EFFECTIVITY
MODEL: 707/720
SERVICE BULLETIN
REFERENCE: 3365
SSI DOCUMENT (D6-44860)
REFERENCE:
SSD: 57-A05-18
57-A15-18
57-A25-18
57-A35-18
57-A45-18

PART 4 - ULTRASONIC

WINGS - ATTACH FITTINGS

1. Purpose

A. To detect cracks in the aluminum overwing fitting out of the four fastener holes common to the overwing fitting and the upper front spar (Detail I).

2. Equipment

A. Any ultrasonic equipment which will satisfy the requirements of this procedure may be used. The following equipment was used during the development of this procedure and found acceptable:

(1) Instrument

(a) Nortec NDT-131, Nortec Corporation, 421 N. Quay, Kennewick, WA. 99336

NOTE: It is recommended that the ultrasonic instrument should have a "reject" type control to suppress low level interference signals.

(2) Transducers

(a) Automation Industries, 5 MHz, 70° A miniature transducer, 57A3066

(b) Automation Industries, 5 MHz, 60° A miniature transducer, 57A3065

NOTE: (1) Small transducers are required. The case size of the above transducers is 0.3 inch wide, 0.7 inch long and 0.6 inch high. The active element is 1/4 inch x 1/4 inch.

(2) The transducers listed above are recommended.

B. Reference Standard

(1) Separate standards are required to calibrate for inboard and outboard overwing fitting inspection. Fabricate reference standards as shown in detail II.

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 1 (Sheet 1)

C. Couplant

(1) Exosen - 20, Krautkremer-Branson

(2) Light Grease

3. Preparation for Inspection

A. Remove fairings as necessary to gain access to the overwing fitting at the front spar.

B. Remove the paint from around the four fasteners common to the front spar and overwing fitting, and for a distance 1.5 inches forward and aft of them.

C. Sand lightly to remove any surface roughness from around the fastener heads.

D. Wipe surface clean.

E. Apply a thin coat of couplant to the inspection surface.

4. Instrument Calibration

A. Select the standard and transducer as follows:

Overwing Fitting	Standard Thickness	Shear Wave Transducer
Inboard	0.29	70°
Outboard	0.45	60°

B. Apply couplant to the standard around the fastener which is the same diameter as the one to be inspected.

C. Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed in contact with the washer as shown in detail III, position 1.

D. Set instrument gain so that the signal from the fastener hole is approximately 90% of the full scale.

E. Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in detail III.

F. Move transducer laterally to detect the calibration notch as shown in detail III, position 2. Note position of notch signal.

5. Inspection Procedure

A. Select the fastener hole to be inspected which matches the calibration conditions.

B. Position the ultrasonic transducer against the fastener and manipulate to detect the fastener hole as shown in detail IV, position 1.

C. Adjust hole response to obtain a 90% of full scale response. Increase instrument gain by an additional 3 db.

D. Move transducer laterally to transmit sound past the edge of the fastener hole. Rotate the transducer approximately ±20° about this point as shown in detail IV, position 2. Repeat for transducer positions 3, 4 and 5.

NOTE: If a crack occurs at "crack position 2" as shown in detail IV, the crack signal location will be close to the hole edge signal. A crack signal is indicated when the transducer is rotated at position 2, 3, 4 or 5 and:

(1) The hole signal remains or shifts slightly as the transducer is rotated.

(2) The hole signal drops and then increases at, or close to the same location as the hole edge when the transducer is rotated.

E. Repeat the inspection process on the remaining three fasteners common to the front spar and the overwing fitting. If oversize fastener holes are encountered use the 3/8 inch diameter calibration hole to establish position of hole and match signals.

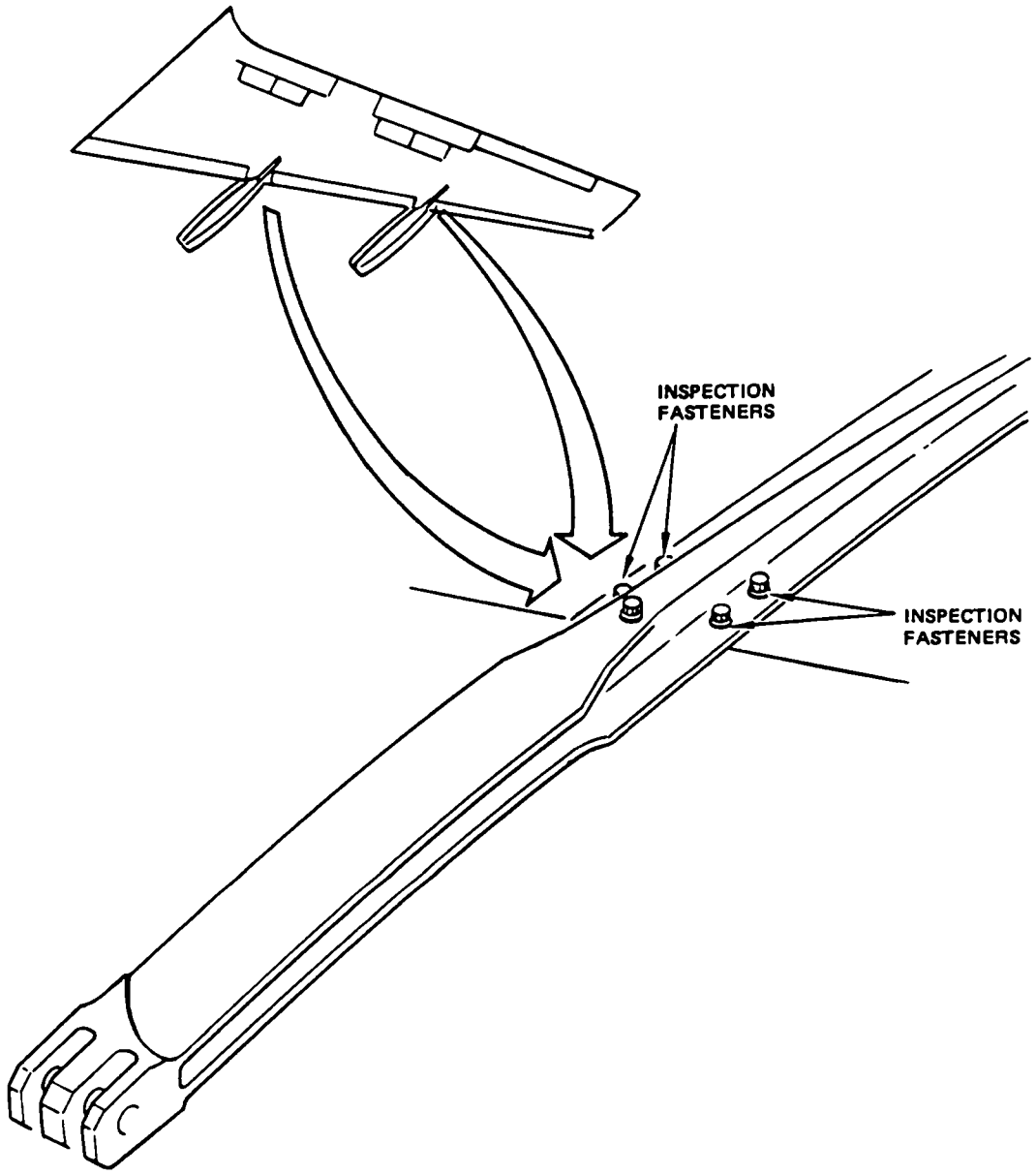
NOTE: (1) For holes which lie close to the heavy center section of the overwing fitting, manipulate the transducer to the extent possible as shown in detail IV, position 6.

(2) If fastener spacing prevents transducer positioning at the recommended position, scan in the expected crack location to the extent possible as shown in detail IV, position 7.

F. Any ultrasonic indication that is 50% or more of screen height, occurring at the expected crack location, should be considered a crack.

G. Repeat the calibration and inspection procedure for each overwing fitting.

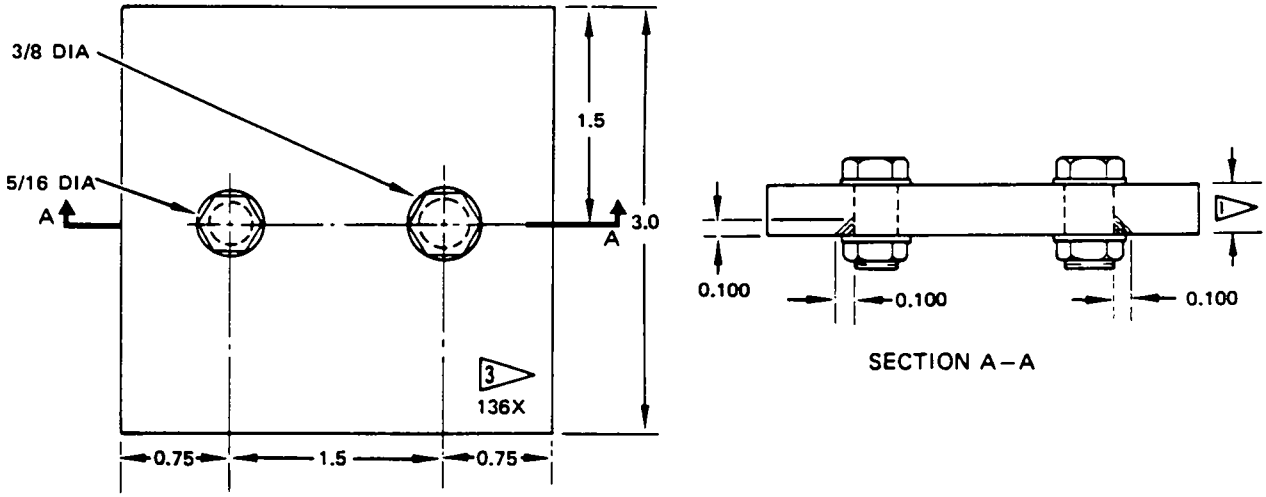
Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 1 (Sheet 3)



OVERWING FITTING–OUTBD SHOWN
DETAIL I

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 1 (Sheet 4)

NONDESTRUCTIVE TEST



SECTION A–A

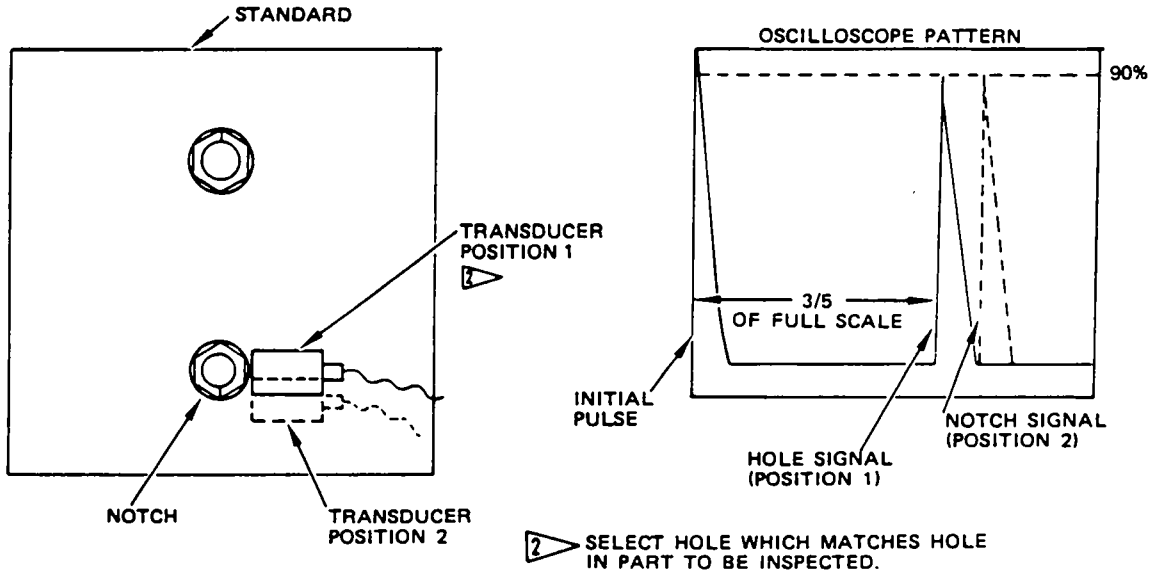
NOTES

- MATERIAL: 2024–T3 ALUMINUM
- HOLE SIZE: 5/16 AND 3/8. INSTALL BOLTS WITH WASHER AT HEAD AND NUT ENDS
- NOTCH WIDTH: 0.02 ± 0.005
- DIMENSIONAL TOLERANCE: X.XX ± 0.030 X.XXX ± 0.010
- P/N 6411–7
  AVAILABLE FROM IDEAL SPECIALTY CO.

