SERVICE BULLETIN REVISION NOTICE

NON-MODIFICATION SERVICE BULLETIN — ENGINE — TURBINE EXHAUST CASE (TEC) — EDDY CURRENT INSPECTION (ECI)

Turbojet Engine Service Bulletin No. 72-0694 Revision No. 2 dated July 2, 2018.

Revision History

Original Issue January 5, 2018

Revision 1 dated February 7, 2018

Revision 2 dated July 2, 2018

Reason for the Revision

To revise the Description paragraph.

To revise the Compliance statement.

To add a new material.

To revise the Inspection Zone paragraph

To add new paragraph for marking the location of the indication.

To revise the Fluorescent Penetrant Inspection paragraph.

To revise Figure 8, 9 and 10.

Effect of Revision on Prior Compliance

All inspections completed with prior revisions of Service Bulletin V2500-ENG-72-0694 are in compliance. Engines that have been previously inspected must use the reduced limits provided in this revision of the Service Bulletin.

This is a Complete Revision (Not Applicable to the SGML version)

The format of this Service Bulletin has been changed from previous versions. This revision shows flow bars and the revision date on the bottom of every page. Technical changes incorporated in this revision are marked with revision bars. The contents are in accordance with the list of effective pages.

MODEL APPLICATION

V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE

V2500 Series 72-0694

Page	Revision No.	Date
1 thru 50	2	July 2/18

A copy of this Revision Notice and any future revision notices must be filed as a permanent record with your copy of the subject bulletin.

SERVICE BULLETIN

NON-MODIFICATION SERVICE BULLETIN — ENGINE — TURBINE EXHAUST CASE (TEC) — EDDY CURRENT INSPECTION (ECI)

MODEL APPLICATION

V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE

V2500 Series 72-0694

ATA NUMBER

72-50-00

Compliance Category

3

P&W Distribution Code

V2500

Summary

The purpose of this Non-Modification Service Bulletin (NMSB) is to detect any crack(s)/indications that develop along the rear mount stiffener rail on the Turbine Exhaust Case (TEC). Cracking has been observed along the rear mount stiffener rail on the V2500-D5 TEC. This NMSB is to detect cracking/indications on the stiffener rails at the rear mounts at specified intervals.

Planning Information

Effectivity Data

Engine Models Applicable

V2525-D5, V2528-D5
Engine Serial Nos. V20001 thru V20285

Concurrent Requirements

There are no concurrent requirements.

Reason

1. Condition: This inspection will mitigate the possibility of the rear mount rail crack(s) propagating and causing failure of the rear mount(s). This NMSB introduces an Eddy Current Inspection (ECI) of the rear mount stiffener rails at the specified intervals.
2. Background: A V2500-D5 engine was removed for a cracked TEC. Case cracked in two places at the engine mount along the stiffener rail.
3. Objective: Perform an ECI to detect possible TEC rear mount crack(s)/indications along the stiffener rails.
4. Substantiation: The inspection method provided has shown to identify crack(s)/indications in the rear mount stiffener rail.
5. Effects of Bulletin on:

   Removal/Installation: Not Affected.

   Disassembly/Assembly: Not Affected.

   Cleaning: Not Affected.

   Inspection/Check: Not Affected.

   Repair: Not Affected.

   Testing: Not Affected.
6. Supplemental Information

   None.

Description

An ECI is required to detect crack(s)/indications along the stiffening rails at the TEC rear mounts. This is a repetitive inspection that will initiate as follows: ECI at the next Engine C Check, prior to engine installation, or within 4,000 flight cycles from the initial Service Bulletin V2500-ENG-72-0694 release, whichever occurs first.

The repetitive inspection with ECI must occur within every 2,000 flight cycles thereafter.

NOTE: This ECI Inspection can be accomplished when engine is installed on aircraft as well as when engine is not installed on aircraft. If performed when not installed on aircraft, the engine center must provide ECI documentation containing the results of the inspection. Documentation can be submitted via email to help24@pw.utc.com ATTN: IAE Customer Technical Services Hot Section Team.

Compliance

Category 3

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The repetitive inspection with ECI must occur within every 2,000 flight cycles thereafter.

NOTE: This ECI Inspection can be accomplished when engine is installed on aircraft as well as when engine is not installed on aircraft. If performed when not installed on aircraft, the engine center must provide ECI documentation containing the results of the inspection. Documentation can be submitted via email to help24@pw.utc.com ATTN: IAE Customer Technical Services Hot Section Team.

Approval Data

The compliance statement and the procedures described in this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model listed.

The aircraft Type Certificate holder has been informed of this inspection.

Manpower

1. In Service
   A. To perform ECI on engines installed on aircraft ..... 6.0 hours
2. At Overhaul
   A. To perform ECI on engines not installed on aircraft ..... 3.0 hours

Weight and Balance

1. Weight Change

   None.
2. Moment Arm

   No Effect.
3. Datum

   Engine Front Mount Centerline (Power Plant Station (PPS) 100)

Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

Software Accomplishment Summary

Not Applicable.

References

NOTE: In 2014 IAE converted the V2500 Technical Publications to a new system. As a result of the conversion, some manuals were consolidated. All manuals received new P&W part numbers. To facilitate the use of this Service Bulletin, a Technical Publications conversion table is provided in the Appendix.

1. ATA Locator — 72-50-00.
2. Internal Reference No. — 17VC430.
3. V2500 Standard Practices and Processes, P&W Ref. PN 2A4414, Chapter/Section 70-25-01.
4. V2500-D5, Series Illustrated Parts Catalog, P&W Ref. PN 2A4426, Chapter/Section 72-50-50.
5. V2500-D5 Series Engine Manual, P&W Ref. PN 2A4416, Chapter/Section 72-50-00.
6. Non-Destructive Inspection Procedure NDIP 1167, — V2500 Turbine Exhaust Case Manual Eddy Current Inspection (Disassembled Component or On-Wing).
7. UniWest EVi Instrument User Manual.
8. Nortec Instrument User Manual.
9. MD-90 Aircraft Maintenance Manual (AMM)
10. Pratt and Whitney Standard Practices Manual, Part No. 585005.

Other Publications Affected

Not Applicable.

Interchangeability of Parts

Not Applicable.

Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (No)

Added Data (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

Material Information

Material — Price and Availability

1. There is a kit, number IAE2P16637 to do this Service Bulletin. Part prices were not available at the time of Service Bulletin publication. Contact IAE Tooling for firm quotations.

Industry Support Program

Not Applicable.

Vendor Services or Special Components/Materials

Vendor Services or Special Components/Materials

P&W Designation	Vendor Designation	Name	Vendor Name & Address
Kapton Tape	KPT-1/4	Kapton Tape (LS Low Static Polyamide, 0.003 inch thick, 1/4, adhesive backed)	Bertech-Kelex 355 Maple Avenue Torrance, CA, 90503 USA
See Illustrated Parts Catalog Vendor Manufacturer's Code List			
PTFE	PTFE 5490	Polytetrafluor-ethylene (1/4 width)	3M Co. 3M Center, Bldg. 225-3S-06 St. Paul, MN 55144-1000 USA
Vendor Manufacturer's Code: 76381 See Illustrated Parts Catalog Vendor Manufacturer's Code List			
PMC-4095	7447	Scotch-Brite Hand Pad 7447, Type 1, Grade A	3M Co., Abrasive Systems Div. 3M Center, Bldg. 0223-06-N-01 St. Paul, MN 55144-1000 USA
Vendor Manufacturer's Code: 28124 See Illustrated Parts Catalog Vendor Manufacturer's Code List			
PMC 4095	74700	Norton Hand Pad	Norton/Saint-Gobain Abrasives One New Bond St. Worcester, MA 01606 USA
Vendor Manufacturer's Code: 44197 See Illustrated Parts Catalog Vendor Manufacturer's Code List			
PMC 4095	5416	Non-woven Hand Pad 5416	Weiler Corp 1 Wildwood Drive Cresco, PA 18326-9804 USA
Vendor Manufacturer's Code: 17699 See Illustrated Parts Catalog Vendor Manufacturer's Code List			

P&W Designation	Vendor Designation	Name	Vendor Name & Address
PMC4059–7	02460	Pencil — Metal Marking (Hard)	Sanford Corporation 2711 Washington Blvd Bellwood, IL 60104 USA
Vendor Manufacturer's Code: 86874 See Illustrated Parts Catalog Vendor Manufacturer's Code List			

NOTE: EXCEPT FOR WORK OR SUPPLIES TO BE PERFORMED OR FURNISHED BY IAE, IT IS UNDERSTOOD THAT IAE DOES NOT ENDORSE THE WORK PERFORMED BY THE COMPANY OR COMPANIES NAMED HEREIN OR ANY OTHER COMPANY AND DOES NOT ACCEPT RESPONSIBILITY TO ANY DEGREE FOR THE SELECTION OF SUCH COMPANY OR COMPANIES FOR THE PERFORMANCE OF ANY WORK OR PROCUREMENT OF SUPPLIES.

Tooling — Price and Availability

Equipment required to accomplish Eddy Current Inspection

ITEM	TOOL NUMBER	DESCRIPTION
IAE2P16637		Kit consisting of items IAE2P16633 thru IAE 2P16636
IAE2P16633	UniWest US-3485	Calibration Standard
IAE2P16634	UniWest US-3461	Outer Segment Rail Probe
IAE2P16635	UniWest US-3462	Inner Segment Rail Probe
IAE2P16636	UniWest 74934	Guide, used to define inspection start
	UniWest EVi or Olympus Nortec 600	Eddy Current Instrument
		Kapton or PTFE Tape

NOTE: Equivalent tooling can be used upon approval by IAE.

The tooling to comply with the inspection(s) will be provided to operator(s) on Free of Charge (FOC) loan basis. To receive the FOC tooling, please follow the ordering procedure outlined below:

1. Submit a Zero charge Order to V2500loantool@pw.utc.com with kit/tool part number.
2. Shipping and customs costs are the responsibility of the operator.
3. For return of kits/tools after use the operator must submit an e-mail request to V2500loantool@pw.utc.com. Return details will be provided by e-mail. Contact your CFD with any questions.

Reidentified Parts

Not Applicable.

Other Material Information Data

Not Applicable.

Accomplishment Instructions

PART I — FOR ENGINES INSTALLED ON AIRCRAFT

1. Inspector Qualification

NOTE: Only qualified operators, specifically designated, trained, and approved can perform this inspection. The following requirements must be met:

A. Inspectors performing this inspection to determine part airworthiness must be qualified in accordance with the Reference 10, Standard Practices Manual, PN 585005, and Section 70-37-02, Eddy Current Inspection requirements for personnel qualification, or equivalent.

B. Have obtained sixteen (16) hours of hands on instruction and familiarization with test equipment, probes, and inspection technique.

C. Inspector shall demonstrate inspection readiness on the Pratt and Whitney approved test part. The student will evaluate instructor-selected areas in the inspection zone and the results will be compared to lab results to determine success of student technique. This step may be contingent upon the instructor's assessment of candidate's capability of performing the inspection given comparison to prior results. The instructor may provide additional training or advise additional training as needed for candidate. This initial evaluation is conducted by Pratt and Whitney approved instructors only.

D. Inspector recertification is required if more than one year elapses without having performed a Turbine Exhaust Case (TEC) inspection or having completed training/refresher training.

(1) Recertification requires up to a two day refresher course given by a Pratt and Whitney approved instructor.

OR

(2) Local refresher training can be led by a given organization's appointed training personnel. The appointed trainer must have a valid certification via completing Pratt and Whitney instructor lead training for this inspection.

(3) Local training must be conducted using a Pratt and Whitney Training Standard or equivalent.

NOTE: It is required that Pratt and Whitney NDE be consulted for determination of equivalency.

E. Contact the Pratt and Whitney MPE/NDE for questions regarding inspector training.

2. Tooling Setup

A. Calibration Standard, PN IAE2P16633

(1) The calibration standard is fabricated from a segment of the flange from a retired case to ensure same electrical properties of the TEC. The calibration notch is located at the center of the flange and is used for set-up of both probes. Figure 1 shows standard, PN IAE2P16633. Serial Numbers will be assigned for each standard and a calibration card provided includes any gain adjustments needed to account for notch variability between standards. Figure 2 shows proper hand position and probe placement for measurement of the notch on a flange segment from the part.

