EFFECTIVITY
MODEL: 707/720 SSI DOCUMENT (D6-44860) REFERENCE: SSD 57-A00-01 57-A10-01 57-A20-01 57-A30-01 57-A40-01

PART 4 - ULTRASONIC

WINGS - MAIN FRAME

1. Purpose

A. To detect cracks emanating from fastener holes in the horizontal flange of the lower rear spar covered by clip fittings, LBL 70.5 to RBL 70.5.

B. This inspection requires wing tank entry. Fuel tank must be drained and purged to a "health safe" condition (as defined by Chapter 28 of the Maintenance Manual) before entering tank with an ultrasonic instrument. The instrument must be battery powered.

NOTE: Approval for operating ultrasonic equipment in a fuel tank with the conditions stated above must be obtained from local Airline/Airport fire department.

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 -

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

(2) Transducer -

Automation Industries, 5 MHz 70°A miniature transducer, or a transducer and wedge assembly not wider than 0.3 inch.

B. Reference Standard

(1) Fabricate Reference Standard per Detail I.

Wing Center Section Rear Spar Lower Flange
Figure 1 (Sheet 1)

3. Preparation for Inspection

A. Gain access to interior of wing center section through lower center section access panels.

B. Remove fuel cells and lower surface backing panels as necessary to gain access to the lower rear spar.

C. Remove sealant on the surface of the lower rear spar horizontal leg at the edge of the clip fittings to allow transducer leading edge to contact clip fitting.

4. Instrument Calibration

A. Coat the inspection surface of the standard with a thin film of couplant.

B. Place the transducer on the lower plate of the standard with transducer leading edge toward the edge of the upper plate. See Detail II.

C. Move the transducer to the unnotched hole and manipulate to obtain a maximum signal from the hole.

D. Adjust the instrument sweep controls so the indication from the hole appears at approximately 3/4 of screen width. See Detail II.

E. Adjust instrument sensitivity so that the amplitude of the hole signal is between 90 and 100% of maximum.

F. Move the transducer to the notched hole and note relation between hole and notch response. See Detail II.

G. Final adjustment for ultrasonic test sensitivity is accomplished on the airplane.

5. Inspection Procedure

WARNING: PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE MAINTENANCE MANUAL MUST BE FOLLOWED BY PERSONNEL ENTERING ANY TANK THAT HAS CONTAINED FUEL. USE ONLY BATTERY-OPERATED, EXPLOSIONPROOF LIGHTS IN VICINITY OF OPEN FUEL TANKS. POSSIBILITY OF EXPLOSION AND TOXIC DANGER EXISTS IN VICINITY OF FUEL TANKS WHICH HAVE CONTAINED FUEL.

A. Place transducer on the rear spar and position to detect hole A (Detail III, Position 1). Maximize the hole response and readjust instrument sensitivity to obtain a 90 to 100% hole signal.

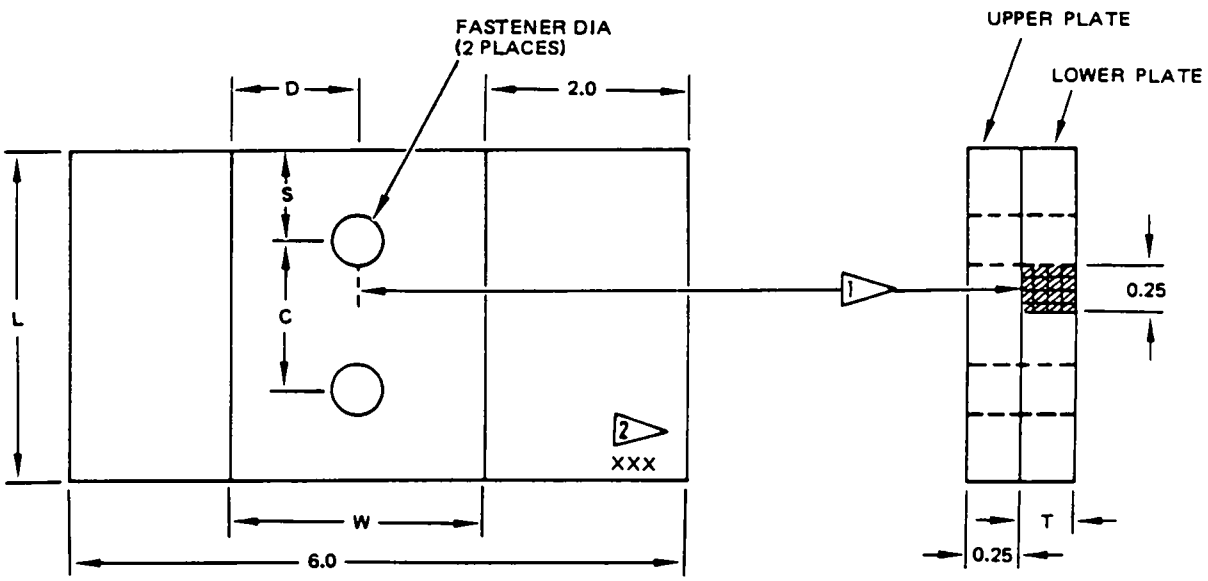
Wing Center Section Rear Spar Lower Flange
Figure 1 (Sheet 2)

B. Scan the transducer on the rear spar to detect cracks out of fastener holes A and B, Detail III.

C. Scan from opposite side of the clip fitting (Detail III, Position 2) to ensure a full coverage of the inspection area which may be blocked by fasteners on one side.

D. Any ultrasonic indication occurring at the inspection area which is not from hole edge (Detail III) and which has a signal height of 50% or more of screen height is a potential crack and should be investigated. Any indication between fastener holes or appearing at the same location on the oscilloscope screen as the notch indication in the calibration, suggests a possible crack.

Wing Center Section Rear Spar Lower Flange
Figure 1 (Sheet 2A)



NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM

1 JEWELER'S SAWCUT 0.030 MAX WIDTH

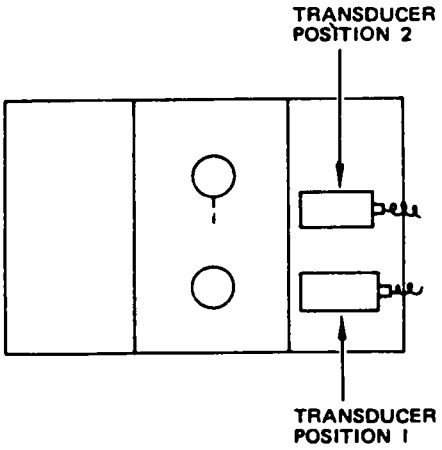
2 ETCH OR STEEL STAMP WITH 142, 143, 144 OR 145

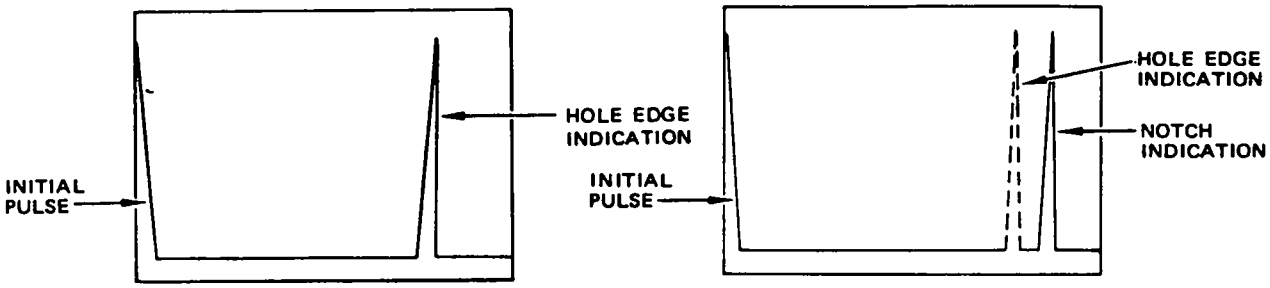
AIRPLANE MODEL	FASTENER DIAMETER	W	L	D	C	S	T	IDEAL SPECIALTY CO. PART NUMBER	BOEING PART NUMBER
–300/–400/–3008/ –300C EXCEPT LINE NUMBERS 13, 20, 35, 58, 70	0.40	2.3	2.4	1.0	1.10	0.65	0.40	6411–16	143
–300/–400/ LINE NUMBERS 13, 20, 35, 58 AND 70	0.40	2.3	2.4	1.0	1.10	0.65	0.48	6411–15	142
–100/–200	0.25	1.5	1.9	1.0	0.80	0.65	0.63	6411–17	144
720	0.25	1.5	1.9	1.0	0.80	0.65	0.24	6411–18	145

REFERENCE STANDARD

DETAIL I

Wing Center Section Rear Spar Lower Flange
Figure 1 (Sheet 3)

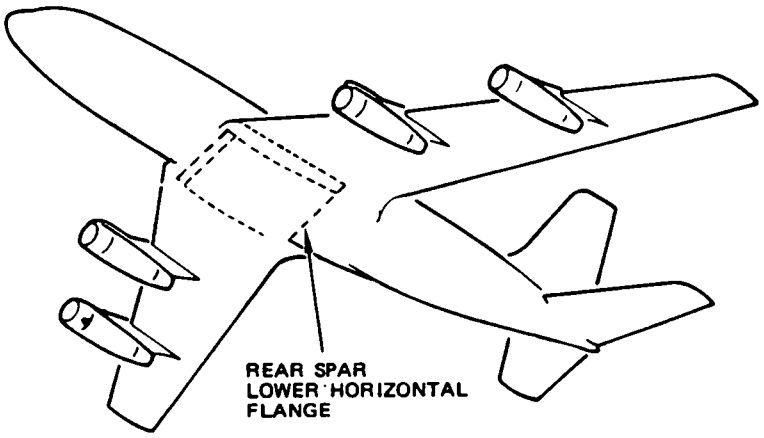


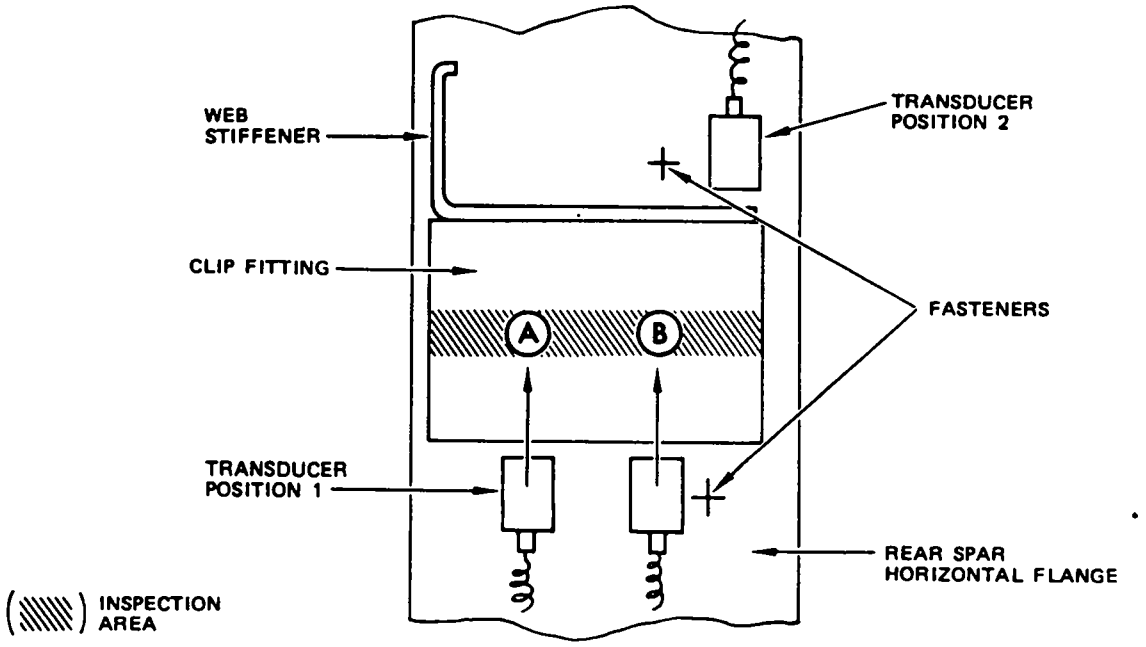


TRANSDUCER AT POSITION 1 SCOPE PRESENTATION

TRANSDUCER AT POSITION 2 SCOPE PRESENTATION

Wing Center Section Rear Spar Lower Flange
Figure 1 (Sheet 4)





INSPECTION PROCESS
DETAIL III

Wing Center Section Rear Spar Lower Flange
Figure 1 (Sheet 5)

EFFECTIVITY
MODEL: 707-100/200 SERVICE BULLETIN REFERENCE: 2583, SSI DOCUMENT (D6-44860) REFERENCE: SSD 57-A15-05 SSD 57-A15-09 SSD 57-A15-12

PART 4 - ULTRASONIC

WINGS - MAIN FRAME

1. Purpose

   A. Detect cracks emanating from selected fastener holes:

      (1) In the vertical flange of the wing lower rear spar chord.

      (2) In the wing skin at fasteners common to the rear spar.

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

   B. The shear wave transducers used for this inspection are 0.35 inch wide by 0/72 inch long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25 inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHZ 0.25 inch element, 60° A (57A8300), top mounted microdot connector.

      NOTE: Transducers (1) and (2) are both required due to restricted access to the rear spar vertical flange.

      (3) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25 inch element, 70° A (57A3066).

      (4) Longitudial Wave, 0.25-inch dia. element, 5 MHZ, 0.375 inch dia. case.

   C. Fabricate three reference standards per Details I, II, and III.

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 1)

D. Fabricate transducer positioning fixture per Details VI and VII.

E. Couplant is light oil or grease.

3. Preparation for Inspection

A. This inspection can be performed from outside the wing and with the part in place on the airplane.

B. Paint removal at inspection areas on the chord may be necessary to improve sound transmission. Smooth out any surface roughness by sanding lightly.

C. Paint removal for inspection of the skin is required.

D. Wipe surface clean.

E. Lightly prick punch the center of the inspection fasteners in the skin.

F. Apply a thin film of couplant to the inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Calibrate Instrument

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord.

(1) Select a fastener location to be inspected. See Detail XI.

(2) From Table I identify the Detail I reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table I obtain the distance D. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

(4) Obtain a signal from the standard hole. Position this signal at midscale. See Detail IV.

(5) Adjust instrument sensitivity to obtain a 90 percent of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 1/4 inch through-thickness notch. Note the difference in the position of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

NOTE: See par. 4.C. for alternate calibration.

(1) Select a fastener location to be inspected from Detail XII.

(2) From Table II identify the reference standard and transducer positioning fixture required for the holes to be inspected.

(3) Coat 0.375-inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail VIII.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail VIII, (Align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. See Detail VIII, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument senstivity to produce approximately a 90% crack signal on the instrument display.

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 3)

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table II which is designated for the hole to be inspected.

(2) Connect the 70° shear wave (see par. 2.B.(3)) transducer to the instrument.

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close the edge of the fastener head as shown in Position 1, Detail X.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in Detail X.

(6) Move transducer laterally to detect the calibration notch as shown in Detail X, Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximatley 100% of the full scale.

5. Inspection Procedure

A. Inspect fastener locations common to vertical flange of rear spar chord.

(1) Select fastener location to be inspected from Detail XI.

(2) Calibrate instrument according to Par. 4.A.

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail XI.

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument senstivity to obtain a 90% signal from the hole. Note position of hole signal.

(5) If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(6) Move the transducer laterally and rotate through a small angle (approximately 20° to inspect for cracks out of the fastener hole. See Detail V.

(7) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(8) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(d) Any signal occurring between fastener holes where no signal should be expected.

(9) Repeat inspection procedure for each location identified in Detail XI.

B. Inspect wing skin at fastener holes common to rear spar horizontal leg. See Detail XII.

NOTE: See par. 5.C. for alternate insertion of wing skin.

(1) Select inspection location from Detail XII and specific fasteners to be inspected from Table II.

(2) Calibrate instrument according to par. 4.B.

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 5)

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener being inspected. The minimum extent of scan is shown in Detail IX.

(4) If the minimum scan cannot be performed, scan with a hand held transducer calibrated per par. 4.C. Inspect per par. 5.C.

(5) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(6) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(7) Repeat inspection procedure for each location identified in Detail XII.

(8) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

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

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer approximately $\pm$ 20° about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

LOCATION NO.	APPROX. W.S.	FASTENER CODE NUMBERS	FASTENER DIA. (INCH)	CHORD THICKNESS	D [2] (INCH)	CALIBRATION HOLE [3]
1	187.5	81,83	1/2	0.48	0.62	5
2	243	117	7/16	0.35	0.40	5
3	275	270,271 275,276	1/4	0.26	0.45	4
4	283	270,291, 333	3/16	0.15	0.65	1
5	291	369,370	3/16	0.15	0.40	1
6	299	422,423	1/4	0.15	0.40	1
7	340	718,719, 720	3/16	0.15	0.30	1
8	360	861,862	9/16	0.15	0.60	2
9	444	497,498	7/16	0.15	0.70	2

INSPECTION PARAMETERS FOR LOWER REAR SPAR CHORD VERTICAL FLANGE
TABLE I

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 7)

LOCATION NO.	APPROX W.S.	FASTENER CODE NUMBERS	FASTENER DIA. (INCH)	CORD THICKNESS	D [2] (INCH)	CALIBRATION HOLE [3]
10	453	535,574	3/16	0.15	0.50	1
11	506	924	3/16	0.15	0.44	1
12	511	981,982	3/16	0.15	0.44	1
13	542	41,42,71 78	3/16	0.15	0.30	1
14	615	472,502	1.00	0.15	0.25	3
15	700	976,998	9/16	0.15	0.50	2
16	715	1044,1045 1079,1080	3/16	0.15	0.80/0.30	1

INSPECTION PARAMETERS FOR LOWER REAR SPAR CHORD VERTICAL FLANGE
TABLE I (CONT)

NOTES:

[1] SEE DETAIL XI FOR INSPECTIONS LOCATIONS.

[2] D = DISTANCE BETWEEN LEADING EDGE OF TRANSDUCER AND EDGE OF FASTENER HOLE TO BE USED FOR CALIBRATION. ON THE CHORD, D CORRESPONDS TO THE DISTANCE BETWEEN THE HOLE AND THE CLOSEST POSSIBLE LOCATION FOR TRANSDUCER PLACEMENT.

[3] HOLE IN THE REFERENCE STANDARD 074 (SEE DETAIL III) TO BE USED FOR CALIBRATION.

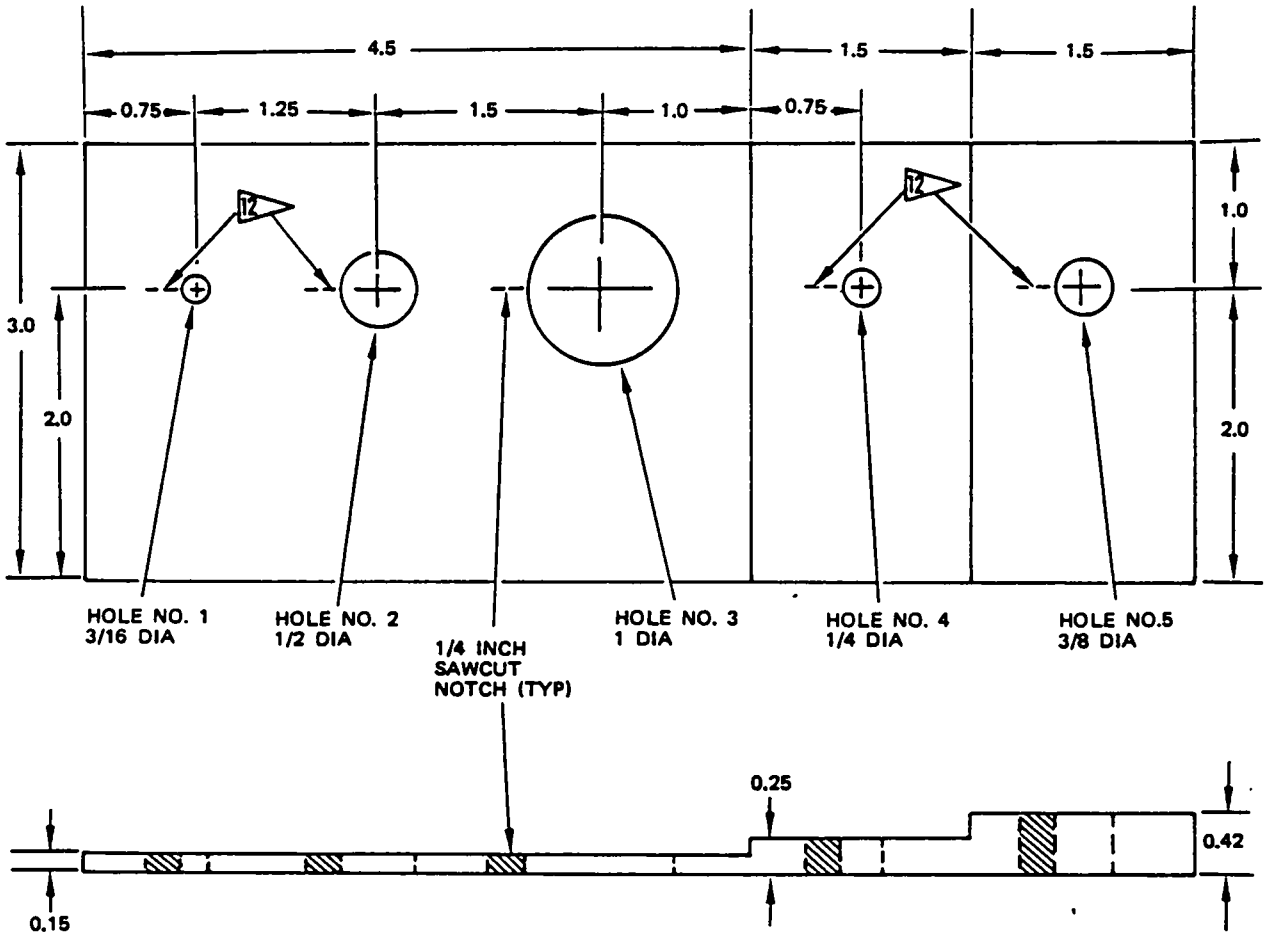
LOCATION NO. ▷4◁	APPROX W.S.	FASTENER CODE NUMBER	FASTENER DIAMETER (INCH)	SKIN THICKNESS (INCHES)	POSITIONING FIXTURE	REFERENCE STAMDARD TO BE USED FOR CALIBRATION
1	280.5 TO 291	98,108, 110,113, 115-118	1.4,5/16	0.40	(See Detail VIII) PF 4	(See Detail II) No. 094
2	311 TO 315.5	158,16 or 163	3/16,5/16	0.25	(See Detail IX) PF 2	(See Detail III) No. 095
3	321 TO 337	174-196	3/16	0.25	PF 2	No. 095
4	444	362,367, 368,373	5/16	0.23	PF 2	No. 095
6	546	96,97, 103,104	1/4,5/16	0.20	PF 2	No. 095

INSPECTION PARAMETERS FOR LOWER SKIN AT THE REAR SPAR
TABLE II

NOTES

▷4◁ SEE DETAIL XII FOR INSPECTION LOCATIONS.

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 9)



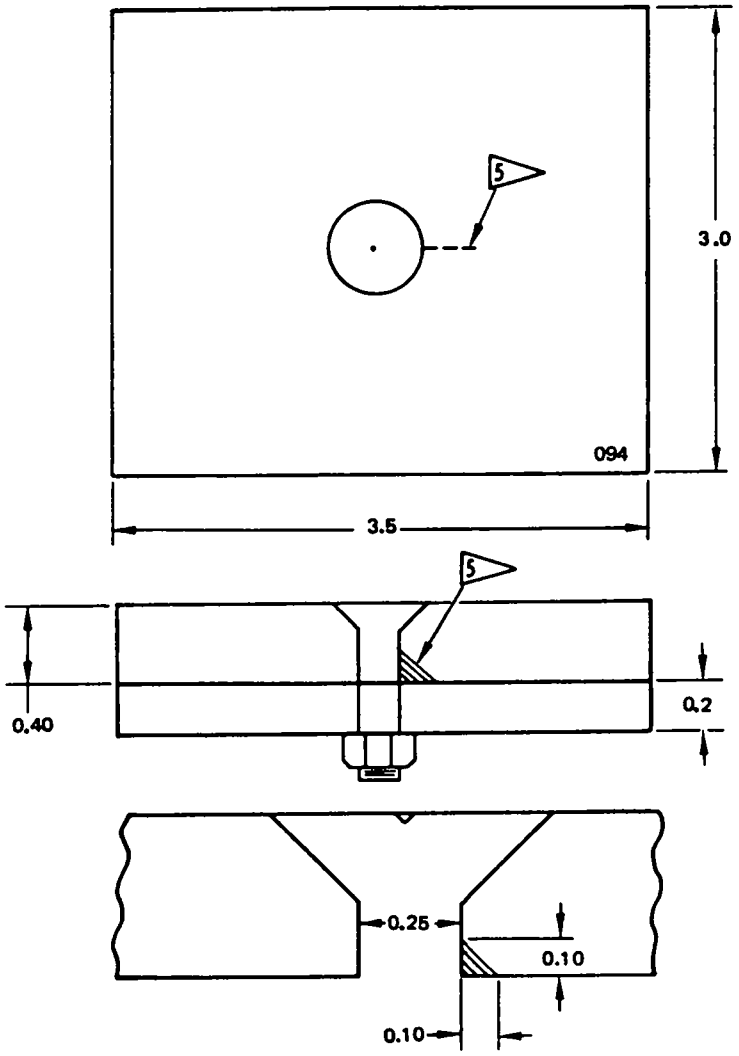
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL –7075 – T6, ALUMINUM
- TOLERENCES – X.X+ 0.030, X.XX+ 0.010
- P/N 6411–29
  AVAILABLE FROM IDEAL SPECIALITY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

12 JEWELER'S SAWCUT 0.030 MAX WIDTH (5 PLACES)

REFERENCE STANDARD 074
DETAIL I

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 10)



NOTES

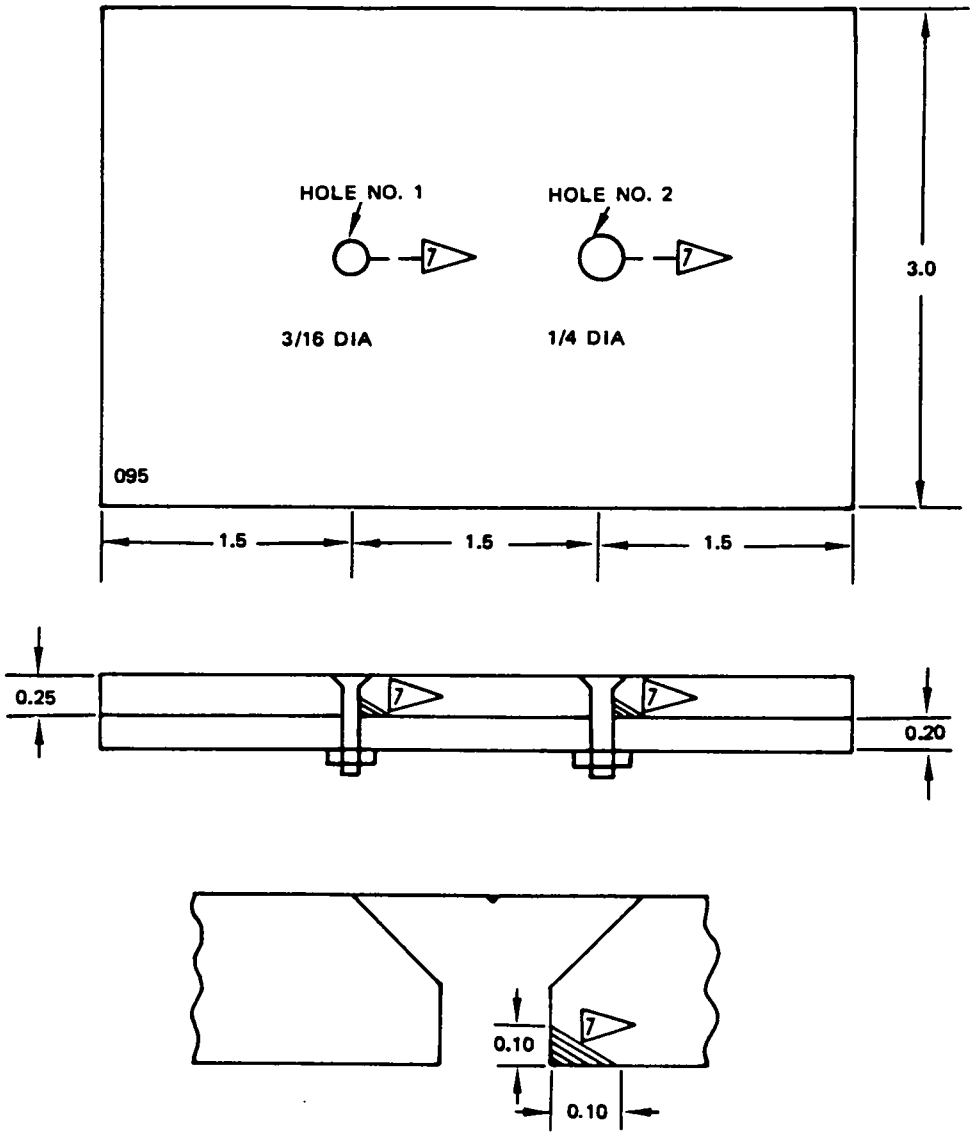
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL – 2024 – T6, ALUMINUM
- TOLERANCES – X.X ± 0.030 , X.XX ± 0.010
- FASTENER TYPE – BACB30GY8–9; BACC30K COLLAR
- P/N 6411–30
  AVAILABLE FROM IDEAL SPECIALITY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110
- ETCH OR STEEL STAMP WITH 094

5 JEWELER'S SAWCUT 0.030 MAX WIDTH

SKIN INSPECTION CALIBRATION
REFERENCE STANDARD 094

DETAIL II

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 11)



NOTES

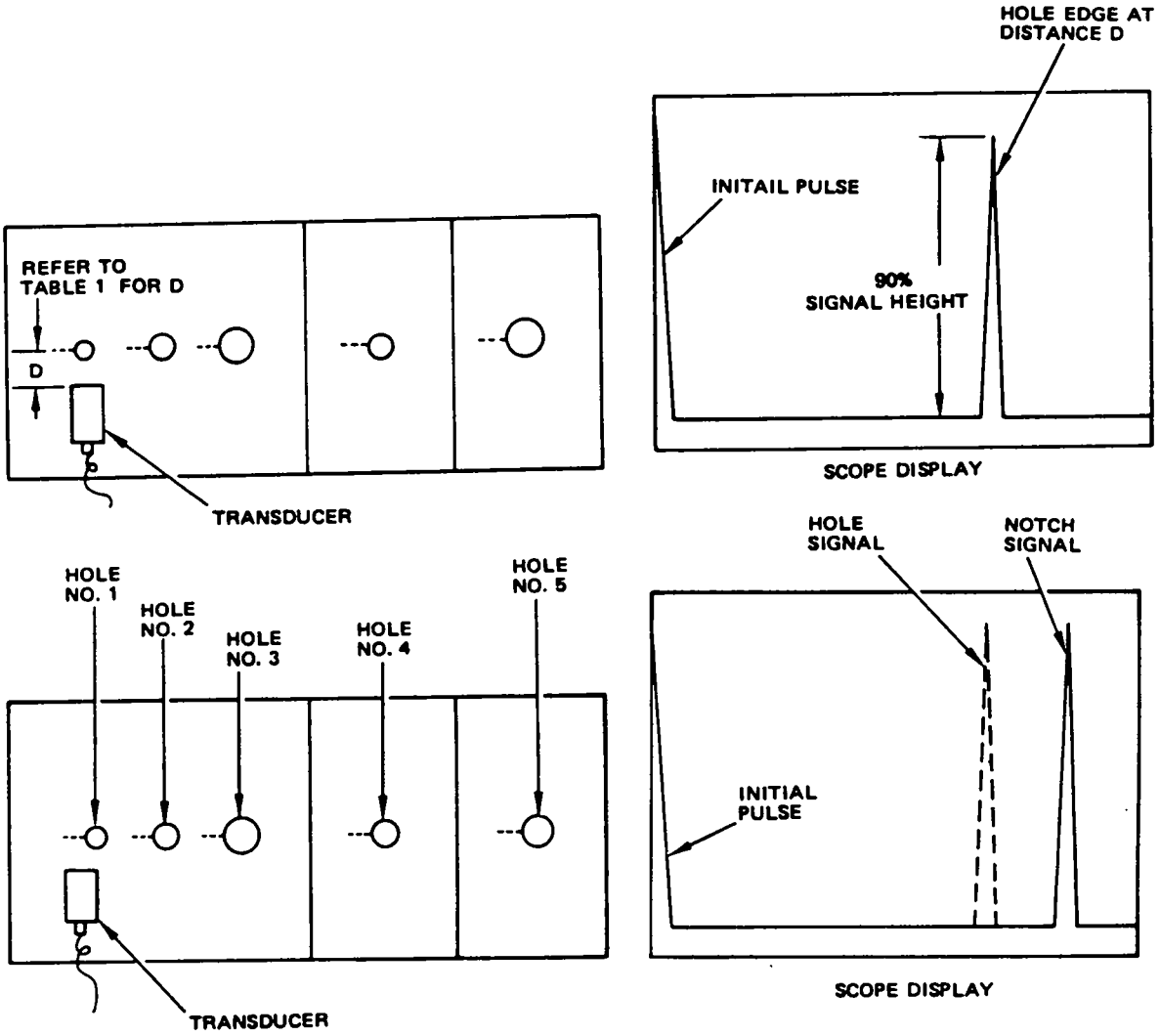
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- TOLERANCE TYPE X.X ± 0.030, X.XX ± 0.010
- FASTENER TYPE: 3/16 BACB30LU3–7; BACN10JC3 NUT
  1/4 BACB30LU4–7; BACN10JC4 NUT
- ETCH OR STEEL STAMP WITH 095
- P/N 6411–31
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULKA, OKLAHOMA 74110

7 JEWELER'S SAWCUT
0.030 MAX WIDTH (2 PLACES)

FOR SKIN INSPECTION CALIBRATION
REFERENCE STANDARD 095

DETAIL III

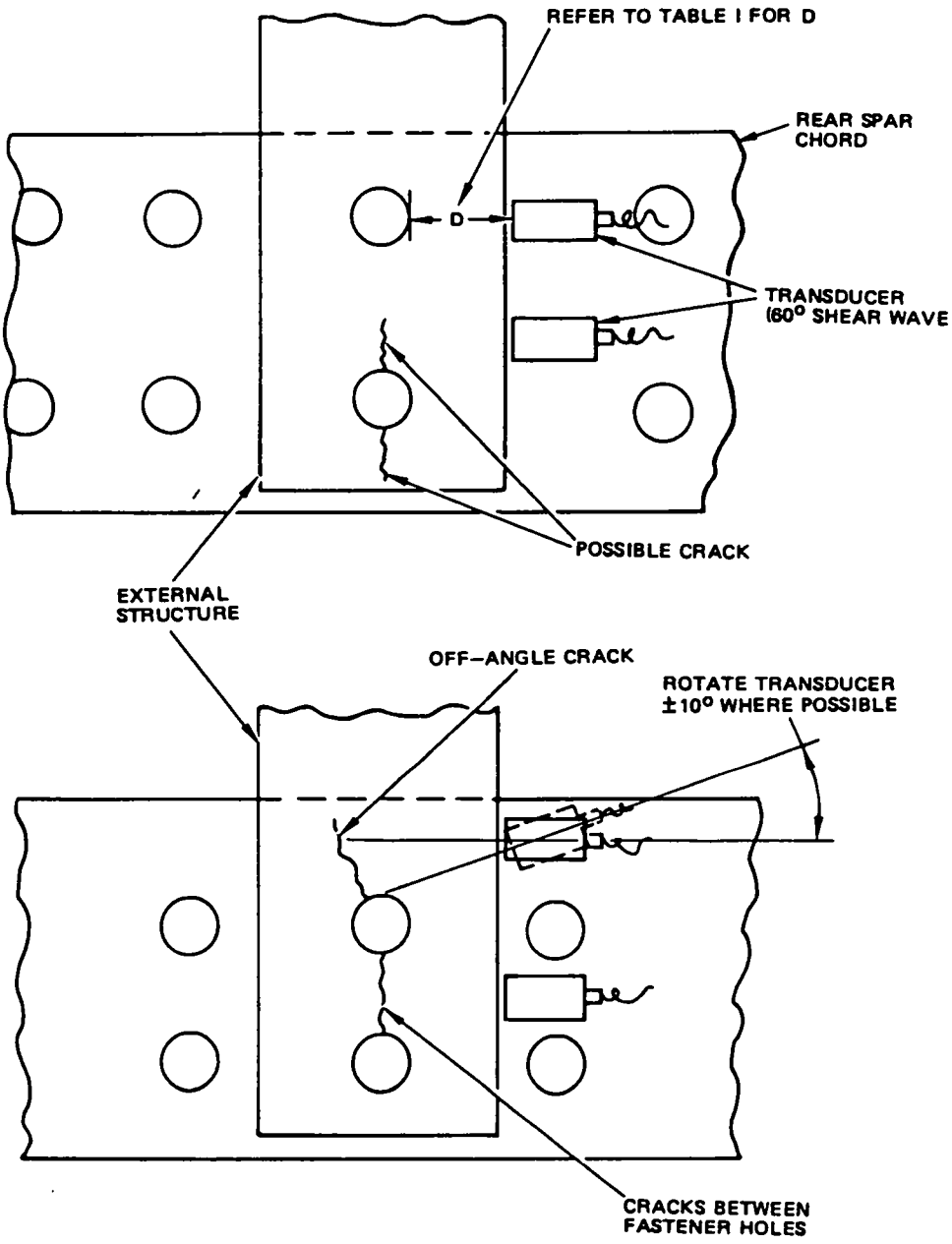
Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 12)



INSTRUMENT CALIBRATION

DETAIL IV

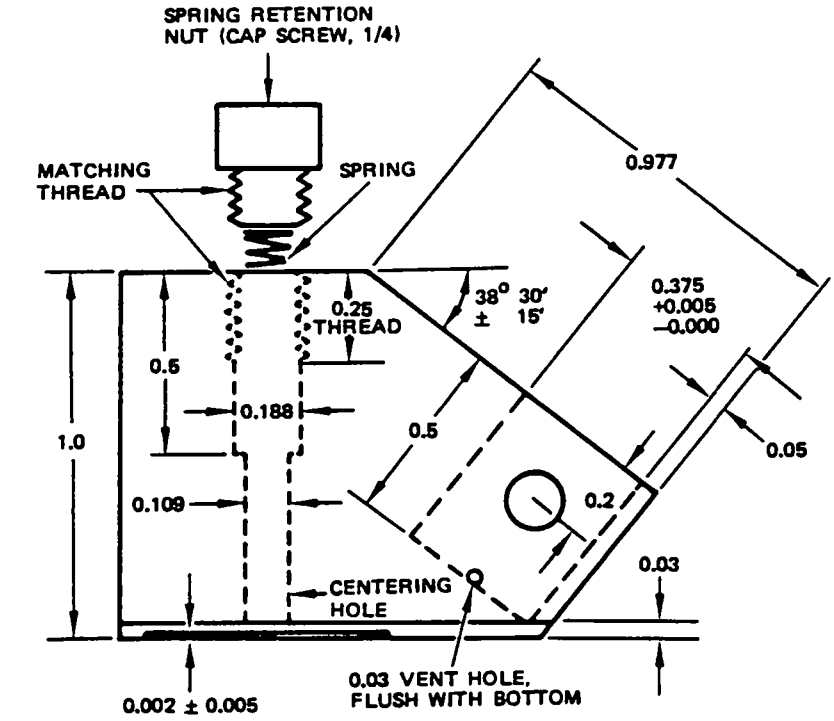
Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 13)

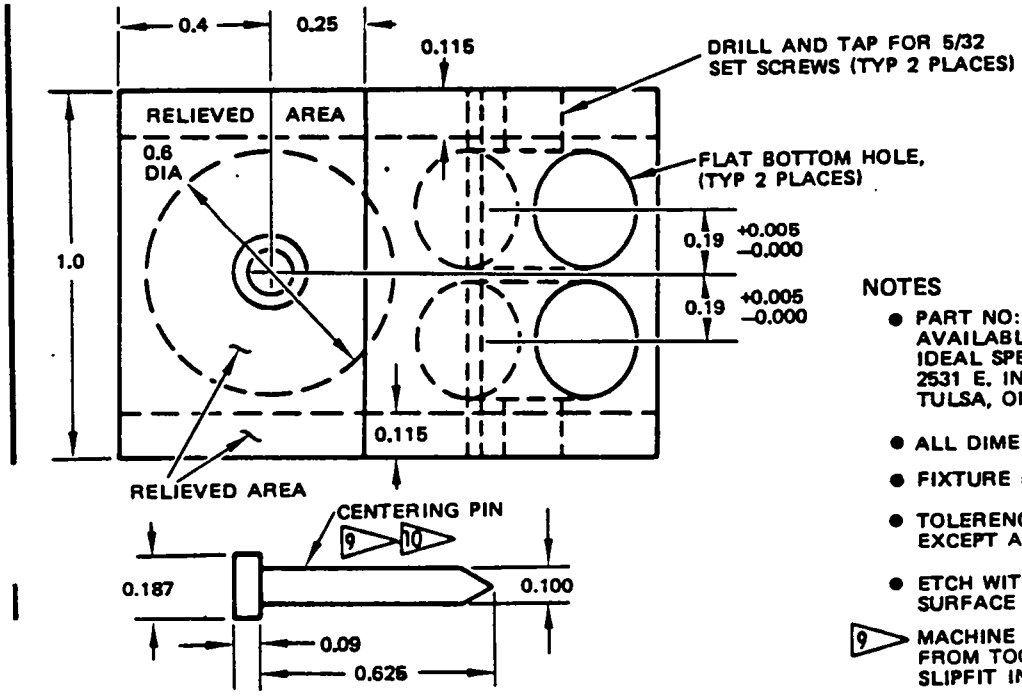


INSPECTION OF REAR SPAR CHORD

DETAIL V

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 14)





NOTES

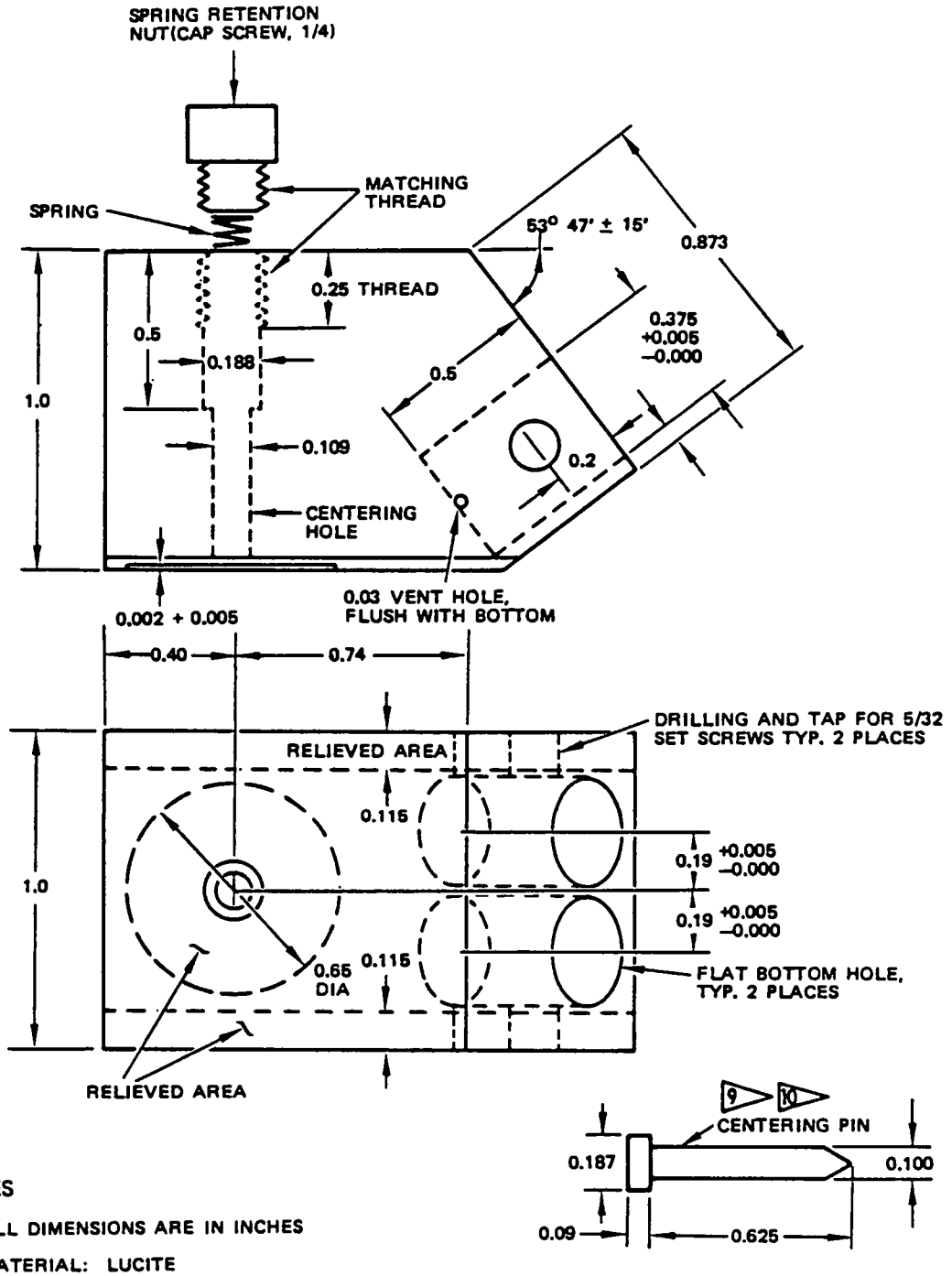
- PART NO: 6410–12 AVAILABLE FROM IDEAL SPECIALTY CO. 2531 E. INDEPENDENCE ST. TULSA, OKLAHOMA 74110
- ALL DIMENSIONS ARE IN INCHES
- FIXTURE MATERIAL: LUCITE
- TOLERENCE: ± 0.010 EXCEPT AS NOTED
- ETCH WITH PF4 ON TOP SURFACE

9 MACHINE CENTERING PIN FROM TOOL STEEL FOR SLIPFIT IN CENTERING HOLE.

10 INSTALL CENTERING PIN IN HOLE, ADD LIGHT TENSION SPRING, AND RETAIN WITH RETENTION NUT

TRANSDUCER POSITIONING FIXTURE NO. PF4
DETAIL VI

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 15)



NOTES

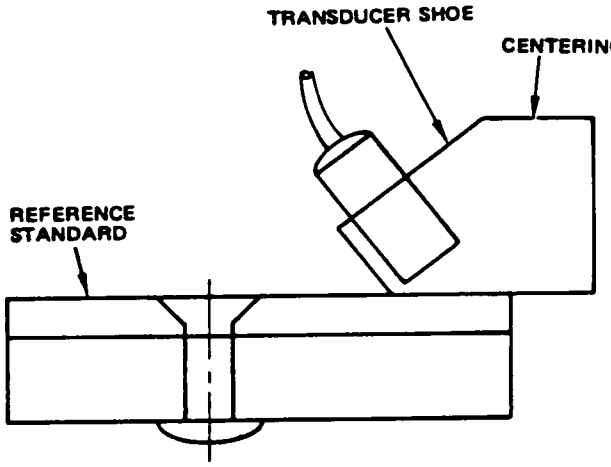
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: LUCITE
- TOLERANCE: X.XX + 0.010 EXCEPT AS NOTED
- ETCH WITH PF2 ON TOP SURFACE
- P/N 6410–10
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

9 MACHINE CENTERING PIN FROM TOOL STEEL FOR SLIP FIT IN CENTERING HOLE

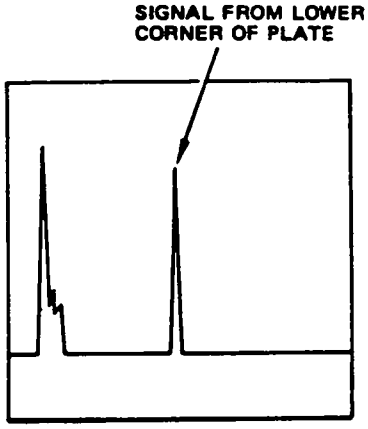
10 INSTALL CENTERING PIN IN HOLE, ADD LIGHT TENSION SPRING, AND RETAIN RETENTION NUT

TRANSDUCER POSITIONING FIXTURE NO. PF2
DETAIL VII

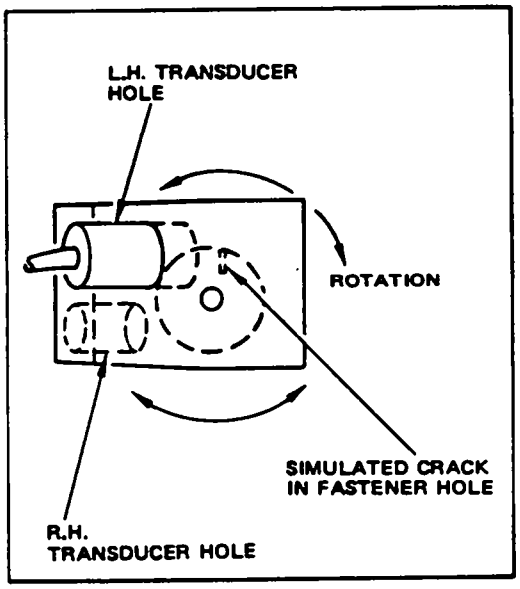
Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 16)



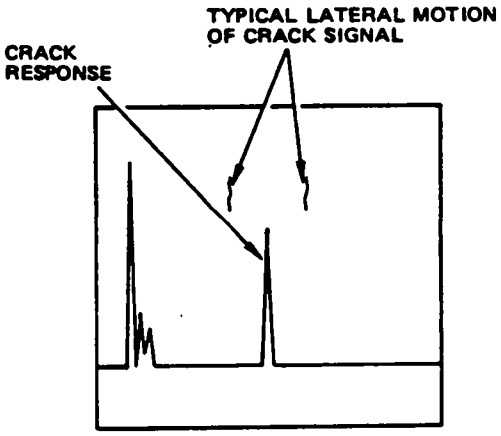
POSITION 1



INSTRUMENT DISPLAY



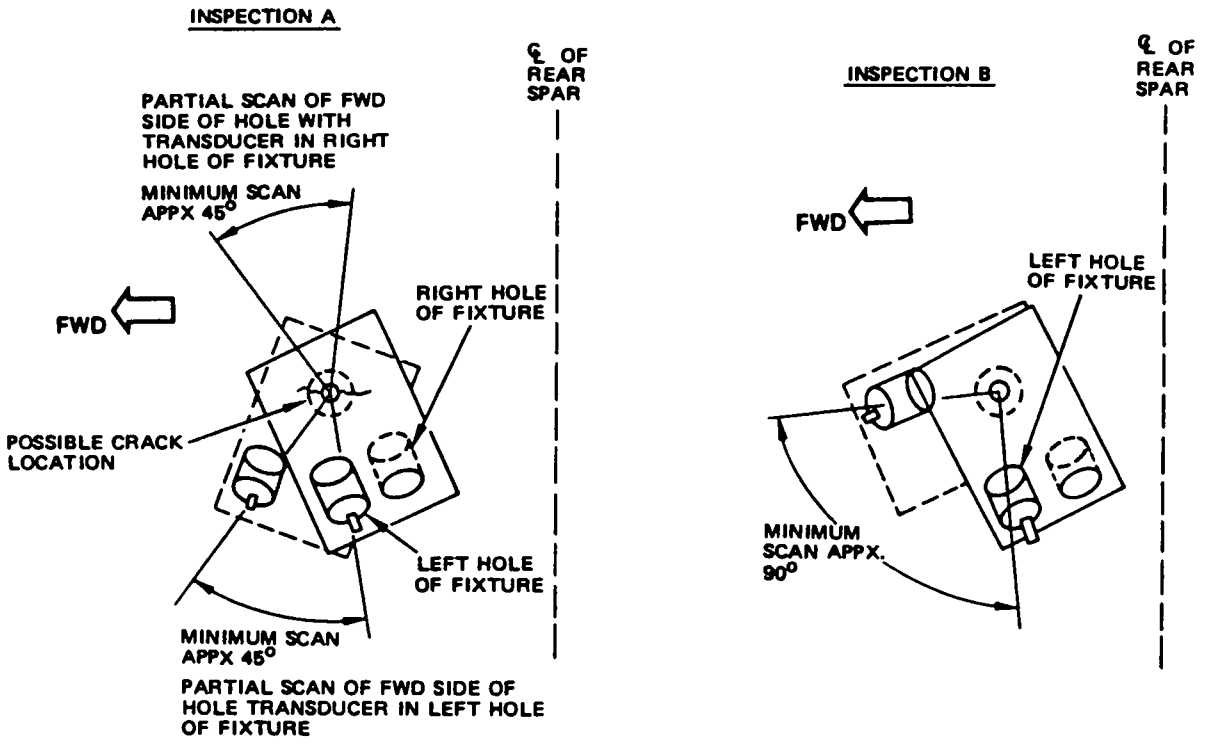
POSITION 2



INSTRUMENT DISPLAY

CALIBRATION FOR SKIN INSPECTION
DETAIL VIII

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 17)



A. INSPECTION IS POSSIBLE FROM BOTH INBD AND OUTBD SIDE OF THE FASTENER, BUT THE SCAN IS LIMITED BY ADJACENT FASTENERS.

A PARTIAL SCAN OF FWD SIDE OF THE FASTENER LOCATION IS ACCOMPLISHED WITH THE TRANSDUCER IN THE LEFT POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE THE SCAN OF THE FWD SIDE OF THE FASTENER LOCATION BY PLACING THE TRANSDUCER IN THE RIGHT HOLE OF THE FIXTURE AND SCANNING FROM THE OPPOSITE SIDE OF THE FASTENER LOCATION. REPEAT THIS PROCESS TO SCAN THE AFT SIDE. 11

B. INSPECTION IS POSSIBLE FROM ONLY ONE SIDE OF THE FASTENER (OUTBD OR INBD)

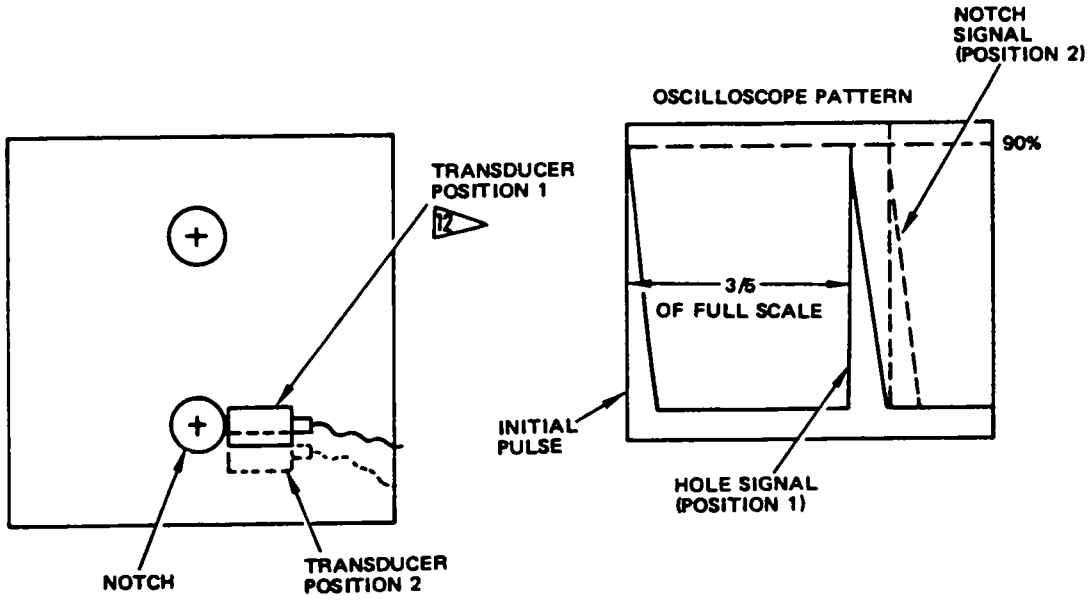
SCAN THE FWD SIDE OF THE FASTENER LOCATION WITH THE TRANSDUCER IN THE LEFT HOLE OF THE POSITIONING FIXTURE AS INDICATED. SCAN THE AFT SIDE OF THE FASTENER LOCATION WITH THE TRANSDUCER IN THE RIGHT HOLE 11

NOTES

11 IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT AT THE FASTENER LOCATION(S) WITH HAND HELD TRANSDUCER PER PAR 5.C.

MINIMUM INSPECTION COVERAGE WHERE ADJACENT FASTENERS INTERFERE WITH SCAN

DETAIL IX



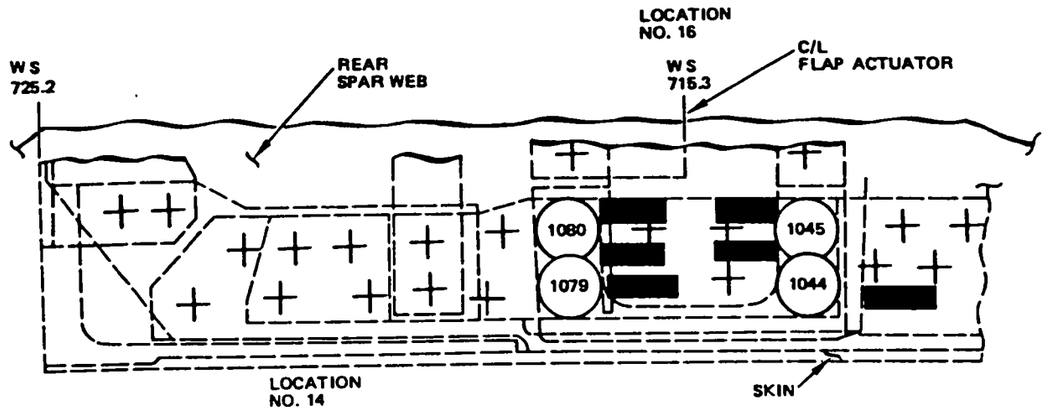
NOTES

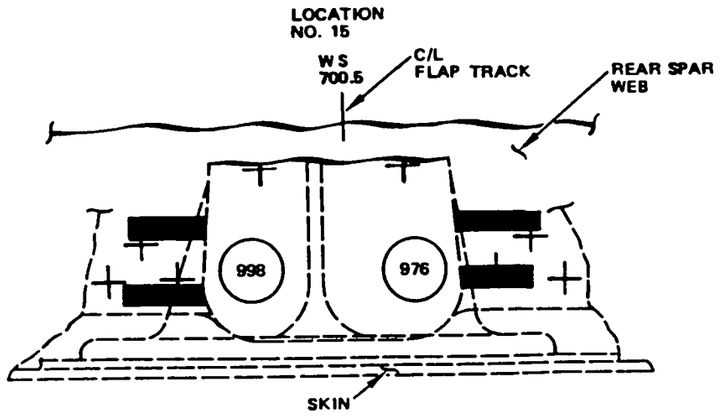
12 SELECT STANDARD AND HOLE SPECIFIED IN TABLE 2 FOR HOLE IN SKIN TO BE INSPECTED.

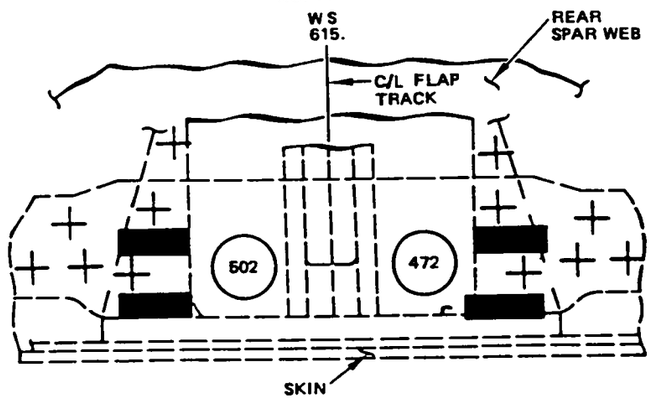
TRANDUCER CALIBRATION POSTION
FOR ALTERNATE INSPECTION OF SKIN

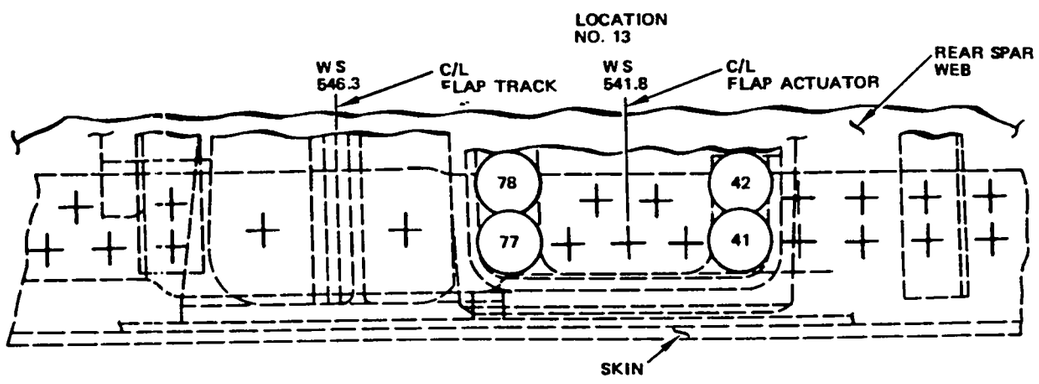
DETAIL X

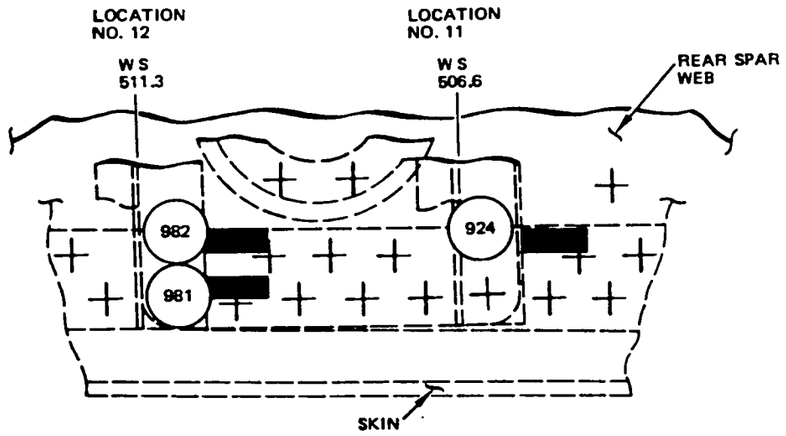
Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 19)

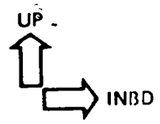












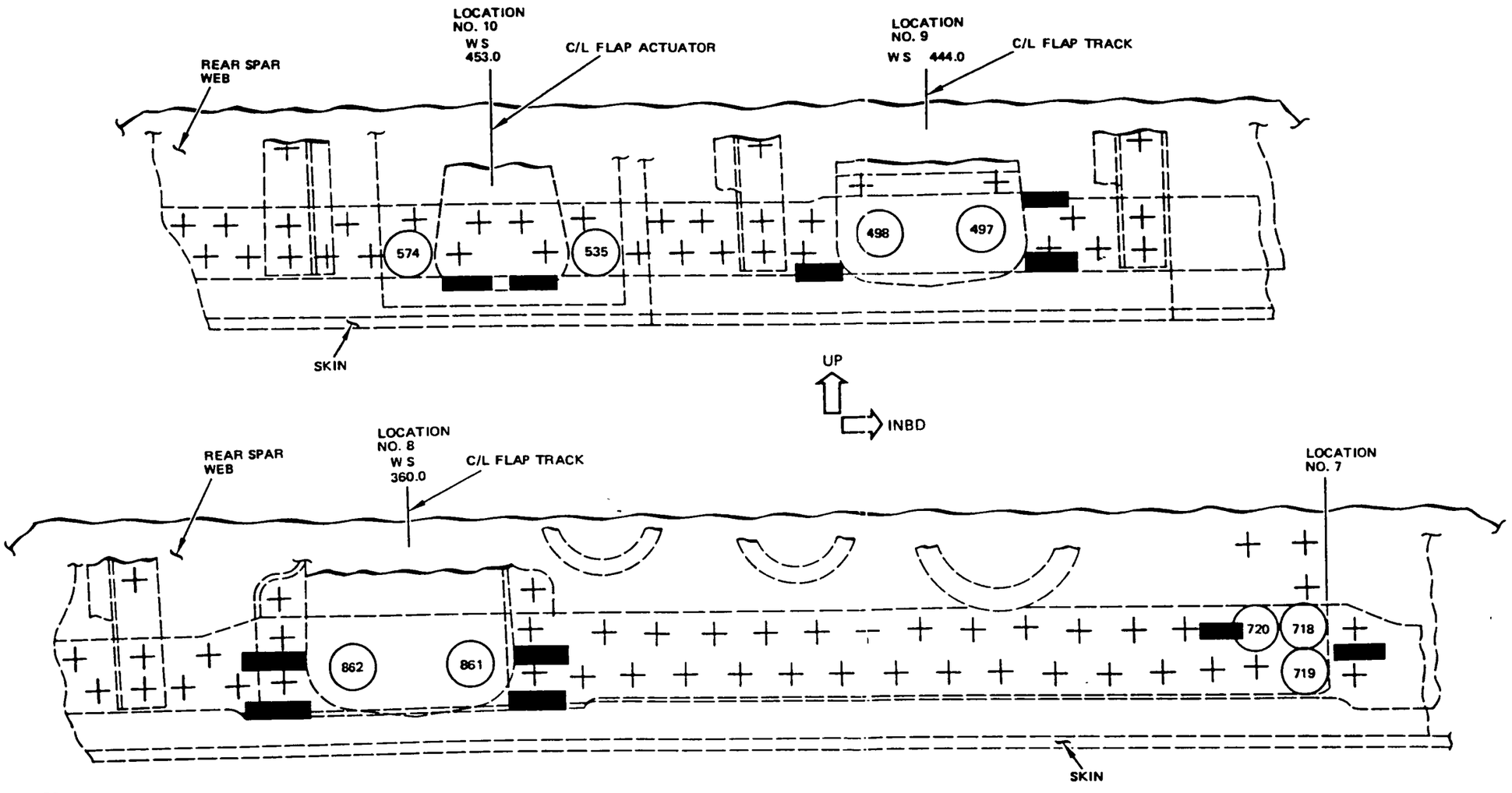
NOTES

TRANSDUCER POSITION

(981) FASTENER TO BE INSPECTED

WING LOWER REAR SPAR CHORD VERTICAL FLANGE

DETAIL XI (CONT)



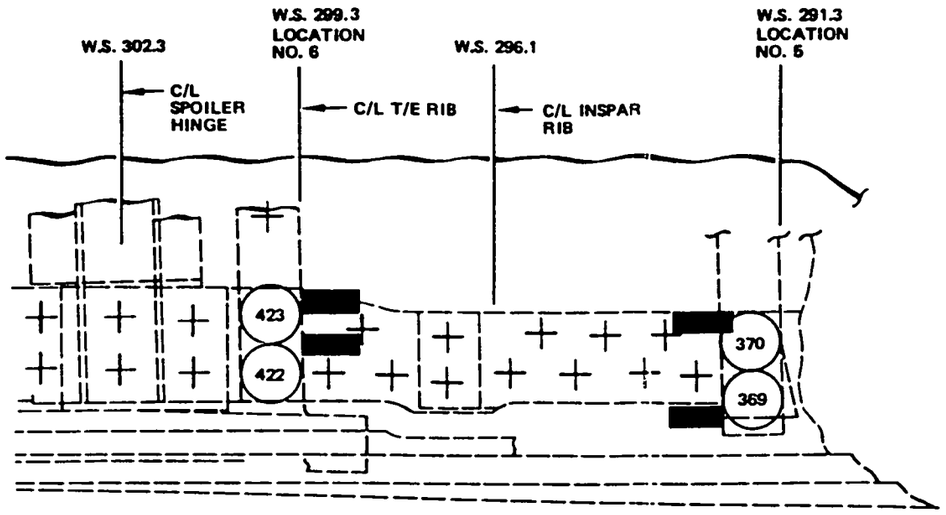
NOTES

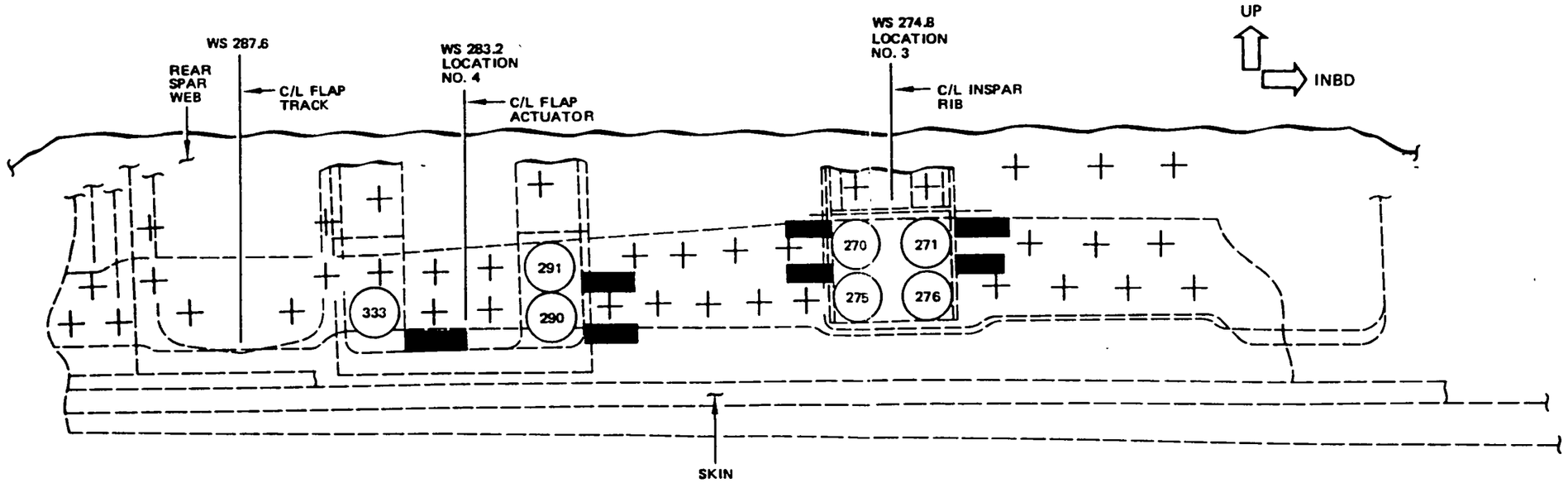
862 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSTION

WING LOWER REAR SPAR CHORD VERTICAL FLANGE
DETAIL XI (CONT)

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 21)



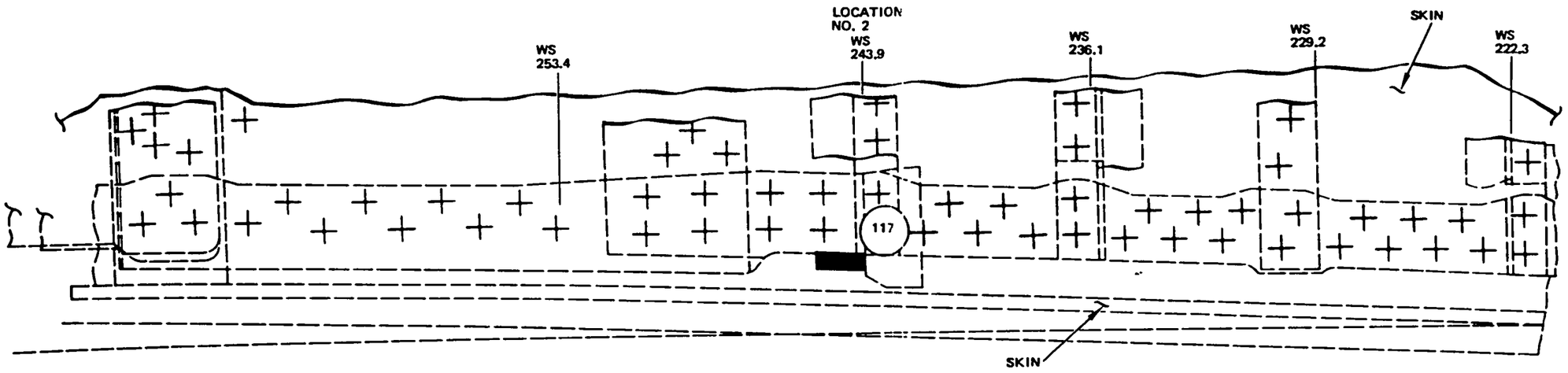


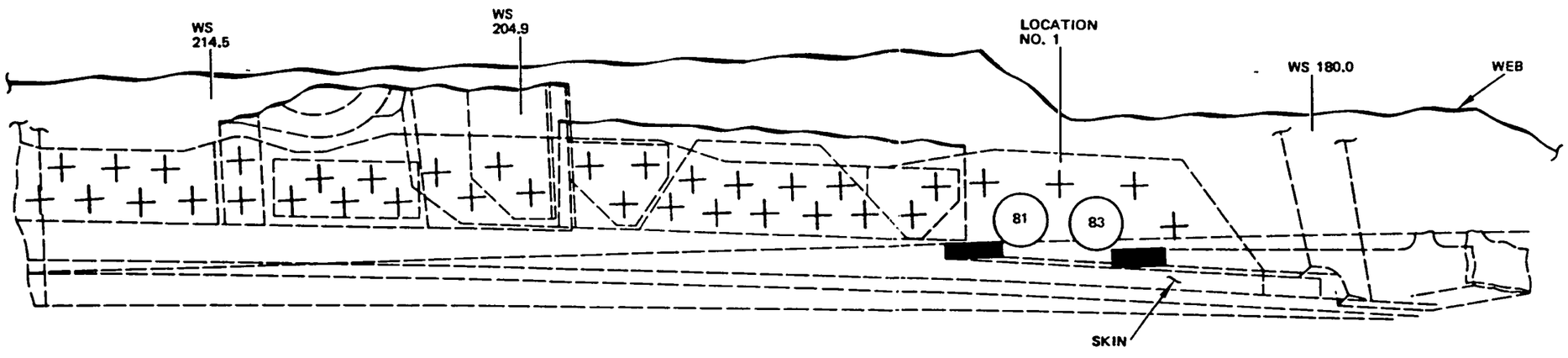
NOTES

(333) FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

WING LOWER REAR SPAR CHORD VERTICAL FLANGE
DETAIL XI (CONT)



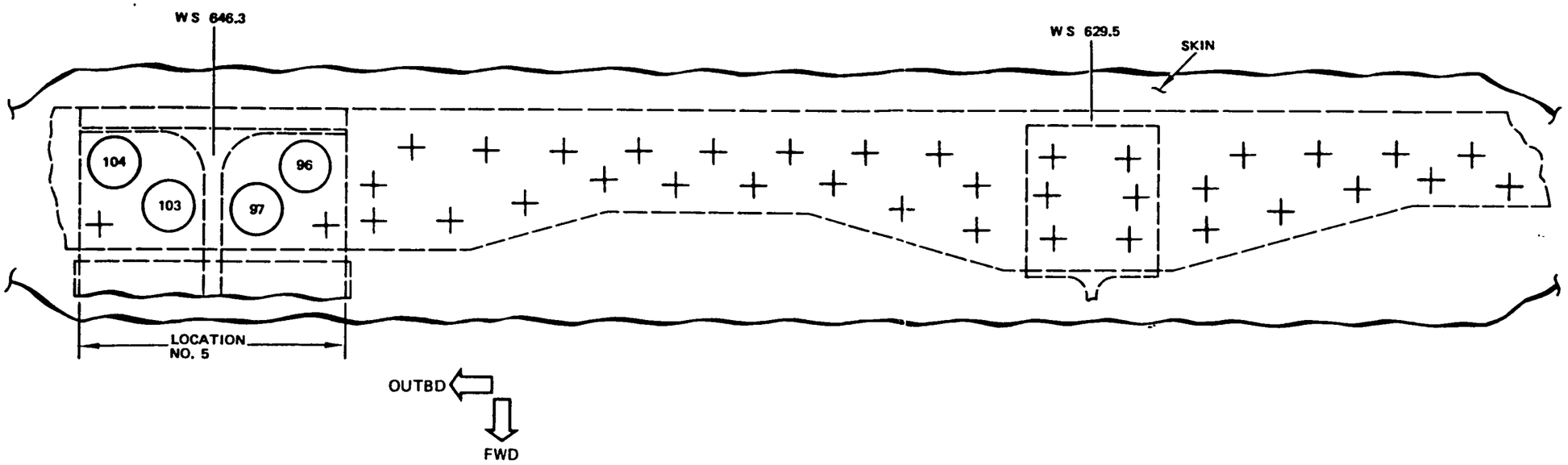


NOTES

(81) FASTENER TO BE INSPECTED

TRANSDUCER POSITION

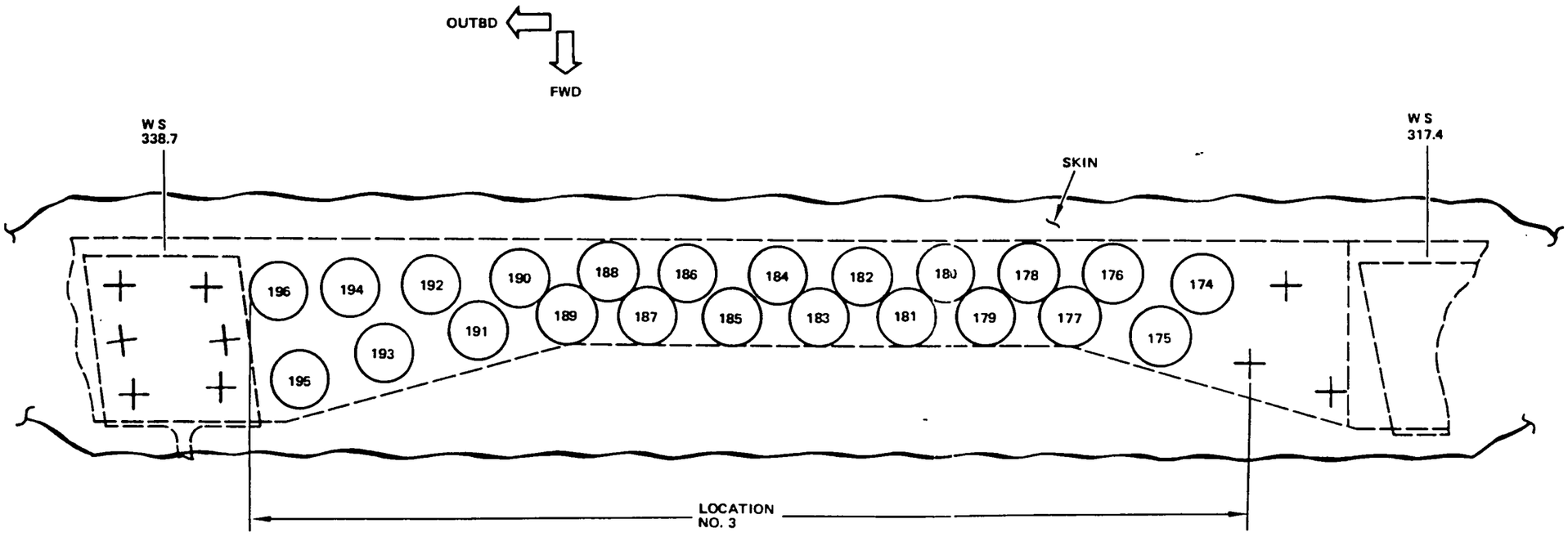
WING LOWER REAR SPAR CHORD VERTICAL FLANGE
DETAIL XI (CONT)



NOTES
- LEFT WING SHOWN, RIGHT WING SIMILAR
- VIEW LOOKING UP

(373) FASTENER TO BE INSPECTED

LOWER WING SKIN AT REAR SPAR CHORD
DETAIL XII (CONT)



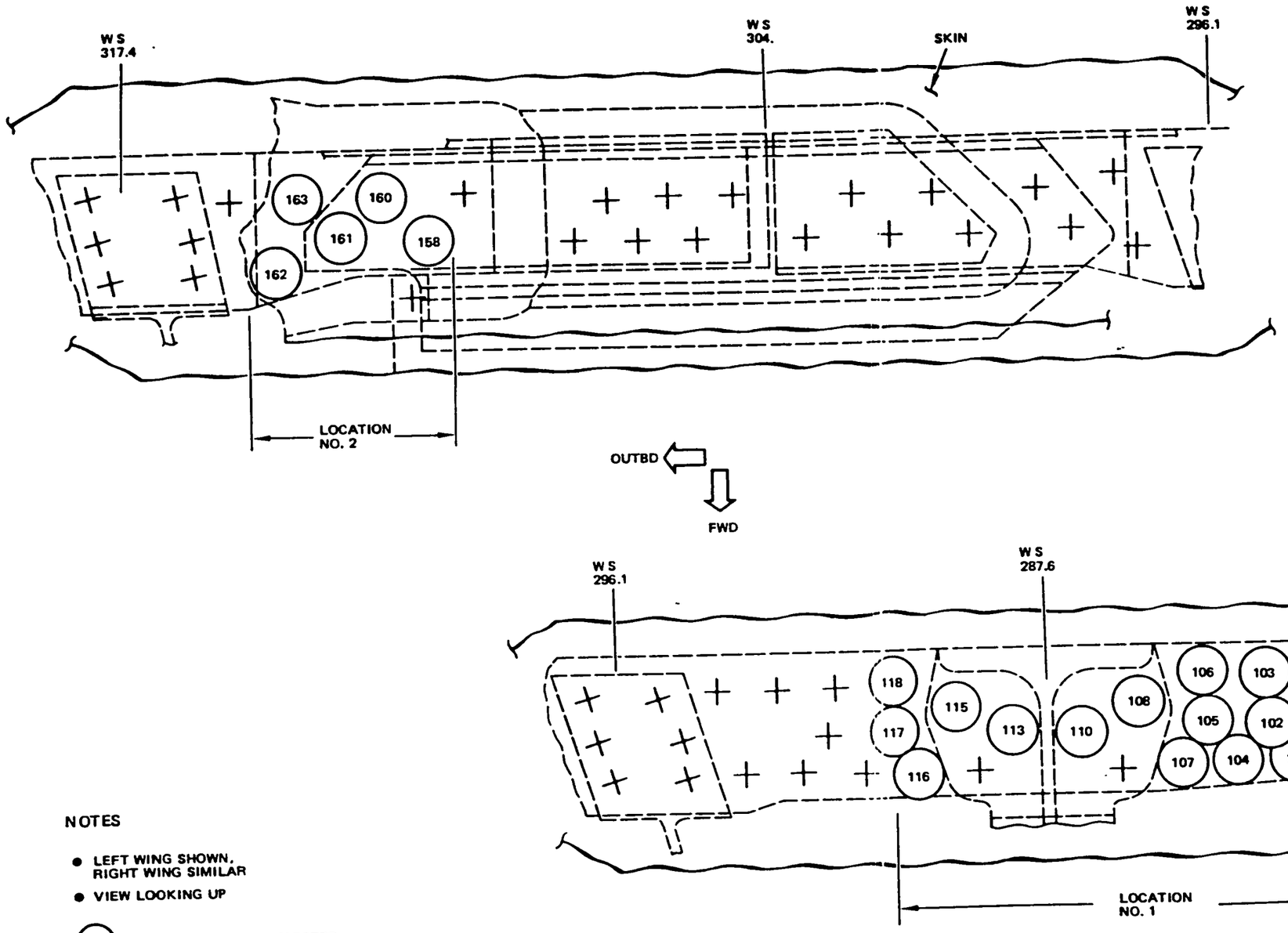
NOTES

- LEFT WING SHOWN RIGHT WING SIMILAR
- VIEW LOOKING UP

(196) FASTENER TO BE INSPECTED

LOWER WING SKIN AT REAR SPAR CHORD
DETAIL XII (CONT)

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 25)



NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- VIEW LOOKING UP

(163) FASTENER TO BE INSPECTED

LOWER WING SKIN AT REAR SPAR CHORD
DETAIL XII

Wing Lower Rear Spar Chord - Vertical Flange and Wing Skin
Figure 2 (Sheet 26)

EFFECTIVITY
MODEL: 707-300/400 SERVICE BULLETIN REFERENCE: 2570, 2605 SSI DOCUMENT (D6-44860) REFERENCE: SSD 57-A25-05 57-A25-09 57-A25-12 57-A35-05 57-A35-09 57-A35-12 57-A45-05 57-A45-09 57-A45-12

PART 4 - ULTRASONIC

WINGS - LOWER REAR SPAR CHORD

1. Purpose

   A. To detect cracks emanating from selected fastener holes:

      (1) In the vertical flange of the wing lower rear spar chord.

      (2) In the wing skin at fasteners common to the rear spar.

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.

      Instrument - Nortec NDT-131, Nortec Corporation

   B. Transducer - The shear wave transducers used for this inspection are 0.35-inch wide by 0.72-inch long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25-inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25-inch element, 60° A (57A8300), top mounted microdot connector.

      NOTE: Transducers (1) and (2) are both required due to restricted access to the rear spar vertical flange.

Vertical Flange of Lower Rear Spar Chord and
Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 1)

(3) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25-inch element, 70° A (57A3066).

(4) Longitudinal Wave, 0.25-inch diameter element, 5 MHz, 0.375-inch diameter case.

C. Reference Standard - Fabricate two reference standards per Details I and II.

D. Positioning Fixture - Fabricate transducer positioning fixture per Detail V.

E. Couplant - Light oil or grease.

3. Prepare for Inspection

A. Perform this inspection from outside wing and with part in place on the airplane.

NOTE: Smooth out any surface roughness by sanding lightly.

B. Remove paint at inspection areas on the chord if necessary to improve sound transmission.

C. Remove paint for inspection of the skin.

D. Wipe surface clean.

E. Lightly prick punch the center of the inspection fasteners in the skin.

F. Apply a thin film of couplant to the inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Calibrate Instrument

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord.

(1) Select a fastener location be inspected. See Detail IX.

(2) From Table 1 identify the Detail I reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table 1 obtain the distance. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

Vertical Flange of Lower Rear Spar Chord and
Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 2)

(4) Obtain a signal from the standard hole. Position this signal at midscale. See Detail III.

(5) Adjust instrument sensitivity to obtain a 90 percent of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 0.25-inch thru thickness notch. Note the difference in the position of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

NOTE: See 4.C. alternate calibration for inspection of wing skin.

(1) Select a fastener location to be inspected from Detail X.

(2) From Table 2 identify the reference standard and transducer positioning fixture required for the holes to be inspected.

(3) Coat .375 inch diameter transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail VI.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail VI (align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. See Detail VI, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument sensitivity to produce approximately a 90% crack signal on the instrument display.

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table 2 which is designated for the hole to be inspected.

(2) Connect the 70° shear wave (see Section 2.B.(3)) transducer to the instrument.

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close the edge of the fastener head as shown in Position 1, Detail VIII.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in Detail VIII.

(6) Move transducer laterally to detect the calibration notch as shown in Detail VIII Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximately 100% of the full scale.

5. Inspection Procedure

A. Inspect fastener locations common to vertical flange of rear spar chord.

(1) Select fastener location to be inspected from Detail IX.

(2) Calibrate instrument according to par. 4.A.

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail IX.

Vertical Flange of Lower Rear Spar Chord and
Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 4)

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument sensitivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(5) Move the transducer laterally and rotate through a small angle (approx 20°) to inspect for cracks out of the fastener hole. See Detail IV.

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response, or, a response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(c) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Detail 1.

B. Inspect wing skin at fastener holes common to rear spar horizontal leg. See Detail X.

NOTE: See par. 5.C for alternate inspection of wing skin at fastener holes.

