CHAPTER 57

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"END"

CHAPTER 57 - WINGS

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"END"

GENERAL - DESCRIPTION AND OPERATION

The all-metal wing group consists of the fuselage carry-through structure, outboard wing panels, leading edge, wing tips, flaps, aileron and aileron trim tabs, and the integral fuel cells. The wing tips, flaps, ailerons, and fuel cells are readily removable. To remove the wing assembly, engine removal is required.

CARRY-THROUGH STRUCTURE

The carry-through structure, to which the wing assemblies are attached, is riveted to the fuselage and forms an integral part thereof. The upper forward carry-through extruded spar cap is of clad 2024-T3 aluminum alloy; while the lower spar cap is of 2014-T6 aluminum alloy. A web of clad 2024-T3 aluminum alloy sheet encloses the area between both spar caps. The aft (one piece) extruded spar cap is of clad 2416-T6 aluminum alloy.

OUTBOARD WING

Two spars, their attaching ribs and skin, constitute the box beam construction used throughout the wing. The outer wing spars are of the same construction as the carry-through structure, except that a combination of clad 2014-T4 aluminum alloy extrusions and formed clad 2024-T4 aluminum alloy U-channel members comprise the main spar caps while those of the rear spar are composed of formed clad 2024-T3 and 2024-T4 aluminum alloy angles and clad 2024-T3 cap strips. The stamped ribs and formed stringers used throughout the wing are of clad 2024-T3 aluminum alloy. Clad 2024-T3 aluminum skin covers the entire wing. The wing tips are formed of clad 6061-T4 aluminum alloy sheets and are attached to the wing with screws. Two fuel cells are located in the leading edge, and a nacelle and box section cell is located between the main and rear spar in each wing assembly. Each fuel cell cavity is lined with clad 2024-T3 aluminum alloy sheet.

"END"

GENERAL - MAINTENANCE PRACTICES

WING TIP REMOVAL

NOTE

On aircraft equipped with pneumatic surface deicers, the deicer boot must be removed from the wing tip before the wing tip can be removed. Refer to Chapter 30-10-00 for deicer boot removal and installation procedures.

a. Remove the two access plates, located on the lower side of the wing tip.

b. Loosen the clamps and disconnect the three vent lines from the fuel vent float valve.

c. Remove the screws attaching the wing tip to the wing.

d. Disconnect the electrical leads to the navigation and landing lights.

WING TIP INSTALLATION

a. Connect the electrical leads to the navigation and landing lights.

b. Position the wing tip to the wing and install the attaching screws.

c. Install the three vent lines on the fuel vent float valve. Torque the hose clamps to 25 ± 5 inch-pounds.

d. Reinstall the deicer boots (If applicable).

e. Reinstall the access plates on the lower side of the wing tip.

WING REMOVAL

a. Drain and purge all fuel cells.

b. Remove the wing mounting bolt access plates from the top and bottom of the wing.

c. Place the aircraft on a three point jack to prevent an unbalanced condition of the airplane after the wing is removed.

d. Place a wing stand under the wing that is not being removed and place a stand under the tail. Place two adjustable screw jacks under the wing being removed, one jack just inboard of the nacelle and one near the wing tip.

e. Remove the engine as instructed in Chapter 71-00-00.

f. Open the brake cylinder bleed ports and pump all fluid from the system.

g. Retract the landing gear until the inboard landing gear doors are fully open.

h. Disconnect the inboard door actuating rod from the control horn.

i. Disconnect the landing gear actuator rod from the V-brace in the wheel well.

j. Disconnect the aileron cables at the turnbuckles in the wheel well and remove the roll pins from the inboard aileron cable pulley brackets. Disconnect the aileron tab cables and aileron tab stops in the left wheel well.

k. Disconnect the hydraulic brake line at the inboard connection in the wheel well.

l. Disconnect the fuel lines between the wing root rib and the fuselage.

m. Remove the leading edge cover of the wing located between the fuselage and nacelle.

n. Disconnect the pressurization ducting in the leading edge of the wing stub, and disconnect the firewall shutoff control cable.

o. Disconnect the flap drive shaft at the flap actuator and remove the clamps attaching the shaft housing to the wing.

p. Remove the lower aft nacelle fairing assembly.

q. Remove the inboard nacelle fairing.

r. Remove the clamps securing the wire bundles to the wing inboard leading edge. Disconnect the wire bundles at the terminals located on the aft side of the firewall.

s. Disconnect the wiring to the electrical components located in each side of the upper nacelle.

t. Disconnect and cap all plumbing between the wing root rib and the fuselage.

WARNING

The two air conditioner lines between the right wing root rib and the fuselage are high pressure lines. Before disconnecting the two lines, loosen the fitting just enough to bleed off the pressure slowly.

u. Disconnect the flap wire bundle and safety switch wiring in the left wheel well. Disconnect the plumbing and electrical wiring (boost pump and fuel quantity transmitter) in the wheel well.

v. Remove the clamps securing the engine controls to the leading edge.

w. Position two support jacks under the wing.

NOTE

Outline the position of the wing on the fuselage, using a grease pencil. This will aid realignment when the wing is reinstalled.

CAUTION

If bolt binding occurs, adjust the position of the wing until the bolt disengages freely. Do not screw or drive a bolt into, or out of the fittings.

x. Remove the wing attach bolts from the fittings.

y. Remove the wing by pulling it straight away from the fuselage.

NOTE

The soft aluminum washers between the upper wing attach fittings and the preload indicating washer under the nut at the lower forward wing attach point must be discarded and new components installed when the wing is reinstalled.

WING INSTALLATION

a. Using a nonmetalic brush and naphtha or methyl ethyl ketone (20 or 21, Chart 207, 91-00-00), clean the wing attach fittings and hardware (bolts, washers, and nuts). Inspect the wing attach fittings and attaching hardware as instructed under WING BOLT, NUT, AND FITTING INSPECTION.

WARNING

Wing bolts and nuts that have reached their life limit (10 years after the initial inspection) must not be reused (see Chart 202).

b. Coat the fitting bolt bores and bearing faces, bolts, washers and nuts with MIL-C-16173 Grade II corrosion preventive compound (43, Chart 207, 91-00-00).

c. Place the slide in the fuselage fitting at the leading edge attach point as shown in Figure 205.

d. Guide the flap shaft and landing gear retract rod into their respective positions.

e. Align the wing and fuselage fittings, install the new soft aluminum washers between the upper wing attach fittings, and insert the bolts into the fittings.

CAUTION

Each bolt must be inserted by hand without binding. If a bolt cannot be easily inserted, reposition the wing until the bolt moves freely through the fittings. Do not screw or drive a bolt into, or out of the fittings. Bolts, nuts and washers must be oriented as shown in the applicable illustration for each location (Figure 201, 202, 203, 204 and 205).

f. Start the nuts on the bolts and rotate the wing trailing edge until the wing aligns with the outline drawn on the fuselage. After alignment is established, verify that the lower forward bolt is not binding on the bolt bore. If bolt binding is encountered, adjust the position of the wing until the bolt moves freely in the fittings.

CAUTION

When torquing the wing nuts, assure that the wrenches do not come into contact with the wing attach fittings. Such an occurrence could result in damage to the fittings and false torque readings.

