

#### **4.5 Installation and Maintenance Manual**

## **INSTALLATION and MAINTENANCE MANUAL NUMBER C1004001**

**FAA/STC SA02211CH    EASA/STC 10070260**

**CESSNA 100 Series Aircraft**

**Three Point Torso Restraint System Installations**

Cessna 170, 172, 175, 180, 182, 185

Per Approved Model List



Model C100-114FS



Model C100-114IR

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

Revision	Date	Change	Approved
A	10/10/2005	Initial Issuance	-
B	11/07/2005	Drawing Change C1003003	-
C	5/15/2006	Add Models 182E thru 182P	-
D	2/12/2017	Address Change	
E	11/01/2019	Add at page 12; TSO ITEMS – Or “Equivalent FAA Approved Restraint System”	

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

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## **1.0 Model Designations**

Model Number	Product Description
C100-114FS	Three-point restraint system, TSO-C114, Fixed torso strap
C100-114IR	Three-point restraint system, TSO-C114, Inertial reel torso strap

## **2.0 Product Description**

### Model C100-114FS

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 a MS21075-4N nut plate to the existing cabin structure at fuselage station 65.33, as called out in the drawing package.

### Model C100-114IR

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 installation of a MS21075-4N nut plate to the existing cabin structure at fuselage station 65.33, 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 C100-114FS or Model C100-114IR restraint system.

### **4.0 Weight and Balance**

Model C100-114FS has a location of station 65.33 and a net weight change of 1.75 pounds per installation; two pilot positions.

Model C100-114IR has a location of station 65.33 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 C1004001 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.**

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## **6.0 Instruction For Continued Airworthiness (ICA)**

### **Instructions for Continued Airworthiness**

**Dated 10/10/2005**

### **Models; C100-114FS / C100-114IR 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

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## **7.0**

Dated; 5/15/2006

# **INSTALLATION INSTRUCTIONS**

## **UPPER MOUNT POINT**

**Cessna 100 Series Aircraft, Models 170, 172, 175, 180, 182, 185**  
**Per Approved Model List**

These instructions cover the installation of Part Number MS21075-4N, which creates a torso restraint upper mount centered at fuselage station 65.33, adjacent to each pilot position.

The upper mount installation is accomplished by reference to Drawings C1003001 and C1003002.1 / C1003002.2. The attachment of the TSO-C114 restraint system is accomplished by reference to Drawing C1003003.

**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 doorpost.

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 C1003001, locate fuselage station 65.33 on the right and left side of the fuselage. The vertical location is above and horizontally aft of the passenger door opening.
2. Remove the interior trim and open the headliner to the extent necessary to gain access to the inboard flange of the vertical fuselage frame.

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 C1003002.1 or C1003002.2 (Model 182E thru 182P) Locate and mark a horizontal line on the face of the fuselage gusset, centered between the upper two rivets, which hold the gusset to the inboard flange of the fuselage frame.

## **Cessna 170 / 172 / 175 / 180 / 182 Thru 182D / 185**

4. Mark a **vertical** line on the face of the gusset, which depicts the **centerline** of the inboard flange of the fuselage frame.

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**Cessna 182E Thru 182P**

4. Mark a **vertical** line on the face of the gusset, which depicts the **centerline** of the upper two rivets, which hold the gusset to the inboard flange of the fuselage frame.
  
5. At the intersection of the fuselage flange vertical line and the horizontal location, drill a .257 hole through the gusset and fuselage frame. ( Letter Drill "F" )
  
6. Using the MS21075-4N nut plate as a template, mark the nut plate mounting hole locations on the face of the gusset. Drill the #40 (3/32") mounting holes, as marked and mount the nut plate to the **inside** of the fuselage frame flange, as shown on drawing C1003003.
  
7. Test fit the AN4-7A bolt to the nut plate and adjust as necessary to assure ease of installation.
  
8. Reinstall the headliner and moldings, locate and open the .250-inch mounting hole.
  
9. Install the upper torso restraint strap or inertial reel using the hardware configuration shown on Drawing C1003003.
  
10. Torque each bolt to 60 in/lbs dry torque.

**Lap Belt Attachment:**

11. Remove the existing lap belts at their primary mounting point, saving the attachment hardware.
  
12. Install the new lap belt assembly, **buckle portion inboard**, using the original hardware configuration; as shown in Cessna 100 Series Maintenance Manual.
  
