

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR21FA266

AIRWORTHINESS

Group Chair's Factual Report - Attachment 1
Structural Inspection and Repair Manual 57-13-01

June 21, 2022

36 pages

CRACK INSPECTION - WING STRUCTURE**(LW-1 THRU LW-347; LJ-1 THRU LJ-1087, EXCEPT LJ-1085 WITHOUT SPAR KIT 90-4077-1 INSTALLED)****1. Crack Inspection**

- A. At the intervals designated in [Table 201](#), the wing attach fittings, center section and outboard wing spar caps and the nacelle splice plates must be inspected for cracks, corrosion and damage (Refer to [Figure 216](#)). Prior to or concurrent with this inspection, the inspection doors contained in Main Spar Inspection Provisions Kit No. 90-4063 must be incorporated. Airplane serials LJ-552 and after, and LW-1 and after, were delivered from the factory with the equivalent of Kit No. 90-4063 installed.
- B. Kit No. 100-4002-3 (LH) or 100-4002-4 (RH) contains the parts and instructions for replacing the outboard main spar. Kit No. 100-4002-1 contains all the parts and instructions for replacing an outboard wing spar but does not include the spar.

WARNING: A crack in the center section lower forward spar cap necessitates the replacement of all lower forward inboard fittings, the lower forward spar cap on the center section, and both outboard forward wing panel main spar assemblies. A crack in an outboard wing panel spar cap requires replacement of the outboard forward spar assembly. A crack in a center section spar fitting requires replacement of the affected fitting only. A crack in an outboard wing panel main spar fitting necessitates replacement of the entire outboard wing panel spar assembly. Textron Aviation Technical Support should be contacted for an operational safety evaluation anytime a crack is found in a wing attach fitting or spar.

CAUTION: When fastener removal is required to perform an inspection, extreme caution must be exercised during the removal procedure. Refer to [Chapter 20-50-03](#) for fastener removal instructions.

NOTE: Airplanes in this serial group that have had Spar Kit No. 90-4077-1 incorporated are covered in [57-13-02, 201](#).

NOTE: If the airplane has been equipped with a spar bridge or any other type of device that will hinder the execution of the inspections in this chapter, this device must be removed. Refer to the King Air 90 Series Maintenance Manual for the spar bridge removal and installation procedures.

NOTE: This section is only applicable to airplanes that do not have winglets. For airplanes with winglets installed, comply with all inspections in the applicable Instruction for Continued Airworthiness (ICA) documents. Then comply with ANY index numbers in [Table 201](#) that are not called out in the ICA documents.

Table 201. Standard Flight Profile

Index No.	Figure No.	Inspection Area	Inspection Method	Possible Findings	Initial Inspection	Recurring Inspection Interval	Component Replacement Schedule
1.	201	All wing attach fitting flat surfaces, depressions, counterbores and bolt bores	Magnified visual and Eddy current as specified	Cracks, corrosion and mechanical damage	See note	1,000 hrs or 3 yrs, whichever occurs first	None
2.	202	Lower forward wing fitting-to-spar attachment	Eddy current	Cracks	See note	1,000 hrs or 3 yrs, whichever occurs first	None
3.	203	Spar cap in wheel well	Eddy current	Cracks	See note	1,000 hrs or 3 yrs, whichever occurs first	None
4.	204	Spar cap in nacelle, inboard of wheel well	Eddy current	Cracks	See note	1,000 hrs or 3 yrs, whichever occurs first	None
5.	205	Lower surface of lower forward spar cap from nacelle to fuselage	Eddy current	Cracks	See note	1,000 hrs or 3 yrs, whichever occurs first	None

6.	205	Four fastener holes in the lower forward spar cap at the wing root	Eddy current	Cracks	See note	1,000 hrs or 3 yrs, whichever occurs first	None
7.	206	Area under center section floor boards between the forward and aft spars	Visual	Cracks and loose rivets	See note	1,000 hrs or 3 yrs, whichever occurs first	None
8.	207	Outboard wing lower main spar cap from wing attach fitting to tie down	Eddy current	Cracks	See note	1,000 hrs or 3 yrs, whichever occurs first	None
9.	209	Outboard wing upper and lower main spar caps	Visual	Cracks and corrosion	See note	Annually	None
10.	211 thru 215	Wing attach bolts and nuts	Magnified visual and fluorescent liquid penetrant as specified	Corrosion, cracks and mechanical damage	See note	1,000 hrs or 3 yrs, whichever occurs first	Replace at 20 years of service or 20,000 hours, whichever occurs first.
11.		Nacelle splice plates Ref. 57-13-04	Visual	Cracks	10,000 hrs	1,000 hrs	Refer to Chapter 4 of the 90 Series Airworthiness Limitations Manual (90-590024-187)
NOTE: The time designated for the initial inspection has expired. The time shown in the recurring inspection interval column is now effective for this inspection.							

2. Wing Fitting

A. Inspection

- (1) Remove the wing bolt covers and any placards that are affixed to the wing attach fittings. With the wing bolts in place and properly torqued, clean the inspection area. Eddy current inspect the exposed flat surface of all 16 fittings (Ref. [Figure 201](#)).
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).
 - (b) Perform SURFACE INSPECTION WING SPAR FITTING procedure (Ref. [Chapter 20-00-00](#)).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).
- (2) In compliance with the inspection schedule ([Table 201](#)), remove and inspect the wing bolts one at a time as instructed under the heading [WING BOLT, NUT AND SPAR FITTING INSPECTION](#) in this chapter.
- (3) Eddy current inspect the bathtub area of the fittings, to include the counterbore face (washer face areas) and the counterbore radius of all 16 wing attach fittings. Focus extra attention on the counterbore radius and the feathered edges (Ref. [Chapter 20-00-00](#), [Figure 210](#), [Figure 211](#), and [Figure 212](#)).
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).
 - (b) Perform SURFACE INSPECTION WING SPAR FITTING procedure (Ref. [Chapter 20-00-00](#)).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).
- (4) It is possible that small cracks may be removed from the feathered edge of the counterbore and from the back of the tub of all fittings and from the slot in the center section fittings. However, Textron Aviation Technical Support should be contacted prior to initiation of any crack removal procedure.

- (5) Any fitting cracked beyond acceptable limits, as determined by Textron Aviation Technical Support, must be replaced.
- (6) Replace all placards which were removed after the **WING FITTING INSPECTION** and **WING BOLT, NUT AND SPAR FITTING INSPECTION** is completed.
- (7) Ensure that the drain holes in the upper wing attach fittings are unobstructed.

3. Lower Forward Spar Cap and Wing Attach Fitting

A. Inspection

- (1) Remove the forward and aft access covers outboard of the nacelle on the upper wing surface. Working through the aft access opening, loosen and relocate the inverter aft to gain access to the spar (Ref. **Figure 202**, Sheet 1).

WARNING: A crack of the type shown in **Figure 202, Sheet 1 of 3 mandates the replacement of the lower forward center section spar cap and both outboard wing panel main spar assemblies.**

- (2) Remove the round inspection panel or inverter cooling panel (depending on airplane model) on the outboard side of the nacelle below the lower forward wing joint (Ref. **Figure 202**, Sheet 2).
- (3) Remove the aft inboard fastener that secures the wing attach fitting to the spar. If the original lock bolt is still installed in this position, Refer to **Chapter 20-50-03** for the lock bolt removal procedure.
- (4) Eddy current inspect the hole where the fastener was removed. Focus particular attention on the interior of the spar cap near the surface that joins the wing fitting. Calibrate, inspect and evaluate in accordance with **Chapter 20-00-00**, FASTENER HOLE INSPECTION procedure.
- (5) If cracks, corrosion or oversized holes are found, ream the 3/16-inch-diameter holes to the next larger oversize (1/64 or 1/32 inch) as required to clean up the hole. If this fails to adequately remove the damage, contact Textron Aviation Technical Support for an evaluation and corrective action recommendations.

NOTE: To prevent moisture from entering the bolt hole and causing corrosion, lubricate the bolt and fill the bolt hole with grease (1, Table 204, 91-00-00) or corrosion preventive compound (12, Table 203, 91-00-00).

- (6) Install an NAS464P3A9 bolt in a standard-sized hole, an NAS2903-9 bolt in a 1/64-inch-oversized hole, an NAS3003-9 bolt in a 1/32-inch-oversized hole, an AN960-10 washer and an MS20364-1032 nut in place of the fastener removed in Step b.. Orient the nut and bolt as shown in the illustration and torque the nut 20 to 25 inch-pounds.
- (7) Utilizing the Eddy current, inspect the center the exposed aft edge of the lower forward spar cap, utilizing a nonconductive straight edge as required.
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. **Chapter 20-00-00**).
 - (b) Perform SURFACE INSPECTIONS SPAR FLANGES SURFACES procedure (Ref. **Chapter 20-00-00**).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. **Chapter 20-00-00**).
- (8) Remove the lower forward wing bolt cover. Eddy current inspect the center of the forward flange of the lower forward spar cap. Scan in an inboard / outboard direction. Utilize a nonconductive straight edge as required.
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. **Chapter 20-00-00**).
 - (b) Perform SURFACE INSPECTIONS SPAR FLANGES SURFACES procedure (Ref. **Chapter 20-00-00**).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. **Chapter 20-00-00**).
- (9) After inspection procedure is complete, install the inverter and all access covers.

4. Wheel Well

A. Inspection

CAUTION: This caution applies to airplanes being prepared for the initial inspection where permanent fasteners were installed. It is not applicable to recurring inspections where removable fasteners have been installed. If required, refer to **Chapter 20-50-03 for the fastener removal procedures. When removing aluminum rivets from the spar cap, DO NOT DRILL THROUGH THE CAP. Drill through the rivet head only and carefully drive the rivet shank out of the spar cap with a pin punch of a somewhat smaller diameter than the rivet shank.**

- (1) Remove the three fasteners (1, 2, and 3) that attach the landing gear bumper to the spar. Remove the bumper pad and inspect the area under the pad for corrosion. If the area under the pad is free of corrosion, Eddy current inspect

the three holes. Calibrate, inspect and evaluate in accordance with [Chapter 20-00-00](#), FASTENER HOLE INSPECTION procedure. Do not install the bumper pad until Step d. is completed (Ref. [Figure 203](#)).

- (2) Remove the fasteners (4 and 5) from the drag leg support one at a time to prevent movement of the support. Eddy current inspect each of the holes. Lubricate the bolts with grease ([1, Table 204, 91-00-00](#)) or corrosion preventive compound ([12, Table 203, 91-00-00](#)). Calibrate, inspect and evaluate in accordance with [Chapter 20-00-00](#), FASTENER HOLE INSPECTION procedure. Replace the fasteners in the drag leg support with NAS464P3A6 bolts, AN960-10 washers, and MS20364-1032 nuts. Place the nuts on the bottom side of the spar cap and torque them 20 to 25 inch-pounds.
- (3) Remove the fastener (6) that attaches the outboard nacelle angle to the spar cap and Eddy current inspect. Lubricate the bolt and fill the bolt hole with grease ([1, Table 204, 91-00-00](#)) or corrosion preventive compound ([12, Table 203, 91-00-00](#)). Calibrate, inspect and evaluate in accordance with [Chapter 20-00-00](#), FASTENER HOLE INSPECTION procedure. Replace the fastener with a NAS464P3A6 bolt, AN960-10 washer and an MS20364-1032 nut. Place the nut on the bottom of the spar cap and torque it 20 to 25 inch-pounds.
- (4) Eddy current inspect along the center of the forward and aft edges of the forward and aft spar cap flanges (item 1). Inspect the lower surface of the spar cap 1/8 inch from the edges of the forward and aft edges (item 2) of the forward and aft spar cap flanges. Inspect the lower surface of the spar cap 1/8 inch from the edges of the forward and aft steps (item 3) in the lower surface of the spar cap in the wheel well. Scan in an inboard / outboard direction from BL 68 to BL 88. Utilize a nonconductive straight edge as required. Since the drag leg support angle can not be removed, this inspection can not be performed on the section of the spar surface covered by the angle (Ref. [Figure 203](#), Sheet 2).
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).
 - (b) Perform SURFACE INSPECTIONS SPAR FLANGES SURFACES procedure (Ref. [Chapter 20-00-00](#)).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).
- (5) Lubricate the bumper pad bolts and fill the bolts holes in the pad and spar with grease ([1, Table 204, 91-00-00](#)) or corrosion preventive compound ([12, Table 203, 91-00-00](#)). Apply a thin film of the lubricant to the mating surfaces of the bumper pad and the spar. Install the bumper pad with three NAS464P3A11 bolts, AN960-10 washers and MS20364-1032 nuts. Locate the nuts on the bottom of the spar and torque them 20 to 25 inch-pounds.

NOTE: If oversize fastener holes are located during the inspection, ream the holes to the next larger oversize and install NAS2903 (1/64-oversize) or NAS3003 (1/32-inch oversize) bolts as required in the oversize holes.

5. Lower Forward Spar Cap (Inboard Side of Nacelle)

A. Inspection

CAUTION: This caution applies to airplanes being prepared for the initial inspection where permanent fasteners were installed. It is not applicable to recurring inspections where removable fasteners have been installed. If required, refer to [Chapter 20-50-03](#) for the fastener removal procedures. When removing aluminum rivets from the spar cap, DO NOT DRILL THROUGH THE CAP. Drill through the rivet head only and carefully drive the rivet shank out of the spar cap with a pin punch of a somewhat smaller diameter than the rivet shank.

NOTE: If the rivets were replaced with bolts after the initial inspection, remove the bolts one at a time to prevent movement of the nutplate assembly.

- (1) Locate the four 5/32- or 3/16-inch brazier head rivets (initial inspection only), or bolts on the lower aft side of the spar cap (Ref. [Figure 204](#), Sheet 1). Remove all four fasteners, one at a time, from each side of the center section.
- (2) For the initial inspection only, where permanent fasteners were installed, ream the holes to 3/16 inch prior to conducting the eddy current inspection.
- (3) Eddy current inspect each hole. Calibrate, inspect and evaluate in accordance with [Chapter 20-00-00](#), FASTENER HOLE INSPECTION procedure. If cracks, corrosion or oversized holes are indicated, ream the holes to the next larger size. If reaming to 1/32-inch oversize fails to clean out the damage, contact Textron Aviation Technical Support for consultation.
- (4) Eddy current inspect the forward and aft surfaces of the lower forward spar cap surface in the nacelle inboard of the main gear wheel well from BL 68 to BL 62. Scan in an inboard / outboard direction 1/8-inch from the edge of the exposed spar cap (View A). Utilize a nonconductive straight edge as required. Inspect the area for cracks, loose

rivets and other damage.

- (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).
- (b) Perform SURFACE INSPECTIONS SPAR FLANGES SURFACES procedure (Ref. [Chapter 20-00-00](#)).
- (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).

NOTE: Disregard Step e. if the airplane has been previously inspected and a nut plate assembly has been installed. These fasteners will now become a part of the periodic eddy current inspection.

- (5) Fabricate a nut plate assembly (Ref. [Figure 208](#)).
- (6) Install NAS464P3A7 bolts in the two or three standard inboard holes and an NAS464P3A9 bolt in the standard outboard hole.
- (7) Install NAS2903 series bolts in the 1/64-inch oversized holes or NAS3003 bolts in 1/32-inch oversized holes. Install an AN960D10 washer under the head of each bolt and torque them 25 to 30 inch-pounds.

