# CHAPTER

# 77

# ENGINE INDICATION

## (CFM56 ENGINES (CFM56-7))

BOEING

# 737-600/700/800/900
# AIRCRAFT MAINTENANCE MANUAL

## CHAPTER 77
## ENGINE INDICATION



A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

# 77-EFFECTIVE PAGES

# 737-600/700/800/900
# AIRCRAFT MAINTENANCE MANUAL

## CHAPTER 77
## ENGINE INDICATION



# 77-CONTENTS

## CHAPTER 77
## ENGINE INDICATION



# 77-CONTENTS

## N1 SPEED SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has two tasks:

(1) The removal of the N1 speed sensor

(2) The installation of the N1 speed sensor.

**TASK 77-11-01-000-801-F00**

### 2. N1 Speed Sensor Removal

(Figure 401)

#### A. General

(1) This task is the removal procedure for the N1 speed sensor (referred to as the sensor).

(2) The N1 speed sensor is located on the fan frame at the 4:00 o'clock position.

(a) The probe is engaged in the fan frame strut 4.

#### B. References

| Reference | Title |
|---|---|
| 70-10-02-910-801-F00 | General Precautions during the Removal and Installation of Engine Components (P/B 201) |
| 71-11-02-010-801-F00 | Open the Fan Cowl Panels (P/B 201) |

#### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-195 | Container - 1 Quart, Oil/Fuel Resistant |

#### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00270 | Tape - Scotch Flatback Masking 250 | ASTM D6123 (Supersedes A-A-883) |

#### E. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

#### F. Prepare for the Removal

**SUBTASK 77-11-01-860-001-F00**

(1) For Engine 1, open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-11-01-860-002-F00

(2) For Engine 2, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

SUBTASK 77-11-01-010-001-F00

(3) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

## G. N1 Speed Sensor Removal

SUBTASK 77-11-01-020-002-F00

(1) Remove the sensor [5]:

(a) Disconnect the electrical connectors, DP0701 (CH A) [7], DP0801 [8] (CH B) and DP0103 [10] from the sensor receptacles.

(b) Put a 1 quart oil/fuel resistant container, STD-195, below the guide tube.

NOTE: Oil leakage can occur, when you remove the sensor probe [3] from the guide tube.

**CAUTION**

BE CAREFUL WHEN YOU REMOVE THE N1 SPEED SENSOR. THE N1 SPEED SENSOR IS VERY LONG AND DAMAGE CAN OCCUR.

(c) Remove the two bolts [12] that attach the sensor mounting flange to the guide tube flange.

(d) Slowly and carefully pull the sensor [5] out of the guide tube.

1) Let the oil drain in the container.

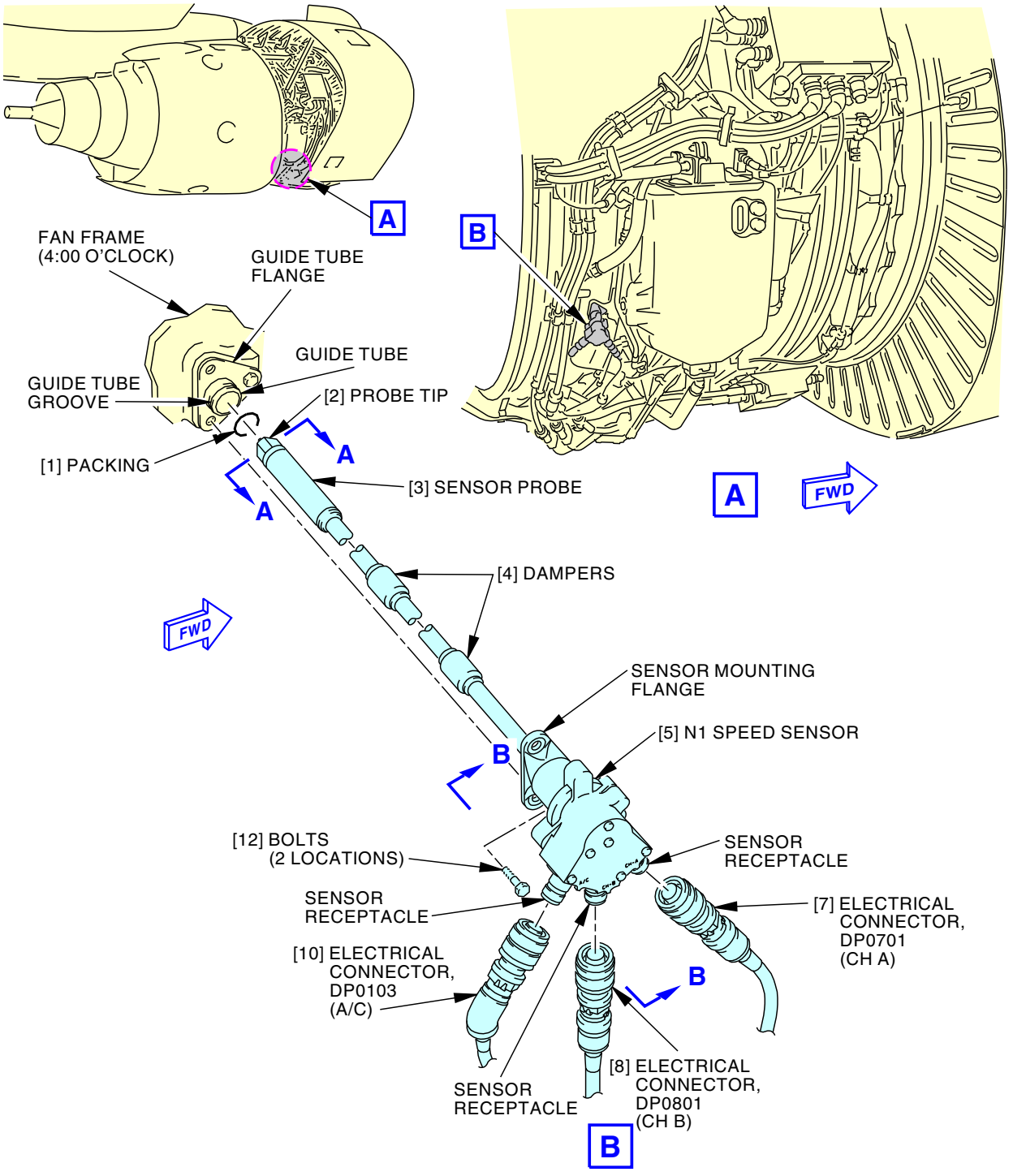
(e) Remove the sensor [5].

(f) Remove and discard the packing [1] from the guide tube groove.

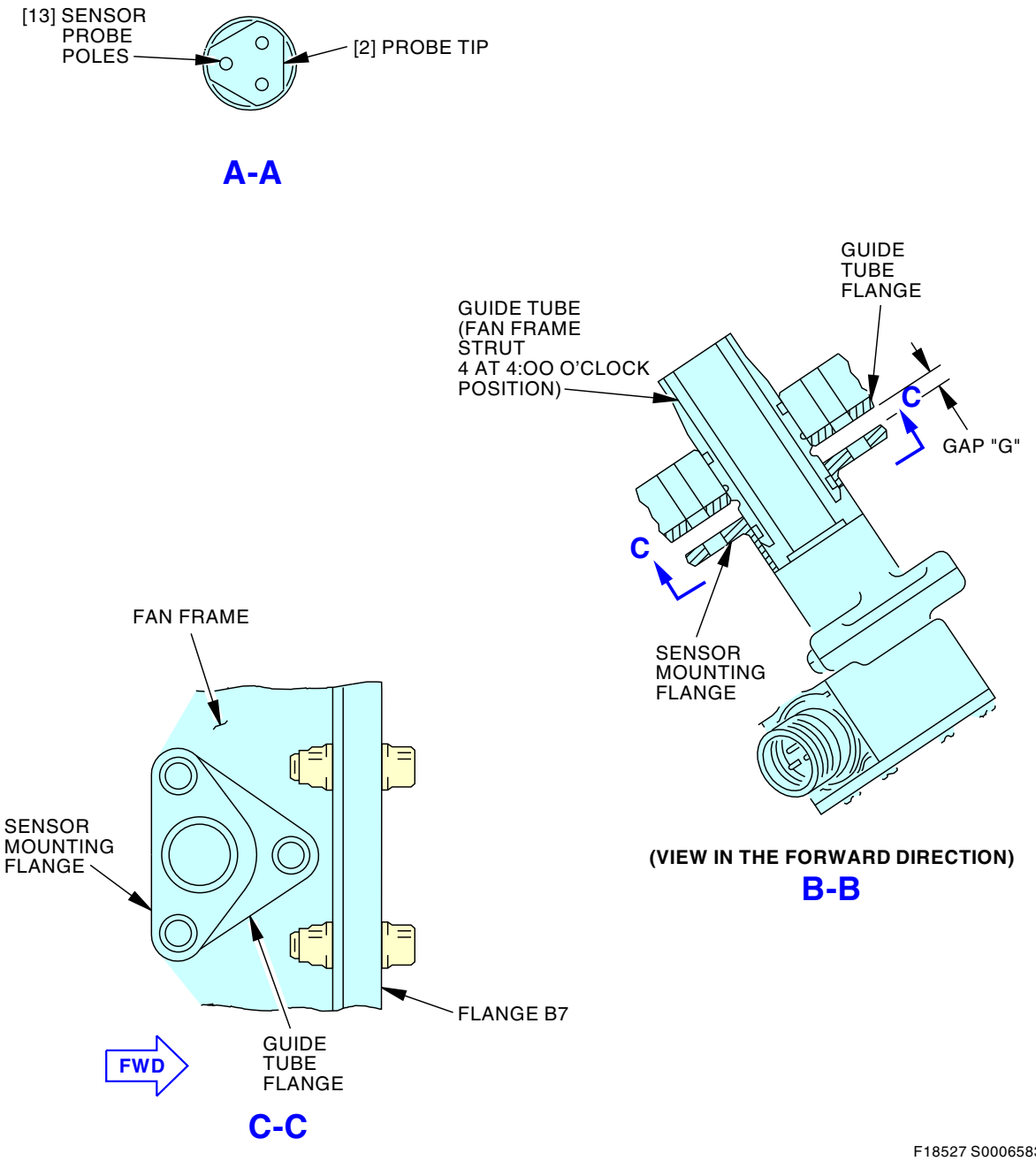
(g) Put a protective cover on the probe tip [2] (TASK 70-10-02-910-801-F00).

(h) Put Scotch Flatback Masking Tape 250, G00270, on the guide tube port.

**END OF TASK**




**N1 Speed Sensor Installation**
**Figure 401/77-11-01-990-801-F00 (Sheet 1 of 2)**

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**N1 Speed Sensor Installation**
**Figure 401/77-11-01-990-801-F00 (Sheet 2 of 2)**

**TASK 77-11-01-400-801-F00**

## 3. N1 Speed Sensor Installation

(Figure 401)

### A. General

(1) This task is the installation procedure for the N1 speed sensor (referred to as the sensor).