(1) Select inspection location from Detail X and specific fasteners to be inspected from Table 2.

Vertical Flange of Lower Rear Spar Chord and
Wing Skin between WS 180 and WS 715
Figure 3 (Sheet 5)

(2) Calibrate instrument according to par. 4.B.

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener being inspected. The minimum extent of scan is shown in Detail VII.

If the minimum scan cannot be performed, it will be necessary to scan with a hand held transducer calibrated per par. 4.C. Inspect per par. 5.C.

(4) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(5) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(6) Repeat inspection procedure for each location identified in Detail X.

(7) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

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

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer approximately $\pm$ 20° about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response, or, a response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

Inspection [2] Location	Wing Station	Fastener Identification Number	Fastener Diameter	[5] Chord Thickness	[1][5] Distance D	Reference Standard Hole [6]
1	118	1	3/4	0.55	0.88	No. 6
1A	118	4	3/4	0.55	0.88	No. 6
2	139	53,54	7/16	0.28	0.63	No. 5
2A	139	31,32	7/16	0.30	0.63	No. 5
3	144	95,96	7/16	0.30	0.63	No. 5
3A	144	38,39	7/16	0.32	0.63	No. 5
4	150	102,103	7/16	0.32	0.63	No. 5
4A	150	45,46	7/16	0.33	0.63	No. 5
5	163	151,152	7/16	0.37	0.63	No. 5
5A	163	58,59	7/16	0.36	0.63	No. 5
6	169	191,192	7/16	0.40	0.63	No. 5
6A	169	65,66	7/16	0.38	0.63	No. 5
7	204	327 thru 330	1/4	0.32	0.38	No. 4
8	210	405,406	3/16	0.25	0.36	No. 4
9	214	410,411	9/16	0.15	0.52	No. 2
10	220	474,475	3/16	0.15	0.46	No. 1

PARAMETERS USED
FOR INSPECTION OF CHORD
TABLE I (CONT)

NOTES:

[1] D = DISTANCE BETWEEN LEADING EDGE OF TRANSDUCER AND EDGE OF FASTENER HOLE TO BE USED FOR CALIBRATION. ON THE CHORD, D CORRESPONDS TO THE DISTANCE BETWEEN THE HOLE AND THE CLOSEST POSSIBLE LOCATION FOR TRANSDUCER PLACEMENT

[2] SEE DETAIL I FOR LOCATIONS

Vertical Flange of Lower Rear Spar Chord and
Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 8)

NONDESTRUCTIVE TEST

Inspection [7] Location	Wing Station	Fastener Identification Number	Fastener Diameter	Chord Thickness	Distance D	Reference Standard Hole
11	232	542,543	3/16	0.15	0.41	No. 1
12	235	549,550	3/16	0.15	0.47	No. 1
13	240	598,599	3/16	0.15	0.46	No. 1
14	244	607,608	3/16	0.15	0.46	No. 1
15	254	677,678	3/16	0.15	0.46	No. 1
16	259	732,733	3/16	0.15	0.46	No. 1
17	263	741,742	3/16	0.15	0.46	No. 1
18	267	799,800	3/16	0.15	0.46	No. 1
19	273	853,854 855,856	3/16	0.15	0.31	No. 1
20	293	1011,1012	1/2 [3] 9/16 [4]	0.15	0.59 [3] 0.56 [4]	No. 2
21	298	1019,1020	3/16	0.15	0.41	No. 1
22	303	1066,1067	3/16	0.15	0.41	No. 1
23	307	1075,1076	3/16	0.15	0.41	No. 1
24	312	1127,1128	3/16	0.15	0.41	No. 1

TABLE I (CONT)

NOTES:

[3] FOR CUM LINE NO.S 13,20,35,58,61,62,65,68 thru 71,73 thru 76, 78 thru 84, 86,88 thru 94,98,99,100,101,103 thru 107,110 thru 118,121 thru 129,133 thru 139,144,145,151 thru 155,159 thru 162,167 thru 171,175,176,192,200, 205,209,216,217,264,266,269,271,272,274,275,282,283,293,302,328,330,334, 353

[4] ALL 707-300B/-300C MODELS

[5] ALL DIMENSIONS ARE IN INCHES

[6] REFERENCE STANDARD 077

Inspection Location	Wing Station	Fastener Identification Number	Fastener Diameter	Chord Thickness	Distance D	Reference Standard Hole
25	320	1182,1183	3/16	0.15	0.41	1
26	322	1187,1188	3/16	0.15	0.41	1
27	328	1244,1245	3/16	0.15	0.41	1
28	333	1255,1256	3/16	0.15	0.41	1
29		1322,1323	3/16	0.15	0.41	1
30	349	1376,1377	3/16	0.15	0.41	1
31	355	1384,1385	1/4	0.15	0.38	1
32	364	1,2	1/4	0.15	0.38	1
33	370	31,32	3/16	0.15	0.41	1
34	374	41	3/16	0.15	0.41	1
35	444	472,473, 515,514	3/16	0.15	0.31	1
36	444	475	3/16	0.15	0.10	1
37	506	907,908	3/16	0.15	0.36	1
38	511	929,930	3/16	0.15	0.36	1
39	541	41,42	3/16	0.15	0.53	1

TABLE I (CONT)

Vertical Flange of Lower Rear Spar Chord and
Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 10)

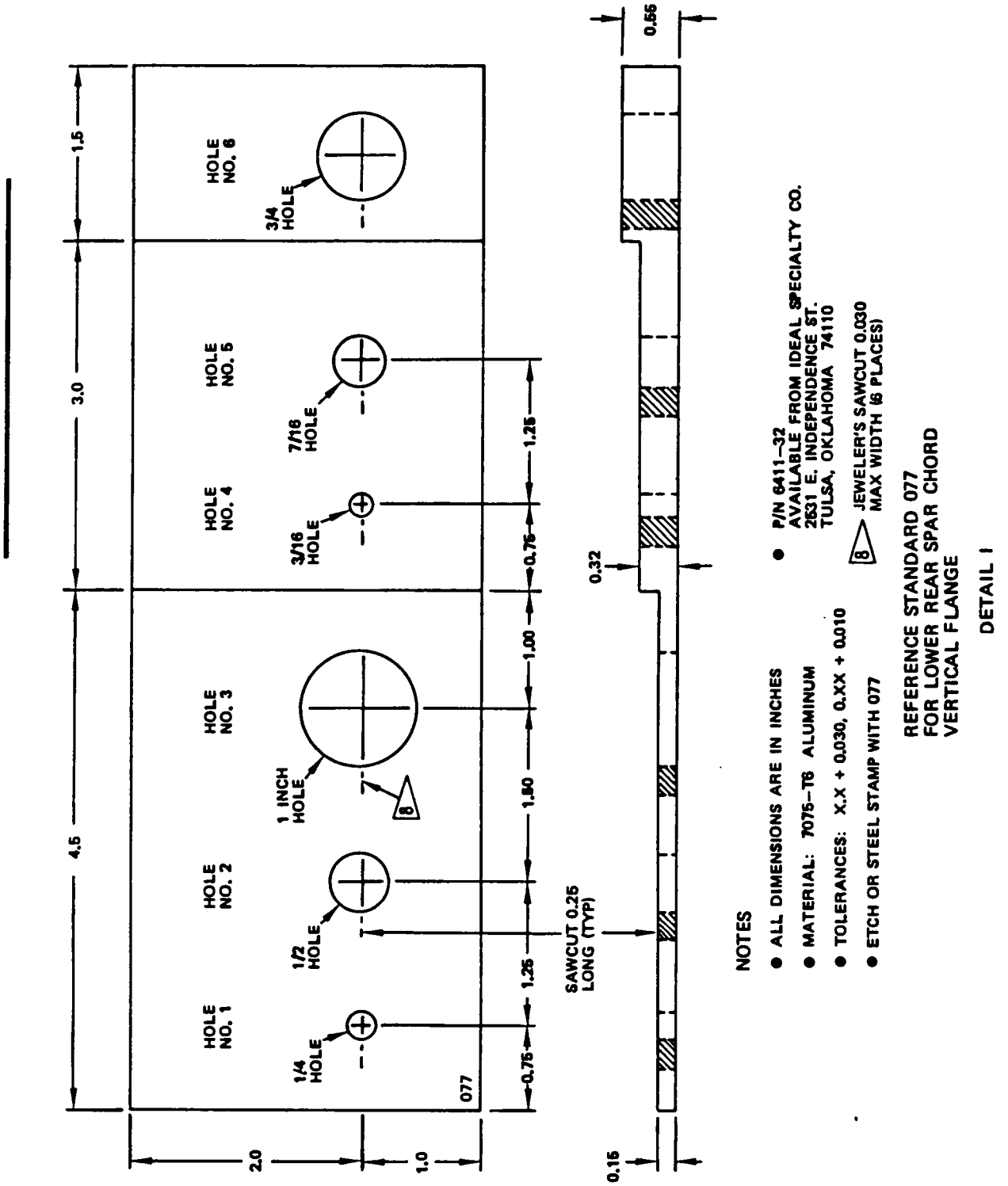
Inspection Location	Wing Station	Fastener Identification Number	Fastener Diameter	Chord Thickness	Distance D	Reference Standard Hole
40	546	100	5/16	0.15	0.79	No. 1
41	615	472,502	1.00	0.15	0.25	No. 3
41A	615	472,502	1.00	0.15	0.25	No. 3
		469,506	3/16		0.33	No. 1
42	700	976,988	9/16	0.15	0.42	No. 2
43	715	1044,1045 1079,1080	3/16	0.15	0.41	No. 1

TABLE I (CONTINUED)

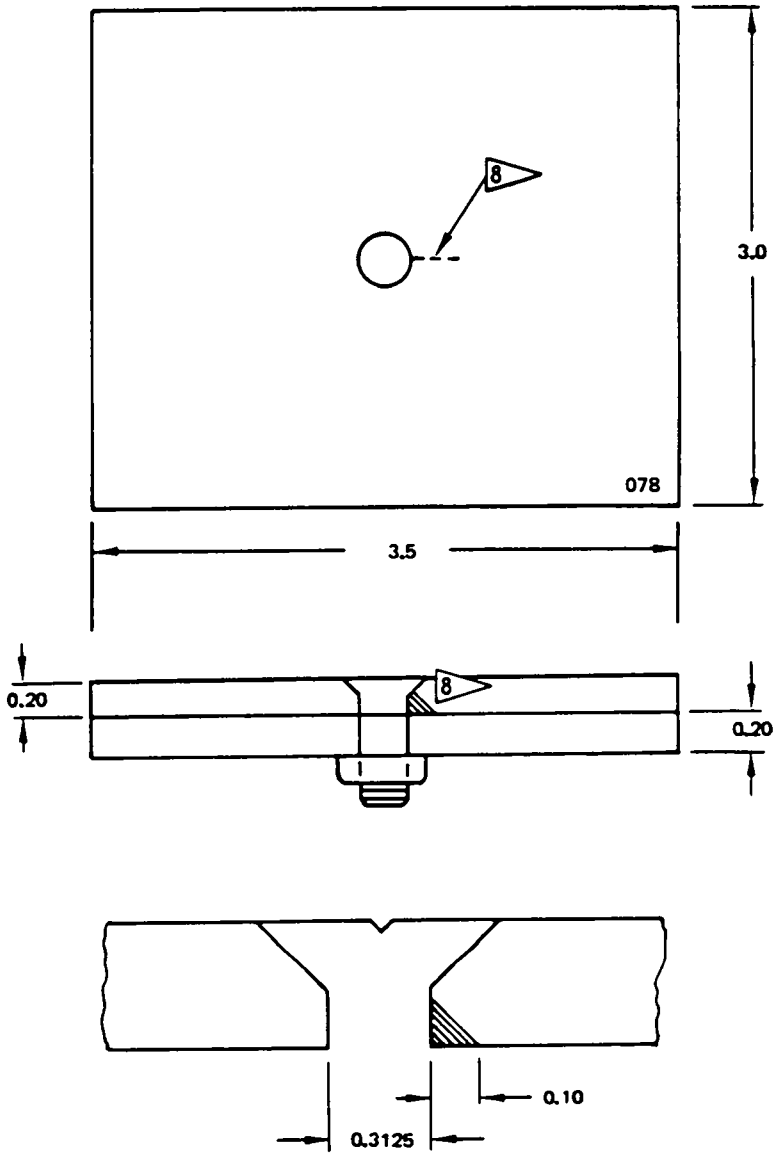
STATION NO. (16)	APPROX. W.S.	FASTENER CODE NUMBER	FASTENER DIAMETER (INCH)	SKIN THICKNESS	REFERENCE STANDARD	POSITION FIXTURE	A/P. EFF:
1	438	120,121,124, 125,126,127, 129,132	3/8	0.23	Detail II	Detail V	707-300,400
1A	438	21,22,23,24	3/8	0.18	Detail II	Detail V	707-300B 300C
2	546	287,289,294 295	5/16 1/4	0.20	Detail II	Detail V	707-300,400
2A	546	31,32,33,34 35,36,37,38	5/16	0.16	Detail II	Detail V	707-300B, 300C
3	700	575,577,578, 581,582,583	1/4	0.16	Detail II	Detail V	707-300,400
3A	700	51,52,53,54 55,56,57,58	1/4	0.17	Detail II	Detail V	707-300B, 300C

PARAMETERS USED FOR SKIN INSPECTION
TABLE II

(16) Refer to Detail X for locations



Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 13)



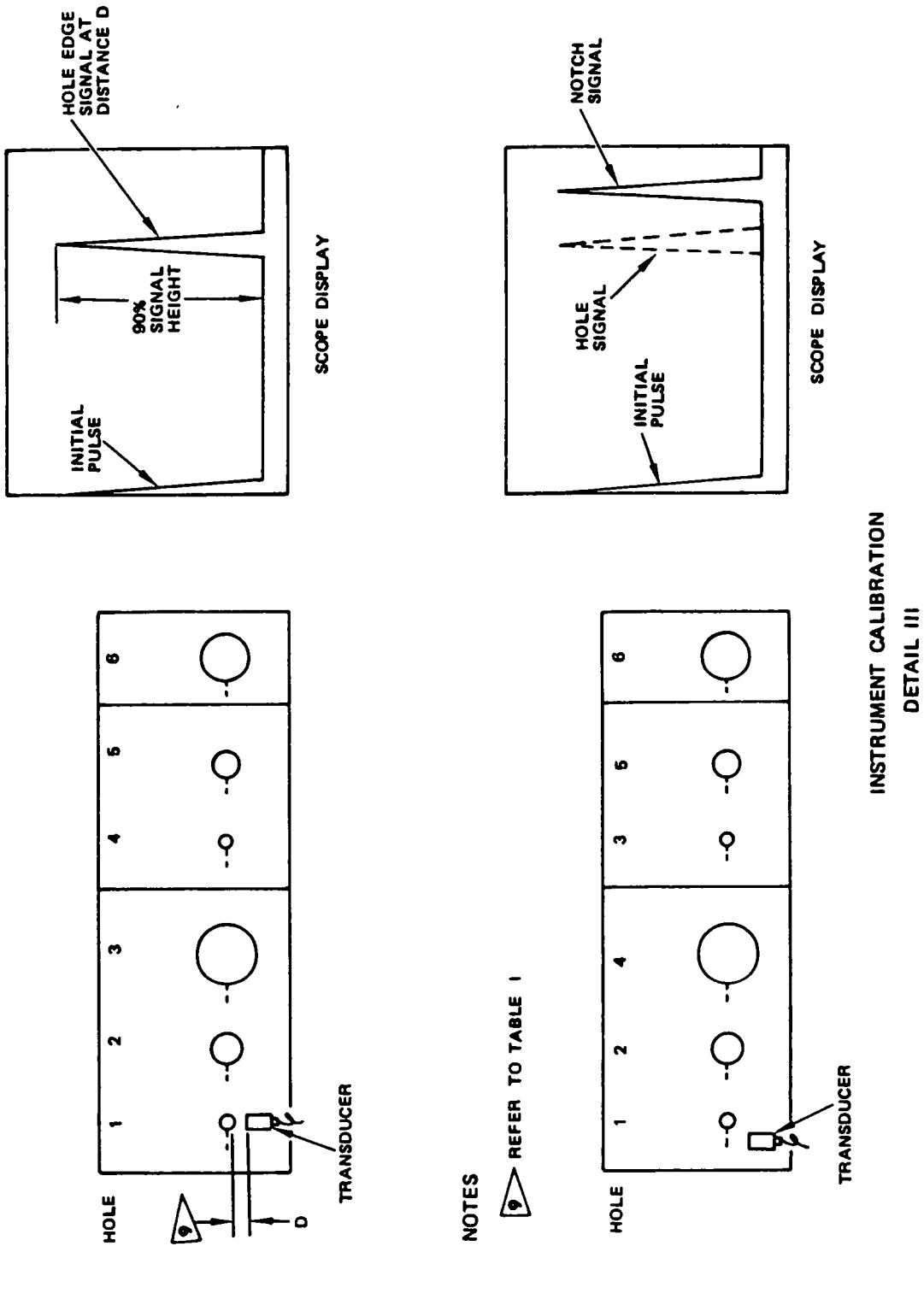
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- TOLERANCE: X.X + 0.030, X.XX +0.010
- USE BACB30LU5–6 FASTENER AND BACN10JC5 NUT OR EQUIVALENT
- ETCH OR STEEL STAMP WITH 078
- P/N 6411–33 AVAILABLE FROM IDEAL SPECIALTY CO.

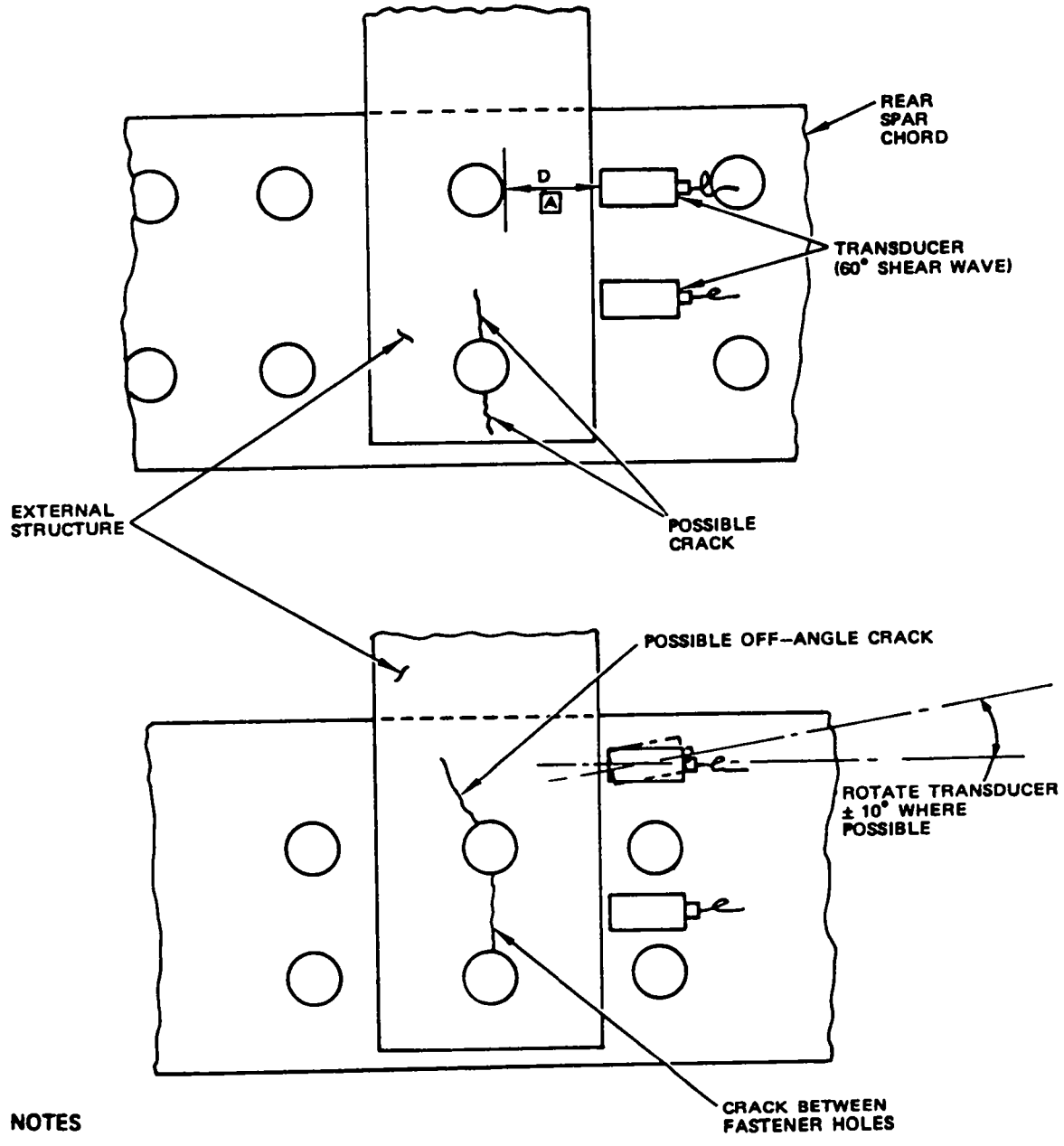
8 JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 078
FOR SKIN INSPECTION CALIBRATION
DETAIL II

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 14)



Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 15)



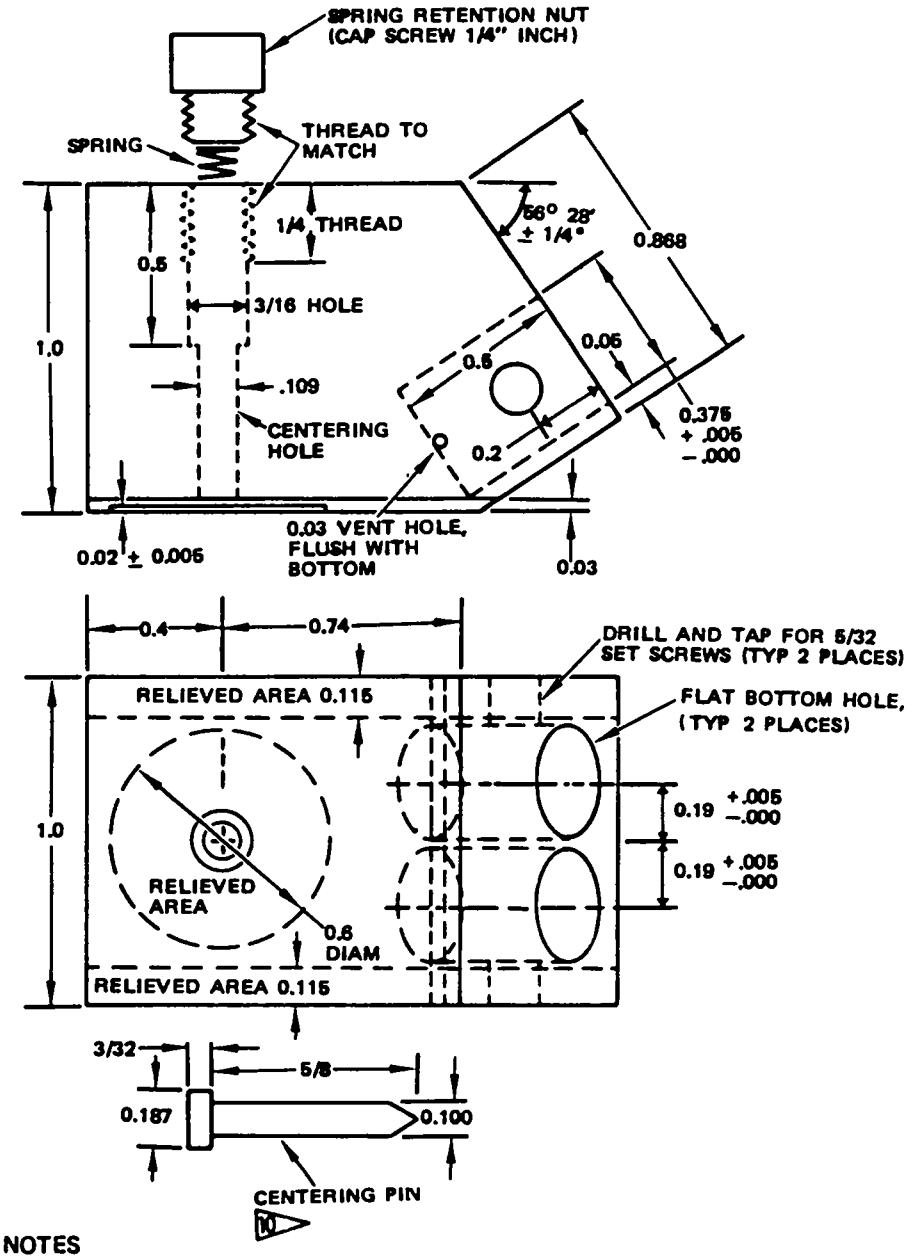
NOTES

A SEE TABLE I

INSPECTION OF REAR SPAR CHORD

DETAIL IV

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 16)

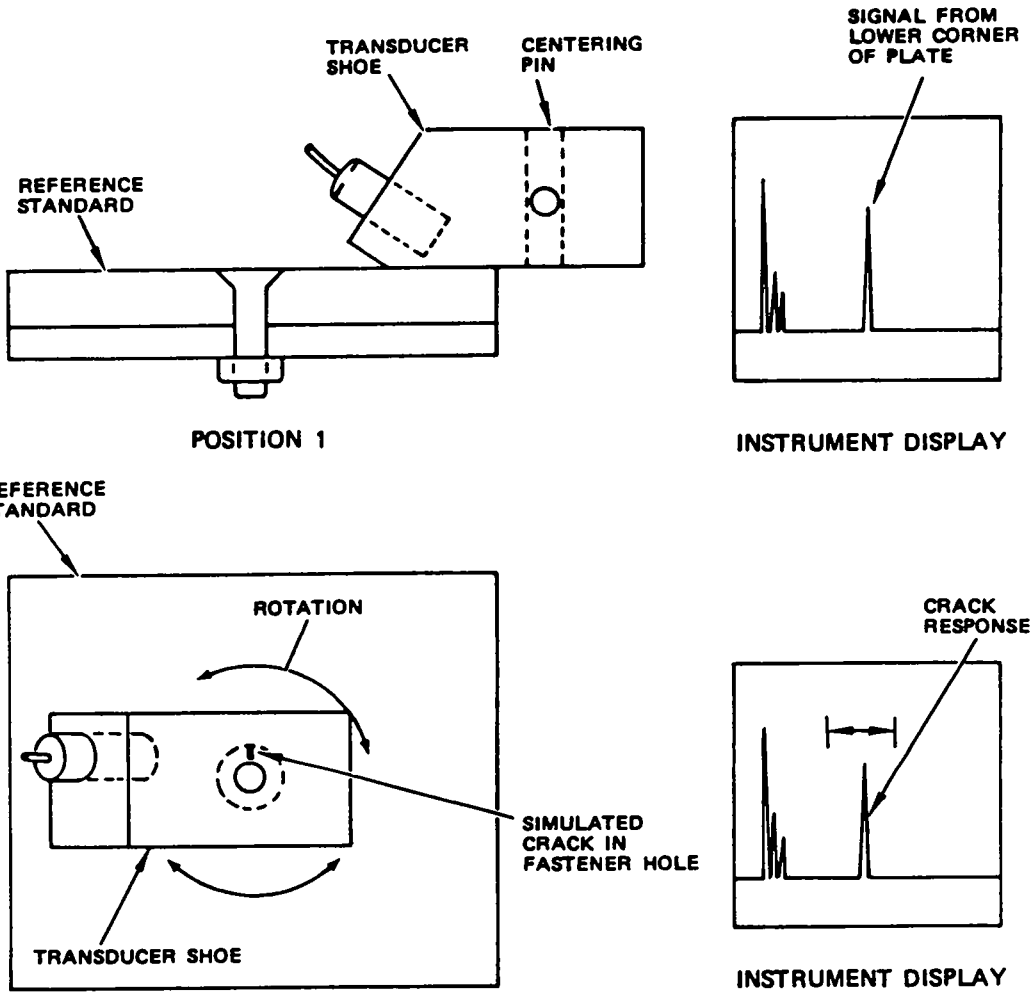


NOTES

- ALL DIMENSIONS ARE IN INCHES
- FIXTURE MATERIAL: LUCITE
- TOLERANCE: ± 0.010 EXCEPT AS NOTED
- POLISH TO 100 MICROINCHES
- ETCH WITH PF1 ON TOP SURFACE
- P/N 6410-9 AVAILABLE FROM IDEAL SPECIALTY CO. 2631 E. INDEPENDENCE ST. TULSA, OKLAHOMA 74110

10 MACHINE CENTERING PIN FROM TOOL STEEL FOR SLIP FIT IN CENTERING PIN HOLE. INSTALL IN CENTERING PIN HOLE, ADD LIGHT TENSION SPRING AND RETAIN WITH RETENTION NUT.

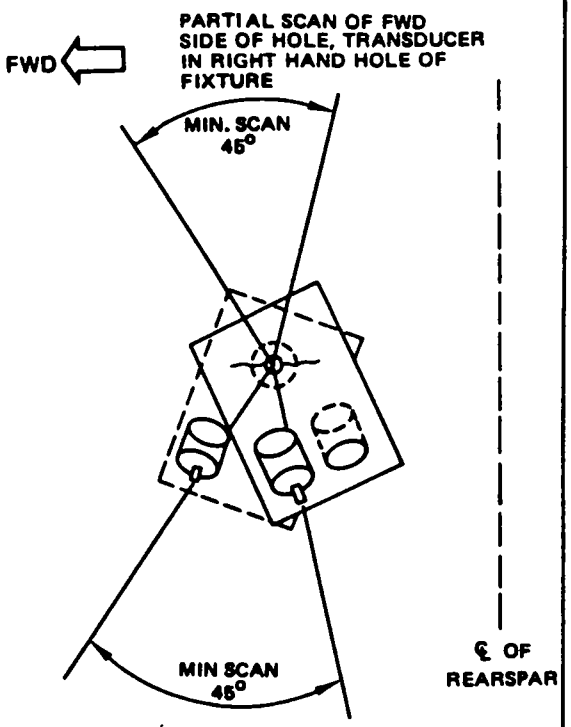
TRANSDUCER POSITIONING FIXTURE NO. PF 1
DETAIL V
Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 17)



CALIBRATION FOR SKIN INSPECTION

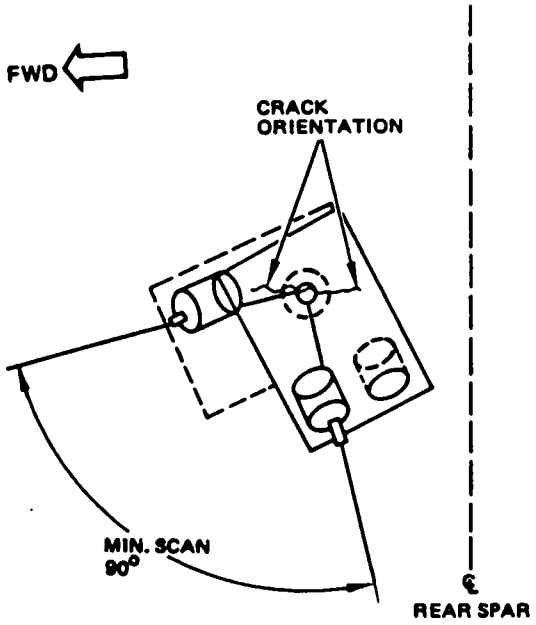
DETAIL VI

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 18)



A. INSPECTION IS POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN L.H. POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD SIDE OF HOLE BY PLACING TRANSDUCER IN R.H. HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE. ▽11



B. INSPECTION IS POSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

SCAN FWD. SIDE OF FASTENER WITH TRANSDUCER IN L.H. HOLE AS INDICATED. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN R.H. HOLE. ▽11

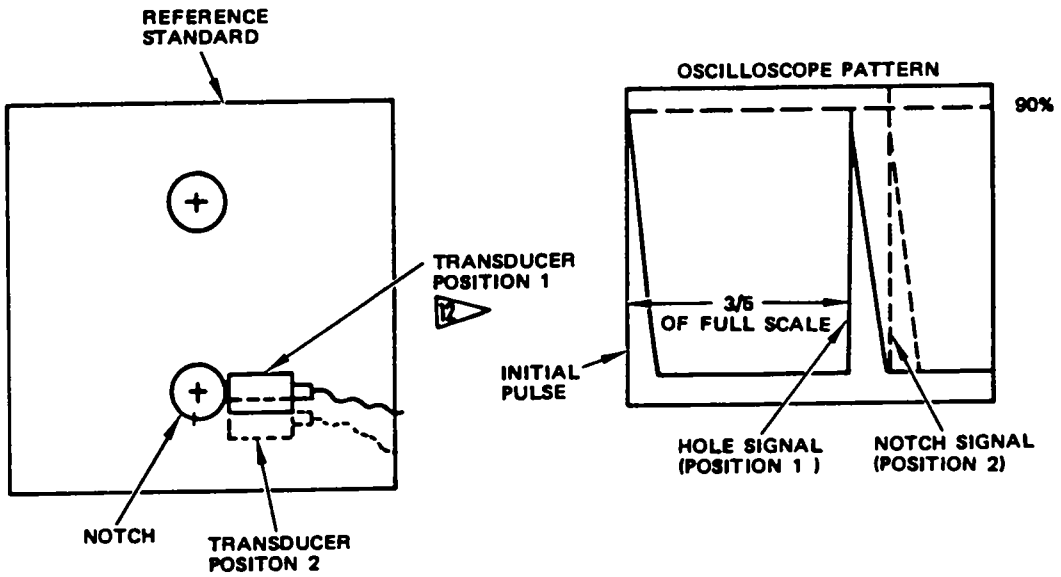
▽11 IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PART 6. C.

NOTES

MINIMUM INSPECTION COVERAGE WHERE ADJACENT FASTENERS INTERFERE WITH SCAN

DETAIL VIII

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 19)



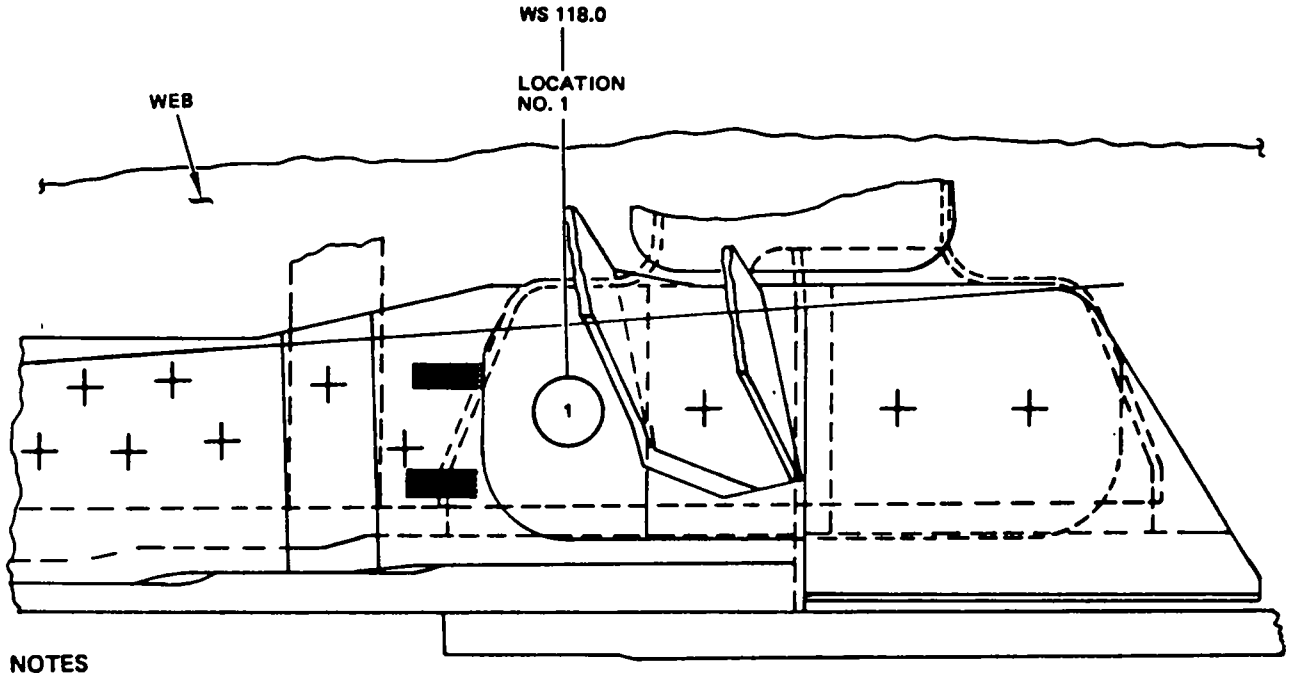
12 SELECT STANDARD AND HOLE SPECIFIED IN TABLE II FOR HOLE IN SKIN TO BE INSPECTED

TRANSDUCER CALIBRATION POSITION
FOR ALTERNATE INSPECTION OF SKIN

DETAIL VIII

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 20)

Jun 15/80

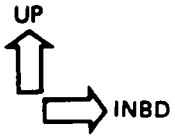


NOTES

(1) FASTENER LOCATION TO BE INSPECTED

TRANSDUCER LOCATION

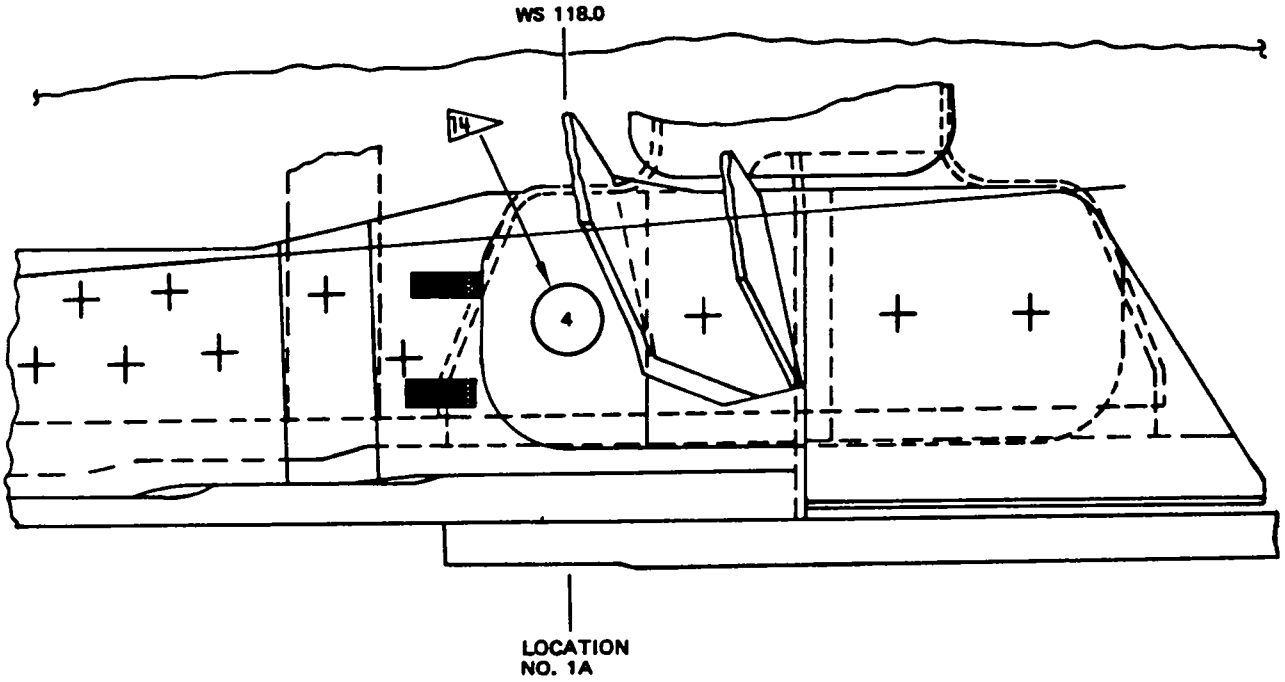
● LEFT WING SHOWN, RIGHT WING SIMILAR, VIEW LOOKING FWD



WING LOWER REAR SPAR
CHORD VERTICAL FLANGE

DETAIL IX

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 21)



NOTES:

(4) FASTENER LOCATION TO BE INSPECTED

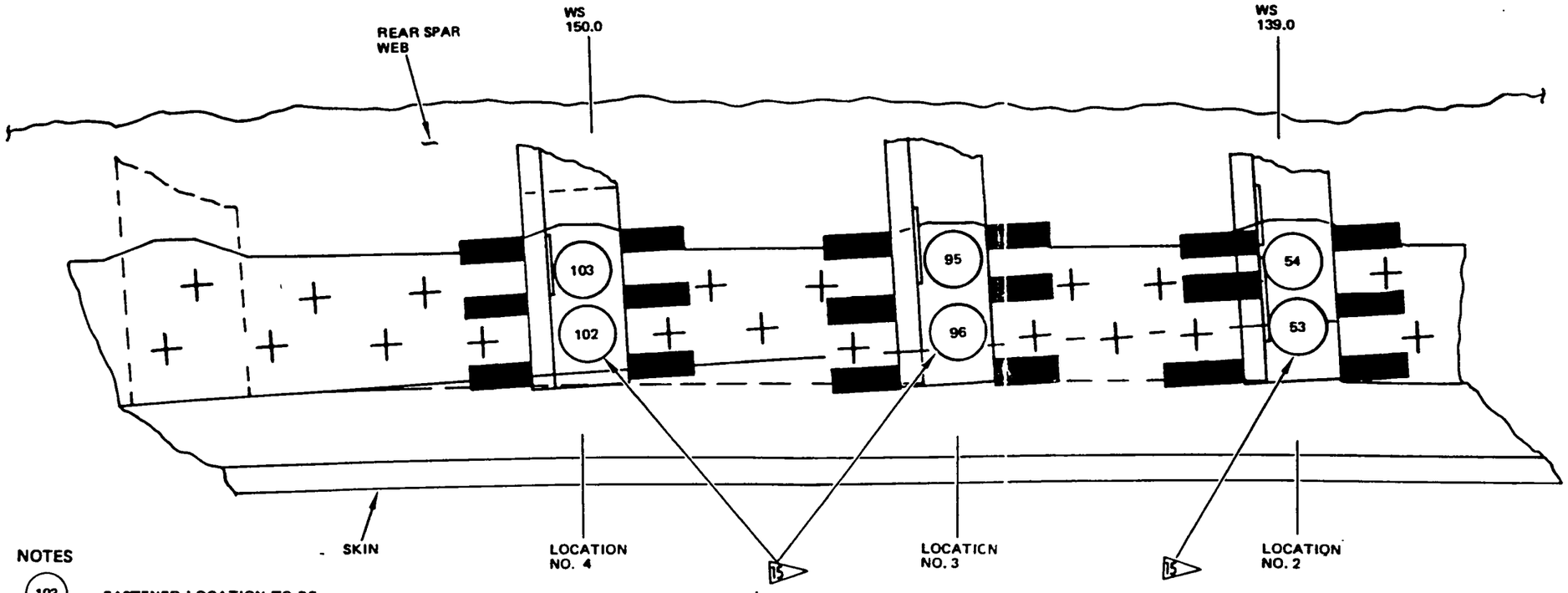
TRANSDUCER POSITION

14 FOR CUM LINE NUMBERS

389, 394, 397, 541, 544, 613, 626, 629, 717, 720, 744 THRU 770, 772 THRU 776, 778 THRU 786, 788 THRU 793, 795 THRU 800, 802 THRU 897, 899, 900, 905, 906, 908, 910, 911, 912, 914, 915, 917, 918, 919, 922, 923, 926, 928, 929

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 22)



NOTES

(103) FASTENER LOCATION TO BE INSPECTED

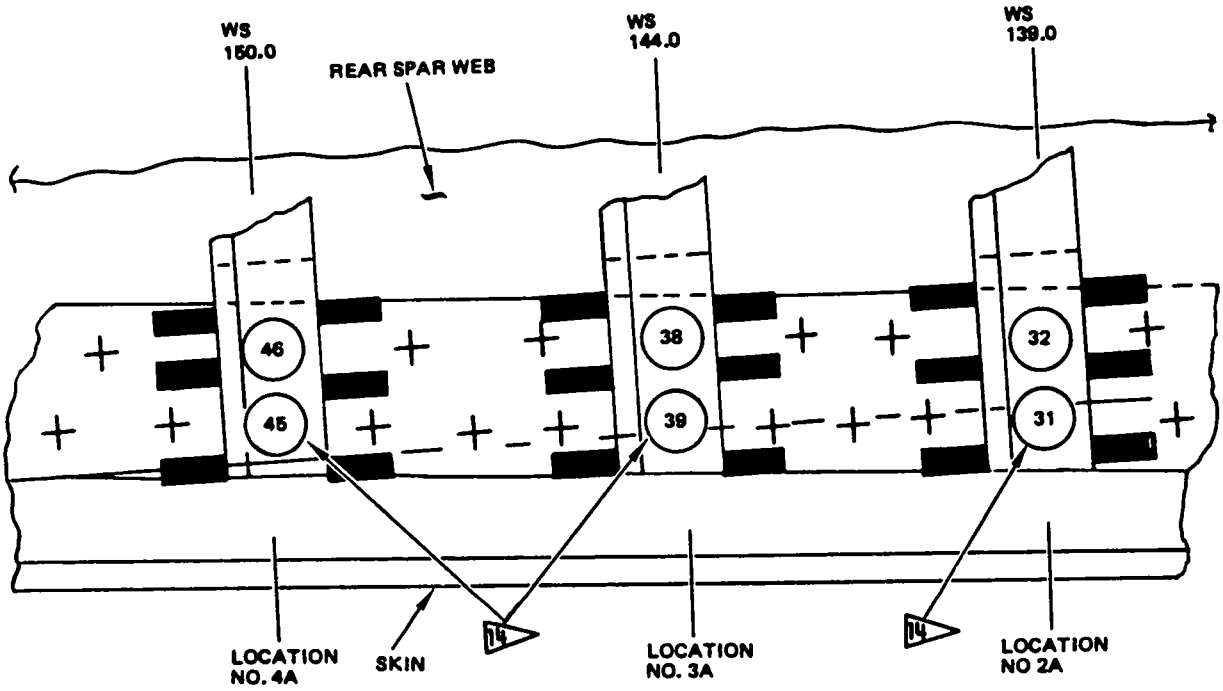
TRANSDUCER POSITION

15 FOR CUM LINE NO'S

268, 270, 276, 287, 292, 303, 305, 320, 323, 325,
326, 327, 329, 331, 332, 333, 335, 336, 341, 343
THRU 346, 348, 349, 350, 352, 354 THRU 360,
362 THRU 373, 375 THRU 379, 383, 386,
387, 389, 394, 397 THRU 400, 402 THRU 409,
411, 412, 413, 415 THRU 419, 421, 424,
425, 428, 430, 431, 434 THRU 441, 443 THRU
447, 449, 450, 451, 453 THRU 469, 471, 472,
475 THRU 478, 482 THRU 485, 487, 488, 494
THRU 505, 507 THRU 511, 513, 515 THRU 525,
527, 528, 529, 531, 532, 534, 536, 537,
538, 540 THRU 557, 559, 560, 561, 563, 566,
568, 570, 572, 574, 576, 578, 580, 582,
584, 585, 587, 588, 590, 592, 594,
596, 599, 601, 603, 605, 607 THRU 614, 616
THRU 620, 625 THRU 668, 670 THRU 682, 683
THRU 743, 745 THRU 770, 772 THRU 800,
802 THRU 897, 899, 900, 905, 906, 908,
910, 911, 912, 914, 915, 917,
918, 919, 922, 923, 925, 928, 929,
(ALL 707-300/-400 MODELS)

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 23)



NOTES:

(46) FASTENER LOCATION TO BE INSPECTED

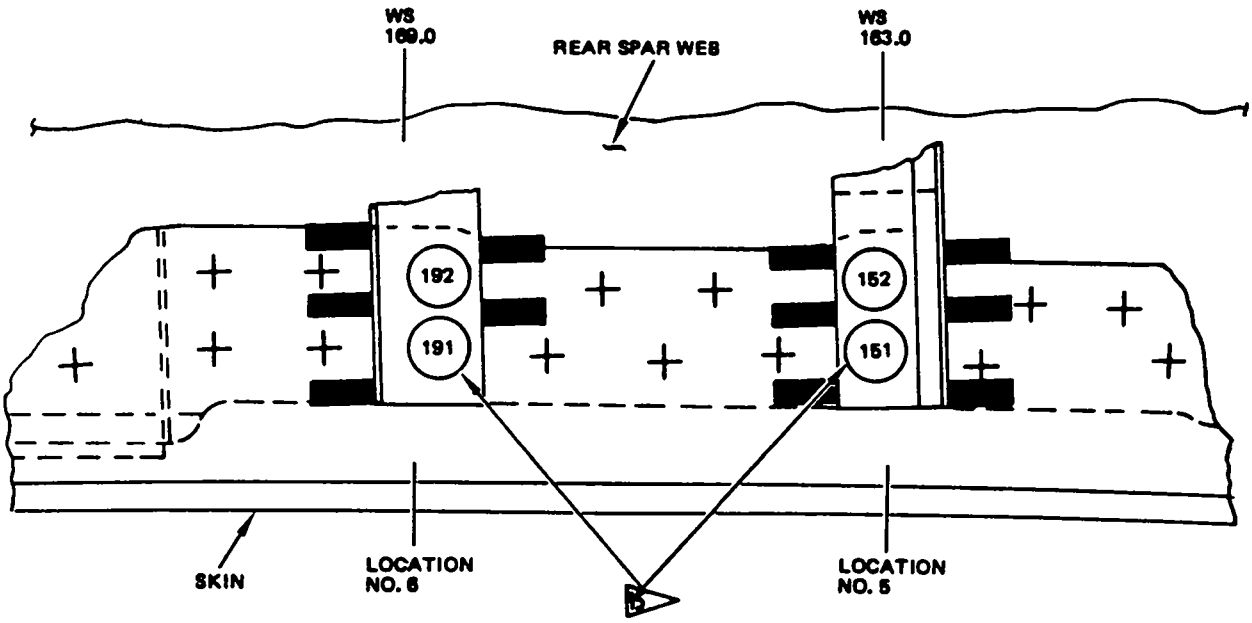
TRANSDUCER POSITION

14 FOR CUM LINE NUMBERS

389, 394, 397, 541, 544, 613, 626, 629, 717, 720, 744 THRU 770, 772 THRU 776, 778 THRU 786, 788 THRU 793, 795 THRU 800, 802 THRU 897, 899, 900, 905, 906, 908, 910, 911, 912, 914, 915, 917, 918, 919, 922, 923, 925, 928, 929

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 24)



NOTES

192 FASTENER LOCATION TO BE INSPECTED

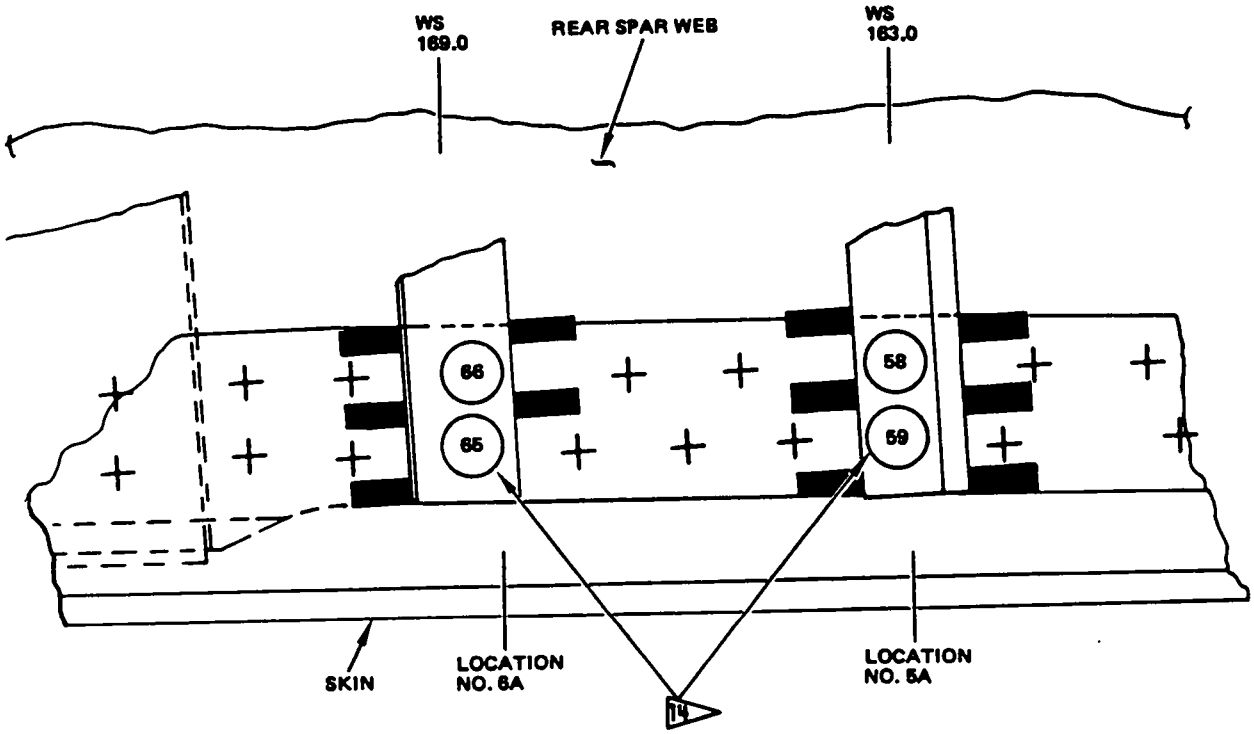
TRANSDUCER POSITION

FOR CUM LINE NO'S

268, 270, 276, 287, 292, 303, 305, 320, 323, 325, 326, 327, 329, 331, 332, 333, 335, 336, 341, 343 THRU 346, 348, 349, 350, 352, 354 THRU 360, 362 THRU 373, 375 THRU 379, 383, 386, 387, 389, 394, 397 THRU 400, 402 THRU 409, 411, 412, 413, 415 THRU 419, 421, 424, 425, 428, 430, 431, 434 THRU 441, 443 THRU 447, 449, 450, 451, 453 THRU 469, 471, 472, 475 THRU 478, 482 THRU 485, 487, 488, 494 THRU 505, 507 THRU 511, 513, 515 THRU 525, 527, 528, 529, 531, 532, 534, 536, 537, 538, 540 THRU 557, 559, 560, 561, 563, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 585, 587, 588, 590, 592, 594, 596, 599, 601, 603, 605, 607 THRU 614, 616 THRU 620, 625 THRU 668, 670 THRU 682, 683 THRU 743, 745 THRU 770, 772 THRU 800, 802 THRU 897, 899, 900, 905, 906, 908, 910, 911, 912, 914, 915, 917, 918, 919, 922, 923, 925, 928, 929, (ALL 707-300/-400 MODELS)

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 25)



NOTES

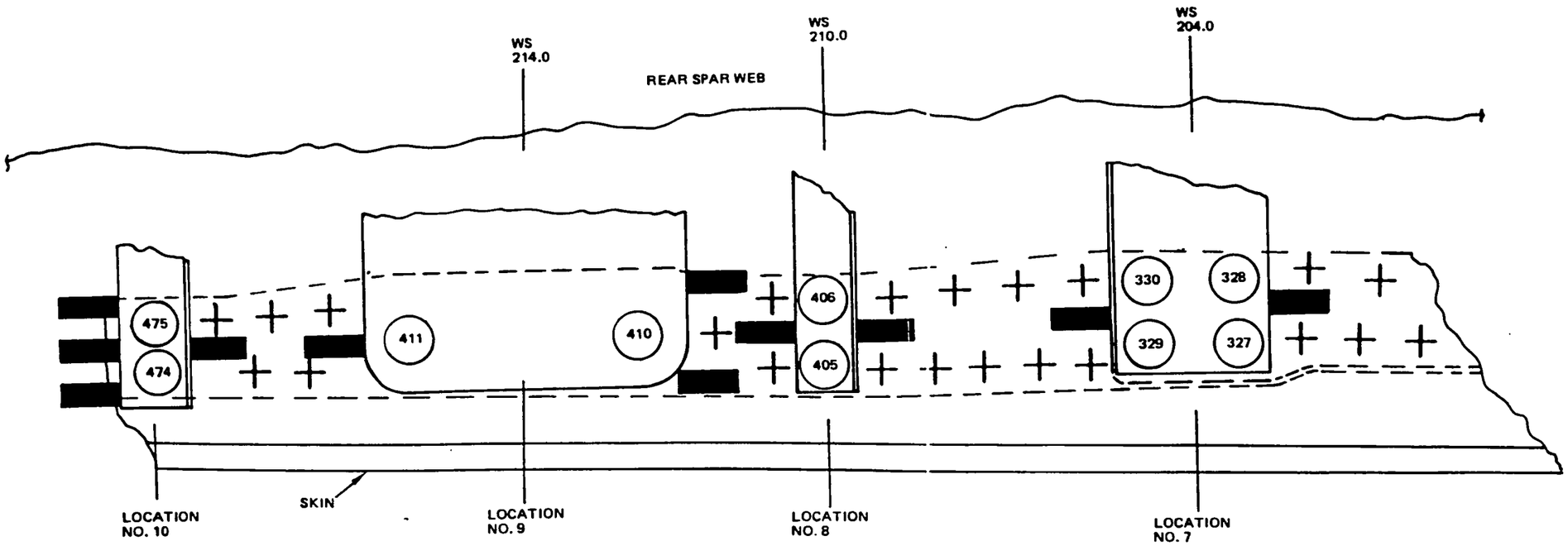
66 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

14 FOR CUM LINE NUMBERS
389, 394, 397, 541, 544, 613, 626, 629, 717, 720, 744 THRU 770, 772 THRU 776, 778 THRU 786, 788 THRU 793, 795 THRU 800, 802 THRU 897, 899, 900, 905, 906, 908, 910, 911, 912, 914, 915, 917, 918, 919, 922, 923, 925, 928, 929

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 26)



NOTES

(475) FASTENER LOCATION TO BE INSPECTED

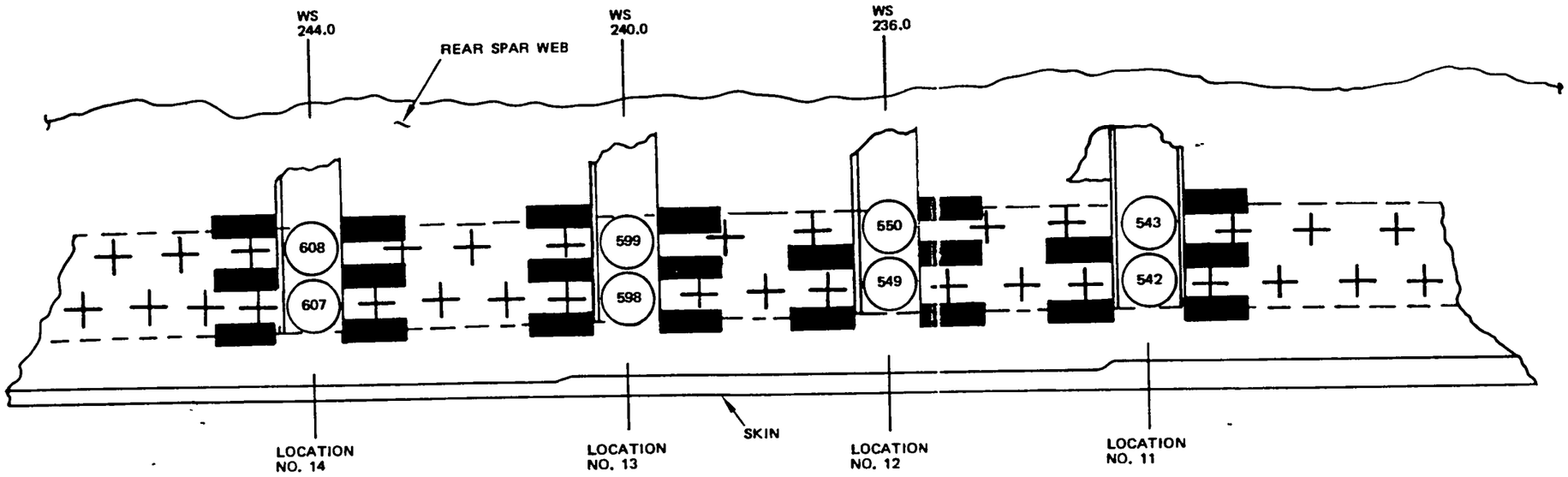
TRANSDUCER POSITION

UP

INBD

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 27)



NOTES

608 FASTENER LOCATION TO BE INSPECTED

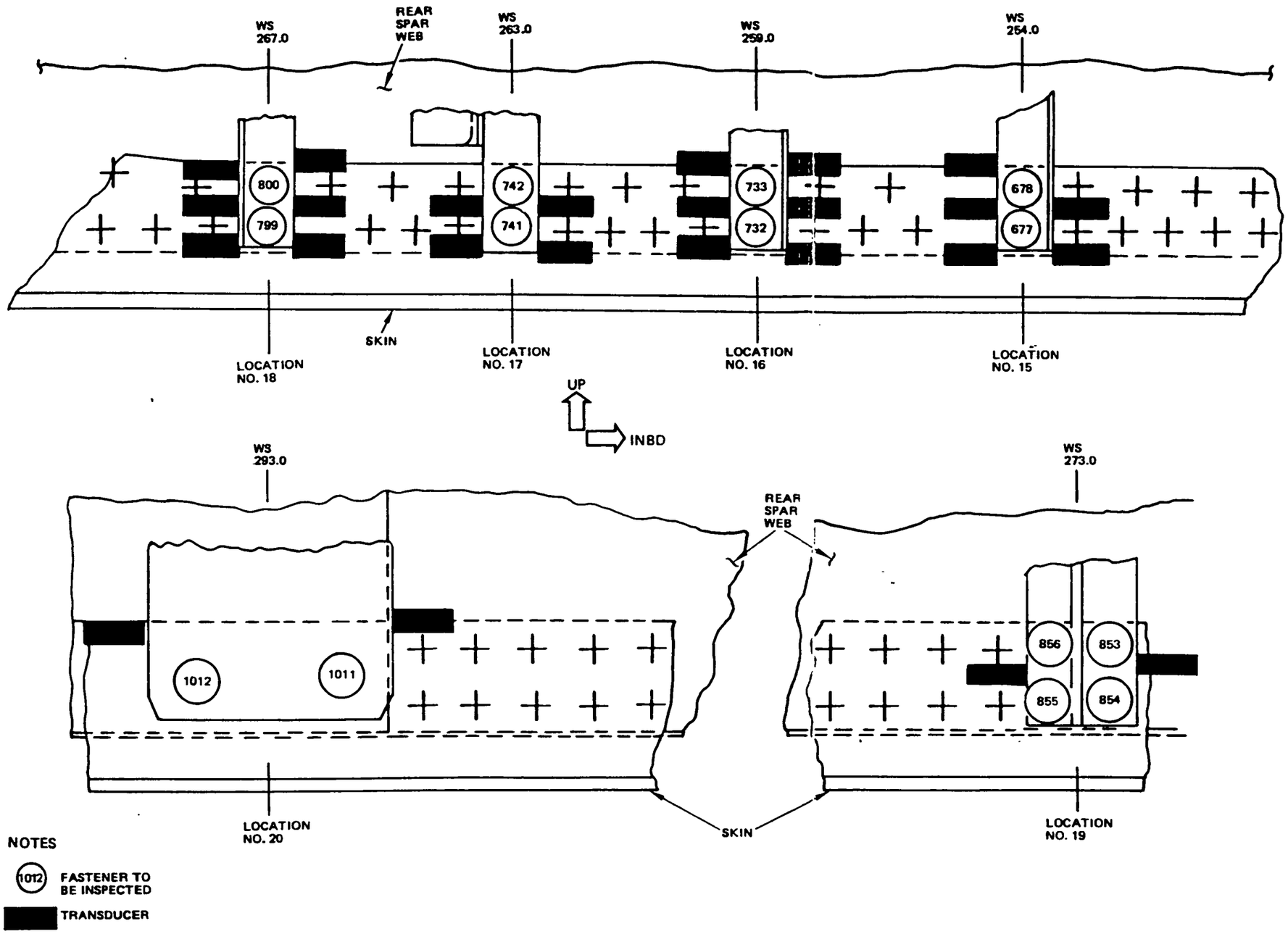
TRANSDUCER POSITION

UP

INBD

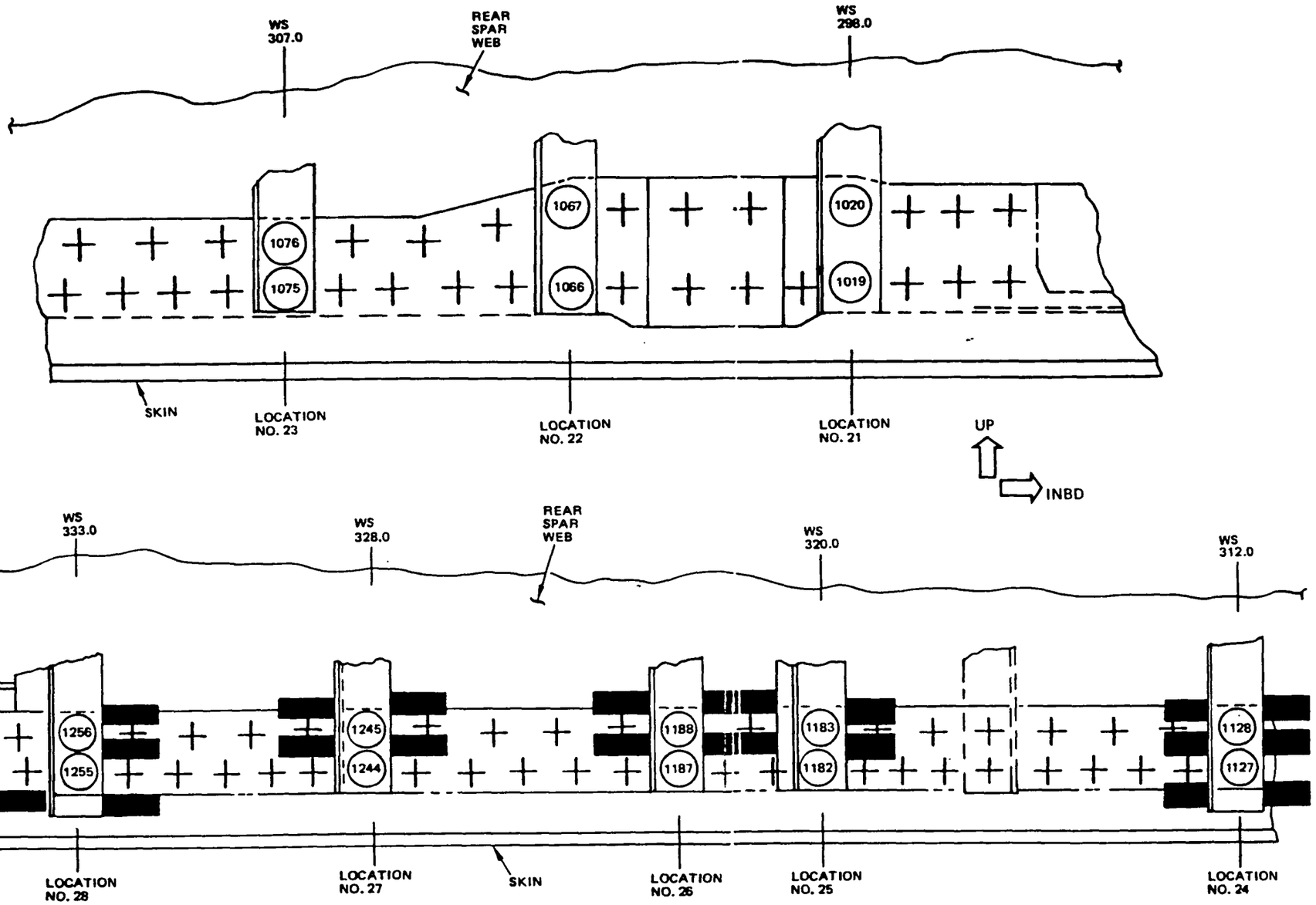
DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 28)



DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 29)



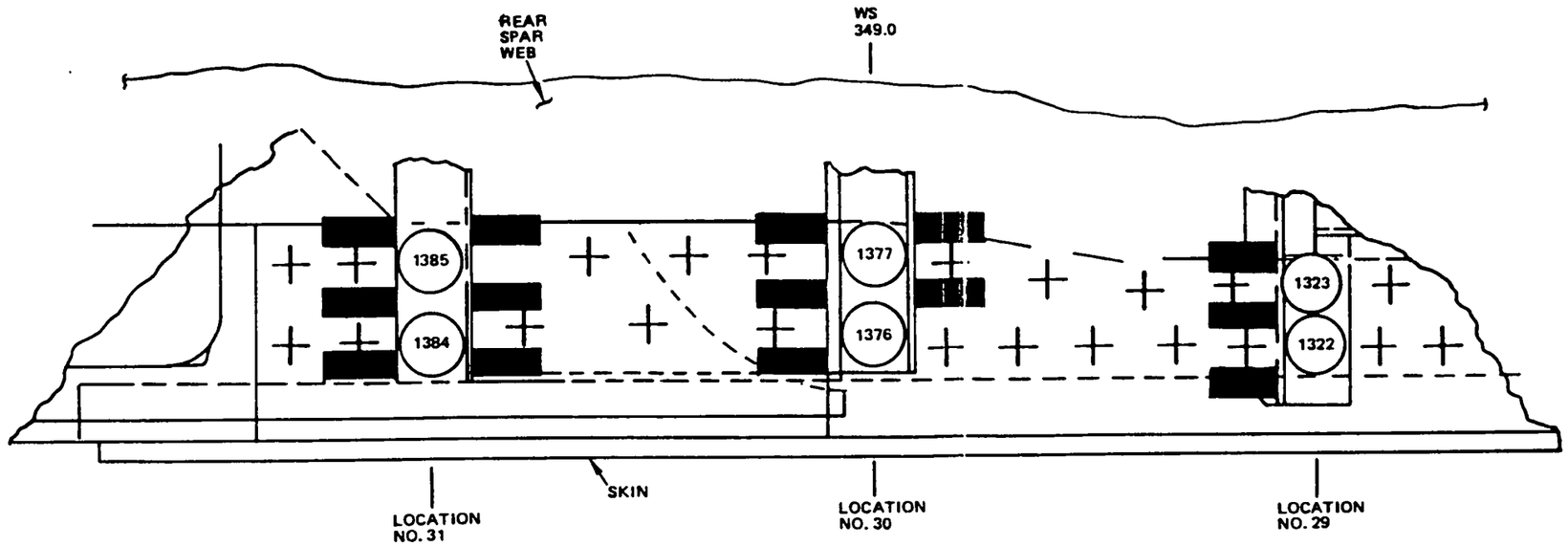
NOTES

1256 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 30)



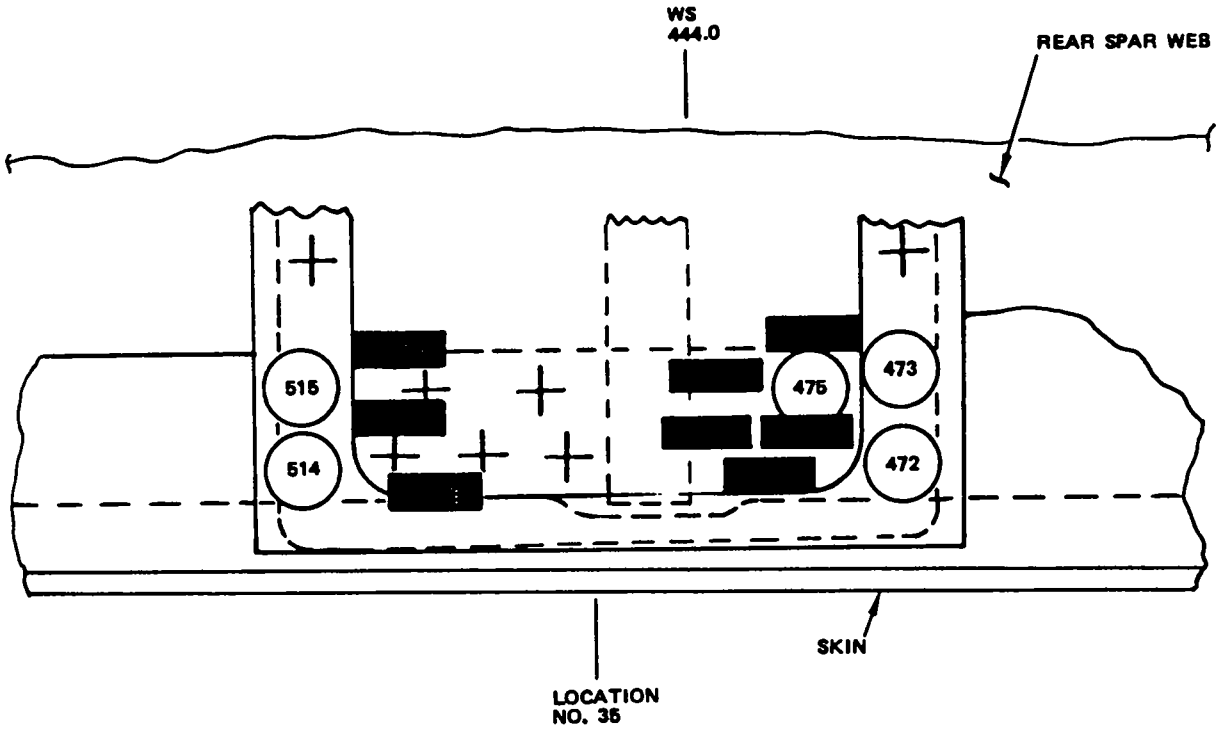
NOTES

(41) FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 31)



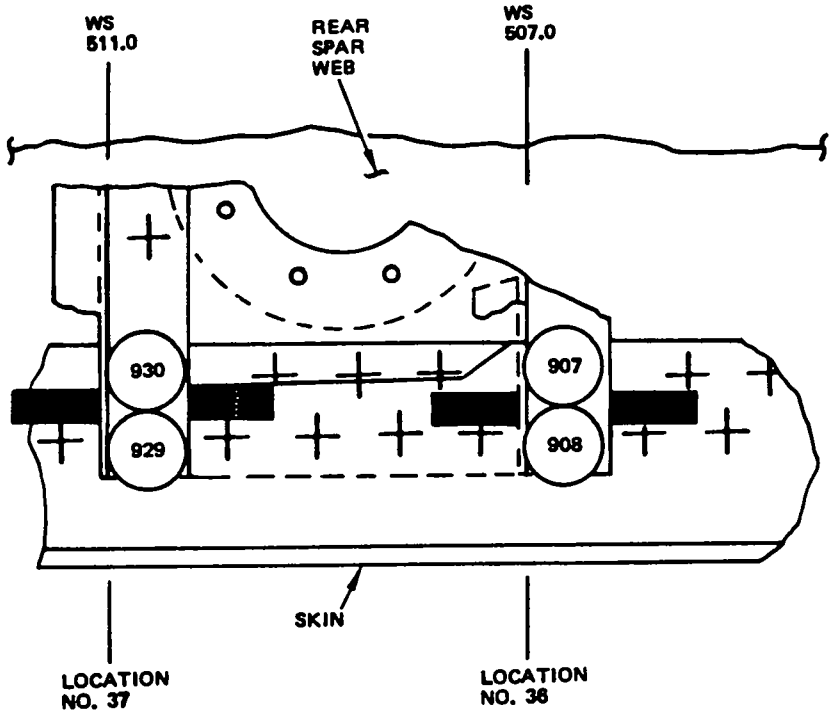
NOTES

(515) FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 32)



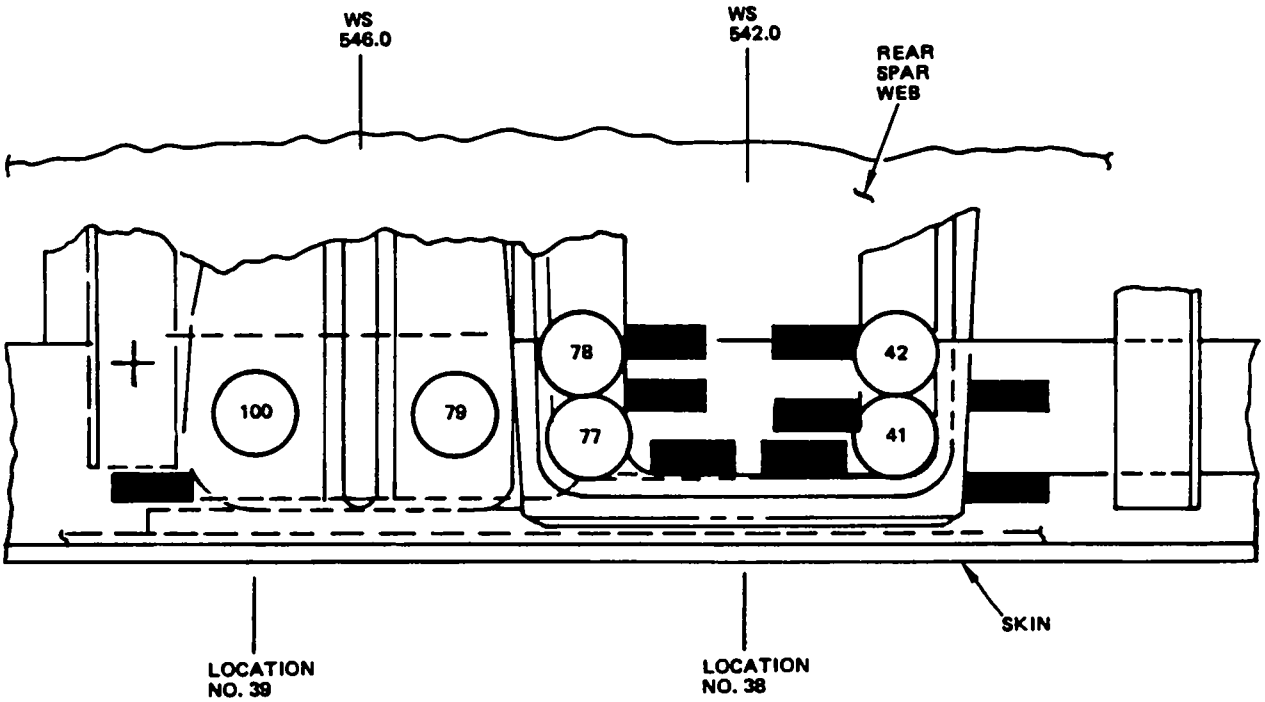
NOTES

930 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 33)



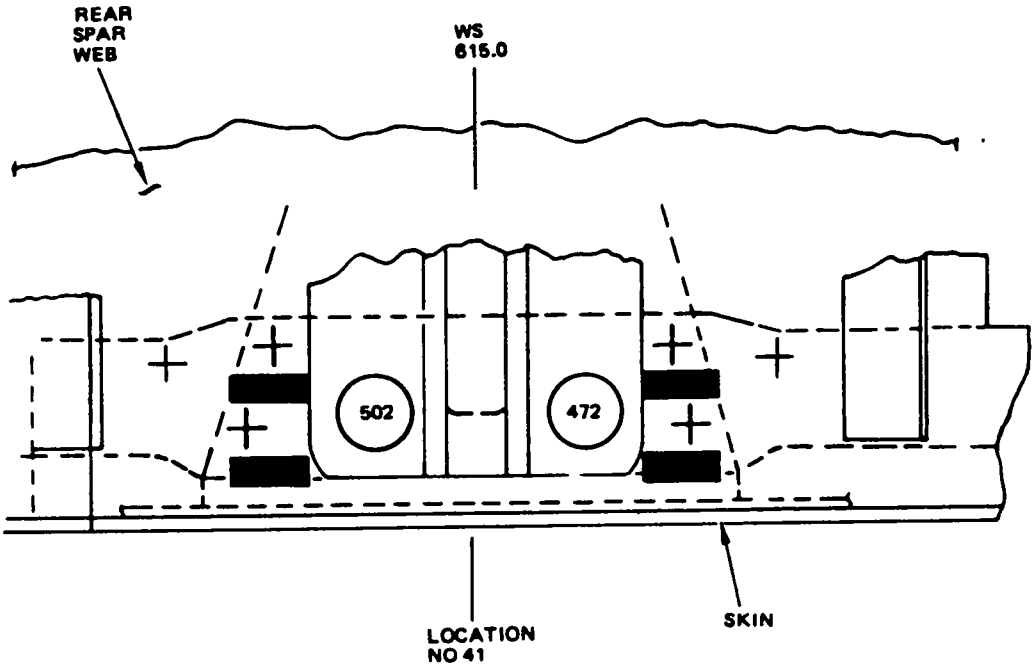
NOTES

(100) FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 34)



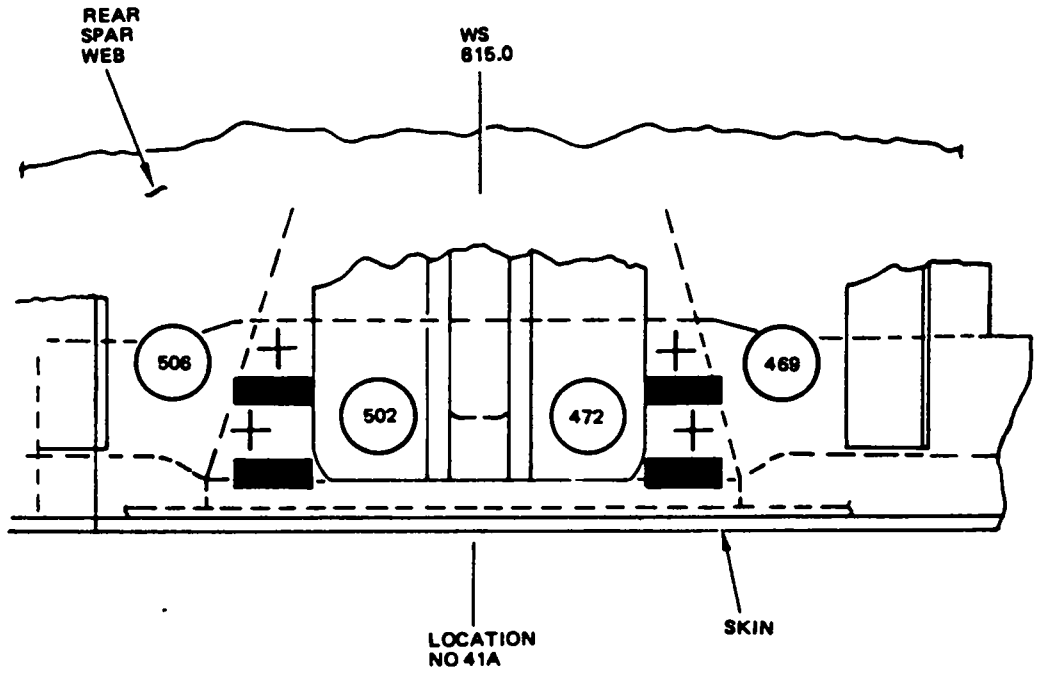
NOTES

502 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 35)



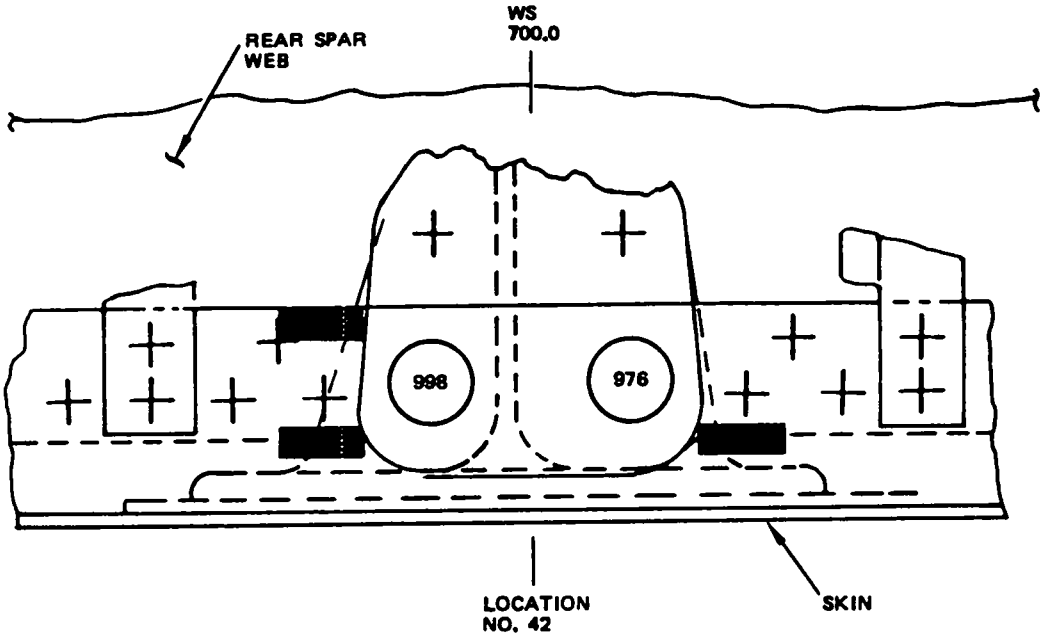
NOTES

503 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 36)



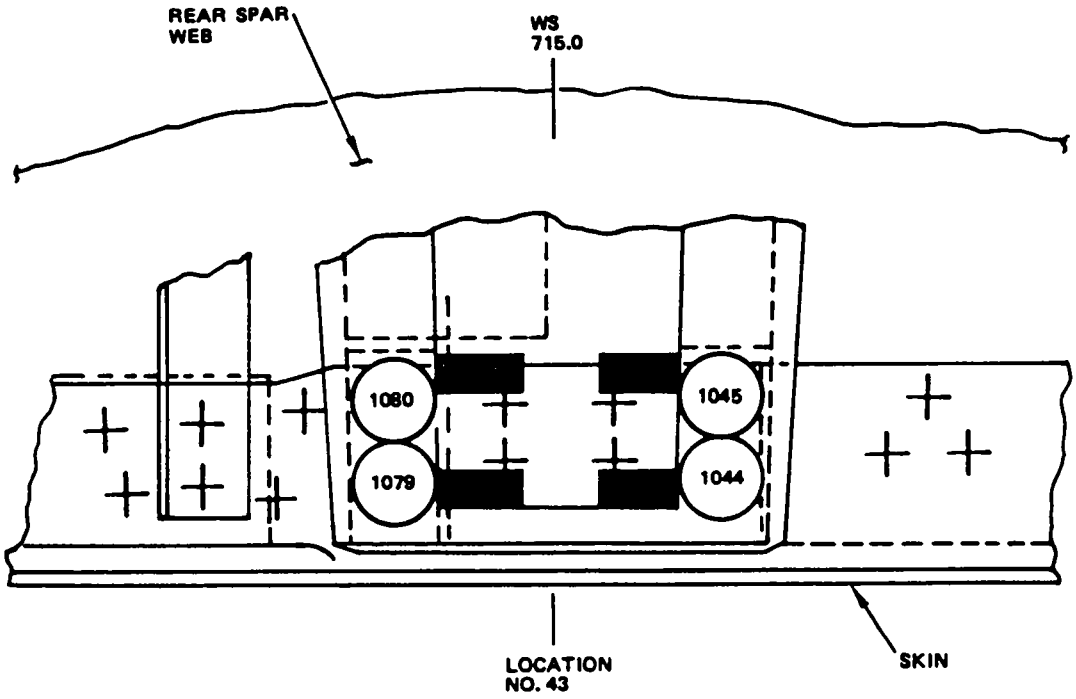
NOTES:

(998) FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 37)



