

AA-5 SERIES
MAINTENANCE MANUAL

CHAPTER 57

WINGS

TABLE OF CONTENTS

<u>NUMBER</u>		<u>PAGE</u>
57-0	WINGS	
	Description	1
	General	1
	Wing Root	1
	Wing Tips	1
	Wing Interchangeability	1
	Maintenance Practices	201
	Wing Removal/Installation	201
	Wing Root Removal/Installation	207
	Wing Tip Removal/Installation	208
	Wing and Center Spar Repair	209

**AA-5 SERIES
MAINTENANCE MANUAL**

WINGS - DESCRIPTION

1. General

The wings consist of all-metal structures bonded to ribs and incorporate the ailerons, flaps, fuel tanks, fuel sump tanks, wing tip assemblies and navigation lights. The AA-5, AA-5A, and AA-5B models have a wing span of 31 feet and 6 inches.

Each wing half consists of two assemblies, the inner and outer wing panels. The inner and outer wing panels are bolted together and the outer can be removed and replaced separately. The wing halves are bonded around tubular spars which attach to the main spar located in the fuselage. The wing halves are built and bonded in jig fixtures at the factory.

2. Wing Root

The wing root is located between the wing and fuselage and provides a smooth fusing of the wing assembly to the fuselage. The wing root encloses the upper main landing gear attaching brackets and fuel sumps and lines to the fuel tanks.

3. Wing Tips

The wing tips are the outermost part of the wing assembly. They blend the wing leading edge and trailing edge into a single unit. The wing tips house the aileron balance weight assemblies and contain the navigation lights.

4. Wing Interchangeability

Wing components are interchangeable only as follows:

<u>WING PANEL COMPONENT</u>	<u>MODEL INTERCHANGEABILITY</u>
LH Outer	AA-5, AA-5A and AA-5B
AA-5 LH Inner	AA-5A LH Inner, std. tank
AA-5A RH Outer	AA-5B RH Outer
AA-5A LH Inner, std. tank	AA-5 LH Inner
AA-5A LH Inner, Opt. tank	AA-5B LH Inner with or without fuel gauging tab
AA-5A RH Inner, Opt. tank	AA-5B RH Inner with or without fuel gauging tab
AA-5B RH Outer	AA-5A RH Outer
AA-5B LH Inner with fuel gauging tab	AA-5A LH Inner, Opt. tank and AA-5B LH Inner without fuel gauging tab
AA-5B LH Inner without fuel tab	AA-5B LH Inner with fuel gauging tab
AA-5B RH Inner with fuel gauging tab	AA-5A RH Inner, Opt. tank and AA-5B RH Inner without fuel gauging tab
AA-5B RH Inner without gauging tab	AA-5B RH Inner with fuel gauging tab

WINGS – MAINTENANCE PRACTICES

1. Wing Removal/Installation

A. Wing Removal

NOTE: The wing halves can be removed as assemblies with the wing tips, ailerons, and flaps intact, or they can be removed by a disassembly procedure, whichever is required. If the wing is being removed for transportation or storage, use the following procedure. If it is being removed for sectional repair, it may be advantageous to remove the wing tip (See Paragraph I and J, Wing Tip Removal and Wing Tip Installation), aileron (refer to Chapter 27, Aileron Removal), and flap (refer to Chapter 27, Flap Removal), prior to the following procedure.

NOTE: Numbers in parentheses refer to callouts in figures.

- (1) Remove the screws (1, Figure 201), attaching the access panel (2) to the wing root (3).
- (2) From within the wing root, remove the shoulder bolts (1, Figure 202) and washers (2).
- (3) Disconnect the airspeed pitot line located in the wing root (left side only).
- (4) Drain the fuel from the main tank and sump (Refer to Refueling/Defueling, Chapter 28.) and disconnect the fuel lines to the wing root.
- (5) Disconnect all wiring in the wing root.
- (6) Tilt the rear seat forward and remove the access cover.