### B. References

| Reference | Title |
|---|---|
| 70-10-02-910-801-F00 | General Precautions during the Removal and Installation of Engine Components (P/B 201) |
| 71-00-00-800-811-F00 | Power Plant Test Reference Table (P/B 501) |
| 71-11-02-410-801-F00 | Close the Fan Cowl Panels (P/B 201) |

### C. Tools/Equipment

| Reference | Description |
|---|---|
| STD-1107 | Gauge - Feeler, 0.0 - 0.5 Inch, Readable to 1/1000th |

### D. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A50464 | Tape - Vinyl, Adhesive Coated | BMS5-179 |
| D00599 [CP2442] | Oil - Engine | |
| D00601 [CP2101] | Vaseline - Graphite Mineral | |
| D00672 [CP5070] | Vaseline - Pure Mineral | V V-P-236 |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02129 | Tape - 223S (use until stock depleted) | |
| G02352 [CP2179] | Lanolin - Industrial | |

### E. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Packing | 77-11-01-01-020 | LOM ALL |
| 5 | Sensor | 77-11-01-01-010 | LOM ALL |

### F. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

### G. N1 Speed Sensor Installation

**SUBTASK 77-11-01-640-001-F00**

(1) Do these steps to prepare the sensor [5] for the installation (TASK 70-10-02-910-801-F00) (Figure 401):

(a) Remove the protective cover from the probe tip [2].

(b) Remove the tape from the guide tube port.

(c) Use a piece of Nitto 223S Tape, G02129 or tape, A50464, to remove all the magnetic particles from the probe tip [2].

(d) Carefully clean the three sensor probe poles [13] at the probe tip [2] with a cotton wiper, G00034.

(e) Lubricate a new packing [1] with oil, D00599 [CP2442].

**CAUTION**

MAKE SURE YOU INSTALL THE PACKING CORRECTLY ON THE GUIDE TUBE GROOVE. IF YOU DO NOT INSTALL THE PACKING CORRECTLY, OIL LOSS CAN OCCUR DURING ENGINE OPERATION AND CAN CAUSE DAMAGE TO THE ENGINE.

(f) Install the packing [1] on the guide tube groove.

(g) Lubricate the dampers [4] with a thin layer of vaseline, D00672 [CP5070], or lanolin, G02352 [CP2179].

**SUBTASK 77-11-01-420-001-F00**

(2) Install the sensor [5] in the guide tube (Figure 401):

**CAUTION**

BE CAREFUL NOT TO USE TOO MUCH FORCE WHEN YOU ENGAGE THE N1 SPEED SENSOR IN THE GUIDE TUBE. IF YOU USE TOO MUCH FORCE, DAMAGE TO THE N1 SPEED SENSOR CAN OCCUR.

(a) Align the probe tip [2] with the guide tube.

(b) Engage the probe tip [2] in the guide tube.

(c) Slowly, push the sensor [5] down the guide tube.

(d) Be careful to keep the axial alignment and to use a smooth movement when you engage the sensor [5].

(e) When you feel the sensor [5] touch the bottom of its recess, stop and do not push the sensor [5] in more.

**SUBTASK 77-11-01-220-001-F00**

(3) Make sure that the sensor [5] has the correct clearance (Figure 401):

(a) With no bolts [12] installed, measure the clearance of GAP "G" between the machined surfaces of the sensor mounting flange and the guide tube flange.

**CAUTION**

THE SENSOR PROBE IS SPRING-LOADED TO KEEP ITS INNER END SHOULDER IN CONTACT WITH THE BOTTOM OF THE GUIDE TUBE RECESS. IF YOU DO NOT OBEY THE SPECIFIED GAP "G" LIMITS WITH ABOVE CONDITION, DAMAGE TO THE N1 SPEED SENSOR CAN OCCUR.

(b) If the GAP "G" clearance is not 0.051-0.169 inch (1.30-4.30 mm), remove the sensor [5].

1) Measure the GAP “G”clearance with a 0.0 - 0.5 Inch feeler gauge, STD-1107.

2) Look for damage to the sensor [5] (distortion of the sensor probe [3], not positioned correctly, etc).

(c) If you cannot install the sensor [5] with the correct GAP "G" clearance, replace the sensor [5].

**SUBTASK 77-11-01-420-002-F00**

(4) Tighten the sensor [5] (Figure 401):

(a) Lubricate the threads of the two bolts [12] with graphite mineral vaseline, D00601 [CP2101].

**CAUTION**

TIGHTEN ONE BOLT AND THEN THE OTHER BOLT IN SMALL INCREMENTS TO PREVENT DISTORTION OF THE SENSOR PROBE. IF IT IS POSSIBLE, USE TWO RATCHET WRENCHES TO TIGHTEN THE BOLTS AT THE SAME TIME.

(b) Install the two bolts [12].

1) Tighten the bolts [12] to 110-120 pound-inches (12.5-13.5 Newton meters).

(c) Connect the electrical connectors, DP0701 (CH A) [7], DP0801 (CH B) [8] and DP0103 [10] to the applicable sensor receptacles, CH A, CH B, and CH A/C.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 77-11-01-410-002-F00

(1) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

SUBTASK 77-11-01-860-003-F00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-11-01-860-004-F00

(3) For Engine 2, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

## I. N1 Speed Sensor Installation Test

SUBTASK 77-11-01-800-001-F00

(1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

**END OF TASK**

## N2 SPEED SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has two tasks:

(1) The removal of the N2 speed sensor

(2) The installation of the N2 speed sensor.

**TASK 77-11-02-000-801-F00**

### 2. N2 Speed Sensor Removal

(Figure 401)

#### A. General

(1) This task is the removal procedure for the N2 speed sensor (referred to as the sensor).

(2) The N2 speed sensor is located on the forward side of the accessory gearbox (AGB), between the EEC alternator and the engine air starter.

#### B. References

| Reference | Title |
|---|---|
| 70-10-02-910-801-F00 | General Precautions during the Removal and Installation of Engine Components (P/B 201) |
| 71-11-02-010-801-F00 | Open the Fan Cowl Panels (P/B 201) |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00270 | Tape - Scotch Flatback Masking 250 | ASTM D6123 (Supersedes A-A-883) |

#### D. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

#### E. Prepare for the Removal

**SUBTASK 77-11-02-860-001-F00**

(1) For Engine 1, open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-11-02-860-002-F00

(2) For Engine 2, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

SUBTASK 77-11-02-010-001-F00

(3) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

## F. N2 Speed Sensor Removal

SUBTASK 77-11-02-020-002-F00

(1) Remove the sensor [4]:

(a) Disconnect the electrical connectors, DP0503 (CH A) [9], DP0603 (CH B) [10] and DP1201 [1] from the sensor receptacles.

(b) Remove the two bolts [2] that attach the sensor [4] to the AGB boss.

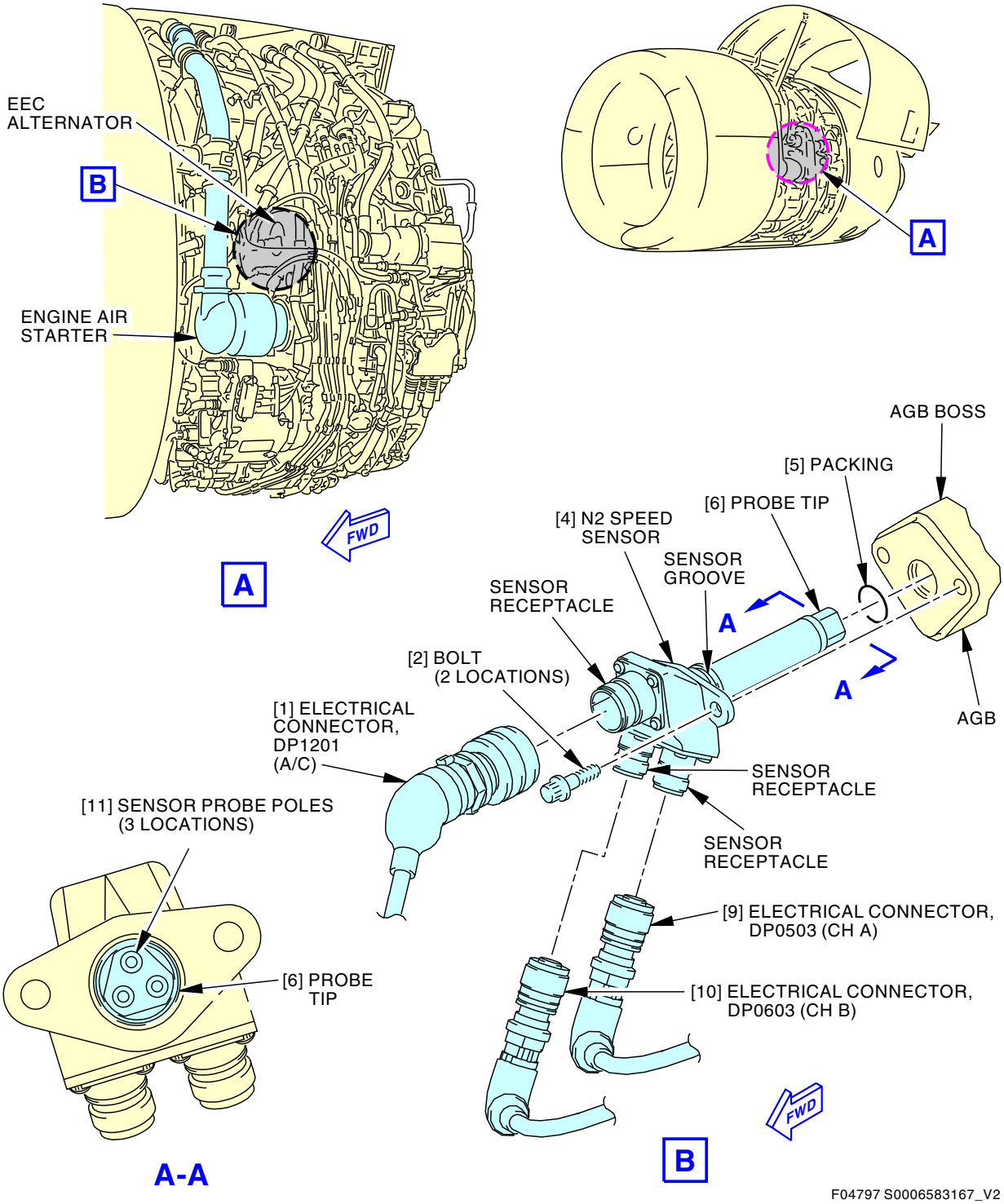
(c) Remove the sensor [4] from the AGB recess.

(d) Remove and discard the packing [5].

(e) Put a protective cover on the probe tip [6] (TASK 70-10-02-910-801-F00).

(f) Put Scotch Flatback Masking Tape 250, G00270, on the AGB orifice.

**——— END OF TASK ———**




**N2 Speed Sensor Installation**
**Figure 401/77-11-02-990-801-F00**

**TASK 77-11-02-400-801-F00**

## 3. N2 Speed Sensor Installation

(Figure 401)

### A. General

(1) This task is the installation procedure for the N2 speed sensor (referred to as the sensor).

