INSTALLATION and MAINTENANCE MANUAL
NUMBER PA244001

FAA/STC SA02492CH
PIPER PA24 / 30 / 39 Series Aircraft
Three Point Torso Restraint System Installations

PA-24, PA-24-250, PA-24-260, PA-24-400, PA-30, PA39
Per Approved Model List

Model PA24-114FS

Model PA24-114IR

Alpha Aviation Inc.
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Owatonna, Minnesota 55060
800-653- 5112

Revision	Date	Change	Approved
A	9/01/2007	Initial Issuance	
B	10/12/2007	Minor Corrections	
C	8/10/2010	Add Installation Detail	
D	6/02/2011	Add Installation Detail	
E	6/05/2017	Address and Minor Changes	
F	10/31/2019	Add to TSO items pg. 15 OR "Equivalent FAA Approved Restraint System"	DCA

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

Table of Contents

1.0 Model Designation

Model Number	Product Description
PA24-114FS	Three-point restraint system, TSO-C114, Fixed torso strap
PA24-114IR	Three-point restraint system, TSO-C114, Inertial reel torso strap

2.0 Product Description

Model PA24-114FS

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 each 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 addition of a cabin roof support and mounting hard point to the fuselage structure adjacent to each pilot position and centered at fuselage station 112.0.

Model PA24-114IR

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.

The attachment of the fixed end of the torso restraint strap is accomplished by the addition of a cabin roof support and mounting hard point to the fuselage structure adjacent to each pilot position centered at fuselage station 112.

3.0 Airframe Qualification

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

The airworthiness certificate must be issued in the Normal 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 PA24-114FS or Model PA24-114IR restraint system.

4.0 Weight and Balance

Model PA24-114FS has a location of station 112.0 and a net weight change of 1.75 pounds per installation; two pilot positions.

Model PA24-114IR has a location of station 112.0 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 the installation manual PA244001 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.

6.0 Instruction For Continued Airworthiness (ICA)

Instructions for Continued Airworthiness Dated 9/01/2007

Models; PA24-114FS / PA24-114IR 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 connecter 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

7.0 Issue D, Dated; 6/2/2011

INSTALLATION INSTRUCTIONS

UPPER MOUNT POINT

PIPER PA-24 / 30 / 39 Series Aircraft

Per Approved Model List

These instructions cover the installation of the torso restraint upper mount; centered at fuselage station 112.0, adjacent to each pilot position.

The upper mount installation is accomplished by reference to Drawings PA243001, PA243002 and PA243004. The attachment of the TSO-C114 restraint system is accomplished by reference to Drawing PA243003.

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

PA24 Aircraft Serial Number 24-1 through 24-2843

Note 1 –
An unknown number of aircraft in this serial number range are equipped with an optional overhead ventilation system, which will require the trimming of part numbers PA242001 and PA242002 by 1.75 inches as shown on drawing PA243004.

1. By reference to Drawing PA243001, locate fuselage station 112.0 on the right and left side of the fuselage. The vertical location is above and horizontally aft of each pilot's outboard shoulder.

2. Remove the passenger assist strap, interior trim and relocate the headliner to the extent necessary to gain access to the cabin roof at Station 105 back to the baggage door frame, Station 136.

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

3. Refer to Drawing PA243002; Test fit parts PA242001, 242002, and 242003 to verify that no conflicts exist that would hamper this installation.

   Note – Except for being reversed - The left and right installations are identical. Arranging the parts on the bench in a left and right orientation will allow them to be laid out, marked and drilled for installation, saving considerable time.

4. Layout and drill up parts PA242001, 242002, and 242003 using #40 drill.

5. Rivet parts PA242001, 242002 together, center two rows only, and install the nut plates as shown. Upsize to #30 drill and use AD4-4 rivets.

6. Cleco parts PA242001, 242002, and 242003 together and place them into their respective locations in the aircraft. Mark and drill (#30) for the 8 window channel rivets. Cleco in place.

