



## SRS TESTING AFTER A COLLISION EVENT

### Key Legend:

**SRS:** Supplementary Restraint System or Supplement Restraint System, depending on the OEM

**ACM:** Airbag Control Module (ACM), sometimes referred to as RCM (Restraint Control Module, Ford), SDM (Sensing and Diagnostic Module, GM), ORC (Occupant Restraint Controller, Chrysler) or ECM (Electronic Control Module)

**EDR:** Electronic Data Recorder - a SRS subcircuit contained within the ACM to record pre- and post-crash data

**OWC:** Occupant Weight Classification, OWS (Occupant Weight System) or PPS (Passenger Presence System). This is the system utilized to control the operation of the passenger airbag based on the size of the passenger.

**DTC:** Diagnostic Trouble Code

**MIL:** Malfunction Indicator Lamp

Since the advent of smart airbag systems, we have come to understand that not all airbags are required to deploy during a collision. In some cases, the airbag may not deploy at all. Generally, most of us notice and deal with an illuminated SRS MIL, indicating a DTC within ACM, at the end of the repair when we are planning to return the vehicle to the consumer. Obviously, this is neither productive nor efficient, as the damage assessor (estimator) should have checked the system when he/she was preparing the damage report. This article is going to outline the general procedure to check a vehicle after a collision event with or without an airbag deployment. As always, check with the OEM for their specific procedures, as the procedures in this article are a generalization. Before we continue, please refer to the key legend at the top of this page for clarification of the acronyms we'll be discussing.

Most vehicles require a computer scan to read the vehicle modules - generally the ACM and (in some cases) the Engine Computer Module (ECM) - to retrieve any current or history codes. In many cases, there may be no MILs illuminated on the instrument panel information center, although there are DTCs present in the modules. For this reason alone, it is paramount that the vehicle is scanned during the damage assessment and then again after repairs are completed. Sometimes, this requires the vehicle to be taken to a dealer to be scanned by an OEM computer scanner. During the damage analysis, the damage assessor should perform a visual inspection and physical testing of the SRS components. The inspection steps are as follows:

1. Visually check for any deployed airbag or safety components. These may be, but are not limited to: The driver's airbag, passenger airbag, head airbags, thorax airbag, seat belt retractors, seat belt buckles, front seat assemblies and passenger OWC components. If there are no visual signs of deployment, then move on to the physical testing.
2. Start the vehicle (if it is operational), and check the SRS MIL on the instrument cluster. The lamp should illuminate, flash on and off and stay off after a few seconds. If available, a vehicle scanner should be

connected to the vehicle through the DLC to read any current DTCs or historic DTCs stored in the system.

3. If the driver and/or passenger airbags are deployed, check the wire harness connectors for burns and/or melting. For the driver's airbag, it may require the removal of the bag to examine the clock spring/cable reel. For the passenger airbag, there is generally access through the glove box.

4. Static seat belt testing/"Thump Test:" This test should be performed on each and every seat belt in the vehicle. Unwind the seat belt completely and check the webbing for damage (stains, cuts, burns, deformities, pulled threads, etc.). Listen for abnormal sounds. Now, allow the belt to retract back and listen for a smooth reeling sound. (On a CINCH belt, you will hear a clicking sound as the belt reels back into the retractor.) After the above testing, pull the belt about halfway out and then pull quickly on it. The belt should "LOCK UP." If the belt locks, then it can be considered acceptable.

5. Seat belt buckle test. Look at the buckles to ensure they are not collapsed. Some buckles are just a bar or cable, which cannot collapse, but some buckles have a corrugated outer covering. (Hint: It probably can deploy.) Check the covering for any misalignment and the height of the buckle. Like the name implies, install the tongue (it looks like a chrome metal striker) into the buckle, and you should hear an audible "click." If the buckle clicks and disengages the tongue, it can be classified as acceptable.