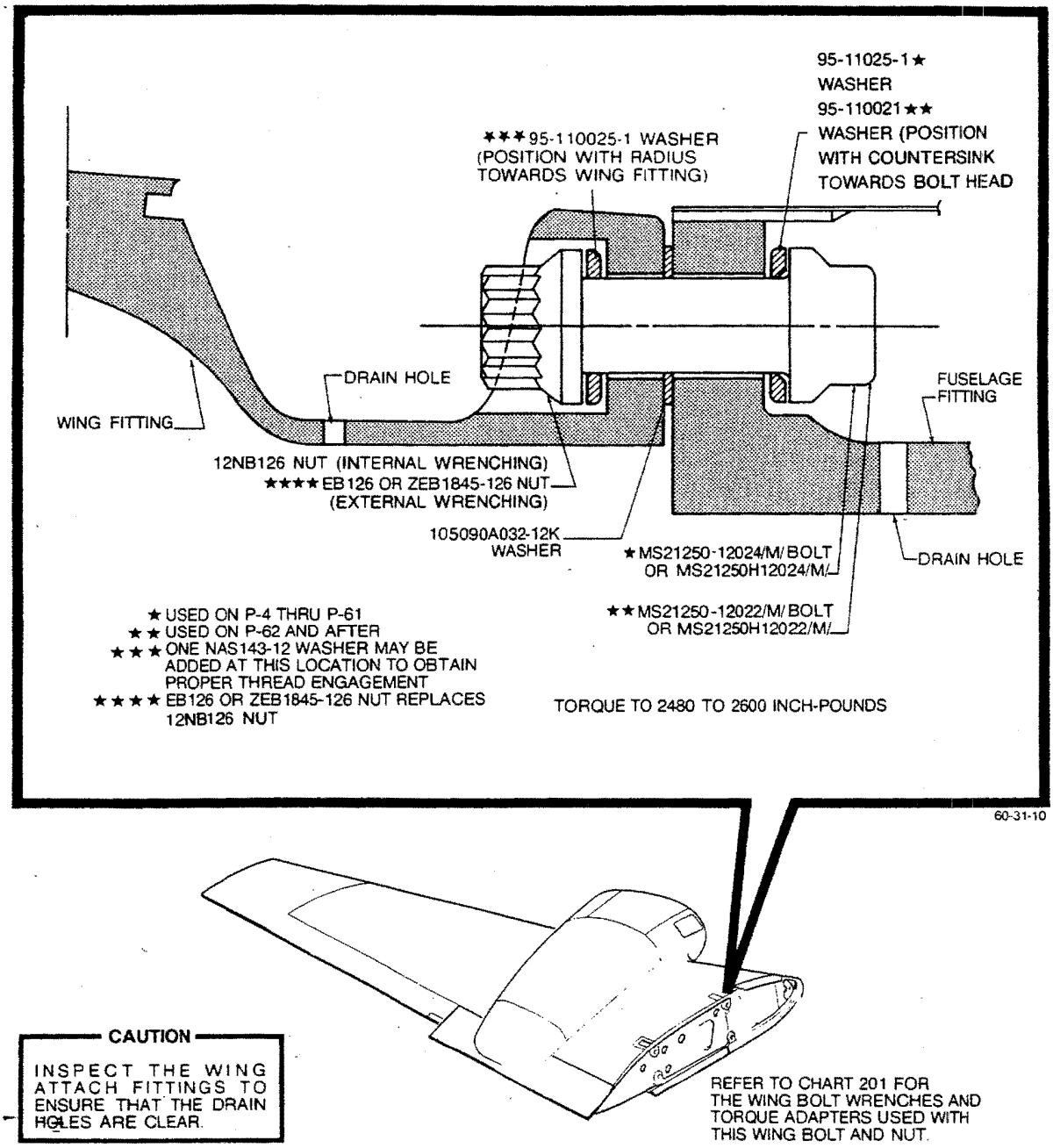
g. Tighten the upper forward nut and remove the holding force from the wing cradle (if used). Torque the remaining three nuts in the following order: upper aft, lower forward, and lower aft. When a torque wrench adapter is used, the length of the adapter must be added to the length of the torque wrench and the proper torque value computed as detailed in Chapter 20-00-00.

NOTE

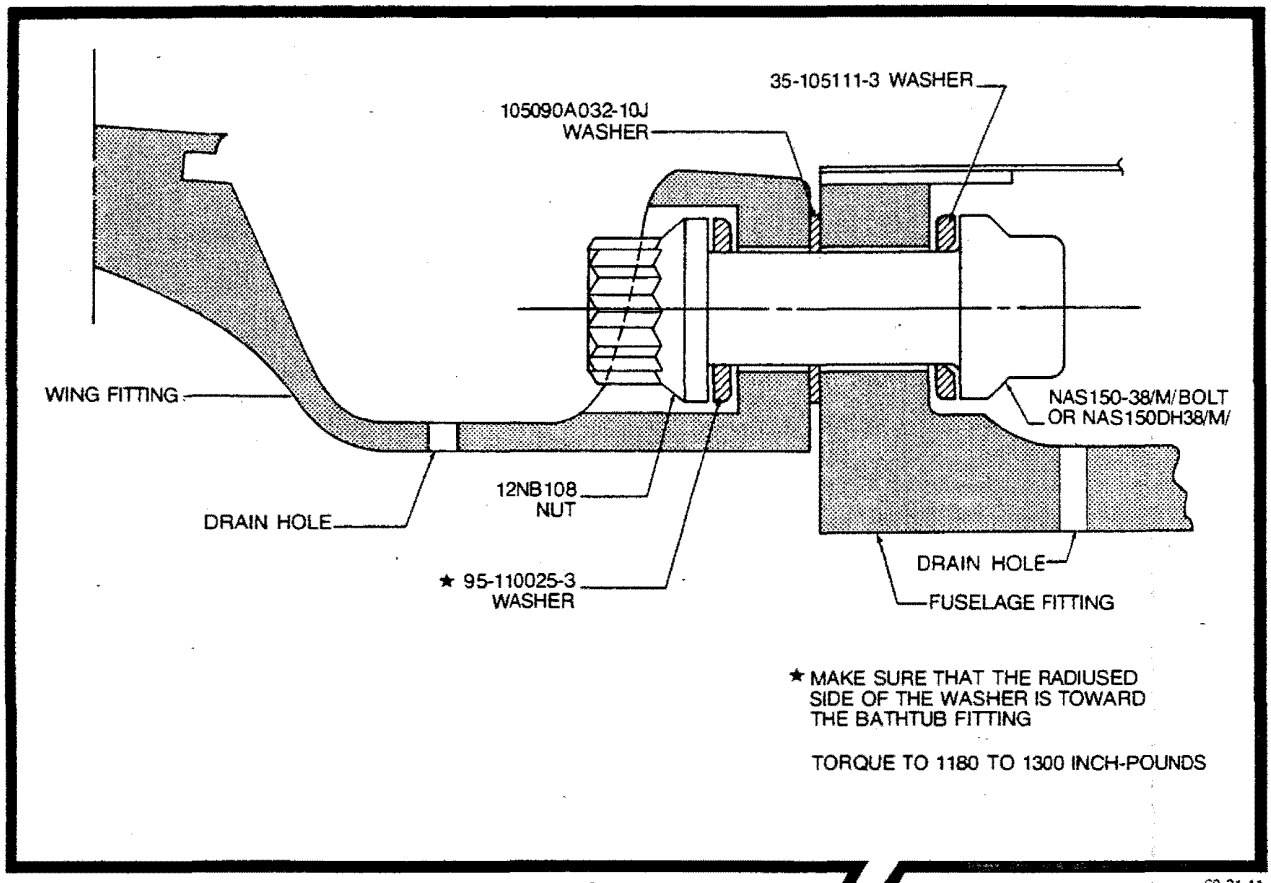
Each nut must be torqued to the value shown in the appropriate illustration for each location (Figure 201, 202, or 204). However, the lower forward attach point is not torqued to a specific torque value and must be tightened as instructed in Figure 206.

CAUTION

Before the lower aft nut is torqued, a slight gap may exist between the fittings. This gap must not exceed a width of .030 inch. No gap should remain after the nut is torqued. Torque the wing attach bolts at the nut end. Do not rotate the bolt in the bolt bore.

