PART 4 - ULTRASONIC

MAIN LANDING GEAR - UPPER TORSION LINK PIN

1. Purpose

A. To detect cracks propagating from anti-rotation bolt hole in the upper torsion link pin of the main landing gear. See Figure 1.

NOTE: This inspection need not be performed where the upper torsion link pins have been replaced per the referenced service bulletin.

B. Service Bulletin Reference: 737-32A1113

2. Equipment

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

(1) Instrument - Nortec NDT 131

(2) Transducer - Nortec 5 MHz, 0.25-inch diameter element, P/N SP0562

NOTE: Any 5 MHz, 0.25-inch diameter element satisfying the requirements of this procedure is acceptable.

B. Fabricate Reference Standard 349 per Figure 2.

C. Couplant is a light grease, oil or commercial couplant compatible with airplane structure.

3. Prepare for the Inspection

A. Remove paint from ends of torsion link pin by sanding lightly.

B. Thoroughly clean the surface to be inspected.

C. Apply a thin film of couplant.

4. Instrument Calibration

A. Calibration A

(1) Obtain reference standard, apply a light film of couplant and make preliminary instrument adjustments (see Figure 3).

(2) Apply light film of couplant to transducer and place transducer on end of reference standard and adjust sweep time so that back reflection is 90 percent of full screen width away from the initial pulse.

(3) Obtain back reflection from 0.375-inch hole. This signal should appear approximately 40 percent of full screen width from the initial pulse. Set gain to obtain 50 percent full scale height for the hole signal.

(4) Move transducer to detect the notch at the side of the hole. Note notch signal position and amplitude.

B. Calibration B

(1) Calibrate per Paragraph 4.A.

(2) Obtain back reflection from 0.375-inch hole, per Figure 4.

(3) Adjust sweep time so that hole reflection appears at 80 percent of full screen width from the initial pulse.

(4) Scan over notch. Note position and amplitude of notch signal.

NOTE: Use filters and reject control to minimize side wall reflections.

5. Inspection Procedure

A. Calibrate instrument per Paragraph 4.A.

(1) Apply couplant to surface to be inspected.

(2) Place transducer on the end of the torsion link pin at Position 1 per Figure 5 to detect the anti-rotation bolt hole. Adjust sensitivity to obtain a 50 percent of full scale response from the bolt hole.

(a) Approximate location of hole reflection should be as found in Position 1 per Figure 5.

(b) If the end slots in the pin fall in line with the anti-rotation bolt hole, place transducer adjacent to the slot.

(3) Scan transducer around the end of the pin. The signal from the anti-rotation bolt hole and the back reflection from end of the pin will occur on the screen at the locations indicated with the approximate amplitudes shown in Figure 5.

(4) Signals from Positions 3 and 4, as shown in Figure 5, will aid in determining if the pin is cracked. The pin should be further investigated if:

(a) The transducer is placed at Positions 3 or 4 per Figure 5 and a strong signal, 50 percent or greater amplitude, is obtained at approximately 5 percent full screen width from the anti-rotation bolt hole signal. This is evidence of a crack.

(b) The transducer is placed at Positions 3 or 4 per Figure 5 and a significant loss in back reflection from the opposite end of the pin occurs. This is evidence of a crack.

NOTE: Verify the back reflection by dampening the signal with a finger. This will assure that there is not a second back reflection from the crack.

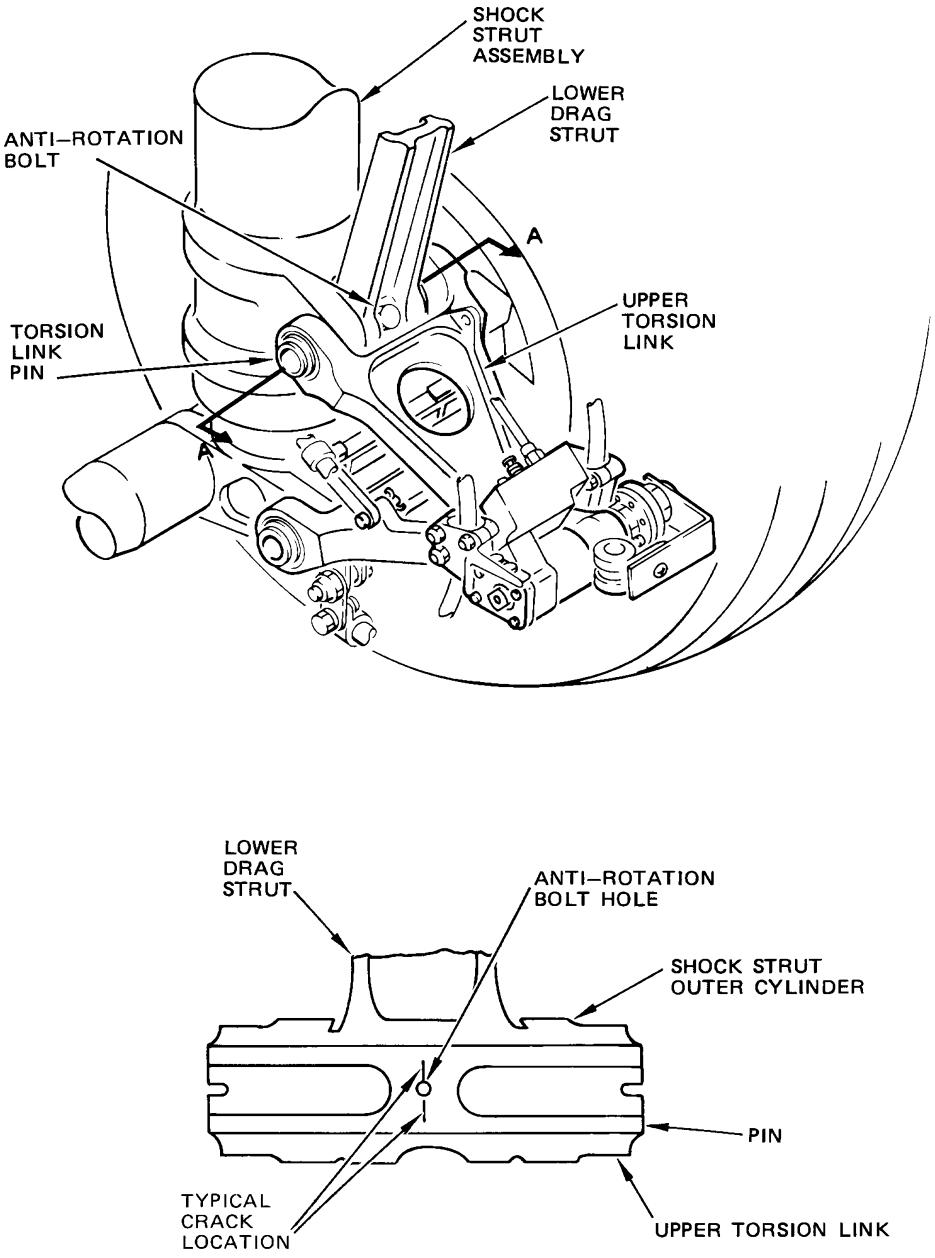
B. Calibrate instrument per Paragraph 4.B.

(1) Apply couplant to surface to be inspected.

(2) Place transducer on the end of the torsion link pin at Position 1 per Figure 6 to detect the anti-rotation bolt hole. Adjust sensitivity to obtain 50 percent of full scale response from the bolt hole.

(3) Scan from Position 1 to Position 4. Any response which is approximately 5 percent to 10 percent screen width further, on the time base, away from the anti-rotational bolt hole pin and 50 percent or greater in amplitude should be considered a crack.

NOTE: Verify a suspected crack by inspecting from the opposite side of pin.



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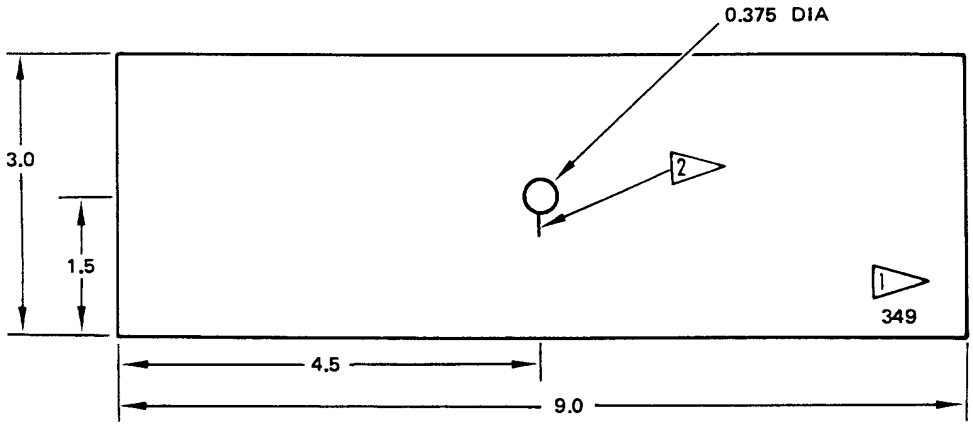
Location of Torsion Link Pin
Figure 1



NOTES

- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):
  X.X = ± 0.05
  X.XX = ± 0.020
  X.XXX = ± 0.005
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: STEEL PLATE
- THICKNESS: 0.375 ± 0.05

1 ETCH OR STEEL STAMP WITH 349

2 EDM NOTCH OR JEWELERS SAW CUT: 0.25 x 0.375 x 0.030; 0.375 IS THE THICKNESS OF THE STEEL PLATE; 0.030 IS THE MAXIMUM WIDTH

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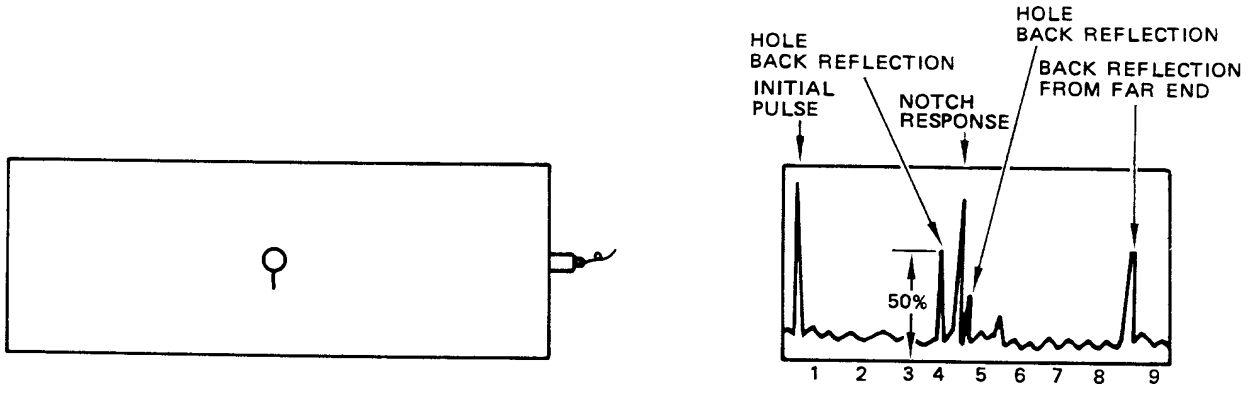
Reference Standard 349
Figure 2



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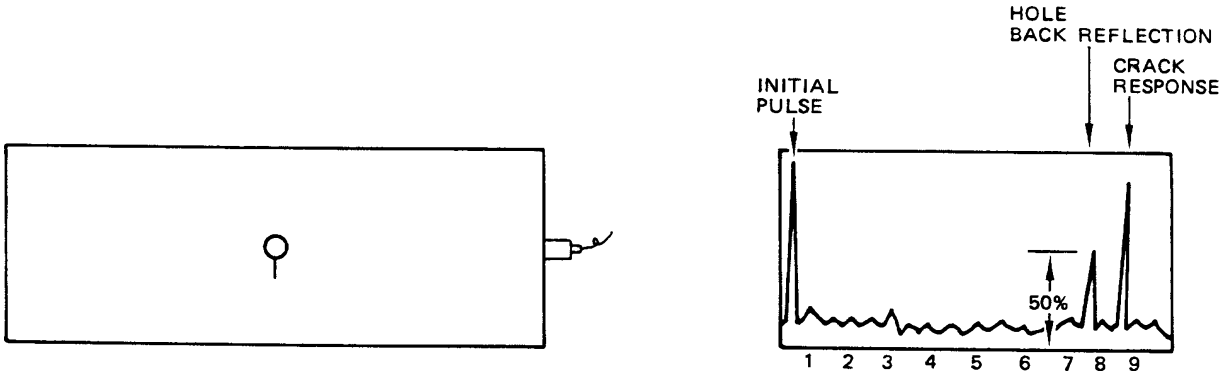
Calibration A
Figure 3



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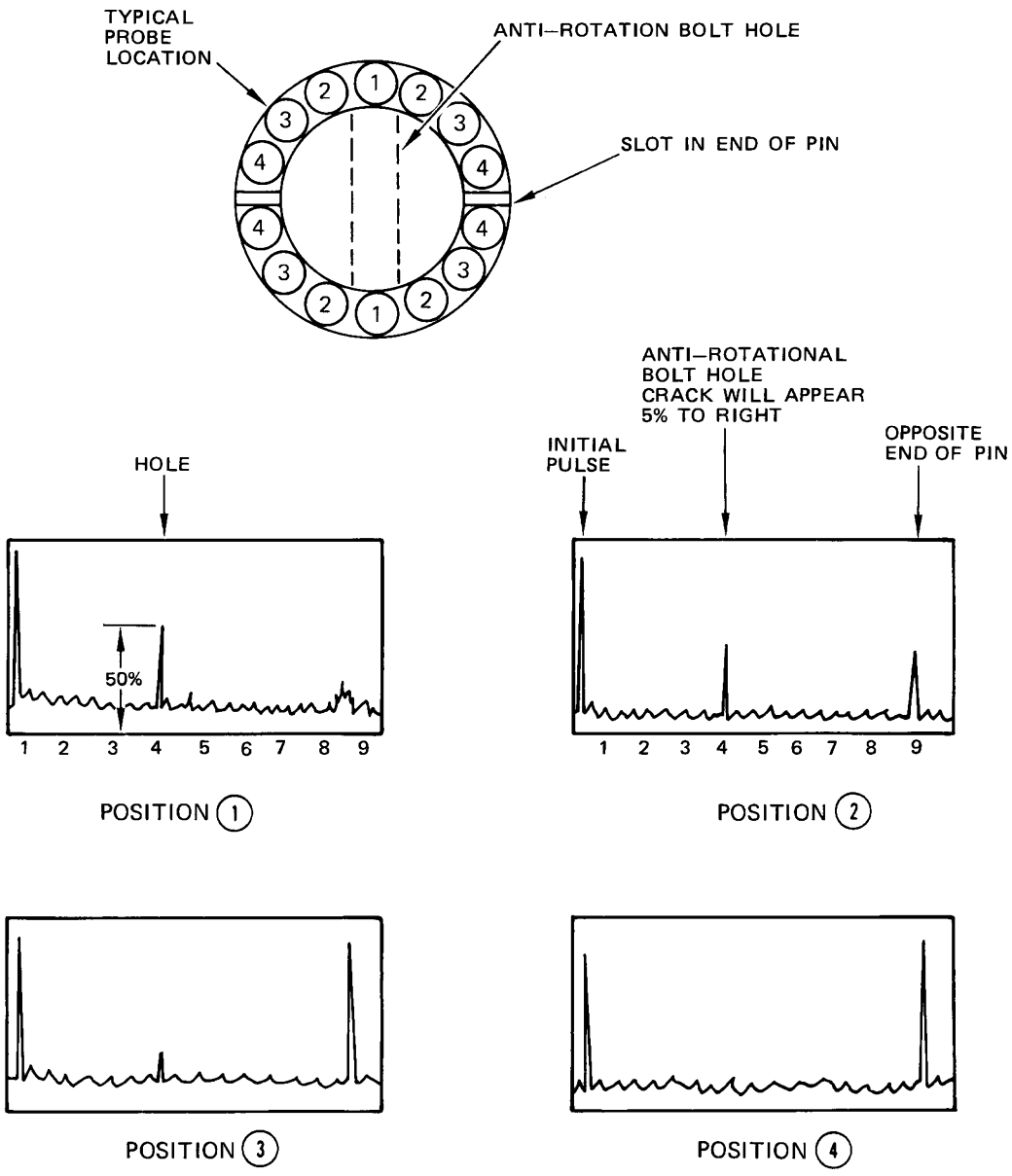
Calibration B
Figure 4

