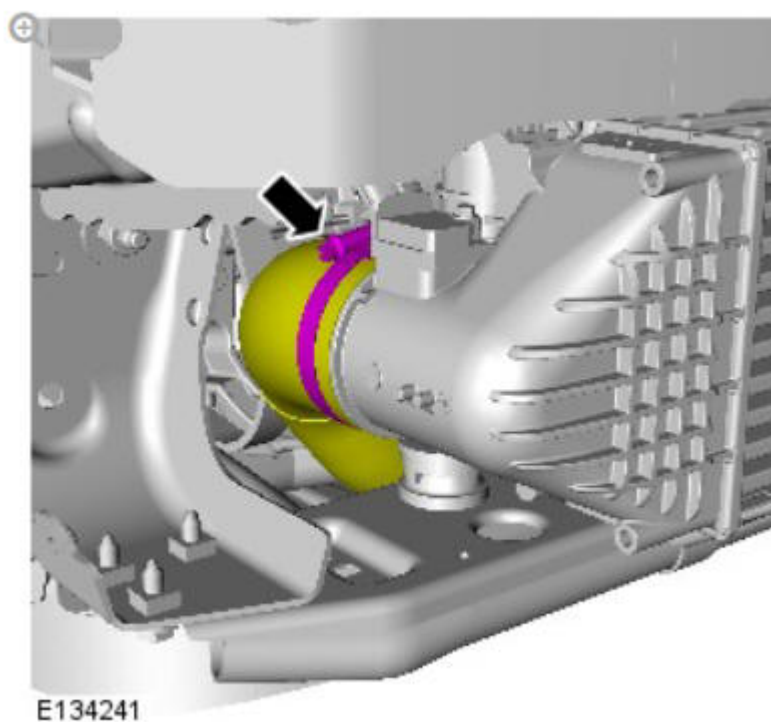
REMOVAL

WARNING:

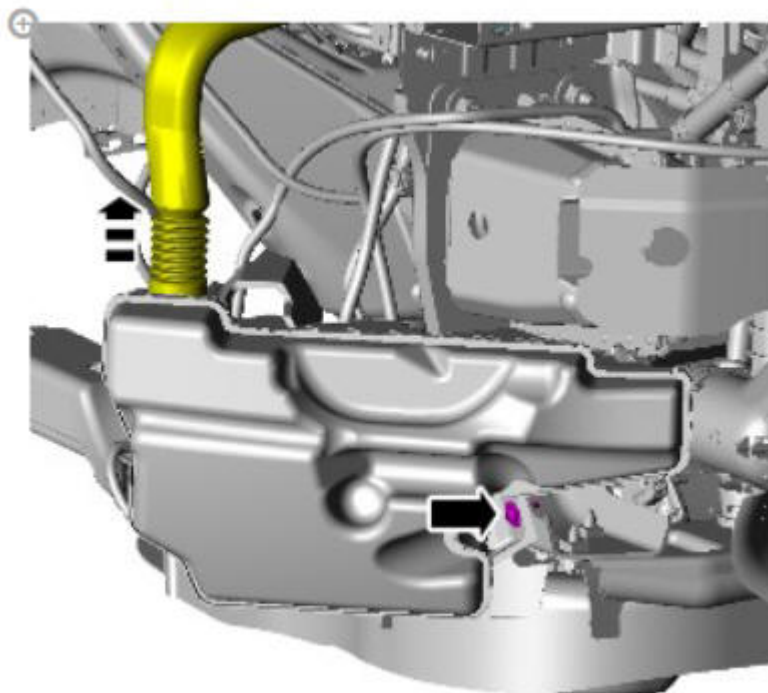
Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

Refer to: Front Bumper Cover (501-19, Removal and Installation).

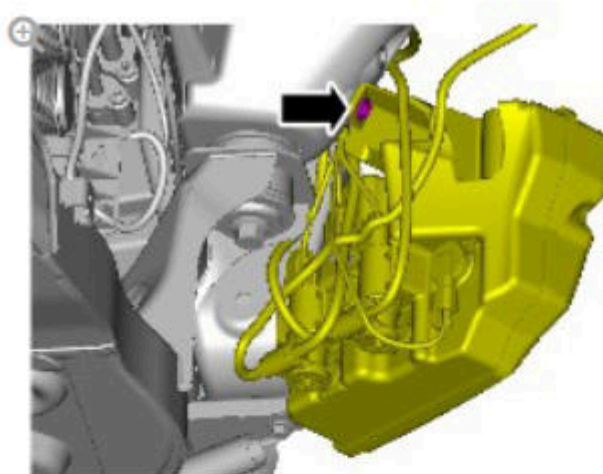
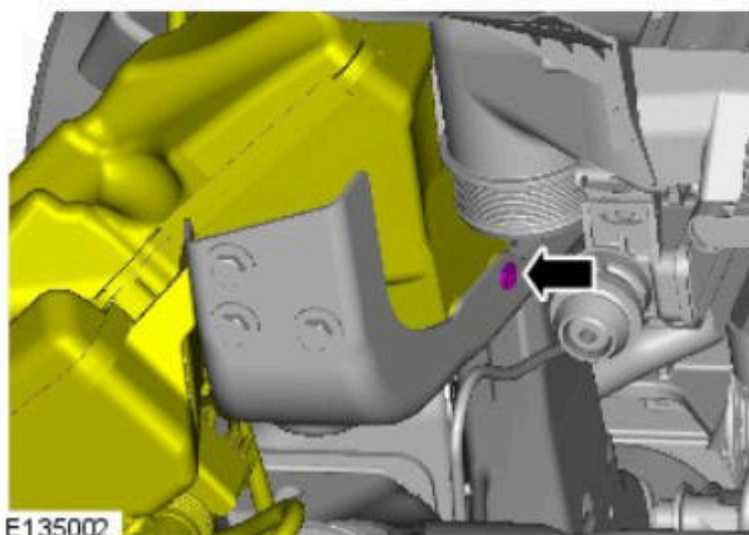


Torque: 5 Nm



E135004

Torque: 4.1 Nm

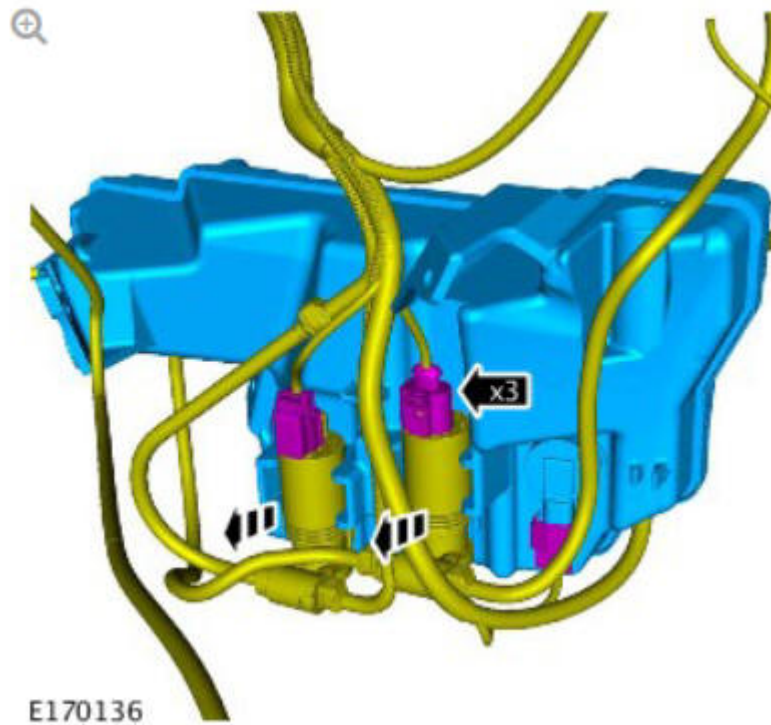


E135002

Torque: 4.1 Nm

CAUTION:

Be prepared to collect escaping fluids.



INSTALLATION

To install, reverse the removal procedure.

Windshield wiper motor (G1780358) removal and installation

REMOVAL

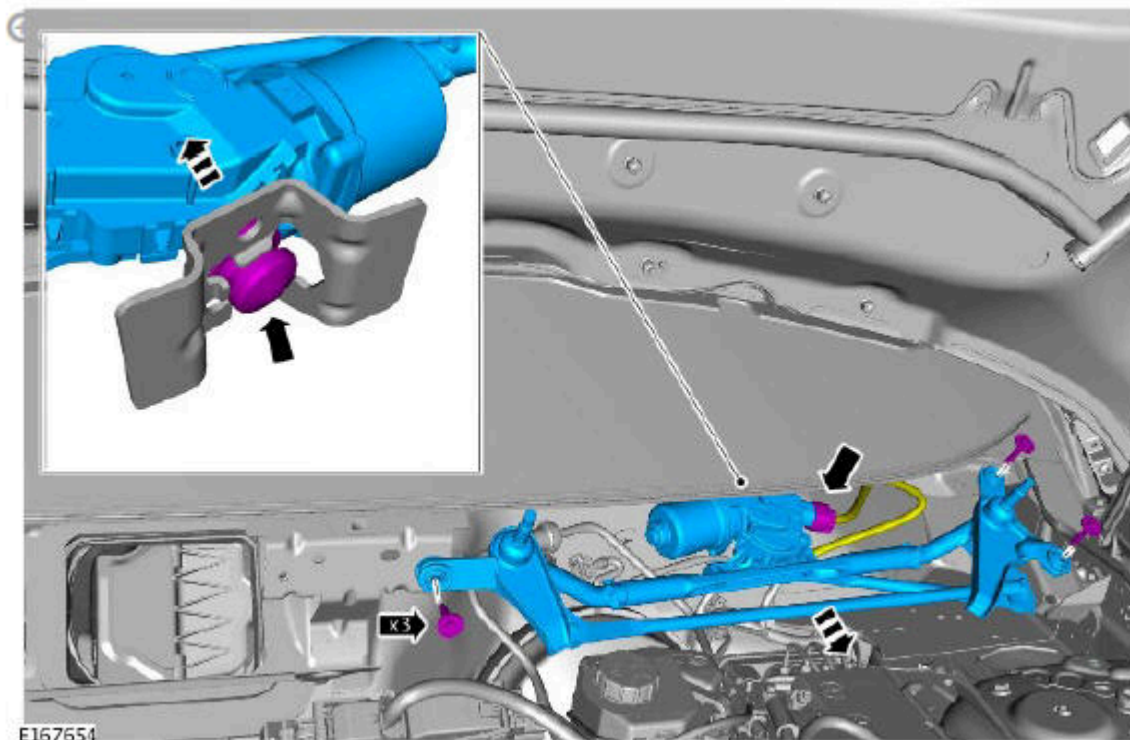
NOTE:

Removal steps in this procedure may contain installation details.