CAUTION: DO NOT DISTURB THE CABLE TURNBUCKLES OR CONTROL SURFACE RIGGING.

- (7) Remove the nut and bolt securing the aileron horn to the torque tube and remove it from the torque tube by rotating and sliding from the end of the tube. (See Figure 203.)
- (8) Disconnect the flap drive linkage from the flap torque tube horn (1, Figure 204) assembly located under the rear seat.

NOTE: On Aircraft AA5-0001 through AA5-0050, cut safety wire (2, Figure 204) securing the two special drive bolts (3).

- (9) Remove the two special drive bolts (3, Figure 204) from the flap torque tube bellcrank (4). Loosen the bellcrank clamp bolt and slide the bellcrank from the torque tube.

CAUTION: EXERCISE CARE TO PREVENT FLAP “OVERTRAVEL” WHICH MAY RESULT IN THE SCRATCHING OF PAINT OR SKINS.

- (10) Place two men at the wing tip to support wing weight and to be ready to pull wing out.
- (11) Place one man inside the aircraft to make sure torque tubes do not bind.
- (12) Place one man at the inboard leading edge and another man at inboard trailing edge and rotate the wing slightly clockwise and counterclockwise until the wing is free of the spar. Pull wing outboard from the fuselage.

B. Wing Disassembly

NOTE: Before disassembly of the wing, remove the wing tip (See Paragraphs 3A and 3B, Wing Tip Removal and Wing Tip Installation.), the aileron (Refer to Aileron Removal, Chapter 27.), and the flaps. (Refer to Flap Removal, Chapter 27.)

**AA-5 SERIES
MAINTENANCE MANUAL**

NOTE: Numbers in parentheses refer to callouts in Figure 202.

- (1) Locate the trailing edge end of the wing seam strap (3) binding the inner and outer wing panels. At the outboard side of the wing seam strap, drill out the rivets (one at the top of the wing, one on the underneath side of the wing).
- (2) Remove four bolts (4) from the splice plate assembly (5) at the junction of the inner and outer panels.
- (3) Remove two outboard access covers from bottom side of inner wing panel.
- (4) Through the access holes, disconnect the fuel vent lines.
- (5) In the left hand wing half, disconnect the airspeed pitot line.
- (6) Through the access holes, remove the shoulder bolts (6) and washers (7).
- (7) Work the wing panels partially apart by rotating the panels slightly clockwise until the navigation light wires and stall warning switch wires (right wing) are exposed. Cut these wires near the center for easier splicing on reassembly.
- (8) Continue rotating the wing panels slightly until separated.

C. Wing Reassembly

- (1) Spray the wing panel spar mating surfaces with a solid film lubricant and rub general purpose lubricating oil over the inner wing panel spar mating surface. Approved solid film lubricants are:
 - (a) McLube 1708 by McGee Chemical Co., Inc.
 - (b) Lube-Lok 5396 by Allen Aircraft Products, Inc.
- (2) Work the inner and outer wing panel spars together approximately 3 inches.
- (3) Slide a short length of shrink tubing over each navigation light wire and splice wires with quick-connects.
- (4) Slide shrink tube over connections and shrink for tight seal. On the right hand wing panels, also splice and apply shrink tubing to the stall warning switch wiring.

NOTE: Numbers in parentheses refer to callouts in Figure 202.

- (5) Continue sliding the wing panels together, using caution to assure that the ABS plastic spacer (8) under the splice strap (3), slides over the wing skin.
- (6) When the spar attach bolts are aligned, install the shoulder bolts (6) and washers (7). Torque the spar attach bolts 60 to 85 in. lb.
- (7) Install splice plate assembly (5) at the junction of the inner and outer panels with four bolts (4) and washers (9). Torque bolts 20 to 25 in. lb.
- (8) Through the access hole, connect the fuel vent lines. On left side, connect the airspeed pitot line.
- (9) Install access covers (10) with screws (11).
- (10) Install the rivets in the trailing edges of the wing seam splice strap on the top and bottom of the rear spar.

