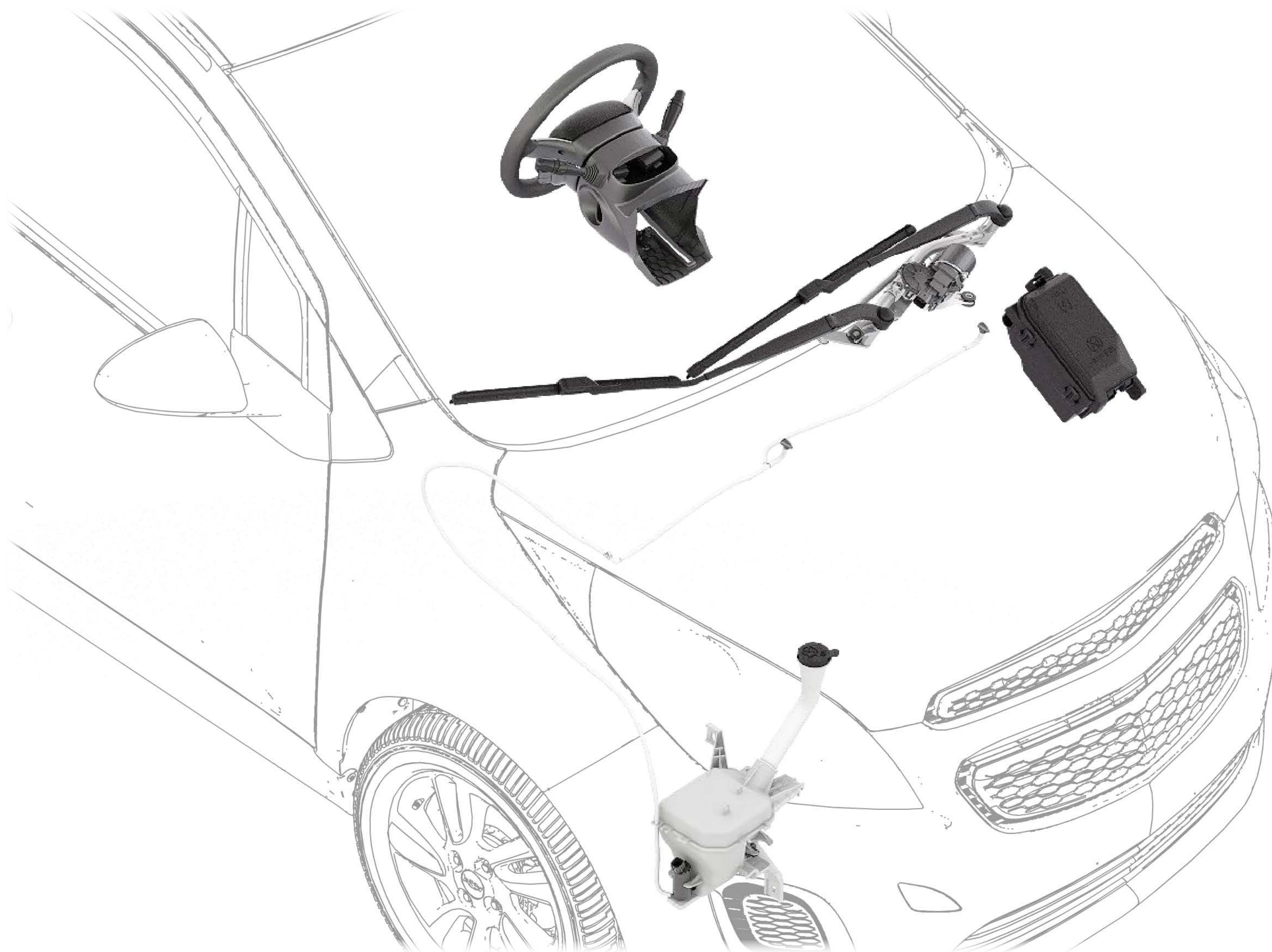


The windshield wiper and washer system is an important system for safety and also a legal requirement for vehicles driven on public roads. The system provides the operator to clear the windshield of rain, snow, and debris in order to have a clear unobstructed view of the road ahead. To operate the system the operator moves the wiper switch/stalk to one of the speed positions. Electrical current flows through the switch to the electric wiper motor causing it to rotate. The torque from the motor shaft is transferred through a worm gear set to the wiper motor crank. The wiper motor crank moves the wiper transmission links which transfer the motion to the wiper arms via the wiper shafts. This is a simplified explanation, however modern vehicles now use electronic control modules known as Body Control Module or BCM that manage the operation of the windshield wiper and washer system.