B. Eddy Current Probes, PN IAE2P16634 and PN IAE2P16635

(1) ECI probe PN IAE2P16634 is used to cover the upper to middle extent of the TEC rail and probe, PN IAE2P16635 covers the mid to lower edge of the rail. Figure 3 (left) shows the two sensors from the outer edge. Note the shift in the position which corresponds to the necessary coverage requirements.

Figure 3 (right, top) is the side view of the probe “feet”. Figure 3 (right, lower) is the view of the “feet surface” and shows that the outer foot (away from cable entry position) is the location of the active element.

C. Eddy Current Instruments

(1) The UniWest EVi and Olympus N600 instruments have been qualified for this inspection. Use of other instruments is determined by Pratt & Whitney. It may be necessary to ship other instruments to Pratt & Whitney MPE Laboratory for equivalency determination, if desired.

D. Protective Tape

(1) Cover the eddy current probe feet and sensor area with a smooth wrinkle free layer of Kapton or PTFE tape.

E. Part Marker

(1) Use a silver pencil to mark the part.

NOTE: Only use Pratt and Whitney approved temporary part marking materials.

3. Job set-up procedure

A. Deactivate the thrust reverser hydraulic control unit (HCU) as specified in Reference 9, Aircraft Maintenance Manual, Chapter/Section 78-30-00.

B. Open the fan cowls as specified in Reference 9, Aircraft Maintenance Manual, Chapter/Section 71-13-00.

C. Open the thrust reverser halves as specified in Reference 9, Aircraft Maintenance Manual, Chapter/Section 78-32-00.

4. Inspection Zone

A. The inspection zone includes both left and right mount lug locations as shown in Figure 4.

B. Both the forward and aft rail faces are to be inspected. Rail face geometries are defined in Figure 5. The “top of the rail” serves as the outer diameter (OD) of the rail. The sensor feet should traverse over the OD surface or “top of the rail”.

C. For the forward rail, the probe guide should be positioned on the forward surface to minimize interference with the lug surfaces as shown in Figure 6. For the aft rail, the probe guide should be positioned on the aft surface to minimize interference with the lug surfaces.

D. Given that the sensor is located beneath the foot away from the cable, the probe guide should be positioned to approach edges with the cable side trailing shown in Figure 7 (left) rather than leading as shown in Figure 7 (right). This minimizes rocking of the probe guide as the sensor approaches the edge.

E. Figure 8 shows the inspection zone for the right hand side of the turbine exhaust case when viewed from the AFT looking FWD (Position 1 Mount). The inspection zone begins 2 ± 0.2 inches (50.8 ± 5.0 mm) past the sensor pad and ends at the cusp of

the rail transition point. Note the 1.5 inches (38.1 mm) non-inspect areas around the four bolt hole locations are indicated as View “A-A” and discussed further below.

F. Figure 9 shows the inspection zone for the left hand side of the turbine exhaust case when viewed from the AFT looking FWD (Position 2 Mount). The inspection zone begins 2 ± 0.2 inches (50.8 ± 5.0 mm) past the sensor pad and ends at the cusp of the rail transition point. Note the 1.5 inches (38.1 mm) non-inspect areas around the four bolt hole locations are indicated as View “A-A” and discussed further below.

G. A non-inspect area has been defined approximately 1.5 ± 0.1 inches (38.1 ± 2.5 mm) around the four bolt holes noted as View A-A in Figures 8 and 9. There are four holes per side. Figure 10 shows the expanded View A-A of the non-inspect area around one of the four bolt holes.

H. Install the guide PN IAE2P16636 into the keeper bolt hole as shown in Figure 11. When the pin is installed the non-inspect area is covered. Use a silver pencil to mark the inspection start zone at the end of the guide. The guide must be removed prior to the inspection. Leaving the guide in place may affect the eddy current inspection. All four locations denoted by View "A-A" must be marked prior to beginning the inspection.

5. Inspection Surface Preparation

A. Typical surface conditions are shown in Figure 12 for six different engines. The extent of surface oxidation is related to flight environment, operational temperatures, and time since last overhaul cleaning.

B. Because surface oxidation and/or corrosion can result in noise that impacts the eddy current inspection, surface preparation may be required. Remove residue by hand wiping with a shop wipe dampened with Isopropyl Alcohol as specified by PMC 9016.

CAUTION: THIS PROCESS IS LIMITED TO HAND-HELD USE OF PADS ONLY. DREMELS, ROTARY TOOLS AND OTHER HAND-HELD POWER TOOLS SHALL NOT BE USED FOR SURFACE PREPARATION FOR THIS INSPECTION.

C. If the use of alcohol dampened wipes does not sufficiently remove corrosion products, Abrasive Impregnated Nylon Pads as specified by PMC 4095 can be used. Acceptable materials include 3M Scotch Brite (fine), PN 7447, Norton, PN 747 and Weiler Corp., non-woven hand pad PN 5416.

D. Manually rub the inspection surface with the abrasive impregnated nylon material. Remove residue by wiping with Isopropyl alcohol.

6. System Preparation - Probes

A. Prior to inspection, the probe feet should be taped to protect the sensor and guide from wear. Because of the rough nature of the TEC surface and engine run condition, it may be necessary to re-tape the probe multiple times during a single inspection.

B. After changing tape, a calibration check will be necessary and recalibration required if amplitude has changed by more ± 0.3 div.

7. System Preparation - UniWest EVi Instrument (Probe IAE2P16634)

A. The EVi instrument as shown in Figure 13 is approved for use for this inspection. Install Cable #72306 and #94032 to the instrument. Connect the probe, PN IAE2P16634 to the instrument. Turn on the EVi using the power button at the lower right edge of the instrument.

B. Load the settings file, V2500 TEC. Enter the “BASIC” menu, use the vertical slider to highlight the “FILE” functions and hit “ENTER”. Ensure that the “FILE TYPE” is set to “SETTINGS”. If not, use the vertical slider to change to “SETTINGS”. Use the vertical slider to highlight “LOAD” and press “ENTER”. Select “V2500 TEC” from the drop down list and press “ENTER”. Wait until the “Load Settings” is complete before moving to the next step. Verify that the four function buttons are set for “Gain” “Rotation” “Freeze Screen” and “Save” as shown in Figure 14. If not, reload the V2500 TEC settings file.

C. After loading, verify that F1/DIFF on the EVi instrument is set to the following initial settings. To access the settings, go to the “BASIC” menu, use the vertical slider to select “EDDY CURRENT” and press ENTER. The FREQUENCY/CHANNEL should be at F1/DIFF. Use the ENTER function as necessary to set to F1/DIFF. If any of the values are different than listed below, modify to the correct setting, see Figure 14:

- Frequency - 1 MHz
- Gain - 50 dB (to be adjusted as necessary during calibration step).
- Rotation (Phase) - Adjusted as necessary during calibration step.
- Low Pass (LP) Filter - 60 Hz
- High Pass (HP) Filter - 2 Hz
- Drive (Probe Drive) - High
- X and Y Null positions: 0.0 Div
- Screen Sensitivity: 200 mV
- Auto clear: 3 sec
- Display Shift: 0 deg
- Scan Type: Manual

D. Perform a “null” operation with the probe inserted onto the calibration standard but away from the EDM notches. It is important to null each probe prior to calibration and prior to inspection. Failure to null the probe will lead to erroneous gain/rotation settings and an ineffective inspection.

E. Set the rotation such that the notch response is vertical. Adjust the gain such that the response is 4 div or V Vpp = 0.8 V then adjust the gain as specified on the calibration card for the standard. The Vpp reading is shown in the upper right corner of the impedance plane display, as shown in the oval in Figure 15. The response from the calibration notch is shown for typical gain and rotation settings for this probe.

F. Use the “Freeze Screen” F3 function button to record indications of interest. Enter the Basic menu, File settings, change the file type to “Screen Shots”. Set the PRIMARY BASE NAME to Probe ID “P16634” or “P16635” as applicable.

G. Set the SECONDARY BASE NAME to the Engine ID or SN, to distinguish this inspection from other inspections of the same part.

H. Set the FILE LOCATION to “Internal”. Set AUTO NAME ON: to ON. Set counter to “000”.

8. Eddy Current Inspection - UniWest EVi Instrument

A. After calibration, traverse the probe over the rail surface, starting with the forward rail, probe, PN IAE2P16634. Perform a “null” operation on the part.

B. Traverse the EC probe, maintaining contact at a constant speed (approximately 1 inch per second) along the rail while monitoring the trace for the EC signals. The

inspector must ensure coverage over the full inspection zone. Monitor the tape for wear and replace as needed. If the tape is replaced, the probe must be recalibrated per paragraph 7.E. described above.

C. An indication will appear as a figure eight on the impedance plane (MAIN PLOT), similar to the notch response during calibration. The response will also show up as an amplitude spike in the vertical response vs. time trace as shown in Figure 16.

9. Rejection Criteria - EVi Instrument

A. Indications greater than 6 divisions and having the figure eight response are rejectable. The area should be cleaned as defined in Step 5. Repeat the inspection to determine if response is still greater than 6 divisions. Record the response using the freeze screen and screenshot functions.

B. FPI any rejectable indications. See Step 20.

C. For any indications greater than 10 divisions, reduce the gain by 6dB as needed to capture an unsaturated signal. Record the dB reduction on the data sheet. Use the freeze screen and screenshot functions to record the signal response and associated EC settings.

10. Post-Calibration - EVi Instrument

A. Confirm that the post-calibration notch response is within 0.5 div of the pre-calibration value.

11. Eddy Current Inspection - Uniwest EVi instrument (Probe IAE2P16635)

A. Repeat steps 7 through 10 with probe IAE2P16635.

12. Evaluation and Report Generation - EVi Instrument

A. Acceptance / Rejection Criteria: Indications that exceed the rejection threshold shall be recorded using the FREEZE and SCREENSHOT functions described above. Utilize Appendix A to document inspection results. See Step 22 for reporting.

13. System Preparation - Nortec 600 (Probe IAE2P16634)

A. The Nortec 600 shown in Figure 17 is approved for use for this inspection. Install Cable #94186 to the instrument. Connect the probe, PN IAE2P16634 to the instrument. Turn on the Nortec 600 using the power button at the lower right edge of the instrument. When the display has activated, select the “Surface Cracks” menu option using the “Enter” button (√) at the upper left. When the display has activated, if the Application screen is present, select the return button. If the settings are in the Memory, load the settings from the appropriate file for NDIP1167. If the settings are not in the memory, proceed to set up the instrument per paragraph 13.C.

B. Load the settings file, “V2500 TEC”. Enter the “MEM” menu key at the bottom right side of the instrument, use the smart knob (upper left) to highlight the “V2500 TEC” file as shown in Figure 18. Use function Key “B” (upper right) to activate the RECALL function and load the V25000 TEC setup file.

C. Verify that instrument is set to the following initial settings. To access the settings, go to the “ADV SETUP” menu, using the button in the lower right. Select “ALL SETTINGS” by pressing function key, B, on the right side. The FREQUENCY should be set to Single (upper display) as shown below. Use the function keys (A for col 1; B for col 2; C for Col 3) and the “FULL Next” button (upper right) as necessary to step thru set-up parameters. Use the Smart Knob as necessary to change the settings to the values listed below. See Figure 19.

- Frequency - 1 MHz
- Gain - 70 dB (to be adjusted as necessary during calibration step)
- Rotation (Phase) - Adjusted per 5.7
- Low Pass (LP) Filter - 60 Hz
- High Pass (HP) Filter - 2 Hz
- Drive (Probe Drive) - High
- Cont Null - Off
- DISP MODE - SWP + IMP

D. Perform a “null” operation with the probe placed on the calibration standard but away from the EDM notch. It is important to null each probe prior to calibration and prior to inspection. Failure to null the probe will lead to erroneous gain/rotation settings and an ineffective inspection.