13. 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.

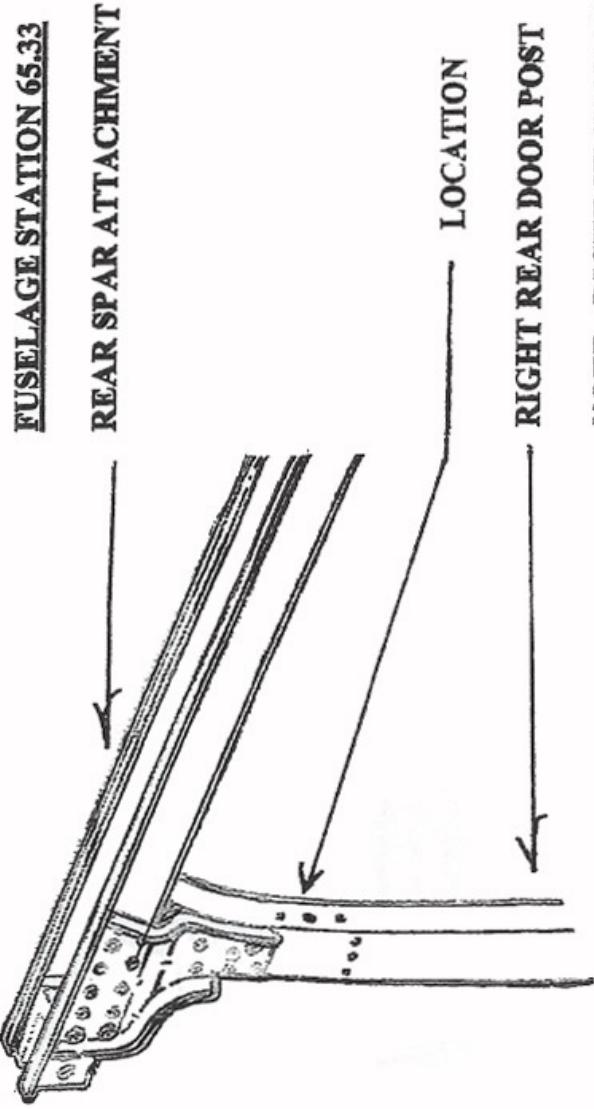
**\*\* FOR REVIEW ONLY – NO STC AUTHORIZATION \*\***

## **8.0 Installation Drawing**

### **ATTACHED DOCUMENTS**

Page 8	8.1	Drawing C1003001	Mount Location
Page 9	8.2	Drawing C1003002.1	Mount Detail, Typical
Page 10	8.3	Drawing C1003002.2	Mount Detail, 182E thru 182P
Page 11	8.4	Drawing C1003003	Restraint Strap, Attachment
Page 12	8.5		Required Installation Parts

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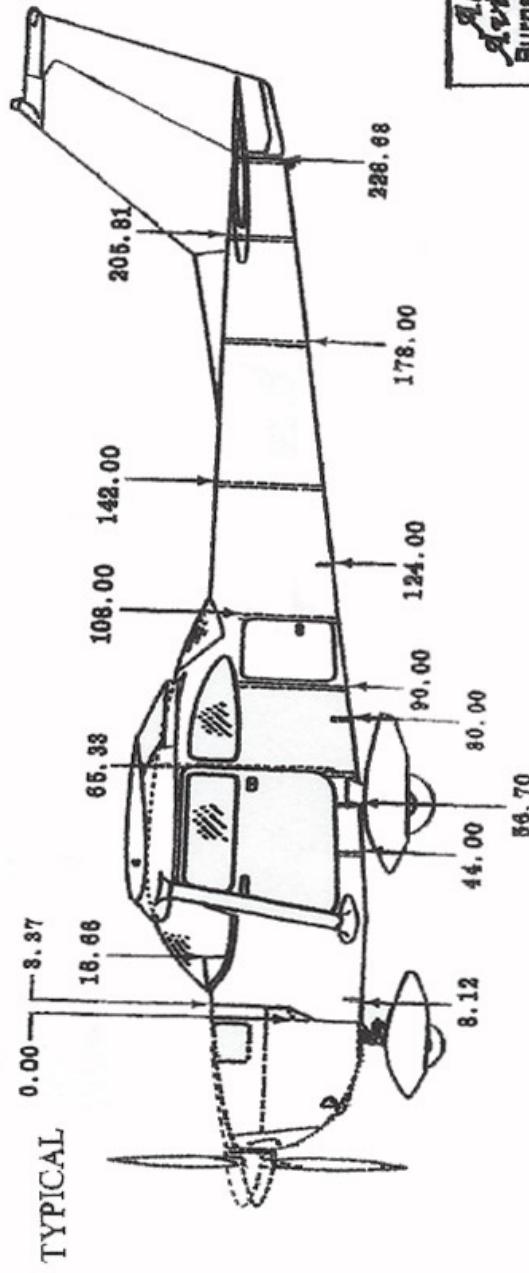


