**Overview**

The Passenger Airbag Deactivation feature provides a mechanism to passenger airbag deployments for a particular seating position. Depending on markets, regulation, and vehicle safety strategy, this feature may or may not be available on a particular vehicle. When available, the method of deactivation may be automatic or manual. Whether automatic or manual similarly varies by market and regulation.

In all cases where Passenger Airbag Deactivation is offered, a Passenger Airbag Deactivation Indicator (PADI) will provide indication to the occupants of actual airbag status (On or Off) for the associated seating position.

**Deactivation Mechanisms**

Automatic deactivation utilizes an Occupant Classification Sensor (OCS) which is able to detect and classify occupant size and, depending on the safety strategy, request suppression of appropriate airbag deployments. The OCS is currently a standalone ECU installed within the applicable seat.

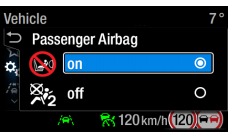
Manual deactivation utilizes an Airbag Control Switch (ACS), which is actuated by the customer, to enable or disable the associated airbag. The ACS may be implemented using a physical mechanism which requires use of the vehicle key (a.k.a Hardwired ACS), or it may be implemented as a “soft switch” (a.k.a Menu ACS) within a touch screen display.

**Menu ACS**

The Menu ACS should have the following characteristics:

* Functional and available whenever the vehicle ignition is ON.
* Vehicle speed lockout. (e.g. not usable when vehicle speed is above a set threshold)
* Readily customer accessible. (e.g. not more than 2 menu levels deep)
* Robust against inadvertent actuation. (e.g. HMI long press or slider switch)
* Provide visual confirmation of the current position. (e.g. Display of On/Off)
* Remember and utilize the state active on the prior vehicle operation cycle.
* Assume a default state of On, if the state of a prior key cycle has not been set or has been forgotten. (e.g. a brand new vehicle, first power-up at B&A or after a service procedure wiping out memory)

Menu ACS example:

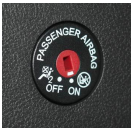


**Hardwired ACS**

The hardwired ACS should have the following characteristics:

* Contain the text “PASSENGER AIRBAG”
* ON/OFF and ISO symbols associated with the switch position.
* Operate by means of the vehicle ignition key.
* In FMVSS markets, the switch must be accessible to the driver while occupying the driver seat. (e.g. in the instrument panel or in the glove box closest to the driver)
* In ECE markets, the switch must be located on the end of the instrument panel and accessible only when the passenger door is open.

Hardwired ACS example:



**Passenger Airbag Deactivation Indicator**

A PADI provides indication of airbag ON of OFF state for the associated seating position.

Generally, the PADI is only associated with the front outboard passenger seating position.

With the introduction of Autonomous Vehicles (AV), a PADI may be associated with more than one seating position. In particular, a PADI may also be used to indicate status of the 1st row, former driver, seating position in an AV.

**Vehicle Applicability**

Subject to regulation and the specific vehicle safety strategy, as defined by Vehicle Crash Safety.

All vehicles in FMVSS markets with a GVW < 8500 lbs will implement automatic suppression, by using an OCS and provide airbag status indication using a Dual PADI.

All vehicles in ECE markets that are class N1 (GVW < 3500 kg) will implement manual deactivation, by using either a mechanical ACS or Menu ACS and provide airbag status indication using a Dual PADI.

Vehicles exceeding the weight criteria stated above, may implement a Single PADI.

Any vehicle using either an Occupant Classification Sensor (OCS) or Airbag Control Switch (ACS) requires either a Dual or Single PADI consistent with the requirements above.

**Single PADI (OFF Indication only) vs. Dual PADI (ON and OFF Indication)**

A Single PADI provides indication of only the OFF state. After initial indicator proveout, if enabled, the indicator will reflect the status of the front passenger airbag.

A Dual PADI provides indication of both an ON state and OFF state. After initial indicator proveout, if enabled, either the ON or OFF indicator will be illuminated to reflect the front passenger airbag status.