6. Check the area of damage to see if any of the crash sensors are physically harmed. If you are not sure of the locations of the crash sensors, you can check their location in the OEM repair manual (on their website and/or a third party company like ALLDATA).

7. Most vehicles are equipped with a passenger weight sensor to control the deployment of the passenger airbag. On the dash panel, instrument cluster or the rear view mirror, there will be a Passenger Airbag Disable Lamp (PADL) to inform the operator if the passenger airbag is active or not. This all depends on the amount of weight on the passenger seat. To test the system, start the vehicle and let it run for a few seconds. Check the PADL to see if it is illuminated with nothing on the passenger seat. It should illuminate "Passenger Airbag OFF" or the lamp should be off. Sit

in the seat while the vehicle is still running, wait a few seconds and the lamp should illuminate "Passenger Airbag ON" or the lamp should illuminate "ON."

8. Inspect the steering column for bending, twisting, buckling or any type of damage, or for a collapsible column. To know if the vehicle you are inspecting has a collapsible column, look at the airbag description and operation statements in the repair manual. Generally, you will need to remove the knee bolster to view the underside of the column mounting points.

9. The instrument panel knee bolsters and mounting points need to be inspected for bending, twisting, buckling, stress markings or any other type of damage.

10. The instrument panel brackets, braces, etc. need to be inspected for bending, twisting, buckling or any other type of damage. Generally, visual access can be achieved by removing the side instrument trim panels on some models.

11. In severe collision events, inspect the instrument panel cross car beam and mounting points for bending, twisting, buckling or any other type of damage. Generally, to view the cross beam, the dash will require removal. If this is necessary, generally the airbags have deployed and the vehicle has sustained significant damage.

12. The brake pedal should be inspected for bending, twisting, buckling or any type of damage. Additionally, examine the condition of the brake pedal pad and if it is affixed correctly.

13. The seats and seat mounting points require inspection for bending, twisting, buckling or any other type of damage. Additionally, the seat adjustments must be checked for operation and functionality; this includes both power and manual seat assemblies.

14. The roof and headliner mounting points should be checked for damage and if there is any visible damage to the roof panel.

15. Some manufacturers utilize a SRS battery positive (+) disconnect. If the vehicle is involved in a collision, the battery cable must be checked for deployment. In some cases, a technician, tow driver or even the vehicle owner reconnected the deployed junction to be able to move the vehicle. Generally, a deployed battery cable will set a DTC and illuminate a MIL.

16. Any malfunctions of damaged components should be noted on the damage report.

## GENERAL WARNINGS

1. Proper operation of the Supplemental Inflatable Restraint (SIR) sensing system requires that any repairs to the vehicle structure return the vehicle structure to the original production configuration. The improper repair of the vehicle structure could cause non-deployment of the airbag(s) in a frontal collision or deployment of the airbag(s) for conditions less severe than intended. After any collision, inspect the above components as indicated. If you detect any damage, replace the component. If you detect any damage to the mounting points or mounting hardware, repair the component or replace the hardware as needed. After repairs are concluded, a complete scanning of the vehicle should be performed to ensure proper functionality of the system.

2. Do not repair or replace the seat stitching or seams in the seat back trim cover with an internal mounted seat side airbag module. Replace the complete seat back trim cover, upper seat assembly or seat assembly as per the required OEM protocols. Non-OEM seat stitching may cause improper airbag deployment, which could result in personal injury. Do not use aftermarket or used airbag system components.

3. Mounting hardware for SRS components should not be reused.

4. Many OEMs require the replacement of the impact sensors in the area of collision damage regardless of their operation and/or condition, whether or not the airbags have deployed or if it appears to be undamaged. The area of collision damage is defined as the portion of the vehicle which is crushed, bent or damaged due to a collision. An example of this would be a moderate collision where the front of the vehicle impacts an object. If the vehicle has an impact sensor mounted forward of the radiator, it must be replaced. Impact sensor damage that is not visible, such as slight bending

of the mounting bracket or cuts in the wire insulation, can cause improper operation of the SIR system. Do not try to determine whether the impact sensor is undamaged; replace the impact sensor. Also, if you follow a diagnostic trouble code (DTC) procedure and a malfunctioning impact sensor is indicated, replace the impact sensor.

