

INSTALLATION and MAINTENANCE MANUAL

NUMBER PA285001

FAA/STC SA02015CH

PIPER PA28, PA32 Aircraft Three Point Torso Restraint System Installations

PIPER PA28 140/150/160/S160/180/S180/235/R180/R200 AIRCRAFT
PIPER PA32-260, PA32-300, PA32S-300 AIRCRAFT



Model PA28-114FS



Model PA28-114IR

Alpha Aviation Inc.
1500 East Main Street
Owatonna, Minnesota 55060
800-653-5112

Revision	Date	Change	Approved
A	5/01/2004	Initial Issuance	
B	5/14/2004	Added Installation Detail	
C	8/01/2005	Add PA32 Aircraft	
D	9/01/2005	Expand Installation Detail	
E	6/02/2017	Minor Change Updates	
F	10/31/2019	Add – Required Parts Listing; TSO Items “Or - Equivalent FAA Approved Restraint System”	<i>DCM</i>

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

Table of Contents

- 1.0 Model Designations
- 2.0 Product Description
- 3.0 Airframe Qualification
- 4.0 Weight and Balance Information
- 5.0 FAA Documentation
- 6.0 Instructions for Continued Airworthiness, (ICA)
- 7.0 Installation Instructions, Upper Attachments
- 8.0 Installation Parts and Drawings

Installation Parts Required, Model PA28-114FS/IR

Drawing - PA283001 Mount, Hard Point
PA283002 Mount, Detail
PA283003 Restraint Strap, Fixed / Inertial

Photos Shown on Last 2 Pages

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

1.0 Model Designations

Model Number	Product Description
PA28-114FS	Three-point restraint system, TSO-C114, Fixed torso strap
PA28-114IR	Three-point restraint system, TSO-C114, Inertial reel torso strap

2.0 Product Description

Model PA28-114FS

Accommodates the installation of a vendor supplied, FAA approved, TSO-C114 restraint system, at each pilot position. The restraint system incorporates a traditional pelvic restraint strap (lap belt) provided with the provision to attach, as needed, a single diagonal torso restraint strap. The upper end of the torso restraint strap is hard mounted to the airframe at a location aft and above the pilot position. The free end of the strap is attached to the pelvic restraint strap at the buckle location and adjusted, as necessary, by use of the cinch strap provided.

The attachment points for the pelvic restraint strap (lap belt) are continued in use, as they were provided by the manufacturer at the time of type certification.

This installation requires that the installing mechanic inspect the attachment hardware configuration for correctness and install the TSO-C114 pelvic restraint strap to the primary attachment points, using the original hardware configuration.

The attachment of the fixed end of the torso restraint strap is accomplished by the installation of an aluminum mount centered at fuselage station 111.35, as called out in the drawing package.

Model PA28-114IR

Accommodates the installation of a vendor supplied, FAA approved, TSO-C114 restraint system, at each pilot position. The restraint system incorporates a traditional pelvic restraint strap (lap belt) provided with the provision to attach, as needed, a single diagonal torso restraint strap. The upper end of the torso restraint strap is equipped with an inertial reel assembly, which is hard mounted to the airframe at a location aft and above the pilot position. The free end of the strap is attached to the pelvic restraint strap at the buckle location and is self adjusting through the inertial reel.

The attachment points for the pelvic restraint strap (lap belt) are continued in use, as the manufacturer provided them, at the time of type certification. This installation requires that the installing mechanic inspect the attachment hardware configuration for correctness and install the TSO-C114 pelvic restraint strap to the primary attachment points, using the original hardware configuration.

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

The attachment of the torso restraint strap is accomplished by the installation of an aluminum mount centered at fuselage station 111.35, as called out in the drawing package.

3.0 Airframe Qualification

Aircraft that have a standard airworthiness certificate are eligible for this installation.

The airworthiness certificate must be issued in either the Normal or Utility category.

Inspect the aircraft and its records to assure that any change in structure or window installation does not preclude the installation of the Model PA28-114FS or Model PA28-114IR restraint system.

4.0 Weight and Balance

Model PA28-114FS has a location of station 111.35 and a net weight change of 1.75 pounds per installation; two pilot positions.

Model PA28-114IR has a location of station 111.35 and a net weight change of 3.50 pounds per installation; two pilot positions.