### B. References

| Reference | Title |
|---|---|
| 70-10-02-910-801-F00 | General Precautions during the Removal and Installation of Engine Components (P/B 201) |
| 71-00-00-800-811-F00 | Power Plant Test Reference Table (P/B 501) |
| 71-11-02-410-801-F00 | Close the Fan Cowl Panels (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| A50464 | Tape - Vinyl, Adhesive Coated | BMS5-179 |
| D00599 [CP2442] | Oil - Engine | |
| D00601 [CP2101] | Vaseline - Graphite Mineral | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |
| G02129 | Tape - 223S (use until stock depleted) | |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 4 | Sensor | 77-11-02-01A-060 | LOM 411, 412, 415, 416, 420, 422-434, 437-447, 450-999 |
| | | 77-11-02-01B-060 | LOM 402, 404, 406, 407, 411, 416, 445 |
| 5 | Packing | 77-11-02-01A-055 | LOM 412, 415, 416, 420, 422-434, 437-447, 450-999 |
| | | 77-11-02-01B-055 | LOM 402, 404, 406, 407, 411, 416, 445 |

### E. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

### F. N2 Speed Sensor Installation

**SUBTASK 77-11-02-840-001-F00**

(1) Do these steps to prepare the sensor [4] for the installation (TASK 70-10-02-910-801-F00) (Figure 401):

(a) Remove the protective cover from the probe tip [6].

(b) Remove the tape from the AGB orifice.

(c) Use a piece of Nitto 223S Tape, G02129 or tape, A50464, to remove all the magnetic particles from the probe tip [6].

(d) Carefully, clean the three sensor probe poles [11] with a cotton wiper, G00034.

(e) Lubricate a new packing [5] with oil, D00599 [CP2442].

**CAUTION**

MAKE SURE YOU INSTALL THE PACKING CORRECTLY ON THE SENSOR GROOVE. IF YOU DO NOT INSTALL THE PACKING CORRECTLY, OIL LOSS CAN OCCUR DURING ENGINE OPERATION AND CAN CAUSE DAMAGE TO THE ENGINE.

(f) Install the packing [5] on the sensor groove.

SUBTASK 77-11-02-420-001-F00

(2) Install the sensor [4] (Figure 401):

(a) Carefully put the sensor [4] into the AGB orifice.

(b) Lubricate the threads of the two bolts [2] with graphite mineral vaseline, D00601 [CP2101].

**CAUTION**

TIGHTEN ONE BOLT AND THEN THE OTHER BOLT IN SMALL INCREMENTS TO PREVENT DISTORTION OF THE N2 SPEED SENSOR. IF IT IS POSSIBLE, USE TWO WRENCHES TO TIGHTEN THE BOLTS AT THE SAME TIME.

(c) Install the two bolts [2].

1) Tighten the bolts [2] to 98-110 pound-inches (11-12.5 Newton meters).

(d) Connect the electrical connectors, DP0503 (CH A) [9], DP0603 (CH B) [10] and DP1201 (A/C) [1] to the applicable sensor receptacles CH A, CH B, and A/C.

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 77-11-02-410-001-F00

(1) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

SUBTASK 77-11-02-860-003-F00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-11-02-860-004-F00

(3) For Engine 2, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

**H. N2 Speed Sensor Installation Test**

**SUBTASK 77-11-02-800-001-F00**

(1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

**——— END OF TASK ———**

## T49.5 PROBE - REMOVAL/INSTALLATION

### 1. General

A. This procedure has two tasks:

(1) The removal of the T49.5 probe

(2) The installation of the T49.5 probe.

**TASK 77-21-01-000-801-F00**

### 2. T49.5 Probe Removal

(Figure 401)

#### A. General

(1) This task is the removal procedure for the T49.5 probes (and thermocouples) of the Exhaust Gas Temperature (EGT) indication system.

(2) The engine has four T49.5 probes, each T49.5 probe has two thermocouples, a high temperature receptacle which is connected by a connector nut on the left or right harnesses, CJ10 or CJ9.

(3) The T49.5 probes are installed on the Low Pressure Turbine (LPT) case at the 2:00, 5:00, 7:30 and 10:00 o'clock positions.

(4) The removal and installation tasks for all four T49.5 probes are equivalent; but, for the references to the connectors, top left DP1013 (CH B), bottom left DP1012 (CH B), top right DP0912 (CH A) and bottom right DP0913 (CH A) and harnesses, left CJ10 (CH B) and right CJ9 (CH A).

#### B. References

| Reference | Title |
|---|---|
| 78-31-00-010-801-F00 | Open the Thrust Reverser (Selection) (P/B 201) |

#### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| G00270 | Tape - Scotch Flatback Masking 250 | ASTM D6123 (Supersedes A-A-883) |

#### D. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

#### E. Prepare for the T49.5 Probe Removal

**SUBTASK 77-21-01-860-001-F00**

(1) For Engine 1, open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C00458 | ENGINE 1 IGNITION RIGHT |
| A | 3 | C00153 | ENGINE 1 IGNITION LEFT |
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| B | 8 | C01103 | ENGINE 1 START VALVE |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-21-01-860-002-F00

(2) For Engine 2, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 4 | C00154 | ENGINE 2 START VALVE |
| D | 4 | C00459 | ENGINE 2 IGNITION RIGHT |
| D | 6 | C00151 | ENGINE 2 IGNITION LEFT |
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

SUBTASK 77-21-01-010-001-F00

**WARNING** DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

## F. T49.5 Probe Removal

SUBTASK 77-21-01-020-001-F00

**CAUTION** BE CAREFUL OF THE FIRE DETECTOR HARNESSES. DAMAGE TO EQUIPMENT CAN OCCUR WHEN YOU INSTALL THE T49.5 PROBE.

(1) Do these steps to remove the T49.5 probe [3]:

(a) Disconnect the applicable connector nut [2], DP1013 (top left), DP1012 (bottom left), DP0912 (top right) or DP0913 (bottom right) from the applicable receptacle.

**LOM ALL PRE SB CFM56-7B-72-088**

(b) Remove the two nuts [4], washers [5], bolts [8] and washers [7] that attach the receptacle to the bracket.

**LOM ALL POST SB CFM56-7B-72-088**

(c) For the top-right T49.5 probe, do this step:

1) Remove the two bolts [8] and washers [7] that attach the receptacle to the bracket.

(d) For the top-left, bottom-left and bottom-right T49.5 probes, do this step:

**LOM ALL POST SB CFM56-7B-72-088 (Continued)**

1) Remove the two nuts [4], washers [5], bolts [8] and washers [7] that attach the receptacle to the bracket.

**LOM ALL PRE SB CFM56-7B-72-0423**

(e) Remove the four nuts [6] that attach the T49.5 probe [3] to the LPT case studs.

**LOM ALL POST SB CFM56-7B-72-0423**

(f) Cut and remove the lockwire which attaches the bolt to the specific washer.

NOTE: For the engine with T49.5 probe brackets repaired, you find a bolt which replaces a stud and a nut [6]. A lockwire safeties the bolt to a specific washer located on the nut [6].

Write on the specific washer mark area, the number of SB CFM56-7B 72-0423.

(g) Remove and keep the bolt which attaches the T49.5 probe [3] to the bracket assembly on the turbine frame.

(h) Remove the nut [6] which attaches the T49.5 probe [3] to the turbine frame.

(i) Remove and keep the specific washer.

**LOM ALL**

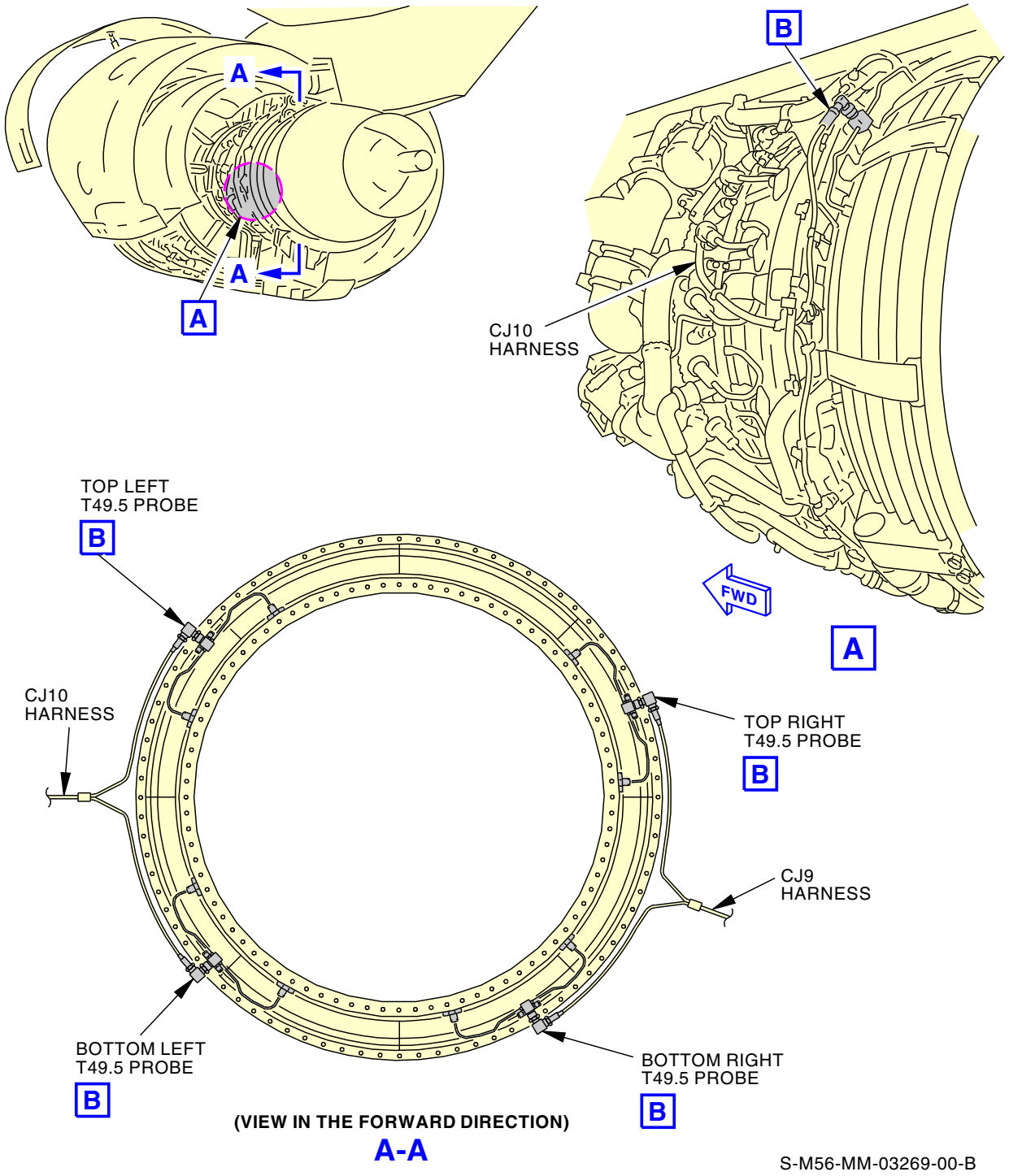
(j) Carefully, remove the T49.5 probes [3] from the engine.

(k) Put protective covers on the thermocouples.

