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Viewed:	1186		

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Title: **S13 Brake Switch Diagnostics**

Applies To: **LT, RH, HV, HX with S13 engine**

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

12/09/2025 - Changed step 8 and 9 as steps were not clear. Corrected pin numbers.
04/23/2025 - corrected redundant and brake switch 1 part numbers
04/22/2025 - Initial Article Release

DESCRIPTION

This document is intended to provide supplemental information for concerns with brake light switches and pressure sensors used by the BCM and PIM module to determine if the operator of the vehicle is applying the service brakes. All S13 vehicles are equipped with BCM feature 597483 (BCM PROG, BRAKE SWITCH, Use With Brake Application Pressure Switch). 597483 uses a normally open brake pressure switch that closes with 2-6 psi of air pressure and a brake application pressure sensor. When the switch is closed or the pressure sensor reads higher than 4psi, the BCM considers the brakes applied and will broadcast that over the J1939 networks to other modules. The S13 also includes a redundant brake switch that is wired directly to the PIM. This switch is normally closed and opens with 2-6 psi of air pressure. If the S13 ECM believes the brakes are applied from one of these brake signals, it can reduce or completely cut throttle input.

NOTE: All Next Gen 2024MY+ CE buses also use this feature; it is optional on other vehicles as well. These diagnostics can also be used on those vehicles, but the symptoms will be different.

SYMPTOM(s)

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

DTC/Light	Description	Notes
SA 33 SPN 116 FMI 15	Brake Switch and Pressure Transducer are Mismatched High	If the pressure sensor reads more than 15 psi for 30 seconds while the brake switch input is inactive, this fault is set. This fault will cause brake lights to illuminate when active. Remember that a pressure reading above 4psi means the BCM considers the brakes applied so this fault may not necessarily set when the symptoms are present.
SA 33 SPN 116 FMI 17	Brake Switch and Pressure Transducer are Mismatched Low	If the pressure sensor reads less than 1 psi for 30 seconds while the brake switch input is active, this fault is set. This fault will cause brake lights to illuminate when active.
SA 33 SPN 597 FMI 0	Brake Switch reading above normal range.	Brake Switch (Connector J5/1602 pin E14) Shorted High or Open Circuit
SA 33 SPN 597 FMI 1	Brake Switch reading below normal range	Brake Switch (Connector J5/1602 pin E14) Short To Ground
SA 0 SPN 603 FMI 17	Brake Pedal Switch 2 : Data Valid But Below Normal Operating Range – Least Severe Level	Fault means the ECM sees the brake signal from the BCM showing applied while the redundant brake switch shows released. This fault does not mean there is a problem with the redundant brake switch or it's circuits.

Customer Observations or Concerns:

Low engine power
No Response from the Throttle pedal

SPECIAL TOOLS / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Diamond Logic® Builder		EZ-Tech Software	

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
Switch, Sensor, Transducer Pressure	4192764C1	1	Brake Application Pressure Sensor. The same part is used for primary and secondary tank pressure sensors and ESP brake pressure sensors.
Switch, Stop/brake Light	2505850C2	1	Brake Switch 1 is wired to the BCM
Switch, Sensor, Pressure Switch	4200246C1	1	Redundant brake switch wired to PIM module
TERMINAL CABLE*DELPHI MICRO-PA	3539904C1	1	Terminal pin E3 1602 connector at BCM

DIAGNOSTIC STEP(s)

Note: These diagnostics are written for level 2 (or higher) dealer or fleet access in DLB.

Step	Action	Decision
1	If there are network communication codes on the 500K powertrain network, performance-related fault codes stored in the ECM/PIM, and/or brake switch-related faults, follow the FCAPS for these faults and address them before proceeding with this diagnostics. If there is a complaint of low power, throttle cut, no response from the accelerator pedal, with no fault codes, then check the brake switch signal in SDS when connected to the engine. Does the brake switch signal show the brakes are depressed when the concern happens?	**Yes - Brake Switch Signal is showing as depressed when service brakes are not applied.** Go to Step 2. **No - Brake switch is not showing as depressed when concern occurs.** Consult applicable engine low-performance diagnostics.

