

# **INSTALLATION and MAINTENANCE MANUAL NUMBER 415-4001**

## **FAA/STC SA02493CH**

**Univair (Erco/Forney) 415-C, 415-CD, 415-D, Model-E, Model-G, F-1, F-1A  
SERIES AIRCRAFT**



**1500 East Main Street  
Owatonna, Minnesota 55060  
800-653- 5112**

Revision	Date	Change	Approved
A	9/01/2007	Initial Issuance	<i>DeM</i>
B	6/01/2017	Minor Updates and Address Change	<i>DeM</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	Required Installation Parts and Packing List.
Drawing – 415-3001 Fuselage Location	
Drawing – 415-3002 Installation Detail	
Drawing – 415-3003 Shoulder Restraint Attachment	

**\*\* FOR REVIEW ONLY - NO STC AUTHORIZATION \*\***

## **1.0 Model Designations**

Model Number	Product Description
415-114FS	Three-point restraint system, TSO-C114, Fixed torso strap

## **2.0 Product Description**

### **Model 415-114FS**

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 aft end of the torso restraint strap is hard mounted to the airframe at a location aft of 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 replacement hardware which is provided.

The attachment of the fixed end of the torso restraint strap is accomplished by the addition of a mounting hard point to the fuselage structure; adjacent to each pilot position and centered at fuselage station 67.0.

## **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 does not preclude the installation of the Model 415-114FS restraint system.

Note – This installation has been successfully proof tested with the frame “E” cross member removed, to insure structural integrity when installed in aircraft that were manufactured, or modified to include an enlarged baggage area.

## **4.0 Weight and Balance**

The Model 415-114FS installation has a location of station 67.0 and a net weight change of +1.75 pounds per installation; two pilot positions.

**\*\* FOR REVIEW ONLY - NO STC AUTHORIZATION \*\***

## **5.0 FAA Documentation**

The installation of this restraint system is an FAA approved installation, when accomplished according to the approved data. All parts supplied by Alpha Aviation Inc. are either FAA/PMA modification parts or standard parts; the installation manual 415-4001 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 “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 \*\***

**Instructions for Continued Airworthiness**

Dated 9/1/2007

Univair (Erco/Forney) 415-C, 415-CD, 415-D, Model-E, Model-G, F-1, F-1A Aircraft

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. One restraint system is installed at each pilot and/or passenger 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 lift lever buckle .  
  
The shoulder strap originates at the sidewall 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 permitted.
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**

<b>AFT HARD POINT</b>
<b>Univair (Erco/Forney) 415-C, 415-CD, 415-D, Model-E, Model-G, F-1, F-1A SERIES AIRCRAFT</b>

These instructions cover the installation of the aft torso restraint hard point; centered at fuselage station 67.0, adjacent to each pilot position.

The aft hard point installation is accomplished by reference to Drawings 415-3001 and 415-3002. The attachment of the TSO-C114 restraint system is accomplished by reference to Drawing 415-3003.

### **Step-by-Step Instructions:**

1. By reference to Drawing 415-3001, locate fuselage station 67.0 on the right and left side of the fuselage. And the horizontal angle PN 415-31116L / R.
2. Refer to Drawing 415-3002; Test fit parts 415-2001, 415-2002 to verify that no conflicts exist that would hamper this installation.

Notes – Except for being reversed - The left and right installations are identical.

Arranging the parts on the bench with left and right orientation will allow them to be laid out, marked and drilled for installation, saving considerable time.

3. Layout and drill parts 415-2001 and 415-2002. Drill locating holes using a #40 drill. The holes will be up-sized later, as needed.
4. Rivet parts 415-2001, 415-2002 together, outer two rivets only. #30 Drill
5. Place aft mount assembly in place and mark, drill (#40) and cleco the 6 vertical holes, which are needed to anchor the assembly to the horizontal angles 415-31116-L and R.
6. Drill (#40) and cleco the 6 rivet locations through the cabin outer skin.
7. Upsize the holes (#18) in the horizontal angles 415-31116L/R. Install AN526 bolts.

**\*\* FOR REVIEW ONLY - NO STC AUTHORIZATION \*\***

8. Complete the riveting through the cabin outer skin by upsizing the holes to #30 and installing AN20470AD4-4 rivets, per drawing 415-3002.
9. Upsize the shoulder belt attachment hole to .250 and de-bur.
10. Install the shoulder belt aft attachment as shown on drawing 415-3003.

Note – When access issues preclude the use of the supplied MS21042- 4 nuts; MS21047-L4 structural rated nut plates and CCR264SS3-2 rivets may be substituted. These additional parts are supplied for convenience.