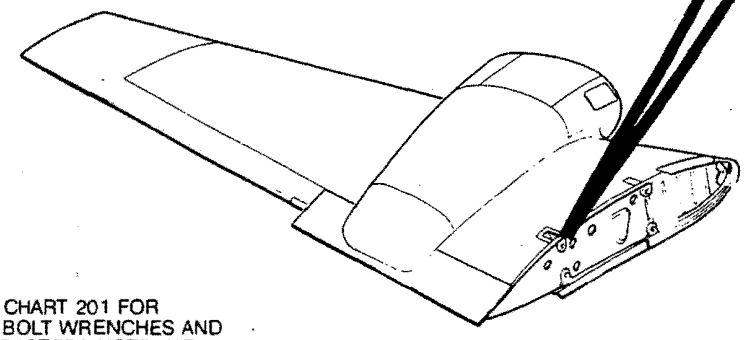


Upper Forward Wing Bolt Installation
Figure 201



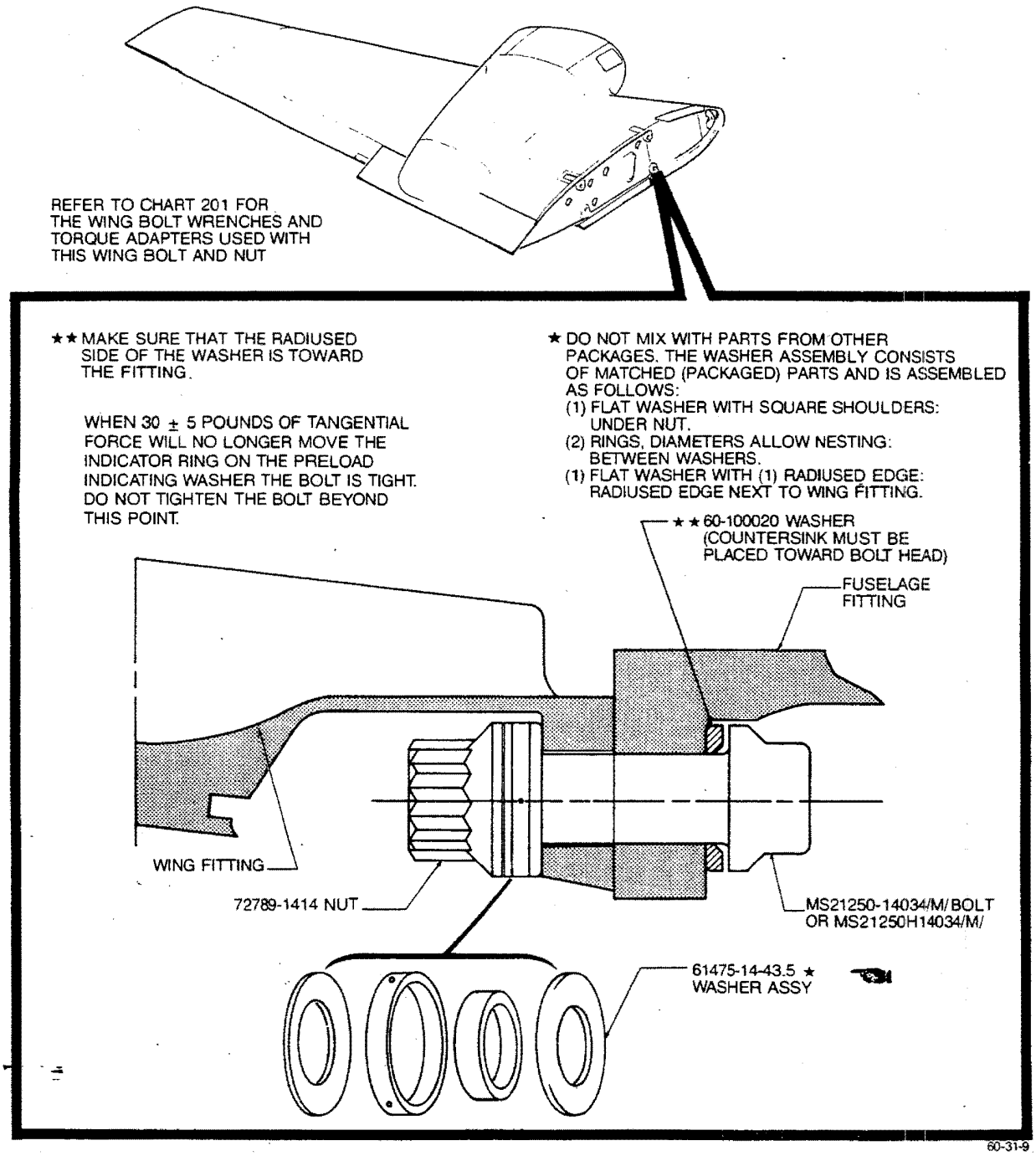
CAUTION

INSPECT THE WING ATTACH FITTINGS TO ENSURE THAT THE DRAIN HOLES ARE CLEAR.

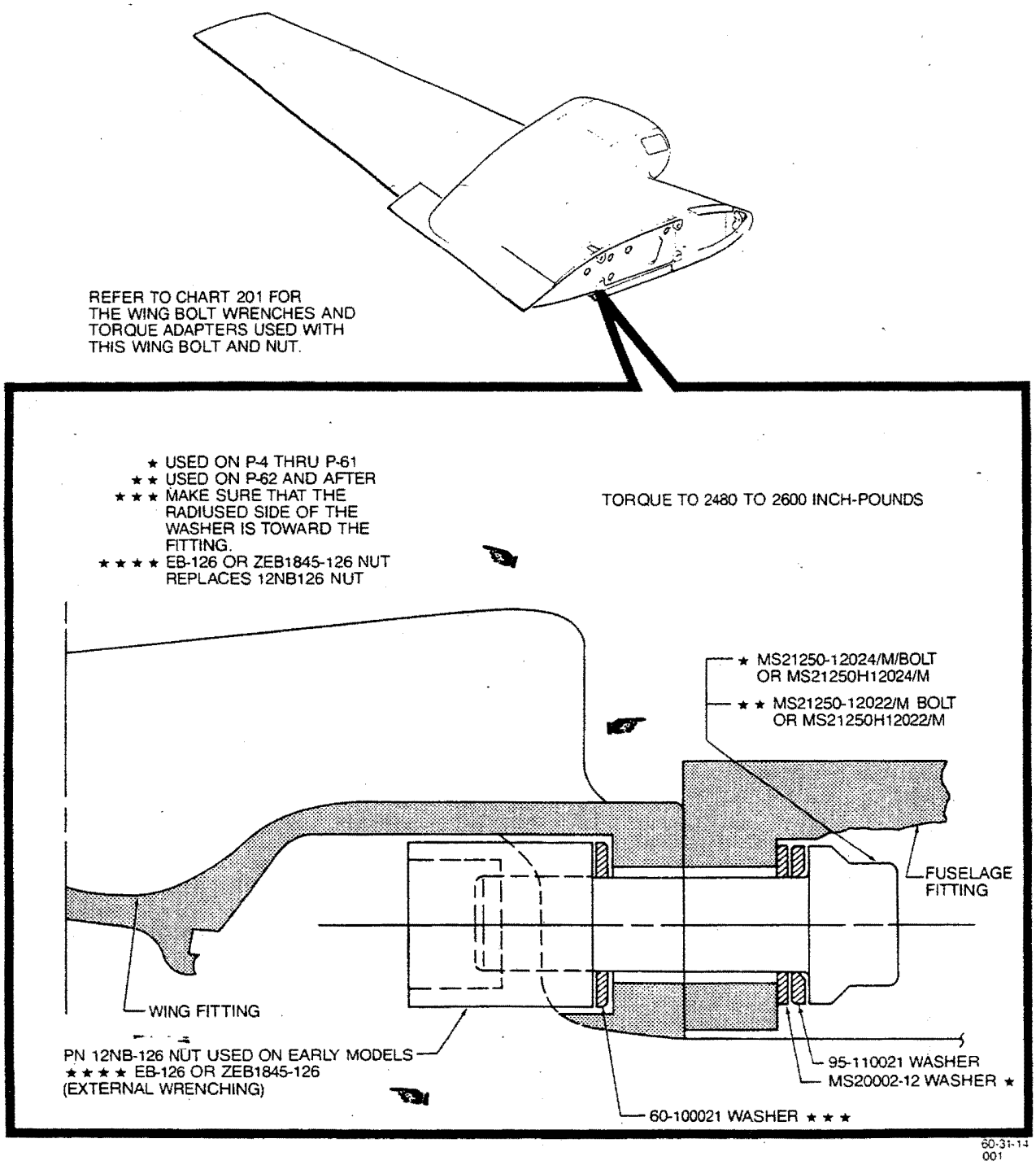


REFER TO CHART 201 FOR THE WING BOLT WRENCHES AND TORQUE ADAPTERS USED WITH THIS WING BOLT AND NUT.

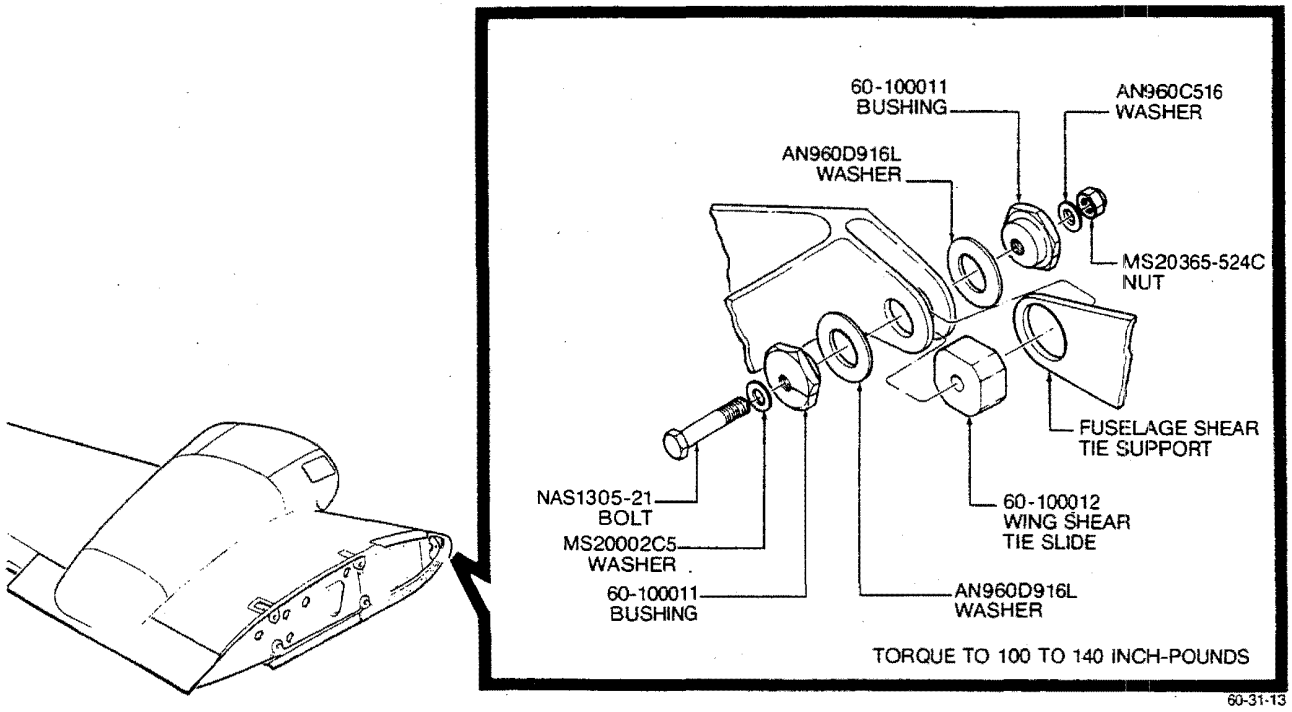
Upper Aft Wing Bolt Installation
Figure 202



Lower Forward Wing Bolt Installation
Figure 203



Lower Rear Wing Bolt Installation
Figure 204



The Forward And Aft Travel Of The 60-100011 Bushings Must Not Exceed .025 Inch, After The Bolt Is Torqued.