E. Set the rotation such that the notch response is vertical. Adjust the gain such that the response is 4 div or Vpp = 4.0 +/- 0.3V then adjust the gain as specified on the calibration card for the standard. The Vpp reading is shown on the instrument display. The response from the calibration notch is shown for typical gain and rotation settings for this probe in Figure 20.

F. Use the “Freeze” and “Save”/“Main” buttons (bottom left) to record indications of interest to a removable microSD card. Use the “Freeze” button to capture the indication of interest. To save the screen capture, hold the “Main” menu key (bottom left) and simultaneously press the “REF SAVE” key. If both keys are not pressed simultaneously, the file will not save to the external card. The screen shot is saved to the external SD card once there is a short beep. The file is saved as a .bmp and will not show up on the instrument memory page. The file will only be viewable once the SD card accessed using a computer.

14. Eddy Current Inspection - Nortec 600 Instrument

A. After calibration, traverse the probe over the rail surface, starting with the forward rail, probe, PN IAE2P16634. Perform a “null” operation on the part.

B. Traverse the EC probe, maintaining contact at a constant speed (approximately 1 inch per second) along the rail while monitoring the trace for the EC signals. The inspector must ensure coverage over the full inspection zone. Monitor the tape for wear and replace as needed. If tape is replaced, the probe must be recalibrated per paragraph 13.E. described above.

C. An indication will appear as a figure eight on the impedance plane (MAIN PLOT), similar to the notch response during calibration. The response will also show up as an amplitude spike in the vertical response vs. time trace as shown in Figure 21. Figure 22 provides additional impedance place examples. Note that for larger indications, there will be phase rotation to the upper right quadrant.

D. Note that large cracks have been found through use of this eddy current inspection with results shown in Figure 23. The eddy current response (upper left) for this full-rail-width crack exceeded a 10 Vpp response. The crack extended across the rail face and down both sides (upper right). While this expanded image shows a clear crack indication, this crack was not easily visible. Through the FPI process (lower) shows a total crack of 0.89 inches (22.60 mm) was found.

15. Rejection Criteria - Nortec 600 Instrument

A. Indications greater than 6 divisions and having the figure eight response are rejectable. The area should be cleaned as defined in Step 5. Repeat the inspection to determine if response is still greater than 6 divisions. Use the “Freeze” and “Save”/”Main” buttons (bottom left) to record indications of interest to a removable microSD card as defined in paragraph 13.F.

B. FPI any rejectable indications. See Step 20.

C. For any indications greater than 10 divisions, reduce the gain by 6dB increments as needed to capture an unsaturated signal. Record the dB reduction on the data sheet. Use the “Freeze” and “Save”/”Main” buttons (bottom left) to record indications of interest to a removable microSD card as defined in paragraph 13.F.

16. Post-Calibration - Nortec 600 Instrument

A. Confirm that the post-calibration notch response is within 0.5 div of the pre-calibration value.

17. Eddy Current Inspection - Nortec 600 Instrument (Probe IAE2P16635)

A. Repeat steps 13 through 16 with probe IAE2P16635.

18. Evaluation and Report Generation - Nortec 600 Instrument

A. Acceptance / Rejection Criteria: Indications that exceed the rejection threshold shall be recorded using the FREEZE and SAVE/MAIN FILTER buttons described above. Utilize Appendix A to document inspection results. See Step 22 for reporting.

19. Mark the location of the indication.

A. Use a silver pencil to mark the rear mount stiffening rail at the location of the indication.

B. Use a silver pencil to mark the outer wall of the TEC adjacent to the stiffening rail at the previously marked location.

20. Fluorescent Penetrant Inspection

A. If the eddy current inspection indicates a rejectable reading, perform the following steps.

(1) Perform local FPI using SPOP 70 (high sensitivity)(or equivalent IAE TASK 70-23-05-230-501 high sensitivity)

(2) If FPI identifies a crack, see Step 21 for part disposition.

(3) If FPI does not identify a crack complete the following steps:

(a) Re-clean the inspection location per Inspection Surface Preparation, Step 5, above.

(b) Manually blend any raised material and/or sharp edges of mechanical damage with a flat stone to prevent probe damage. The blending must not use more than 2 stones. The blending stone(s) must not be coarser than 150 grit and must not be finer than 220 grit. When two stones are used, the manual blending must be performed with the coarse stone first and finished with the fine stone The stoning must not remove any crack(s) or bulk material on the rear mount stiffening rail and blend time must not exceed 10 minutes.

(c) After the flat stone blend, clean the part by manually rubbing the inspection surface with the Abrasive Impregnated Nylon Material. Remove residue by wiping with Isopropyl alcohol.

(4) Repeat the eddy current inspection of the local area.

(5) If the repeat eddy current inspection indicates a rejectable reading after the flat stone blend, perform local FPI, using SPOP 70 (high sensitivity)(or equivalent IAE TASK 70-23-05-230-501 high sensitivity).

(a) If the FPI does not indicate a crack; perform one of the two options below at the following intervals as long as ECI rejections occurs with no FPI indications:

1 Option 1: Perform Service Bulletin V2500-ENG-72-0694 within every 500 cycles as long as ECI rejection(s) occur with no FPI indications.

CAUTION: INSPECTION AREA MUST BE DONE IN A DARKENED AREA. WHITE LIGHT MUST NOT BE MORE THAN 2 FOOTCANDLES (20 LUX) AT THE INSPECTION SURFACE OF THE PART.

2 Option 2: Perform a detailed Visual Inspection using white light and magnification and a focused FPI inspection without ECI within every 250 cycles. The area must be cleaned with alcohol and an Abrasive Impregnated Nylon Pad. The exact location of the ECI reject needs to be marked using Pratt and Whitney approved silver pencil to indicate the area for focusing the FPI indication. ECI and FPI per Service Bulletin V2500-ENG-72-0694 within every 1,000 cycles from initial ECI reject as long as no FPI indications are found and the exact location of the ECI indication is known.

(b) If an ECI reject occurs with a FPI indication follow the part disposition per Service Bulletin V2500-ENG-72–0694 Step 21.

1 See Step 22 for reporting. Utilize Appendix A to document inspection results.

(6) If the silver pencil mark is removed during the FPI, remark the part at the location of the indication. See Step 19.

21. Part Disposition:

A. Inspection Disposition for engines installed on aircraft using the following criteria:

(1) If the crack indication extends past the rail and on the OD of the case, remove the engine from service.

(2) If the total crack indication does not extend past the rail and there is no evidence of an FPI indication on the OD of the case, a ferry to a maintenance location not to exceed 2 cycles is permitted.

22. Reporting

A. Use Appendix A to document results of the eddy current inspection.

B. Indications that exceed the ECI rejection threshold shall be recorded using the FREEZE and SCREENSHOT functions described above. Results shall be communicated back Pratt and Whitney through the Global Operations Center, help24@pw.utc.com. Include the following information:

- Photo-documentation of the TEC inspection surface condition
- Available eddy current screenshots
- Engine position

- Engine serial number
- TEC part number and serial number
- Location of the indication
- Data Reporting Sheet from Appendix A

C. For indications with an FPI indication, results shall be communicated back Pratt and Whitney through the Global Operations Center, help24@pw.utc.com. Include the following information:

- Photo-documentation of the FPI indication
- Available eddy current screenshots
- Engine position
- Engine serial number
- TEC part number and serial number
- Location and length of the indication
- Data Reporting Sheet from Appendix A

23. Recording Instructions

A. A record of accomplishment is required.

24. Job close -up procedure

A. Close the thrust reverser halves as specified in Reference 9, Aircraft Maintenance Manual, Chapter/Section 78-32-00.

B. Close the fan cowls as specified in Reference 9, Aircraft Maintenance Manual, Chapter/Section 71-13-00.

C. Activate the thrust reverser hydraulic control unit (HCU) as specified in Reference 9, Aircraft Maintenance Manual, Chapter/Section 78-30-00.

PART II — FOR ENGINES NOT INSTALLED ON AIRCRAFT

1. Inspector Qualification

NOTE: Only qualified operators, specifically designated, trained, and approved can perform this inspection. The following requirements must be met:

A. Inspectors performing this inspection to determine part airworthiness must be qualified in accordance with the Reference 10, Standard Practices Manual, PN 585005, and Section 70-37-02, Eddy Current Inspection requirements for personnel qualification, or equivalent.

B. Have obtained sixteen (16) hours of hands on instruction and familiarization with test equipment, probes, and inspection technique.

C. Inspector shall demonstrate inspection readiness on the Pratt and Whitney approved test part. The student will evaluate instructor-selected areas in the inspection zone and the results will be compared to lab results to determine success of student technique. This step may be contingent upon the instructor's assessment of candidate's capability of performing the inspection given comparison to prior results. The instructor may provide additional training or advise additional training as needed for candidate. This initial evaluation is conducted by Pratt and Whitney approved instructors only.

D. Inspector recertification is required if more than one year elapses without having performed a Turbine Exhaust Case (TEC) inspection or having completed training/refresher training.

(1) Recertification requires up to a two day refresher course given by a Pratt and Whitney approved instructor.

OR

(2) Local refresher training can be led by a given organization's appointed training personnel. The appointed trainer must have a valid certification via completing Pratt and Whitney instructor lead training for this inspection.

(3) Local training must be conducted using a Pratt and Whitney Training Standard or equivalent.

NOTE: It is required that Pratt and Whitney NDE be consulted for determination of equivalency.

E. Contact the Pratt and Whitney MPE/NDE for questions regarding inspector training.

2. Tooling Setup

A. Calibration Standard, PN IAE2P16633

(1) The calibration standard is fabricated from a segment of the flange from a retired case to ensure same electrical properties of the TEC. The calibration notch is located at the center of the flange and is used for set-up of both probes. Figure 1 shows standard, PN IAE2P16633. Serial Numbers will be assigned for each standard and a calibration card provided includes any gain adjustments needed to account for notch variability between standards. Figure 2 shows proper hand position and probe placement for measurement of the notch on a flange segment from the part.

B. Eddy Current Probes, PN IAE2P16634 and PN IAE2P16635

(1) ECI probe PN IAE2P16634 is used to cover the upper to middle extent of the TEC rail and probe, PN IAE2P16635 covers the mid to lower edge of the rail. Figure 3 (left) shows the two sensors from the outer edge. Note the shift in the position which corresponds to the necessary coverage requirements.

Figure 3 (right, top) is the side view of the probe "feet". Figure 3 (right, lower) is the view of the "feet surface" and shows that the outer foot (away from cable entry position) is the location of the active element.

C. Eddy Current Instruments

(1) The UniWest EVi and Olympus N600 instruments have been qualified for this inspection. Use of other instruments is determined by Pratt & Whitney. It may be necessary to ship other instruments to Pratt & Whitney MPE Laboratory for equivalency determination, if desired.

D. Protective Tape

(1) Cover the eddy current probe feet and sensor area with a smooth wrinkle free layer of Kapton or PTFE tape.

E. Part Marker

(1) Use a silver pencil for marking the part.

NOTE: Only use Pratt and Whitney approved temporary part marking materials.

3. Inspection Zone

   A. The inspection zone includes both left and right mount lug locations as shown in Figure 4.

   B. Both the forward and aft rail faces are to be inspected. Rail face geometries are defined in Figure 5. The “top of the rail” serves as the outer diameter (OD) of the rail. The sensor feet should traverse over the OD surface or “top of the rail”.

   C. For the forward rail, the probe guide should be positioned on the forward surface to minimize interference with the lug surfaces as shown in Figure 6. For the aft rail, the probe guide should be positioned on the aft surface to minimize interference with the lug surfaces.

   D. Given that the sensor is located beneath the foot away from the cable, the probe guide should be positioned to approach edges with the cable side trailing shown in Figure 7 (left) rather than leading as shown in Figure 7 (right). This minimizes rocking of the probe guide as the sensor approaches the edge.