NOTE: To prevent moisture from entering the bolt holes and causing corrosion, lubricate the bolts and fill the bolt holes with grease ([1, Table 204, 91-00-00](#)) or corrosion preventive compound ([12, Table 203, 91-00-00](#)).

6. Lower Forward Spar Cap at Wing Root

A. Inspection

CAUTION: Some early model 90's have only two large rivets instead of four as shown in [Figure 205](#). DO NOT remove the two smaller rivets which are installed with the two large rivets on early models.

- (1) Remove access panels referenced in [Figure 205](#) to gain access to fasteners that attach the wing root rib to the forward flange of the spar cap.
- (2) Remove the fasteners that attach the wing root rib to the forward flange of the spar cap.
- (3) Eddy current inspect the hole where the fastener was removed. Calibrate, inspect and evaluate in accordance with [Chapter 20-00-00](#), FASTENER HOLE INSPECTION procedure.
- (4) To prevent moisture from entering the bolt holes and causing corrosion, lubricate the fasteners and fill the fastener holes with grease ([1, Table 204, 91-00-00](#)) or corrosion preventive compound ([12, Table 203, 91-00-00](#)).
- (5) Install NAS2903-6 (1/64-inch oversized) bolts, AN960-10 washers and MS20364-1032 nuts in place of brazier head rivets. Install NAS1703-6R (1/64-inch oversized) screws, AN960-10 washers and MS20364-1032 nuts in place of Jo-bolts. Torque the fasteners or screws as applicable, 25 to 30 inch-pounds.
- (6) Eddy current inspect the forward and aft edges of the exposed surfaces of the lower surface of the lower forward spar cap between each nacelle and the fuselage centerline (View A). Scan in an inboard / outboard direction 1/8-inch from the exposed edge (View B). Utilize a nonconductive straight edge as required.
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).
 - (b) Perform SURFACE INSPECTIONS SPAR FLANGES SURFACES procedure (Ref. [Chapter 20-00-00](#)).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).

7. Center Section Subfloor

A. Inspection

- (1) Remove the center aisle floorboards and the access panels shown in the illustration. Visually inspect the accessible areas of the lower forward and aft spar assemblies and the centerline skin between the forward and aft center section spars for loose rivets and cracks. Inspect the fuselage formers along the centerline for cracks (Ref. [Figure 206](#)).
- (2) Repair any damage that may be detected utilizing FAA Advisory Circular 43.13 and [Chapter 20-00-00](#), which provides the Acceptable Methods, Techniques and Practices for Structural Repairs.

8. Lower Spar Cap

A. Inspection

- (1) Eddy current inspect the forward and aft edges of the exposed surfaces of the lower main spar cap of the outboard wing from the wing attach fitting to the tie-down. Scan in an inboard / outboard direction 1/8-inch from edge of exposed spar cap. Utilize a non-conductive straight edge as required (Ref. [Figure 207](#)).
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).

- (b) Perform SURFACE INSPECTIONS SPAR FLANGES SURFACES procedure (Ref. [Chapter 20-00-00](#)).
- (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).

9. Mounting Plate Fabrication

A. Fabricate a mounting plate from 0.063 aluminum.

- (1) Draw a line down the center of the bottom side of the plate to aid fastener alignment (Ref. [Figure 208](#)).
- (2) Install a nutplate at the inboard end of the mounting plate.

NOTE: The four nutplates should be installed at a 45° angle to the mounting plate length.

- (3) Remove the sealer at the intersection of the aft side of the main spar and keel web.
- (4) Insert the nutplate assembly through the void created by the sealer removal.
- (5) Install an NAS464P3A7 bolt and an AN960D10 washer to hold the mounting plate in position.
- (6) Align the mark on the plate with the centerline of the holes in the spar cap and tighten the bolt sufficiently to prevent movement of the plate.

CAUTION: If a drill is used to mark the fastener locations, do not drill through the plate. Drilling through the plate could result in fuel liner or bladder penetration.

- (7) Utilizing the three open holes, mark the remaining fastener locations.
- (8) Remove the bolt and washer that was used to secure the plate and remove the plate for final assembly.
- (9) Utilizing a vacuum source and a small hose capable of entering the intersection void, clean out all debris that resulted from the fastener removal procedure.
- (10) Drill the mounting plate at the three marked spots and install NAS1068A3 or MS20176L3 nutplates.

10. Outboard Wing - Main Spar Crack and Corrosion

A. Complete the inspection of the upper and lower spar caps as described in the following Steps:

WARNING: The entire upper and lower spar cap from the wing attach fitting to the wing tip must be inspected.

NOTE: Special emphasis should be placed on airplanes that have been operated and/or stored for extended periods in areas where the geographical location and atmospheric conditions are conducive to corrosion.

- (1) Visually inspect the exterior surfaces of the upper and lower spar caps for any buildup of the whitish, salt-like nonmetallic substance indicative of corrosion. If any buildup of this substance is detected, the area should receive extra attention. Wax or paint that may be trapped between the edge of the skin and the exposed portion of the spar cap should not be interpreted as corrosion.
- (2) Utilizing normal cleaning procedures, wash all exposed surfaces of the upper and lower spar caps.
- (3) Visually inspect all exposed surfaces of the spar caps for paint blisters, raised areas and/or surface distortions and cracks in metal. The exposed surface of the spar cap is extruded flat. Any of the previously noted irregularities could indicate corrosion and must be considered suspect (Ref. [Figure 209](#)).

NOTE: Spar cap surface irregularities may be detected by sliding the fingers over the surface, by moving a straightedge over the surface or by sighting down the length of the spar cap.

- (4) If wing main spar replacement becomes necessary, Kit No. 100-4002-3S should be ordered for LH spar replacement and/or Kit No. 100-4002-4S for RH spar replacement. Kit No. 100-4002-1S provides all parts and instructions necessary for spar replacement but does not include the spar. If unusual conditions are noted which cannot be resolved locally, contact Textron Aviation Technical Support for consultation.

11. Wing Bolt, Nut and Spar Fitting

A. Inspection

WARNING: All eight wing attach bolts must be removed and each of the wing attach fittings inspected. The wing bolts and nuts are life-limited parts and must be replaced in compliance with the time limits designated in [Table 201](#). Render unserviceable all components removed in compliance with their life limit. ew wing attach components must be obtained only from Textron Aviation or Textron Aviation approved source.

- (1) Before removing any of the wing attach bolts, ensure that the wing is properly supported in a manner which prevents wing shifting. Draw a line across each pair of fittings with a grease pencil to aid wing alignment, if required.

CAUTION: Do not scribe or scratch the fittings.

- (2) If (while using hand pressure only) wing attach bolt binding occurs, upon disengagement or installation, loosen the remaining three wing attach bolts and position the wing in a manner that releases binding of the bolt. If the wing attach fittings are separated or repositioned, the aluminum washers between the upper wing attach fittings must be replaced with new washers. Replacement of these washers will not be required if the wing attach bolts can be removed one at a time. The preload indicating washer assembly at the lower forward attach point must be replaced with a new assembly each time the wing bolt at this point is loosened or removed.

NOTE: Ensure that the 50-105011 washer shown in Figure 211, the 90-110032-1 washer shown in Figure 212, Figure 214 and Figure 215 and the 95-110025-1 washer shown in Figure 213 have a fully complete radius with no sharp edges which could mark the spar fittings. Replace any washers which exhibit an incomplete radius or sharp edges.

- (3) Replace all placards which were removed after the WING FITTING INSPECTION and WING BOLT, NUT AND SPAR FITTING INSPECTION is completed.

B. Lower Forward Wing Bolt, Nut and Fitting Inspection

- (1) Remove each lower forward wing attach bolt, preload indicating washer assembly and nut. Using a nonmetallic brush, thoroughly clean the bolt, nut and washers with solvent (2 or 3, Table 208, 91-00-00).
- (2) If the wing attach bolts and nuts do not exceed their specified life limit as designated in Table 201, visually inspect them with a 10-power or stronger magnifying glass for cracks and mechanical damage. Scratches and markings in the cadmium plating, and or localized deterioration of the cadmium plating is not reason to reject a bolt. The cadmium plating may be discolored and may have areas exhibiting a rubbed or polished appearance, usually resulting from the installation procedure. If cracks or mechanical damage is found on any component, replace the affected component.
- (3) Fluorescent liquid penetrant inspect (as directed in Chapter 20-00-00) each inconel wing bolt and nut. If the bolts and nuts prove to be free of all damage, they may be reused after cleaning.
- (4) Eddy current inspect the exposed spar fittings, focusing extra attention at the washer-seat and bolt-bore area. If scoring, corrosion pitting, crack indications, or washer impressions are found in these areas, contact Textron Aviation Technical Support for consultation.
 - (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. Chapter 20-00-00).
 - (b) Perform SURFACE INSPECTION WING SPAR FITTINGS procedure (Ref. Chapter 20-00-00).
 - (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. Chapter 20-00-00).
- (5) Coat the spar fitting bolt-bores and washer/nut-bearing faces, the complete bolt, nut and new preload indicating washer assembly with corrosion preventive compound (12, Table 203, 91-00-00).

WARNING: The components of the preload indicating washer assembly constitute a matched set and its components must not be interchanged with any other preload indicating washer assembly. It is essential that the radii used outside diameter of the flat washer portion of the preload indicating washer assembly be placed with the radius toward the fitting washer seat. Refer to Figure 211 for proper orientation.

- (6) Install a wing attach bolt, new preload indicating washer assembly and nut into the wing fitting.
- (7) DO NOT TIGHTEN THE LOWER FORWARD WING ATTACH BOLT AT THIS TIME. Temporarily snug the bolt down to approximately 1200 inch-pounds.

C. Upper Forward, Upper and Lower Rear Wing Bolt, Nut and Fitting Inspection

- (1) Ensure that the wing is properly supported for maintenance. Remove only one wing bolt at a time for inspection. Perform the inspection as detailed in this section, then replace and torque the bolt to the value specified in the appropriate illustration before removing another bolt.
- (2) With the wing properly supported, remove an upper forward, upper rear or lower rear wing attach bolt, nut and washer. When a fastener is loosened, ensure that the radius on the outer circumference of each washer adjacent to the wing attach fitting in the outer wing panel and in the wing center section is facing the radius in the end of the fitting recess (does not apply to MS20002 or NAS143 washers). If the radius is not orientated as shown in the applicable illustration, contact Textron Aviation Technical Support for consultation. If the washers are installed correctly, proceed with the remaining Steps.
- (3) Eddy current inspect the exposed spar fittings, focusing extra attention at the washer-seat and bolt-bore area. If

scoring, corrosion pitting, crack indications, or washer impressions are found in these areas, contact Textron Aviation Technical Support for consultation.

- (a) Perform CALIBRATION (STANDARDIZATION) procedure (Ref. [Chapter 20-00-00](#)).
- (b) Perform SURFACE INSPECTION WING SPAR FITTINGS procedure (Ref. [Chapter 20-00-00](#)).
- (c) Perform INDICATION EVALUATION FOR SURFACE INSPECTION procedure (Ref. [Chapter 20-00-00](#)).
- (4) If the bolts and nuts do not exceed their life limit as designated in [Table 201](#), thoroughly clean the bolt, nut and washers with solvent ([2 or 3, Table 208, 91-00-00](#)) and inspect for cracks and mechanical damage with a 10-power or stronger magnifying glass. If mechanical damage or cracks are found, replace the affected component. Scratches and markings in the cadmium plating, and or localized deterioration of the cadmium plating is not reason to reject a bolt. The cadmium plating may be discolored and may have areas exhibiting a rubbed or polished appearance, usually resulting from the installation procedure. If the components are acceptable after the visual inspection, perform a fluorescent liquid penetrant inspection on each of the bolts and nuts (see [Chapter 20-00-00](#)). If the bolts and nuts are free of cracks and mechanical damage, they may be reused after cleaning.
- (5) Coat the spar fittings, bolt-bore and washer nut bearing face, the complete bolt, washer and nut with corrosion preventive compound ([12, Table 203, 91-00-00](#)).
- (6) Install the wing attach bolt, washers and nut, and torque the nut to the torque value specified in the applicable illustration (Ref. [Figure 212](#), [Figure 213](#), [Figure 214](#), or [Figure 215](#)).
- (7) After the nut is properly torqued, coat the exposed threads of the wing bolt with corrosion preventive compound ([12, Table 203, 91-00-00](#)).

WARNING: Prior to installing the wing bolt covers, ensure that the drain holes in the upper forward and aft fittings are free of obstructions.

CAUTION: Ensure that the wing bolt wrench does not bottom out against the wing fitting. Wrench contact with the fitting could result in erroneous torque readings and fitting damage.

D. Lower Forward Wing Bolt Tightening Procedure

WARNING: The lower forward wing attach bolt which was not tightened after inspection must be tightened at this time. Remove any wing supports before tightening this bolt.

- (1) Insert the pin on the tool shown in [Figure 210](#) into one of the holes in the outer ring of the preload indicating washer assembly and rotate the ring back and forth while tightening the nut. The bolt is tight when the outer ring of the preload indicating washer assembly can no longer be turned using 30 ± 5 pounds of tangential force applied to the ring as shown in [Figure 210](#). Do not tighten the nut beyond this point.

CAUTION: Ensure that the wing bolt wrench does not bottom out against the wing fitting. Wrench contact with the fitting could result in erroneous torque readings and fitting damage.

- (2) After completing the tightening procedure on the lower forward bolt, coat the exposed threads which protrude through the nut with corrosion preventive compound ([12, Table 203, 91-00-00](#)).

12. Wing Bolt Maintenance

- A. At the first scheduled airplane inspection (as designated by the King Air 90 Series Maintenance Manual) after the bolts have been loosened and retorqued or after initial installation, check the wing bolts for proper torque as stated in the illustration for the specific location (Ref. [Figures 212, Figure 213, Figure 214 or Figure 215](#)).
- B. Check the preload indicating washer at the lower forward attach point as shown in [Figure 210](#) and [211](#).
- C. Concurrent with the above Step and annually thereafter, coat the exposed bolt threads which protrude through the nuts with corrosion preventive compound ([12, Table 203, 91-00-00](#)).

WARNING: Prior to installing the fitting covers, ensure that the drain holes in the upper forward and upper aft attach fittings are unobstructed and can drain freely.