Leading Edge Attach Point
Figure 205

h. Install the attaching components in the leading edge fitting. See Figure 205 for proper arrangement of the components. When the components are properly arranged, torque the bolt to the value shown in Figure 205. Check the bushings to assure that the scribe marks align.

CAUTION

Do not lubricate the fittings or attach hardware at the leading edge attach point (Figure 205). The torque value shown in this figure is for dry hardware only.

i. Coat the threads that protrude through the nuts at the forward and aft spar attach points with MIL-C-16173 Grade II corrosion preventive compound (43, Chart 207, 91-00-00).

j. Route the engine control cables along the leading edge, through the engine firewall, and secure in place with clamps.

k. Route the electrical wire bundles along the leading edge and secure in place with clamps, connect wire ends to the terminals on the aft side of the firewall.

l. Connect all fuel, air condition, and deicing plumbing between the wing root and fuselage.

m. Connect the pressurization ducting and fuel selector cable in the leading edge of the wing stub.

n. Install the inboard leading edge cover.

o. Connect the electrical wiring to the fuel boost pump and transmitter.

p. Connect the flap and safety switch wiring in the left wheel well.

q. Connect the flap drive shaft at the flap actuator and clamp the shaft housing to the wing.

r. Install the roll pins in the aileron and aileron trim tab pulley brackets.

s. Install the aileron tab cable stops and connect the aileron cables and the tab cables to the turnbuckles. Rig the aileron control system as instructed in Chapter 27-10-00.

t. Connect the landing gear and the inboard main gear door actuating rods. Check the landing gear rigging as instructed in Chapter 32-30-00.

u. Connect the brake hydraulic line and bleed the brake system as instructed in Chapter 32-40-00.

v. Install the engine as instructed in Chapter 71-00-00.

w. Charge the air condition system with refrigerant as instructed in Chapter 21-50-00.

x. Install all removed access plates and covers.

y. Install the nacelle fairings.

z. Remove the airplane jack and service the fuel cells as instructed in Chapter 12-10-00. Check for fuel leaks.

aa. Perform an engine run-up; check and adjust, a necessary, as instructed in Chapter 71-00-00.

ab. Test fly the airplane, and adjust the wing an engine, as necessary.

ADJUSTING THE WING

After a wing is installed or repaired, flight tests may sho one wing to be chronically heavy. This condition may b corrected by altering the angle of incidence, using th following procedure:

CAUTION

When adjusting the wing, always replace the soft aluminum washers and the 61475-14-43.5 washer assembly at the forward lower wing attach point. Check the torque at the first 100-hour inspection by making certain the center outer ring of the 61475-14-43.5 washer assembly does not turn by finger pressure. Check the remaining wing bolts for proper torque at the first 100-hour inspection after a wing has been installed.

a. Raise the trailing edge of the light wing t decrease its lift as follows:

1. Mark the position of the wing on the re wing bolt fittings.

2. Loosen the mounting nut at the lower re wing fitting. Remove the mounting bolt and nut at the low forward wing fitting. Remove and replace the 61475-14-43. washer assembly at the lower forward attachment a outlined under CAUTION in this procedure ADJUSTIN THE WING. Loosen the mounting bolt on the forward fitting

3. Remove the upper mounting bolt and nu from the two upper wing fittings. Install new aluminu washers between the upper wing and fuselage fitting Raise the wing trailing edge, install the upper wing mountin bolts and nuts and torque all the wing nuts to the specifie torque.

4. Flight test the airplane. If the same wing still heavy, accomplish step "b".

b. Lower the trailing edge of the heavy wing increase its lift as follows:

1. Mark the position of the wing on the re wing bolt fittings.

2. Loosen the mounting bolt nut at the low rear wing fitting. Remove the mounting bolt nut at the low

forward wing fitting. Remove and replace, the 61475-14-43.5 washer assembly at the lower forward attachment as outlined under CAUTION in this procedure. Loosen the mounting bolt on the forward fitting.

3. Remove the upper mounting bolt and nuts from the two upper wing fittings. Install new aluminum washers between the upper wing and fuselage fittings. Lower the wing trailing edge, install the upper wing mounting bolts and nuts, and torque all the wing nuts to the specified torque.

c. If the combination of steps "a" and "b" does not correct the wing heavy condition, rig the flap down on the heavy wing by screwing the actuator out. Do this only as a last resort, since it will create a drag on the airplane.

1. RH Wing Heavy

(a) Disconnect the flap actuator from the flap and screw the actuator arm out to eliminate the wing heavy condition.

(b) Connect the flap actuator to the flap.

2. LH Wing Heavy

(a) Lower the flaps to provide access to flap up limit switch.

(b) Loosen the attaching screws on the flap up limit switch.

(c) Adjust the position of the switch in the elongated holes to rig the flap down enough to eliminate the wing heavy condition.

(d) Tighten the attaching screws on the flap up limit switch.

(e) Disconnect the flap actuator from the RH flaps and screw the actuator arm in to bring the RH flap up to the same position it was before the limit switch was adjusted.

(f) Connect the flap actuator to the RH flap.

Adjust the flaps only as a last resort, since it will create a drag on the airplane.

WING DISASSEMBLY

a. Support the wing on a suitable cradle.

b. Remove the wing tip, aileron, wing flap, fuel cells and other equipment as required by the work to be accomplished.

c. Remove the screws around the spar caps and the root ribs.

d. Vise-grip pliers may be used to remove the steel hinge pins. Remove the pins from the box section first, then the leading edge.

CAUTION

Do not attempt to spin the hinge pins out with a drill motor; the heating and expansion of the pin will cause the pin to seize in the hinge and break.

WING ASSEMBLY
(Figure 207)

a. Before assembling the spar to the wing sections it is advisable to drive the hinge pins through the hinge sections to remove any burrs and foreign material.

b. Use a new hinge pin, liberally coated with graphite (29, Chart 207, 91-00-00).

c. Position the spar on the leading edge and align the hinge sections.

d. Using an E-2, or equivalent size, rivet gun and the telescoping tube kit (P/N 35-588S), drive the hinge pin in until the tip is completely through the hinge, but not against the wing attach fitting. The pin must be supported with the telescoping tubes during the driving operation. Start the pointed end of the pin in the hinge and support the pin with the longest tubes against the hinge, then drive the pin. Remove the tubes as necessary, until the pins are completely inserted. Trim the hinge pins as necessary to extend 4.88 ± .12 inches beyond the end of the spar. Bend the end of the pins at a 90° angle and install retaining plates.

NOTE

It is imperative that the larger tube be held firmly against the hinge throughout the driving procedure in order to prevent the pin from kinking in the intervening space.

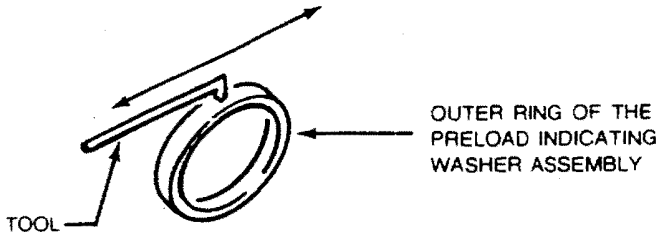
e. Install the box section in the same manner as the leading edge.

NOTE

If necessary, place a phenolic block against the spar and vibrate the spar with another rivet gun.

f. Install the screws around the spar caps and root ribs.

g. Install all components which had been removed.



To tighten the lower forward wing attach bolts, insert the tool into one of the holes in the outer ring of the preload indicating washer assembly. Rotate the ring back and forth while tightening the nut. The bolt is tight when the outer ring can no longer be rotated using 30 ± 5 pounds tangential force applied as shown by the symbol above the tool. Do not tighten the bolt beyond this point.

Lower Forward Wing Bolt Tightening Procedure
Figure 206

60-31 15

CHART 201
WING BOLT WRENCHES AND TORQUE ADAPTERS

POSITION	*BOLT PART NO.*	*WRENCH PART NO.*	*NUT PART NO.*	*NUT TORQUE ADAPTER*
UPPER FORWARD	MS21250-12024/M/ or MS21250H12024/M/ or MS21250-12022/M/ or M/S21250H12022/M/	TK1817 922-4	12NB126 (internal wrenching) or EB126 (external wrenching) or ZEB1845-126 (external wrenching)	TS1171-2 or TS1176-2 TS1176-10 or TS1171-10
UPPER AFT	NAS150-38/M/ or NAS150DH38/M/	TS1222-4 or TS1222-8	12NB108	TS1171-1 or TS1176-1 or 50-590013
LOWER FORWARD	MS21250-14034/M/ or MS21250H14034/M/	TK1817 922-5	72789-1414	50-590014
LOWER AFT	MS21250-12024/M/ or MS21250H12024/M/ or MS21250-12022/M/ or M/S21250H12022/M/	TK1817 922-4	12NB126 (internal wrenching) or EB126 (external wrenching) or ZEB1845-126 (external wrenching)	TS1171-2 or TS1176-2 TS1171-10 or TS1176-10

METAL STALL STRIPS

The stall strips installed on airplanes without wing deicer boots are manufactured from clad 6063 aluminum alloy extrusion and riveted to the leading edge. A 10.50-inch strip is located outboard of wing station 123.06 on the left wing, and a 7.62-inch strip is located outboard of wing station 122.93 on the right wing.