	REFERENCE STANDARD NO.
1 OUTBOARD FITTING: 0.450 INBOARD FITTING: 0.290	136A 136B

3 ETCH OR STEEL STAMP WITH 136A OR 136B

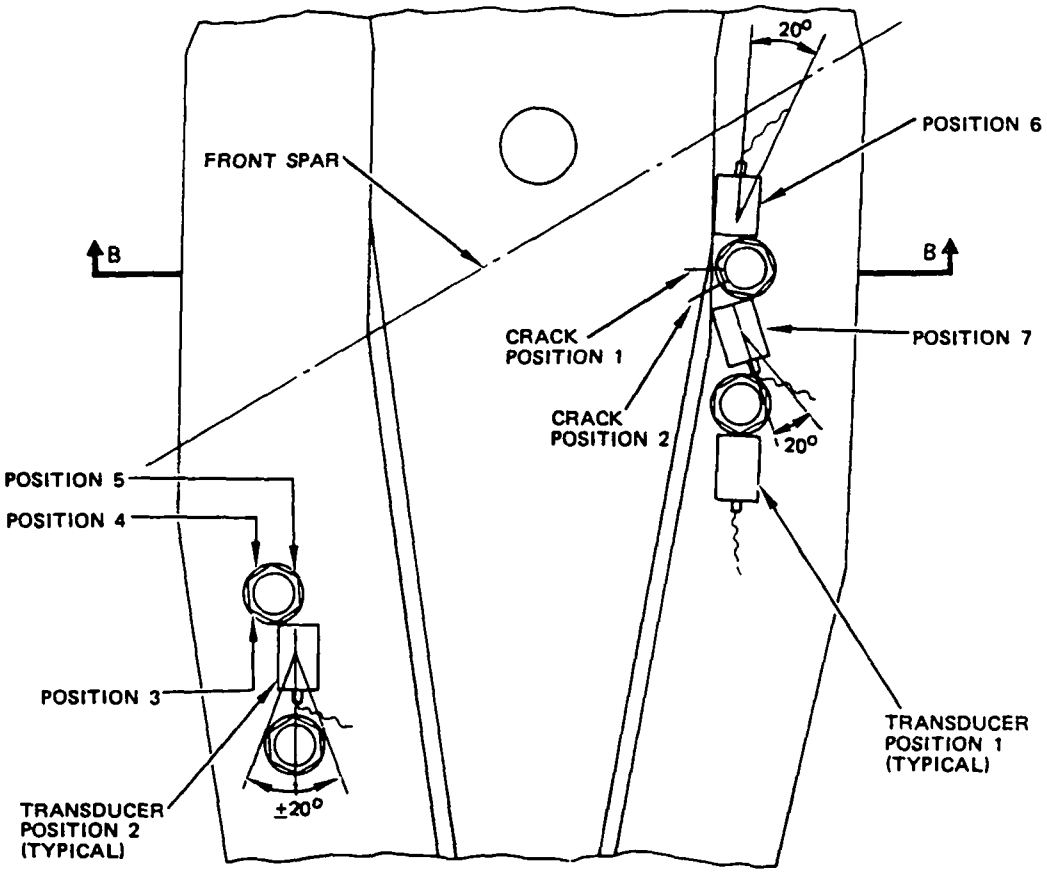
REFERENCE STANDARD – OVERWING FITTING
DETAIL II



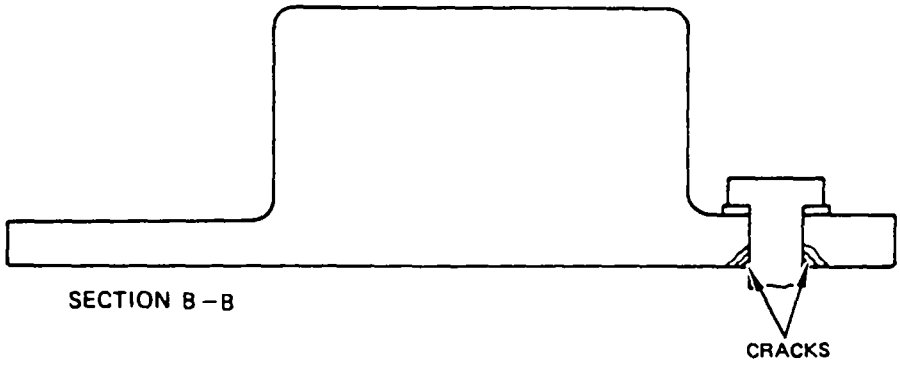
2 SELECT HOLE WHICH MATCHES HOLE IN PART TO BE INSPECTED.

TRANSDUCER CALIBRATION POSITION
DETAIL III

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 1 (Sheet 5)



LEFT HAND INBD FITTING SHOWN



TRANSDUCER INSPECTION POSITIONS – OVERWING FITTING
DETAIL IV

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 1 (Sheet 6)

EFFECTIVITY
MODEL: 707/720
SERVICE BULLETIN REFERENCE: 2090, 3173
SSI DOCUMENT (D6-48023) REFERENCE:
SSD: 57-A15-19
57-A25-19
57-A35-19
57-A45-19

PART 4 - ULTRASONIC

OVERWING SUPPORT FITTING CLEVIS LUGS

1. Purpose

   A. This procedure examines the clevis lugs of the overwing support fittings at the inboard and outboard nacelle struts for cracks.

2. Equipment

   A. All ultrasonic equipment that can do this procedure are permitted for use.

      NOTE: Refer to Part 1, 51-01-00, for data on the equipment manufacturers.

      (1) Instrument - Use an ultrasonic instrument that can operate between 4 and 6 MHz. The instrument specified below was used to help prepare this procedure.

         (a) Krautkramer/Branson USL 38, Krautkramer/Branson Corp.

      (2) Transducer - A 5 MHz 45-degree shear wave (in aluminum) transducer with a 0.25 inch (6.0 mm) diameter element. The element is put in a case approximately 0.75 inch (19.0 mm) long, 0.37 inch (9.0 mm) wide, and 0.75 inch (19.0 mm) high. This transducer case has an end connector. The transducer specified below was used to help prepare this procedure.

         (a) Automation part number 57A3064; Staveley Sensors, Inc.

            NOTE: Equivalent transducer - Staveley Instrument Inc.; part number Z-Z-0.250-5MHz-45A

   B. Reference Standards

      (1) Use the data in Detail I and Table 1 to help make the reference standard necessary to do the inspections for the overwing support fittings on your specific airplanes.

         NOTE: The reference standard used during this inspection must have the same configuration as the lug to be examined.

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 1)

C. Couplant - Use couplant that will not damage the airplane structure.

3. Preparation for Inspection

A. Remove the fairings from the inboard and outboard nacelle struts to get access to the overwing support fittings.

B. Make sure the clevis lug inspection areas are free from dirt and loose paint.

4. Instrument Calibration

It is necessary to do two calibrations to completely examine a clevis lug hole for cracks. One calibration sets up the equipment to find cracks that start in the aft area of the hole and one calibration sets up the equipment to find cracks in the forward area of the hole. See Detail II.

A. Calibrate the equipment to examine the aft area of the clevis lug holes (see Detail II) in the overwing support fittings for cracks as follows:

(1) Connect the transducer to the instrument and prepare the instrument for use. Make sure that:

(a) You set the reject control to a minimum so it does not have an effect on the screen display.

(b) The sound initial pulse is set at zero percent of the full screen width.

(2) Get the reference standard that has the same configuration as the clevis lug to be examined. See Table I.

(3) Put the transducer on the reference standard so that the sound exit point is approximately 1.25 inch (32.0 mm) from the lug hole center line and so that the ultrasonic beam points at the clevis lug hole. See Detail III, transducer position "A."

(4) Move the transducer at position "A" to get a maximum response signal on the instrument screen display from the lug hole (see Note). Adjust the instrument controls to position the lug hole response signal at 70 percent of full screen width and 100 percent of full screen height. See Detail III, position "A" and flagnote 2.

NOTE: You will get the maximum response signal from the lug hole when the sound exit point of the transducer is 1.25 inch (32.0 mm) from the hole centerline.

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 2)

(5) Move the transducer to position "D" (see Detail IV) to get the sound exit point at approximately 1.0 inch (25.0 mm) from the hole centerline. With the transducer at this position, you will get a response signal from the 10-degree notch and two response signals from the lug hole. The response signals from the lug hole must be at approximately 60 and 80 percent of full screen height. To make sure the signals you get are from the lug holes, lightly tap the inside of the lug hole with your finger; the amplitude of the lug hole signals will decrease. See Detail IV, transducer position "D", and flagnotes 2, 3, and 4.

(6) Move the transducer to position "B" (see Detail III) to get the sound exit point at approximately 0.75 inch (19.0 mm) from the hole centerline. Monitor the instrument screen display to get a maximum response signal from the 10-degree notch. The notch response signal must occur at 60 percent of full screen width. Adjust the instrument sensitivity control so the notch signal is 80 percent of full screen height. See Detail III, transducer position "B", and flagnote 3.

(7) To see how the notch signal can move laterally, move the transducer at position "B" (see Detail III) to and away from the 10-degree notch and monitor the notch response signal. The notch response signal will move laterally from 55 to 65 percent (approximately) of full screen width. See Detail III, flagnote 5.

NOTE: The amplitude of the notch response signal will change as the transducer moves to and away from the 10-degree notch.

(8) Put the transducer on the reference standard at position "C" as shown in Detail III. Move the transducer at position "C" to and away from the lug hole (see Detail III, flagnote 7). While you move the transducer, monitor the instrument display screen. This will show you the signal responses you will get when you do the inspection on a hole without a crack.

B. Calibrate the equipment to examine the forward area of the clevis lug holes (see Detail II) in the overwing support fittings for cracks as follows:

(1) Do paragraphs 4.A.(1) and 4.A.(2).

(2) Put the transducer on the reference standard at position "A" (see Detail V), so that the sound exit point is approximately 1.25 inch (32.0 mm) from the lug hole centerline. Make sure the ultrasonic beam points at the clevis lug hole.

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 3)

(3) Move the transducer at position "A" to get a maximum response signal on the instrument screen display from the lug hole (see NOTE). Adjust the instrument controls to position the lug hole response signal at 70 percent of full screen width and 100 percent of full screen height. See Detail V, transducer position "A", and flagnote 2.

NOTE: You will get the maximum response signal from the lug hole when the sound exit point of the transducer is 1.25 inch (32.0 mm) from the hole centerline.

(4) Increase the instrument sensitivity 16 dB.

(5) Move the transducer to position "D" (see Detail VI) to get the sound exit point at approximately 1.0 inch (25.0 mm) from the hole centerline. With the transducer at this position, you will get three lug hole response signals. To make sure the signals you get are from the lug holes, lightly tap the inside of the lug hole with your finger; the amplitude of the lug hole signals will decrease. See Detail VI, transducer position "D", and flagnotes 2, 3, and 4.

(6) Move the transducer to position "B" (see Detail V) to get the sound exit point at approximately 0.37 inch (9.0 mm) from the hole centerline. Monitor the instrument screen display to get a maximum response signal from the 30-degree notch (see NOTE). Adjust the instrument controls to position the 30-degree response signal at 80 percent of full screen height and 70 percent of full screen width. See Detail V, transducer position "B", and flagnote 3.

NOTE: Turn the transducer so the front of the transducer points at the reference standard edge that has the notch to get a maximum response signal from the notch. See Detail V, position "B", and flagnote 4.

(7) To see how the notch signal can move laterally, move the transducer at position "B" (see Detail V) to and away from the 30-degree notch and monitor the notch response signal. The notch response signal will move laterally from 65 to 75 percent (approximately) of full screen width. See Detail V, transducer position "B", and flagnote 5.

NOTE: The amplitude of the notch response signal will change as the transducer moves to and away from the 30-degree notch.

(8) Put the transducer on the reference standard at position "C" as shown in Detail V. Move the transducer at position "C" to and away from the lug hole (see Detail V, flagnote 7). While you move the transducer, monitor the instrument display screen. This will show you the signal responses you will get when you do the inspection on a hole without a crack.

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 4)

5. Inspection Procedure

A. Examine the aft area of the clevis lug holes (see Detail II) in the overwing support fittings for cracks as follows:

(1) Calibrate the instrument as specified in paragraph 4.A.

(2) Put the transducer on the upper inspection surfaces of the clevis lug at the inboard strut (see Detail VII). Move the transducer on the inspection surfaces to make sure it fully touches the clevis lug. If the transducer does not fully touch the clevis lug, lightly sand the painted inspection surface until it does.

(3) Put couplant on the clevis lug surfaces that the transducer will touch. See Detail VII, inspection area surface.

(4) Put the transducer at position "A" on the clevis lug (see Detail VII) so that the sound exit point is approximately 1.25 inch (32.0 mm) from the hole centerline. Make sure that the sound beam of the transducer points to the forward end of the clevis lug. See Detail VII.

(5) Move the transducer at position "A" and monitor the instrument screen display. You must get a response signal from the lug hole that is at 70 percent of full screen width. If necessary, increase the instrument sensitivity a maximum of 6 db to get a response signal that is approximately the full screen height (the same as you got during calibration; see Detail III, flagnote 2, transducer position "A").

NOTE: A response signal from the lug hole on the instrument screen display tells you that sound is transmitted into the lug satisfactorily.

(6) Move the transducer forward so that the sound exit point is approximately 0.75 inch (19.0 mm) aft of the lug hole centerline. See Detail VII, flagnotes 2 and 3.

NOTE: When the sound exit point of the transducer is approximately 1.0 inch (25.0 mm) from the lug hole centerline you will get a response signal from the lug hole that is almost the same as you got during calibration (see Detail IV, flagnotes 2 and 4 for the calibration signals).

(7) Examine the aft side of the clevis lug holes. To do this, move the transducer so that the sound exit point moves in an area that is between 0.75 and 0.37 inches (19.0 to 9.0 mm) (approximately) aft of the lug hole centerline. Do the inspection as follows:

(a) Monitor the instrument screen display as you do the inspection.

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 5)

(b) Make a list of all the response signals that are equal to or more than 40 percent of full screen height and between 50 to 70 percent of full screen width.

(c) Compare the response signals you get during the inspection with the response signals you got during calibration (see Detail III, flagnotes 3 and 5).

(8) Do paragraphs 5.A.(1) thru 5.A.(7) again for the lower inspection surfaces of the clevis lug. See Detail VII, transducer position "B".

(9) Do paragraphs 5.A.(1) thru 5.A.(8) again on the outboard struts.

B. Examine the forward area of the clevis lug holes (see Detail II) in the overwing support fittings for cracks as follows:

(1) Calibrate the instrument as specified in paragraph 4.B.

(2) Put couplant on the surfaces of the clevis lug at the inboard strut that the transducer will touch. See Detail VII, transducer position "A" inspection area.