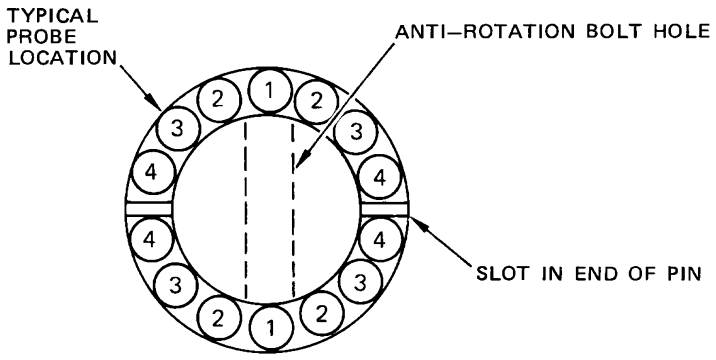


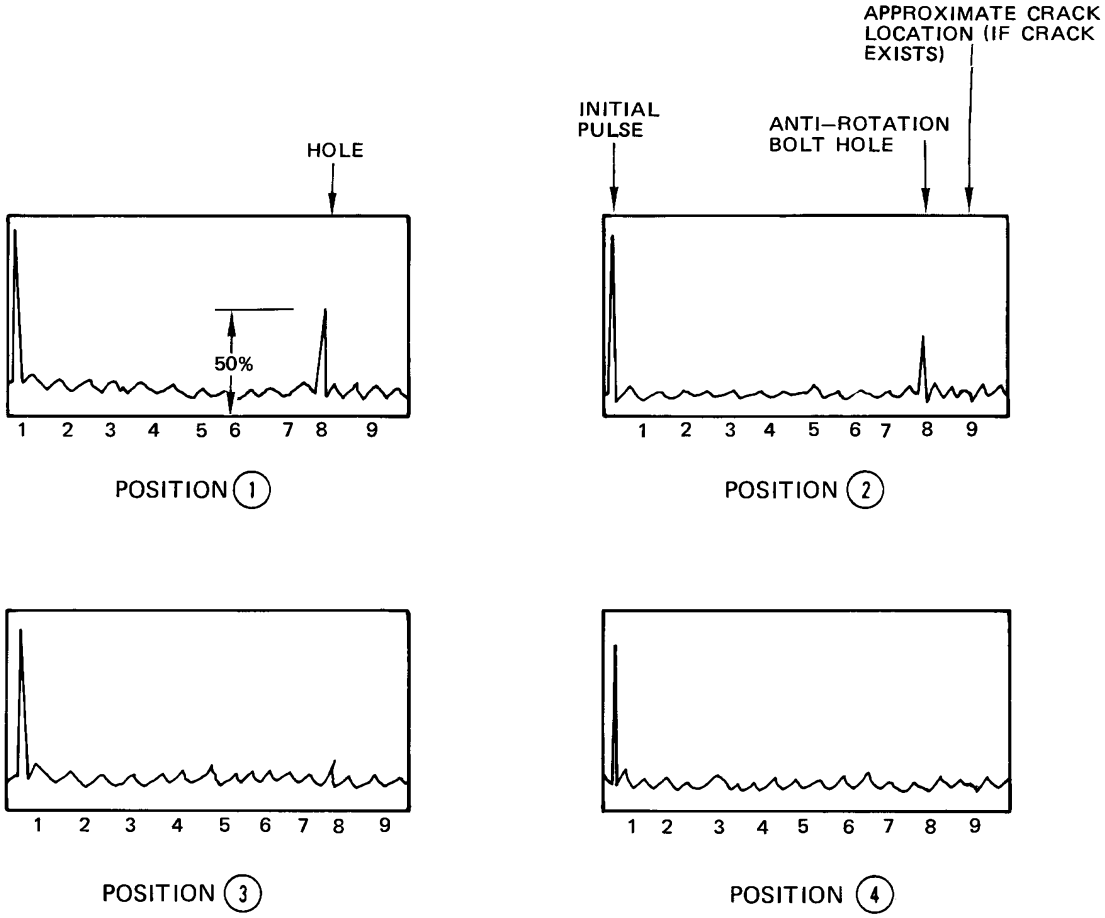
NOTE

- THESE RESULTS HOLD FOR UNDAMAGED PIN ONLY

2157638 S0000471138_V1

Transducer Positions for Calibration A
Figure 5





NOTE

- THESE RESULTS HOLD FOR UNDAMAGED PIN ONLY

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Transducer Positions for Calibration B
Figure 6

PART 4 - ULTRASONIC

MAIN LANDING GEAR ACTUATOR BEAM ARM

1. Purpose

A. Use this ultrasonic procedure to find cracks in the lugs of the actuator beam arm of the main landing gear. Cracks that start at the lug holes can be found during the scan when the transducer is moved along the outer diameter of the lugs. See Figure 1 and Figure 7 for the inspection areas.

B. A longitudinal wave transducer and three special transducer positioners are used for this inspection. See Paragraph 2.C.

NOTE: Part 4, 32-10-03 is an alternative to this inspection. The alternative inspection uses a single paint brush type transducer.

C. This procedure uses an ultrasonic instrument set for pulse echo at 5 MHz.

D. Three calibrations are done for this inspection. One calibration is done to find cracks that start in the middle of the lug hole. Two more calibrations are done to find cracks at the corners of the lug hole.

E. Service Bulletin Reference: 737-32-1224, 737-32A1314

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-04-00 for more data about ultrasonic inspections.

(3) Refer to Part 1, 51-01-00 for the names and addresses of the NDT equipment suppliers.

(4) The NDT Engineering Corporation has a kit, part number NEC-8090, that has the reference standard, a transducer, and all three transducer positioners specified in this procedure. Other equipment suppliers can also be used to provide this equipment.

B. Instrument

(1) Use an ultrasonic instrument that:

(a) Can do a pulse echo inspection.

(b) Operates at a frequency of 4 MHz to 6 MHz.

(2) The instruments specified below were used to prepare this procedure (only one instrument is necessary to do this procedure):

(a) USN 50; Krautkramer Branson

(b) Sonic 136; Staveley Instruments

(c) Epoch 2002; Panametrics

(d) USL 38; Krautkramer

C. Transducers

(1) Use a transducer that:

(a) Operates at a frequency between 4 MHz and 6 MHz.

(b) Is a longitudinal beam with a 0.376 inch (9.5 mm) maximum case diameter and a 0.370 (9.4 mm) minimum case diameter.

(c) Has a maximum height of 0.40 inch (10.1 mm).

(d) Has a micro dot connector on the side of the case.

(2) The longitudinal wave transducers identified below were used to prepare this procedure (only one transducer is necessary to do this procedure):

(a) Part number 291-719-800, Alpha 5 MHz; Krautkramer Branson Aerotech.

(b) SUC 169; NDT Engineering Corp.

(3) The transducer positioners that are to be used with the longitudinal transducers are as follows:

(a) Transducer Positioner NDT3023P1: This transducer positioner is used with the longitudinal transducer. It is used to find cracks near the middle of the lug hole. See Figure 2 for instructions to make this positioner.

(b) Transducer Positioner NDT3023P2: This transducer positioner is used with the longitudinal transducer. It is used to find cracks at the corner of the lug hole. See Figure 3 for instructions to make this positioner.

(c) Transducer Positioner NDT3023P3: This transducer positioner is a mirror image of NDT3023P2. It is used to find cracks at the corner of the lug hole from the opposite direction. See Figure 4 for instructions to make this positioner.

D. Reference Standard

(1) Make reference standard NDT3023. This reference standard has two EDM notches in it. See Figure 5 to make this reference standard.

NOTE: If too much noise appears on the screen during calibration and/or if the EDM notch signals are not found, it can be necessary to normalize the reference standard. See Figure 5 for instructions on how to normalize the reference standard.

E. Couplant

(1) Use oil, grease or an equivalent couplant that will not cause corrosion or other damage to the airplane. A light grease was used during the inspections that were done to prepare this procedure.

3. Prepare for the Inspection

NOTE: You can get access to the inspection area from below the airplane wing or from above the airplane wing.

A. Prepare for the inspection if you choose to do the inspection from below the wing of the airplane as follows:

NOTE: It is not necessary to remove access panels 8405L and 8505R if you choose to do the inspection from below the wing of the airplane.

(1) Clean the transducer scan areas on the lugs of the actuator beam arm. Remove loose or soft paint from the transducer scan areas. If the paint surface is rough, make the area smooth by approved procedures. Soft, loose or rough paint will not let sufficient sound into the lug. See Figure 1 for the location of the actuator beam arm and Figure 7 for the transducer scan areas.

B. Prepare for the inspection if you choose to do the inspection from above the wing of the airplane as follows:

(1) Remove access panels 8405L and 8505R to get access to the actuator beam arm. These panels are immediately above the actuator beam arm of the main landing gear. When you look down, you will see the transducer scan areas on the lugs of the actuator beam arm.

(2) Do Paragraph 3.A.(1).

C. Make a check of the transducer positioners, NDT3023P2 and NDT3023P3, to make sure they will satisfactorily touch the lug surface. The positioner guide must be against the side of the lug as specified in Figure 7.

NOTE: The transducer positioners are made to examine lugs of different outer diameters. Although the transducer positioner will move from front to back (rock) to some degree on small diameter lugs, you can find the cracks to satisfactorily do this procedure. The bottom edge of the shoe guide must not touch the top of the washer or bushing. There must not be interference caused by the washer or bushing.

D. If there is interference caused by the washer or bushing, do the steps below:

(1) If necessary, decrease the thickness of the positioner guide until the transducer positioner satisfactorily touches the lug.

(2) If necessary, decrease the drop (overlap) of the positioner guide until the transducer positioner satisfactorily touches the lug. You can sand the edge of the positioner guide with sand paper to remove the overlap.

E. If the positioner guide continues to prevent the transducer from satisfactorily touching the lug, complete removal of the positioner guide is permitted.

4. Instrument Calibration

A. Calibrate the equipment with positioners NDT3023P1, NDT3023P2, and NDT3023P3 as follows:

(1) Calibrate the equipment with positioner NDT3023P1: This calibration is done to find cracks near the middle of the lug holes.

(a) Put sufficient couplant in the 0.380 inch (9.65 mm) hole of transducer positioner NDT3023P1.

(b) Tighten the microdot connector on the longitudinal transducer used for this inspection.

(c) Put the transducer in the couplant filled hole of the transducer positioner. When the transducer touches the bottom of the hole in the positioner, tighten the screw in front of the positioner. Do not tighten the screw too much. If the screw is tightened too much, the transducer positioner could crack. Make sure the transducer does not lift out of the hole in the positioner.

(d) Connect the cable to the instrument.

(e) Set the instrument frequency to 5 MHz. If a broad band instrument is used, then it is not necessary to adjust the frequency. Make sure reject is set to off.

(f) Apply sufficient couplant to the transducer scan area on reference standard NDT3023. The transducer scan area on the reference standard for this calibration is on the outer surface near the center notch. See Figure 6.

(g) Put transducer positioner NDT3023P1 on reference standard NDT3023 and move the transducer positioner to get the signal from the center notch. Slowly move the positioner up and back until the signal from the center notch is at a maximum height on the screen. If the center notch signal is above 100 percent of full screen height, lower the gain until the top of the signal is below 100 percent of full screen height.

(h) Adjust the gain to put the center notch signal at 90 percent of full screen height. See Figure 6 for the calibration signals.

(i) Adjust the range and delay so the signal from the center notch is at 70 percent of full screen width and the initial pulse signal is at 0. See Figure 6.

(j) Slowly move the transducer up and back and to and from the edge of the reference standard to make sure that the maximum height from the center notch is 90 percent of full screen height. It could be necessary to add more couplant to the reference standard during the calibration. Couplant gets pushed away during many scans with the positioner. This loss of couplant could make it difficult to get a maximum signal from the notch.

(2) Calibrate the equipment with positioner NDT3023P2: This calibration is done to find cracks at the corners of the lug holes.

(a) Do the calibration as specified in Paragraph 4.A.(1), but this time use NDT3023P2 with the corner notch on reference standard NDT3023. This positioner has a shoe guide that is used to keep the positioner along the edge of the reference standard and lug of the actuator beam arm. See Figure 6 for the calibration.

(3) Calibrate the equipment with positioner NDT3023P3: This calibration is done to find cracks at the corners of the lug holes, from a direction opposite to NDT3023P2.

(a) Do the calibration as specified in Paragraph 4.A.(1), but this time use NDT3023P3 with the corner notch on reference standard NDT3023. This positioner has a shoe guide that is used to keep the positioner along the edge of the reference standard and lug of the actuator beam arm. See Figure 6 for the calibration.

5. Inspection Procedure

A. Examine the lug holes of the actuator beam arms for cracks with transducer positioners NDT3023P1, NDT3023P2, and NDT3023P3 as follows:

(1) Examine the middle surface area of the lug holes for cracks with transducer positioner NDT3023P1 as follows:

(a) Do the calibration as specified in Paragraph 4.A.(1).

(b) Put sufficient couplant on the surface of the lugs to make sure sufficient sound goes into the lug.

(c) Put the transducer on the transducer scan areas of the lug as shown in Figure 7. Slowly move the transducer as specified in Figure 7.

NOTE: It is important to do the scans slowly. If the scans are done too fast, it is possible a crack will not be found.

(d) Do complete scans as the transducer points in one direction. Start with the transducer off the edge of the lug. Move the transducer 0.1 inches (2.5 mm) after each scan until the middle surface area of the lug hole has been fully examined. See Figure 7 for the scan positions.

NOTE: A complete scan is when the transducer does a full scan away from you and then back again.

(e) Put sufficient couplant on the surface of the lugs again.

(f) Turn the transducer 180 degrees and do Paragraph 5.A.(1)(a) thru Paragraph 5.A.(1)(d).

(g) Do Paragraph 5.A.(1)(a) to Paragraph 5.A.(1)(f) on the other lug and on the lugs on the other side of the airplane.

(h) After the inspection, do a calibration check to see if the center notch signal is at 80% of full screen height or higher. If the center notch signal is lower than 80% of full screen height, do the calibration and inspection again.

(2) Examine the corners of the lug holes for cracks with transducer positioner NDT3023P2 as follows:

(a) Do the calibration as specified in Paragraph 4.A.(2).

(b) Put sufficient couplant on the surface of the lugs to make sure sufficient sound goes into the lug.

(c) Put the transducer on the transducer scan areas of the lug as shown in Figure 7. Make sure the positioner guide is against the side of the lug.

(d) Slowly move the transducer as specified and shown in Figure 7.

NOTE: It is important to do the scans slowly. If the scans are done too fast, it is possible a crack will not be found.

(e) Do a complete scan with the positioner guide against the side of the lug.

NOTE: A complete scan is when the transducer does a full scan away from you and then back again.

(f) Put sufficient couplant on the surface of the lugs again.

(g) Turn the transducer 180 degrees and do a complete scan on the other side of the same lug. Make sure the positioner guide is against the side of the lug.

(h) Do Paragraph 5.A.(2)(b) thru Paragraph 5.A.(2)(g) on the other lug and on the lugs on the other side of the airplane.

(i) After the inspection, do a calibration check to see if the corner notch signal is at 80% of full screen height or higher. If the corner notch signal is lower than 80% of full screen height, do the calibration and inspection again.

(3) Examine the corners of the lug holes for cracks with transducer positioner NDT3023P3 as follows:

(a) Do the calibration as specified in Paragraph 4.A.(3).

(b) Do Paragraph 5.A.(2)(b) thru Paragraph 5.A.(2)(i) again with the transducer in positioner NDT3023P3.