WING BOLT NUT AND FITTING INSPECTION

NOTE

Read this entire section before removing any wing bolt for inspection.

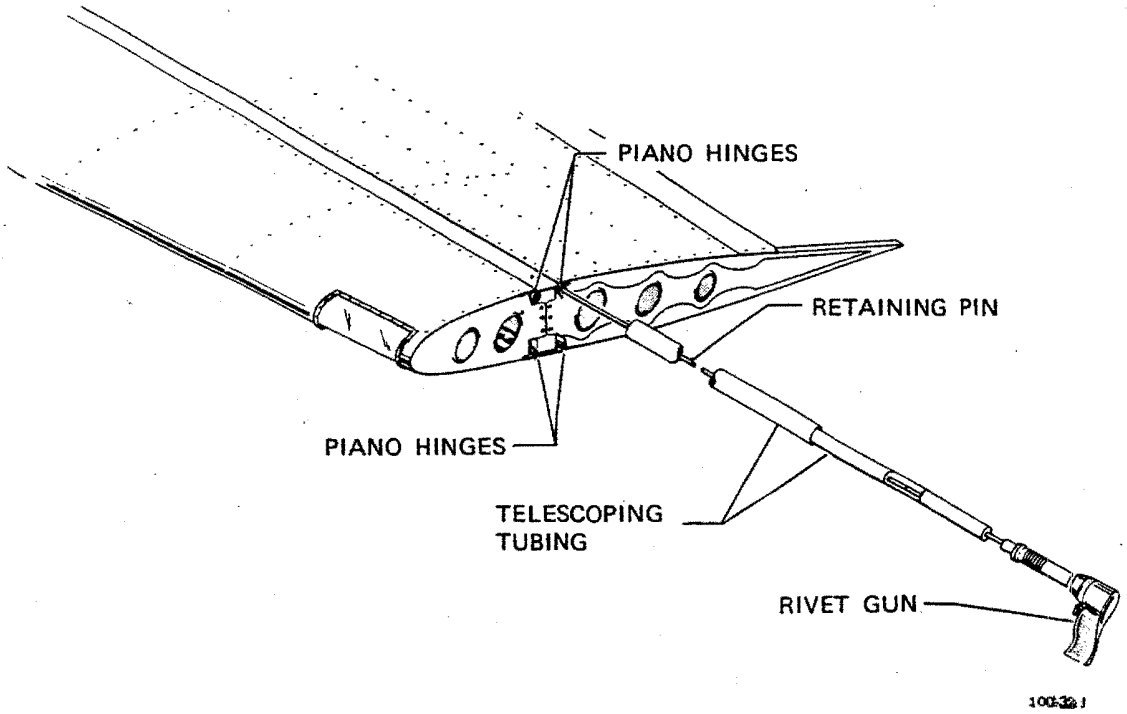
WARNING

The wing bolts and nuts installed in all Model 60 (Duke series) airplanes that are five years old or older must be removed and inspected. If the bolts and nuts prove to be free of all damage, they may be reinstalled for an additional five year period. At the end of this period the bolts and nuts must again be removed and inspected. Ten years after the initial inspection, all wing bolts and nuts must be replaced with new hardware. Render unserviceable all components removed in compliance with Chart 202.

a. Before removing any wing bolt, draw an outline of the wing position on the fuselage with a grease pencil. If wing bolt binding is encountered and the wing must be shifted, the outline will be helpful in returning the wing to its original position.

CAUTION

There should be no wing bolt binding during removal or installation of the bolts. Do not screw or drive a bolt in or out of the fittings. If wing bolt binding is encountered, place the airplane on a three point jack and raise until the wheels are clear (see Chapter 7-00-00 for jacking



Wing Hinge Pin Installation
Figure 207

instructions). Place a wing stand under each wing and a tail stand under the aft fuselage. Defuel the wing, loosen the remaining three bolts and rotate the wing until the binding bolt moves freely through the fittings. Replace the soft aluminum washers between the upper wing attach fittings and the preload indicating washer under the nut at the lower forward wing attach point. Retorque the nuts in the order outlined in this chapter under WING INSTALLATION.

NOTE

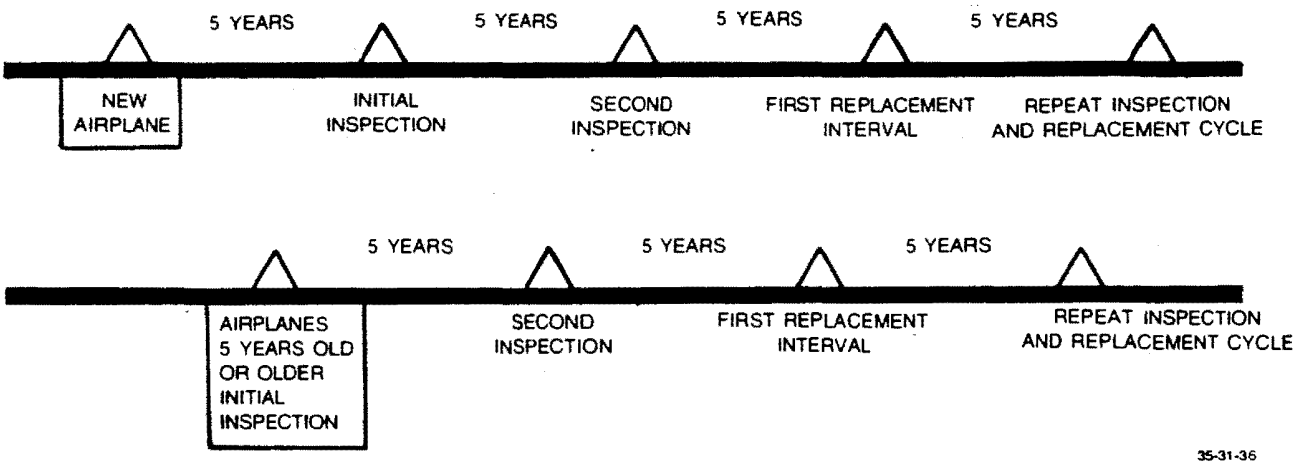
Beech Aircraft Corporation supplies hardware that has been given an additional magnetic particle inspection since manufacture. These components may be identified by the green dye on the head of the bolt and on some portion of the nut.

WARNING

Use only the components specified in the applicable illustrations. DO NOT INSTALL THE BLACK P/N H20 NUTS; these nuts have been dry film lubricated with molybdenum disulfide. When MIL-C-16173 Grade II corrosion preventive compound is added to these nuts, the additional lubrication may cause improper preload in the bolt when it is torqued.

b. Starting at the lower forward wing attach point on each side, remove, inspect, and retorque one bolt and nut set at a time until the complete set of eight bolts and nuts have been inspected. The leading edge attach fittings and hardware (Figure 205) ARE NOT a part of this inspection requirement.

c. Using a nonmetallic brush, thoroughly clean the bolt, washers, and nut with naphtha or methyl ethyl ketone (20 or 21, Chart 207, 91-00-00).



NOTE

The first inspection for airplanes five years old or older must be performed at the first scheduled inspection following the issue date of revision A14.

NOTE

At each replacement interval, all wing attach bolts, washers, and nuts must be replaced with new hardware.

Wing Bolt And Nut Inspection And Replacement Cycle
Chart 202

CAUTION

Assure that the radiused washers shown in Figures 201, 202, 203 and 204 have a full radius with no sharp edges that could damage the wing fittings.

d. If the bolts and nuts do not exceed the life limit shown in Chart 202, visually inspect each bolt and nut with a 10-power or stronger magnifying glass; inspect for corrosion, cracks and mechanical damage. The cadmium plating may have areas that appear rubbed, discolored or polished. These areas are usually the result of previous installation procedures and are of no consequence. A bolt should not be rejected because of cadmium plating deterioration; however, any component that is cracked, corroded or shows signs of mechanical damage must be replaced.

e. Using the magnetic particle inspection process described in this chapter, check each bolt for circumferential crack indications and each nut for longitudinal crack indications. If the bolts and nuts prove to be free of all damage (corrosion, cracks, and mechanical damage), they may be reused after demagnetization and cleaning.

f. Clean the fitting bolt bores with naptha or methyl ethyl ketone (20 or 21, Chart 207, 91-00-00). Do not strip the epoxy paint from this area. Inspect the surface condition of each fitting; focus special attention on the washer seat and bolt bore area. If scoring, corrosion pitting or washer impressions are discovered in this area, contact the Commercial Service Department of Beech Aircraft Corporation. If the fittings are satisfactory, coat the bolt bores and bearing faces with Alodine 1200, 1200S or 1201 (48, Chart 207, 91-00-00). Allow the coating to remain on the surface for approximately five minutes. When the approximate time has elapsed, wash the treated areas with water and blow dry (do not wipe dry). Paint the treated areas with zinc chromate primer (26, Chart 207, 91-00-00) and allow to dry.

g. Coat the bearing faces and bolt bores of the fittings, the complete bolt, washers, and nut with MIL-C-16173 Grade II corrosion preventive compound (43, Chart 207, 91-00-00).

h. Install the bolts, washers and nut into the fittings.

