**Wipers and Washers**

The wiper and washer system consists of the following components:
- windshield wiper blades
- windshield wiper pivot arms
- rear window wiper pivot arm (Excursion only)
- windshield wiper mounting arm and pivot shaft
- front windshield wiper motor
- rear window wiper motor (Excursion only)
- windshield washer fluid reservoir
- windshield washer fluid pump
- windshield wiper/washer switch (part of multifunction switch)

**Windshield Wiper/Washer Switch**

The windshield wiper/washer switch is an integral component of the steering column multifunction switch.

**Principles of Operation**

The wiper motors receive inputs from the following:
- multifunction switch
- anti-lock brake control module (vehicle speed signal)
- ignition switch
- power distribution junction box (PDJB)

The following components are integrated in the wiper motors:
- windshield wiper motor module
- hi/lo speed relay
- run/park sense (Hall effect)
- washer pump relay

**High Speed Windshield Wipers**

High speed is activated when the multifunction switch supplies ground to the windshield wiper motor module inputs. The windshield wiper motor module then supplies ground to the run/park sense and high/low relay coil, activating the relay with voltage supplied from the battery through the central junction box (CJB). When the windshield wiper motor module receives voltage from the run/park sense, it removes ground from the run/park sense, deactivating it. The windshield wiper motor continues to operate from voltage connected through the run/park sense until the Hall effect senses magnet in the motor. When the Hall effect senses magnet in the motor the windshield wiper motor returns to the park position, the internal run/park sense grounds the windshield wiper motor module input and the windshield wiper motor module removes ground from the windshield wiper high/low relay coil, deactivating the high/low relay and windshield wiper motor. The windshield wiper motor module continues to cycle the windshield wipers until the inputs from the multifunction switch are changed from the high speed position.

**Low Speed Windshield Wipers**

Low speed is activated when the multifunction switch supplies a specific ground to the speed inputs of the windshield wiper motor module. The windshield wiper motor module then supplies ground to only the windshield wiper run/park relay coil, activating it. When the windshield wiper run/park relay is activated, the deactivated windshield high/low relay connects voltage to the windshield wiper motor low input activating the wiper motor. The windshield wiper motor module continues to operate the windshield wiper motor in the same manner as in high speed.
The intermittent wiper speed is activated with grounds controlled by the multifunction switch inputs to the windshield wiper motor module. The windshield wiper motor module then activates the windshield wiper run/park relay coil and switches voltage through the windshield wiper high/low relay. The high/low relay remains deactivated supplying the voltage to the wiper motor low speed input and activates the windshield wiper motor. When the windshield wiper motor module receives the grounded input, the motor continues to operate until Hall effect senses magnet to turn off run/park sense the output to the windshield wiper run/park software, deactivating the relay and disconnecting voltage to the wiper motor. The windshield wipers remain parked until the windshield wiper motor module completes a time-out and then repeats the intermittent windshield wiper cycle.

**Speed Dependent Windshield Wipers**
The windshield wiper motor module responds to the windshield wiper control commands by interpreting inputs from the ABS system. The speed dependent wipers will compensate for the extra moisture that accumulates on the windshield at higher speeds, except when the multifunction switch is in the INT 1 position. At higher speeds, the speed dependent feature shortens the delay between wipes when using the variable interval wipers. Delays will automatically adjust at speeds between 16 and 105 km/h (10 and 65 mph).

**Intermittent Rear Window Wiper System (Excursion only)**
The rear window wiper intermittent speed is activated when the rear window wiper motor module receives ground controlled by the multifunction switch inputs to the rear window wiper motor module. The rear window wiper motor module then activates the rear window wiper relay (internal) by momentarily grounding the relay coil. This activates the rear window wiper motor by providing voltage from the battery junction box (BJB). Once the rear window wiper motor is activated, its internal run/park switch connects voltage to the motor keeping it operating. When the rear window wiper motor returns to the park position, the run/park switch disconnects voltage internally from the wiper motor input reconnecting it to the rear window wiper motor module output. The rear window wiper remains parked until the rear window wiper motor module completes a time-out and then repeats the cycle.

**Washer System**
The windshield washer or the rear window washer is activated by the internal wiper motor modules when it receives a ground from the multifunction switch between the washer inputs. Dependent on the correct ground, the internal wiper motor modules activates either the windshield washer or rear window washer relay (internal) by grounding the respective relay coil. When either relay is activated, it connects voltage to the washer pump while the deactivated relay provides ground to the washer pump. In this manner voltage polarity is reversible to achieve directional change of the washer pump and washer fluid.

**Default Mode**
The windshield wiper motor defaults to this mode when the RUN/PARK sense does not sense the hall effect magnet inside wiper motor, this can be caused by obstruction of windshield wipers or binding linkage. The windshield wiper motor will continue to operate in a HI/LO speed condition for a period of 60 seconds.