After indicator proveout, illumination of the ON and OFF indicators of a Dual PADI are mutually exclusive.

**Graphical Layout in vehicles with a Single PADI**

The PADI shall state “PASSENGER AIRBAG" and be followed by the illuminated indicator. The word PASSENGER shall not be abbreviated.

The OFF indicator shall be comprised of the word “OFF” and the ISO symbol K.03 .

The OFF indicator shall be located immediately after or under the words PASSENGER AIRBAG.

Indication of the OFF state shall illuminate both the word OFF and the associated ISO symbol.

The words “PASSENBER AIRBAG” may or may not be illuminated, depending on styling preference.

On state of a Single PADI: Off state of a Single PADI:



Provout statue of a Single PADI:



**Graphical Layout in vehicles with one Dual PADI (e.g. traditional vehicles with a driver seating position)**

The PADI shall state “PASSENGER AIRBAG" and be followed by the illuminated indicator. The word PASSENGER shall not be abbreviated.

The OFF indicator shall be comprised of the word “OFF” and the ISO symbol K.03 .

The OFF indicator shall be located immediately after or under the words PASSENGER AIRBAG,

The ON indicator shall be comprised of the word “ON” with a surrounding racetrack and the ISO symbol Z.01. 

The ON indicator shall be located to the right of the OFF indicator.

Indication of the OFF state shall illuminate both the word OFF and the associated ISO symbol.

Indication of the ON state, in case of dual PADI, shall illuminate both the word ON and the associated ISO symbol.

The words “PASSENGER AIRBAG” may or may not be illuminated, depending on styling preference.

On state of a Dual PADI: Off state of a Dual PADI:

Proveout state of a Dual PADI:



**Graphical Layout in vehicles with more than one PADI (e.g. Autonomous vehicles without a driver seating position)**

Each shall state “PASSENGER AIRBAG" and be followed by the illuminated ON or OFF indicator. The word PASSENGER shall not be abbreviated.

“PASSENGER AIRBAG” shall be preceded or followed by an arrow pointing toward the associated seating position.

See example below.

Example depicting Left passenger OFF and Right passenger ON:

Example depicting Left passenger ON and Right passenger OFF:

Proveout state of a Dual PADI in vehicles with more than one PADI:

**PADI Visibility, applicable to all PADI variants**

The Passenger Airbag Deactivation Indicator must be visible to the driver and outboard front passenger in all seating positions. Design study shall show line-of-sight visibility from both 5% female and 95% male eye ellipse. The illumination of the status indicator must be sufficiently bright to be visible when the vehicle is exposed to direct sunlight.

The OFF indicator color shall be AMBER.

The ON indicator color shall be AMBER, unless otherwise approved.

There shall be no light bleed between the "ON" and "OFF" indicators when one is illuminated.

The "ON" and "OFF" indicators shall be deadfront when not illuminated.

The lettering font must be a minimum of 3mm in height and a maximum of 4mm in height.

The lettering font type may vary based upon program requirements.

Background and letter colors shall be determined by the vehicle design studio and HMI group.

**Functional & Electrical Requirements**

The PADI shall operate when vehicle ignition is in the RUN and START state.

The PADI shall also operate when vehicle ignition is in the OFF state but has been remotely started.

The PADI shall operate over the 8 - 18volt range vehicle ignition voltage.

The PADI shall operate at the temperature ranges applicable to its package location.

Additional functional requirements applicable to the RCM and, in the case of PADI control via the CAN network, the PADI, or its host ECU are contained in the Restraint Electronic Subsystem Specification (RESS) Section 2.5.3. This RESS section is an attachment to this requirement.

In the case of a single or dual hardwired PADIs controlled by the RCM, the PADI circuit shall be as shown in the figures below, unless an alternative circuit topology has been reviewed and approved by Ford Restraints Engineering.

Note: The PADI circuit shown applies to any hardwire controlled PADI whether standalone, integrated into Instrument Panel components, or integrated in the Airbag Control Switch.