CAUTION

Ensure that the wing bolt wrenches do not bottom out on the wing fittings when torquing the nut. This could result in damage to the wing fittings and erroneous torque readings.

i. Torque the nut to the wet torque value shown in the appropriate illustration (Figure 201, 202, 203 or 204). When a torque wrench adapter is used, the length of the adapter must be added to the length of the torque wrench and the proper torque value computed as detailed in Chapter 20-00-00.

j. Coat the exposed threads that protrude through the nut with MIL-C-16173 Grade II corrosion preventive compound (43, Chart 201, 91-00-00).

k. Check that the decal shown in Figure 208 is affixed to the appropriate locations on the airplane.

l. At the first scheduled inspection after the wing bolts have been inspected or replaced, check each bolt for proper torque and inspect the drain holes in the upper wing fittings to assure that they are unobstructed.

MAGNETIC-PARTICLE INSPECTION

Magnetic-Particle Inspection is a method for locating surface and subsurface discontinuities in ferromagnetic materials (i.e. materials capable of being magnetized); consequently, nonferromagnetic materials (such as aluminum alloys, magnesium alloys, copper alloys, lead, titanium alloys, nickel base alloys and many stainless steel alloys) cannot be inspected by this method. Magnetic-Particle Inspection is based upon the principle that any discontinuities lying in a direction generally transverse to the direction of the magnetic field of the part magnetized for the test will cause a leakage field to be formed at and above the surface of the part. The presence of the leakage field denoting the discontinuity is detected by the use of finely divided ferromagnetic particles over the surface of the part. Some of the particles are magnetically gathered and held by the leakage field to form an outline indicating the location, size, shape and extent of the discontinuity. In general, magnetic particle inspection utilizes a variety of types of equipment for magnetization, as well as several methods for application of ferromagnetic particles to the test part. Additionally, the ferromagnetic particles are available in a selection of colors (including fluorescent) and particle shapes. Magnetic particle inspections required by this manual can best be accomplished by utilizing the "wet continuous method" on the standard wet horizontal type equipment, with either visible or fluorescent magnetic particles suspended in a petroleum base vehicle (normally kerosene). Since magnetic particle indications are best obtained when the discontinuity lies in a direction transverse to the magnetic field, the following procedures are recommended for optimum detection of discontinuities in both bolts and nuts.

NOTICE

**WING BOLTS ARE LUBRICATED
SEE MAINTENANCE MANUAL
FOR CORRECT TORQUE VALUES**

WHEN THE CORROSION PREVENTIVE COMPOUND HAS BEEN APPLIED TO THE WING BOLTS, AFFIX THE ABOVE DECAL TO THE FOLLOWING LOCATIONS:

1. On the side of the fuselage immediately above the RH forward and aft wing bolt covers.
2. On the wing immediately forward of the LH forward and aft wing bolt covers.
3. On the wing immediately forward of the lower forward wing bolt covers on both sides.
4. On the wing immediately aft of the lower aft wing bolt covers on both sides.

**Lubricated Bolt Identification Placard Location
Figure 208**

WARNING

Improper operation of the magnetic particle inspection because of faulty equipment or untrained operators can jeopardize the airworthiness of parts being inspected. Minute electrical arc burns caused during inspection by improper operation of the test equipment can result in eventual failure of the part.

Bolts: Inspection of a bolt is accomplished by longitudinal magnetization in a multiturn low-fill factor coil (i.e. the inner diameter of the coil greatly exceeds the bolt diameter). For proper magnetization the bolt is positioned close to the coil inside wall with the bolt length perpendicular to the winding direction. The magnetic particle suspension is flowed on the bolt and the appropriate current is applied to achieve adequate field strength. Using the described procedure, laboratory testing has indicated that the ampere turn values listed in Chart 203 provide for optimum detection of discontinuities perpendicular to the bolt axis.

**CHART 203
MAGNETIC-PARTICLE INSPECTION
(BOLTS)**

BOLT DIAMETER	*TOTAL BOLT LENGTH INCLUDING HEAD TO NEAREST 1/4 INCH*	*AMPERE TURNS*
5/8 INCH	2 1/2 INCH	7900
5/8 INCH	2 3/4 INCH	7100
5/8 INCH	3 INCH	6600
3/4 INCH	3 INCH	7900
3/4 INCH	3 1/4 INCH	7400
3/4 INCH	3 1/2 INCH	6700
3/4 INCH	3 3/4 INCH	6300
7/8 INCH	3 1/2 INCH	7900
7/8 INCH	3 3/4 INCH	7400
7/8 INCH	4 INCH	6900
7/8 INCH	5 INCH	5500
1 INCH	5 INCH	6300

*Amperage requirement is the ampere turns value divid by the number of turns on the coil. For example: A 1-in diameter x 5-inch long bolt tested on a 5-turn coil wo require 6300 ÷ 5, or 1260 amps.

CHART 204
MAGNETIC-PARTICLE INSPECTION
(NUTS)

NUT SIZE	*CENTRAL CONDUCTOR SIZE*	*AMPERAGE*
5/8 INCH	1/2 INCH	500 AMPS
3/4 INCH	5/8 INCH	600 AMPS
7/8 INCH	3/4 INCH	700 AMPS
1 INCH	7/8 INCH	800 AMPS

Nuts: Inspection of a nut is accomplished by circular magnetization on a central conductor (usually a copper rod) the approximate size of the nut inside diameter. For proper magnetization, the central conductor bar is inserted through the nut and the bar is positioned between the heads of the wet horizontal equipment. The magnetic particle suspension is flowed on the nut and the appropriate current is applied through the central conductor to achieve adequate field strength. Using the described procedure, laboratory testing has indicated that the amperage values listed in Chart 204 provide for optimum detection of discontinuities parallel to the nut axis.

After magnetic particle inspection, the parts must be carefully demagnetized and cleaned of the ferromagnetic particles. Examine parts for any possible evidence of electric arc bum that may have occurred during the inspection.

WING MAIN SPAR CAP INSPECTION

The outboard wing main spar caps must be inspected for corrosion annually.

WARNING

All areas of the upper and lower spar caps must be inspected from the attach fitting to the outboard end.

BEECHCRAFT KIT NO. 58-4002-1S provides the parts and information necessary to install a new 000-110011-7 LH spar and a new 000-110011-8 RH spar on the 60 and A60 series airplanes. The kit does not contain the spars which must be ordered separately. Parts for installing new spars on the B60 series airplanes may be ordered from the Model 60 series parts catalog.

NOTE

Special emphasis should be placed on airplanes that have been operated or stored for extended periods (5 years or longer) in geographical locations where atmospheric conditions are highly conducive to corrosion.

Inspection of the upper and lower spar caps should be accomplished in the following manner:

a. Examine the forward and aft sides of the spar cap where it meets the skin. If a whitish, salt-like, nonmetallic substance is noted in these areas, a thorough inspection must be performed to determine if corrosion has occurred. Wax or paint trapped between the edge of the skin and the exposed section of the spar cap should not be misinterpreted as corrosion.

NOTE

To gain access to the upper spar caps in the nacelle area, remove the solid black panels shown in Figure 210.

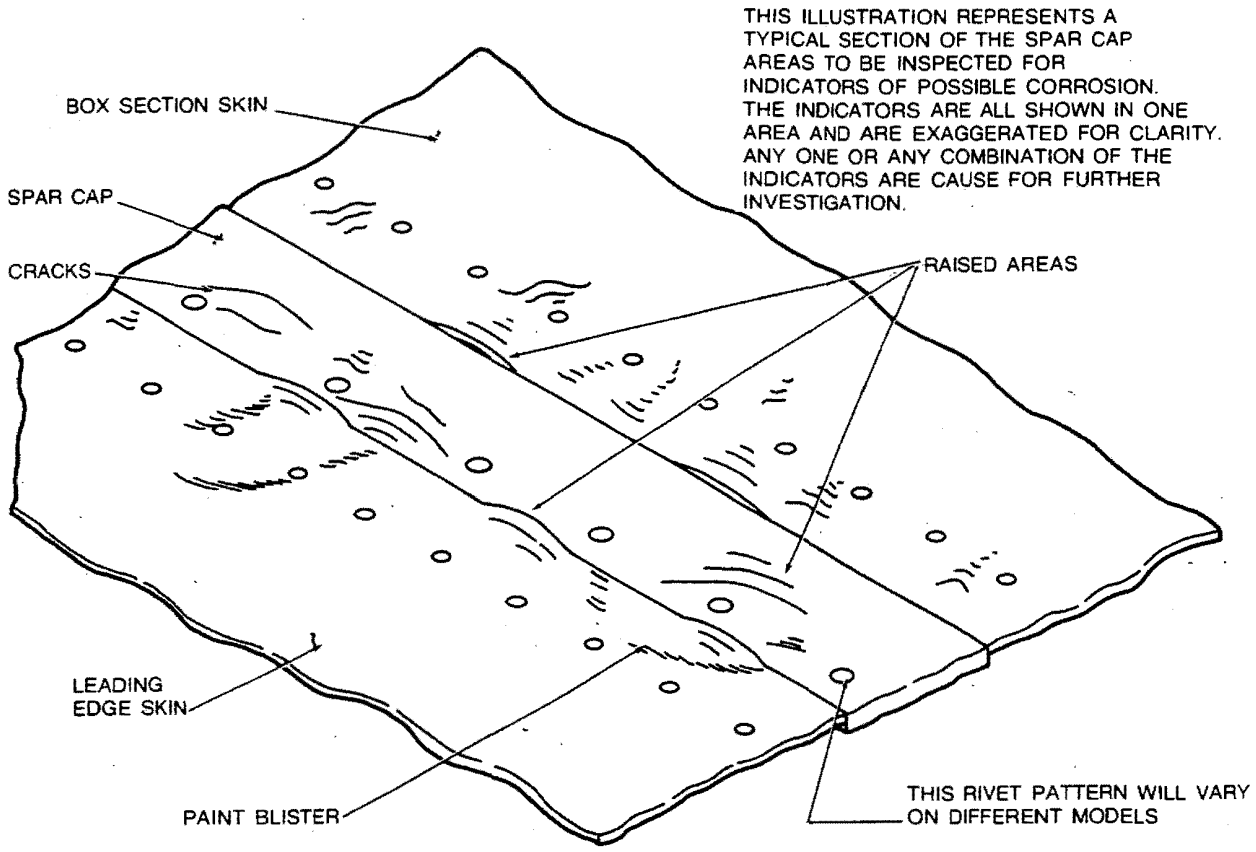
b. Wash all exposed areas of the upper and lower spar caps.