Refer to: Plenum Chamber (412-01, Removal and Installation).

NOTE:

LHD illustration shown, RHD is similar.



Torque: 8 Nm

INSTALLATION

To install, reverse the removal procedure.

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Rear Window Wiper Pivot Arm (G1780367) / Removal and InstallationWiper Pivot Arm (G1780362) / Removal and Installation

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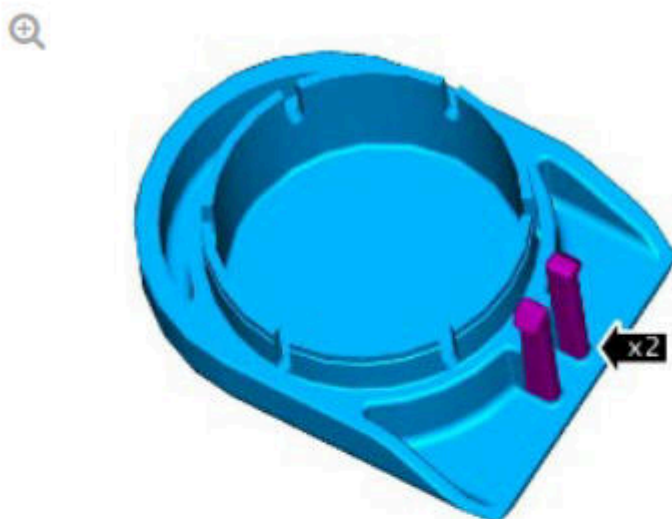
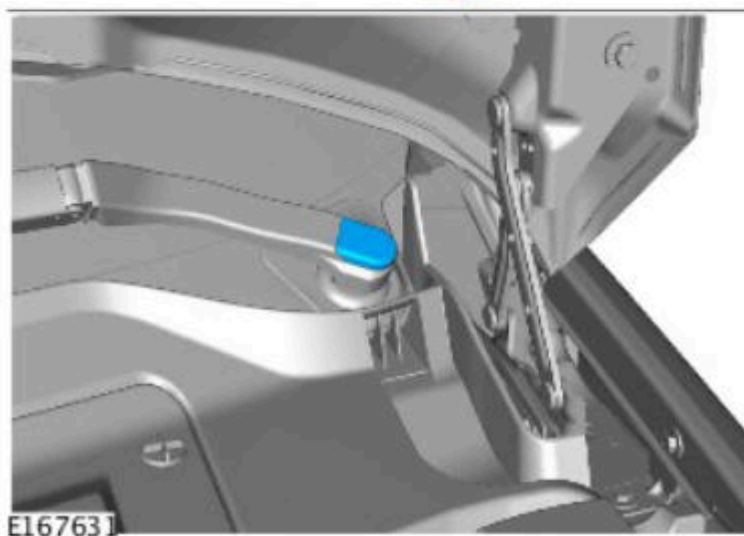
Стеклоочиститель ось рычаг / снятие и установка

Wiper Pivot Arm (G1780362) / Removal and Installation

REMOVAL

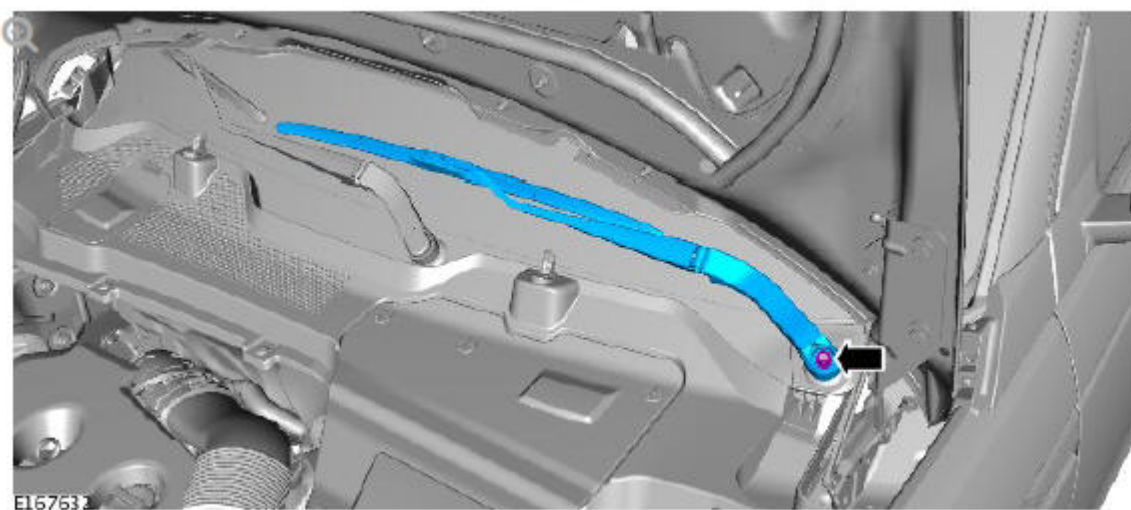
NOTES:

- Removal steps in this procedure may contain installation details.
- LHD illustration shown, RHD is similar.



CAUTION:

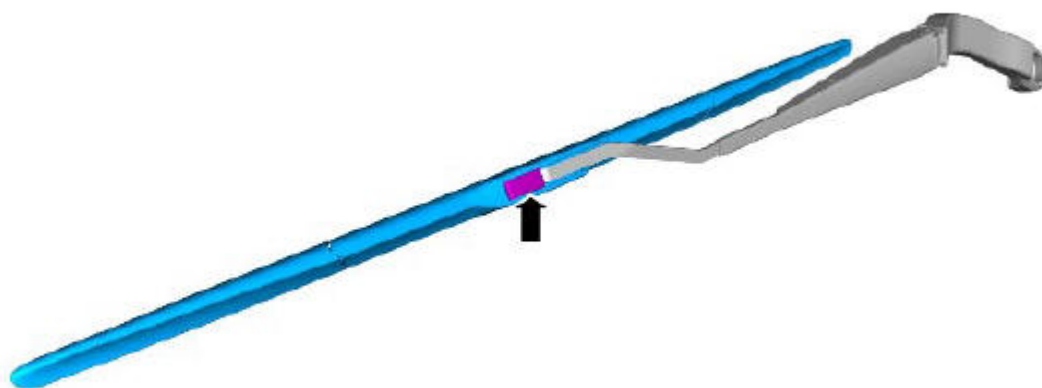
Note the installed position of the component prior to removal.



Torque: 25 Nm

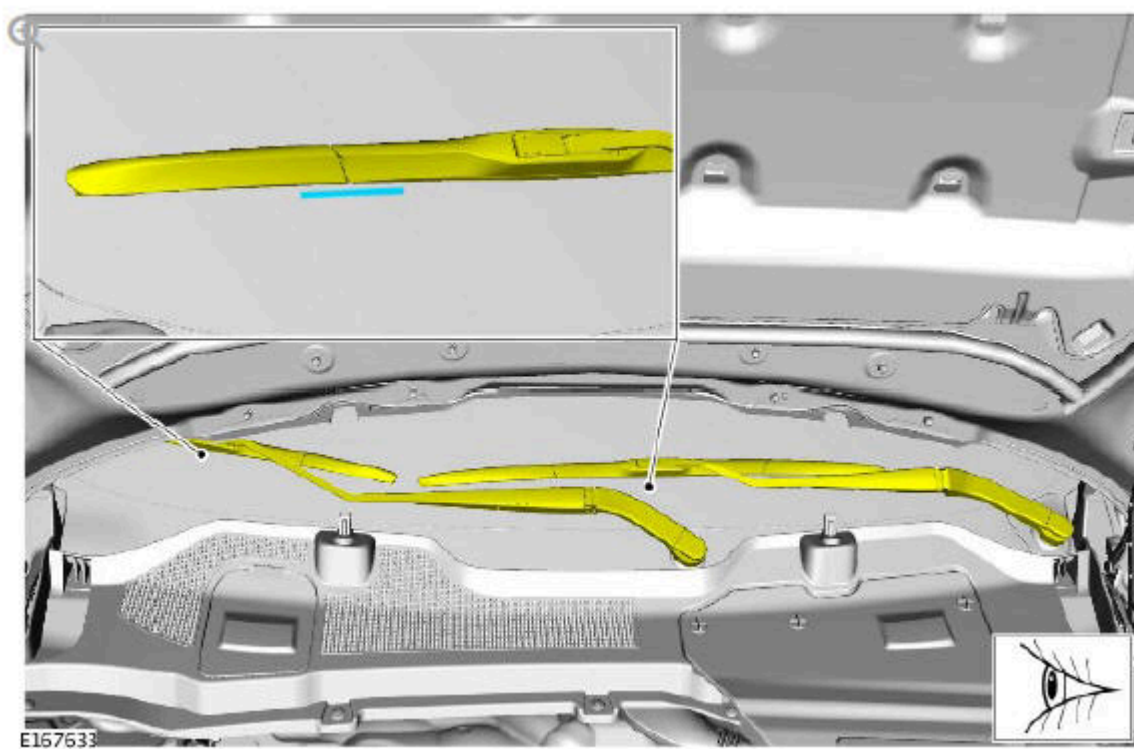
NOTE:

Do not disassemble further if the component is removed for access only.