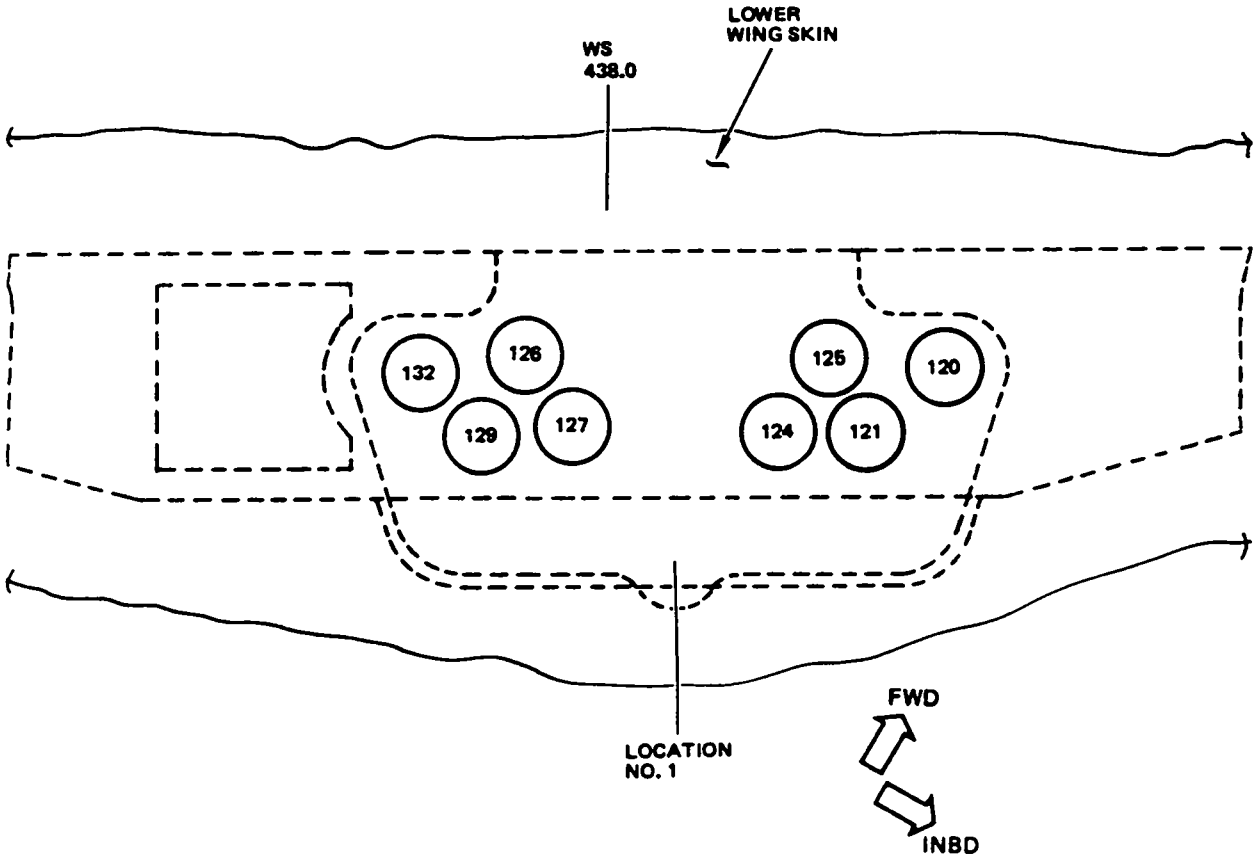
NOTES:

1080 FASTENER LOCATION TO BE INSPECTED

TRANSDUCER POSITION

DETAIL IX (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 38)



NOTES

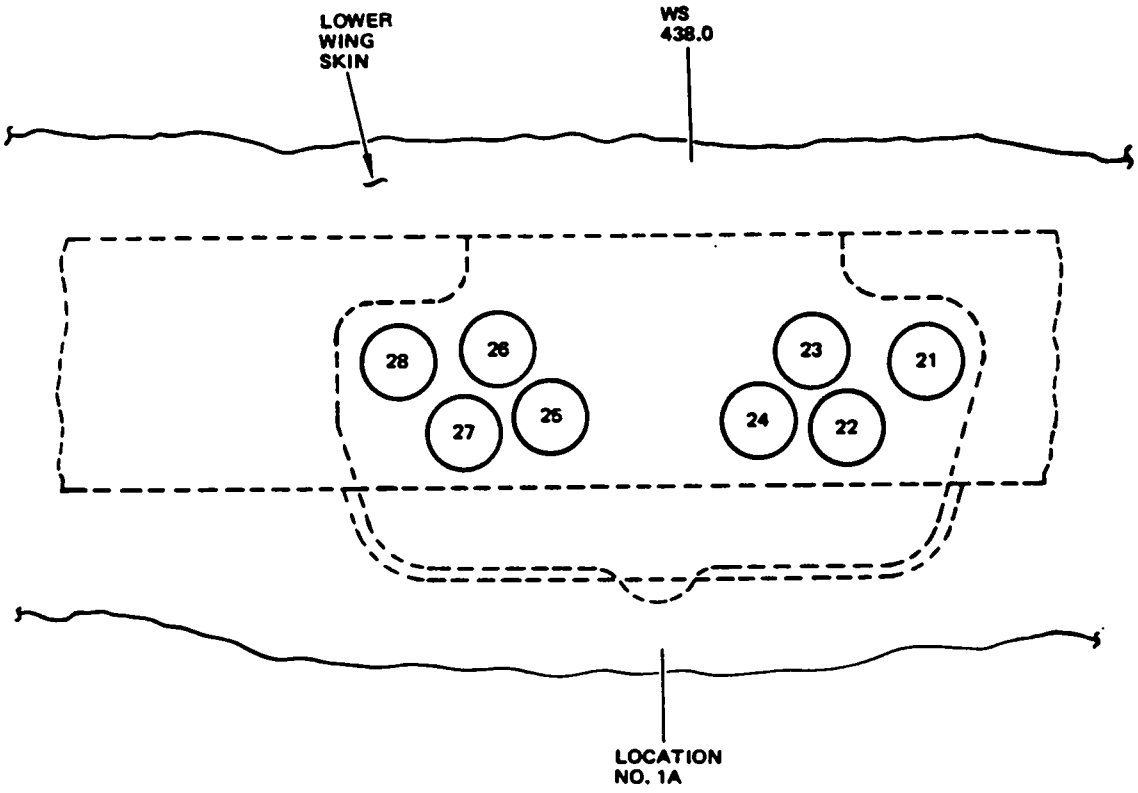
(126) FASTENER LOCATION TO BE INSPECTED

● LEFT WING SHOWN, RIGHT WING SIMILAR VIEW LOOKING DOWN

FASTENER LOCATIONS IN LOWER WING SKIN AT REAR SPAR TO BE INSPECTED

DETAIL X (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 39)



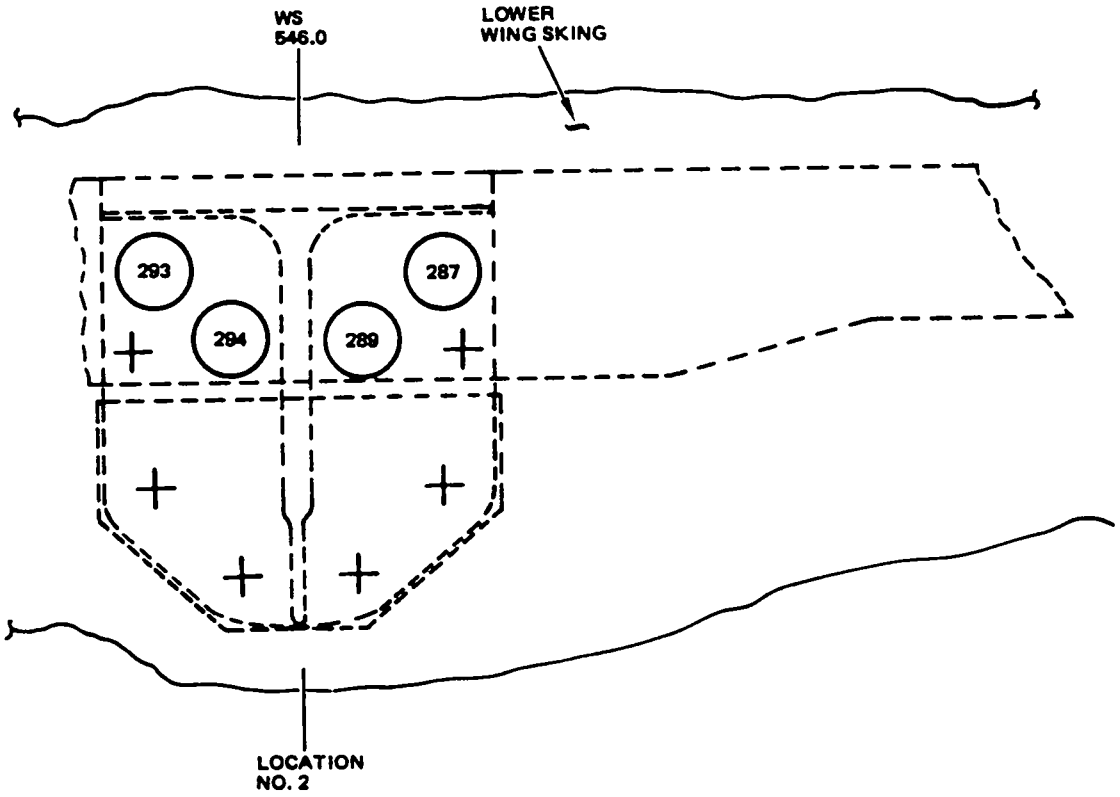
NOTES

(28) FASTENER LOCATION TO BE INSPECTED

● A/P EFF: 707-300B, 300C

DETAIL X (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 40)

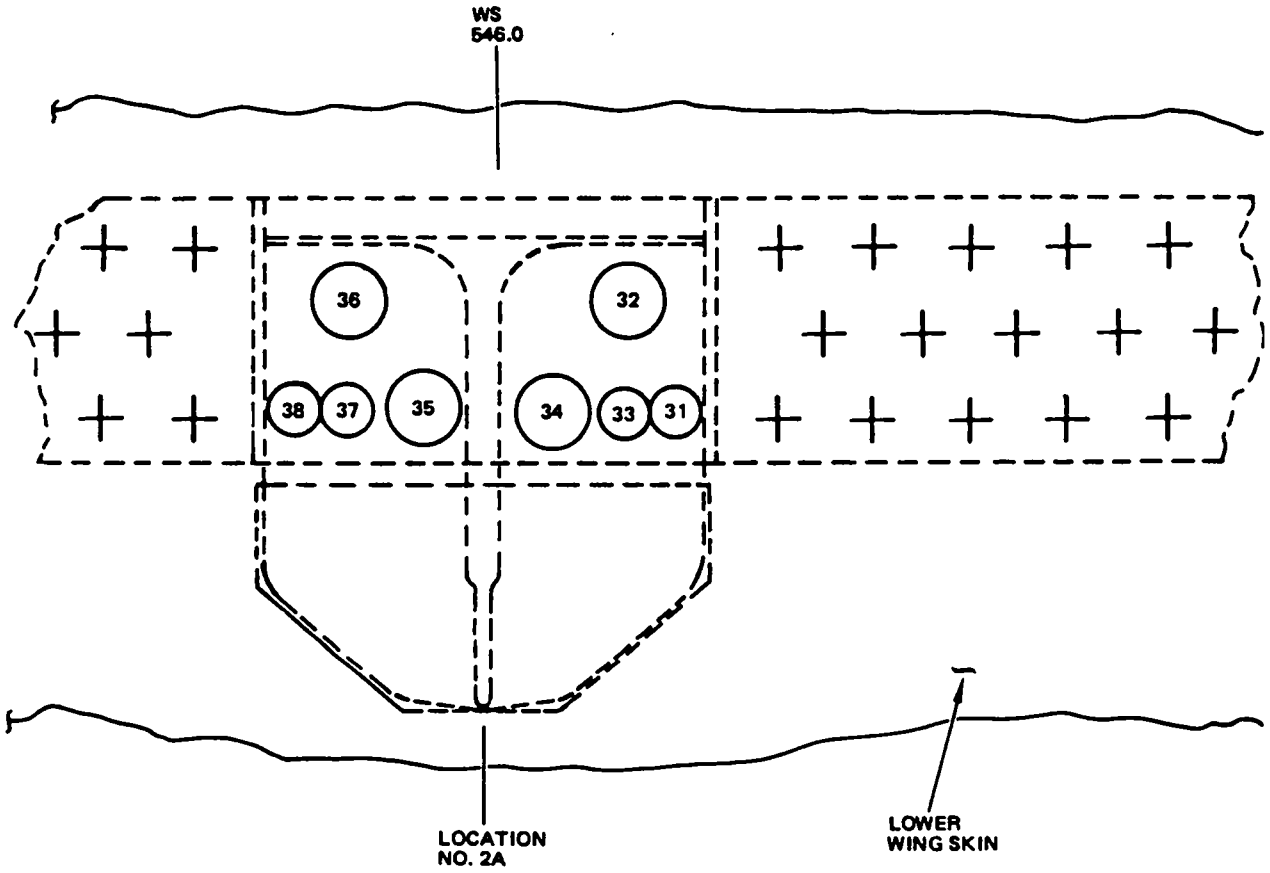


NOTES

(293) FASTENER LOCATION TO BE INSPECTED

DETAIL X (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 41)



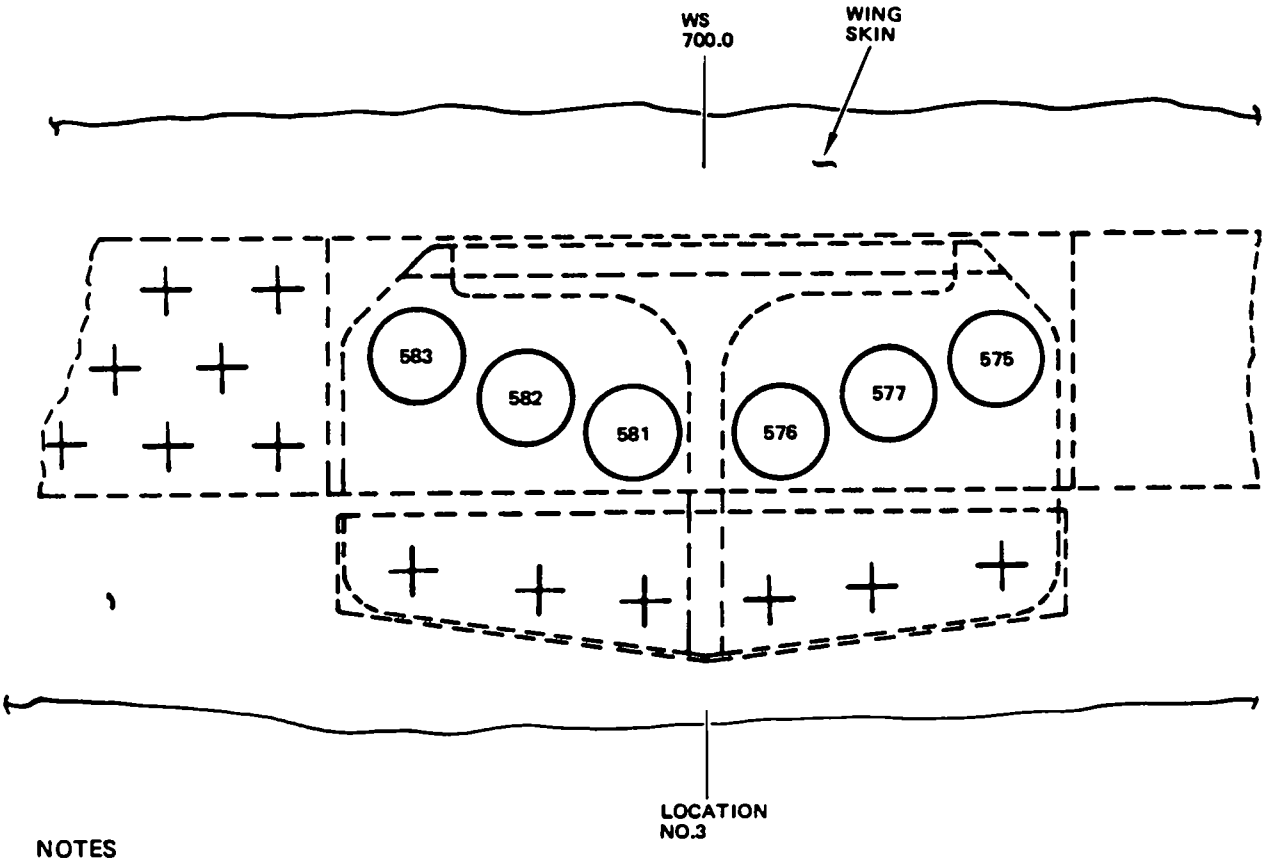
NOTES

(38) FASTENER LOCATION TO BE INSPECTED

● A/P EFF: 707-300B, 300C

DETAIL X (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 42)

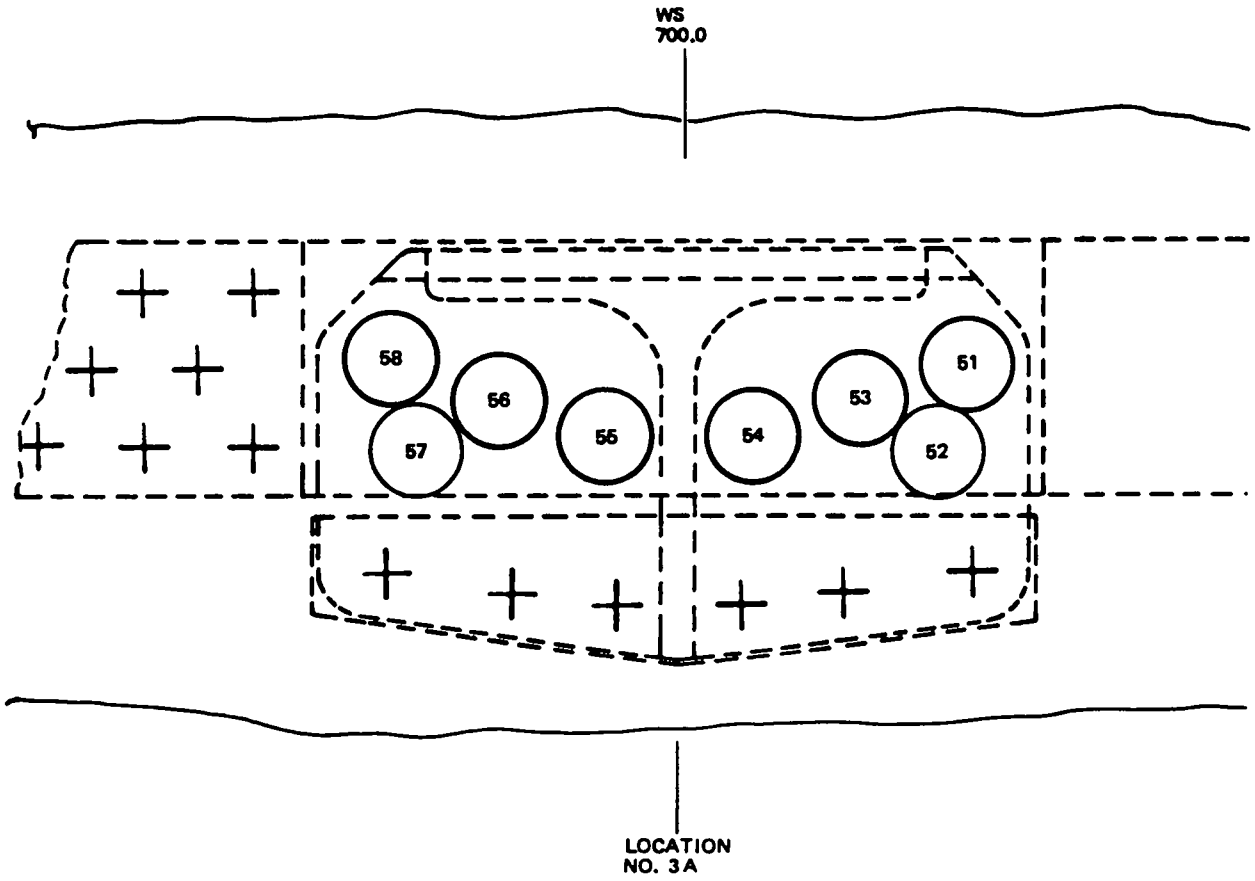


NOTES

(583) FASTENER LOCATION TO BE INSPECTED

DETAIL X (CONT)

Vertical Flange of Lower Rear Spar Chord and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 43)



NOTES

(57) FASTENER LOCATION TO BE INSPECTED

● A/P EFF:
707-300B, 300C

DETAIL X (CONT)

Vertical Flange of Lower Rear Spar Chord
and Wing Skin Between WS 180 and WS 715
Figure 3 (Sheet 44)

EFFECTIVITY
MODEL: 707-100/200 SSI DOCUMENT (D6-44860) REFERENCE: SSD 57-A10-14

PART 4 - ULTRASONIC

WING - UPPER REAR SPAR CHORD

1. Purpose

   A. To detect cracks emanating from selected fastener holes from WS 360 to production break.

      (1) In the vertical flange of the wing upper rear spar chord.

      (2) In the wing skin at fasteners common to the rear spar.

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.

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

   B. The shear wave transducers used for development of this procedure were 0.35 inch wide by 0.72 inch long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25 inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25 inch element, 60° A (57A8300), top mounted microdot connector.

      NOTE: Transducers (1) and (2) are both required due to restricted access to the rear spar vertical flange.

      (3) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25 inch element, 70° A (57A3066).

      (4) Longitudial Wave, 0.25 inch dia. element, 5 MHz, 0.375 inch dia. case.

Upper Wing Skin and Vertical Flange of Upper Rear Spar Chord
Figure 4 (Sheet 1)

C. Fabricate two reference standards per Details I and II.

D. Obtain transducer positioning fixture PF1 per Part 4, 57-10-07, Fig. 3, Detail V.

E. Couplant is light oil or grease.

3. Preparation for Inspection

A. Inspect from outside the wing with part in place on airplane.

B. Paint removal at inspection areas may be necessary to improve sound transmission. Smooth out any surface roughness by sanding lightly.

C. Paint removal for skin inspection is required.

D. Wipe surface clean.

E. Lightly prick punch center of inspection fasteners in skin.

F. Apply thin film of couplant to inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Instrument Calibration

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord.

(1) Select a fastener location to be inspected (Detail IX).

(2) From Table I identify Detail I reference standard calibration hole. Apply couplant about hole.

(3) From Table I obtain distance D. Locate leading edge of the 60° shear wave transducer D distance from reference hole.

(4) Obtain a signal from standard hole. Position signal at midscale. See Detail III.

(5) Adjust instrument sensitivity for a 90% full scale signal from hole.

(6) Move transducer laterally to obtain a signal from the 0.25 inch saw cut. Note the difference in the position of the signal obtained from the side of the hole and the saw cut.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

NOTE: See par. 4.C. for alternate calibration for inspection of wing skin.

(1) Select a fastener location to be inspected from Detail X.

(2) From Table II identify the reference standard and transducer positioning fixture required for the holes to be inspected.

(3) Coat 0.375 inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail VII.

(4) Coat surface of reference standard with couplant and place transducer shoe in Position 1 as shown in Detail VII (align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard (Detail VII, Position 2). Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument sensitivity to produce approximately a 90% crack signal on the instrument display.

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table II which is designated for the hole to be inspected.

(2) Connect the 70° shear wave transducer (par. 2.B.(3)) to the instrument.

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close to the edge of the fastener head as shown in Detail VIII Position 1.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in Detail VIII.

(6) Move transducer laterally to detect the calibration saw cut as shown in Detail VIII, Position 2. Note position of saw cut signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the saw cut is approximately 100% of full scale.

5. Inspection Procedure

A. Inspect fastener locations common to vertical leg of rear spar chord.

(1) Select fastener location to be inspected from Detail IX.

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

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail IX.

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument sensitivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(5) Move the transducer laterally and rotate through a small angle (approximately 20°) to inspect for cracks out of the fastener hole. See Detail IV.

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the saw cut hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge ocurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(d) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Detail IX.

B. Inspect wing skin at fastener holes common to rear spar horizontal leg. See Detail X.

(1) Select inspection location from Detail X and specific fasteners to be inspected from Table II.

NOTE: See par. 5.C for alternate inspection of wing skin using hand-held transducer.

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

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener being inspected. The minimum extent of scan is shown in Detail VI.

(4) If the minimum scan cannot be performed, it will be necessary to scan with a hand held transducer calibrated per par. 4.C. Inspect per par. 5.C.

(5) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(6) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(7) Repeat inspection procedure for each location identified in Detail X.

(8) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

(1) Calibrate instrument par par. 4.C.

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward an aft sides of the hole. Rotate the transducer approximately $\pm 20°$ about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge (compare with the oscilloscope response pattern obtained from the saw cut hole in the standard).

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of lateral movement than that experienced from the reference standard hole or from known good hole in similar structure on the airplane.

LOCATION NO. [2]	WING STATION	FASTENER CODE NUMBER	FASTENER DIAMETER (INCHES)	CORD THICKNESS (INCH)	D [1]	CALIBRATION HOLE [3]
1	444	510,511	5/16	0.15	0.32	2
2	541	55,63	3/16	0.15	0.30	1
3	696	956	3/16	0.15	0.47	1
4	700	987,988, 989,990	5/16	0.15	0.36	2
5	705	1014	3/16	0.15	0.43	1
6	715	1062,1090	3/16	0.15	0.35,0.74	1

PARAMETERS USED FOR INSPECTION OF THE
UPPER REAR SPAR CHORD VERTICAL FLANGE

TABLE I

NOTES:

[1] D = Distance between leading edge of transducer and edge of fastener hole

[2] See Detail IX for location number

[3] Hole in Reference Standard 081 (Detail I) to be used for calibration

LOCATION NO.	WING STATION	FASTENER CODE NUMBER	SKIN THICKNESS (INCHES)	FASTENER DIAMETER (INCH)	REFERENCE STANDARD 082 HOLE NO.
1	442-446	335,336, 337,340, 342,344, 347	0.21	1/4	2
2	451-457	352 THRU 361	0.21	1/4	2
3	544-548	136,138, 139,141	0.185	5/16 (4 places)	2
4	608-622	256 THRU 264,266, 270,272, 276 THRU 285	0.17	3/16 (18 places) 5/16 (4 places)	1 2

PARAMETERS USED FOR INSPECTION OF UPPER SKIN AT THE REAR SPAR

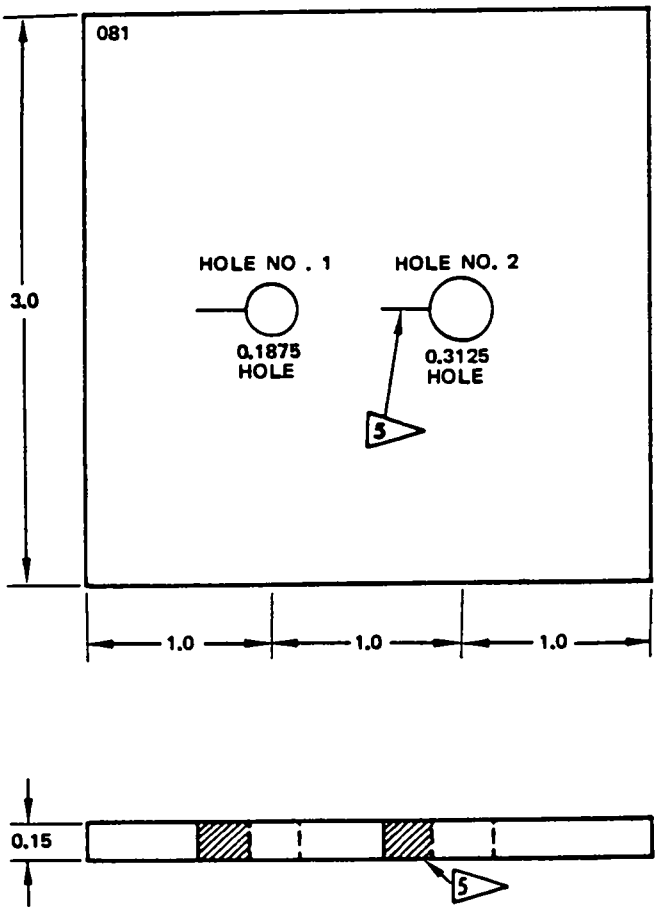
TABLE II

NOTES

- For Transducer Positioning Fixture See Part 4, 57-10-07, Fig. 3, Detail V.
- Reference Standard 082

See Detail X for inspection location number.

Upper Wing Skin and Vertical Flange of Upper Rear Spar Chord
Figure 4 (Sheet 8)

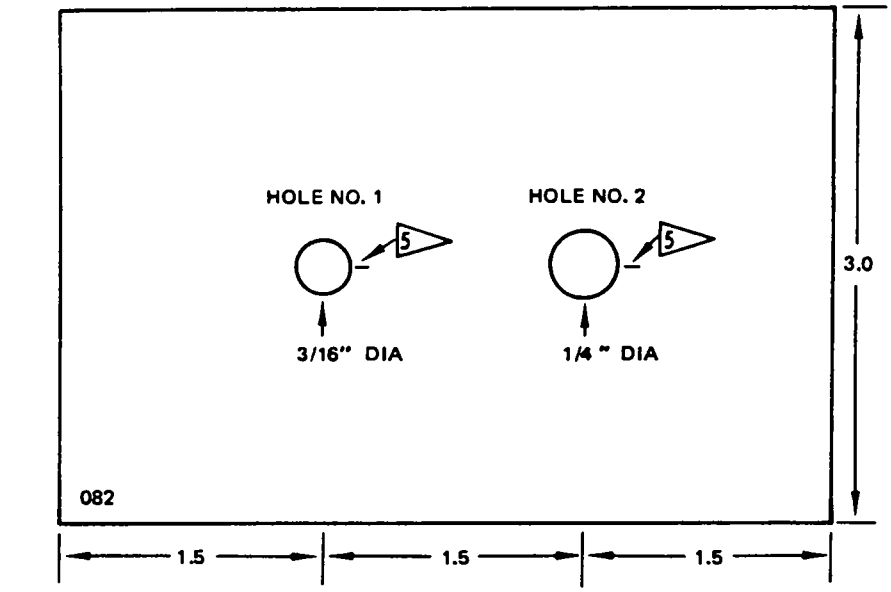


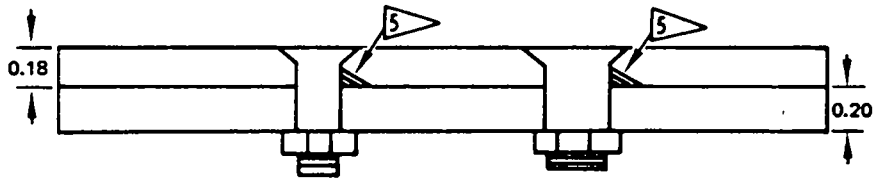
NOTES

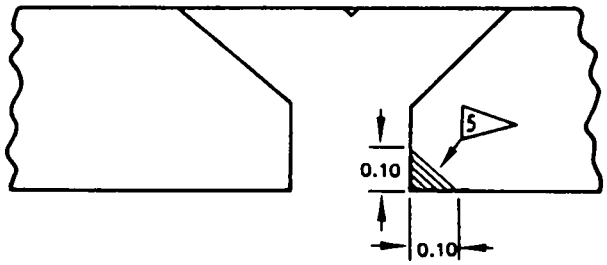
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 7075–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030, X.XX ± 0.01
- P/N 6411–34
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110
- ETCH OR STEEL STAMP WITH 081
- 5 JEWELER'S SAWCUT 0.030 MAX WIDTH, 0.25 LONG (2 PLACES)

REFERENCE STANDARD 081
FOR REAR SPAR CHORD VERTICAL FLANGE
DETAIL I

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 9)







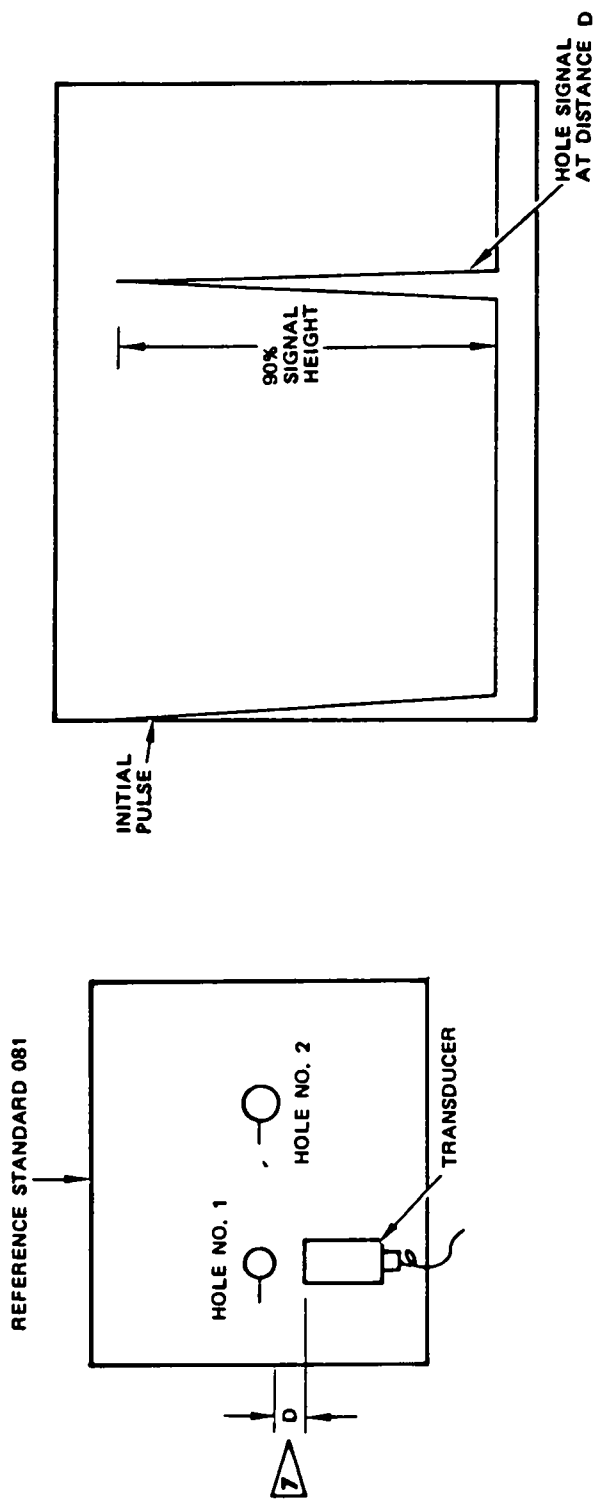
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL 2024–T6 ALUMINUM
- TOLERANCE– X.X ± 0.030 X.XX ± 0.010
- FASTENER TYPE: BACB30LU3–6 WITH BACN10JC3 NUT
  BACB30LU4–6 WITH BACN10JC4 NUT
- ETCH OR STEEL STAMP WITH 082
- P/N 6411–35
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

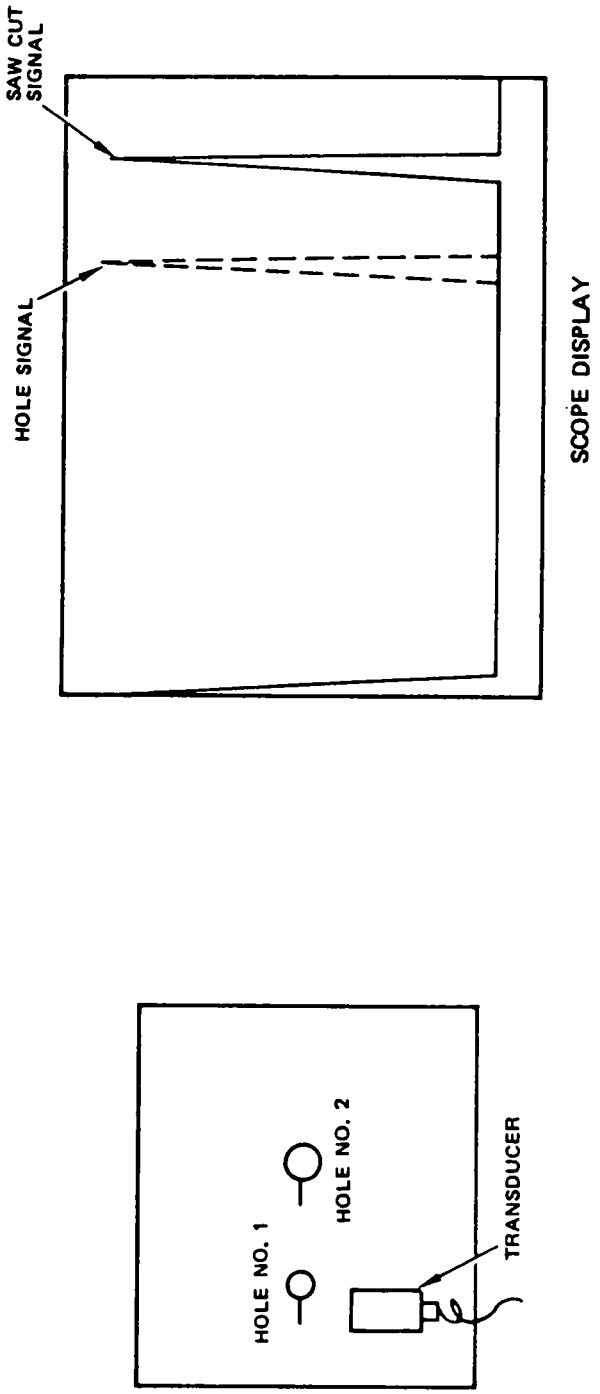
5 JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 082
FOR SKIN INSPECTION CALIBRATION
DETAIL II

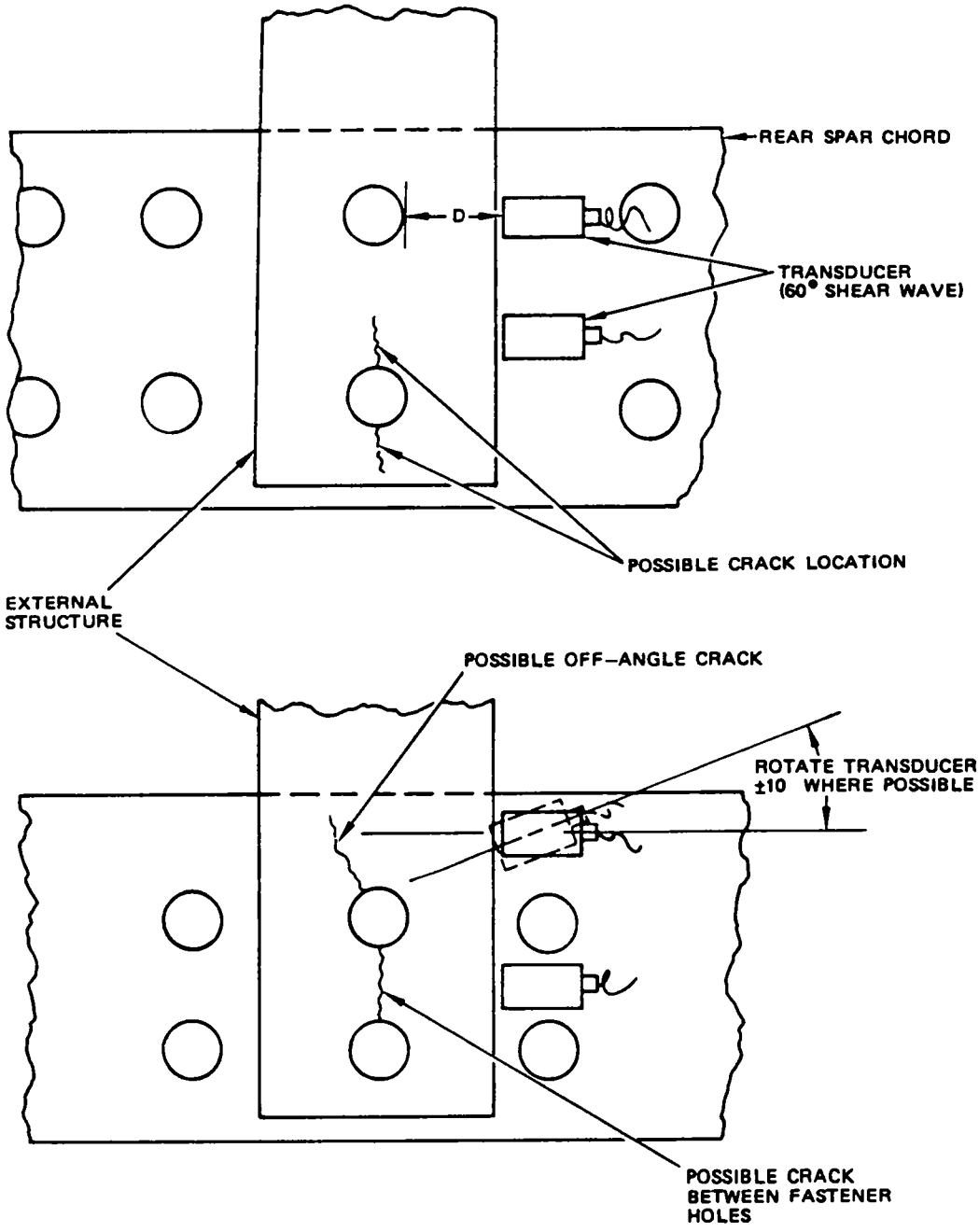
Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 10)



Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 11)

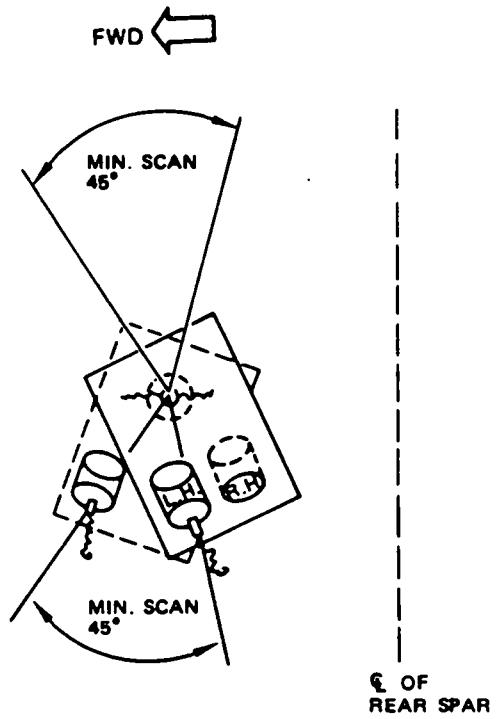


Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 12)



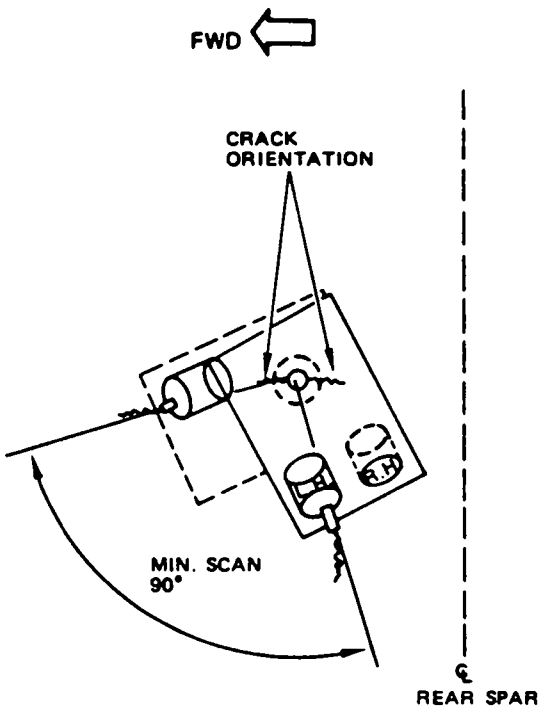
INSPECTION OF REAR SPAR CHORD
DETAIL IV

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 13)



A. INSPECTION POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN L/H POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD. SIDE OF HOLE BY PLACING TRANSDUCER IN R/H HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE. SEE NOTE.



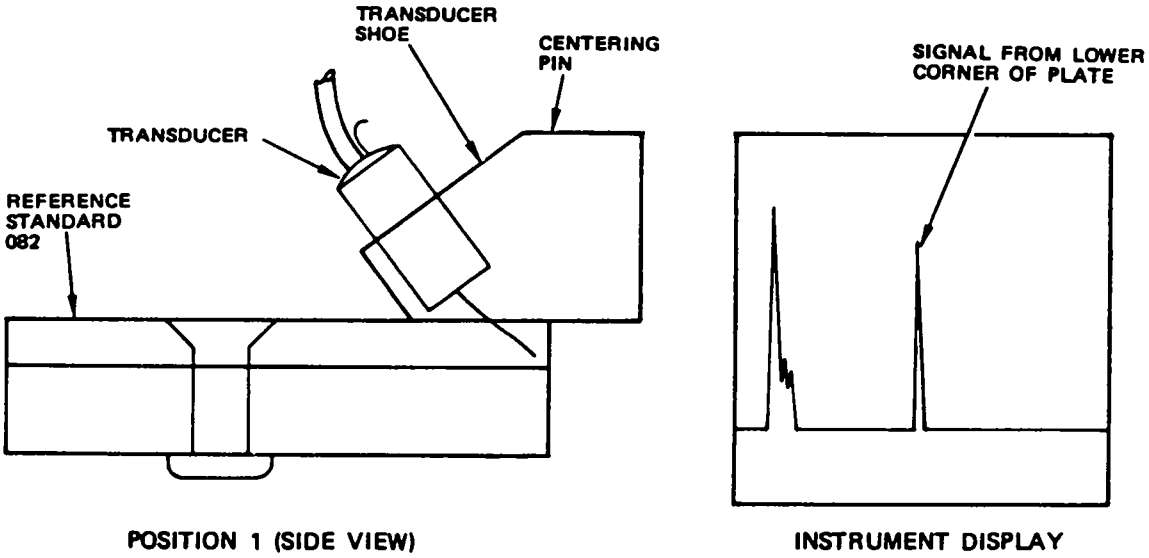
B. INSPECTION IS POSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

SCAN FWD. SIDE OF FASTENER WITH TRANSDUCER IN L/H HOLE AS INDICATED. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN R/H HOLE. SEE NOTE.

NOTE

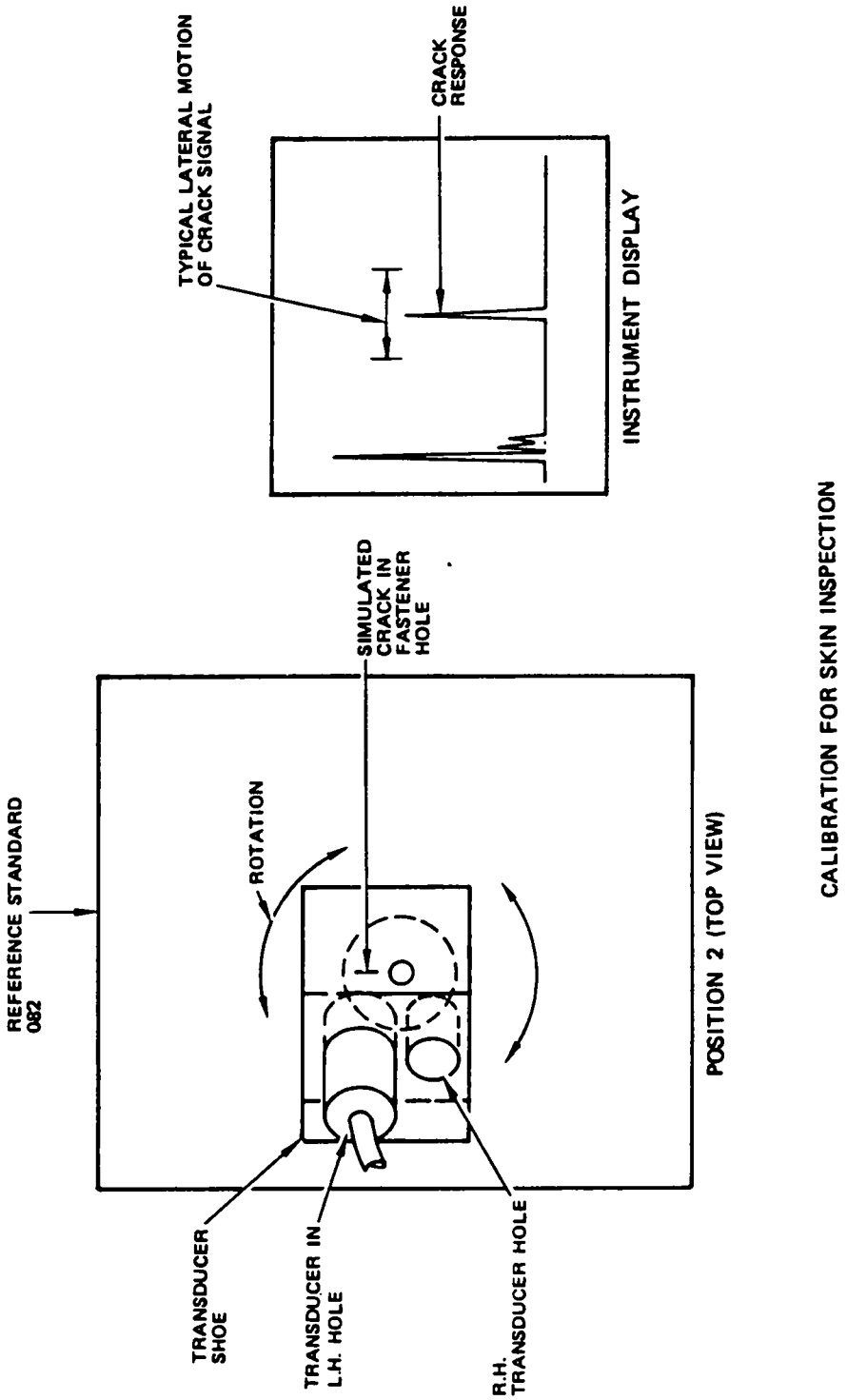
IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PAR. 5.C.

MINIMUM INSPECTION COVERAGE WHEN ADJACENT FASTENERS INTERFERE WITH SCAN
DETAIL VI

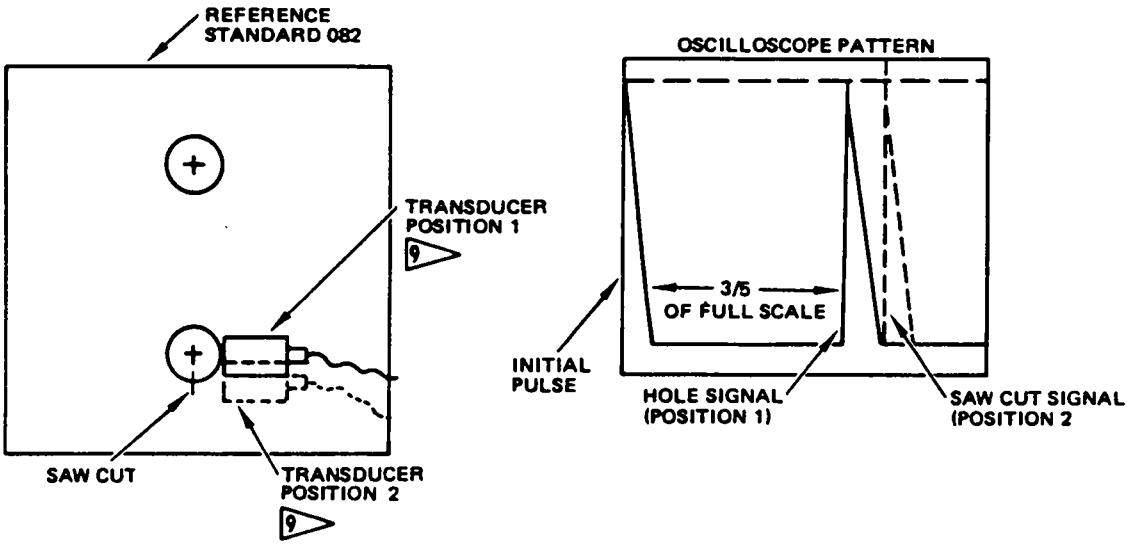


CALIBRATION FOR SKIN INSPECTION

DETAIL VII (CONT)



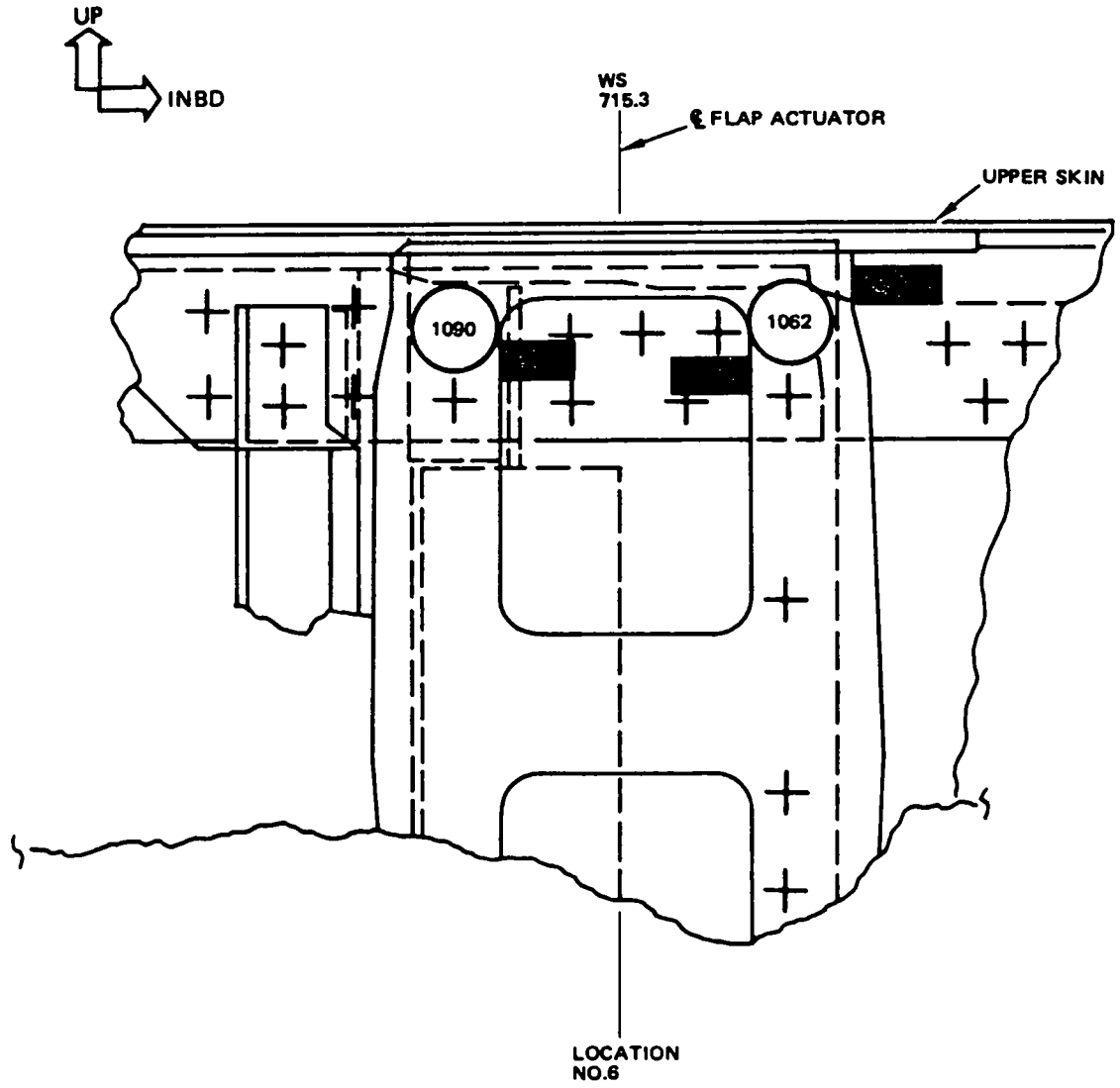
Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 17)



9 SELECT REFERENCE STANDARD HOLE SPECIFIED IN TABLE 2 FOR APPLICABLE FASTENER HOLE IN SKIN TO BE INSPECTED

TRANSDUCER CALIBRATION POSITION
FOR ALTERNATE INSPECTION OF SKIN

DETAIL VIII

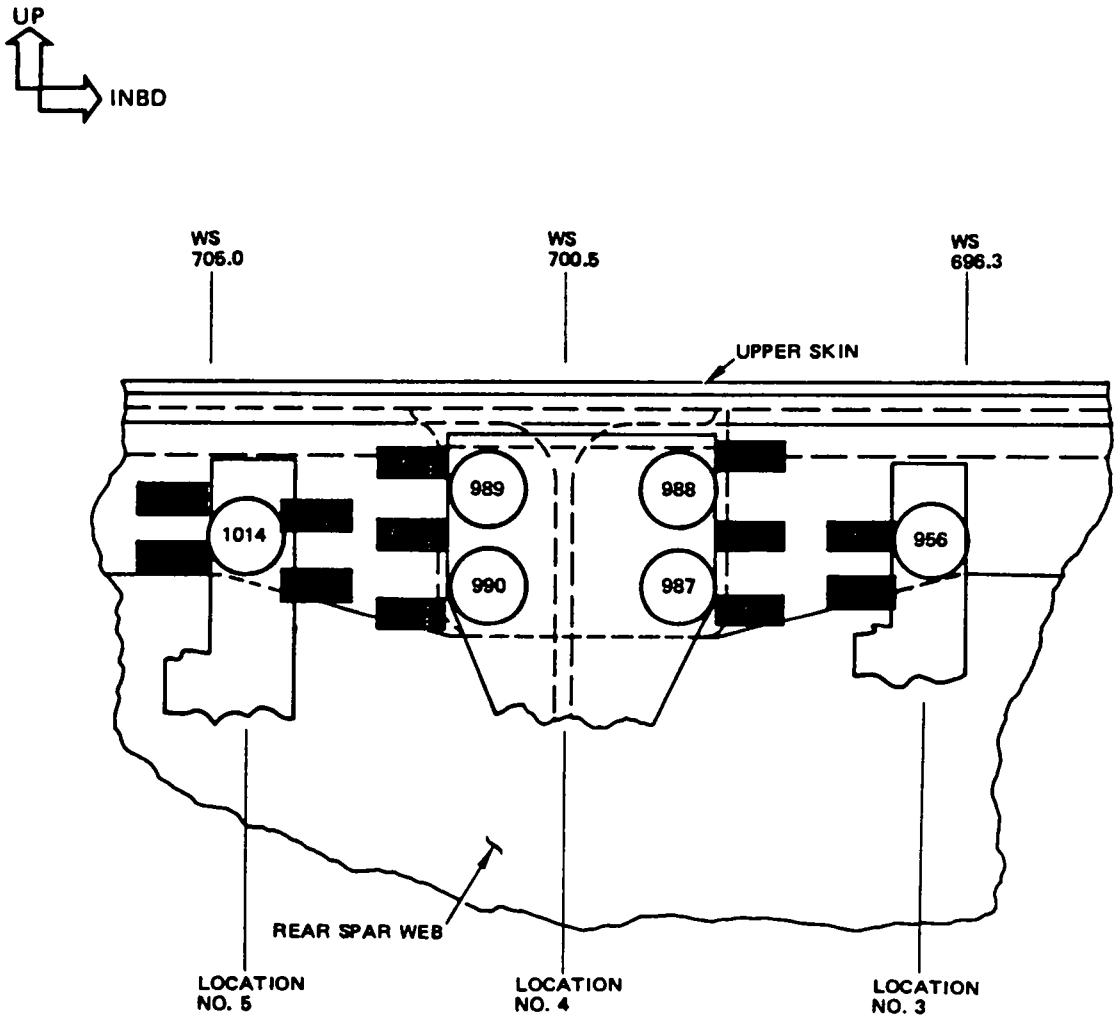


WING UPPER REAR SPAR CHORD VERTICAL FLANGE
DETAIL IX (CONT)

NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- VIEW LOOKING FORWARD
- 1062 FASTENER TO BE INSPECTED
  FASTENER IDENTIFICATION

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 19)



WING UPPER REAR SPAR CHORD
VERTICAL FLANGE
(LEFT WING SHOWN, RIGHT WING SIMILAR)

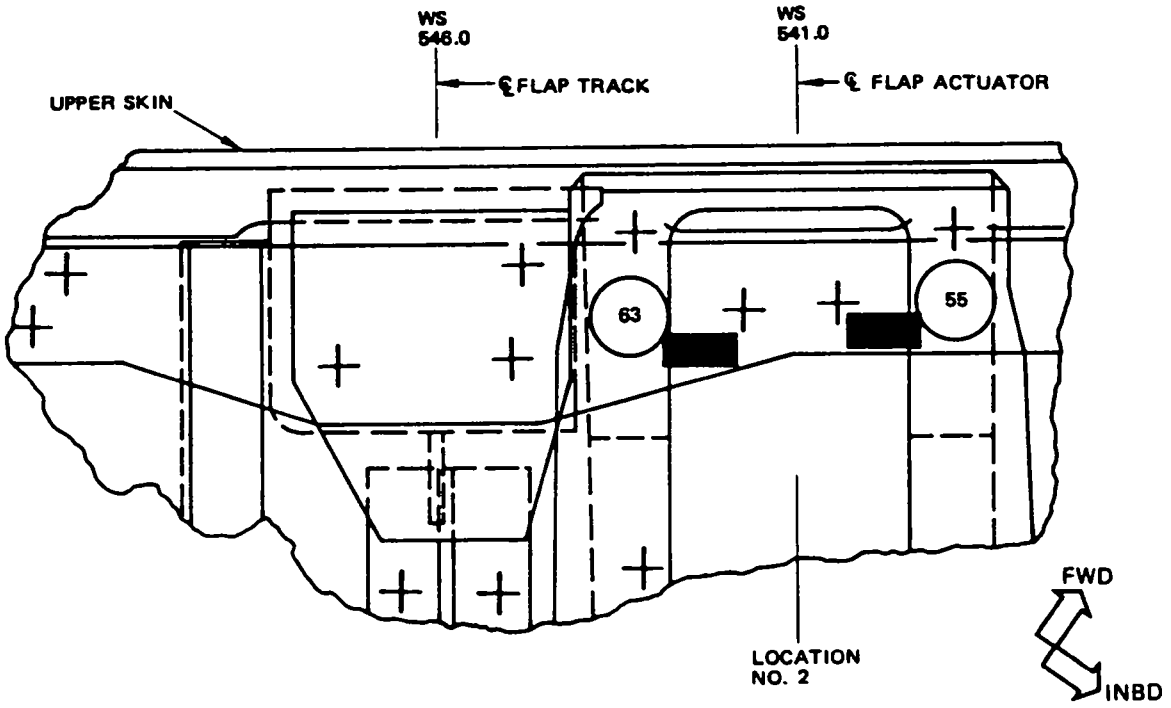
DETAIL IX (CONT)

NOTES

956 FASTENER LOCATION TO BE INSPECTED
FASTENER IDENTIFICATION NUMBER

TRANSDUCER POSTION

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 20)



WING UPPER REAR
SPAR CHORD VERTICAL FLANGE

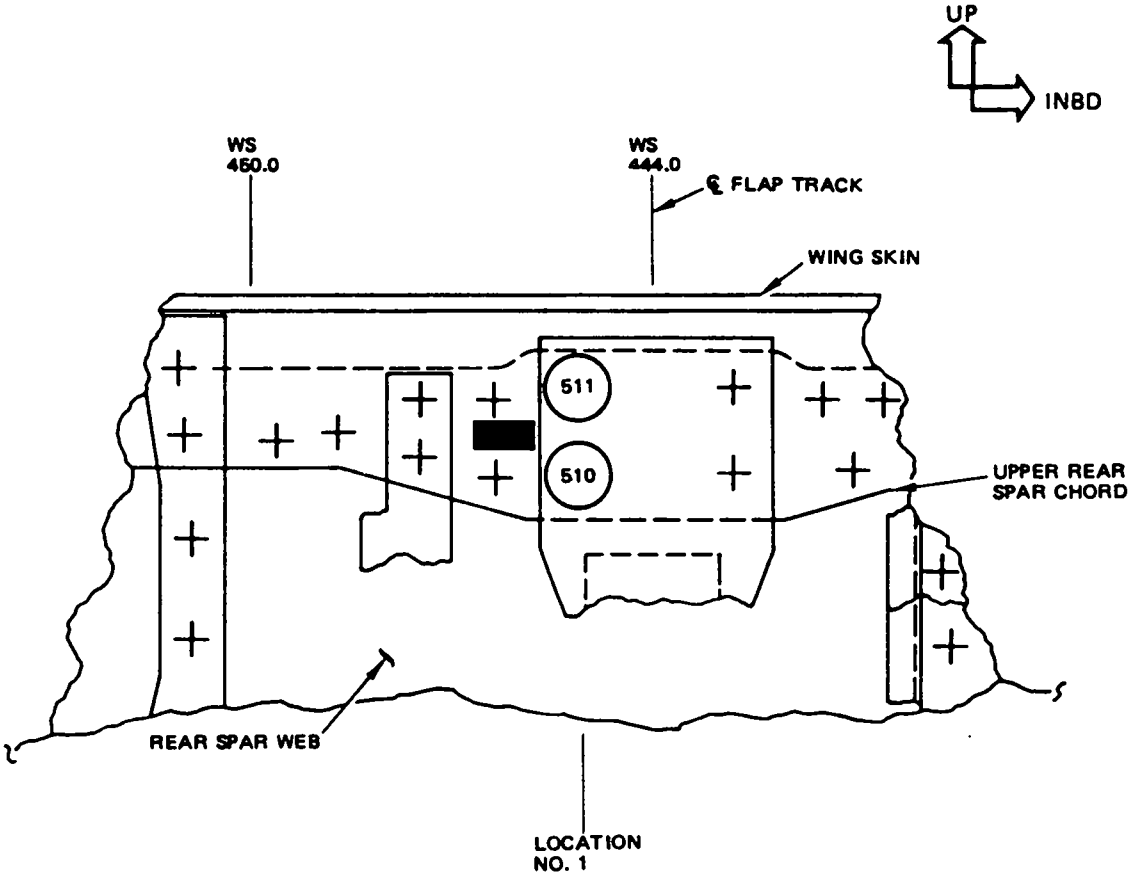
DETAIL IX (CONT)

NOTES:

63 — FASTENER LOCATION TO BE INSPECTED; FASTENER IDENTIFICATION NUMBER

TRANSDUCER POSITION

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 21)



WING UPPER REAR SPAR CHORD
VERTICAL FLANGE

DETAIL IX (CONT)

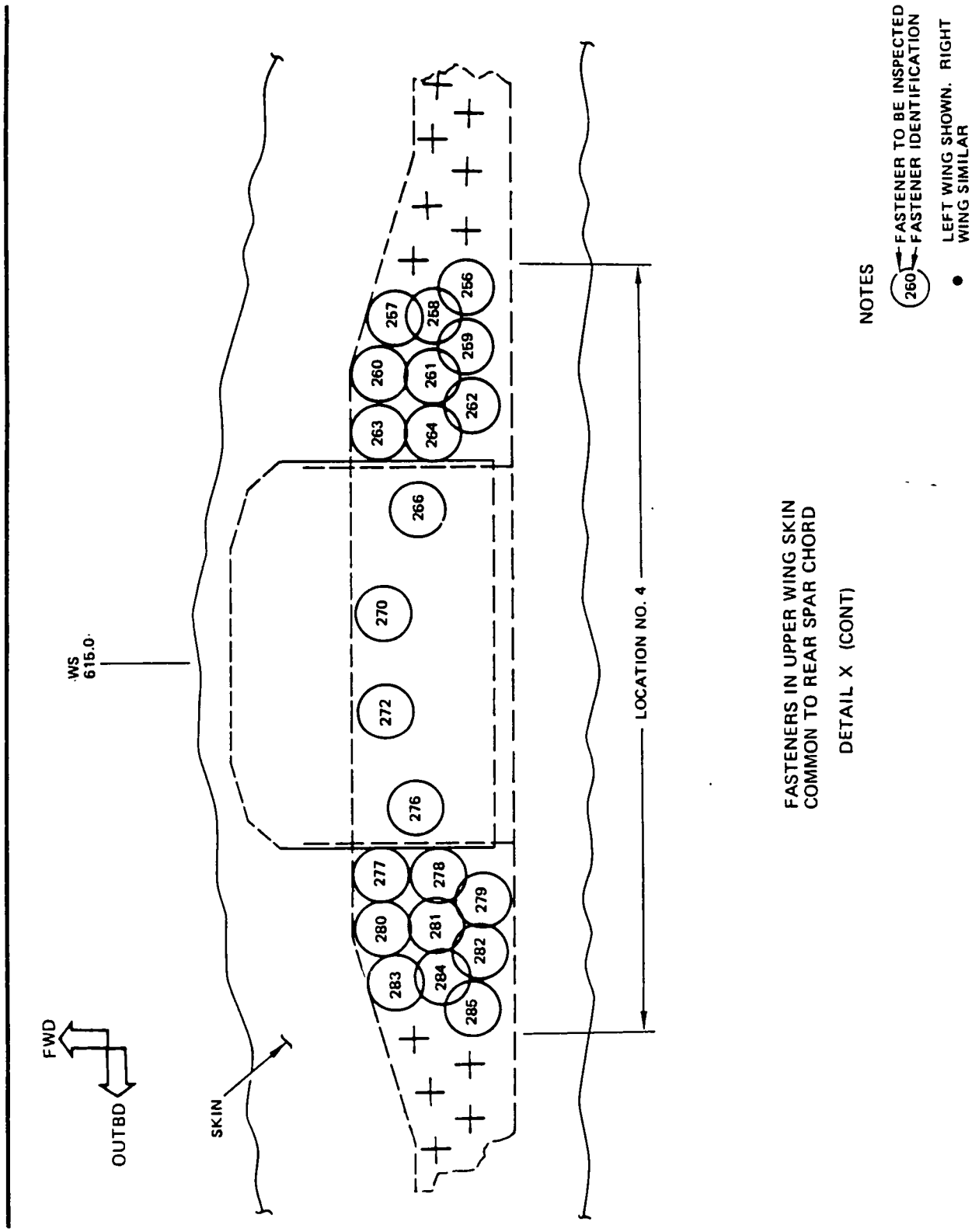
NOTES

511 FASTENER TO BE INSPECTED

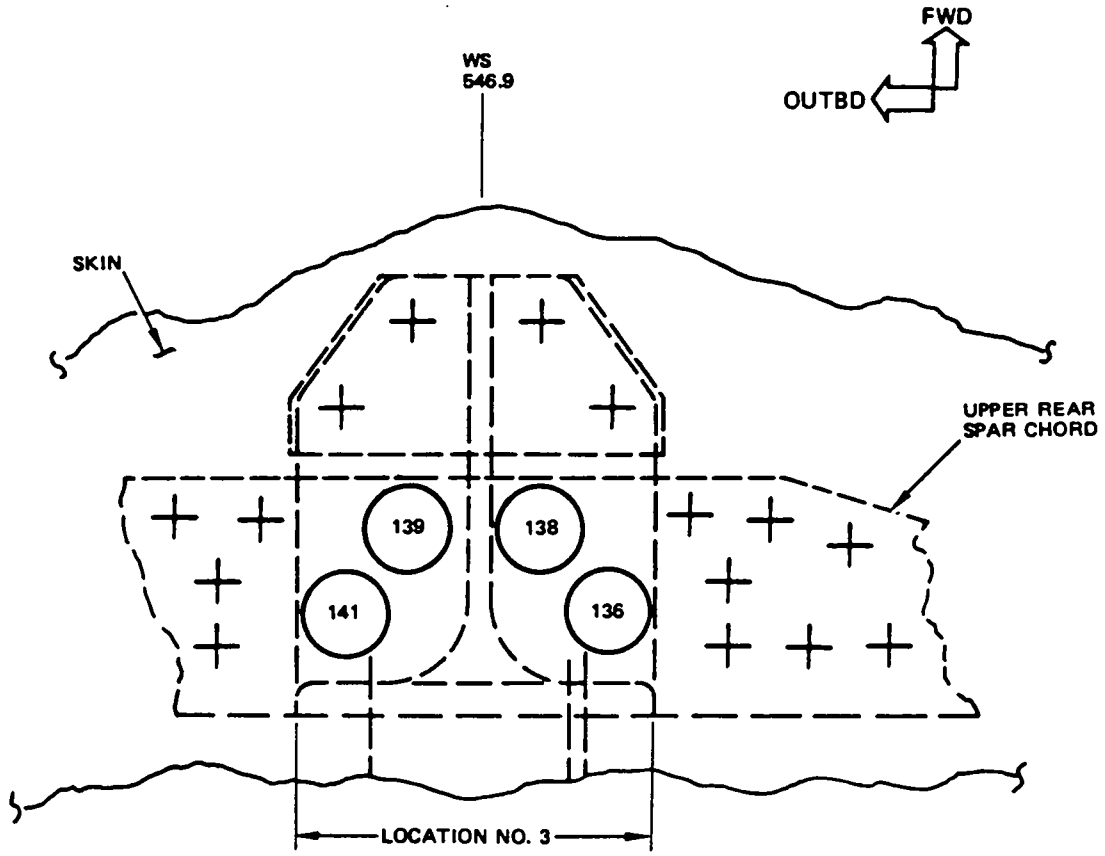
511 FASTENER IDENTIFICIATION NUMBER

TRANSDUCER POSTION

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 22)



Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 23)



UPPER WING FASTENERS IN SKIN
COMMON TO REAR SPAR CHORD

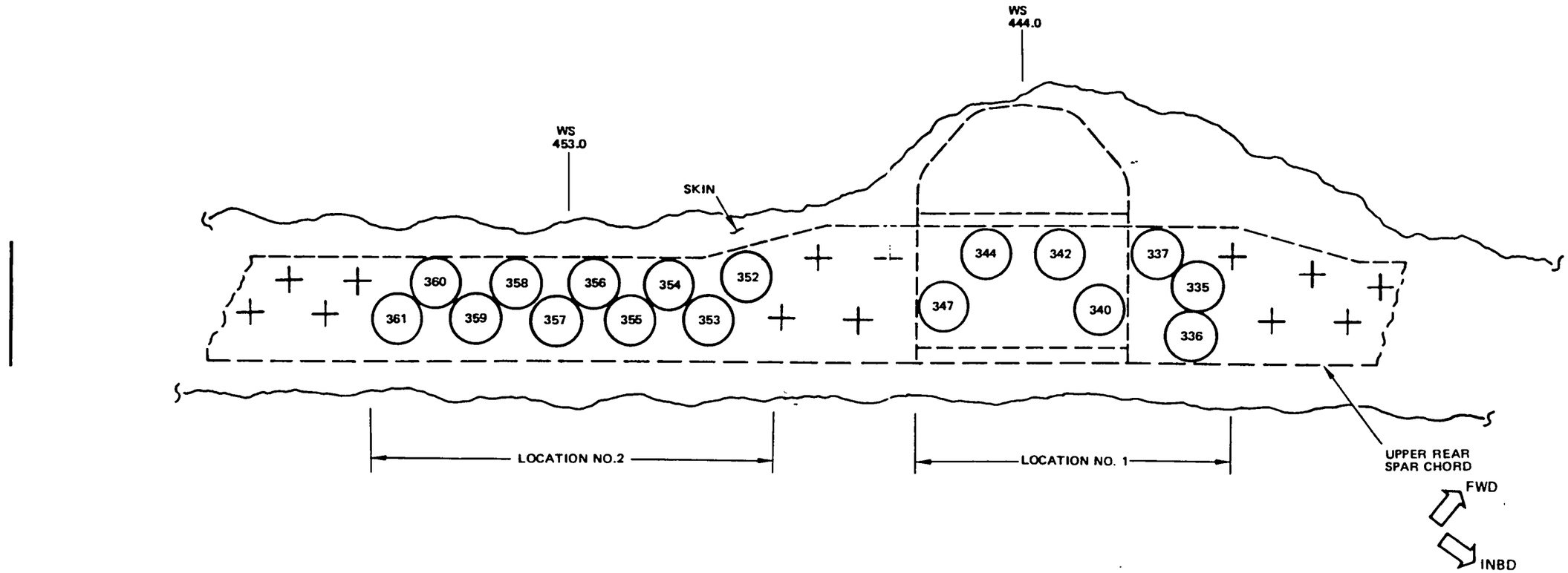
DETAIL X (CONT)

NOTES

- LEFT WING SHOWN
  RIGHT WING SIMILAR

(138) FASTENER TO BE INSPECTED
FASTENER IDENTIFICATION

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 24)



FASTENER IN UPPER WING SKIN COMMON TO REAR SPAR CHORD

DETAIL X

NOTES
- LEFT WING SHOWN, RIGHT WING SIMILAR
- (336) FASTENER LOCATION TO BE INSPECTED
- FASTENER IDENTIFICATION NUMBER

Upper Wing Skin and Vertical Flange
of Upper Rear Spar Chord
Figure 4 (Sheet 25)

PART 4 - ULTRASONIC

WINGS - UPPER REAR SPAR CHORD

1. Purpose

   A. To detect cracks emanating from selected fastener holes in the vertical flange of the wing upper rear spar chord and in the wing skin at fasteners common to the rear spar from WS 360 to production break.

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.

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

   B. The shear wave transducers used for this inspection are 0.35 inch wide by 0.72 inch long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A8300), top mounted microdot connector.

         NOTE: Transducers (1) and (2) are both required due to restricted access to the rear spar vertical flange.

      (3) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 70° A (57A3066).

      (4) Longitudinal Wave, 0.25-inch dia. element, 5 MHZ, 0.375-inch dia. case.

   C. Fabricate two reference standards per Details I and II.

   D. Fabricate transducer positioning fixture P-F1 per Part 4, 57-10-07, Fig. 3, Detail V.

   E. Couplant is light oil or grease.

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 1)

3. Prepare for Inspection

A. This inspection is performed from outside the wing with the part in place on the airplane.

B. Smooth out any surface roughness by sanding lightly. Paint removal at inspection areas on the chord may be necessary to improve sound transmission.

C. Remove paint for inspection of the skin.

D. Wipe surface clean.

E. Lightly prick punch the center of the inspection fasteners in the skin.

F. Apply a thin film of couplant to the inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Calibrate Instrument

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord.

(1) Select a fastener location to be inspected. See Detail IX.

(2) From Table II identify the Detail I reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table II obtain the distance D. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

(4) Obtain a signal from the standard hole. Position this signal at midscale. See Detail III.

(5) Adjust instrument sensitivity to obtain a 90% of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 0.25-inch through thickness sawcut notch. Note the difference in the position of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

NOTE: See par. 4.C. for alternate calibration for inspection of wing skin.

(1) Select a fastener location to be inspected from Detail X.

(2) Identify the reference standard and transducer positioning fixture required for the holes to be inspected from Table III.

(3) Coat 0.375 inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail VI.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail VI (align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. See Detail VI, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument sensitivity to produce approximately a 90% crack signal on the instrument display.

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table III which is designated for the hole to be inspected.

(2) Connect the 70° shear wave (par. 2.B.(3)) transducer to the instrument.

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close the edge of the fastener head as shown in Position 1, Detail VIII.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in Detail VIII.

(6) Move transducer laterally to detect the calibration notch as shown in Detail VIII, Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximately 100% of the full scale.

5. Inspection Procedures

A. Inspect fastener locations common to vertical flange of rear spar chord.

(1) Select fastener location to be inspected from Detail IX.

(2) Calibrate instrument according to par. 4.A.

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail IX.

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument sensitivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(5) Move the transducer laterally and rotate through a small angle (approx 20°) to inspect for cracks out of the fastener hole. See Detail IV.

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known hole in similar structure on the airplane.

(d) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Detail IX.

B. Inspect wing skin at fastener holes common to rear spar horizontal flange. See Detail X.

NOTE: See par. 5.C for alternate inspection of wing skin.

(1) Select inspection location from Detail X and specific fasteners to be inspected from Table III.

(2) Calibrate instrument according to par. 4.B.

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener. The minimum extent of scan is shown in Detail VII.

(4) If the minimum scan cannot be performed, scan with a hand held transducer calibrated per par. 4.C. Inspect per par. 5.C.

(5) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(6) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(7) Repeat inspection procedure for each location identified in Detail X.

