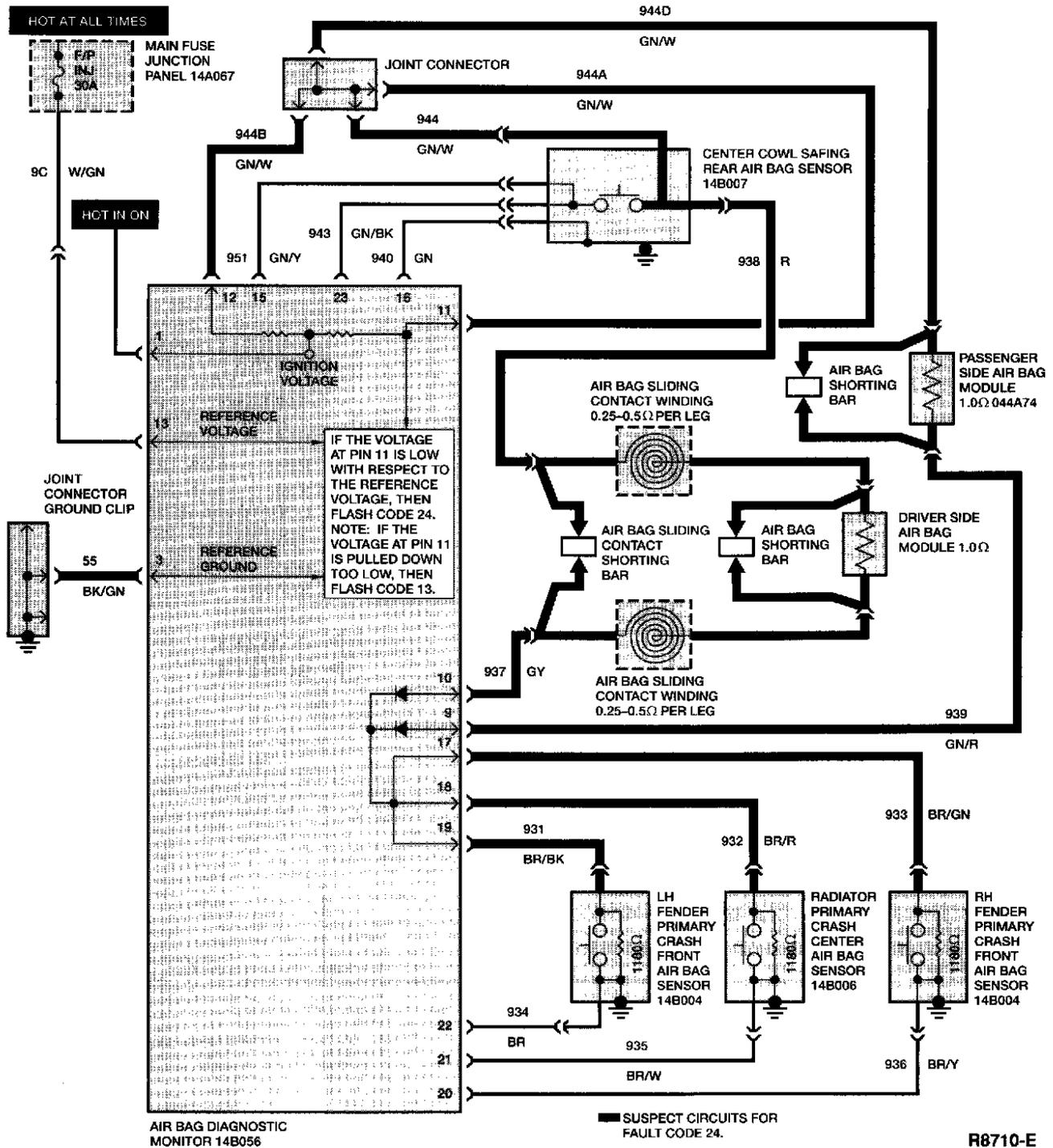


DTC 24: Center Cowl Safing Sensor Output Feed/Return Open

Electrical Schematic:



Normal Operation

The LH, RH, and center primary crash air bag sensors all have internal resistors. The [air bag diagnostic monitor](#) uses the resistor in the primary crash air bag sensors in combination with the two resistors inside the diagnostic monitor to create a tightly controlled diagnostic voltage at pin 11 (circuit 944A "GN/W"). The primary crash air bag sensors are tied together inside the air bag diagnostic monitor at pins 17 (circuit 933 "BR/GN"), 18 (circuit 932 "BR/R") and 19 (circuit 931 "BR/BK"). Therefore, the resistors in the primary crash air bag sensors are connected in parallel. The parallel combination of all the primary crash air bag sensor resistors should be equal to 393 ohms. The vehicle is equipped with three primary crash air bag sensors; the resistance of each primary crash air bag sensor should be 1180 ohms (± 12 ohms).