5.0 FAA Documentation

The installation of either model restraint system is an FAA approved installation, when accomplished using the approved data and parts. All parts supplied by Alpha Aviation Inc. are either FAA/PMA modification parts or standard parts and installation manual PA285001 is FAA approved data.

When the installation is completed, per the approved data, the installer should:

Update the aircraft equipment list.

Update the aircraft weight and balance record.

Install the appropriate “Instructions for Continued Airworthiness” (ICA) in the aircraft maintenance records.

Make the appropriate maintenance entries in the aircraft log book.

Prepare and submit FAA Form 337.

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

6.0 Instruction For Continued Airworthiness (ICA)

Instructions for Continued Airworthiness

Dated 3/1/2004

Models; PA28-114FS – PA28-114IR Three Point Restraint System

1. Introduction; This ICA is issued to provide information pertinent to the inspection and ongoing maintenance of the TSO-C114 Occupant Restraint System installed on this aircraft.
2. Description;
This aircraft has been modified by FAA approval for the installation of a TSO-C114 occupant restraint system, which consists of a lap belt arrangement and single diagonal shoulder strap. The shoulder strap is controlled by a cinch strap or inertial reel. One restraint system is installed at each pilot position.
3. Operation;
The occupant restraint system operates normally in all respects. The lap belt portion is connected via a lift lever buckle. The strap is shortened or lengthened by the use of the adjuster, which is integral with the connector half of the buckle assembly .

The shoulder strap originates at the sidewall upper attach point and is available to the pilot over the shoulder. It is connected to the lap belt portion of the system by adjusting the length and attaching the shoulder belt to the lap belt connector half.
4. Servicing information; No field service allowed.
5. Maintenance instructions;
Inspection of the occupant restraint system shall be made on an Annual / 100 Hour Inspection basis and consist of an operational check of each installed belt system, and a visual inspection of all mounting hardware. Field maintenance is limited to the replacement of mounting hardware.
6. Trouble shooting procedures; None
- 7 Removal and replacement; No special procedures apply.
- 8 Diagrams; None required.
- 9 Special inspections; None required.
- 10 Special treatments; None required.
- 11 Data; Standard procedures and torque values apply.
- 12 Special tools; None required.
- 13 Does not apply.
- 14 Overhaul periods; Overhaul required “on condition”.
- 15 Airworthiness limitations; None required
16. Revisions; All revisions to this document must be prepared and presented to an FAA inspector, for field approval in the form of an FAA Form 337.

End

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

INSTALLATION INSTRUCTIONS

UPPER MOUNT POINT

PIPER PA28 AIRCRAFT 140/150/160/S160/180/S180/235/R180/R200
PIPER PA32-260, PA32-300, PA32S-300

These instructions cover the installation of Part Numbers PA282001 and PA282002, 2024T3-.040 aluminum brackets, which combine to create a torso restraint upper mount centered at fuselage station 111.35, adjacent to each pilot position.

The upper mount installation is accomplished by reference to Drawings PA283001 and PA283002. The attachment of the TSO-C114 restraint system is accomplished by reference to Drawing PA283003.

Except as noted below, the right and left side upper attach point installations are identical.

Step-by-Step Instructions:

Caution – Some aircraft have had wiring run through the window and door post.
The installer must verify the existence of any wiring and prepare to work around or relocate the wiring, as necessary.

1. By reference to Drawing PA283001, locate fuselage station 111.35 on the right and left side of the fuselage. Note that the vertical location is to the rear of the frame at station 108.17 and above the rear passenger side window.
2. Remove the rear passenger window trim as necessary, on each side.
3. Remove other adjacent trim and moldings as necessary to gain access to the edges of the headliner.
4. Carefully loosen the headliner from the window channels and using clamps, position the headliner in such a manner as to provide access to the area above the passenger window and to the rear of the frame at station 108.17.

Note – The use of a heat gun or hair dryer to aid the release of the headliner adhesive can reduce the risk of damage to the headliner material.

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

PIPER PA28 AIRCRAFT 140/150/160/S160/180/S180/235/R180/R200

Note – If installed, the triangular shaped gusset, left or right side at station 108.17, acting as an anchor point for a passenger assist strap, will need to be removed. The nut plate may be transferred to the assembled restraint strap mount in order to facilitate the re-installation of the passenger assist strap.

Note - The rivet between the upper window channel and the fuselage frame on each side, at station 108.17, will need to be removed.