   E. Figure 8 shows the inspection zone for the right hand side of the turbine exhaust case when viewed from the AFT looking FWD. The inspection zone begins 2 ± 0.2 inches (50.8 ± 5.0 mm) past the sensor pad and ends at the cusp of the rail transition point. Note the 1.5 inch (38.1 mm) non-inspect areas around the four bolt hole locations are indicated as View “A-A” and discussed further below.

   F. Figure 9 shows the inspection zone for the left hand side of the turbine exhaust case when viewed from the AFT looking FWD. The inspection zone begins 2 ± 0.2 inches (50.8 ± 5.0 mm) past the sensor pad and ends at the cusp of the rail transition point. Note the 1.5 inch (38.1 mm) non-inspect areas around the four bolt hole locations are indicated as View “A-A” and discussed further below.

   G. A non-inspect area has been defined approximately 1.5 ± 0.1 inches (38.1 ± 2.5 mm) around the four bolt holes noted as View A-A in Figures 8 and 9. There are four holes per side. Figure 10 shows the expanded View A-A of the non-inspect area around one of the four bolt holes.

   H. Install the guide PN IAE2P16636 into the keeper bolt hole as shown in Figure 11. When the pin is installed the non-inspect area is covered. Use a silver pencil to mark the inspection start zone at the end of the guide. The guide must be removed prior to the inspection. Leaving the guide in place may affect the eddy current inspection. All four locations denoted by View “A-A” must be marked prior to beginning the inspection.

4. Inspection Surface Preparation

   A. Typical surface conditions are shown in Figure 12 for six different engines. The extent of surface oxidation is related to flight environment, operational temperatures, and time since last overhaul cleaning.

   B. Because surface oxidation and/or corrosion can result in noise that impacts the eddy current inspection, surface preparation may be required. Remove residue by hand wiping with a shop wipe dampened with Isopropyl Alcohol as specified by PMC 9016.

      CAUTION: THIS PROCESS IS LIMITED TO HAND-HELD USE OF PADS ONLY. DREMELS, ROTARY TOOLS AND OTHER HAND-HELD POWER TOOLS SHALL NOT BE USED FOR SURFACE PREPARATION FOR THIS INSPECTION.

   C. If the use of alcohol dampened wipes does not sufficiently remove corrosion products, Abrasive Impregnated Nylon Pads as specified by PMC 4095 can be used.

Acceptable materials include 3M Scotch Brite (fine), PN 7447, Norton, PN 747 and Weiler Corp,. non-woven hand pad PN 5416.

D. Manually rub the inspection surface with the abrasive impregnated nylon material. Remove residue by wiping with Isopropyl alcohol.

5. System Preparation - Probes

A. Prior to inspection, the probe feet should be taped to protect the sensor and guide from wear. Because of the rough nature of the TEC surface and engine run condition, it may be necessary to re-tape the probe multiple times during a single inspection.

B. After changing tape, a calibration check will be necessary and recalibration required if amplitude has changed by more ± 0.3 div.

6. System Preparation - UniWest EVi Instrument

A. The EVi instrument as shown in Figure 13 is approved for use for this inspection. Install Cable #72306 and #94032 to the instrument. Connect the probe, PN IAE2P16634 to the instrument. Turn on the EVi using the power button at the lower right edge of the instrument.

B. Load the settings file, V2500 TEC. Enter the “BASIC” menu, use the vertical slider to highlight the “FILE” functions and hit “ENTER”. Ensure that the “FILE TYPE” is set to “SETTINGS”. If not, use the vertical slider to change to “SETTINGS”. Use the vertical slider to highlight “LOAD” and press “ENTER”. Select “V2500 TEC” from the drop down list and press “ENTER”. Wait until the “Load Settings” is complete before moving to the next step. Verify that the four function buttons are set for “Gain” “Rotation” “Freeze Screen” and “Save” as shown in Figure 14. If not, reload the V2500 TEC settings file.

C. After loading, verify that F1/DIFF on the EVi instrument is set to the following initial settings. To access the settings, go to the “BASIC” menu, use the vertical slider to select “EDDY CURRENT” and press ENTER. The FREQUENCY/CHANNEL should be at F1/DIFF. Use the ENTER function as necessary to set to F1/DIFF. If any of the values are different than listed below, modify to the correct setting, see Figure 14:

- Frequency - 1 MHz
- Gain - 50 dB (to be adjusted as necessary during calibration step).
- Rotation (Phase) - Adjusted as necessary during calibration step.
- Low Pass (LP) Filter - 60 Hz
- High Pass (HP) Filter - 2 Hz
- Drive (Probe Drive) - High
- X and Y Null positions: 0.0 Div
- Screen Sensitivity: 200 mV
- Auto clear: 3 sec
- Display Shift: 0 deg
- Scan Type: Manual

D. Perform a “null” operation with the probe inserted onto the calibration standard but away from the EDM notches. It is important to null each probe prior to calibration and prior to inspection. Failure to null the probe will lead to erroneous gain/rotation settings and an ineffective inspection.

E. Set the rotation such that the notch response is vertical. Adjust the gain such that the response is 4 div or V Vpp = 0.8 V then adjust the gain as specified on the calibration card for the standard. The Vpp reading is shown in the upper right corner of the impedance plane display, as shown in the oval in Figure 15. The response from the calibration notch is shown for typical gain and rotation settings for this probe.

F. Use the “Freeze Screen” F3 function button to record indications of interest. Enter the Basic menu, File settings, change the file type to “Screen Shots”. Set the PRIMARY BASE NAME to Probe ID “P16634” or “P16635” as applicable.

G. Set the SECONDARY BASE NAME to the Engine ID or SN, to distinguish this inspection from other inspections of the same part.

H. Set the FILE LOCATION to “Internal”. Set AUTO NAME ON: to ON. Set counter to “000”.

7. Eddy Current Inspection - UniWest EVi Instrument

A. After calibration, traverse the probe over the rail surface, starting with the forward rail, probe, PN IAE2P16634. Perform a “null” operation on the part.

B. Traverse the EC probe, maintaining contact at a constant speed (approximately 1 inch per second) along the rail while monitoring the trace for the EC signals. The inspector must ensure coverage over the full inspection zone. Monitor the tape for wear and replace as needed. If the tape is replaced, the probe must be recalibrated per paragraph 6.E. described above.

C. An indication will appear as a figure eight on the impedance plane (MAIN PLOT), similar to the notch response during calibration. The response will also show up as an amplitude spike in the vertical response vs. time trace as shown in Figure 16.

8. Rejection Criteria - EVi Instrument

A. Indications greater than 6 divisions and having the figure eight response are rejectable. The area should be cleaned as defined in Step 4. Repeat the inspection to determine if response is still greater than 6 divisions. Record the response using the freeze screen and screenshot functions.

B. FPI any rejectable indications. See Step 19.

C. For any indications greater than 10 divisions, reduce the gain by 6dB as needed to capture an unsaturated signal. Record the dB reduction on the data sheet. Use the freeze screen and screenshot functions to record the signal response and associated EC settings.

9. Post-Calibration - EVi Instrument

A. Confirm that the post-calibration notch response is within 0.5 div of the pre-calibration value.

10. Eddy Current Inspection - Uniwest EVi instrument (Probe IAE2P16635)

A. Repeat steps 6 through 9 with probe IAE2P16635.

11. Evaluation and Report Generation - EVi Instrument

A. Acceptance / Rejection Criteria: Indications that exceed the rejection threshold shall be recorded using the FREEZE and SCREENSHOT functions described above. Utilize Appendix A to document inspection results. See Step 21 for reporting.

12. System Preparation - Nortec 600 (Probe IAE2P16634)

A. The Nortec 600 shown in Figure 17 is approved for use for this inspection. Install Cable #94186 to the instrument. Connect the probe, PN IAE2P16634 to the instrument. Turn on the Nortec 600 using the power button at the lower right edge of the instrument. When the display has activated, select the “Surface Cracks” menu option using the “Enter” button (√) at the upper left. When the display has activated, if the Application screen is present, select the return button. If the settings are in the Memory, load the settings from the appropriate file for NDIP1167. If the settings are not in the memory, proceed to set up the instrument per paragraph 12.C.

B. Load the settings file, “V2500 TEC”. Enter the “MEM” menu key at the bottom right side of the instrument, use the smart knob (upper left) to highlight the “V2500 TEC” file as shown in Figure 18. Use function Key “B” (upper right) to activate the RECALL function and load the V25000 TEC setup file.

C. Verify that instrument is set to the following initial settings. To access the settings, go to the “ADV SETUP” menu, using the button in the lower right. Select “ALL SETTINGS” by pressing function key, B, on the right side. The FREQUENCY should be set to Single (upper display) as shown below. Use the function keys (A for col 1; B for col 2; C for Col 3) and the “FULL Next” button (upper right) as necessary to step thru set-up parameters. Use the Smart Knob as necessary to change the settings to the values listed below. See Figure 19.

- Frequency - 1 MHz
- Gain - 70 dB (to be adjusted as necessary during calibration step)
- Rotation (Phase) - Adjusted per 5.7
- Low Pass (LP) Filter - 60 Hz
- High Pass (HP) Filter - 2 Hz
- Drive (Probe Drive) - High
- Cont Null - Off
- DISP MODE - SWP + IMP

D. Perform a “null” operation with the probe placed on the calibration standard but away from the EDM notch. It is important to null each probe prior to calibration and prior to inspection. Failure to null the probe will lead to erroneous gain/rotation settings and an ineffective inspection.

E. Set the rotation such that the notch response is vertical. Adjust the gain such that the response is 4 div or Vpp = 4.0 +/- 0.3V then adjust the gain as specified on the calibration card for the standard. The Vpp reading is shown on the instrument display. The response from the calibration notch is shown for typical gain and rotation settings for this probe in Figure 20.

F. Use the “Freeze” and “Save”/“Main” buttons (bottom left) to record indications of interest to a removable microSD card. Use the “Freeze” button to capture the indication of interest. To save the screen capture, hold the “Main” menu key (bottom left) and simultaneously press the “REF SAVE” key. If both keys are not pressed simultaneously, the file will not save to the external card. The screen shot is saved to the external SD card once there is a short beep. The file is saved as a .bmp and will not show up on the instrument memory page. The file will only be viewable once the SD card accessed using a computer.

13. Eddy Current Inspection - Nortec 600 Instrument

A. After calibration, traverse the probe over the rail surface, starting with the forward rail, probe, PN IAE2P16634. Perform a “null” operation on the part.

B. Traverse the EC probe, maintaining contact at a constant speed (approximately 1 inch per second) along the rail while monitoring the trace for the EC signals. The inspector must ensure coverage over the full inspection zone. Monitor the tape for wear and replace as needed. If tape is replaced, the probe must be recalibrated per paragraph 12.E. described above.

C. An indication will appear as a figure eight on the impedance plane (MAIN PLOT), similar to the notch response during calibration. The response will also show up as an amplitude spike in the vertical response vs. time trace as shown in Figure 21. Figure 22 provides additional impedance place examples. Note that for larger indications, there will be phase rotation to the upper right quadrant.

D. Note that large cracks have been found through use of this eddy current inspection with results shown in Figure 23. The eddy current response (upper left) for this full-rail-width crack exceeded a 10 Vpp response. The crack extended across the rail face and down both sides (upper right). While this expanded image shows a clear crack indication, this crack was not readily visually evident. Through the FPI process (lower) shows a total crack of 0.89 inches (22.60 mm) was found.

14. Rejection Criteria - Nortec 600 Instrument

A. Indications greater than 6 divisions and having the figure eight response are rejectable. The area should be cleaned as defined in Step 4. Repeat the inspection to determine if response is still greater than 6 divisions. Use the “Freeze” and “Save”/”Main” buttons (bottom left) to record indications of interest to a removable microSD card as defined in paragraph 12.F.

B. FPI any rejectable indications. See Step 19.

C. For any indications greater than 10 divisions, reduce the gain by 6dB increments as needed to capture an unsaturated signal. Record the dB reduction on the data sheet. Use the “Freeze” and “Save”/”Main” buttons (bottom left) to record indications of interest to a removable microSD card as defined in paragraph 12.F.