Table 202. Wing Bolt Tools

Position	Bolt Part Number	Wrench Part Number	Nut Part Number	Nut Torque Adapter
----------	------------------	--------------------	-----------------	--------------------

Lower Forward	81784-14-31 or VCC0035 (LJ-1 thru LJ-67 except airplanes with Spar Kit 90-4077-1 installed)	TK1817 922-5 or 15/16-inch box-end wrench modified to accept a 40-inch extension	81790-1414	TS1584N
Lower Forward	81784-14-32 or VCC0026 (LW-1 thru LW-347; LJ-68 thru LJ-1087 except LJ-1085 and airplanes with Spar Kit 90-4077-1 installed)	TK1817 922-5 or 15/16-inch box-end wrench modified to accept a 40-inch extension	81790-1414	TS1584N
Upper Forward	81785-10-23 or VCN0003 (LJ-1 thru LJ-567; LW-1 thru LW-4, except airplanes with Spar Kit 90-4077-1 installed)	TS1222-7 or 1/2-inch Hex Head Wrench	81791-1018	TS1176-1 or TS1171-1
Upper Forward	81785-12-23 or VCN0007 (LW-5 thru LW-347; LJ-568 thru LJ-1087 except LJ-1085 and airplanes with Spar Kit 90-4077-1 installed)	TS1222-5 or 50-590012 or 9/16-inch Hex Head Wrench	81791-1216	TS1176-2 or TS1171-2
Upper and Lower Rear	81786-10-18 or VCN0014	TS1222-5, 50-590012 or a 9/16-inch Hex Head Wrench	81791-1018	TS1176-1 or TS1171-1

Figure 201 : Sheet 1 : Wing Fitting Inspection

E16999

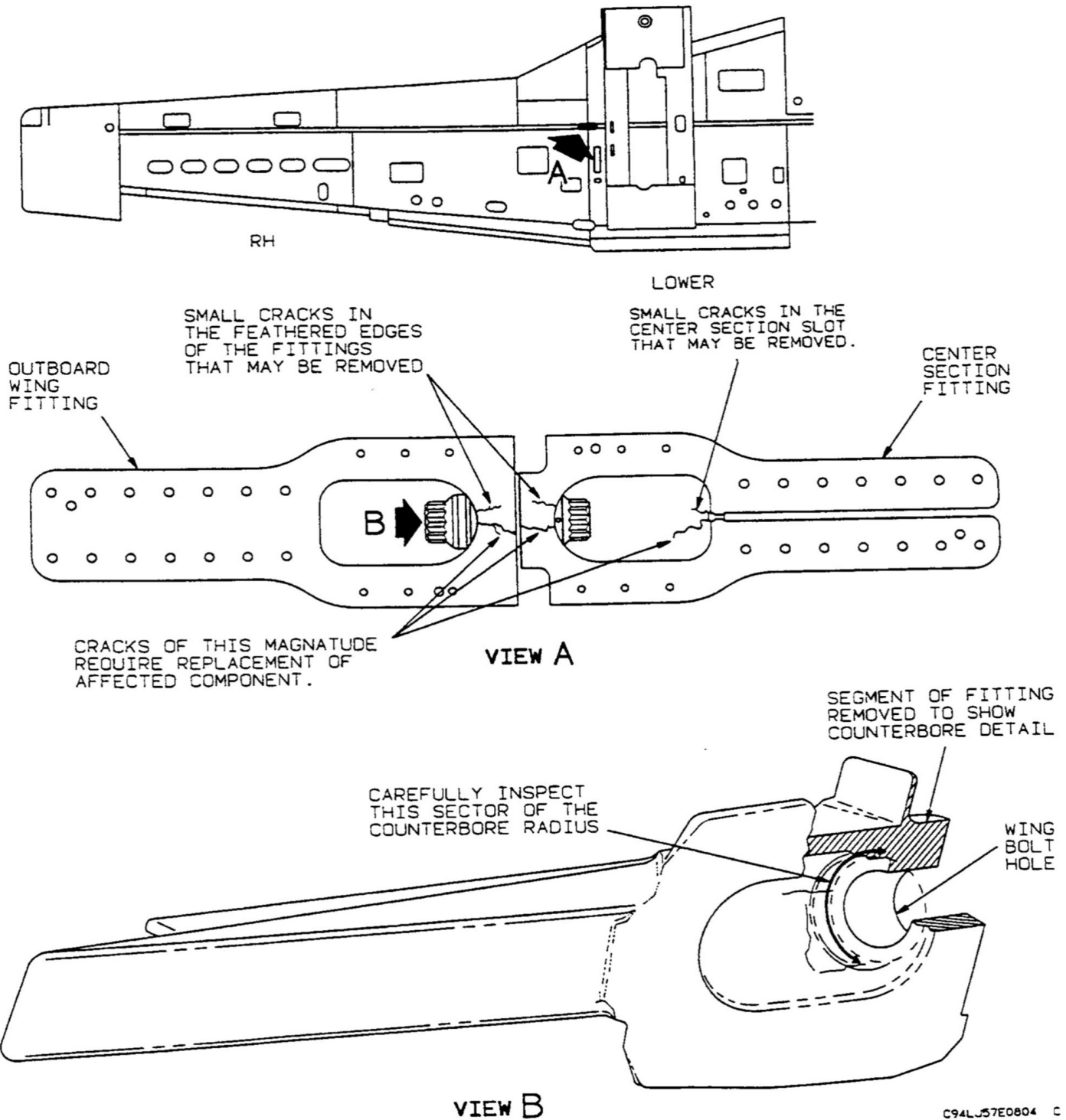


Figure 201 : Sheet 2 : Wing Fitting Inspection

E17034

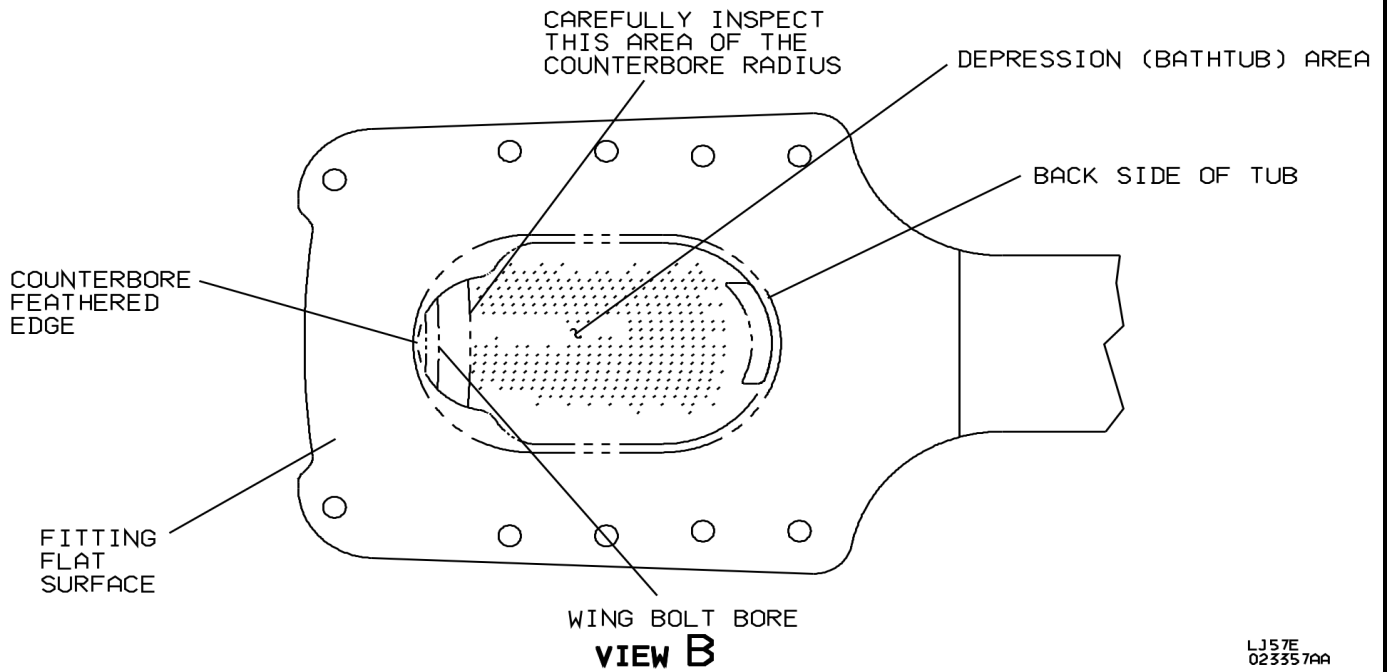
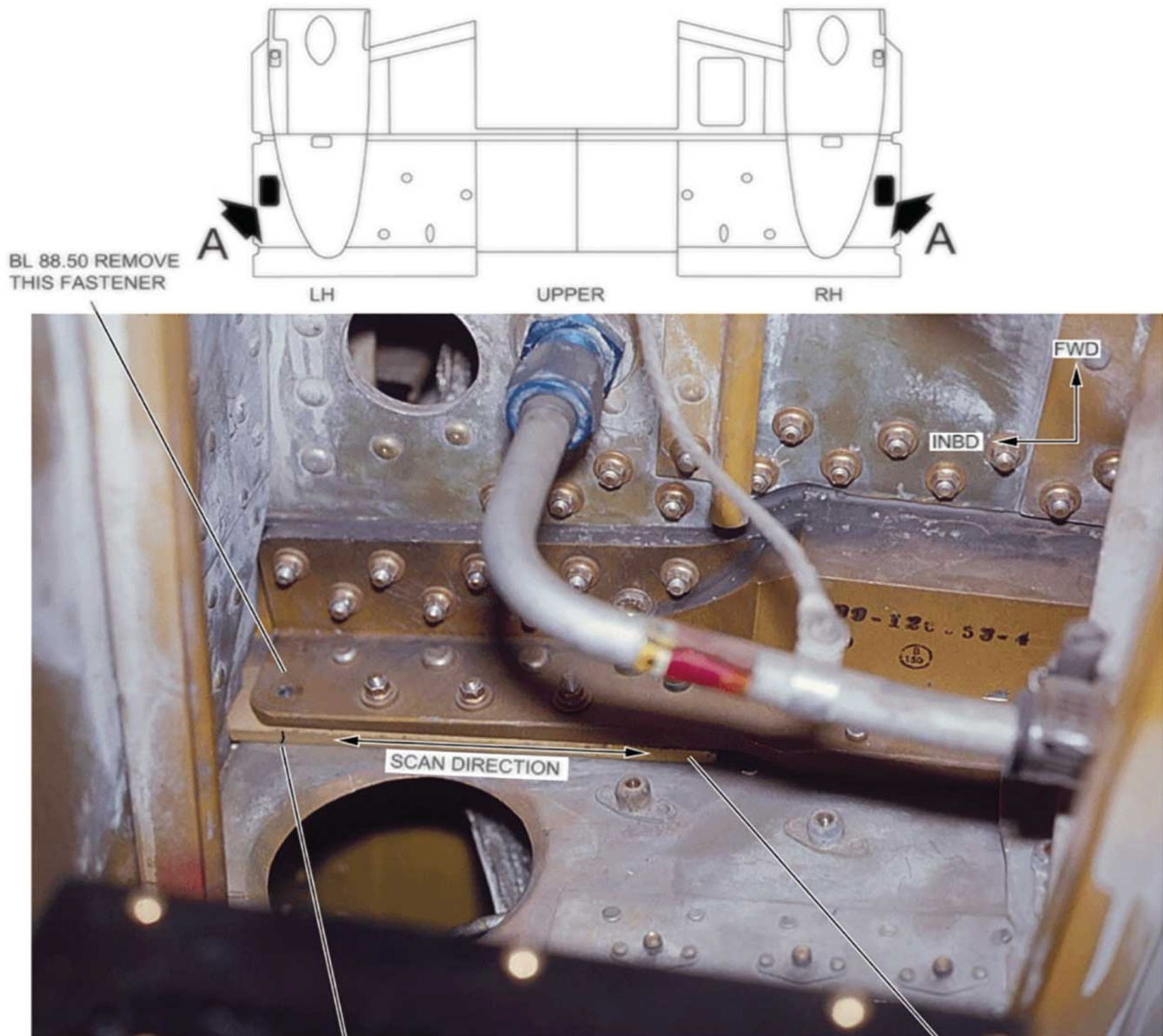


Figure 202 : Sheet 1 : Lower Forward Spar Cap and Wing Attach Fitting Inspection

E17033



CRACKS, SUCH AS THE ONE SHOWN, FOUND IN ANY SECTION OF THE CENTER SECTION LOWER FORWARD SPAR CAP NECESSITATE THE REPLACEMENT OF ALL LOWER FORWARD WING ATTACH FITTINGS, THE LOWER FORWARD SPAR CAP ON THE CENTER SECTION, AND BOTH OUTBOARD WING PANEL MAIN SPARS.

LOWER FORWARD SPAR CAP AFT FLANGE

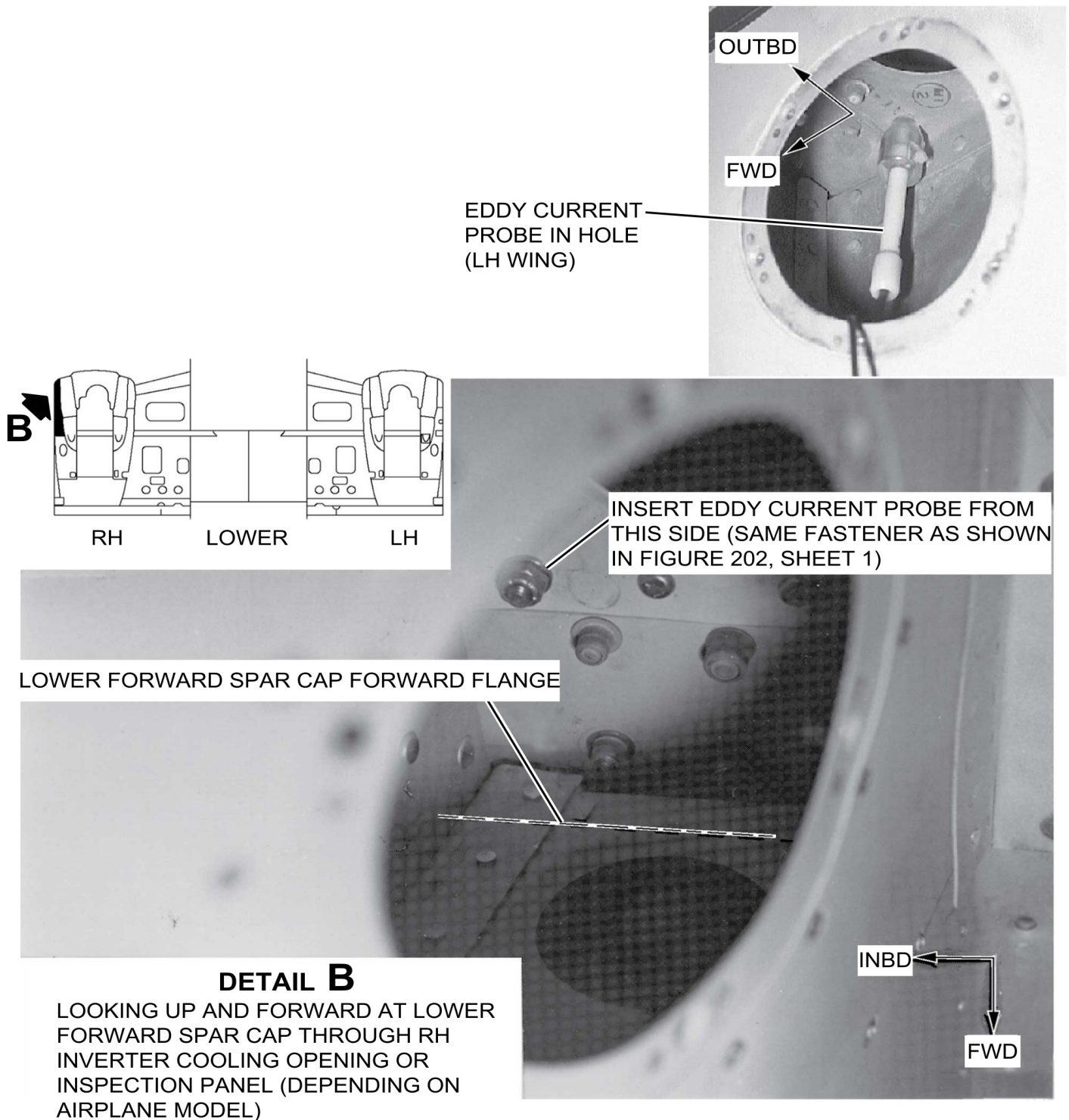
VIEW A

LOOKING FORWARD AND DOWN AT FORWARD SPAR AND LOWER WING ATTACH FITTING THROUGH RH INVERTER ACCESS OPENING.