5. Refer to Drawing PA283002. Place Part PA282002 into position in the upper window channel – note that the forward vertical edge requires trimming in order to slide behind the flange of the frame at station 108.17.

Note – The trim angle required for Part PA282002 can be established by inserting Part PA282002 under Part PA282001, flush with the forward top surface and scribing a vertical cut line.

6. Test fit Parts PA282001 and PA282002, note that PN282001 butts up to the rear facing flange on the fuselage frame and Part PA282002 slides behind into the flange for riveting.
7. Holding the parts in place, mark the location of the Part PA282002 in relation to Part PA282001.
8. On the bench – Layout and rivet the parts together as shown on Drawing PA283002 and install the nut plate as shown on Drawing PA283003.
9. Reposition the assembly in the aircraft – Drill and cleco the assembly in place, using a #40 drill. Reuse existing holes as appropriate. Minor rivet spacing changes are permitted.
10. After the assembly is properly positioned and cleco'd in place, up size the fastener holes to a #30 drill and rivet in place. Solid rivets are used through the cabin skin and cherry rivets are used through the frame flange and window channel..
11. Reinstall the headliner and moldings, locate and open the .250-inch mounting hole.
12. Install the upper torso restraint strap or inertial reel using the hardware configuration shown on Drawing PA283003.
13. Torque each bolt to 60 in/lbs dry torque.

PIPER AIRCRAFT PA32-260, PA32-300, PA32S-300

Note – If installed, the triangular shaped gusset on the right side at station 108.17, acting as an anchor point for a passenger assist strap, will need to be removed. The nut plate may be transferred to the assembled restraint strap mount in order to facilitate the re-installation of the passenger assist strap.

Note - The reinforcing plate on the left side, station 108.17, which reinforces the upper window channel to fuselage frame junction, will stay in place. The rivets attaching the reinforcement plate to the fuselage frame and rear window channel will need to be removed, to be replaced as the assembled mount is installed.

5. Refer to Drawing PA283002. Place Part PA282002 into position in the upper window channel – note that the forward vertical edge requires trimming in order to slide behind the flange of the frame at station 108.17.

Note – The trim angle required for Part PA282002 can be established by inserting Part PA282002 under Part PA282001, flush with the forward top surface and scribing a vertical cut line.

6. Part PA282001 will require minor forming to allow it to conform to the angle of the upper window channel flange. Form part PA282001 by marking a horizontal line 1” above the bottom edge of the part and establish the required inboard bend along the horizontal line.
7. Part PA282002 will require minor forming to allow it to conform to the angle of the upper window channel flange. Form PA282002 by marking a horizontal line 1” above the bottom edge of the part. Remove the reinforcing flange in the area below the horizontal line and establish the required inboard bend along the horizontal line.
8. Test fit Parts PA282001 and PA282002, note that PN282001 butts up to the rear facing flange on the fuselage frame and Part PA282002 slides behind into the flange for riveting.
9. Holding the parts in place, mark the location of the Part PA282002 in relation to Part PA282001.
10. On the bench – Layout and rivet the parts together as shown on Drawing PA283002 and install the nut plate as shown on Drawing PA283003.
11. Reposition the assembly in the aircraft – Drill and cleco the assembly in place using a #40 drill. Reuse existing holes as appropriate. Minor rivet spacing changes are permitted.

Note – Where flush rivets were removed, PN PA282001 will require countersinking to mate with the flange correctly.

12. After the assembly is properly positioned and cleco'd in place, up size the fastener holes to a #30 drill and rivet in place. Solid rivets are used through the cabin skin and cherry rivets are used through the frame flange and window channel..
13. Reinstall the headliner and moldings, locate and open the .250-inch mounting hole.
14. Install the upper torso restraint strap or inertial reel using the hardware configuration shown on Drawing PA283003.
15. Torque each bolt to 60 in lbs, dry torque

Lap Belt Attachment:

- 1 . Remove the existing lap belts at their primary mounting point, saving the attachment hardware.
2. Install the new lap belt assembly, **buckle portion inboard**, using the original hardware configuration; as shown in Piper Maintenance Manual.
- 3 . Test fit and inspect each completed installation. All end fittings and inertial reels should be firmly attached, all hardware should be tight and each belt segment should be free to rotate in response to any restraint system loading.