15. Post-Calibration - Nortec 600 Instrument

A. Confirm that the post-calibration notch response is within 0.5 div of the pre-calibration value.

16. Eddy Current Inspection - Nortec 600 Instrument - (Probe IAE2P16635)

A. Repeat steps 12 through 15 with Probe IAE2P16635.

17. Evaluation and Report Generation - Nortec 600 Instrument

A. Acceptance / Rejection Criteria: Indications that exceed the rejection threshold shall be recorded using the FREEZE and SAVE/MAIN FILTER buttons described above. Utilize Appendix A to document inspection results. See Step 21 for reporting.

18. Mark the location of the indication.

A. Use a silver pencil to mark the rear mount stiffening rail at the location of the indication.

B. Use a silver pencil to mark the outer wall of the TEC adjacent to the stiffening rail at the previously marked location.

19. Fluorescent Penetrant Inspection

A. If the eddy current inspection indicates a rejectable reading, perform the following steps.

(1) Perform local FPI using SPOP 70 (high sensitivity)(or equivalent IAE TASK 70-23-05-230-501 high sensitivity).

(2) If FPI identifies a crack, see Step 20 for disposition.

(3) If FPI does not identify a crack complete the following steps:

(a) Re-clean the inspection location per Inspection Surface Preparation, Step 4, above.

(b) Manually blend any raised material and/or sharp edges of mechanical damage with a flat stone to prevent probe damage. The blending must not use more than 2 stones. The blending stone(s) must not be coarser than 150 grit and must not be finer than 220 grit. When two stones are used, the manual blending must be performed with the coarse stone first and finished with the fine stone The stoning must not remove any crack(s) or bulk material on the rear mount stiffening rail and blend time must not exceed 10 minutes.

(c) After the flat stone blend, clean the part by manually rubbing the inspection surface with the Abrasive Impregnated Nylon Material. Remove residue by wiping with Isopropyl alcohol.

(4) Repeat the eddy current inspection of the local area.

(5) If eddy current inspection indicates a rejectable reading after the flat stone blend, perform local FPI, using SPOP 70 (high sensitivity)(or equivalent IAE TASK 70-23-05-230-501 high sensitivity).

(a) If the FPI does not indicate a crack; perform one of the two options below at the following intervals as long as ECI rejections occurs with no FPI indications:

1 Option 1: Perform Service Bulletin V2500-ENG-72-0694 within every 500 cycles as long as ECI rejection(s) occur with no FPI indications.

CAUTION: INSPECTION AREA MUST BE DONE IN A DARKENED AREA. WHITE LIGHT MUST NOT BE MORE THAN 2 FOOTCANDLES (20 LUX) AT THE INSPECTION SURFACE OF THE PART.

2 Option 2: Perform a detailed Visual Inspection using white light and magnification and a focused FPI inspection without ECI within every 250 cycles. The area must be cleaned with alcohol and an Abrasive Impregnated Nylon Pad. The exact location of the ECI reject needs to be marked using Pratt and Whitney approved silver pencil to indicate the area for focusing the FPI indication. ECI and FPI per Service Bulletin V2500-ENG-72-0694 within every 1,000 cycles from initial ECI reject as long as no FPI indications are found and the exact location of the ECI indication is known.

(b) If an ECI reject occurs with a FPI indication follow the part disposition per Service Bulletin V2500-ENG-72–0694 Step 20.

1 See Step 21 for reporting. Utilize Appendix A to document inspection results.

(6) If the silver pencil mark is removed during the FPI, remark the part at the location of the indication. See Step 18.

20. Part Disposition:

    A. Inspection Disposition for engines not installed on aircraft using the following criteria:

        (1) If the crack indication is found during a shop visit, reject for continued service use and contact the local Pratt and Whitney Field Service Representative for part disposition.

21. Reporting

    A. Use Appendix A to document results of the eddy current inspection.

    B. Indications that exceed the ECI rejection threshold shall be recorded using the FREEZE and SCREENSHOT functions described above. Results shall be communicated back Pratt and Whitney through the Global Operations Center, help24@pw.utc.com. Include the following information:

        • Photo-documentation of the TEC inspection surface condition
        • Available eddy current screenshots
        • Engine position
        • Engine serial number
        • TEC part number and serial number
        • Location of the indication
        • Data Reporting Sheet from Appendix A

    C. For indications with an FPI indication, results shall be communicated back Pratt and Whitney through the Global Operations Center, help24@pw.utc.com. Include the following information:

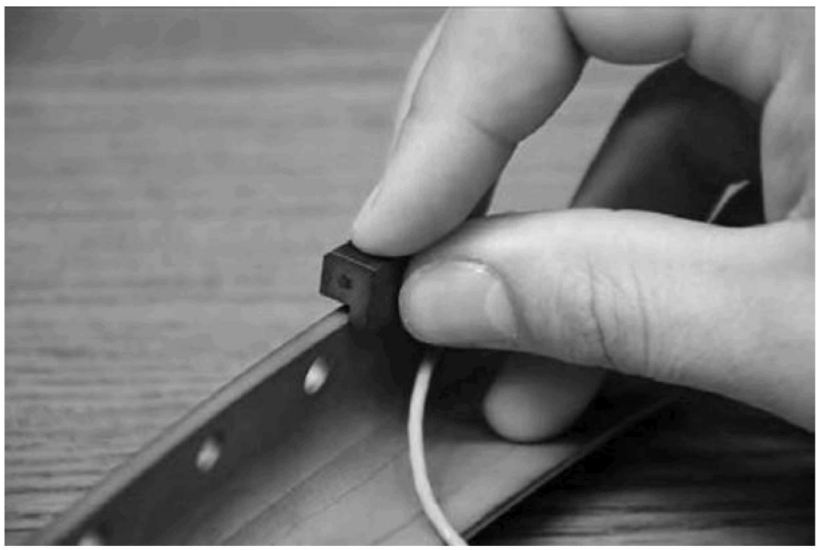
        • Photo-documentation of the FPI indication
        • Available eddy current screenshots
        • Engine position
        • Engine serial number
        • TEC part number and serial number
        • Location and length of the indication
        • Data Reporting Sheet from Appendix A

22. Recording Instructions

    A. A record of accomplishment is required.

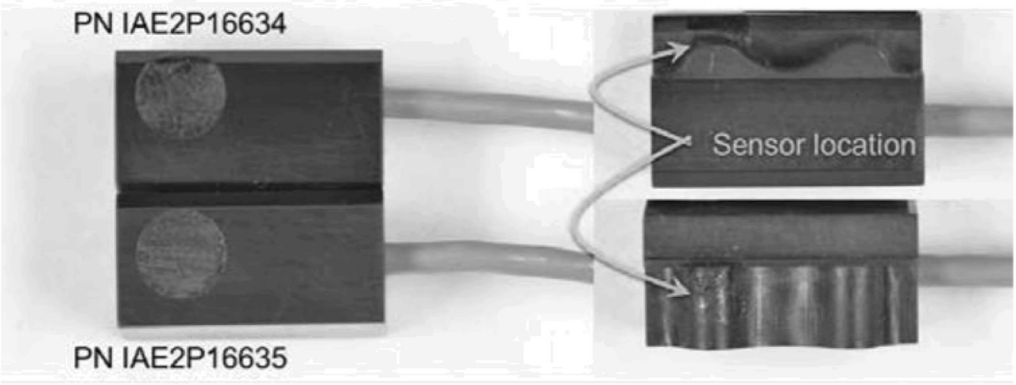
B526888

CALIBRATION STANDARD
FIGURE 1



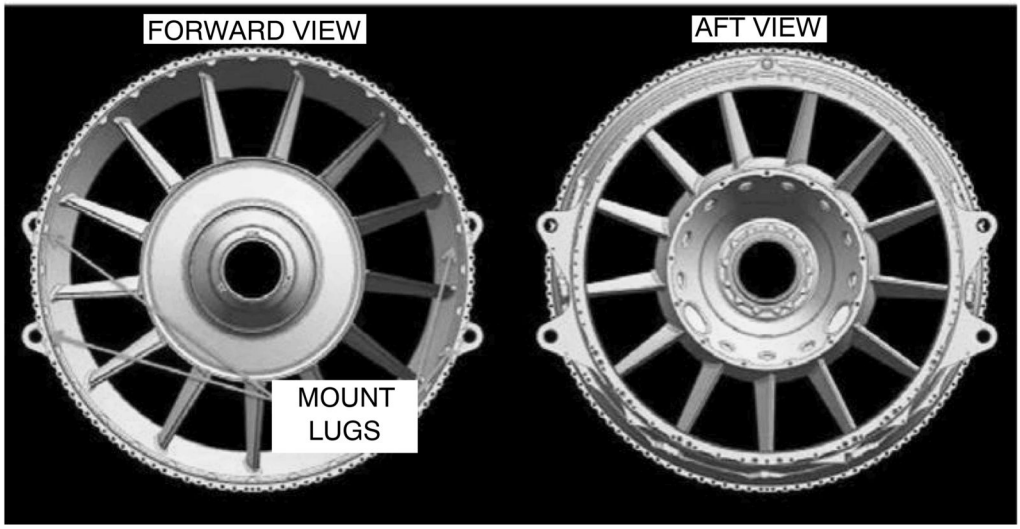
B526889

TEST ARTICLE, SHOWN WITH PROBE AND PROPER HAND POSITION
FIGURE 2



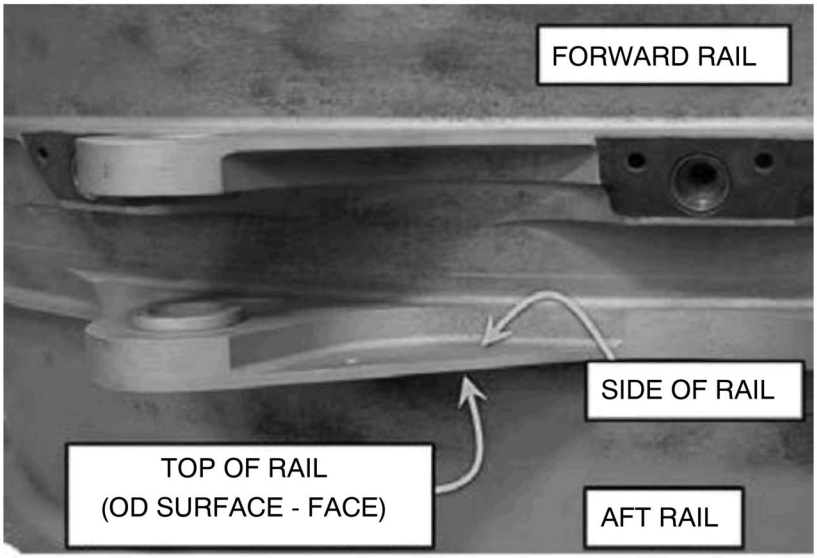
B526890

EDDY CURRENT PROBES, PN IAE2P16634 AND IAE2P16635. ACTIVE SENSOR POSITION TO COVER FULL EXTENT OF FORWARD AND AFT RAIL. SENSOR IS LOCATED BELOW OUTER MOST FOOT OF THE PROBE (AWAY FROM CABLE ENTRY POSITION).
FIGURE 3