LA57E
023588AA.A1

Figure 202 : Sheet 2 : Lower Forward Spar Cap and Wing Attach Fitting Inspection

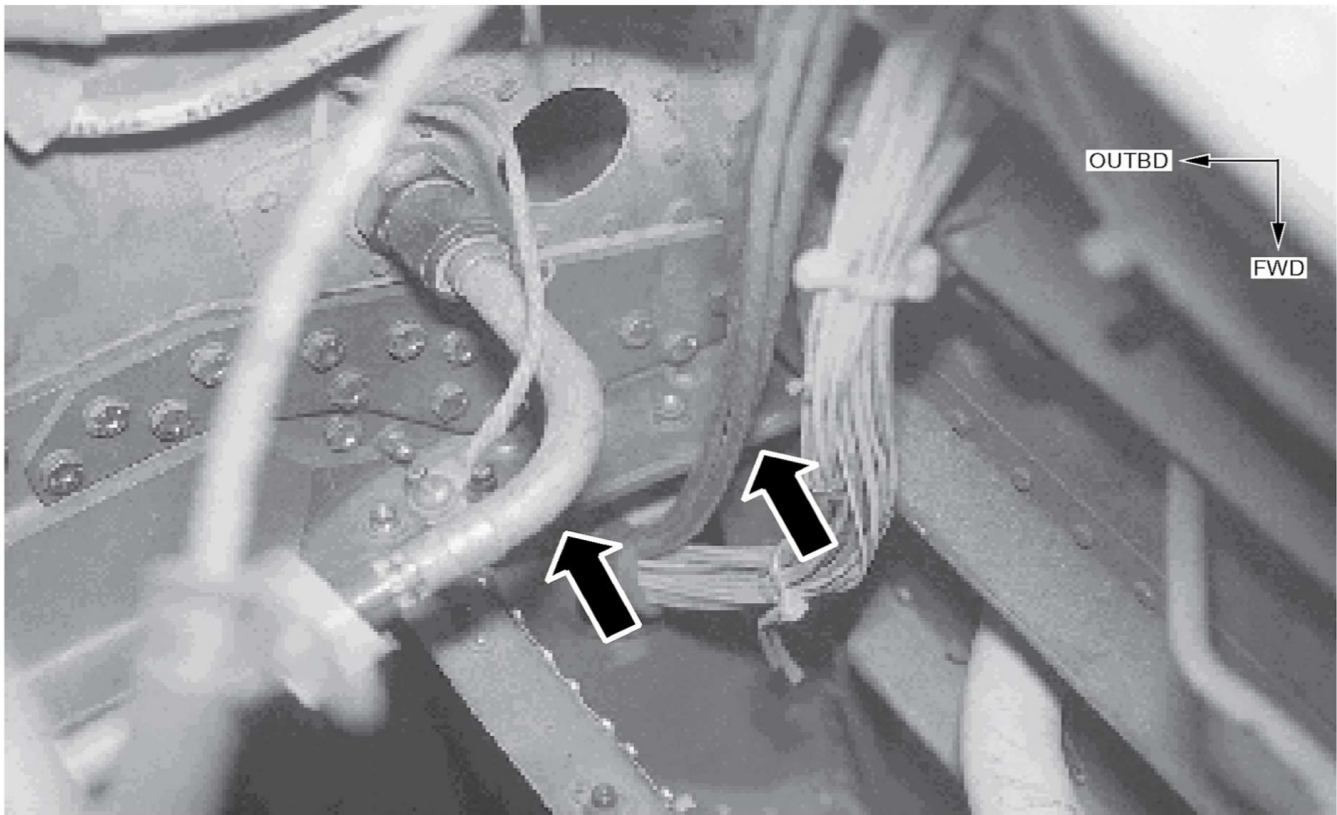
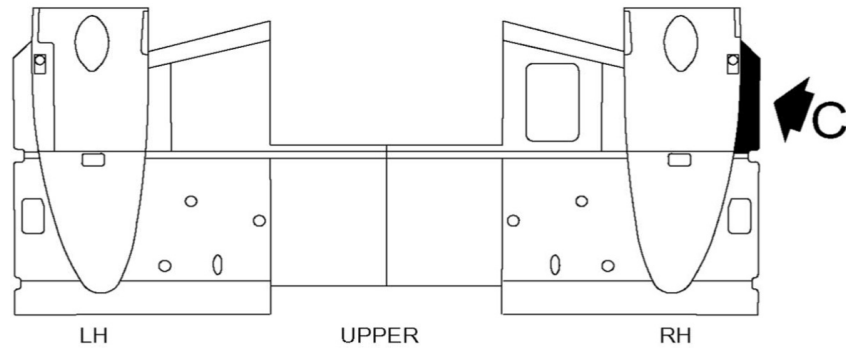
E17032



LA57E
023589AA.AI

Figure 202 : Sheet 3 : Lower Forward Spar Cap and Wing Attach Fitting Inspection

E17311



LOWER FORWARD SPAR CAP FORWARD FLANGE

VIEW C

LOOKING DOWN AT THE FORWARD SIDE OF THE
LOWER FORWARD RH WING FITTING AND SPAR CAP.
NOTE: THE FORWARD FLANGE ON THE WING FITTING
EXTENDS OUT APPROXIMATELY 3/8-INCH BEYOND
THE SPAR CAP FLANGE.

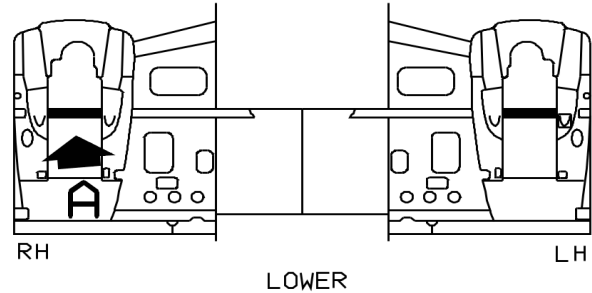
LA57E
023590AA.AI

Figure 203 : Sheet 1 : Wheel Well Inspection

E17294

NOTE

The fasteners shown in this illustration are those used after the initial inspection.



RIVET
(DO NOT
REMOVE)

BL 87.50 (6)

BL 85.82 (1)

BL 85.16 (4)

BL 83.50 (2)

BL 81.84 (5)

BL 81.18 (3)

LOWER FORWARD
SPAR CAP

DRAG LEG
SUPPORT

VIEW A

LOOKING UP AND FORWARD
INTO RH MAIN GEAR WHEEL WELL

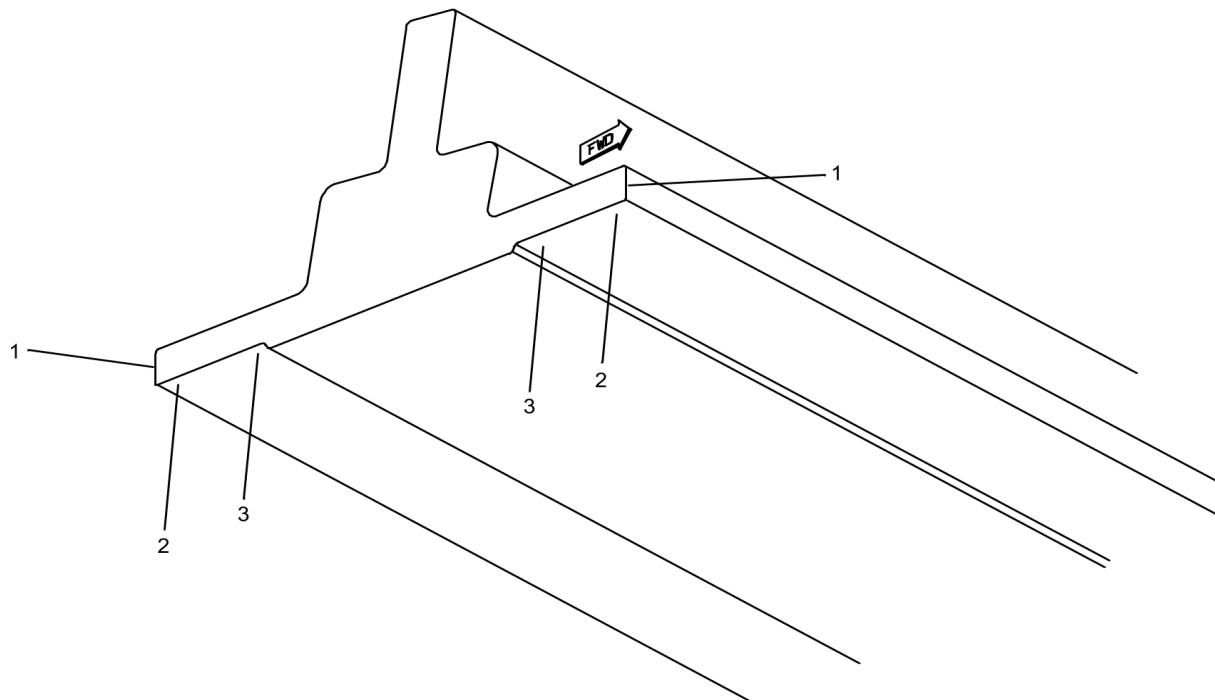
BL 88

BL 68

C95LC57E0007 C

Figure 203 : Sheet 2 : Wheel Well Inspection

E17310

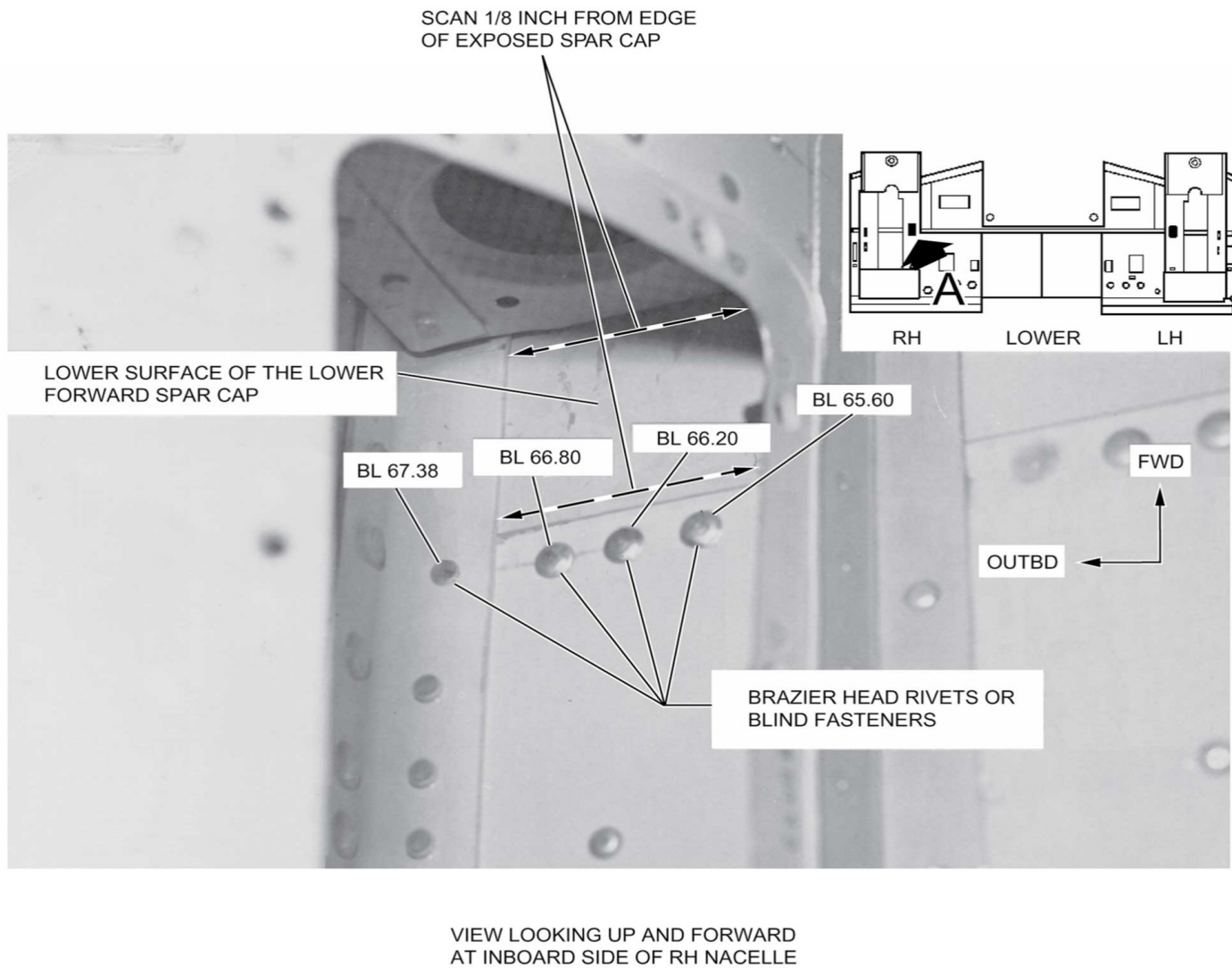


1. SCAN THE CENTER OF SPAR CAP FLANGE.
2. SCAN 1/8 OF AN INCH IN FROM EDGE.
3. SCAN 1/8 OF AN INCH FROM CORNER RADIUS.

LA57E
023591AA.AI

Figure 204 : Sheet 1 : Lower Forward Spar Cap Inspection (Inboard Side of Nacelle)

E17303



VIEW A

LA57E
023615AA.AI

Figure 204 : Sheet 2 : Lower Forward Spar Cap Inspection (Inboard Side of Nacelle)

