

AmSafe Seatbelt Airbag

First-Responder Reference Guide



Copyright 2009 © AmSafe, Inc.

AMSAFE PROPRIETARY RIGHTS: This information contained herein is confidential and proprietary to AmSafe. It shall not be reproduced or disclosed in whole or in part to persons other than those necessary for the user to utilize such information or used in any manner detrimental to AmSafe's interests or for the purpose for which such information was provided without the express, written consent of AmSafe.

E509944, Rev E



Important User Information

The information contained in this publication and presented to you is intended as a guide only. Although the information has been researched and presented with due care, no warrant is given in relation to accuracy, correctness or completeness of this publication or the information presented. AmSafe Inc. accepts no responsibility for any errors or omissions, and, to the maximum extent permitted by law, excludes all liability arising from or in relation to your use of or reliance on this publication or the information.

Because of the variety of uses for the products described in this publication and use of these products, you must satisfy yourself that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes, and standards.

The illustrations, charts, and graphics shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, AmSafe, Inc. assumes no responsibility or liability (to include intellectual property liability) for actual use based on the examples shown in this publication.

This manual describes some important differences between a standard restraint and airbag restraint that should be taken into consideration when applying products such as those described in this publication.

Throughout this publication, reference is made to other training materials. When applying procedures, you must consult all references listed regarding more detailed safety information as it applies to specific circumstances.

Reproduction of the contents of this copyrighted publication, in whole or in part, without the written permission of AmSafe, Inc. is prohibited.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Copyright 2009 © AmSafe, Inc.

AMSAFE PROPRIETARY RIGHTS: This information contained herein is confidential and proprietary to AmSafe. It shall not be reproduced or disclosed in whole or in part to persons other than those necessary for the user to utilize such information or used in any manner detrimental to AmSafe's interests or for the purpose for which such information was provided without the express, written consent of AmSafe.

E509944, Rev E

General Information

- **IMPORTANT NOTE:** The AmSafe Seatbelt Airbag System is **NOT** connected to aircraft power and will **NOT** be disabled by disconnecting the aircraft battery.
- It is a restraint system with an airbag inserted in the restraint webbing.
- It is designed to deploy in a significant crash event to provide torso and head protection for aircraft crew and passengers.
- The crash pulse required to deploy the system is a function of acceleration and impact energy. A severe longitudinal deceleration sustained over a period of 40-50 ms is a typical condition for the sensor to activate the airbag system.
- The AmSafe Seatbelt Airbag 2- point lap belt and 3-point restraint systems have the airbag attached to the lap belt portion, under a protective cover.
- The AmSafe Seatbelt Airbag 4- and 5 -point restraint systems have the airbag attached to the shoulder strap portion of the restraint under a protective cover.

The AmSafe Seatbelt Airbag system is a FAA approved & certified product and is installed on a variety of general aviation aircraft and multiple foreign and domestic commercial aviation aircraft.

- See Appendix A for installed applications and configuration information.

System Components

- Electronic Module Assembly (EMA) – Sensing system & power supply.
- Inflator Assemblies – The ROI Inert gas storage cylinder contains 6250 psi compressed helium to inflate the airbag during a crash event. When the gas is released into the Inflatable Lap Belt Assembly via the inflator hose, the gas will be released at ambient temperature. The Inflator-in-the-Webbing System may use the ASH 2.2, hybrid type inflator with stored gas (70%Ar /20%NO /10%He) at 5400psig, or the ACH 2.1 hybrid inflator with a stored gas mixture (20% AR/80%He) at 7400 psig.
- Inflatable Lap Belt Assembly – Aircraft restraint system with airbag attached to the webbing to provide enhanced occupant protection during an aircraft crash event.
- Interface Cable Assembly – Cable which connects the EMA, inflator and Inflatable Lap Belt Assembly.

The AmSafe Seatbelt Airbag system is designed to not impede egress. After deployment in a crash event, the airbag will deflate in less than 10 seconds.

The AmSafe Seatbelt Airbag is distinguishable from a standard seatbelt restraint by the material covering the airbag.



AmSafe Seatbelt Airbag 3- , 4- and 5-Point Restraints

Updated System Component Options

AmSafe has recently added another version of the seatbelt airbag system for 4- and 5-point airbag restraints. This new version of inflator allows us to install the inflator assembly directly into the webbing on the restraint to simplify installation and gas hose routing issues that sometimes affect the standard system installation. The same basic criteria for precautionary concerns and disabling the system will apply; however, the system will look different than other applications when installed. The following pictures represent a sample of the inflator-in-the-webbing application:



AmSafe Seatbelt Airbag Inflator-in-the-Webbing Samples

As shown above, the inflator assembly can be located inside a Velcro cover and the cable assembly (used to disconnect the system) will remain the same as the other installations. Although the inflator assembly is located inside a cover, the airbag will deploy the same. When approaching an airplane accident you will be able to identify the airbag restraint either because it deployed or by the padded leather-look of the restraint assembly regardless if the inflator was installed in the webbing or in the seat.