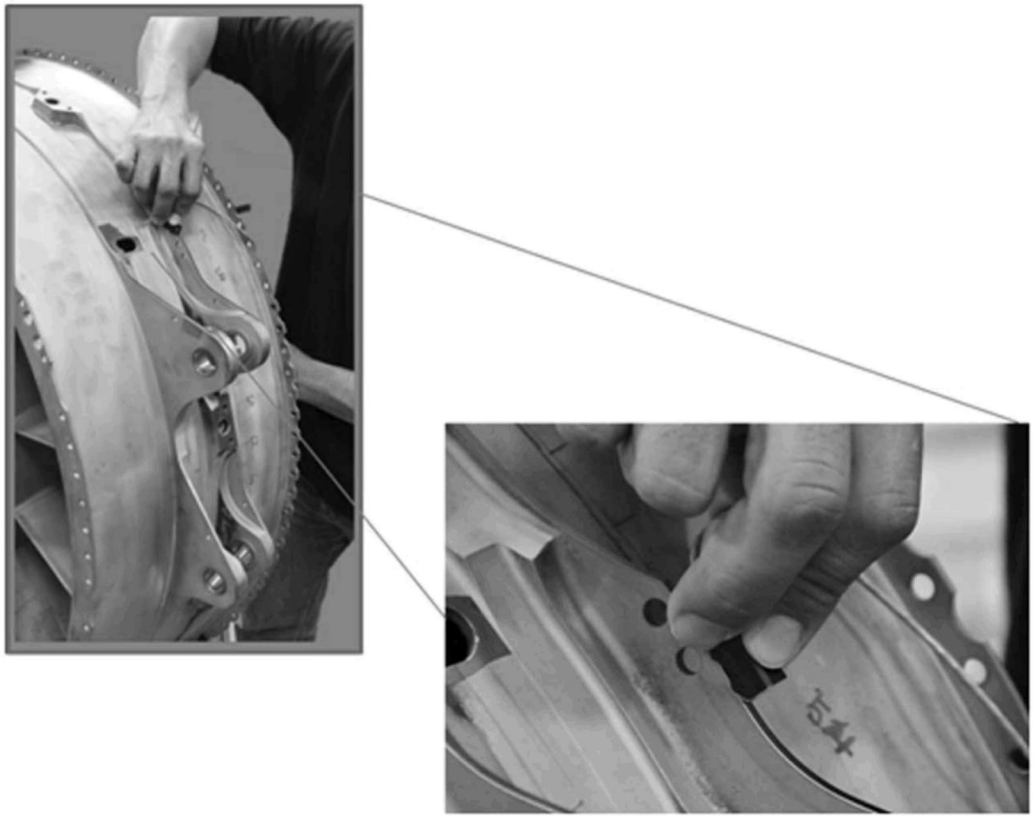
B526891

PART GRAPHIC SHOWING MOUNT LUG LOCATIONS FROM FORWARD (LEFT) AND AFT (RIGHT)
FIGURE 4



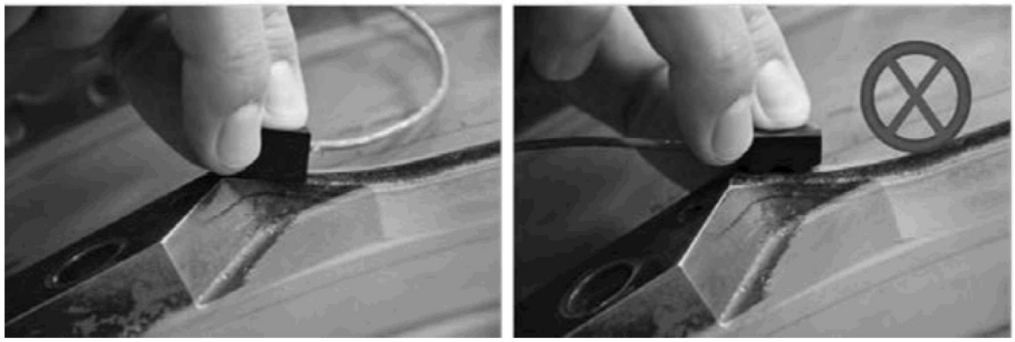
B526892

GEOMETRY DEFINITION SHOWING SIDE RAIL FACE AND TOP OF RAIL. THE OD SURFACE OR “TOP OF THE RAIL” IS THE REQUIRED INSPECTION SURFACE FOR THIS INSPECTION.
FIGURE 5



B526895

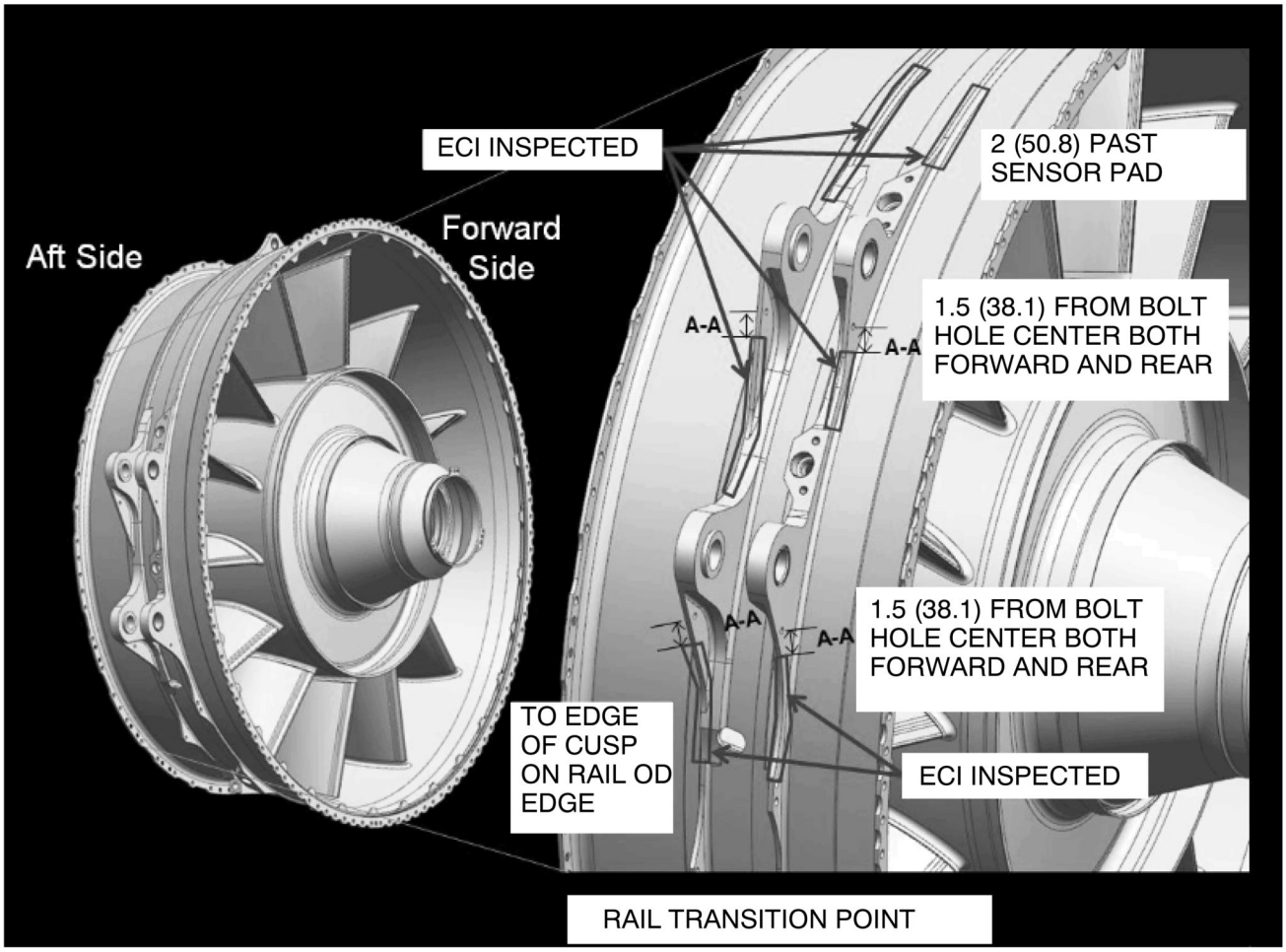
PROBE POSITIONED SUCH THAT THE SENSOR TRANSVERSES SIDE FACE
FIGURE 6



B526894

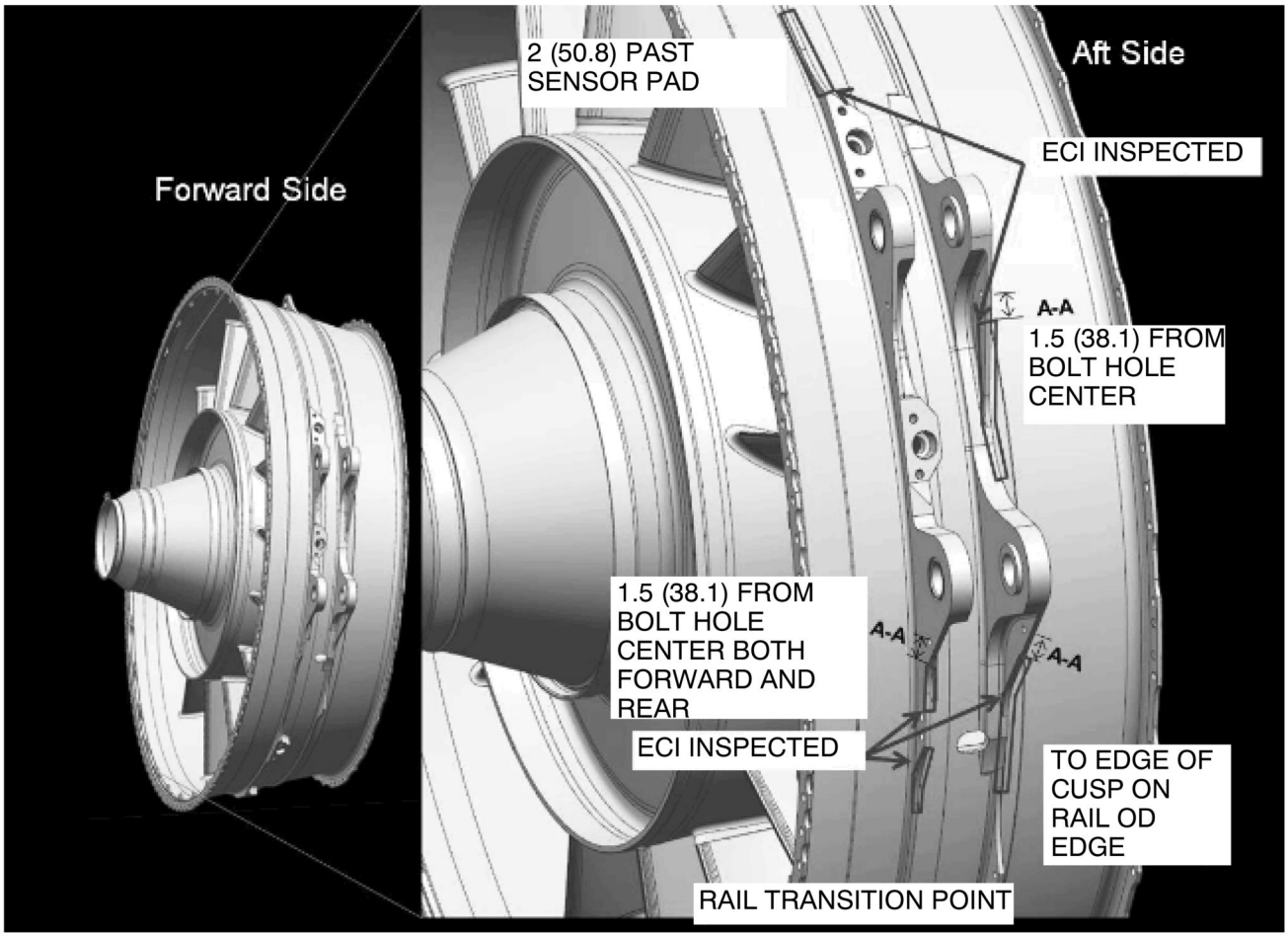
PROPER PROBE TRAVEL WITH SENSOR IN LEADING POSITION AND CABLE IN TRAILING POSITION IS SHOWN IN LEFT GRAPHIC. IF THE PROBE TRAVELS SUCH THAT THE SENSOR APPROACHES THE EDGE TRANSITION AS SHOWN IN THE RIGHT GRAPHIC, GEOMETRY NOISE IS MORE SEVERE AND WILL LEAD TO UNINSPECTABLE AREAS.