E17325

INBOARD WHEEL
WELL WALL

INSERT NUTPLATE
ASSEMBLY THROUGH
THIS VOID

NUTPLATE ASSEMBLY

MAIN SPAR
LOWER AFT
FLANGE

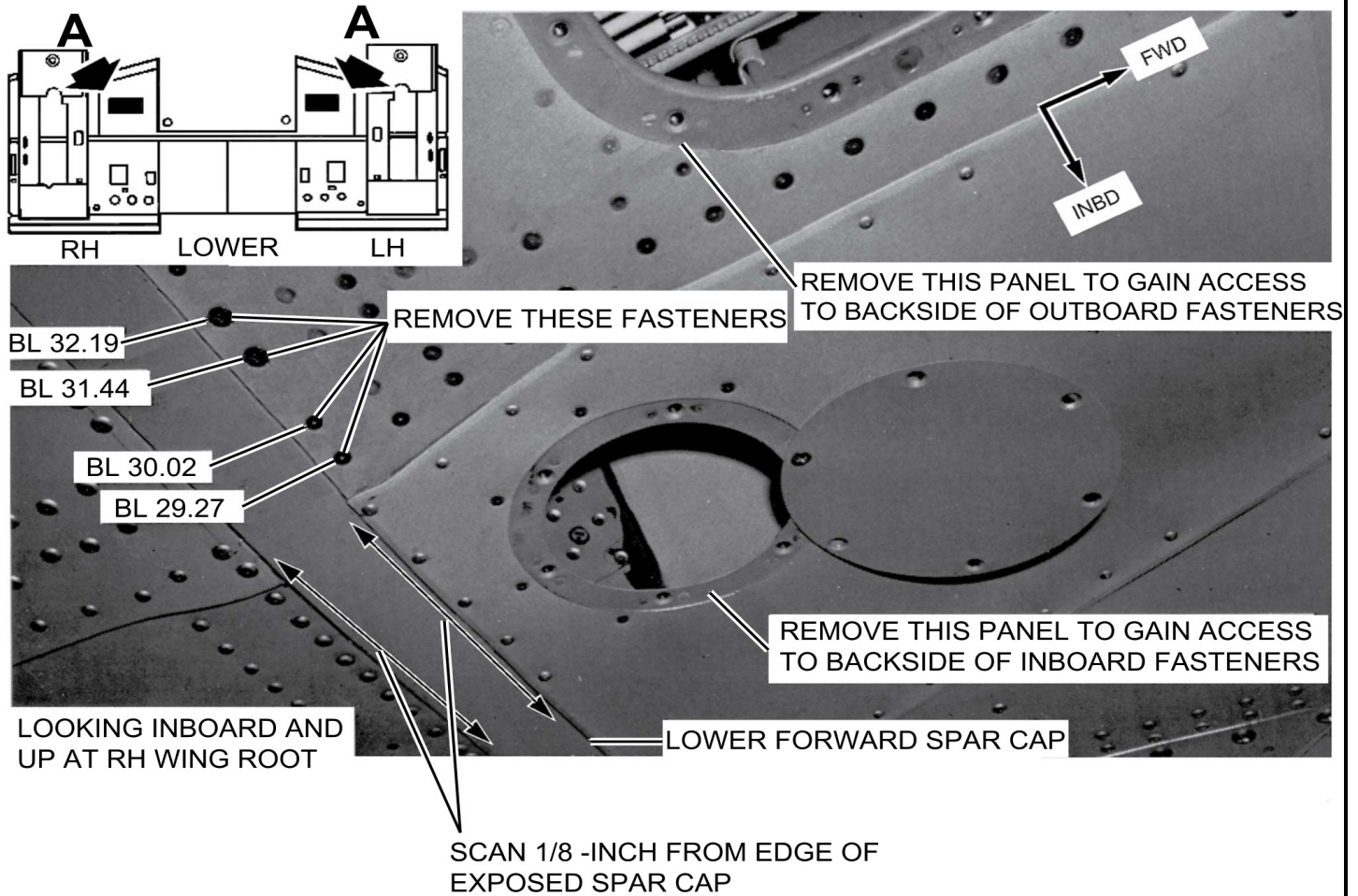


LOOKING UP AT AFT SIDE OF THE MAIN SPAR

LJ00P
003409AA

Figure 205 : Sheet 1 : Lower Forward Spar Cap Inspection at Wing Root

E17302



DETAIL A

LJ57E
023846AA.AI

Figure 206 : Sheet 1 : Center Section Subfloor Inspection

E17318

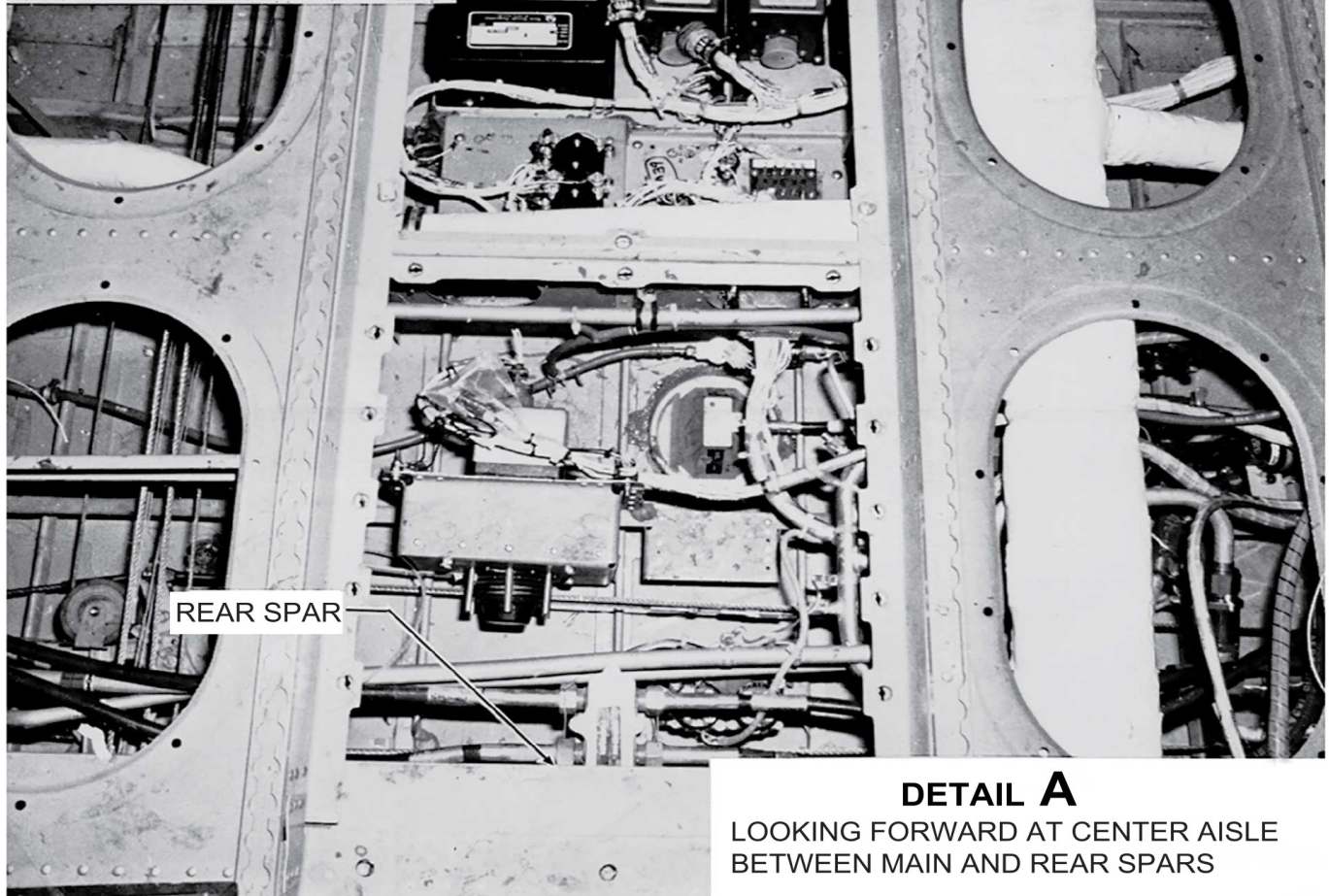
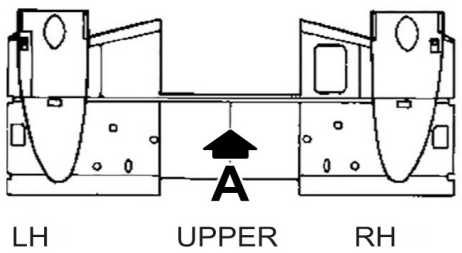


Figure 207 : Sheet 1 : Lower Spar Cap Inspection

E17301

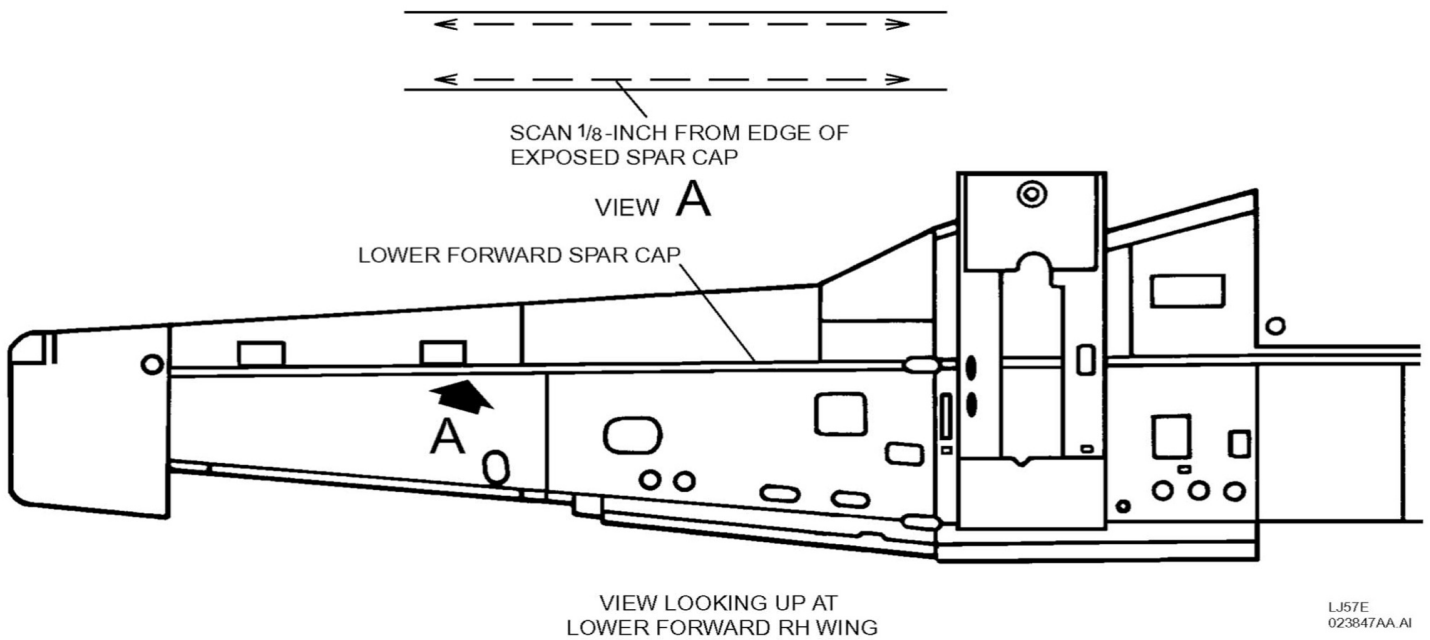


Figure 208 : Sheet 1 : Mounting Plate Fabrication

E17293

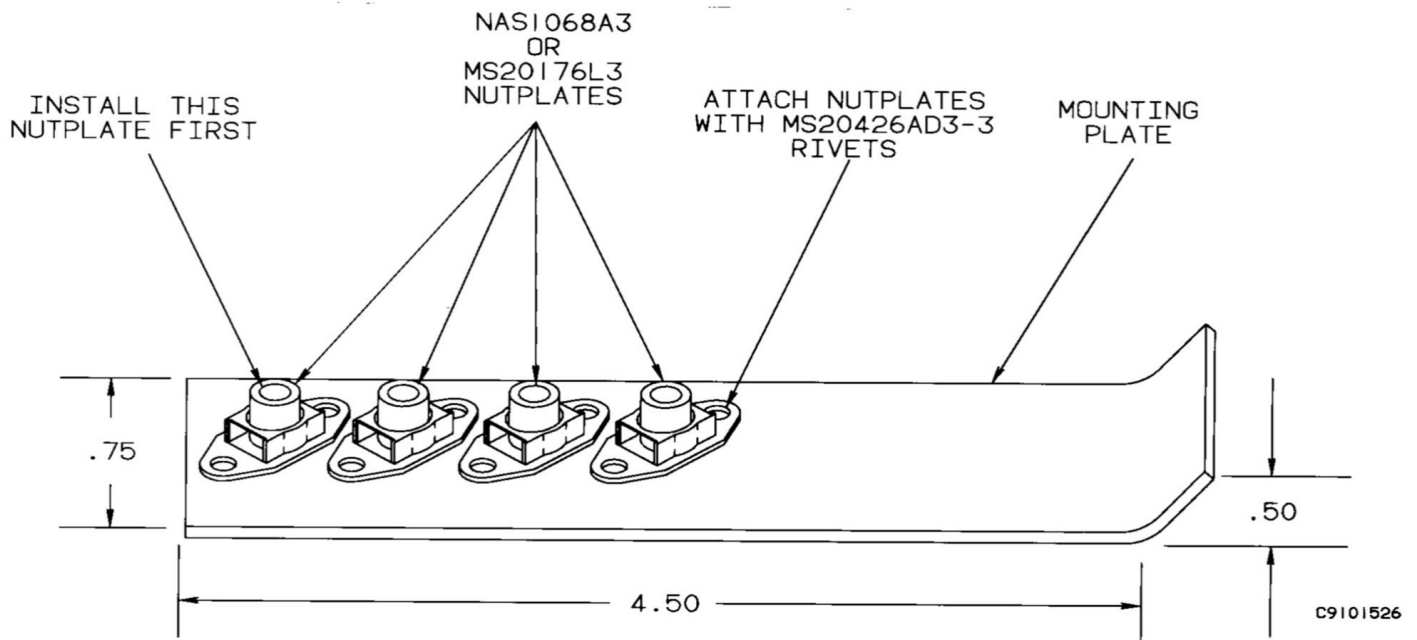
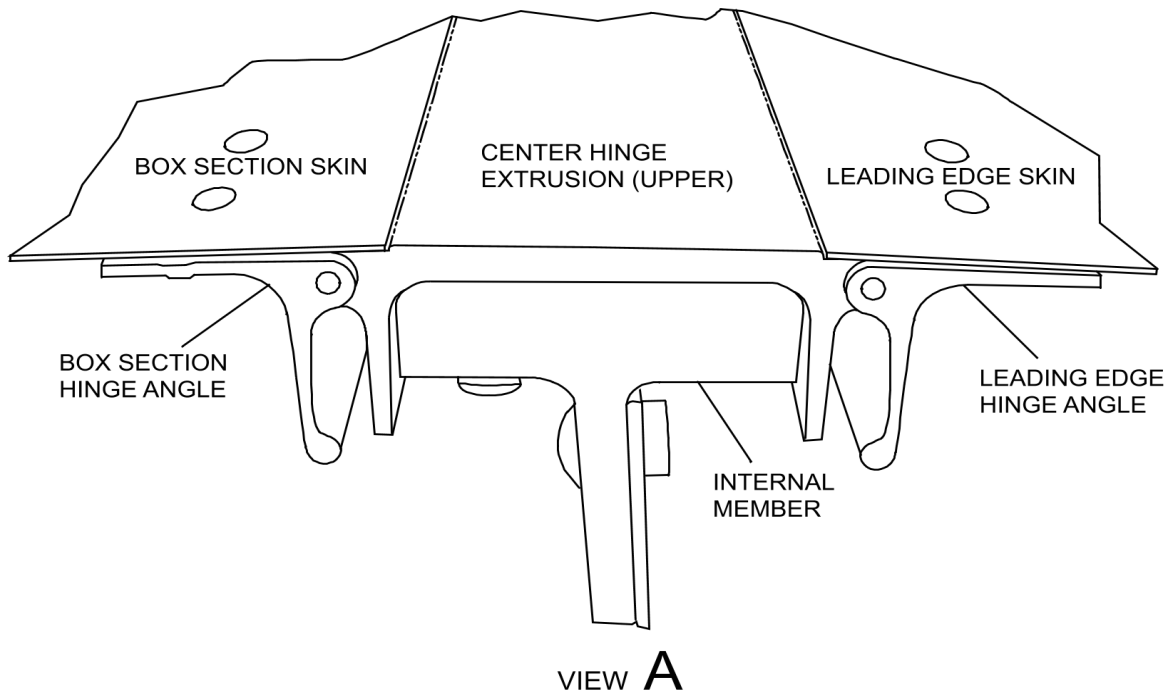
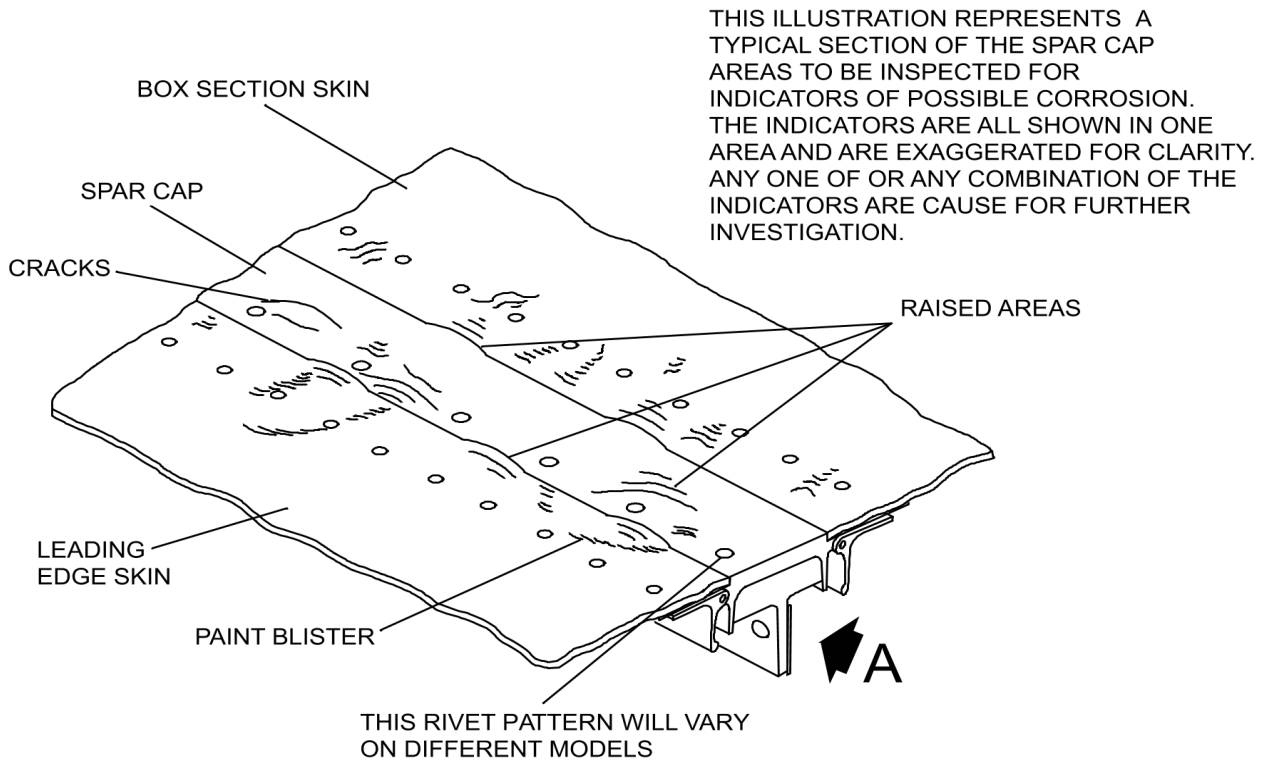