E167630

INSTALLATION



E167633

To install, reverse the removal procedure.

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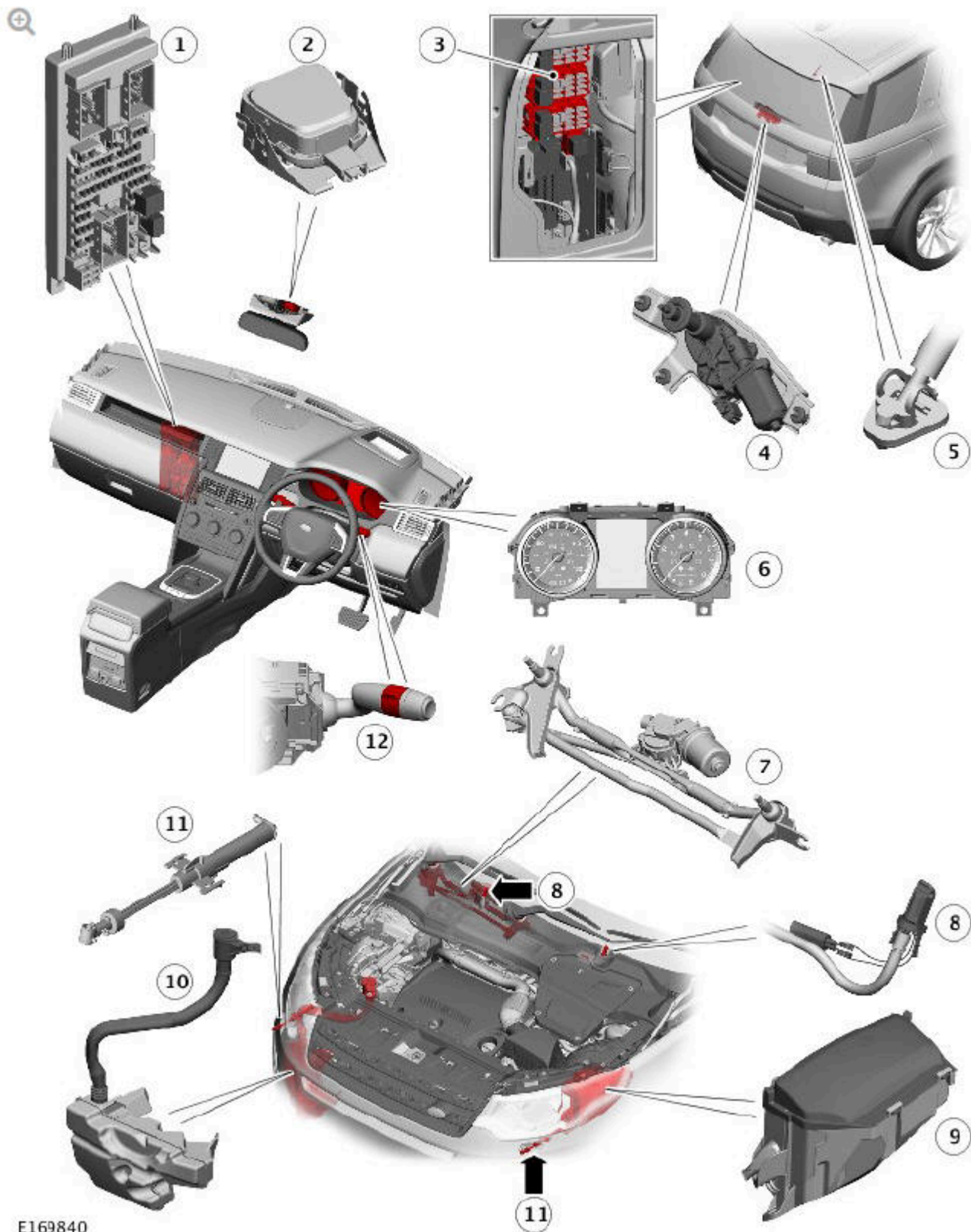
Windshield Washer Reservoir (G1780365) / Removal and InstallationWipers and Washers

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Стеклоочистители и омыватели

Wipers and Washers

COMPONENT LOCATION



E169840

1. Central Junction Box (CJB)
2. Rain/light sensor
3. Rear Junction Box (RJB)
4. Rear window wiper motor
5. Rear window washer jet
6. Instrument Cluster (IC)
7. Windshield wiper motor and linkage assembly
8. Windshield washer jet

9. Engine Junction Box (EJB)
10. Windshield washer reservoir
11. Headlamp washer jet (2 off)
12. Right steering wheel switchpack

OVERVIEW

Windshield wiper and washer operation is controlled by the Central Junction Box (CJB) in response to driver inputs and if fitted, signals from the rain/light sensor.

The wiper and washer system comprises:

- Windshield wiper motor and linkage assembly
- Windshield washer jets - located in cowl panel
- Rear window wiper motor
- Rear window washer jet - located in rear spoiler
- Headlamp washer (if fitted)
- Rain/light sensor (if fitted).

The windshield wipers have five operational states:

- Intermittent wipers - vehicles without rain/light sensor
- Automatic wipers - vehicles with rain/light sensor - automatic wipers can be disabled to operate as intermittent via the Instrument cluster (IC) menu.
- Flick wipe
- Windshield wash and wipe
- Slow wipe
- Fast wipe.

The rear window wiper has three operational states as follows:

- Rear window wash and wipe
- Intermittent rear window wipe
- Continuous rear window wipe.

A windshield washer reservoir contains washer fluid which is used by both the front and rear wipers and the headlamp washers (if fitted).

The headlamp washers (if fitted) use a dedicated headlamp washer pump located in the reservoir. The front and rear washers share a single washer pump.

On vehicles with a rain/light sensor, the wipers have an 'Auto' function. The 'Auto' function uses an output from the rain/light sensor to the CJB on a Local Interconnect Network (LIN) bus to provide automatic operation of the windshield wipers. The rain/light sensor is mounted on the inner surface of the windshield and transmits infra-red light to determine the amount of water on the outer surface of the windshield.

DESCRIPTION

- Windshield Wiper Motor and Linkage Assembly - Description
- Rear Window Wiper and Motor - Description
- Windshield Washer Reservoir - Description
- Headlamp Washers - Description
- Rain/Light Sensor (If Fitted) - Description
- Wipers and Washers Control Switch - Description
- Windshield Wiper Fast/Slow/Single Wipe - Operation
- Rear Window Wiper - Operation
- Headlamp Washers - Operation

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Wiper Pivot Arm (G1780362) / Removal and Installation
Windshield Wiper Motor and Linkage Assembly - Description

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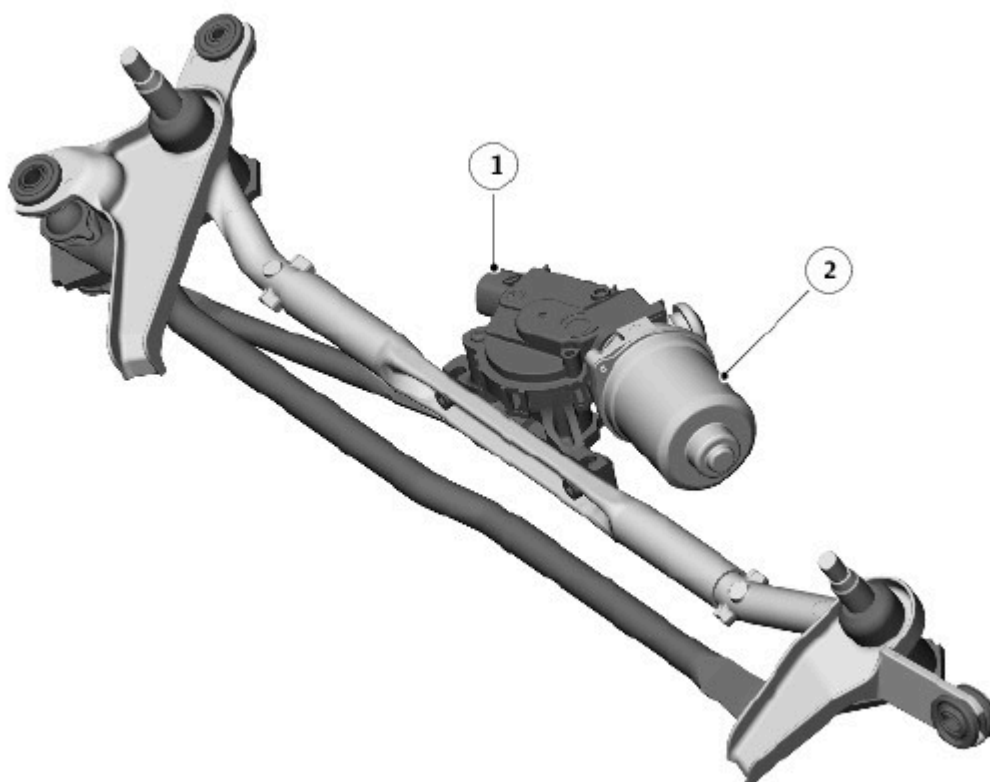
Лобовое стекло мотор стеклоочистителя и тяга в сборе - описание

Windshield Wiper Motor and Linkage Assembly - Description

Windshield Wiper Motor

NOTE:

Right Hand Drive (RHD) wiper assembly shown



41

1. Electrical connector
2. Electric windshield wiper motor

The windshield wiper motor comprises a 12V electric motor and gear wheel and worm drive, contained in an integral housing.

