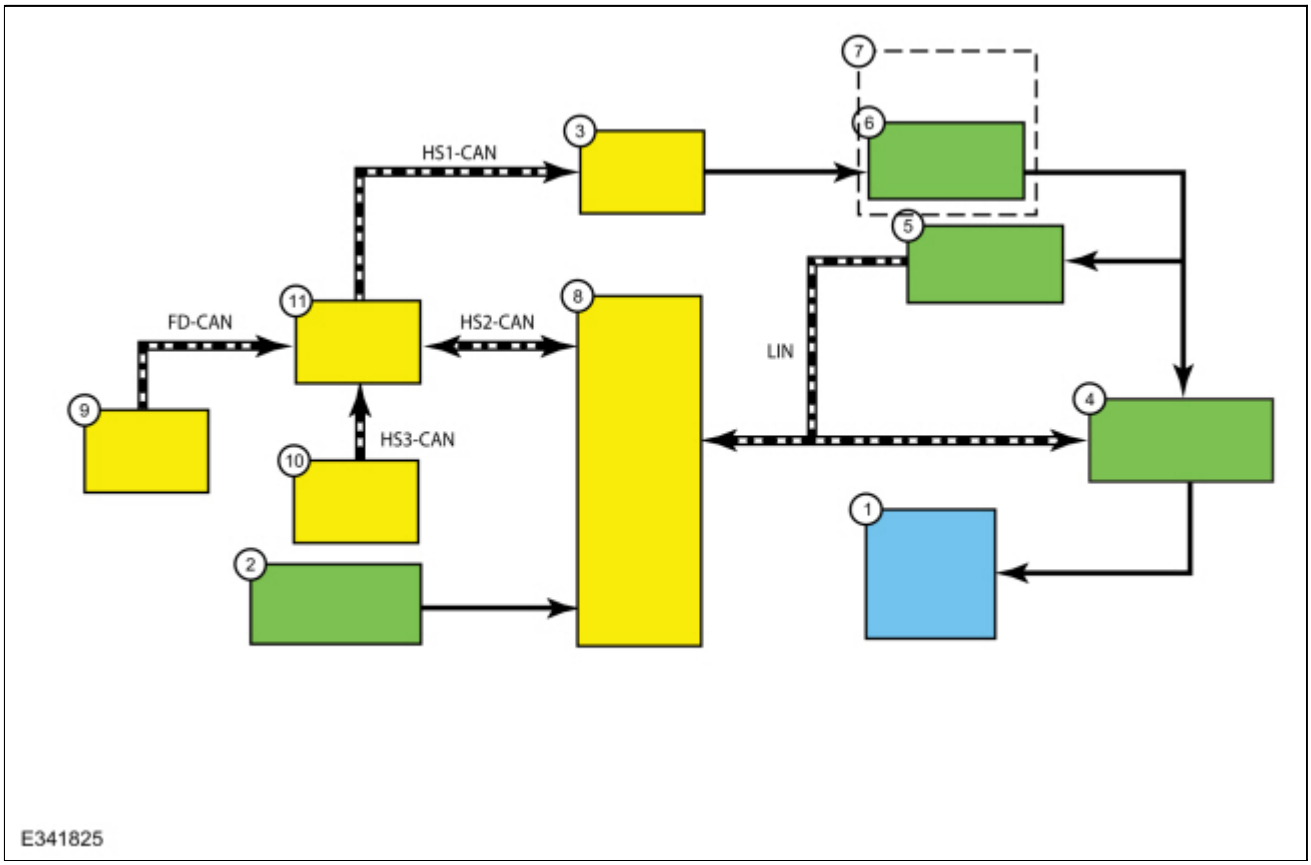
Wipers and Washers - System Operation and Component Description

System Operation

System Diagram



Item	Description
1	Washer Motor
2	Wiper Switch
3	BCM
4	Wiper Motor
5	Rain Sensor
6	Wiper Relay
7	BCMC
8	SCCM
9	PCM
10	IPC
11	GWM

Network Message Chart

SCCM Network Input Messages

Broadcast Message	Originating	Message Purpose

	Module	
Vehicle speed	PCM	The SCCM uses vehicle speed information for the operation of the speed sensitive wiper function.
Message center feature configuration	IPC	The SCCM uses the message center feature configuration to enable/disable the courtesy wipe and the rain sensitive wiper features.

BCM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Front wiper status	SCCM	The BCM uses the wiper status information for the operation of the wiper activated headlamps feature.

Windshield Wipers

The wiper relay is energized when the ignition is on and provides voltage to the windshield wiper motor and the rain sensor.

The SCCM monitors the wiper/washer switch inputs and sends the wiper/washer switch data to the windshield wiper motor through a LIN circuit.

Based on the input, the windshield wiper motor activates the appropriate wash, low, high and intermittent or rain sense modes. The logic of the wiper operation is contained within the windshield wiper motor.