6. Inspection Results

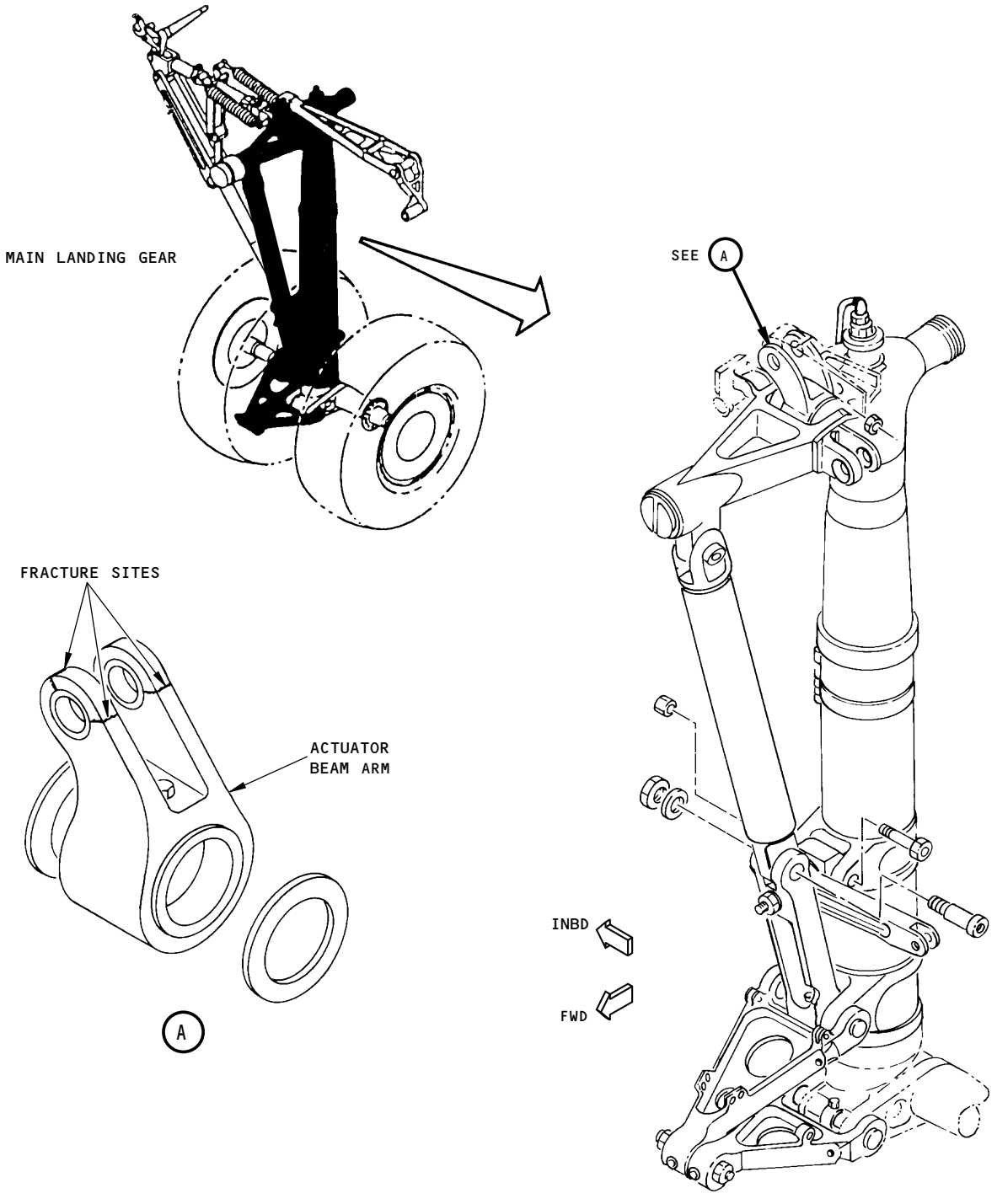
A. An ultrasonic signal is a crack signal if:

(1) The signal is 30 percent or more of full screen height and between 55 and 90 percent of full screen width.

(2) The signal moves horizontally along the screen display as the transducer or positioner is moved in the transducer scan area.

(a) A signal that does not move horizontally on the screen display during a transducer scan is not a crack signal. This type of signal is from a wall reflection inside the transducer positioner. The wall reflection type signals that do not move horizontally during a scan can occur between 20 and 50 percent of full screen width.

B. Compare the signals that occur during the inspection to the signals that you got from the reference standard notches during calibration.



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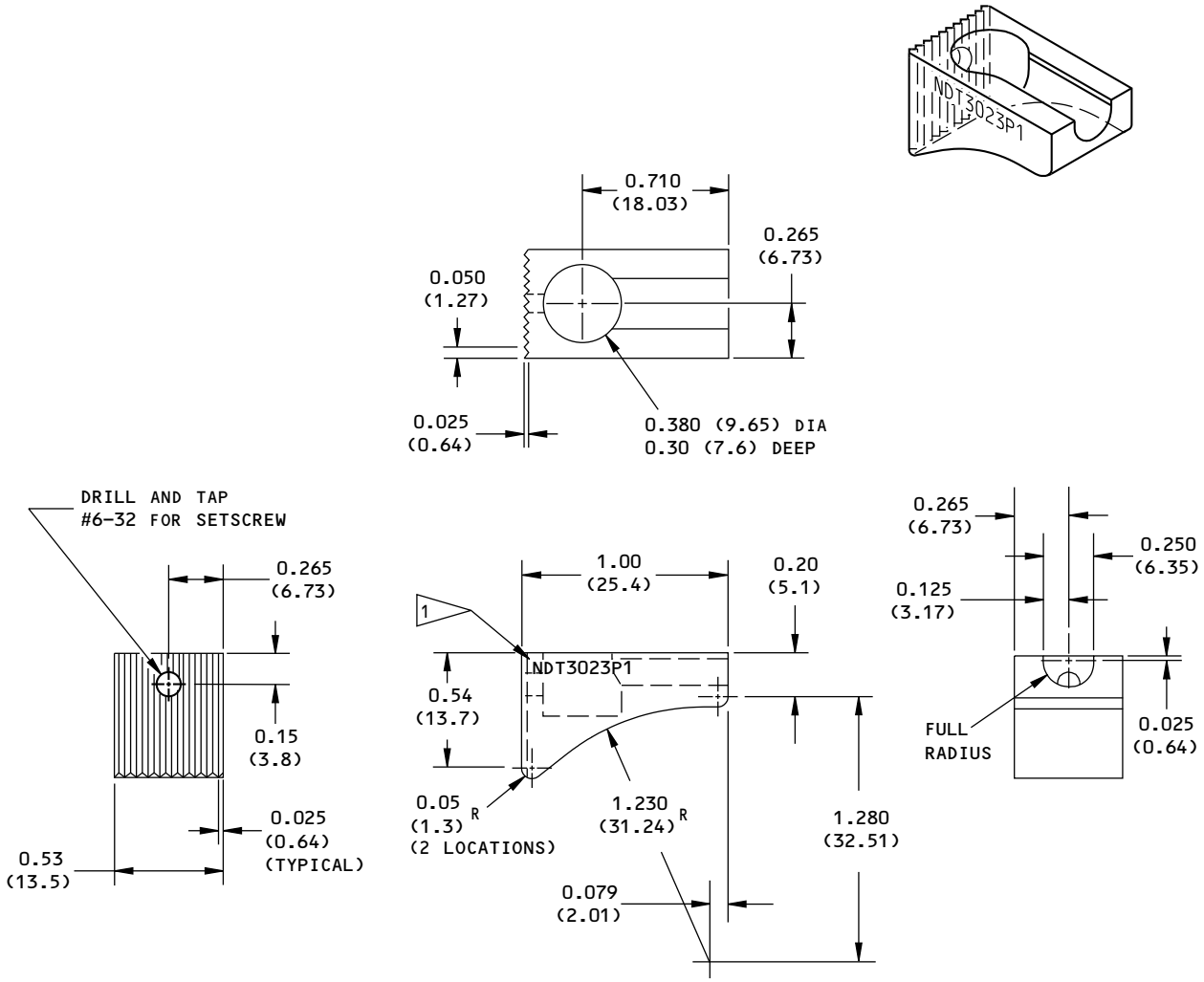
Location of Actuator Beam Arm and Fracture Sites
Figure 1



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.010	X.X = ± 0.3
X.X = ± 0.020	X = ± 0.5

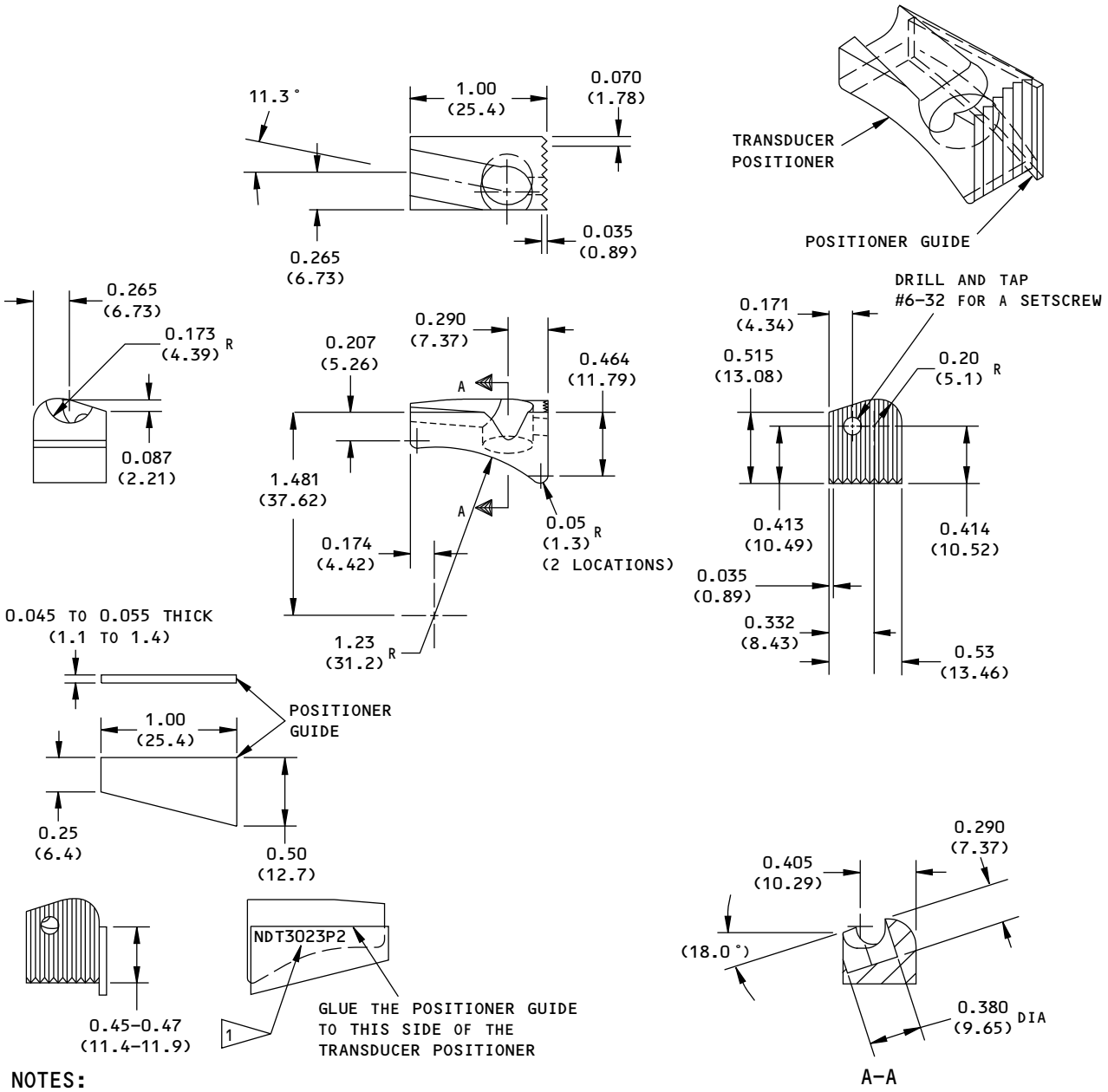
ANGULAR: ± 0.5 DEGREE
RADIUS: ± 0.010 (0.25)

- MATERIAL: LUCITE OR PLEXIGLAS

1 ETCH THE NUMBER NDT3023P1 AT APPROXIMATELY THIS LOCATION.

2157641 S0000471142_V1

Transducer Positioner NDT3023P1
Figure 2



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.010	X.X = ± 0.3
X.X = ± 0.020	X = ± 0.5

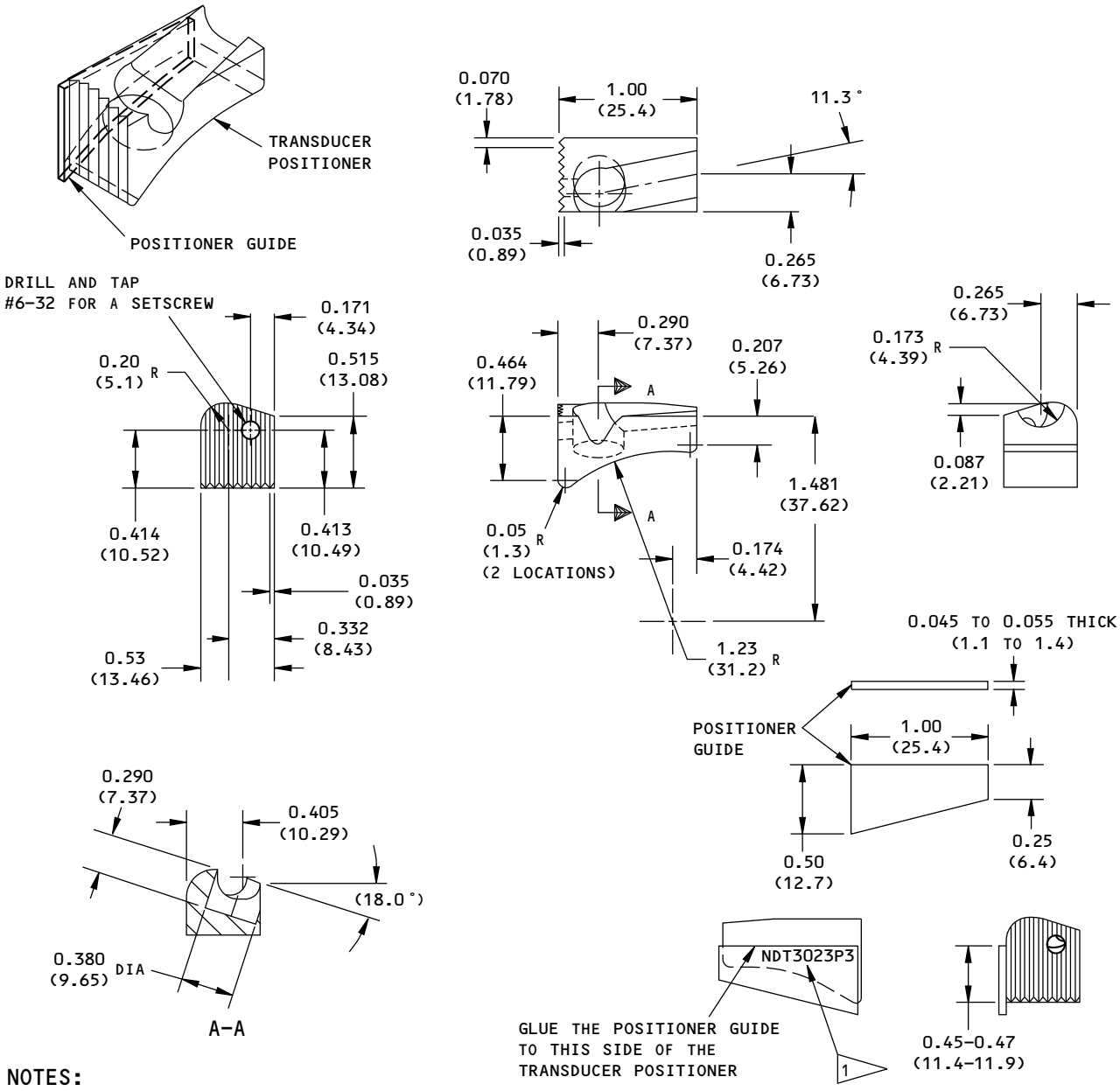
ANGULAR: ± 0.5 DEGREE
RADIUS: ± 0.010 (0.25)

- MATERIAL: LUCITE OR PLEXIGLAS
- GLUE THE POSITIONER GUIDE TO THE POSITIONER AS SHOWN ABOVE.

1 ETCH THE NUMBER NDT3023P2 AT APPROXIMATELY THIS LOCATION.

2157643 S0000471143_V1

Transducer Positioner NDT3023P2 With Shoe Guide
Figure 3



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.010	X.X = ± 0.3
X.X = ± 0.020	X = ± 0.5
ANGULAR: ± 0.5 DEGREE	
RADIUS: ± 0.010 (0.25)	

- MATERIAL: LUCITE OR PLEXIGLAS
- GLUE THE POSITIONER GUIDE TO THE POSITIONER AS SHOWN ABOVE.