7. Adjust the cabin roof support, PN242003, as necessary to establish a uniform 4.5" spacing between the lower edge of the upper window channel and the flange. As shown on Drawing PA243002.

8. Drill (#30) and cleco the cabin roof support, part PA242003 and parts PA242001 and PA242002 in place.

9. Complete riveting, per drawing PA243002 and close the headliner, reinstalling the trim and cabin assist strap, as removed.

10. Install the shoulder belt upper attachment as shown on drawing PA243003.

PA24 Aircraft Serial Number 24-2844 through 24-4299

(Less SN 24-4247)

and

PA24 Aircraft Serial Number 26-2 through 26-148

Note 1 –
Beginning with Serial Number 24-2844, an additional short rib was added to strengthen the roof structure at fuselage station 107, resulting in the need to shorten the forward end of part PA242003 by 2.50 inches. This change is detailed on Drawing PA243002 and referenced below for clarity.

Note 2 –
An unknown number of aircraft in this serial number range are equipped with an overhead ventilation system, which may require the trimming of part numbers PA242001 and PA242002 by 1.75 inches as shown on drawing PA243004.

1. By reference to Drawing PA243001, locate fuselage station 112.0 on the right and left side of the fuselage. The vertical location is above and horizontally aft of each pilot's outboard shoulder.

2. Remove the passenger assist strap, interior trim and relocate the headliner to the extent necessary to gain access to the cabin roof at Station 105 back to the baggage door frame, Station 136.

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

3. Refer to Drawing PA243002; Shorten part PA242003 by 2.50 inches and test fit it for installation between the short rib at station 107 and the fuselage frame at station 136.

4. Test fit parts PA242001, 242002, and 242003 to verify that no conflicts exist that would hamper the completed installation.

Notes – Except for being reversed - The left and right installations are identical.
Arranging the parts on the bench in a left and right orientation will allow them to be laid out, marked and drilled for installation, saving considerable time.

5. Layout and drill up parts PA242001, 242002, and 242003 using #40 drill.

6. Rivet parts PA242001, 242002 together, center two rows only, and install the nut plates as shown. Upsize to #30 drill and use AD4-4 rivets.

7. Cleco parts PA242001, 242002, and 242003 together and place them into their respective locations in the aircraft. Mark and drill (#30) for the 8 window channel rivets. Cleco in place.

8. Adjust the cabin roof support, PN242003, as necessary to establish a uniform 4.5” spacing between the lower edge of the upper window channel and the flange. As shown on Drawing PA243002.

9. Drill (#30) and cleco the cabin roof support, part PA242003 and parts PA242001 and PA242002 in place.

10. Complete riveting, per drawing PA243002 and close the headliner, reinstalling the trim and cabin assist strap, as removed.

11. Install the shoulder belt upper attachment as shown on drawing PA243003.

PA24 Aircraft Serial Number 24-4300 through 24-4921

(And SN 24-4247)

and

PA30 Aircraft Serial Number 30-2 and up

Note –
Beginning with Serial Numbers 24-4300 and 30-2 the cabin roof structure was further strengthened by the installation of an additional fuselage frame at station 121 and the relocation of the cabin roof vent forward 1.75 inches.
These changes necessitate the need to shorten part PA242003 and the trimming as needed of parts PA242001 and PA242002. This change is detailed on Drawing PA243004 and referenced below for clarity.

1. By reference to Drawing PA243001, locate fuselage station 112.0 on the right and left side of the fuselage. The vertical location is above and horizontally aft of each pilot's outboard shoulder.

2. Remove the passenger assist strap, interior trim and relocate the headliner to the extent necessary to gain access to the cabin roof at Station 105 back to expose the roof frame at Station 121.

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

3. Refer to Drawing PA243004; Shorten part PA242003 to 12.0 inches and test fit it for installation between the short rib at station 107 and the fuselage roof frame at station 121.

4. Refer to Drawing PA243004; Shorten parts PA242001 and PA242002 to 6.25 inches and test fit it for installation between the short rib at station 107 and the forward edge of the cabin vent outlet at station 114.