Copyright 2009 © AmSafe, Inc.

AMSAFE PROPRIETARY RIGHTS: This information contained herein is confidential and proprietary to AmSafe. It shall not be reproduced or disclosed in whole or in part to persons other than those necessary for the user to utilize such information or used in any manner detrimental to AmSafe's interests or for the purpose for which such information was provided without the express, written consent of AmSafe.

E509944, Rev E

Incident Scenarios

If you need immediate incident support, contact Jim Crupi (602) 628-0349, Lee Langston (602)628-0336 or call the AmSafe First-responder Hotline (602) 850-2787

Scenario 1: Aircraft crash event occurs which causes the AmSafe Seatbelt Airbag to deploy.

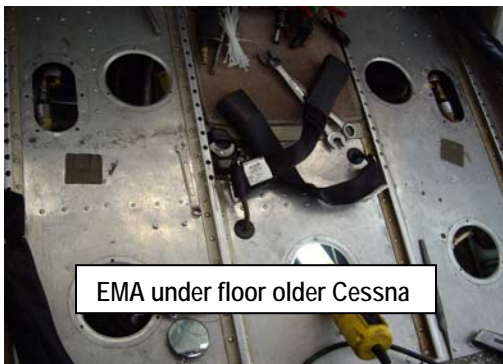
When the AmSafe Seatbelt Airbag is deployed in an aircraft crash event, the system is rendered inert because the helium-filled inflator assembly has expended its contents.

Note: Some aircraft have multiple seat placements. Depending upon the particular crash event criteria, all airbags may not have deployed. Be sure to check all seat positions in the aircraft for AmSafe Seatbelt Airbag System placements.

Scenario 2: Aircraft crash event occurs where AmSafe Seatbelt Airbag does not deploy.

If an aircraft crash event occurs where the AmSafe Seatbelt Airbag is not deployed, be sure to use one of the steps below to reduce the risk of deploying the system:

- Disconnect the cable assembly from the EMA. The EMA is typically installed under the seat and in some cases is attached to or secured below the floor of the seat. (shown below)



Copyright 2009 © AmSafe, Inc.

AMSAFE PROPRIETARY RIGHTS: This information contained herein is confidential and proprietary to AmSafe. It shall not be reproduced or disclosed in whole or in part to persons other than those necessary for the user to utilize such information or used in any manner detrimental to AmSafe's interests or for the purpose for which such information was provided without the express, written consent of AmSafe.

Installation Examples:



- *Disconnect the connector from the Inflator Assembly which is typically installed on, below, just behind the seat, or inside the Velcro flap on the web strap behind the occupant. Shown below.*

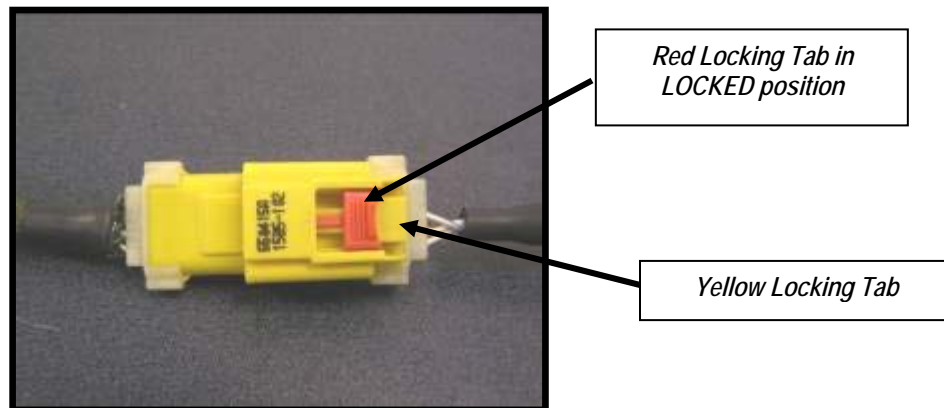


Squib Connector -
Squeeze connector sides to
release (ROI Inflator shown)
Squib connector is the same
for all inflator types.

NOTE:

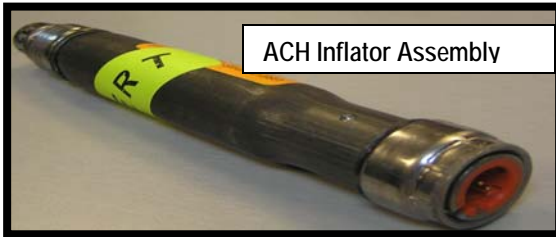
Disabling the system can be accomplished by either locating the Inflatable Lap Belt Assembly connector within the Cable Interface or by simply cutting the connection.