c. Visually inspect all exposed areas of the upper and lower spar caps for irregularities, such as paint blisters, raised or uneven areas, and cracks. The exposed areas of the spar caps are extruded flat and irregularities could be an indication of corrosion. Thoroughly investigate all irregular areas to determine if any damage has occurred.

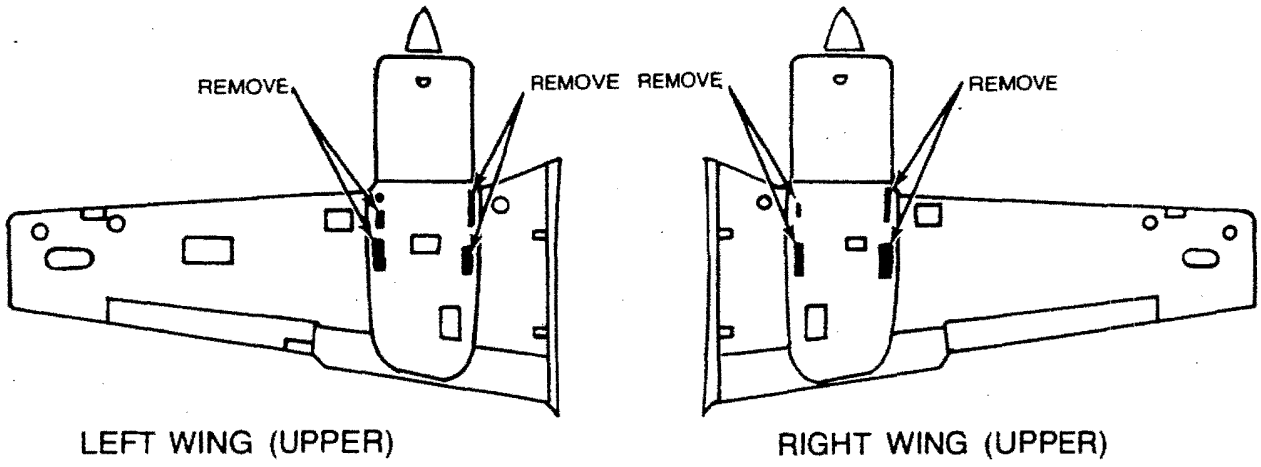
NOTE

Uneven or raised areas on the spar caps may be detected by sliding the fingers over the surface, by moving a straight edge over the surface or by sighting down the length of the spar cap surface.

d. If unusual conditions are encountered that cannot be resolved locally, contact the Commercial Service Department of Beech Aircraft Corporation for evaluation and determination of any corrective action that may be required.



Spar Cap Inspection
Figure 209



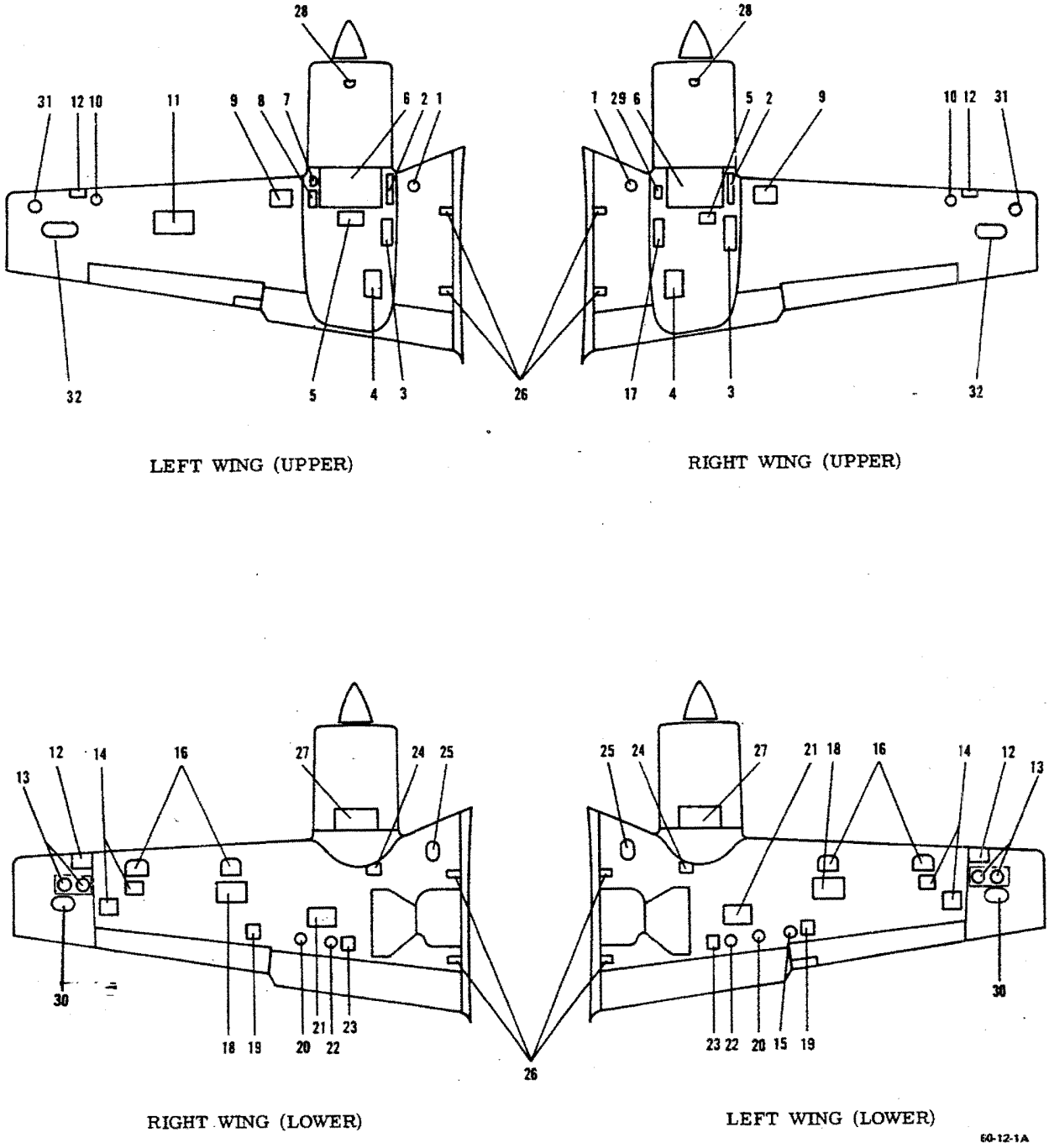
Upper Spar Cap Access Panels
Figure 210

"END"

PLATES/SKIN-MAINTENANCE PRACTICES

WING ACCESS OPENINGS

The panels, plates and doors as shown in Figure 201, provides maintenance access to the components, plumbing and cables enclosed within the wing. When installed, they continue the aerodynamic lines of the wing with little increase of drag.