8.0 Installation Parts and Drawings

ATTACHED DOCUMENTS

Installation Parts Required, Model PA28-114FS/IR

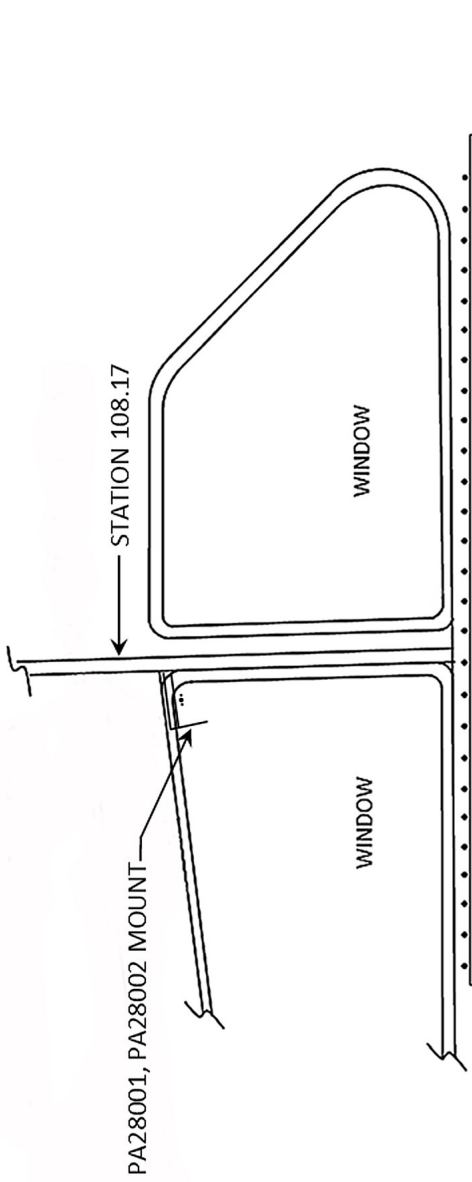
Drawing PA283001, Mount Hard Point

Drawing PA283002, Mount, Detail

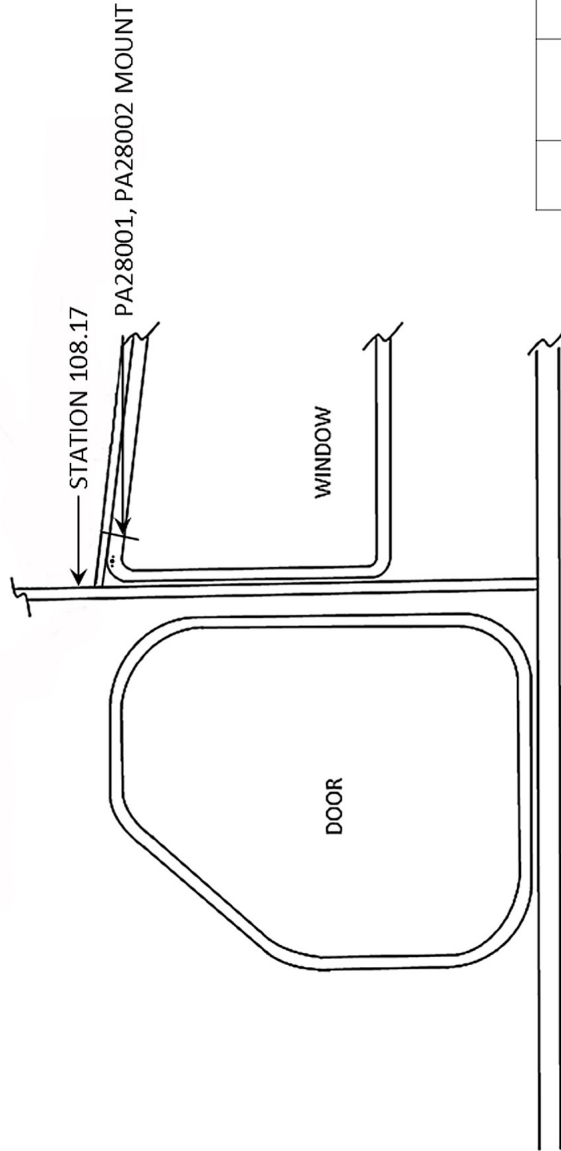
Drawing PA283003, Restraint Strap, Fixed / Inertial