**AA-5 SERIES
MAINTENANCE MANUAL**

D. Wing Installation

- (1) Spray the spar mating surfaces with a solid film lubricant and rub general purpose lubricating oil over the fuselage carry-through spar. See C(1) above for approved lubricants.
- (2) Tilt the rear seat forward and remove the access cover to gain access to the flap and aileron control assemblies. Place one man inside the aircraft to adjust the aileron and flap tube assemblies when inserted through the wing root and fuselage.
- (3) Place one man at the wing tip, one man at the inboard leading edge, and another man at the inboard trailing edge.
- (4) With all three men lifting, lift the wing and align the center spar with the wing spar and align the torque tube assembly with aft hole in the wing root.
- (5) Carefully install wing spar to center spar, with man stationed in aircraft aligning flap tube to flap bearing and aileron tube to aileron horn assembly.
- (6) Prior to installation of shoulder bolts, shake wing vertically and horizontally to check for looseness. If looseness is noted at the wing tip, proceed with the following steps:
 - (a) Apply a 25 pound down load at the wing tip and measure gap at top of spar, between center spar and wing spar, using a wire type feeler gauge. If gap exceeds 0.016 inch, shim to reduce gap to not more than 0.008 inch (unshimmed gap less shim thickness) as described in Steps (b) through (f) below. (See Figure 205.)
 - (b) Sand edges of the shim(s) down to remove sharp corners.
 - (c) Place the shim(s) on the top and/or bottom of the inboard spar as required.
 - (d) Bend approximately 1.25 inches of the outboard end of the shim(s) over the ends and inside the inboard spar.
 - (e) Bend over the inboard end(s) of the shim(s) so that this portion will wrap over the end of the outboard wing spar when the wing is fully installed.
 - (f) Before wing installation, coat surfaces of shim(s) with McLube 1708 solid film lubricant or equivalent.

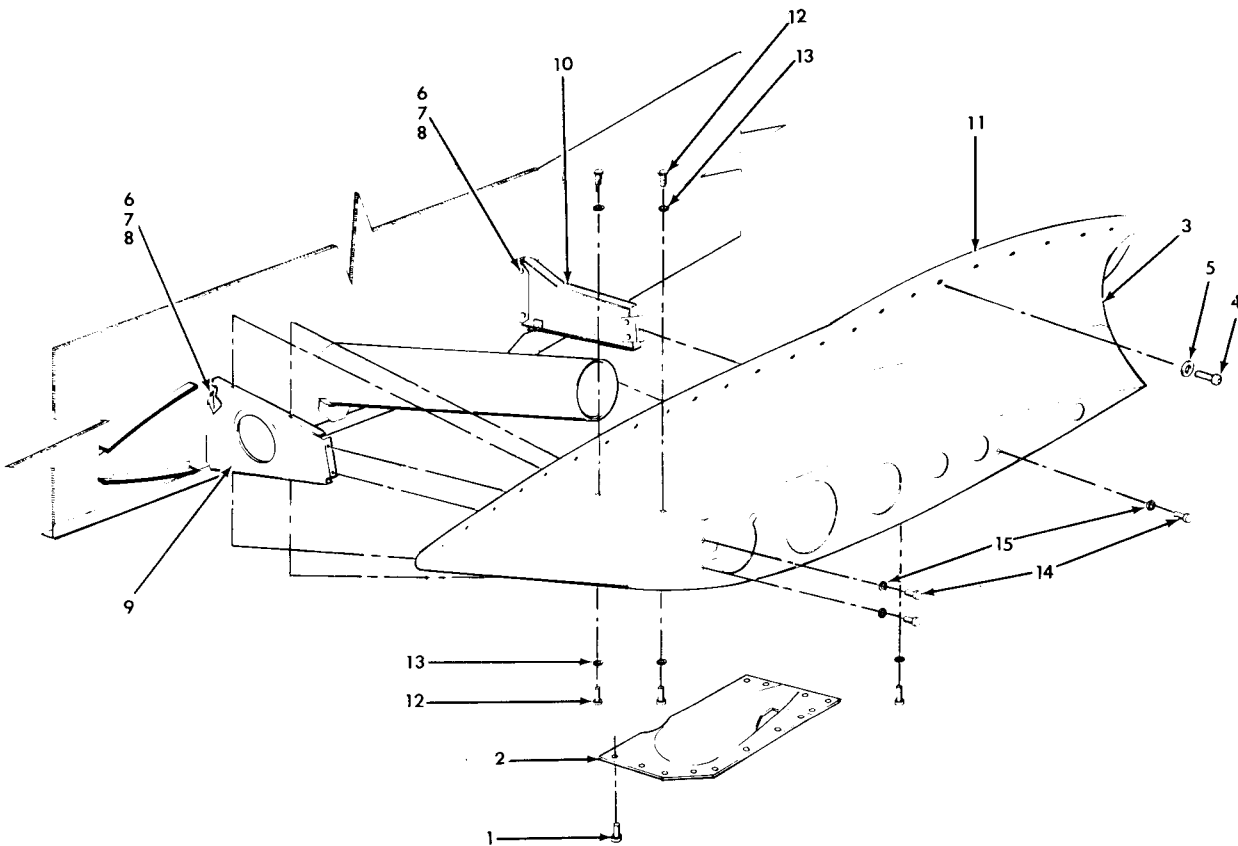
NOTE: Numbers in parentheses refer to callouts in figures.