Pin 11 And 12 Voltage Chart:

Charging System Voltage	Voltage at Pin 11	Voltage at Pin 12
9.0	1.9	1.9
9.5	2.0	2.0
10.0	2.1	2.1
10.5	2.2	2.2
11.0	2.3	2.3
11.5	2.4	2.4
12.0	2.5	2.5
12.5	2.6	2.6
13.0	2.7	2.7
13.5	2.8	2.8
14.0	2.9	2.9
14.5	3.0	3.0
15.0	3.1	3.1
15.5	3.2	3.2
16.0	3.3	3.3

The resistors inside the [air bag diagnostic monitor](#) are connected to pins 11 (circuit 944A "GN/W") and 12 (circuit 944B "GN/W") and are equal in value. Note that circuits 944A and 944B are tied together at the joint connector. Therefore, the two resistors inside the air bag diagnostic monitor are connected in parallel and will function the same as one resistor of half the original value. The air bag system is wired so that current will flow from both pins 11 and 12 through the center cowl safing rear air bag sensor and out to the driver side air bag module and through the joint connector and out to the passenger side air bag module. Current flows through the driver side air bag module and into pin 10 (circuit 937 "GY") and through the passenger side air bag module and into pin 9 (circuit 939 "GN/R"). Current then flows from pin 10 and pin 9 through the diodes inside the air bag diagnostic monitor and out to the primary crash air bag sensors through pins 17, 18, and 19. The current flows through each primary crash air bag sensor resistor and stops at the case ground of each primary crash air bag sensor. Pin 11 is the midpoint of the resistor network and voltage at pin 11 will change with vehicle charging system voltage. The expected voltage at pin 11 is shown in the chart provided.

The [air bag diagnostic monitor](#) measures the vehicle charging system voltage at pin 13 (battery input). By measuring the voltage at pin 13, the air bag diagnostic monitor can accurately predict what the voltage at pin 11 should be in a normal functioning system.

If the circuit 944B "GN/W" wire opens between the joint connector and the [air bag diagnostic monitor](#), pin 12 does not assist in the diagnostic voltage. Both resistors are needed to pull up the diagnostic voltage to the correct value. In this situation, the resistor on pin 11 is the only resistor inside the air bag diagnostic monitor pulling up the voltage. Therefore, the voltage on pin 11 will be half of the normal expected voltage and the voltage on pin 12 will be approximately equal to the vehicle charging system voltage. The air bag diagnostic monitor does not measure the voltage on pin 12, so the air bag diagnostic monitor bases its decision strictly on the voltage at pin 11. If the voltage at pin 11 is lower than it should be, the air bag diagnostic monitor will flash a code 24.

Another situation that can cause low voltage at pin 11 is a decrease in the air bag sensor resistance (resistance is too low). If this occurs, the voltage at pin 11 will be pulled down to a lower than normal value. In this situation, the voltage at pins 11 and 12 will be identical. Therefore, an air bag sensor with low resistance may cause low voltage at pin 11 and the monitor will flash a code 24 on the air bag indicator.

Possible Causes

Low voltage at pin 11 and high voltage at pin 12 can be caused by:

- An open circuit or high resistance in the wiring harness in circuit 944B ("GN/W").

Low voltage on both pins 11 and 12 can be caused by:

- Resistance to ground on circuit 944B or 944A. Circuits 944B and 944A should be open circuits to ground when the [air bag diagnostic monitor](#) is disconnected from the harness. Resistance to ground on these circuits can cause a drop in the diagnostic voltage on both circuits.
- Low resistance in one or more of the primary crash air bag sensors. If the resistance of one or more of the primary crash air bag sensors is lower than normal, the voltage on pin 11 will be pulled down too low.
- Intermittent battery voltage at pin 13 can cause the reference voltage inside the [air bag diagnostic monitor](#) to fluctuate and can cause a fault code 24 in some circumstances.
- A poor ground on pin 3 of the [air bag diagnostic monitor](#) may cause voltage to appear on the air bag diagnostic monitor ground reference. Any voltage on the ground reference will cause the air bag diagnostic monitor to measure the voltage at pin 11 as low, even though the voltage on pin 11 with respect to sheet metal is normal.