The BCM receives inputs from the wiper/washer switch and then activates the wiper motor or washer pump as commanded. By using a BCM to control wiper/wash function, new convenience features can be enabled such as rain sensitive wipers that automatically adjust the wiper delay depending on the level of moisture on the windshield.

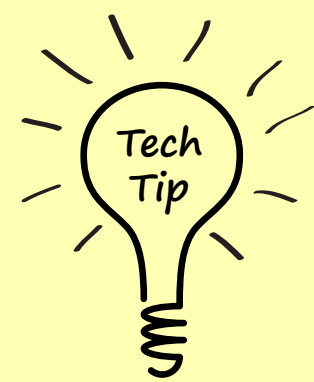


Windshield Wiper Blade

Description/Function: The metal and rubber assembly that contacts the windshield, like a squeegee it clears water and debris from the surface of the glass. Three common types: standard spring armature, winter type with shrouded armature and the one piece aero beam style blade.

Causes/Concerns:

- Deteriorated rubber
- Chatter/Skipping/Noisy
- Bent or damaged armature
- Streaking/not clearing



Cleaning the rubber insert regularly will improve performance. Simply wipe the insert with a paper towel and window cleaner, vinegar or denatured alcohol. ACDelco has a full line of premium wiper blades for most car and trucks.

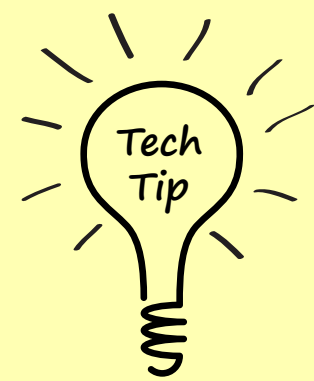


Windshield Wiper Transmission

Description/Function: The assembly that transfers the rotating motion of the wiper motor shaft to the back and forth oscillating motion of the wiper blade arms. Typically includes the frame, connecting links, wiper arm shafts and wiper motor crank.

Causes/Concerns:

- Slow wiper operation
- One or both wipers inoperative
- Excessive noise, knocking
- Worn pivots
- Binding wiper arm posts
- Bent or broken links



The wiper arm posts are exposed to the elements, over time the lubricant can degrade and cause binding of the shaft causing slow operation, puts strain on motor. If motor failed, check transmission for binding or damage.

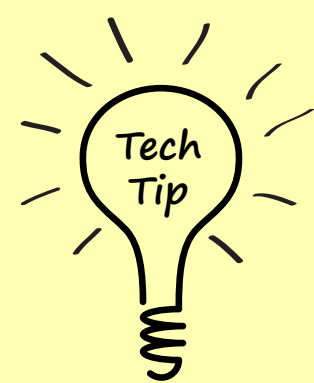


Windshield Wiper Arm

Description/Function: The arm that carries the wiper blade. The wiper arm is spring loaded to press the wiper blade against the glass. The arm must also pivot at its hinge to keep the blade in full contact with the glass. Variety of blade attachment styles: U-Hook, Side Lock, Bayonet, Side Pin, Pinch Tab, Push Button.

Causes/Concerns:

- Bent arm
- Weak or broken spring
- Seized or stiff hinge pivot
- Stripped wiper shaft socket/spline
- Chatter/Skipping/Noisy
- Streaking/not clearing
- Inoperative / not moving



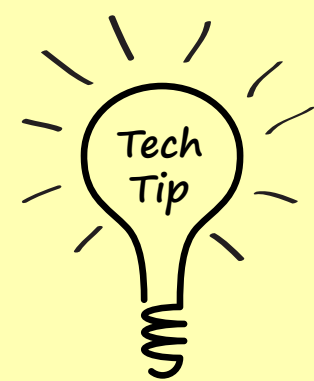
Inspect the tension spring for good down pressure; also that hinge pivot is not binding. Another point to check is alignment of the blade attachment point to the glass. Wipers work best when the blade is perpendicular to the glass, twisted arms cause chatter and poor performance, replace arms that have binding pivots or weak or broken tension springs. Adjust arms that are twisted.