- Locate the Inflatable Lap Belt Assembly connector (yellow) section of the Cable Interface Assembly, and disconnect by sliding the red locking tab backwards to the unlocked position, depressing the yellow tab and then pull apart both connector halves.
- If access to either of these connectors is not possible due to deformation of the seat assembly or the fuselage, it is acceptable to cut the cable that connects to the inflator assembly or the EMA.
- If access to the connectors or cable assemblies is not feasible, another option is to cut the inflator hose as close to the bottom end of the restraint as possible to prevent deployment of a non-deployed airbag.



System Components:

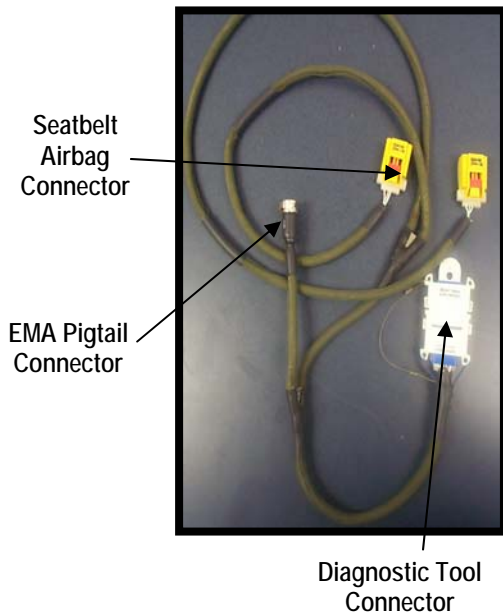
Inflator Assemblies



EMA Assembly

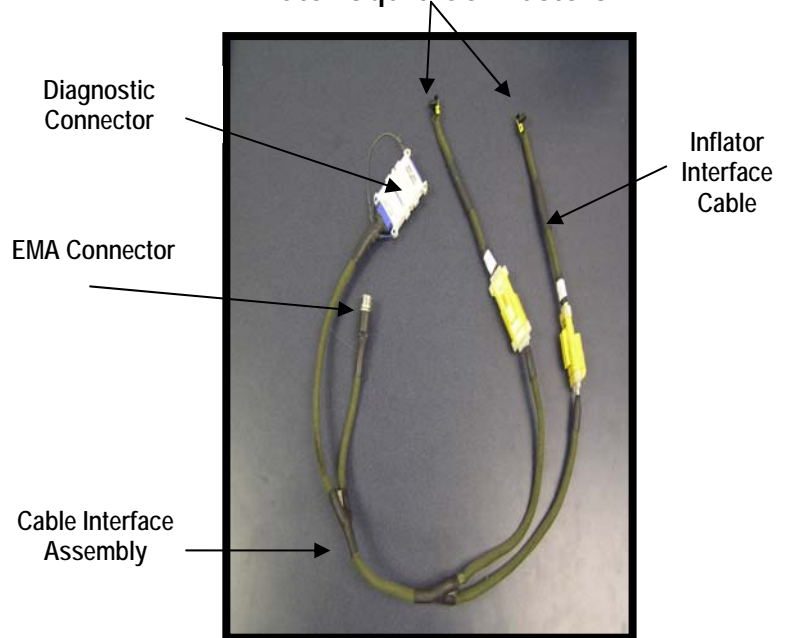


Cable Assemblies



Three-Point System Cabling

Inflator Squib Connectors



Four/Five-Point System Cabling



First Responder Quick Check List for AmSafe Seatbelt Airbag System Safety Considerations

- 1. DISCONNECTING THE AIRCRAFT BATTERY WILL NOT DISABLE THE AMSAFE SEATBELT AIRBAG SYSTEM AS IT IS SELF-CONTAINED AND NOT CONNECTED TO AIRCRAFT POWER**
2. *Check to see if the aircraft is configured with the AmSafe Seatbelt Airbag System*
 - a) *The restraint system will have a padded bag attached on the lap belt or the shoulder harness*
 - b) *If the airbags have deployed it will be obvious, however, unoccupied seats may also have an active airbag system so take precautions to disable accordingly*
3. *Disable the airbag system using one of the following options:*
 - a) *Disconnect the yellow airbag connector by pressing the red locking tab and separating the connector pieces*
 - b) *Cut the cable assembly to the EMA or to the inflator, to deactivate the circuit*
 - c) *Cut the inflator hose as close to the bottom end of the restraint as possible to prevent deployment of a non-deployed airbag. If somehow the system were activated with the hose cut, the gas would be released away from the responder and the occupant (lasting approximately 5-10 ms, at high pressure between 6200-7400 psi).*
4. *Extraction Considerations:*
 - a) *If for some reason the airbags are not deployed, use extreme caution while cutting structure as the inflator assembly will still be a hazard and severe or fatal injury could occur if the inflator is cut or drilled*
 - b) *If a fire occurs after an aircraft crash event, the inflator will ignite in excessive heat:*
 - (1) *ACH inflator will auto ignite at approximately 130° C or 266° F and will release the stored gas to inert the system to reduce the risk of injury to emergency personnel*
 - (2) *ROI inflator will auto ignite at approximately 400° C or 750° F and will release the stored gas to inert the system to reduce the risk of injury to emergency personnel*