- (7) Slide the flap torque tube bellcrank (4, Figure 204) over the flap torque tube. Tighten bellcrank clamp bolt.
 - (8) Install special drive bolts (3) to flap bellcrank, making sure bolts are properly indexed in torque tube hole, and tighten. Bolt should be flush minimum and extend not more than 0.032 inch.
- NOTE: Install safety wire (2) to bolts for Aircraft AA5-0001 through AA5-0050.
- (9) Connect flap drive linkage to flap torque tube horn assembly.
 - (10) Install the nut and bolt securing the aileron horn to the torque tube. (See Figure 203.) Torque bolt 95 inch-pounds maximum.
 - (11) Connect all electrical wiring and fuel lines in the wing root.
 - (12) Connect the airspeed pitot line located in the wing root (left-side of aircraft).

AA-5 SERIES
MAINTENANCE MANUAL

- (13) Through access panel (2, Figure 201) on wing root, install shoulder bolts and washers (1 and 2, Figure 202). Torque shoulder bolts to 120 inch-pounds.
- (14) Install the screws (1, Figure 201) attaching the access panel (2) to the wing root (3).

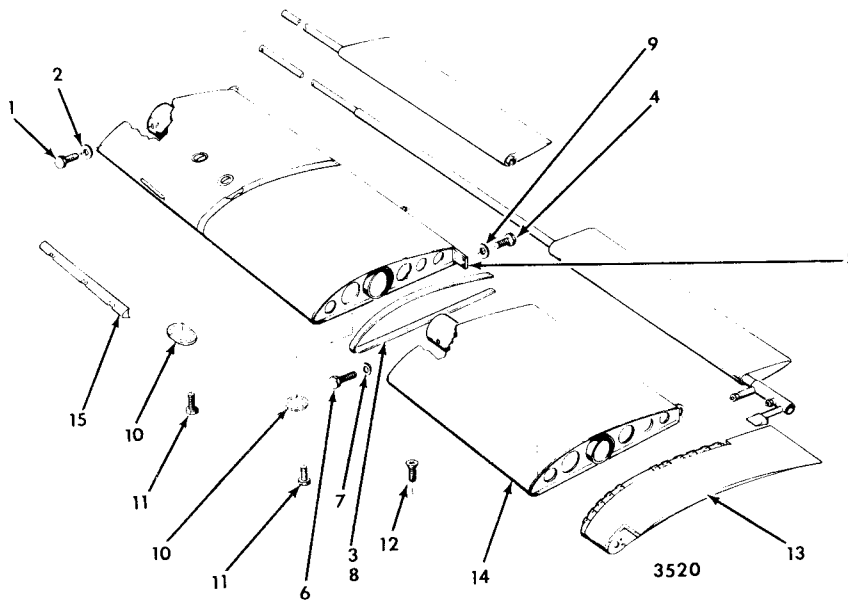
NOTE: If the original wing is replaced by a new wing, the outboard stall strip (item (15), Figure 202) should be centered on a line drawn 0.31 inch up from the flap surface on the bottom side of the wing and taped in place and the aircraft test flown to "fine tune" the wing. Perform a series of stalls at half throttle and move the stall strip slightly up or down (maximum 1/8 inch), as required, to obtain a straight ahead stall and rivet in place.



