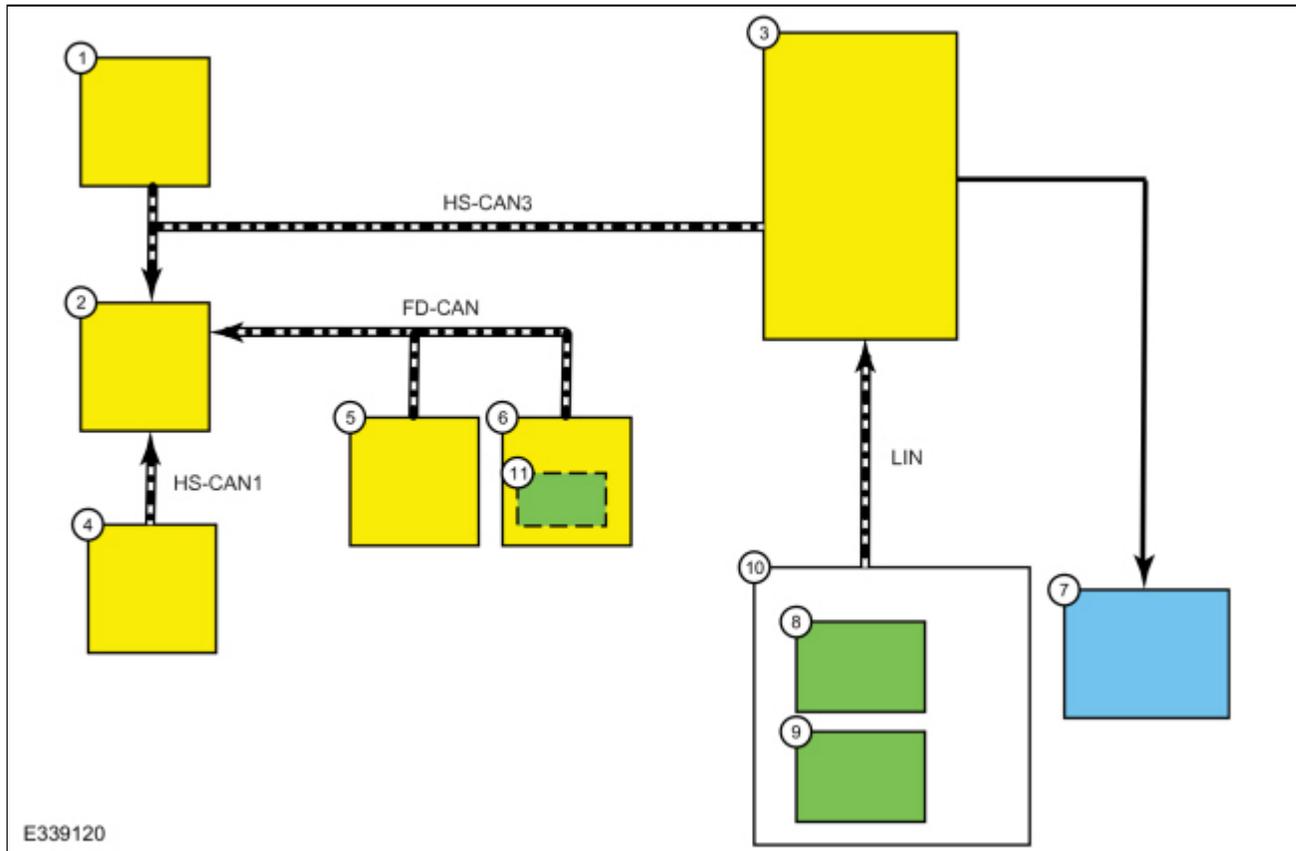


Auxiliary Brake System - System Operation and Component Description

System Operation

System Diagram



Item	Description
1	<u>IPC</u>
2	<u>GWM</u>
3	ITBM
4	<u>BCM</u>
5	<u>PCM</u>
6	<u>ABS</u>
7	Trailer Tow Connector
8	Gain Buttons
9	Manual Slider Switch
10	Trailer Brake Switch
11	<u>BPP</u>