Step	Action	Decis
2	1. Connect to the vehicle with Diamond Logic Builder (DLB) Software and enter diagnostics mode. 2. Go to the features tab, select feature 597483, and click the "Make Session" button.	**No - B Servic is grea Brake_ unche pressu high: (** **No - B Servic is less Brake_**

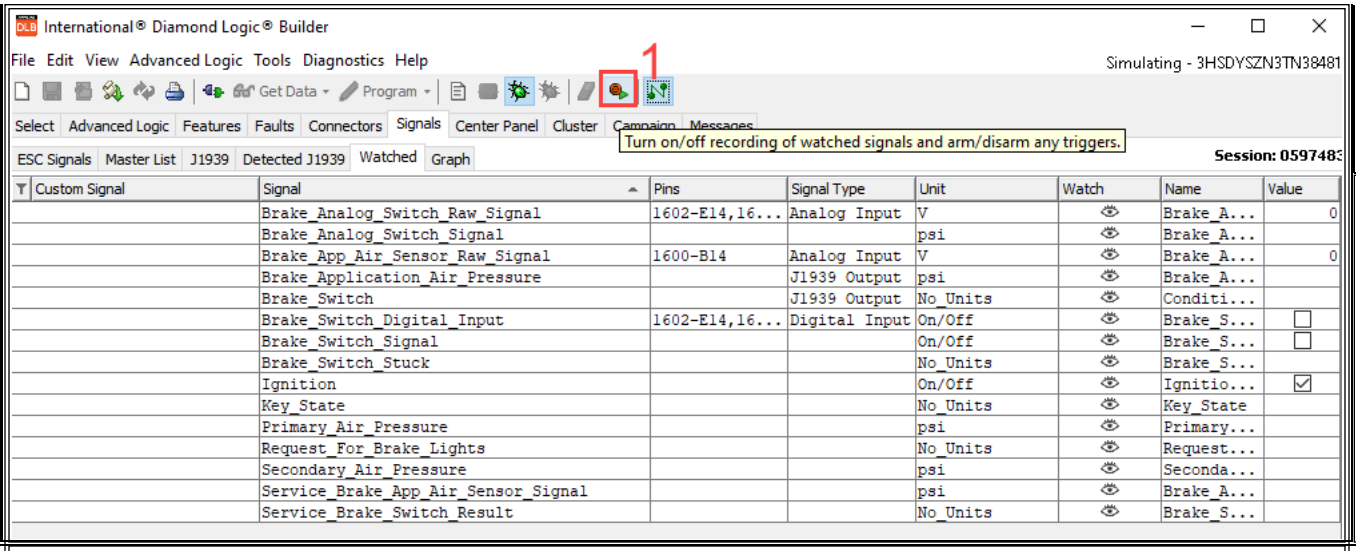

Figure 1: 597483 Session in DLB

Item 1: Record/Arm Button

Step	Action	Decision
3	**With the issue still present (see concern), with no brake application), unplug the brake application pressure sensor and check the resistance from pin 2 at the sensor and ground. It is also recommended to backprobe pin E3 in connector 1602 and check the voltage between that circuit and a known good ground.** Is Service_Brake_App_Air_Sensor_Signal less than 4 psi and Brake_Switch_Digital_Input unchecked anytime the brake pedal is NOT depressed?	**No - high resistance or voltage is higher than .5V. The ZVR circuit has** circuit for the cause of high resistance. Carefully inspect the E3 in the 1602 connector and pins A4 on both sides of the D490 connector (IP to DCM connection located by the steering column). Inspect for damaged or poorly done crimping of terminals to wire. Repair the circuit as necessary. Replace the terminal if necessary. Save the failed terminal for warranty review. **Note:** The most common cause of this complaint has been the terminal in the E3 cavity of the 1602 connector. **Yes - resistance is good.** Go to step 4.

Step	Action	Decision
4	**With the sensor disconnected, check for voltage between pin 1 and a known good ground:** Is the voltage less than .5V?	**No - the voltage is higher than .5V. The sensor signal circuit has a short to power.** Carefully inspect the circuit between the sensor connector and BCM for shorts to other power circuits. **Yes - no issue with circuits.** Replace the brake application pressure sensor. If the brake application pressure reading still does not read properly, verify no air is being trapped in the air circuits and use a test BCM to verify the BCM has not failed.