- | | |
|-----------------|-------------|
| 1. Screw | 9. Support |
| 2. Access Panel | 10. Support |
| 3. Wing Root | 11. Seal |
| 4. Screw | 12. Screw |
| 5. Washer | 13. Washer |
| 6. Bolt | 14. Bolt |
| 7. Washer | 15. Washer |
| 8. Spacer | |

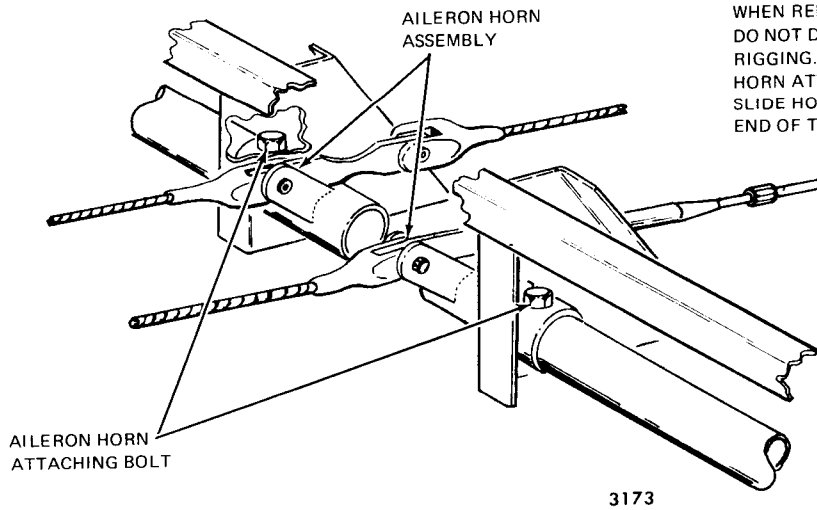
Wing Root Installation (L.H.)
Figure 201

AA-5 SERIES
MAINTENANCE MANUAL



- | | |
|--------------------------|--------------------------|
| 1. Shoulder Bolt | 9. Washer |
| 2. Washer | 10. Cover |
| 3. Strap | 11. Screw |
| 4. Bolt | 12. Screw |
| 5. Splice Plate Assembly | 13. Wing Tip Assembly |
| 6. Shoulder Bolt | 14. Outer panel Assembly |
| 7. Washer | 15. Stall Strip |
| 8. Spacer | |