The windshield wiper motor drives an integral gear wheel via a worm drive attached to the motor spindle. The gear wheel has a central spigot which provides the attachment point for the motor crank. The windshield wiper motor and linkage assembly are a single component and cannot be replaced separately.

The motor assembly is connected to the vehicle harness by a four pin electrical connector. The electrical connector provides two battery voltage feeds from a fast/slow wiper relay in the Battery Junction Box (BJB), a wiper park feed from the Central Junction Box (CJB), and a ground path for the motor assembly.

The wiper motor is prevented from operating when the hood is open. If the vehicle speed is more than 3 km/h (1.9 mph) the CJB considers the hood closed and the wiper motor will operate.

The motor contains a park switch which is connected to the CJB. When the motor is switched off, the CJB detects the park switch opening and stops the windshield wiper motor in the park position.

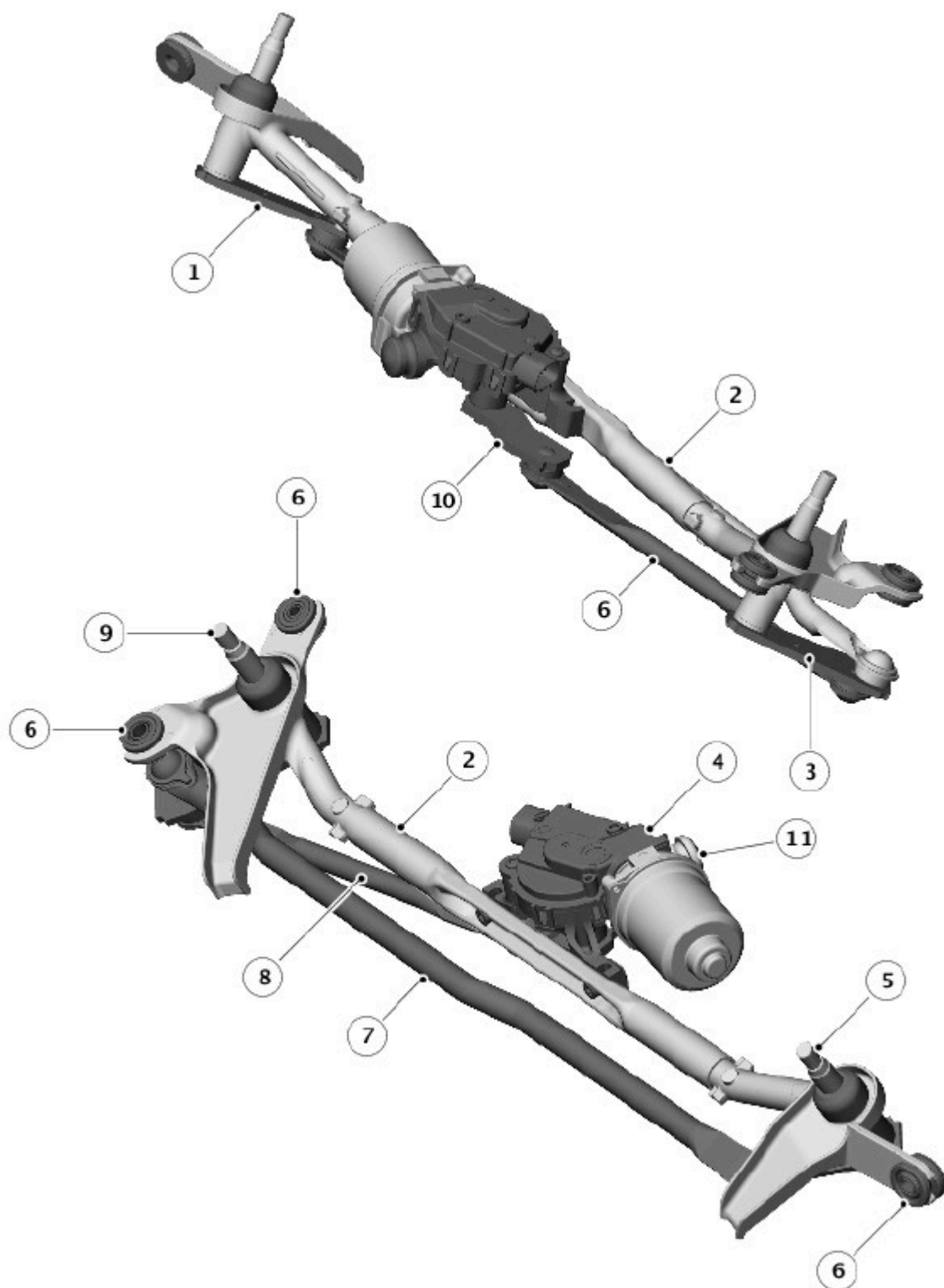
If the windshield wipers or the linkage become obstructed, the CJB will remove power to the windscreen wiper motor if the park signal does not change state within 6 seconds. The wiper motor will remain disabled until the obstruction is cleared or an alternative active wiper mode is selected.

Three disable events are allowed until a 180 second disable period is activated or until the next ignition cycle when the event counter will be reset to zero.

Windshield Wiper Linkage

NOTE:

Right Hand Drive (RHD) wiper assembly shown



E169842

1. Pivot crank
2. Main tube
3. Pivot crank
4. Motor assembly
5. Pivot - left windshield wiper arm
6. Rubber mounting (3 off)
7. Link rod
8. Link rod
9. Pivot - right windshield wiper arm
10. Motor crank

11. Rubber mounting

The windshield wiper motor and linkage assembly differs between Left Hand Drive (LHD) and Right Hand Drive (RHD) models. The wiper linkage and motor assembly are not available as separate service components.

The windshield wiper motor and linkage assembly is attached to the vehicle body with screws and washers at each end. The screws are located in rubber bushes in the wiper linkage assembly which isolate the assembly from the vehicle body. A rubber mounting is located behind the motor and engages on a spigot on the vehicle body to locate the linkage assembly.

The windshield wiper motor and linkage assembly comprises a main tube with a pivot housing assembly located at each end. The motor assembly is attached to the tube by two screws. The motor output shaft is fitted with a crank. A link rod is connected to the motor crank and is connected at the opposite end to one of the pivots via a crank. The connection changes with the drive hand of the vehicle. The driven pivot crank is fitted with a second link rod which is connected directly to the crank on the opposite pivot assembly

The motor crank converts rotary motion from the motor output shaft into linear movement of the link rods. The cranks connected to each pivot, convert the linear motion of the link rods back to rotary motion of the pivots. This rotary motion is passed to the wiper arms and blades causing the blades to wipe a reciprocating arc across the windshield.

Each wiper arm is located on a taper spline on the respective pivot. A nut is screwed on the end of the pivot shaft and positively secures the wiper arm on the taper spline.

The wiper blades are attached to the wiper arms with quick release fittings.

The wiper arms are spring loaded to maintain a constant wiper blade pressure on the windshield. The wiper blades are of the conventional blade type with the wiper blade supported on two pivoting yokes which apply an even pressure along the length of the wiper blade and allow the wiper blade to curve and match the windshield profile throughout their arc.

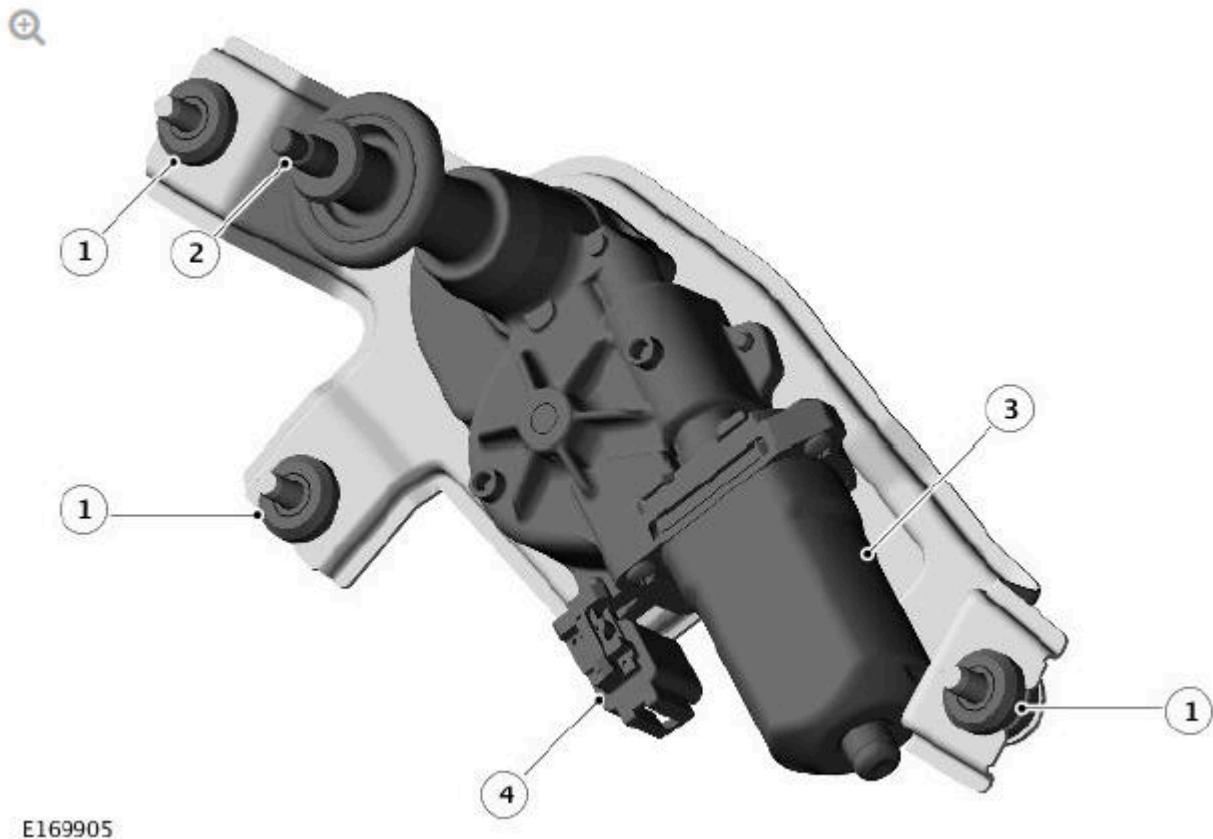
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Wipers and WashersRear Window Wiper and Motor - Description

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Задний стекло стеклоочиститель и электродвигатель - описание

Rear Window Wiper and Motor - Description



1. Rubber mounting (3 off)
2. Pivot
3. Motor assembly
4. Electrical connector

The single speed rear window wiper motor is mounted on the inner panel of the tailgate and is secured with three bolts. Three rubber bushes isolate the rear window wiper motor assembly from the tailgate.