5. Test fit parts PA242001, 242002, and 242003 to verify that no conflicts exist that would hamper the completed installation.

Notes – Except for being reversed - The left and right installations are identical.
Arranging the parts on the bench in a left and right orientation will allow them to be laid out, marked and drilled for installation, saving considerable time.

6. Layout and drill up parts PA242001, 242002, and 242003 using #40 drill.

7. Rivet parts PA242001, 242002 together, center two rows only, and install the nut plates as shown. Upsize to #30 drill and use AD4-4 rivets.

8. Cleco parts PA242001, 242002, and 242003 together and place them into their respective locations in the aircraft. Mark and drill (#30) for the 7 window channel rivets. Cleco in place.

9. Adjust the cabin roof support, PN242003, as necessary to establish a uniform 4.5” spacing between the lower edge of the upper window channel and the flange. As shown on Drawing PA243004.

10. Drill (#30) and cleco the cabin roof support, part PA242003 and parts PA242001 and PA242002in place.

11. Complete riveting, per drawing PA243004 and close the headliner, reinstalling the trim and cabin assist strap, as removed.

12. Install the shoulder belt upper attachment as shown on drawing PA243003.

Lap Belt Attachment;

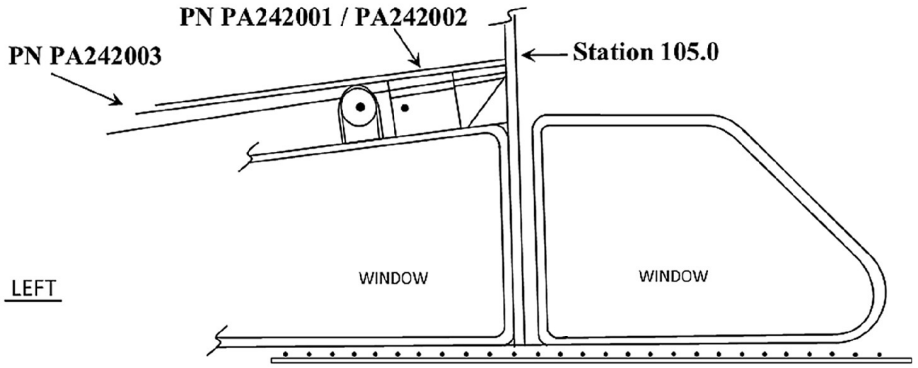
1. Remove the existing lap belts at their primary mounting point, saving the attachment hardware.

2. Install the new lap belt assembly, **buckle portion inboard**, using the original hardware configuration; as shown in Piper PA24 / 30 / 39 Series Maintenance Manual.

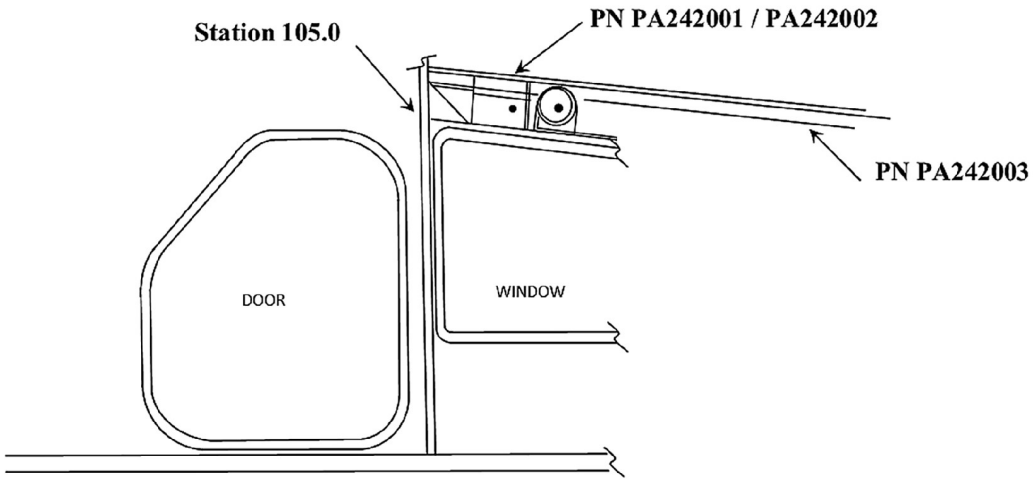
3.Test fit and inspect each completed installation. All end fittings and inertial reels should be firmly attached, all hardware should be tight, and each lap belt segment should be free to rotate in response to any restraint system loading. The shoulder belt upper attachment or inertial reel should be snug and rotated to provide for a smooth flow of the webbing over the pilot’s shoulder.