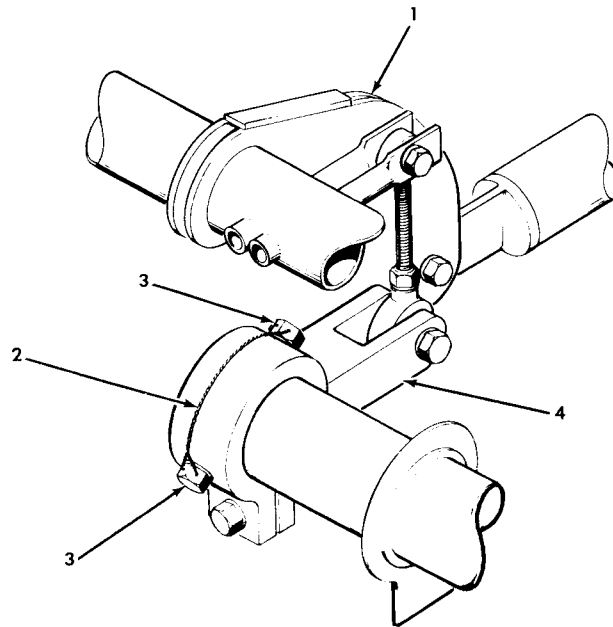
Wing Half (L. H.)
Figure 202



NOTE
WHEN REMOVING AILERONS,
DO NOT DISTURB AILERON
RIGGING. REMOVE THE AILERON
HORN ATTACHING BOLT AND
SLIDE HORN ASSEMBLY FROM
END OF TORQUE TUBE.

Aileron Torque Tube Horn Assemblies
Figure 203

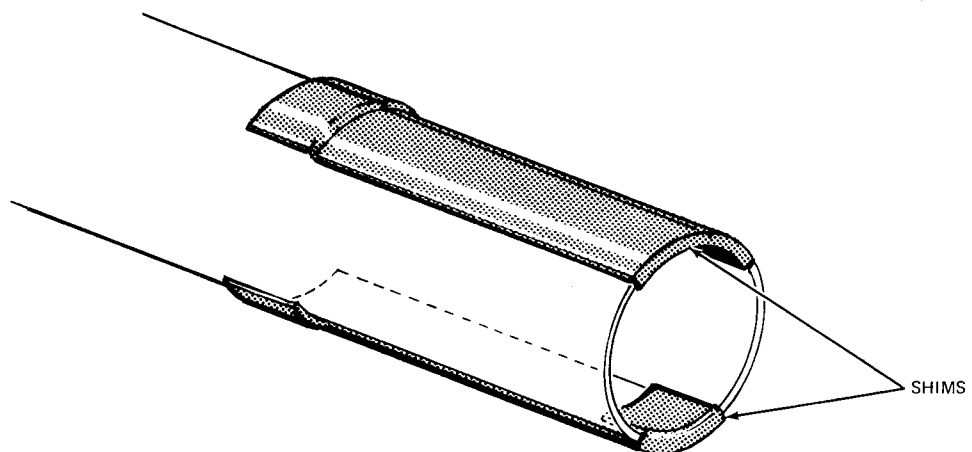
AA-5 SERIES
MAINTENANCE MANUAL



3521

1. Flap Torque Tube Horn
2. Safety Wire (AA5-0001 Thru AA5-0050 Only)
3. Special Drive Bolts
4. Flap Torque Tube Bellcrank

Flap Drive Assembly
Figure 204



3522

Shim Installation
Figure 205

2. Wing Root Removal/Installation

A. Wing Root Removal (Support Brackets Attached to Root)

NOTE: If wing root is to be removed and installed with support brackets attached to root structure, follow procedures in A. and B. below.

NOTE: Numbers in parentheses refer to callouts in Figure 201.

- (1) Remove wing. (See Paragraph 1.A.)
- (2) Remove aft fuselage inner trim paneling. (Refer to Aft Fuselage Inner Trim Paneling Removal, Chapter 25.)
- (3) Remove the screws attaching interior upholstery side panels to fuselage.
- (4) Remove the screws (4) and washers (5) from inboard edge of the wing root (3).
- (5) From within the fuselage, remove the bolts (6), washers (7), and spacers (8), securing the support brackets (9 and 10) to the fuselage. Remove wing root with brackets attached.
- (6) Remove the seal (11).