The rear window wiper motor drives an integral gear wheel via a worm drive attached to the motor spindle. The gear wheel is fitted with a crank which in turn is connected to the rear window pivot. The crank converts the rotary motion of the gear wheel into the required reciprocating arc to wipe the rear window.

The rear window wiper motor is controlled by the CJB. Power is supplied via the Rear Junction Box (RJB). Power is supplied to the motor through an Radio Frequency (RF) filter which removes electrical interference which may interfere with radio signals to the audio antennas. The motor contains a park switch which is connected to the CJB. When the motor is switched off, the CJB detects the park switch opening and stops the rear window wiper motor in the park position. The RF filter also provides a feedback signal to the CJB. If the rear wiper becomes obstructed, the CJB will remove power to the rear wiper motor if the park signal does not change state within 6 seconds. The rear wiper motor will remain disabled until the obstruction is cleared. Three disable events are allowed until a 180 second disable period is activated or until the next ignition cycle when the event counter will be reset to zero.

The rear window wiper motor is disabled if the CJB detects that the tailgate has been opened.

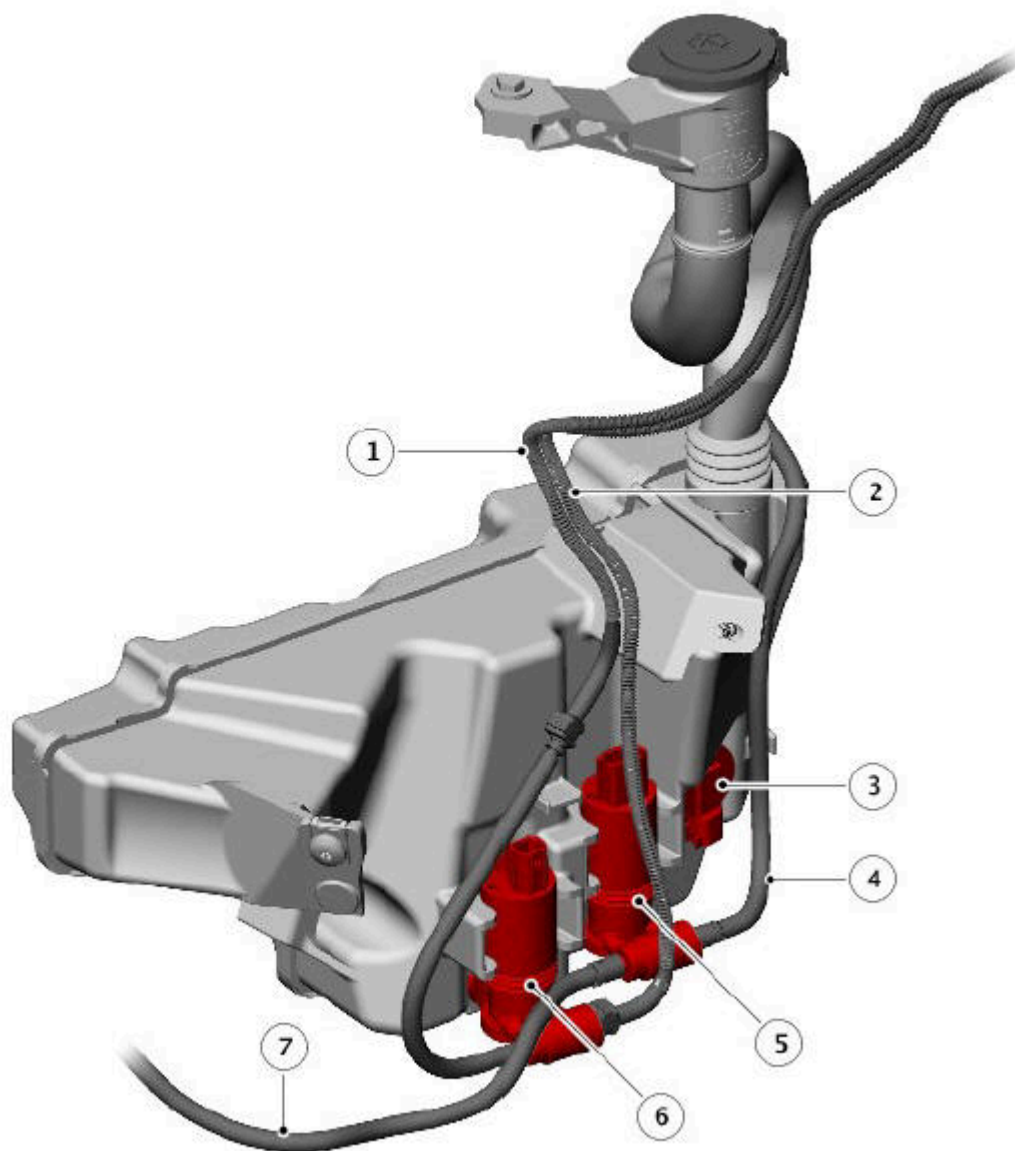
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Windshield Wiper Motor and Linkage Assembly - DescriptionWindshield Washer Reservoir - Description

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Лобовое стекло бачок омывателя - описание

Windshield Washer Reservoir - Description



E169843

1. Windshield washer supply hose
2. Rear window washer supply hose
3. Washer fluid level sensor
4. Right headlamp washer supply hose
5. Headlamp washer pump
6. Front/rear washer pump
7. Left headlamp washer supply hose

The windshield washer reservoir is located in the front of the right wheel arch, behind the wheel arch liner. The windshield washer reservoir is a plastic molding and is secured in the wheel arch with two bolts and a screw.

A level sensor is located in the windshield washer reservoir and is connected to the Central Junction Box (CJB). A windshield washer pump and a headlamp washer pump are located at the base of the windshield washer reservoir. The windshield washer pump supplies washer fluid to the windshield washer jets or the rear window washer jet. The headlamp washer pump supplies fluid to the left and right headlamp washer jets.

A filler cap is located at the top of the windshield washer reservoir and is accessible from the engine compartment.

The washer pumps are located in rubber sealing grommets in holes in the windshield washer reservoir and secured with clips. The washer fluid hoses have quick release connectors which mate with the pumps. The fluid level sensor is a push fit into a sealing grommet in one side of the windshield washer reservoir body.

The windshield washer pump is a bi-directional pump, Rotation of the pump in one direction pumps washer fluid to the windshield washer jets, the opposite direction pumps washer fluid to the rear window washer jet. The change of pump rotation is controlled by the CJB changing the polarity of the voltage supplied to the windshield washer pump motor via two relays in the CJB.

The windshield washer jets are located in the cowl panel, below the windshield. The windshield washer jets can be heated on some models.

Power for the heating elements in the jets is supplied from the CJB. The heater elements are active at all times when the engine is running.

The rear window washer jet is located in the underside of the rear spoiler.

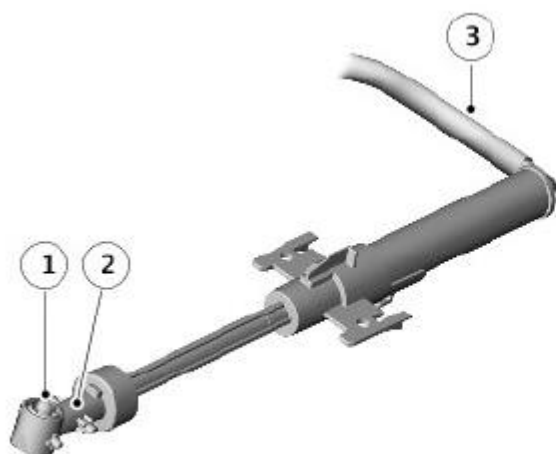
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Rear Window Wiper and Motor - DescriptionHeadlamp Washers - Description

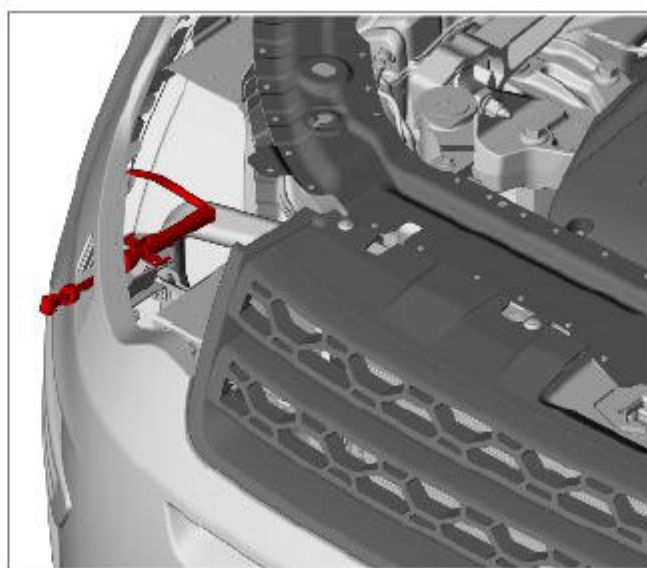
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Фара омыватели - описание

Headlamp Washers - Description



E169844



1. Washer jet
2. Telescopic arm

3. Washer fluid supply hose

NOTE:

The headlamp washers will only operate if the vehicle headlamps are on.