8.0 Drawings

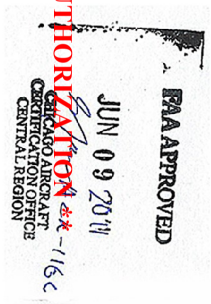
DRAWING RETRACED 4.9.2021
FOR CLARITY ONLY



LEFT



RIGHT



ALPHA AVIATION INC.	Burnsville, MN	MOUNT LOCATION	Part Number PA243001
Fin: See Note	Tolerance	.XX+-.030	.XXX +/- .010
Drawn 8/21/2007	Chk'd DCH	Approved DCH	Rev A 9/1/07

DRAWING RETRACED 4.9.2021
FOR CLARITY ONLY

RIGHT POSITION SHOWN - LEFT POSITION REVERSED

Drawing applies to -

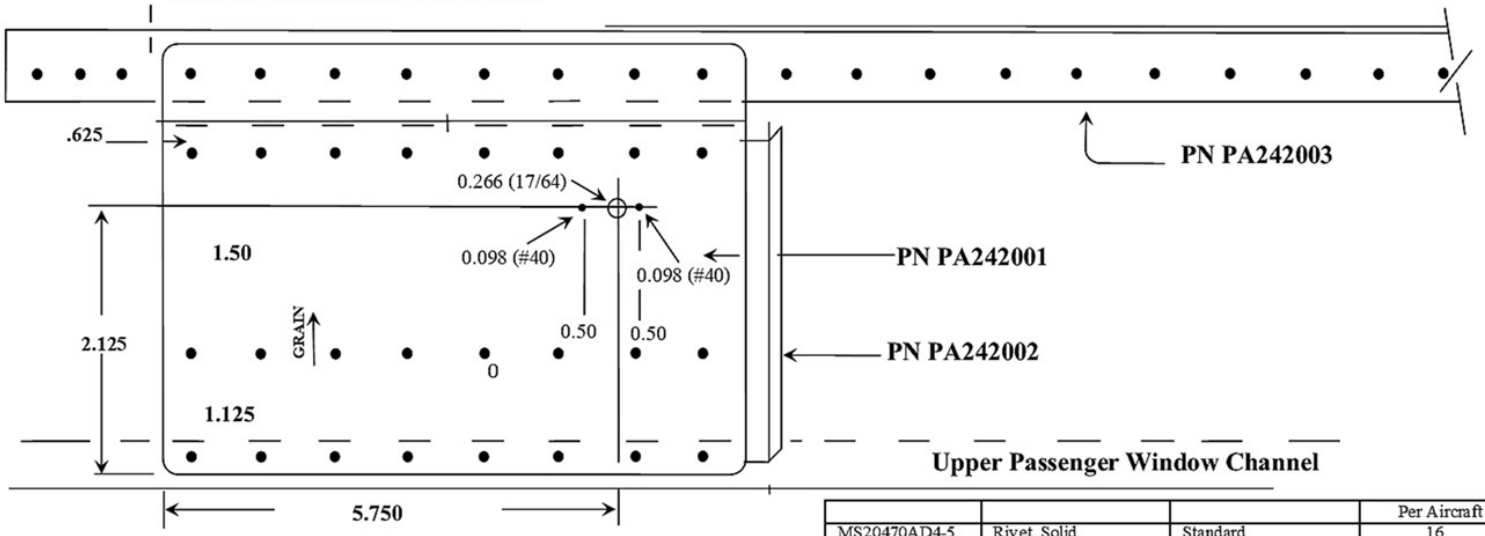
PA24 Aircraft SN 24-1 through 24-2843

and

PA24 Aircraft SN 24-2844 through 24-4299
(Less SN 24-4247)