B. Wing Root Installation (Support Brackets Attached to Root)

- (1) Place seal (11) in position between wing root and fuselage.
- (2) Align holes in support brackets (9 and 10) installed in the root and holes in the inboard edge of the wing root with holes in the fuselage side.
- (3) Install the bolts (6), washers (7), and spacers (8) to secure the support brackets with root attached to the fuselage side.
- (4) Apply Loctite to screw threads and install the screws (4) and washers (5) securing the inboard edge of the wing root to the fuselage side.
- (5) Install screws attaching interior upholstery side panels to fuselage.
- (6) Install aft fuselage inner trim paneling. (Refer to Aft Fuselage Inner Trim Paneling Removal, Chapter 25.)
- (7) Install wing. (See Wing Installation, Paragraph 1.D.)

C. Wing Root Removal (Support Brackets Remaining Attached to Fuselage)

- (1) Remove wing. (See Paragraph 1.A.)
- (2) Remove the screws (12) and washers (13) on the top and bottom surfaces of the wing root (3).
- (3) Remove the bolts (14) and washers (15) from the side face of the wing root.
- (4) Remove screws attaching interior upholstery side panels to fuselage.
- (5) Remove aft fuselage inner trim paneling. (Refer to Aft Fuselage Inner Trim Paneling Removal, Chapter 25.)
- (6) Remove the screws (4) and washers (5) from the inboard edge of the wing root and pull the wing root from the fuselage.
- (7) Remove the seal (11).

D. Wing Root Installation (Support Brackets Attached to Fuselage)

- (1) Place seal in position between wing root (3) and fuselage.
- (2) Align holes in wing root with holes in support brackets (9 and 10) and align holes in the inboard edge of the wing root with holes in the fuselage side.
- (3) Apply Loctite to screw threads and install screws (12) and washers (13) on the top and bottom surface of the wing root.
- (4) Install the bolts (14) and washers (15) to the side face of the wing root.
- (5) Apply Loctite to screw threads and install screws (4) and washers (5) to the inboard edge of the wing root.
- (6) Install wing. (See Paragraph 1.D.)
- (7) Install screws attaching interior upholstery side panels to fuselage.
- (8) Install aft fuselage inner trim paneling. (Refer to Aft Fuselage Inner Trim Paneling Installation, Chapter 25.)

3. Wing Tip Removal/Installation

A. Wing Tip Removal

NOTE: Numbers in parentheses refer to Figure 202.

- (1) Remove the screws (12) from the outboard edge of the outer wing panel.
- (2) With the aileron in the neutral or down position to clear the balance weight, carefully slide the wing tip (13) from the outer wing panel (14) until the navigation and strobe light wires come into view.
- (3) From inside the wing tip, disconnect the navigation and strobe light wires and pull the wing tip from the outer wing panel.

B. Wing Tip Installation

NOTE: Check condition and location of all clip nuts before wing tip installation.

- (1) Align wing tip (13) with outboard edge of the outer wing panel (14) and connect navigation and strobe light wires.

NOTE: Check for positive clearance of the aileron balance weight.

- (2) Secure wing tip to outer wing panel with screws (12).

4. Wing and Center Spar Repair

Enlarged or elongated mounting holes in the wing spar and center spar and the resulting deformation or wear in the shoulder bolts (1, Figure 202) may result in excessive play or rocking at the junction. The maximum allowable dimension on mounting holes in the wing and center spar at this location is 0.380 inch.

If either mounting hole exceeds the above dimension, the following repair is acceptable from a structural standpoint.

NOTE: Two methods of mounting the nut plate within the center spar have been employed. On aircraft AA5-0001 through AA5-0714 and aircraft AA5B-0001, the nut plate is mounted directly to the center spar. On aircraft AA5-0715 and subsequent, AA5B-0002 and subsequent, and AA5A-0001 and subsequent, the nut plate is mounted to a spacer assembly which is in turn mounted to the center spar.