Note: *The AmSafe Seatbelt Airbag Inflator Assembly is a high pressure device (6250 psi – ROI compressed helium inflator or 7400 psi for the hybrid ASH inflator described above) and can create a fragmentation hazard if cut or punctured by hydraulic extraction tools. Please use caution when responding to an accident where the airbags have not deployed. Typical installation of the inflator assembly is under or around the seat. The inflator assembly is the same device used in automotive side-curtain airbag applications.*



Information requested by AmSafe to assist in accident investigation

- **Photos**
 - Deployed Airbag
 - Instrument Panel (or any other area of contact between the occupant and the aircraft interior)
 - Installed AmSafe Seatbelt Airbag equipment
- **Occupant Info**
 - Injuries, type & severity
 - Name
 - Seat position
 - Contact info
- **Accident/Incident Information**
 - Aircraft Type
 - Severity
 - Location
 - Witnesses
 - Time of accident
 - FAA on-site contacts
 - OEM on-site contacts
 - NTSB on-site contacts

AmSafe Contacts

James Crupi
Manager, Programs & Technical Support
(602) 850-2836 - Office
(602) 628-0349 - Mobile
jcrupi@amsafe.com

Lee Langston
Airbag Systems Technical Support
(602) 850-2844 - Office
(602) 628-0336 - Mobile
llangston@amsafe.com

Airbag Support Hotline
(602) 850-2787

Note: For access to additional AmSafe Seatbelt Airbag system information, please visit www.amsafe.com and select the AmSafe Aviation Customer/Partner Site link to register. Please be sure to specify "First Responder" in the NOTES section of the registration form to expedite access.

Additional First Responder Safety Reference Training Information is now available on the FAA website. The training material on this site is comprehensive to include a variety of potential hazardous material considerations when responding to an aircraft accident, to include: airbags, parachutes, medical supplies, oxygen, etc.

Please go to http://www.faa.gov/aircraft/gen_av/first_responders/ for this information.

Copyright 2009 © AmSafe, Inc.

AMSAFE PROPRIETARY RIGHTS: This information contained herein is confidential and proprietary to AmSafe. It shall not be reproduced or disclosed in whole or in part to persons other than those necessary for the user to utilize such information or used in any manner detrimental to AmSafe's interests or for the purpose for which such information was provided without the express, written consent of AmSafe.

E509944, Rev E

ENGINEERING ORDER

DRAWING NUMBER	DRAWING TITLE	CHANGE ORIGATION:	ORIGINATED BY: F. Armenta
E509944	First Responder's Reference Guide	CRI-9227	ORINATION DATE 4/13/11
PRODUCT USED ON		EFFECTIVITY	
Multiple		REV LETTER	E
		RELEASE DATE	4/22/11
		APPROVALS	
		CHECKED BY <i>Diane Bell</i> 4/22/11	
DISPOSITION:	U = USE AS IS R = REWORK N = NO EFFECT S = SCRAP	QTY ON HAND DISP QTY ON ORDER DISP QTY IN WIP DISP	DRAWING CHANGE TYPE ENGINEERING
NIA			NEW RELEASE: ADD PART(S): SUB PART(S): DIM CHANGE: NOTE CHANGE: X PICTORIAL OTHER
NEXT ASSY		CLASS	MARKETING/CUST PLANNING
NIA		MAJOR	CERTIFICATION YES NO YES X
PROD. LINE COE		ITEM TYPE CODE	COLOR CODE
AFFECTED DOCUMENTS	YES	NO	REASON(S) FOR CHANGE
MFG/TEST/INSP		<input checked="" type="checkbox"/>	
ICA/SICA		<input checked="" type="checkbox"/>	
PMA		<input checked="" type="checkbox"/>	
REGULATORY		<input checked="" type="checkbox"/>	
AFFECTED DOC. NOS.			
Update to nomenclature and logo.			
DESCRIPTION OF CHANGE (S):			
Updated AmSafe logo. Nomenclature updated: AmSafe was AmSafe Aviation.			