Intermittent Wiper Module/Relay

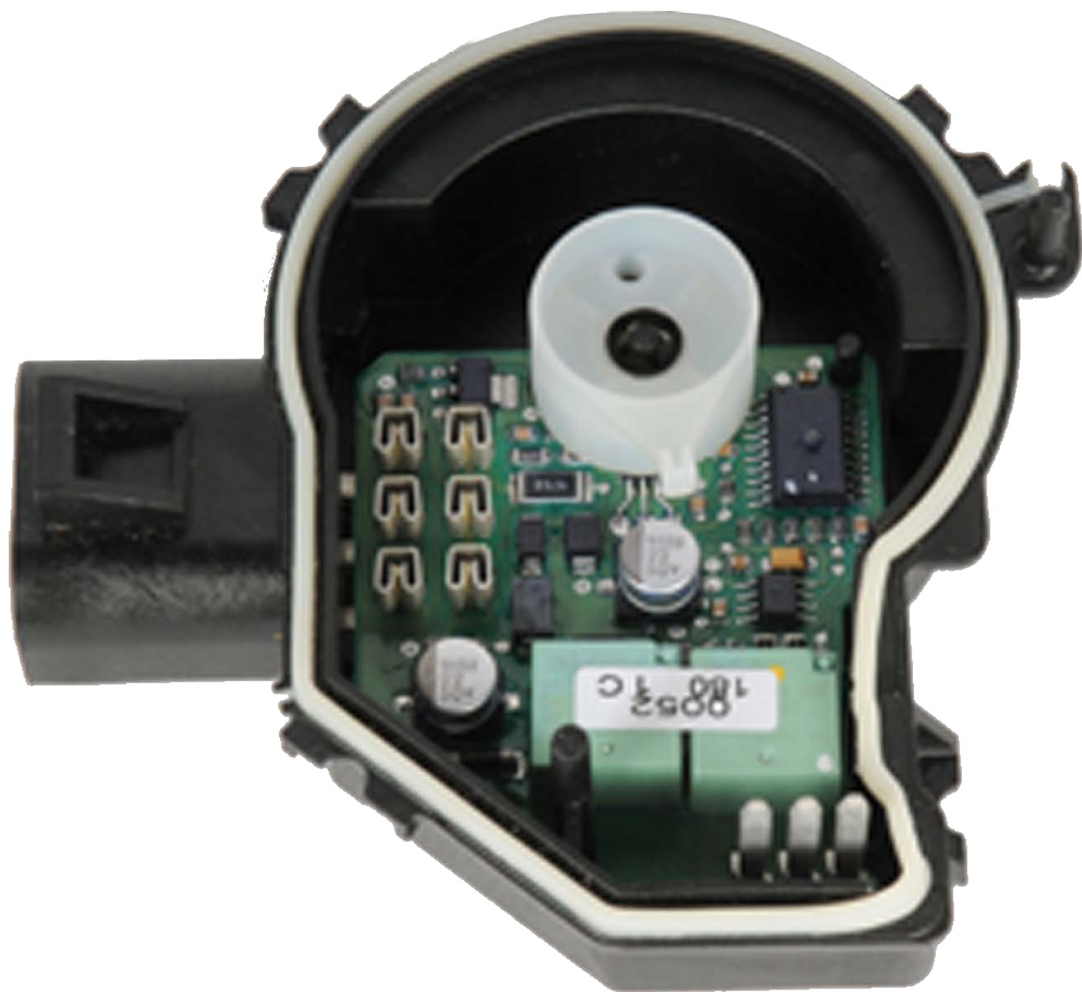
Description/Function: Intermittent wipers offer a variable delay for light mist or rain situations. The function is typically controlled by a relay or module on older vehicles. Modern vehicles have this function integrated with a Body Control Module or BCM. The command for intermittent operation comes from the wiper switch. The module then pulses the wiper motor low speed circuit to wipe the windshield.

Causes/Concerns:

- No intermittent function
- Variable delay inoperative
- Wipers stay on low
- Wipers inoperative
- Electrical Malfunction
- Water damage



Depending on the vehicle, the intermittent wiper module/relay may control all wiper functions, electrical malfunctions can be caused by excessive current draw, (worn or binding motor/transmission. Check for loose terminals/connections; Don't forget to check the Fuse!



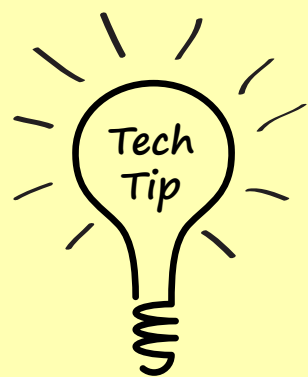
Windshield Wiper Motor

Description/Function: The wiper motor is responsible for driving the windshield wipers. It converts electrical energy from the vehicle electrical system into motion. Typically have 2 or 3 speeds depending on the design of the motor.