A. Aircraft AA5-0001 through AA5-0714 and AA5B-0001

NOTE: If both sets of mounting holes in one wing are to be repaired, complete the repair on one set of mounting holes before beginning the other to maintain proper alignment.

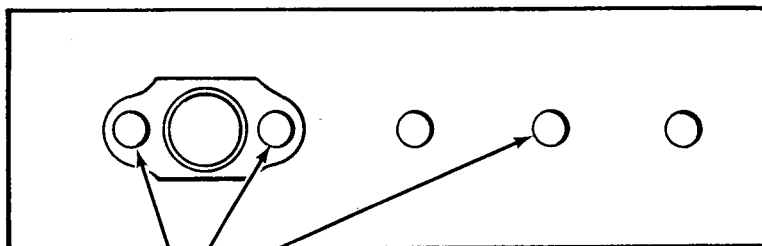
- (1) Remove the wing and wing root. Refer to Paragraphs 1 and 2 above.
- (2) Remove the rivets and the nut plate from the wing inboard spar. Use rivets conforming to MS20426AD4 to plug the existing rivet holes.
- (3) Install the wing on the airplane and install the bolt in the remaining nut plate to ensure proper alignment.
- (4) Drill and ream the mounting holes in the wing and center spar to 0.4375/0.4395 inch. Remove the wing from the airplane.
- (5) Modify a spacer assembly, Part Number 5102342-501 as shown in Figure 206.
- (6) Using the modified spacer assembly as a template, match drill two 0.128/0.133 inch holes in the wing spar. Countersink 100° x 0.242 inch diameter.
- (7) Install the modified spacer assembly in the wing spar and secure with MS20426AD4-12 rivets.
- (8) Install the wing and wing root using AN7 or AN177 bolt of suitable length in the modified spacer assembly.

B. Aircraft AA5-0715 and subsequent, AA5B-0002 and subsequent, AA5A-0001 and subsequent

NOTE: If both sets of mounting holes in one wing are to be repaired, complete the repair on one set of mounting holes before beginning the other to maintain proper alignment.

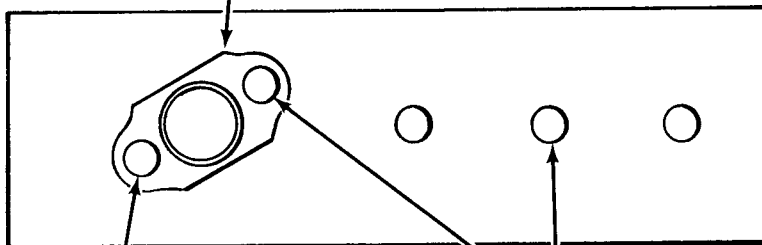
- (1) Remove the wing and wing root. Refer to Paragraphs 1 and 2 above.
- (2) Remove the rivets and the spacer assembly containing the nut plate from the inboard spar.
- (3) Install the wing on the airplane and install the bolt in the remaining nut plate to ensure proper alignment.
- (4) Drill and ream the mounting holes in the wing and center spar to 0.4375/0.4395 inch. Remove the wing from the airplane.
- (5) Modify the spacer assembly as shown in Figure 206.
- (6) Install the modified spacer assembly in the wing spar and secure with MS20426AD4-12 rivets.
- (7) Install the wing using AN7 or AN177 bolt of suitable length in the modified spacer assembly.

5102342-501
SPACER ASSEMBLY



REMOVE RIVETS AND
NAS1031P5 NUT PLATE

INSTALL NAS1031P7 NUT PLATE



MS20426AD4-4
RIVET
(INSTALL FIRST)

MS20426AD4-7
RIVETS

NOTE: Rotate P7 nut plate approximately as shown to allow sufficient rivet edge clearance. Drill 0.128/0.133 holes. Counter-sink 100° x 0.242 diameter on the opposite side. Secure nut plate with rivet types indicated above.

Spacer Assembly Modification
Figure 206