(3) Put the transducer at position "A" on the clevis lug (see Detail VII, flagnote 1) so that the sound exit point is approximately 1.25 inch (32.0 mm) from the hole centerline. Make sure that the sound beam of the transducer points to the forward end of the clevis lug.

(4) Move the transducer at position "A" and monitor the instrument screen display. You must get a response signal from the lug hole that is at 70 percent of full screen width. If necessary, increase the instrument sensitivity a maximum of 6 db to get a response signal that is approximately the full screen height (the same as you got during calibration; see Detail III, flagnote 2, transducer position "A").

NOTE: A response signal from the lug hole on the instrument screen display tells you that sound is transmitted into the lug satisfactorily.

(5) Move the transducer forward so that the sound exit point is approximately 0.5 inch (13.0 mm) aft of the lug hole centerline. See Detail VII, flagnotes 2 and 3.

NOTE: When the sound exit point of the transducer is approximately 1.0 inch (25.0 mm) from the lug hole centerline you will get a response signal from the lug hole that is almost the same as you got during calibration (see Detail VI, flagnotes 2, 3 and 4 for the calibration signals).

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 6)

(6) Examine the forward side of the clevis lug hole. To do this, move the transducer so that the sound exit point moves in an area that is approximately 0.5 inches (13.0 mm) aft of the lug hole centerline to about 0.25 inches (6.0 mm) forward of the lug hole centerline. Do the inspection as follows:

(a) Make sure the front of the transducer points at the edge of the lug hole as shown in Detail V, flagnote 4.

(b) Monitor the instrument screen display as you do the inspection.

(c) Make a list of all the response signals that are equal to or more than 40 percent of full screen height and between 50 to 70 percent of full screen width.

(d) Compare the response signals you get during the inspection with the response signals you got during calibration (see Detail V, flagnotes 3 and 5).

(7) Do paragraphs 5.B.(1) thru 5.B.(6) again for the lower inspection surfaces of the clevis. See Detail VII, transducer position "B".

(8) Do paragraphs 5.B.(1) thru 5.B.(7) again on the outboard struts.

6. Inspection Results

A. A response signal that is 40 percent or more of the full screen height and from 50 to 70 percent of the full screen width is an indication of a possible crack.

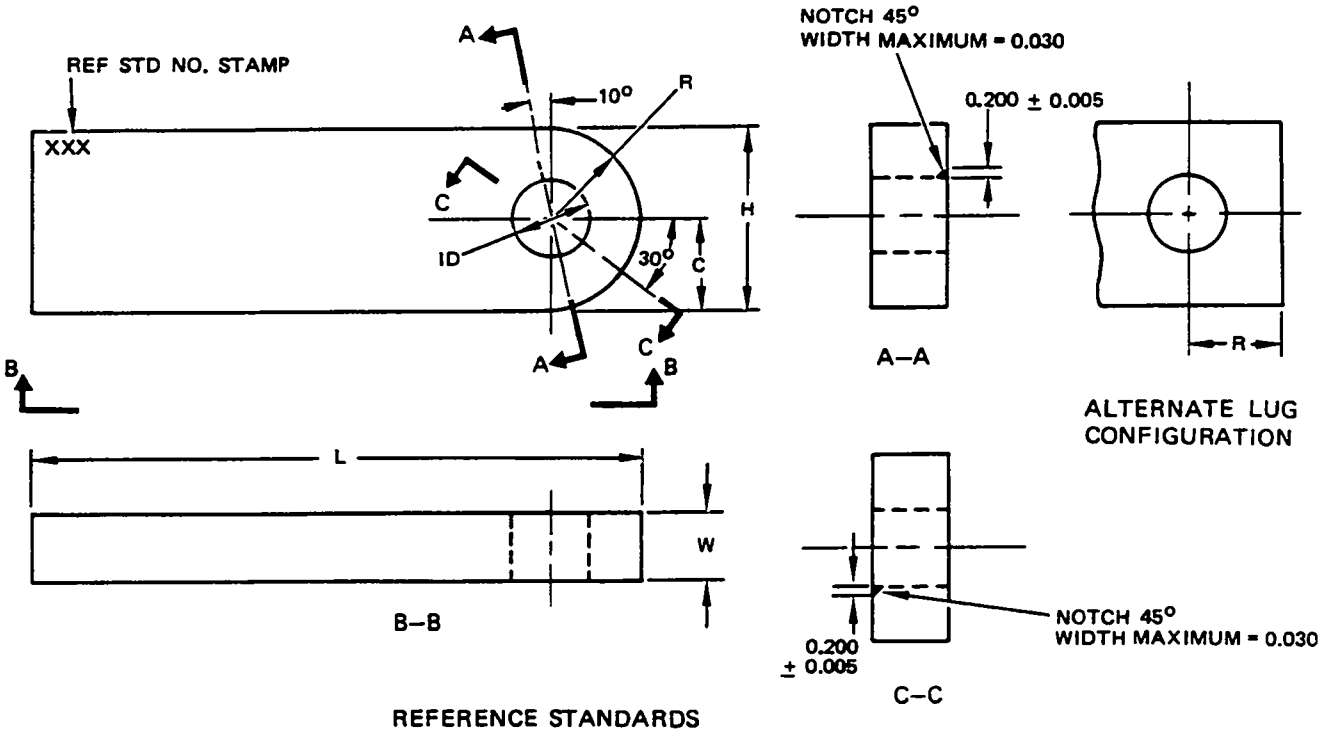
B. Compare the signals that look to be crack indications that occur during the inspections of paragraph 5.A. (the aft area of the clevis lug holes) with the crack signals you got during calibration (see the instrument screen displays of Detail III, flagnotes 3 and 5).

C. Compare the signals that look to be crack indications that occur during the inspections of paragraph 5.B. (the forward area of the clevis lug holes) with the crack signals you got during calibration (see the instrument screen displays of Detail V, flagnotes 3 and 5).

D. A possible crack can be examined with a surface eddy current inspection after the clevis lug bolt and bushing are removed.

NOTE: It can be necessary to remove the overwing support fitting from the nacelle strut to do the eddy current inspection.

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 7)



REFERENCE STANDARDS
DETAIL I

EFFECTIVITY	STRUT LOCATION	ID	L	H	W	R	C	REF STD NUMBER
1	INBOARD	1.03	8.0	2.42	0.88	1.25	1.21	104
2	INBOARD	1.03	8.0	2.42	0.68	1.25	1.21	105
3	INBOARD	1.25	8.0	3.75	0.73	1.87	1.87	106
4	OUTBOARD	0.84	8.0	2.52	0.41	1.25	1.26	107
5	OUTBOARD	0.84	8.0	2.76	0.55	1.38	1.38	108
TOLERANCE		±0.005	±0.030	±0.010	±0.030	±0.010	±0.010	

EFFECTIVITY TABLE
TABLE I

NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 7079–T6, 7075–T6, 2024–T3, OR 2024–T4 ALUMINUM
- ETCH OR STEEL STAMP WITH THE REFERENCE STANDARD NUMBER SPECIFIED IN TABLE I
- FINISH: 125 MICROINCHES

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 8)

NOTES FOR TABLE I: (CONT)

1> CUM LINE NOS. 440 THRU 722, 724 THRU 897, 899, 900, 903, 905, 906, 908, 910 THRU 912, 914 AND 915

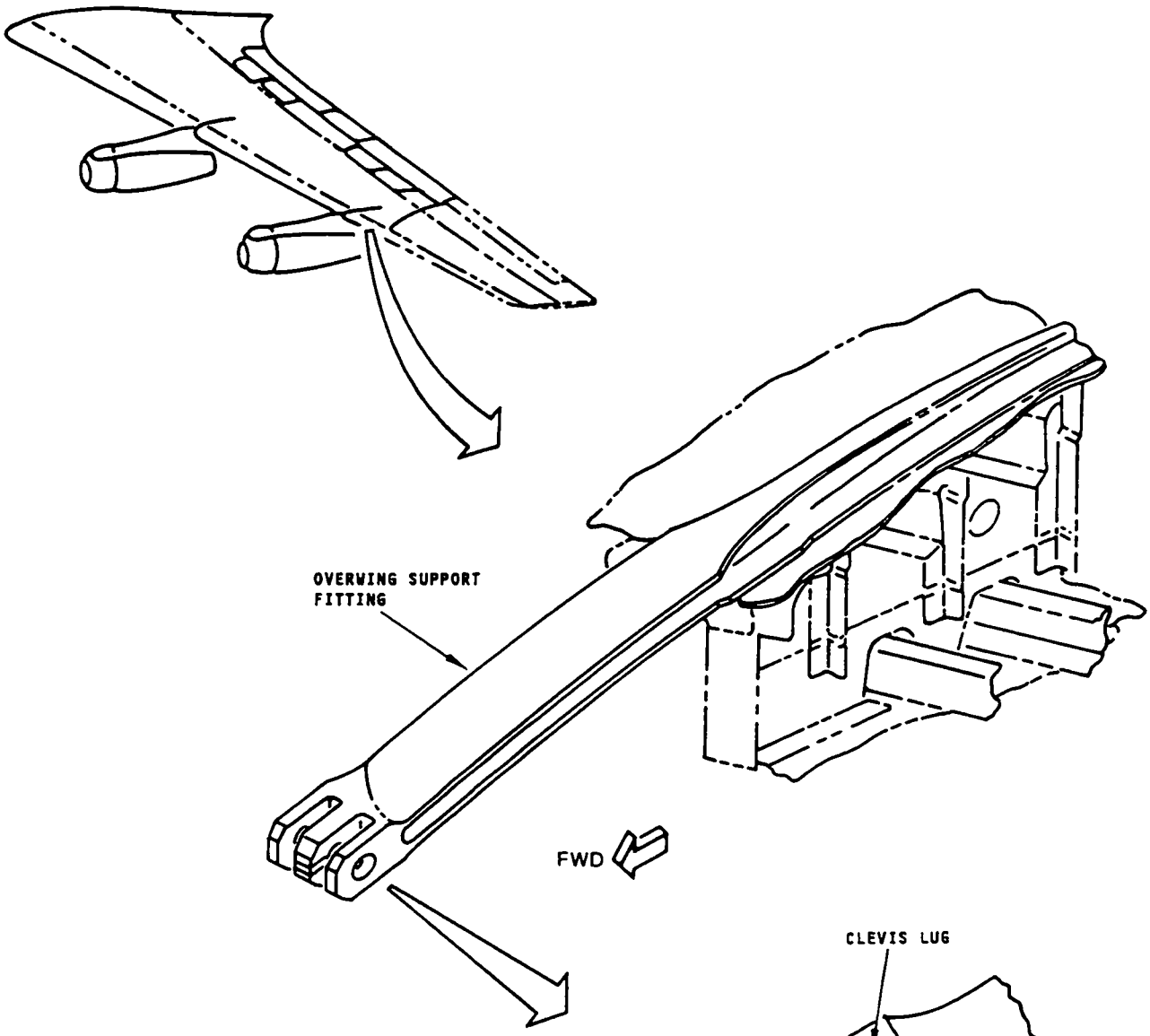
2> CUM LINE NOS. 1 THRU 211, 213 THRU 439

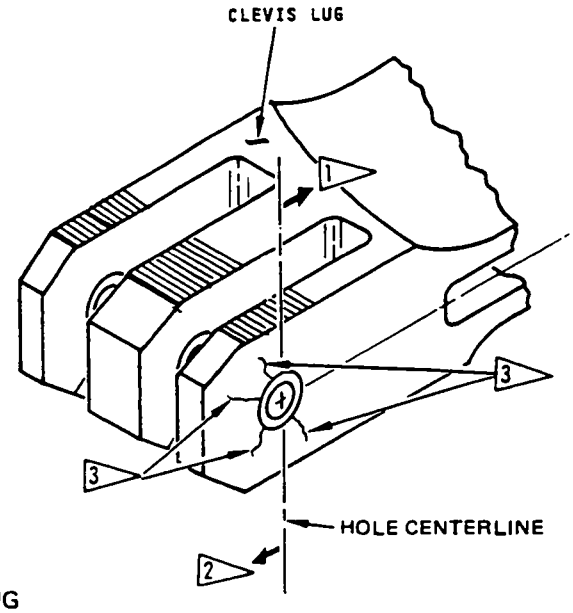
3> CUM LINE NOS. 917 THRU 919, 922, 923, 925, 928, 929, 936, 938 and 941

4> CUM LINE NOS. 1 THRU 211, 213 THRU 439, 471, 490, 491, 493, 506, 526, 533, 535, 539, 562, 565, 571, 575, 579, 586, 589 THRU 591, 593 595, 600, 602, 604, 622, 682, 787, 794 AND 801

5> CUM LINE NOS. 440 THRU 489, 492, 494 THRU 505, 507 THRU 525, 527 THRU 532, 534, 536, 537, 538, 540 THRU 561, 563, 564, 566 THRU 570, 572 THRU 574, 576 THRU 578, 580 THRU 585, 587, 588, 590, 592, 594, 596 THRU 599, 601, 603, 605 THRU 621, 623 THRU 681, 683 THRU 786, 788 THRU 793, 795 THRU 800, 802 THRU 897, 899, 900, 903, 905, 906, 908, 910 THRU 912, 914, 915, 917 THRU 919, 922, 923, 925, 928, 929, 936, 938, 941

Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 9)