5. Seat mounting hardware (nuts, bolts, etc.) should always be replaced if loosened or removed.

Perform zero point calibration and sensitivity check if any of the following conditions occur:

- a. The occupant detection ACM or OWS is replaced
- b. Seat SRS OWS components are replaced
- c. Accessories (seatback tray and seat cover, etc.) are installed
- d. The front passenger seat is removed from the vehicle
- e. One of the bolts that is used to install the front passenger seat is removed and reinstalled
- f. The passenger airbag ON/OFF indicator ("OFF") comes on when the front passenger seat is not occupied
- g. The vehicle is brought to the shop for repair due to an accident or a collision. The severity of the collision is irrelevant; the system should always be checked.

## PRECAUTIONS FOR SRS AIRBAG SYSTEM

### 1. HANDLING OF A VEHICLE THAT HAS BEEN DAMAGED IN A COLLISION:

- a. Refer to the SRS airbag system inspection procedures.
- b. If impacts are likely to occur to the front airbag sensors, side airbag sensors, rear airbag sensors or center airbag sensor, remove each sensor as necessary beforehand.
- c. Do not allow the front airbag sensors, side airbag sensors, rear airbag sensors or center airbag sensor to become heated to high temperatures.
- d. Check the wire harnesses and connectors for damage and/or melting, as some areas of the airbags and seat belt pretensioners may heat up to several hundred degrees when they operate.

### 2. PRECAUTIONS FOR USING ELECTRIC WELDERS

- a. Check the Diagnostic Trouble Codes (DTCs).
- b. If one or more DTCs are displayed:
  - Disconnect the negative (-) terminal cable from the battery.
  - Disconnect all the malfunctioning circuit connectors.
  - Disconnect the center airbag sensor assembly connector.

### 3. If DTCs are NOT displayed:

- a. Inspect for damage to the electric wiring harnesses and connectors.
- b. Disconnect the negative (-) terminal cable from the battery.
- c. Disconnect the center airbag sensor assembly connector.

## REPAIRS AND INSPECTIONS REQUIRED AFTER A COLLISION

Restraint systems can be damaged in a collision. To help avoid injury and ensure that all parts in need of replacement are replaced, do the following:

- a. Replace any seat belt system that was in use during a collision serious enough to deploy any automatic restraint device such as airbags and seat belt pretensioners. This not only includes seat belt systems in use by people of adult size, but seat belt systems used to secure child restraints, infant carriers and booster seats, including LATCH system and top tether anchorages.
- b. Replace any seat belt system that has torn, worn or damaged components. This not only includes adult seat belt systems, but built-in child restraints and LATCH system components, if any.
- c. Replace any seat belt system if you observe the words "REPLACE" or "CAUTION," or if a yellow tag is visible. Do not replace a seat belt if only the child seat caution label is visible.

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d. Replace any seat belt system if you are doubtful about its condition. This not only includes adult seat belt systems, but built-in child restraints, LATCH system components and any restraint system used to secure infant carriers, child restraints and booster seats.

e. Do NOT replace single seat belt system components in vehicles that have been in a collision as described above. Always replace the entire seat belt system with the buckle, guide and retractor assembly, which includes the latch and webbing material.

f. After a minor collision where no automatic restraint device was deployed, seat belt system replacement may not be necessary unless some of the parts are torn, worn or damaged.

There is a video we did on this topic for CollisionHub's Repair University. The video can be found on CollisionHub's Repair University YouTube Channel at [www.youtube.com/watch?v=XsEm8fKijtl](http://www.youtube.com/watch?v=XsEm8fKijtl).

We hope this article has helped the industry to better understand the required procedures and processes to check the restraint system after a collision event. Feel free to contact us if you have any questions. **H&D**

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