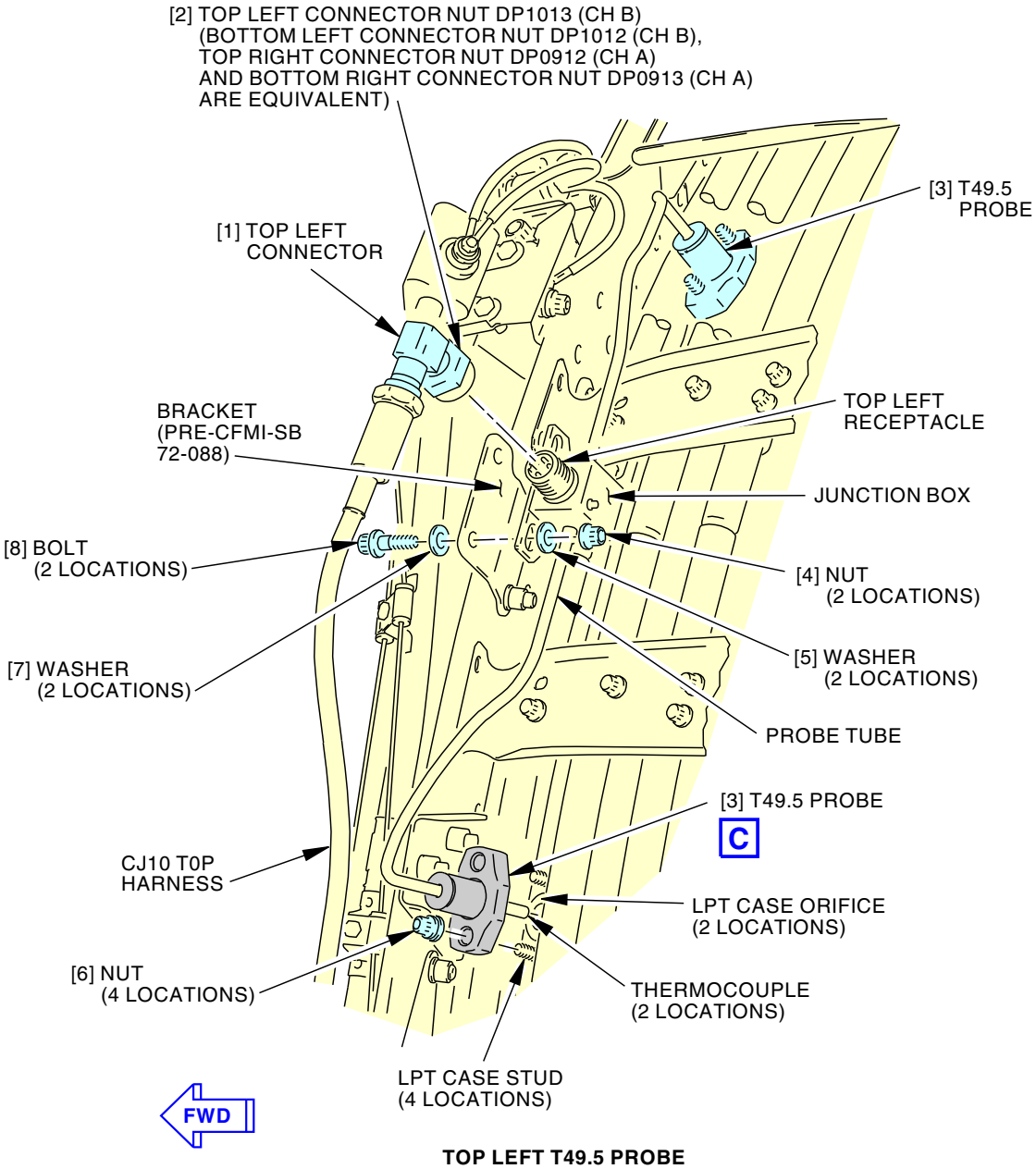
(l) Put a protective cover on the connector nut and receptacle.

(m) Put Scotch Flatback Masking Tape 250, G00270 (metal tape) or protective covers on the two LPT case ports.