NOTES

- LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE
- OUTBOARD STRUT SHOWN, INBOARD STRUT ALMOST THE SAME

INSPECTION SURFACE AREA - UPPER AND LOWER SURFACE OF CLEVIS LUGS

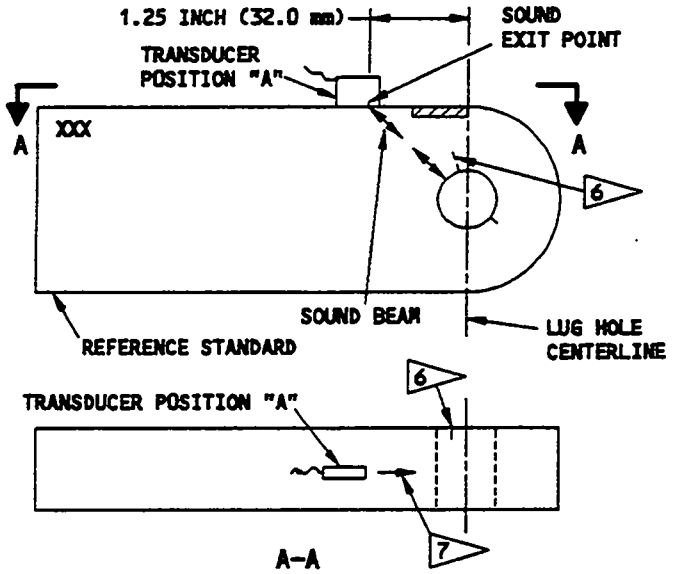
1 AFT INSPECTION AREA (AFT AREA OF THE HOLE)

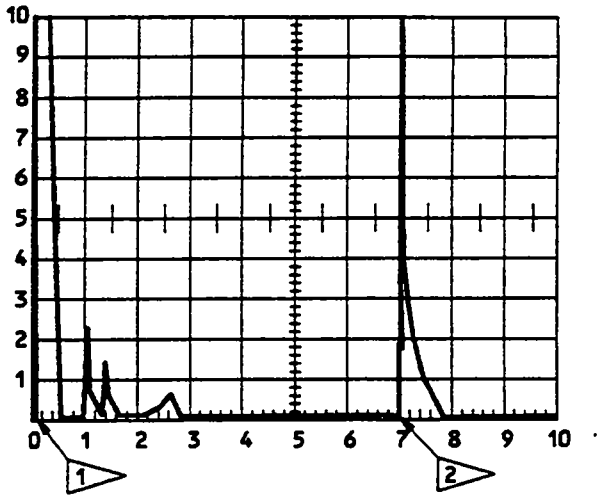
2 FORWARD INSPECTION AREA (FORWARD AREA OF THE HOLE)

3 POSSIBLE CRACK LOCATIONS

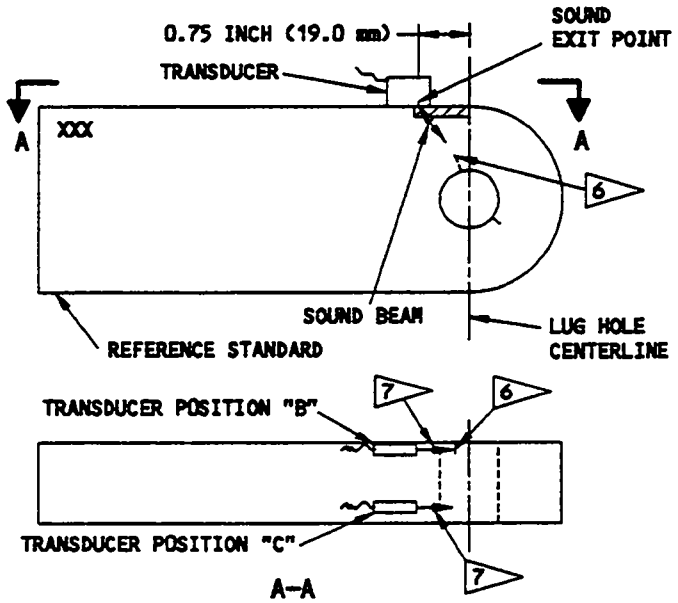
OUTBOARD OVERWING SUPPORT FITTING CLEVIS LUG
DETAIL II

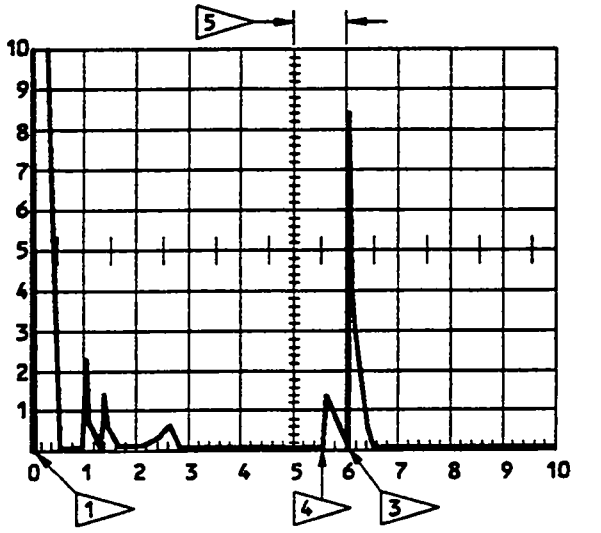
Overwing Support Fitting Clevis Lugs
Figure 2 (Sheet 10)





INSTRUMENT SCREEN DISPLAY - TRANSDUCER SOUND EXIT POINT AT 1.25 INCH (32.0 mm) FROM LUG HOLE CENTERLINE





INSTRUMENT SCREEN DISPLAY - TRANSDUCER SOUND EXIT POINT AT 0.75 INCH (19.0 mm) FROM LUG HOLE CENTERLINE

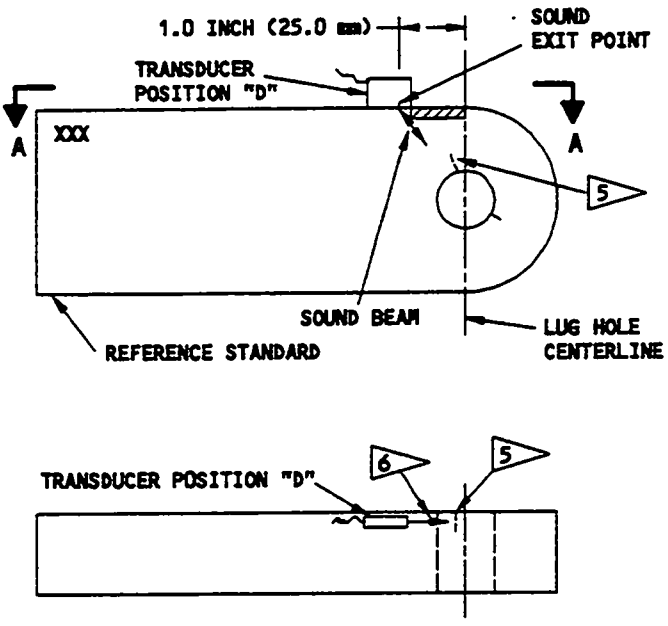
NOTES

INSPECTION AREA - APPROXIMATELY 0.75 INCH (19.0 mm)

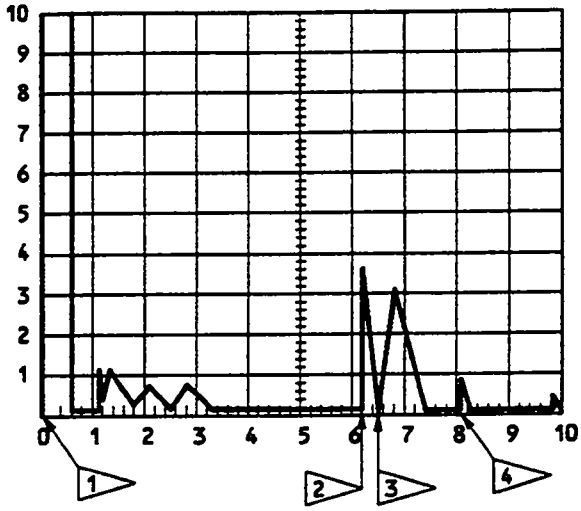
1. SOUND INITIAL PULSE
2. HOLE RESPONSE SIGNAL AT 70 PERCENT OF FULL SCREEN WIDTH AND 100 PERCENT OF FULL SCREEN HEIGHT (OCCURS AT POSITION "A")
3. NOTCH RESPONSE SIGNAL AT 60 PERCENT OF FULL SCREEN WIDTH AND 80 PERCENT OF FULL SCREEN HEIGHT (OCCURS AT POSITION "B")
4. HOLE RESPONSE AT 55 PERCENT OF FULL SCREEN WIDTH (OCCURS AT POSITION "C")
5. LATERAL MOVEMENT OF THE NOTCH RESPONSE SIGNAL WILL OCCUR BETWEEN 55 TO 65 PERCENT OF FULL SCREEN WIDTH WHEN THE TRANSDUCER IS MOVED TO OR AWAY FROM THE NOTCH (OCCURS WHEN THE TRANSDUCER IS NEAR POSITION "B")
6. 10 DEGREE NOTCH
7. TRANSDUCER MOVEMENT

DETAIL III

Instrument Calibration on Reference Standard - Aft Inspection Area
Figure 2 (Sheet 11)



A-A
POSITION "D"



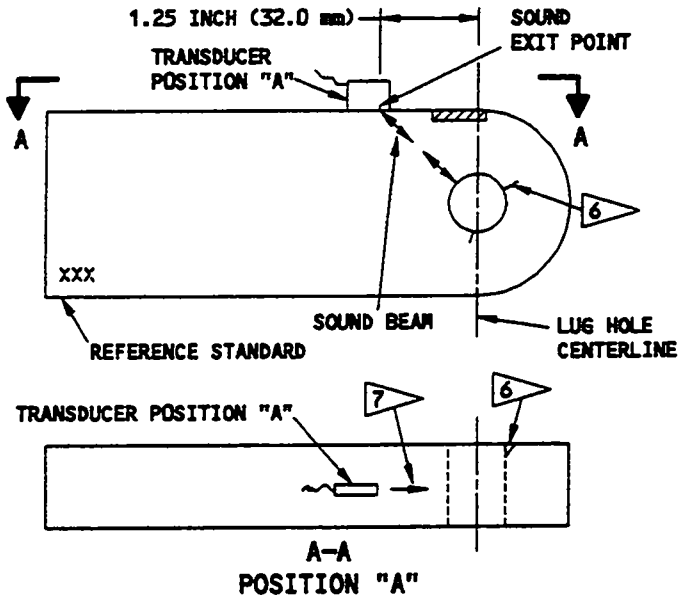
INSTRUMENT SCREEN DISPLAY - TRANSDUCER SOUND EXIT POINT AT 1.0 INCH (25.0 mm) FROM LUG HOLE CENTERLINE

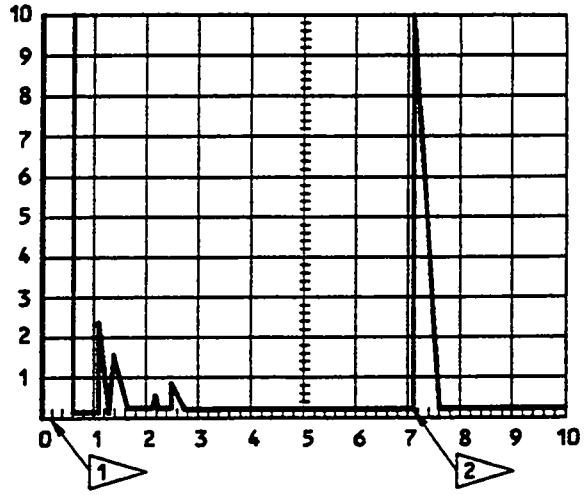
NOTES

- INSPECTION AREA - APPROXIMATELY 0.75 INCH (19.0 mm)
- 1 SOUND INITIAL PULSE
- 2 HOLE RESPONSE SIGNAL AT APPROXIMATELY 60 PERCENT OF FULL SCREEN WIDTH
- 3 NOTCH RESPONSE SIGNAL AT APPROXIMATELY 65 PERCENT OF FULL SCREEN WIDTH
- 4 SECOND HOLE RESPONSE SIGNAL AT APPROXIMATELY 80 PERCENT OF FULL SCREEN WIDTH
- 5 10 DEGREE NOTCH
- 6 TRANSDUCER MOVEMENT

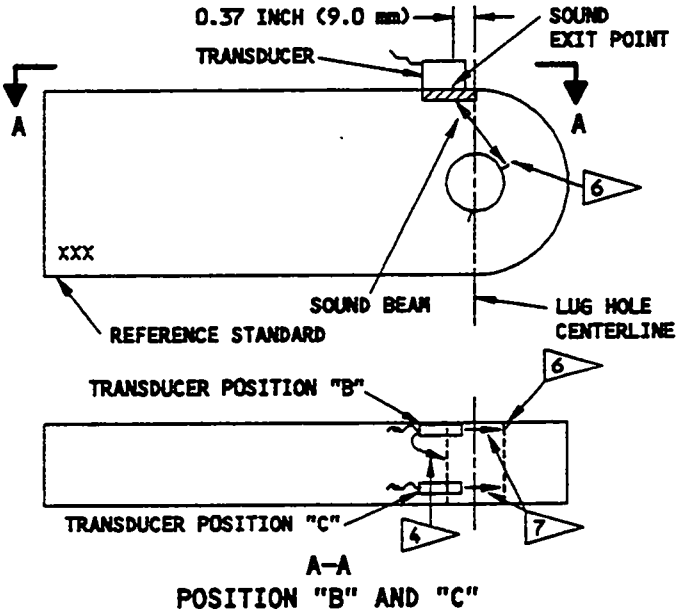
DETAIL IV

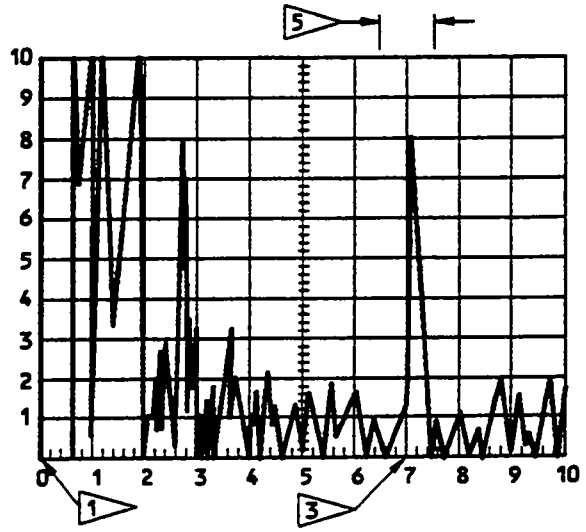
Instrument Calibration on Reference Standard - Aft Inspection Area
Figure 2 (Sheet 12)