1 ETCH THE NUMBER NDT3023P3 AT APPROXIMATELY THIS LOCATION.

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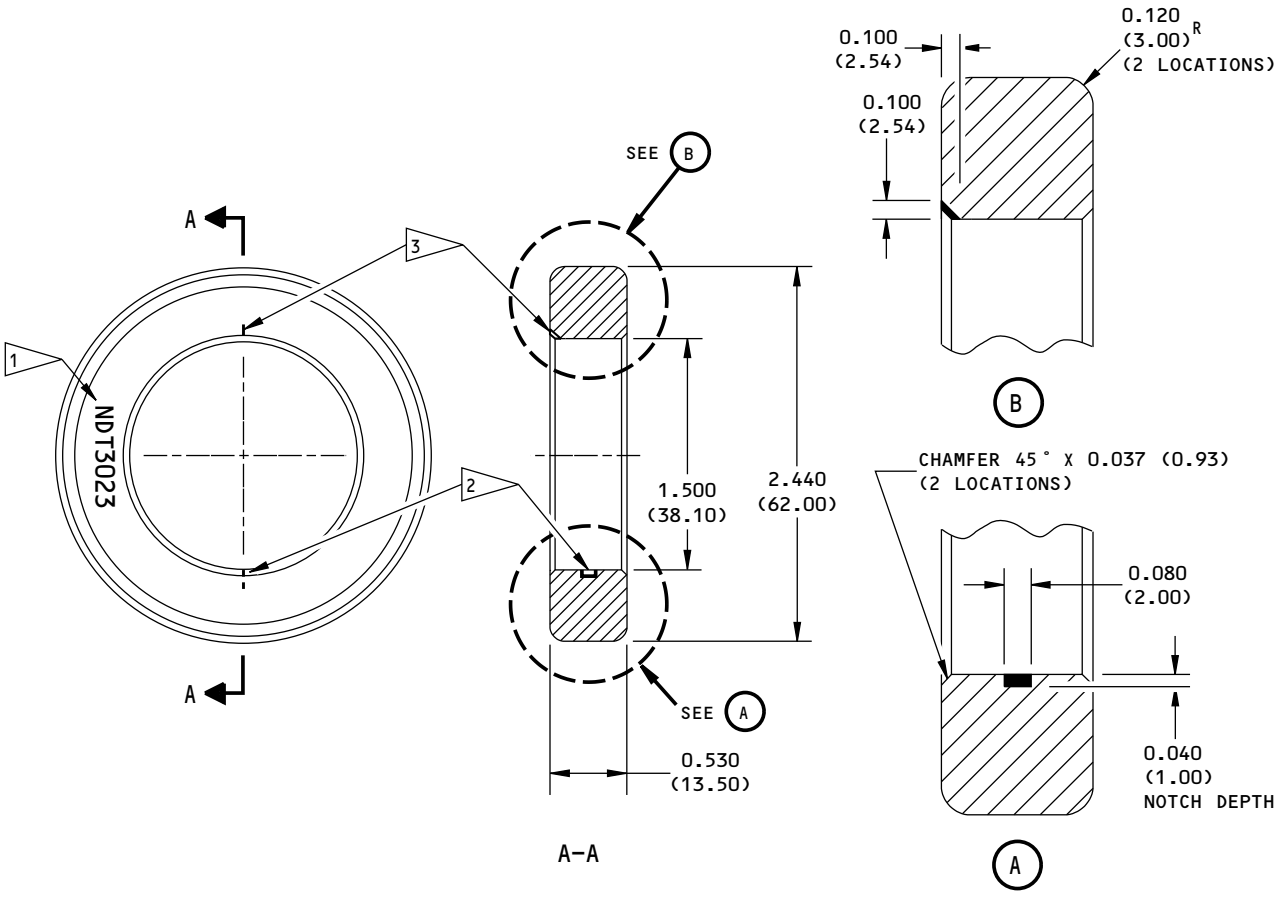
Transducer Positioner NDT3023P3 With Shoe Guide
Figure 4



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

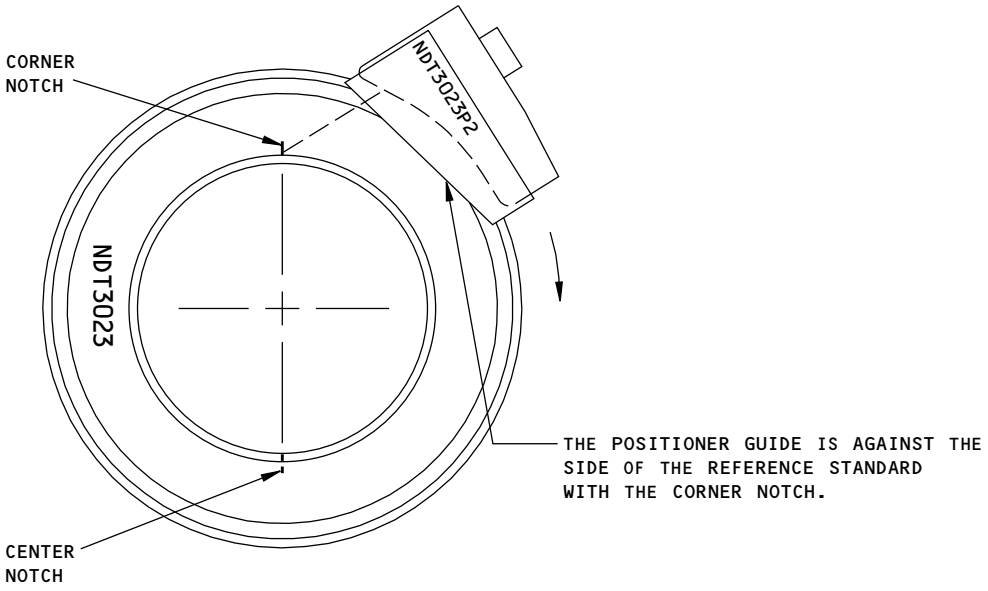
ANGULAR = ±1 DEGREE

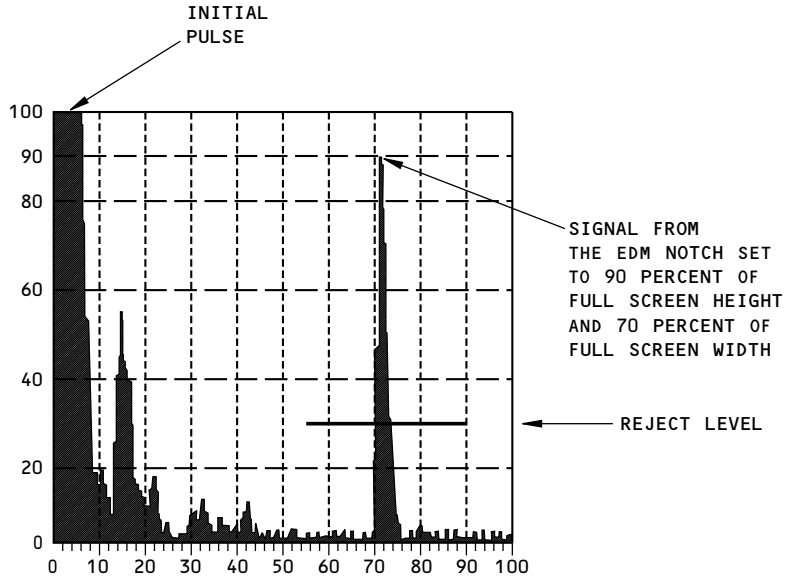
- MATERIAL: 4340M OR 4340 STEEL BAR. AFTER YOU MACHINE THE PART TO THE FINAL DIMENSIONS, NORMALIZE THE PART AS SPECIFIED IN BAC5617 OR MIL-H-6875.
- SURFACE ROUGHNESS: 63 RA OR BETTER

1. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT3023 AT APPROXIMATELY THIS LOCATION.
2. EDM NOTCH: 0.010 (0.25) MAXIMUM WIDTH.
3. EDM CORNER NOTCH: 0.007 (0.17) MAXIMUM WIDTH.

2157648 S0000471145_V1

Reference Standard NDT3023
Figure 5



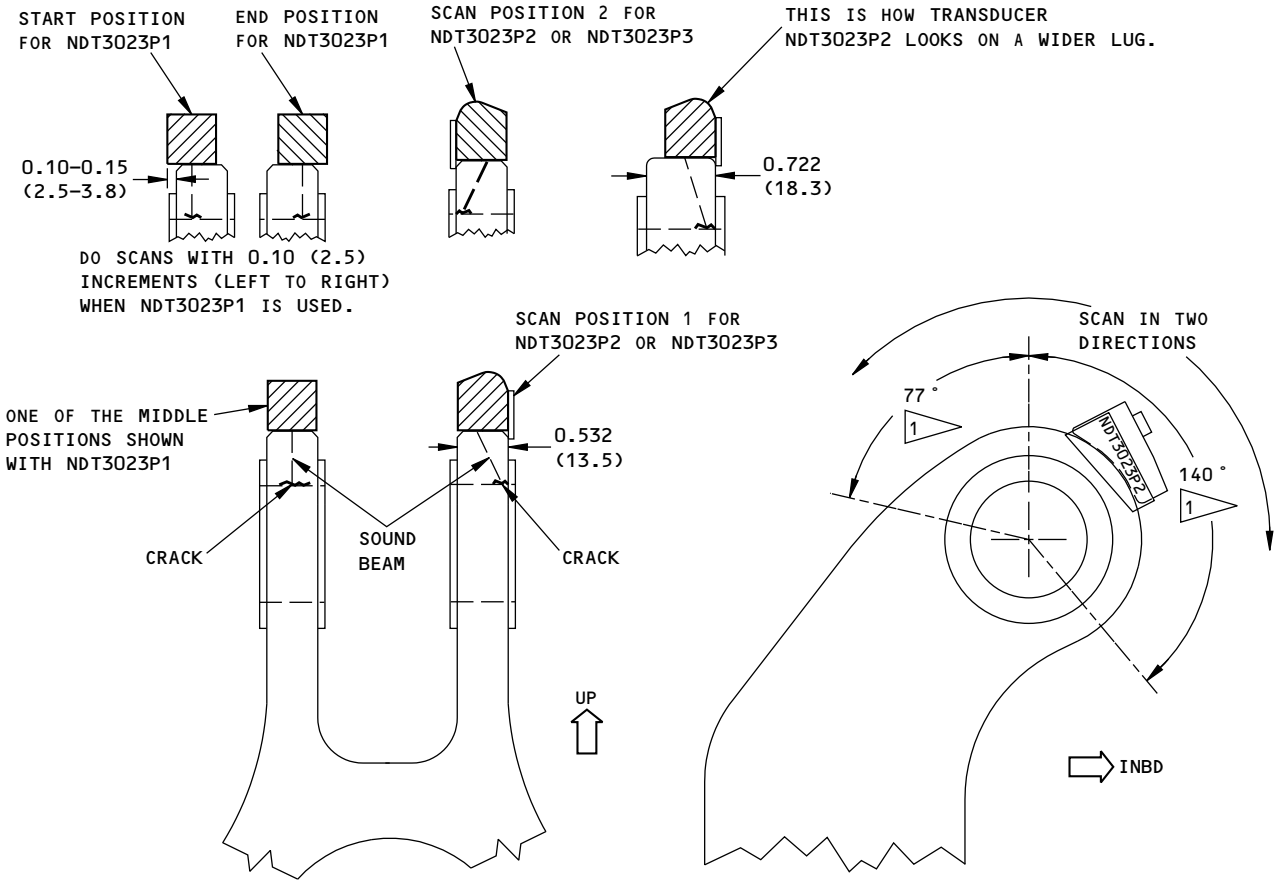


NOTES:

- DO THE CALIBRATION WITH THE TRANSDUCER AND POSITIONER TO GET THE SIGNALS AS SHOWN ABOVE.
- THE CALIBRATION IS SHOWN ON THE CORNER NOTCH WITH TRANSDUCER POSITIONER NDT3023P2. THE CALIBRATION WITH NDT3023P3 IS DONE ON THE LEFT SIDE OF THE CORNER NOTCH.
- DO THE CALIBRATION WITH POSITIONER NDT3023P1 ON THE CENTER NOTCH.

2157649 S0000471146_V1

Calibration
Figure 6



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- DO THE SCANS AS SHOWN ABOVE ON EACH LUG OF THE ACTUATOR BEAM ARM. MOVE THE TRANSDUCER AS FAR AS POSSIBLE AROUND THE LUG UNTIL THE TRANSDUCER COMES OFF THE LUG. THERE ARE TWO LUGS ON EACH ACTUATOR BEAM ARM.
- MAKE SURE THERE IS SUFFICIENT COUPLANT ON THE LUGS DURING THE SCANS. MAKE SURE TO MOVE THE TRANSDUCER SLOWLY AWAY FROM YOU AND BACK AGAIN DURING EACH SCAN.
- WHEN THE SCANS ARE DONE WITH POSITIONER NDT3023P1, START WITH THE TRANSDUCER 0.10 INCH (2.5 MM) TO 0.15 INCH (3.8 MM) OFF THE EDGE AS SHOWN ABOVE. DO EACH SCAN AN INCREMENT OF 0.10 INCH (2.54 MM) APART FROM EACH OTHER. THE LAST SCAN IS DONE WITH THE TRANSDUCER 0.10 INCH (2.5 MM) TO 0.15 INCH (3.8 MM) OFF THE OTHER EDGE OF THE LUG.
- DURING THE SCANS WITH POSITIONER NDT3023P2 AND NDT3023P3, MAKE SURE THE POSITIONER GUIDE IS AGAINST THE SIDE OF THE LUGS. DO TWO SCANS ON ONE SIDE OF THE LUG WITH EACH POSITIONER. TURN THE POSITIONER 180 DEGREES AND DO THE TWO SCANS ON THE OTHER SIDE OF THE SAME LUG.

1 TRANSDUCER SCAN AREA.

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Transducer Scan Positions
Figure 7

INSPECTION OF THE ACTUATOR BEAM ARM OF THE MAIN LANDING GEAR WITH A PAINTBRUSH TYPE TRANSDUCER

1. Purpose

A. Use this ultrasonic procedure to find cracks in the lugs of the actuator beam arm of the main landing gear. Cracks that start at the lug holes can be found during the scan when the transducer is moved along the outer diameter of the lugs. See Figure 1 and Figure 4 for the inspection areas.

B. This inspection procedure is an alternative to Part 4, 32-10-02. This inspection uses a paintbrush type transducer. Only one paintbrush transducer is necessary for this inspection procedure.

C. This procedure uses an ultrasonic instrument set for pulse echo at 5 MHz.

D. Only one calibration is necessary for this inspection. The calibration is done to find cracks that start in the middle of the lug hole and at the corners of the lug hole.

E. Service Bulletin Reference: 737-32-1224, 737-32A1314

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-04-00 for more data about ultrasonic inspections.

(3) Refer to Part 1, 51-01-00 for the names and addresses of the NDT equipment suppliers.

B. Instrument

(1) Use an ultrasonic instrument that:

(a) Can do a pulse echo inspection.

(b) Operates at a frequency of 4 MHz to 6 MHz.

(2) The instruments specified below were used to prepare this procedure:

(a) USN 50; Krautkramer Branson

(b) Sonic 136; Staveley Instruments

(c) Epoch 2002; Panametrics

(d) USL 38; Krautkramer

C. Transducers

(1) Use one of the paintbrush transducers that follow:

NOTE: These transducers operate at 5 MHz. They must find the corner EDM notch and the center EDM notch of the reference standard with the transducer pointed in two directions. Figure 4 shows a side view of the transducer pointed in two directions on an actuator beam lug.

(a) AFS-1384; AeroFab NDT

(b) XAB-6053; Xactex Corp. (not in production)

D. Reference Standard

(1) Make reference standard NDT3023. This reference standard has two EDM notches in it. See Figure 2 to make this reference standard.

NOTE: If too much noise appears on the screen during calibration and/or if the EDM notch signals are not found, it can be necessary to normalize the reference standard. See Figure 2 for instructions on how to normalize the reference standard.

E. Couplant

(1) Use oil, grease or an equivalent couplant that will not cause corrosion or other damage to the airplane. A light grease was used during the inspections that were done to prepare this procedure.

3. Prepare for the Inspection

NOTE: You can get access to the inspection area from below the airplane wing or from above the airplane wing.

A. Prepare for the inspection if you choose to do the inspection from below the wing of the airplane as follows:

NOTE: It is not necessary to remove access panels 8405L and 8505R if you choose to do the inspection from below the wing of the airplane.