**——— END OF TASK ———**




**T49.5 Probe Installation**
**Figure 401/77-21-01-990-801-F00 (Sheet 1 of 6)**

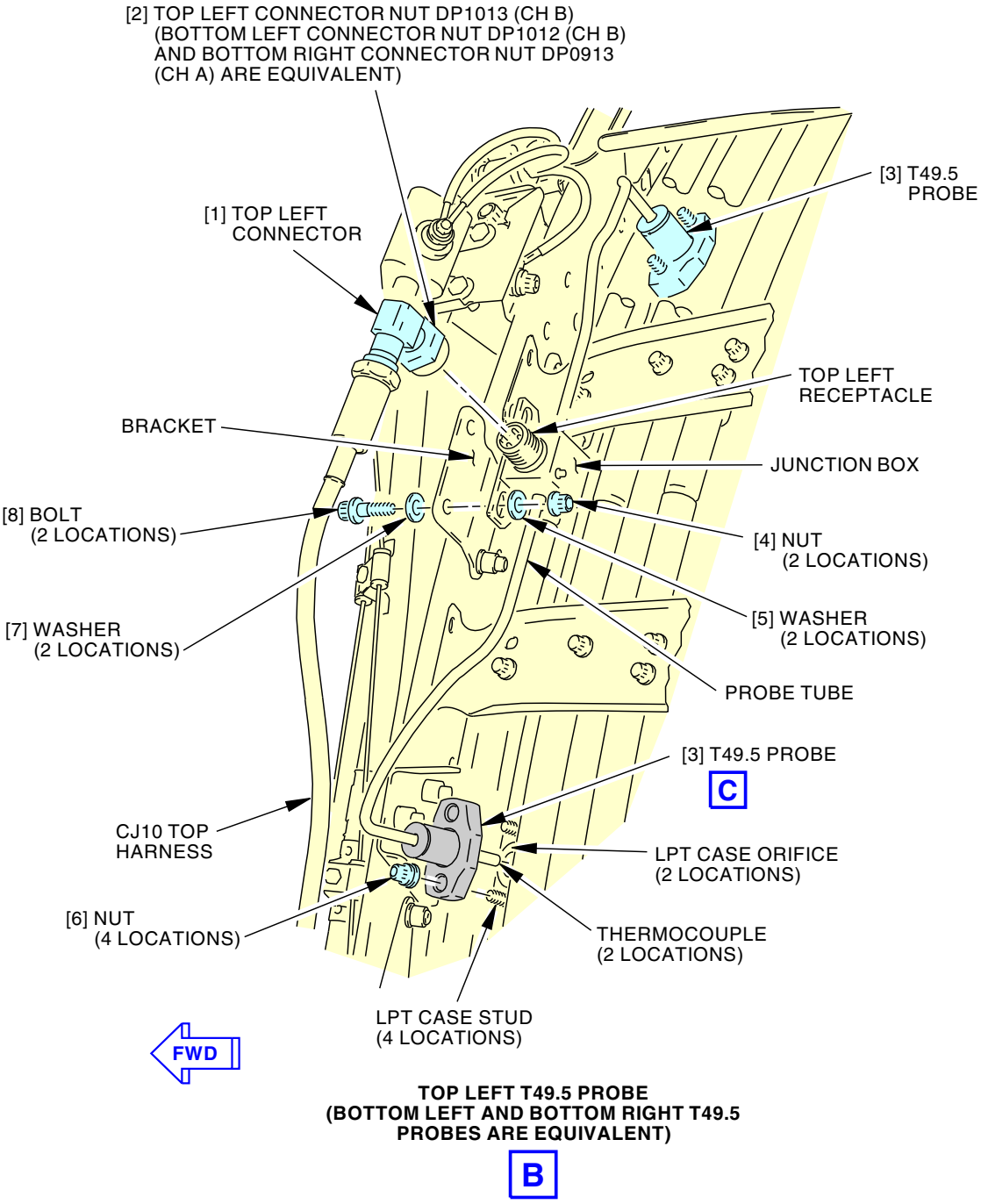



**TOP LEFT T49.5 PROBE**
**(BOTTOM LEFT, TOP RIGHT AND BOTTOM RIGHT**
**T49.5 PROBES ARE EQUIVALENT)**

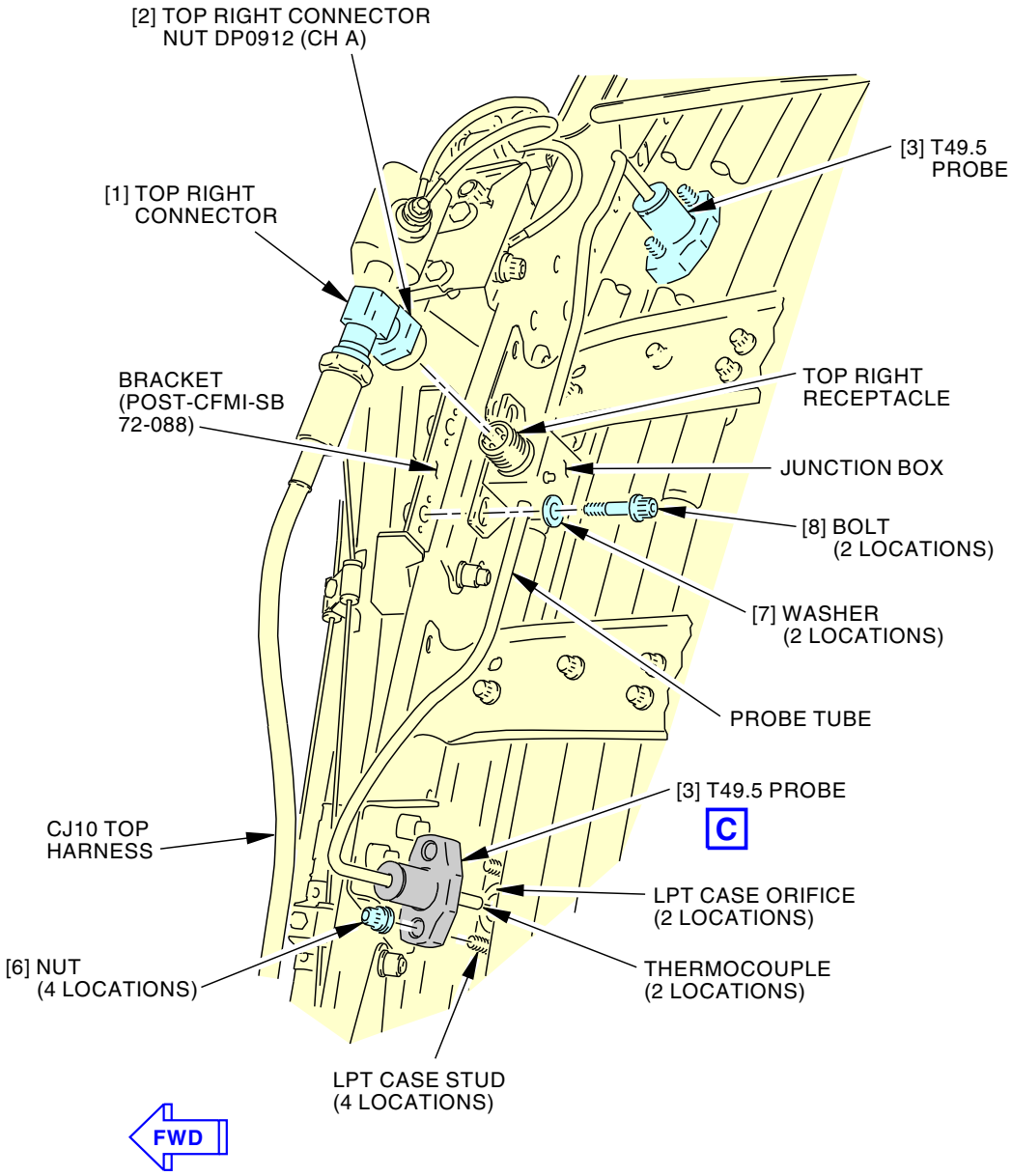
**B**

F06193 S0006583174_V3

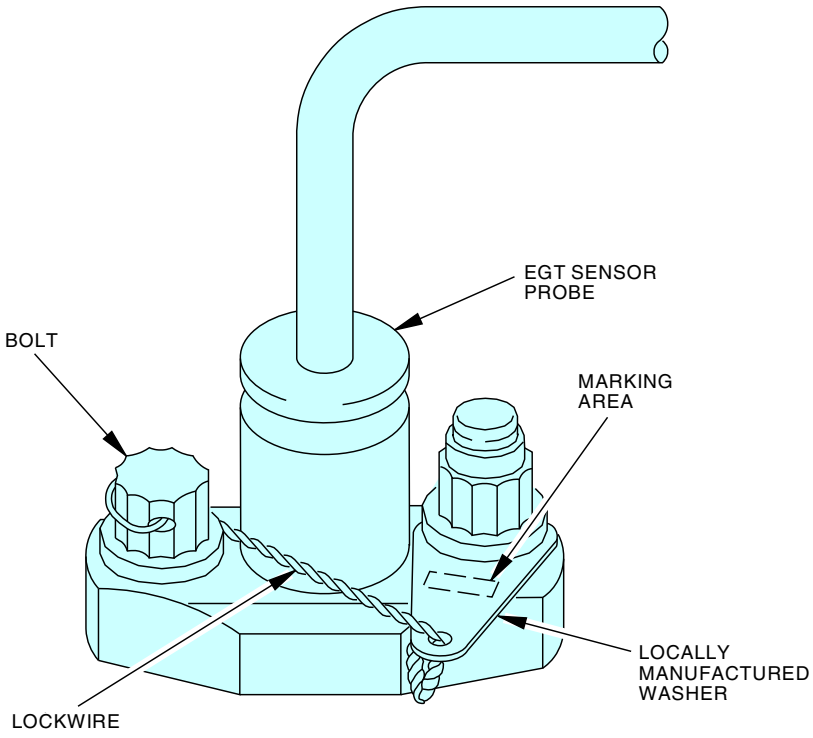
**T49.5 Probe Installation**
**Figure 401/77-21-01-990-801-F00 (Sheet 2 of 6)**




**T49.5 Probe Installation**
**Figure 401/77-21-01-990-801-F00 (Sheet 3 of 6)**




**T49.5 Probe Installation**
**Figure 401/77-21-01-990-801-F00 (Sheet 4 of 6)**

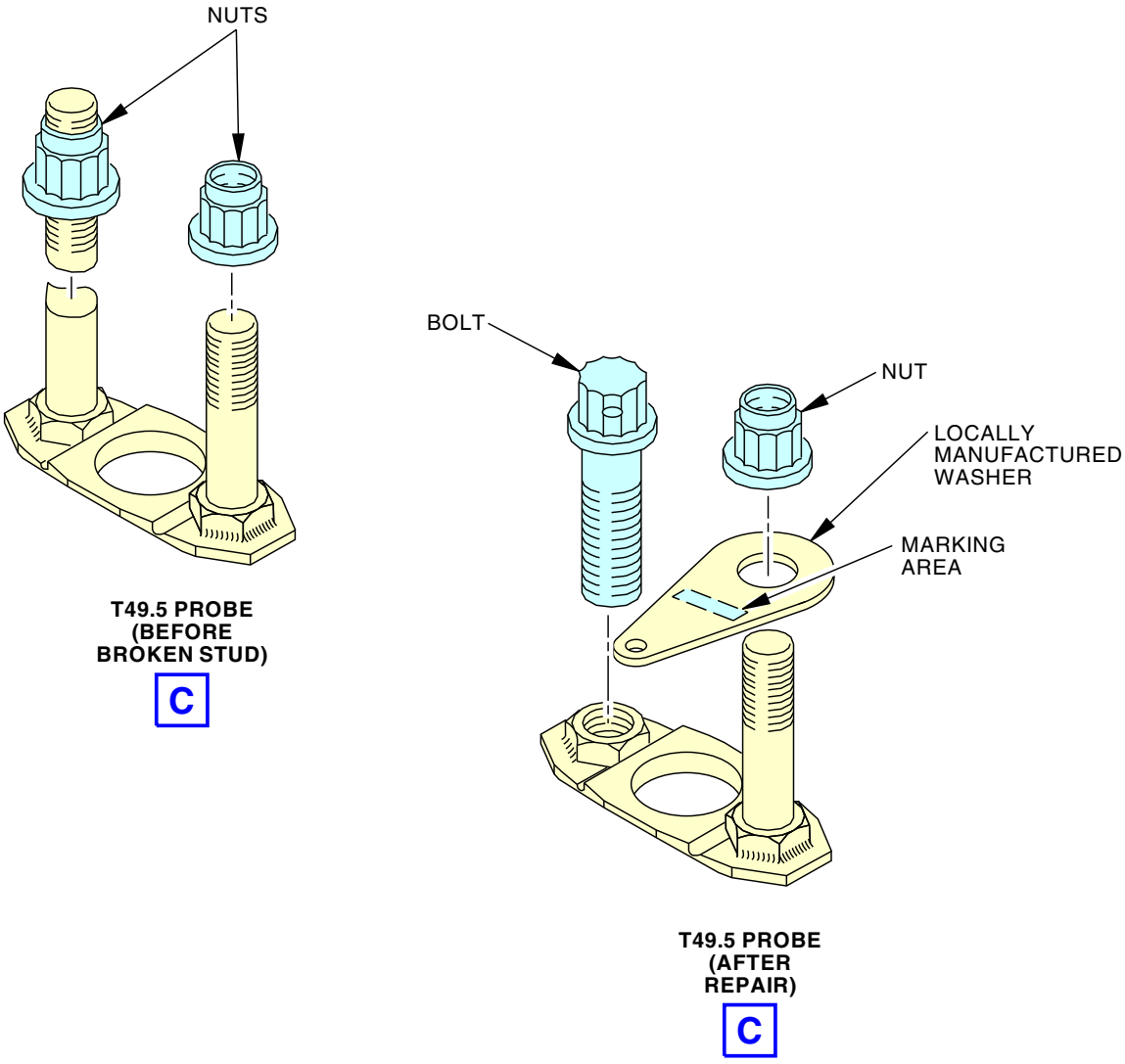



**T49.5 PROBE**

C

1321776 S0000232074_V2

**T49.5 Probe Installation**
**Figure 401/77-21-01-990-801-F00 (Sheet 5 of 6)**




1321744 S0000232075_V2

**T49.5 Probe Installation**
**Figure 401/77-21-01-990-801-F00 (Sheet 6 of 6)**

**TASK 77-21-01-400-801-F00**

## 3. T49.5 Probe Installation

(Figure 401)

### A. General

(1) This task is the installation procedure for the T49.5 probes.

### B. References

| Reference | Title |
|---|---|
| 70-20-01-800-804-F00 | Lockwire Installation (P/B 201) |
| 71-00-00-800-811-F00 | Power Plant Test Reference Table (P/B 501) |
| 78-31-00-010-804-F00 | Close the Thrust Reverser (Selection) (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| D00601 [CP2101] | Vaseline - Graphite Mineral | |
| D50068 [CP2544] | Lubricant - Molykote P37, Paste | |
| G02345 [CP8001] | Wire - Safety, 0.032 Inch (0.8 mm) Diameter | AMS 5687 |
| G50065 [CP8006] | Cable, Safety, Stainless Steel, 0.032 inch (0.8 mm) Diameter | M50 TF 9 CL-A |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 3 | Probe | 77-21-01-01-130 | LOM 402, 404, 406, 407, 411, 416, 445 |
| | | 77-21-01-01A-080 | LOM 411, 412, 415, 416, 420, 422-434, 437-447, 450-999 |

### E. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

### F. T49.5 Probe Installation

**SUBTASK 77-21-01-420-001-F00**

(1) Do these steps to prepare the T49.5 probe [3] for the installation:

(a) Remove the masking (metal) tape or protective covers from the two Low Pressure Turbine (LPT) case ports.

(b) Remove the protective cover from the connector nut and receptacle.

(c) Remove the protective covers from the thermocouples.

(d) Lubricate the threads of the two bolts [8] with graphite mineral vaseline, D00601 [CP2101].

(e) Lubricate the threads of the four LPT case studs with lubricant, D50068 [CP2544].

SUBTASK 77-21-01-420-002-F00

CAUTION

BE CAREFUL OF THE FIRE DETECTOR HARNESSES. DAMAGE TO EQUIPMENT CAN OCCUR WHEN YOU INSTALL THE T49.5 PROBE.

(2) Do these steps to install the T49.5 probe [3]:

(a) Carefully, install the T49.5 probes [3] in the LPT case ports.

**LOM ALL PRE SB CFM56-7B-72-0423**

(b) Install the four nuts [6] to attach the T49.5 probe [3] to the LPT case studs.

(c) Tighten the nuts [6] to 80-90 Pound-inches (10-10.5 Newton-meters).

**LOM ALL POST SB CFM56-7B-72-0423**

(d) Lubricate the threads of the bolts that you have removed before with lubricant, D50068 [CP2544].

NOTE: For the engine with T49.5 probe [3] brackets repaired, you must replace a bolt to one missing stud and one nut [6] on each bracket.

(e) Attach the T49.5 probe [3] to the turbine frame bracket with the bolts located in the threaded holes of the T49.5 probe [3] bracket.

(f) Install the specific washer that you have removed before on the studs with the number engraved at the top.

NOTE: Be careful to set the plate of the specific washers turned to the head of the bolts.

(g) Attach the T49.5 probe [3] to the studs with the nuts [6].

(h) Tighten the nuts [6] and the bolts to 100 - 110 Pound-inches (11.5 - 12.5 Newton-meters).

(i) Lock the bolts by a safety wire, G02345 [CP8001] or cable, G50065 [CP8006] (Ref. to Lockwire Installation, TASK 70-20-01-800-804-F00).

1) Install the lockwire through the head holes.

2) Attach the specific washers.

**LOM ALL PRE SB CFM56-7B-72-088**

(j) Loosely install the two bolts [8], washers [7], washers [5] and nuts [4] to attach the receptacle to the bracket.

**LOM ALL POST SB CFM56-7B-72-088**

(k) For the top-right T49.5 probe, do this step:

1) Loosely install the two bolts [8] and washers [7] to attach the receptacle to the bracket.

(l) For the top-left, bottom-left and bottom-right T49.5 probes, do this step:

1) Loosely install the two bolts [8], washers [7], washers [5] and nuts [4] to attach the receptacle to the bracket.

**LOM ALL**

(m) Do a check for the gap between the probe tube (T49.5 probe to the junction box) and the adjacent parts (brackets, nuts, bolts, etc.).

1) Make sure that the gap is not less than 0.12 in. (3.0 mm).

2) Tighten the bolts [8] to 98-110 Pound-inches (11-12.5 Newton-meters), respectively.

(n) Make sure that the connector nut [2] and receptacle are clean and clear of unwanted materials.

(o) Connect the applicable connector nut [2], DP1013 (CH B, top left), DP1012 (CH B, bottom left), DP0912 (CH A, top right) or DP0913 (CH A, bottom right) to the applicable receptacle.

1) Tighten the connector nut [2] to 133 in-lb (15 N·m) - 177 in-lb (20 N·m).

2) Install the safety wire, G02345 [CP8001] or cable, G50065 [CP8006] to the connector nut [2].