PA24 Aircraft SN 26-2 through 26-148

Modified to remove the forward 2.50 inches
From PN 242003 and the elimination of the



PN PA242001: Rivet top row using MS20470AD4-5
Rivet bottom row using CR3213-4-3

PN PA242002: Lies behind PN PA242001 and is riveted, Rows 1 + 2, using MS20470AD4-4

PN PA242003: Is riveted using MS20470AD4-4 rivets in all locations, except where PN PA242001 overlies PN PA242003

and

Where PN PA242003 passes over the cabin vent fitting - 4 ea., CR3213-4-2 rivets are used.

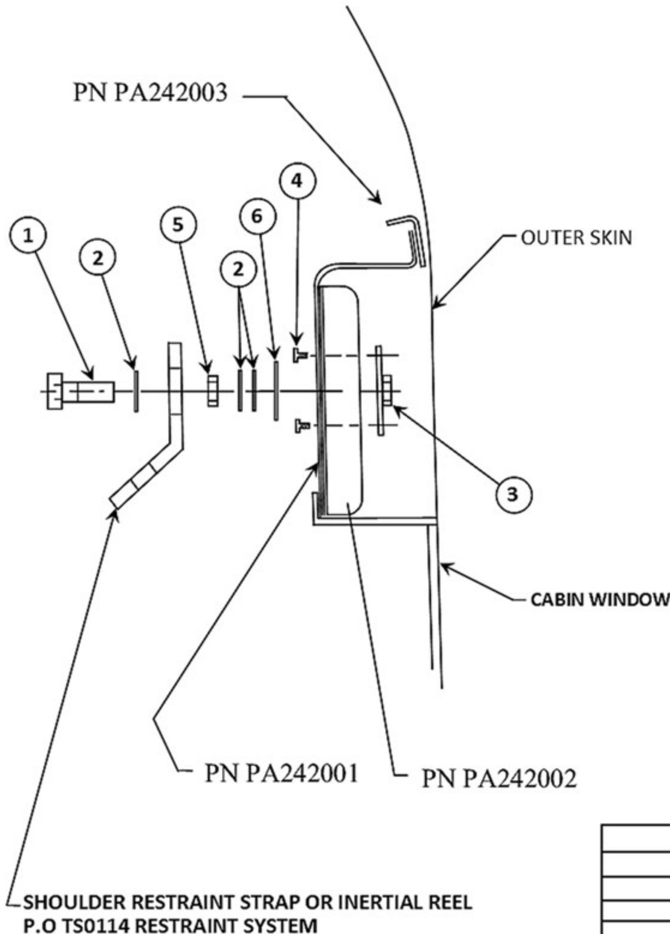
MS21047-L4: Nut Plate installation is shown on drawing PA243003

FAA APPROVED
JUN 09 2011
CHICAGO AIRCRAFT CERTIFICATION OFFICE CENTRAL REGION

			Per Aircraft
MS20470AD4-5	Rivet, Solid	Standard	16
MS20470AD4-4	Rivet, Solid	Standard	68
CCR3213-4-3	Rivet, Cherry	Standard	16
CCR3213-4-2	Rivet, Cherry	Standard	8
PA242003	Support - Cabin Roof	PMA - Part	2
PA242002	Mount - Inner	PMA - Part	2
PA242001	Mount - Outer	PMA - Part	2
Part	Description	Specification	Required
ALPHA AVIATION INC.	Burnsville, MN	Installation Detail Mount	Part Number PA243002
Fin: See Note	Tolerance	.XX+-.030	.XXX +/-.010
Drawn 6/2/2011	Chk'd DCM	Approved DCM	Rev C