**** FOR REVIEW ONLY – NO STC AUTHORIZATION ****

DRAWING RETRACED
02.03.2021
FOR CLARITY ONLY



LEFT

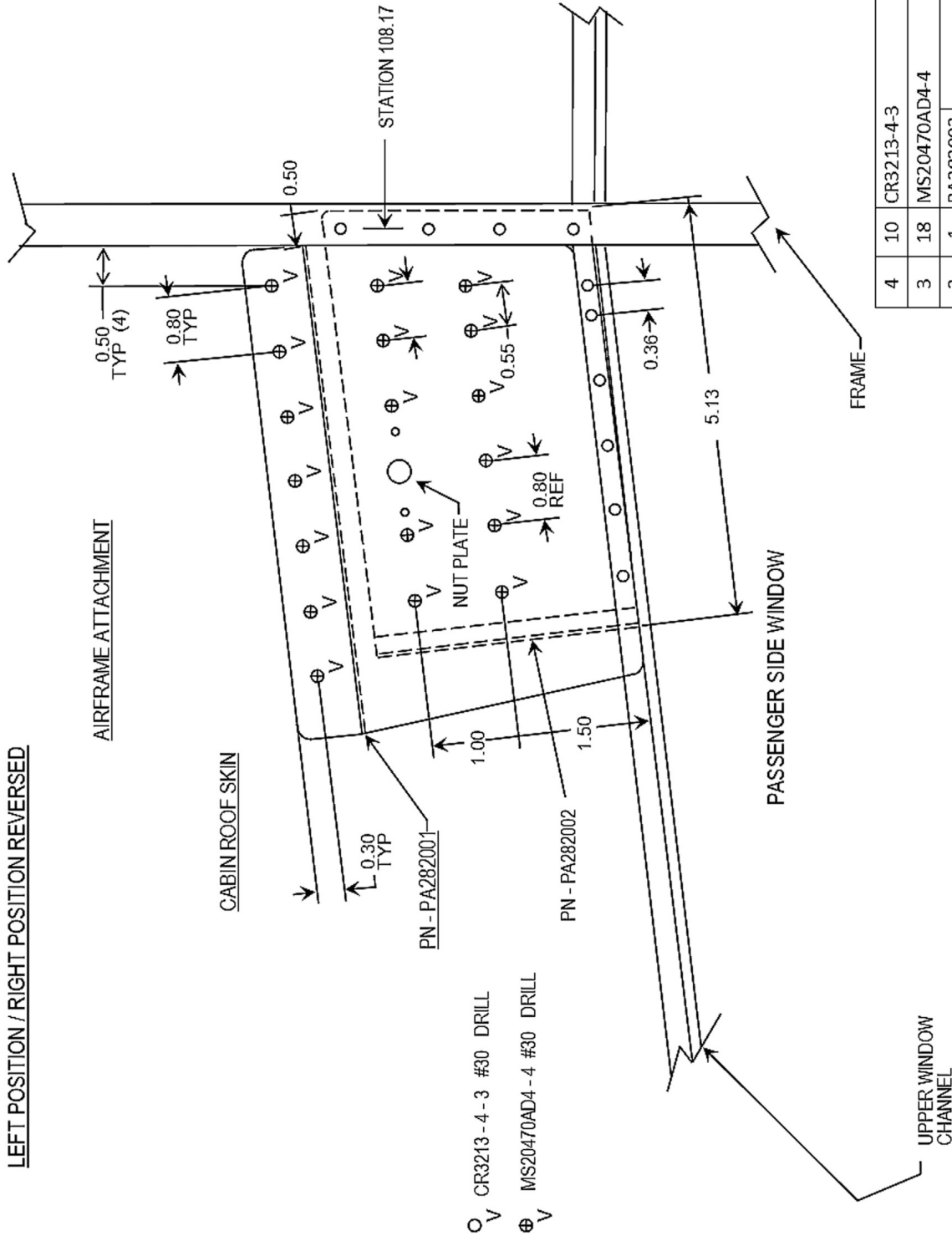


RIGHT

NO. REQ.	PART NO.	SIZE	DESCRIPTION	SPEC.	REV
B	Alpha Aviation Burnsville MN.		HARDPOINT MOUNT	PA283001	B
A	FIN: N/A		TOL. XX+/- .03, XXX+/- .010, OR NOTED		
REV	DATE	DESCRIPTION	CHK	APPR	
	5/14/04	DETAIL ADDITIONS			
	5/1/04	ISSUE			