Wing Access Openings
Figure 201 (Sheet 1 of 2)

1. Leading Edge Fuel Cell Transmitter
2. Alternate Air and Fuel Pressure Solenoid
3. Nacelle Fuel Cell Transmitter and Plumbing
4. Nacelle Fuel Cell and Vent Line Plumbing
5. Fuel Vent Check Valve and Plumbing
6. Battery, Battery Relays, Voltage Regulators, Overvoltage Relays, Starter Relays, Paralleling Rheostat, Fuel Flow Inverter, Load Meter Shunt, Fuse Block, Radio Inverter, Radio Inverter Circuit Breaker and Relay, External Power Diode and Current Limiter for Battery
7. External Power Plug
8. Reverse Current Diode, External Power and LH Control Relay
9. Leading Edge Fuel Cell Transmitter and Fuel Cell Installation
10. Fuel Filler
11. Remote Compass
- **12. Landing Light
- * 13. Wing Tip Tiring and Fuel Vent Float Valve
14. Fuel Siphone Valve
15. Aileron Tab Actuator
16. Leading Edge Fuel Cell
17. Nacelle Fuel Cell Plumbing
18. Box Section Fuel Cell
19. Aileron Actuator and Pulleys
20. Aileron Cable, Fuel Vent and Battery Vent
21. Box Section Fuel Cell
22. Fuel Vent Line and Aileron Tab Cable
23. Fuel Vent Line
24. Landing Gear Attach Bolt
25. Fuel Boost Pump
26. Wing Attach Bolt
27. Cowl Flap
28. Oil Level Indicator
29. Reverse Current Diode
- **30. Remote Compass Detector
- †31. Fuel Filler
- †32. Wing Tip Access Opening

* One (1) retangular opening on P-223 and after without wet wing tip
** P-223 through P-347, P-349 through P-364
† Optional P-348, P-365 and after

Wing Access Openings
Figure 201 (Sheet 2 of 2)

"END"

ATTACH FITTINGS - MAINTENANCE PRACTICES

The major fittings in each wing are the supporting structures adjacent to the attachment points for the flap actuator, flap tracks and flap, the aileron hinge brackets and hinges, the main landing gear, support brace and landing gear doors, and the engine mount. Minor fittings include brackets to support cable pulleys, bell cranks, and similar components. The main gear is bolted to heavy aluminum alloy fittings attached to the main and rear spar. The support brace is attached in the same manner. If the landing gear hinge bolt fittings are cracked, or if the spars are warped or buckled, replacement is necessary.

WING FRONT SPAR CAP INSPECTION

Perform this inspection on all Dukes, which are 5 years or older, in the areas and by the methods defined in Service Instructions No. 0514-035, Rev. 1.

"END"

FLIGHT SURFACES - MAINTENANCE PRACTICES

BALANCING THE AILERON (Figure 201)

When the aileron control surface is being repainted, suspend it by the trailing edge so that excess paint will drain toward the leading edge. After any repainting or repair, the finished surface must be check balanced to ensure that its static moment about the hinge line is within the prescribed limits.

NOTE

The finished aileron assembly, with static discharge wicks (if required) installed, must have a static overbalance of between 0.2 and 3.0 inch-pounds.

The static moment of the aileron is determined by multiplying the unbalanced weight of the aileron assembly times the perpendicular distance from the hinge center line to the center of gravity when the chord line is horizontally level. The weight is measured in pounds and the distance in inches. The static moment of a 100 percent balanced control surface is 0.0 inch-pounds. A tail-heavy surface exhibits static underbalance. A nose-heavy surface exhibits static overbalance.

CHECKING BALANCE

The aileron balance must be checked in a draft free area with the aileron completely assembled in flying condition. All painting, including stripes and touch-up, must be completed. The tab, tab push rod, static wicks, and hinge bolts must be attached. The chord line must be horizontally level and the hinge line must be properly supported when the static moment is measured. Although many different methods of check balancing exist, the simplest is counterbalancing: The application of a known force or weight at a measured distance from the hinge line to counter the unbalance moment of the aileron assembly.

EQUIPMENT REQUIRED TO PERFORM CHECK BALANCING BY COUNTERBALANCING METHOD

a. A stand with knife edge supports as illustrated in Figure 201. The knife edges must be in the same horizontal plane.
b. A cup or similar light weight container.
c. Approximately 1 pound of lead shot.
d. A certified beam balance weighting device calibrated in units of .01 pound or less.
e. A straight edge, ruler, and spirit level.

BALANCING PROCEDURE

COUNTERBALANCING METHOD

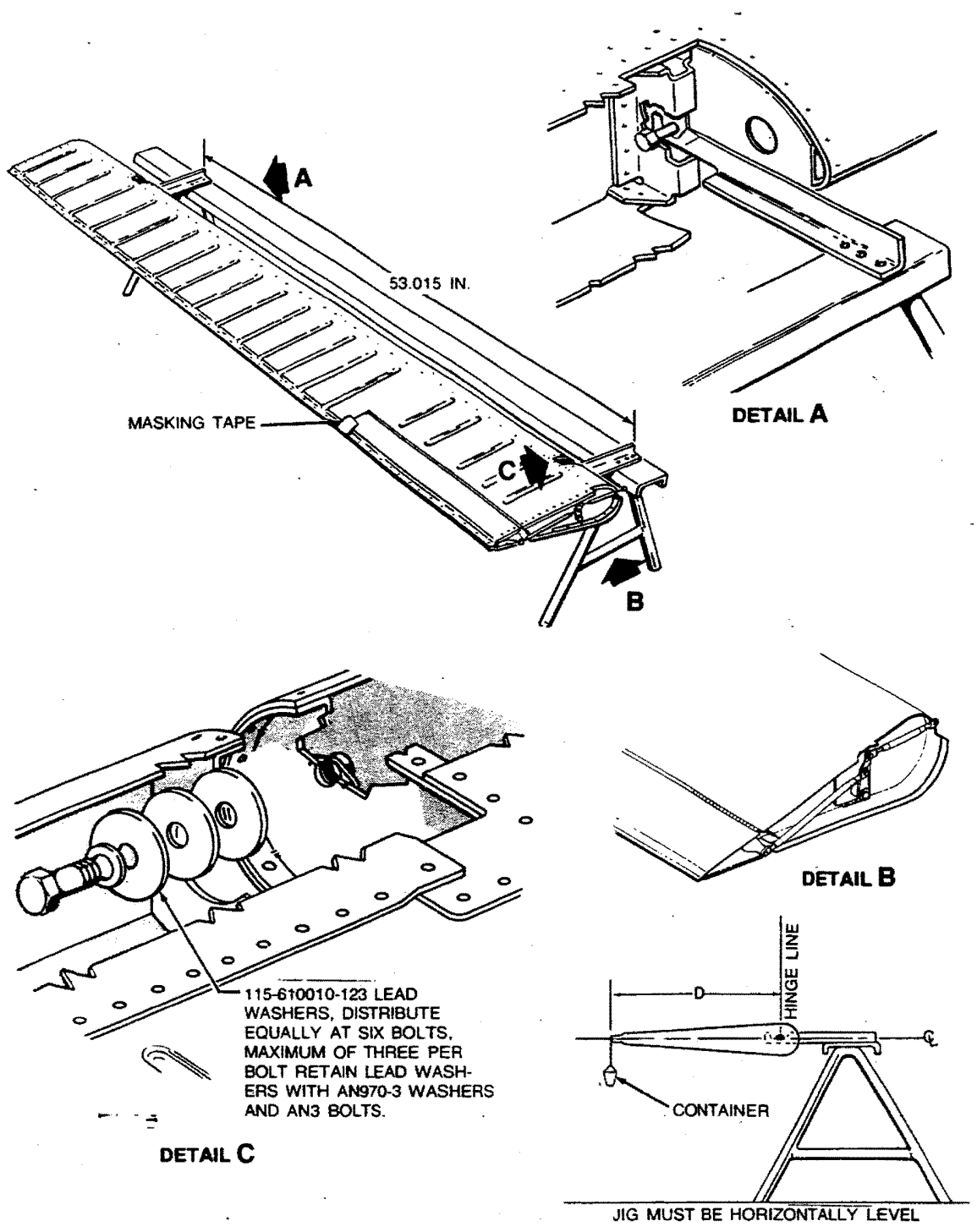
a. Locate the chord line by placing a straight edge at the inboard end of the aileron assembly so that one end is on the trailing edge and the other end is centered on the leading edge. Mark the chord line with a suitable marker such as a grease pencil, then remove the straight edge.
b. Secure the trim tab (LH only) in its neutral position with a small piece of masking tape.
c. Fit the correct size bolts in the hinge brackets and mount the aileron on the knife edge supports. Ensure that the aileron is free to rotate about the hinge line.
d. To determine if weight should be added or removed, suspend a cup from a point near the center of the aileron trailing edge. Use a short length of small diamter string secured to the surface with a small piece of masking tape. (See Figure 201.) The cup must be free to hang vertically.
e. Add small quantities of lead shot to the cup until the aileron balances with the chord line level. Check this by holding the spirit level aligned with the marked chord line.
f. The distance "D" must be perpendicular to the hinge line. Measure "D" from the hinge line to the suspension point of the cup.
g. Remove the cup, contents, and string, then weight them.

NOTE

Since any weighing error is magnified by the distance "D", weighing is most important and must be done carefully on scales that are certified for accuracy.

h. Calculate the static balance as follows:

1. The weight of the cup and contents is designated by "W".
2. The overbalance moment is designated by "M".
3. M = W x D.
4. The following is a typical example of a balancing calculation: If the aileron balances with the chord line level at "W = .15 pound" and "D = 10.0 inches", then . . .



Balancing the Aileron
Figure 201

M = .15 x 10.0

M = 1.50 inch-pounds. The product of "W x D".

In this instance, "M" is within the required static balance range and is therefore acceptable.

i. If the static balance is not as noted in BALANCING THE AILERON, in this chapter, add or remove the lead washers as needed to attain the desired balance.

NOTE

A maximum of three lead washers (115-610000-123) may be added on each of six AN3 bolts near the leading edge, to bring the aileron balance within limits. Equally distribute and attach the washers with AN3 bolts of suitable length, and use one AN970-3 washer between the head of bolt and lead washer (see Figure 201).

"END"