(1) Clean the transducer scan areas on the lugs of the actuator beam arm. See Figure 1 for the location of the actuator beam arm and Figure 4 for the transducer scan areas.

(2) Remove loose or soft paint from the transducer scan areas. If the paint surface is rough, make the area smooth by approved procedures. Soft, loose or rough paint will not let sufficient sound into the lug.

B. Prepare for the inspection if you choose to do the inspection from above the wing of the airplane as follows:

(1) Remove access panels 8405L and 8505R to get access to the actuator beam arm. These panels are immediately above the actuator beam arm of the main landing gear. When you look down, you will see the transducer scan areas on the lugs of the actuator beam arm.

(2) Do Paragraph 3.A.(1) and Paragraph 3.A.(2).

4. Instrument Calibration

A. Calibrate the equipment with one of the paintbrush transducers as follows:

NOTE: It is possible that the engraved letters on the side of the reference standard can give signals on the screen. Ignore these signals if they occur during the calibration.

(1) Connect the cable to the transducer and the instrument.

(2) Set the instrument to 5 MHz. If a broad band instrument is used, then it is not necessary to adjust the frequency.

(3) Make sure that “reject” is set to “off”.

(4) Apply sufficient couplant to the transducer scan area on reference standard NDT3023. The transducer scan area on the reference standard is on the outer surface opposite the two EDM notches. See Figure 3.

(5) Put the paintbrush transducer on reference standard NDT3023 and move the transducer to get a signal from the center notch.

NOTE: Couplant gets pushed away during many scans with the transducer. It can be necessary to add more couplant to the reference standard during the calibration.

(6) Slowly move the transducer up and back and left to right until the signal is at a maximum height on the screen. The edge of the transducer is permitted to extend out from the edge of the reference standard to get a maximum signal.

(7) Adjust the gain to put the center notch signal at 80 percent of full screen height. See Figure 3 for the calibration signals.

(8) Adjust the range and delay so the signal from the center notch is at 60 percent of full screen width and the initial pulse is at 0. See Figure 3.

(9) Move the transducer to the corner notch to get a maximum signal from the corner notch. Slowly move the transducer up and back and left to right to make sure the corner notch signal is at a maximum height on the screen.

(10) If the maximum signal from the corner notch is higher than the signal from the center notch, do not adjust the gain.

(11) If the maximum signal from the corner notch is lower than the signal from the center notch, increase the gain so the corner notch signal is at 80 percent of full screen height.

(12) Adjust the range and delay so that the center notch signal is at 60 percent of full screen width and the corner notch signal is from 70 to 75 percent of full screen width. See Figure 3.

5. Inspection Procedure

A. Examine the lug holes of the actuator beam arms for cracks with one of the paintbrush transducers as follows:

(1) Do the calibration as specified in Paragraph 4.A.

(2) Put sufficient couplant on the surface of the lugs to make sure sufficient sound goes into the lug.

(3) Put the transducer on the transducer scan areas of the lug as shown in Figure 4.

NOTE: It is important to do the scans slowly. If the scans are done too fast, it is possible a crack will not be found.

(4) Do complete scans as the transducer points in one direction. Start with the transducer off the edge of the lug. Move the transducer 0.1 inch (2.5 mm) after each scan until the lug surface has been fully examined. See Figure 4 for the scan positions.

NOTE: A complete scan is when the transducer moves away from you and then back again for the full scan area shown in Figure 4. The transducer must point in the same direction during a complete scan.

(5) Put sufficient couplant on the surface of the lugs again.

(6) Turn the transducer 180 degrees and do Paragraph 5.A.(1) thru Paragraph 5.A.(4) again.

(7) Do Paragraph 5.A.(1) thru Paragraph 5.A.(6) on the other lug and on the lugs on the other side of the airplane.

(8) After the inspection, do a calibration check to see if the signals from the center notch and the corner notch are at 80% of full screen height or higher. If the signals from the two notches are lower than 80% of full screen height, do the calibration and inspection again.

6. Inspection Results

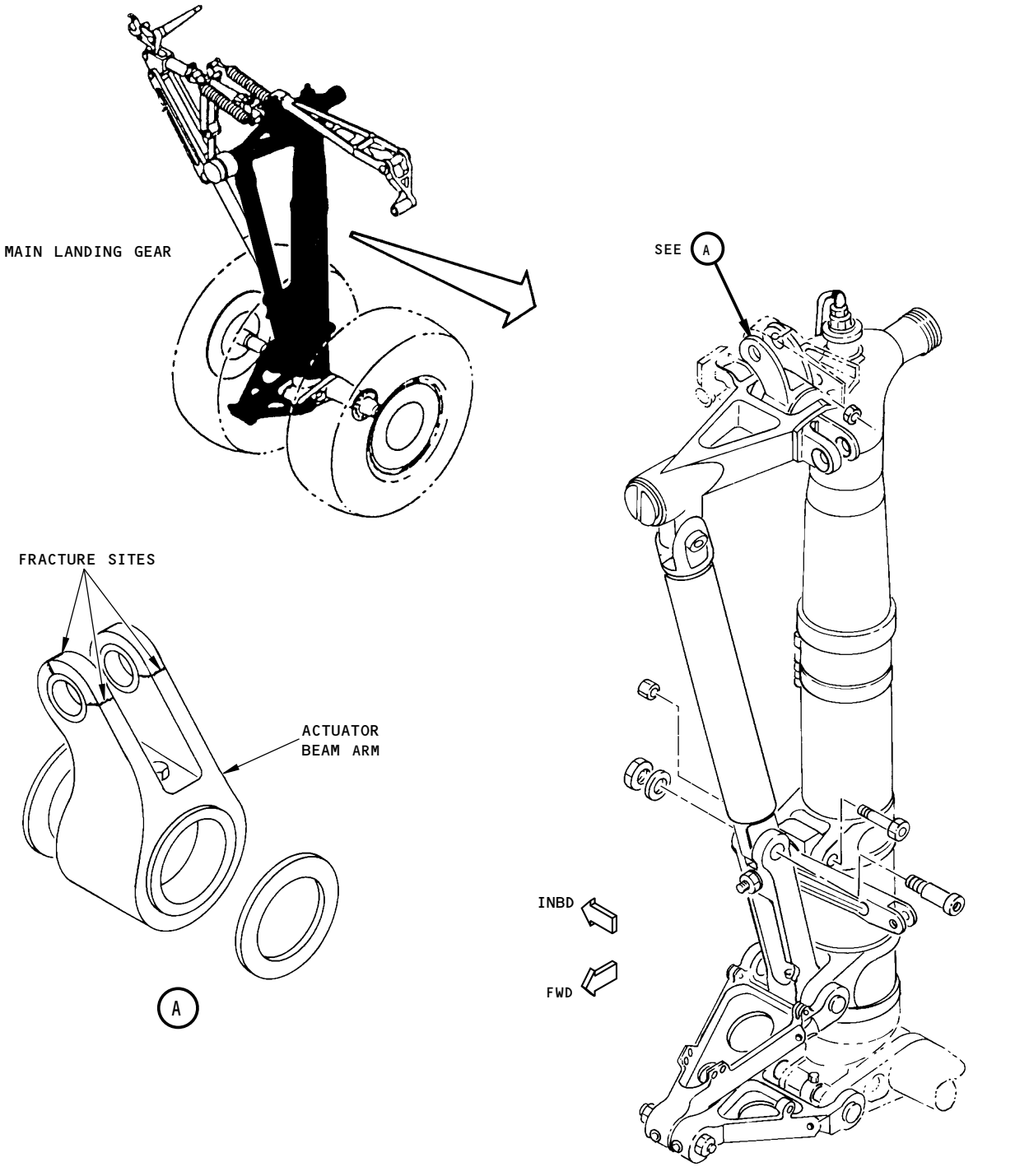
A. An ultrasonic signal is a crack signal if:

(1) The signal is 40 percent (or more) of full screen height and between 50 and 95 percent of full screen width.

(2) The signal moves horizontally along the screen display as the transducer or positioner is moved in the transducer scan area.

(a) A signal that does not move horizontally on the screen display during a transducer scan is not a crack signal. This type of signal is from a wall reflection inside the transducer positioner. The wall reflection type signals that do not move horizontally during a scan can occur between 20 and 45 percent of full screen width.

B. Compare the signals that occur during the inspection to the signals that you got from the reference standard notches during calibration.



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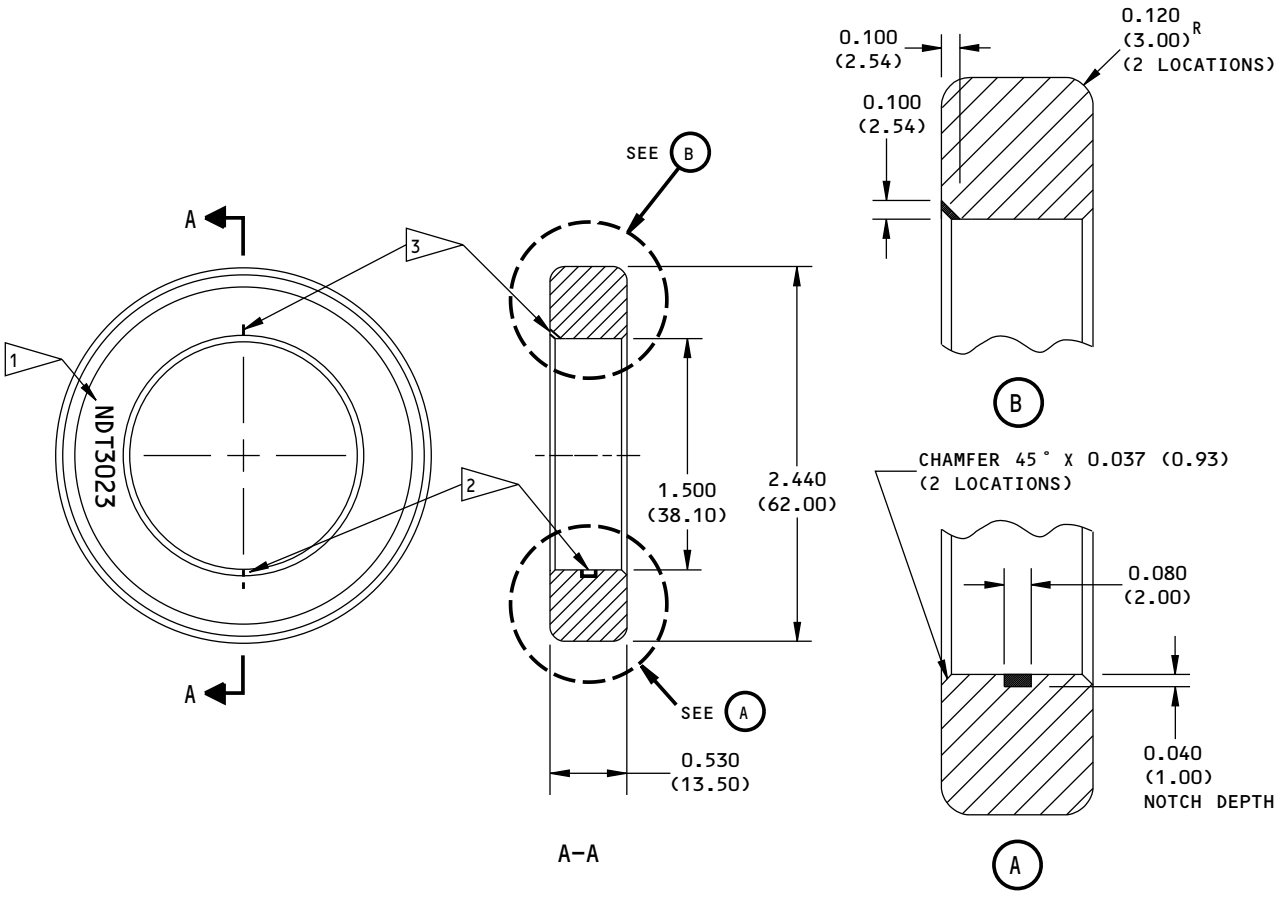
Location of Actuator Beam Arm and Fracture Sites
Figure 1



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

ANGULAR = ±1 DEGREE

- MATERIAL: 4340M OR 4340 STEEL BAR. AFTER YOU MACHINE THE PART TO THE FINAL DIMENSIONS, NORMALIZE THE PART AS SPECIFIED IN BAC5617 OR MIL-H-6875.
- SURFACE ROUGHNESS: 63 RA OR BETTER

1 ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT3023 AT APPROXIMATELY THIS LOCATION.

2 EDM NOTCH: 0.007 (0.17) MAXIMUM WIDTH.

3 EDM CORNER NOTCH: 0.007 (0.17) MAXIMUM WIDTH.

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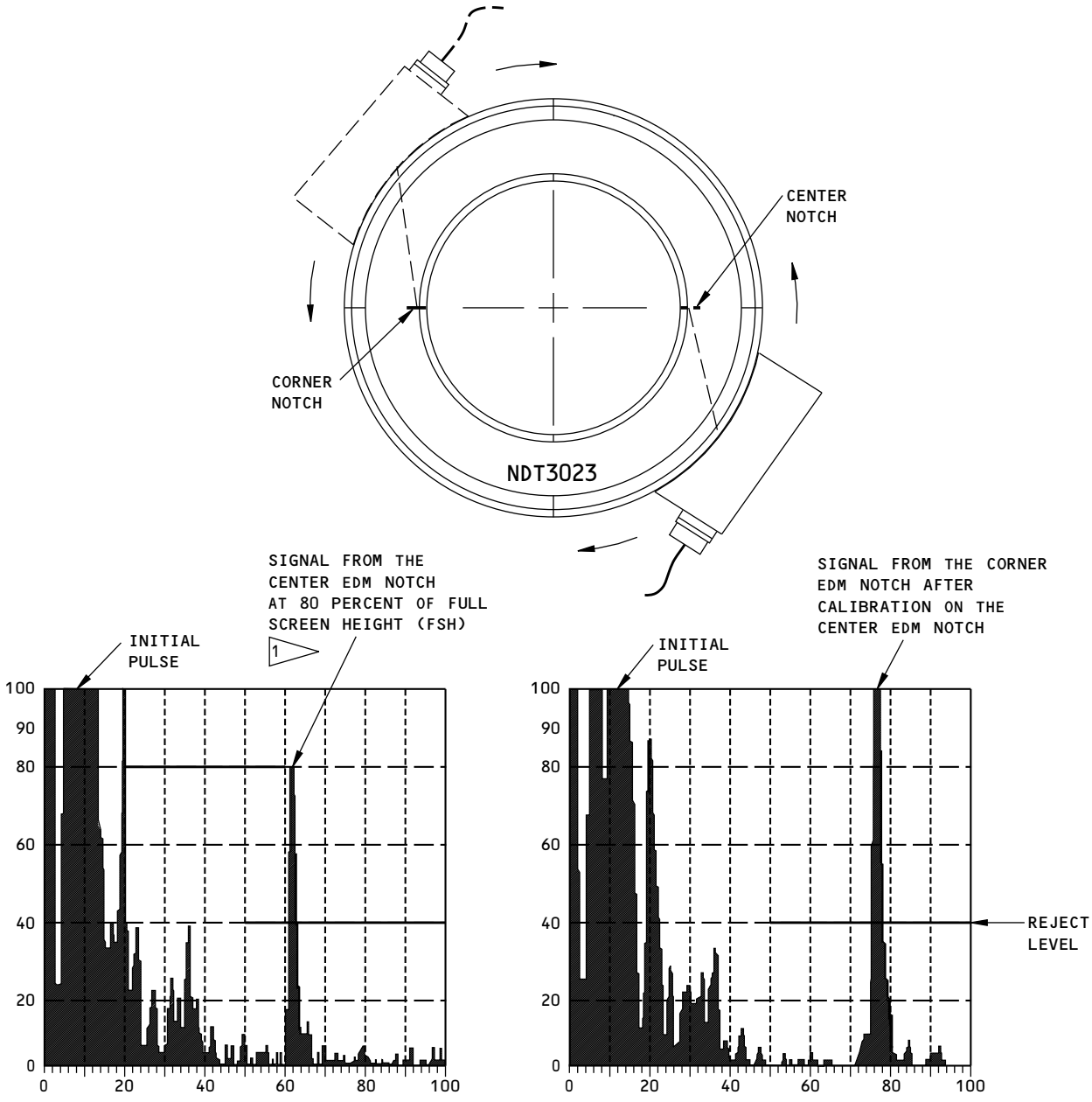
Reference Standard NDT3023
Figure 2



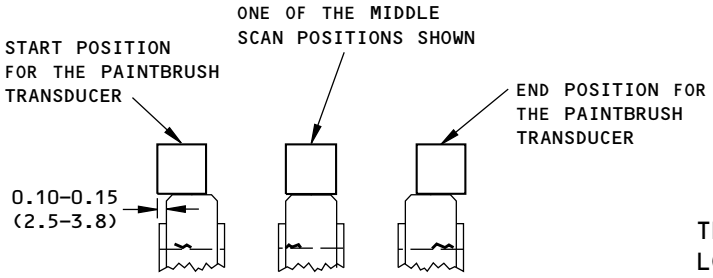
NOTES:

- DO THE CALIBRATION TO GET THE SIGNALS AS SHOWN ABOVE.
- SET THE SIGNAL FROM THE CENTER NOTCH AT 80 PERCENT OF FULL SCREEN HEIGHT.
- SET THE SIGNAL FROM THE CENTER NOTCH AT 60 PERCENT OF FULL SCREEN WIDTH.
- SET THE SIGNAL FROM THE CORNER NOTCH FROM 70 TO 75 PERCENT OF FULL SCREEN WIDTH.

