TECHNICAL REPORT

I-CAR NEW ZEALAND

Supplementary Restraint Systems (SRS) – Detection and Activation ADVANCEMENTS :

Recently introduced technologies that "speed up " airbag Deployment

In previous technical articles , we have made reference to **"Active"** & **"Passive"** safety systems that are found in virtually all vehicles that contain electronic enhancements. In recent model releases, that has seen an explosion of **"Active"** safety systems .

To avoid confusion (and perhaps re-cap on these terms), **"Active Safety"** refers to those features that are designed to **avoid or reduce the severity** of a collision event occurring.
Most vehicle-makers now put these features under the umbrella term of "**A**dvanced **D**river **A**ssistance **S**ystems", or **ADAS.**

Examples of **ADAS** include :

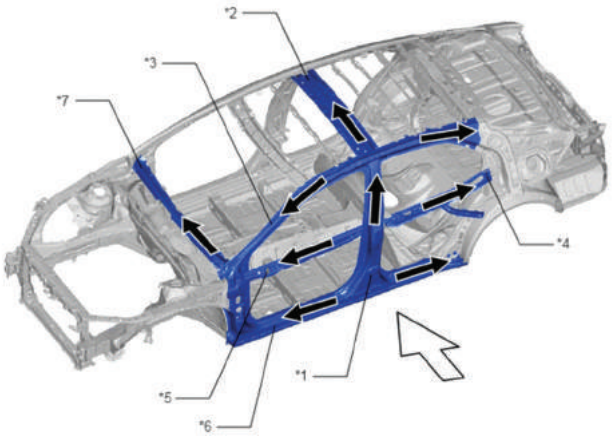
- Lane Departure Warning (LDW)
- Rear Cross Traffic Alert (RCTA)
- Blind Spot Monitoring (BSM)
- Forward Obstruction Warning (FOW)
- Adaptive Cruise Control (ACC)

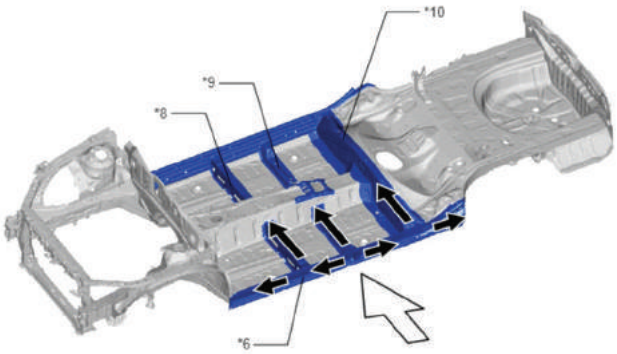
"Passive Safety" refers to those systems that come into play **once a collision event has taken place** –The best examples that we can identify with would be SRS systems and the ever-increasing use of AHSS metals and other high strength materials (such as Aluminium and Composites).

Side impact has always been an area of concern, as unlike front or rear impacts where vehicle construction can incorporate collapse zones and energy absorption structures, there is little or no "distance" between the occupant cell and the impacting object (that is, another vehicle, or maybe a power pole, as examples).

As would be expected, the side structure(s) of later – model vehicles is where we see the extensive use of the strongest steels and metals (particularly the B pillar & sill/rocker reinforcement areas). These are obviously designed to minimize intrusion and transfer collision energy away from the passenger compartment.

Courtesy of Toyota :-





Designed to work in conjunction with these new-age materials, “standard” SRS devices now include seatback & bolster airbags, in addition to full side curtain airbag systems. The effectiveness of these pyrotechnic devices is substantially dependent on how **rapidly** they are deployed .

Conventional SRS sensors that trigger airbag (SRS) deployment, rely on **direct contact** of the impacting force (and the subsequent deformation of the body structure). While that is a fairly efficient action, any reduction in the activation time will be a major factor in injury and/or death reduction.

With the recent introduction of **“Pressure Sensors”** by numerous vehicle-makers to replace conventional sensors, (which work by measuring sudden incremental changes in air pressure within the door cavity, as would occur in a collision event), the reaction time betweeen impact detection and SRS deployment is further reduced.

This new technology may have serious consequences for the collision repair industry
– To explain this in more detail :-

Everyday bodshop operations often include removal & re-fitting of door components and trims for panel repairs or replacement, painting & blending.

By necessity, the inner sealing sheet of the doorshell is disturbed and often damaged in the strip & fit process – in the case of door shells that feature pressure sensors, non-sealing of the door cavity is likely to have a detrimental effect on how SRS systems respond, should a future collision event take place…