Causes/Concerns:

- Wipers do not park
- One or more speeds inoperative
- Excessive noise
- Electrical malfunction/blown fuse
- permanent magnet damaged
- water damage
- worn bushings
- park switch malfunction
- damaged gear drive



Depending on the vehicle a no park condition may be repaired with a park switch repair kit. Proper diagnosis requires understanding of the function of the wiper switch and wiper motor circuit. Also inspect connectors and terminals for corrosion or loose and dislocated terminals.

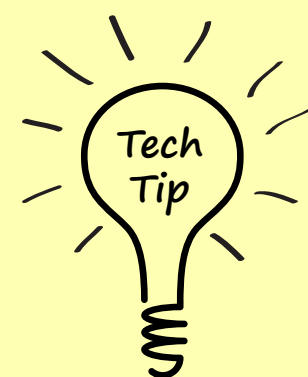
Don't forget to check the fuse first!

Windshield Wiper and Washer Switch

Description/Function: Windshield wiper and wash functions are selected by the wiper switch. The switch typically located on the steering column, has multiple electrical contacts that direct current to the different speed circuits of the motor, also to the intermittent wiper module/relay and the washer pump.

Causes/Concerns:

- | | |
|---|--|
| <ul style="list-style-type: none"> • One or more wiper speeds inoperative • Intermittent wiper inoperative • Wash function inoperative | <ul style="list-style-type: none"> • Worn or damaged contacts • Damaged or broken mechanism • Loose or dislocated terminals |
|---|--|



Correct diagnosis involves understanding current flow through the switch. Removal of airbag may be required to replace switch, understand and follow all safety precautions and service procedures issued by the vehicle manufacturer.

Don't forget to check that Fuse!

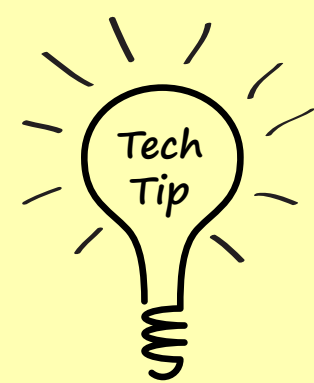


Windshield Washer Pump

Description/Function: The washer pump’s purpose is to deliver washer fluid solvent to the windshield for clearing the windshield of debris/dirt. Some pumps are dual function and may also support the rear window on some hatchbacks. The pump is driven by a small electric motor.

Causes/Concerns:

- No wash function
- Washer fluid leaks
- Electrical Malfunction
- Cracked pump housing due to freezing (insufficient washer solvent concentration)



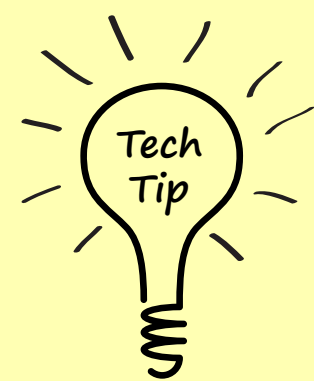
The washer pump can be damaged from freezing, always ensure washer solvent concentration is suitable for weather conditions. Inoperative washer system in winter is a safety hazard. Replace damaged or inoperative pumps with premium ACDelco replacements.

Windshield Washer Nozzle

Description/Function: The washer nozzles located near the base of the windshield or on the wiper arms sprays/distributes the washer fluid onto the windshield. The nozzles are connected to the washer pump via a plastic/rubber hoses. Some nozzles are electrically heated for improved winter performance.