DRAWING RETRACED
02.03.2021
FOR CLARITY ONLY

LEFT POSITION / RIGHT POSITION REVERSED



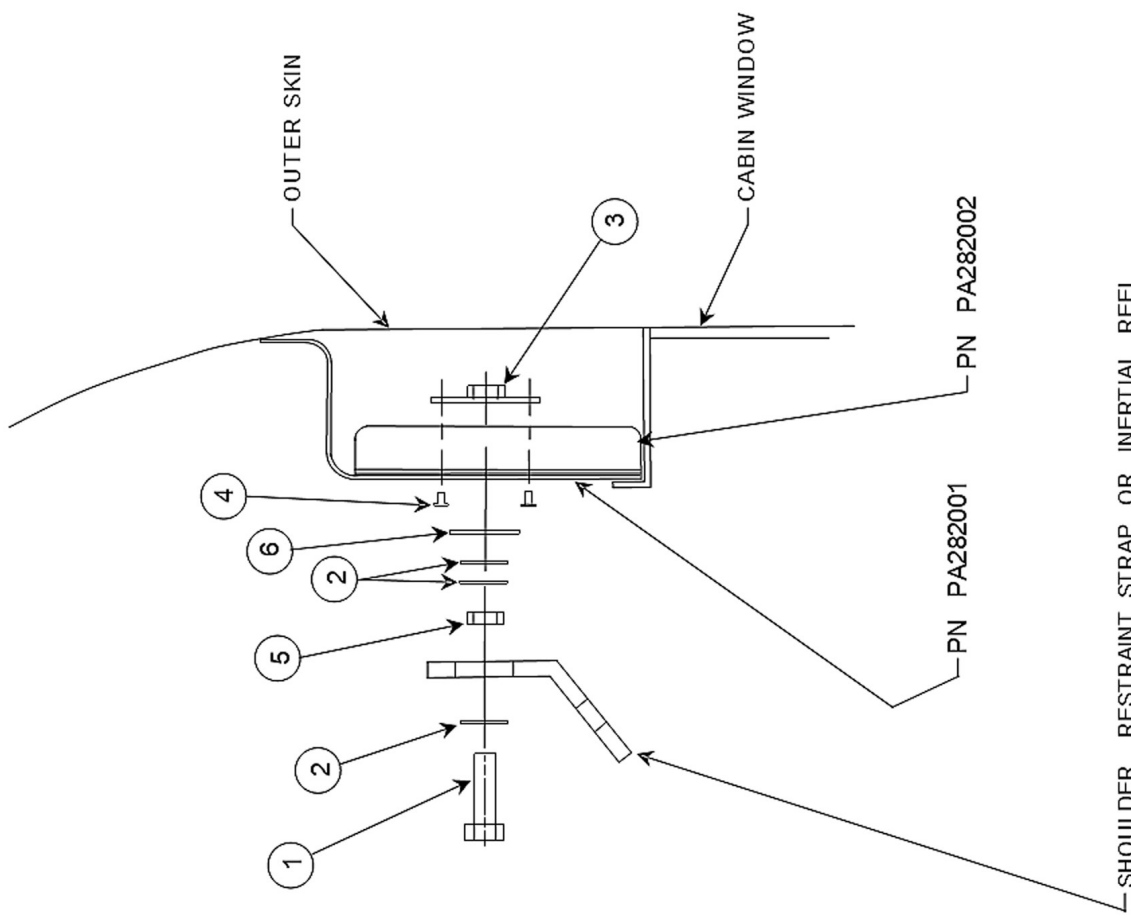
- V CR3213-4-3 #30 DRILL
- ⊕ V MS20470AD4-4 #30 DRILL

ITEM NO.	REQ.	PART NO.	SIZE	DESCRIPTION	SPEC.
4	10	CR3213-4-3		RIVET	STANDARD
3	18	MS20470AD4-4		RIVET	STANDARD
2	1	PA282002		MOUNT - INNER	FAA/PMA
1	1	PA282001		MOUNT - OUTER	FAA/PMA

