PART 6 - EDDY CURRENT

CONTROL CABLE MATERIAL IDENTIFICATION

1. Purpose

A. To identify control cables as carbon steel or corrosion resistant steel (CRES) in the aircraft.

B. This procedure uses an impedance plane eddy current instrument that can identify the cable material by different screen signals.

C. Service Letter Reference: 737-SL-76-2-A (-100, -200); 737-SL-76-9 (-300, -400, -500)

2. Equipment

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

A. Instruments - All impedance plane eddy current instrument and probe combinations that can operate between 20 kHz and 500 kHz and that meet the necessary conditions of this procedure are permitted. The eddy current instrument must have isolated horizontal and vertical gain controls or a vertical/horizontal ratio control. The following instruments were used to make this procedure:

(1) NDT 19; Nortec

(2) MIZ 20A; Zetec

B. Probes - All pencil or spot probes that can operate between 20 kHz and 500 kHz and have a tip diameter of 0.35 inch or less are correct for this procedure. The following probes were used to make this procedure:

(1) LS902-50B/20K/2D; NDT Engineering

(2) LS905-50B/20K; NDT Engineering

(3) SPO-1598 20-50 kHz; Nortec

(4) MP-902-60 200 kHz; NDT Engineering

C. Reference Standard - 198A, B, C, D, E, F. See Figure 1.

3. Prepare for the Inspection

A. Get access to the control cables that are to be examined.

NOTE: A one-foot length of each control cable is sufficient for inspection.

B. Make sure that the area of the inspection is clean.

C. Make sure that the equipment for the inspection, the probe, the reference standards and the areas of the inspection are at the same ambient temperature.

4. Instrument Calibration

A. Set the instrument frequency to the probe frequency. The probe frequency must be between 20 kHz and 500 kHz.

NOTE: If the instrument has a probe drive selection control, set the probe drive to low or medium.

B. Set the gain so that the vertical/horizontal ratio is between 0.2 to 1 and 0.8 to 1.

(1) EXAMPLE: With the vertical gain at 45 and the horizontal gain at 70 the vertical/horizontal ratio is 0.64 to 1.

C. Balance the probe in the air away from all conductive material.

D. Put the probe coil directly on the surface of the applicable carbon steel reference cable. Make sure that the probe is at least one inch from the end of the cable. See Figure 2.

NOTE: Each cable that is to be examined must be calibrated on the reference standard cables of the same diameter.

E. Move the probe many times (approximately 10) over the surface of the carbon steel reference cable in the direction shown in Figure 2.

F. Monitor the signal movement and adjust the phase so that the signal direction starts from the bottom of the screen and goes up. See Figure 3.

G. Adjust the gain so that the vertical signal travel is 50 percent full screen height when Paragraph 4.E. is done. See Figure 3.

H. Put the probe directly on the surface of the CRES reference standard cable that is the same diameter of the cable of the inspection.

I. Move the probe many times over the surface of the CRES reference cable in the direction shown in Figure 2.

J. The CRES signal will be approximately 30 percent full screen height. See Figure 3.

K. Adjust the vertical/horizontal gain and filter controls so that the signals show as in Figure 3. The carbon steel cable signal must be set at 50 percent full screen height. The CRES cable signal must appear at least 30 degrees to the left of the carbon steel cable as in Figure 3. Try different vertical/horizontal gain ratios until the signals are almost the same as those shown in Figure 3.

5. Inspection Procedure

A. Calibrate the instrument as specified in Paragraph 4. Make sure the reference standards used for calibration are the same diameter of the cable to be examined.