** FOR REVIEW ONLY – NO STC AUTHORIZATION **

DRAWING RETRACED 4.9.2021
FOR CLARITY ONLY



AIRFRAME
LEFT (PILOT) POSITION SHOWN
RIGHT POSITION REVERSED

			Per Aircraft
6	AN970-4 Washer	Standard	2
5	NAS75-4-004 Bushing	Standard	2
4	CCR264SS3-2 Rivet	Standard	4
3	MS21047-L4 Nut Plate	Standard	2
2	AN960-416 Washer	Standard	6
1	AN4-6A Bolt	Standard	2
Item	Description	Specification	Required
ALPHA AVIATION INC.	**Burnsville, MN**	**Installation Detail ATTACHMENT**	**Part Number PA243003**
Fin: See Note	**Tolerance**	**.XX+-.030**	**.XXX +/-.010**
Drawn 8/21/2007	**Chk'd** DCH	**Approved** DCH	**Rev** **A** 9/1/07

FAA APPROVED
JUN 09 2021
ACE-116C
CHICAGO AIRCRAFT CERTIFICATION OFFICE CENTRAL REGION

** FOR REVIEW ONLY – NO STC AUTHORIZATION **

DRAWING RETRACED 4.9.2021
FOR CLARITY ONLY

RIGHT POSITION SHOWN - LEFT POSITION REVERSED

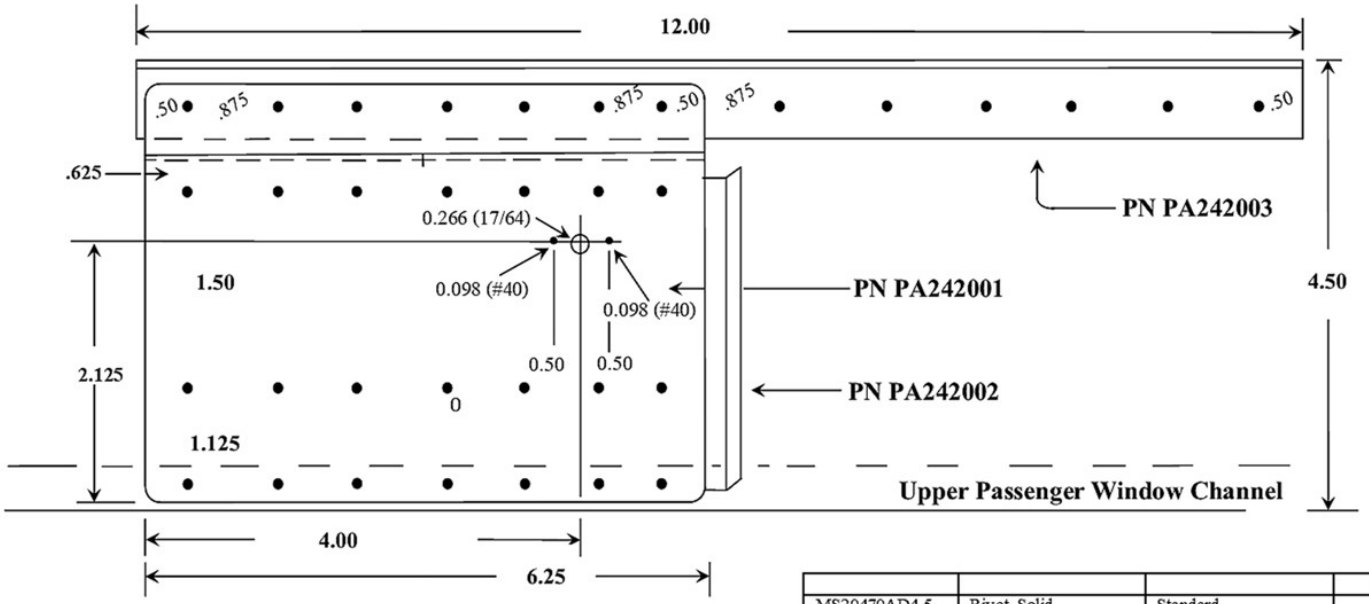
Drawing applies to -

PA24 Aircraft Serial Number 24-4247 and 24-4300 through 24-4921
PA30 Aircraft Serial Number 30-2 and up.