## G. Put the Airplane Back to Its Usual Condition

SUBTASK 77-21-01-010-005-F00

**WARNING** OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 77-21-01-860-011-F00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C00458 | ENGINE 1 IGNITION RIGHT |
| A | 3 | C00153 | ENGINE 1 IGNITION LEFT |
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| B | 8 | C01103 | ENGINE 1 START VALVE |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-21-01-860-012-F00

(3) For Engine 2, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 4 | C00154 | ENGINE 2 START VALVE |
| D | 4 | C00459 | ENGINE 2 IGNITION RIGHT |
| D | 6 | C00151 | ENGINE 2 IGNITION LEFT |
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

### H. T49.5 Probe Installation Test

**SUBTASK 77-21-01-800-002-F00**

(1) Do this task: Power Plant Test Reference Table, TASK 71-00-00-800-811-F00.

**——— END OF TASK ———**

## T49.5 PROBE AND EGT SYSTEM - INSPECTION/CHECK

### 1. General

A. This procedure contains one task, the electrical check of the T49.5 probe.

**TASK 77-21-01-200-801-F00**

### 2. T49.5 Probe and EGT System Inspection

(Figure 601)

#### A. General

(1) This task is an electrical check for the complete system of the exhaust gas temperature (EGT) indication system.

(2) The engine has four T49.5 probes, each T49.5 probe has two thermocouples, a high temperature receptacle which is connected by a connector nut on the left or right harnesses, CJ10 or CJ9.

(3) The T49.5 probes are installed on the LPT case at the 2:00, 5:00, 7:30 and 10:00 o'clock positions.

(4) The electrical check for all four T49.5 probes is equivalent; but, for the references to the connectors, top left DP1013 (CH B), bottom left DP1012 (CH B), top right DP0912 (CH A) and bottom right DP0913 (CH A) and harnesses, left CJ10 (CH B) and right CJ9 (CH A).

(5) The T49.5 probe is made of alumel (AL) and chromel (CR) metals.

#### B. References

| Reference | Title |
|---|---|
| 71-00-00-800-811-F00 | Power Plant Test Reference Table (P/B 501) |
| 73-21-06-000-802-F00 | 3 O'clock Strut Harness Removal (P/B 401) |
| 73-21-06-000-803-F00 | Core Engine Harness Removal (P/B 401) |
| 73-21-06-400-802-F00 | 3 O'clock Strut Harness Installation (P/B 401) |
| 73-21-06-400-803-F00 | Core Engine Harness Installation (P/B 401) |
| 77-21-01-000-801-F00 | T49.5 Probe Removal (P/B 401) |
| 77-21-01-400-801-F00 | T49.5 Probe Installation (P/B 401) |
| 78-31-00-010-801-F00 | Open the Thrust Reverser (Selection) (P/B 201) |
| 78-31-00-010-804-F00 | Close the Thrust Reverser (Selection) (P/B 201) |

#### C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1793 | Multimeter - Digital/Analog (or equivalent meter meets task requirements)<br>Part #: 117 Supplier: 89536<br>Part #: 260-8XPI Supplier: 55026<br>Part #: 287 Supplier: 89536<br>Part #: 289 Supplier: 89536<br>Part #: 87V Supplier: 89536<br>Part #: FLUKE 27 II Supplier: 89536<br>Part #: FLUKE-77-4 Supplier: 89536<br>Opt Part #: 187 Supplier: 89536<br>Opt Part #: 189 Supplier: 89536<br>Opt Part #: 21 Supplier: 89536<br>Opt Part #: 27 Supplier: 89536<br>Opt Part #: 77 SERIES III Supplier: 89536<br>Opt Part #: 87 Supplier: 89536<br>Opt Part #: FLUKE 27 Supplier: 89536<br>Opt Part #: MODEL 27 Supplier: 89536 |
| COM-6457 | Meter - Insulation (Range: 1-1,000 VDC or equivalent, select meter per test requirements)<br>Part #: 1864-9700 Supplier: 62015<br>Part #: 1865PLUS Supplier: 62015<br>Part #: 1865PLUSCE Supplier: 62015<br>Part #: 2471F Supplier: 21844<br>Opt Part #: 1865-00-CE Supplier: 62015 |

**D. Consumable Materials**

| Reference | Description | Specification |
|---|---|---|
| G02345 [CP8001] | Wire - Safety, 0.032 Inch (0.8 mm) Diameter | AMS 5687 |
| G50065 [CP8006] | Cable, Safety, Stainless Steel, 0.032 inch (0.8 mm) Diameter | M50 TF 9 CL-A |

**E. Location Zones**

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

**F. Prepare for the T49.5 Probe Inspection**

**SUBTASK 77-21-01-860-005-F00**

(1) For Engine 1, open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C00458 | ENGINE 1 IGNITION RIGHT |
| A | 3 | C00153 | ENGINE 1 IGNITION LEFT |
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| B | 8 | C01103 | ENGINE 1 START VALVE |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-21-01-860-006-F00

(2) For Engine 2, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| C | 4 | C00154 | ENGINE 2 START VALVE |
| D | 4 | C00459 | ENGINE 2 IGNITION RIGHT |
| D | 6 | C00151 | ENGINE 2 IGNITION LEFT |
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

SUBTASK 77-21-01-010-003-F00

**WARNING** DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION OF THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

## G. EGT System Inspection

SUBTASK 77-21-01-760-001-F00

(1) Do the electrical resistance check of the EGT system as follows:

NOTE: You can use 50 up to 125 Vdc range input to measure the insulation resistance.

(a) Use an digital/analog multimeter, COM-1793 or equivalent , with a precision of 0.01 Ohm and a range of 0-200 Ohms for the test.

(b) Set the Ohmmeter to zero (range 0-200 Ohm).

(c) Measure and record the resistance value (See tables below).

(d) Change the direction of the ohmmeter wires for the subsequent resistance value.

(e) Measure and record the resistance value between the pins A and B at the same receptacle, again.

(f) Add the two values together and then, divide the result by two.

1) The calculated average value must be in accordance with the values given in the tables below:

a) Electrical check of J wiring harness + CJ wiring harness + T49.5 probe

| Measure from: | Sector | Pins | Line Resistance at 20 °C (68 °F) |
|---|---|---|---|
| J9 connector DP0909 | S1 | B- to U- | 5.00 to 6.13 Ohms |
| J9 connector DP0909 | S2 | H to A- | 5.39 to 6.60 Ohms |
| J10 connector DP1010 | S3 | B- to U- | 5.52 to 6.76 Ohms |
| J10 connector DP1010 | S4 | H to A- | 5.61 to 6.88 Ohms |

NOTE: Line resistance values increases 10% higher at 80 °C (176 °F).

b) Electrical check of CJ wiring harness + T49.5 probe

| Measure from: | Sector | Pins | Line Resistance at 20 °C (68 °F) |
|---|---|---|---|
| CJ9 connector DP0911 | S1 | 7 to 8 | 1.66 to 2.10 Ohms |
| CJ9 connector DP0911 | S2 | 9 to 10 | 2.05 to 2.57 Ohms |
| CJ10 connector DP1011 | S3 | 1 to 2 | 2.53 to 2.91 Ohms |
| CJ10 connector DP1011 | S4 | 3 to 4 | 2.42 to 3.02 Ohms |

NOTE: Line resistance values increases 10% higher at 80 °C (176 °F).

c) Disconnect the applicable connector nut, DP1013 (top left), DP1012 (bottom left), DP0912 (top right) or DP0913 (bottom right) from the applicable receptacle.

<1> Do a visual inspection of the applicable connector nut and harness receptacle for corrosion.

NOTE: If you find corrosion at the connector nut and harness receptacle, then clean the components and do the EGT electrical checks again.

d) Electrical check of T49.5 probe

| Measure from: | Sector | Pins | Line Resistance at 20 °C (68 °F) |
|---|---|---|---|
| T49.5 probe connector DP0912 | S1 | A to B | 0.6 to 0.8 Ohms |
| T49.5 probe connector DP0913 | S2 | A to B | 0.6 to 0.8 Ohms |
| T49.5 probe connector DP1012 | S3 | A to B | 0.6 to 0.8 Ohms |
| T49.5 probe connector DP1013 | S4 | A to B | 0.6 to 0.8 Ohms |

NOTE: Line resistance values increases 10% higher at 80 °C (176 °F).

(g) If the values are not correct, replace the defective part. These are the tasks:

T49.5 Probe Removal, TASK 77-21-01-000-801-F00

T49.5 Probe Installation, TASK 77-21-01-400-801-F00

3 O'clock Strut Harness Removal, TASK 73-21-06-000-802-F00

3 O'clock Strut Harness Installation, TASK 73-21-06-400-802-F00

Core Engine Harness Removal, TASK 73-21-06-000-803-F00

Core Engine Harness Installation, TASK 73-21-06-400-803-F00.

SUBTASK 77-21-01-760-003-F00

(2) Do the insulation resistance check of the complete EGT system as follows:

NOTE: You can use 50 up to 125 Vdc range input to measure the insulation resistance.

(a) Measure the insulation resistance with a insulation meter, COM-6457, between each pin and the receptacle housing.

(b) Make sure that the insulation resistance value is more than 20 MOhms.

1) Insulation resistance check of J wiring harness + CJ wiring harness + T49.5 probe

| Measure from: | Sector | Pins | Line Resistance at 20 °C (68 °F) |
|---|---|---|---|
| J9 connector DP0909 | S1 | B- to ground & U- to ground | Higher than 20 MOhms |
| J9 connector DP0909 | S2 | H to ground & A- to ground | Higher than 20 MOhms |
| J10 connector DP1010 | S3 | B- to ground & U- to ground | Higher than 20 MOhms |
| J10 connector DP1010 | S4 | H to ground & A- to ground | Higher than 20 MOhms |

2) Insulation resistance check of CJ wiring harness + T49.5 probe

| Measure from: | Sector | Pins | Line Resistance at 20 °C (68 °F) |
|---|---|---|---|
| CJ9 connector DP0911 | S1 | 7 to ground & 8 to ground | Higher than 20 MOhms |
| CJ9 connector DP0911 | S2 | 9 to ground & 10 to ground | Higher than 20 MOhms |
| CJ10 connector DP1011 | S3 | 1 to ground & 2 to ground | Higher than 20 MOhms |
| CJ10 connector DP1011 | S4 | 3 to ground & 4 to ground | Higher than 20 MOhms |

3) Insulation resistance check of T49.5 probe

| Measure from: | Sector | Pins | Line Resistance at 20 °C (68 °F) |
|---|---|---|---|
| T49.5 probe connector DP0912 | S1 | A to ground & B to ground | Higher than 20 MOhms |
| T49.5 probe connector DP0913 | S2 | A to ground & B to ground | Higher than 20 MOhms |
| T49.5 probe connector DP1012 | S3 | A to ground & B to ground | Higher than 20 MOhms |
| T49.5 probe connector DP1013 | S4 | A to ground & B to ground | Higher than 20 MOhms |

(c) If the values are not correct, replace the defective part. These are the tasks:

T49.5 Probe Removal, TASK 77-21-01-000-801-F00

T49.5 Probe Installation, TASK 77-21-01-400-801-F00

3 O'clock Strut Harness Removal, TASK 73-21-06-000-802-F00

3 O'clock Strut Harness Installation, TASK 73-21-06-400-802-F00

Core Engine Harness Removal, TASK 73-21-06-000-803-F00

Core Engine Harness Installation, TASK 73-21-06-400-803-F00.