B. Put the probe on a clean area of the cable to be examined.

C. Move the probe may times (approximately 10) over the surface of the control cable. See Figure 2.

D. Monitor the signal movement on the instrument.

E. Do Paragraph 5.B. thru Paragraph 5.C. on at least three areas within a one-foot length of the cable.

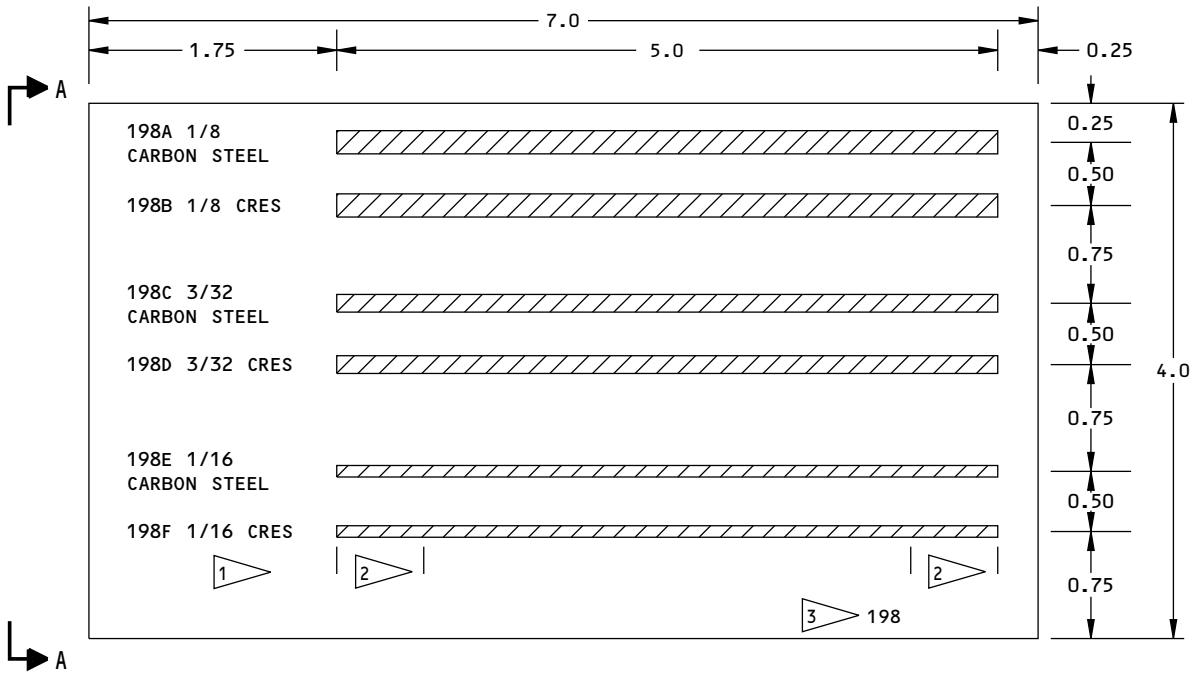
F. Compare the signal to the signals from the carbon steel reference cable and the CRES reference cable.

G. Do Paragraph 5.A. thru Paragraph 5.F. on all control cables in the aircraft.

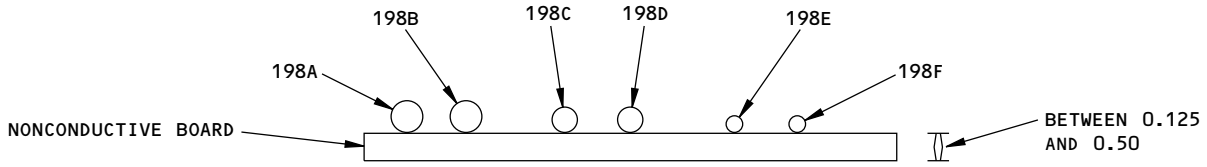
6. Inspection Results

A. All signals that travel in a vertical direction as in the carbon steel signal shown in Figure 3 are indications of a carbon steel cable.

B. All signals that travel in a direction as in the CRES signal shown in Figure 3 are indications of a CRES cable.



REFERENCE STANDARD SHOWN WITH 6 DIFFERENT CABLES



VIEW A-A

NOTES

- ALL CABLES ARE PER MIL-W-83420
- ALL DIMENSIONS ARE IN INCHES
- CABLE PLACEMENT DIMENSIONS ARE ON CENTER
- BOARD DIMENSION TOLERANCE: ±0.25
- CABLE LENGTH TOLERANCE: ±0.50