Resize parts PA242001, 242002 and 242003 as shown; to accommodate
The addition of additional roof structure and relocation of the cabin vent fitting.

Process -

1. **Part PA242001; Trim forward edge to a final width of 6.25 inches**
2. **Part PA242002; Trim forward edge to a final width of 6.25 inches**
3. **Part PA242003; Shorten length to 12.00 inches or as needed**



PN PA242001: Rivet top row using MS20470AD4-5
Rivet bottom row using CR3213-4-3

PN PA242002: Lies behind PN PA242001 and is riveted,
Rows 1 + 2, using MS20470AD4-4

PN PA242003: Is riveted using MS20470AD4-4 rivets in all locations, except where PN PA242001 overlies PN PA242003

and

Where PN PA242003 passes over the cabin vent fitting - 4 ea., CR3213-4-2 rivets are used.

MS21047-L4: Nut Plate installation is shown on drawing PA243003

CHICAGO AIRCRAFT CERTIFICATION OFFICE CENTRAL REGION
JUN 09 2011
FAA APPROVED

			Per Aircraft
MS20470AD4-5	Rivet, Solid	Standard	16
MS20470AD4-4	Rivet, Solid	Standard	68
CCR3213-4-3	Rivet, Cherry	Standard	16
CCR3213-4-2	Rivet, Cherry	Standard	8
PA242003	Support - Cabin Roof	PMA - Part	2
PA242002	Mount - Inner	PMA - Part	2
PA242001	Mount - Outer	PMA - Part	2
Part	Description	Specification	Required
ALPHA AVIATION INC.	**Burnsville, MN**	**Installation Detail Mount**	**Part Number PA243004**
Fin: See Note	**Tolerance**	**.XX+-.030**	**.XXX +/-.010**
Drawn 6/2/2011	**Chk'd** Dcm	**Approved** Dcm	**Rev B**

** FOR REVIEW ONLY – NO STC AUTHORIZATION **

FAA APPROVED MODEL LIST (AML) NO. SA02492CH
ALPHA AVIATION INC.
FOR
INSTALLING THREE POINT TORSO RESTRAINT SYSTEM

ISSUE DATE: 10/29/07

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-24, PA-24-250, PA-24-260, PA-24-400	1A15	CAR 3	Installation and Maintenance Manual No. PA244001	Revision B, dated 10/12/07*	N/A	--
2	Piper	PA-30, PA-39	A1EA	CAR 3	Installation and Maintenance Manual No. PA244001	Revision B, dated 10/12/07*	N/A	--

* or latter FAA Approved Revisions.