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 5)

(8) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

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

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer (approx $\pm$ 20°) about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

AIRPLANE EFFECTIVITY	LOCATION NO.
ALL	1 THRU 8
707-300B/300C	9 THRU 13
ALL EXCEPT 707-300B/300C	14 THRU 16

AIRPLANE EFFECTIVITY
TABLE I

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 6)

LOCATION (1) NO.	APPROX WS OR RSS	FASTENER CODE NO.	FASTENER DIAM	CHORD THICKNESS	D (2)	CALIBRATION HOLE (3)
1	374.0	59	3/16	0.15	0.40	1
2	429.0	413	3/16	0.15	0.35	1
3	444.0	490,491, 532,533	3/16	0.15	0.37	1
4	541.0	55,56, 62,63	3/16	0.15	0.30	1
5	696.0	956	3/16	0.15	0.47	1
6	700.0	987,988, 989,990	5/16	0.15	0.36	2
7	705.0	1014	3/16	0.15	0.43	1
8	715.0	1062,1090	3/16	0.15	0.35 0.74	1

NOTES

- ALL DIMENSIONS ARE IN INCHES

(1) SEE DETAIL IX FOR INSPECTION LOCATIONS

(2) D =
DISTANCE BETWEEN LEADING EDGE OF TRANSDUCER AND EDGE OF FASTENER HOLE TO BE USED FOR CALIBRATION. ON THE CHORD, D CORRESPONDS TO THE DISTANCE BETWEEN THE HOLE AND THE CLOSEST POSSIBLE LOCATION FOR TRANSDUCER PLACEMENT

(3) HOLE IN REFERENCE STANDARD 079 (DETAIL I) TO BE USED FOR CALIBRATION

UPPER REAR SPAR CHORD, VERTICAL FLANGE INSPECTION PARAMETERS
TABLE II

LOCATION NO. (FOR EFFECTIVITY SEE TABLE I)	APPROX WS OR RSS	FASTENER CODE NO.	FASTENER DIAM	SKIN THICK-NESS	POSITIONING FIXTURE	HOLE IN REFERENCE STANDARD 080 TO BE USED FOR CALIBRATION
9	438 thru 441	26, 27	3/8	0.19	PF1 [A]	3
10	438 thru 441	22, 23	3/8	0.19	PF1 [A]	3
11	441 thru 450	28 thru 42	5/16(11 places) [4] and 1/4 (4 places) or 5/16 (15 places)	0.19	PF1 [A]	2
12	544 thru 548	1 thru 4	1/4 or 5/16 [4]	0.18	PF1 [A]	2
13	608 thru 622	5 thru 8, 21 thru 30	5/16	0.17	PF1 [A]	2
14	438 thru 450	99,101,102,103 104,106,107,109 thru 115	3/8 (2 places) 3/16 (8 places) 1/4 (4 places)	0.19	PF1 [A]	1 for 3/16 fasteners 2 for 1/4 fasteners 3 for 3/8 fasteners
15	544 thru 548	299,301,302, 304	1/4 or 5/16 [4]	0.18	PF1 [A]	2
16	608 thru 622	419 thru 428, 432, 434,438, 440 thru 448	5/16 (4 places) 3/16 (18 places)	0.165	PF1 [A]	1 for 3/16 fasteners 2 for 5/16 fasteners

NOTES

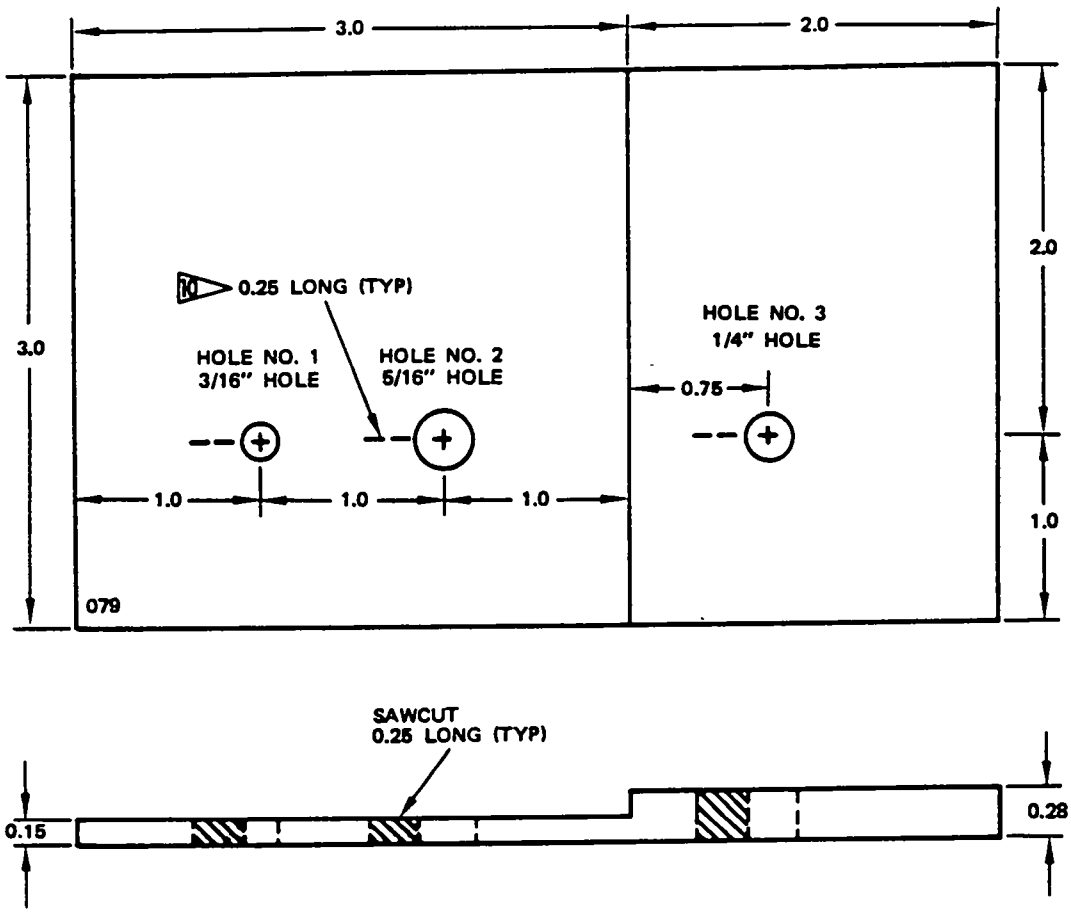
- ALL DIMENSIONS ARE IN INCHES

[4] DEPENDING ON AIRPLANE EFFECTIVITY, FASTENER DIAMETER WILL BE 1/4 INCH OR 5/16 INCH. CALIBRATION HOLE NO. 2 IS USED FOR BOTH FASTENER SIZES

[A] REFER TO PART 4, 57-10-07, FIG. 3, DETAIL V

UPPER SKIN AT REAR SPAR INSPECTION PARAMETERS
TABLE III

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 7)



NOTES

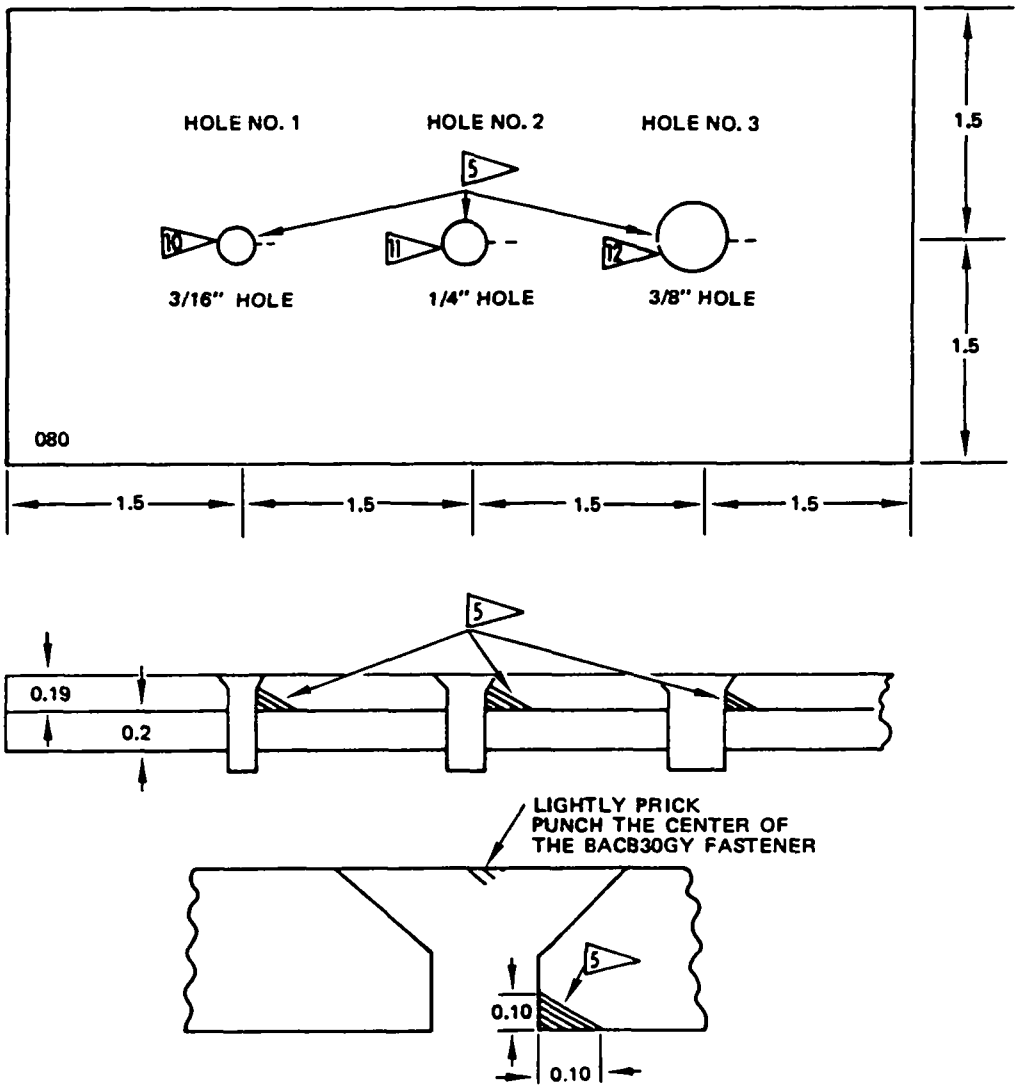
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 7075–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030; X.XX ± 0.010
- P/N 6411–36
  AVAILABLE FROM IDEAL
  SPECIALTY CO.
  2531 E. INDEPENDENCE
  TULSA, OKLAHOMA 74110
- ETCH OR STEEL STAMP WITH 079

JEWELER'S SAWCUT 0.030 MAX WIDTH 3 PLACES

REFERENCE STANDARD 079 FOR
REAR SPAR VERTICAL FLANGE

DETAIL I

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 9)



NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030
  X.XX ± 0.010
- P/N 6411–37
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110
- ETCH OR STEEL STAMP WITH 080

5 JEWELER'S SAWCUT 0.030 MAX WIDTH

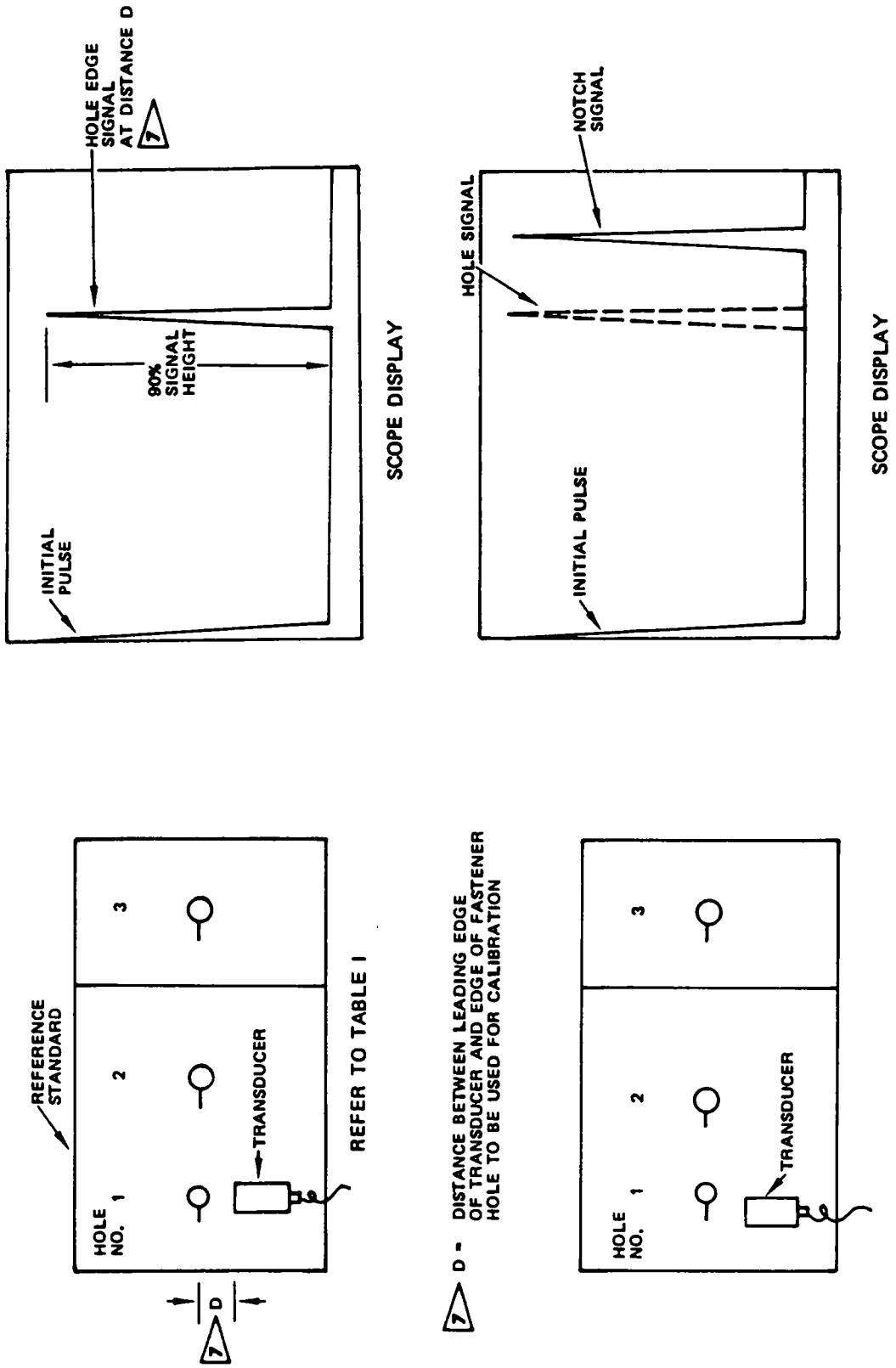
10 BACB30LU3–6 WITH BACN10JC–3 NUT

11 BACB30LU4–6 WITH BACN10JC–4 NUT

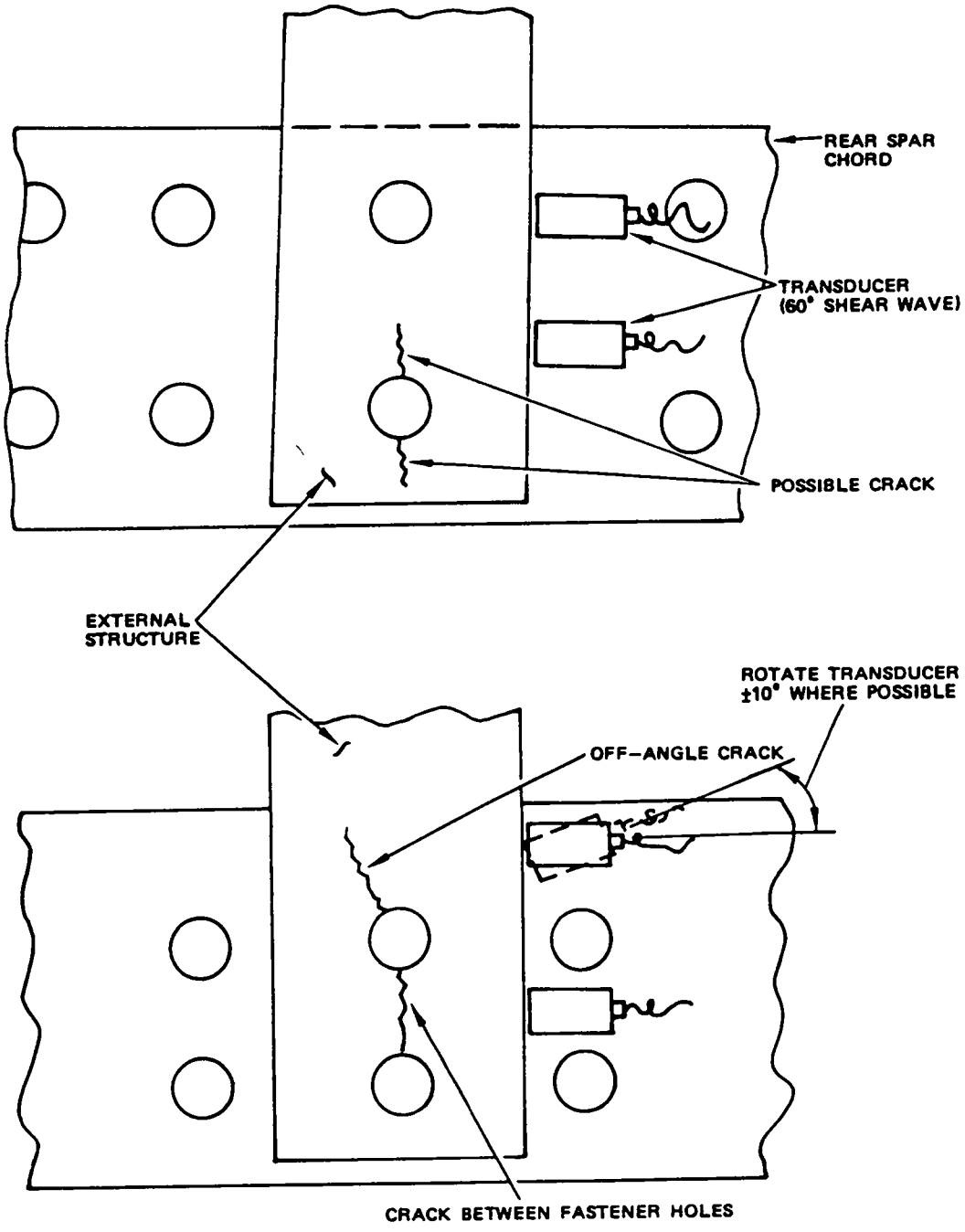
12 BACB30GY12–6 WITH BACC30K COLLAR

REFERENCE STANDARD 080 FOR
SKIN INSPECTION CALIBRATION
DETAIL II

Wing - Upper Rear Spar Chord - Vertical Flange
Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 10)



Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 11)

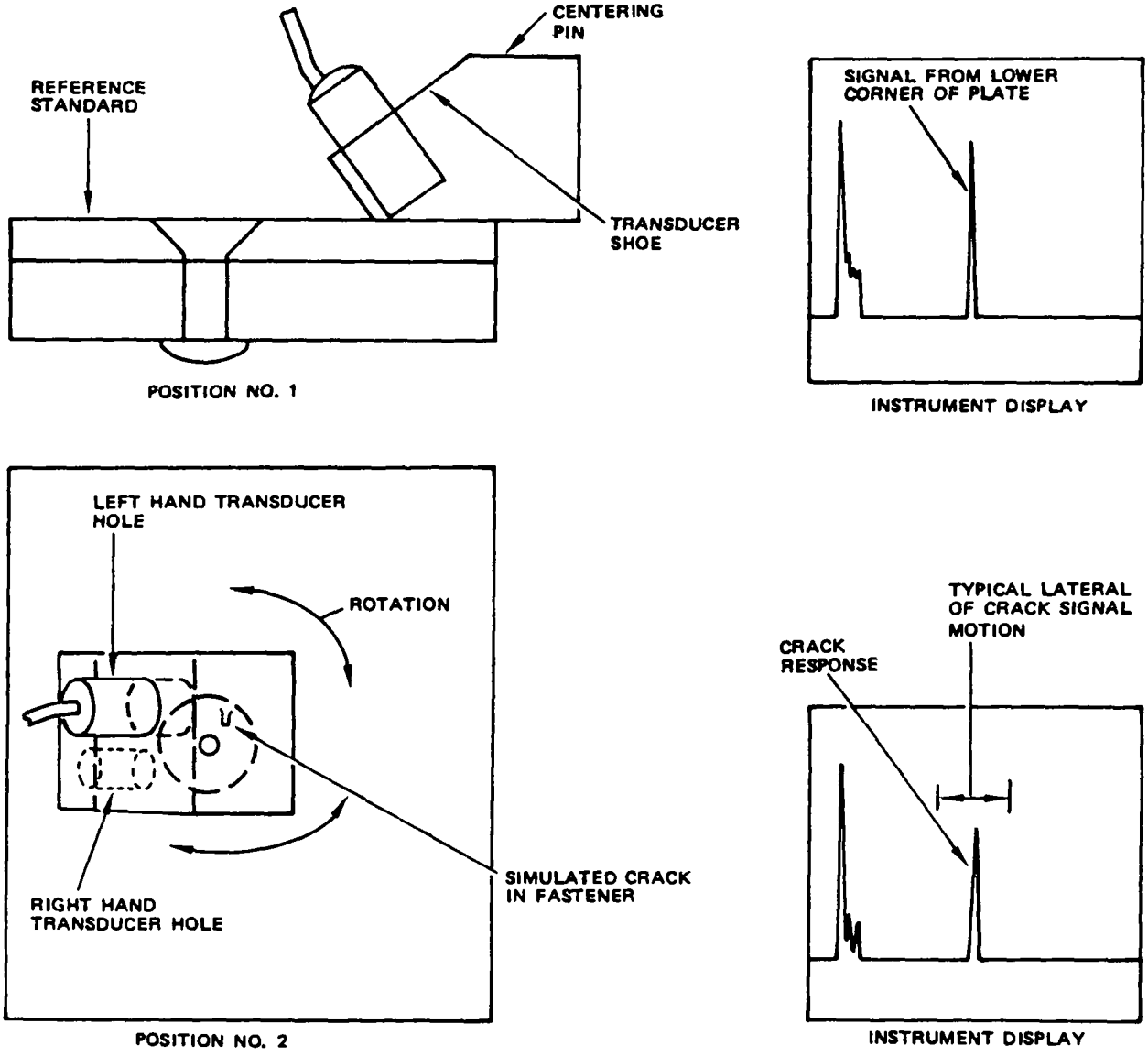


INSPECTION OF REAR SPAR CHORD

DETAIL IV

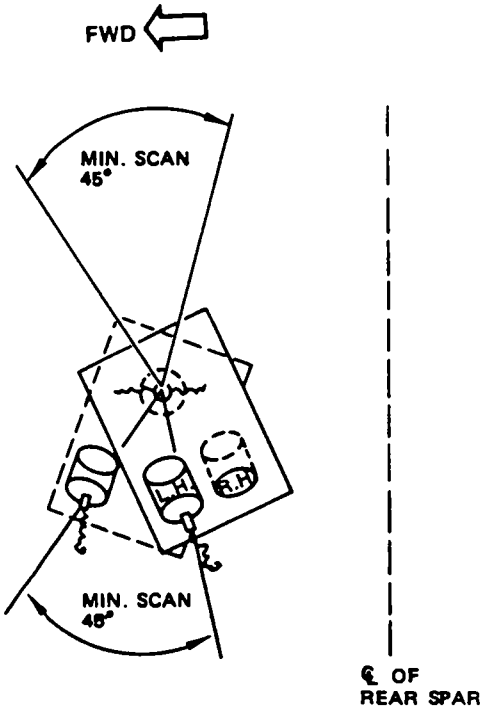
Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break

Figure 5 (Sheet 12)



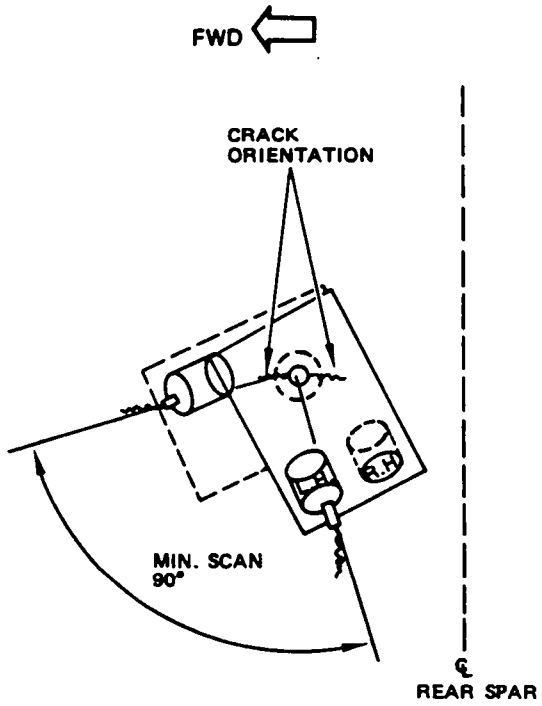
CALIBRATION FOR SKIN INSPECTION
DETAIL VI

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 14)



A. INSPECTION POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN L/H POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD. SIDE OF HOLE BY PLACING TRANSDUCER IN R/H HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE. SEE NOTE.



B. INSPECTION IS POSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

SCAN FWD. SIDE OF FASTENER WITH TRANSDUCER IN L/H HOLE AS INDICATED. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN R/H HOLE. SEE NOTE.

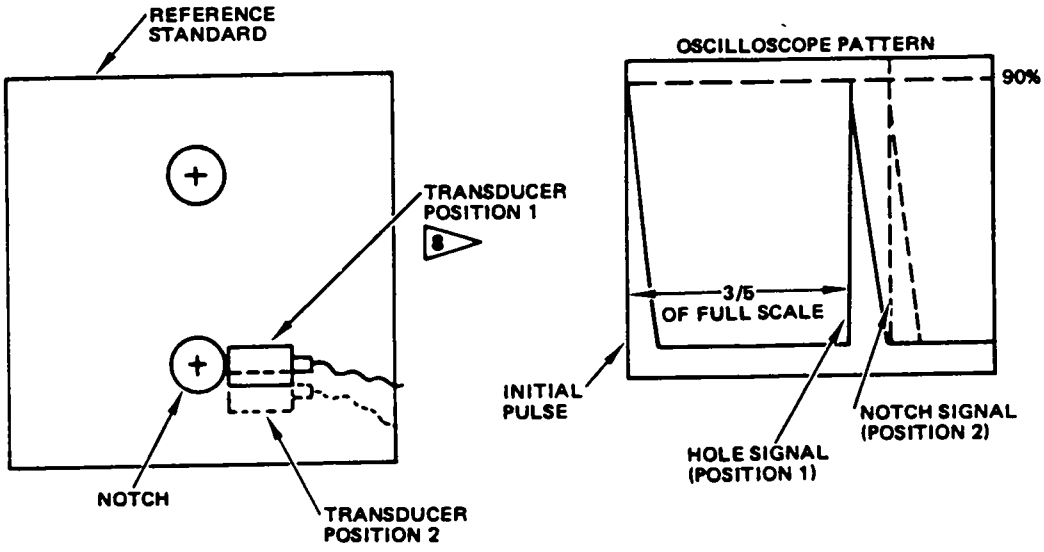
NOTE

IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PAR. 5.C.

MINIMUM INSPECTION COVERAGE WHEN ADJACENT FASTENERS INTERFERE WITH SCAN

DETAIL VII

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 15)

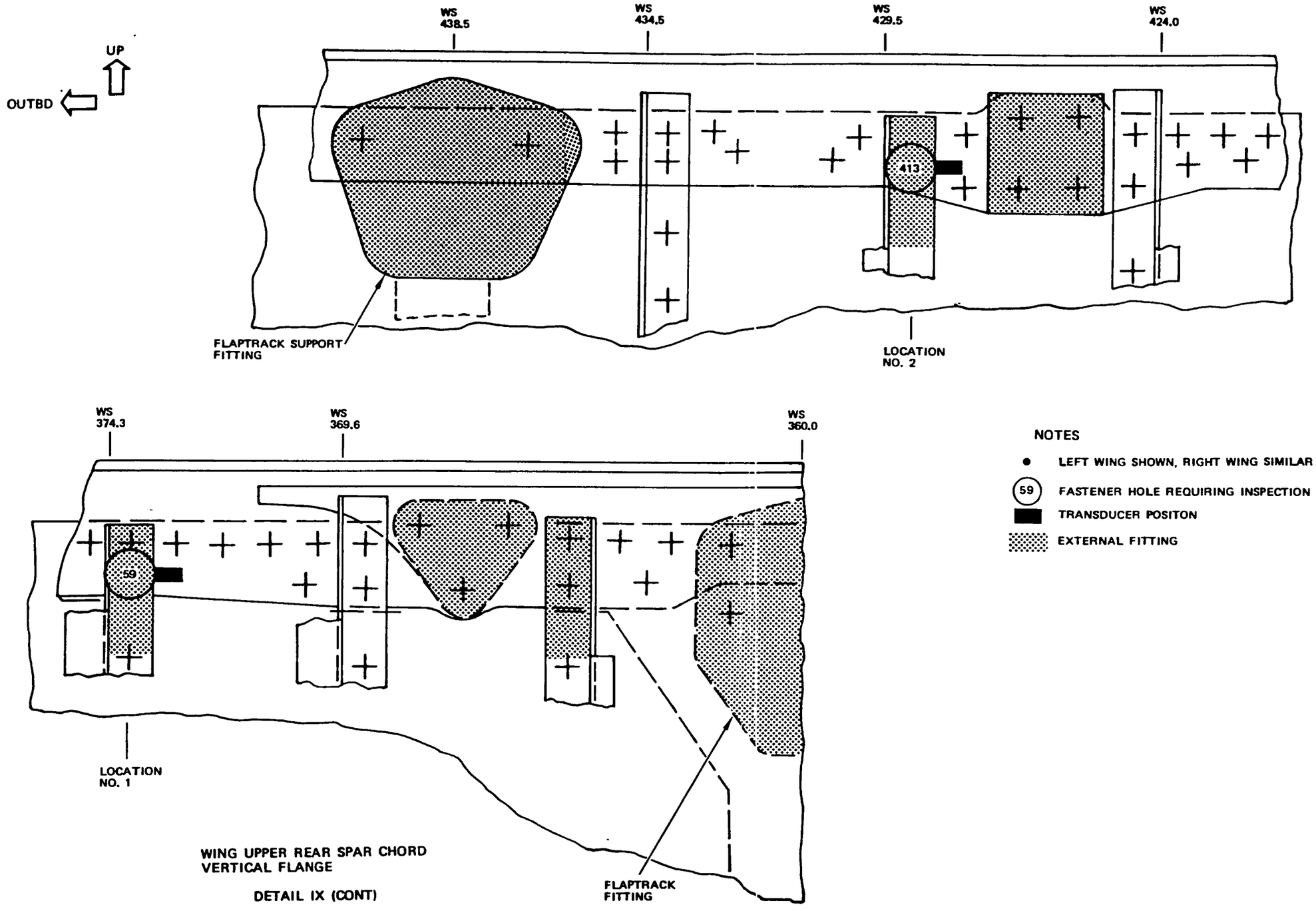


8 SELECT STANDARD HOLE SPECIFIED IN TABLE III FOR HOLE IN SKIN TO BE INSPECTED

TRANSDUCER CALIBRATION POSITION
FOR ALTERNATE INSPECTION OF SKIN

DETAIL VIII

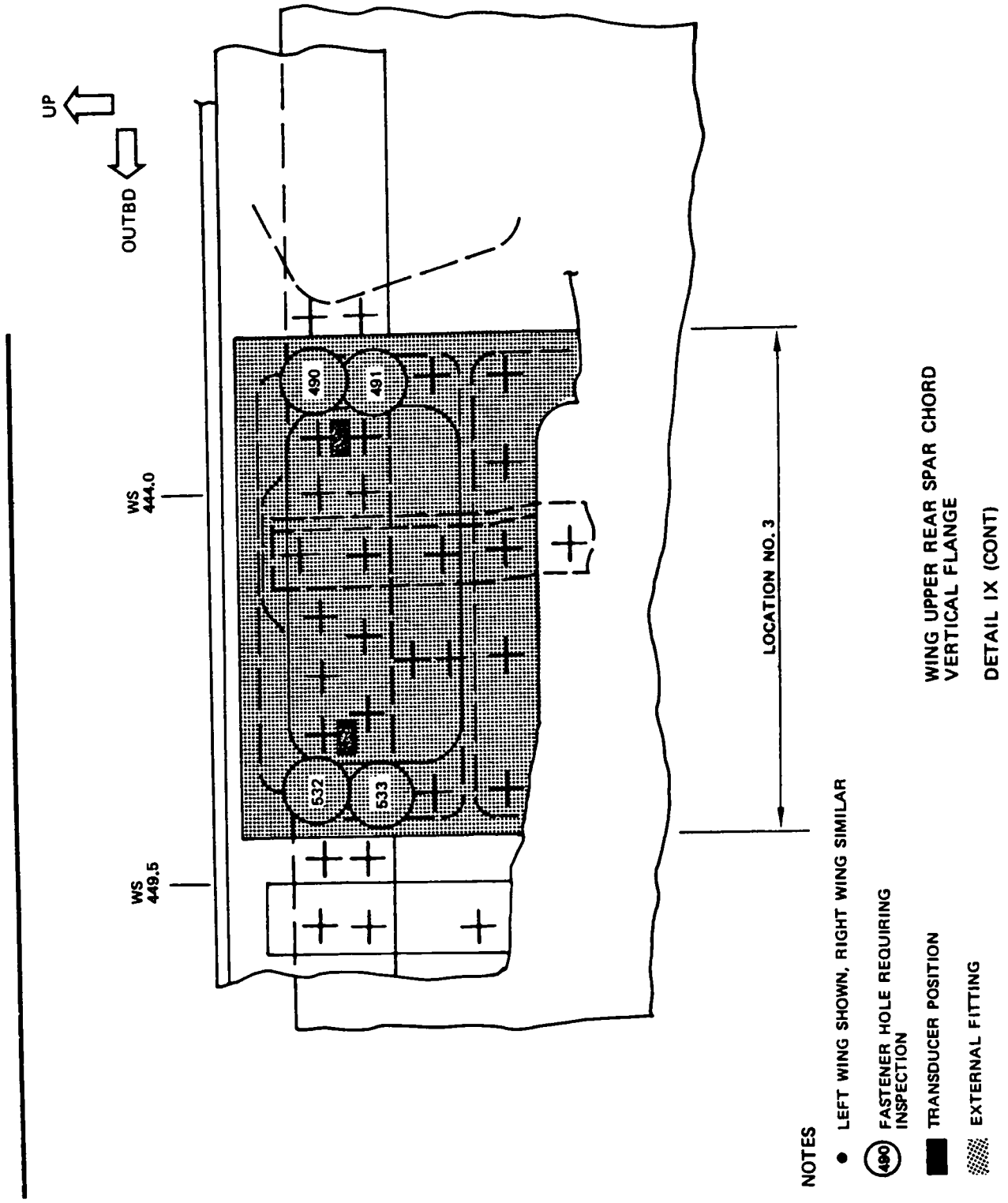
Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 16)



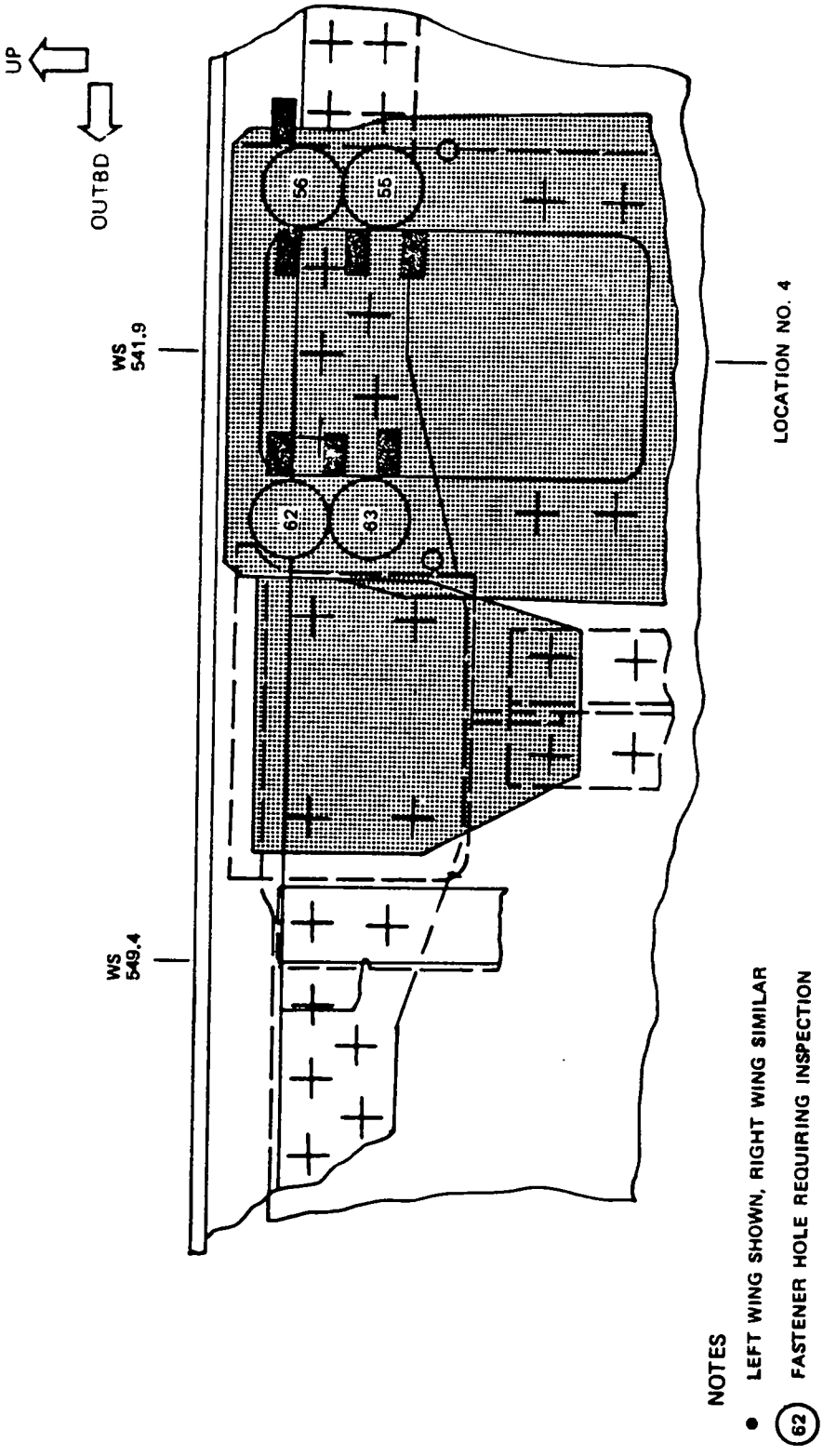
WING UPPER REAR SPAR CHORD
VERTICAL FLANGE

DETAIL IX (CONT)

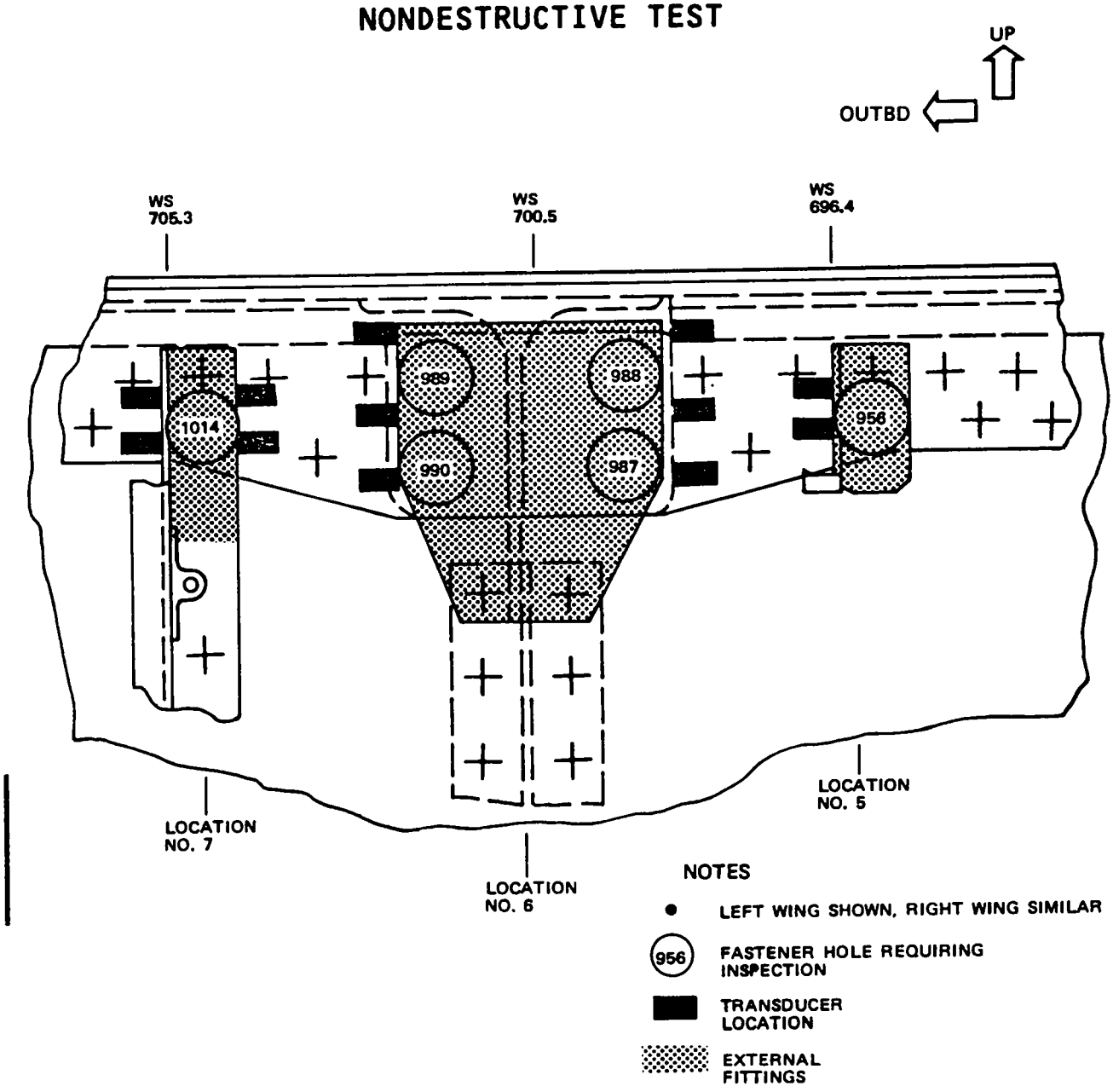
Wing - Upper Rear Spar Chord - Vertical Flange
Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 17)



Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 18)



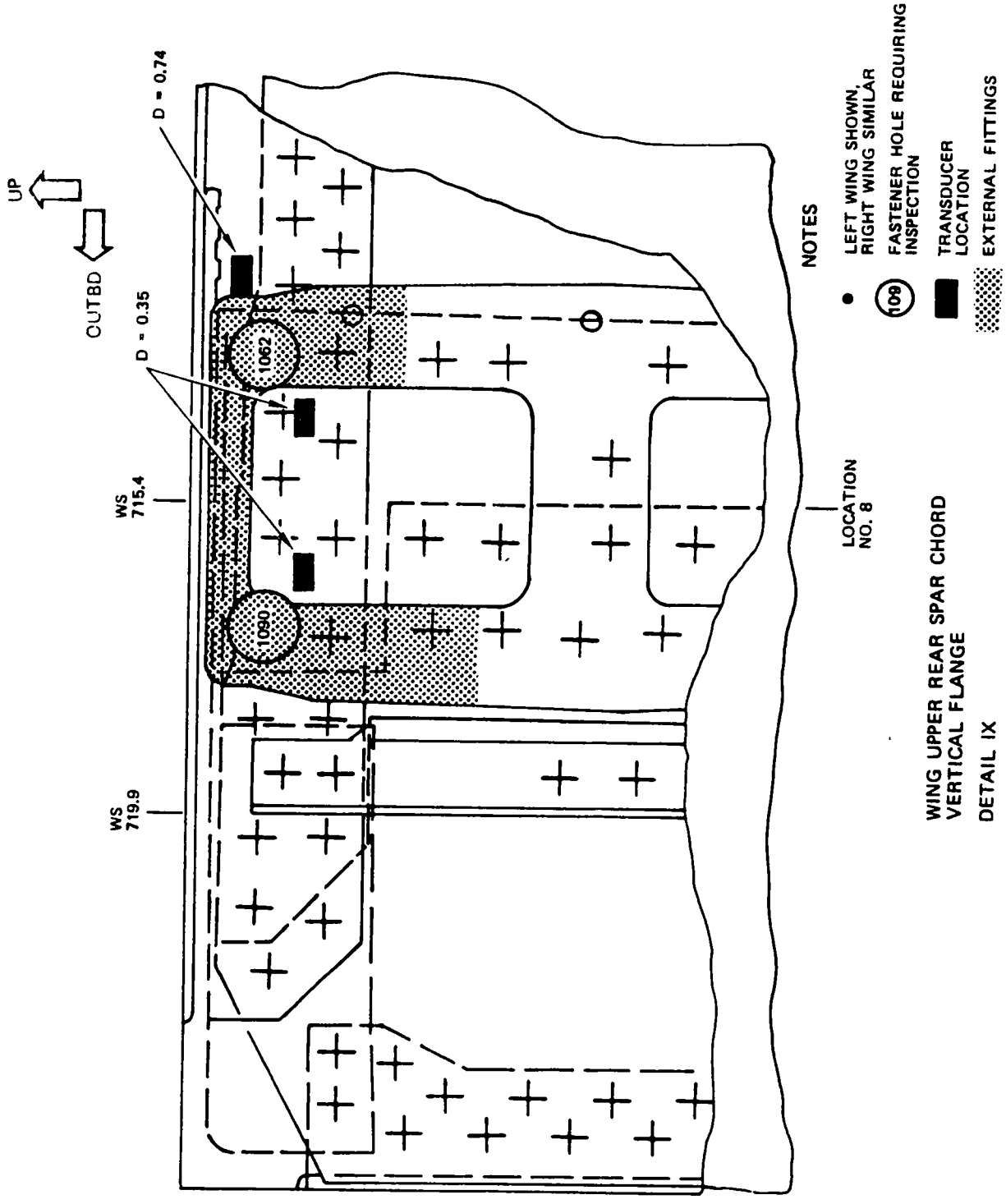
Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 19)



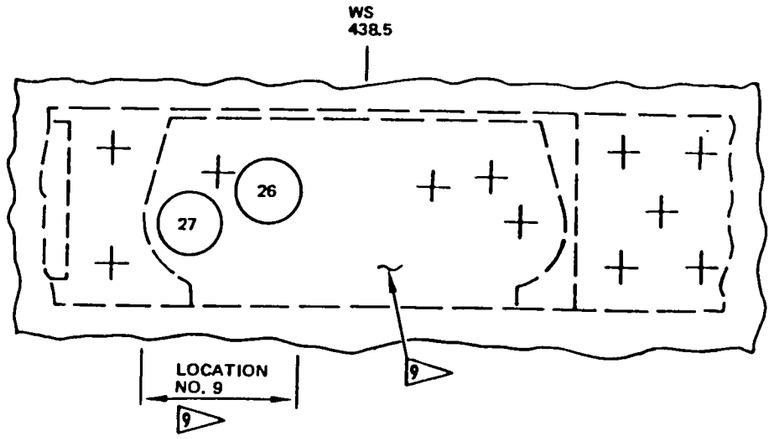
WING UPPER REAR SPAR CHORD
VERTICAL FLANGE

DETAIL IX (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 20)



Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 21)

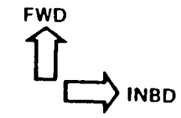


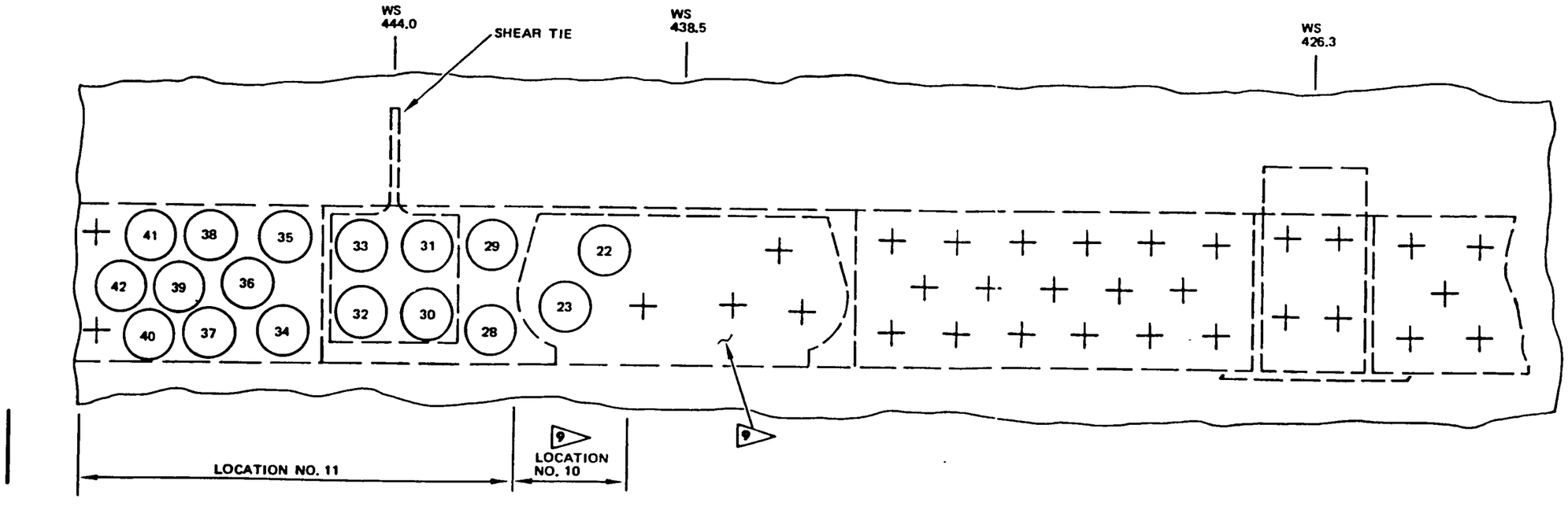
NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- FOR A/P EFFECTIVITY SEE TABLE 1. 2

(26) FASTENER HOLE REQUIRING INSPECTION

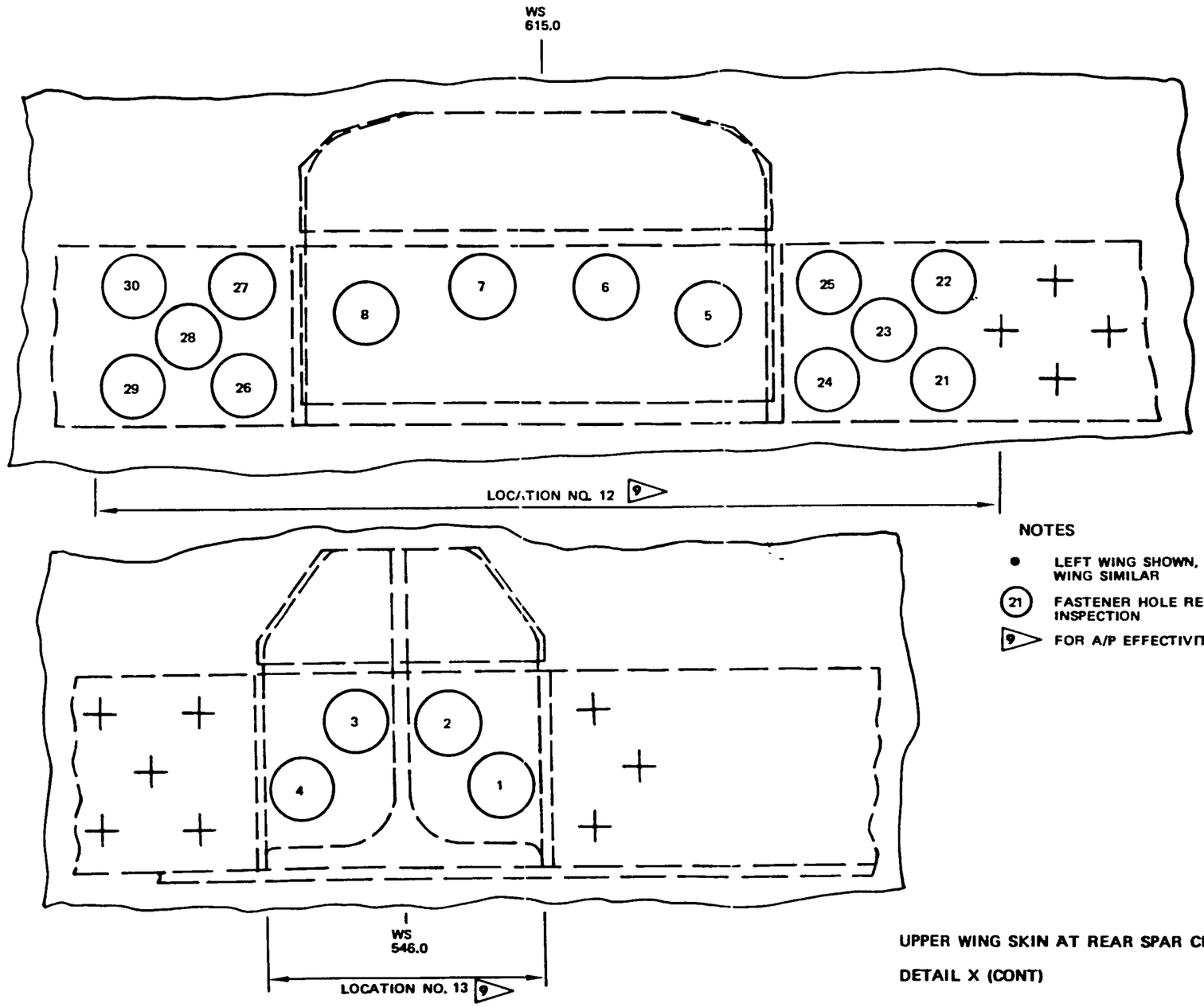
9 FOR A/P EFFECTIVITY SEE TABLE 1





UPPER WING SKIN AT REAR SPAR CHORD
DETAIL X (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 22)



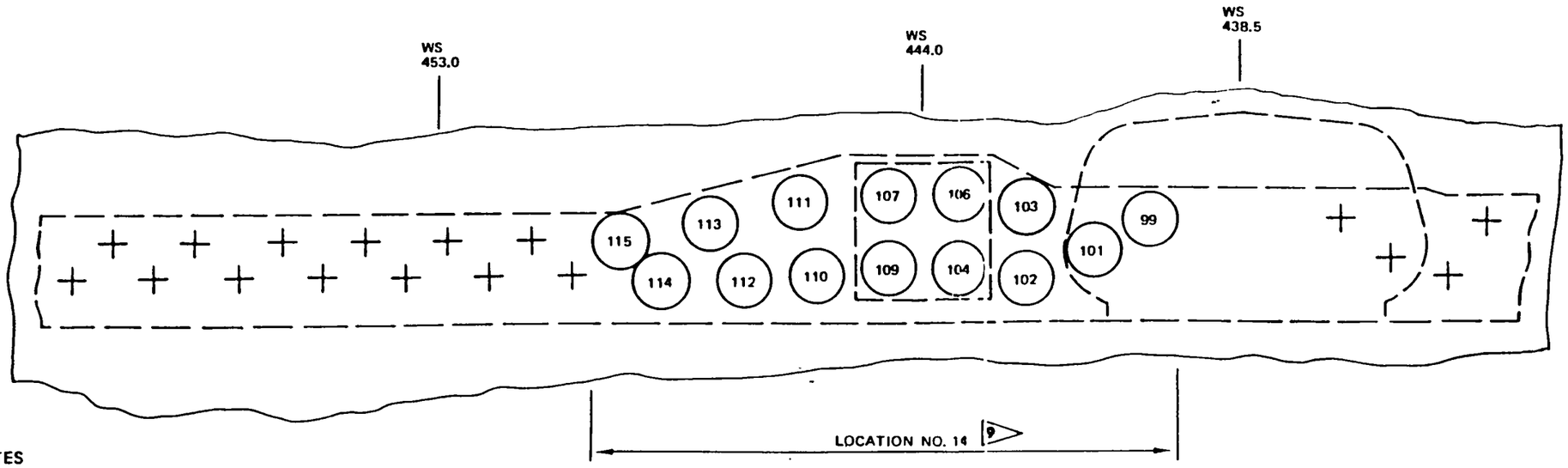
NOTES

- ● LEFT WING SHOWN, RIGHT WING SIMILAR
- (21) FASTENER HOLE REQUIRING INSPECTION
- 9 FOR A/P EFFECTIVITY SEE TABLE 1

UPPER WING SKIN AT REAR SPAR CHORD

DETAIL X (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 23)

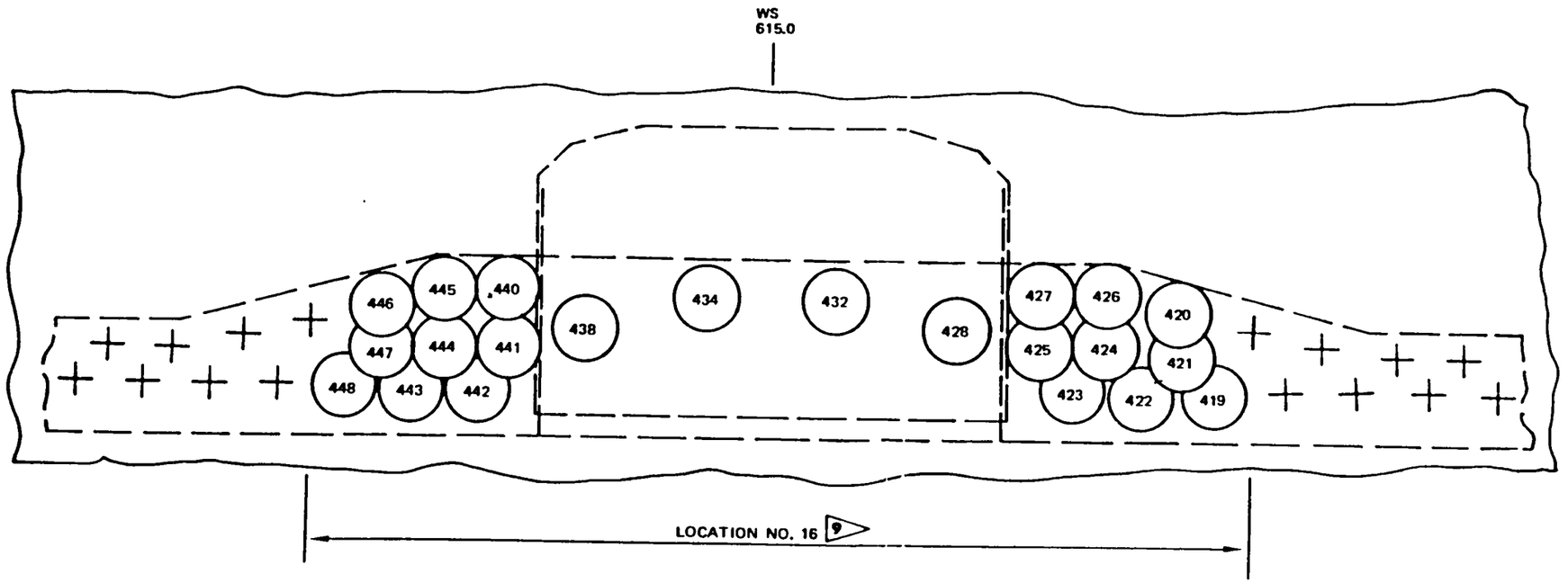


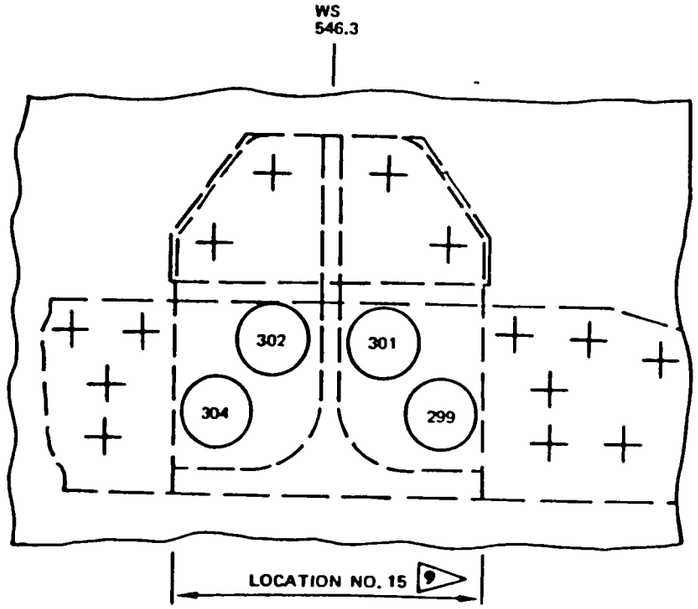
NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- (113) FASTENER HOLE REQUIRING INSPECTION
- 9 FOR A/P EFFECTIVITY SEE TABLE 1

UPPER WING SKIN AT REAR SPAR CHORD

DETAIL X (CONT)





NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- (427) FASTENER HOLE REQUIRING INSPECTION
- 9 FOR A/P EFFECTIVITY SEE TABLE 1

UPPER WING SKIN AT REAR SPAR CHORD

DETAIL X (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 360 to Production Break
Figure 5 (Sheet 25)

PART 4 - ULTRASONIC

WINGS - LOWER REAR SPAR CHORD

1. Purpose

   A. To detect cracks emanating from selected fastener holes:

      (1) In the vertical flange of the wing lower rear spar chord.

      (2) In the wing skin under the splice plate at B B L 70.5.

      (3) In the wing skin at fasteners common to the rear spar.

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

   B. The shear wave transducers used for this inspection are 0.35 inch wide by 0/72 inch long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A8300), top mounted microdot connector.

      (3) Automation Industries, Shear Wave, Type SMZ, 5MHZ, 0.25-inch element, 70° A (57A3066).

      (4) Longitudinal Wave, 0.25 inch dia. element, 5 MHZ, 0.375-inch dia. case.

   C. Fabricate Reference Standards per Details IV, V, VI, and VII.

      NOTE: Reference Standards 095 and 096 are also used for the upper 720 R/S inspection.

Wing Lower Rear Spar Chord - Vertical Flange
Figure 6 (Sheet 1)

D. Obtain transducer positioning fixtures as follows:

(1) PF1 - Part 4, 57-10-07, Fig. 3, Detail V.

(2) PF2 - Part 4, 57-10-07, Fig. 2, Detail VII

(3) PF4 - Part 4, 57-10-07, Fig. 2, Detail VI

NOTE: Positioning fixtures PF1 and PF2 are also used for the upper 720 R/S inspection.

E. Couplant is light oil or grease.

3. Preparation for Inspection

A. This inspection is performed from outside the wing with the part in place on the airplane.

B. Paint removal at inspection areas on the chord may be necessary to improve sound transmission. Smooth any surface roughness by sanding lightly.

C. Remove paint for inspection of the skin.

D. Wipe surface clean.

E. Lightly prick punch the center of the inspection fasteners in the skin.

F. Apply a thin film of couplant to the inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Calibrate Instrument

A. Calibrate for selected fastener locations common to vertical leg of rear spar chord; and for fastener holes in the wing skin under the B.B.L. 70.5 splice plate..

(1) Select a fastener location to be inspected. See Details I and II.

(2) From Table I identify the Detail IV reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table I obtain the distance D. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

(4) Obtain a signal from the standard hole. Position this signal at midscale. See Detail VIII.

(5) Adjust instrument sensitivity to obtain a 90% of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 0.25-inch through thickness notch. Note the difference in the position of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate to inspect wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

(1) Select a fastener location to be inspected from Detail III.

(2) From Table II identify the reference standard and transducer positioning fixture required for the holes to be inspected.

(3) Coat 0.375-inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail XIII.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail XIII, (align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. See Detail XIII, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument senstivity to produce approximately a 100% crack signal on the instrument display.

Wing Lower Rear Spar Chord - Vertical Flange
Figure 6 (Sheet 3)

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table II which is designated for the hole to be inspected.

(2) Select the transducer as follows:

Locations 1 and 2 - 60° Shear Wave; See Section 2.B.(1).

Locations 3 thru 6 - 70° Shear Wave; See Section 2.B.(3).

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close the edge of the fastener head as shown in Detail XV, Position 1.

(5) Position the hole signal approximately 60% of the full screen width away from the initial pulse as shown in Detail XV.

(6) Move transducer laterally to detect the calibration notch as shown in Detail XV, Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximatley 90% of the full scale.

5. Inspection Procedure

A. Inspect fastener locations common to vertical leg of rear spar chord and skin under B B L splice plate.

(1) Select fastener location to be inspected from Detail I or II.

(2) Calibrate instrument according to Par. 4.A.

(3) Place the transducer on the vertical leg of the chord at the positions indicated in Detail I, or on the skin at the positions indicated in Detail II.

Wing Lower Rear Spar Chord - Vertical Flange
Figure 6 (Sheet 3)

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument senstivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(5) Move the transducer laterally and rotate through an angle of approximately ±20° to inspect for cracks out of the fastener hole. See Detail IX.

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(d) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Details I and II.

B. Inspect wing skin at fastener holes common to rear spar horizontal leg. See Detail III.

(1) Select inspection location from Detail III and specific fasteners to be inspected from Table II.

(2) Calibrate instrument according to par. 4.B.

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener being inspected. The minimum extent of scan is shown in Detail XIV.

(4) If the minimum scan cannot be performed, it will be necessary to scan with a hand held transducer calibrated per par. 4.C. Inspect per par. 5.C.

(5) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(6) Any crack indication equal to or greater than 40% of full scale should be investigated further.

(7) Repeat inspection procedure for each location identified in Detail III.

(8) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

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

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer approximately $\pm$ 20° about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

NONDESTRUCTIVE TEST

LOCATION NO. [2]	APPROX. W.S.	FASTENER CODE NUMBERS	FASTENER DIA. (INCH)	CHORD THICKNESS	D (INCH) [3]	CALIBRATION HOLE [4]
1	240	270	7/16 [1]	0.43 [1]	0.58 [1]	6
2	274	322, 323, 324, 325	1/4	0.26	0.37	4
3	281	336, 335	3/16	0.15	0.8	1
4	284.5	377	3/16	0.15	0.3	1
5	291.5	414	3/16	0.15	0.4	1
6	299.5	469, 468	3/16	0.3	0.35	4
7	335	710	3/16	0.3	0.4	4
8	341	775, 773, 776	3/16	0.3	0.3	4
9	360	913, 914	9/16	0.3	0.64	5
10	451	543	3/16	0.15	0.5	1
11	482	775, 774	3/16	0.16	0.4	1
12	487	784	1/4	0.15	0.4	2
13	541	32, 78	3/16	0.15	0.3, 0.7 as noted see Detail I	1
14	615	472, 500	5/8	0.15	0.48	3
15	700	326, 348	9/16	0.15	0.64	3
16	715	1030, 1029, 994, 995	3/16	0.15	0.3,0.7 as noted see Detail I	1
17	187	17A	1	Skin is 0.56	1.3	7

PARAMETERS USED FOR INSPECTION OF CHORD
TABLE I

NOTE

[1] All dimensions are in inches

[2] See Detail I for inspection locations 1 thru 16 and see Detail II for location 17.

[3] D = Distance between leading edge of transucer and edge of fastener hole used for calibration. On the chord, D = distance between the hole and closest possible transducer placement location.

[4] Hole in Detail 4 Reference Standard to be used for Calibration.

LOCATION NO. (5)	APPROX. W.S.	FASTENER CODE NUMBERS	FASTENER DIA. (INCH) (1)	SKIN THICKNESS (1)	POSITIONING FIXTURE, DETAIL	REFERENCE STANDARD
1	283.4 to 301.3	142 to 148, 151, 152, 155 to 161, 163, 164 to 167, 169, 171, 173 to 175, 177 to 180, 182, 183	1/4 5/16	0.45 0.35	PF4 [A]	094
2	306.5 to 310	189, 190, 192, 193 to 195	1/4, 5/16	0.35	PF4 [A]	094
3	311.8 to 314.6	197, 198, 200-202	5/16, 3/16	0.25	PF2 [B]	095 (6)
4	319.8 to 330.9	212, 213, 214, 216 to 219, 221 to 226 to 229, 231, 232	3/16	0.25	PF2 [B]	095 (6)
5	442 to 446	506, 510, 514 518	5/16	0.23	PF2 [B]	095 (6)
6	538.5 to 548.5	157, 159, 160, 163, 164, 165 to 168, 172, 176, 179, 183	1/4, 5/16	0.20	PF1 [C]	096

PARAMETERS USED FOR SKIN INSPECTION
TABLE II

NOTE

(1) All dimensions are in inches.

(5) See Detail VII for inspection locations.

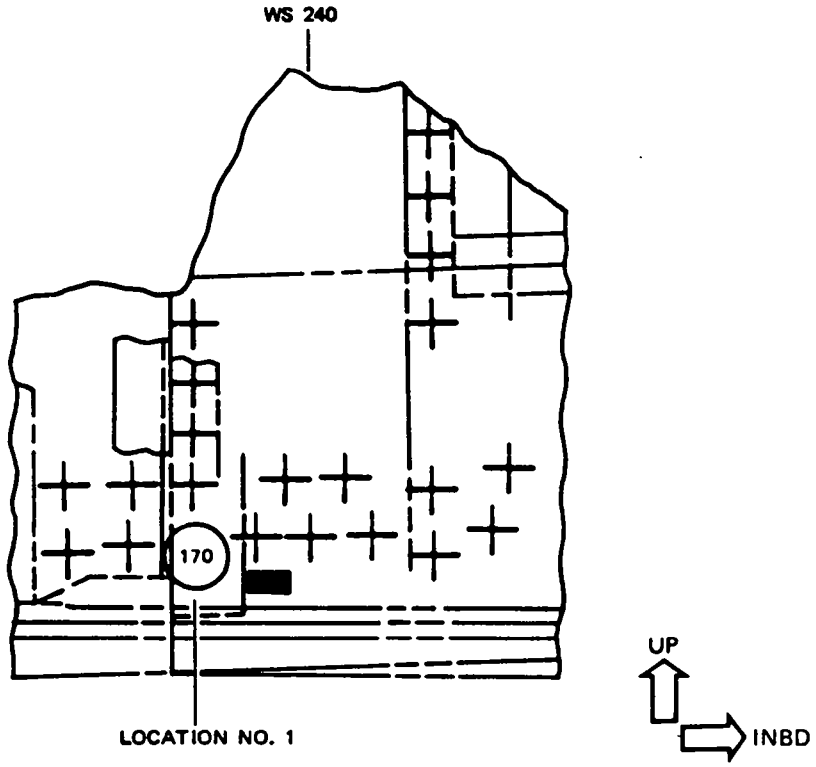
(6) On reference standards 095 and 096 use hole 1 to calibrate for inspection of 3/16 inch fasteners and hole 2 for 1/4 inch and 5/16 inch fasteners.

[A] See part 4, 57-10-07, Fig. 2, Detail VI.

[B] See part 4, 57-10-07, Fig. 2, Detail VII.

[C] See part 4, 57-10-07, Fig. 3, Detail V.

Wing Lower Rear Spar Chord - Vertical Flange
Figure 6 (Sheet 9)



NOTES

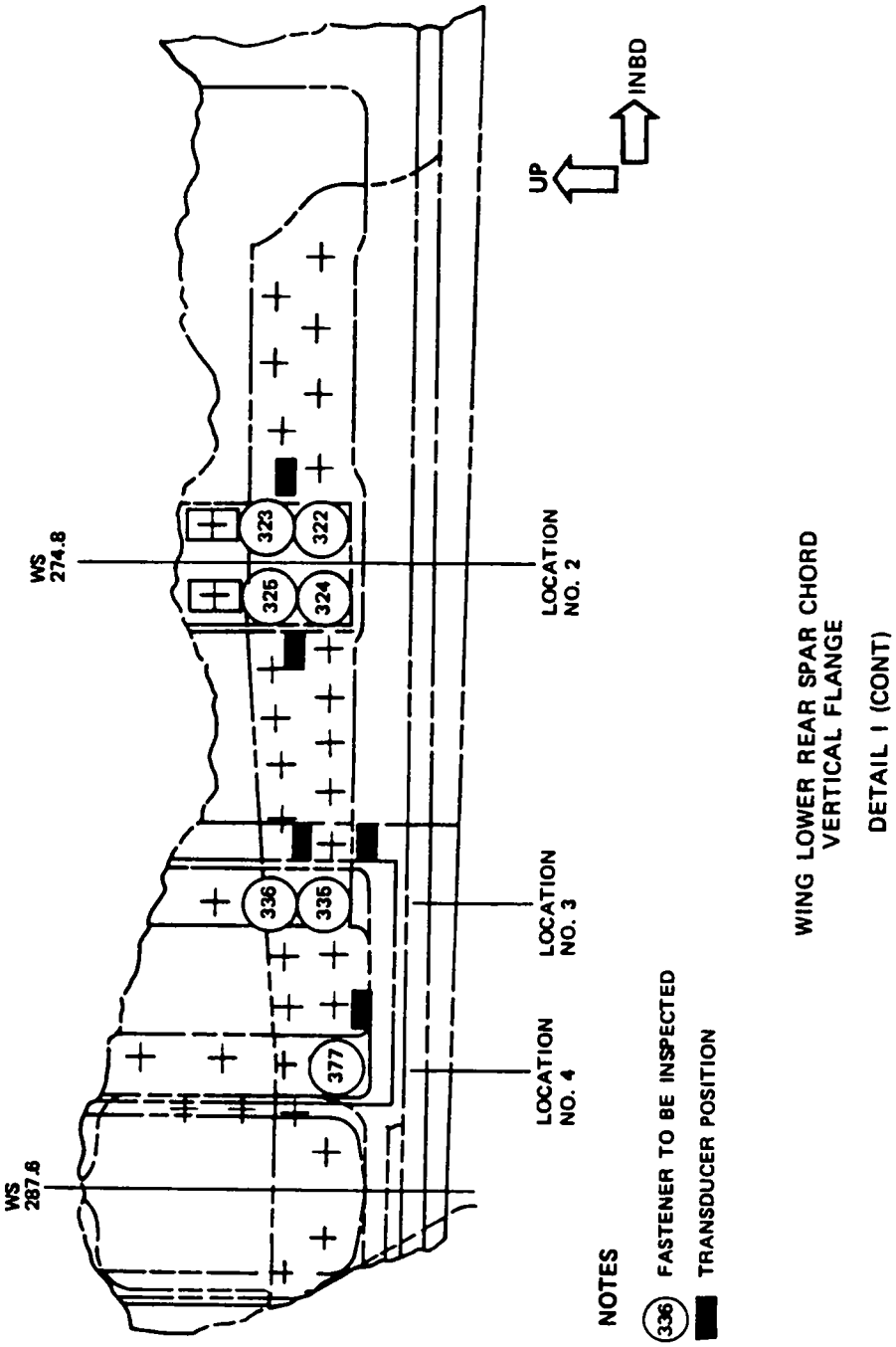
(170) FASTENER HOLE TO BE INSPECTED

TRANSDUCER POSITION

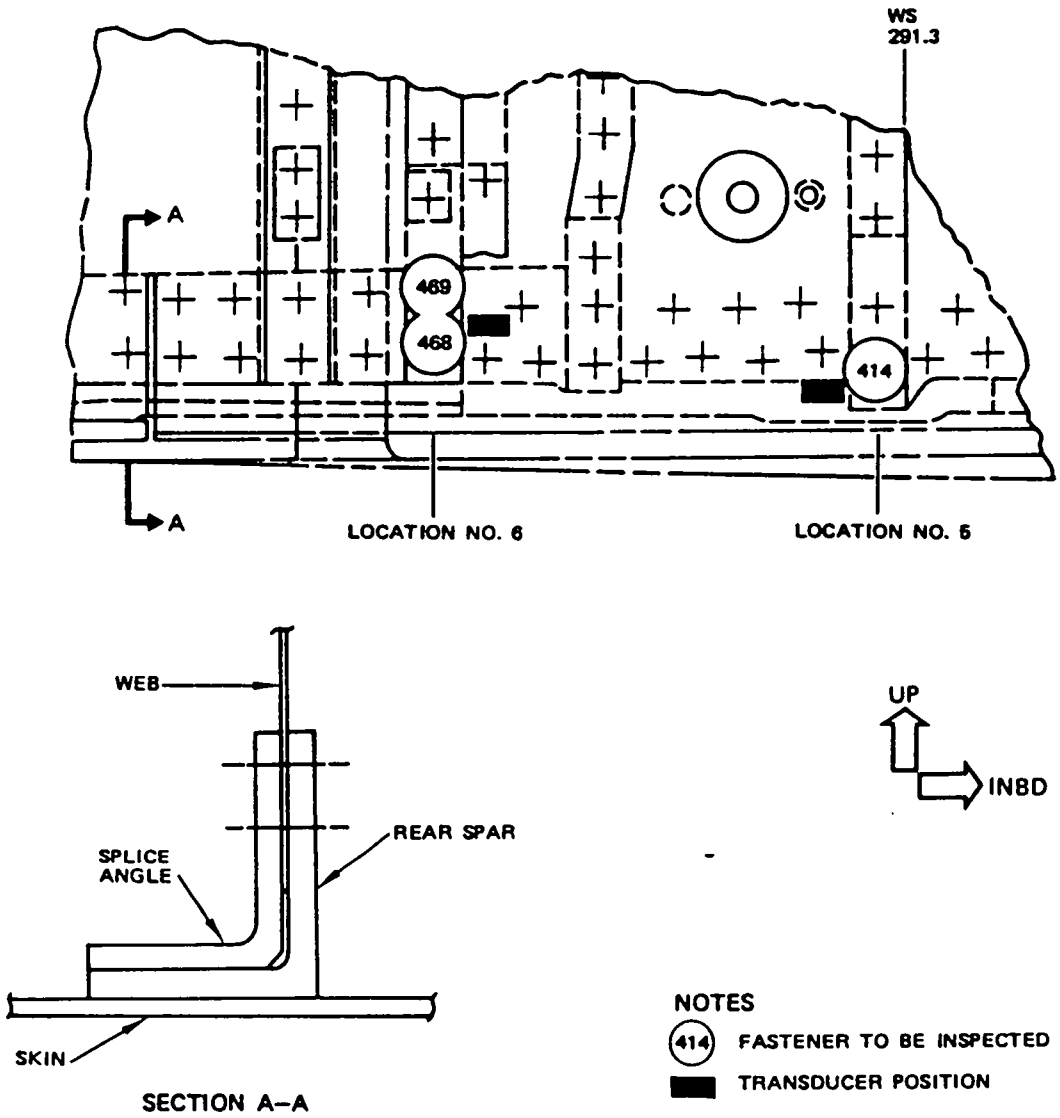
LOWER REAR SPAR CHORD
VERTICAL FLANGE

DETAIL I

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 10)

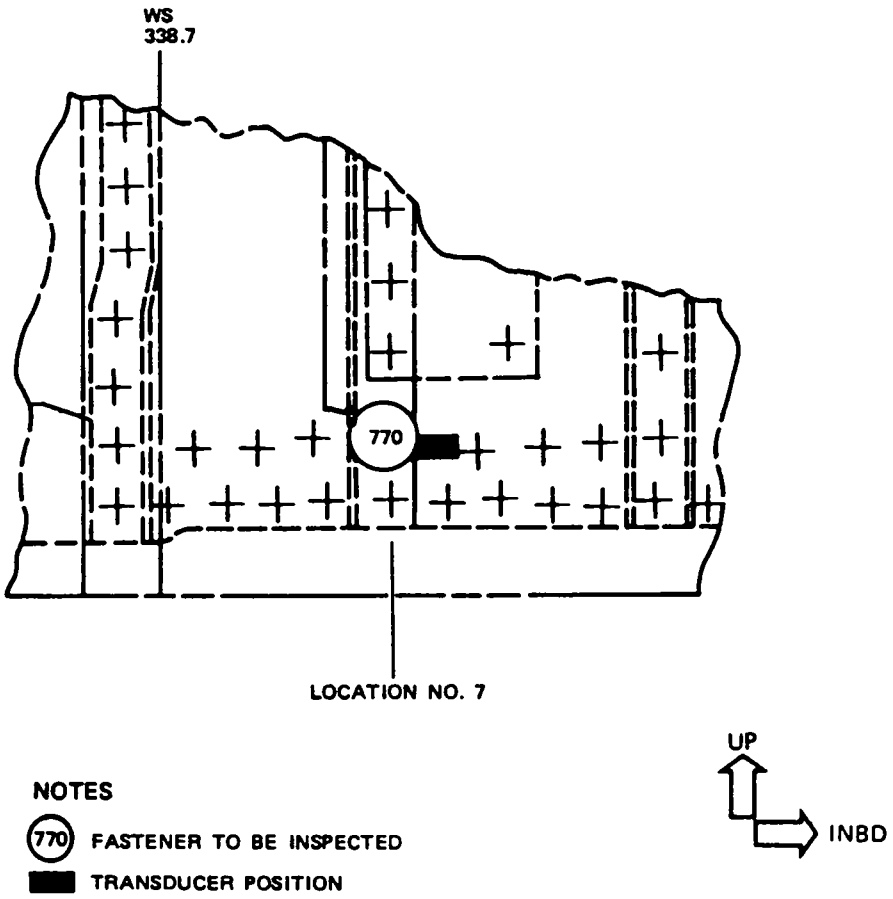


Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 11)



LOWER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL I (CONT)

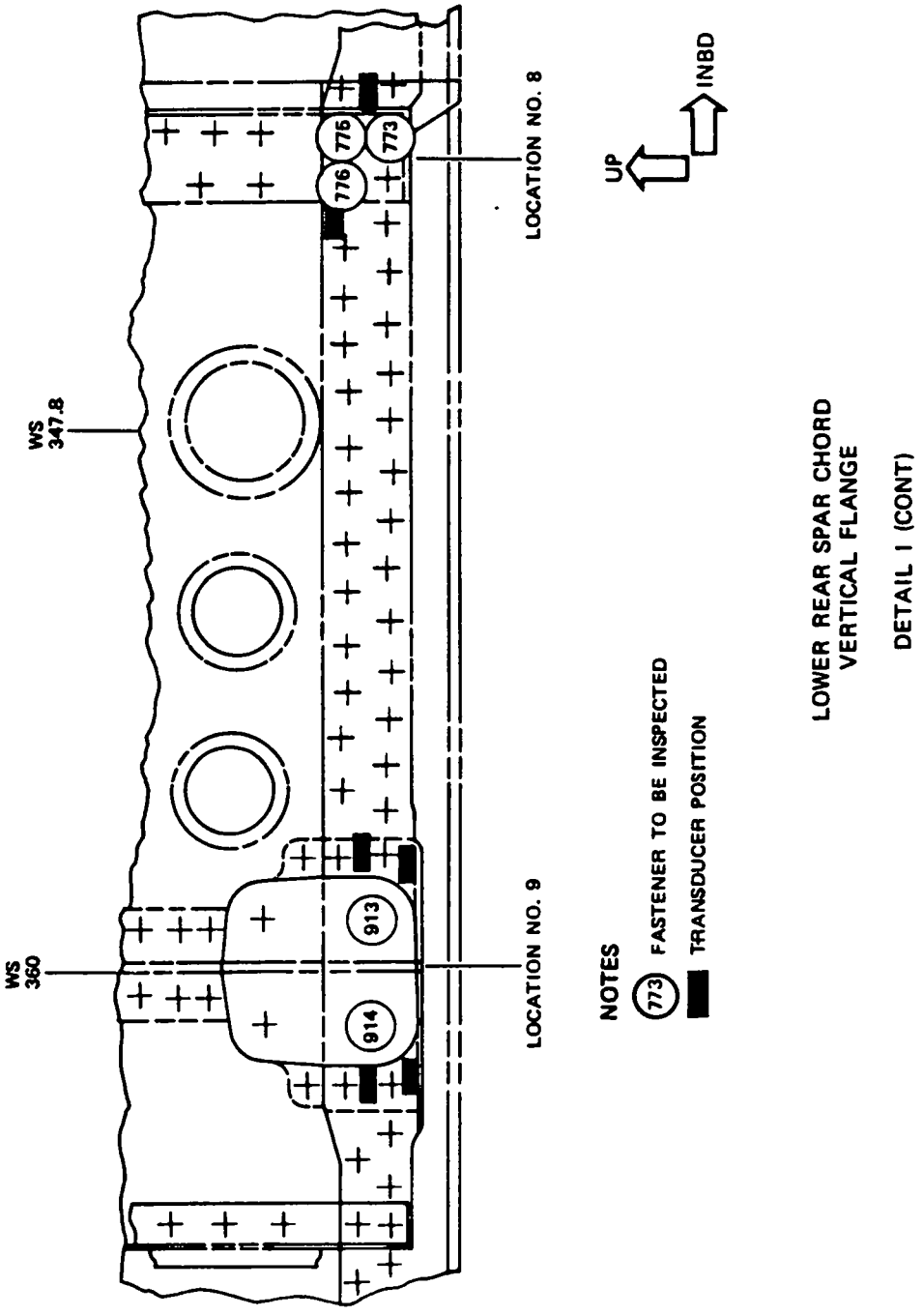
Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 12)



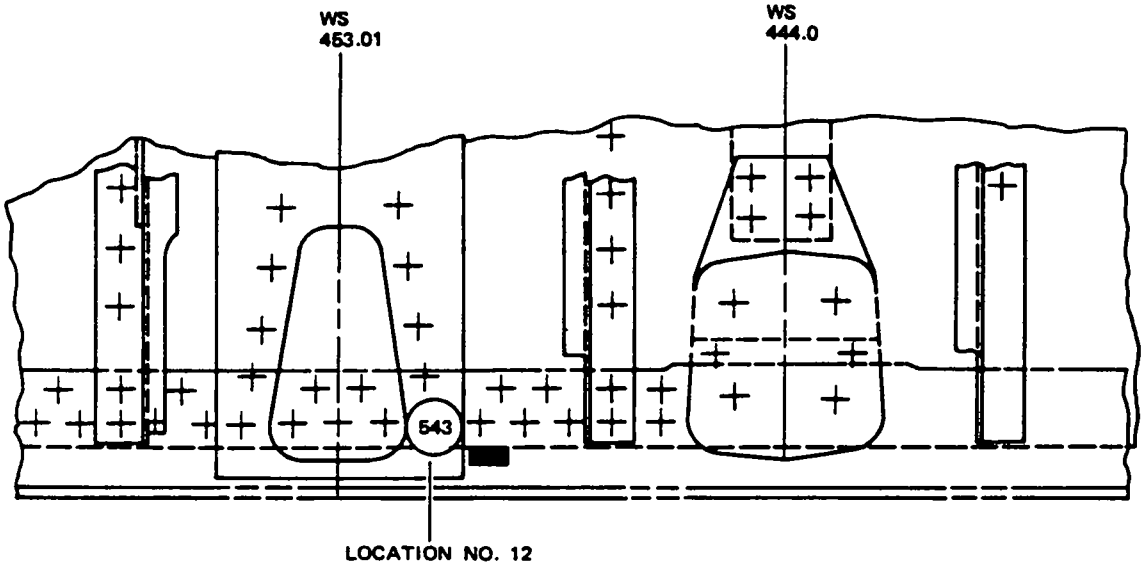
LOWER REAR SPAR CHORD
VERTICAL FLANGE

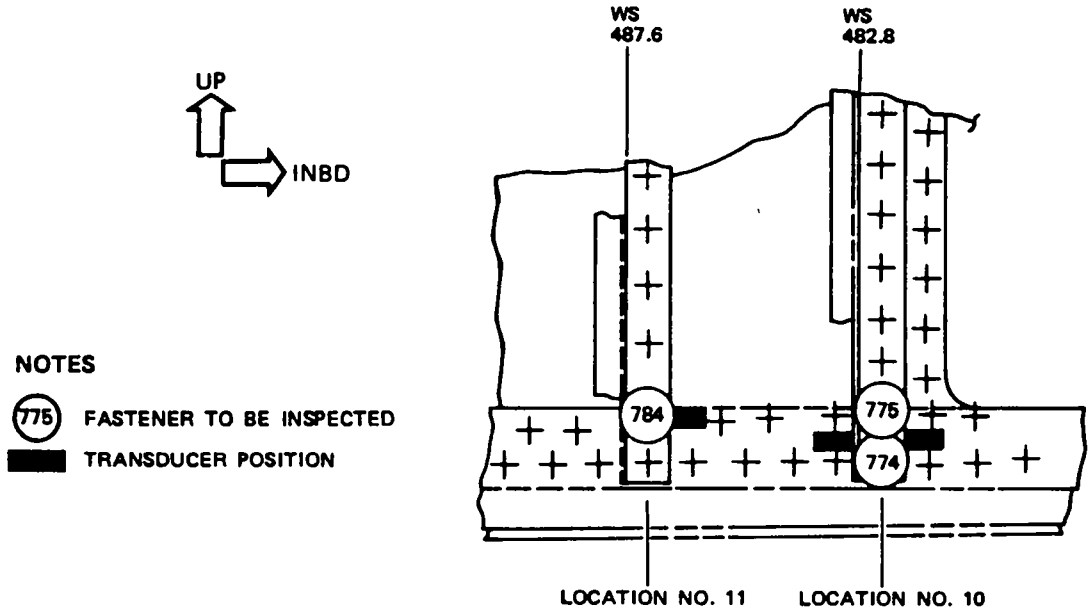
DETAIL I (CONT)

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 13)



Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 14)

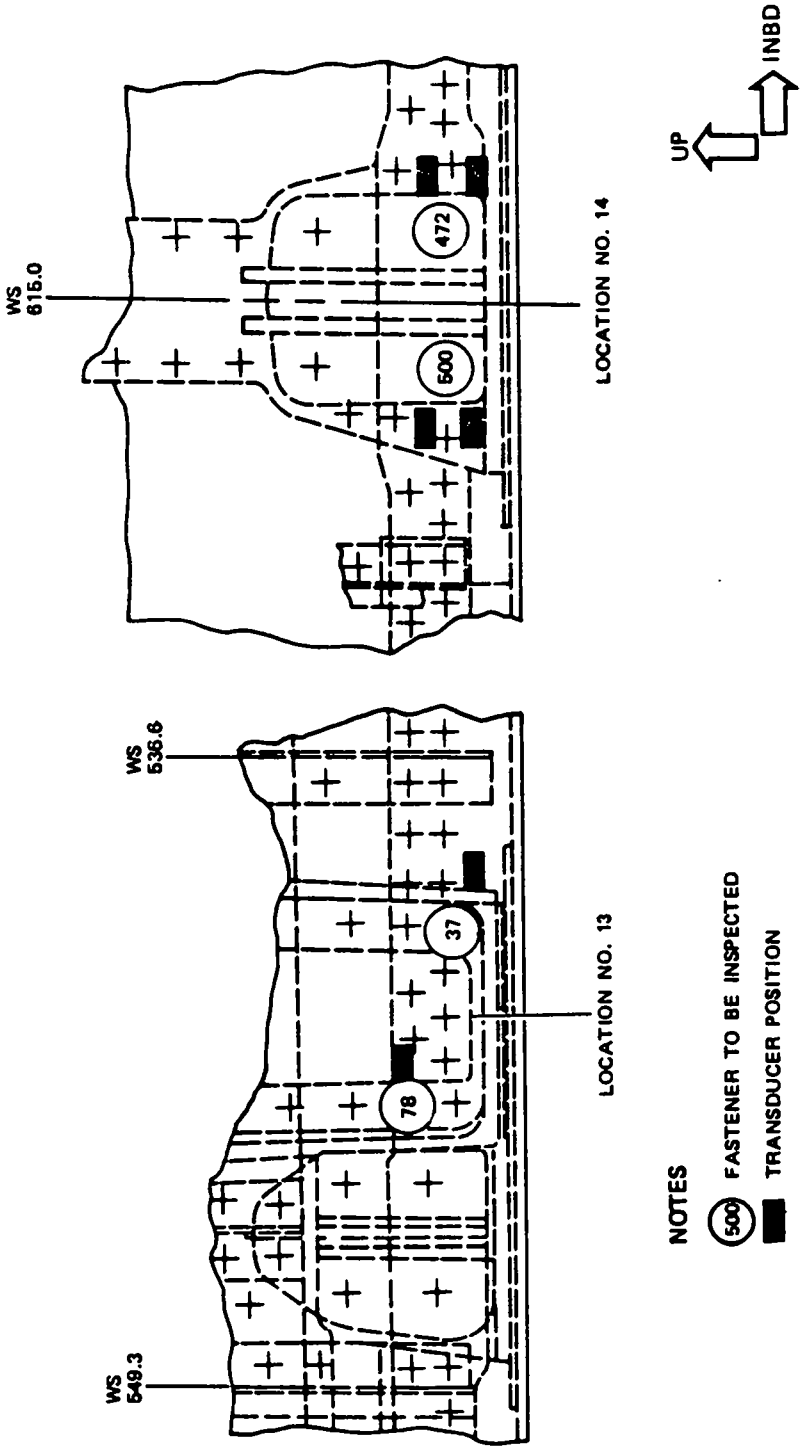




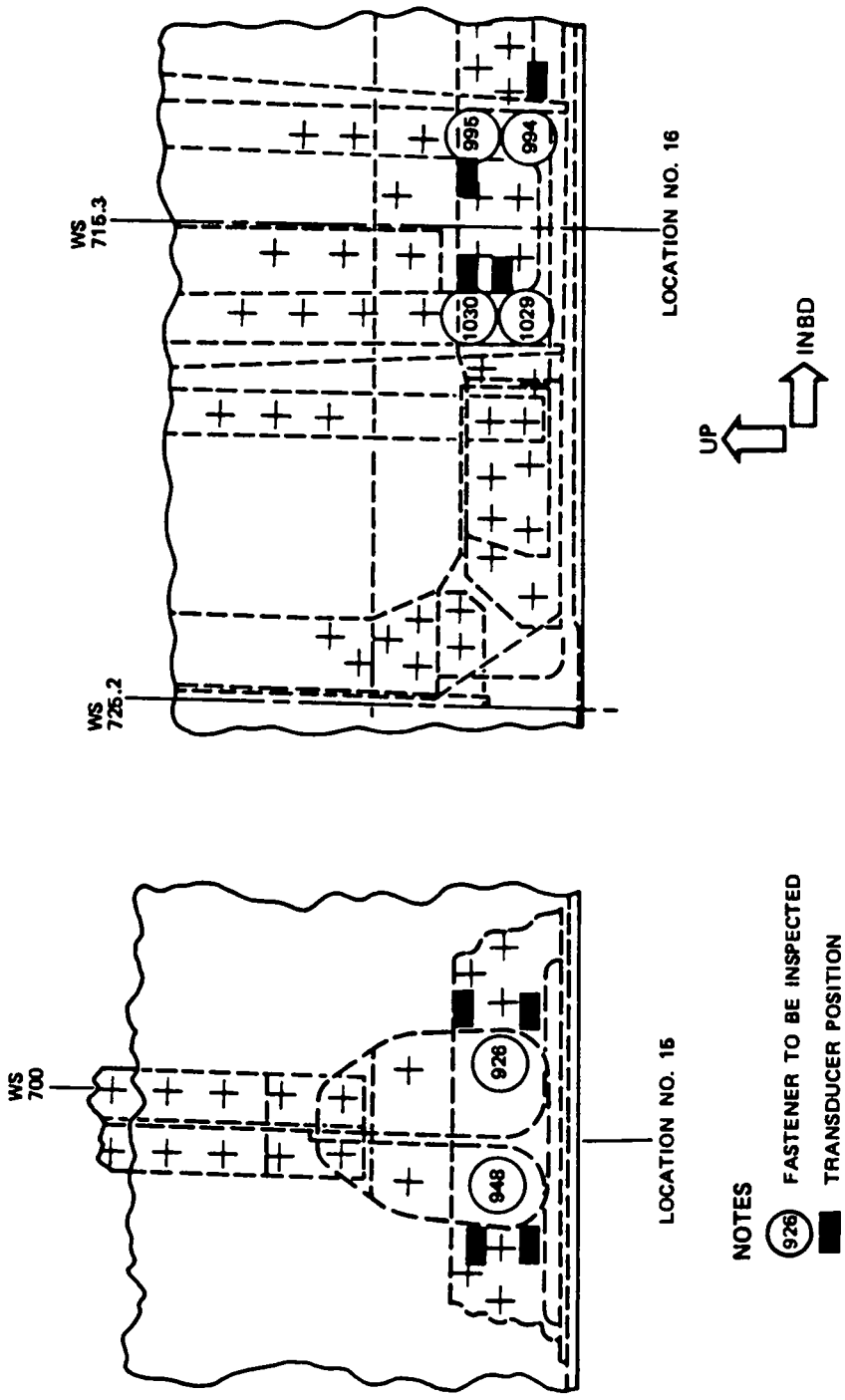
LOWER REAR SPAR CHORD
VERTICAL FLANGE

DETAIL I (CONT)