Figure 209 : Sheet 1 : Spar Cap Crack and Corrosion Inspection

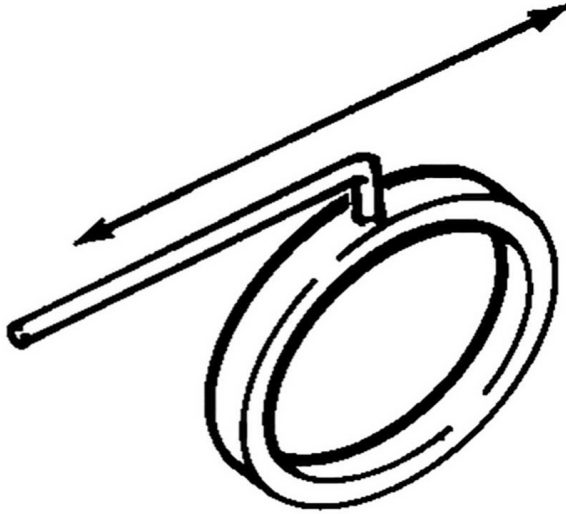
E17309



LA57E
023592AA.AI

Figure 210 : Sheet 1 : Lower Forward Wing Bolt Tightening Procedure

E17328

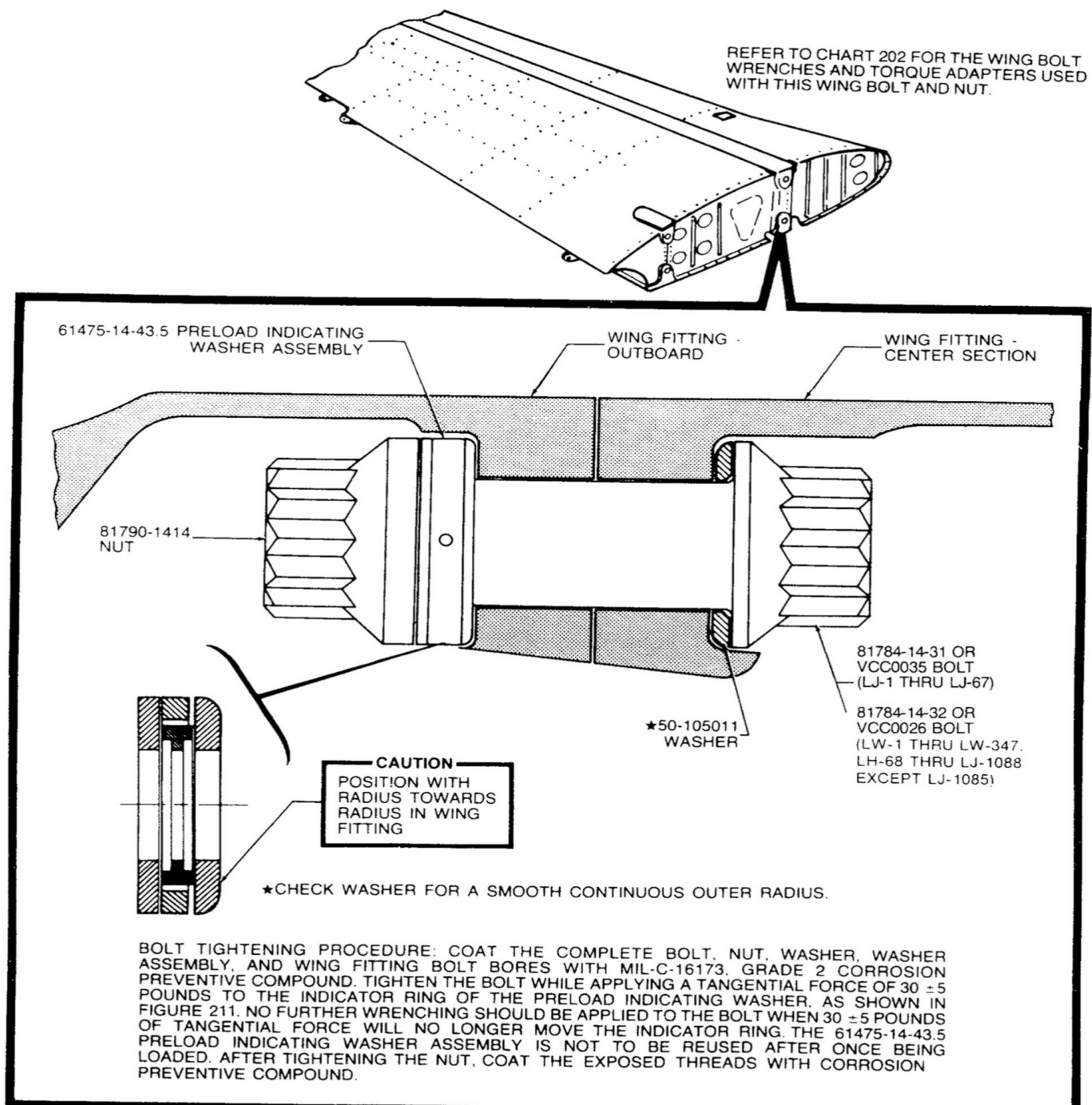


**WHEN 30 ± 5 POUNDS OF TANGENTIAL
FORCE WILL NO LONGER MOVE THE
INDICATOR RING ON THE
PRE LOAD INDICATING WASHER,
THE BOLT IS TIGHT. DO NOT TIGHTEN
THE BOLT BEYOND THIS POINT**

200-31-8

Figure 211 : Sheet 1 : Lower Forward Wing Bolt Installation

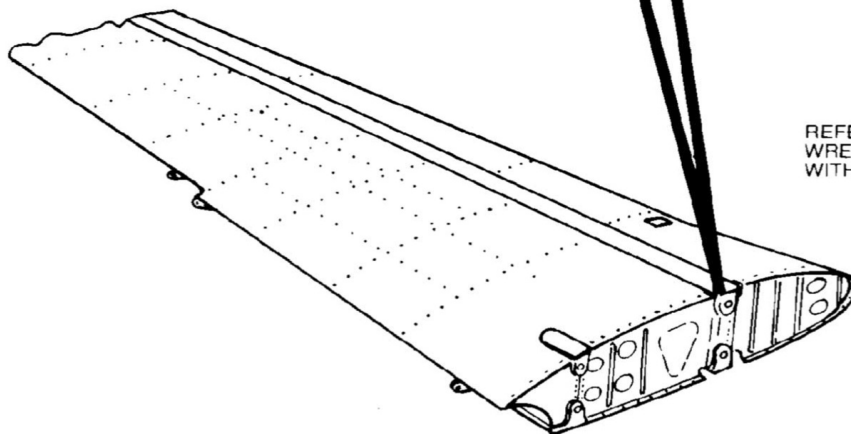
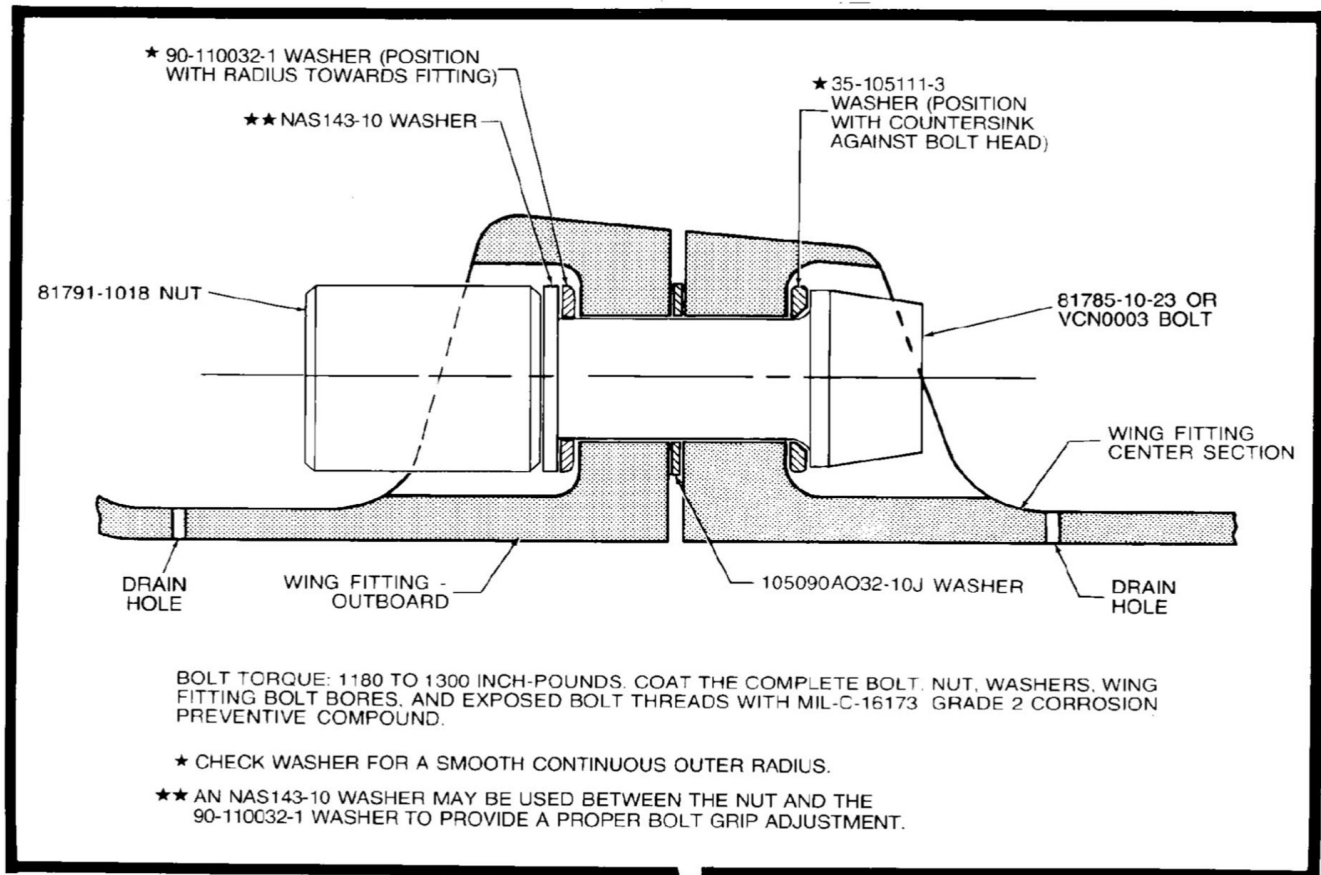
E17335



90-31-65

Figure 212 : Sheet 1 : Upper Forward Wing Bolt Installation (LW-1 thru LW-4 and LJ-1 thru LJ-567 airplanes without Spar Kit No. 90-4077-1 installed)

E17343



REFER TO CHART 202 FOR THE WING BOLT WRENCHES AND TORQUE ADAPTERS USED WITH THIS WING BOLT AND NUT.