INSTRUMENT SCREEN DISPLAY - TRANSDUCER SOUND EXIT POINT AT 1.25 INCH (32.0 mm) FROM LUG HOLE CENTERLINE





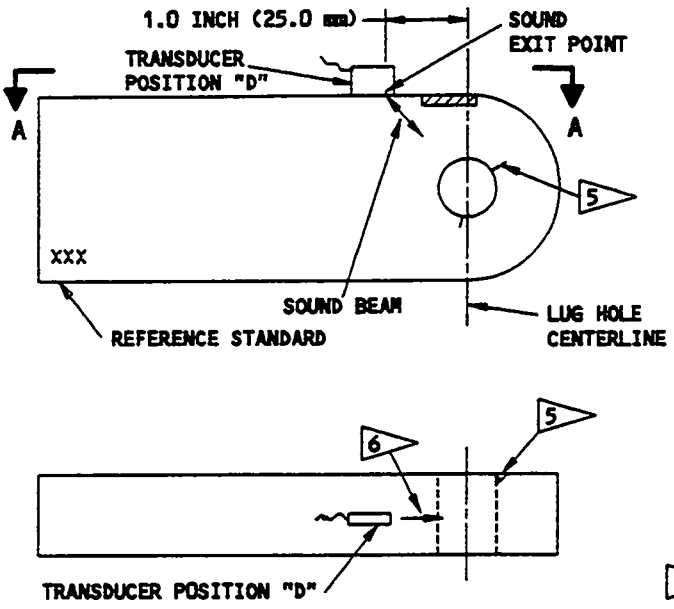
INSTRUMENT SCREEN DISPLAY - TRANSDUCER SOUND EXIT POINT AT 0.37 INCH (9.0 mm) FROM LUG HOLE CENTERLINE

NOTES

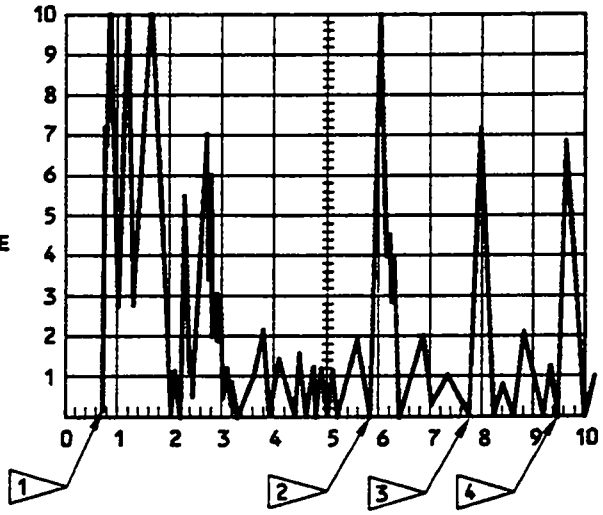
- INSPECTION AREA - APPROXIMATELY 0.75 INCH (19.0 mm)
- 1 SOUND INITIAL PULSE
- 2 HOLE RESPONSE SIGNAL AT 70 PERCENT OF FULL SCREEN WIDTH AND 100 PERCENT OF FULL SCREEN HEIGHT (OCCURS AT POSITION "A")
- 3 NOTCH RESPONSE SIGNAL AT 70 PERCENT OF FULL SCREEN WIDTH AND 80 PERCENT OF FULL SCREEN HEIGHT (OCCURS AT POSITION "B")
- 4 TURN THE TRANSDUCER SO IT POINTS AT THE NOTCH/REFERENCE STANDARD EDGE
- 5 LATERAL MOVEMENT OF THE NOTCH RESPONSE SIGNAL WILL OCCUR BETWEEN 65 TO 75 PERCENT OF FULL SCREEN WIDTH WHEN THE TRANSDUCER IS MOVED TO OR AWAY FROM THE NOTCH (OCCURS WHEN THE TRANSDUCER IS NEAR POSITION "B")
- 6 30 DEGREE NOTCH
- 7 TRANSDUCER MOVEMENT

DETAIL V

Instrument Calibration on Reference Standard - Forward Inspection Area
Figure 2 (Sheet 13)



A–A
POSITION "D"



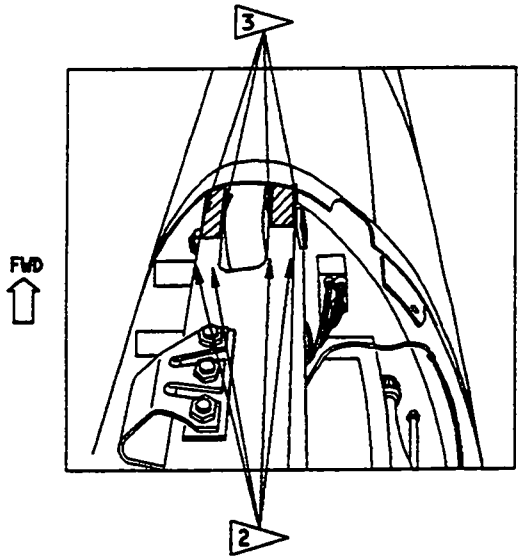
INSTRUMENT SCREEN DISPLAY – TRANSDUCER SOUND EXIT POINT AT 1.0 INCH (25.0 mm) FROM LUG HOLE CENTERLINE

NOTES

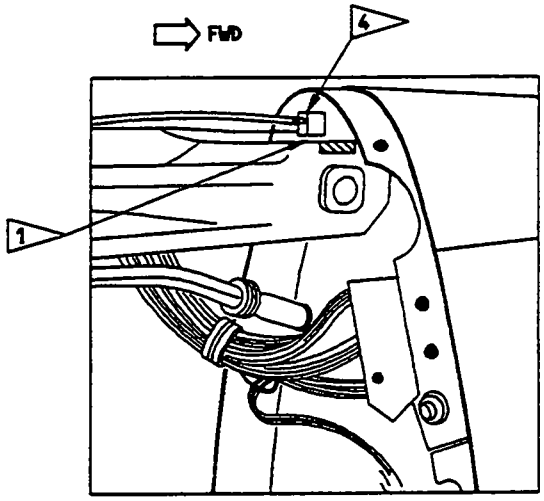
- INSPECTION AREA – APPROXIMATELY 0.75 INCH (19.0 mm)
- 1 SOUND INITIAL PULSE
- 2 HOLE RESPONSE SIGNAL AT APPROXIMATELY 60 PERCENT OF FULL SCREEN WIDTH
- 3 MULTIPLE HOLE RESPONSE SIGNAL AT APPROXIMATELY 75 PERCENT OF FULL SCREEN WIDTH
- 4 MULTIPLE HOLE RESPONSE SIGNAL AT APPROXIMATELY 95 PERCENT OF FULL SCREEN WIDTH
- 5 30 DEGREE NOTCH
- 6 TRANSDUCER MOVEMENT

DETAIL VI

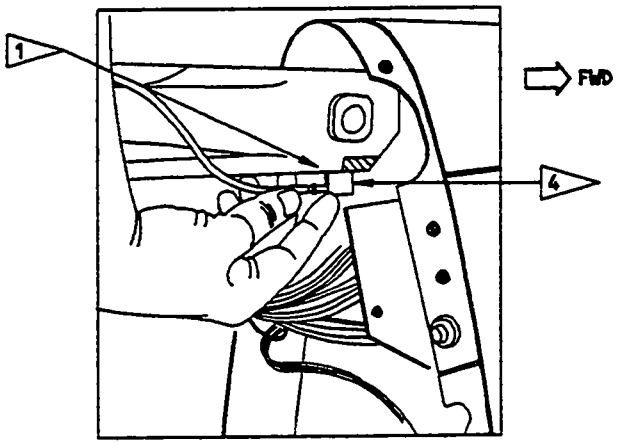
Instrument Calibration on Reference Standard – Forward Inspection Area
Figure 2 (Sheet 14)



VIEW LOOKING FORWARD AND DOWN
THE UPPER INSPECTION SURFACE IS SHOWN
THE LOWER INSPECTION SURFACE IS ALMOST THE SAME



UPPER INSPECTION SURFACE AREA
TRANSDUCER POSITION "A"



LOWER INSPECTION SURFACE AREA
TRANSDUCER POSITION "B"

NOTES

- INBOARD STRUT SHOWN, OUTBOARD STRUT ALMOST THE SAME

▨ INSPECTION AREA - APPROXIMATELY 0.75 INCH (19.0 mm) AFT OF THE LUG HOLE CENTERLINE TO 0.250 INCH (6.0 mm) FORWARD OF THE LUG HOLE CENTERLINE

1 PUT THE TRANSDUCER ON THE INSPECTION SURFACE APPROXIMATELY 1.25 INCH (32.0 mm) AFT OF THE LUG HOLE CENTERLINE

2 MOVE THE TRANSDUCER FORWARD ALONG THE INBOARD AND OUTBOARD SIDES OF THE CLEVIS LUGS

3 MAKE SURE THE TRANSDUCER POINTS TOWARD THE LUG HOLE EDGE WHILE YOU MOVE IT FORWARD

4 TRANSDUCER

DETAIL VII
Inboard and Outboard Nacelle Strut Overwing Support Clevis Lugs
Figure 2 (Sheet 15)

EFFECTIVITY
MODEL: ALL
SSI DOCUMENT (D6-44860)
REFERENCE:
SSD 57-A10-08
57-A20-08
57-A30-08
57-A40-08

PART 4 - ULTRASONIC

BOTTLE PIN AND REAR SPAR TERMINAL FITTING

1. Purpose

To detect large cracks or broken bottle pins in the wing front and rear spar terminal fitting. See Detail III.

2. Equipment

A. Any ultrasonic instrument which satisfies the requirements of this procedure may be used. The following equipment was used during the development of this procedure and found acceptable.

(1) Instrument

(a) Portable battery operated ultrasonic instrument

(b) P/N NDT 131, Nortec Corporation.

(2) Transducer

(a) 5-MHz, 0.25 inch longitudinal wave transducer

(b) P/N K-M-4-5, Nortec Corporation.

B. Reference Standard

(1) Fabricate Reference Standard per Detail I.

C. Couplant is a light grease or any thick commercial couplant compatible with airplane structure.

3. Preparation for Inspection

A. Gain access to front spar bottle pin through inboard leading edge lower access door. Gain access to aft spar bottle pin from main landing gear wheel well.

NOTE: Some hydraulic lines may have to be loosened to facilitate the inspection.

B. Remove bottle pin retaining bolt and retaining cap. See Detail III.

C. Clean inspection area of old grease and other foreign matter.

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 1)

D. Smooth rough surfaces with aid of abrasive cloth.

E. Apply couplant to inspection area.

4. Instrument Calibration

Two instrument calibrations are required.

A. Calibration for front spar (small) terminal fitting bottle pin.

(1) Connect transducer and make preliminary instrument adjustments.

(2) Place transducer on end of reference standard four inches from 1/8 inch dia hole and obtain a signal from the hole. Position hole signal at approximately 50% of full screen width. Adjust sensitivity to obtain 60% of full scale response. See Detail II, flagnotes 1 and 2.

B. Calibration for rear spar (large) terminal fitting bottle pin.

(1) Calibrate instrument per par. 4.A.(1) to 4.A.(2) except position hole signal at approximately 30% of screen width and adjust sensitivity to obtain 90% of full scale response. See Detail II, flagnotes 1 and 3.

5. Inspection Procedure

A. Inspection of front spar terminal fitting bottle pin.

(1) Calibrate instrument per par. 4.A.

(2) Place transducer on the bottle pin at the 3 or 9 o'clock position of the inspection surface defined in Detail IV. Obtain a back reflection pattern from bottle pin opposite end. See Detail IV, flagnote 1.

NOTE: If excess paint on bottle pin surface prevents adequate sound transmission remove the paint.

(3) If a pin back reflection cannot be obtained at any point through the inspection surface and response pattern similar to Detail IV, flagnote 2 is obtained, check for a broken bottle pin.

(4) Adjust instrument sensitivity to obtain approximately a 40% back reflection response.

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 2)

(5) Scan around the entire circumference of bottle pin, with transducer positioned closed to edge of bottle pin inner bore.

(6) Any indication occuring within the inspectioin area, 15% to 40% of screen width and 80% to 100% of full scale height, is a potential crack and should be investigated further. See Detail IV, flagnote 2.

B. Inspection of rear spar terminal fitting bottle pin.

(1) Calibrate instrument per par. 4.B.

(2) Inspect bottle pin per par. 5.A.(2) thru 5.A.(6).