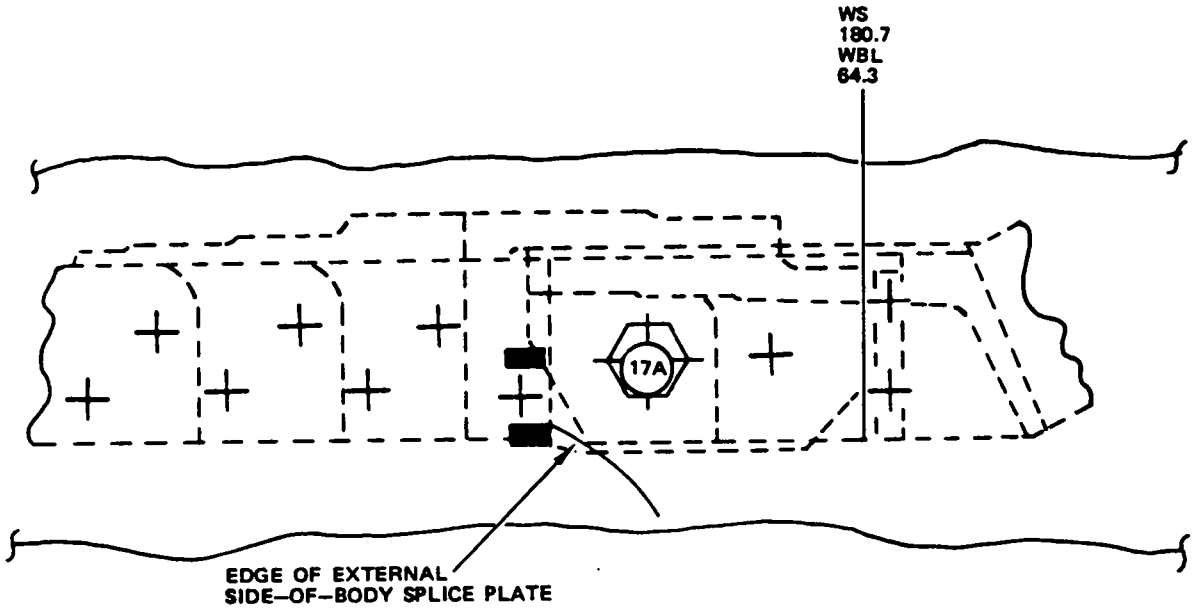
Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 15)



Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 16)



Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 17)



NOTES

17A TRANSDUCER POSITION

INSPECTION FASTENER

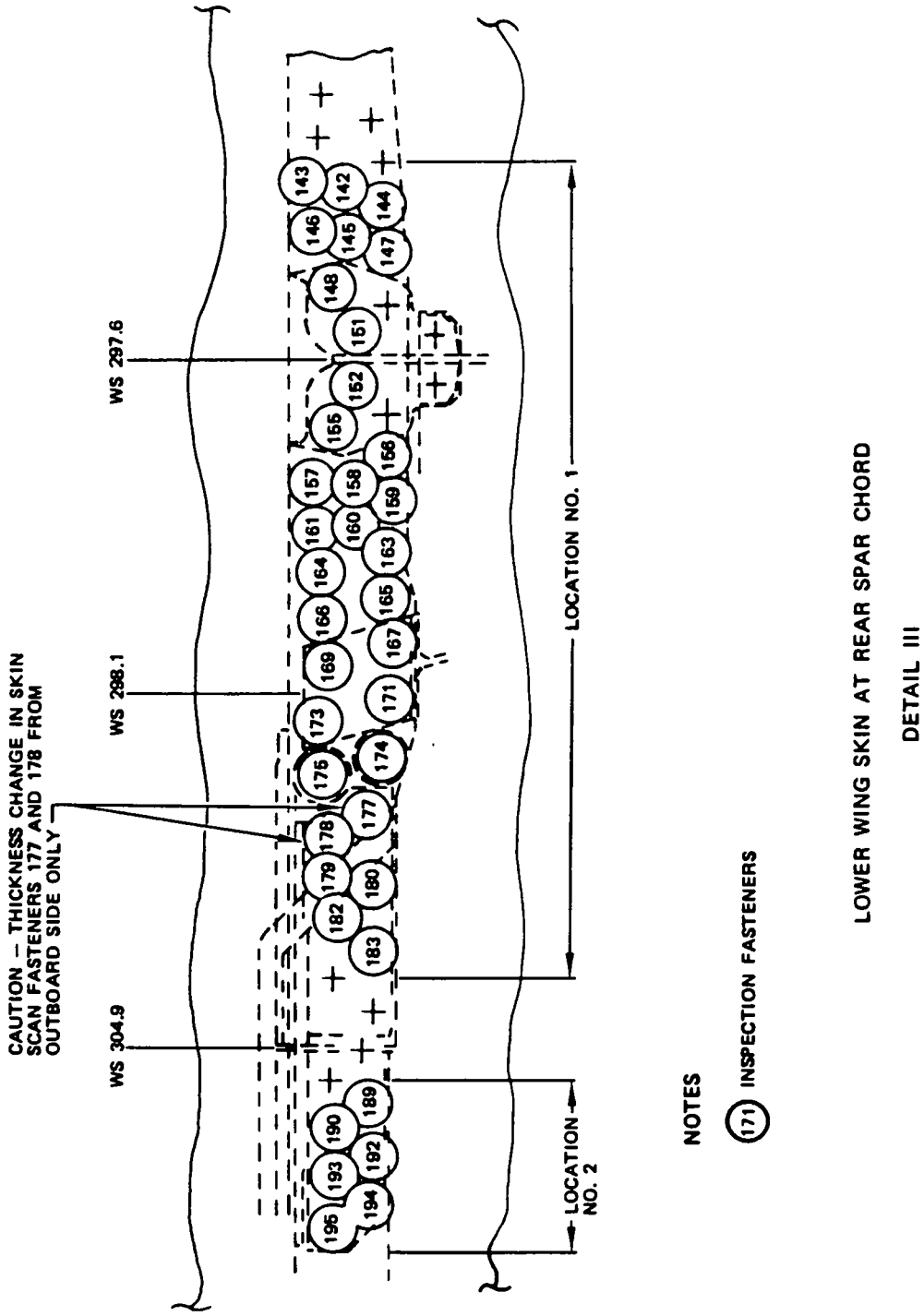
INBD

FWD

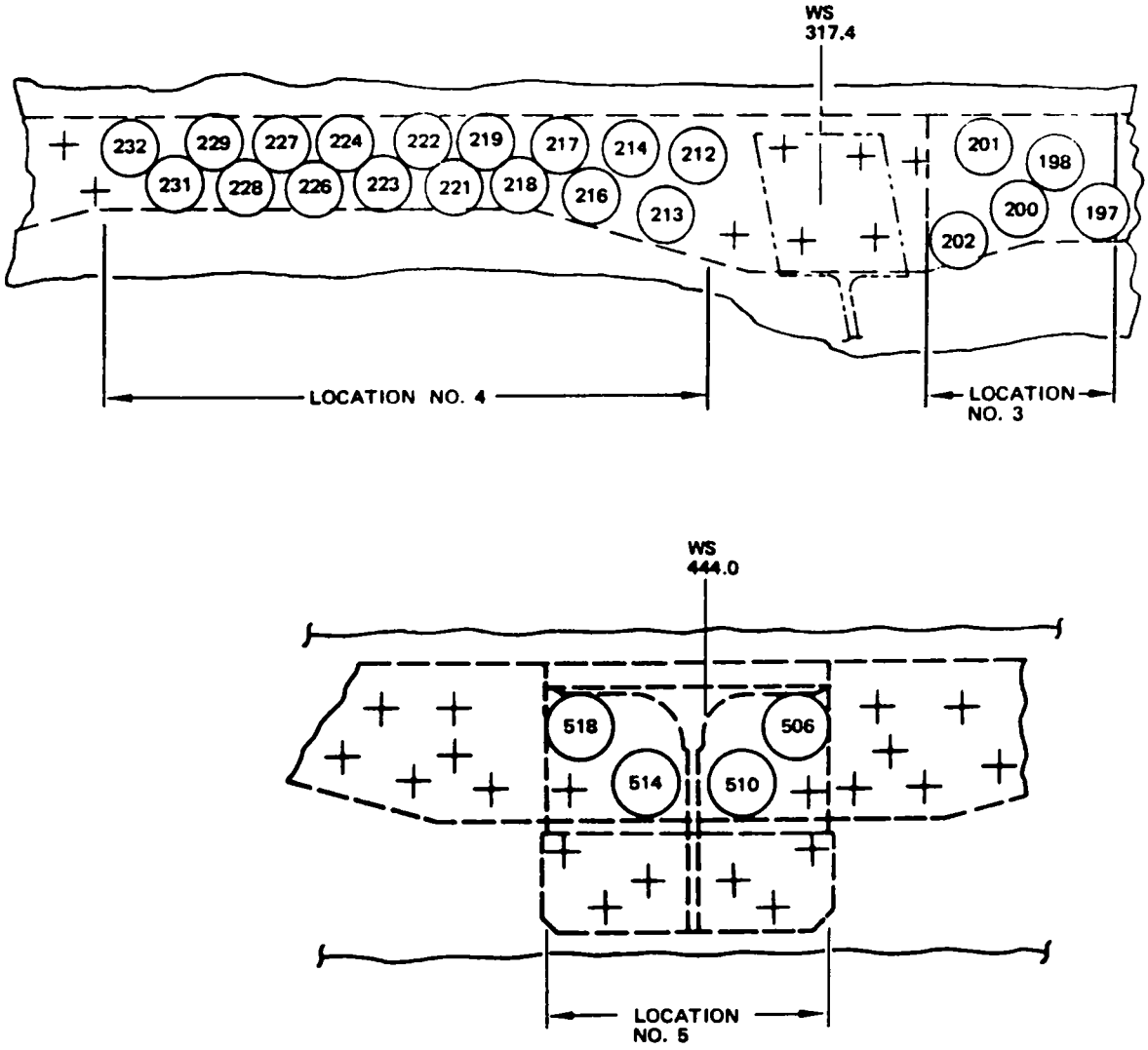
LOWER WING SKIN UNDER SPLICE PLATE

DETAIL II

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 18)



Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 19)



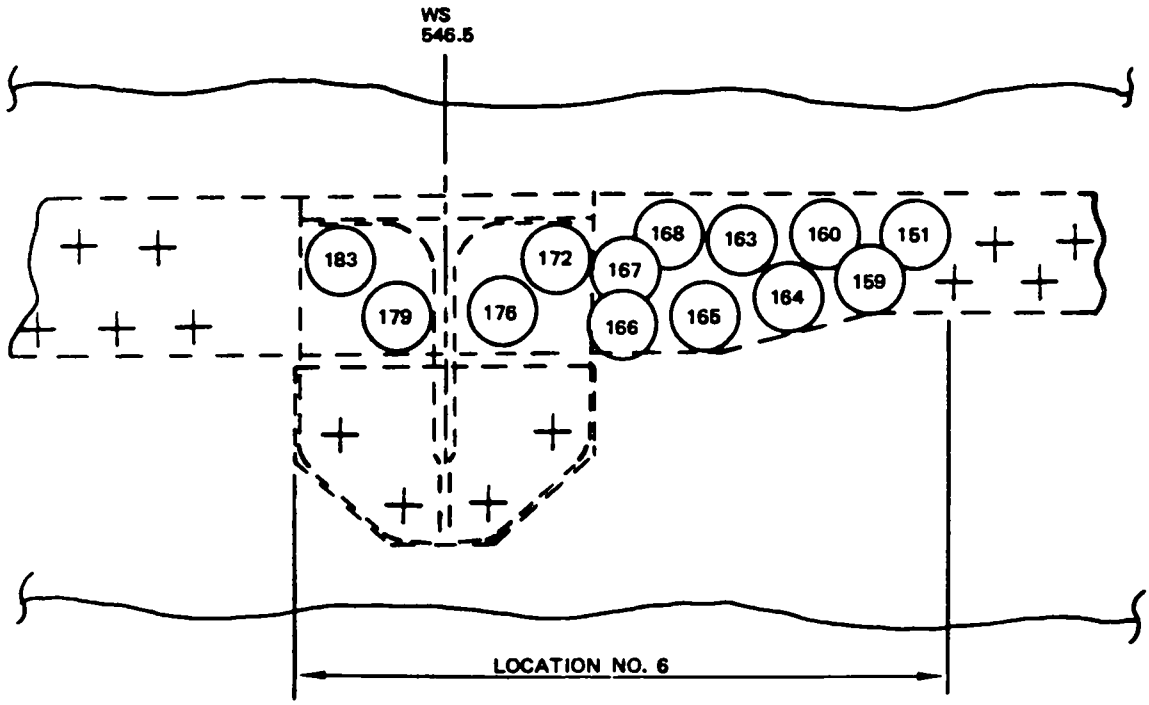
NOTES

(219) INSPECTION FASTENER

LOWER WING SKIN AT REAR SPAR CHORD

DETAIL III (CONT)

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 20)



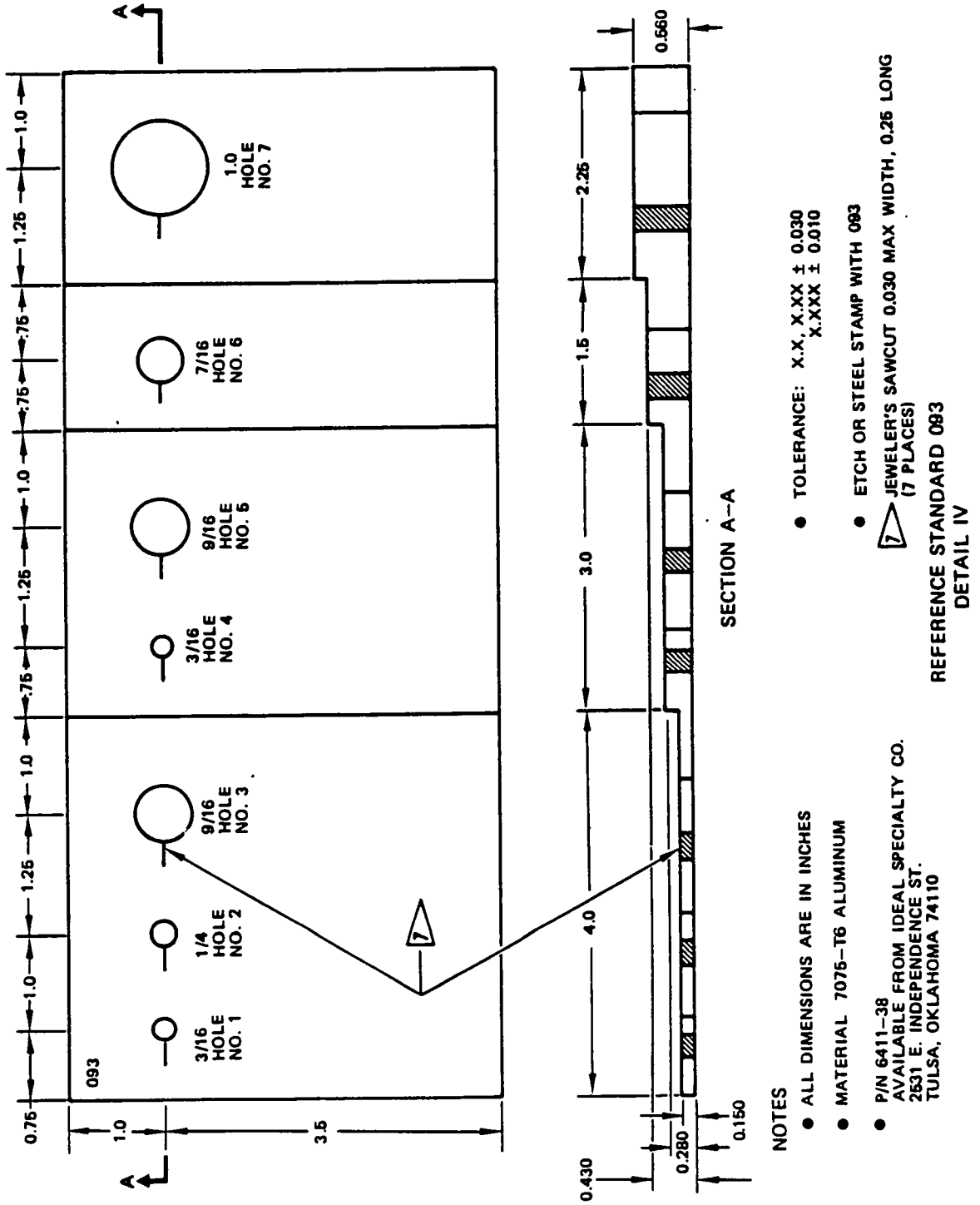
BOTTOM VIEW

NOTES

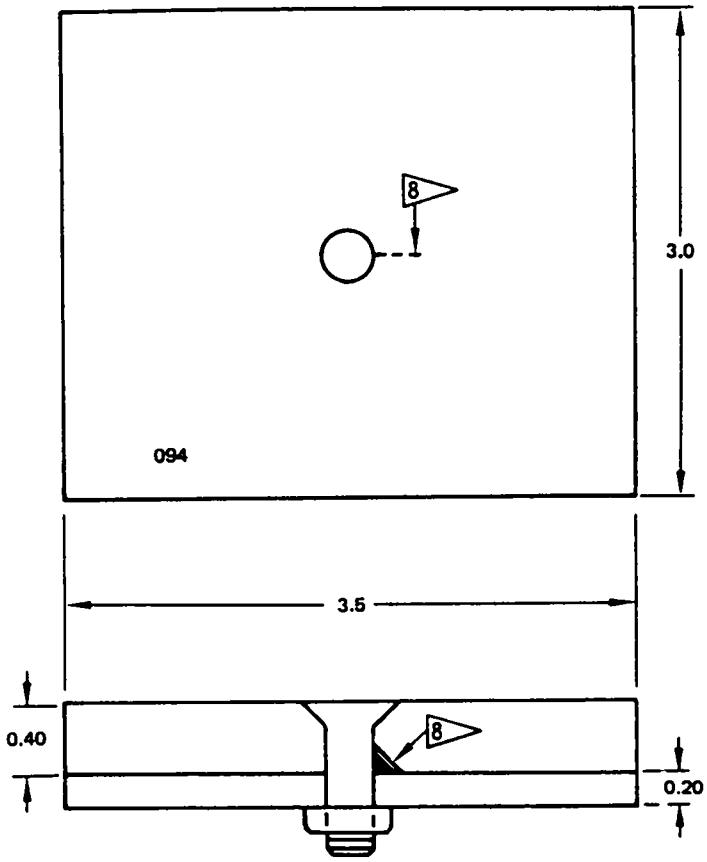
183 INSPECTION FASTENER

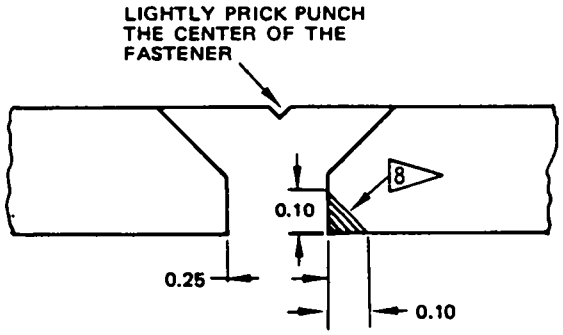
LOWER WING SKIN AT REAR SPAR CHORD
DETAIL III (CONT)

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 21)



Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 22)



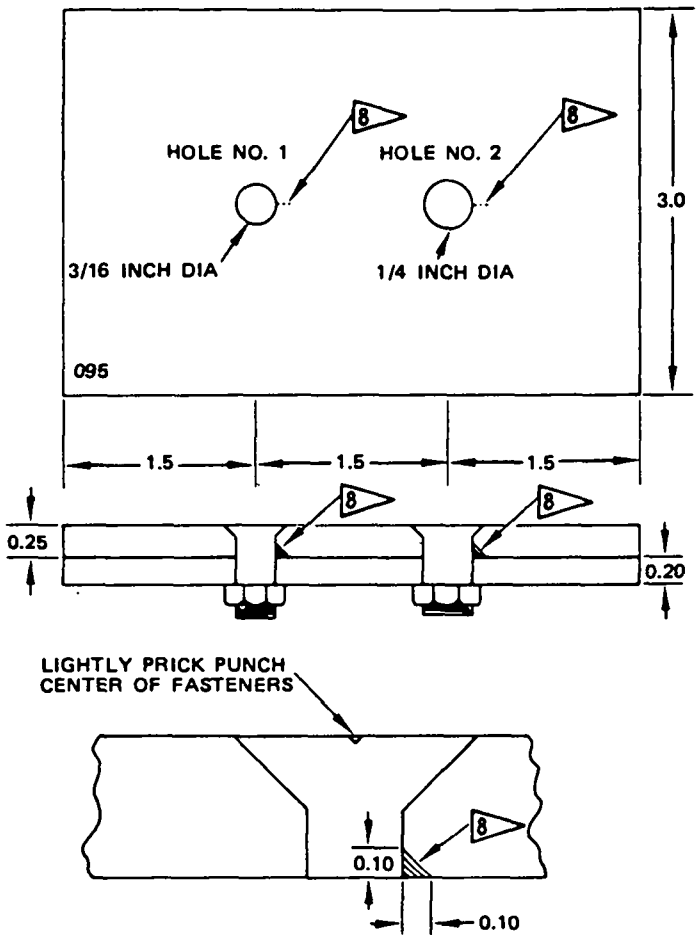


NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- ETCH OR STEEL STAMP WITH 094
- TOLERANCE: X.X ± 0.030, 0.XX ± 0.010
- FASTENER TYPE: BACB30GY8–9 WITH BACC30K8 COLLAR
- P/N 6411–30
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

8 JEWELER'S SAWCUT 0.030 MAX WIDTH (2 PLACES)

REFERENCE STANDARD NO. 094 FOR
SKIN INSPECTION CALIBRATION
DETAIL V



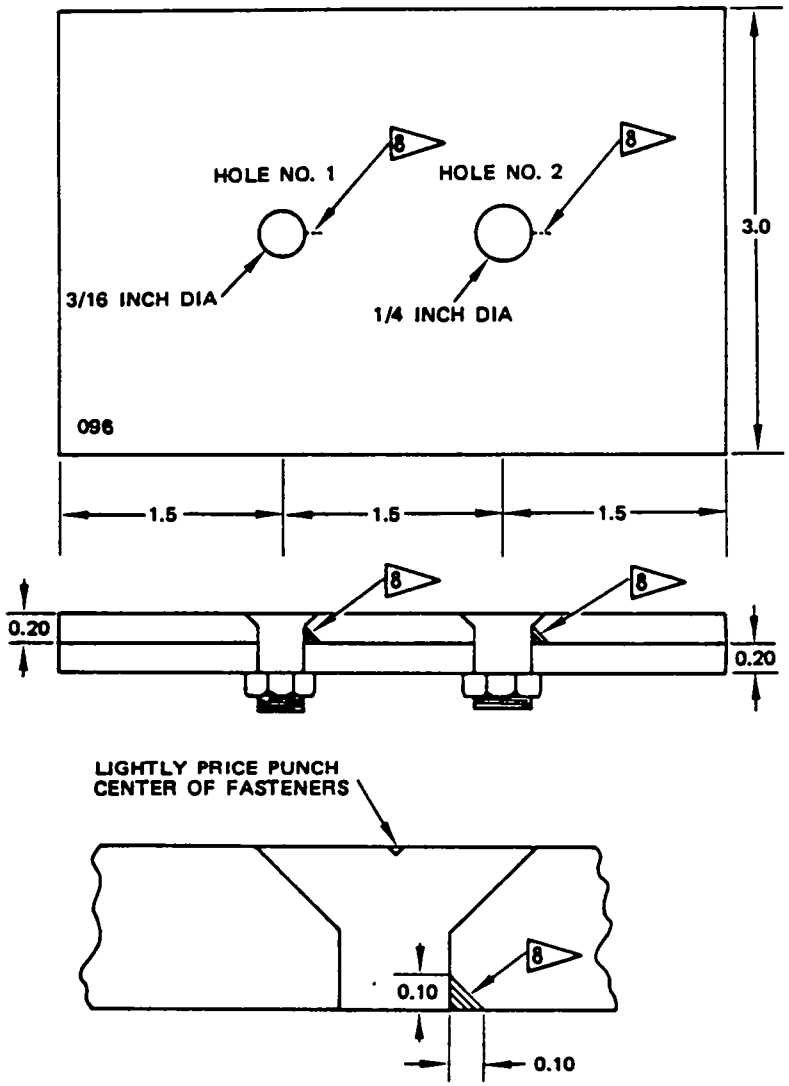
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- ETCH OR STEEL STAMP WITH 095
- TOLERANCE: X.X ± 0.030
  X.XX ± 0.010
- FASTENER TYPE:
  BACB30LU3–7 FASTENER; BACN10JC3 NUT
  BACB30LU4–7 FASTENER; BACN10JC4 NUT
- P/N 6411–31
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

8 JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 095
FOR SKIN INSPECTION CALIBRATION
DETAIL VI

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 24)



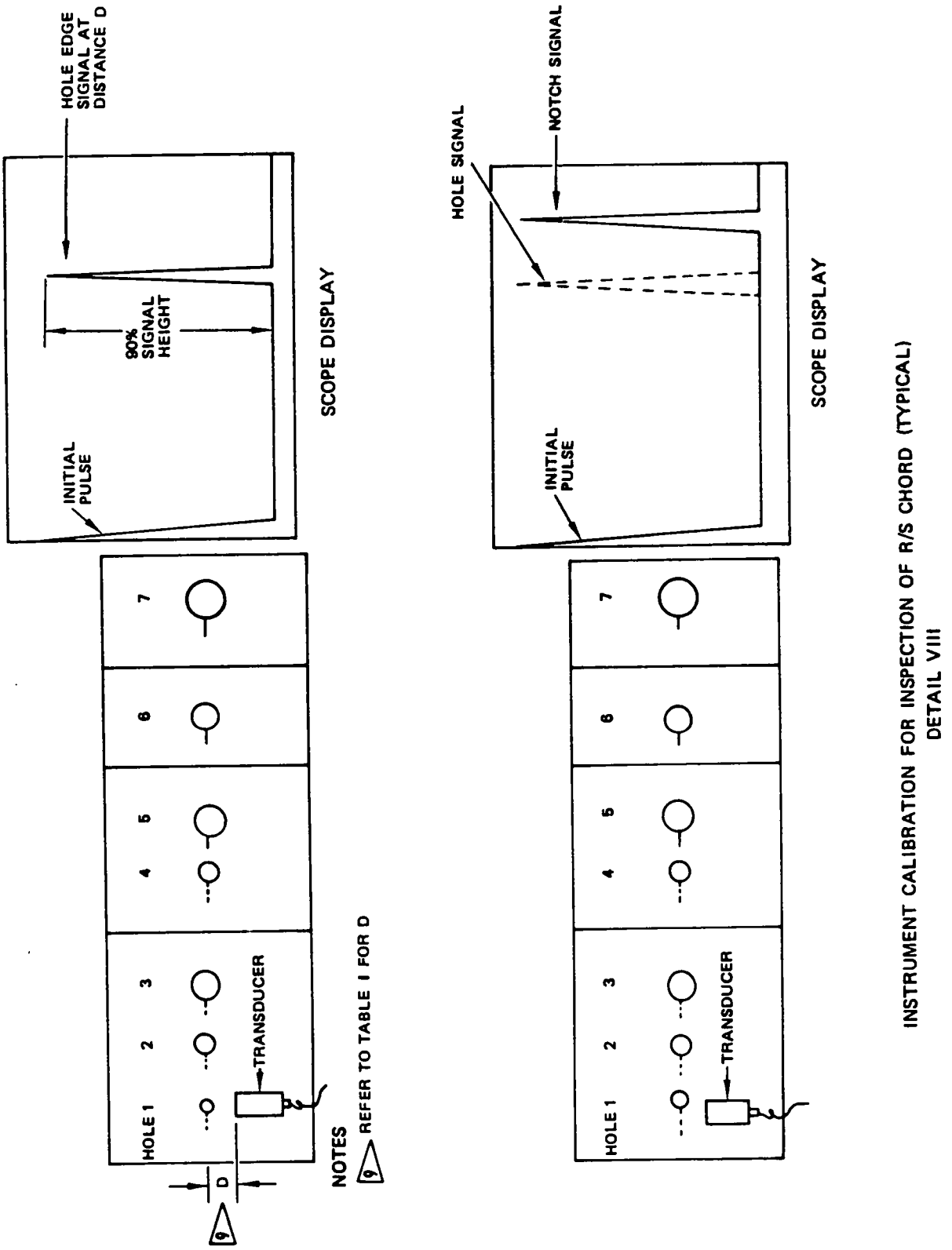
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL : 2024–T6 ALUMINUM
- TOLERANCE: X.X ± .030
  X.XX ± .010
- FASTENER TYPE:
  BACB30LU4–6 FASTENER; BACN10JC4 NUT
  BACB30LU3–6 FASTENER; BACN10JC3 (NUT)
- P/N 6411–41
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110
- ETCH OR STEEL STAMP WITH 096

8 JEWELER'S SAWCUT 0.030 MAX WIDTH

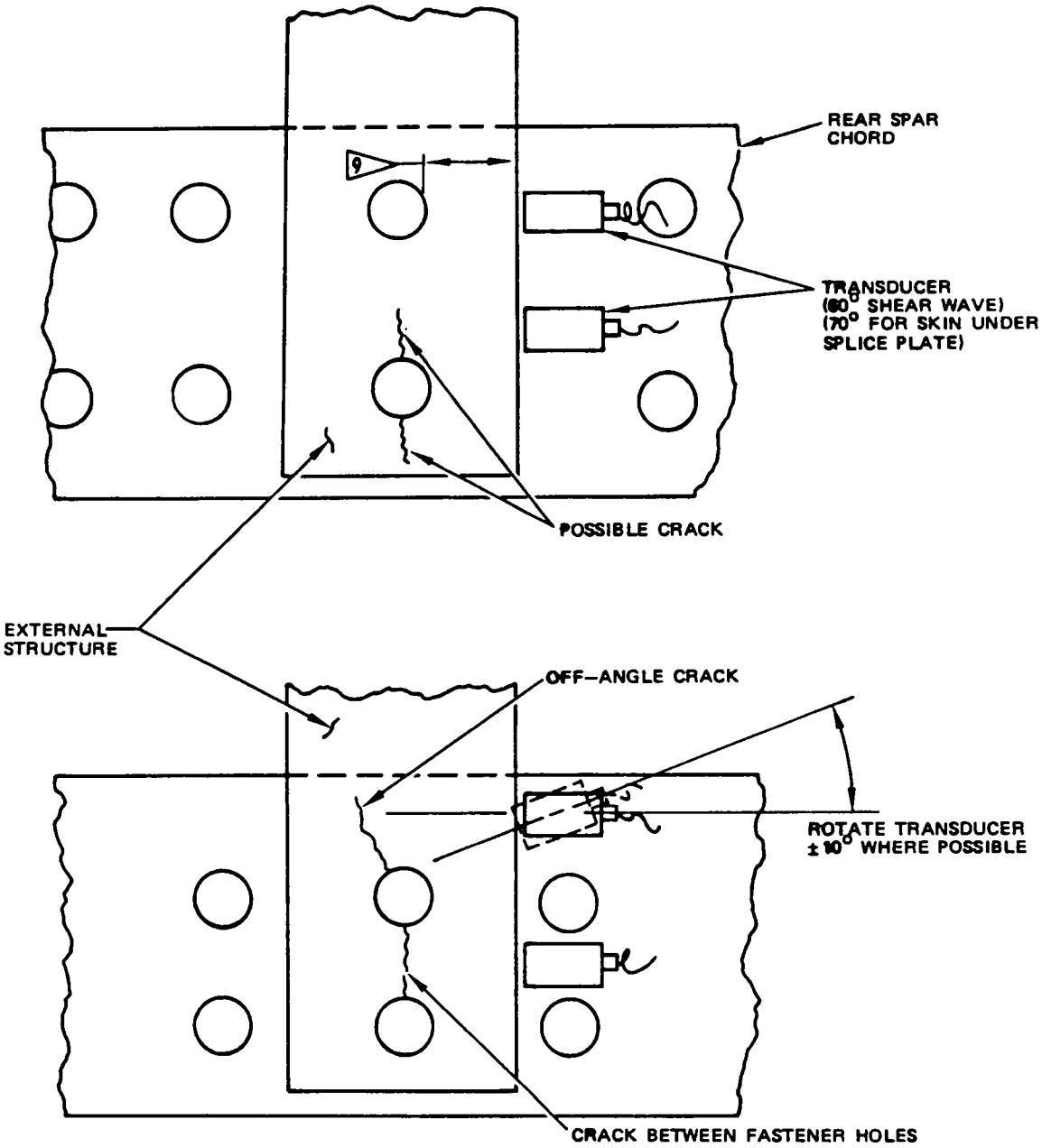
REFERENCE STANDARD 096
FOR SKIN INSPECTION CALIBRATION
DETAIL VII

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 25)



Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 26)

NONDESTRUCTIVE TEST



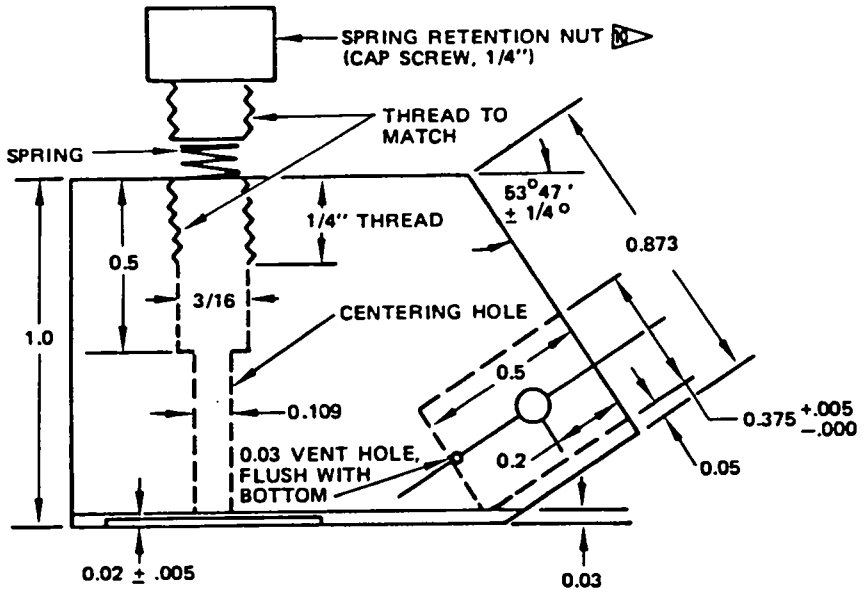
NOTES

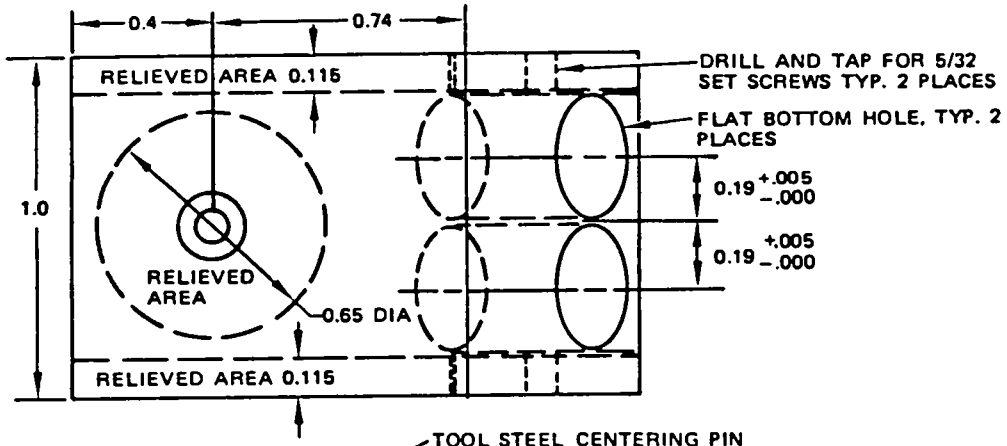
- INSPECTION OF SKIN UNDER SPLICE PLATE SIMILAR

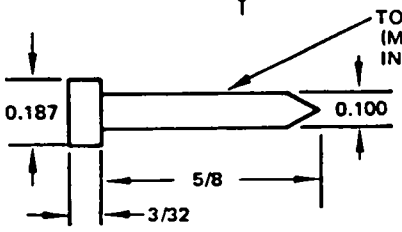
9 REFER TO TABLE I FOR D

INSPECTION OF REAR SPAR CHORD
DETAIL IX

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 27)







NOTES

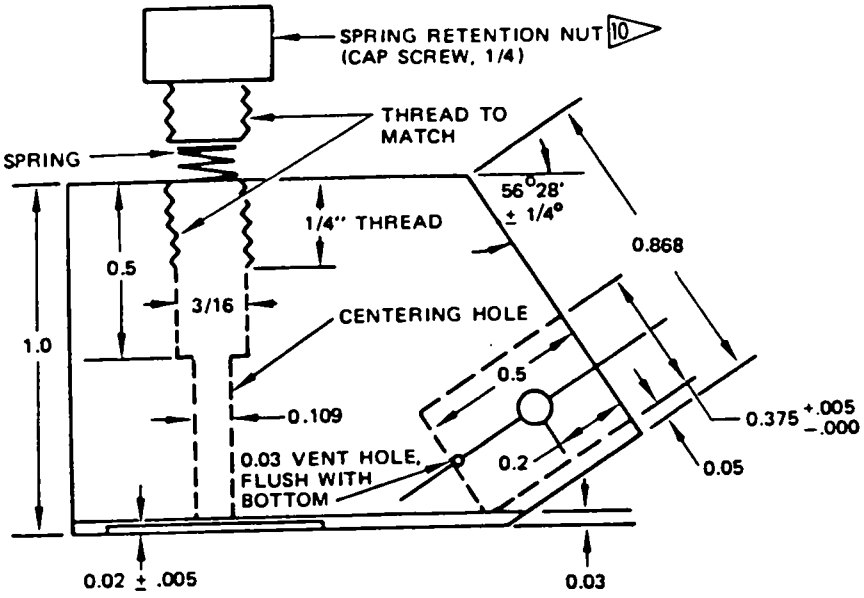
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: LUCITE
- TOLERANCE: ± 0.010 EXCEPT AS NOTED
- ETCH WITH NO. PF 2 ON TOP SURFACE
- P/N 6410-10 AVAILABLE FROM IDEAL SPECIALTY CO.

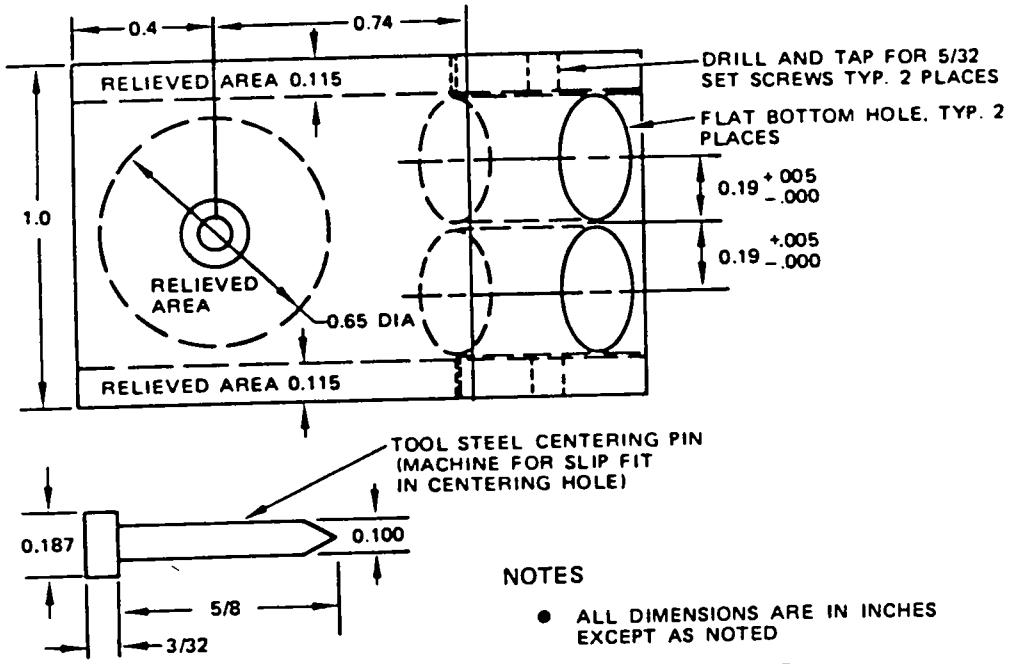
10 INSTALL CENTERING PIN IN HOLE, ADD LIGHT TENSION SPRING AND RETAIN WITH RETENTION NUT

TRANSDUCER POSITIONING FIXTURE NO. PF2

DETAIL XI

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 29)





NOTES

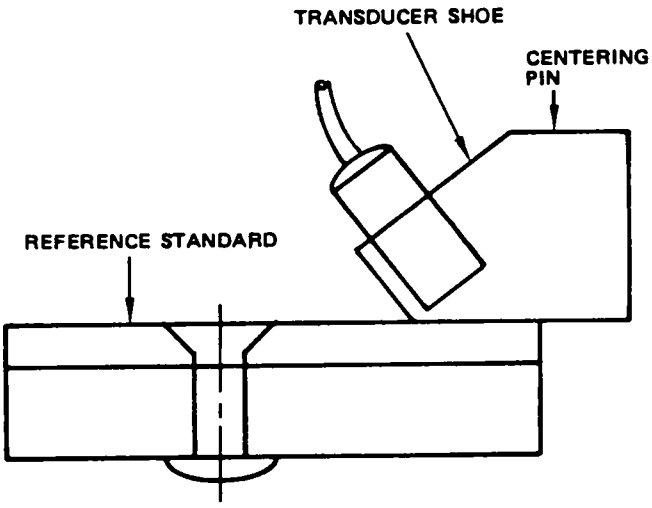
- ALL DIMENSIONS ARE IN INCHES EXCEPT AS NOTED
- MATERIAL: LUCITE
- TOLERANCE: ±0.010 EXCEPT AS NOTED
- ETCH WITH NO. PF 1 ON TOP SURFACE
- P/N 6410-9 AVAILABLE FROM IDEAL SPECIALTY CO.

10 INSTALL CENTERING PIN IN HOLE, ADD LIGHT TENSION SPRING AND RETAIN WITH RETENTION NUT

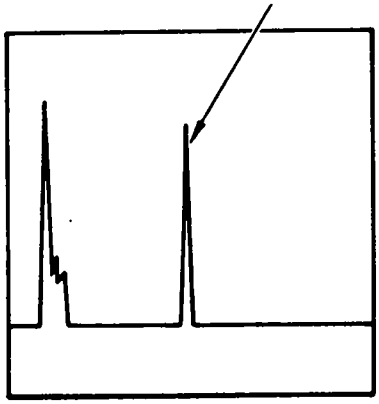
TRANSDUCER POSITIONING FIXTURE NO. PF1

DETAIL XII

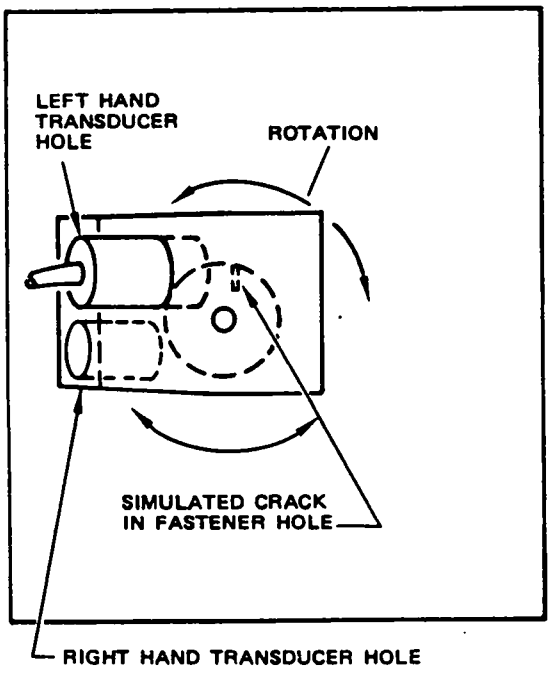
Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 30)



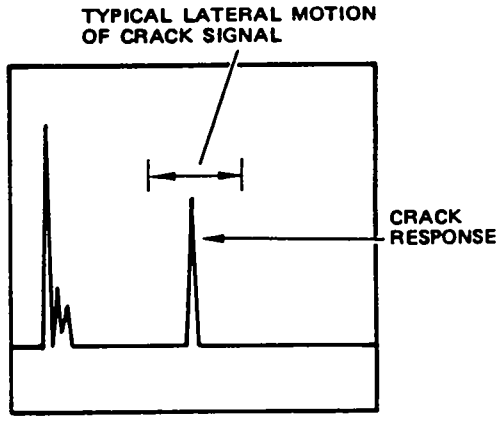
POSITION 1



INSTRUMENT DISPLAY



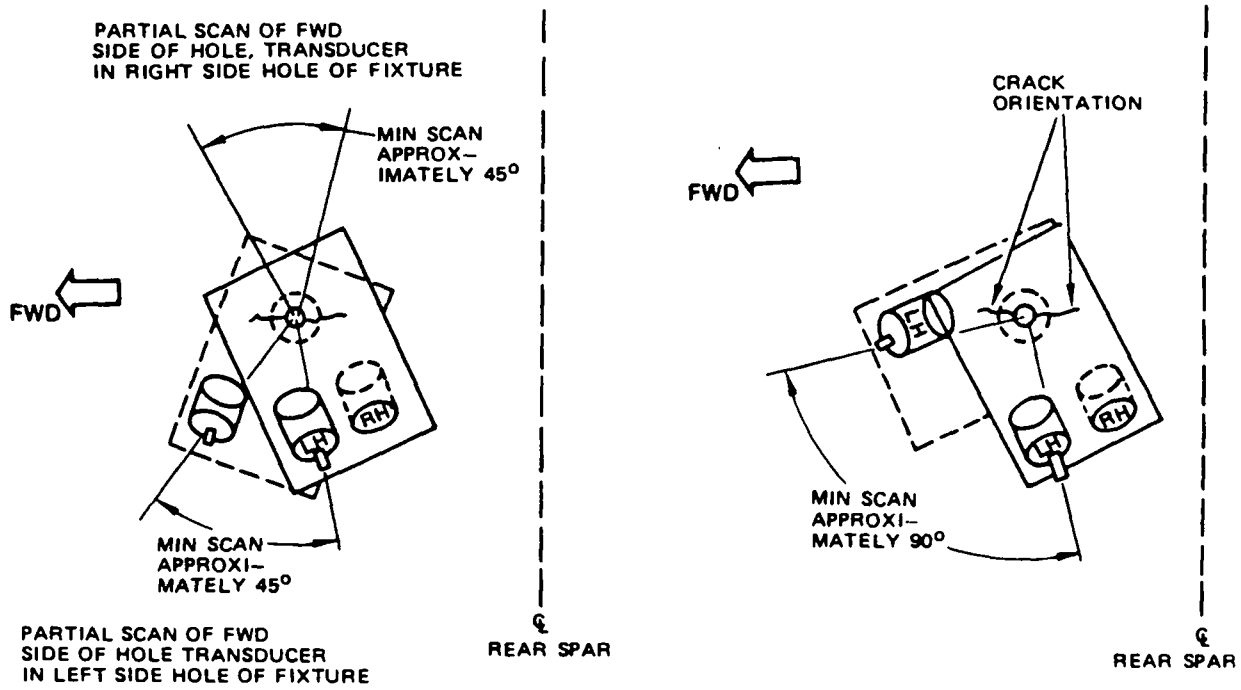
POSITION 2



INSTRUMENT DISPLAY

CALIBRATION FOR SKIN INSPECTION
DETAIL XIII

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 31)



A. INSPECTION IS POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN LEFT SIDE POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD. SIDE OF HOLE BY PLACING TRANSDUCER IN RIGHT SIDE HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE. SEE NOTE (11)

B. INSPECTION IS POSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

SCAN FWD. SIDE OF FASTENER WITH TRANSDUCER IN LEFT SIDE HOLE AS INDICATED. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN RIGHT SIDE HOLE. (11)

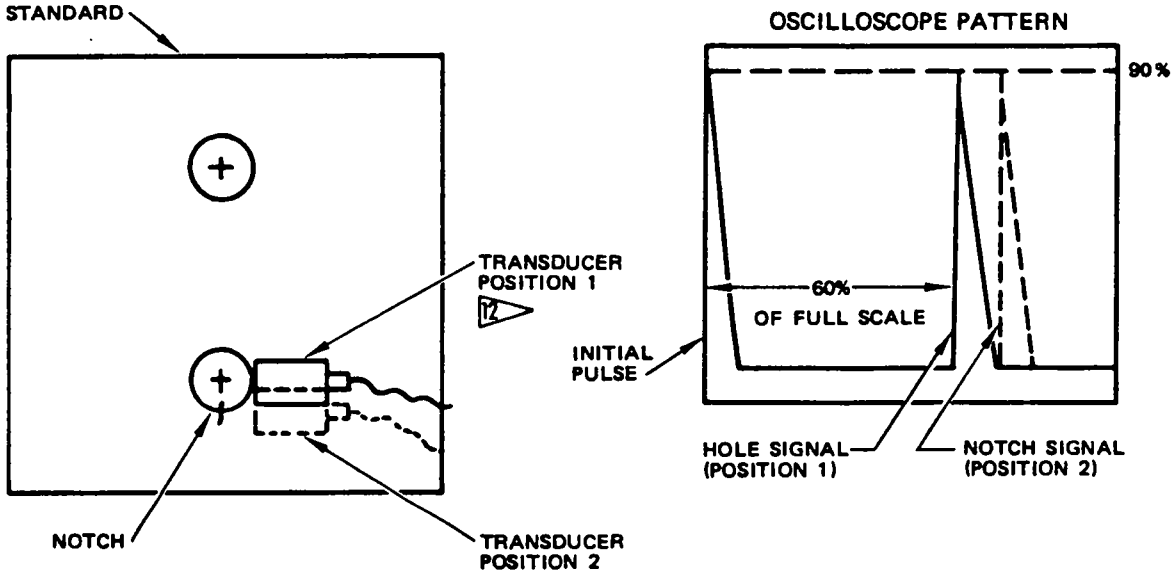
NOTE

(11) IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PAR 5 C

MINIMUM INSPECTION COVERAGE WHERE ADJACENT FASTENERS INTERFERE WITH SCAN

DETAIL XIV

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 32)



12 SELECT STANDARD AND HOLE SPECIFIED IN TABLE II FOR HOLE IN SKIN TO BE INSPECTED

TRANSDUCER CALIBRATION POSITION
FOR ALTERNATE INSPECTION OF SKIN

DETAIL XV

Wing Lower Rear Spar Chord Vertical Flange
Figure 6 (Sheet 33)

EFFECTIVITY
MODEL: 720
SSI DOCUMENT (D6-44860)
REFERENCE: SSD 57-A00-14, 57-A00-15

PART 4 - ULTRASONIC

WING - UPPER REAR SPAR CHORD

1. Purpose

   A. To detect cracks emanating from selected fastener holes:

      (1) In the vertical flange of the wing upper rear spar chord.

      (2) In the wing skin under the splice plate at BBL 70.5.

      (3) In the wing skin at fasteners common to the rear spar.

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

   B. The shear wave transducers used for this inspection are 0.35 inch wide by 0.72 inch long. Any transducers with the specified refracted angles of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25 inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25 inch element, 60° A (57A8300), top mounted microdot connector.

      (3) Automation Industries, Shear Wave, Type SMZ, 5 MHA, 0.25 inch element, 70° A (57A3066).

      (4) Longitudinal Wave 0.25 inch dia. element, 5 MHZ, 0.375 inch dia. case.

   C. Fabricate reference standards per Detail V, VI, VII and VIII.

      NOTE: Standards 095 and 096 are also used for the lower 720 rear spar inspection.

Wing upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 1)

D. Fabricate transducer positioning fixture PF1 per Part 4, 57-10-07, Fig. 3, Detail V; fixture PF2 per Part 4, 57-10-07, Fig. 2, Detail VII; and fixture PF3 per Part 4, 57-10-07, Fig. 7, Detail XI.

NOTE: Positioning fixtures PF1 and PF2 are also used for the lower 720 rear spar inspection.

E. Couplant is light oil or grease.

3. Prepare for Inspection

A. This inspection is performed from outside the wing with the part in place on the airplane.

B. Paint removal at inspection areas on the chord may be necessary to improve sound transmission. Smooth out any surface roughness by sanding lightly.

C. Remove paint for inspection of the skin is required.

D. Wipe surface clean.

E. Lightly prick punch the center of the inspection fasteners in the skin.

F. Apply a thin film of couplant to the inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Calibrate Instrument

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord; and for fastener holes in the wing skin common to the BBL 70.5 splice plate.

(1) Select a fastener location to be inspected. See Details I and II.

(2) From Table I identify the Detail V reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table I obtain the distance D. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

(4) Obtain a signal from the standard hole. Position this signal at mid-scale. See Detail IX.

(5) Adjust instrument sensitivity to obtain a 90 percent of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 0.25 inch through thickness notch. Note the difference in the postion of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

(1) Select a fastener location to be inspected from Detail III or Detail IV as approprate.

(2) From Table II identify the reference standard and transducer positioning fixture required for the holes to be inspected.

(3) Coat 0.375 inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail XIV.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail XIV (align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. Refer to Detail XIV, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument sensitivity to produce approximately a 90% crack signal on the instrument display.

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table II which is designated for the hole to be inspected.

(2) Select the transducer as follows:

Locations 1 thru 3 60° Shear Wave, See for 2.B.(1).

Locations 4 thru 13 70° Shear Wave, See for 2.B.(3).

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close to the edge of the fastener head as shown in Detail XVI, Position 1.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse per Detail XVI.

(6) Move transducer laterally to detect the calibration notch as shown in Detail XVI, Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximately 100% of full scale.

5. Inspection Procedure

A. Inspect fastener locations common to vertical flange of rear spar chord and skin under BBL splice plate.

(1) Select fastener location to be inspected from Details I or II.

(2) Calibrate instrument according to Par 4.A.

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail I, or on the skin at the positions indicated in Detail II.

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument sensitivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(5) Move the transducer laterally and rotate through an angle of ±20° to inspect for cracks out of the fastener hole. Refer to Detail X.

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 4)

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(d) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Details I and II.

B. Inspect wing skin at fastener holes common to rear spar horizontal flange. See Details III and IV.

(1) Select inspection location from Detail III and specific fasteners to be inspected from Table II.

(2) Calibrate instrument according to Par 4.B.

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in wing skin either on the forward or aft side of the fastener hole.

NOTE: 1. Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener being inspected. The minimum extent of scan is shown in Detail XV.

2. If the minimum scan cannot be performed, it will be necessary to scan with a hand held transducer calibrated per Par 4.C. Inspect per Par 5.C.

(4) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 5)

(5) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(6) Repeat inspection procedure for each location identified in Detail III or Detail IV.

(7) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

(1) Calibrate instrument per Par 4.C.

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer approximately $\pm 20°$ about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

LOCATION NO. [1]	APPROX. WS	FASTENER CODE NUMBERS	FASTENER DIA.	CHORD THICKNESS	D [2]	CALIBRATION HOLE [3]
1	189.0	110	3/4	0.31	0.62	5
2	204.9	95	7/16	0.24	0.34	3
3	243.9	188, 187	7/16	0.30	0.66	4
4	283.9	356, 362	3/16	0.15	0.34	1
5	287.6	395, 396	5/16	0.14	0.35	2
6	291.3	431, 432	3/16	0.13	0.46	1
7	299.3	486	3/16	0.13	0.34	1
8	307.9	539	1/4	0.13	0.43	2
9	444.0	520, 521, 491, 492	5/16	0.15	0.35	2
10	696.4	906	3/16	0.15	0.38	1
11	700.0	937, 938, 939, 940	5/16	0.15	0.38	2
12	705.3	964	3/16	0.15	0.32	1
13	715.4	1101, 1040	3/16	0.15	0.35,0.75	1
14	189.0	5	3/4	0.33	0.8	5
15	189.0	5A	3/4	0.33	0.8	5

INSPECTION PARAMETERS FOR
UPPER REAR SPAR CHORD VERTICAL FLANGE
TABLE I

NOTES:

- All dimensions are in inches

[1] See Detail I for inspection locations 1 to 13 and Detail II for locations 14 and 15.

[2] D = distance between leading edge of transducer and edge of fastener hole to be used for calibration. On the chord, D corresponds to the distance between the hole and the closest possible location for transducer placement.

[3] Hole in Reference Standard 097 to be used for calibration.

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 7)

INSPECTION PARAMETERS FOR
UPPER REAR SPAR CHORD, VERTICAL FLANGE
TABLE II (CONT)

LOCATION NO. & EFFECTIVITY	APPROX. WS	FASTENER CODE NUMBERS	FASTENER DIA.(INCH)	SKIN THICKNESS (INCH)	POSITIONING FIXTURE	CALIBRATION STANDARD
1 4 5	272 THRU 277	149 THRU 156	5/16	0.33	PF3 C (Detail XI)	098
6	272 THRU 277	50 THRU 57	5/16	0.33	PF3 C	098
2 4 5	280 THRU 289	162, 163, 165 THRU 167, 170 THRU 175, 177 THRU 179, 181 THRU 184	5/16	0.33	PF3 C	098
6	280 THRU 289	62 THRU 78, 179	5/16	0.33	PF3 C	098
3 4 5	300 THRU 305	211, 212, 214 THRU 216, 222, 223	5/16	0.31 - 0.29	PF3 C	098
6	300 THRU 305	180 THRU 186	5/16	0.31 - 0.29	PF3 C	098
4 4 5	311 THRU 315	239, 242 THRU 244, 247 THRU 250	5/16	0.23 - 0.25	PF2 A (Detail XII)	Hole No. 2 095
6	311 THRU 315	187 THRU 195	5/16	0.23 - 0.25	PF2 A	Hole No. 2 095
5 4 5	321 THRU 337	264, 268 THRU 273, 278 THRU 283, 290 THRU 295, 302 THRU 304, 306, 307, 309 THRU 316	5/16	0.23	PF2 A	Hole No. 2 095
6	321 THRU 337	196 THRU 225	5/16	0.23	PF2 A	Hole No. 2 095

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 8)

LOCATION NO. & EFFECTIVITY	APPROX WS	FASTENER CODE NUMBERS	FASTENER DIA (INCH)	SKIN THICKNESS (INCH)	POSITIONING FIXTURE	CALIBRATION STANDARD
6 4 5	339 THRU 343	318 THRU 321, 325 THRU 328, 332, 333	1/4	0.23	PF2 A	Hole No. 2 095
6	339 THRU 343	226 THRU 235	5/16	0.23	PF2 A	Hole No. 2 095
7 4 5	345 THRU 349	345 THRU 348, 352, 353	1/4	0.23	PF2 A	Hole No. 2 095
6	345 THRU 349	236 THRU 243	5/16	0.23	PF2 A	Hole No. 2 095
8 4 5	353 THRU 363	358, 359, 361 THRU 372, 376, 378	1/4, 5/16	0.23	PF2 A	Hole No. 2 095
6	353 THRU 363	244 THRU 256	1/4, 5/16	0.23	PF2 A	Hole No. 2 095
9 4 5	436 THRU 439	493, 495 THRU 500	1/4	0.21	PF2 A	Hole No. 2 095
6	436 THRU 439	128 THRU 135	5/16	0.21	PF2 A	Hole No. 2
10 4 5	480 THRU 488	15 THRU 30	3/16	0.20	PF1 B	Hole No. 1 095
6	480 THRU 488	147 THRU 159	5/16	0.20	PF1 B	Hole No. 2 096
11 4 5	538 THRU 548	136 THRU 149, 156, 157, 158	3/16, 1/4	0.18	PF1 B	Hole No. 1 7 096
6	538 THRU 548	160 THRU 168, 109 THRU 112	5/16, 1/4	0.18	PF1 B	Hole No. 2 096

INSPECTION PARAMETERS FOR
UPPER REAR SPAR CHORD, VERTICAL FLANGE
TABLE II (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 9)

INSPECTION PARAMETERS FOR
UPPER REAR SPAR CHORD, VERTRICAL FLANGE
TABLE II

LOCATION NO. & EFFECTIVITY	APPROX WS	FASTENER CODE NUMBERS	FASTENER DIA (INCH)	SKIN THICKNESS (INCH)	POSITIONING FIXTURE	CALIBRATION STANDARD
12 △4 △5	608 THRU 621	273 THRU 281, 286, 287, 292 THRU 301, 303	3/16, 5/16	0.165	[B]	Hole No. 1 & 2 096 △7
△6	608 THRU 621	169 THRU 178, 113 THRU 116	5/16	0.165	[B]	Hole No. 2 096

NOTES

[A] See Part 4, 57-10-07, Fig. 2, Detail VII

[B] See Part 4, 57-10-07, Fig. 3, Detail V

[C] See Part 4, 57-10-07, Fig. 7, Detail XI

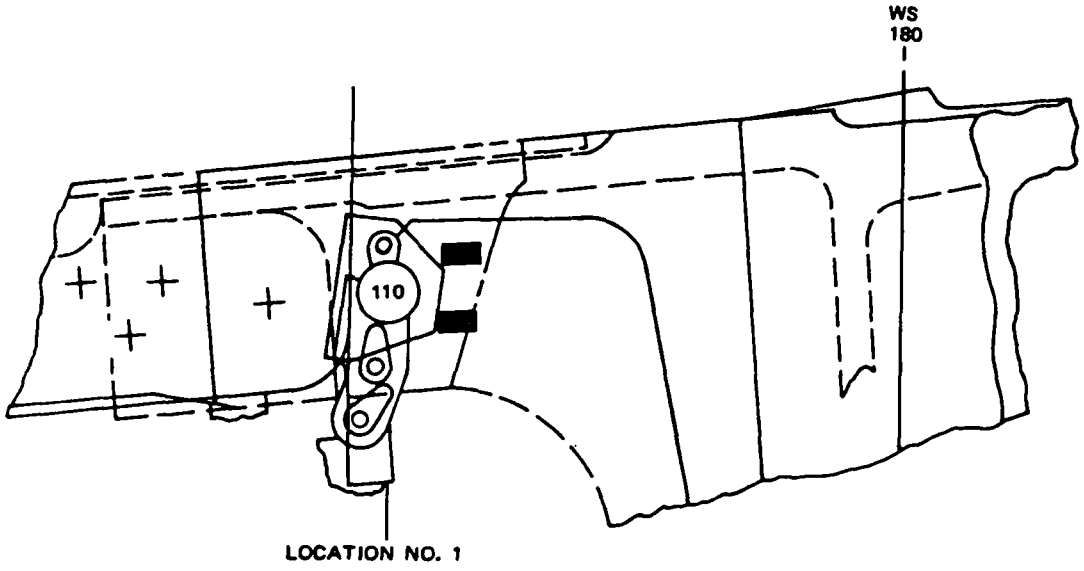
△4 FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 thru 150, 156, 157, 158, 165, 166, 173, 174, 177, 180 and 181

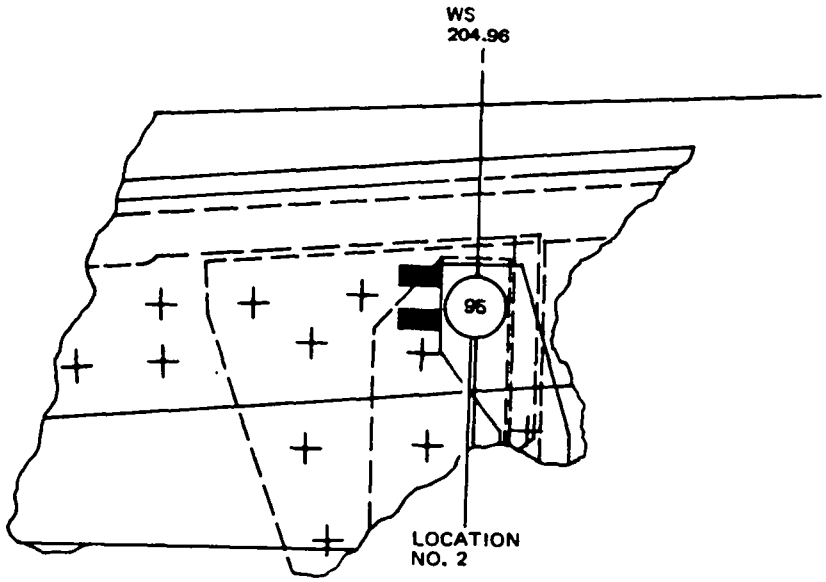
△5 FOR CUM LINE NUMBERS 172, 178, 179, 182 thru 191, 193 thru 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 thru 226, 230 thru 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 thru 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481, 512 and 514

△6 FOR CUM LINE NUMBERS 581, 597, 615, 621 and 624, and on

△7 On Reference Standard 096 use hole NO. 1 to calibrate for 5/16 fasteners and hole NO. 2 for 1/4 and 5/16 fasteners

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 10)





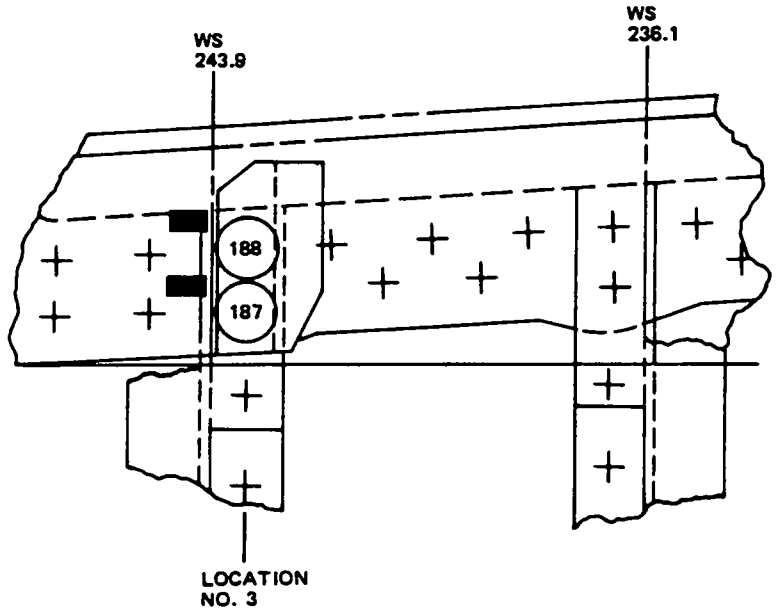
NOTES

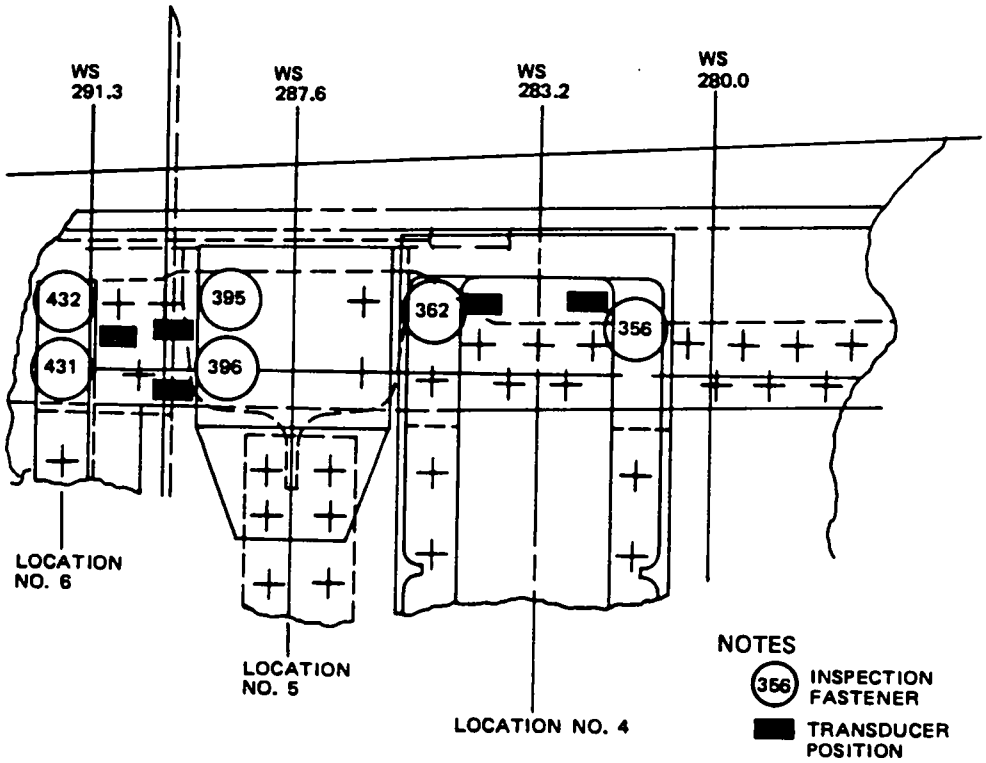
TRANSDUCER POSITION

(95) INSPECTION FASTENER

UPPER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL I (CONT)

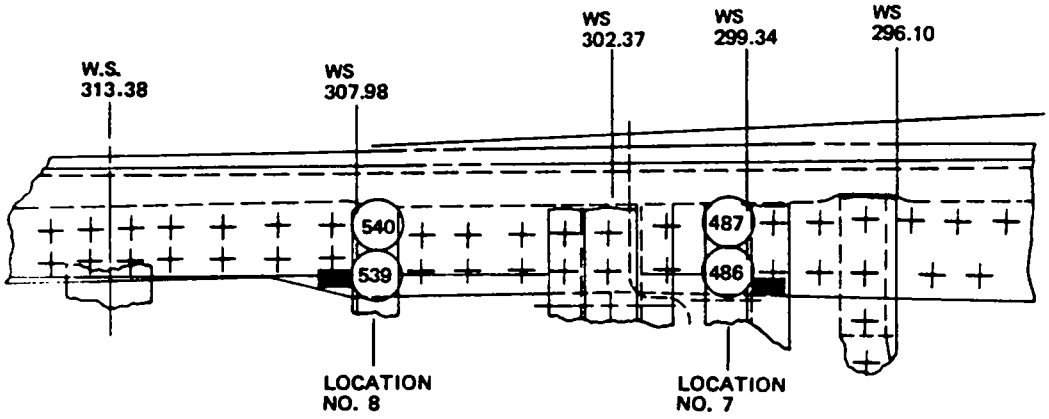
Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 11)

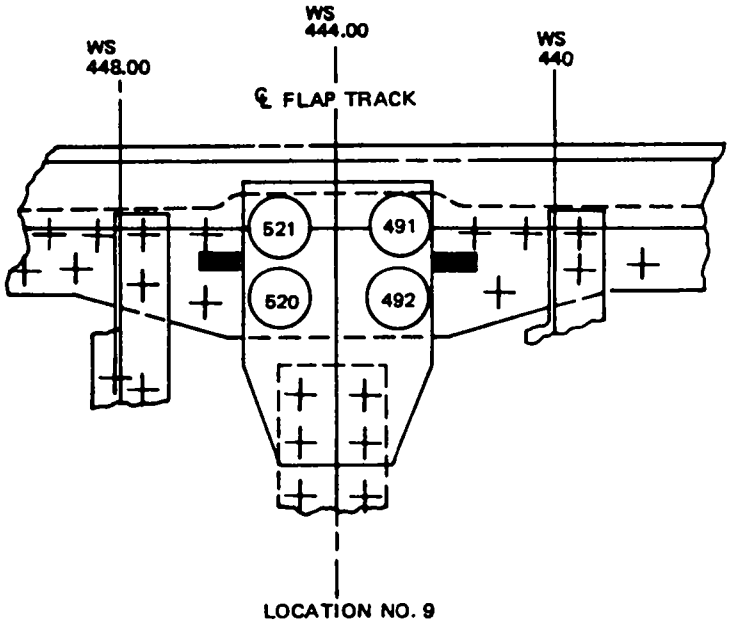




UPPER REAR SPAR CHORD VERTICAL FLANGE
DETAIL I (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 12)





NOTES

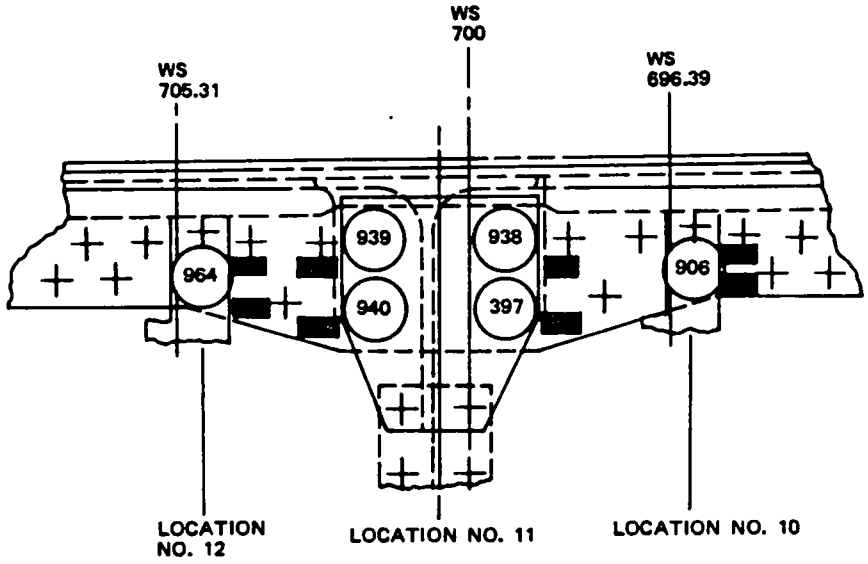
(521) INSPECTION FASTENER

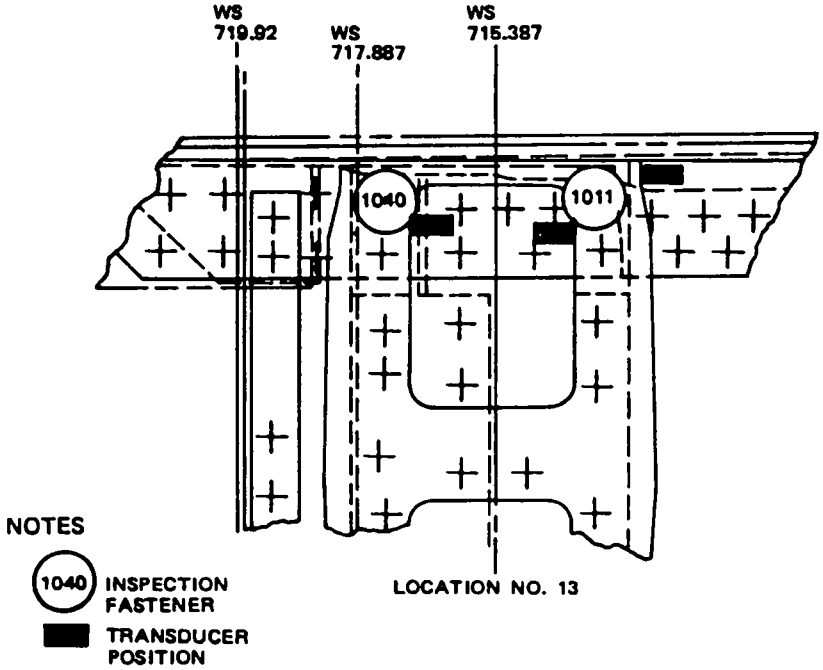
TRANSDUCER POSITION

UPPER REAR SPAR CHORD VERTICAL FLANGE

DETAIL I (CONT)

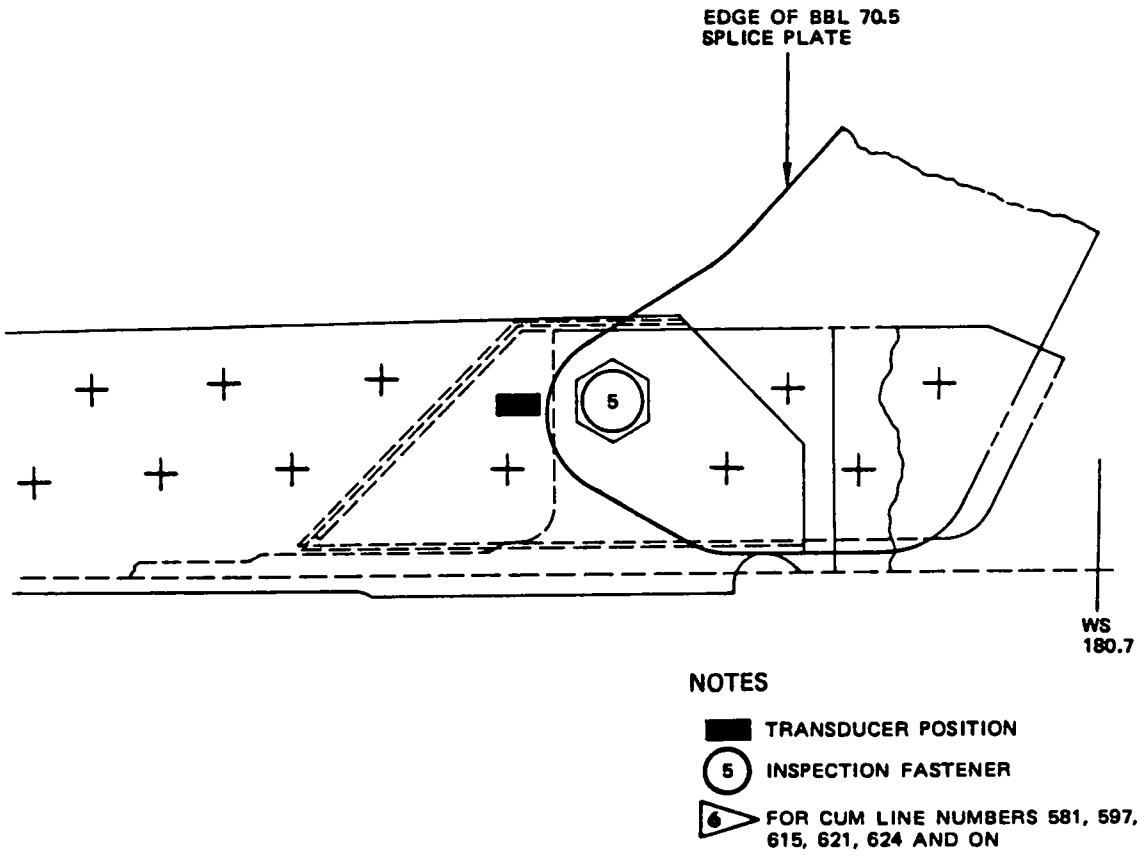
Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 13)





UPPER REAR SPAR CHORD VERTICAL FLANGE
DETAIL I

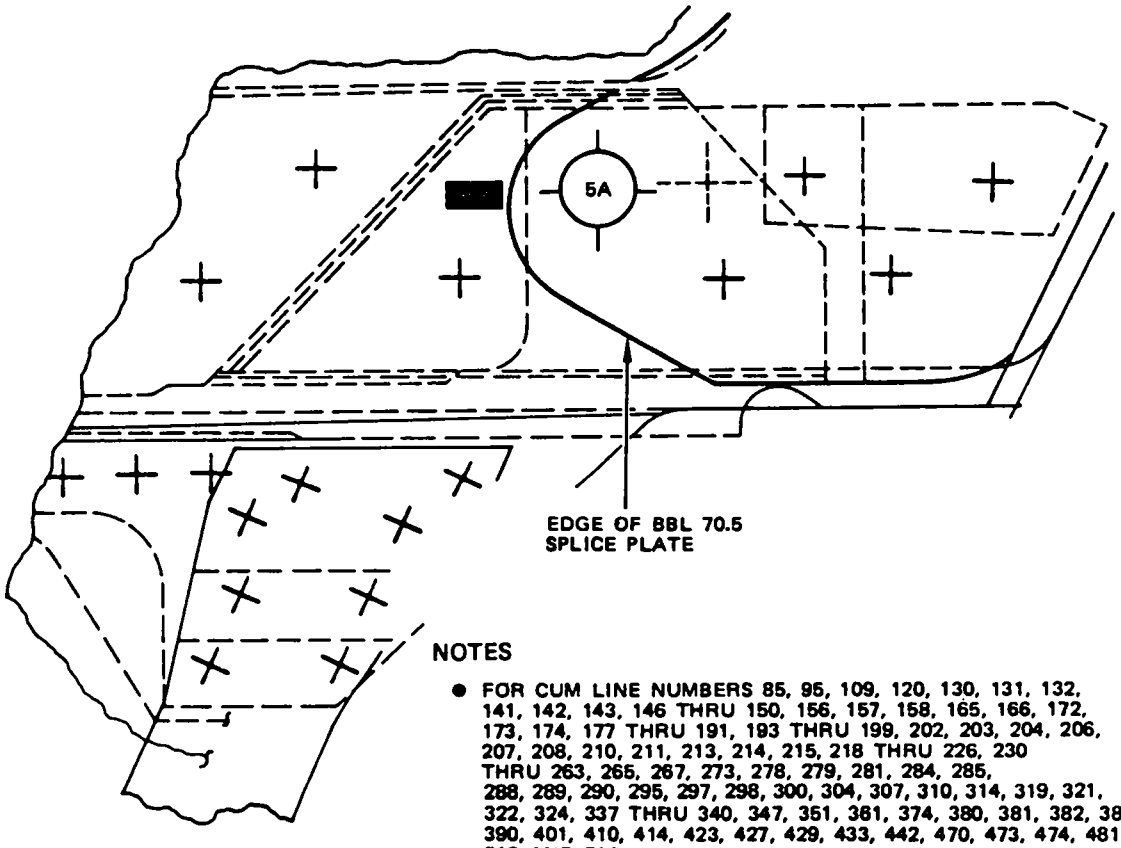
Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 14)



SKIN UNDER BBL 70.5
SPLICE PLATE

DETAIL II

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 15)



NOTES

- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481, 512 AND 514.

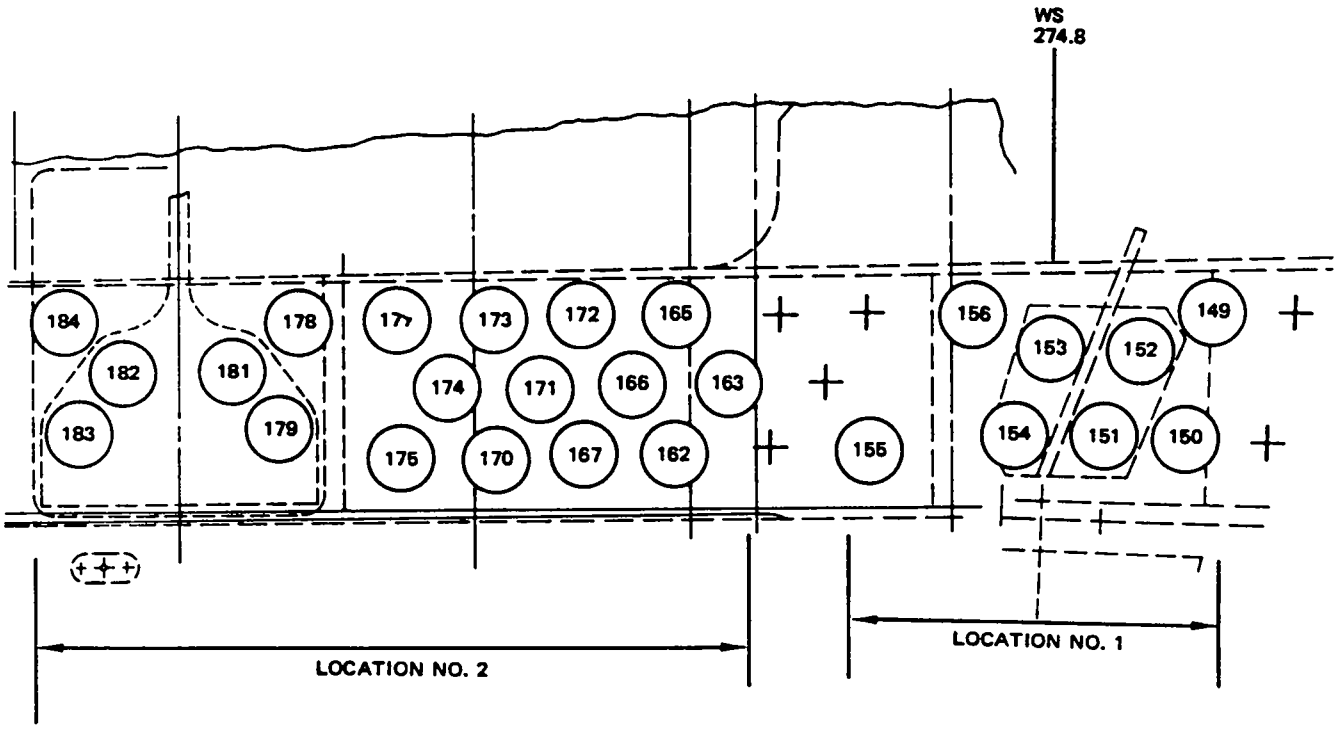
(5A) INSPECTION FASTENER

TRANSDUCER POSITION

SKIN UNDER BBL 70.5
SPLICE PLATE

DETAIL II

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 16)



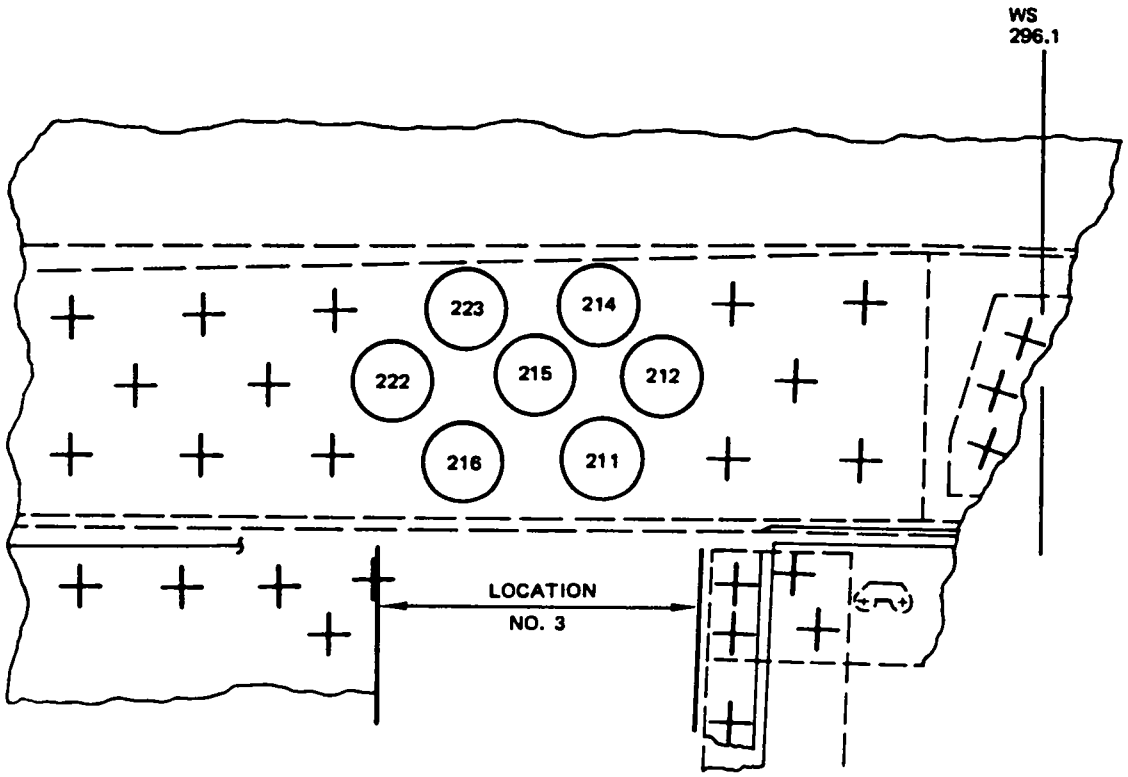
SKIN AT UPPER REAR SPAR CHORD
DETAIL III (CONT)

NOTES

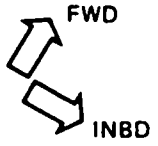
(156) INSPECTION FASTENER

FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 210, 211, 213, 214, 215, 218 THRU 226, 230, THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289,290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433,442, 470, 473, 474, 481, 512, AND 514.