SUBTASK 77-21-01-420-005-F00

(3) Do these steps to connect the applicable connector nut:

(a) Connect the applicable connector nut, DP1013 (CH B, top left), DP1012 (CH B, bottom left), DP0912 (CH A, top right) or DP0913 (CH A, bottom right) to the applicable receptacle.

1) Tighten the connector nut to 133 in-lb (15 N·m)-177 in-lb (20 N·m).

2) Install safety wire, G02345 [CP8001] or cable, G50065 [CP8006] to the connector nut.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 77-21-01-010-004-F00

**WARNING** OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 77-21-01-860-009-F00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 1 | C00458 | ENGINE 1 IGNITION RIGHT |
| A | 3 | C00153 | ENGINE 1 IGNITION LEFT |
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |
| B | 8 | C01103 | ENGINE 1 START VALVE |
| D | 5 | C01359 | DISPLAY DEU 1 PRI |

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 10 | C01361 | DISPLAY DEU 1 HOLDUP |

SUBTASK 77-21-01-860-010-F00

(3) For Engine 2, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-1**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 9 | C01362 | DISPLAY DEU 2 HOLDUP |
| D | 11 | C01360 | DISPLAY DEU 2 PRI |

**F/O Electrical System Panel, P6-2**

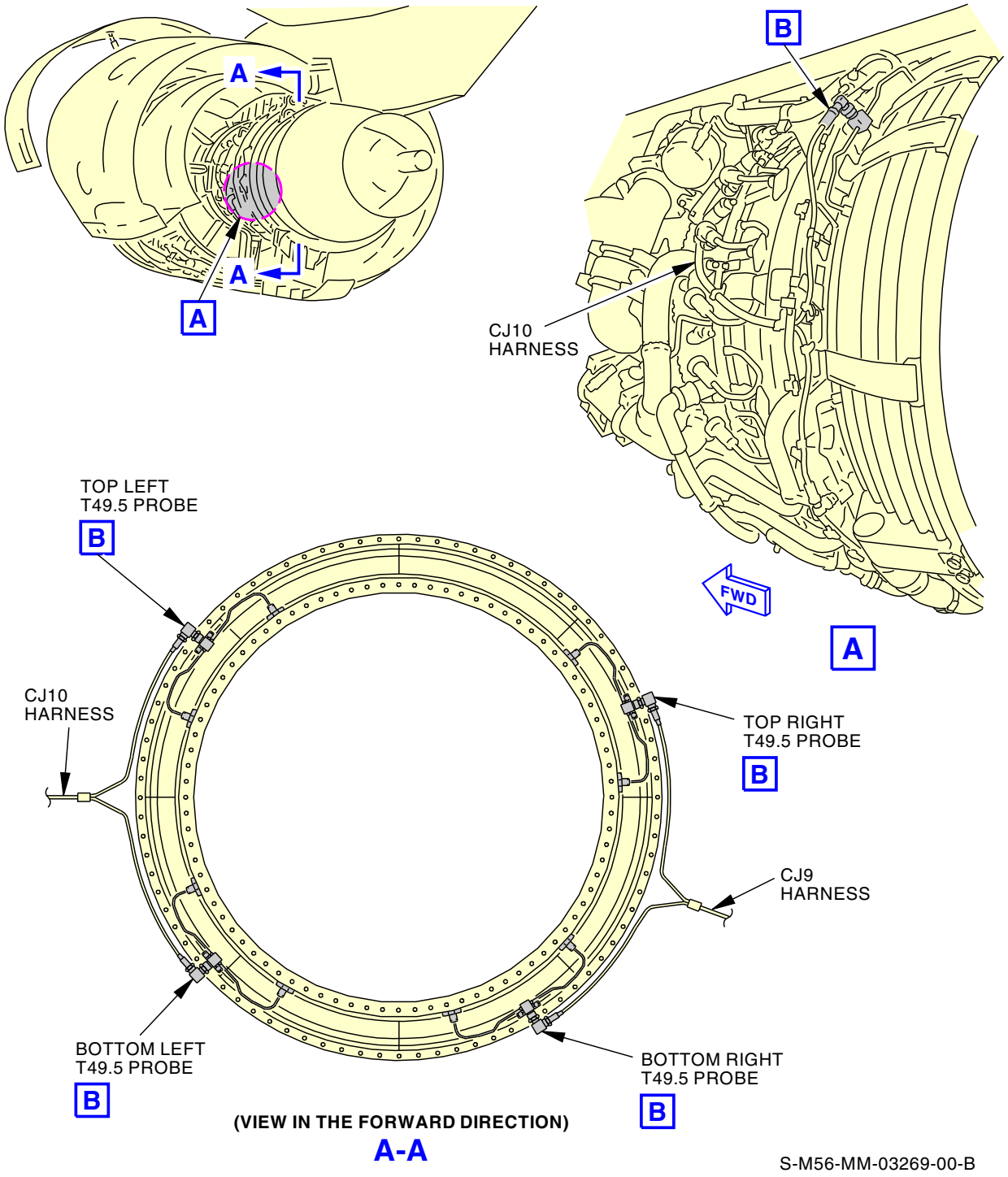
| Row | Col | Number | Name |
|---|---|---|---|
| C | 4 | C00154 | ENGINE 2 START VALVE |
| D | 4 | C00459 | ENGINE 2 IGNITION RIGHT |
| D | 6 | C00151 | ENGINE 2 IGNITION LEFT |
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

### I. T49.5 Probe Installation Test

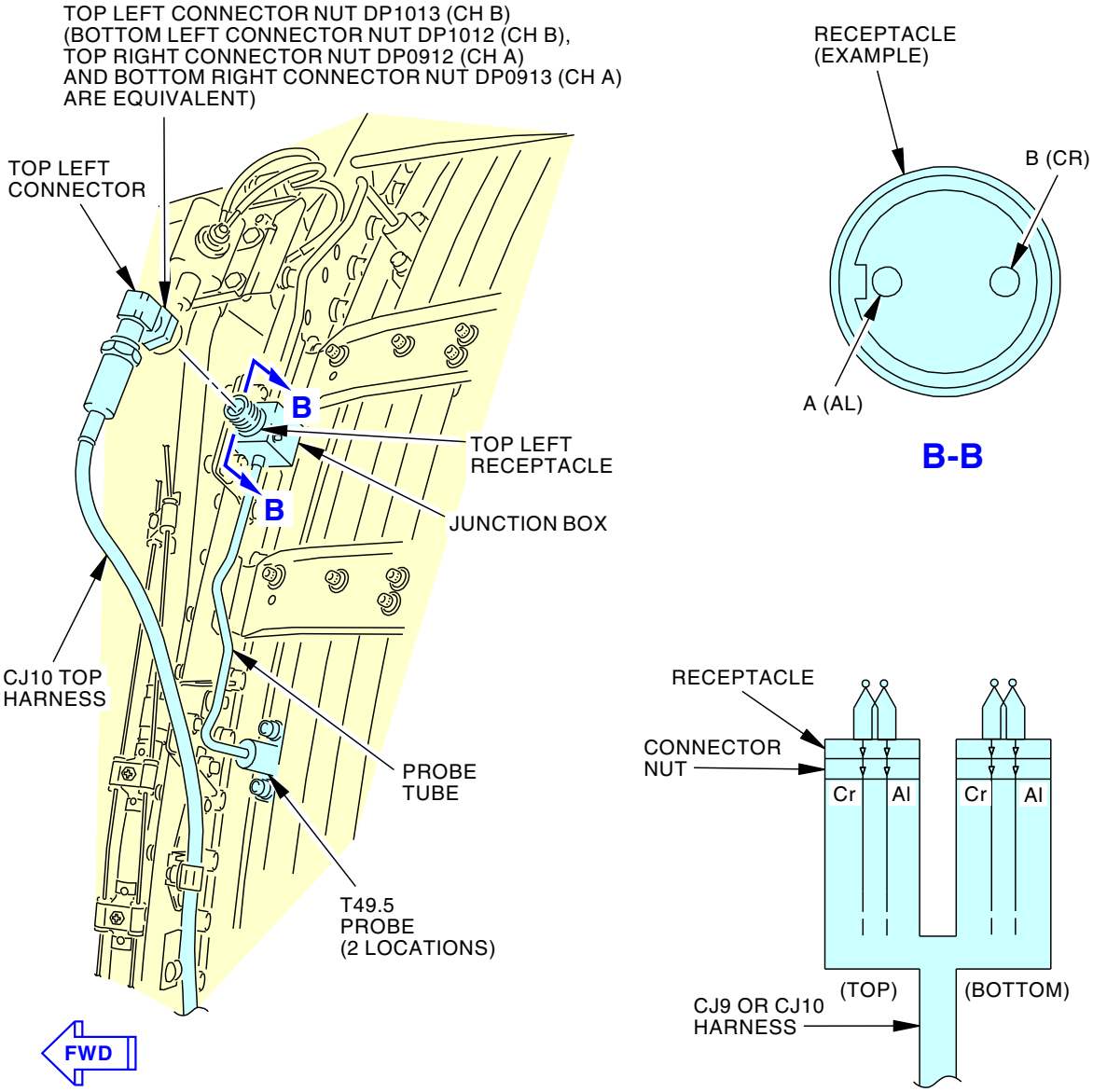
**SUBTASK 77-21-01-800-001-F00**

(1) Do the test that is listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

**——— END OF TASK ———**




**T49.5 Probe Inspection**
**Figure 601/77-21-01-990-802-F00 (Sheet 1 of 2)**




**TOP LEFT T49.5 PROBE (BOTTOM LEFT, TOP RIGHT AND BOTTOM RIGHT T49.5 PROBES ARE EQUIVALENT)**

**B**

**T49.5 PROBE WIRING DIAGRAM (EXAMPLE)**

S-M56-MM-03270-01-B
F92364 S0006583180_V2

**T49.5 Probe Inspection**
**Figure 601/77-21-01-990-802-F00 (Sheet 2 of 2)**

## AIRBORNE VIBRATION MONITORING (AVM) SYSTEM - MAINTENANCE PRACTICES

### 1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure contains these tasks:

(1) Airborne Vibration Monitoring (AVM) System - System Test

(2) Download The Advanced AVM (AAVM) Bearing Data With The Ground Support Software (GSS).

(3) The ARINC 429 Data Bus Charts.

**TASK 77-31-00-970-803-F00**

### 2. Airborne Vibration Monitoring (AVM) System - System Test

#### A. General

(1) This task is the system test procedure for the airborne vibration monitoring (AVM) system.

(2) Use this procedure for the AVM signal conditioner with this part number:

**LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 PRE SB 737-77-1069**

(a) Boeing part number - S360N021-113 and -114.

- Supplier part number - Vibro-meter P/N 241-258-032-109 and 241-258-032-110.

(b) Boeing part number - S362A001-1, -10 and -12.

- Supplier part number - Vibro-meter P/N 241-280-051-012, 241-280-053-013 and 241-280-056-014.

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069**

(c) Boeing part number - S362A001-11, -13, -21 and -23.

- Supplier part number - Vibro-meter P/N 241-298-002-011, 241-298-002-012, 241-298-002-015, and 241-298-002-016.

**LOM ALL**

(3) This AVM signal conditioner has a digital display of three lines of eight (8) characters in each line.

(4) This procedure uses the Built-In Test Equipment in the AVM signal conditioner.

(5) The AVM signal conditioner shows the Built-In Test Equipment Maintenance Messages first and then the flight history.

(6) This procedure refers to the Built-In Test Equipment as the BITE.