### **Lap Belt Attachment;**

11. Remove the existing lap belts at their primary mounting point. Discard the attachment hardware and triangles.
12. Install the new lap belt assemblies,

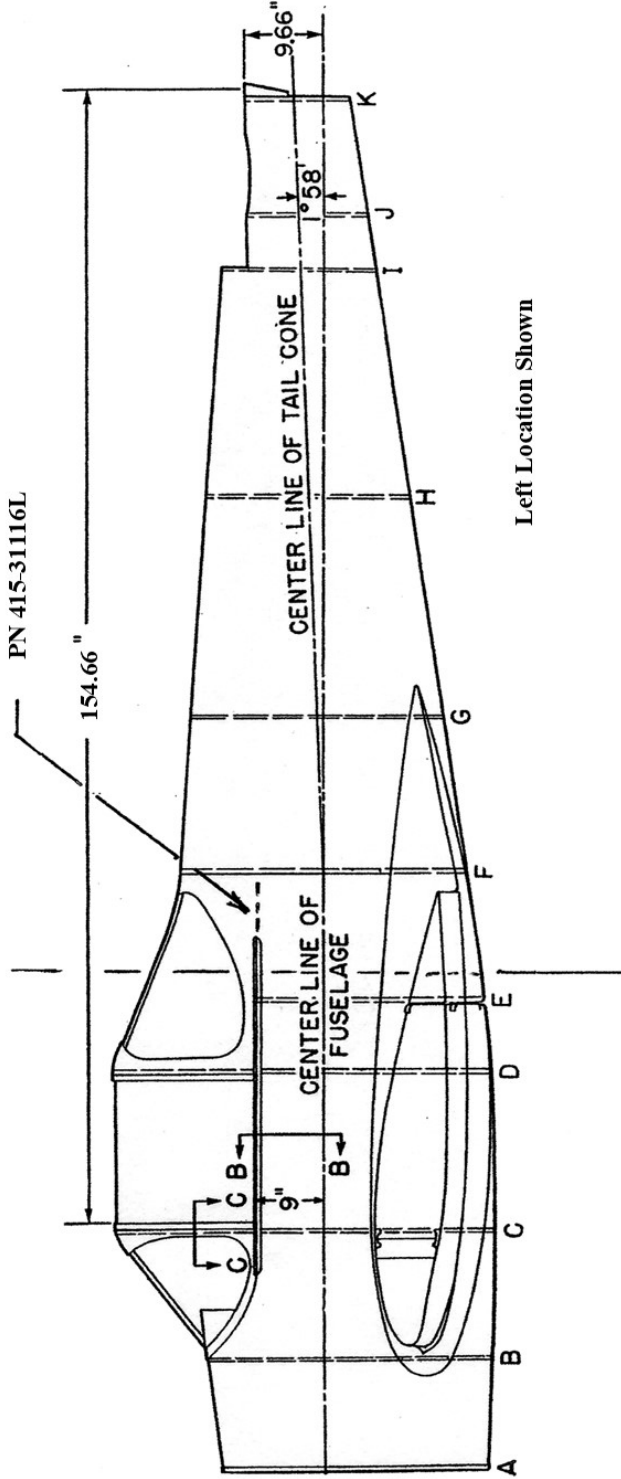
Lift lever buckle portion inboard; snapping it to the OEM square loop.

Connector portion outboard; using the supplied AN4-6A bolts, AN960-416 washers, NAS75-4-004 bushings and MS21042-4 nuts..

13. Test fit and inspect each completed installation. All end fittings 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 aft attachment should provide for a smooth flow of the webbing over the pilots shoulder.