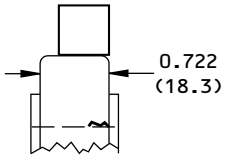
1 IT IS POSSIBLE FOR THE CORNER NOTCH TO BE AT 80 PERCENT OF FSH AND THE CENTER NOTCH TO BE HIGHER THAN 80 PERCENT OF FSH

2157671 S0000471151_V2

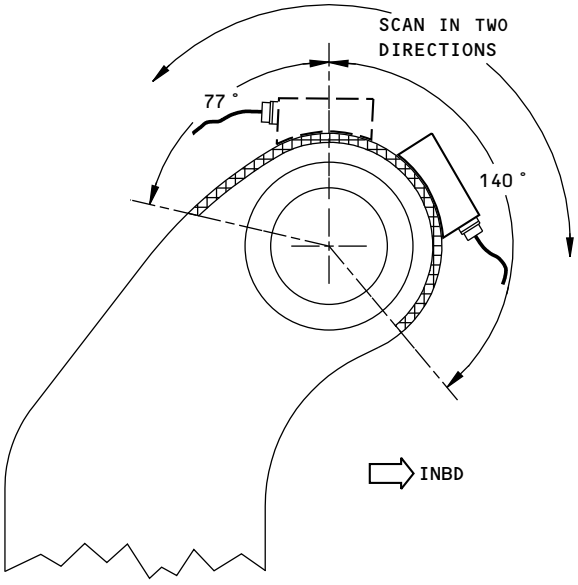
Calibration
Figure 3

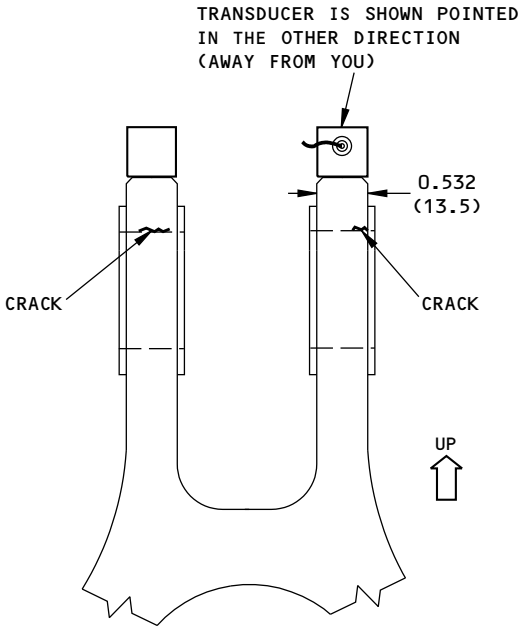


DO THE SCANS IN 0.10 (2.5)
INCREMENTS (LEFT TO RIGHT)



THIS IS HOW THE TRANSDUCER
LOOKS ON A WIDER LUG





THIS IS THE VIEW AS
YOU LOOK OUTBOARD

NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- DO THE SCANS AS SHOWN ABOVE ON EACH LUG OF THE ACTUATOR BEAM ARM. MOVE THE TRANSDUCER AS FAR AS POSSIBLE AROUND THE LUG UNTIL THE TRANSDUCER COMES OFF THE LUG. THERE ARE TWO LUGS ON EACH ACTUATOR BEAM ARM.
- MAKE SURE THERE IS SUFFICIENT COUPLANT ON THE LUGS DURING THE SCANS. MAKE SURE TO MOVE THE TRANSDUCER SLOWLY AWAY FROM YOU AND BACK AGAIN DURING EACH SCAN.
- WHEN YOU DO THE SCANS, START WITH THE TRANSDUCER 0.10 INCH (2.5 MM) TO 0.15 INCH (3.8 MM) OFF THE EDGE OF THE LUG AS SHOWN ABOVE. DO EACH SCAN IN INCREMENTS THAT ARE 0.10 INCH (2.5 MM) APART FROM EACH OTHER. THE LAST SCAN IS DONE WITH THE TRANSDUCER 0.10 INCH (2.5 MM) TO 0.15 INCH (3.8 MM) OFF THE OTHER EDGE OF THE LUG.
- MAKE SURE YOU DO THE SCANS AGAIN WITH THE TRANSDUCER TURNED 180 DEGREES IN THE OTHER DIRECTION.

TRANSDUCER SCAN AREA.

2157674 S0000471153_V1

Transducer Scan Positions
Figure 4

PART 4 - ULTRASONIC

MAIN LANDING GEAR ACTUATOR BEAM ARM

1. Purpose

A. Use this ultrasonic procedure to find cracks in the lugs of the actuator beam arm of the main landing gear. Cracks that start at the lug holes can be found during the scan when the transducer is moved along the outer diameter of the lugs. See Figure 1 and Figure 7 for the inspection areas.

B. A longitudinal wave transducer and three special transducer positioners are used for this inspection. See Paragraph 2.C.

NOTE: Part 4, 32-10-03 is an alternative to this inspection. The alternative inspection uses a single paint brush type transducer.

C. This procedure uses an ultrasonic instrument set for pulse echo at 5 MHz.

D. Three calibrations are done for this inspection. One calibration is done to find cracks that start in the middle of the lug hole. Two more calibrations are done to find cracks at the corners of the lug hole.

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-04-00 for more data about ultrasonic inspections.

(3) Refer to Part 1, 51-01-00 for the names and addresses of the NDT equipment suppliers.

(4) The NDT Engineering Corporation has a kit, part number NEC-8090, that has the reference standard, a transducer, and all three transducer positioners specified in this procedure. Other equipment suppliers can also be used to provide this equipment.

B. Instrument

(1) Use an ultrasonic instrument that:

(a) Can do a pulse echo inspection.

(b) Operates at a frequency of 4 MHz to 6 MHz.

(2) The instruments specified below were used to prepare this procedure (only one instrument is necessary to do this procedure):

(a) USN 50; Krautkramer Branson

(b) Sonic 136; Staveley Instruments

(c) Epoch 2002; Panametrics

(d) USL 38; Krautkramer

C. Transducers

(1) Use a transducer that:

(a) Operates at a frequency between 4 MHz and 6 MHz.

(b) Is a longitudinal beam with a 0.376 inch (9.5 mm) maximum case diameter and a 0.370 (9.4 mm) minimum case diameter.

(c) Has a maximum height of 0.40 inch (10.1 mm).

(d) Has a micro dot connector on the side of the case.

(2) The longitudinal wave transducers identified below were used to prepare this procedure (only one transducer is necessary to do this procedure):

(a) Part number 291-719-800, Alpha 5 MHz; Krautkramer Branson Aerotech.

(b) SUC 169; NDT Engineering Corp.

(3) The transducer positioners that are to be used with the longitudinal transducers are as follows:

(a) Transducer Positioner NDT3023P1: This transducer positioner is used with the longitudinal transducer. It is used to find cracks near the middle of the lug hole. See Figure 2 for instructions to make this positioner.

(b) Transducer Positioner NDT3023P2: This transducer positioner is used with the longitudinal transducer. It is used to find cracks at the corner of the lug hole. See Figure 3 for instructions to make this positioner.

(c) Transducer Positioner NDT3023P3: This transducer positioner is a mirror image of NDT3023P2. It is used to find cracks at the corner of the lug hole from the opposite direction. See Figure 4 for instructions to make this positioner.

D. Reference Standard

(1) Make reference standard NDT3023. This reference standard has two EDM notches in it. See Figure 5 to make this reference standard.

NOTE: If too much noise appears on the screen during calibration and/or if the EDM notch signals are not found, it can be necessary to normalize the reference standard. See Figure 5 for instructions on how to normalize the reference standard.

E. Couplant

(1) Use oil, grease or an equivalent couplant that will not cause corrosion or other damage to the airplane. A light grease was used during the inspections that were done to prepare this procedure.

3. Prepare for the Inspection

NOTE: You can get access to the inspection area from below the airplane wing or from above the airplane wing.

A. Prepare for the inspection if you choose to do the inspection from below the wing of the airplane as follows:

NOTE: It is not necessary to remove access panels 8405L and 8505R if you choose to do the inspection from below the wing of the airplane.

(1) Clean the transducer scan areas on the lugs of the actuator beam arm. Remove loose or soft paint from the transducer scan areas. If the paint surface is rough, make the area smooth by approved procedures. Soft, loose or rough paint will not let sufficient sound into the lug. See Figure 1 for the location of the actuator beam arm and Figure 7 for the transducer scan areas.

B. Prepare for the inspection if you choose to do the inspection from above the wing of the airplane as follows:

(1) Remove access panels 8405L and 8505R to get access to the actuator beam arm. These panels are immediately above the actuator beam arm of the main landing gear. When you look down, you will see the transducer scan areas on the lugs of the actuator beam arm.

(2) Do Paragraph 3.A.(1).

C. Make a check of the transducer positioners, NDT3023P2 and NDT3023P3, to make sure they will satisfactorily touch the lug surface. The positioner guide must be against the side of the lug as specified in Figure 7.

NOTE: The transducer positioners are made to examine lugs of different outer diameters. Although the transducer positioner will move from front to back (rock) to some degree on small diameter lugs, you can find the cracks to satisfactorily do this procedure. The bottom edge of the shoe guide must not touch the top of the washer or bushing. There must not be interference caused by the washer or bushing.

D. If there is interference caused by the washer or bushing, do the steps below:

(1) If necessary, decrease the thickness of the positioner guide until the transducer positioner satisfactorily touches the lug.

(2) If necessary, decrease the drop (overlap) of the positioner guide until the transducer positioner satisfactorily touches the lug. You can sand the edge of the positioner guide with sand paper to remove the overlap.

E. If the positioner guide continues to prevent the transducer from satisfactorily touching the lug, complete removal of the positioner guide is permitted.

4. Instrument Calibration

A. Calibrate the equipment with positioners NDT3023P1, NDT3023P2, and NDT3023P3 as follows:

(1) Calibrate the equipment with positioner NDT3023P1: This calibration is done to find cracks near the middle of the lug holes.

(a) Put sufficient couplant in the 0.380 inch (9.65 mm) hole of transducer positioner NDT3023P1.

(b) Tighten the microdot connector on the longitudinal transducer used for this inspection.

(c) Put the transducer in the couplant filled hole of the transducer positioner. When the transducer touches the bottom of the hole in the positioner, tighten the screw in front of the positioner. Do not tighten the screw too much. If the screw is tightened too much, the transducer positioner could crack. Make sure the transducer does not lift out of the hole in the positioner.

(d) Connect the cable to the instrument.

(e) Set the instrument frequency to 5 MHz. If a broad band instrument is used, then it is not necessary to adjust the frequency. Make sure reject is set to off.

(f) Apply sufficient couplant to the transducer scan area on reference standard NDT3023. The transducer scan area on the reference standard for this calibration is on the outer surface near the center notch. See Figure 6.

(g) Put transducer positioner NDT3023P1 on reference standard NDT3023 and move the transducer positioner to get the signal from the center notch. Slowly move the positioner up and back until the signal from the center notch is at a maximum height on the screen. If the center notch signal is above 100 percent of full screen height, lower the gain until the top of the signal is below 100 percent of full screen height.

(h) Adjust the gain to put the center notch signal at 90 percent of full screen height. See Figure 6 for the calibration signals.

(i) Adjust the range and delay so the signal from the center notch is at 70 percent of full screen width and the initial pulse signal is at 0. See Figure 6.

(j) Slowly move the transducer up and back and to and from the edge of the reference standard to make sure that the maximum height from the center notch is 90 percent of full screen height. It could be necessary to add more couplant to the reference standard during the calibration. Couplant gets pushed away during many scans with the positioner. This loss of couplant could make it difficult to get a maximum signal from the notch.

(2) Calibrate the equipment with positioner NDT3023P2: This calibration is done to find cracks at the corners of the lug holes.

(a) Do the calibration as specified in Paragraph 4.A.(1), but this time use NDT3023P2 with the corner notch on reference standard NDT3023. This positioner has a shoe guide that is used to keep the positioner along the edge of the reference standard and lug of the actuator beam arm. See Figure 6 for the calibration.

(3) Calibrate the equipment with positioner NDT3023P3: This calibration is done to find cracks at the corners of the lug holes, from a direction opposite to NDT3023P2.

(a) Do the calibration as specified in Paragraph 4.A.(1), but this time use NDT3023P3 with the corner notch on reference standard NDT3023. This positioner has a shoe guide that is used to keep the positioner along the edge of the reference standard and lug of the actuator beam arm. See Figure 6 for the calibration.

5. Inspection Procedure

A. Examine the lug holes of the actuator beam arms for cracks with transducer positioners NDT3023P1, NDT3023P2, and NDT3023P3 as follows:

(1) Examine the middle surface area of the lug holes for cracks with transducer positioner NDT3023P1 as follows:

(a) Do the calibration as specified in Paragraph 4.A.(1).

(b) Put sufficient couplant on the surface of the lugs to make sure sufficient sound goes into the lug.

(c) Put the transducer on the transducer scan areas of the lug as shown in Figure 7. Slowly move the transducer as specified in Figure 7.

NOTE: It is important to do the scans slowly. If the scans are done too fast, it is possible a crack will not be found.

(d) Do complete scans as the transducer points in one direction. Start with the transducer off the edge of the lug. Move the transducer 0.1 inches (2.5 mm) after each scan until the middle surface area of the lug hole has been fully examined. See Figure 7 for the scan positions.

NOTE: A complete scan is when the transducer does a full scan away from you and then back again.

(e) Put sufficient couplant on the surface of the lugs again.

(f) Turn the transducer 180 degrees and do Paragraph 5.A.(1)(a) thru Paragraph 5.A.(1)(d).

(g) Do Paragraph 5.A.(1)(a) to Paragraph 5.A.(1)(f) on the other lug and on the lugs on the other side of the airplane.

(h) After the inspection, do a calibration check to see if the center notch signal is at 80% of full screen height or higher. If the center notch signal is lower than 80% of full screen height, do the calibration and inspection again.

(2) Examine the corners of the lug holes for cracks with transducer positioner NDT3023P2 as follows:

(a) Do the calibration as specified in Paragraph 4.A.(2).

(b) Put sufficient couplant on the surface of the lugs to make sure sufficient sound goes into the lug.

(c) Put the transducer on the transducer scan areas of the lug as shown in Figure 7. Make sure the positioner guide is against the side of the lug.

(d) Slowly move the transducer as specified and shown in Figure 7.

NOTE: It is important to do the scans slowly. If the scans are done too fast, it is possible a crack will not be found.

(e) Do a complete scan with the positioner guide against the side of the lug.

NOTE: A complete scan is when the transducer does a full scan away from you and then back again.

(f) Put sufficient couplant on the surface of the lugs again.

(g) Turn the transducer 180 degrees and do a complete scan on the other side of the same lug. Make sure the positioner guide is against the side of the lug.

(h) Do Paragraph 5.A.(2)(b) thru Paragraph 5.A.(2)(g) on the other lug and on the lugs on the other side of the airplane.

(i) After the inspection, do a calibration check to see if the corner notch signal is at 80% of full screen height or higher. If the corner notch signal is lower than 80% of full screen height, do the calibration and inspection again.

(3) Examine the corners of the lug holes for cracks with transducer positioner NDT3023P3 as follows:

(a) Do the calibration as specified in Paragraph 4.A.(3).

(b) Do Paragraph 5.A.(2)(b) thru Paragraph 5.A.(2)(i) again with the transducer in positioner NDT3023P3.