6. Evaluation

A. This inspection is for large cracks or broken pins.

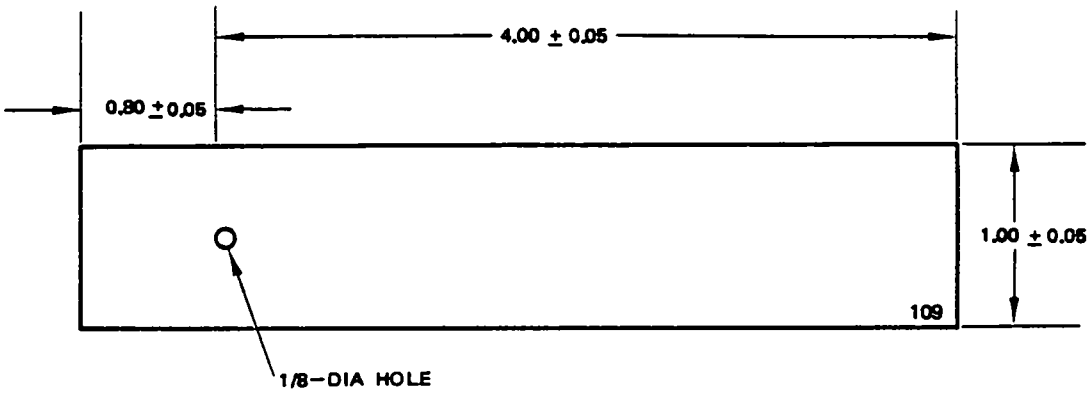
B. A large crack will be indicated by multiple crack indications and a loss of 50% or more of bottle pin back reflection. See Detail IV, flagnote 2.

C. The following scope penetration should not be interpreted as a potential crack indication.

(1) A signal obtained from the inspection area meeting the requirements of par. 5.A.(6) except the back reflection from the end of the bottle pin is not significantly reduced. See Detail IV, flagnote 3.

NOTE: This false crack indication occured as a result of sound transmitted across the interface between bottle pin and bushing and reflecting from the end of the bushing back to the transducer.

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 3)

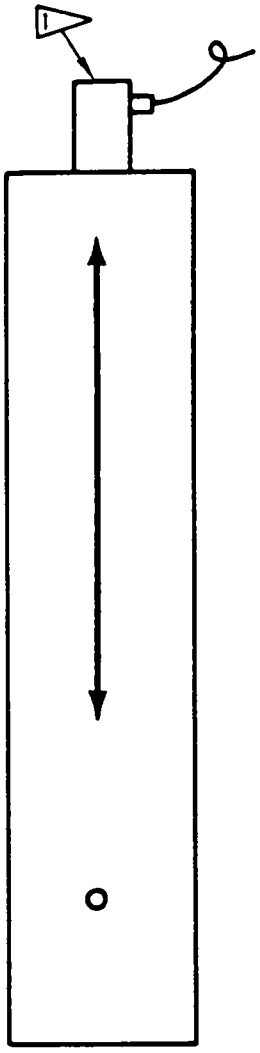


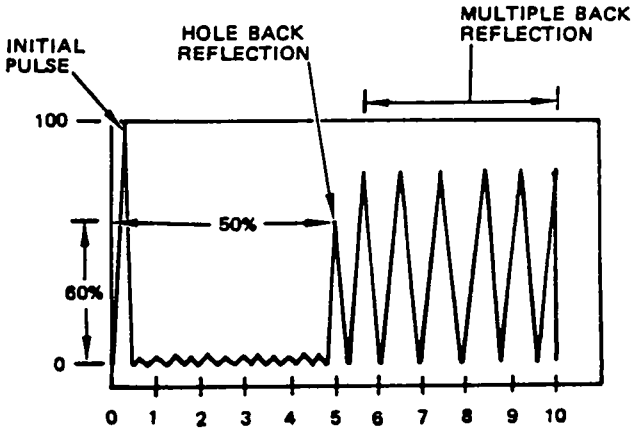
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: LOW CARBON STEEL PLATE 0.5 INCH THICK
- ETCH OR STEEL STAMP WITH 109
- P/N: 6411–59
  AVAILABLE FROM
  IDEAL SPECIALTY CO.
  REF: PART 1, 51–06–00, PAR. 7

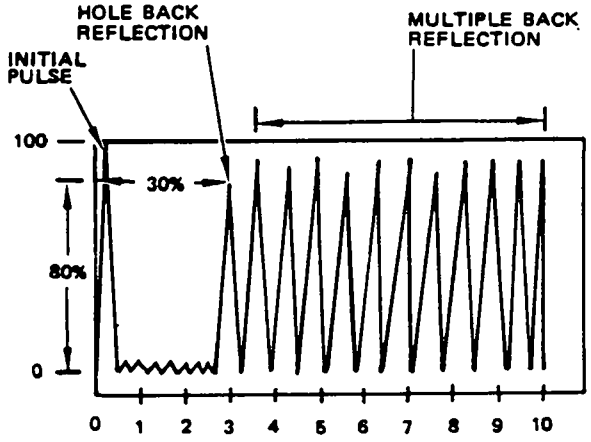
REFERENCE STANDARD 109
DETAIL I

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 4)





FRONT SPAR TERMINAL FITTING
RESPONSE PATTERN FROM REFERENCE STANDARD 2



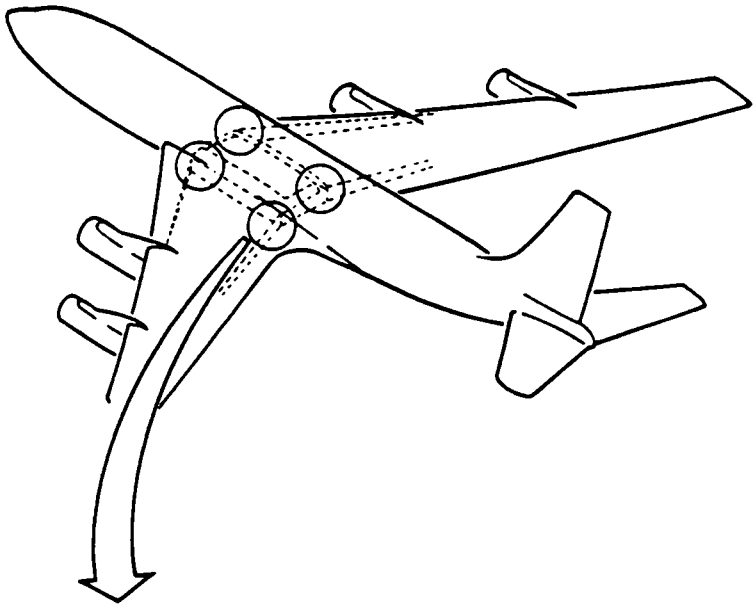
REAR SPAR TERMINAL FITTING
RESPONSE PATTERN FROM REFERENCE STANDARD 3

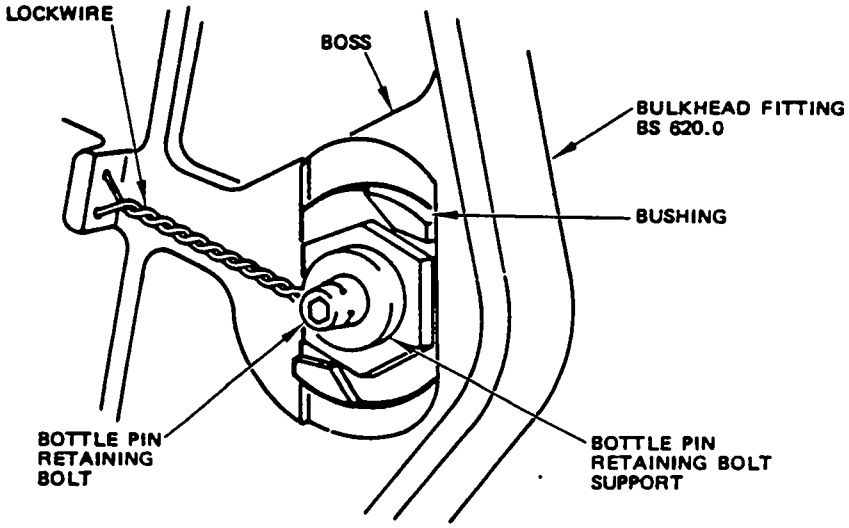
NOTES

1. PLACE TRANSDUCER DIRECTLY IN LINE WITH REFERENCE STANDARD HOLE
2. CALIBRATION FOR FRONT SPAR TERMINAL FITTING
3. CALIBRATION FOR REAR SPAR TERMINAL FITTING

REFERENCE STANDARD 109 CALIBRATION
DETAIL II

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 5)

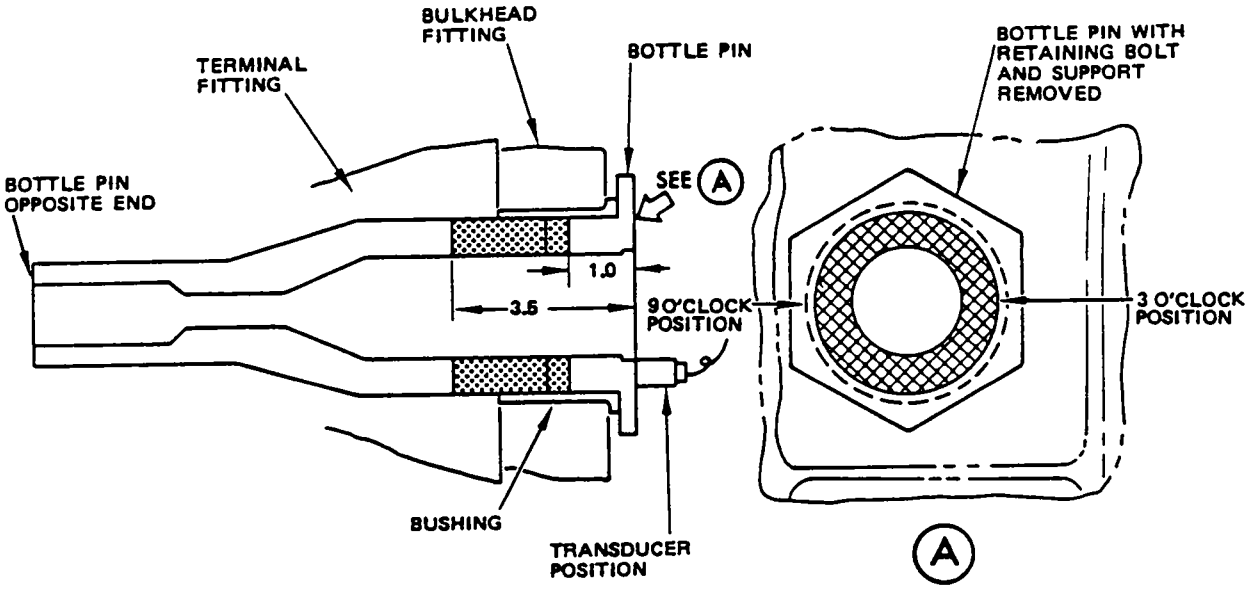


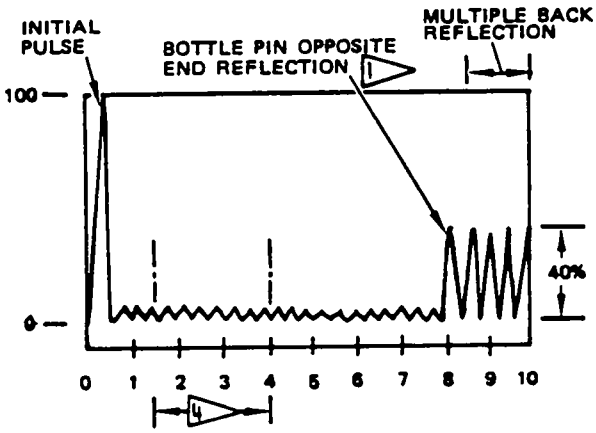


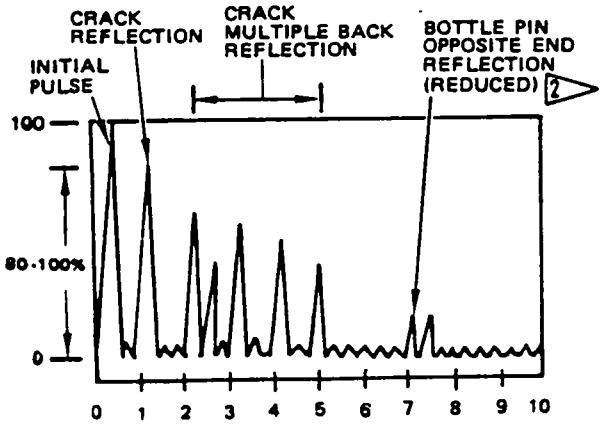
NOTE
REMOVE BOTTLE PIN RETAINING BOLT AND SUPPORT

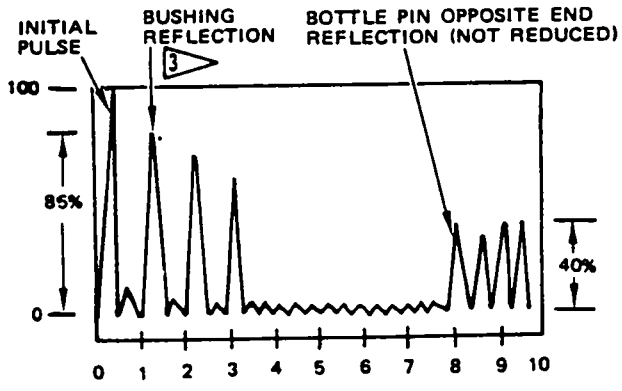
BOTTLE PIN LOCATION
DETAIL III

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 6)









NOTES

- ALL DIMENSIONS ARE IN INCHES
- TRANSDUCER SCANNING AREA
- POSSIBLE CRACK LOCATIONS
- 1 NORMAL RESPONSE FROM OPPOSITE END
- 2 CRACK RESPONSE WITH BOTTLE PIN OPPOSITE END REFLECTION REDUCED
- 3 BUSHING (FALSE CRACK INDICATION) RESPONSE. BOTTLE PIN OPPOSITE END REFLECTION REMAINS APPROXIMATELY AT 40% OF SCREEN HEIGHT
- 4 INSPECTION AREA

TYPICAL CROSS SECTION OF BOTTLE PIN
DETAIL IV

Wing Terminal Fitting - Bottle Pin
Figure 3 (Sheet 7)

EFFECTIVITY
MODEL: 707/720
SERVICE BULLETIN REFERENCE: 3173 3365
SSI DOCUMENT (D6-44860) REFERENCE: 57-A05-18 57-A15-18 57-A25-18 57-A35-18 57-A45-18

PART 4 - ULTRASONICS

WINGS - ATTACH FITTINGS

1. Purpose

   A. To detect faying surface stress corrosion cracks in the aluminum nacelle strut overwing support fitting aft of the front spar. Cracks extend in a forward and aft direction.