Pinpoint Test Steps:

24-1 - 24-5:

Test Step		Result	Action to Take
24-1	VERIFY CONDITION		
	<ul style="list-style-type: none"> ● Key ON. ● Count the fault code (if any). ● Is code 24 flashing? 	Yes No	GO to 24-2. READ the normal operation description for this fault code. EXAMINE the fault code schematic and look for areas where intermittent problems would occur (connectors, splices, crimps, etc.). NOTE: Do not proceed with pinpoint tests until the code is flashing! Failure to do so will result in needless replacement of the air bag diagnostic monitor and repeat repairs.
24-2	CHECK VOLTAGE AT AIR BAG DIAGNOSTIC MONITOR		
	<ul style="list-style-type: none"> ● Deactivate the air bag system. ● Key ON. ● Measure the voltage between circuit 944A ("GN/W") of the black air bag diagnostic monitor connector pin 11 and circuit 55 ("BK/GN") (ground) of the gray air bag diagnostic monitor connector pin 3. ● Measure the voltage between circuit 944B ("GN/W") of the black air bag diagnostic monitor connector pin 12 and circuit 55 ("BK/GN") (ground) of the gray air bag diagnostic monitor connector pin 3. ● Compare measured voltages with the pin 11 and 12 Voltage Chart. ● Are the voltages correct? 	Yes No	INSPECT circuit 9C ("W/GN") for intermittent open between main fuse junction panel and pin 13 of the air bag diagnostic monitor. SERVICE any poor connections. REPLACE the air bag diagnostic monitor only if no poor connections are located. VERIFY the system. REACTIVATE the system. If both pins low, GO to 24-3. If pin 12 is high and pin 11 is low, LOCATE and SERVICE open in circuit(s) 944B, 944, 944D. RECONNECT the system. VERIFY the system. REACTIVATE the system.
24-3	CHECK PRIMARY CRASH AIR BAG SENSOR CIRCUITS		
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the battery ground cable. ● Disconnect the air bag diagnostic monitor connectors. ● Measure the resistance of circuit 933 ("BR/GN") between the gray air bag diagnostic monitor connector pin 17 and the gray air bag diagnostic monitor connector pin 3. ● Measure the resistance of circuit 932 ("BR/R") between the gray air bag diagnostic monitor connector pin 18 and the gray air bag diagnostic monitor connector pin 3. ● Measure the resistance of circuit 931 ("BR/BK") between the black air bag diagnostic monitor connector pin 19 and the gray air bag diagnostic monitor connector pin 3. ● Are all of the resistances greater than 1168 ohms? 	Yes No	GO to 24-5. GO to 24-4.
24-4	CHECK PRIMARY CRASH AIR BAG SENSOR(S)		
	<ul style="list-style-type: none"> ● Disconnect the primary crash air bag sensor(s) in question. ● Measure the resistance of the primary crash air bag sensor between the circuit leading to it and its grounding point. ● Is the resistance greater than 1168 ohms? 	Yes No	LOCATE and SERVICE the short to ground in circuit 933, 932 and / or 931. RECONNECT the system. VERIFY the system. REACTIVATE the system. REPLACE the primary crash air bag sensor(s). RECONNECT the system. VERIFY the system. REACTIVATE the system.
24-5	CHECK CIRCUIT FOR RESISTANCE TO GROUND		
	<ul style="list-style-type: none"> ● Disconnect the air bag sliding contact connector. ● Place the digital multimeter on the highest resistance setting. ● Measure the resistance of circuit 944A ("GN/W") between the black air bag diagnostic monitor connector pin 11 and the gray air bag diagnostic monitor connector pin 3. ● Is the resistance infinite? 	Yes No	REPLACE the air bag diagnostic monitor. RECONNECT the system. VERIFY the system. REACTIVATE the system. LOCATE and SERVICE short to ground in circuit 944, 944A, 944B, 944D and / or 938 and the center cowl safing rear air bag sensor and bracket. RECONNECT the system. VERIFY the system. REACTIVATE the system.