6. Inspection Results

A. An ultrasonic signal is a crack signal if:

(1) The signal is 45 percent or more of full screen height and between 55 and 90 percent of full screen width.

(2) The signal moves horizontally along the screen display as the transducer or positioner is moved in the transducer scan area.

(a) A signal that does not move horizontally on the screen display during a transducer scan is not a crack signal. This type of signal is from a wall reflection inside the transducer positioner. The wall reflection type signals that do not move horizontally during a scan can occur between 20 and 50 percent of full screen width.

B. Compare the signals that occur during the inspection to the signals that you got from the reference standard notches during calibration.

C. Signals in the inspection area can also be caused by the conditions that follow:

(1) A dried cadmium puddle on the bore surface of the lug. These cadmium puddles can occur when cadmium is applied during the manufacturing process. A cadmium puddle can cause a signal equivalent to a crack signal.

(2) An area on the lug where the bushing to lug interface is very tight can cause a signal to occur that is almost equivalent to a crack signal.

D. If a signal occurs that is at or above 45 percent of full screen height and between 55 and 90 percent of full screen width, do the steps that follow:

(1) Remove the actuator beam arm from the main landing gear.

(2) Remove the bushing from the lug where the signal was found.

(3) Clean the bore and do a visual inspection of the bore with a light and magnifying glass to see if there is a corrosion pit, or a cadmium puddle. Also feel the bore with your finger for a raised cadmium puddle.

(4) If there is a cadmium puddle in the area where the signal occurred, remove the cadmium puddle with Scotch Brite.

(5) Do the calibration and ultrasonic inspection again as specified in Paragraph 4. and Paragraph 5. Make sure to use the same calibration procedure, transducer positioner, and to move the transducer in the same direction as when the crack type signal occurred before.

(6) Do a wet fluorescent magnetic particle inspection with a central bar conductor.

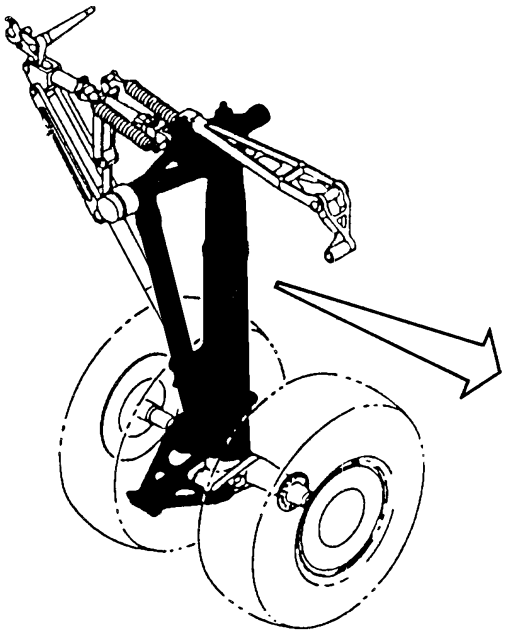
E. Reject the part if one of the conditions that follow occur:

(1) If the ultrasonic inspection with the bushing installed causes a crack signal to occur that is 45 percent of full screen height or higher, and the subsequent ultrasonic inspection with the bushing removed gives a signal at or above 45 percent of full screen height, then reject the part.

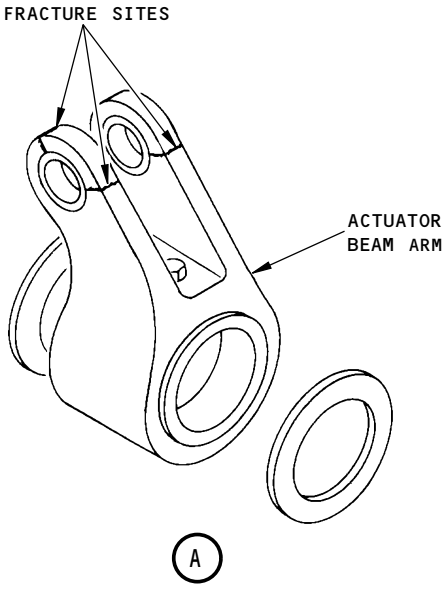
(2) If linear, wet fluorescent, magnetic particle indications occur on the bore that are 0.080 inch (2.00 mm) or longer, then reject the part.

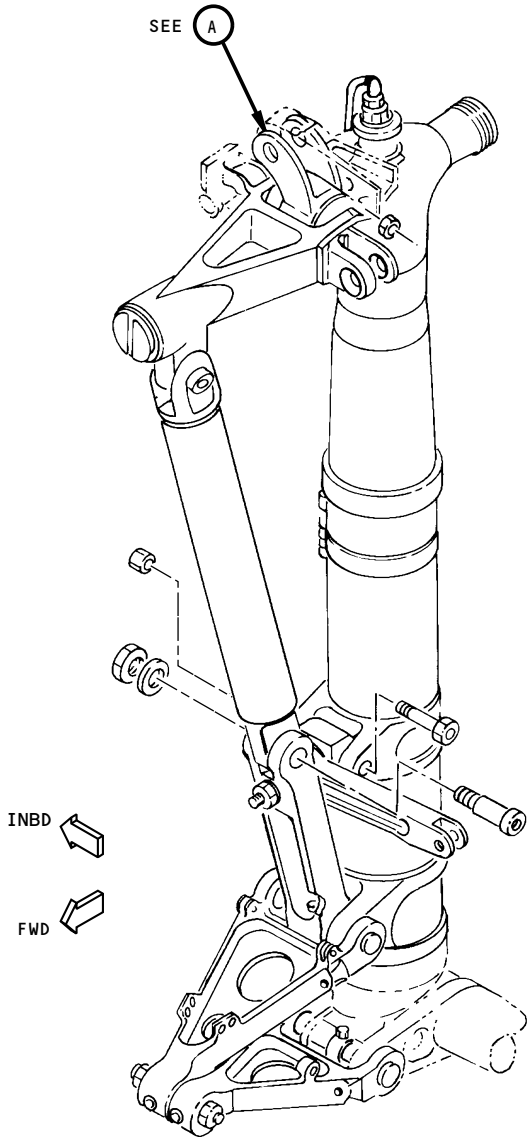
NOTE: If the ultrasonic signal that occurred with the bushing installed does not occur after the bushing is removed and the magnetic particle inspection does not find a crack indication, then the part is acceptable.

F. Cadmium plate the bore if cadmium was removed.



MAIN LANDING GEAR





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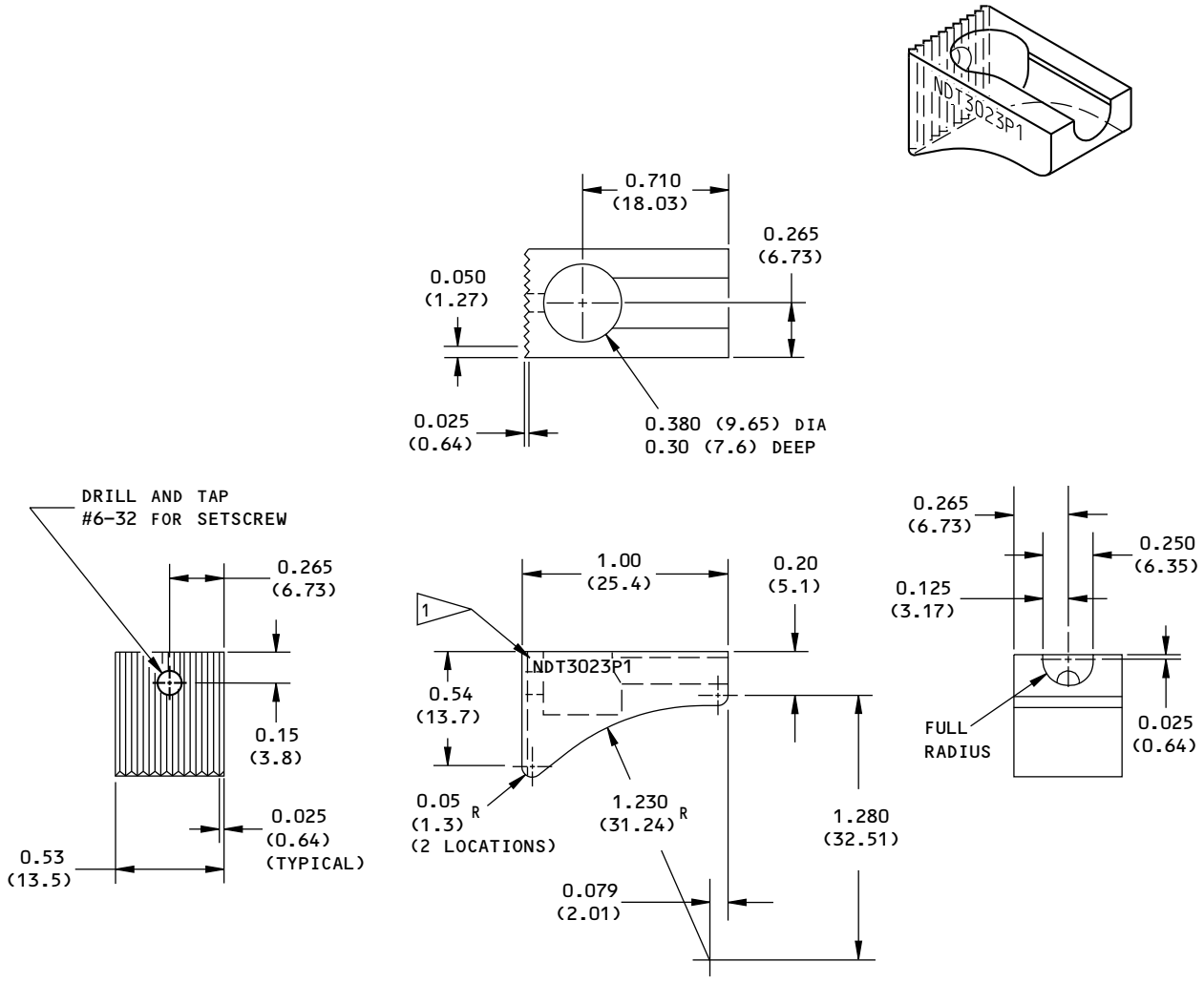
Location of Actuator Beam Arm and Fracture Sites
Figure 1



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.010	X.X = ± 0.3
X.X = ± 0.020	X = ± 0.5

ANGULAR: ± 0.5 DEGREE
RADIUS: ± 0.010 (0.25)

- MATERIAL: LUCITE OR PLEXIGLASS

1 ETCH THE NUMBER NDT3023P1 AT APPROXIMATELY THIS LOCATION.

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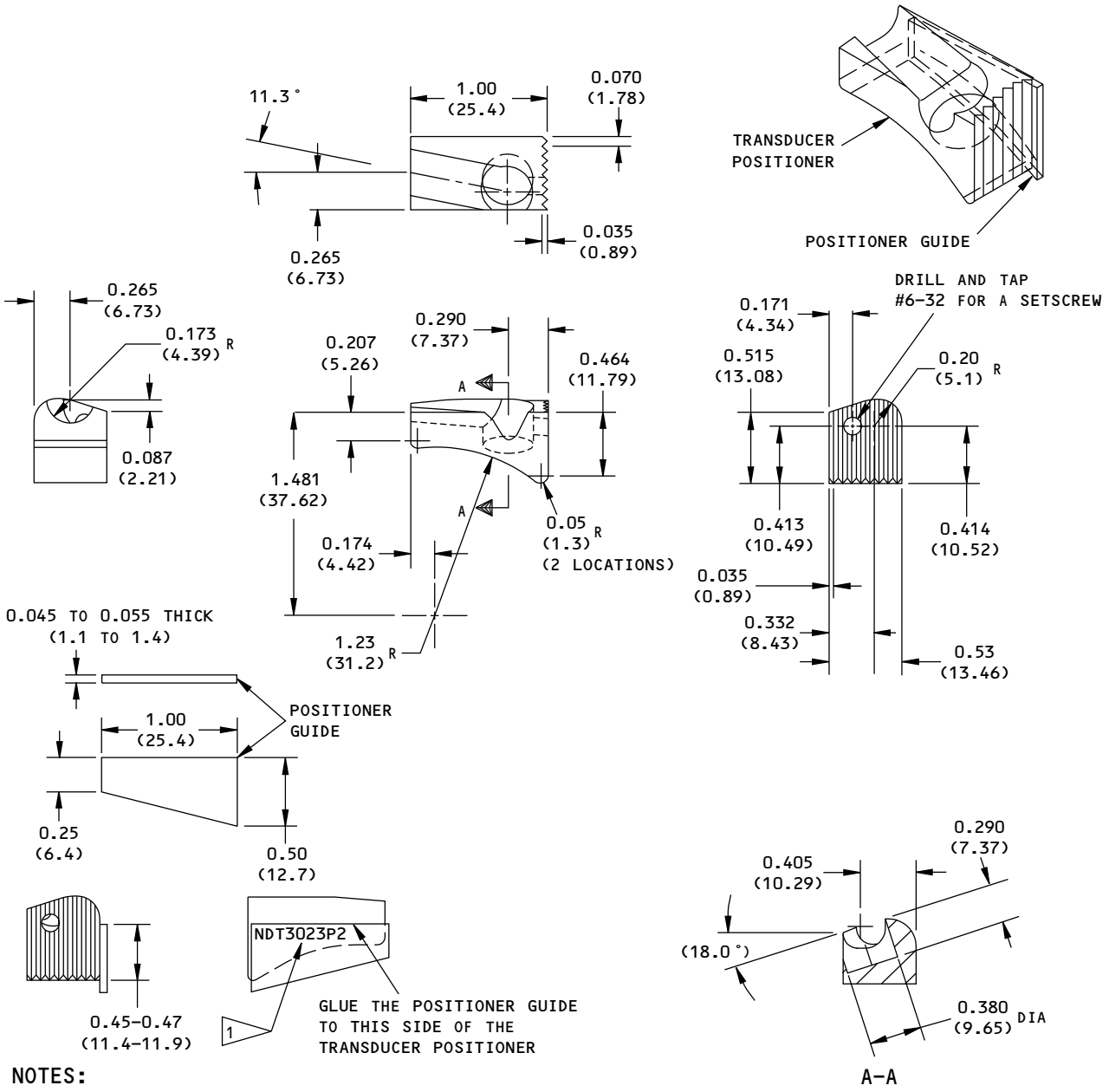
Transducer Positioner NDT3023P1
Figure 2



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.010	X.X = ± 0.3
X.X = ± 0.020	X = ± 0.5

ANGULAR: ± 0.5 DEGREE
RADIUS: ± 0.010 (0.25)

- MATERIAL: LUCITE OR PLEXIGLASS
- GLUE THE POSITIONER GUIDE TO THE POSITIONER AS SHOWN ABOVE.