NOTE - RIGHT SIDE SHOWN / LEFT SIDE REVERSED

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CHICAGO AIRCRAFT  
CERTIFICATION OFFICE  
CENTRAL REGION

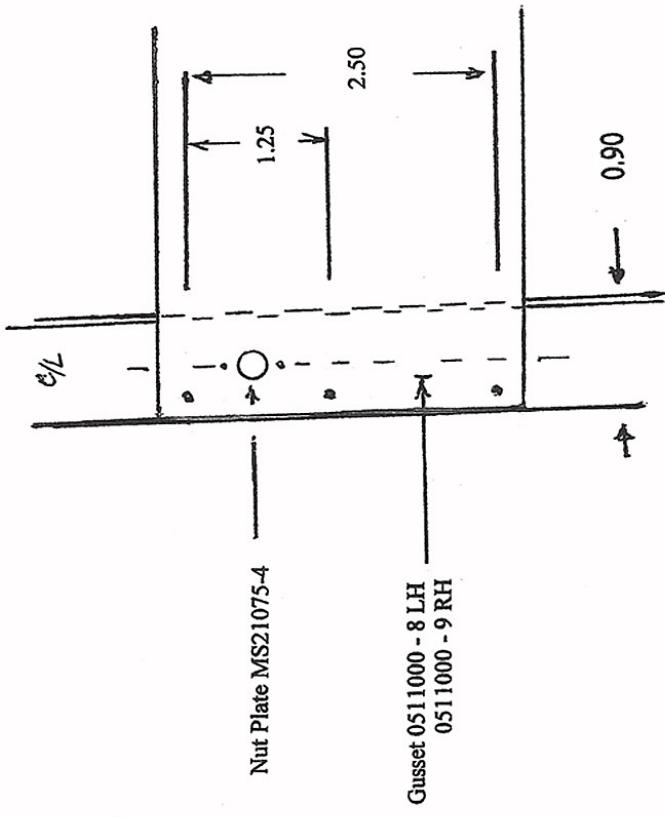


Applicant Burnsville MN.	Location TOL, HHT/-, .03, .0004+/-, .010, OR NOTED	Serial C1003001	Rev A
FIN: N/A			
DRAWN 1/9/05	CHK, Dcm	APPR, Dcm	