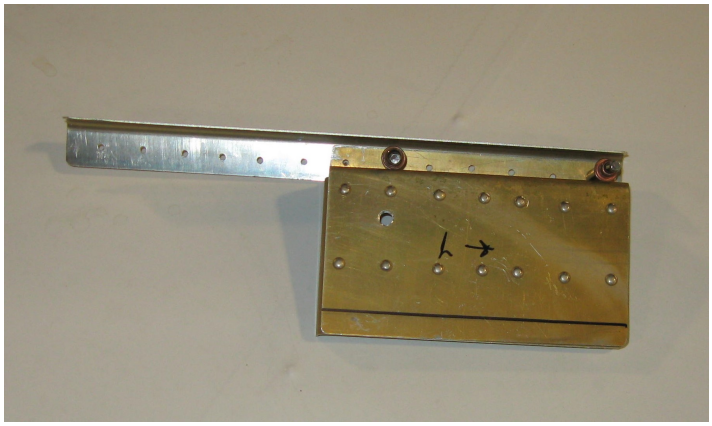
Original signed by:
Gregory J. Michalik

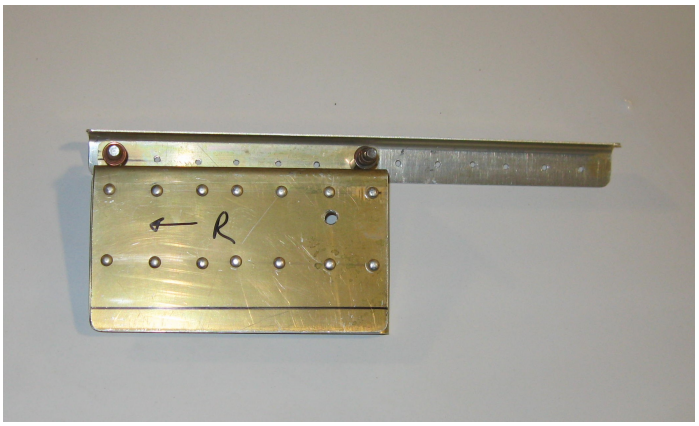
FAA APPROVED: _____

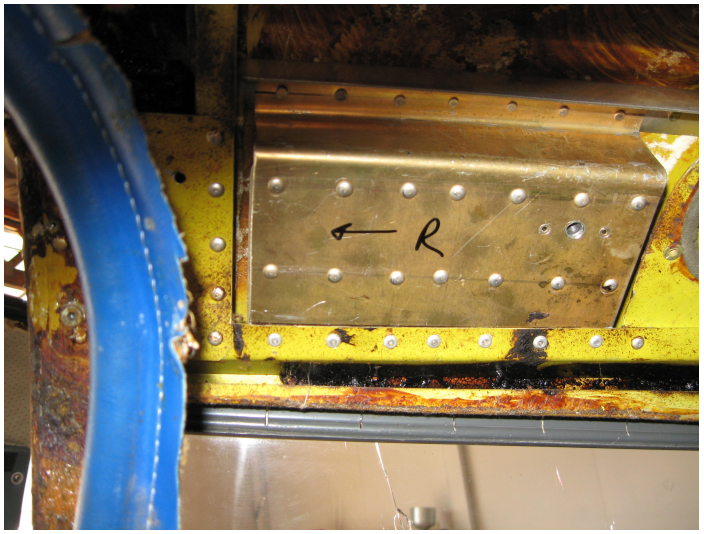
Karol Mordasiewicz
Manager, Airframe & Administrative Branch
Chicago Aircraft Certification Office

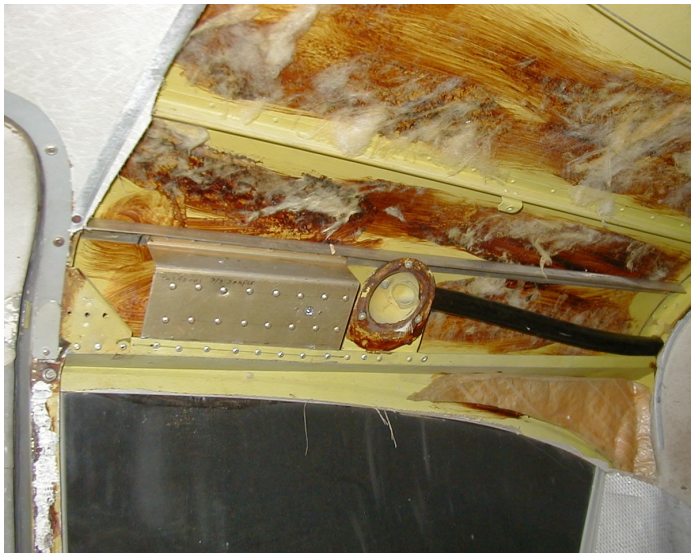
Reissued: 12/20/16

PA24 / PA30 / PA39 STC INSTALLATION PHOTOS









INERTIAL REEL
SHOWN WITHOUT COVER