1 ETCH THE NUMBER NDT3023P2 AT APPROXIMATELY THIS LOCATION.

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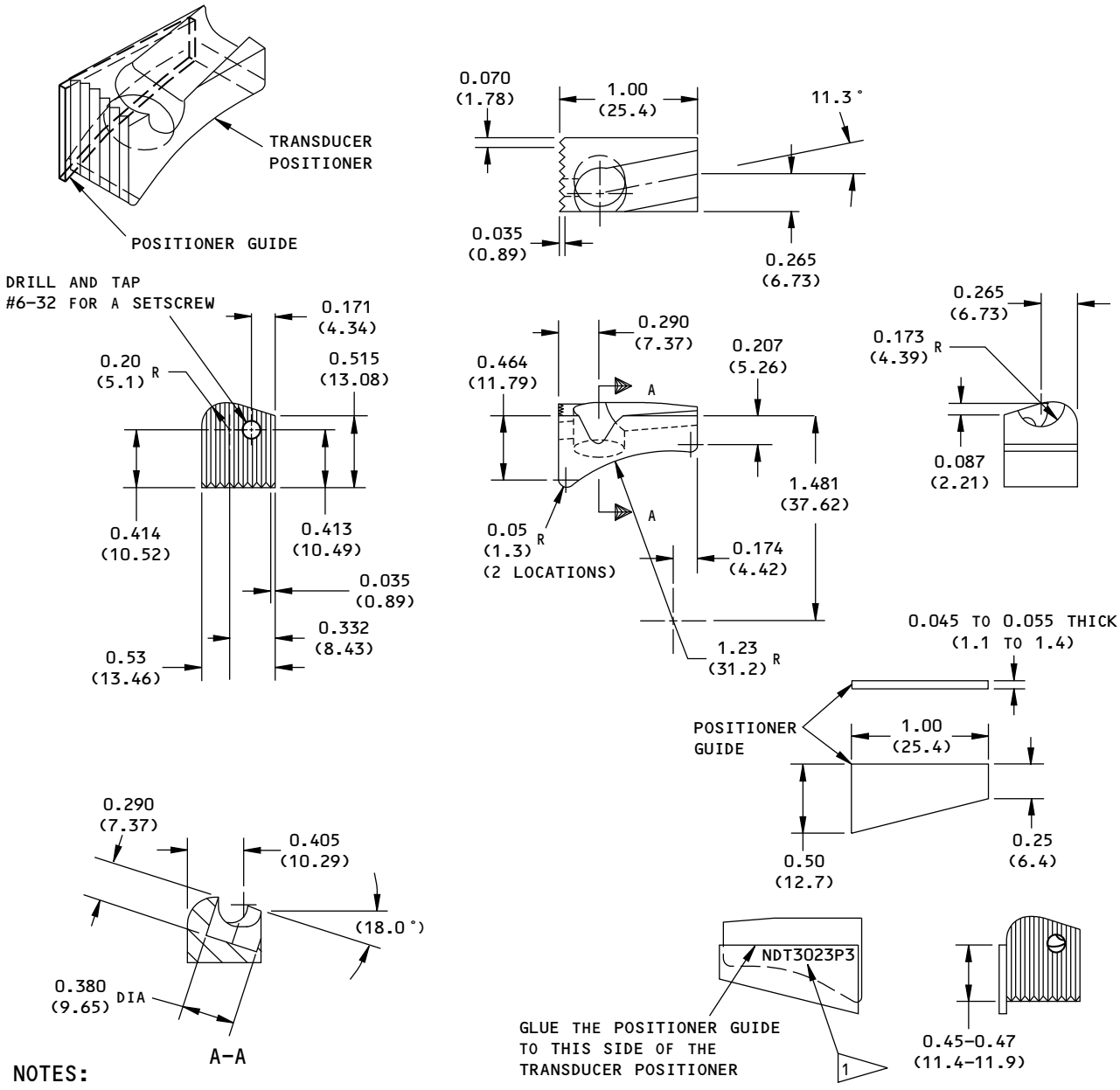
Transducer Positioner NDT3023P2 with Shoe Guide
Figure 3



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.010	X.X = ± 0.3
X.X = ± 0.020	X = ± 0.5

ANGULAR: ± 0.5 DEGREE
RADIUS: ± 0.010 (0.25)

- MATERIAL: LUCITE OR PLEXIGLASS
- GLUE THE POSITIONER GUIDE TO THE POSITIONER AS SHOWN ABOVE.

1 ETCH THE NUMBER NDT3023P3 AT APPROXIMATELY THIS LOCATION.

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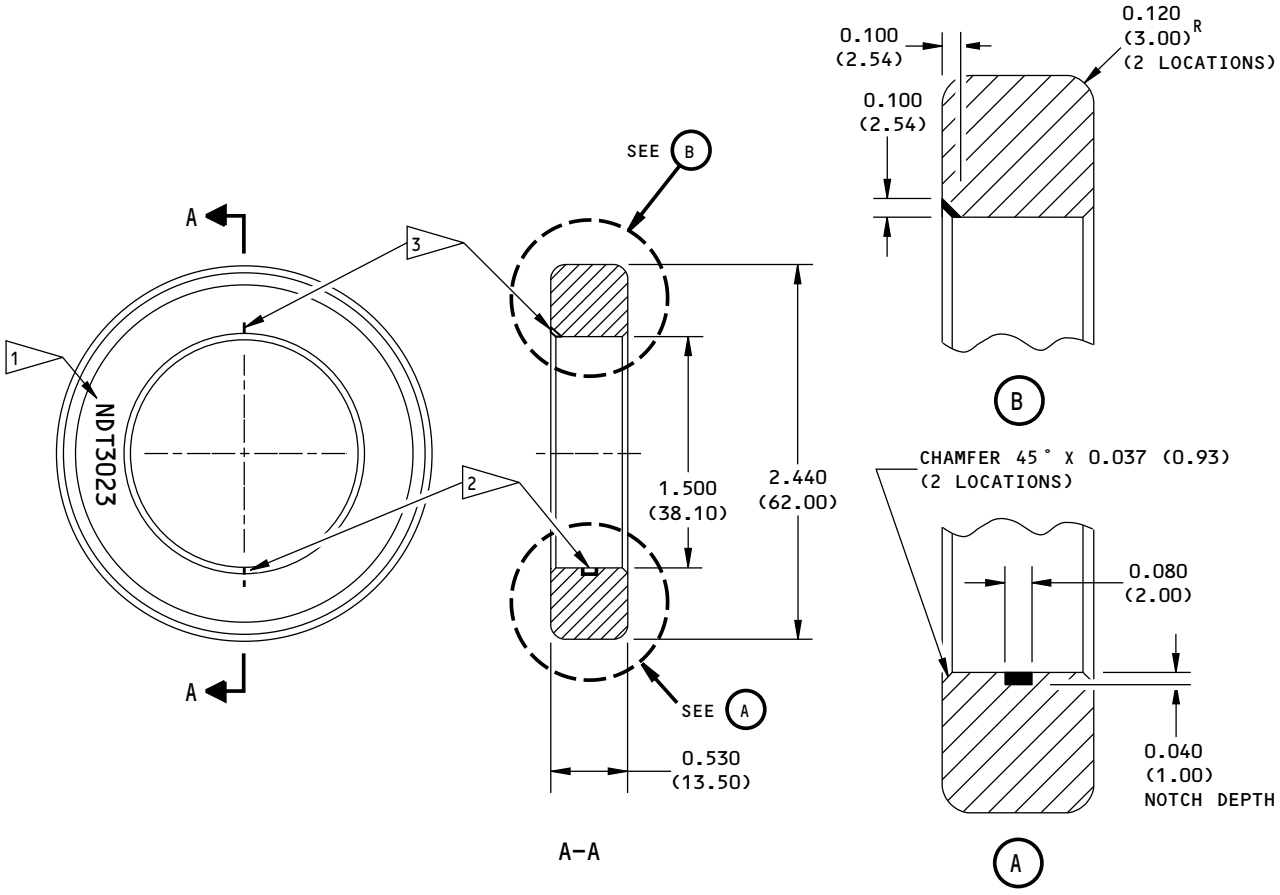
Transducer Positioner NDT3023P3 with Shoe Guide
Figure 4



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ± 0.005	X.XX = ± 0.10
X.XX = ± 0.025	X.X = ± 0.5
X.X = ± 0.050	X = ± 1

ANGULAR = ±1 DEGREE

- MATERIAL: 4340M OR 4340 STEEL BAR. AFTER YOU MACHINE THE PART TO THE FINAL DIMENSIONS, NORMALIZE THE PART AS SPECIFIED IN BAC5617 OR MIL-H-6875.
- SURFACE ROUGHNESS: 63 RA OR BETTER

1. ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT3023 AT APPROXIMATELY THIS LOCATION.
2. EDM NOTCH: 0.010 (0.25) MAXIMUM WIDTH.
3. EDM CORNER NOTCH: 0.007 (0.17) MAXIMUM WIDTH.

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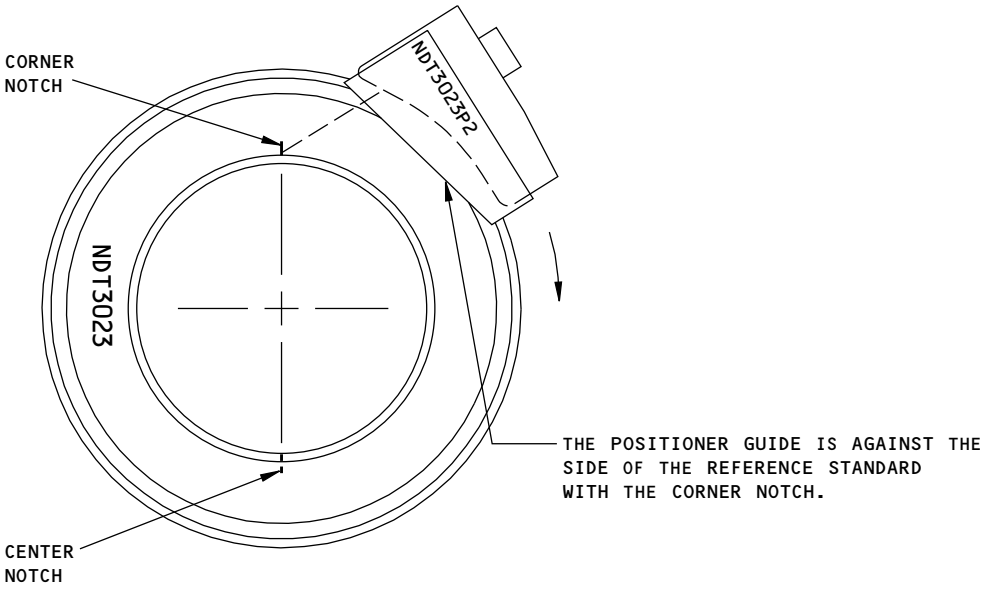
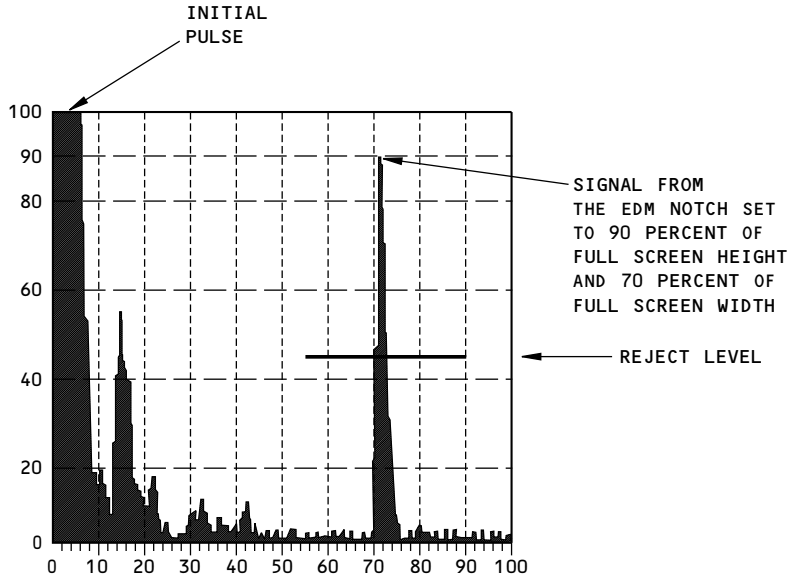
Reference Standard NDT3023
Figure 5





NOTES:

- DO THE CALIBRATION WITH THE TRANSDUCER AND POSITIONER TO GET THE SIGNALS AS SHOWN ABOVE.
- THE CALIBRATION IS SHOWN ON THE CORNER NOTCH WITH TRANSDUCER POSITIONER NDT3023P2. THE CALIBRATION WITH NDT3023P3 IS DONE ON THE LEFT SIDE OF THE CORNER NOTCH.
- DO THE CALIBRATION WITH POSITIONER NDT3023P1 ON THE CENTER NOTCH.

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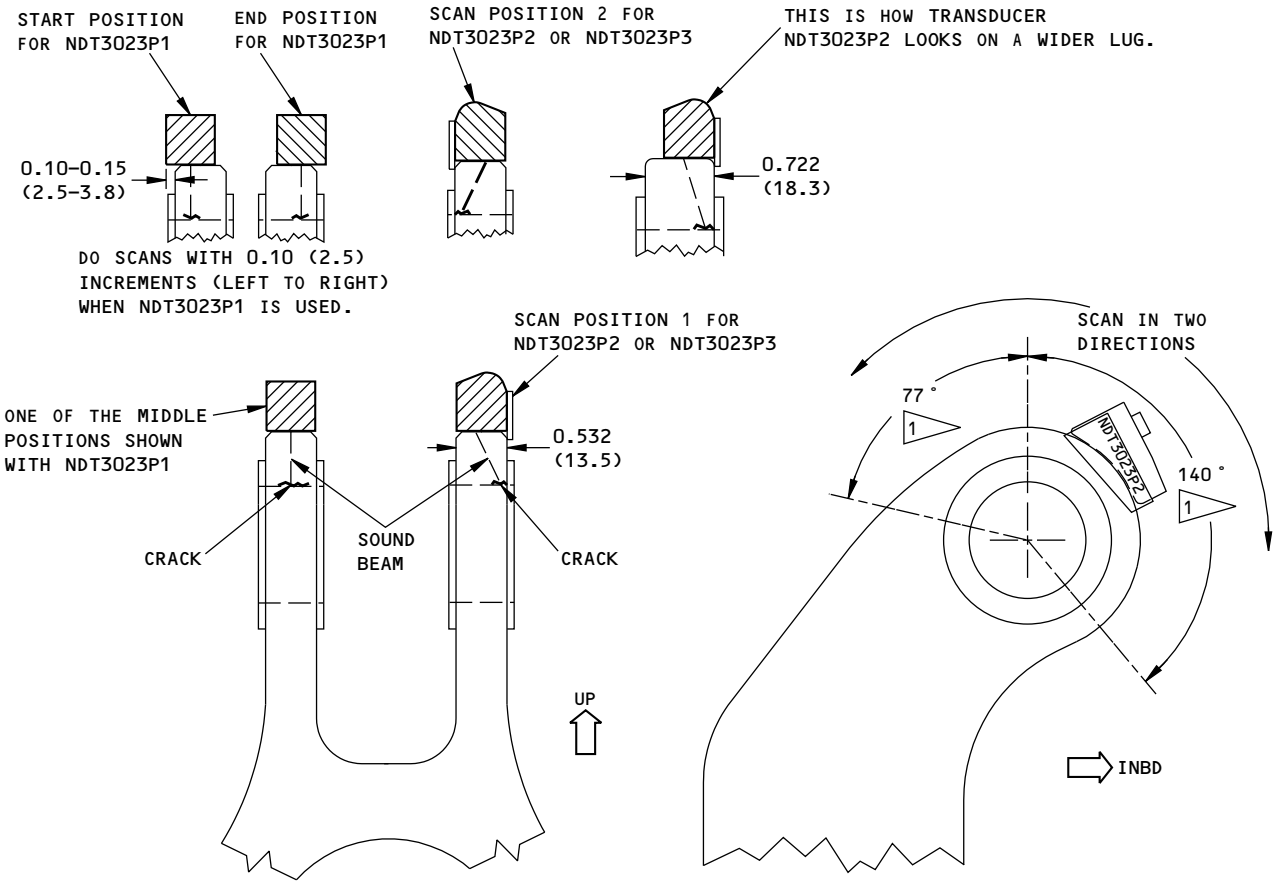
Calibration
Figure 6



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- DO THE SCANS AS SHOWN ABOVE ON EACH LUG OF THE ACTUATOR BEAM ARM. MOVE THE TRANSDUCER AS FAR AS POSSIBLE AROUND THE LUG UNTIL THE TRANSDUCER COMES OFF THE LUG. THERE ARE TWO LUGS ON EACH ACTUATOR BEAM ARM.
- MAKE SURE THERE IS SUFFICIENT COUPLANT ON THE LUGS DURING THE SCANS. MAKE SURE TO MOVE THE TRANSDUCER SLOWLY AWAY FROM YOU AND BACK AGAIN DURING EACH SCAN.
- WHEN THE SCANS ARE DONE WITH POSITIONER NDT3023P1, START WITH THE TRANSDUCER 0.10 INCH (2.5 MM) TO 0.15 INCH (3.8 MM) OFF THE EDGE AS SHOWN ABOVE. DO EACH SCAN AN INCREMENT OF 0.10 INCH (2.54 MM) APART FROM EACH OTHER. THE LAST SCAN IS DONE WITH THE TRANSDUCER 0.10 INCH (2.5 MM) TO 0.15 INCH (3.8 MM) OFF THE OTHER EDGE OF THE LUG.
- DURING THE SCANS WITH POSITIONER NDT3023P2 AND NDT3023P3, MAKE SURE THE POSITIONER GUIDE IS AGAINST THE SIDE OF THE LUGS. DO TWO SCANS ON ONE SIDE OF THE LUG WITH EACH POSITIONER. TURN THE POSITIONER 180 DEGREES AND DO THE TWO SCANS ON THE OTHER SIDE OF THE SAME LUG.

1 TRANSDUCER SCAN AREA.

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Transducer Scan Positions
Figure 7