CESSNA 170, 172, 175, 180, 182-182D, 185

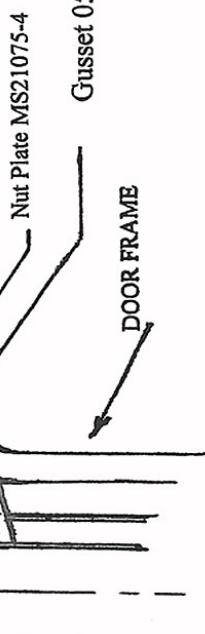
FORWARD

REAR SPAR ATTACHMENT



PULLEY LOCATION

VERTICAL MEMBER / FLANGE  
LEFT SIDE SHOWN / RIGHT SIDE REVERSED



**FAA APPROVED**

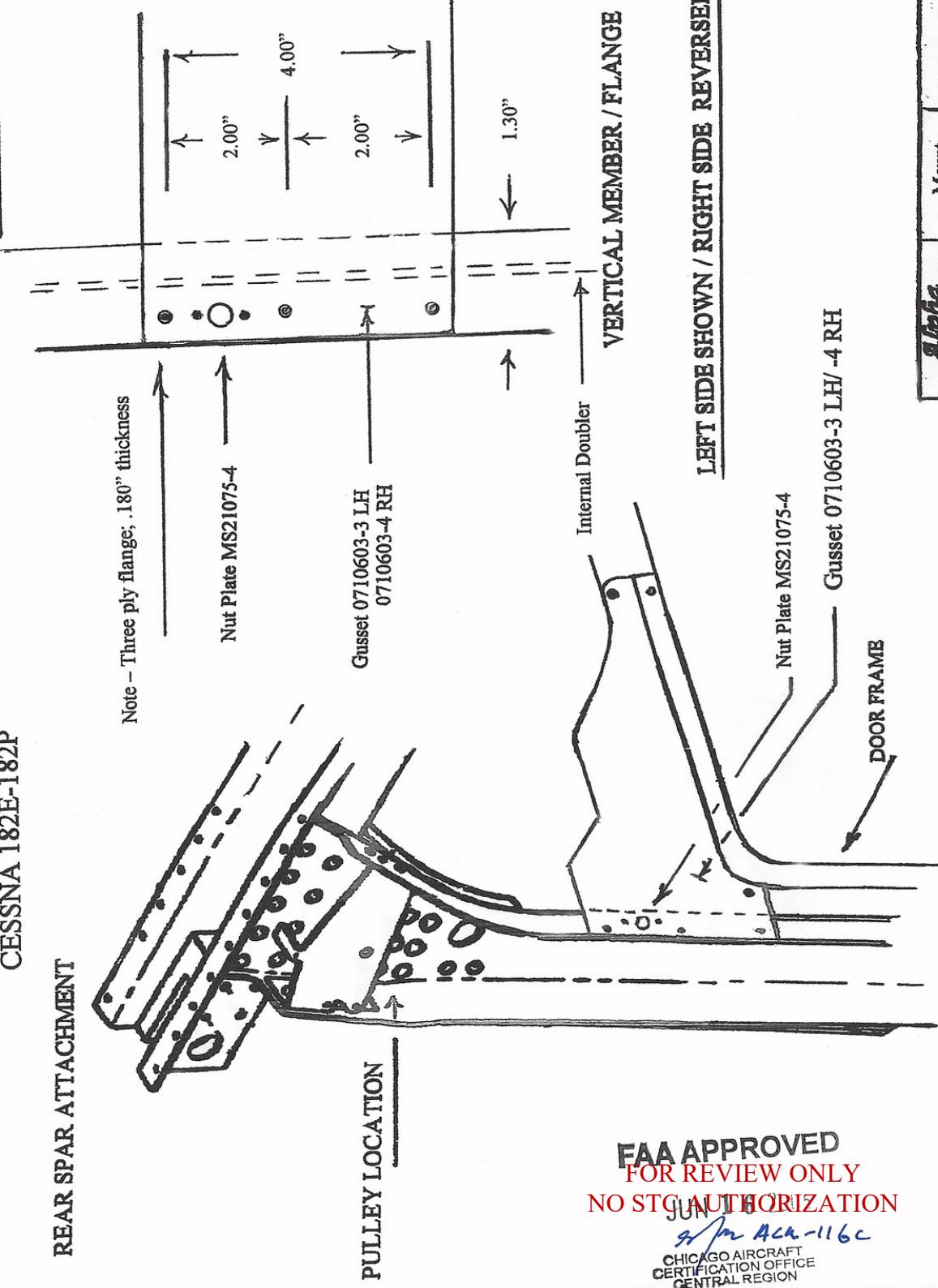
JUN 16 2006  
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NO STICKER AUTHORIZATION  
CHICAGO C/L  
CERTIFICATION OFFICE  
CENTRAL REGION

Applicant Burrville, MN.	Mount Detail	C1003002.1	Rev. A
FIN N/A	TL, MM/-. M, MM/-. M, OR NORM		
DRAWN 5/15/06	CHK, DCR, APPR, DCM		