   NOTE: The four fastener holes for attaching the overwing support fitting to the front spar are also inspected per Part 4, 57-40-07, Fig. 1 and Part 6, 57-40-07, Fig. 3.

2. Equipment

   A. Any ultrasonic equipment satisfying the requirements of this procedure may be used. The following equipment was used during the development of this procedure and found acceptable.

      1) Instrument -
      Nortec NDT-131, Nortec Corporation

      2) Transducer -
      5 MH_z, 45 degree miniature transducer
      P/N 57A3064, Automation Industries

      NOTE: Small transducers are required. The case size of the above transducer is 0.3 inch wide, 0.7 inch long, and 0.6 inch high. The active element is 1/4 inch x 1/4 inch.

   B. Reference Standard - A 0.25-inch thick aluminum plate (minimum 2 x 2 inch) with a 1/16-inch hole drilled in the center (See Detail I).

   C. Couplant - Grease, oil or any commercial couplant compatible with airplane structure.

Overwing Support Fittings
Figure 4 (Sheet 1)

3. Preparation for Inspection

A. Remove fairings as necessary to gain access to the overwing fitting from the front spar aft. See Detail II.

B. Scrape loose paint from inboard and outboard sides of fasteners.

C. Wipe surface clean.

D. Apply a thin coat of couplant to the inspection surface.

4. Instrument Calibration

A. Apply a thin coat of couplant to Reference Standard. See Detail I.

B. Obtain reflection from top of 1/16-inch hole.

C. Set instrument gain so that hole reflection is 100% of full scale.

D. Set position of the top hole signal at 60% full scale width.

E. Obtain reflection from bottom of 1/16-inch hole.

F. This signal should appear at approximately 30% of screen width and have a 100% of full scale response.

5. Inspection Procedure

A. Calibrate instrument per par. 4.

B. Apply a thin coat of couplant to fitting surface forward and aft of fasteners common to the fitting flanges from the front spar aft. See Detail III.

C. Place transducer on the overwing support fitting flanges forward and aft of each accessible inspection fastener. See Detail III.

NOTE: A bracket on the aft end of the overwing support fitting may prevent access to fasteners.

D. Scan transducer in forward, aft, inboard and outboard directions.

NOTE: Crack indication will appear between 30 and 100% full screen width.

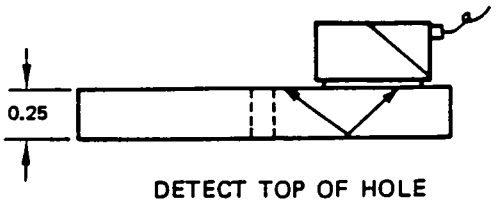
E. Maximize indication by rotating transducer $\pm$ 20 degrees.

Overwing Support Fittings
Figure 4 (Sheet 2)

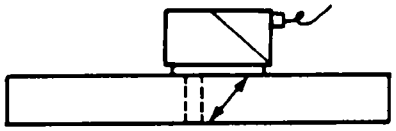
F. Repeat the inspection procedure for each inspection fastener of the inboard and outboard nacelle strut overwing support fitting for the left and right wing.

G. Any ultrasonic indication that is 40% or greater of full screen height (occurring within the inspection range) should be considered a crack.

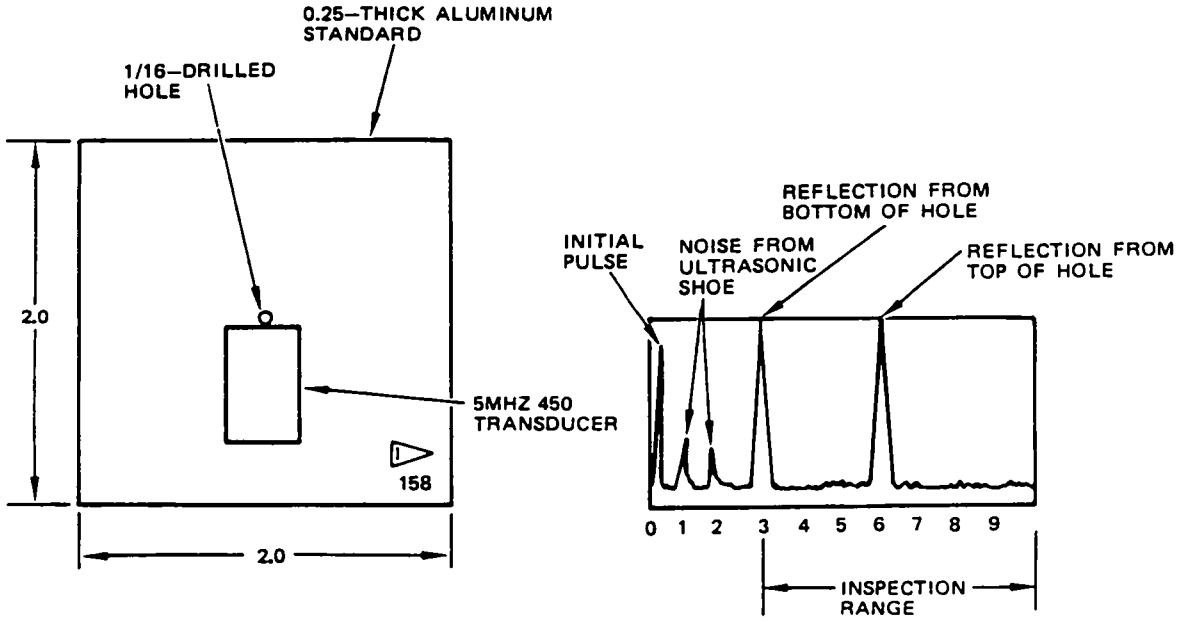
Overwing Support Fittings
Figure 4 (Sheet 3)



DETECT TOP OF HOLE



DETECT BOTTOM OF HOLE



NOTES

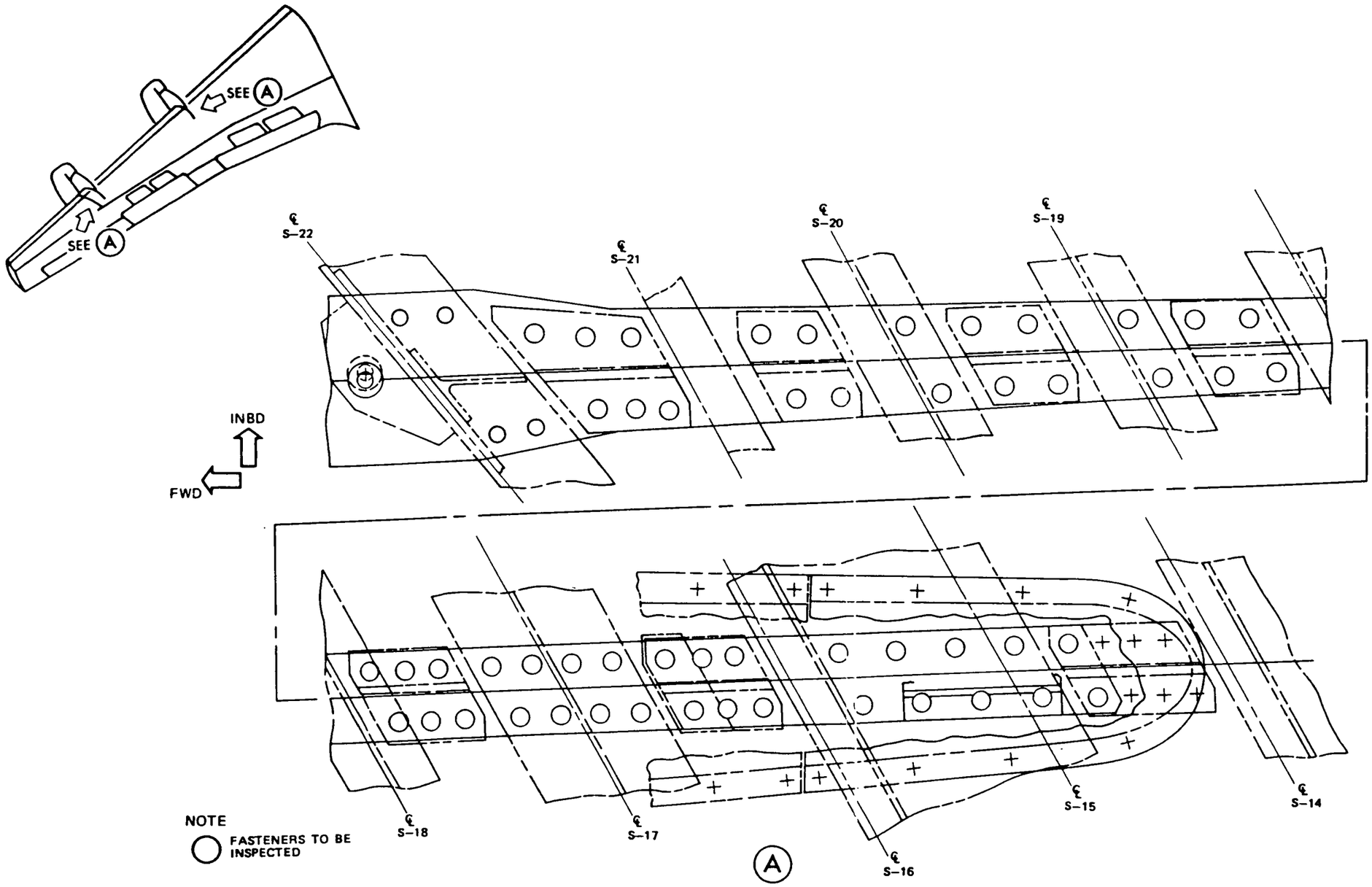
- ALL DIMENSIONS ARE IN INCHES
- P/N 6411–61 AVAILABLE FROM IDEAL SPECIALTY CO.

1 ETCH OR STEEL STAMP WITH 158

REFERENCE STANDARD AND CALIBRATION

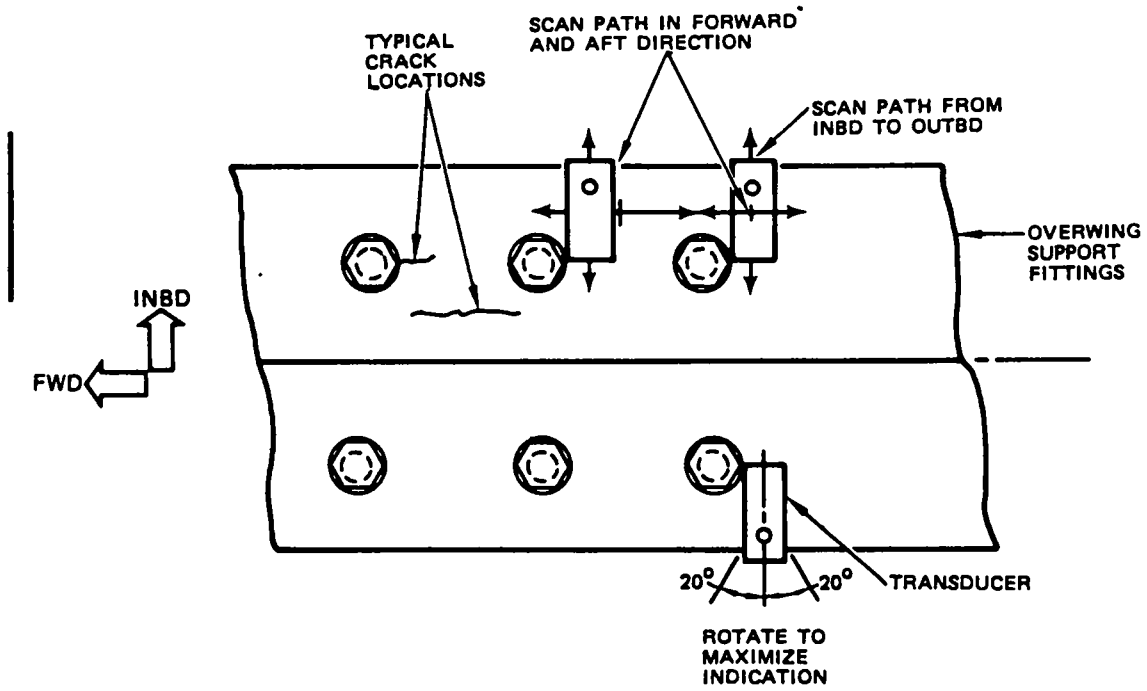
DETAIL I

Overwing Support Fittings
Figure 4 (Sheet 4)



OVERWING SUPPORT FITTINGS
DETAIL II

Overwing Support Fittings
Figure 4 (Sheet 5)



TRANSDUCER PLACEMENT
DETAIL III

Overwing Support Fittings
Figure 4 (Sheet 6)

PART 4 - ULTRASONIC

WINGS - ATTACH FITTINGS

1. Purpose

   A. To detect cracks in the overwing support fitting out of the hole common to the support fitting attached to the forward side of the front spar upper chord. See detail I.

2. Equipment

   A. Any ultrasonic equipment which will satisfy the requirements of this procedure may be used. The following equipment was used during the development of this procedure and found acceptable.