TECHNICAL REPORT

I-CAR NEW ZEALAND

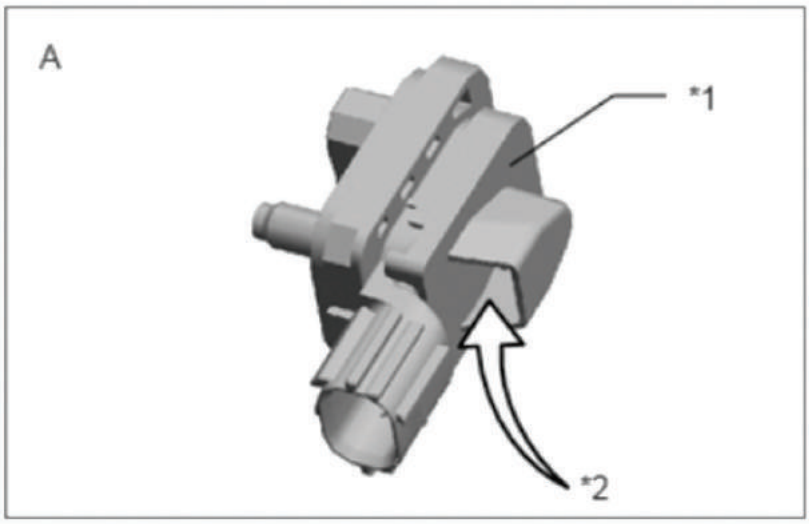
Pressure sensor information as found in the Body Repair Manual (BRM) for 2017> Camry :-

DOOR SIDE AIRBAG SENSOR (PRESSURE SENSOR) DESCRIPTION

A door side airbag sensor is installed to the centre of the front door.

The sensor detects pressure changes between the door outer and door inner according to deformation of the oor panel.

The door side airbag sensor (pressure sensor) and side airbag sensor (G sensor) perform ignition judgement using AND circuits for improved side airbag deployment.



*1	Door side airbag sensor
*2	Air inlet

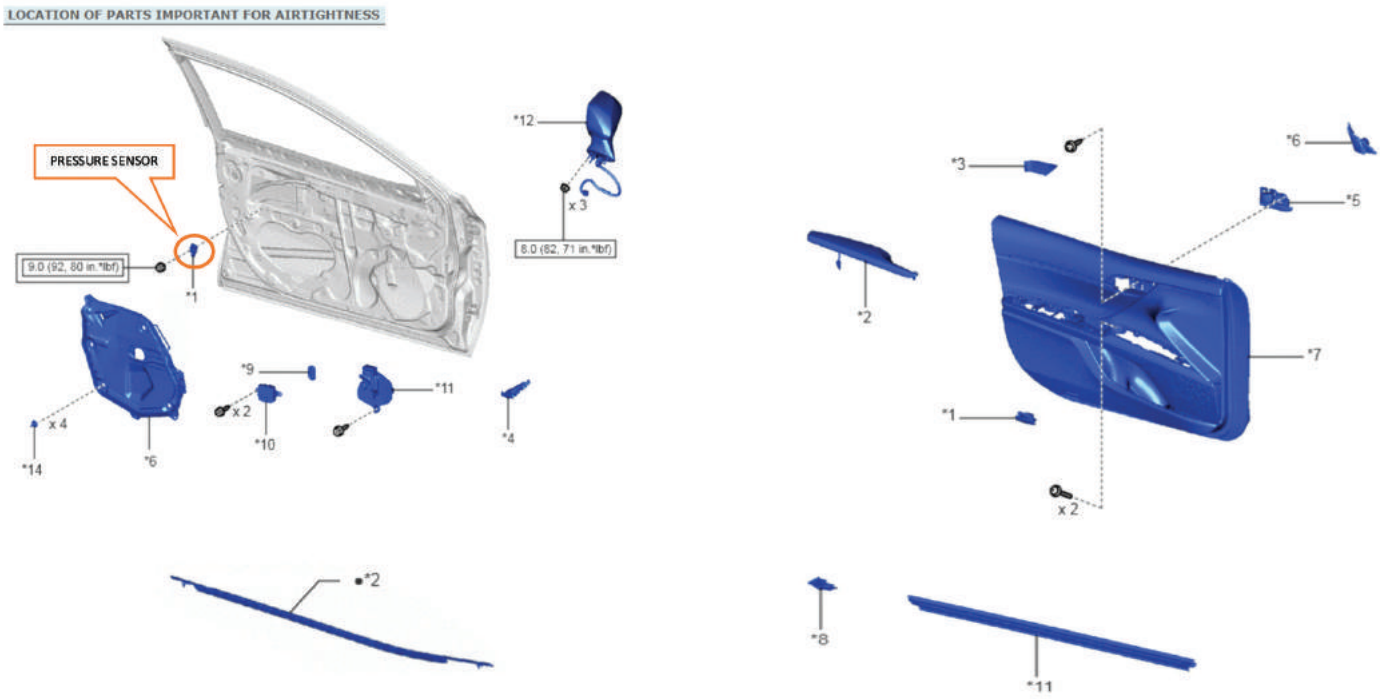
PRECAUTIONS WHEN REPAIRING BODY

Ensure the front door outer and door inner are airtight.

Apply masking tape to the door side airbag sensor to prevent the entry of foreign matter.

NOTICE:
Decreased airtightness between the front door outer and door inner may affect detection performance.

Use large, clearly visible pieces of masking tape to prevent tape from being left on the sensor after the procedure.



Note that Toyota state that the outer door belt mould (*2) is a replacement only item
Other examples of pressure switches and their locations :-

These articles have been written by Martyn Lane : I-CAR Instructor, Weld Test Administrator and Technical Specialist to the auto body industry