CESSNA 182E-182P

REAR SPAR ATTACHMENT

FORWARD →



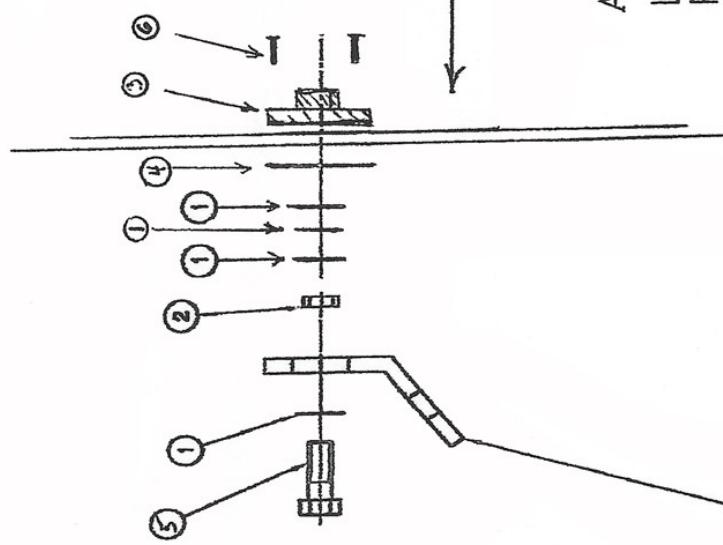
Applicant Organization Burnsville MN.	Mount Detail	C1003002.2	MM
FIN: N/A	REL: MM/- MM, MM+/- MM, MM	SIQ, QN, NSTD	A
DRAWN 5/5/06	CHK. Dcm	APPR. Dcm	

LEFT SIDE DOOR POST / FACING FORWARD

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FUSELAGE FRAME, STATION 65.33

AIRFRAME - LEFT SIDE, FACING AFT  
LEFT (PILOT) POSITION SHOWN  
RIGHT POSITION REVERSED

Item No.	Part No.	Size	Description	Specification	Rev.
6	2	CC0264553-3/4	Rivet	Standard	
5	1	AN4-7A	Bolt	Standard	
4	1	AN970-4	Washer	Standard	
3	1	MS21075-4	Nut Plate	Standard	
2	1	NAS754-004	Bushing	Standard	
1	1/4	AN960-416	Washer	Standard	

TSO-C114 SHOULDER BELT END FITTING  
OR  
INERTIAL REEL HOUSING  
Alpha Aviation  
Burnsville, MN.

FIN: N/A	TOL. MM+/- .03, MM+/- .010, OR NOTED		
DRAWN 11/17/05	CHK. Dem	APPR. Dem	

FAA APPROVED MODEL LIST (AML) NO. SA02211CH  
 ALPHA AVIATION INC.  
 FOR  
 INSTALLING THREE POINT TORSO RESTRAINT SYSTEM

ISSUE DATE: 11/15/05

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	Cessna	170, 170A, 170B	A-799	CAR 3	Installation and Maintenance Manual No. C1004001	Revision B, dated 11/7/05*	N/A	11/11/06
2	Cessna	172, 172A, 172B, 172C, 172D, 172E, 172F, 172G, 172H, 172L, 172K	3A12	CAR 3	Installation and Maintenance Manual No. C1004001	Revision B, dated 11/7/05*	N/A	11/11/06
3	Cessna	175, 175A, 175B, 175C, P172D	3A17	CAR 3	Installation and Maintenance Manual No. C1004001	Revision B, dated 11/7/05*	N/A	11/11/06
4	Cessna	180, 180A, 180B, 180C, 180D, 180E, 180F, 180G, 180H	3A6	CAR 3	Installation and Maintenance Manual No. C1004001	Revision B, dated 11/7/05*	N/A	11/11/06
5	Cessna	182, 182A, 182B, 182C, 182D, 182E, 182F, 182G, 182H, 182J, 182K, 182L, 182M, 182N, 182P	3A13	CAR 3	Installation and Maintenance Manual No. C1004001	Revision C, dated 5/15/06*	N/A	6/16/06
6	Cessna	185, 185A, 185B, 185C, 185D, 185E, A185F, A185G	3A24	CAR 3	Installation and Maintenance Manual No. C1004001	Revision B, dated 11/7/05*	N/A	11/11/06

\* or latter FAA Approved Revisions.

FAA APPROVED:

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

Reissued: 12/20/16  
 Amended: 11/11/06, 6/16/06

# Alpha

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## CESSNA 100 SERIES AIRCRAFT

Three Point Torso Restraint System Installation - STC SA02211CH

### INSTALLATION PHOTOS