The front bumper is fitted with two headlamp washers. The headlamp washers are located in the bumper, below the headlamp assembly. The headlamp washer is located in an aperture at the front of the bumper and secured with two self-tapping screws to a bracket molded into the bumper structure.

The headlamp washers are telescopic units which extend forward from the bumper under washer fluid pressure supplied by the headlamp washer pump. When the pump pressure decreases the headlamp washer is automatically retracted back into the housing. The outer end of the headlamp washer is fitted with a trim which blends the headlamp washer into the bumper when it is not operating. Each headlamp washer has a washer jet which directs washer fluid under pressure onto the headlamp lens when the headlamp washer is extended.

The headlamp washer pump is a bi-directional pump, Rotation of the pump in one direction pumps washer fluid to the left headlamp washer jet, the opposite direction pumps washer fluid to the right headlamp washer jet.

The change of pump rotation is controlled by the CJB changing the polarity of the voltage supplied to the windshield washer pump motor via two relays in the Engine Junction Box (EJB).

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Windshield Washer Reservoir - DescriptionRain/Light Sensor (If Fitted) - Description

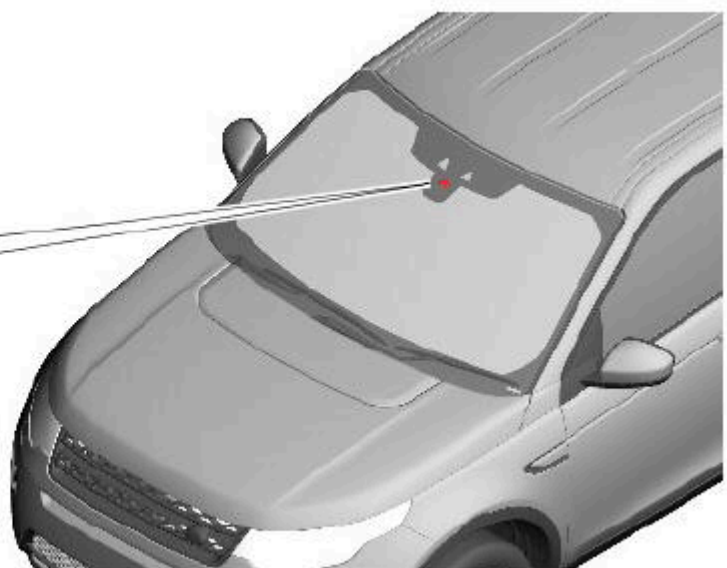
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Дождь / Light датчик (если установлено) - описание

Rain/Light Sensor (If Fitted) - Description



E169845



The rain/light sensor is located at the upper edge of the windshield, behind the interior rear view mirror trim panel. Contact between the rain sensor and windscreen is provided via a silicon pad which is compressed

during the assembly process by two locking retaining clips either side of the sensor.

The rain/light sensor unit attaches to the windshield via a retaining clamp, which latches onto formed tags on the windshield bracket.

The rain/light sensor provides information to the CJB for the optimum wiper operation for the prevailing conditions to maintain the windshield in a clear condition at all times. The rain/light sensor is an optical unit, which operates on an infrared waveband. It uses the principle of the laws of reflection on interfacing surfaces between materials with differing refraction properties.

The light is directed at an angle so that the light is reflected 100% on the outside surface of the screen and is transmitted back into the optical unit.

To receive a 100% reflection, the outer screen surface must be clean and dry.

The light is reflected 4 times from when it leaves the transmitter diodes to when it is picked up by the receiver diodes. If the windshield is wet or dirty in the area of the optical unit, the clean conditions for 100% reflection means that some of the light reflected is lost. As the screen becomes dirtier or wetter, the received light is evaluated by the rain/light sensor and translated into a signal value. A micro-controller within the sensor monitors the change in signal and initiates the appropriate wipe cycle via LIN bus signals to the CJB.

The software can compensate for the long-term effects of scratches and stone chips in the area of the optical unit and the short term effects of dirt or smears caused by worn wiper blades. A heater element is also contained within the rain/light sensor and uses ambient air temperature LIN bus signals from the CJB to keep the optical unit clear of condensation.

The rain/light sensor is connected to the CJB via a Local Interconnect Network bus. The sensor receives a power supply from the CJB. The 'auto' wipers are activated when the wipers and washers control switch is moved to the 'Auto' position. The sensitivity of the rain/light sensor can be adjusted by rotating the sensitivity collar on the wipers and washers control switch in a clockwise or counterclockwise direction. Clockwise rotation will increase sensitivity, while counterclockwise adjustment will decrease sensitivity. An increase in sensitivity adjustment results in a single wipe of the front wiper motor.

The rain/light sensor incorporates a light guide. The light guide directs the ambient light and a proportion of the forward light (from the driving direction) to a light sensitive diode. This is used for the rain sensor sensitivity in low ambient light levels and is also used to control the automatic headlamp function.

For additional information, refer to: Exterior Lighting (417-01, Description and Operation).

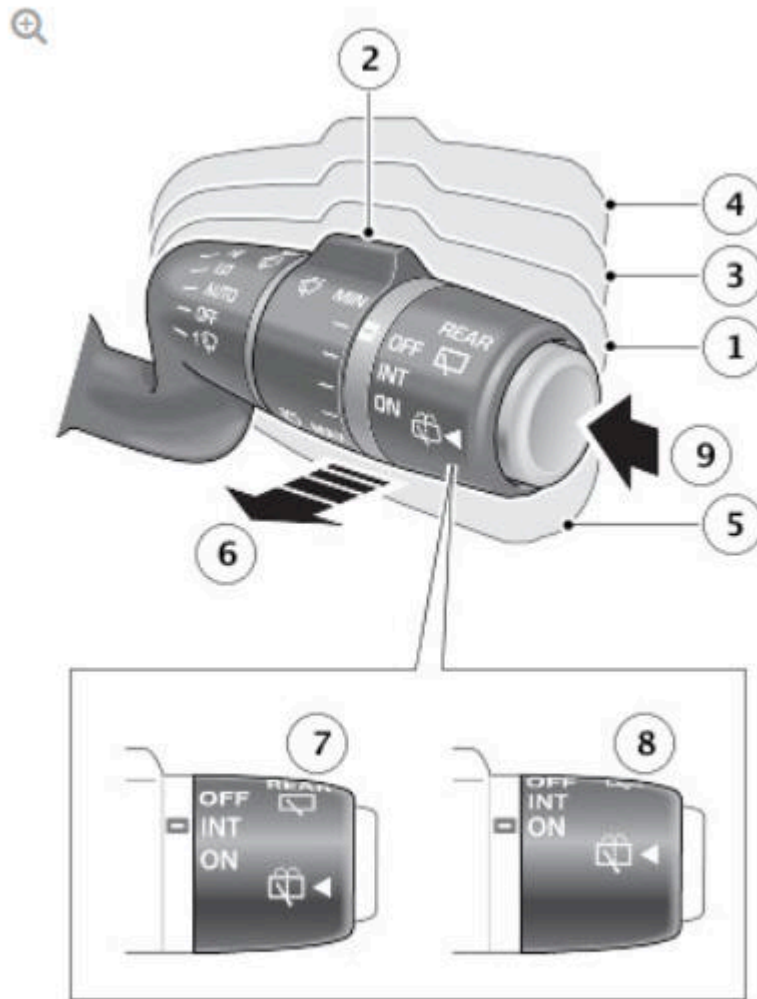
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Headlamp Washers - DescriptionWipers and Washers Control Switch - Description

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Стеклоочистители и оmyватели управление выключатель - описание

Wipers and Washers Control Switch - Description



E169846

1. Vehicles with rain/light sensor - Automatic rain sensing selected/intermittent wipe selected if sensor disabled in IC menu or Vehicles without rain/light sensor - Intermittent wipe selected
2. Vehicles with rain/light sensor - Automatic rain sensing sensitivity adjustment/intermittent delay adjustment if sensor disabled in IC menu or Vehicles without rain/light sensor - Intermittent delay adjustment
3. Low speed wipe
4. High speed wipe
5. Single wipe or hold for continuous wipe
6. Windshield wash/wipe
7. Rear window wiper - intermittent wipe
8. Rear window wiper - continuous wipe
9. Rear window wash/wipe

All windshield wiper and rear window wiper functions are controlled by the driver using the wipers and washers control switch. The control switch is part of the clockspring assembly located on the steering column.

The outputs from the switches are converted to Local Interconnect Network (LIN) bus outputs and are passed from the clockspring to the Central Junction Box (CJB). The CJB processes the LIN bus signals and activates the selected function via relays and outputs to the Rear Junction Box (RJB) and Battery Junction Box (BJB).

Wiper Service Position - Description

The wiper service position allows the windshield wipers to be parked in a position to allow easy access to the wiper blades for replacement.

NOTE:

The smart key must remain in the vehicle when the windshield wipers are in the service position.

Perform the following steps to set the windshield wipers service position:

- Make sure the ignition is off (power mode 0)
- Put the ignition on (power mode 6) and then to off again (power mode 0)
- Immediately move the wipers and washers control switch down to the single wipe position and put the ignition on again (power mode 6)
- The windshield wipers will move to the service position.

To return the windshield wipers to the normal park position perform the following steps:

- Put the ignition to off (power mode 0)
- The windshield wipers will return to the park position.