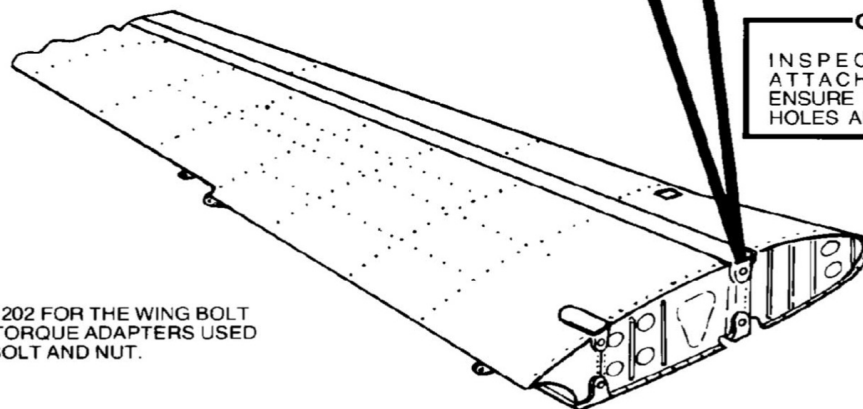
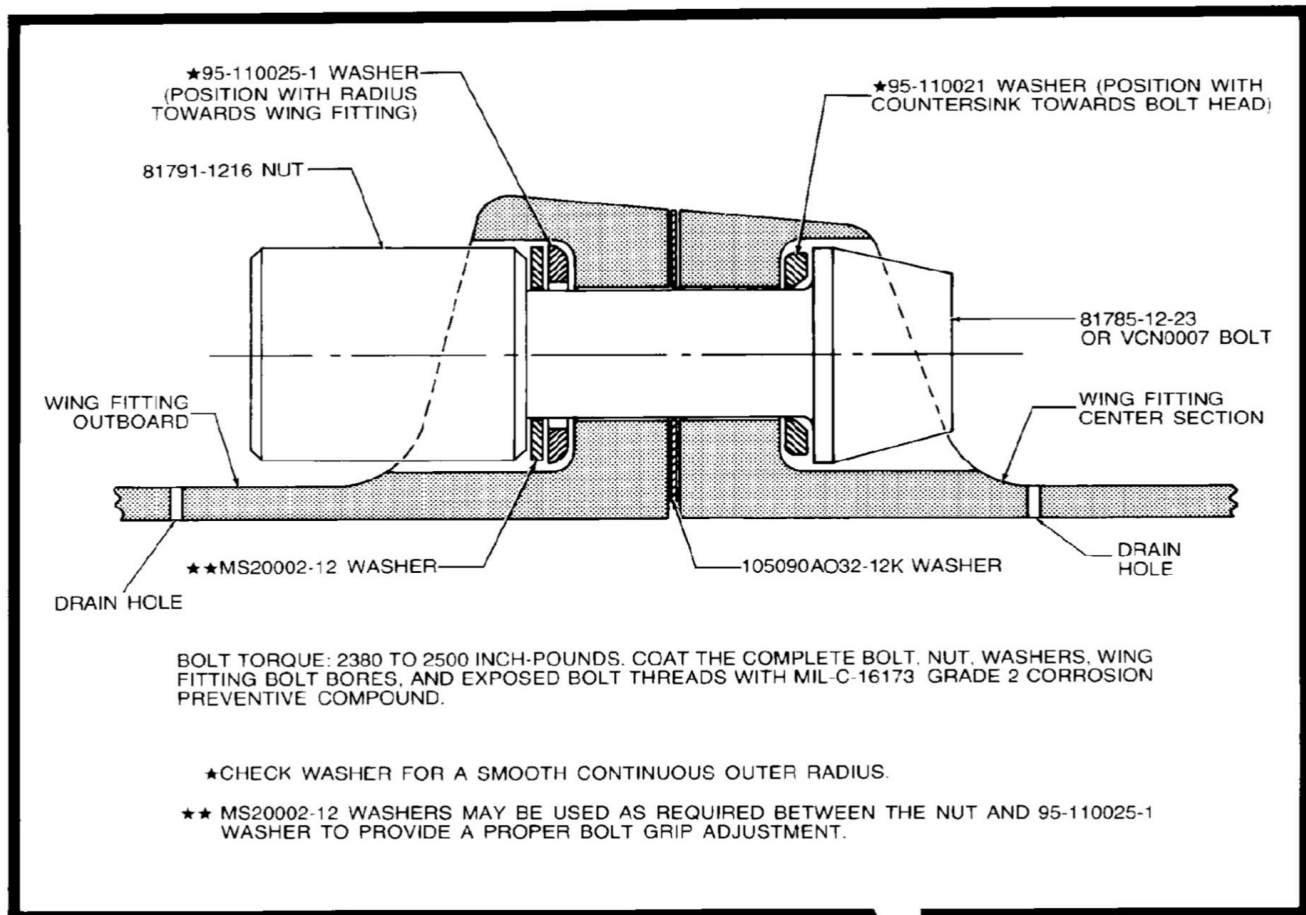
CAUTION

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

90-31-50

Figure 213 : Sheet 1 : Upper Forward Wing Bolt Installation (LW-5 thru LW-347. LJ-568 thru LJ-1087 except LJ-1085 airplanes without Spar Kit No. 90-4077-1 installed)

E17351



CAUTION

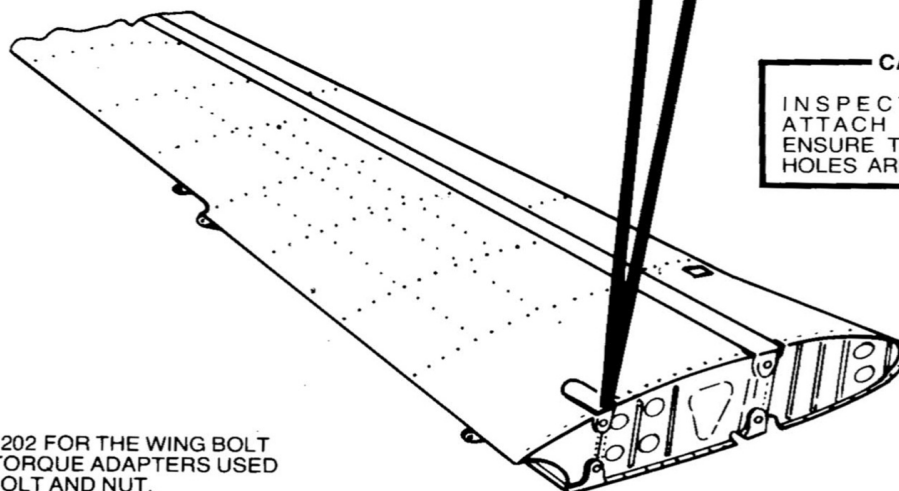
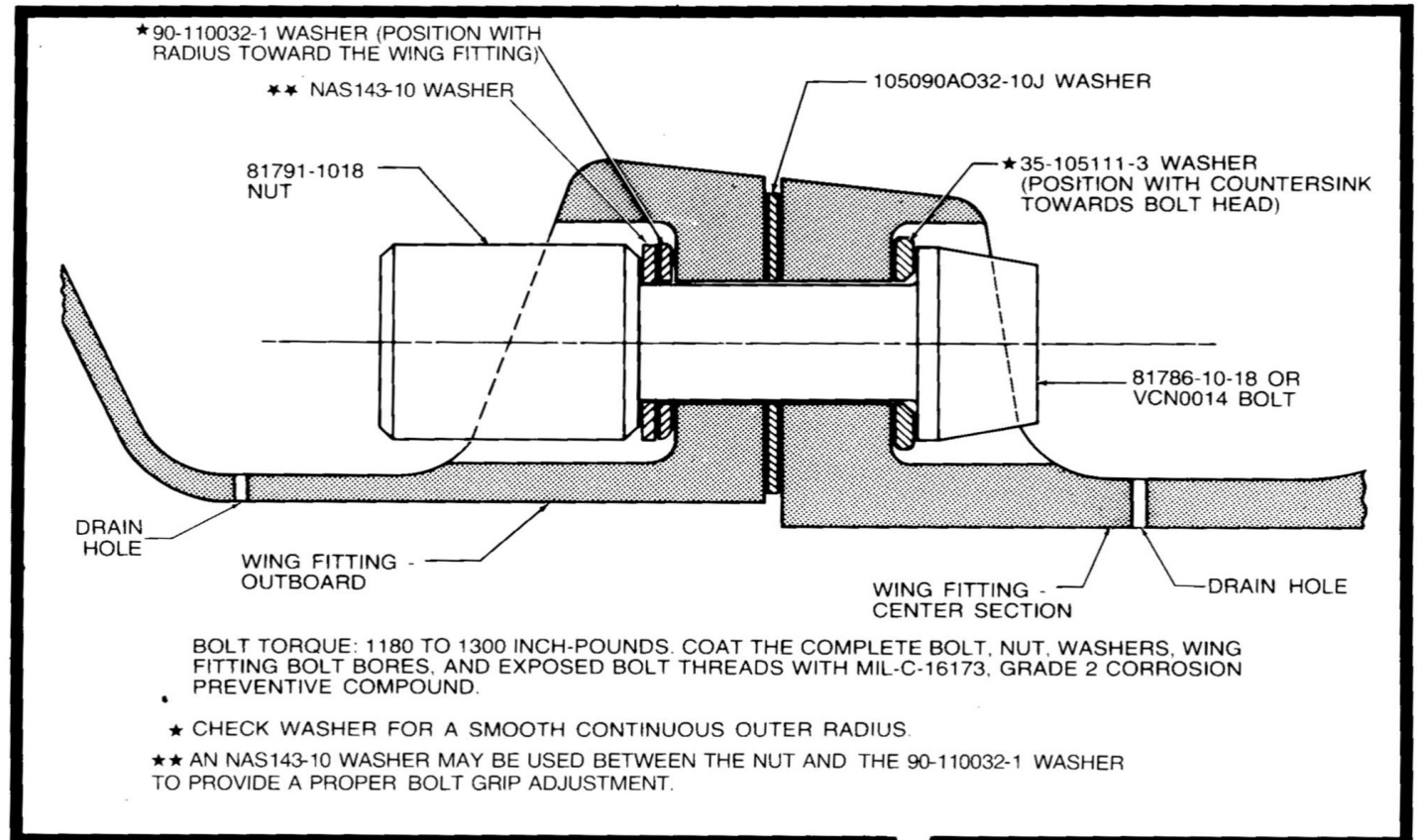
INSPECT THE WING
ATTACH FITTINGS TO
ENSURE THAT THE DRAIN
HOLES ARE CLEAR.

REFER TO CHART 202 FOR THE WING BOLT
WRENCHES AND TORQUE ADAPTERS USED
WITH THIS WING BOLT AND NUT.

90-31-47

Figure 214 : Sheet 1 : Upper Aft Wing Bolt Installation

E17345



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

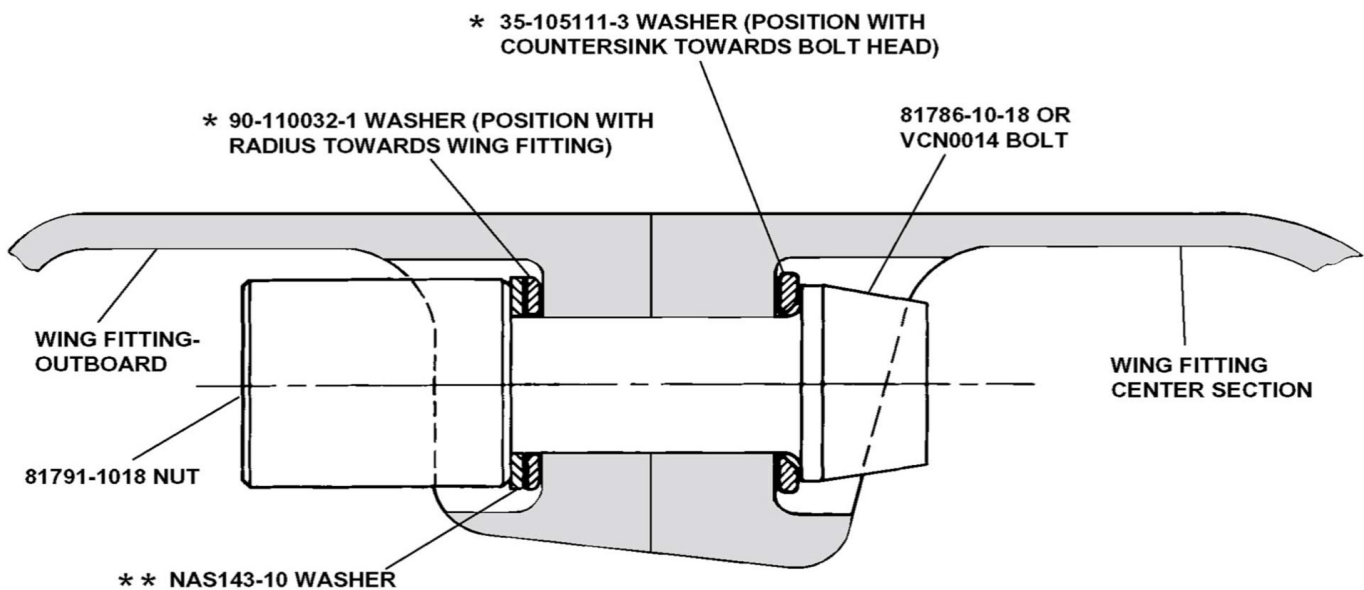
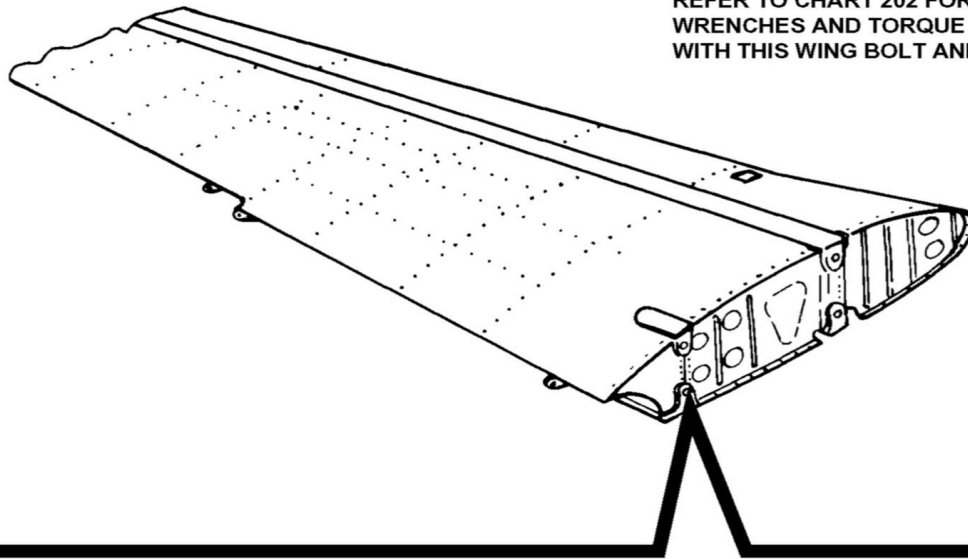
REFER TO CHART 202 FOR THE WING BOLT WRENCHES AND TORQUE ADAPTERS USED WITH THIS WING BOLT AND NUT.

90-31-48

Figure 215 : Sheet 1 : Lower Aft Wing Bolt Installation

E17342

REFER TO CHART 202 FOR THE WING BOLT
WRENCHES AND TORQUE ADAPTERS USED
WITH THIS WING BOLT AND NUT.



BOLT TORQUE: 1180 TO 1300 INCH-POUNDS. COAT THE COMPLETE BOLT, NUT, WASHERS, WING FITTING BOLT BORES, AND EXPOSED BOLT THREADS WITH MIL-C-16173 GRADE 2 CORROSION PREVENTIVE COMPOUND.