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 17)



SKIN AT UPPER REAR SPAR CHORD
DETAIL III (CONT)

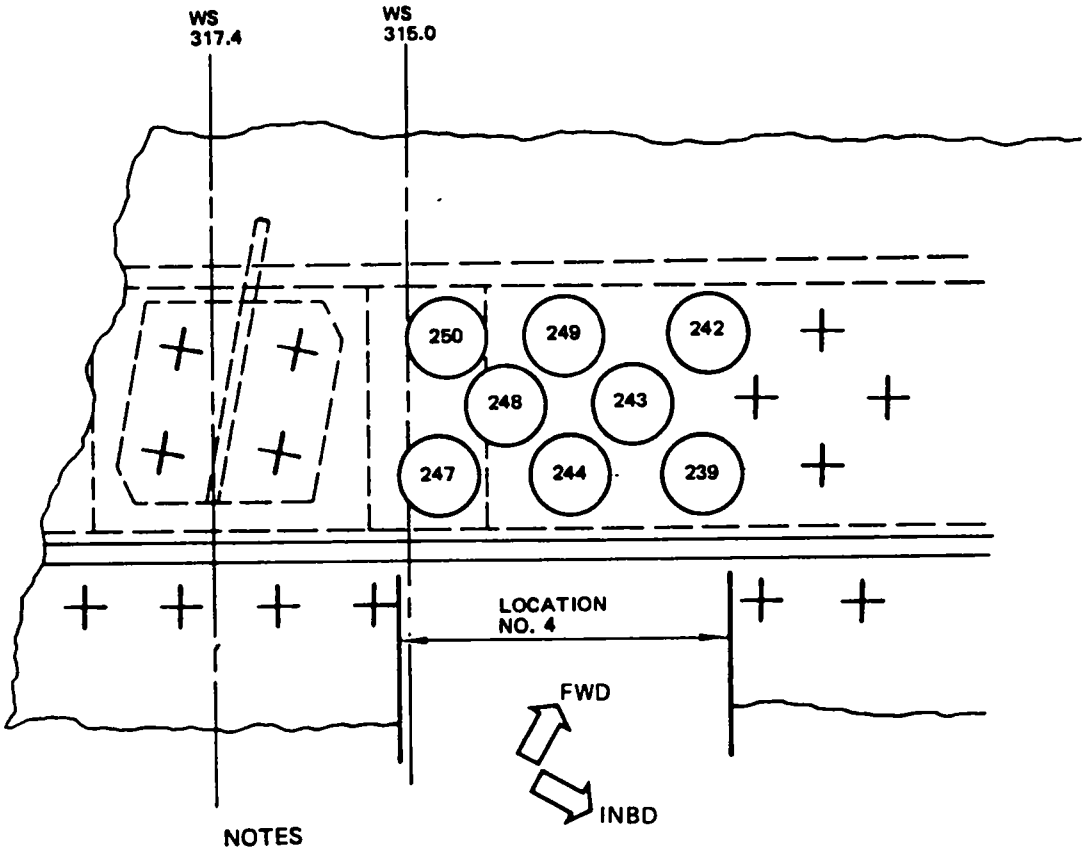


NOTES

(212) INSPECTION FASTENER

- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481, 512 AND 514

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 18)



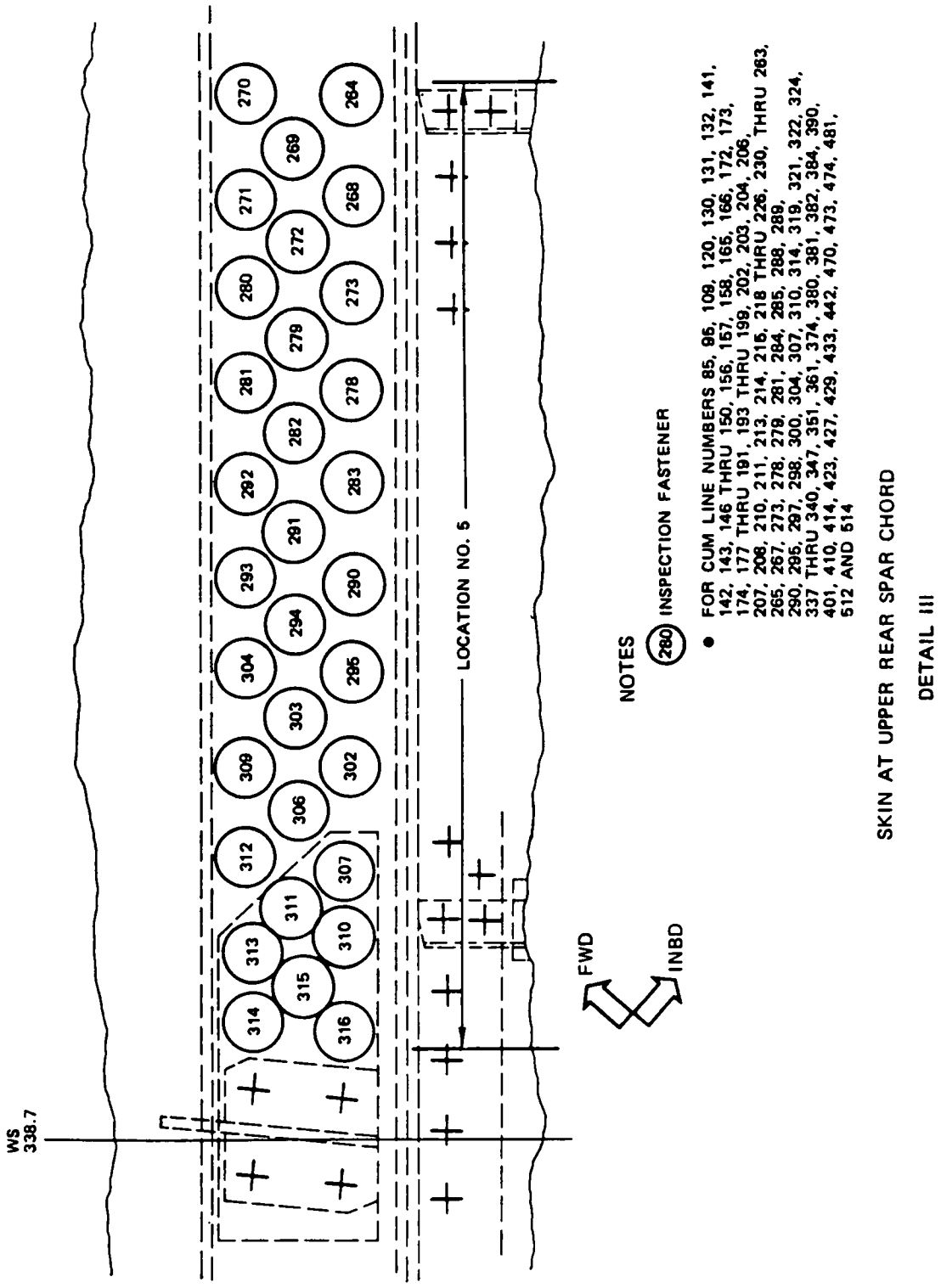
NOTES

(250) INSPECTION FASTENER

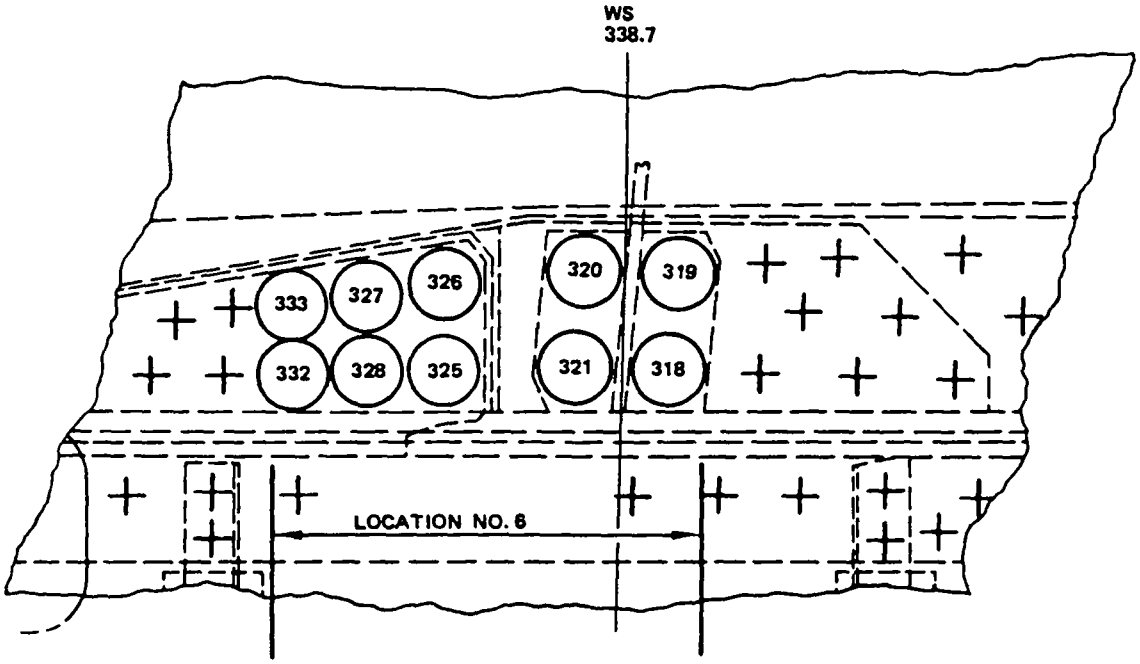
● FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481, 512 AND 514

SKIN AT UPPER REAR SPAR CHORD
DETAIL III

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 19)



Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 20)



NOTE

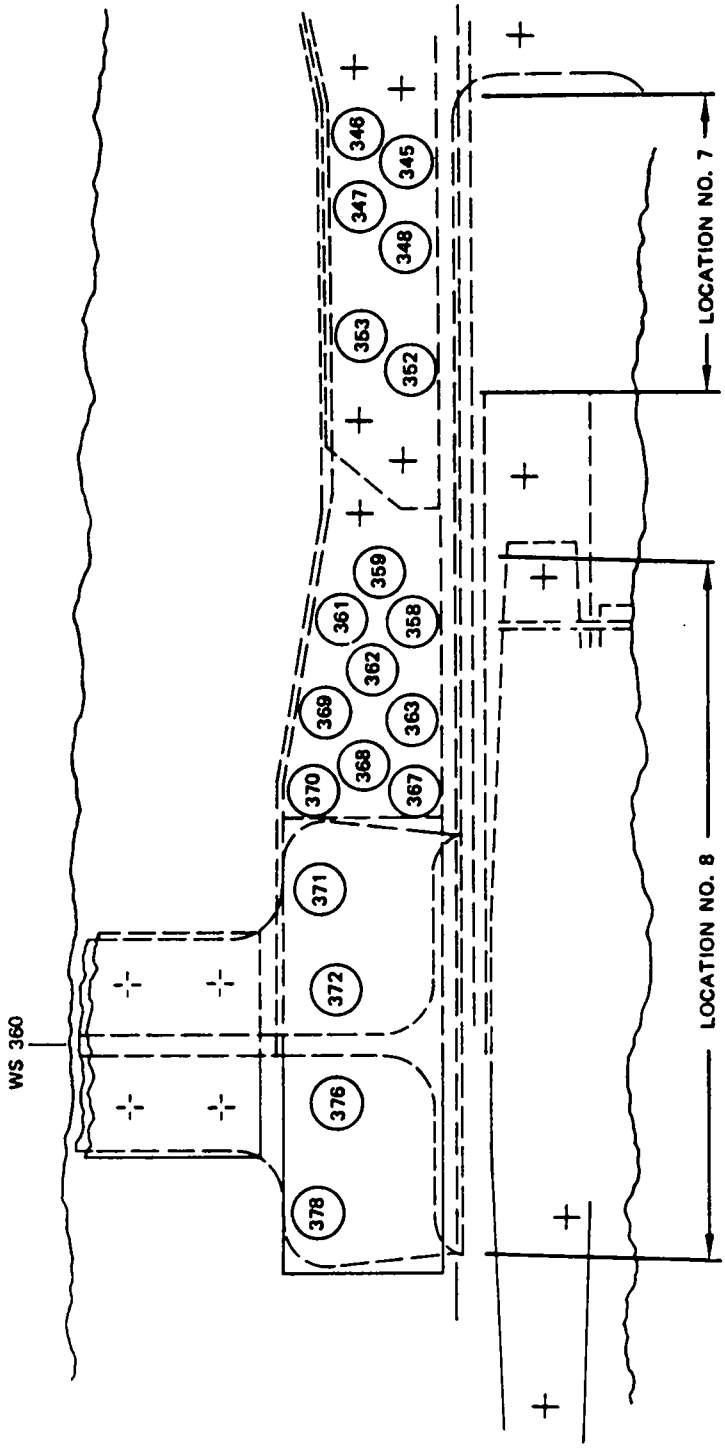
(320) INSPECTION FASTENER

- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481, 512 AND 514.

SKIN AT UPPER REAR SPAR CHORD

DETAIL III

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 21)



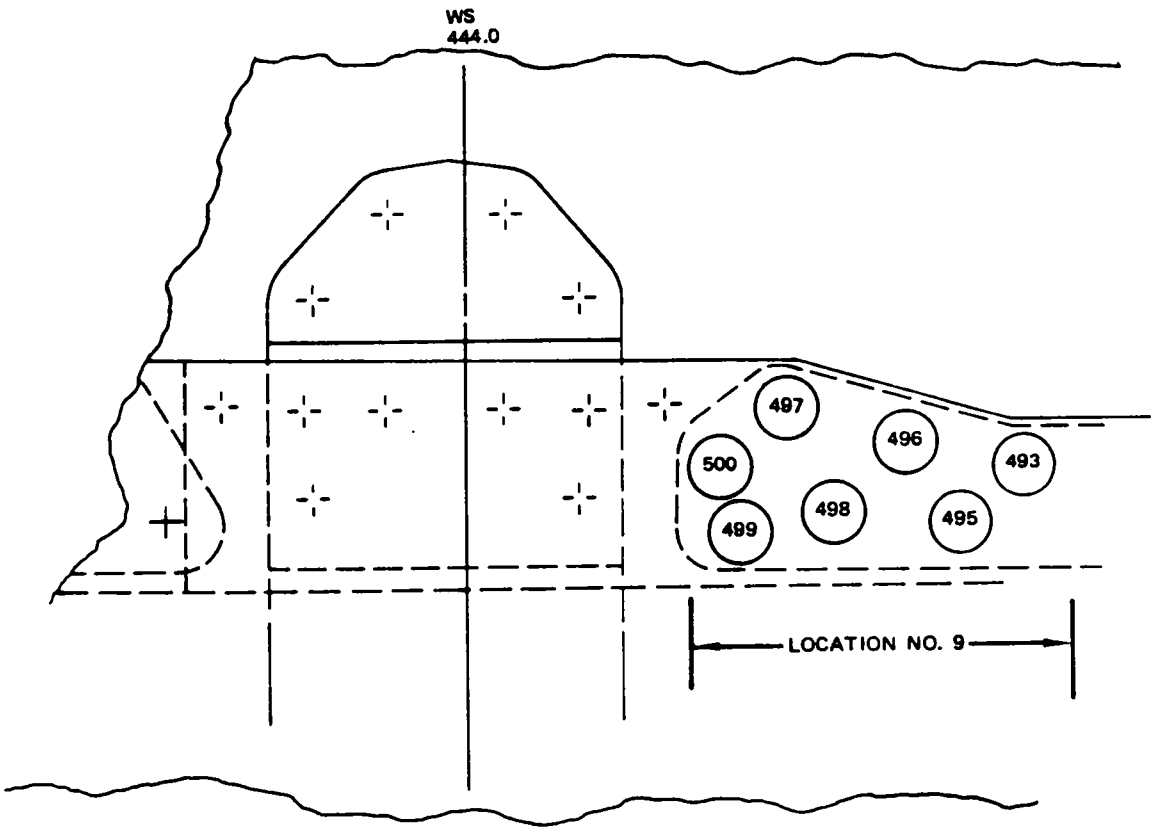
SKIN AT UPPER REAR SPAR CHORD
DETAIL III (CONT)

NOTES

(361) INSPECTION FASTENERS

- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 296, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481 512, AND 514.

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 22)



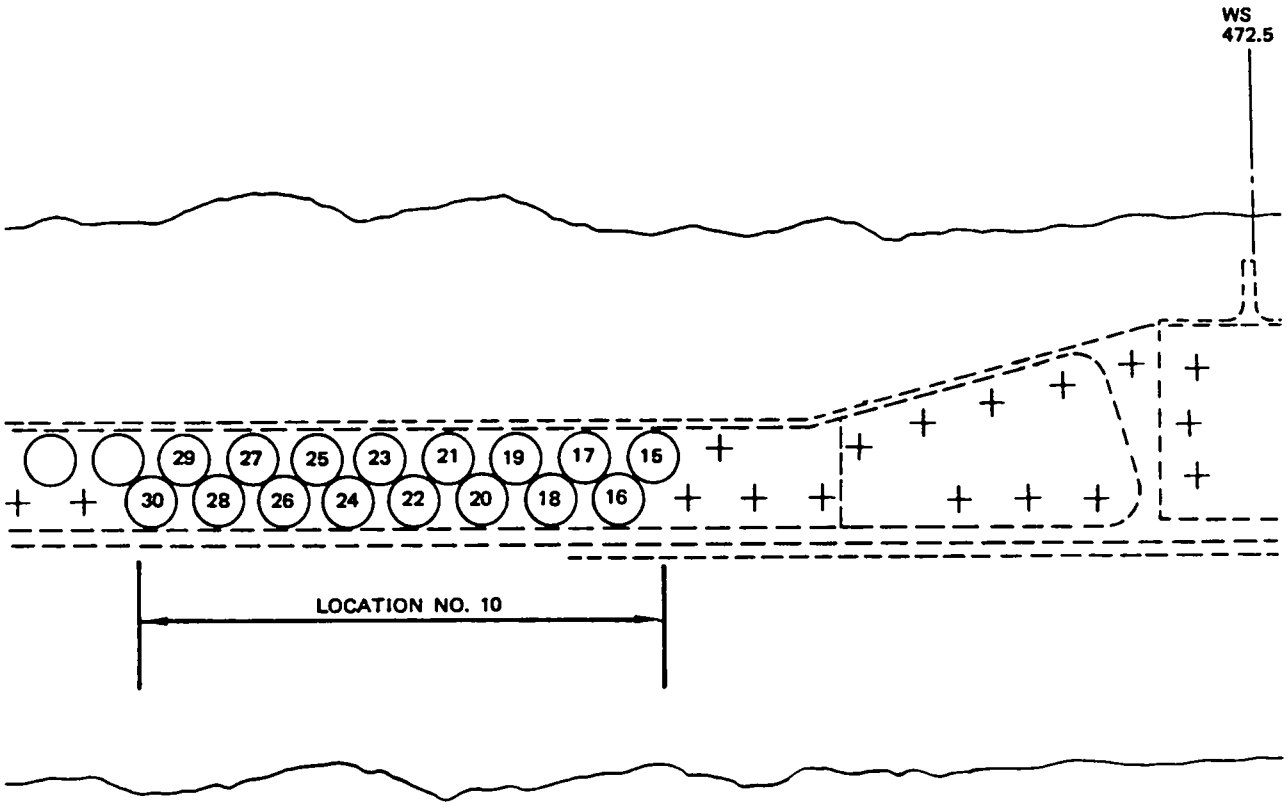
NOTES

(500) INSPECTION FASTENERS

- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481 512 AND 514.

SKIN AT UPPER REAR SPAR CHORD
DETAIL III (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 23)



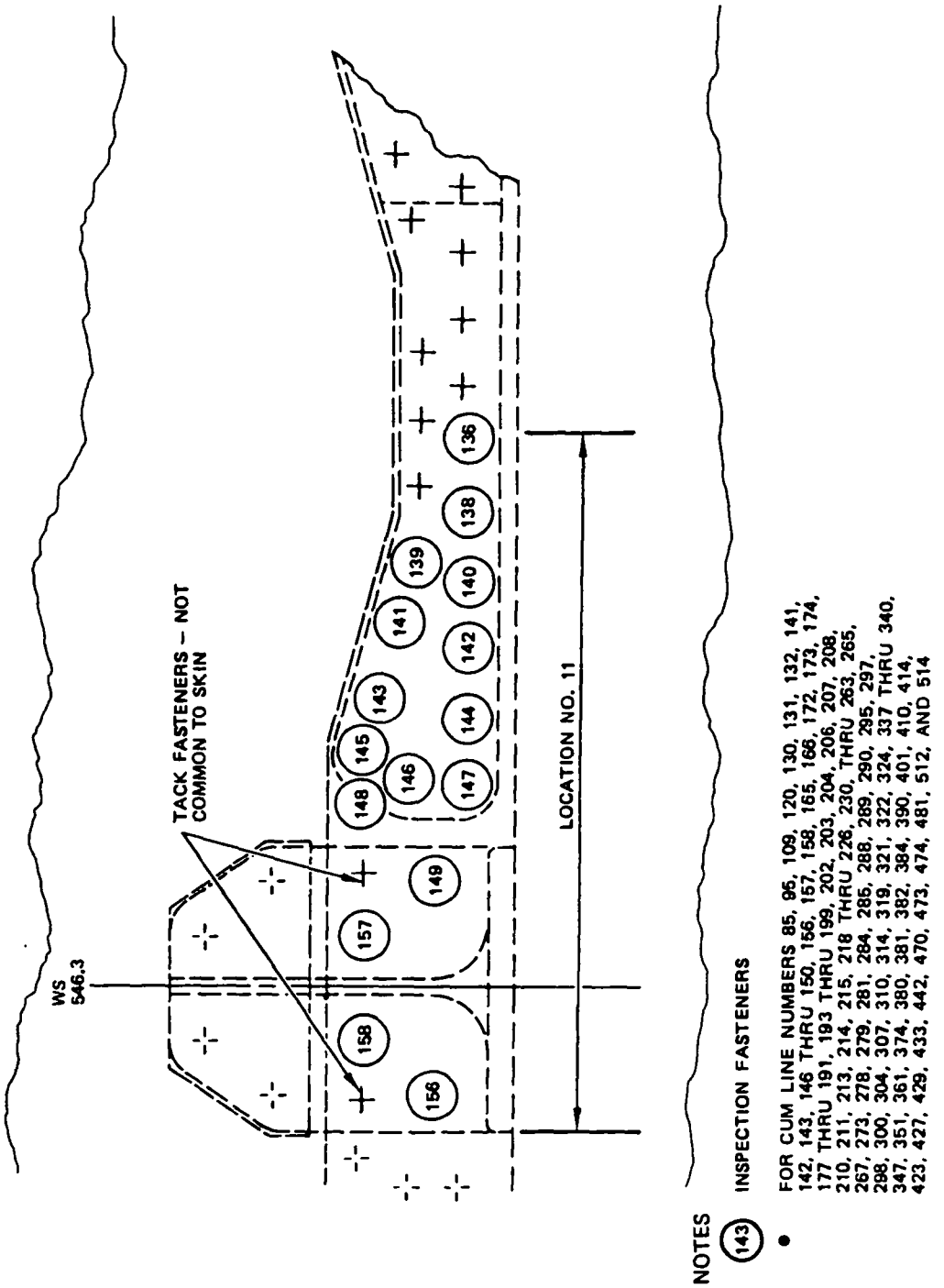
NOTES

(127) INSPECTION FASTENER

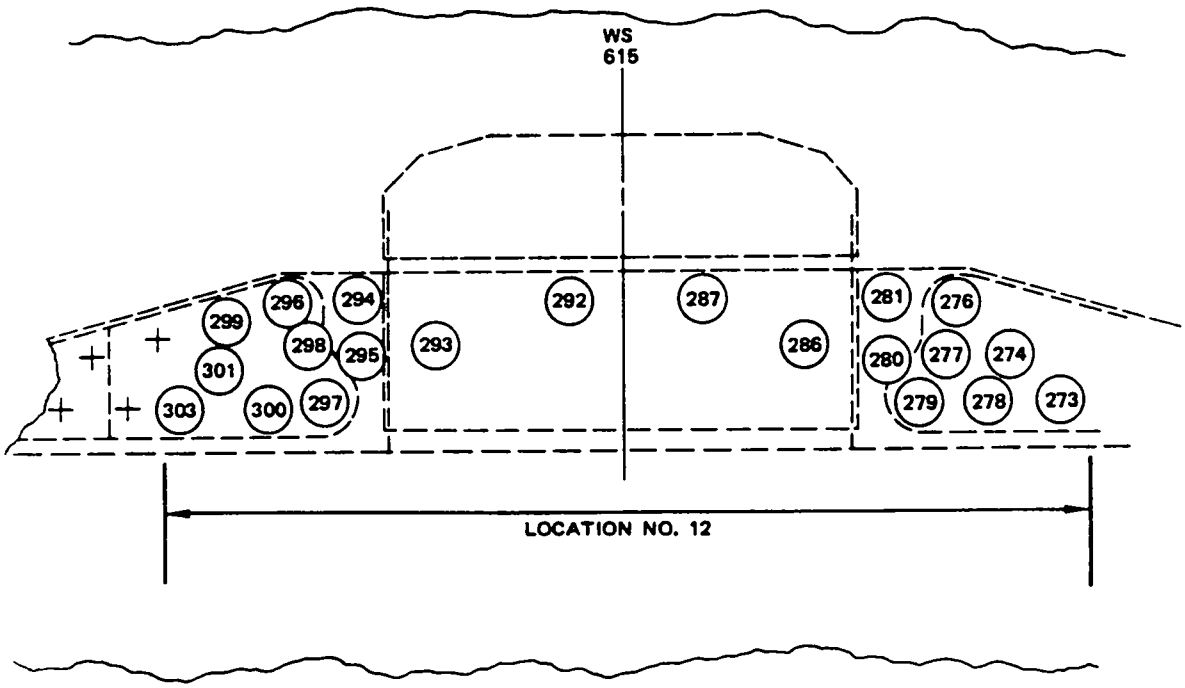
- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230, THRU 263, 265, 267 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 481, 512 AND 514

SKIN AT UPPER REAR SPAR CHORD
DETAIL III (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 24)



Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 25)



NOTES

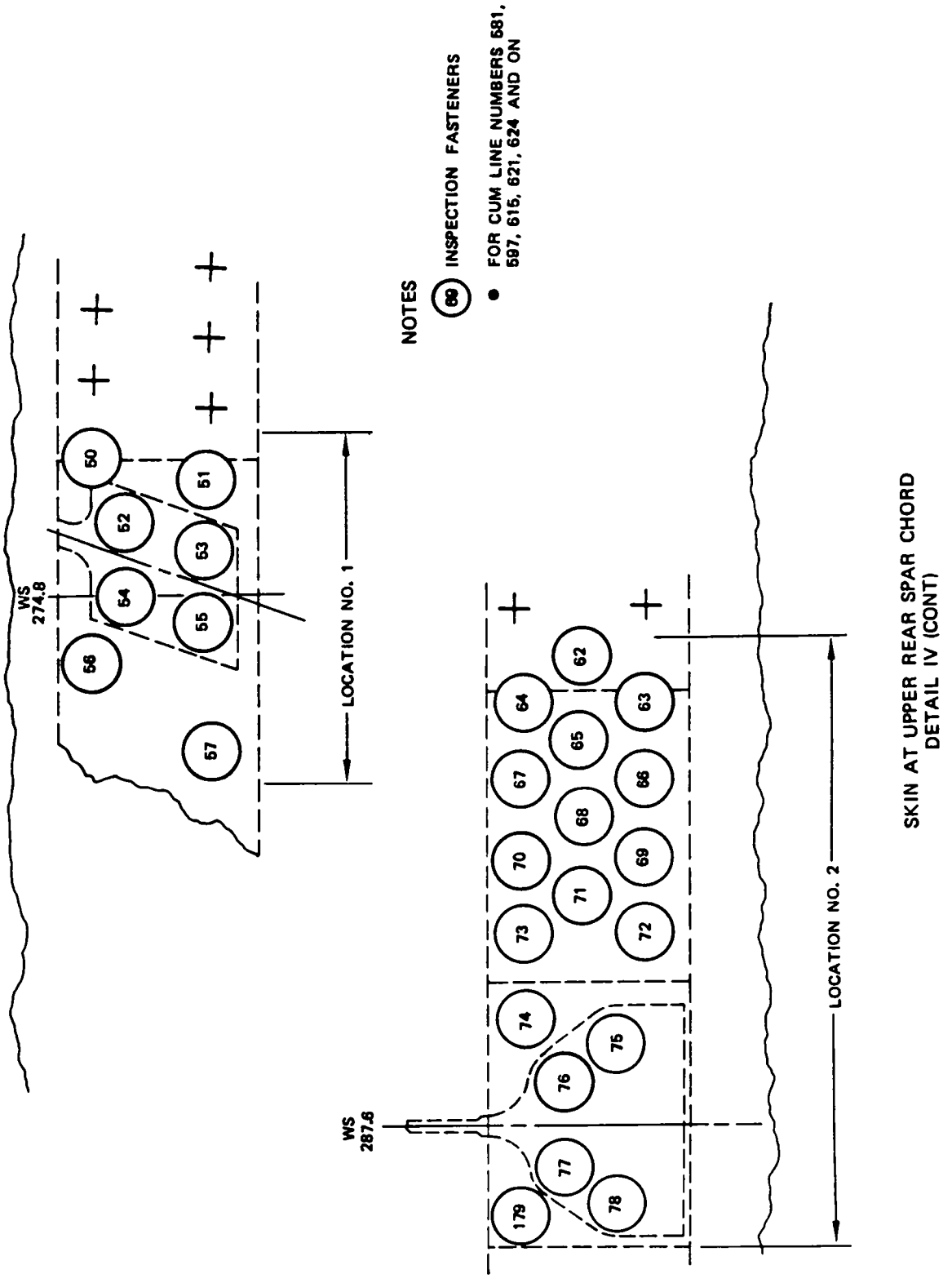
(299) INSPECTION FASTENERS

- FOR CUM LINE NUMBERS 85, 95, 109, 120, 130, 131, 132, 141, 142, 143, 146 THRU 150, 156, 157, 158, 165, 166, 172, 173, 174, 177 THRU 191, 193 THRU 199, 202, 203, 204, 206, 207, 208, 210, 211, 213, 214, 215, 218 THRU 226, 230 THRU 263, 265, 267, 273, 278, 279, 281, 284, 285, 288, 289, 290, 295, 297, 298, 300, 304, 307, 310, 314, 319, 321, 322, 324, 337 THRU 340, 347, 351, 361, 374, 380, 381, 382, 384, 390, 401, 410, 414, 423, 427, 429, 433, 442, 470, 473, 474, 581, 512, AND 514

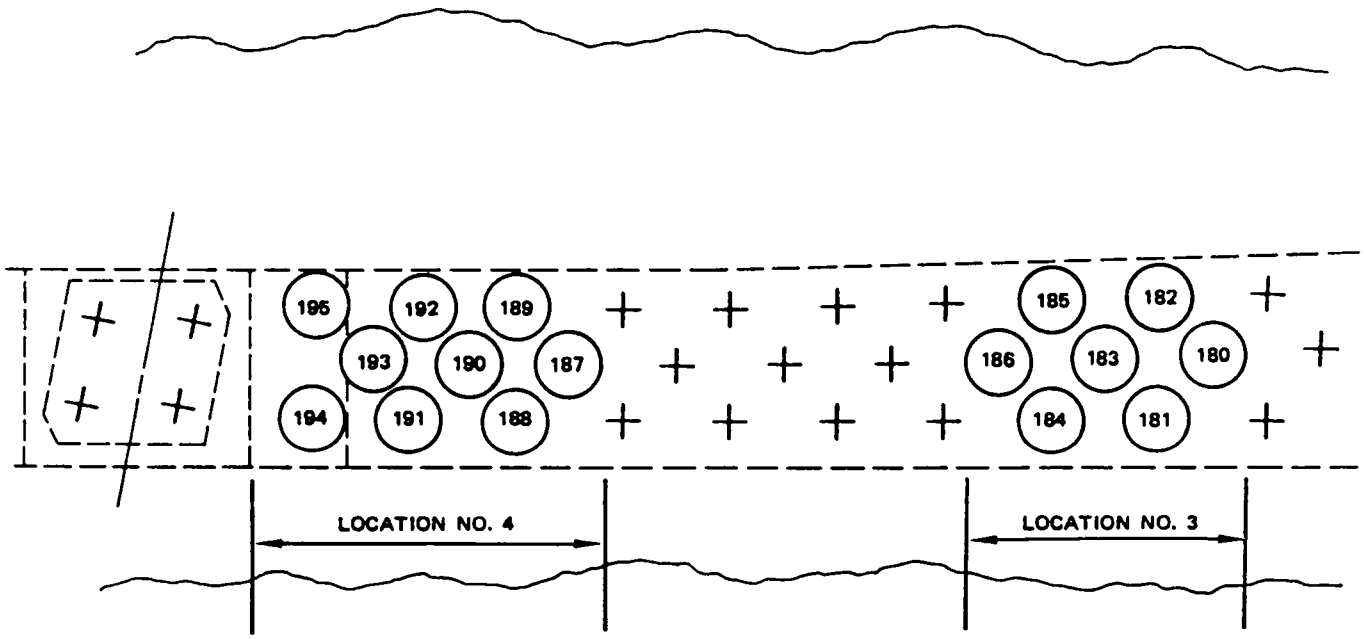
SKIN AT UPPER REAR SPAR CHORD

DETAIL III

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 26)



Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 27)



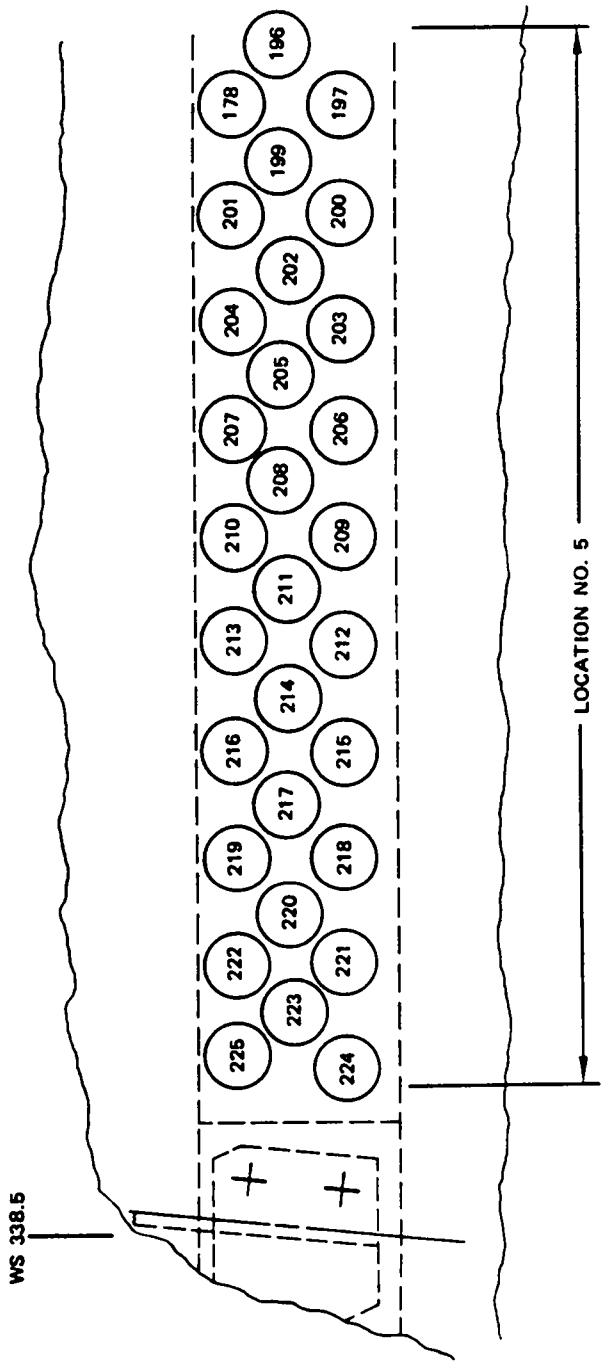
NOTES

(185) INSPECTION FASTENERS

6 FOR CUM LINE NUMBERS 581, 597, 615, 621, 624 AND ON

SKIN AT UPPER REAR SPAR CHORD
DETAIL IV (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 28)



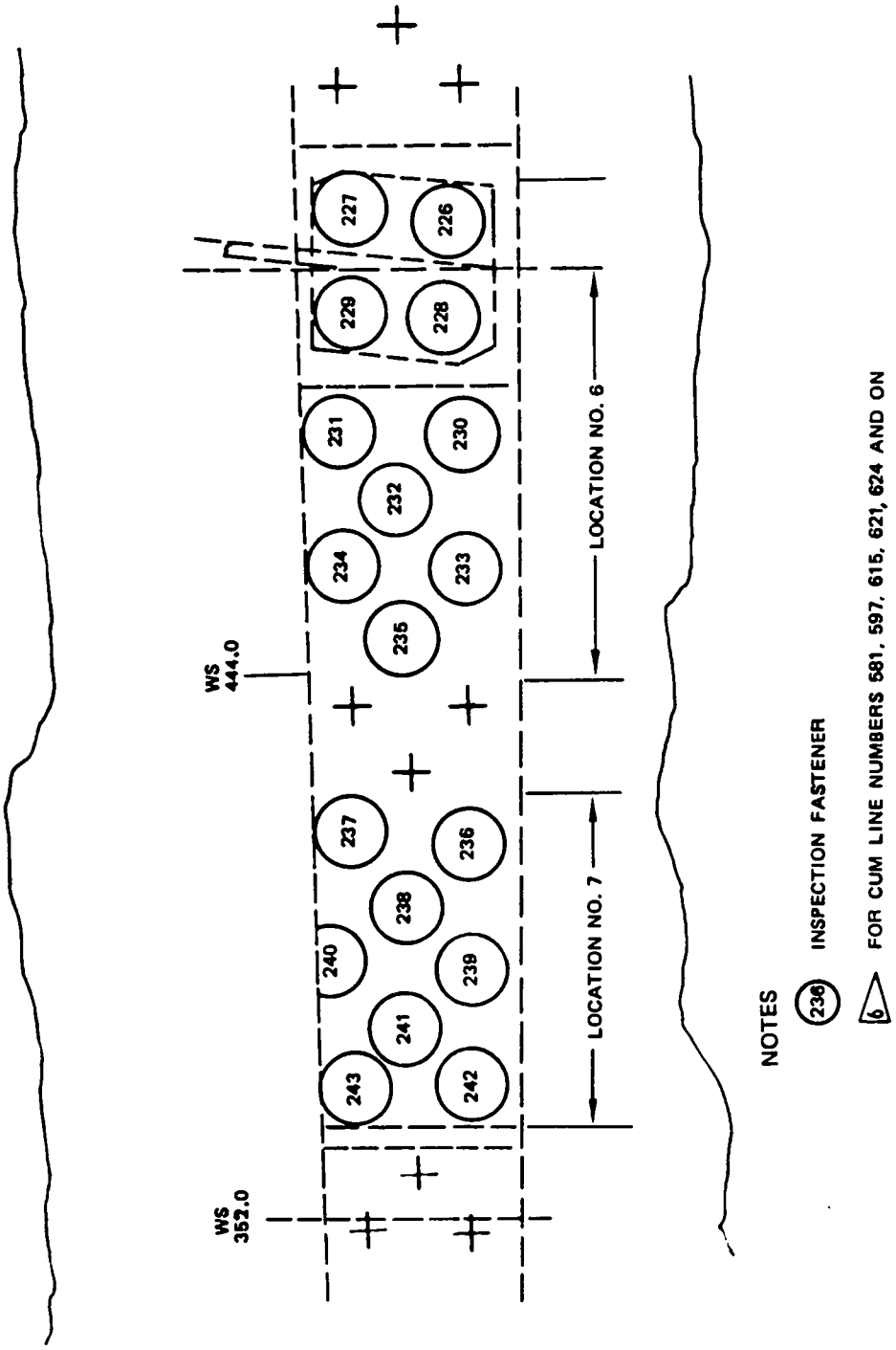
NOTES

(212) INSPECTION FASTENERS

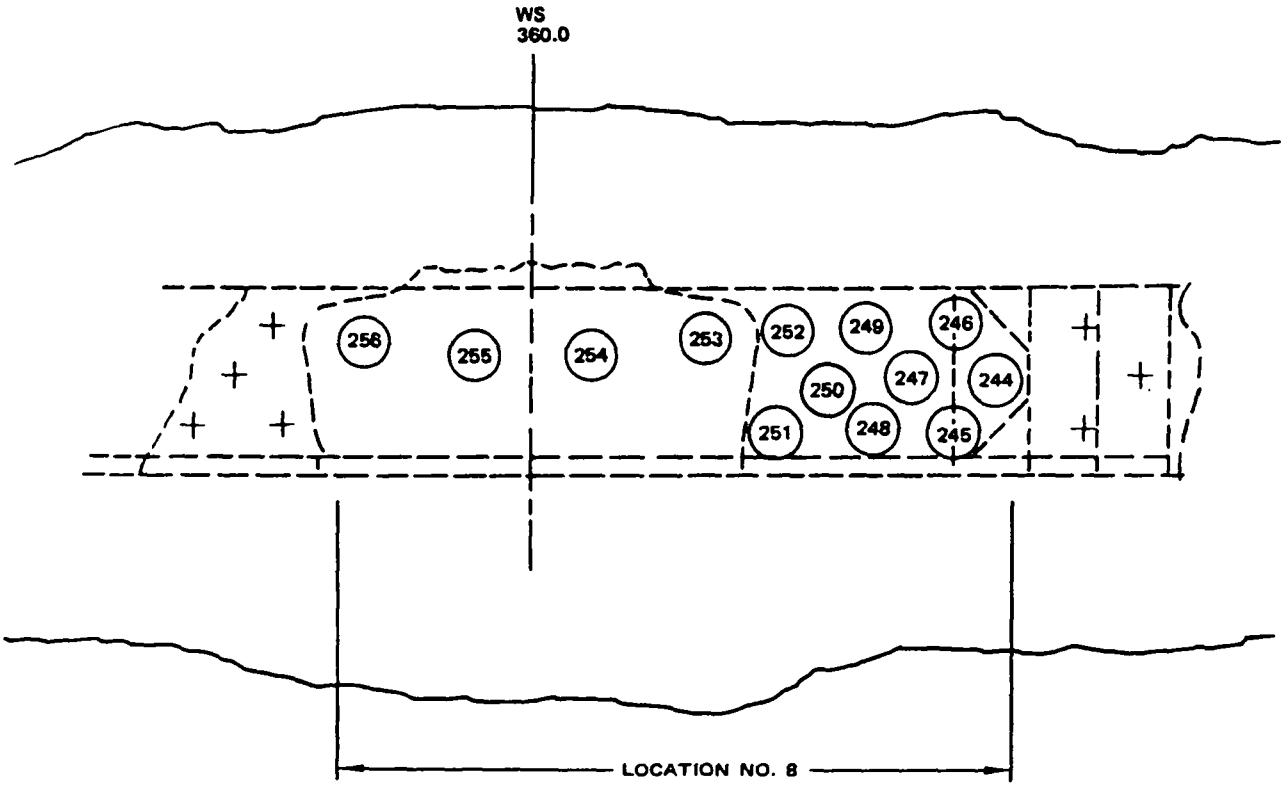
△6 FOR CUM LINE NUMBERS 581, 597, 615, 621 624 AND ON

SKIN AT UPPER REAR SPAR CHORD
DETAIL IV (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 29)



Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 30)



NOTES

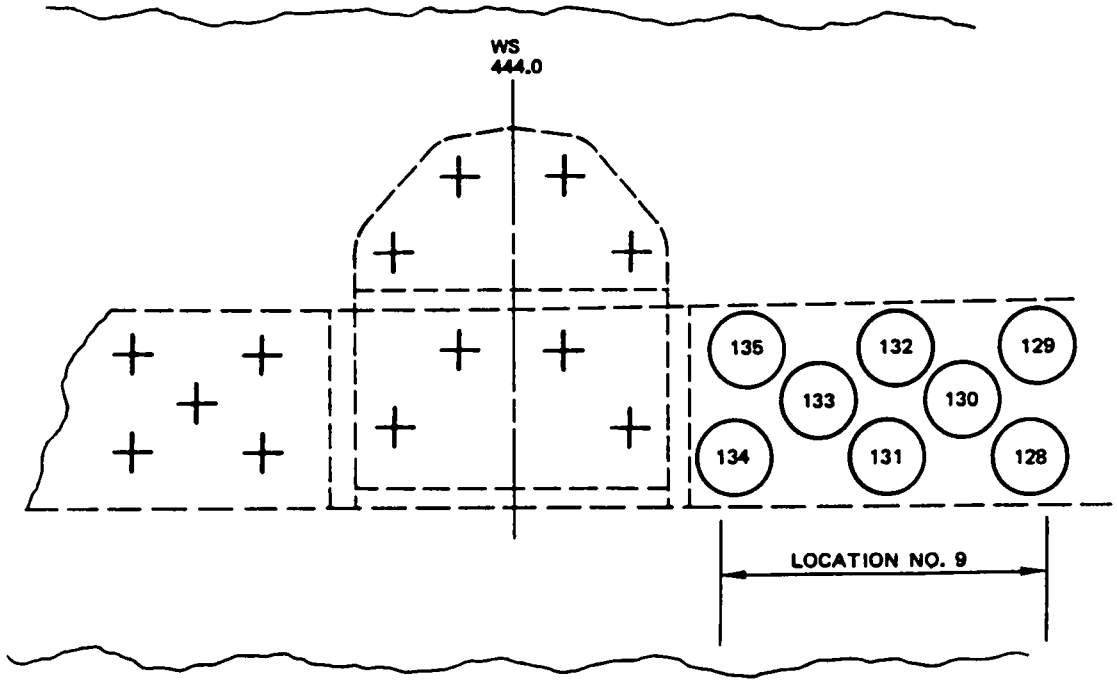
(254) INSPECTION FASTENERS

● FOR CUM LINE NUMBERS 581, 597, 615, 621 AND ON

SKIN AT UPPER REAR SPAR CHORD

DETAIL IV

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 31)



NOTES

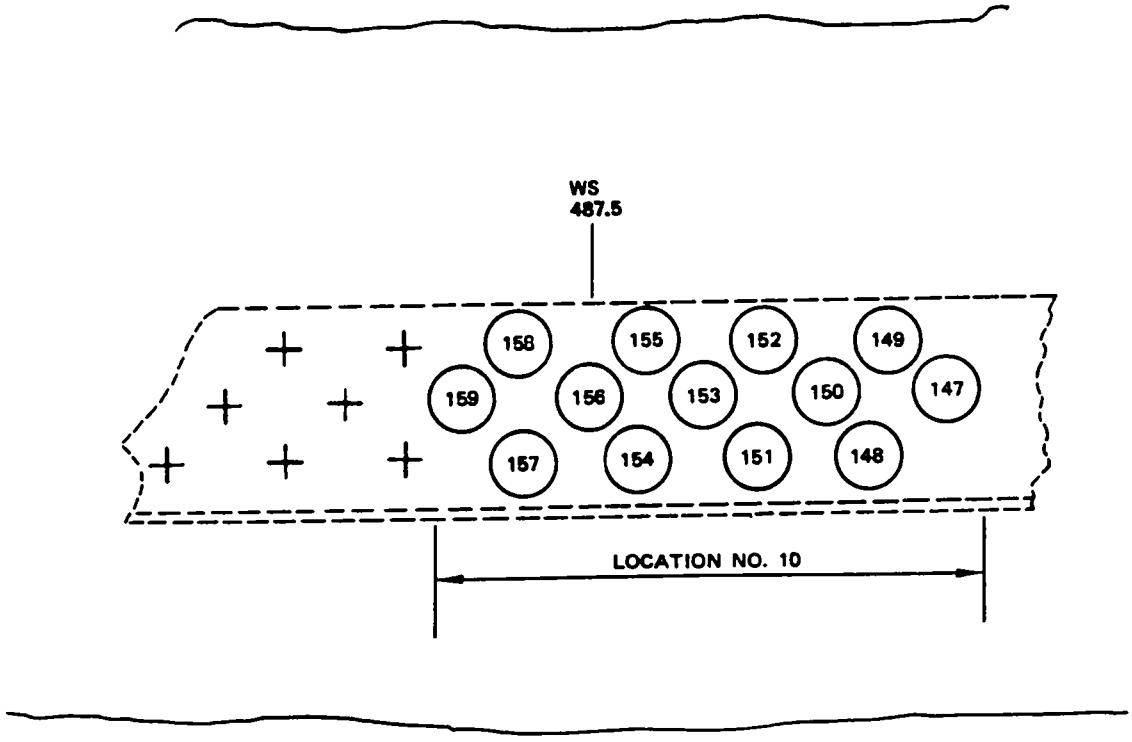
(135) INSPECTION FASTENER

6 FOR CUM LINE NUMBERS 581, 597, 615, 621, AND ON

SKIN AT UPPER REAR SPAR CHORD

DETAIL IV (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 32)



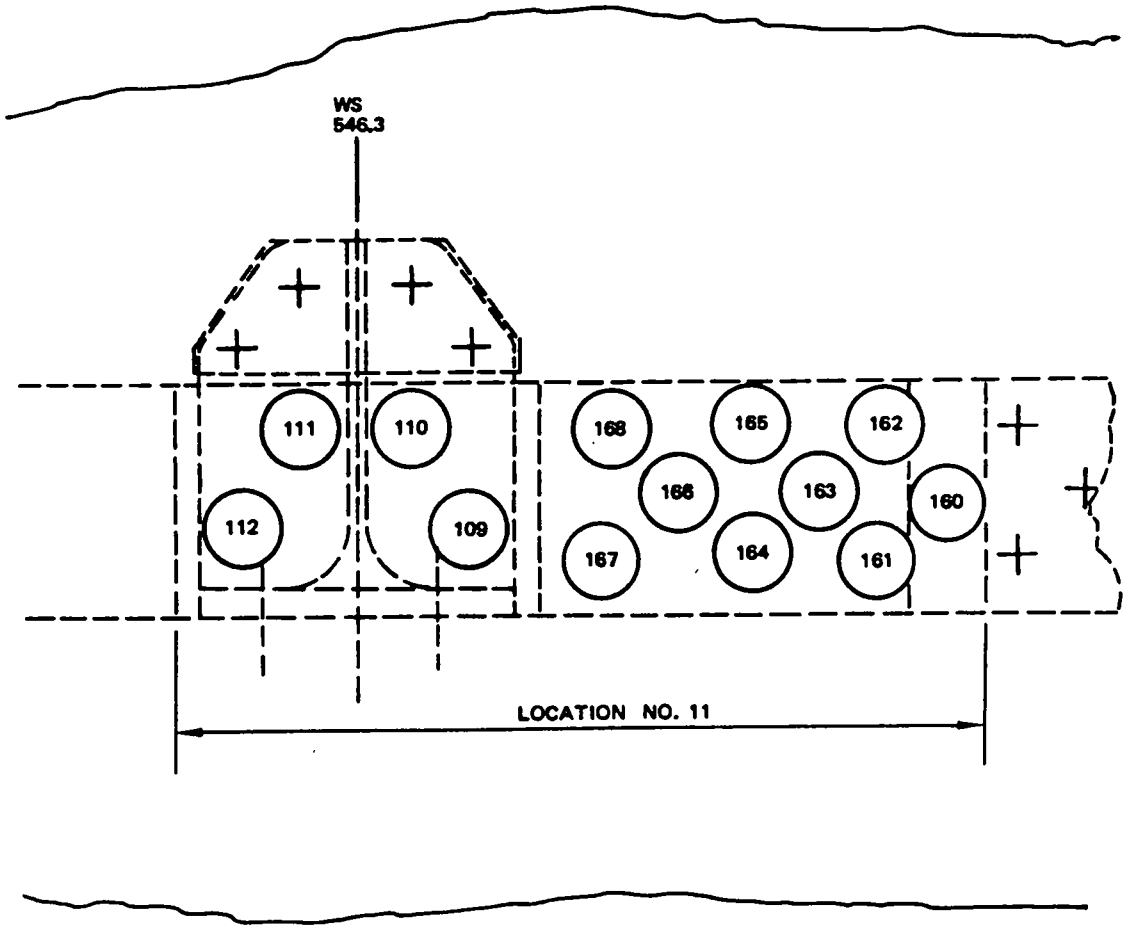
NOTES

(153) INSPECTION FASTENERS

6 FOR CUM LINE NUMBERS 581, 597, 615, 621, 624 AND ON

SKIN AT UPPER REAR SPAR CHORD
DETAIL IV (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 33)



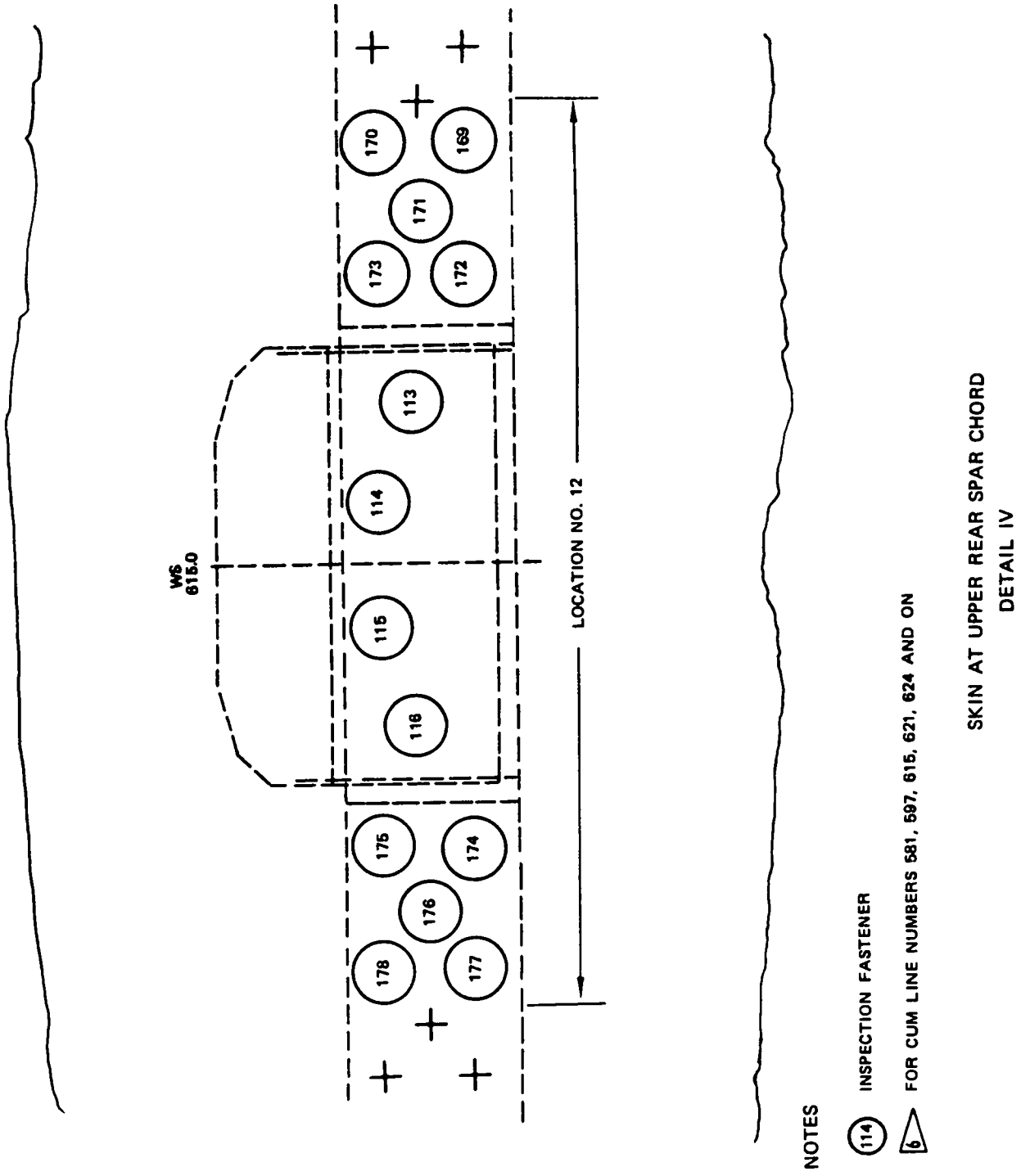
NOTES

(160) INSPECTION FASTENER

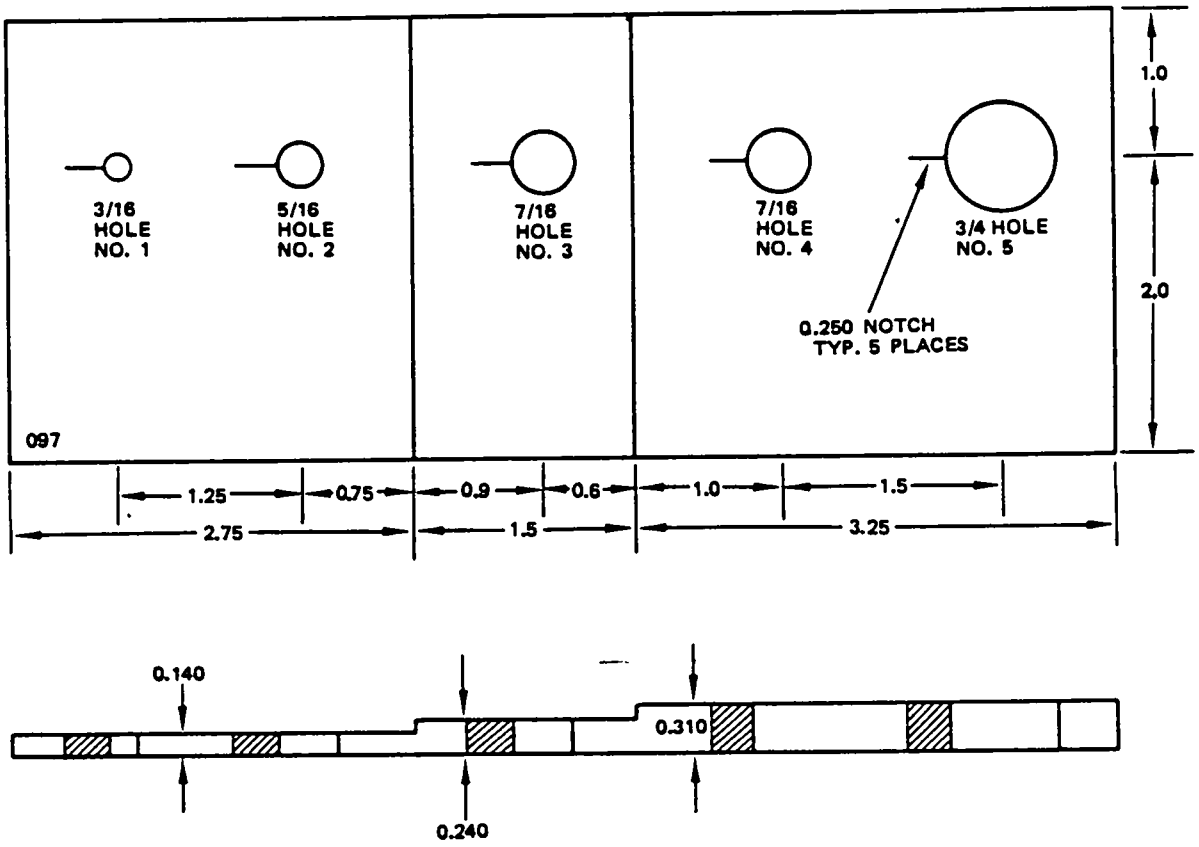
6 FOR CUM LINE NUMBERS
581, 597, 615, 621, 624 AND ON

SKIN AT UPPER REAR SPAR CHORD
DETAIL IV (CONT)

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 34)



Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 35)



NOTES

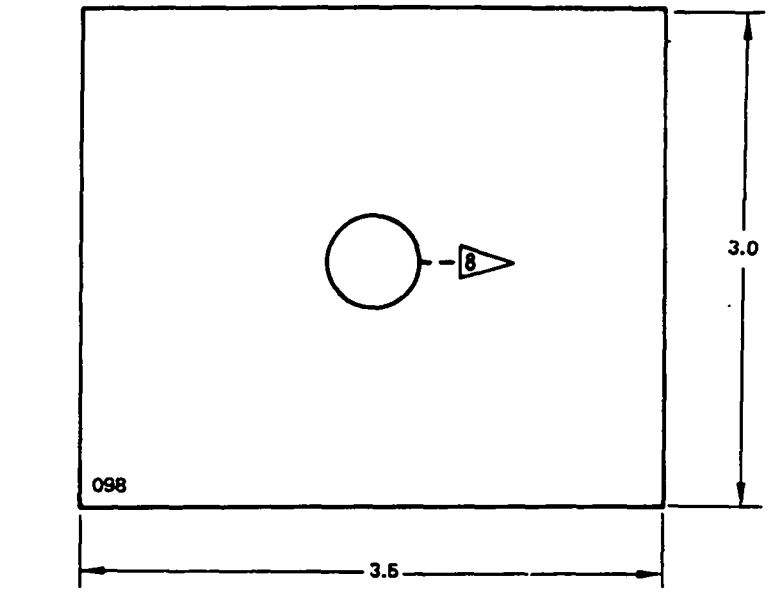
- ALL DIMENSIONS ARE IN INCHES
- TOLERANCE: X.X, X.XX ± .030, X.XXX ± .010
- MATERIAL: 7075 – T6 ALUMINUM
- P/N 6411–43
  AVAILABLE FROM IDEAL SPECIALTY CO
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110
- STEEL STAMP OR ETCH WITH 097

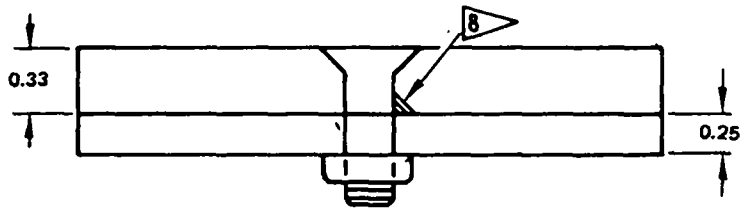
REFERENCE STANDARD 097 FOR UPPER REAR SPAR CHORD VERTICAL FLANGE CALIBRATION

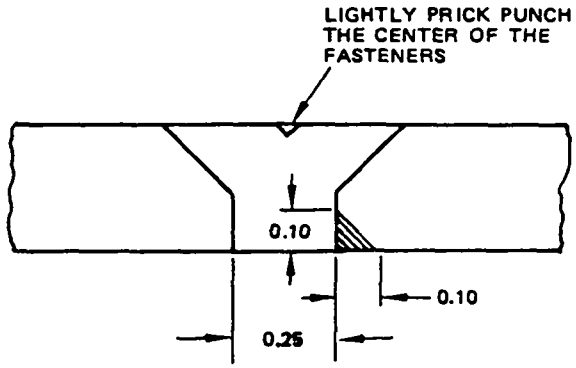
DETAIL V

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 36)

NONDESTRUCTIVE TEST







NOTES

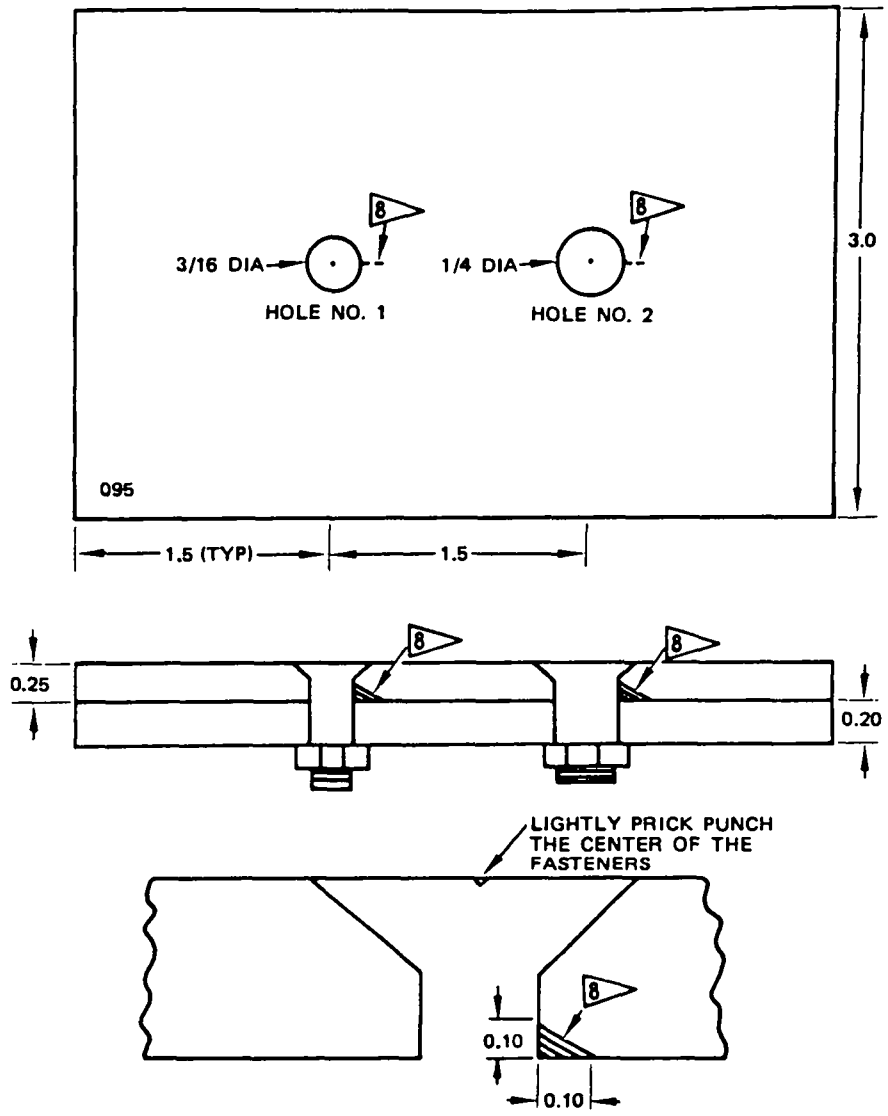
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- ETCH OR STEEL STAMP WITH 098
- TOLERANCE – X.X ±0.030
  O.XX ± 0.010
- FASTENER TYPE: BAC830GY8–9 AND BACC30K8 COLLAR
- P/N 6411–42
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

8 JEWELER'S SAWCUT 0.030 MAX WIDTH (2 PLACES)

REFERENCE STANDARD 098 FOR SKIN INSPECTION CALIBRATION

DETAIL VI

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 37)



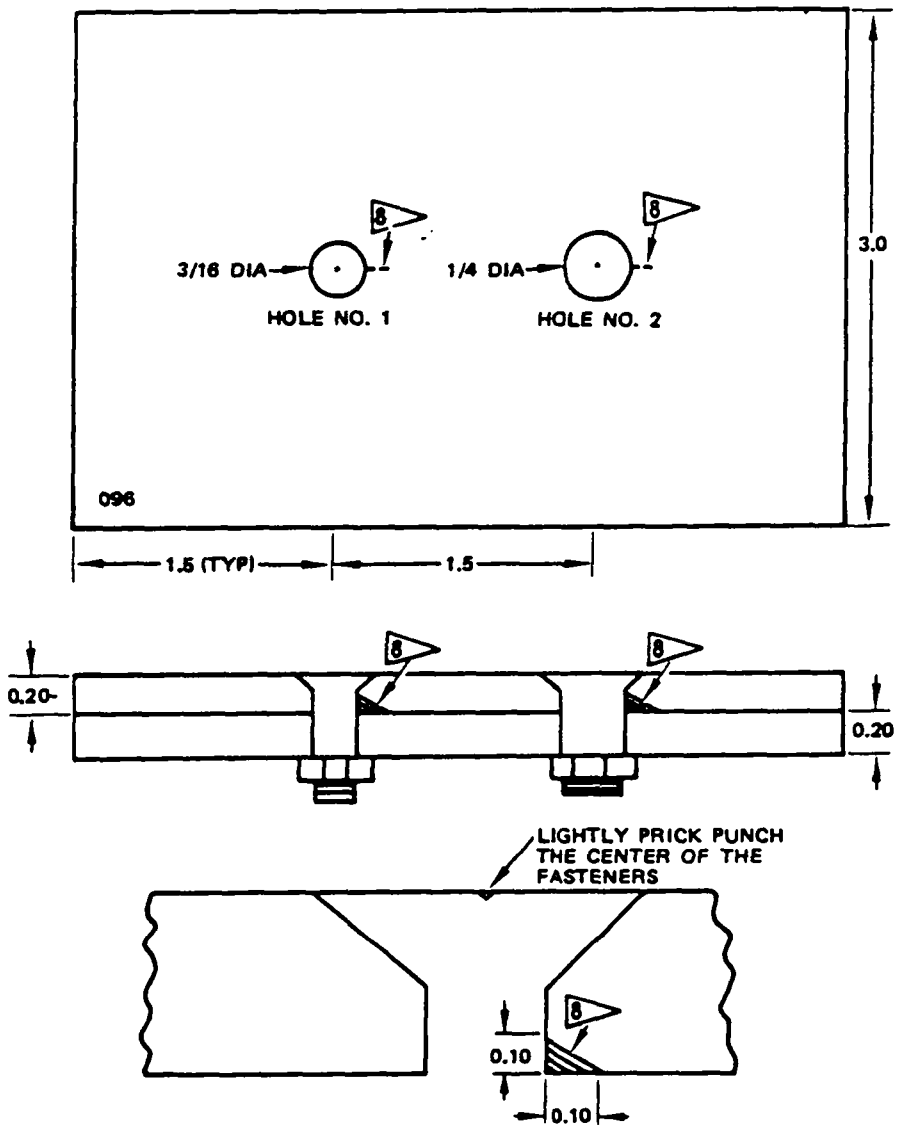
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL : 2024-T6 ALUMINUM
- ETCH OR STEEL STAMP WITH 095
- TOLERANCE : X.X ± 0.030 X.XX ± 0.010
- FASTENER TYPE :
  BACB30LU3-7 FASTENER WITH BACN10JC3 NUT
  BACB30LU4-7 FASTENER WITH BACN10JC4 NUT
- P/N 6411-31
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

8 JEWELER'S SAWCUT 0.030 MAX WIDTH (2 PLACES)

REFERENCE STANDARD 095 FOR SKIN INSPECTION CALIBRATION
DETAIL VII

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 38)



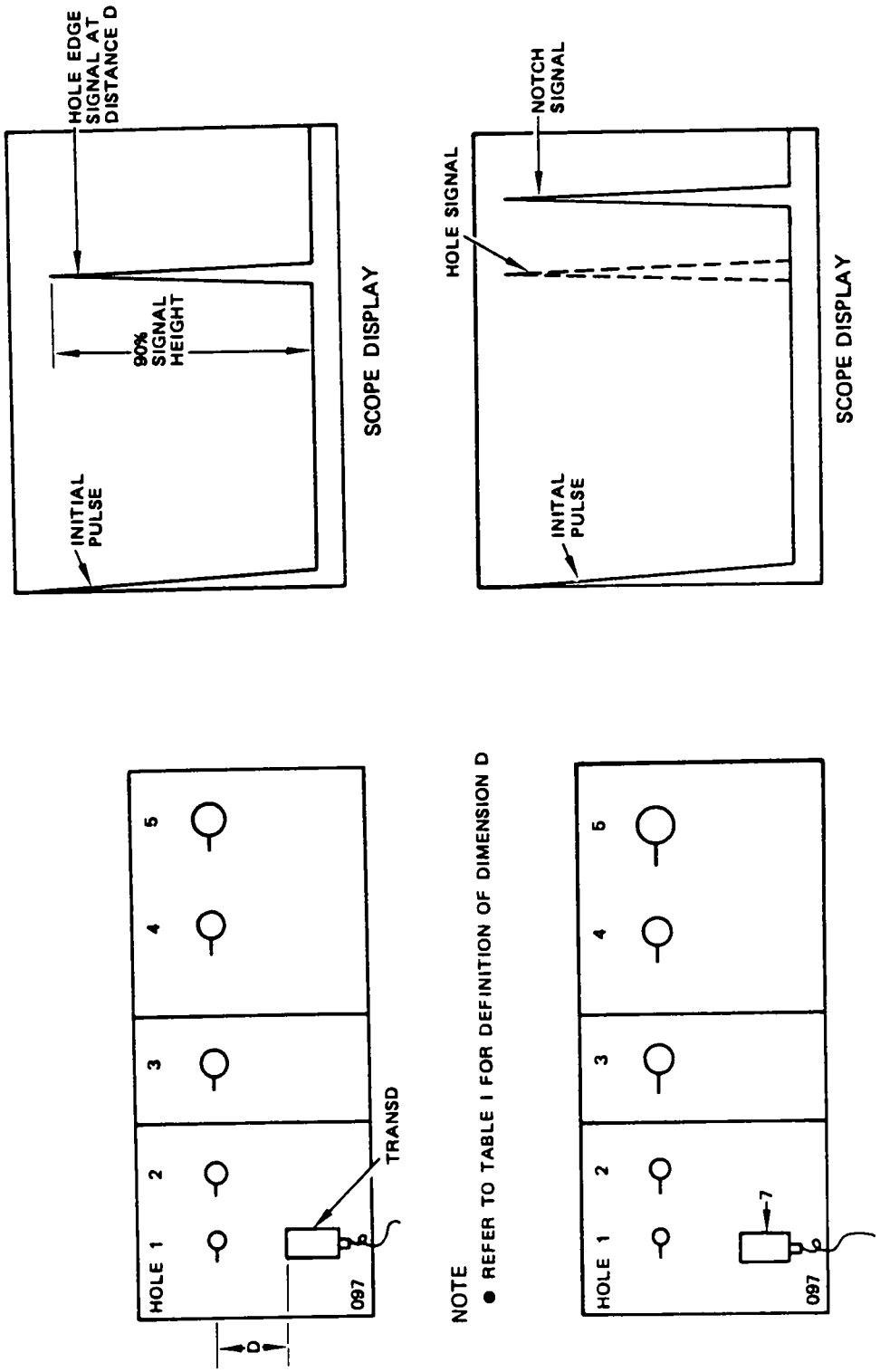
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL : 2024–T6 ALUMINUM
- ETCH OR STEEL STAMP WITH 096
- TOLERANCE : X.X ± 0.030 X.XX ± 0.010
- FASTENER TYPE :
  BAC830LU3–6 FASTENER WITH BACN10JC3 NUT
  BAC830LU4–6 FASTENER WITH BACN10JC4 NUT
- P/N 6411–41
  AVAILABLE FROM IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE ST.
  TULSA, OKLAHOMA 74110

8 JEWELER'S SAWCUT 0.030 MAX WIDTH (2 PLACES)

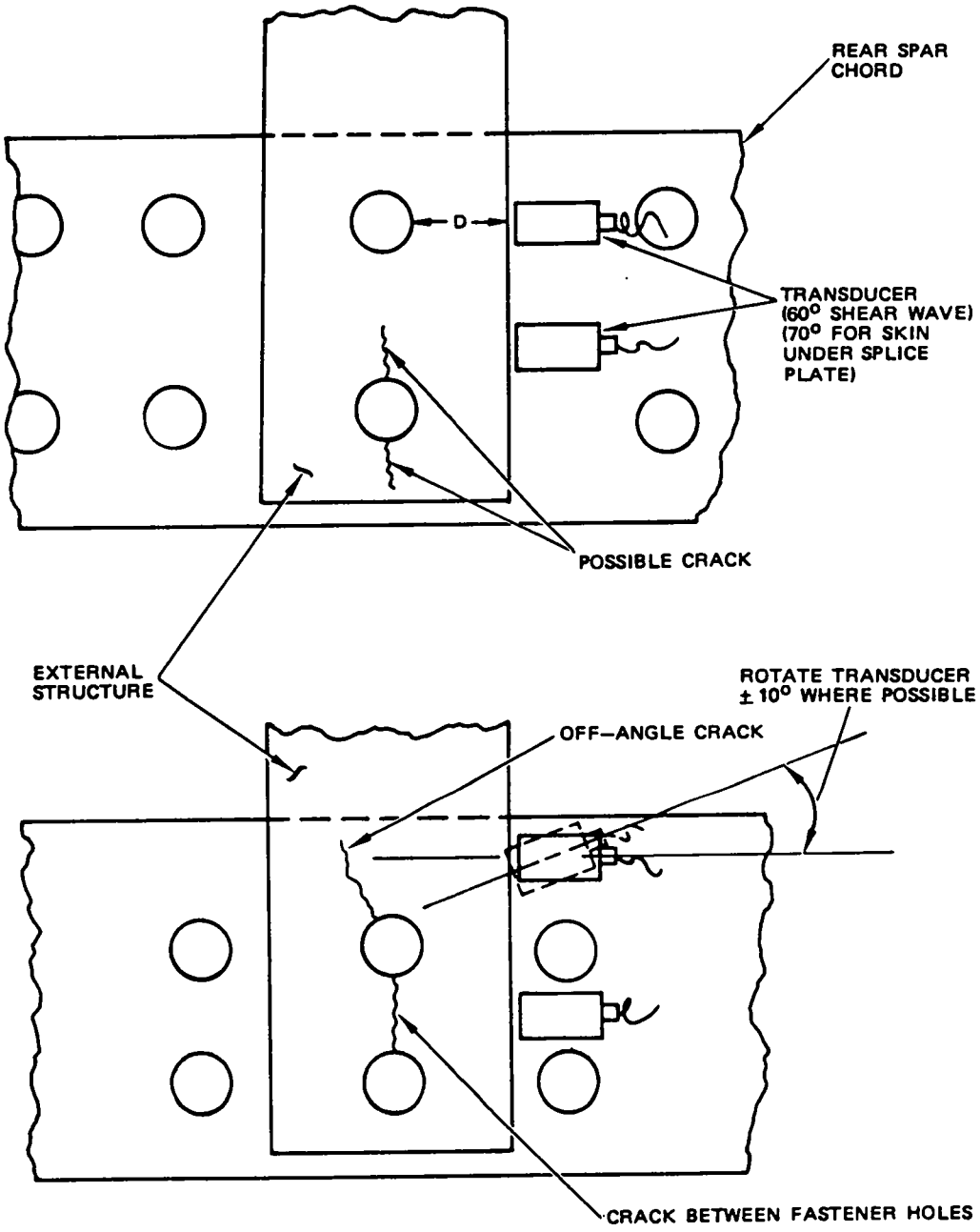
REFERENCE STANDARD 096 FOR SKIN INSPECTION CALIBRATION
DETAIL VIII

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 39)



INSTRUMENT CALIBRATION FOR INSPECTION OF REAR SPAR CHORD
DETAIL IX

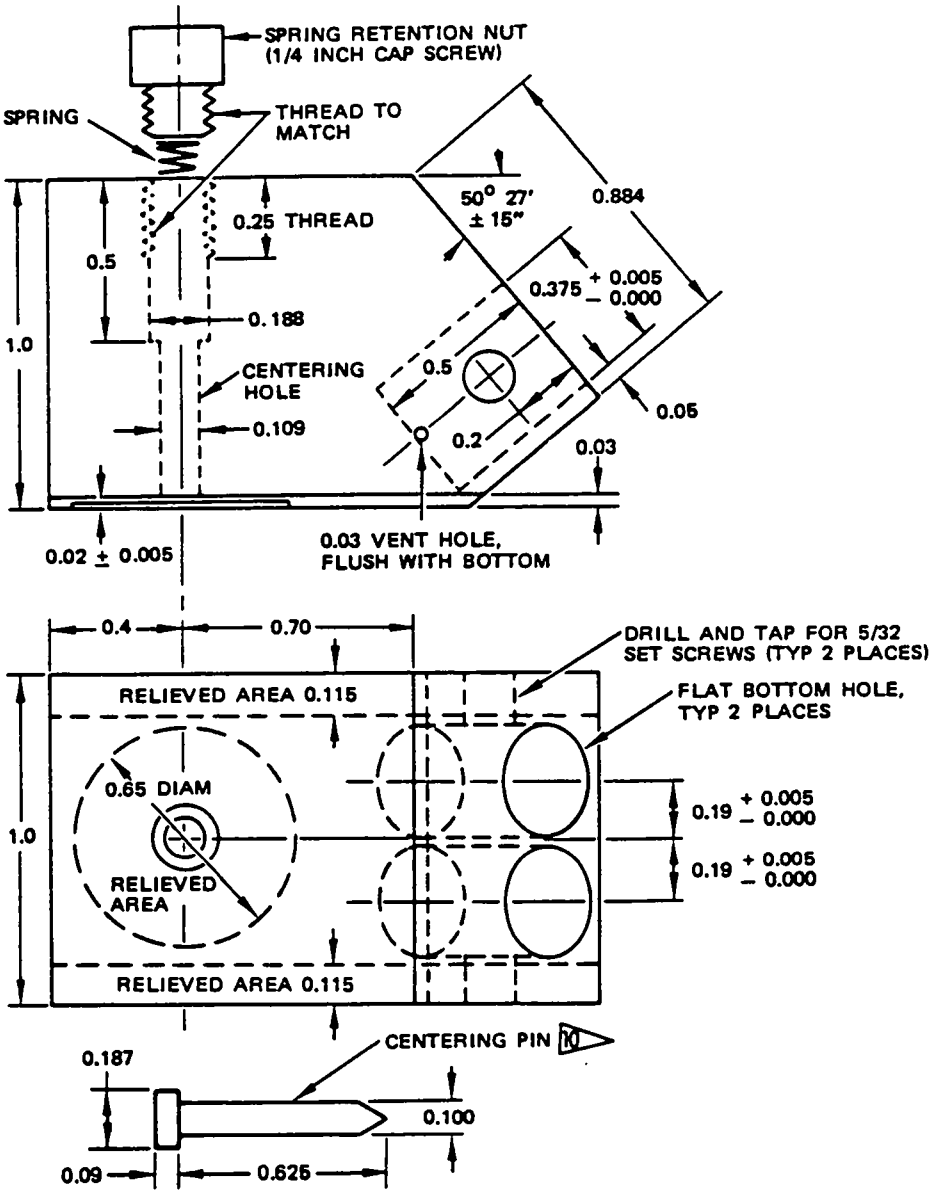
Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 40)



INSPECTION OF REAR SPAR CHORD
(INSPECTION OF SKIN UNDER SPLICE PLATE SIMILAR)

DETAIL X

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 41)



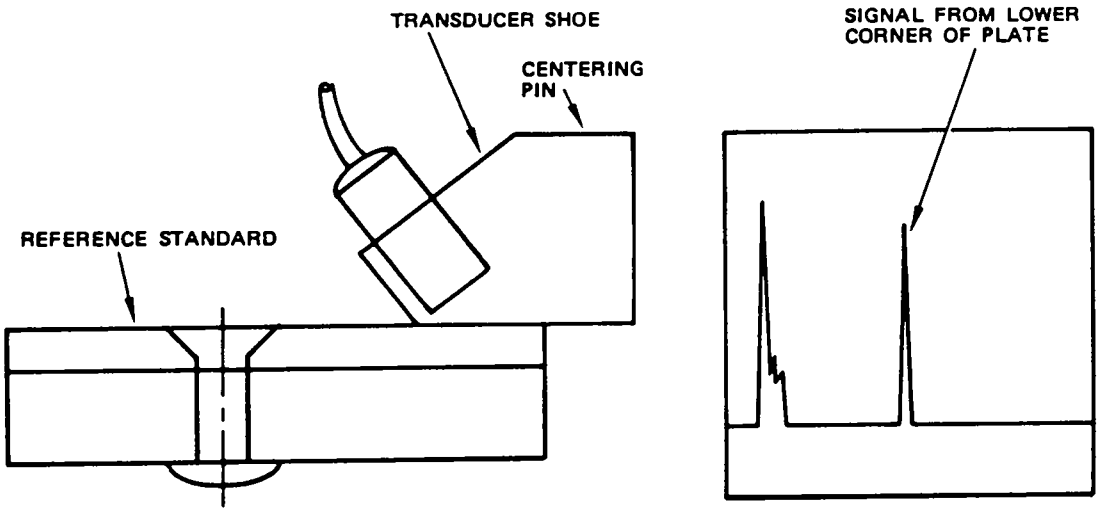
NOTES

- MACHINE CENTERING PIN FROM TOOL STEEL FOR SLIP-FIT IN CENTERING HOLE
- MATERIAL: LUCITE
- TOLERANCE: ± 0.010 EXCEPT AS NOTED
- ETCH WITH NO. PF3 ON TOP SURFACE
- ALL DIMENSIONS ARE IN INCHES
- P/N 6410-11 AVAILABLE FROM IDEAL SPECIALTY CO. 2531 E. INDEPENDENCE ST. TULSA, OKLAHOMA 74110

10 INSTALL CENTERING PIN IN HOLE, ADD LIGHT TENSION SPRING AND RETAIN WITH RETENTION NUT

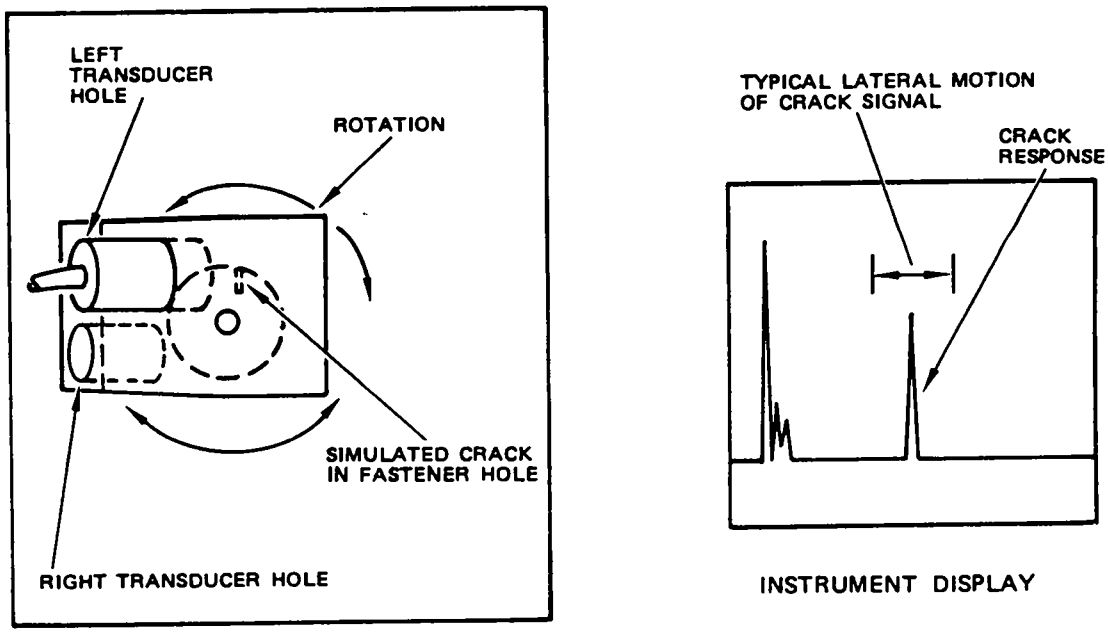
TRANSDUCER POSITIONING FIXTURE NO. PF3
DETAIL XI

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 42)



POSITION 1

INSTRUMENT DISPLAY

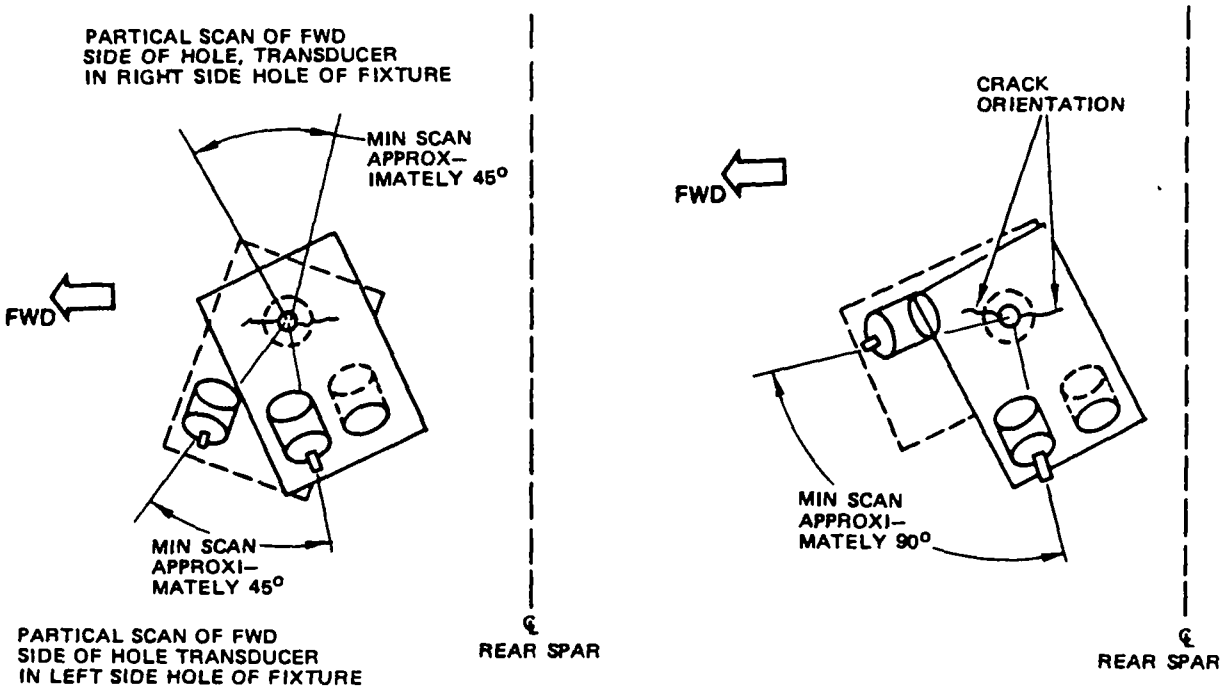


POSITION 2

INSTRUMENT DISPLAY

DETAIL XIV CALIBRATION FOR SKIN INSPECTION

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 45)



A. INSPECTION IS POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN LEFT SIDE POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD. SIDE OF HOLE BY PLACING TRANSDUCER IN RIGHT SIDE HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE.