WINTER PARK POSITION

The winter park position allows the windshield wipers to be set at a higher than normal park position. This allows the windshield wipers to be lifted from the screen to prevent freezing to the windshield and to allow snow or an obstruction to be removed.

The winter park position is enabled or disabled using the instrument cluster menu. Press the 'Menu/OK' switch to open the menu and navigate to select 'Wiper Winter Park'. Press the 'Menu/OK' switch to select or deselect the function.

WINDSHIELD WIPER LIMP HOME MODE

If a failure of the Local Interconnect Network (LIN) bus occurs between the CJB and the wipers and washers control switch, when the windshield wipers are active, the CJB will initiate limp home mode.

The CJB will run the windshield wipers continuously at slow speed whilst an active front wiper mode is selected.

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Rain/Light Sensor (If Fitted) - DescriptionWindshield Wiper Fast/Slow/Single Wipe - Operation

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Лобовое стекло стеклоочиститель Fast / Slow / Single Wipe - работа

Windshield Wiper Fast/Slow/Single Wipe - Operation

OPERATION

Slow Wipe

When the driver moves the wipers and washers control switch to the slow wipe position, the Central Junction Box (CJB) detects a Local Interconnect Network (LIN) bus message and energizes the wiper on/off relay in the Battery Junction Box (BJB). Power flows to the relay contacts of the fast/slow wiper relay in the BJB which supplies power to the windshield wiper motor via a resistor in the motor. The motor will operate at slow speed until fast speed is selected or the On/Off relay is de-energized, removing the power to the windshield wiper motor.

Fast Wipe

When the driver moves the wipers and washers control switch to the fast wipe position, the CJB detects a LIN bus message and energizes the wiper on/off relay in the BJB. Power flows to the relay contacts of the fast/slow wiper relay in the BJB. The CJB provides the ground path for the coil of the fast/slow wiper relay, moving the relay contacts to supply power directly to the windshield wiper motor, bypassing the resistor used for the slow wipe.

The windshield wiper motor will operate at fast speed until slow speed is selected or the relays are de-energized, removing the power to the windshield wiper motor.

Single Wipe

When the driver moves the wipers and washers control switch to the single wipe position, the CJB detects a LIN bus message and energizes the wiper on/off relay in the BJB. Power flows to the relay contacts of the fast/slow wiper relay in the BJB. The motor will operate at slow speed until the wipers and washers control switch is released from the single wipe position. The on/off relay is de-energized, removing the power to the windshield wiper motor.

WINDSHIELD WIPER PARK

The windshield wiper park switch is integral with the windshield wiper motor. The park switch ensures the windshield wipers return to the park position when the windshield wipers are switched off on the wipers and washers control switch.

The park switch is part of the windshield wiper motor gear wheel. When the windshield wipers move from the park position, the park switch contacts are open. When the windshield wiper becomes near to the park position the park switch contacts are closed and a ground path to the CJB is completed.

When the CJB receives a LIN bus signal from the wipers and washers control switch that a wiper operation is selected, the park switch status is continually monitored by the CJB. If the wipers and washers control switch is moved to the off position, when the CJB next senses the ground signal from the park switch, it will remove the power supplies via the wiper on/off relay, stopping the windshield wipers in the park position.

Windshield wiper intermittent function - Operation

NOTE:

On vehicles without a rain/light sensor, only the intermittent function is available. On vehicles with a rain/light sensor the intermittent function can be selected using the Instrument Cluster (IC) menu to disable the automatic wipers function.

When the driver moves the wipers and washers control switch to the intermittent wipe position, the Central Junction Box (CJB) detects a Local Interconnect Network (LIN) bus message and energizes the wiper on/off relay in the Battery Junction Box (BJB). Power flows to the relay contacts of the fast/slow wiper relay in the BJB. The motor will operate at slow speed until the On/Off relay is de-energized, removing the power to the windshield wiper motor.

Simultaneously, the CJB monitors the LIN bus signal from the intermittent delay adjustment switch. Depending on the adjustment switch position, the CJB will operate the windshield wipers for one single wipe. After a time period relating to the adjustment switch position, the CJB will repeat the process until the driver selects wipers off on the wipers and washers control switch or a different windshield wiper selection is made.

Delay Timers

The delay periods in seconds relating to the switch positions are as follows:

- 21 seconds
- 15 seconds

- 11 seconds
- 7 seconds
- 4 seconds
- 2 second.

WINDSHIELD WASHERS

When the driver moves the wipers and washers control switch to the windshield wash position, the CJB energizes the front washer relay. Power is supplied through the relay contacts to the front washer pump. The ground path for the pump is provided through the contacts of the de-energized rear washer relay. Both front and rear washer relays are located in the CJB.

When windshield washer operation is requested, the windshield washers will operate. The CJB will delay windshield wiper operation for 250 ms after the driver has operated the wipers and washers control switch in the windshield wash position.

The CJB will operate the windshield wipers for as long as the driver operates the wipers and washer control switch in the windshield washer position. The washer pump will only be powered for a maximum of 10 seconds. After the switch is released, the CJB will operate the wipers for two full cycles. After a 4 second delay, the CJB will operate the windshield wipers for one full cycle to remove any residual washer fluid from the windshield.

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Wipers and Washers Control Switch - DescriptionRear Window Wiper - Operation

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Задний стекло стеклоочиститель - работа

Rear Window Wiper - Operation

When the driver moves the wipers and washers control switch to the rear window wiper position, the CJB detects a LIN bus message and will energize the rear window wiper relay which is integral with the RF Filter.

When energized, the rear wiper relay provides a power supply to the rear window wiper motor. The rear window wiper motor is operated intermittently by the CJB, with a delay between wipes which varies with vehicle speed from 11 seconds to 5 seconds. This can also be switched to 7 seconds for all speeds by Car Configuration File (CCF) by changing 'intermittent speed dependent option' to OFF.

The rear window wiper motor has an integral park switch. The park switch ensures the rear window wiper motor returns the rear wiper to the park position when the rear window wiper is switched off on the wipers and washers control switch.

The park switch is part of the rear window wiper motor gear wheel. When the rear window wiper moves from the park position, the park switch contacts are closed. When the rear window wiper nears the park position the park switch contacts are open and a ground path to the CJB is broken.

When the CJB receives a LIN bus signal from the wipers and washers control switch that rear window wiper operation is selected, the park switch is continually monitored by the CJB for stall purposes. When the wipers and washers control switch is moved to the off position and the CJB next senses the open circuit signal from the park switch, it will remove the power supplies rear window wiper relay, stopping the rear window wiper motor in the park position.

Reverse Rear Window Wiper Operation

If the windshield wipers are active and reverse gear is selected, the CJB will operate the rear window wiper motor.

On vehicles with automatic transmission, the reverse gear signal is created by the Transmission Control Module (TCM). The TCM broadcasts the reverse gear signal on the high speed Controller Area Network (CAN) powertrain systems bus to the Gateway Module (GWM). The GWM passes the signal to the CJB on the medium speed CAN body systems bus.

On vehicles with manual transmission, the reverse gear signal is generated by the reverse switch in the transmission. The reverse switch is connected directly to the CJB.

REAR WINDOW WASHER

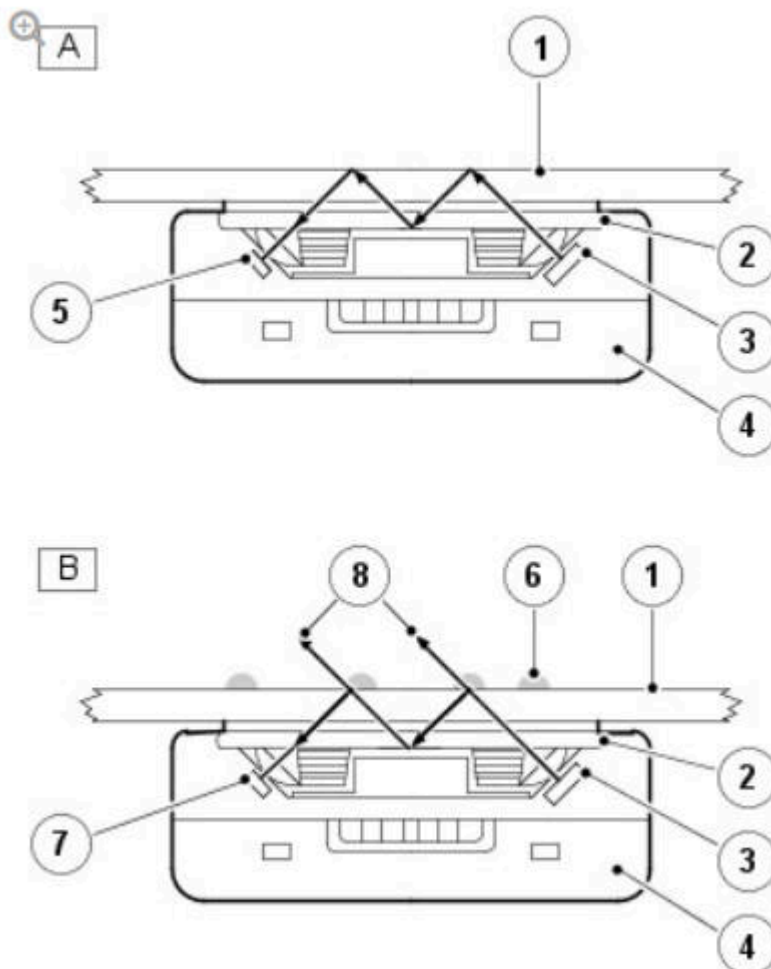
When the driver moves the wipers and washers control switch to the rear window wash position, the CJB detects a LIN bus message and energizes the rear washer relay. Power is supplied through the relay contacts to the rear washer pump. The ground path for the pump is provided through the contacts of the de-energized front washer relay. Both front and rear washer relays are located in the CJB.