**\*\* FOR REVIEW ONLY - NO STC AUTHORIZATION \*\***

Fuselage Station 67.0



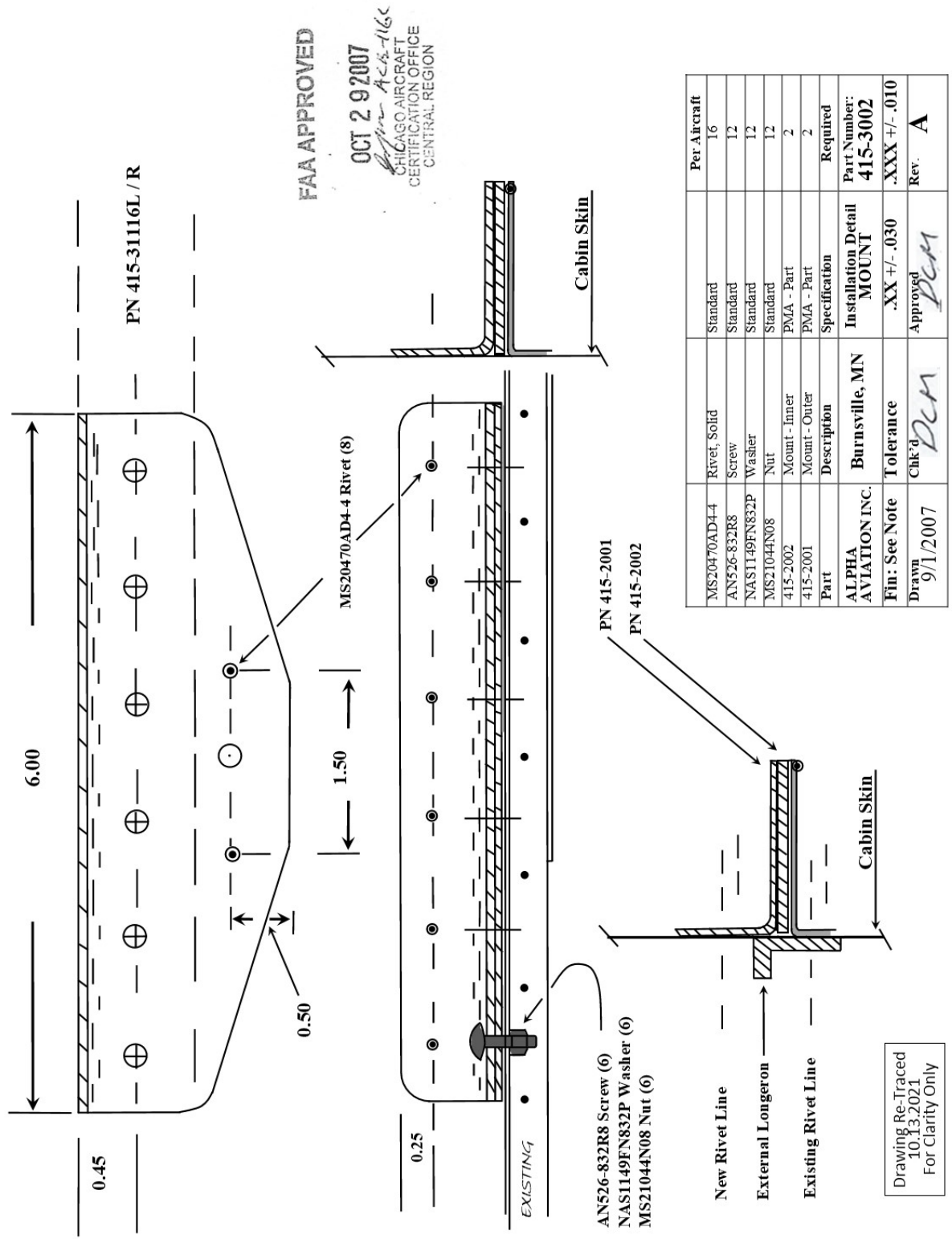
Univair (Erco/Forney) 415-C, 415-CD, 415-D, MODEL E, MODEL G, F-1, F-1A

FAA APPROVED

OCT 29 2007  
CHICAGO AIRCRAFT  
CERTIFICATION OFFICE  
CENTRAL REGION

ALPHA AVIATION INC.	Burnsville, MN	MOUNT LOCATION	Part Number: 415-3001
Fin: See Note	Tolerance	.XX +/- .030	.XXX +/- .010
Drawn 9/1/2007	Chk'd <i>Den</i>	Appro' <i>Den</i>	Rev. A