REV.	DETAIL ADDITIONS	DATE	DESCRIPTION	CHK.	APPR.	REV.
B	5/14/04	5/1/04	ISSUE			B
A	5/1/04		DETAIL ADDITIONS			
REV						

Alpha Aviation
Burnsville MN.
FIN: SEE NOTE
TOL. XX+/- .03, XXX+/- .010, OR NOTED
DRAWN 5/1/04
CHK. *DCM* APPR. *DCM*

DRAWING RETRACED
02.03.2021
FOR CLARITY ONLY



AIRFRAME
LEFT (PILOT) POSITION SHOWN
RIGHT POSITION REVERSED

ITEM	NO. REQ.	SIZE	DESCRIPTION	SPEC.
6	1	AN970-4	WASHER	STANDARD
5	1	NAS75-4-004	BUSHING	STANDARD
4	2	CCR264553-2	RIVET	STANDARD
3	1	MS21047-L4	NUT PLATE	STANDARD
2	3	AN960-416	WASHER	STANDARD
1	1	AN4-6A	BOLT	STANDARD

REV	DATE	DESCRIPTION	CHK	APPR	DCM
B	5/14/04	DETAIL ADDITIONS			
A	5/1/04	ISSUE			

REV	DESCRIPTION	FIN: N/A	TOL. XX+/- .03, XXX+/- .010, OR NOTED
B	RESTRAINT STRAP FIXED / INERTIAL		

REV	DESCRIPTION	FIN: N/A	TOL. XX+/- .03, XXX+/- .010, OR NOTED
B	RESTRAINT STRAP FIXED / INERTIAL		

REV	DATE	DESCRIPTION	CHK	APPR	DCM

**FAA APPROVED MODEL LIST (AML) NO. SA02015CH
ALPHA AVIATION INC.**

FOR

INSTALLING THREE POINT TORSO RESTRAINT SYSTEM

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NUMBER/DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. & DATE		
1	Piper	PA-28-140, PA-28-150, PA-28-160, PA-28-180, PA-28-235, PA-28R-180, PA-28R-200, PA-28S-160, PA-28S-180	2A13	CAR 3	Installation and Maintenance Manual No. PA285001	Revision B, dated 5/14/04*	N/A	--
2	Piper	PA-32-260, PA-32-300, PA-32S-300	A350	CAR 3	Installation and Maintenance Manual No. PA285001	Revision D, dated 9/1/05*	N/A	--

ISSUE DATE: 10/5/05

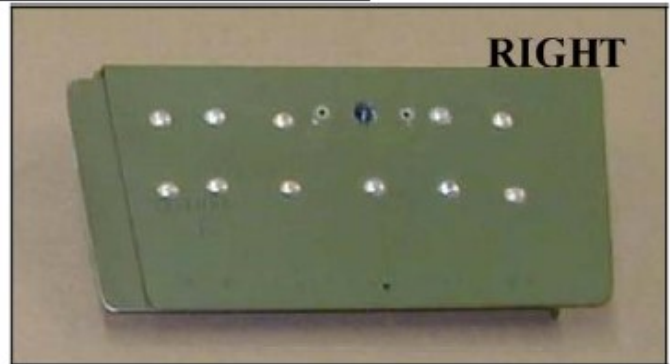
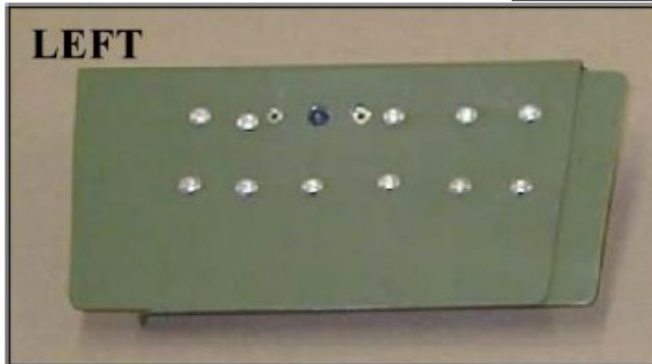
* or latter FAA Approved Revisions.

Original signed by:
Gregory J. Michalik

FAA APPROVED: _____
Karol Mordasiewicz
Manager, Airframe & Administrative Branch
Chicago Aircraft Certification Office

Reissued: 12/20/16

PA28 / PA32 INSTALLATION PHOTOS



INERTIAL REEL - MOUNTED



FIXED STRAP - MOUNTED



EXTERIOR RIVET PATTERN

Last Update: 02.03.2021