*** CHECK WASHER FOR A SMOOTH CONTINUOUS OUTER RADIUS.**

**** AN NAS143-10 WASHER MAY BE USED BETWEEN THE NUT AND THE 90-110032-1 WASHER TO PROVIDE A PROPER BOLT GRIP ADJUSTMENT.**

90-31-52.AI

Figure 216 : Sheet 1 : Wing Attach Fittings

E17004

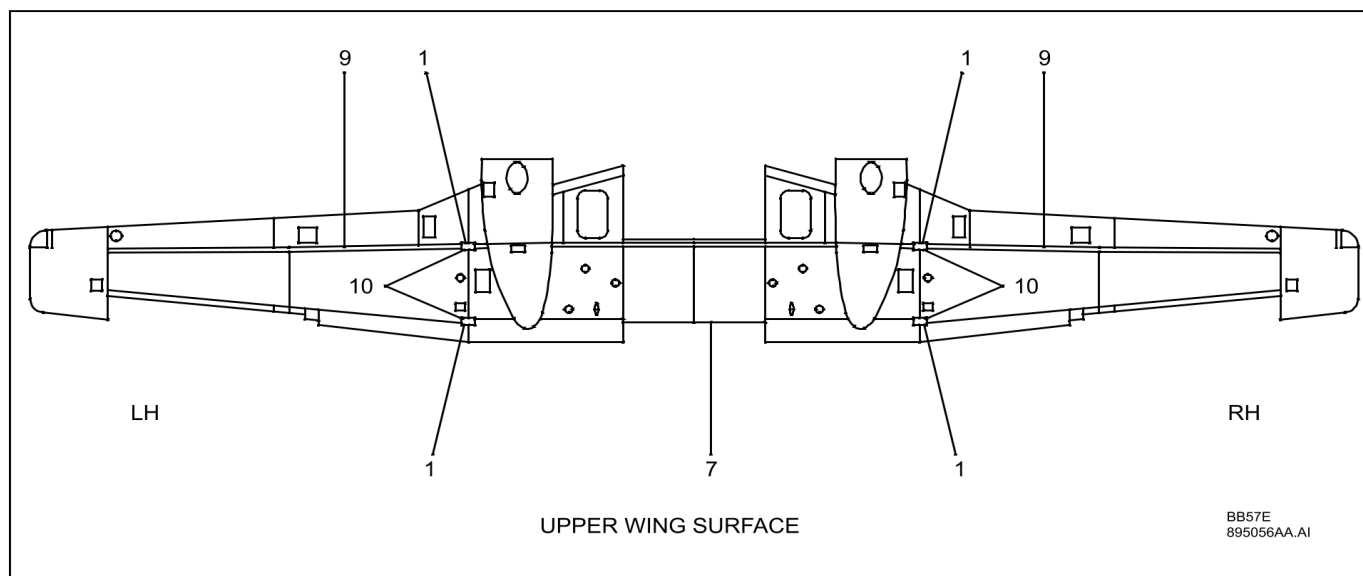


Figure 216 : Sheet 2 : Wing Attach Fittings

E17000

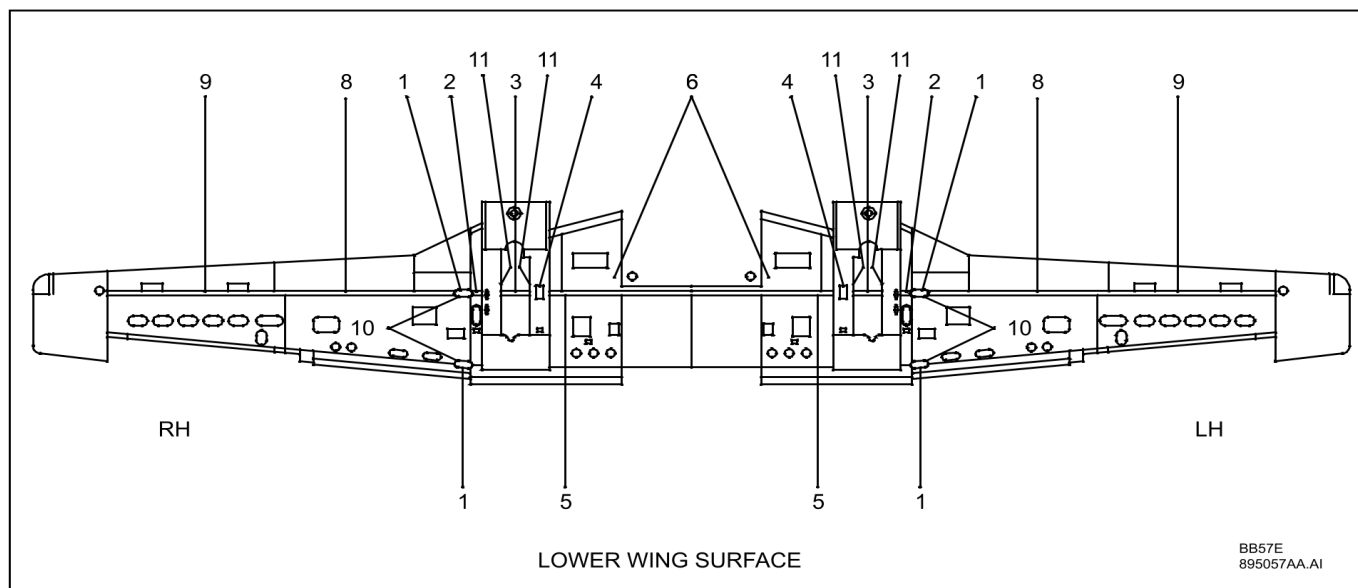
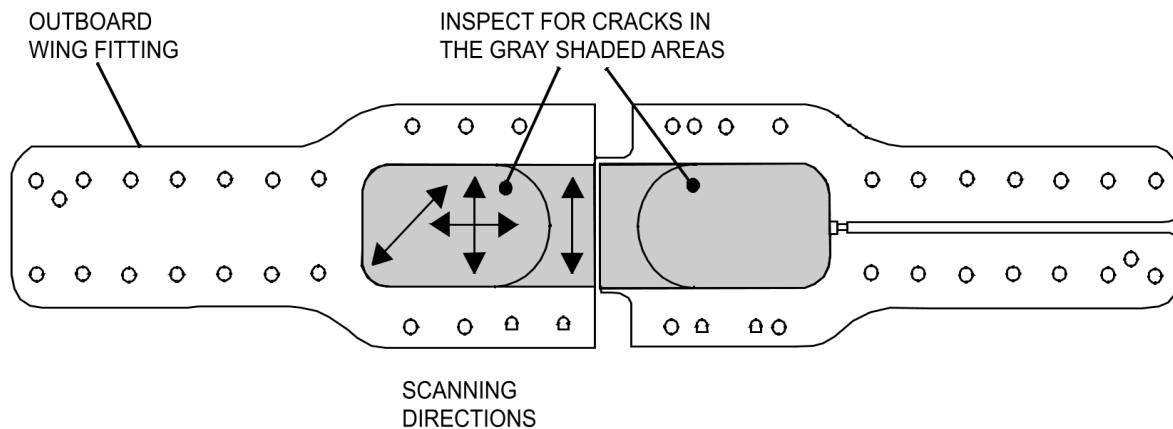
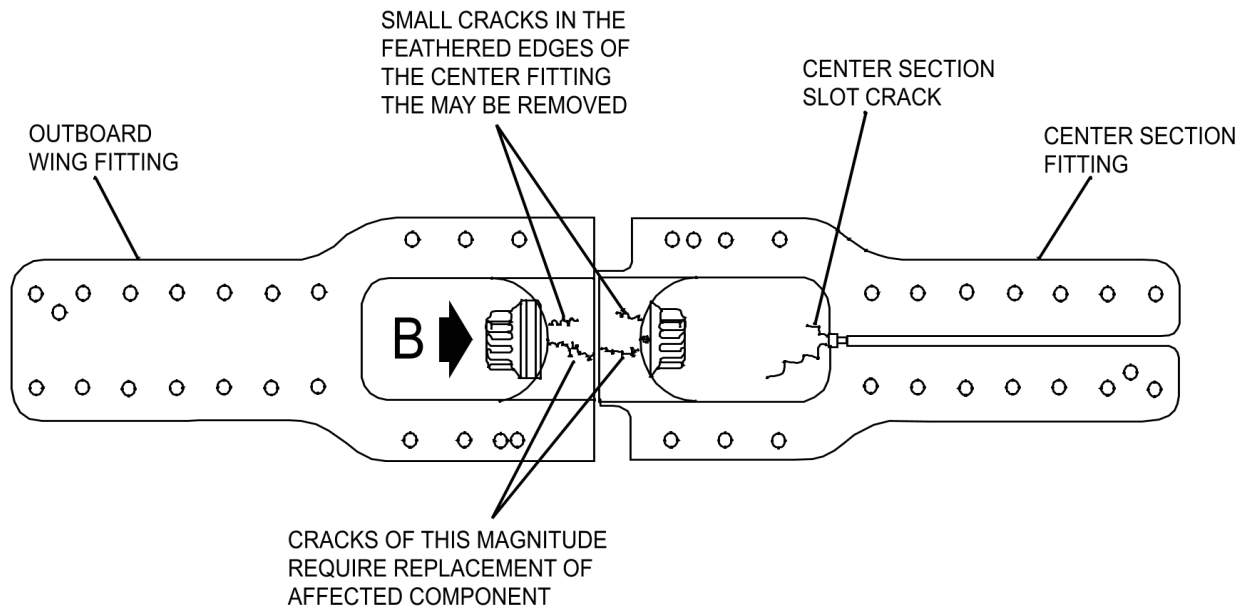


Figure 210 : Sheet 1 : Inspection Areas Bathtub Fittings

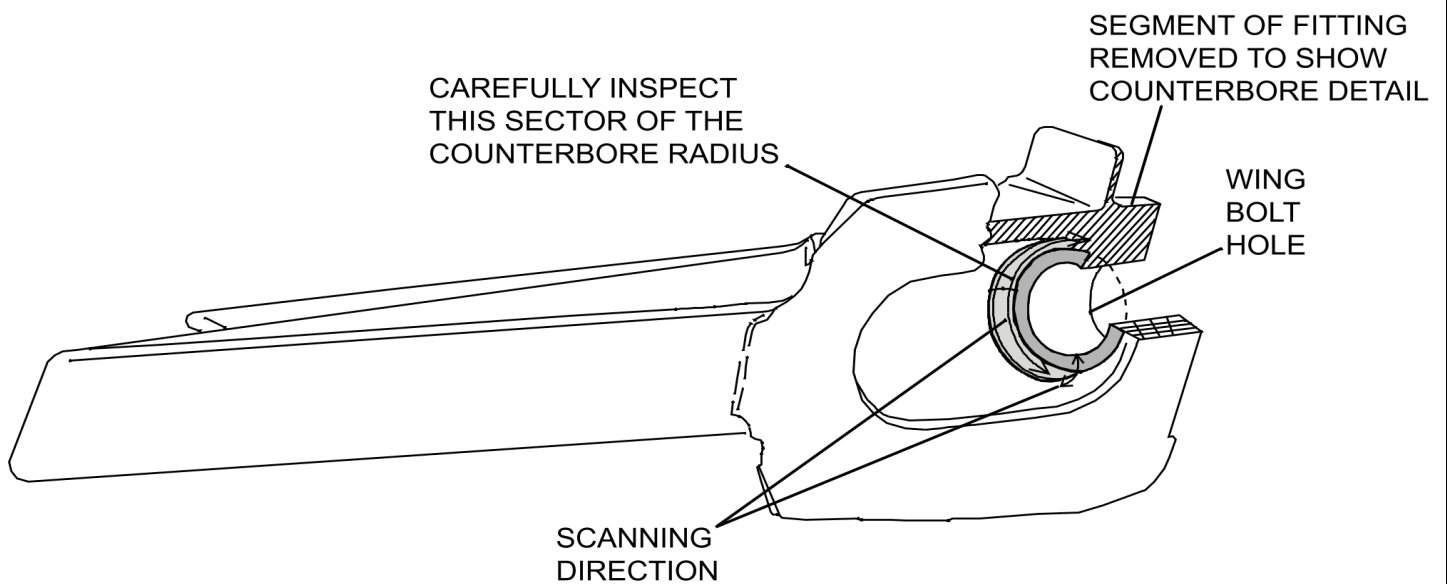
E12749



BB20B
101616AA.AI

Figure 211 : Sheet 1 : Inspection Areas Counterbore Radius

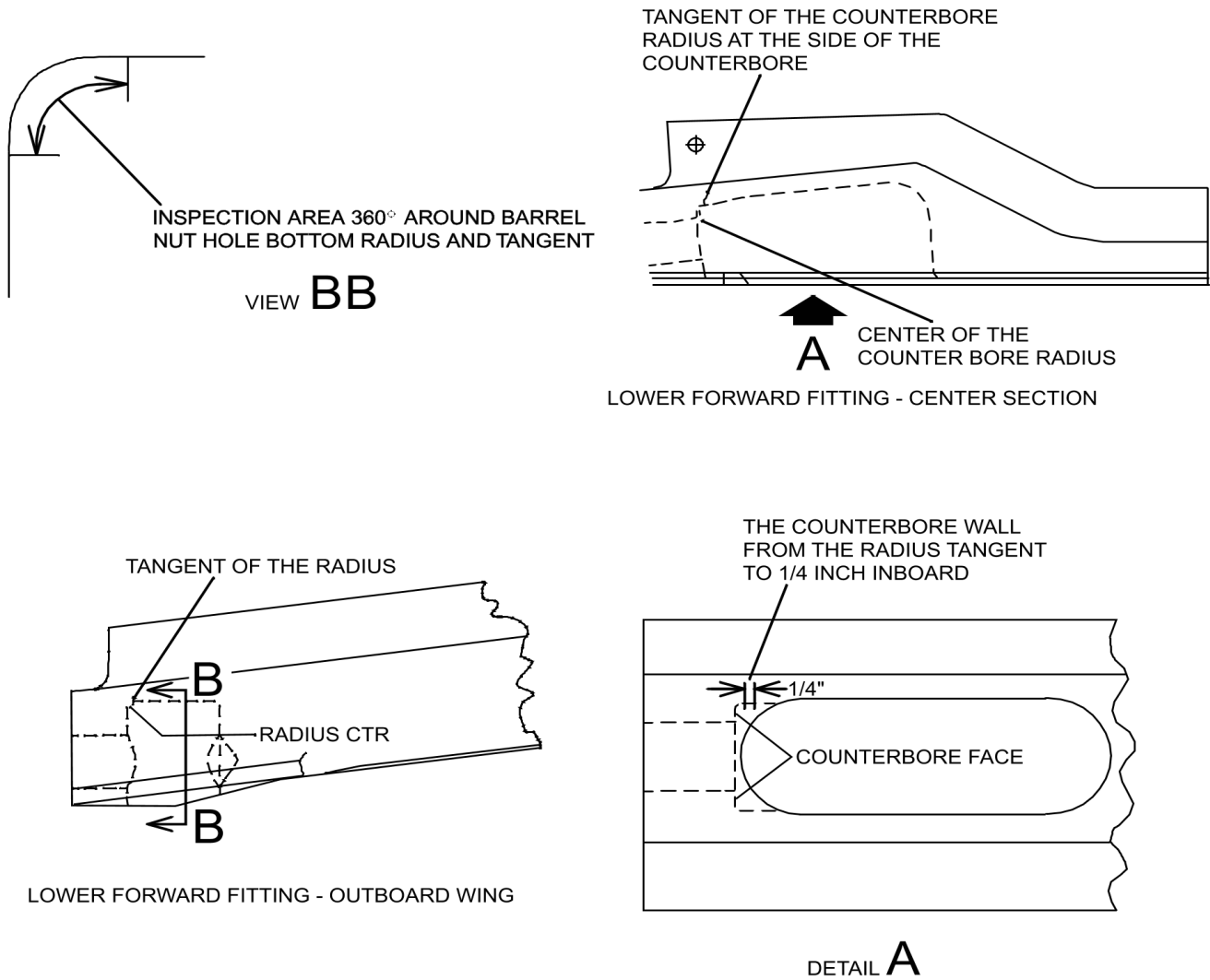
E16215



BB20B
101617AA.AI

Figure 212 : Sheet 1 : Lower Forward Fitting Inspection

E12750



BB20B
101618AA.AI