Rain/Light sensor - if fitted - Operation

The rain/light sensor contains a number of transmitter and receiver diodes which emit and receive infrared light. By comparing the received light signal against the known transmitted light signal, the rain/light sensor can determine the amount of water on the outer surface of the windshield.

NOTE:

A = Clean and dry windshield; B = Wet and dirty windshield



1. Windshield outer surface
2. Optical element
3. Transmitter diodes (100% light transmitted)
4. Rain/light sensor assembly
5. Receiver diodes (100% light received)
6. Water droplets or water film
7. Receiver diodes (less than 100% light received)
8. Lost light

When the driver moves the wipers and washer control switch to the 'Auto' position, the CJB detects a LIN bus message and monitors LIN bus messages received from the rain/light sensor. The rain/light sensor provides LIN bus messages with values ranging from 0 to 7. A signal value of 0 is interpreted by the CJB as there being no water on the windshield.

A signal value from 1 to 6 is interpreted by the CJB as there being a small amount of water hitting the windshield. In this instance, the CJB initiates a slow wipe routine as detailed in the 'Windshield Wiper Slow Wipe' section above.

A signal value from 7 is interpreted by the CJB as there being a large amount of water hitting the windshield. In this instance, the CJB initiates a fast wipe routine as detailed in the 'Windshield Wiper Fast Wipe' section above.

Rain/Light sensor sensitivity can be adjusted by turning the rotary control on the wipers and washers control switch to the required position. Six different sensitivity settings are available, which are broadcast over the LIN bus to the CJB.

NOTE:

The CJB will only change from fast wipe to slow wipe if the rain/light sensor value is lower than 7.

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Windshield Wiper Fast/Slow/Single Wipe - OperationHeadlamp Washers - Operation

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Фара омыватели - работа

Headlamp Washers - Operation

When the engine is running (power mode 7) and the CJB has received a headlamps 'ON' LIN bus message from the lighting control switch, when the driver operates the wipers and washers control switch in the windshield wash position, the CJB will initiate the headlamp washer sequence.

The CJB then suspends headlamp wash activation for the next 10 minutes and 3 operations of the wash/wipe switch, with the headlamp power washers activated on the fourth operation of the switch and after the 10 minute period has expired.

The number of headlamp washer operations in given period is limited to preserve the washer fluid in the washer reservoir. The headlamp washers are activated on the first operation of the windshield washer with the headlamp on. The CJB then suspends headlamp washer activation for the next three operations of the wipers and washers control switch in the windshield washer position, with the headlamp power washers activated again on the fourth operation of the switch and completion of a 10 minute timer.

The timer and event counter is cleared following an ignition cycle or moving the lighting control switch to 'OFF' then back to 'ON'.

When the driver moves the wipers and washers control switch to the windshield wash position and the headlamps are 'ON', the CJB provides a ground for the two headlamp washer relays in the BJB. One relay contacts close and power is supplied to the headlamp washer pump. The other headlamp washer relay contacts open and provide a ground path for the headlamp washer pump. Each relay is energized for a period which is dependent on ambient temperature, which powers the headlamp washer pump to operate the left headlamp washer, the CJB then reverses the sequence to power the headlamp washer pump in the opposite direction to operate the headlamp washer pump to operate the right headlamp washer.

If the washer fluid level becomes low, the CJB suspends headlamp washer operation to preserve the remaining washer fluid.

WASHER FLUID LEVEL SENSOR

The washer fluid level sensor is a basic float switch located within the windshield washer reservoir. the switch is connected to the CJB. When the fluid level in the reservoir falls, the level sensor switch is operated, completing a ground path to the CJB.

The CJB will send a CAN message to the instrument cluster to illuminate the windshield washer reservoir low warning indicator and display a message in the message center.

CONTROL DIAGRAM

NOTE:

A = Hardwired; AP = medium speed CAN comfort systems; O = LIN bus

8. Windshield wiper motor
9. Rear wiper motor
10. RF filter - rear wiper motor
11. Ground
12. Headlamp washer pump
13. Power supply
14. Washer fluid level sensor
15. Right heated washer jet
16. Left heated washer jet
17. Tailgate latch
18. Rain/light sensor

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Rear Window Wiper - Operation Wipers and Washers / Diagnosis and Testing

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Стеклоочистители и омыватели / диагностика и проверка

Wipers and Washers / Diagnosis and Testing

PRINCIPLES OF OPERATION

For a detailed description of the Wipers and Washers system, refer to the relevant Description and Operation section in the workshop manual. REFER to: Wipers and Washers (501-16 Wipers and Washers, Description and Operation).

INSPECTION AND VERIFICATION

CAUTION:

Diagnosis by substitution from a donor vehicle is NOT acceptable.

Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

- *If a control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.*
- *When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.*
- *Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.*

1. Verify the customer concern
2. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none"> ■ Windshield (contamination or damage) ■ Windshield wiper blades ■ Windshield wiper arms ■ Windshield wiper linkage spindle nuts ■ Rear window (contamination or damage) ■ Rear window wiper blades ■ Rear window wiper arms ■ Rear window wiper linkage spindle nuts ■ Washer fluid level ■ Washer fluid hoses (kinks, leaks, etc) ■ Washer jets ■ Wipers and washers control switch, damage and freedom of movement 	<ul style="list-style-type: none"> ■ Fuses ■ Wiring harnesses and connectors ■ Central junction box ■ Wipers and washers control switch

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index
5. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Wipers and washers inoperative	<ul style="list-style-type: none"> Washers inoperative Wiper arm(s) incorrectly installed/aligned Steering column right multifunction switch internal failure Wipers and washers control switch circuit short circuit to ground, short circuit to power, open circuit, high resistance 	<ul style="list-style-type: none"> Listen for washer motor operation. Check and top up washer fluid level. Check and rectify blocked washer circuit. Check for DTCs indicating a wiper/washer circuit fault. Rectify as necessary Check the installation/alignment of the wiper arms. Ensure motor/mechanism is not jammed or seized Check if the wipers and washers control switch retaining screws are tightened according to specifications. Inappropriately tightened screws might cause steering wheel module failure Refer to the electrical circuit diagrams and check the wipers and washers control switch circuit for short circuit to ground, short circuit to power, open circuit, high resistance
Wiper blade(s) drag/judder across the windshield / rear window	<ul style="list-style-type: none"> Windshield / rear window surface contaminated/damaged Wiper arm(s) incorrectly installed Wiper arm(s) incorrectly 	<ul style="list-style-type: none"> Clean the windshield / rear window and check for damage Check the installation of the wiper arms Check the alignment of the wiper arms Check the wiper arm spring tension

	<p>aligned</p> <ul style="list-style-type: none"> Wiper arm(s) spring tension inadequate Wiper arm(s) pivot seized 	<ul style="list-style-type: none"> Check the wiper arm pivot for seizure
Wipers operate too slowly	<ul style="list-style-type: none"> Wiper motor/linkage seized Wiper motor circuit high resistance 	<ul style="list-style-type: none"> Check the wiper motor/linkage for seizure Refer to the electrical circuit diagrams and check the wiper motor circuit for high resistance
Wipers inoperative	<ul style="list-style-type: none"> Wiper motor/linkage seized Wiper motor circuit short circuit to ground, short circuit to power, open circuit, high resistance Wipers and washers control switch circuit short circuit to ground, short circuit to power, open circuit, high resistance 	<ul style="list-style-type: none"> Check the wiper motor/linkage for seizure Refer to the electrical circuit diagrams and check the wiper motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance Refer to the electrical circuit diagrams and check the wipers and washers control switch circuit for short circuit to ground, short circuit to power, open circuit, high resistance
Wipers noisy	<ul style="list-style-type: none"> Windshield / rear window surface contaminated/damaged Wiper motor/linkage seized/damaged Wiper blade/linkage fouling body 	<ul style="list-style-type: none"> Clean the windshield / rear window and check for damage Check the wiper motor/linkage for seizure or damage Check for foul conditions
Washers inoperative	<ul style="list-style-type: none"> Washer fluid level too low Washer fluid frozen Washer hose 	<ul style="list-style-type: none"> Refill the washer fluid reservoir with the correct specification of washer fluid Check that the correct specification of washer fluid is used

	blocked/leaking ■ Washer circuit short circuit to ground, short circuit to power, open circuit, high resistance ■ Wipers and washers control switch circuit	■ Check the washer hoses for blockages or leaks ■ Refer to the electrical circuit diagrams and check the washer circuit for short circuit to ground, short circuit to power, open circuit, high resistance ■ Refer to the electrical circuit diagrams
	short circuit to ground, short circuit to power, open circuit, high resistance	and check the wipers and washers control switch circuit for short circuit to ground, short circuit to power, open circuit, high resistance

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: Diagnostic Trouble Code Index - DTC: Central Junction Box (CJB) (100-00 General Information, Description and Operation).

Wipers and washers specifications

Capacities

ITEM	CAPACITY (LITERS)
Windshield washer reservoir:	
With headlamp washer	4.1
Without headlamp washer	3.2

General Specification

ITEM	SPECIFICATION
Windshield wiper motor	Valeo
Rear window wiper motor	Valeo
Washer pump	Kautex Textron
Rain sensor	Bonded to inner surface of the windscreen behind the interior mirror

Torque Specifications

DESCRIPTION	NM	LB-FT	LB-IN
Wiper pivot arms to windshield wiper motor nuts	25	18	-
Windshield wiper motor to body bolts	8	-	71
Rear window wiper motor cover bolts	5.4	-	48
Rear window wiper pivot arm to motor nut	5.4	-	48
Windshield washer reservoir to body bolts	4.1	-	35
Windshield washer reservoir filler neck bolt	4.1	-	35

Headlamp Washers - OperationChassis

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