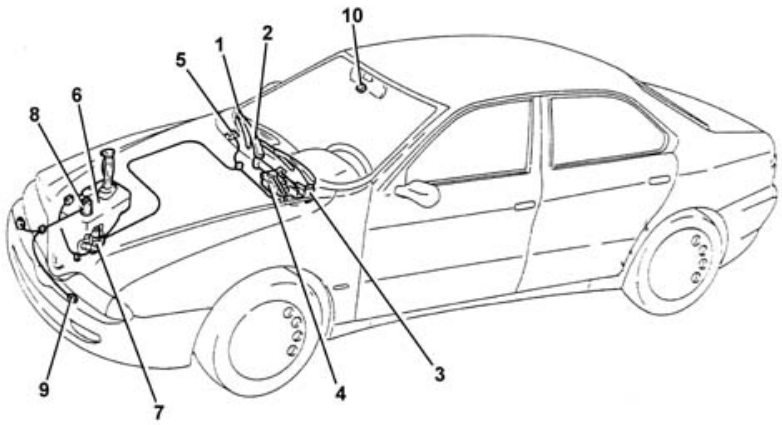
166 Introduction - SCREEN WASHERS AND HEADLAMP WASH/WIPE

DESCRIPTION

The system for cleaning the windscreen and the headlamps makes use of the following components:

- windscreen wiper with or without rain sensor
- windscreen washer
- headlamp washer.



1, Windscreen wiper blade
2, Windscreen wiper arm
3, Windscreen wiper mechanism
4, Windscreen wiper motor
5, Windscreen washer jets
6, Reservoir
7, Windscreen washer pump
8, Headlamp washer pump
9, Headlamp washer jets
10, Rain sensor

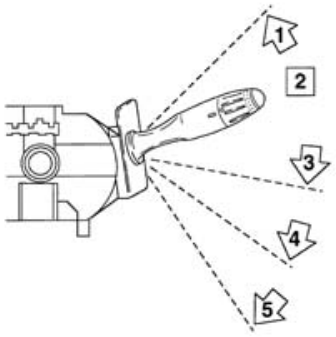
WINDSCREEN WIPER WITHOUT RAIN SENSOR

General description

The windscreen wiper unit consists of a control unit, an electric motor, wiper arms and blades and is responsible for cleaning the windscreen.
The windscreen wiper control unit comes in one version which can be fitted on versions with a rain sensor and on vehicles without this option.

Windscreen wiper operation

The windscreen wiper is operated by the control lever for which there are five positions.



1. Anti-panic
2. Off
3. Intermittent
4. 1 st speed
5. 2 nd speed

Windscreen wiper control unit

Wiper arms "park" position

The control unit places the wiper arms in the "park" position when the windscreen wipers are deactivated (control lever in off position).
This position is reached through an extra travel downwards in relation to the normal travel in operating conditions.

Intermittent operation

With the control lever in the intermittent position, the windscreen wiper operating time depends on the position of the ring nut on the actual lever.

Windscreen wiper speeds

The windscreen wiper motor can move continuously at first or according to the speed of the control lever position.

Pin-out

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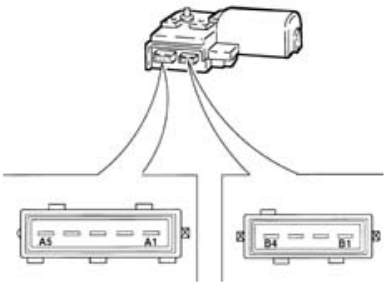


A1, Earth
A2, Signal from ring nut and/or rain sensor
A3, Headlamp washer go ahead
A4, 1 st speed signal
A5, 2 nd speed signal
B1, Earth control
B2, To the sensor
B3, Battery positive supply
B4, Windscreen/headlamp washer pump

WINDSCREEN WIPER WITH RAIN SENSOR

General description

This sytem is designed to automatically regulate the frequency of the windscreen wiper blades according to the intensity of the rain.
The operating principle is based on the reflection of the infrared rays through different refraction means (separating surface glass - air).

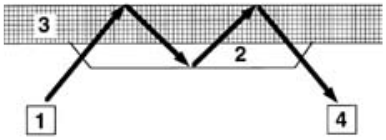
It basically comprises:

- rain sensor fitted in the windscreen
- windscreen wiper unit
- steering column switch unit
- windscreen wiper control unit.

Components

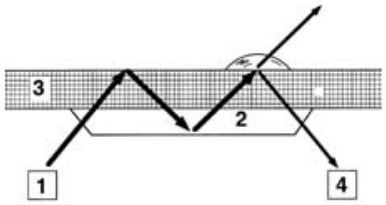
Rain sensor

This is an electronic device fitted in the windscreen inside the area which is wiped by one of the wiper blades, consisting of a lens stuck to the windscreen and an electronic section.
The sensor operates in the infrared wave range and uses the different refraction of the materials (windscreen glass, dops of water, impurities).
The blue coloured lens allows the conduction of the infrared light by transmitter diodes, contained in the electronic section, to the vehicle glass.
The infrared rays sent by the transmitter units, in the electronic unit, pass through the lens and are reflected on the separation surface between the outside of the windscreen and the air. After two successive reflections they return to the electronic unit to be received by the receiver units.
The reflection angle of the infrared light has been selected so that the light is 100% reflected on the outside of the windscreen glass and is therefore sent back to the sensor light casing.
The reflection of the infrared energy transmitted is only 100% if the glass is clean and dry.