1 ETCH IDENTIFICATION INFORMATION AS SHOWN ABOVE. FRACTIONS SHOWN FOR CABLE ARE IN INCHES

2 EPOXY 1 INCH AT BOTH ENDS OF EACH CABLE

3 ETCH REF STD NUMBER 198

MATERIAL

- NONCONDUCTIVE BOARD 7.0 X 4.0
- CARBON STEEL CONTROL CABLE 5.0 X 0.125
- CRES CONTROL CABLE 5.0 X 0.125
- CARBON STEEL CONTROL CABLE 5.0 X 0.093
- CRES CONTROL CABLE 5.0 X 0.093
- CARBON STEEL CONTROL CABLE 5.0 X 0.0625
- CRES CONTROL CABLE 5.0 X 0.0625
- TWO PART EPOXY

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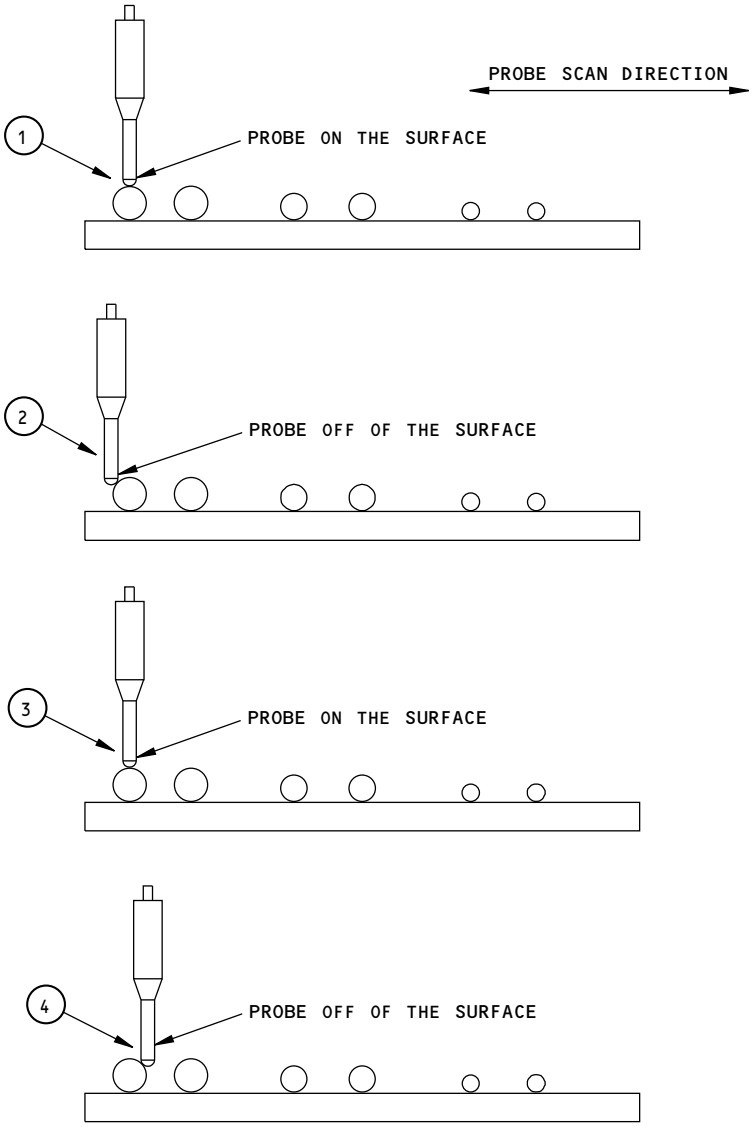
Reference Standard 198
Figure 1



NOTES

- ONE COMPLETE SCAN SHOWN IN A FOUR STEP SEQUENCE
- SIDE VIEW OF REFERENCE STANDARD 198 SHOWN (VIEW A-A)
- PROBE IS SHOWN ON 1/8 INCH CARBON STEEL CABLE
- PROBE SCAN ON ALL CABLES IS THE SAME