Network Message Chart

TBM Network Input Messages

Broadcast	Originating	Message Purpose
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Message	Module	
<u>ABS</u> active	<u>ABS</u> Module	When the <u>TBM</u> receives this message, it adjusts the <u>PWM</u> signal sent to the trailer brakes to aid in the <u>ABS</u> event.
<u>ABS</u> fault	<u>ABS</u> Module	Alerts the <u>TBM</u> of possible system failures in the <u>ABS</u> .
Brake on / off switch	<u>PCM</u>	Used to inform the <u>TBM</u> the driver has pressed the brake pedal. The <u>TBM</u> uses this message to activate the trailer brakes.
Illumination dimming level	<u>BCM</u>	The <u>TBM</u> dims or brightens the display based on current dimming levels.
Trailer brake configuration	<u>IPC</u>	This message informs the <u>TBM</u> of the current <u>IPC</u> configuration for trailer brake messages.
Trailer brake control request	<u>ABS</u> Module	This message communicates the trailer brake output request to the <u>TBM</u> during a trailer sway or other stability control braking event.
Vehicle speed	<u>PCM</u>	This message informs the <u>TBM</u> of the current vehicle speed. The <u>TBM</u> adjusts the <u>PWM</u> signal sent to the trailer brakes in proportion to the current amount of vehicle deceleration.

Trailer Brake Control Function

The gain buttons set the TBM for specific towing conditions such as trailer load, vehicle load, road conditions and weather. The gain is normally set to provide maximum trailer braking while maintaining trailer stability. For information on setting the trailer brake gain, refer to the Owner's Literature.

The manual slider switch on the TBM activates the trailer brakes independently from the vehicle brakes. The manual slider is used in conjunction with the gain buttons to adjust and set the trailer brakes. When the manual slider switch is activated with a trailer connected to the vehicle, the trailer stoplamps and the vehicle stoplamps illuminate.

Once the driver sets the desired gain, the TBM monitors the HS-CAN and FD-CAN messages from the PCM, ABS module and BCM as well as the manual slider switch input to determine if trailer braking is necessary. If trailer braking is necessary, the TBM sends a PWM signal to the trailer to activate the trailer brakes.

TBM Wake Up

NOTE: *These conditions require that a trailer not be connected to the trailer tow connector.*

When the manual lever is set all the way to the left, the message center should display TRAILER DISCONNECTED. At the same time, with the vehicle stationary, battery voltage should be present at pin 3 of trailer tow connector C4099.

When not braking the TBM sends a voltage pulse to pin 3 of the trailer tow connector to determine if a trailer is connected to the trailer tow connector.

TBM Message Center

The TBM continually monitors the trailer brake system operation and trailer connectivity. The TBM sends system operation information such as gain setting and relative braking power to the IPC along the HS-CAN3 . If a system fault or a trailer connectivity issue is detected. The GWM sends this message to the IPC along the HS-CAN3 . When the IPC receives a trailer brake message from the GWM , one or more of the following messages is displayed in the message center:

- **TRAILER CONNECTED** – Displays when the TBM detects a correct trailer wiring connection during the current ignition cycle.
- **TRAILER DISCONNECTED** – Displays when the TBM detects a trailer connection and then a disconnection, either intentional or unintentional, during the current ignition cycle, the display is accompanied by a single audible chime. This message also displays if a vehicle or trailer-wiring fault occurs causing the trailer to appear disconnected, or if the manual slider switch is activated without a trailer connected.
- **TRAILER BRAKE MODULE FAULT** – Displays in response to Diagnostic Trouble Codes (DTCs) reported by the TBM , accompanied by a single audible chime. When this message appears, the system may still function, but performance may be degraded.
- **WIRING FAULT ON TRAILER** – Displays when there is a short circuit on the TBM PWM output signal circuit. If the message is displayed and accompanied by a single audible chime, without a trailer connected, the concern is in the

vehicle wiring. If the message only displays with a trailer connected, the concern is in the trailer wiring.

- **TBC GAIN = XX.X NO TRAILER** – Shows the current gain setting for the current ignition cycle and when adjusting the gain. This message also displays if the manual slider switch or gain buttons are used without a trailer connected.

Component Description

TBM

NOTE: *The TBM and TRM are intergrated into one module.*

The TBM is the electronic control unit for the trailer brake system. The TBM monitors all sensor inputs and all HS-CAN messages relating to trailer braking and directly controls the trailer brakes using a PWM signal. Vehicle configuration information is sent to a new TBM from the BCM when the ignition is set to ON.

Trailer Brake Switch

The trailer brake switch is a stand alone input to the TBM sending messages over a LIN.