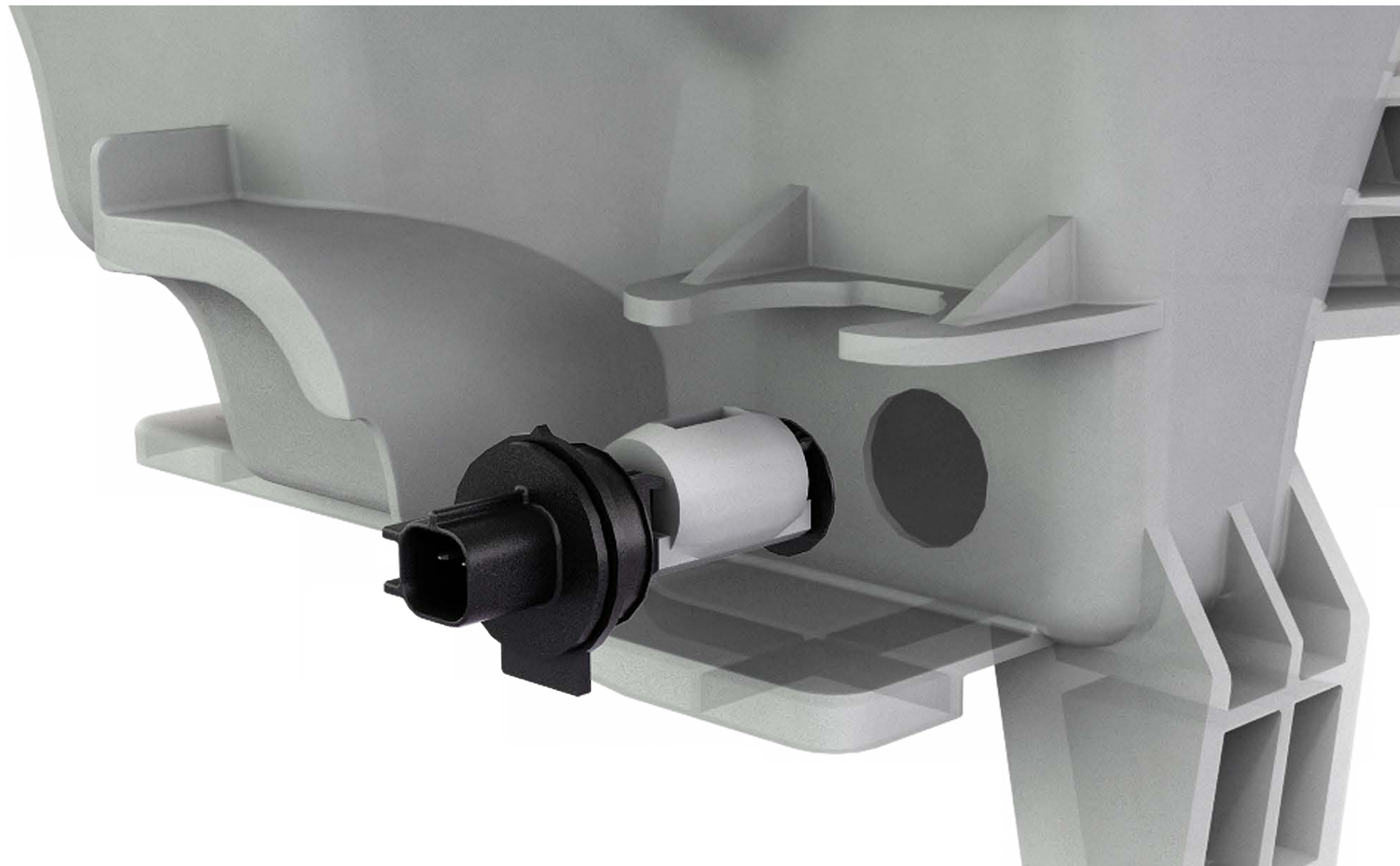
Causes/Concerns:

- Little or no fluid delivery by one or more nozzles.
- Washer fluid stream not hitting the windshield (aiming off)
- Clogged nozzles
- Aiming needed
- Broken or damaged



Windshield nozzles work best when aimed at the center of the windshield. Small needle can be used to aim the “eye-ball” type nozzle; others may have to be bent slightly to correct aim. Using only water leads to algae growth in reservoir which can clog nozzles. Freezing can occur if proper solvent concentration is not used. Replace clogged or damaged nozzles.



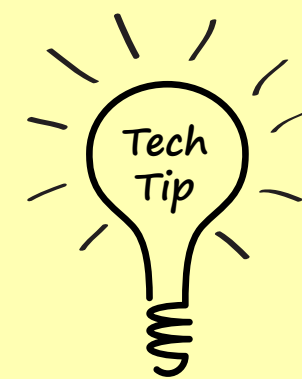


Washer Fluid Level Sensor

Description/Function: Located in the washer fluid reservoir, this sensor notifies the driver of a low fluid level condition. Typically nothing more than a pair of stainless steel probes; the system measures the conductivity of the solvent, when the probes are not in contact with solvent the resistance across the probes increases, indicating low fluid level.

Causes/Concerns:

- Washer fluid level indicator always on.
- Washer fluid leak
- Mineral deposits on sensor
- Cracked sensor housing



The sensor can be damaged from frozen washer fluid, verify the solvent concentration for weather conditions. Poor water quality can cause sensor malfunction. Replace defective sensors with quality ACDelco parts.