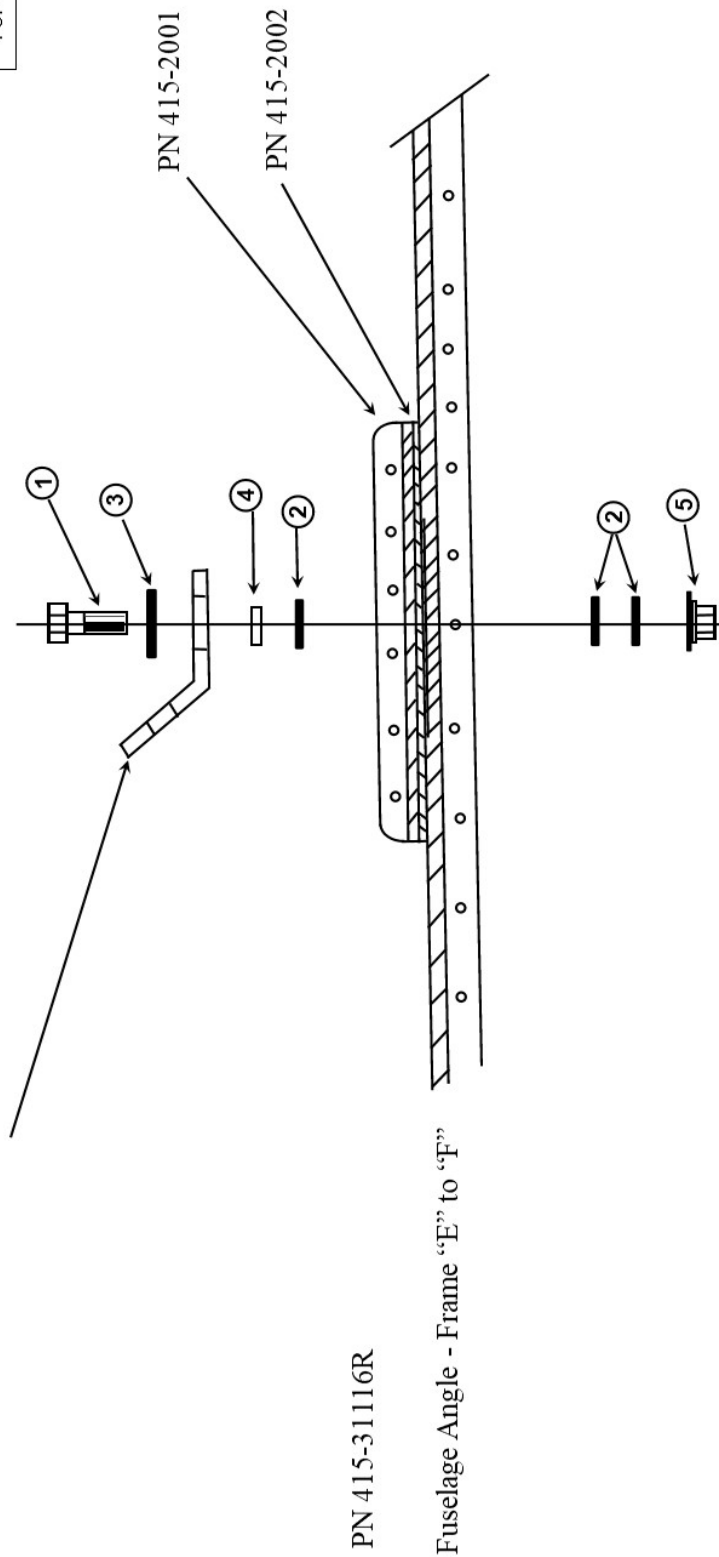


MS20470AD4-4	Rivet, Solid	Standard	Per Aircraft
AN526-832R8	Screw	Standard	16
NAS1149FN832P	Washer	Standard	12
MS21044N08	Nut	Standard	12
415-2002	Mount - Inner	PMA - Part	2
415-2001	Mount - Outer	PMA - Part	2
Part	Description	Specification	Required
ALPHA AVIATION INC.	Burnsville, MN	Installation Detail MOUNT	Part Number: 415-3002
Fin: See Note		Tolerance	.XX +/- .030
Drawn 9/1/2007	Chk'd <i>DCM</i>	Approved <i>DCM</i>	Rev. A

Drawing Re-Traced  
10.13.2021  
For Clarity Only

Drawing Re-Traced  
10.13.2021  
For Clarity Only

TSO-C114; SHOULDER BELT END FITTING



**\*\* FOR REVIEW ONLY - NO STC AUTHORIZATION \*\***

Right Location Shown - Left Reversed

5	NAS21042-4 Nut	Standard	Per Aircraft
4	NAS75-4004 Bushing	Standard	2
3	AN970-4 Washer	Standard	2
2	AN960-416 Washer	Standard	6
1	AN4-6A Bolt	Standard	2
Item Description			Required
ALPHA AVIATION INC. Burnsville, MN			Part Number: 415-3003
Fin: See Note	Tolerance	.XX +/- .030	.XXX +/- .010
Drawn 9/1/2007	Chk'd <i>Dem</i>	Approved <i>Dem</i>	Rev. A

FAA APPROVED

OCT 29 2007  
Chicago Aircraft  
CERTIFICATION OFFICE  
CENTRAL REGION