FIGURE 7



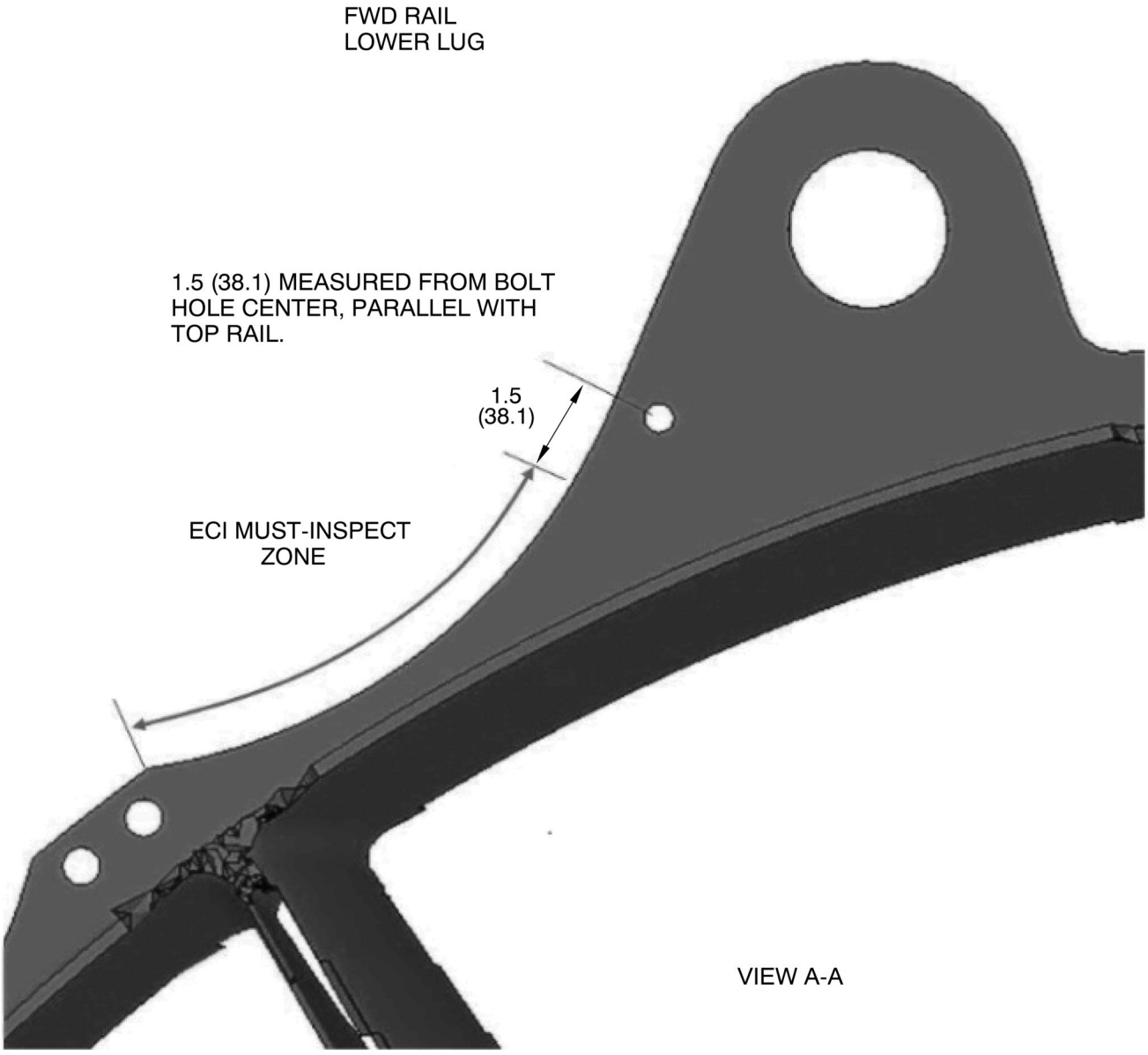
B527148A

RIGHT ENGINE MOUNT LUG INSPECTION AREA
FIGURE 8

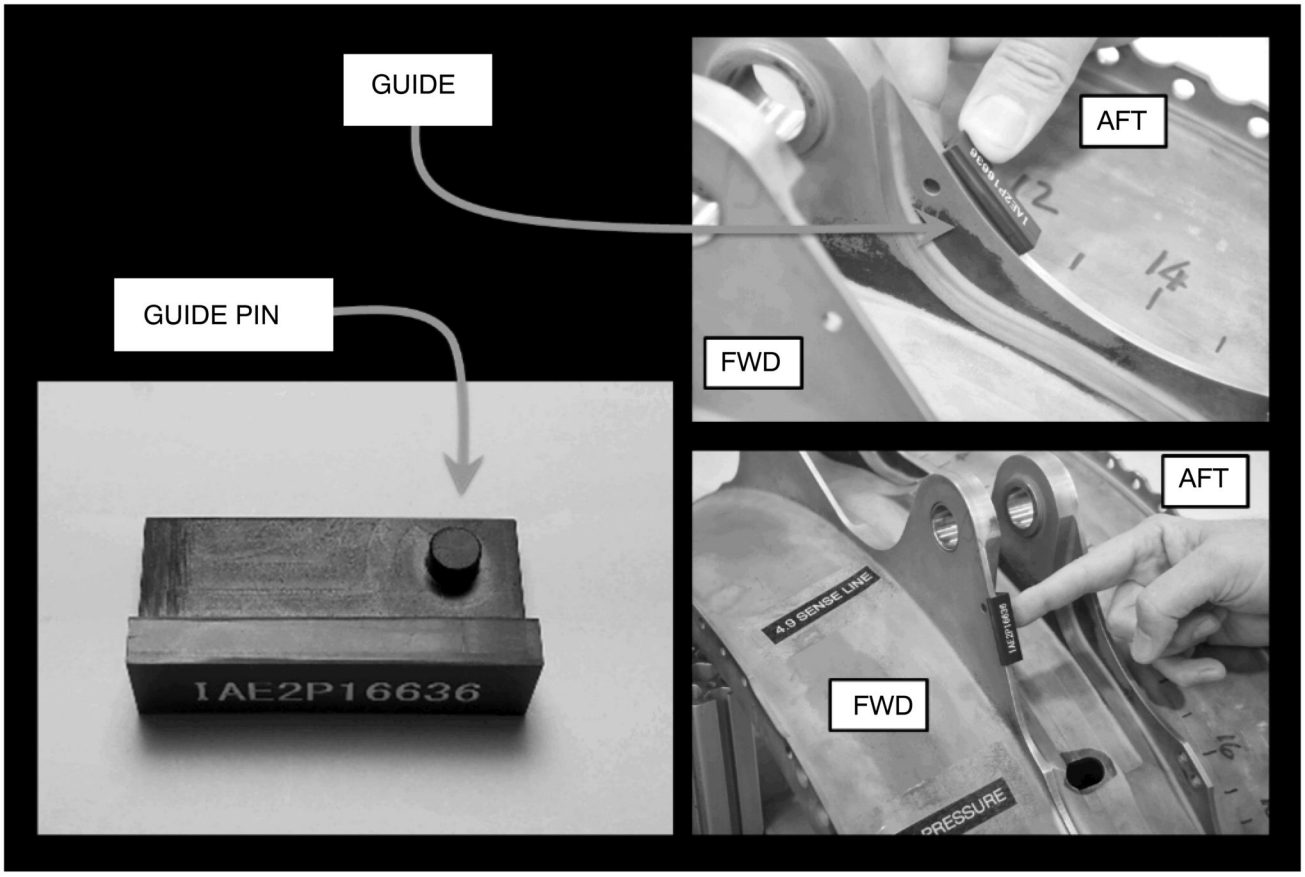


B527149A

LEFT ENGINE MOUNT LUG INSPECTION AREA
FIGURE 9

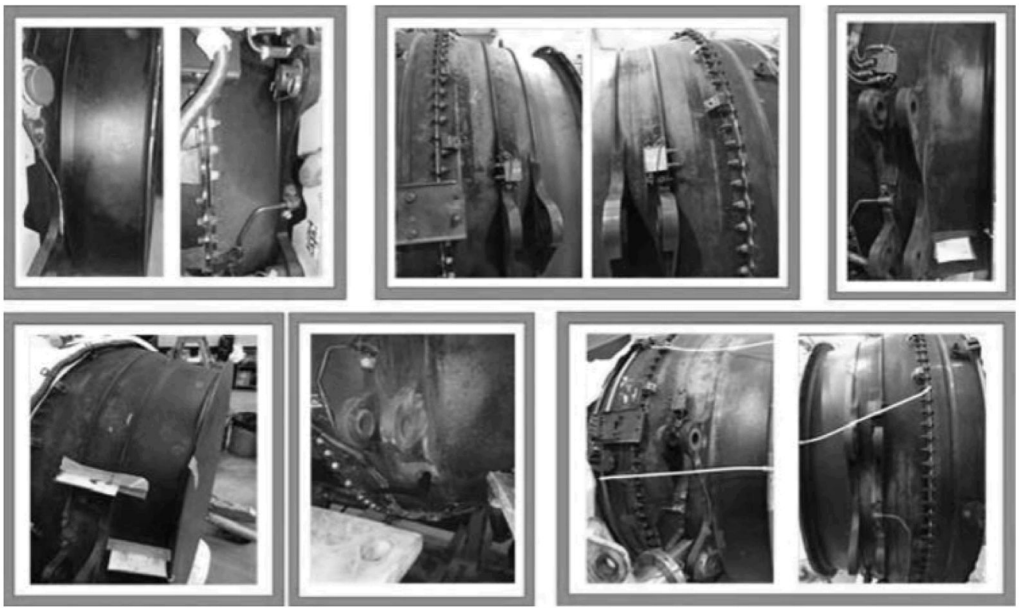


EXPANDED VIEW OF THE INSPECTION ZONE
FIGURE 10



B527079

GUIDE, PN IAE2P16636
FIGURE 11



B526897

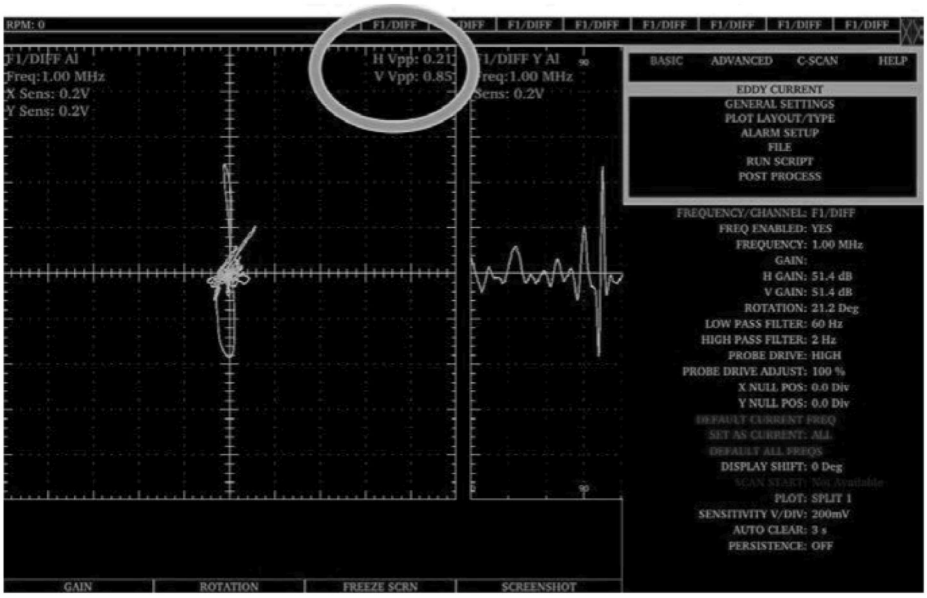
EXAMPLES OF SURFACE CONDITION SHOWING TYPICAL OXIDATION OF THE TURBINE EXHAUST CASE. EACH OF THE BLUE BOXES SHOW RESULTS FOR A DIFFERENT ENGINE.
FIGURE 12