Step	Action	Decision
5	**With the issue still present (Brake_Switch_Digital_Input is checked with no brake application), unplug brake pressure switch 1 and check resistance from**	**No - high resistance or voltage is higher than .5V. The ZVR circuit has**

	pin D at the switch and a known good ground. It is also recommended to backprobe pin E3 in connector 1602 and check the voltage between that circuit and a known good ground: Resistance should be extremely low. Less than 5 ohms at most, ideally less than 1 ohm, but meters can vary. Voltage should be less than .5V. Is resistance to the ground reasonable?	**poor continuity to ground.** Inspect the circuit for the cause of high resistance. Carefully inspect the pin drag of the terminal in the 1602 connector and pin B9 on both sides of the D490 connector (IP to DCM connection located by the steering column). Inspect for damaged or poorly done crimping of terminals to wire. Repair the circuit as necessary. Replace the terminal if necessary. Save the failed terminal for warranty review. **Yes - resistance is good.** Go to step 6.

Step	Action	Decision
6	**With brake pressure switch 1 and BCM connector 1602 unplugged, check resistance between pin C at the switch and pin E14 in the 1602 connector:** Resistance should be extremely low. Less than 5 ohms at most, ideally less than 1 ohm, but meters can vary. Is resistance reasonable?	**No - high resistance on the circuit.** Inspect the circuit for the cause of high resistance. Carefully inspect the pin drag of terminal E14 in 1602 connector and pin B9 on both sides of the D490 connector (IP to DCM connection located by the steering column). Inspect for damaged or poorly done crimping of terminals to wire. Repair the circuit as necessary. Replace the terminal if necessary. Save the failed terminal for warranty review. **Yes - resistance is good.** Go to step 7

Step	Action	Decision
7	**With brake pressure switch 1 and BCM connector 1602 unplugged, check resistance between pin C at the switch and a known good ground:** There should be little to no continuity between this circuit and ground (greater than 10000 ohms). Is there little to no continuity (high resistance) on this circuit?	**No - low resistance to ground on the circuit.** Inspect the circuit for damage and shorts. **Yes - no issue with circuits.** Replace brake pressure switch 1. If Brake_Switch_Digital_Input is still checked with no brake application, verify no air is being trapped in the air circuits, and use a test BCM to verify the BCM has not failed.

Step	Action	Decision
8	**With the issue still present (SDS reporting brakes are applied with no brake application), unplug the redundant brake pressure switch (connector D1812) and check the resistance from pin D at the switch and a known good ground:** Resistance should be extremely low. Less than 5 ohms at most, ideally less than 1	**No - high resistance. The ZVR circuit has poor continuity to ground.** Go to step 9.

	ohm, but meters can vary. Is resistance to the ground reasonable?	
		Yes - resistance is good. Go to step 10.

Step	Action	Decision
9	**With the redundant brake switch and PIM connector D1530 unplugged, check the resistance between pin D at the switch and pin 30 in the D1530 connector:** Resistance should be extremely low. Less than 5 ohms at most, ideally less than 1 ohm, but meters can vary. Is resistance reasonable?	**No - high resistance on the circuit.** Inspect the circuit for the cause of high resistance. Carefully inspect the pin drag of terminal 30 in D1530 connector at the PIM. Also, inspect pin D3 on both sides of the D490 connector (IP to DCM connection located by the steering column). Inspect for damaged or poorly done crimping of the terminal to the wire. Repair the circuit as necessary. Replace the terminal if necessary. Save the failed terminal for warranty review.
		Yes - resistance is good. Go to step 10

Step	Action	Decision
10	**With the redundant brake switch and PIM connector D1530 unplugged, check resistance between pin C at the switch and a known good ground:** There should be little to no continuity between this circuit and ground (greater than 10000 ohms). Is there little to no continuity (high resistance) on this circuit?	**No - low resistance to ground on the circuit.** Inspect the circuit for damage and shorts.
		Yes - no issue with circuits. Replace Redundant Brake Switch. If SDS still shows brakes applied (and BCM doesn't) with no brake application, verify no air is being trapped in air circuits and use a test PIM to verify the PIM has not failed.

WARRANTY INFORMATION

Warranty Claim Coding:
Refer to the Warranty Coding Manual for Group and Noun Codes.

Standard Repair Time(s):
Refer to the SRT Manual for Repair Times

OTHER RESOURCES

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