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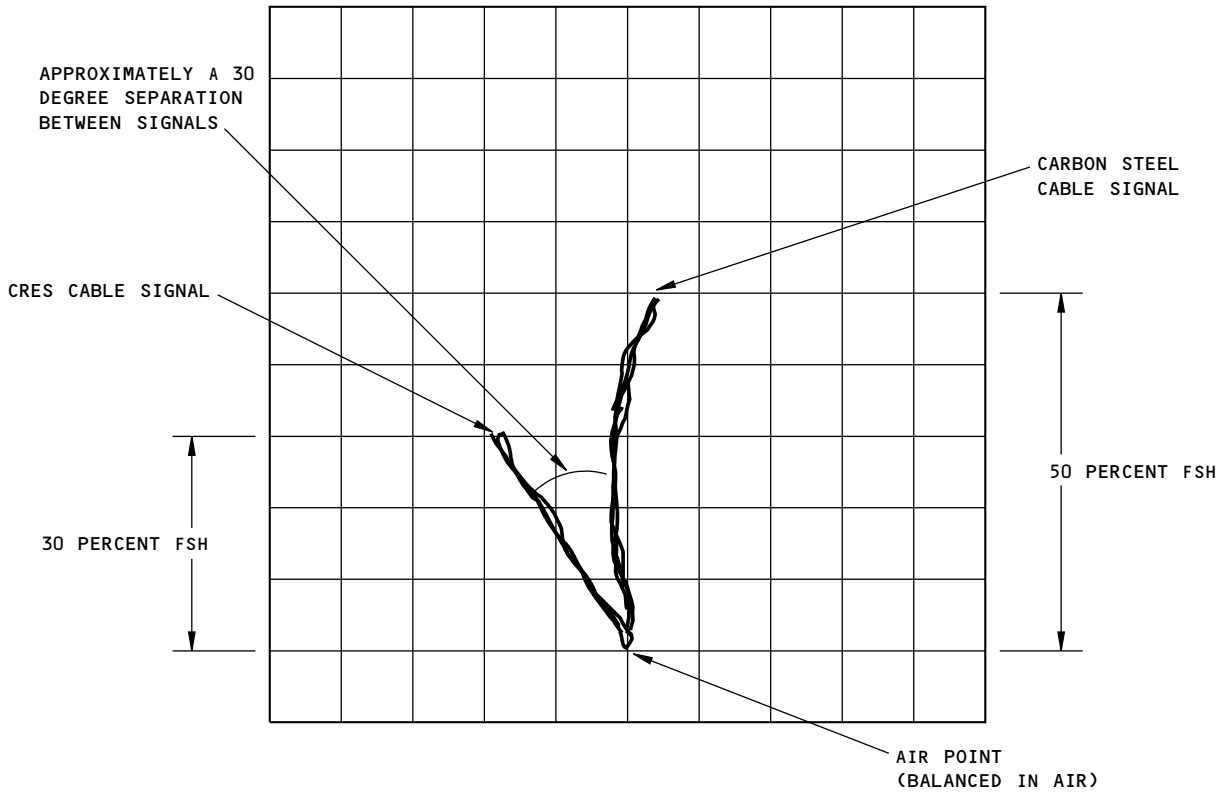
Probe Scan Positions
Figure 2



NOTES

- SET THE CARBON STEEL SIGNAL AT A VERTICAL HEIGHT OF 50 PERCENT FULL SCREEN HEIGHT (FSH).
- THE HORIZONTAL GAIN MUST BE HIGHER THAN THE VERTICAL GAIN TO GET A 30 DEGREE SEPARATION OR GREATER. THE VERTICAL/HORIZONTAL GAIN RATIO MUST BE SET BETWEEN 0.2 TO 1 AND 0.8 TO 1
- WITH THE CARBON STEEL SIGNAL SET AT 50 PERCENT FULL SCREEN HEIGHT, THE CRES SIGNAL WILL SHOW AT APPROXIMATELY 30 PERCENT FULL SCREEN HEIGHT.
- TRY DIFFERENT VERTICAL/HORIZONTAL GAIN, FREQUENCY AND FILTER ADJUSTMENTS TO GET SIGNALS ALMOST THE SAME AS THOSE SHOWN ABOVE.
- THE SIGNALS SHOWN ABOVE ARE THE RESULT OF MORE THAN ONE PROBE SCAN ON THE CABLES.

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Impedance Plane Cable Signals
Figure 3