B526898

UNIWEST EVI EDDY CURRENT INSTRUMENT
FIGURE 13

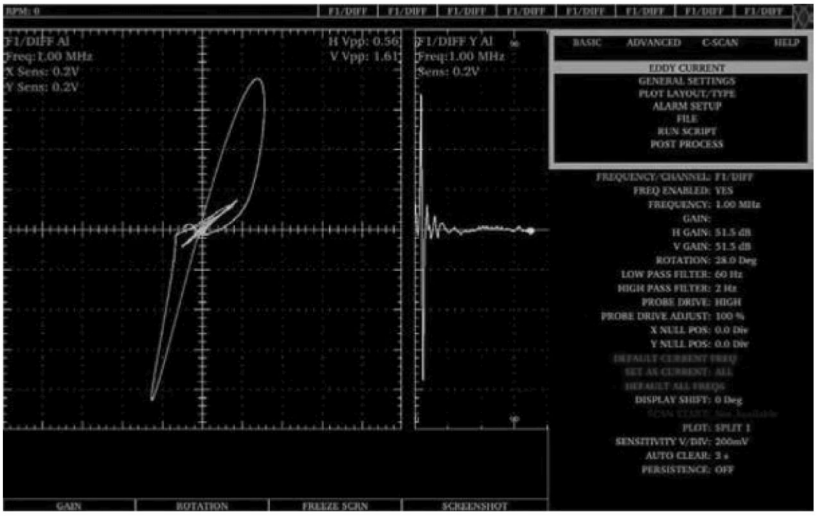
B526899

F1/DIFF INITIAL SETTINGS
FIGURE 14



B526900

TYPICAL CALIBRATION RESPONSE FOR IAE2P16634 PROBE
FIGURE 15



B526901

TYPICAL RESPONSE FOR NOTCH INDICATION IN THE V2500 TEC
FIGURE 16

B526902

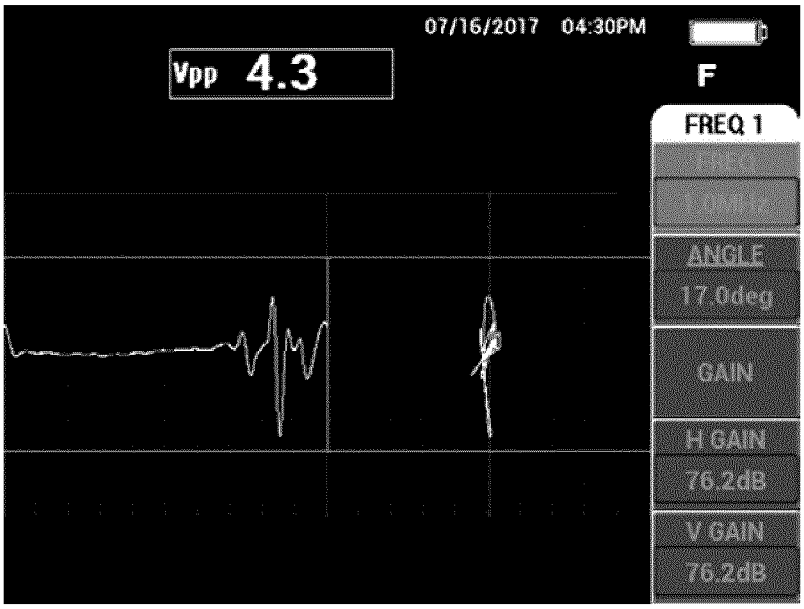
NORTEC 600 INSTRUMENT
FIGURE 17

B526903

FILE MANAGER SCREEN USED TO LOAD THE INITIAL SETTINGS FILE FOR THE V2500 TEC SETUP. USE FUNCTION KEY B TO ACTIVATE RECALL AND LOAD THE CORRECT SETTINGS.
FIGURE 18

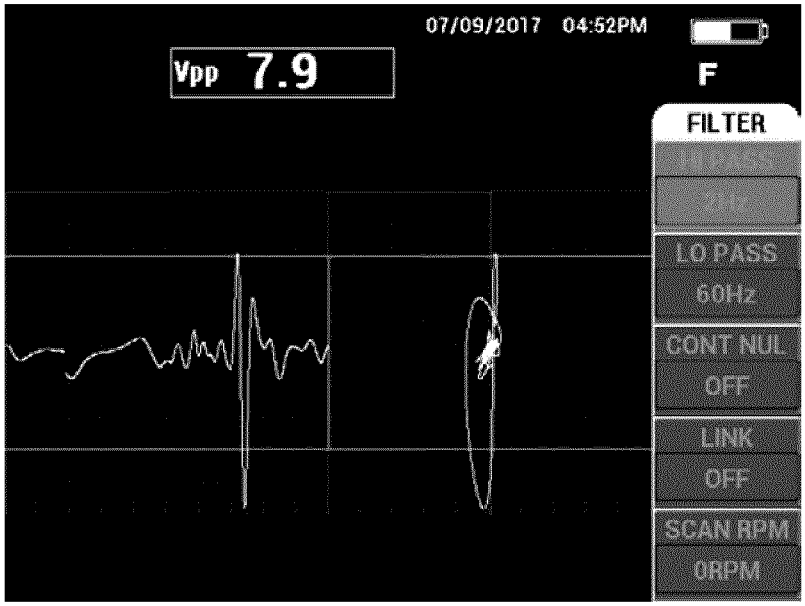
B526904

INITIAL SETTINGS
FIGURE 19



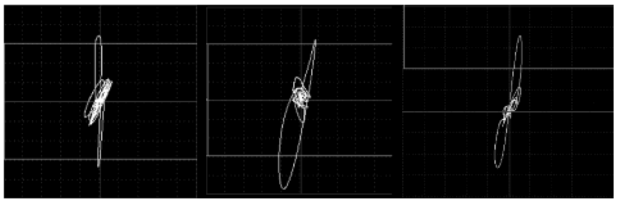
B526905

TYPICAL CALIBRATION RESPONSE
FIGURE 20



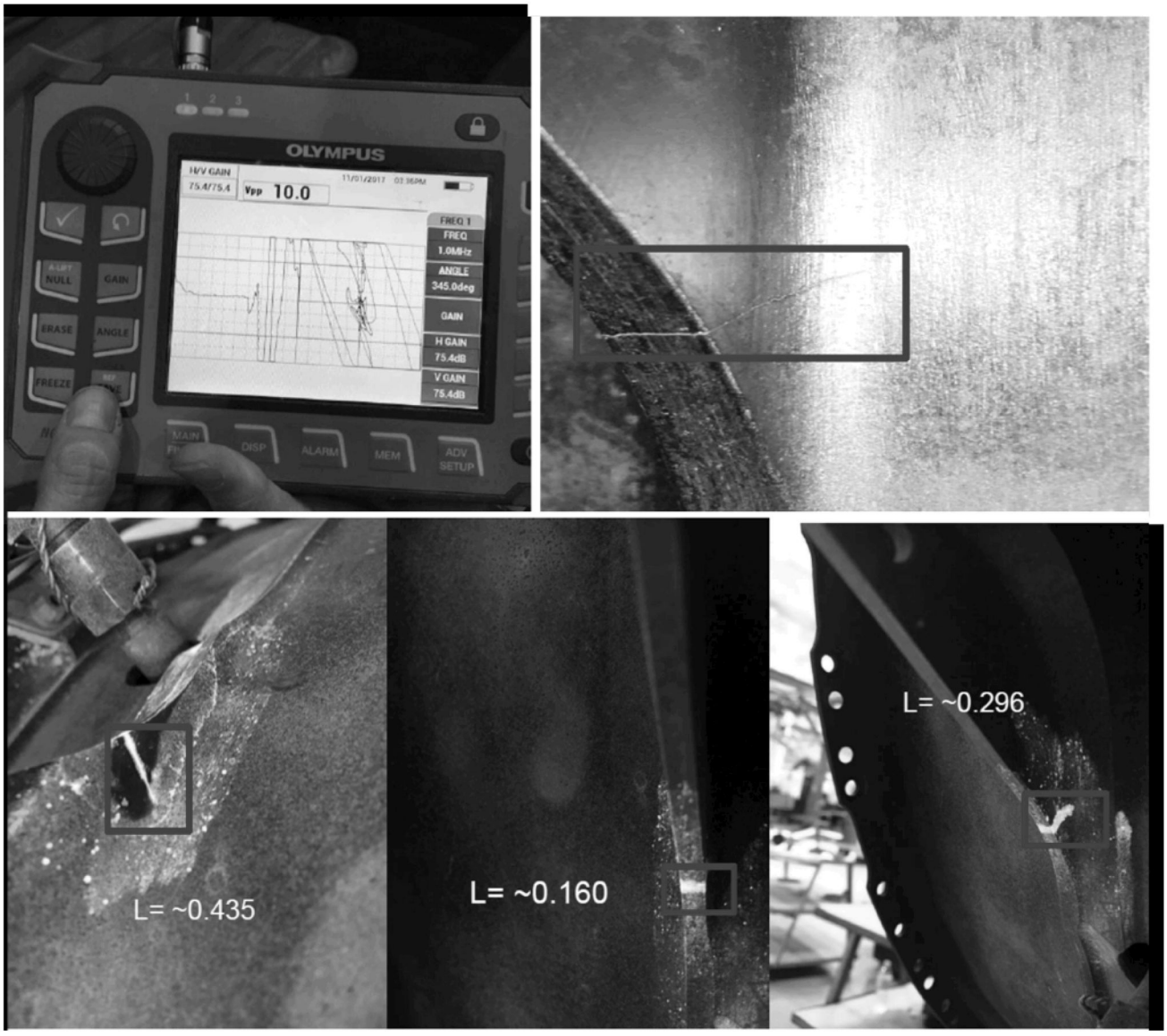
B526906

EXAMPLE OF NOTCH RESPONSE FOR REJECTABLE INDICATION (TOP)
FIGURE 21



B526921

TYPICAL IMPEDANCE PLANE RESPONSES WITH FIGURE 8 PATTERN
FIGURE 22



B527078

CRACK DETECTION EXAMPLE
FIGURE 23

Appendix

Added Data

Appendix A
Data Reporting Sheet

Customer:		Inspection Location:			
Aircraft Tail Number					
Engine SN		Engine position			
Inspector (Print Name)		Date/time			
IAE2P16634		Probe SN			
Cal Standard SN		Gain		Rotation	
Pre Cal Amp:		PostCal Amp:			
IAE2P16635		Probe SN			
Cal Standard SN		Gain		Rotation	
Pre Cal Amp:		PostCal Amp:			

Probe PN	Amplitude (Vptp)	Location (FWD/AFT Rail, Left/Right TEC)	Comments (include distance from bolthole, pre or post FPI?)

B527252

DATA REPORTING SHEET
APPENDIX A

Internal Reference Information

Revision No.	Reference Document	Origination
Original	EA 17VC430	RD/RCM
1	EA 17VC430B	RD/RCM
2	EA 17VC430C	RD/RCM

Number values shown in parentheses adjacent to U.S. values are International System of units (SI) equivalents.

NOTE: In 2014 IAE converted the V2500 Technical Publications to a new system. As a result of the conversion, some manuals were consolidated. All manuals received new P&W part numbers. To facilitate the use of this Service Bulletin, the following Technical Publications cross reference table is provided.

Technical Publications Cross Reference Table

Publication	Engine Model(s)	IAE IETM Pub Ref	P&W Part Number
ENGINE MANUAL — D5	All	E-V2500-3IA	2A4416
CMM-EHC — D5	All	EHC-V2500-31A	2A4418
CMM-FN — D5	All	FN-V2500-3IA	2A4419
CMM-MMC — D5	All	MECH-V2500-3IA	2A4420
CMM-THD — D5	All	THD-V2500-3IA	2A4423
TLM — D5	All	T-V2500-3IA	2A4417
SPPM (SPM) — A1, A5, D5	All	SPP-V2500-1IA	2A4414
EIPC — D5	V2525/V2528-AQ02	S-V2500-3IA	2A4426
	V2525/V2528-AQ03	S-V2500-3IB	
	V2525/V2528-AQ04	S-V2500-3IC	