B. INSPECTION IS POSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

SCAN FWD. SIDE OF FASTENER WITH TRANSDUCER IN LEFT SIDE HOLE AS INDICATED. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN RIGHT SIDE HOLE.

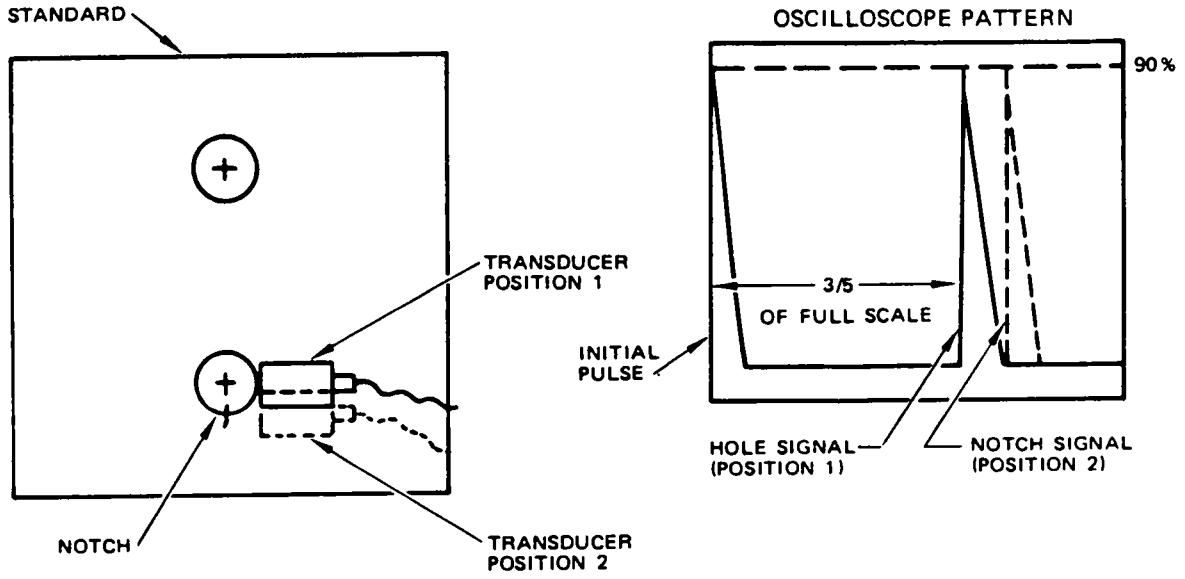
NOTE

- IF MINIMUM SCANS CANNOT BE PERFORM INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PAR. 5.C.

MINIMUM INSPECTION COVERAGE WHERE ADJACENT FASTENERS INTERFERE WITH SCAN

DETAIL XV

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 46)



NOTE

SELECT STANDARD AND HOLE SPECIFIED IN TABLE II FOR HOLE IN SKIN TO BE INSPECTED

TRANSDUCER CALIBRATION POSITION
FOR ALTERNATE INSPECTION OF SKIN

DETAIL XV

Wing Upper Rear Spar Chord Vertical Flange
Figure 7 (Sheet 47)

PART 4 - ULTRASONIC

WINGS - MAIN FRAME

1. Purpose

   A. To detect cracks out of fastener holes in the wing center section lower rear spar chord vertical flange where covered by vertical stiffeners.

   B. This inspection requires wing tank entry. Fuel tank must be drained and purged to a health safe condition (as defined by Chapter 28 of the Maintenance Manual) before entering tank with an ultrasonic instrument. The ultrasonic instrument must be battery powered.

      NOTE: Approval for operating ultrasonic equipment in a fuel tank with the conditions stated above must be obtained from local Airline/Airport fire department.

2. Equipment

   A. Any ultrasonic equipment 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:

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

      (2) Transducer:

      Automation Industries, 5 MHz, 60° A (miniature transducer), or a transducer and wedge assembly not wider than 0.3 inch.

   B. Fabricate Reference Standard per Detail I.

3. Prepare for Inspection

   A. Gain access to interior of wing center section through lower center section access panels.

   B. Remove fuel cells and lower surface backing panels as necessary to gain access to the lower rear spar.

   C. Remove sealant or surface coating as necessary for good transducer contact to surface of lower rear spar chord vertical leg at vertical stiffeners.

Wing Center Section Lower Rear Spar Chord Vertical Flange
Figure 8 (Sheet 1)

4. Calibrate Instrument

A. Coat the rear spar standard (Detail I) with a thin film of couplant.

B. Place transducer on the standard with transducer leading edge behind the scribe line which is 0.7 inch from the hole edge.

NOTE: There are two scribe lines on the calibration standard, one on each side of the holes. The scribe lines represent the approach limit of the transducer to the airplane fastener hole as a result of intervening structure (vertical ribs). The calibration procedure uses the two scribe lines to show the response pattern associated with the restriction on fastener hole-to-transducer proximity.

C. Move to transducer to the unnotched hole and manipulate to obtain a maximum signal from the hole. Transducer must remain behind the scribe line during calibration.

D. Adjust the instrument sweep controls so the indication from the hole appears at approximately 3/4 of screen width. See Detail II.

E. Adjust instrument sensitivity so that the amplitude of the hole signal is between 90 and 100% of maximum.

F. Move the transducer to the notched hole and note position of hole response as compared to position of notch response as shown in Detail III.

G. Place the transducer on the standard with the transducer leading edge behind the scribe line which is 0.5 inch from the hole.

H. Move the transducer to the notched hole and note the locations of the hole and notch signals.

I. Final adjustment for untrasonic test sensitivity should be accomplished on the airplane.

5. Inspection Procedure

WARNING: PRECAUTIONS AND SAFETY PROCEDURES CONTAINED IN CHAPTER 28 OF THE MAINTENANCE MANUAL MUST BE FOLLOWED BY PERSONNEL ENTERING ANY TANK THAT HAS CONTAINED FUEL. USE ONLY BATTERY-OPERATED, EXPLOSIONPROOF LIGHTS IN VICINITY OF OPEN FUEL TANKS. POSSIBILITY OF EXPLOSION AND TOXIC DANGER EXISTS IN VICINITY OF FUEL TANKS WHICH HAVE CONTAINED FUEL.

A. Place transducer on the rear spar and position to detect hole A (Detail IV, Position 1). Maximize the hole response and readjust instrument sensitivity to obtain a 90 to 100% hole signal.

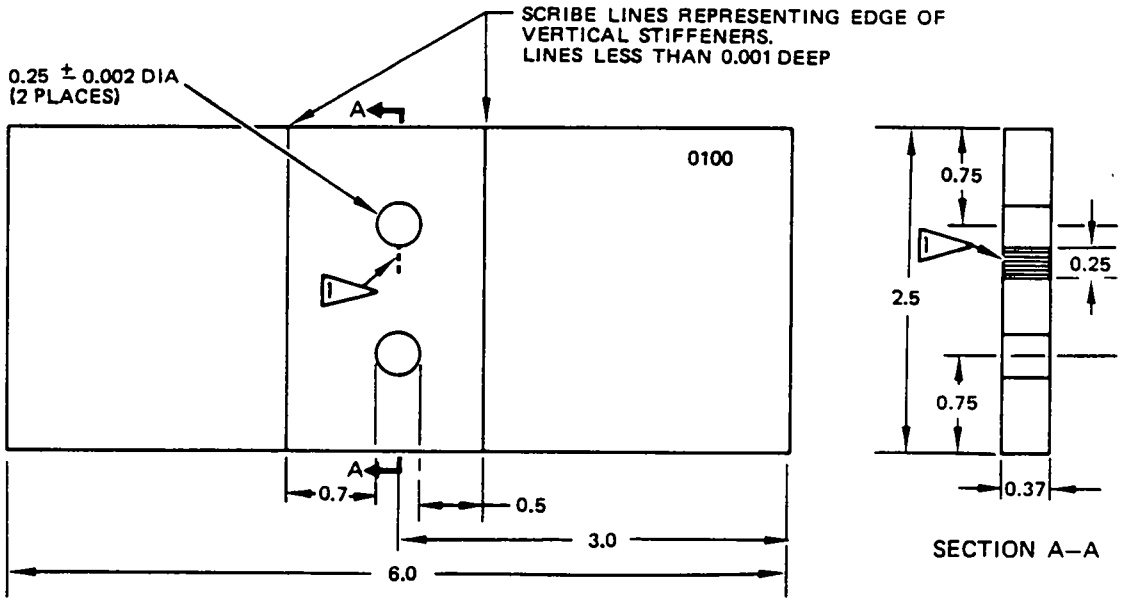
Wing Center Section Lower Rear Spar Chord Vertical Flange
Figure 8 (Sheet 2)

B. Scan the transducer laterally on the rear spar to detect cracks out of the side of fastener holes A and B. See Detail IV.

C. Scan from opposite side of the vertical rib if adjacent fasteners interfere with transducer positioning (Detail IV, Position 2).

D. Any ultrasonic indication occurring at the inspection area whch is not from hole edge (Detail IV) and which has a signal height of 50% or more of screen height is a potential crack and should be investigated. Any indication between fastener holes or appearing at the same location on the oscilloscope screen as the notch indication in the calibration suggests a possible crack.

Wing Center Section Lower Rear Spar Chord Vertical Flange
Figure 8 (Sheet 2A)

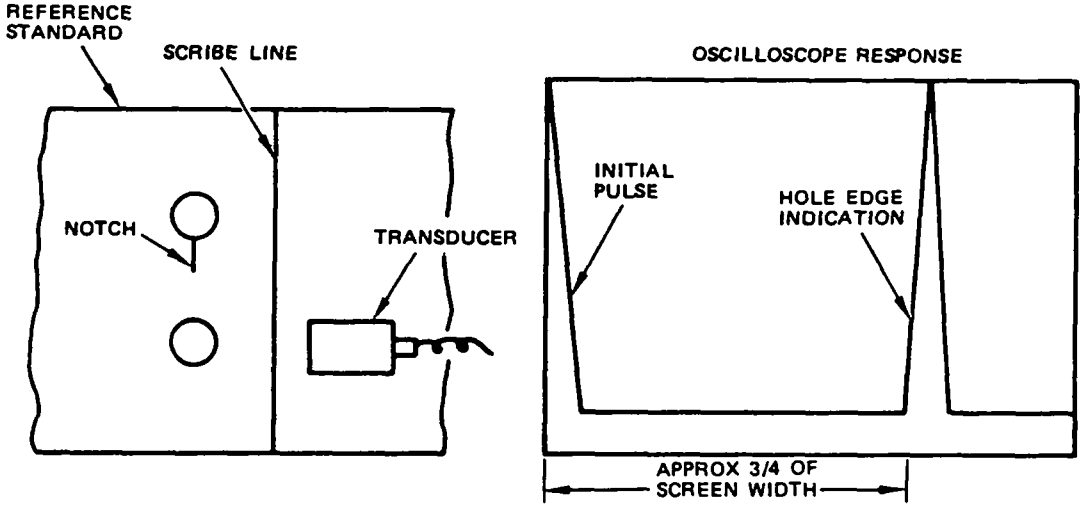


NOTES

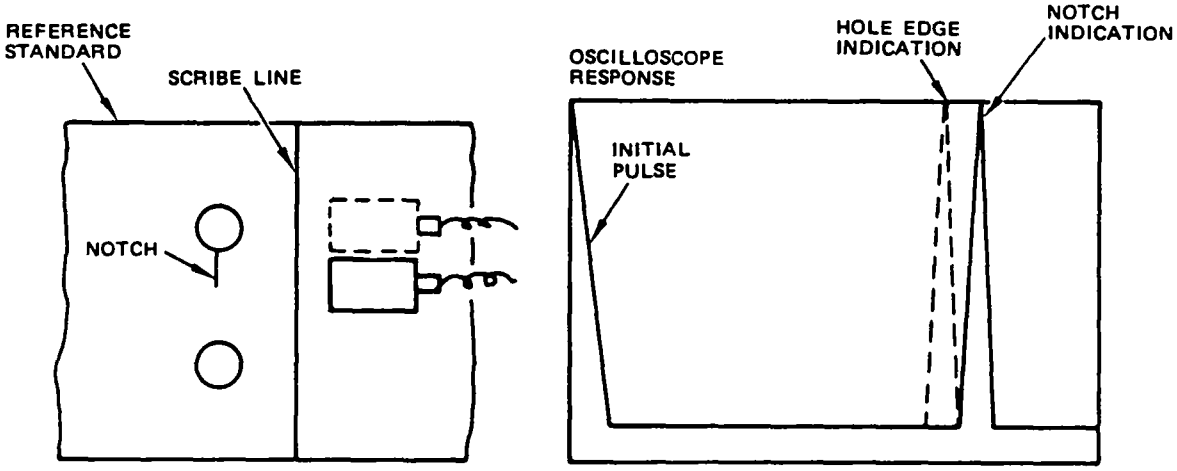
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T4 OR T6 ALUMINUM
- TOLERANCE: X.X = ± 0.05 X.XX = ± 0.05
- P/N 6411–44
  AVAILABLE FROM IDEAL SPECIALTY CO.
- ETCH OR STEEL STAMP WITH 0100
- (1) JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 0100
DETAIL I

Wing Center Section Lower Rear Spar Chord Vertical Flange
Figure 8 (Sheet 3)

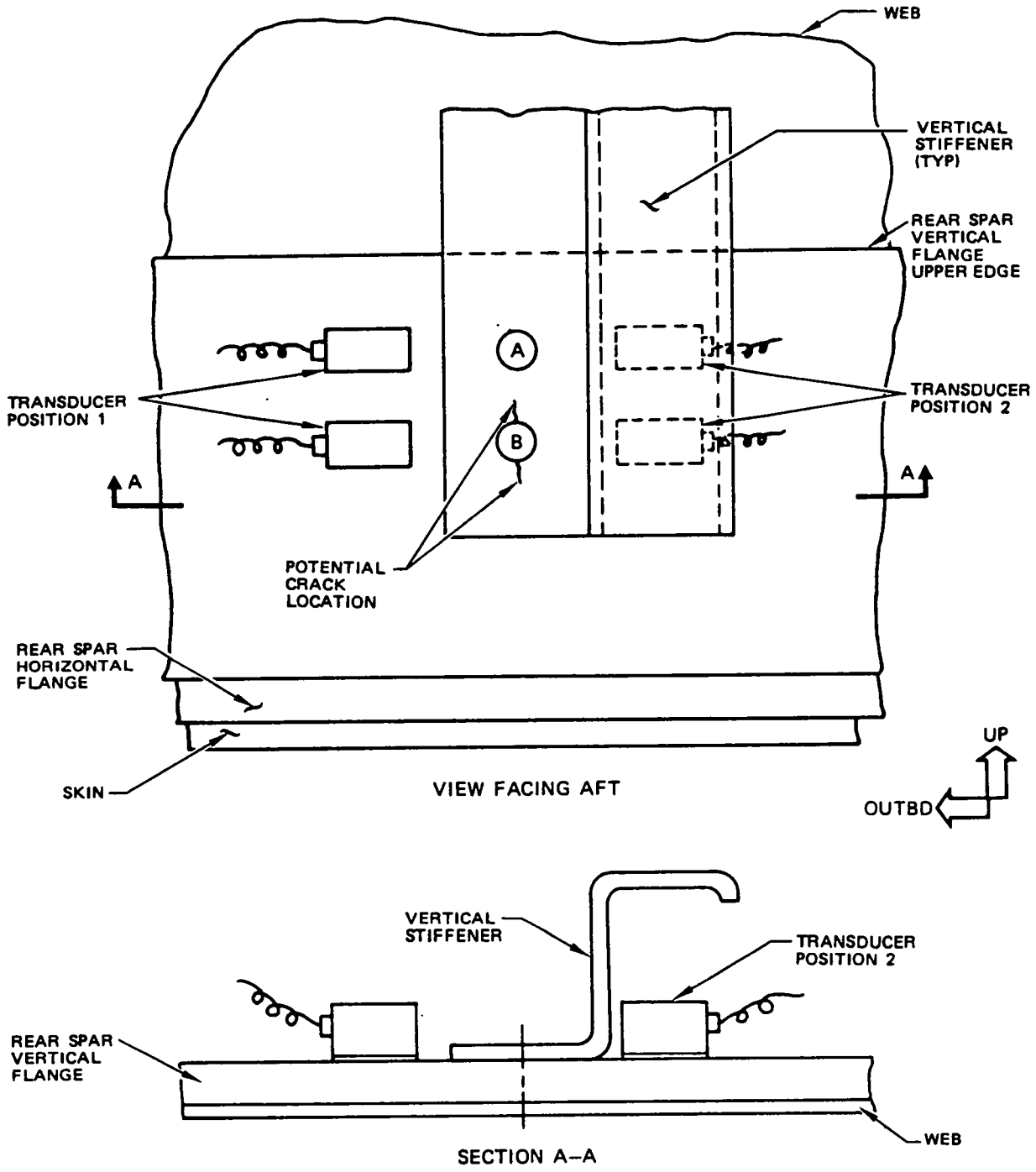


CALIBRATION INDICATION FROM UNNOTCHED HOLE EDGE
DETAIL II



CALIBRATION INDICATION FROM NOTCH AND HOLE EDGE
DETAIL III

Wing Center Section Lower Rear Spar Chord Vertical Flange
Figure 8 (Sheet 4)



REAR SPAR HORIZONTAL AND VERTICAL FLANGES
DETAIL IV

Wing Center Section Lower Rear Spar Chord Vertical Flange
Figure 8 (Sheet 5)

PART 4 - ULTRASONIC

WING - UPPER REAR SPAR CHORD

1. Purpose

   A. To detect cracks emanating from selected fastener holes using low frequency eddy current:

      (1) In the vertical flange of the wing upper rear spar chord.

      (2) In the wing skin at fasteners common to the rear spar.

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

   B. The shear wave transducers used for this inspection are .35 wide by .72 long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

      (1) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A3065), side mounted microdot connector.

      (2) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A8300), top mounted microdot connector.

      (3) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 70° A (57A3066).

      (4) Longitudial Wave, 0.25 inch dia. element, 5 MHZ, 0.375-inch dia. case.

      NOTE: Transducers (1) and (2) are both necessary due to restricted access to the RS vertical flange.

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 1)

C. Reference Standard

(1) Fabricate three reference standards per Details III, IV and V.

D. Transducer Positioning Fixture

(1) Obtain transducer positioning fixtures PF2 and PF3 per Part 4, 57-10-07, Fig. 2, Detail VII and Part 4, 57-10-07, Fig. 7, Detail XI.

E. Couplant

(1) Light oil or grease.

3. Preparation for Inspection

NOTE: This inspection can be performed from outside the wing with the part in place on the airplane.

A. Remove paint at inspection areas on the chord to improve sound transmission. Smooth out any surface roughness by sanding lightly.

B. Remove paint for inspection of the skin.

C. Wipe surface clean.

D. Lightly prick punch the center of the inspection fasteners in the skin.

E. Apply a thin film of couplant to the inspection area.

F. Move wire bundles as necessary to gain access to inspection area.

4. Instrument Calibration

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord.

(1) Select a fastener location to be inspected. See Detail I.

(2) From Table I identify the Detail III reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table II obtain distance D. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

(4) Obtain a signal from the standard hole. Position this signal at mid-scale. See Detail VI.

(5) Adjust instrument sensitivity to obtain a 90 percent of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 0.25 inch through thickness notch. Note the difference in the position of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

(1) Select a fastener location to be inspected from Detail II.

(2) From Table II identify the reference standard and transducer positioning fixture required for the holes to be inspected.

(3) Coat 0.375 inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail VIII.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail VIII, i.e., align the pin hole with the edge of the standard.

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. See Detail VIII, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument sensitivity to produce approximately a 90% crack signal on the instrument display.

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table 2 which is designated for the hole to be inspected.

(2) Select the transducer as follows:

Locations 1-3	60° Shear Wave, See par. 2.B.(1).
Locations 4-7	70° Shear Wave, See par. 2.B.(3).

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close to the edge of the fastener head as shown in Position 1, Detail X.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in Detail X.

(6) Move transducer laterally to detect the calibration notch as shown in Detail X, Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximately 100% of full scale.

5. Inspection Procedure

A. Inspection of fastener locations common to vertical flange of rear spar chord.

(1) Select fastener location to be inspected from Detail I.

(2) Calibrate instrument according to Par. 4.A.

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail I.

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument sensitivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

(5) Move the transducer laterally and rotate through approximately ±20° to inspect for cracks out of the fastener hole. See Detail VII.

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge - compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response, or, a response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(c) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Detail I.

B. Inspection of wing skin at fastener holes common to rear spar horizontal flange. See Detail II.

(1) Select inspection location from Detail II and specific fasteners to be inspected from Table II.

(2) Calibrate instrument according to Par. 4.B.

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: 1. Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener being inspected. The minimum extent of scan is shown in Detail IX.

2. If the minimum scan cannot be performed, it will be necessary to scan with a hand held transducer calibrated per Par. 4.C. Inspect per Par. 5.C.

(4) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(5) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(6) Repeat inspection procedure for each location identified in Detail II.

(7) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

(1) Calibrate instrument per Par. 4.C.

(2) Position the ultrasonic transducer inboard or ouboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer approximately $\pm$ 20° about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response whould be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole (or known good hole) in similar structure on the airplane.

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 7)

LOCATION NO. [1]	APPROX. W.S.	FASTENER CODE NUMBERS	FASTENER DIA (INCH)	CHORD THICKNESS	D [2] (INCH)
1	243	130	7/16	0.30	1.16 [3]
2	283	311, 318	3/16	0.15	0.35
3	288	350, 351	5/16	0.15	0.34
4	291	385, 386	3/16	0.15	0.41
5	299	440	3/16	0.15	0.41
6 [4]	307	491	1/4	0.15	0.43

INSPECTION PARAMETERS-
UPPER REAR SPAR CHORD, VERTICAL FLANGE
TABLE 1

NOTES

- ALL DIMENSIONS ARE IN INCHES.

[1] SEE DETAIL I FOR INSPECTION LOCATIONS.

[2] D = DISTANCE BETWEEN LEADING EDGE OF TRANSDUCER AND EDGE OF FASTENER HOLE TO BE USED FOR CALIBRATION. ON THE CHORD, D IS THE DISTANCE BETWEEN THE HOLE AND THE CLOSEST POSSIBLE LOCATION FOR TRANSDUCER PLACEMENT.

[3] ACTUAL DISTANCE ON THE CHORD IS 0.58 BUT CALIBRATION ON REFERENCE STANDARD IS PERFORMED AT 1.16 TO COMPENSATE FOR DOUBLE CHORD THICKNESS.

[4] THIS LOCATION IS FOR CUM LINE NOS. 562 AND ON.

NONDESTRUCTIVE TEST

LOCATION NO. [5]	APPROX. WS	FASTENER CODE NUMBERS	FASTENER DIA.	SKIN THICKNESS	POSITIONING FIXTURE	REFERENCE STANDARD
1	272 to 277	74,75,76,78, 79,81,82,83	1/4	0.33	PF3	098
2	280 to 289	88 to 96,98, 99,100	5/16,1/4	0.33	PF3	098
3 [6]	300 to 305	122 to 126	1/4	0.32 to 0.29	PF3	098
4 [6]	311 to 315	137,139 to 143	1/4	0.25 to 0.23	PF2	095 [8]
4A [7]	311 to 315	142,143,401, 402,403	3/16, 1/4	0.23	PF2	095 [8]
5	320 to 336	154 to 175	3/16	0.23	PF2	095 [8]
6	339 to 344	182 to 188	1/4	0.23	PF2	095 [8]
7	347-356	194 to 208	1/4	0.23	PF2	095 [8]

INSPECTION PARAMETERS
UPPER SKIN AT THE REAR SPAR
TABLE II

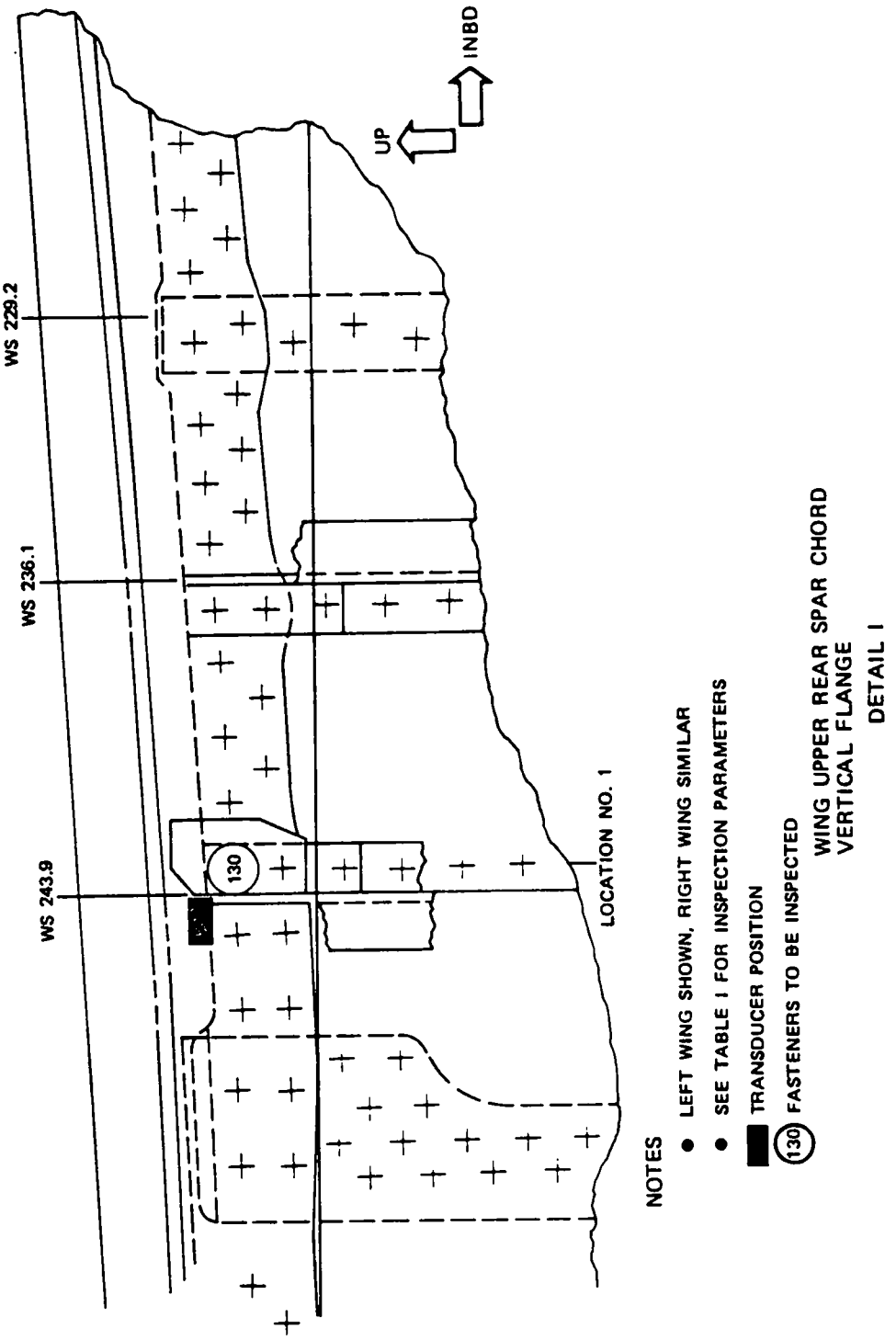
[5] SEE DETAIL II FOR INSPECTION LOCATIONS

[6] LINE NOS. 562 AND ON

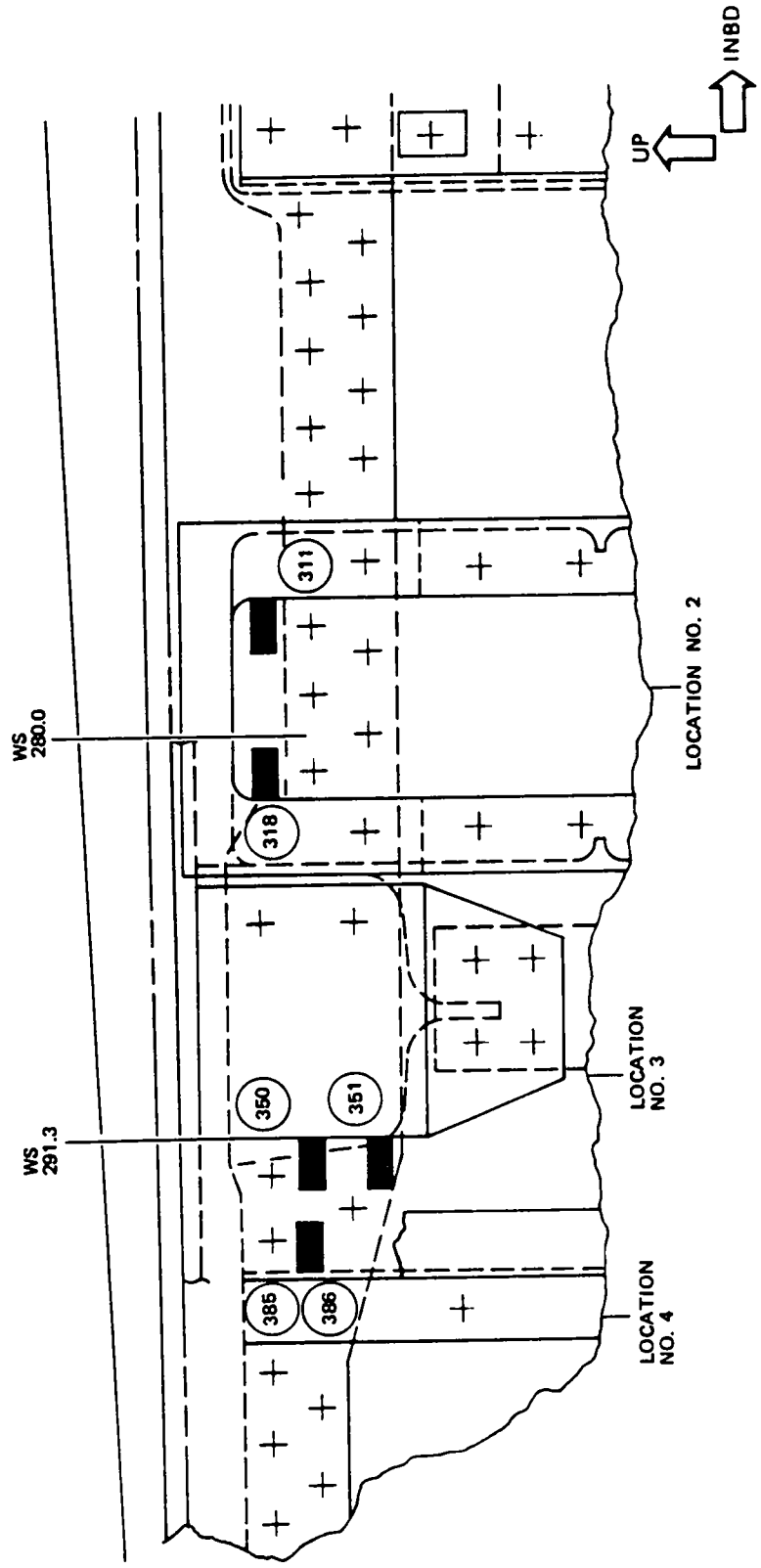
[7] LINE NOS. 1 THRU 558

[8] ON REFERENCE STANDARD 095, CALIBRATE ON THE HOLE WHICH IS THE SAME DIAMETER AS THE HOLE BEING INSPECTED.

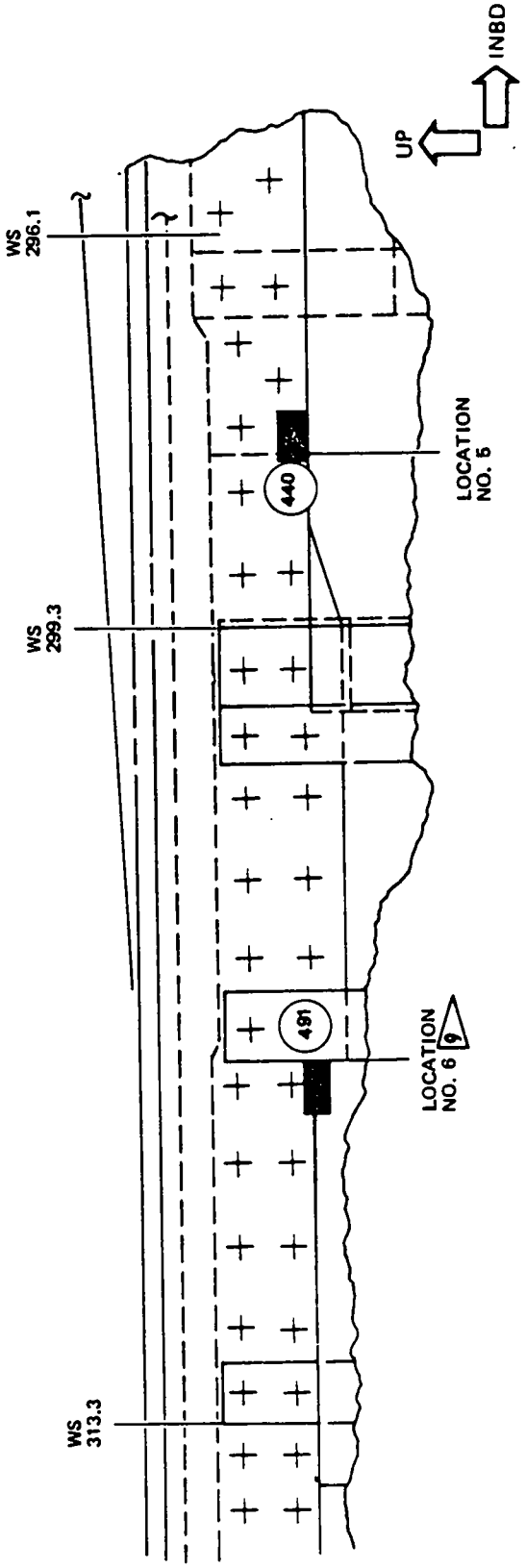
Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 9)



Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 10)



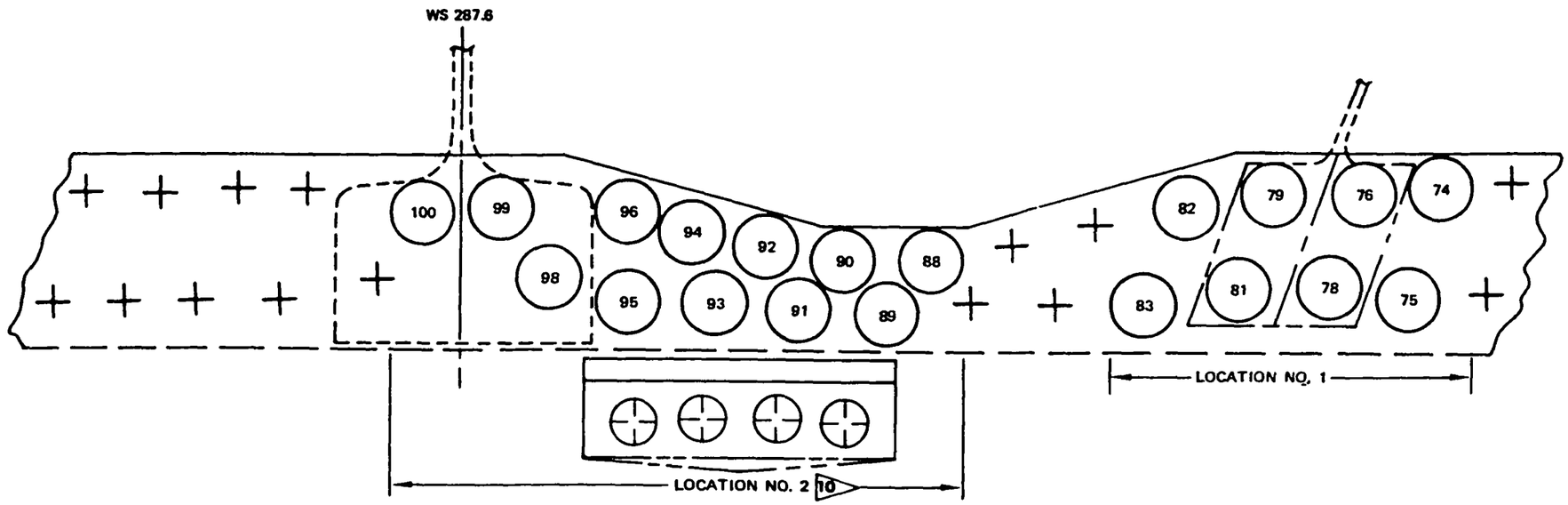
Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 11)

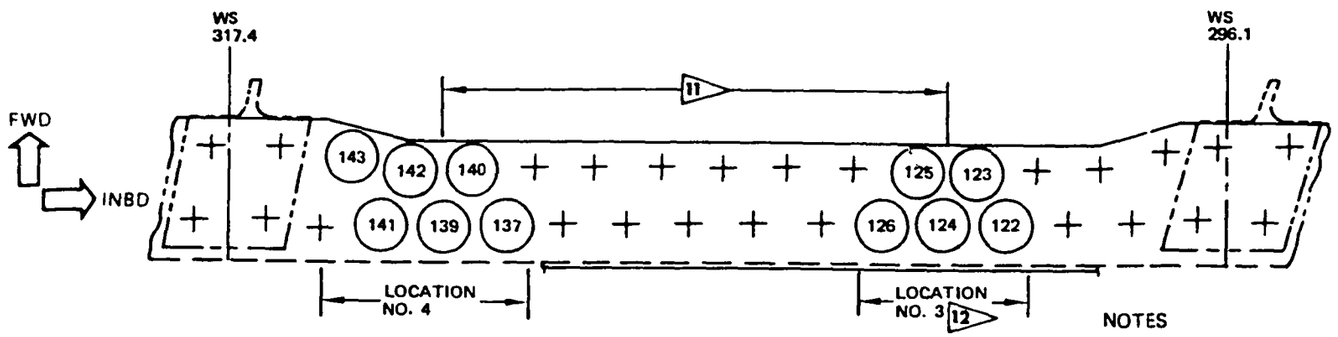


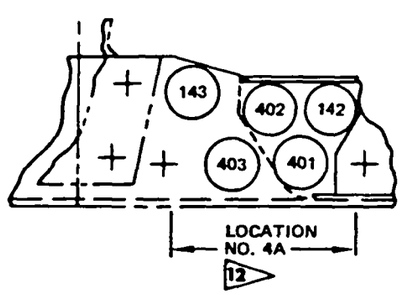
NOTES
- ● LEFT WING SHOWN, RIGHT WING SIMILAR
- ■ TRANSDUCER POSITION
- (491) INSPECTION FASTENERS
- 9 LOCATION 6 APPLIES TO AIRPLANES WITHOUT CHORD SPLICE AND SPLICE PLATE OVER CHORD VERTICAL FLANGE

WING UPPER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL I (CONT)

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 12)





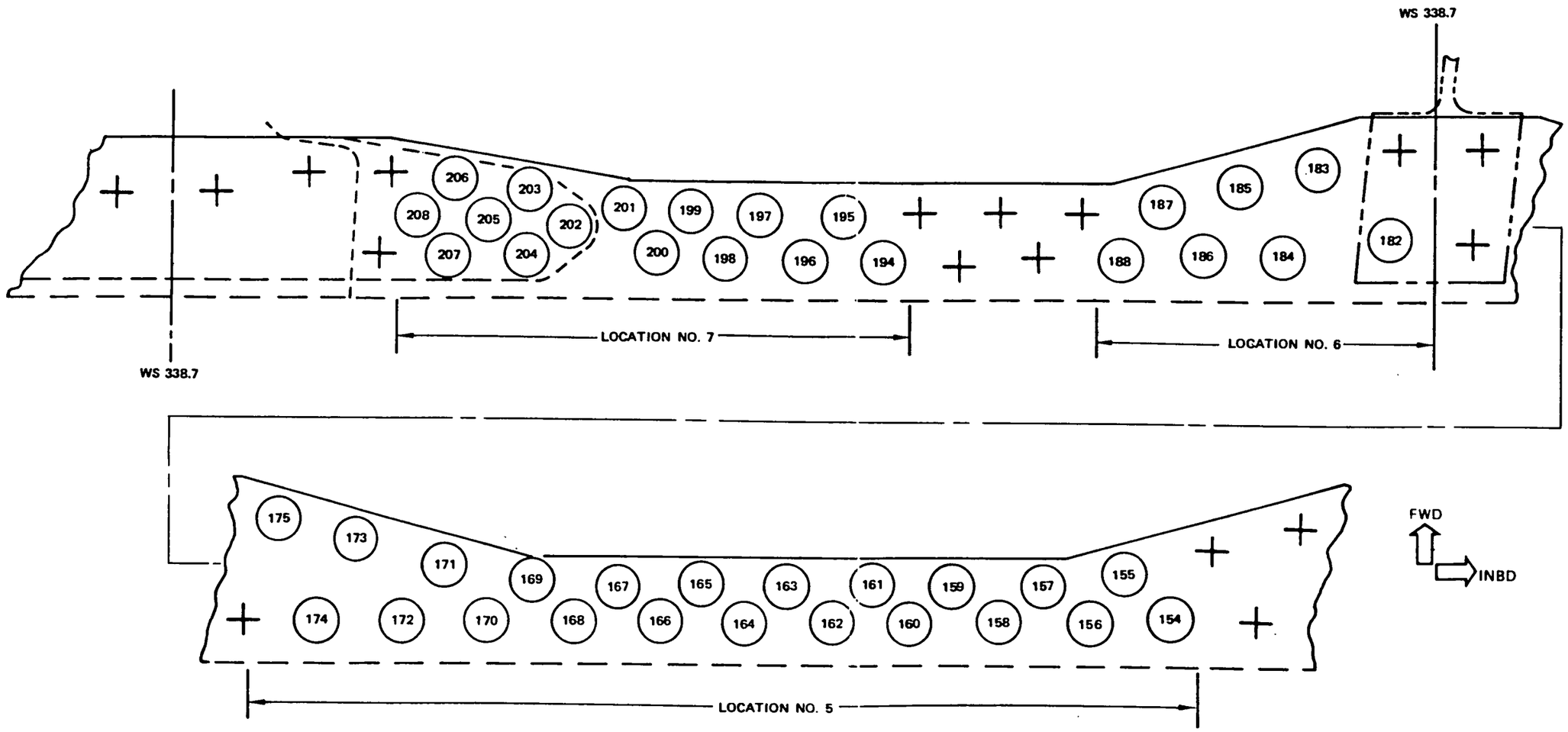


NOTES

- ● LEFT WING SHOWN, RIGHT WING SIMILAR
- (100) INSPECTION FASTENERS
- 10 LOCATION NO. 2 NOT REQUIRED AFTER ADDITION OF EXTERNAL DOUBLER
- 11 A/P CUM LINE NOS. 562 AND ON
- 12 A/P CUM LINE NOS 1 THRU 558 INCORPORATING SB 2177. LOCATION 4A IS REQUIRED ONLY IF NOT COVERED BY EXTERNAL DOUBLER

WING UPPER REAR SPAR CHORD SKIN AT HORIZONTAL FLANGE
DETAIL II (CONT)

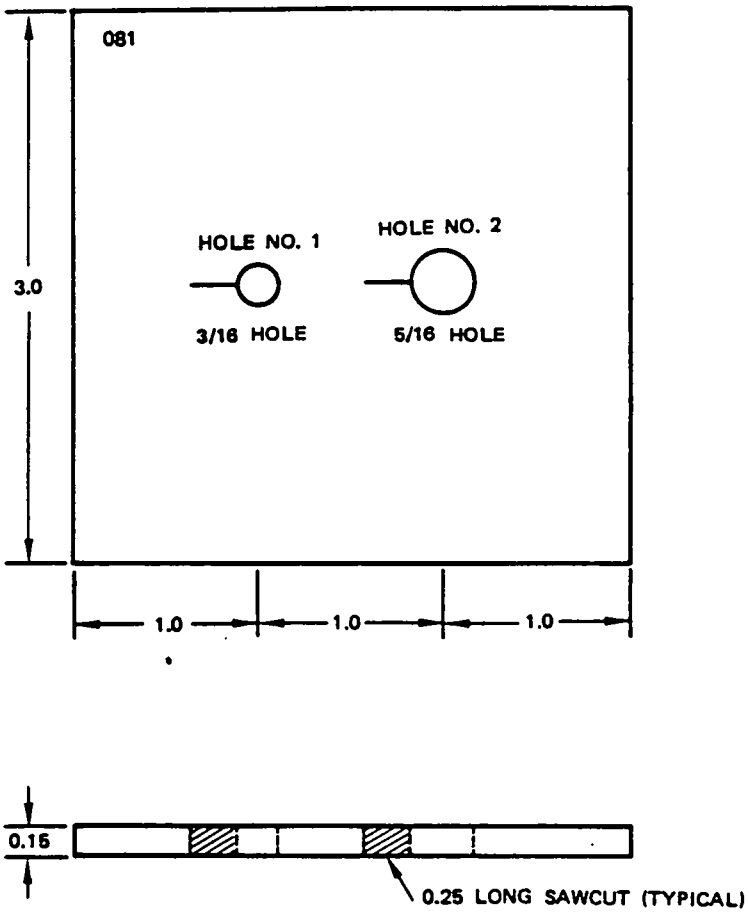
Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 13)



WING UPPER REAR SPAR CHORD
SKIN AT HORIZONTAL FLANGE

DETAIL II (CONT)

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 14)



NOTES

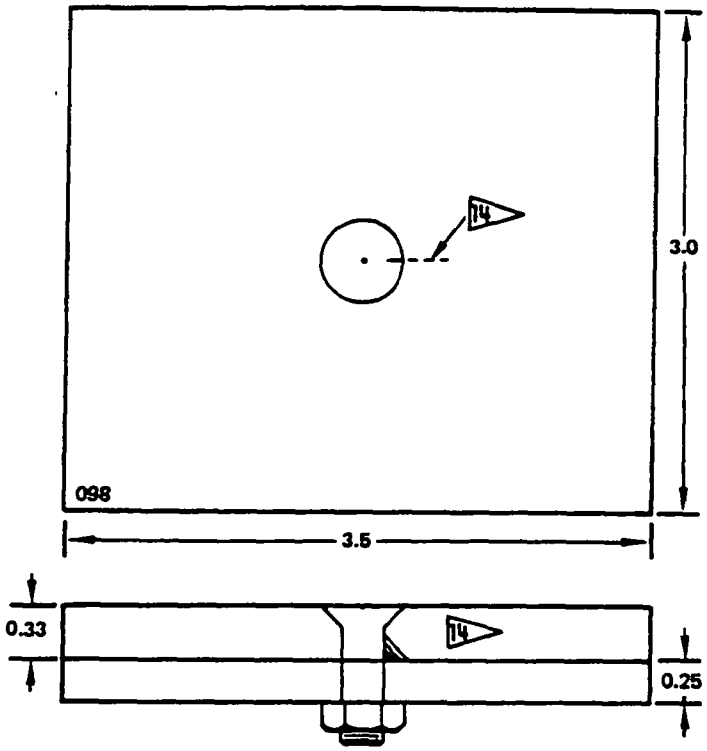
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 7075–T6; 2024–T4, –T6; 6061–T4, –T6 ALUMINUM
- TOLERANCE: X.X ± 0.030, X.XX ± 0.010
- ETCH OR STEEL STAMP WITH 081
- P/N: 6411–34
  AVAILABLE FROM
  IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE
  TULSA, OKLAHOMA 74110

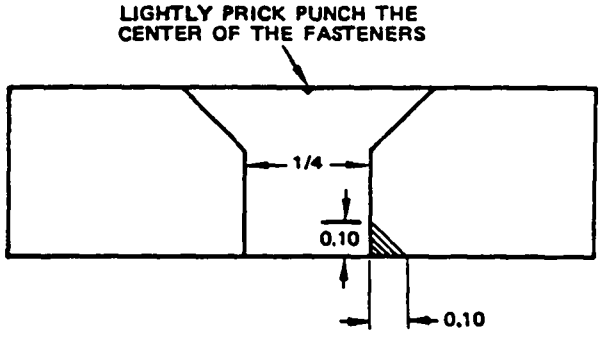
(13) JEWELERS' SAWCUT 0.030 MAX WIDTH (2 PLACES)

REFERENCE STANDARD 081
FOR REAR SPAR VERTICAL FLANGE

DETAIL III

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 15)



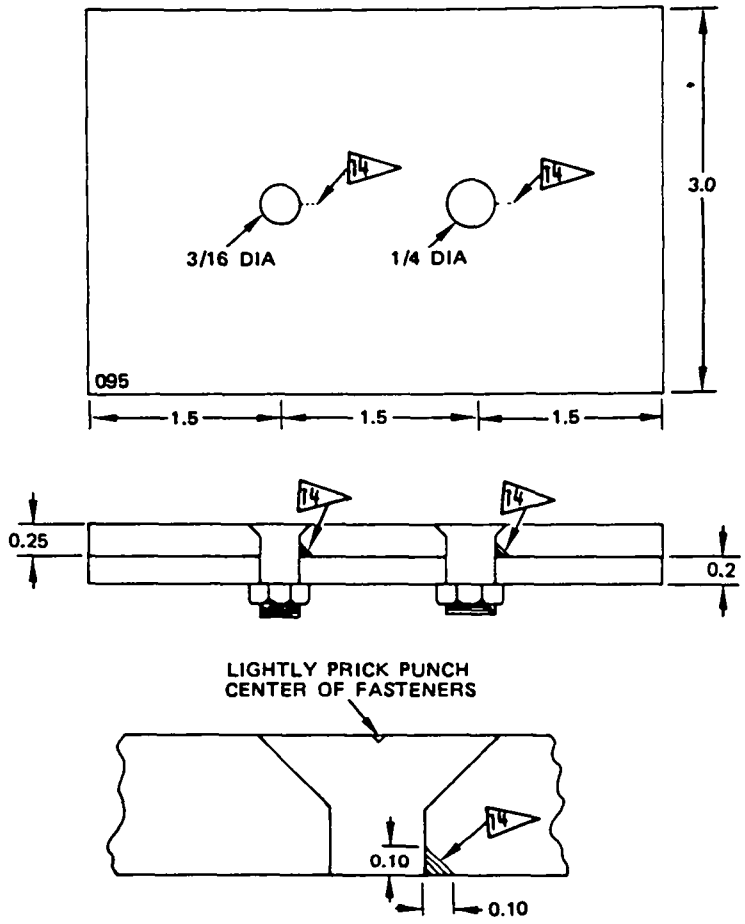


NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6, –T4; 6061–T4, –T6 ALUMINUM
- TOLERANCE: X.X ± 0.030 0.XX ± 0.010
- FASTENER TYPE: BACB30GY8–9, BACC30K8 COLLAR
- ETCH OR STEEL STAMP WITH 098
- P/N: 6411–42 AVAILABLE FROM IDEAL SPECIALTY CO. 2531 E. INDEPENDENCE TULSA, OKLAHOMA 74110

14 45° JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 098
FOR SKIN INSPECTION CALIBRATION
DETAIL IV
Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 16)



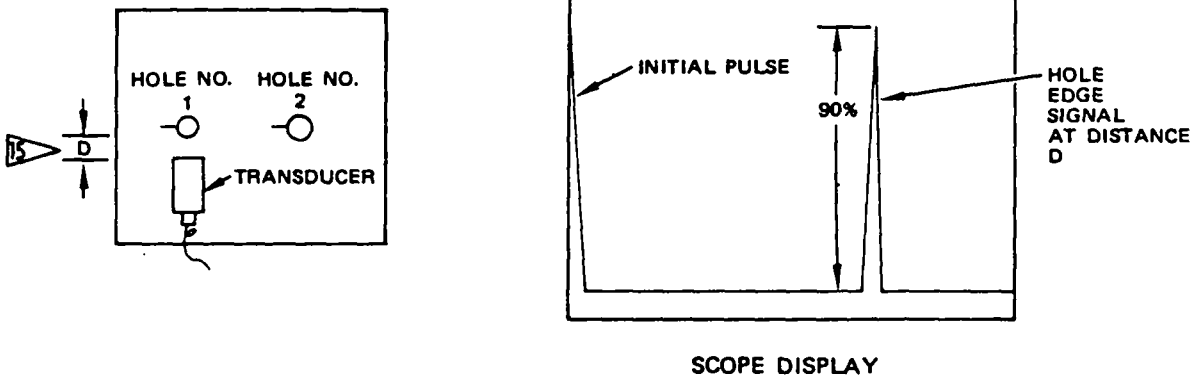
NOTES

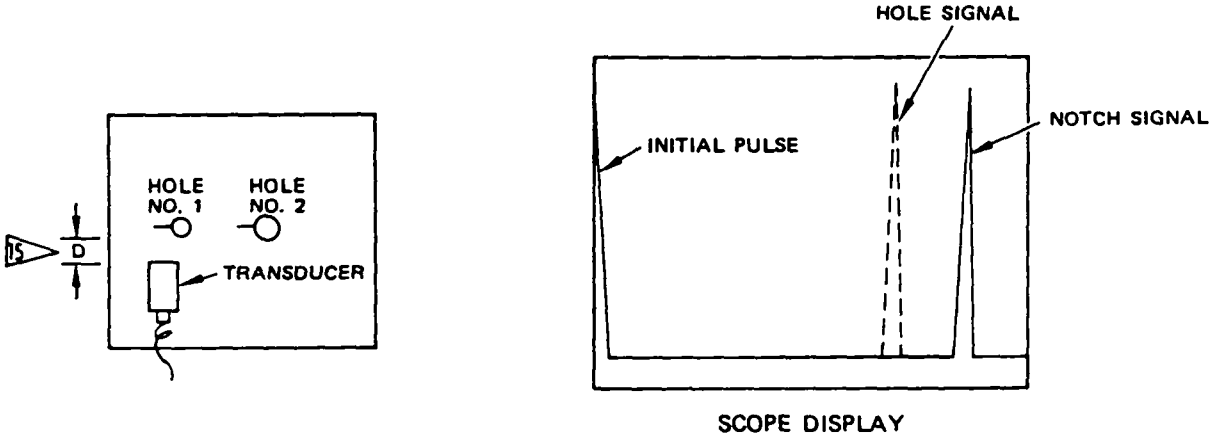
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6, –T4; 7075–T6; 6061–T4, –T6 ALUMINUM
- TOLERANCE: X.X ± 0.030 X.XX ± 0.010
- FASTENERS ARE BACB30LU3–7 WITH BACN10JC3 NUT AND BACB30LU4–7 WITH BACN10JC4 NUT
- ETCH OR STEEL STAMP WITH 095
- P/N: 6411–31 AVAILABLE FROM IDEAL SPECIALTY CO. 2531 E. INDEPENDENCE TULSA, OKLAHOMA 74110

14 45° JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 095
FOR SKIN INSPECTION CALIBRATION
DETAIL V

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 17)



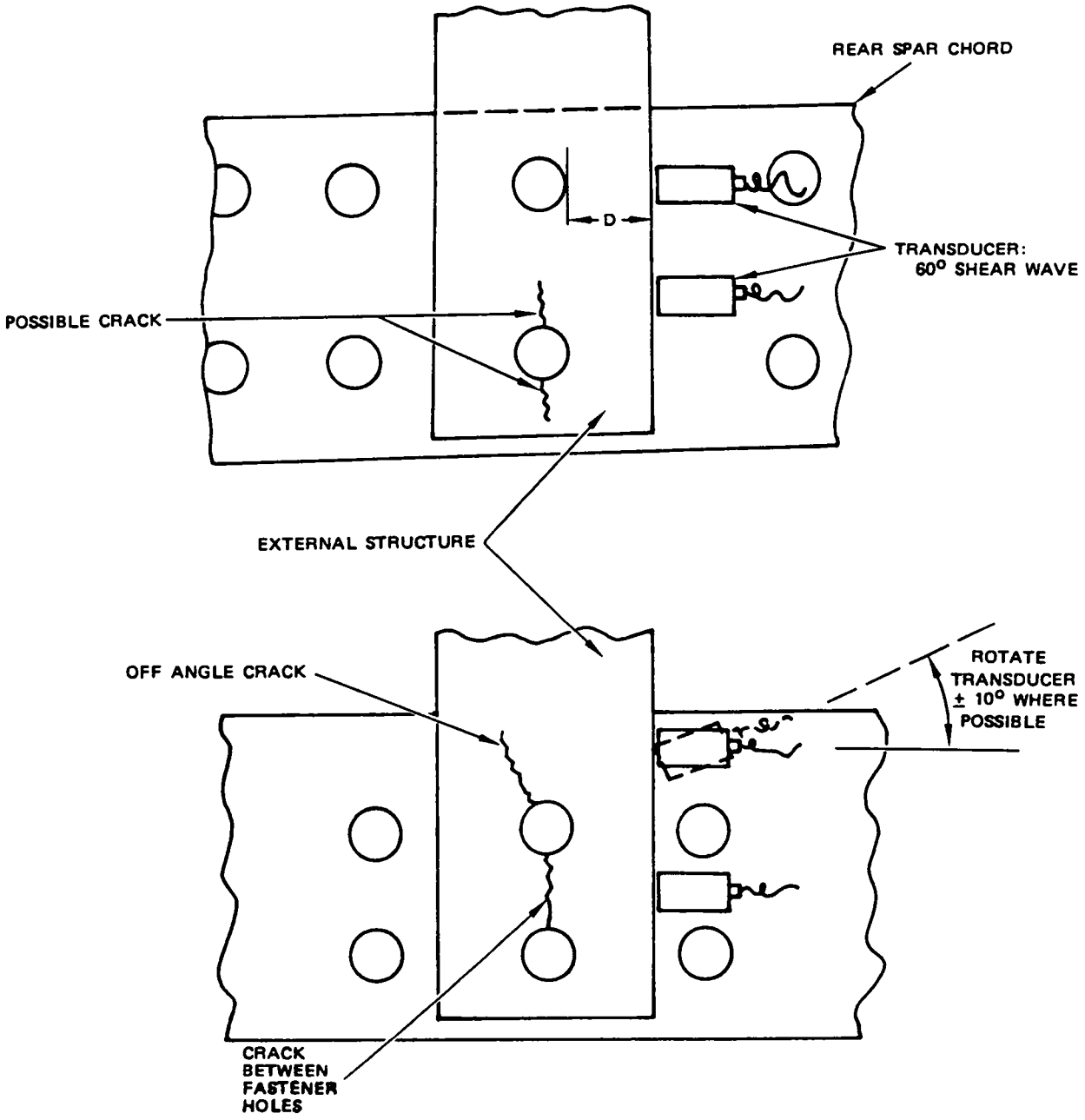


NOTES

15 REFER TO TABLE I FOR DEFINITION OF D

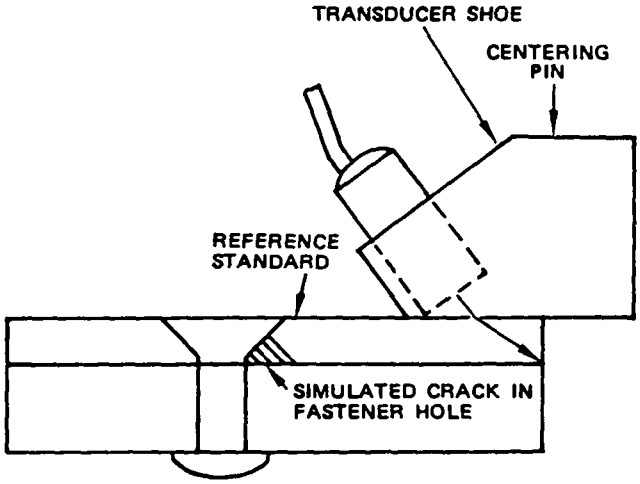
INSTRUMENT CALIBRATION FOR REAR SPAR CHORD
VERTICAL FLANGE
DETAIL VI

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 18)

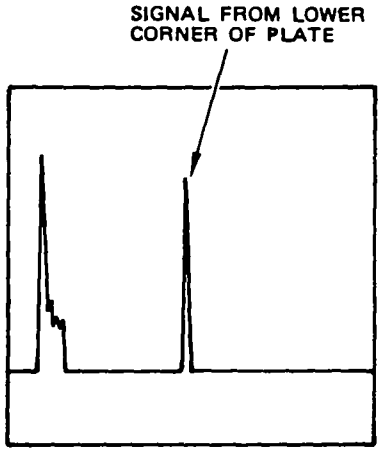


INSPECTION OF REAR SPAR CHORD VERTICAL FLANGE
DETAIL VII

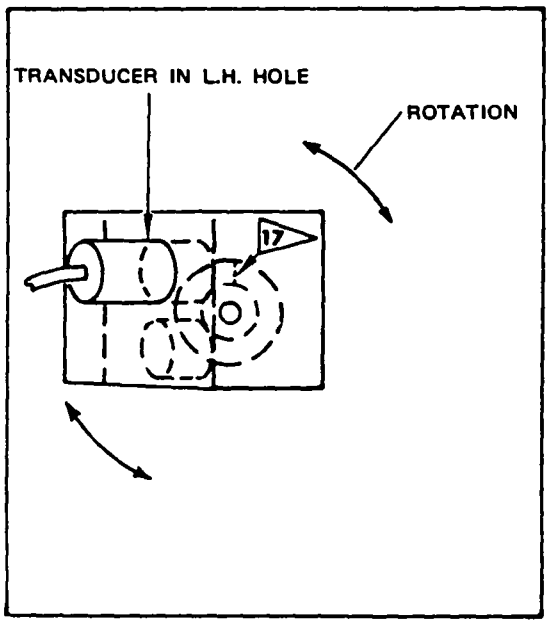
Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 19)



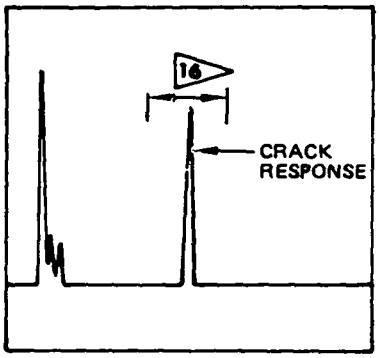
POSITION 1



INSTRUMENT DISPLAY



POSITION II



INSTRUMENT DISPLAY

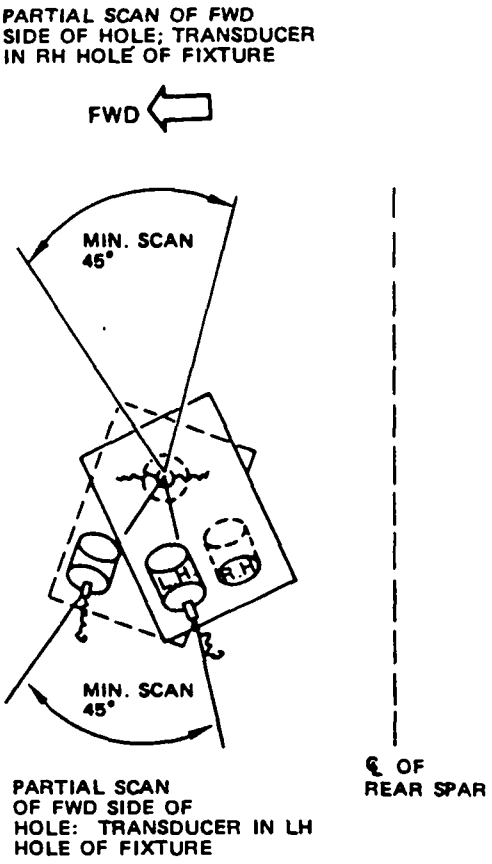
NOTES

16 TYPICAL LATERAL MOTION OF CRACK SIGNAL

17 SIMILATED CRACK IN FASTENER HOLE

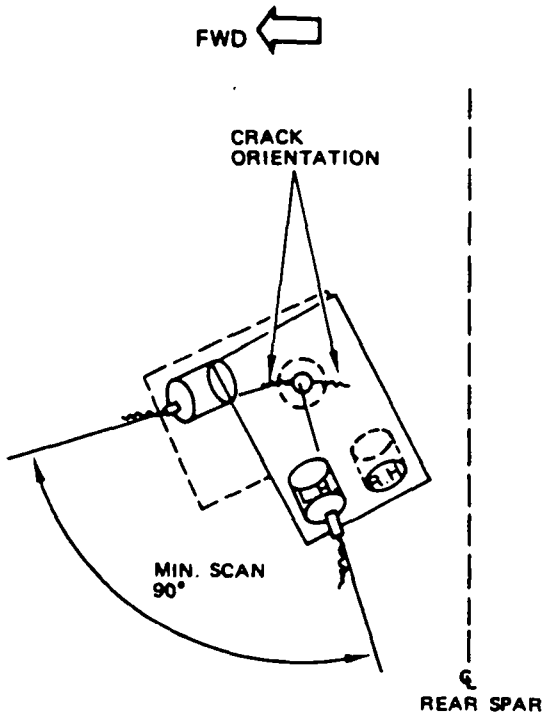
WING UPPER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL VIII

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 20)



A. INSPECTION POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN LH POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD SIDE OF HOLE BY PLACING TRANSDUCER IN RH HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE. SEE NOTE.



B. INSPECTION IS POSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

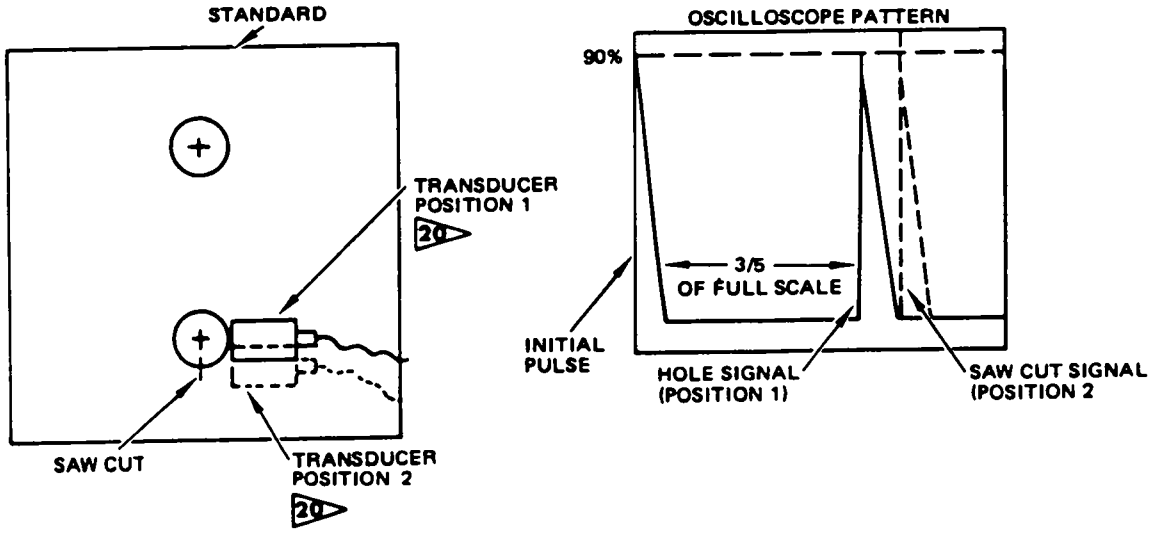
SCAN FWD SIDE OF FASTENER WITH TRANSDUCER IN LH HOLE AS INDICATED.. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN RH HOLE. SEE NOTE.

NOTE

IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PAR. 5.C.

MINIMUM INSPECTION COVERAGE WHEN ADJACENT FASTENERS INTERFERE WITH SCAN
DETAIL XI

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 21)



20 SELECT REFERENCE STANDARD HOLE SPECIFIED IN TABLE 2 FOR APPLICABLE FASTENER HOLE IN SKIN TO BE INSPECTED

TRANSDUCER CALIBRATION POSITION
FOR ALTERNATE INSPECTION OF SKIN
DETAIL X

Wing Upper Rear Spar Chord - Vertical Flange and Skin
Figure 9 (Sheet 22)

EFFECTIVITY

MODEL: 707-300/400/300B/300C LINE NOS. 13 THRU 671 MODIFIED PER SERVICE BULLETIN AND LINE NO 672 AND ON SERVICE BULLETIN
REFERENCE: 2606, 2607, 2731
SSI DOCUMENT (D6-44860)
REFERENCE:
SSD 57-A25-21 B, C, D
57-A35-21 B, C, D, E
57-A45-21 B, C, D, E

PART 4 - ULTRASONIC

WINGS - UPPER REAR SPAR CHORD

1. Purpose

A. To detect cracks emanating from selected fastener holes in the vertical flange of the wing upper rear spar chord and in the wing skin at fasteners common to the rear spar from side of body to WS 360.

B. This procedure provides instruction information for the following airplane modifications:

(1) New skin with external internally machined pad and new chord per SB 2607. See Detail IX.

(2) External doubler with new skin and chord per SB 2607. See Detail X.

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.

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

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 1)

B. The shear wave transducers used for this inspection are 0.35 inch wide by 0.72 inch long. Any transducers with the specified refracted angle of similar size which meet the performance requirements may be used.

(1) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A3065), side mounted microdot connector.

(2) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 60° A (57A8300), top mounted microdot connector.

NOTE: Transducers (1) and (2) are both required due to restricted access to the rear spar vertical flange.

(3) Automation Industries, Shear Wave, Type SMZ, 5 MHZ, 0.25-inch element, 70° A (57A3066).

(4) Longitudinal Wave, 0.25-inch dia. element, 5 MHZ, 0.375-inch dia. case.

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 2)

C. Fabricate two reference standards per Details I and II.

D. Fabricate transducer positioning fixture per Part 4, 57-10-07, Fig. 3, Detail V.

E. Couplant is light oil or grease.

3. Prepare for Inspection

A. This inspection is performed from outside the wing with the part in place on the airplane.

B. Smooth out any surface roughness by sanding lightly. Paint removal at inspection areas on the chord may be necessary to improve sound transmission.

C. Remove paint for inspection of the skin.

D. Wipe surface clean.

E. Lightly prick punch the center of the inspection fasteners in the skin.

F. Apply a thin film of couplant to the inspection area.

G. Move wire bundles as necessary to gain access to inspection area.

4. Calibrate Instrument

A. Calibrate for selected fastener locations common to vertical flange of rear spar chord.

(1) Select a fastener location to be inspected. See Detail XII.

(2) From Table II identify the Detail I reference standard hole to be used for calibration. Apply couplant about hole.

(3) From Table II obtain the distance D. Locate the leading edge of the 60° shear wave transducer this distance from the reference hole.

(4) Obtain a signal from the standard hole. Position this signal at midscale. See Detail III.

(5) Adjust instrument sensitivity to obtain a 90% of full scale signal from the hole.

(6) Move transducer laterally to obtain a signal from the 0.25-inch through thickness sawcut notch. Note the difference in the position of the signal obtained from the side of the hole and the notch.

NOTE: Final instrument sensitivity adjustment is made on the airplane.

B. Calibrate for inspection of wing skin at fastener holes common to wing skin and rear spar chord horizontal flange.

NOTE: See par. 4.C. for alternate calibration for inspection of wing skin where adjacent fastener or structure interferes with the scan.

(1) Select a fastener location to be inspected from Detail X, XII or XIII depending on airplane effectivity. See Table I for effectivity.

(2) Identify the reference standard and transducer positioning fixture required for the holes to be inspected from Table III.

(3) Coat 0.375 inch dia. transducer with couplant and insert in the left hand transducer hole of the positioning fixture as shown in Detail VI.

(4) Coat surface of reference standard with couplant and place shoe in Position 1 as shown in Detail VI (align the pin hole with the edge of the standard).

(5) Locate ultrasonic response from the lower corner of the plate and adjust the instrument controls so that the signal is approximately centered on the instrument display.

(6) Position the transducer shoe with the centering pin located in the center of the reference standard fastener.

(7) Rotate the transducer shoe until a response is received from the simulated crack in the reference standard. See Detail VI, Position 2. Note that the crack response moves laterally on the instrument display as the shoe is rotated about the fastener head.

(8) Adjust the instrument sensitivity to produce approximately a 90% crack signal on the instrument display.

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 4)

C. Alternate Calibration for Inspection of Wing Skin

NOTE: This calibration is to be used only for locations where fastener spacing does not permit use of the positioning fixture.

(1) Select the standard from Table III which is designated for the hole to be inspected.

(2) Connect the 70° shear wave (par. 2.B.(3)) transducer to the instrument.

(3) Apply couplant to the standard around the calibration hole.

(4) Place transducer on the standard and position to detect fastener hole. When using the recommended transducer the front of the case is placed close the edge of the fastener head as shown in Position 1, Detail VIII.

(5) Position the hole signal approximately 3/5 of the full screen width away from the initial pulse as shown in Detail VIII.

(6) Move transducer laterally to detect the calibration notch as shown in Detail VIII, Position 2. Note position of notch signal, and scanning motion necessary to detect it.

(7) Set instrument gain so that the signal from the notch is approximately 100% of full scale.

5. Inspection Procedures

A. Inspect fastener locations common to vertical flange of rear spar chord.

(1) Select fastener location to be inspected from Detail XII.

(2) Calibrate instrument according to par. 4.A.

(3) Place the transducer on the vertical flange of the chord at the positions indicated in Detail XII.

(4) Aim the transducer toward the fastener at the selected location and manipulate to obtain a hole signal. Adjust instrument sensitivity to obtain a 90% signal from the hole. Note position of hole signal.

NOTE: If adjacent fasteners or structure prevent detection of the desired fastener hole for instrument sensitivity adjustment, use a similar nearby fastener hole in the spar chord to set instrument sensitivity.

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 5)

(5) Move the transducer laterally and rotate through a small angle (approx 20°) to inspect for cracks out of the fastener hole. See Detail IV.

(6) Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(7) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

(d) Any signal occurring between fastener holes where no signal should be expected.

(8) Repeat inspection procedure for each location identified in Detail XII.

B. Inspect wing skin at fastener holes common to rear spar horizontal flange. See Detail XII, XIII, or XIV depending on airplane effectivity.

NOTE: See par. 5.C for alternate inspection of wing skin.

(1) Select inspection location from Detail XII, XIII, XIV, and specific fasteners to be inspected from Table III.

(2) Calibrate instrument according to par. 4.B.

(3) Inspect each fastener hole at the selected location by rotating the transducer shoe about the fastener while observing the instrument display. Cracks will occur in the wing skin either on the forward or aft side of the fastener hole.

NOTE: Due to fastener spacing, at some locations it will not be possible to rotate the positioning fixture completely around the fastener. The minimum extent of scan is shown in Detail VII.

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 6)

(4) If the minimum scan cannot be performed, scan with a hand held transducer calibrated per par. 4.C. Inspect per par. 5.C.

(5) Crack indications will be in the same position on the instrument display as the indication obtained from the reference standard.

(6) Any crack indication equal to or greater than 50% of full scale should be investigated further.

(7) Repeat inspection procedure for each location identified in Detail XII, XIII or XIV depending on airplane effectivity.

(8) Repeat the calibration and inspection procedure for each inspection location with the transducer in the opposite hole of the positioning fixture.

C. Alternate inspection of wing skin using hand held transducer.

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

(2) Position the ultrasonic transducer inboard or outboard of the fastener and manipulate to detect the fastener hole at the distance determined during calibration.

(3) Move transducer laterally to transmit sound past the edge of the fastener hole to detect cracks out of the forward and aft sides of the hole. Rotate the transducer (approx. $\pm$ 20°) about this point.

(4) Any signal from the inspection area which is 40% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

(5) The following responses are potential crack indications:

(a) A signal on the oscilloscope which occurs a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

(b) A signal which occurs approximately at the same location but slightly to the side of the hole response.

(c) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

AIRPLANE EFFECTIVITY	INSPECTION LOCATION NO.	DETAIL NOS
ALL	1 THRU 20	XII
1	21, 22, 23	XIII
2	24, 25, 26	XIV
3	27, 28, 29	XV
4	30, 31	XVI

AIRPLANE EFFECTIVITY TABLE
TABLE I

NOTES

- FOR CUM LINE NO'S 13 THRU 671 WITH 3 EXTERNAL DOUBLERS PER SB 2427, INSPECTION OF THE UPPER SKIN IS NOT REQUIRED. SEE DETAIL XI FOR THIS DOUBLER CONFIGURATION

1 CUM LINE NO'S 672 AND ON

2 CUM LINE NO'S 13 THRU 671 WITH FASTENER OVERSIZING PER SB 2606 AND 2731

3 CUM LINE NO'S 13 THRU 671 WITH 3 EXTERNAL DOUBLERS AND NEW SKIN AND CHORD INSTALLED PER SB 2607 SEE DETAIL X FOR THIS DOUBLER CONFIGURATION.

4 CUM LINE NO'S 13 THRU 671 WITH NEW SKIN, INTEGRALLY MACHINED PAD AND NEW CHORD INSTALLED PER SB 2607 SEE DETAIL XI FOR THIS DOUBLER CONFIGURATION.

LOCATION [5] NO.	APPROX.WS OR RSS	FASTENER CODE NUMBERS	FASTENER DIA.	CHORD THICKNESS	D [6]	CALIBRATION HOLE [7]
1	198.0	306,307	1/4	0.30	0.57	3
2	203.7	365,366, 367,368	1/4	0.26	0.37	3
3	210.0	379,380	3/16	0.15	0.39	1
4	214.0	446,447	3/8	0.15	0.49	2
5	220.0	453,454	3/16	0.15	0.47	1
6	232.0	520,521	3/16	0.15	0.40	1
7	235.0	570,571	3/16	0.15	0.35	1
8	240.0	577,578	3/16	0.15	0.35	1
9	244.0	630,631	3/16	0.15	0.35	1
10	254.0	701,702	3/16	0.15	0.47	1
11	258.0	710,711	3/16	0.15	0.47	1
12	263.0	763,764	3/16	0.15	0.35	1
13	267.0	772,773	3/16	0.15	0.35	1
14	273.0	828,829, 830,831	3/16	0.15	0.35	1
15	278.0	921,922	3/16	0.15	0.47	1
16	283.0	930,931	3/16	0.15	0.40	1
17	287.0	966,967	3/16	0.15	0.40	1
18	298.0	1037,1038	3/16	0.15	0.35	1
19	303.0	1046,1047	3/16	0.15	0.49	1
20	349.0	1355,1356	3/16	0.15	0.47	1

UPPER REAR SPAR CHORD VERTICAL FLANGE INSPECTION PARAMETERS
TABLE II

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 8)

NOTES

- ALL DIMENSIONS ARE IN INCHES

5 SEE DETAIL XII FOR INSPECTION LOCATIONS.

6 D = DISTANCE BETWEEN LEADING EDGE OF TRANSDUCER AND EDGE OF FASTENER HOLE TO BE USED FOR CALIBRATION. ON THE CHORD, D CORRESPONDS TO THE DISTANCE BETWEEN THE HOLE AND THE CLOSEST POSSIBLE LOCATION FOR TRANSDUCER PLACEMENT.

7 HOLE IN REFERENCE STANDARD 079 (DETAIL I) TO BE USED FOR CALIBRATION.

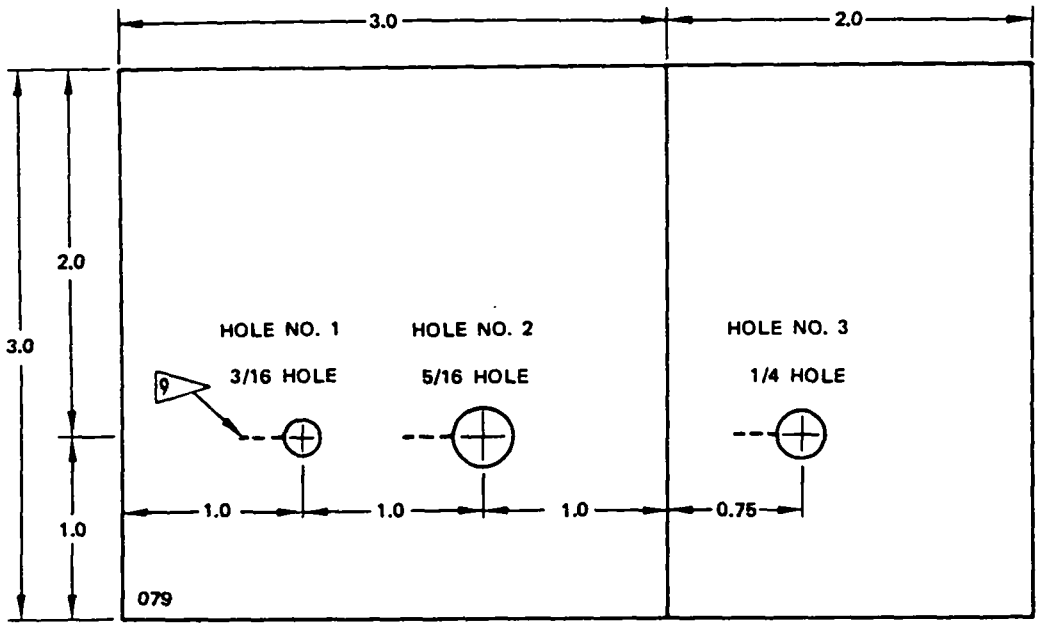
LOCATION NO. (FOR A/P EFFECTIVITY SEE TABLE I)	APPROX. WS OR RSS	FASTENER CODE NO.	FASTENER DIA.	SKIN THICK-NESS	POSITIONING FIXTURE (8)	HOLE IN REFERENCE STANDARD 080 TO BE USED FOR CALIBRATION
21	305-313	292 to 308	5/16	0.18	PF1	2
22	316-336	313 to 350	5/16	0.18	PF1	2
23	342-345	363 to 369	5/16	0.18	PF1	2
24	305-313	262 to 273	1/4	0.19	PF1	2
25	316-336	282 to 308	1/4	0.19	PF1	2
26	342-345	324 to 328	1/4	0.19	PF1	2
27	305-313	284 to 301	5/16	0.18	PF1	2
28	316-336	306 to 343	5/16	0.18	PF1	2
29	342-345	356 to 362	5/16	0.18	PF1	2
30	305-313	285 to 302	5/16	0.18	PF1	2
31	316-336	307 to 343, 382	5/16	0.18	PF1	2
32	342-345	356 to 362	5/16	0.18	PF1	2

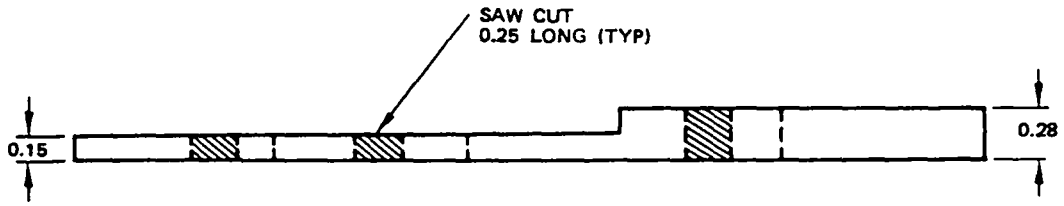
Skin at Rear Spar Inspection Parameters
Table III

NOTES

- ALL DIMENSIONS ARE IN INCHES
- (8) REFER TO PART 4, 57-10-07, FIG. 3, DETAIL V FOR POSITIONING FIXTURE.