When the wiper/washer switch is in the high speed setting, the windshield wiper motor also receives a ground signal directly from the SCCM , bypassing the logic within the windshield wiper motor module. This fail-safe circuit makes sure the windshield wipers function in high speed mode in the event of a LIN communication failure.

Windshield Washer

When the windshield washer switch is activated, the SCCM sends the washer request to the windshield wiper motor over the LIN . The windshield wash relay is internal to the windshield wiper motor. When the windshield wiper motor activates the windshield wash relay, voltage is provided to the washer pump, directing washer solvent to the windshield. When the switch is released, the windshield wiper motor continues to activate for 3 additional wipes and then turns off.

If equipped with a front camera, washer solvent is also directed to the front camera lens when the washer pump is active.

There is an inline filter incorporated between the windshield washer pump and the camera washer nozzle.

The washer pump shuts down when the switch is held active for 10 seconds. The washer can be reactivated by releasing and then reapplying the switch.

There are no check valves incorporated in the system to inhibit solvent flow.

Courtesy Wipe

When the windshield washer is requested, a few seconds after the windshield wash cycle has completed, an additional wipe of the windshield occurs to clear any washer solvent remaining on the windshield.

The courtesy wipe feature can be configured on/off using the message center.

Intermittent Wipers

When the wiper/washer switch is in an intermittent setting, the windshield wiper motor activates at timed intervals. The lower the setting, the longer the interval between wipes.

Speed Dependent Wipers

When the wiper/washer switch is in an intermittent setting, the speed dependent feature increases the frequency of wiping as the vehicle speed increases to compensate for the extra moisture that accumulates on the windshield.

The SCCM receives the vehicle speed from the PCM . The SCCM then sends the vehicle speed data to the windshield wiper motor through the LIN .

Rain Sensitive Wipers (if equipped)

When equipped, the rain sensitive wiper feature replaces the intermittent wiper feature. The rain sensitive feature is active when the wiper/washer switch is in any of the 4 auto/intermittent sensitivity settings. The setting closest to OFF is the least sensitive to moisture, the highest setting being the most sensitive to moisture.

The rain sensor sends data through the LIN to the windshield wiper motor. Based on the data received from the rain sensor and the auto/intermittent setting from the wiper/washer switch, the system automatically activates and adjusts the wiper speed and frequency when moisture is detected on the windshield.

If a fault is detected with the rain sensitive feature, the windshield wipers change to a default intermittent mode. The timing of the wipers correspond to a standard intermittent setting based on the auto/intermittent sensitivity setting on the wiper/washer switch.

Wiper Activated Exterior Lamps

When the headlamp switch is set to AUTO, the BCM turns the exterior lamps on within 10 seconds of the windshield wipers being activated by the wiper/washer switch. Approximately 60 seconds after the windshield wipers turn off, the BCM turns the exterior lamps off.

If the rain sensitive wipers are activated by moisture detected on the windshield when the headlamp switch is in the AUTO position, the BCM turns the exterior lamps on after a time delay. Shortly after the rain sensitive wipers are deactivated (moisture no longer detected on the windshield), the BCM turns the exterior lamps off after a time delay.

Component Description

Wiper/Washer Switch

The wiper/washer switch is part of the multifunction switch which is mounted directly to the SCCM . The windshield wiper/washer inputs to the SCCM are:

- Windshield wash
- Off
- AUTO 1/INT 1
- AUTO 2/INT 2
- AUTO 3/INT 3
- AUTO 4/INT 4
- Low
- High

Windshield Wiper Motor

The windshield wiper motor contains a logic module, internal sensors to monitor the wiper arm position, and a multi-speed motor. The logic module from the windshield wiper motor continuously monitors the wiper/washer switch inputs from the SCCM and the rain sensor when the ignition is on. Depending on the input, the wiper motor activates to achieve the desired request.

The windshield wiper motor is mounted to the wiper and linkage assembly.

Washer Pump

The washer pump is controlled by the windshield wiper motor. The washer pump delivers washer solvent to the windshield

(and the front camera lens if equipped with a front camera) when the windshield wiper motor activates the windshield washer relay (internal to the windshield wiper motor), which provides voltage to the washer pump. When activated, the washer pump delivers washer solvent to the windshield (and the front camera lens, if equipped).

Rain Sensor

The rain sensor uses an infrared beam to optically sense moisture on the windshield. The intensity of the reflected beam is measured and compared to the intensity of the transmitted beam. If there is water on the surface of the windshield the beam distorts, reducing the intensity of the beam. If the beam is not reflected completely, it is interpreted as rain on the windshield and the windshield wipers are activated.

A gel-type lens is used as the interface between the rain sensor and the windshield. If the lens is missing or damaged, the rain sensing wipers can be inoperative. The rain sensor gel-type lens cannot be replaced separately on a rain sensor of this type.