1, Transmitter diode
2, Lens
3, Windscreen
4, Receiver diode

If the windscreen is wet or dirty, in the areas where reflection takes place, total reflection conditions no longer exist and the luminous energy received is lower than that transmitted.



1, Transmitter diode
2, Lens
3, Windscreen
4, Receiver diode

The luminous energy sent to the window is kept constant on account of which the value measured by means of the receiver diodes will decrease proportionally as the quantity of water and other impurities on the windscreen increases.
This variation in energy is processed by the sensor microprocessor which commands the windscreen wiper control unit to carry out a suitable action.

Windscreen wiper control unit

The windscreen wiper control unit comes in one version which can be fitted both on vehicles with a rain sensor and on versions without this option.

Pin-out

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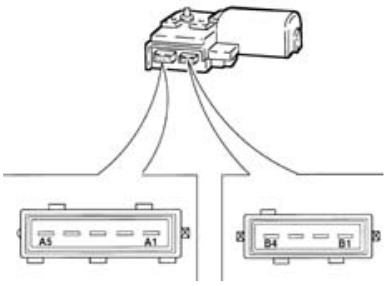


A1, Earth
A2, Signal from ring nut and/or rain sensor
A3, Headlamp washer go ahead
A4, 1 st speed signal
A5, 2 nd speed signal
B1, Earth control
B2, To the sensor
B3, Battery positive supply
B4, Windscreen/headlamp washer pump

Operating logics

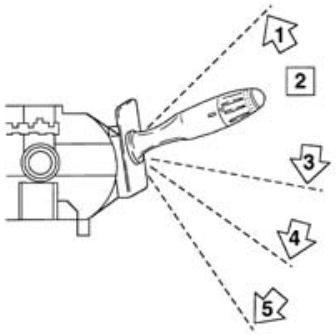
The rain sensor processes special strategies for the effective cleaning of the windscreen in all climate conditions.

The sensor processes the following logics:

- measuring the quantity of water present on the measuring surface
- controlling the sensitivity of the sensor (according to the position of the ring nut on the steering column switch unit lever)
- evaluating the suitable residual times to avoid constant switching between the intermittent position and first speed
- automatically adjusting to the intervention sensitivity in the presence of impurities on the measuring surface (saline deposits, dirt, etc.)
- the intervention of special wiping cycles in particular rain conditions (the presence of drops on the window, for example during the end of a storm)
- the intervention of wiping cycles after the windscreen washer pump has been used to eliminate drips (if activated previously)
- the detection of environmental light by means of a day/night sensor integrated in the rain sensor (to automatically vary the sensitivity of the sensor because the human eye is more sensitive to a wet glass surface in the dark)
- the recognition of water smears caused by worn wiper blades
- compensation of the effects due to aeging of the glass and the electronics
- the continuous check on the correct operation of the windscreen wiper motor system
- the management of the sensor heating to keep the measuring surface free from condensation and to avoid the formation of ice.

Operation

Placing the control lever in the intermittent position activates the automatic operation of the windscreen wiper.



1, Antipanic
2, Off
3, Intermittent (automatic with rain sensor)
4, 1 st speed
5, 2 nd speed

A ring nut on the right control lever makes it possible to vary the sensitivity of the rain sensor with 4 different settings/

The switching to a more sensitive sensor setting causes a wiping cycle to confirm the increase in sensitivity.
If the engine is switched off with the lever in the intermittent position (automatic operation) and is then restarted, the rain sensor is not operational.
To reactivate the automatic operation, the right steering column switch unit control lever must be moved to any position and then returned to the intermittent position or the sensitivity ring nut should be turned in any direction (reset and restart operation).

The movement of the lever from the intermittent position to any position (anti-panic, off, 1 st speed or 2 nd speed) excludes the operation of the rain sensor.

Recovery

In the case of a failure, the windscreen wiper control unit (see specific paragraph) instantly recognizes this condition and the rain sensor control unit is excluded allowing the conventional (non automatic) operation of the windscreen wiper system.
In this case, the ring nut on the right steering column switch unit control lever resumes the definition function for the duration of the intermittent pause.

WINDSCREEN WASHER

The windscreen washer function is managed by the windscreen wiper control unit with controls which operate the windscreen wiper motor and the windscreen washer pump.
This sequence depends on the duration of the command by the user.

With the lever operated for less than half a second,

- windscreen washer pump operated for 1 second
- windscreen wiper pump/motor operated for 3 seconds
- windscreen wiper motor operated for 3 seconds.

With the lever operated for more than half a second,

- windscreen washer pump operated for 1 second
- windscreen wiper motor/pump operated for the length of time the lever is operated by the uer.

This ensire sequence is carried out at the speed set previously or at the 1 st speed if the windcreen wiper motor was not working.
If, during the sequence, the windscreen wiper motor speed is varied by acting on the control lever, the motor immediately assumes the speed requested.

Windscreen washer motor off

If the engine stop condition is recognized (lack of cam angle sensor signal) for more than 30 seconds, the following will occur:

- a single cycle with the control lever in the off position
- five cycles with the control lever in a position other than off.

A variation in the position of the control lever or a change in the cam signals causes the zeroing of the counting of the five cycles and the timing in progress. Any commands by the park sensor for the blades should not have any effect on the cycles described.

HEADLAMP WASHER

The headlamp washer system consists of a special electric pump on the windscreen washer fluid reservoir, connecting pipes and two jets in the bumpers in front of the front light clusters.
The operation of the headlamp washers takes place automatically when the side lights are switched on and the windscreen washer is operated.
The electric pump is controlled by a timer which activates the operation with succesive impulses lasting around half a second.