      (1) Instrument

      Nortec NDT-131
      Nortec Corporation
      421 N. Quay
      Kennewick, WA 99336

      (2) Transducer

      (a) Automation Industries, 5 MHZ, 60°A, miniature transducer, Part Number 57A3065

      (b) 5 MHz, 0.25 diameter transducer in a .375 inch diameter case. To be used with lucite shear wave positioning fixture shown on detail II.

   B. Reference Standards

      (1) A single reference standard may be used to calibrate for both inboard and outboard overwing support fitting inspections. Fabricate reference standard as shown in detail III.

   C. Couplant

      (1) Light Grease

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 5 (Sheet 1)

3. Preparation for Inspection

A. Remove fairings as necessary to gain access to the overwing fitting at the front spar.

B. Remove any loose paint from around fastener common to the front spar fitting and overwing fitting.

C. Sand lightly to remove any surface roughness from around the fastener head.

D. Wipe surface clean.

E. Apply a thin coat of couplant to the inspection surface.

4. Instrument Calibration

A. Apply couplant to the reference standard.

B. Place transducer on the standard and position to detect fastener hole.

C. Compare the signals obtained from the cracked and uncracked fastener holes in the reference standard.

D. Determine the transducer positions that best define the defect and fastener hole signals. Set instrument gain so that the reference standard crack signal is approximately 80% of full scale.

5. Inspection Procedure

A. Position the ultrasonic transducer on top of the fitting and manipulate to detect the fastener hole. See detail IV.

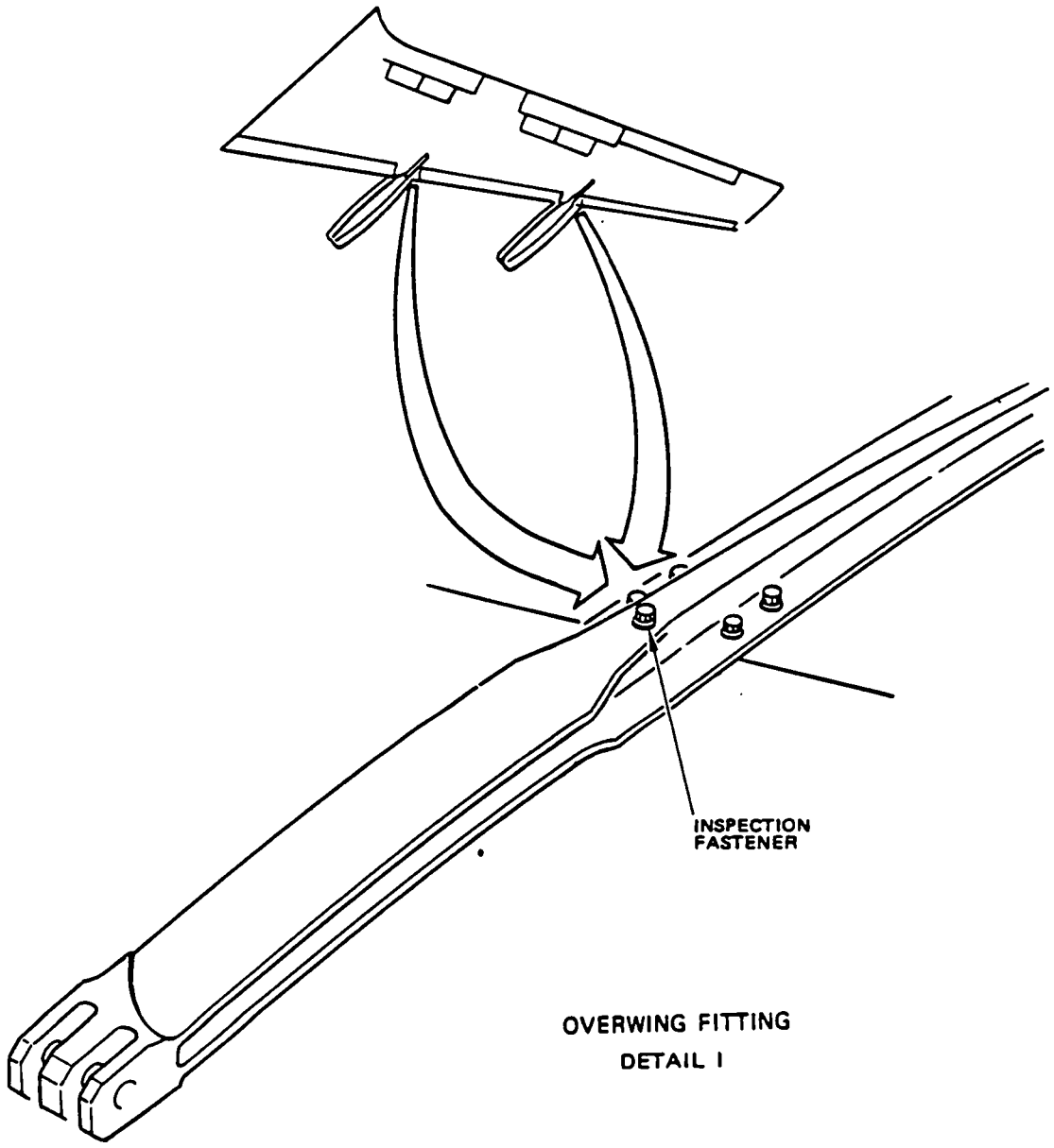
B. Move transducer laterally to transmit sound past the edge of the fastener hole.

C. Any ultrasonic signal that is 40% or more of screen height, occurring at the expected crack location, should be considered a crack.

D. Confirm any ultrasonic defect signals by removing the fastener and performing an eddy current bolt hole inspection.

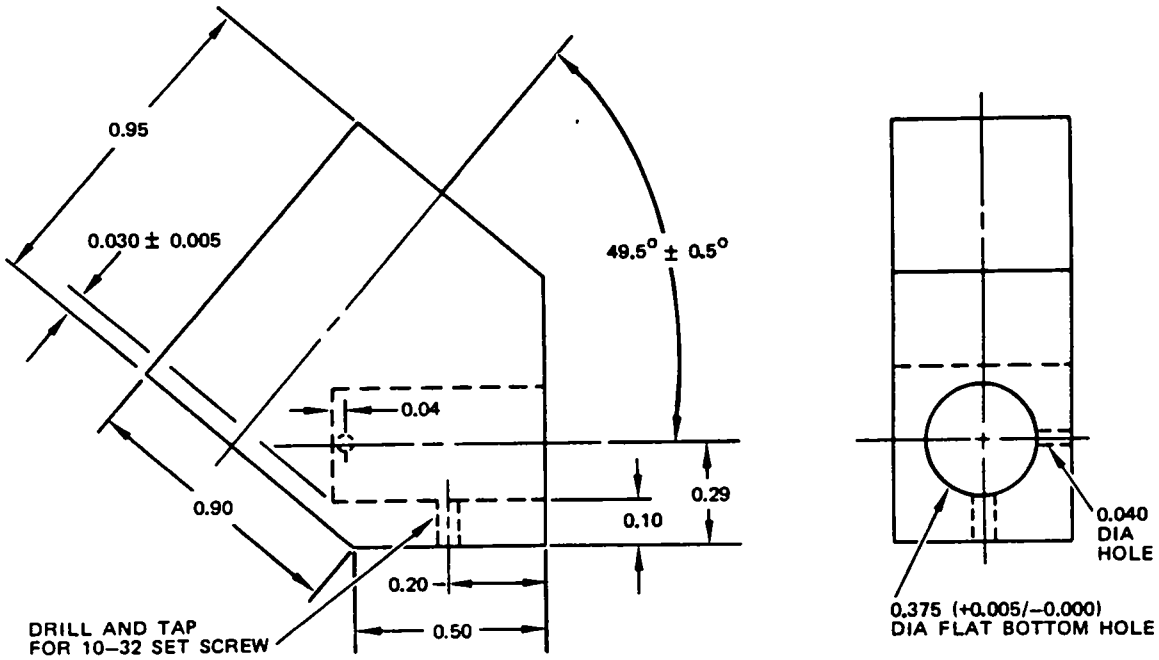
E. Repeat inspection on remaining overwing support fittings.

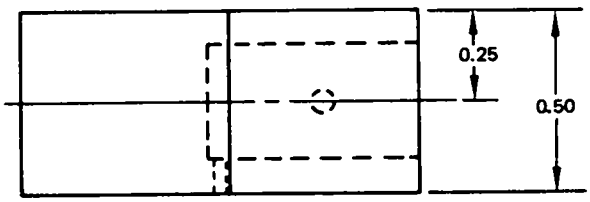
Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 5 (Sheet 2)



OVERWING FITTING
DETAIL I

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 5 (Sheet 3)





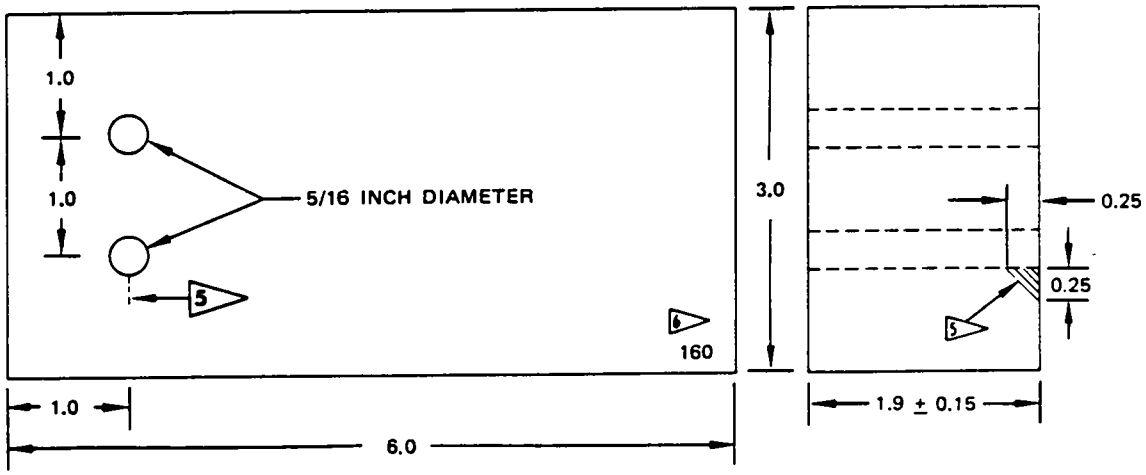
NOTES

- MATERIAL: LUCITE OR PLEXIGLASS
- TOLERANCE: ±0.010 EXCEPT AS NOTED
- FINISH: 100 MICROINCHES
- P/N 6410–15
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

TRANSDUCER POSITIONING FIXTURE

DETAIL II

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 5 (Sheet 4)



NOTES

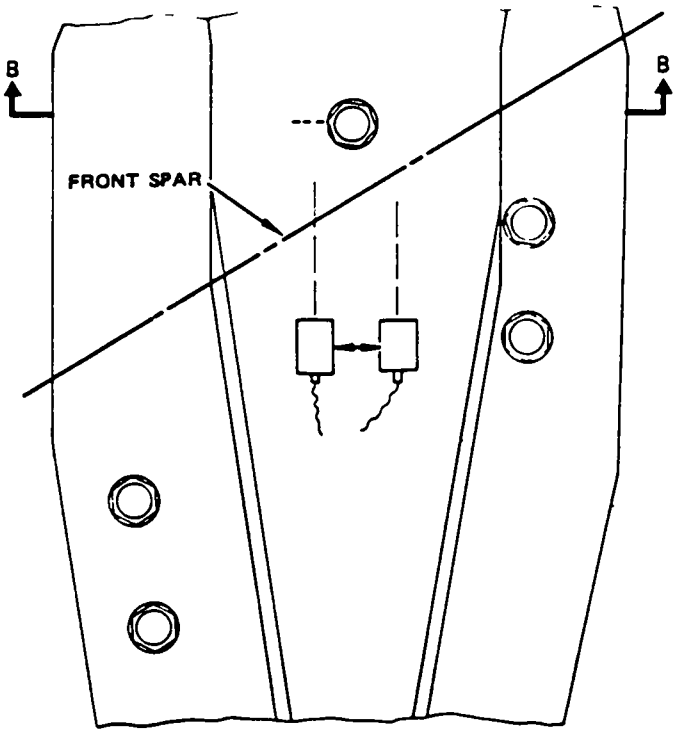
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T4, 7075 T6 ALUMINUM
- TOLERANCES: X.X + 0.05. X.XX + 0.02
- P/N 6411–101
  AVAILABLE FROM IDEAL SPECIALTY CO.

5 JEWELER'S SAWCUT 0.030 MAX WIDTH

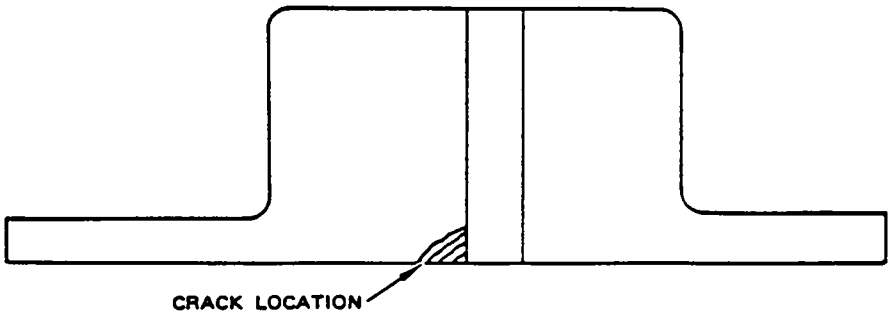
6 ETCH OR STEEL STAMP WITH 160

REFERENCE STANDARD
DETAIL III

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 5 (Sheet 5)



LEFT HAND INBD FITTING SHOWN



SECTION B–B

TRANSDUCER INSPECTION POSITIONS – OVERWING FITTING
DETAIL IV

Inboard and Outboard Nacelle Strut Upper Support Fitting
Figure 5 (Sheet 6)