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 10)





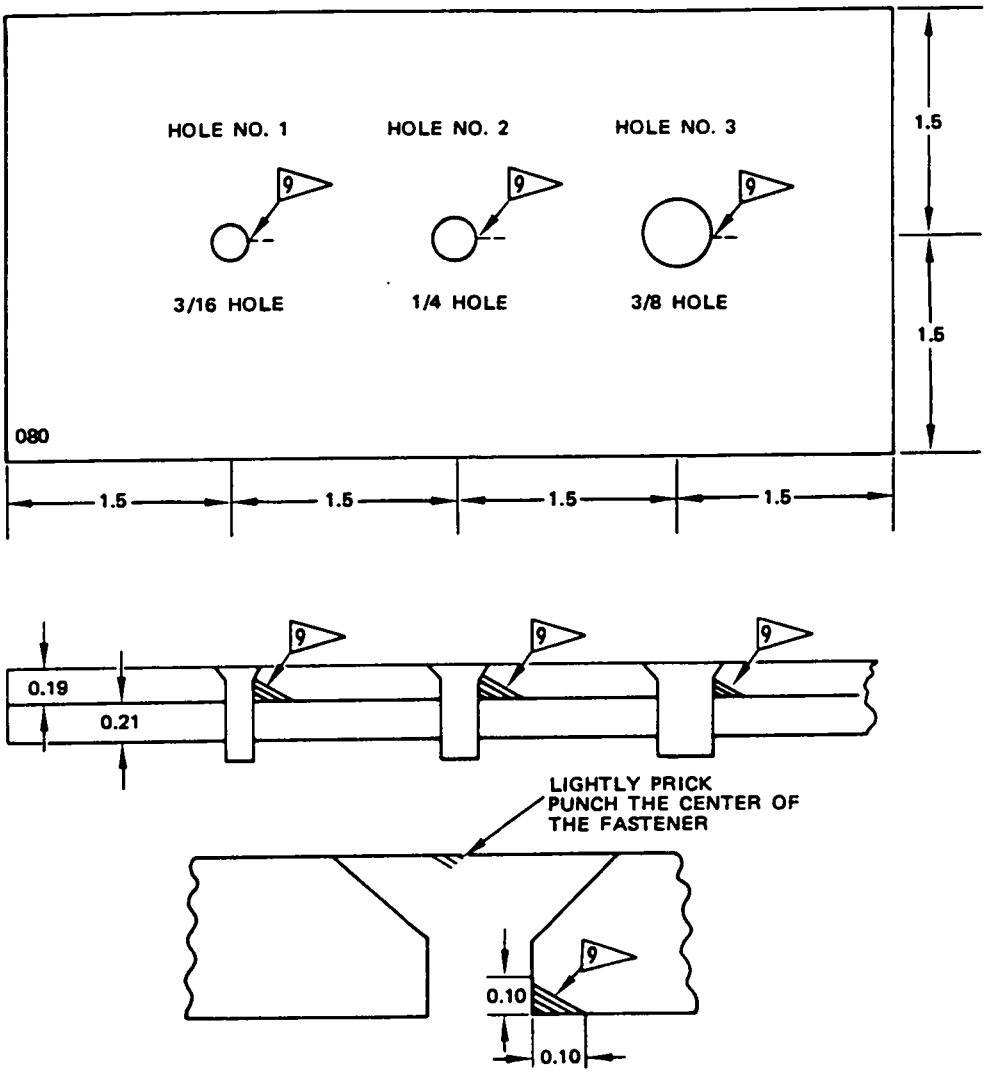
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 7075–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030 X.XX ± 0.010
- ETCH OR STEEL STAMP WITH 079
- P/N: 6411–36
  AVAILABLE FROM
  IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE
  TULSA, OKLAHOMA 74110

9 JEWELER'S SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 079
FOR REAR SPAR VERTICAL FLANGE
DETAIL I

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 11)



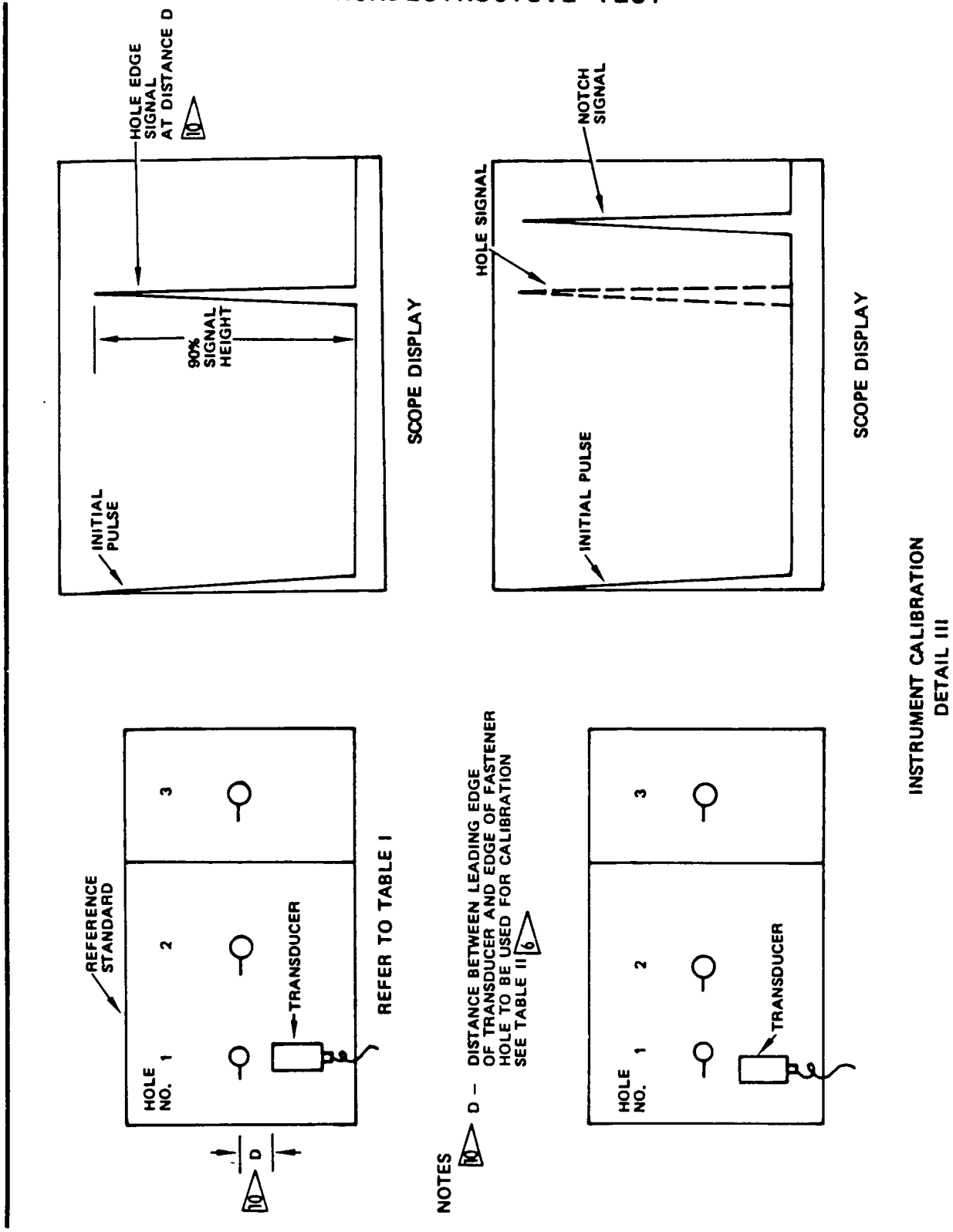
NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T6 ALUMINUM
- ETCH OR STEEL STAMP WITH 080
- TOLERANCE: X.X ± 0.030
  X.XX ± 0.010
- FASTENER TYPE:
  3/16, 1/4 BACB30LU3–6; 4–6 WITH BACN10JC3; 4 NUTS
  3/8 BACB30GY12–6 WITH BACC30K12 COLLAR
- P/N: 6411–37
  AVAILABLE FROM
  IDEAL SPECIALTY CO.
  2531 E. INDEPENDENCE
  TULSA, OKLAHOMA 74110

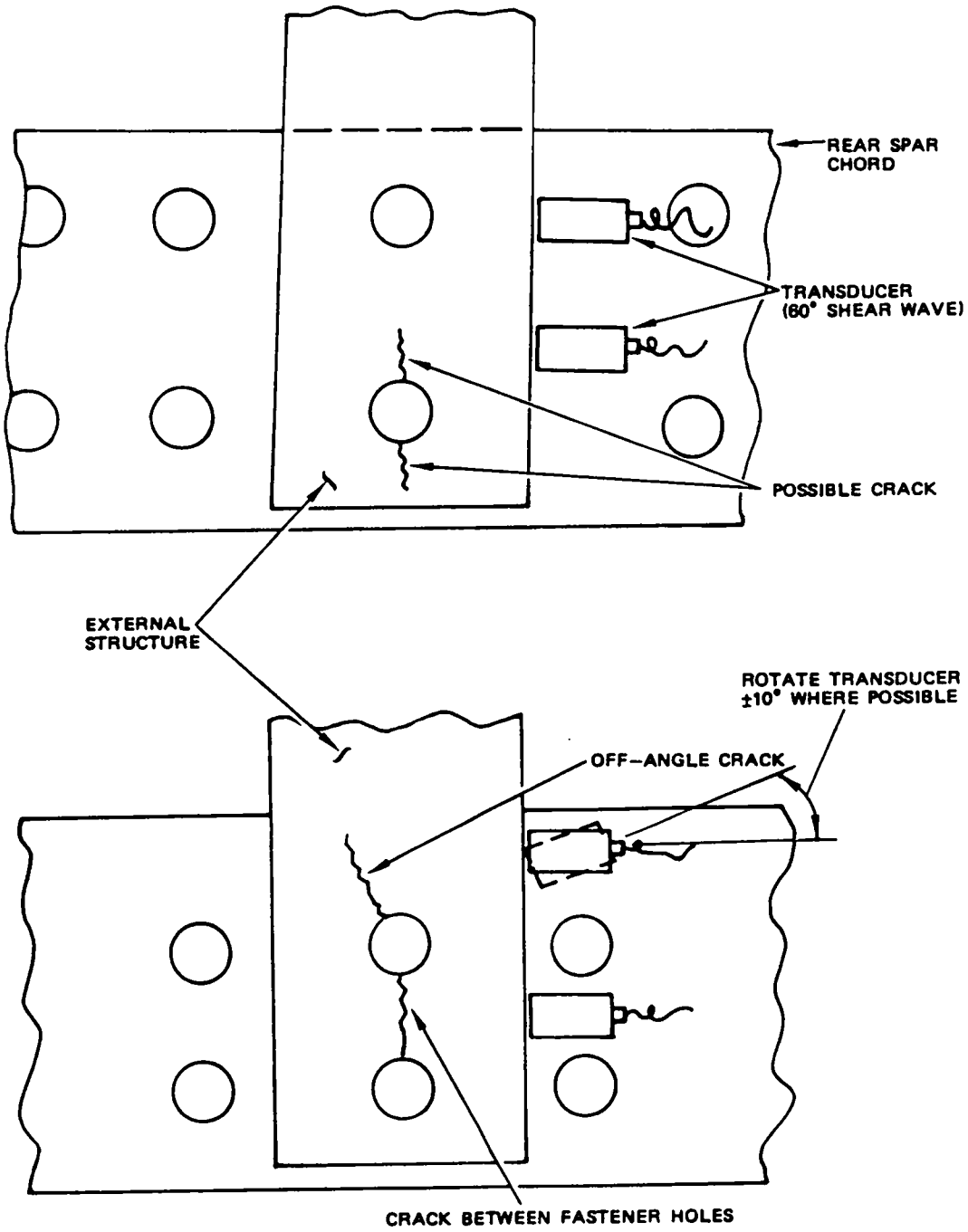
9 JEWELERS' SAWCUT 0.030 MAX WIDTH

REFERENCE STANDARD 080 FOR
SKIN INSPECTION CALIBRATION
DETAIL II

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 12)

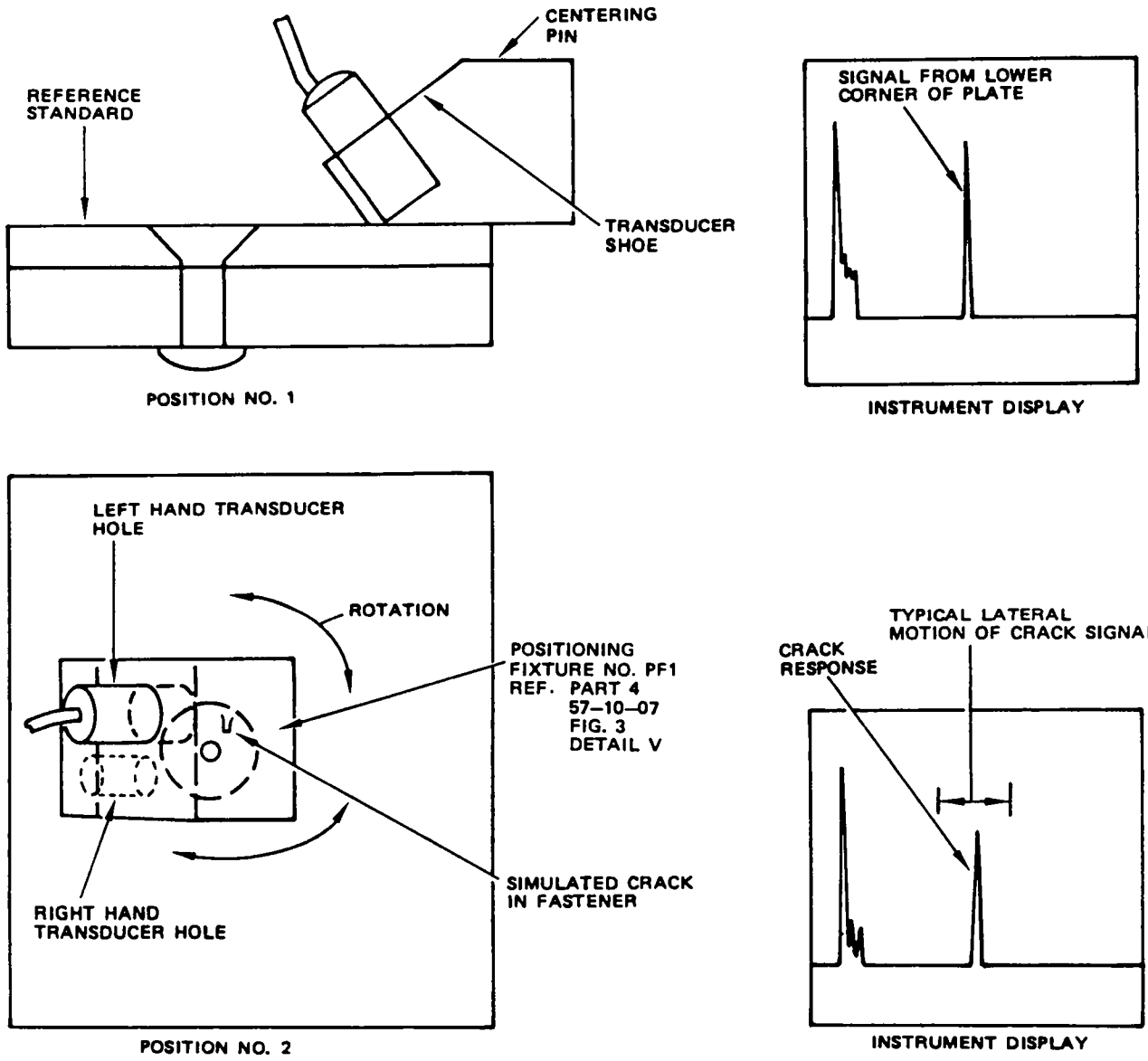


Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 13)



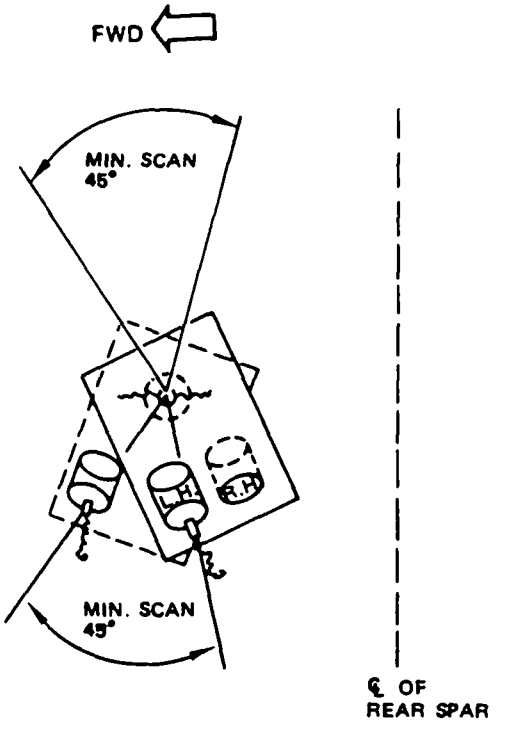
INSPECTION OF REAR SPAR CHORD
DETAIL IV

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 14)



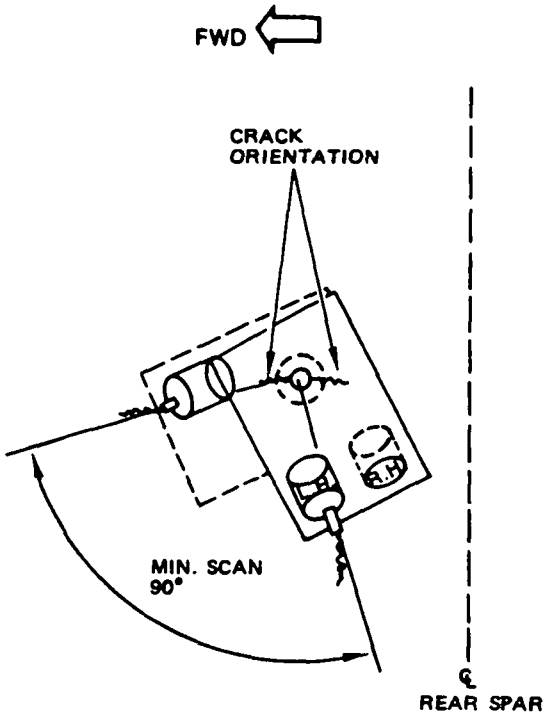
CALIBRATION FOR SKIN INSPECTION
DETAIL VI

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 15)



A. INSPECTION POSSIBLE FROM BOTH INBOARD AND OUTBOARD SIDE OF FASTENER, BUT SCAN IS LIMITED BY ADJACENT FASTENERS.

PARTIAL SCAN OF FWD SIDE OF HOLE IS ACCOMPLISHED WITH TRANSDUCER IN L/H POSITIONING FIXTURE HOLE AS INDICATED. COMPLETE SCAN OF FWD. SIDE OF HOLE BY PLACING TRANSDUCER IN R/H HOLE AND SCANNING FROM OPPOSITE SIDE OF HOLE. REPEAT PROCESS TO INSPECT AFT SIDE OF HOLE. SEE NOTE.



B. INSPECTION IS FOSSIBLE ONLY FROM ONE SIDE OF FASTENER. (OUTBD OR INBD)

SCAN FWD. SIDE OF FASTENER WITH TRANSDUCER IN LH HOLE AS INDICATED. SCAN AFT SIDE OF FASTENER WITH TRANSDUCER IN RH HOLE. SEE NOTE.

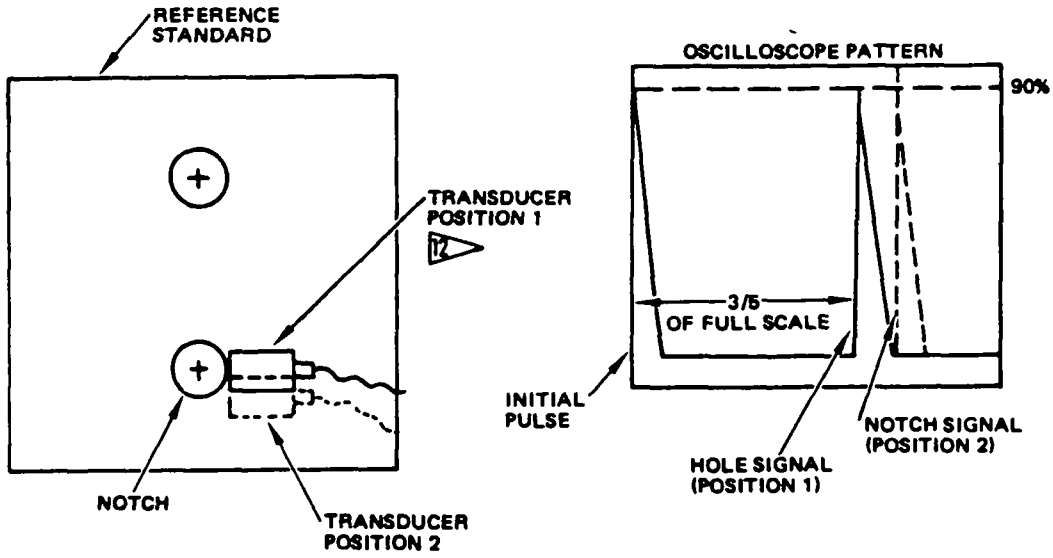
NOTE

IF MINIMUM SCANS CANNOT BE PERFORMED, INSPECT FASTENER WITH HAND HELD TRANSDUCER PER PAR. 5.C.

MINIMUM INSPECTION COVERAGE WHEN ADJACENT FASTENERS INTERFERE WITH SCAN

DETAIL VII

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 16)

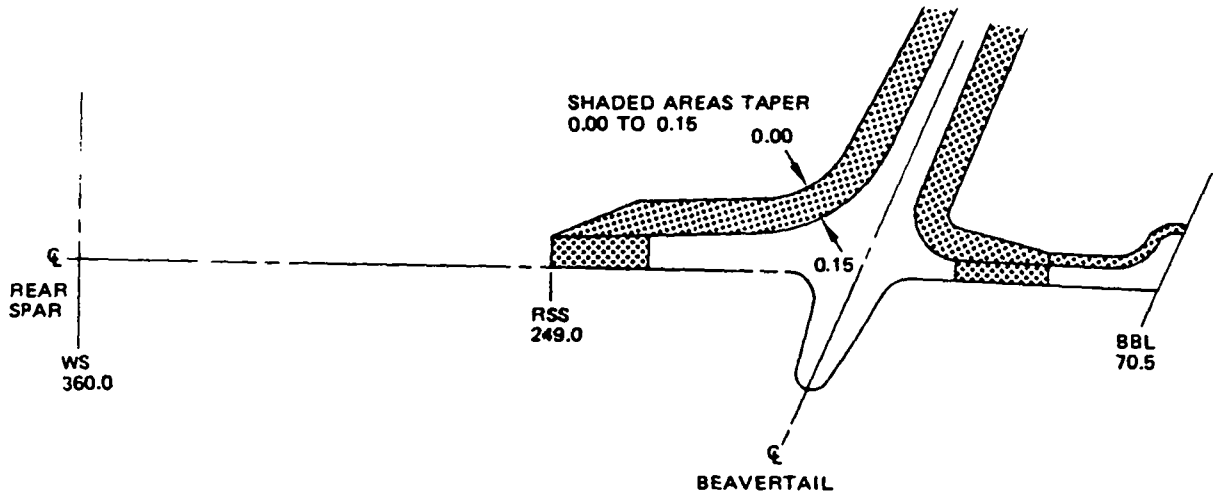


NOTE

12 SELECT STANDARD HOLE SPECIFIED IN TABLE III FOR HOLE IN SKIN TO BE INSPECTED

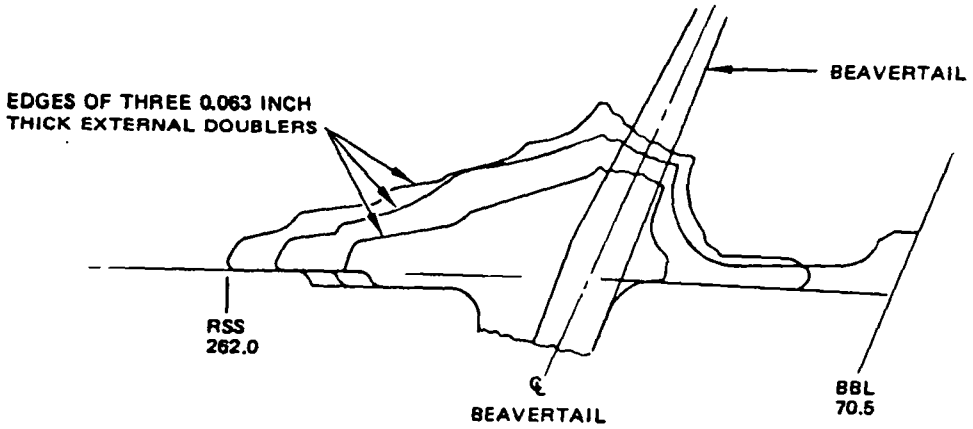
TRANSDUCER CALIBRATION POSITION FOR ALTERNATE INSPECTION OF SKIN

DETAIL VIII



NEW SKIN, EXTERNAL INTEGRALLY MACHINED
PAD AND NEW CHORD CONFIGURATION PER SB 2607

DETAIL IX



NOTE

- SEE TABLE I FOR EFFECTIVITY

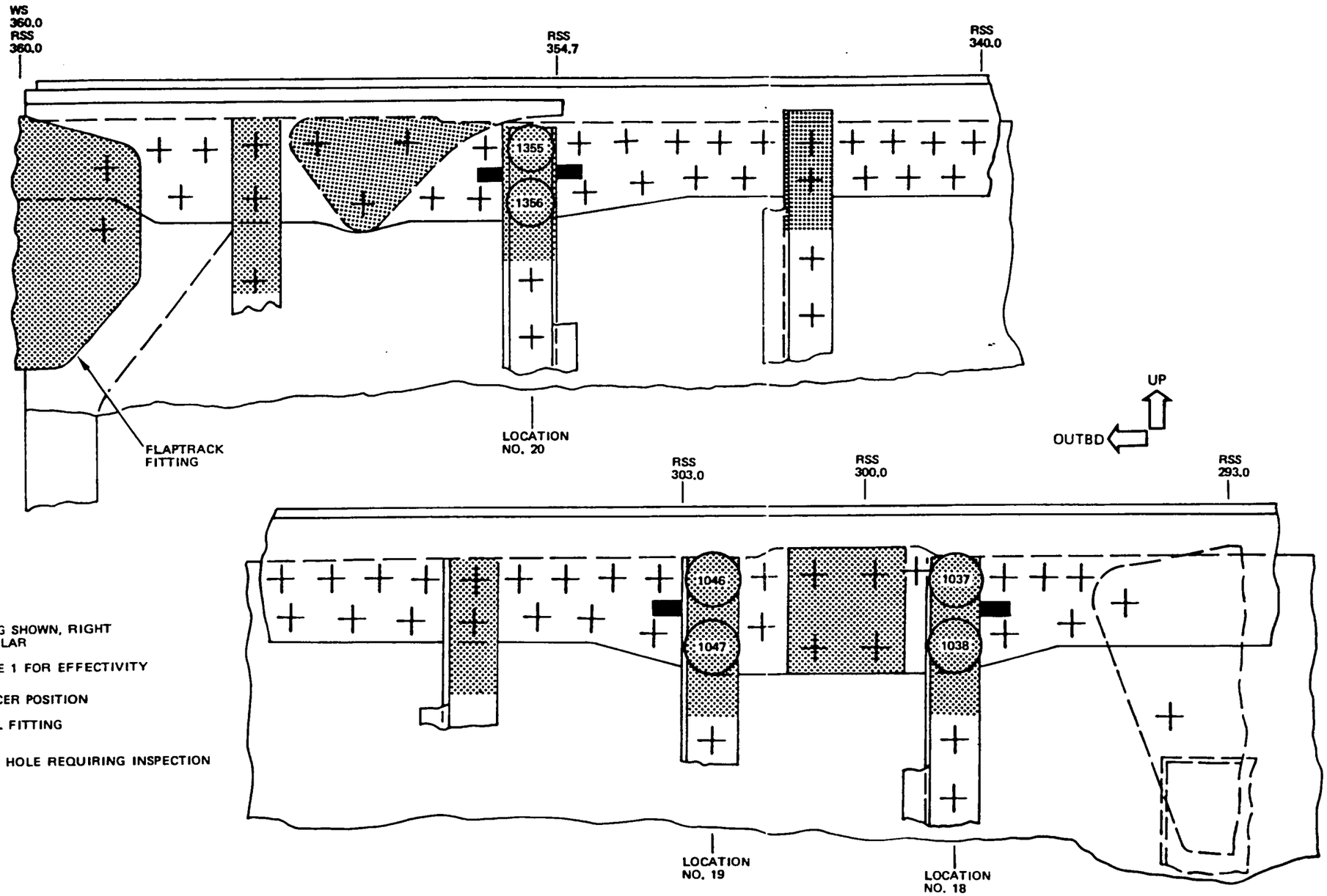
EXTERNAL DOUBLER WITH NEW SKIN
AND CHORD CONFIGURATION PER SB 2607

DETAIL X

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 18)

DELETED

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 19)



NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE 1 FOR EFFECTIVITY

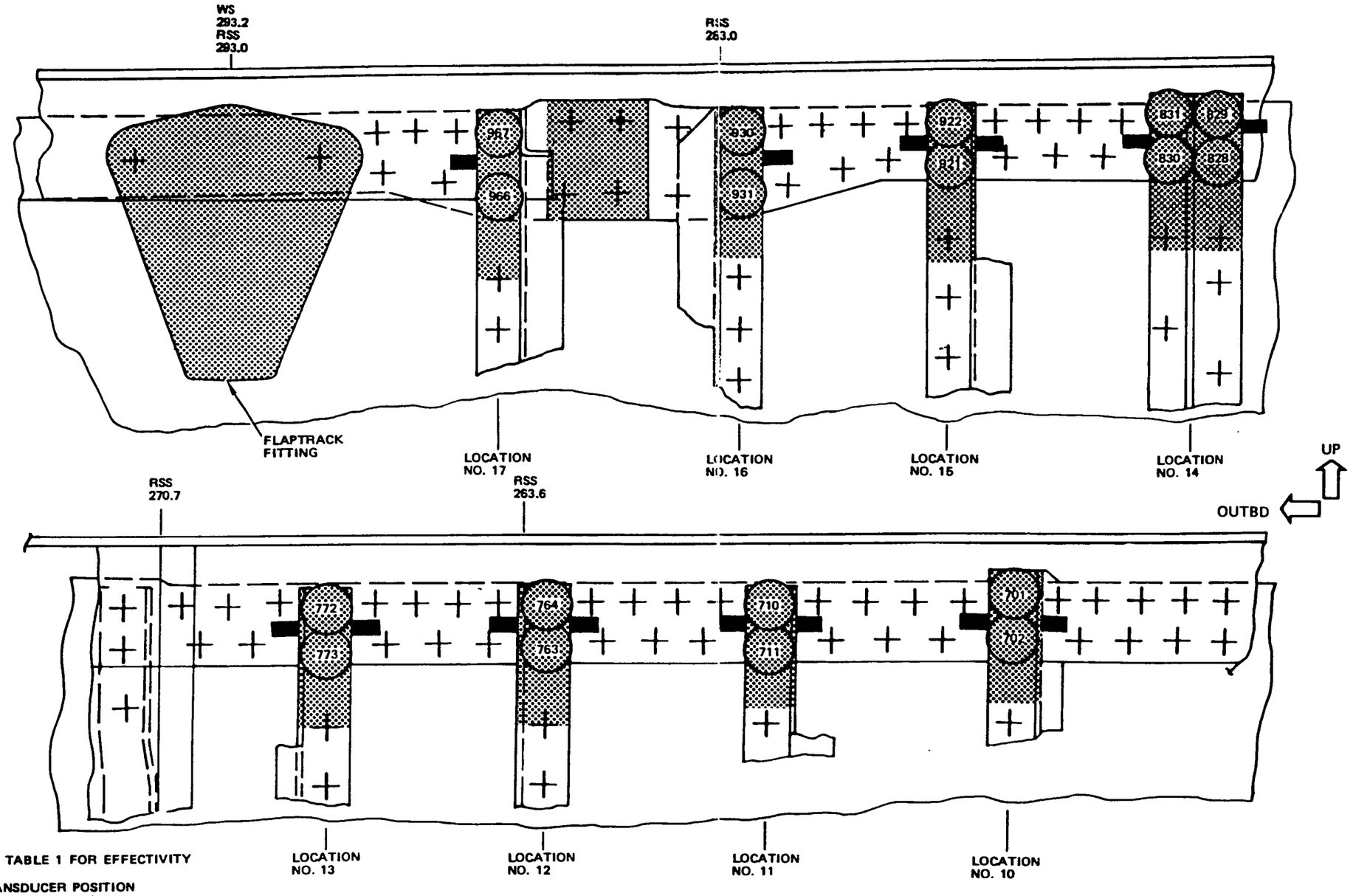
TRANSDUCER POSITION

EXTERNAL FITTING

(1037) FASTENER HOLE REQUIRING INSPECTION

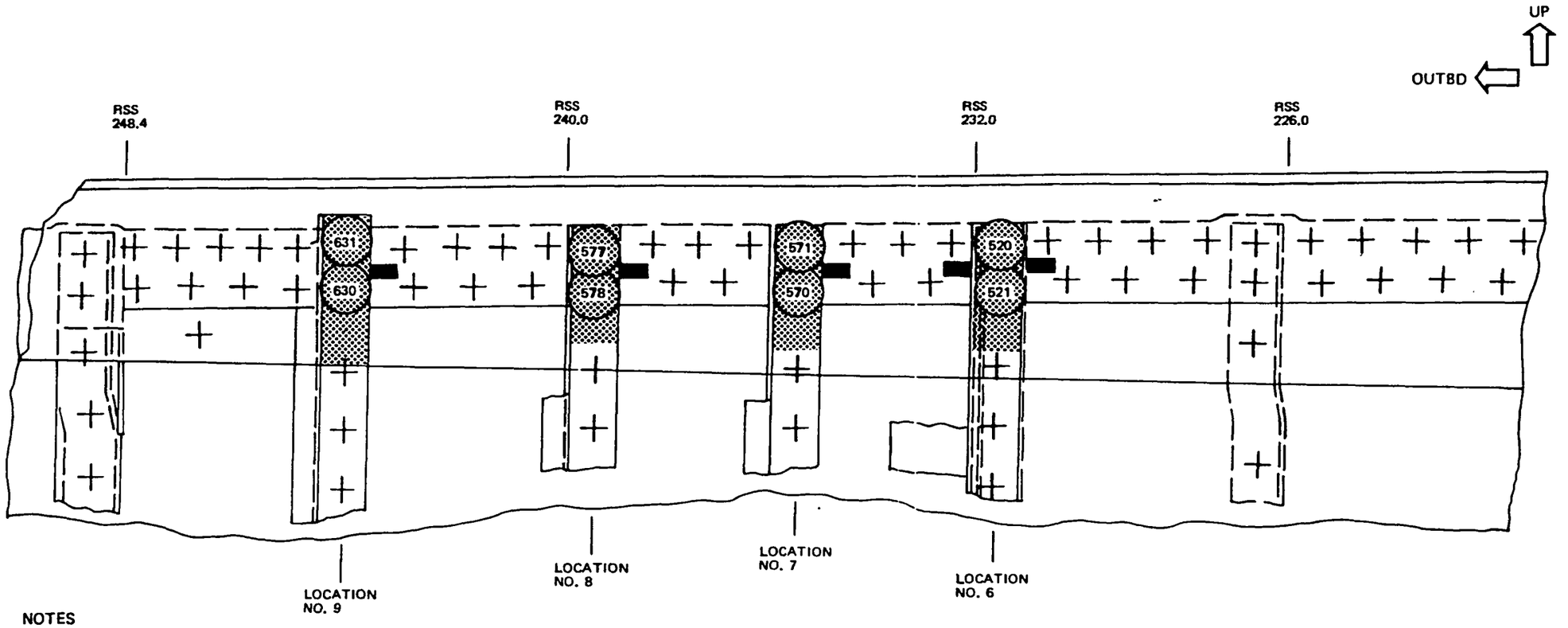
WING UPPER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL XII

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 20)



WING UPPER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL XII (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Between WS 180 and WS 360
Figure 10 (Sheet 21)



NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE 1 FOR EFFECTIVITY

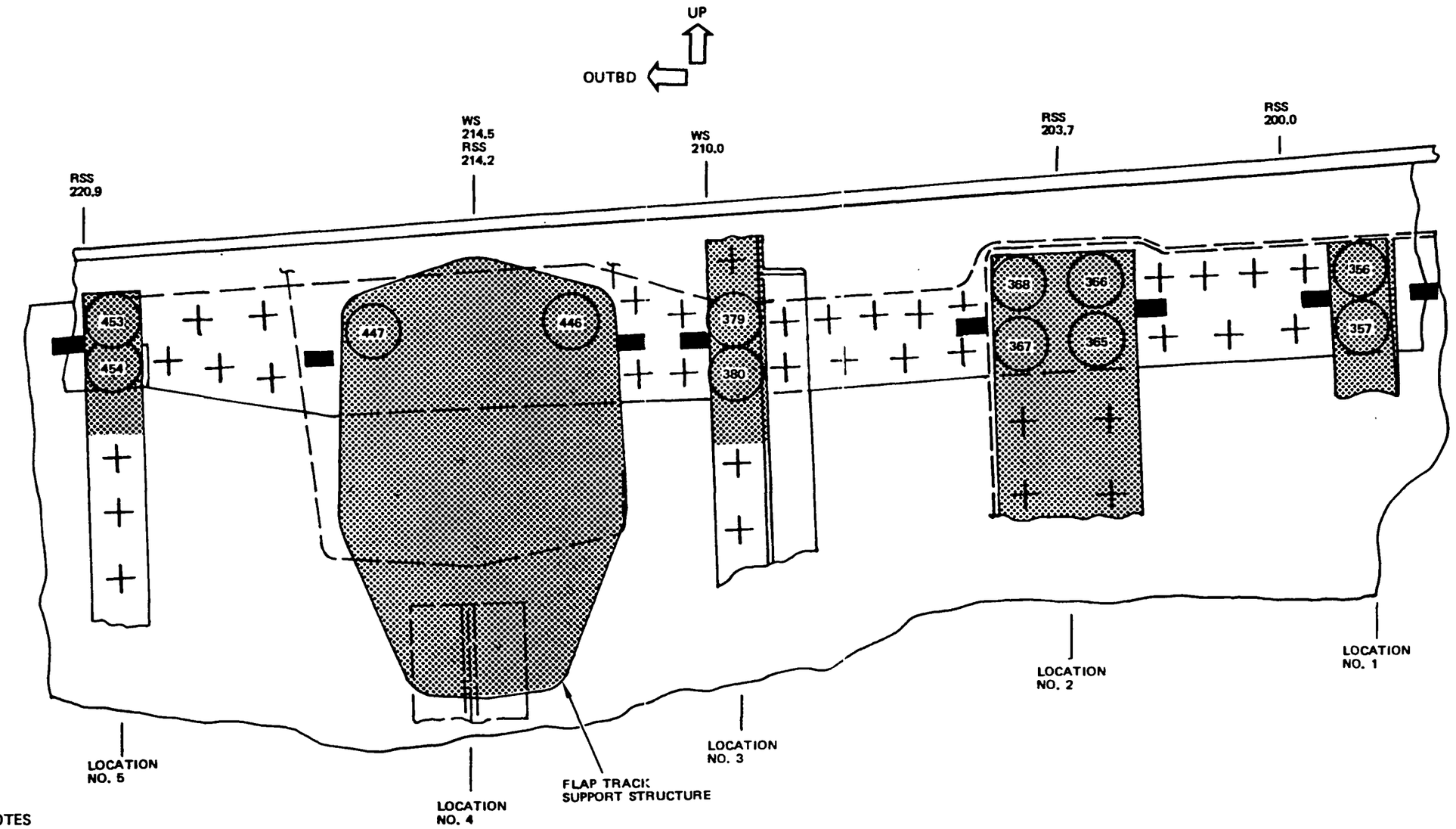
TRANSDUCER POSITION

EXTERNAL FITTINGS

(577) FASTENER HOLE REQUIRING INSPECTION

WING UPPER REAR SPAR CHORD
VERTICAL FLANGE
DETAIL XII (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 22)



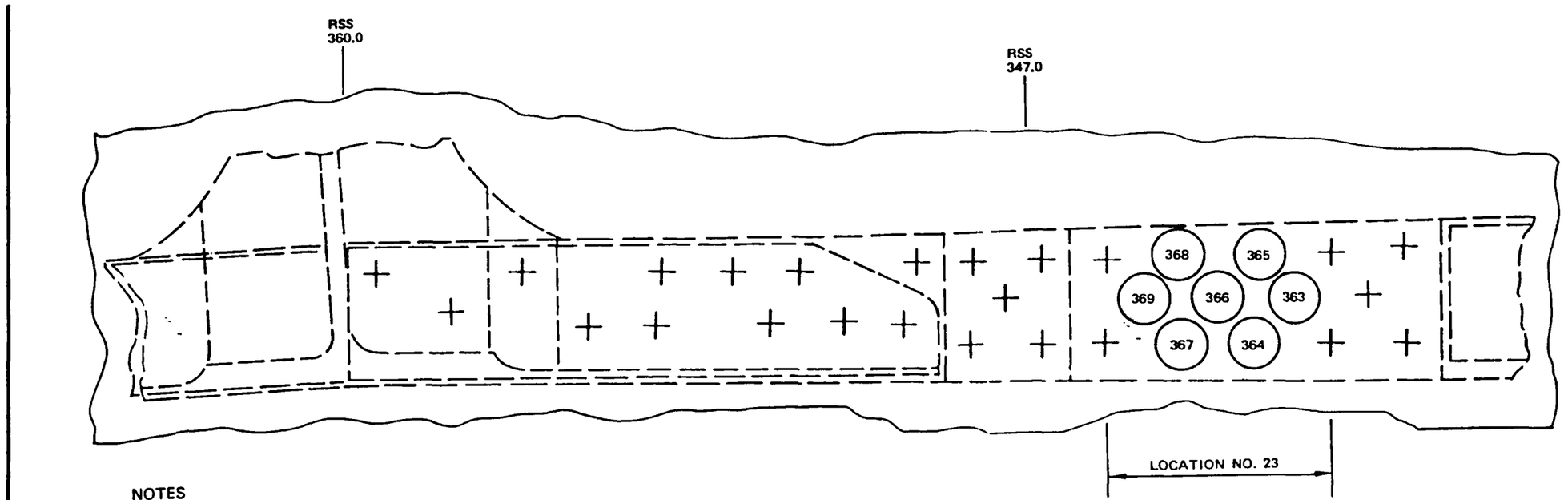
NOTES
- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE 1 FOR EFFECTIVITY

TRANSDUCER POSITION
EXTERNAL FITTINGS
(367) FASTENER HOLE REQUIRING INSPECTION

WING UPPER REAR SPAR CHORD VERTICAL FLANGE

DETAIL XII (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 23)



NOTES

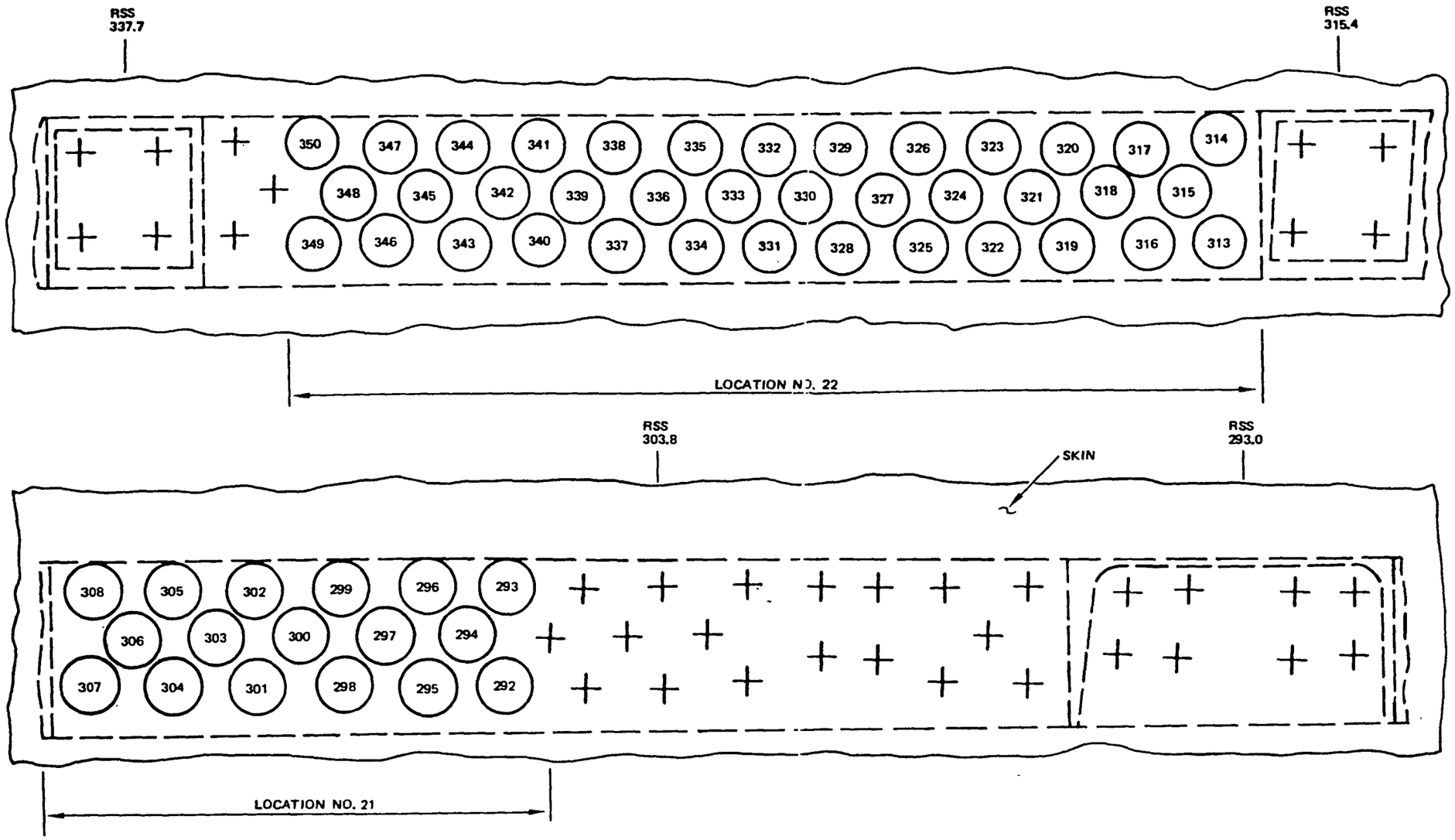
- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE 1 FOR EFFECTIVITY

(368) FASTENER HOLE REQUIRING INSPECTION

UPPER WING SKIN AT REAR SPAR CHORD

DETAIL XIII

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 24)



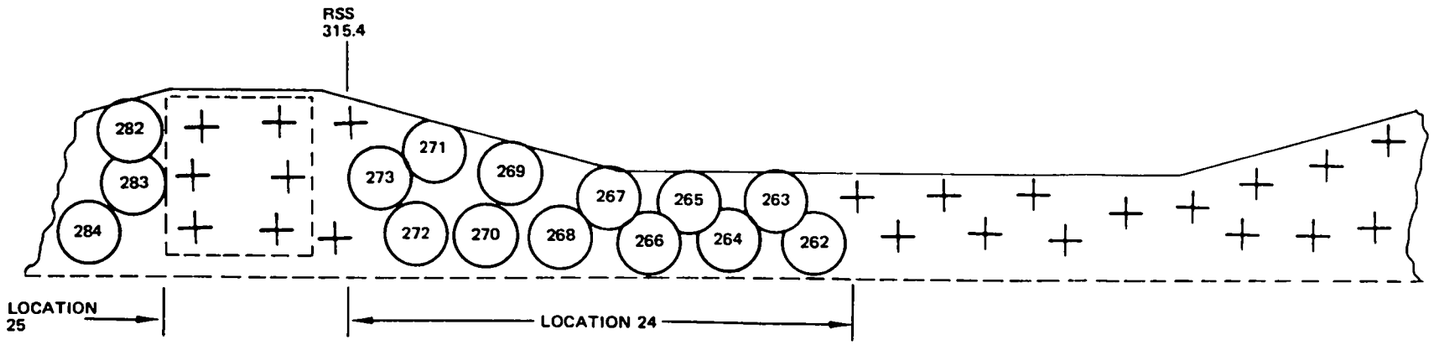
NOTES

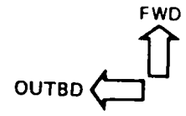
- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE 1 FOR EFFECTIVITY

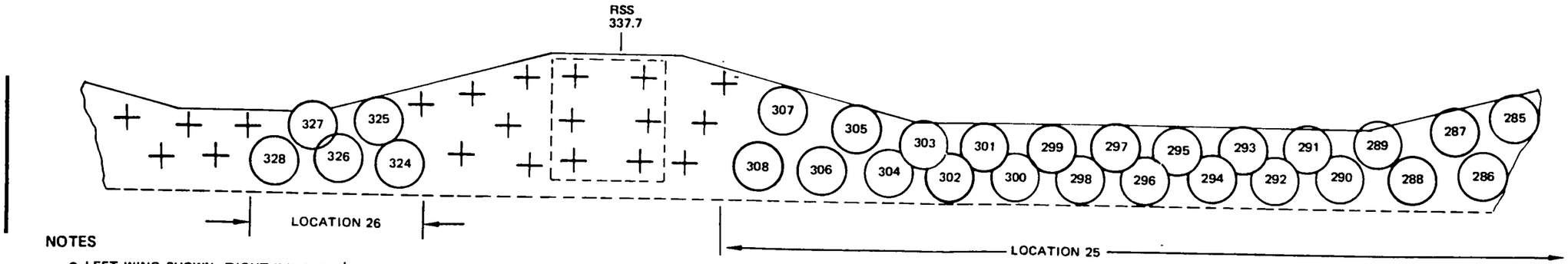
(336) FASTENER HOLE REQUIRING INSPECTION

UPPER WING SKIN AT REAR SPAR CHORD
DETAIL XIII (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 25)







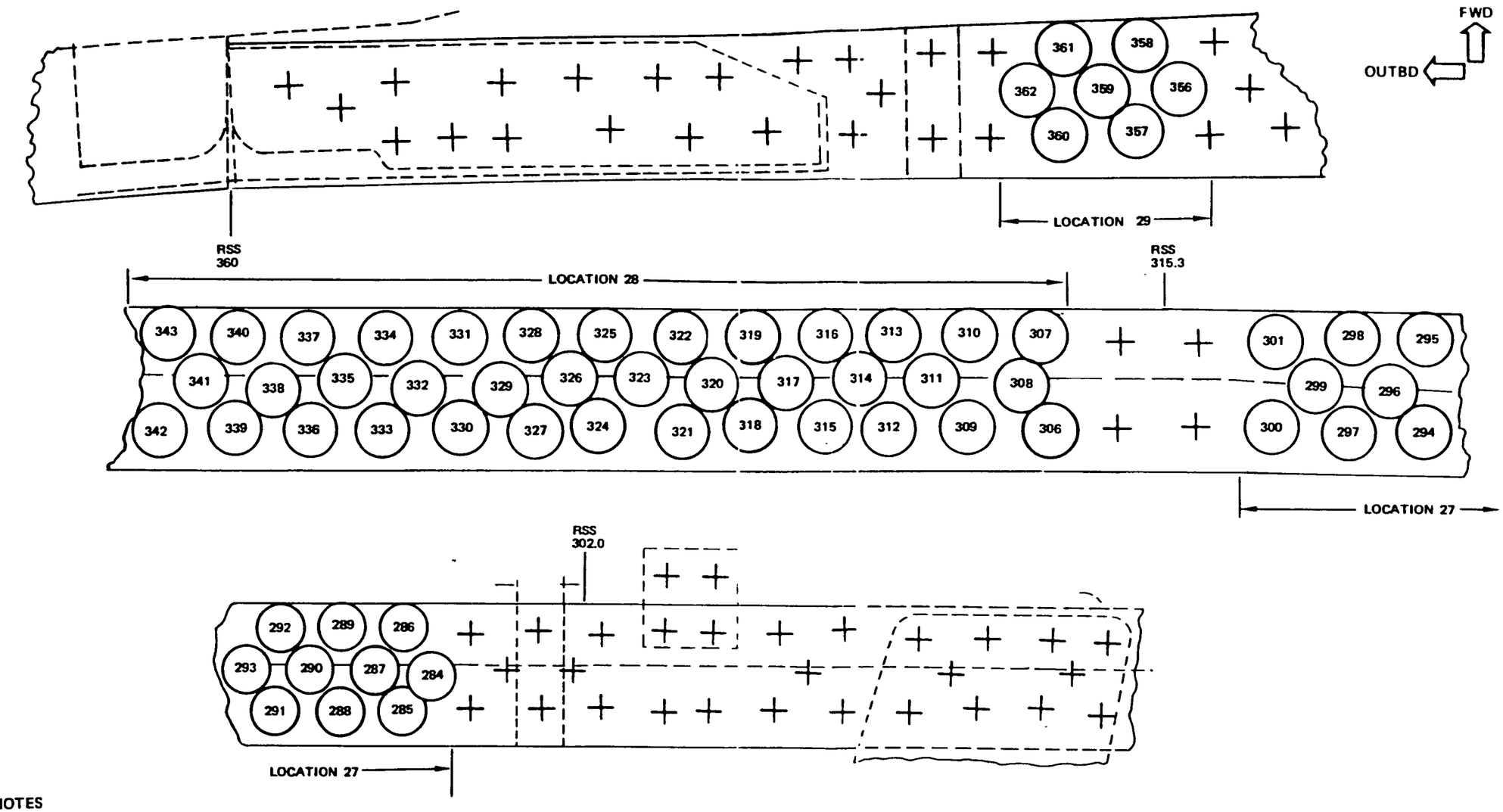
NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE I FOR AIRPLANE EFFECTIVITY
- FASTENER OVERSIZE (SB 2731)

(304) FASTENER HOLE REQUIRING INSPECTION

UPPER WING SKIN AT REAR SPAR CHORD
DETAIL XIV

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 26)

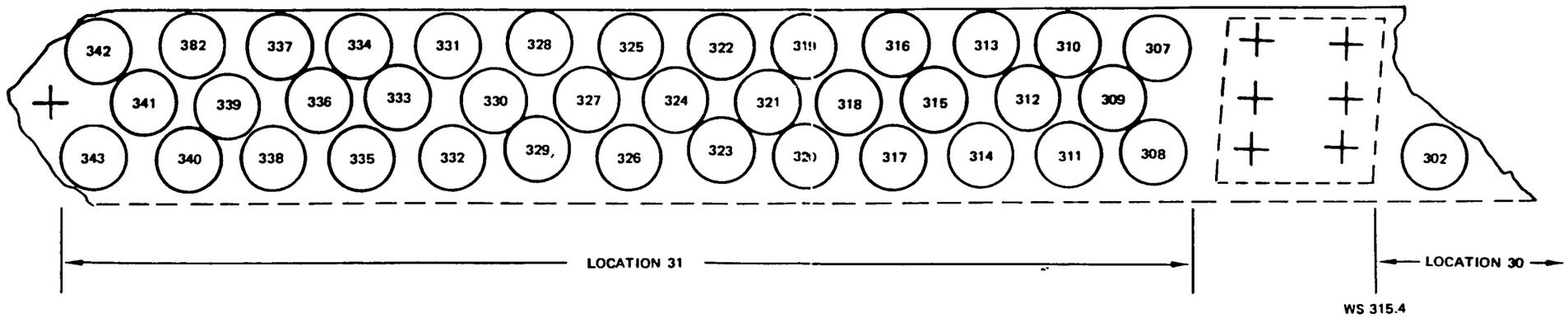


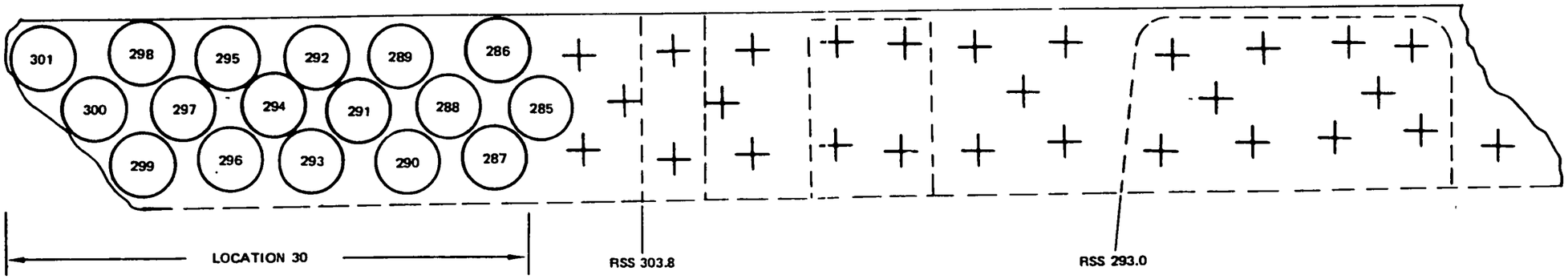
NOTES
- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE 1 FOR EFFECTIVITY
- NEW CHORD AND SKIN WITH 3 EXTERNAL DOUBLERS (SB 2607)

(341) FASTENERS TO BE INSPECTED

UPPER WING SKIN AT REAR SPAR CHORD
DETAIL XV (CON'T)

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 27)





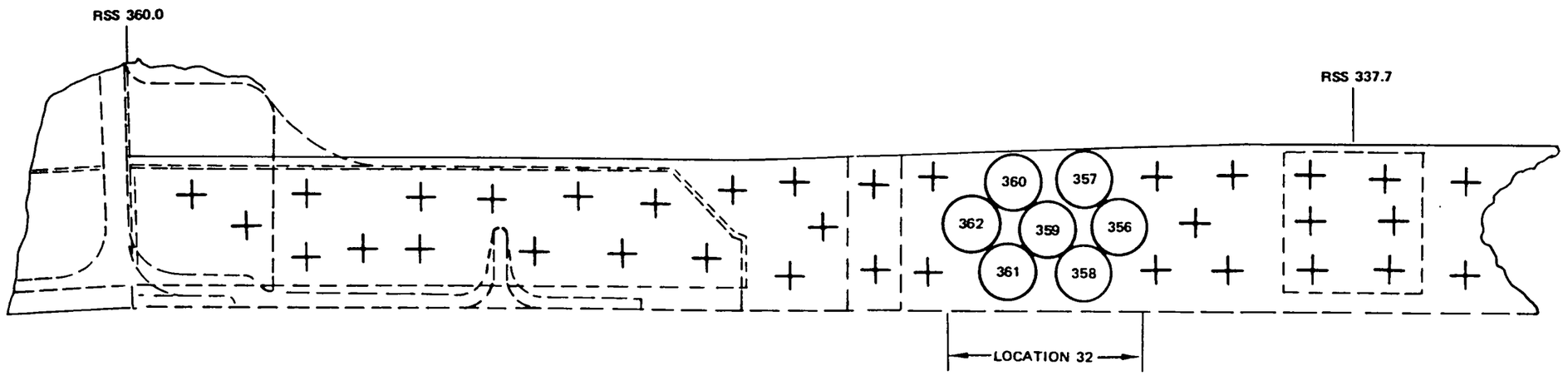
NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE I FOR EFFECTIVITY
- NEW SKIN AND SHORD WITH INTEGRALLY MACHINED EXTERNAL PAD (SB 2607)

(300) FASTENER TO BE INSPECTED

UPPER WING SKIN AT REAR SPAR CHORD
DETAIL XVI

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 28)



NOTES

- LEFT WING SHOWN, RIGHT WING SIMILAR
- SEE TABLE I FOR EFFECTIVITY
- NEW SKIN AND CHORD WITH INTEGRALLY MACHINED EXTERNAL PAD (SB 2607)

(360) FASTENER TO BE INSPECTED

UPPER WING SKIN AT REAR SPAR CHORD
DETAIL XVI (CONT)

Wing - Upper Rear Spar Chord - Vertical Flange and
Upper Wing Skin Between WS 180 and WS 360
Figure 10 (Sheet 29)

PART 4 - ULTRASONIC

WINGS - MAIN FRAME

1. Purpose

A. To detect cracks in the wing lower surface at specified fastener locations common to the inboard fairing attachment angle at the WBL 315 forward bay.

2. Equipment

A. Any ultrasonic instrument which satisfies the requirements of this procedure is acceptable. 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

B. The shear wave transducer used for this inspection is 0.35 inch wide by 0.72 inch long. Any transducer with the specified refracted angle of similar size which meets the performance requirements may be used.

(1) Automation Industries, Shear Wave, Type SMZ, 5 MHz, 0.25-inch element, 70° A (57A3066).

NOTE: This size transducer is required due to restricted access between fasteners common to the front spar chord.

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 1)

C. Reference Standard -

(1) See Detail I to identify existing structural configuration on airplane to be inspected.

(2) See Table I and appropriate airplane configuration for Reference Standard identification.

D. Couplant - Light oil or grease.

3. Preparation for Inspection

NOTE: This inspection is performed from outside the wing.

A. Remove paint from inspection locations.

B. Wipe surface clean.

C. Apply a thin film of couplant to the inspection areas.

4. Instrument Calibration

A. Identify airplane configuration by comparing with Detail I configurations.

NOTE: Different airplane configurations exist at this location.

B. Identify Reference Standard by referring to appropriate airplane configuration in Table I.

C. Calibration procedure -

(1) Select Reference Standard and calibration hole.

(2) Couple transducer to Standard and obtain a signal from the calibration hole. Position this signal at midscale. See Detail V(A).

(3) Adjust instrument sensitivity to obtain 90 percent of full scale signal from the hole.

NOTE: Select transducer-to-hole spacing for calibration which approximates the spacing to be used for hole inspection on the airplane.

(4) Move transucer laterally to obtain a signal from the notch at the side of the hole. Note the difference in the position of the signal obtained from the side of the hole and the notch. See Detail V(B).

NOTE: Final instrument sensitivity adjustment is made on the airplane.

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 2)

5. Inspection Procedure

A. Select a fastener for inspection and identify from Detail VI.

B. Calibrate instrument per par. 4.

C. Place transducer on lower wing surface adjacent to the fairing attach angle. Inspect fastener for which calibration has been established. Obtain a signal from the fastener hole and adjust instrument sensitivity to obtain 90% of full scale signal.

NOTE: Maintain the same spacing between fastener hole and transducer that was established during instrument calibration.

D. Manipulate transducer to inspect for hole cracks running in a forward and aft direction out of the fastener hole.

E. Any signal from the inspection area which is 50% or more of screen height and which is not identified as a hole edge response should be considered a crack and investigated further.

F. The following responses are potential crack indications:

(1) A signal on the oscilloscope occurring a short distance to the right of the response from the hole edge. Compare with the oscilloscope response pattern obtained from the notched hole in the standard.

NOTE: The diameter of the airplane fastener hole may differ by 1/16 inch from the reference standard hole. This will cause a small change in the distance between a hole edge signal and a crack signal compared to the standard.

(2) A response from a hole edge occurring over a wider range of transducer lateral movement than that experienced from the reference standard hole or known good hole in similar structure on the airplane.

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 3)

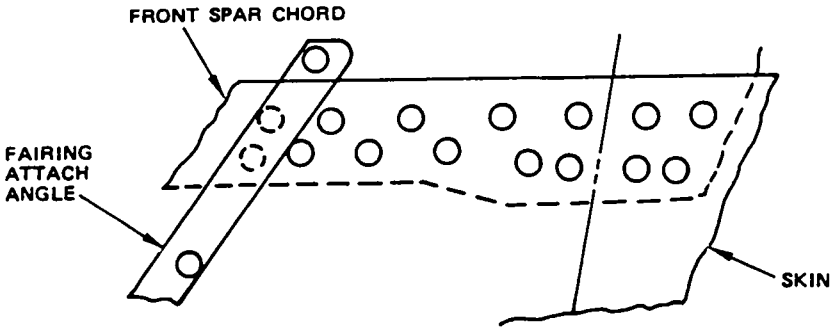
FASTENER LOCATION	AIRPLANE CONFIGURATION									
	I		II		III		IV		V	
	STANDARD	HOLE	STANDARD	HOLE	STANDARD	HOLE	STANDARD	HOLE	STANDARD	HOLE
A	117	1	119	1	118	1	117	-	118	-
B	117	2	119	1	118	1	117	-	118	-
C	117	3	111	2	118	2	117	3	118	2
D	117	3	119	3	118	2	117	3	118	2
E	117	3	119	2	118	2	117	3	118	2

REFERENCE STANDARD AND CALIBRATION HOLE
TABLE I

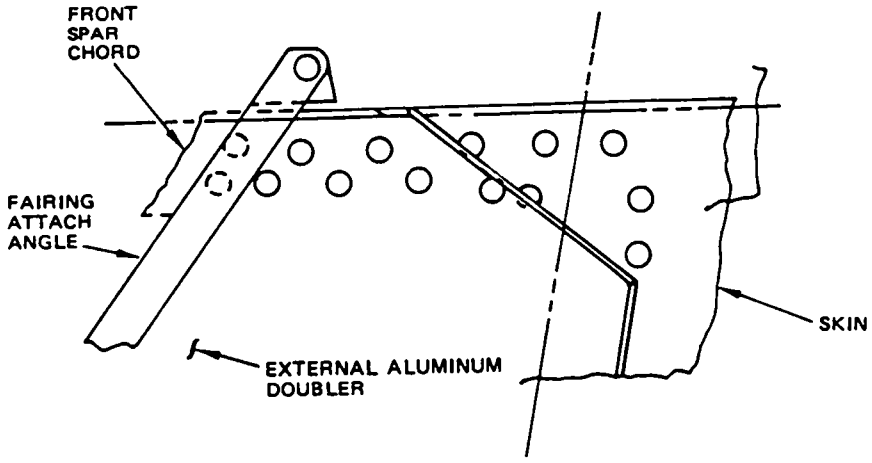
NOTES

- SEE DETAIL I FOR CONFIGURATION
- SEE DETAIL VI FOR INSPECTION FASTENER LOCATION

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 4)



ORIGINAL CONFIGURATION. SEE TABLE I, CONFIG. I
NEW SKIN PER SB 2484 OR 2487. SEE TABLE I, CONFIG. II

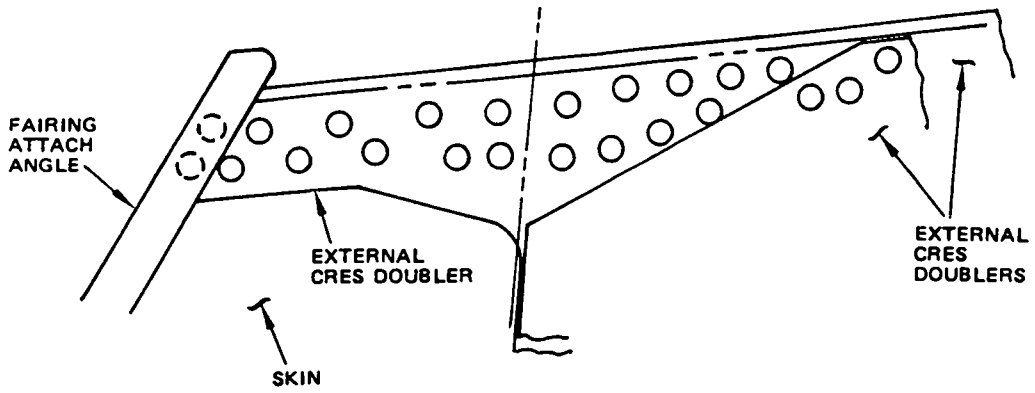


SERVICE BULLETIN 1995 CONFIGURATION
SEE TABLE I, CONFIG. III

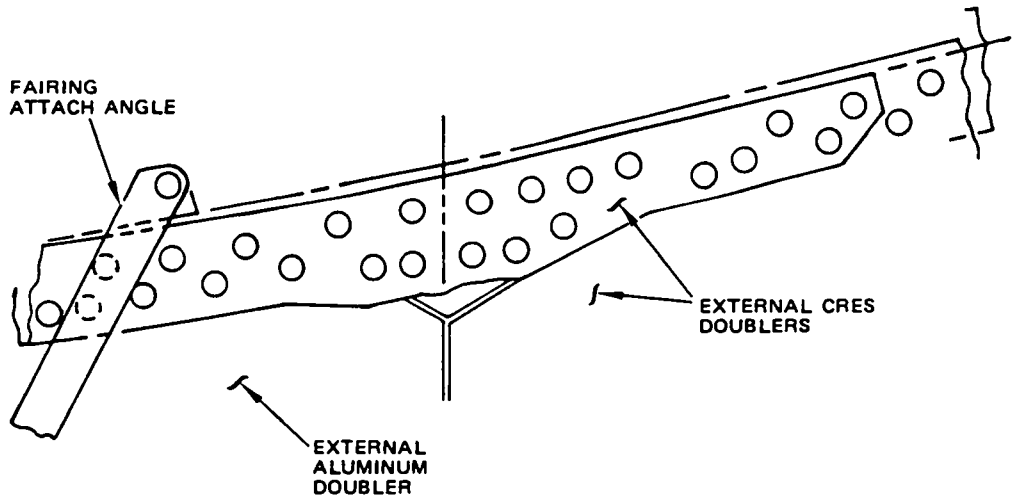
WING LOWER PANEL WBL 315 FWD BAY STRUCTURE CONFIGURATIONS

DETAIL I

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 5)



SERVICE BULLETIN 2323 CONFIGURATION
SEE TABLE I, CONFIG. IV

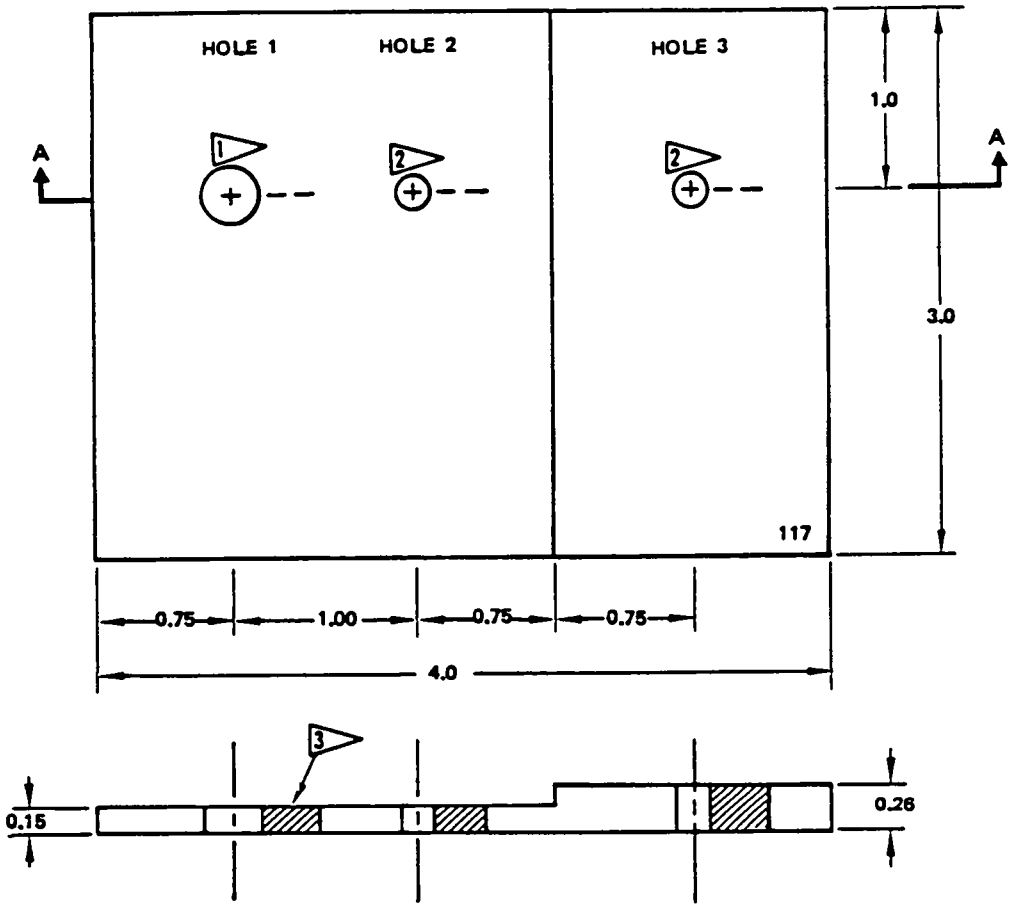


COMBINED SERVICE BULLETINS
1995 AND 2323 CONFIGURATIONS
SEE TABLE I, CONFIG. V

WING LOWER PANEL WBL 315 FWD BAY STRUCTURE CONFIGURATIONS

DETAIL I (CONT)

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 6)



SECTION A–A

NOTES

- EFFECTIVITY: 707–100/200 – LN NO. 1 THRU 622
  –300/400 – ALL
  –300 BS & 300 CS – LN NO. 1 THRU 660
  } ORIGINAL CONFIGURATION
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T3 OR T4 OR 7075–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030, X.XX ± 0.010, X.XXX ± 0.005
- ETCH OR STEEL STAMP WITH 117

- P/N 6411–64
  AVAILABLE FROM IDEAL SPECIALTY CO.

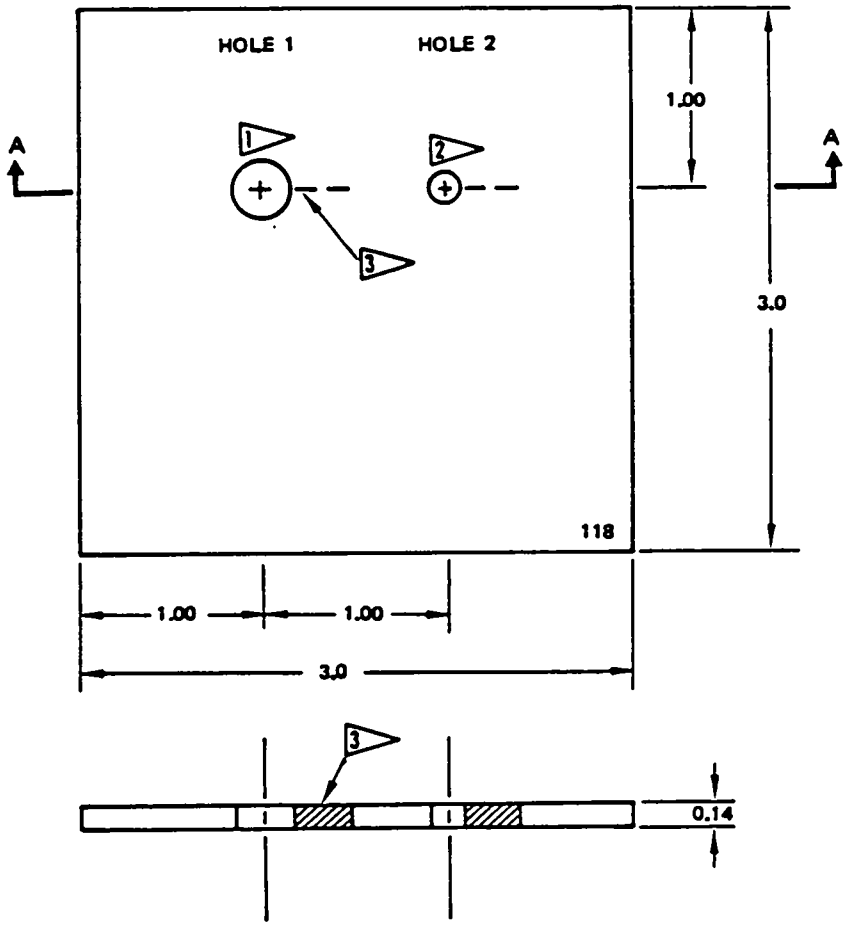
1 0.3125 DIAMETER HOLE

2 0.187 DIAMETER HOLE

3 0.030 MAXIMUM WIDTH JEWELER'S SAWCUT 0.25 INCH LONG (3 PLACES TYP)

REFERENCE STANDARD 117
DETAIL II

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 7)



SECTION A–A

NOTES

- EFFECTIVITY: 707/720
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T3 OR T4 OR 7075–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030, X.XX ± 0.010, X.XXX ± 0.005
- ETCH OR STEEL STAMP WITH 118

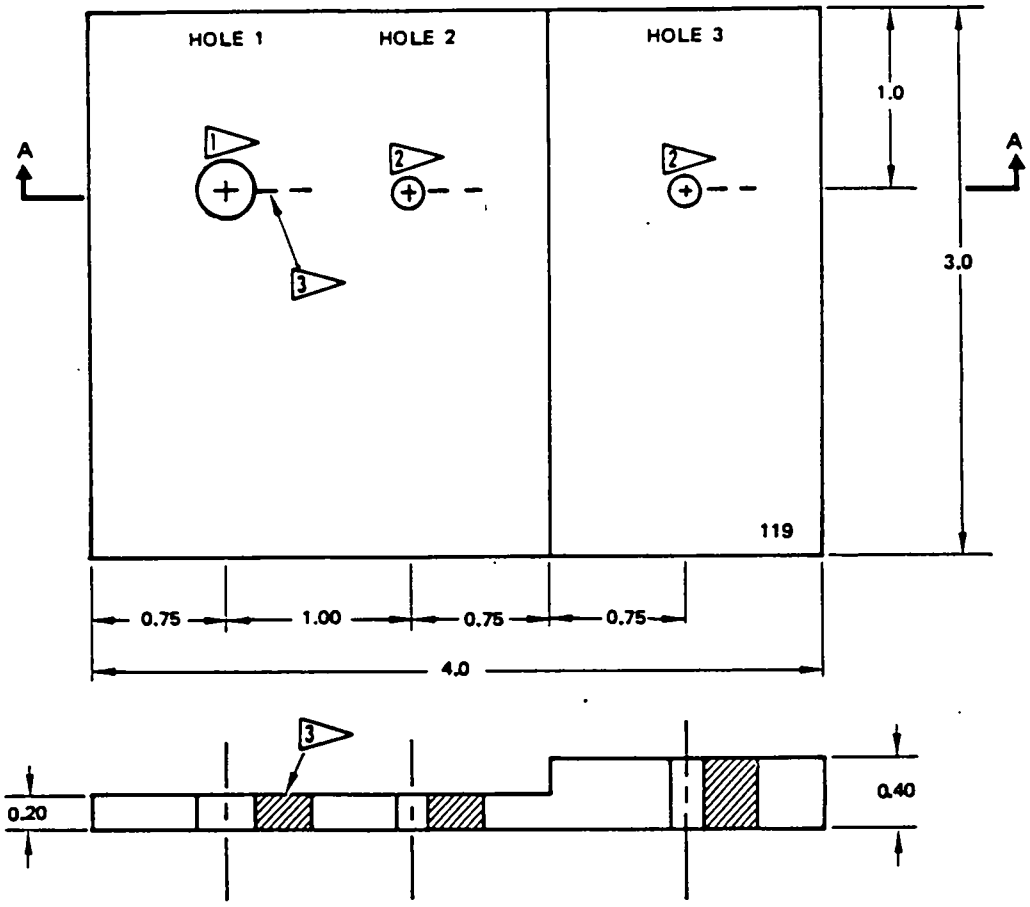
1. 0.3125 DIAMETER HOLE
2. 0.187 DIAMETER HOLE
3. 0.030 MAXIMUM WIDTH JEWELER'S SAWCUT 0.25 INCH LONG (2 PLACES TYP)

- P/N 6411–65

  AVAILABLE FROM IDEAL SPECIALTY CO.

REFERENCE STANDARD 118
DETAIL III

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 8)



SECTION A–A

NOTES

- EFFECTIVITY: 707/720
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: 2024–T3 OR T4 OR 7075–T6 ALUMINUM
- TOLERANCE: X.X ± 0.030, X.XX ± 0.010, X.XXX ± 0.005
- ETCH OR STEEL STAMP WITH 119

1 0.3125 DIAMETER HOLE

2 0.187 DIAMETER HOLE

3 0.030 MAXIMUM WIDTH JEWELER'S SAWCUT, 0.25 INCH LONG (3 PLACES TYP)

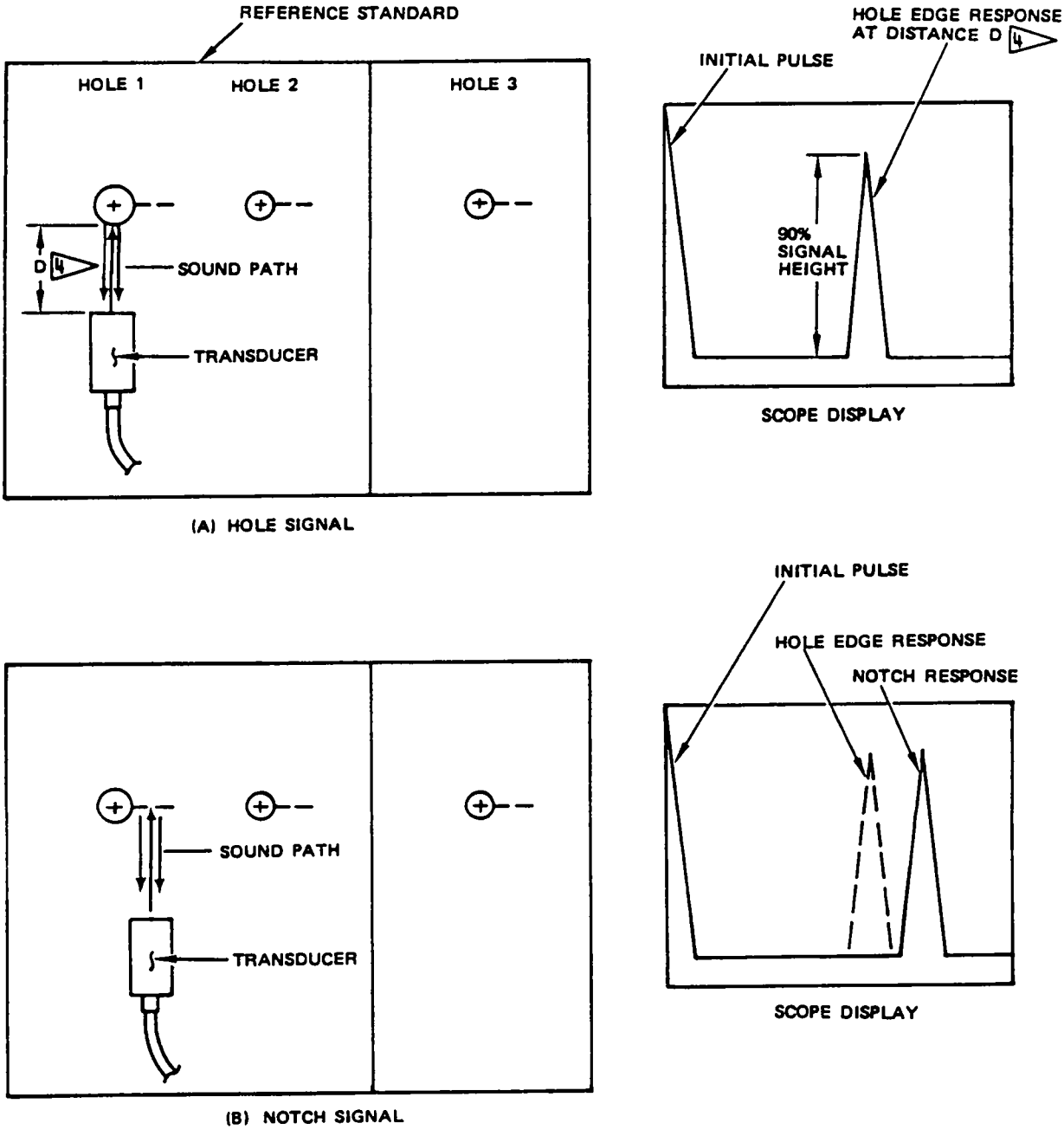
- P/N 6411–66

  AVAILABLE FROM IDEAL SPECIALTY CO.

REFERENCE STANDARD 119

DETAIL IV

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 9)

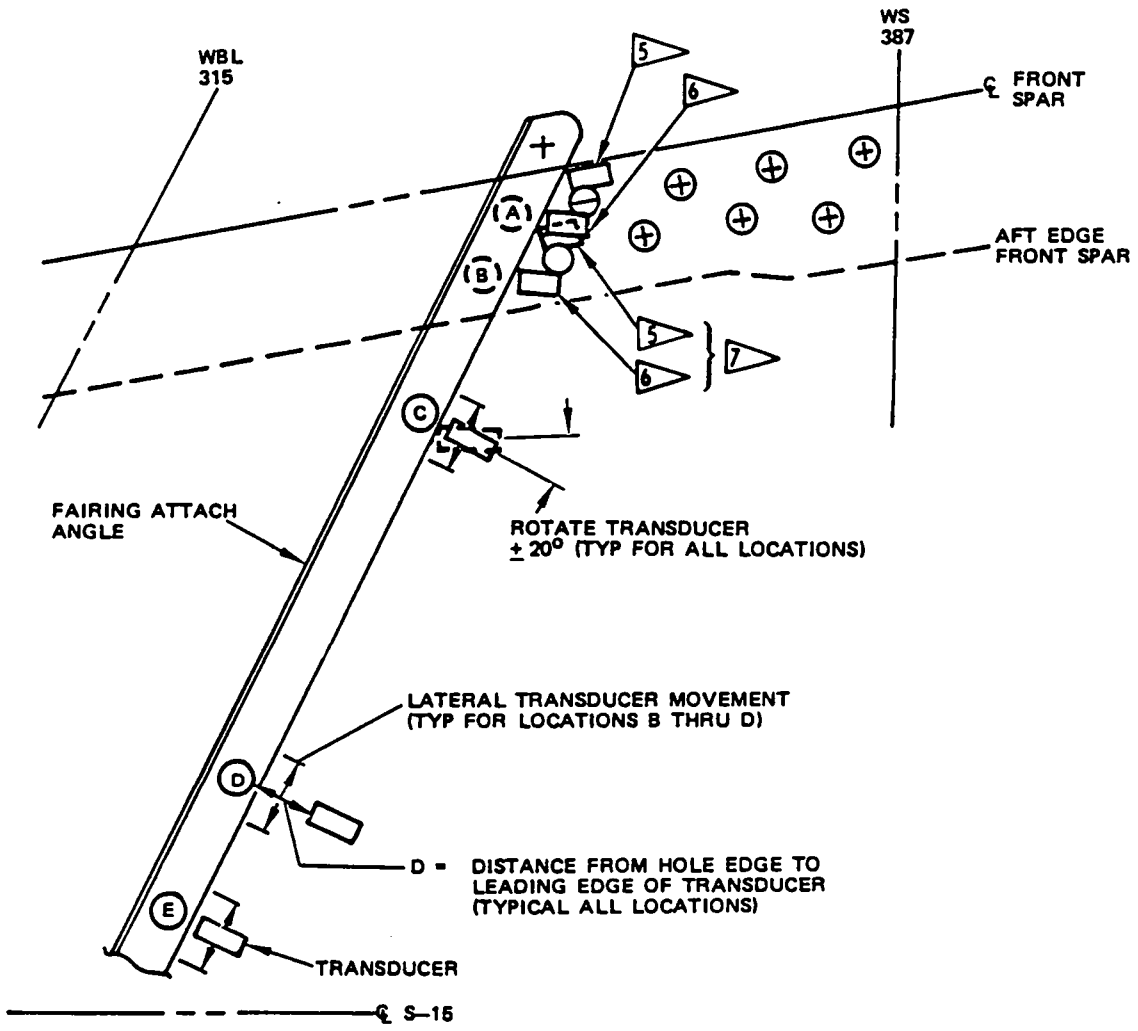


4 D = DISTANCE BETWEEN LEADING EDGE OF TRANSDUCER AND EDGE OF FASTENER HOLE TO BE USED FOR CALIBRATION

INSTRUMENT CALIBRATION DETAIL

DETAIL V

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 10)



NOTES

- PLAN VIEW. LEFT WING SHOWN, RIGHT WING SIMILAR
- (A) FASTENER IDENTIFICATION
- 5 TRANSDUCER POSITION FOR INSPECTION ON FORWARD SIDE OF FASTENER (TYP FOR FASTENERS A AND B)
- 6 TRANSDUCER POSITION FOR INSPECTION ON AFT SIDE OF FASTENER (TYP FOR FASTENERS A AND B)
- 7 TRANSDUCER POSITIONS FOR FASTENER PRESENT ON AIRPLANES:
  (1) 707-100/200'S - LINE NO. 1 THRU 622
  (2) 707-300/400'S - ALL
  (3) 707-3008'S, 300'C'S - LINE NO. 1 THRU 660

INSPECTION LOCATIONS
DETAIL VI

Wing Lower Fairing Attach Angle - WBL 315
Figure 11 (Sheet 11)