#### B. References

| Reference | Title |
|---|---|
| 79-00-00-200-804-F00 | Chip Detectors and Scavenge Screens - Inspection (P/B 601) |
| FIM 77-31 TASK 801 | AVM Signal Conditioner BITE Procedure |

#### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Prepare to Read the BITE Maintenance Messages and the Flight History**

SUBTASK 77-31-00-860-014-F00

(1) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-00-010-005-F00

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**F. Read the BITE Maintenance Messages**

SUBTASK 77-31-00-970-012-F00

(1) Do these steps to read the main menus on the front display of the AVM signal conditioner:

(a) Push and release one of the four buttons to show Self Test? on the front display of the AVM signal conditioner.

(b) After Self Test?, push and release the NO button to show Fault History? on the front display of the AVM signal conditioner.

(c) After Fault History?, push and release the NO button to show Flight History? on the front display of the AVM signal conditioner.

(d) After Flight History?, push and release the NO button to show Balance? on the front display of the AVM signal conditioner.

(e) After Balance?, push and release the NO button to show Turn off Display? on the front display of the AVM signal conditioner.

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069**

1) After Balance?, push and release the NO button to show AEVM? on the front display of the AVM signal conditioner

2) After AEVM?, push and release the NO button to show Turn off Display? on the front display of the AVM signal conditioner

**LOM ALL**

(f) After Turn off Display?, push and release the YES button to turn off the display.

SUBTASK 77-31-00-970-013-F00

(2) Do these steps to read the BITE maintenance messages (Table 201):

**Table 201/77-31-00-993-806-F00**

| BITE MAINTENANCE MESSAGES | |
|---|---|
| **MAINTENANCE MESSAGES** | **DESCRIPTION** |
| No Fault *[1] | No Faults in Non-volatile memory |
| XX Faults Display? *[1] | XX=total number of stored faults |

**Table 201/77-31-00-993-806-F00 (Continued)**

| BITE MAINTENANCE MESSAGES | |
|---|---|
| **MAINTENANCE MESSAGES** | **DESCRIPTION** |
| Fault YY *[1] *[2] | YY=fault number |
| AVM Syst Fault ZZ *[3] | ZZ=fault code |

*[1] Display message only.

*[2] Fault YY is the fault number.

*[3] ZZ is the fault code.

(a) Push and release one of the four buttons to show Self Test? on the front display of the AVM signal conditioner.

NOTE: You can move down the main menus with the NO button, but you can only exit with the NO button. The NO button is used to review all the main menus. Use the UP or DOWN to review faults, flight history, or imbalance data.

(b) Push and release the NO button to show Fault History? on the front display of the AVM signal conditioner.

NOTE: The BITE maintenance messages will not be erased unless the YES button is pushed while Clear Faults Memory? shows on the front of the AVM signal conditioner. The AVM signal conditioner can keep 32 BITE maintenance messages in the storage memory. The YES button is used to review each menu.

(c) After Fault History?, push and release the YES button to show XX Faults Display? on the front display of the AVM signal conditioner.

NOTE: The XX refers to the total number of faults in storage memory. If No Fault is displayed, there are no BITE maintenance messages to view. After No Fault, if the NO button is pushed, the front display will show Flight History?. If Flight History? is displayed, see the flight history steps below.

(d) After XX Faults Display?, push and release the YES button to show the last BITE maintenance message that was set.

NOTE: The UP or DOWN ARROW button can be used to review all the BITE maintenance messages. The most recent BITE maintenance message is displayed first, followed by the most recent BITE maintenance message.

1) Record this BITE maintenance message before you get the subsequent BITE maintenance message.

(e) Push and release the DOWN ARROW button to show each of the remaining BITE maintenance messages.

1) Record each BITE maintenance message before you get the subsequent BITE maintenance message.

(f) If you do not want to continue, or if you want to keep the BITE maintenance messages, push and release the NO button to show Clear Faults Memory? on the front display of the AVM signal conditioner.

NOTE: After Clear Faults Memory?, push and release the NO button again to show the main menu (Flight History displayed).

(g) If you push and release the DOWN ARROW button after the last BITE maintenance message, the first BITE maintenance message will show on the front display of the AVM signal conditioner.

(h) Do one of the steps that follow to interrogate the AVM signal conditioner further:

1) If you want to see the BITE maintenance messages again after Flight History?, push and release the NO button four times.

2) If you want to see flight history after XX Faults Display?, push and release the NO button twice.

NOTE: Clear Faults Memory? and then, Flight History? will show on the front display of the AVM signal conditioner. If Flight History? is displayed, see the flight history steps below.

3) After Fault History?, push and release the NO button to show Flight History? on the front display of the AVM signal conditioner.

NOTE: If Flight History? is displayed, see the flight history steps below.

**CAUTION**

RECORD THE BITE MAINTENANCE MESSAGES BEFORE YOU PUSH THE DATA BUTTON AGAIN. YOU WILL ERASE ALL THE BITE MAINTENANCE MESSAGES WHEN YOU PUSH THE DATA BUTTON AFTER THE LAST BITE MAINTENANCE MESSAGE. WHEN YOU READ FF, ALL BITE MAINTENANCE MESSAGES HAVE BEEN DISPLAYED AND ONE MORE PUSH OF THE DATA BUTTON WILL ERASE THE BITE MAINTENANCE MESSAGES.

4) After XX Faults Display?, push and release the NO button to show Clear Faults Memory? on the front display of the AVM signal conditioner.

NOTE: After Clear Faults Memory?, if the NO button is pushed again the front display will show Flight History?. After Clear Faults Memory?, if the YES button is pushed the front display will show Faults Memory Cleared.

(i) If there are BITE maintenance messages, do the applicable corrective action that shows in the FIM (FIM 77-31 TASK 801).

### G. Read the Flight History

**SUBTASK 77-31-00-970-014-F00**

(1) Do these steps to read the flight history (Table 202):

NOTE: The AVM records the highest vibration level of all the engine rotors.

**Table 202/77-31-00-993-807-F00**

| FLIGHT HISTORY | | |
|---|---|---|
| **What button on the AVM signal conditioner to push** | **Front display of the AVM signal conditioner** | **Description of front display** |
| One of the four buttons, and then the NO button | Self Test?, then Fault History? | Sequence Start for self test and fault history |
| NO button again | Flight History? | Sequence Start for flight history |
| YES button | XX Flights Display?*[1] or NO Flight Data | Total number of flights or no data |
| YES again | Flight XX? *[2] | Flight number, XX = 0-31 |
| **LOM 427-434, 437-447, 450-999** | | |
| S360N021-113/114 | | |
| YES button | FXX E1 *[3] *[4]<br>N1 yyy % *[5]<br>N2 yyy % *[5] | Engine 1 (E1) *[4]<br>N1 Speed (%) - E1<br>N2 Speed (%) - E1 |

**LOM 427-434, 437-447, 450-999 (Continued)**

**Table 202/77-31-00-993-807-F00 (Continued)**

| FLIGHT HISTORY | | |
|---|---|---|
| **What button on the AVM signal conditioner to push** | **Front display of the AVM signal conditioner** | **Description of front display** |
| DOWN button | FAN n.nn *[6]<br>HPC n.nn *[6]<br>HPT n.nn *[6] | Fan Vibration - E1<br>HPC Vibration - E1<br>HPT Vibration - E1 |
| DOWN button | LPT n.nn *[6]<br>Time yy.y h | LPT Vibration - E1<br>yy.y = Time in hours from power-up |
| NO button | FXX E2 *[3] *[4]<br>N1 yyy % *[5]<br>N2 yyy % *[5] | Engine 2 (E2) *[4]<br>N1 Speed (%) - E2<br>N2 Speed (%) - E2 |
| DOWN button | FAN n.nn *[6]<br>HPC n.nn *[6]<br>HPT n.nn *[6] | Fan Vibration - E2<br>HPC Vibration - E2<br>HPT Vibration - E2 |
| DOWN button | LPT n.nn *[6]<br>Time yy.y h | LPT Vibration - E2<br>yy.y = Time in hours from power-up |
| **LOM ALL** | | |
| S362A001 | | |
| YES button | FXX E1 *[3] *[4]<br>FAN n.nn *[6]<br>HPC n.nn *[6] | Engine 1 (E1) *[4]<br>Fan Vibration - E1<br>HPC Vibration - E1 |
| DOWN button | N1 yyy % *[5]<br>N2 yyy % *[5]<br>Time yy.y h | N1 Speed (%) - E1<br>N2 Speed (%)<br>yy.y = Time in hours of max.vib. NOB sensor |
| DOWN button | FXX E1*[3] *[4]<br>LPT n.nn *[6]<br>HPT n.nn *[6] | Engine 1 (E1) *[4]<br>LPT Vibration - E1<br>HPT Vibration - E1 |
| DOWN button | N1 yyy % *[5]<br>N2 yyy % *[5]<br>Time yy.y h | N1 Speed (%) - E1<br>N2 Speed (%) - E1<br>yy.y = Time in hours of max.vib. FFCCV sensor |
| NO button | FXX E2 *[3] *[4]<br>FAN n.nn *[6]<br>HPC n.nn *[6] | Engine 2 (E2) *[4]<br>Fan Vibration - E2<br>HPC Vibration - E2 |
| DOWN button | N1 yyy % *[5]<br>N2 yyy % *[5]<br>Time yy.y h | N1 Speed (%) - E2<br>N2 Speed (%)<br>yy.y = Time in hours of max.vib. NOB sensor |
| DOWN button | FXX E2 *[3] *[4]<br>LPT Vibration - E2<br>HPT Vibration - E2 | Engine 2 (E2) *[4]<br>LPT Vibration - E2<br>HPT Vibration - E2 |

**Table 202/77-31-00-993-807-F00 (Continued)**

| FLIGHT HISTORY | | |
|---|---|---|
| **What button on the AVM signal conditioner to push** | **Front display of the AVM signal conditioner** | **Description of front display** |
| DOWN button | N1 Speed (%) - E2<br>N2 yyy % *[5]<br>Time yy.y h | N1 Speed (%) - E2<br>N2 Speed (%) - E2<br>yy.y = Time in hours of max.vib.<br>FFCCV sensor |

*[1] Total number of flights, XX = 1 to 32.

*[2] Last flight is Flight 0, the flight before is Flight 1 to Flight 31.
Use the DOWN button for Flights other than last the flight F0

*[3] FXX = Flight number 0 to 31.

*[4] E1 is Engine 1 and E2 is Engine 2.

*[5] yyy% is the percent RPM measured for the N1 and N2 shaft.

*[6] n.nn is vibration in scalar units (0.00 to 5.00).

(a) Push and release one of the four buttons to show Self Test? on the front display of the AVM signal conditioner.

NOTE: The NO button is used to review all the main menus.

(b) After Self Test?, push and release the NO button to show Fault History? on the front display of the AVM signal conditioner.

NOTE: If Fault History? is displayed, see the BITE maintenance message steps above.

(c) After Fault History?, push and release the NO button to show Flight History? on the front display of the AVM signal conditioner.

NOTE: The flight history will not be erased unless the YES button is pushed after Clear Flight Memory? is displayed on the front display of the AVM signal conditioner. The AVM signal conditioner can keep 32 flights in the storage memory. The YES button is used to review each menu.

(d) After Flight History?, push and release the YES button to show XX Flights Display? on the front display of the AVM signal conditioner.

NOTE: The XX refers to the total number of flights in storage memory. If No Flight Data shows, there is no flight history to view. After No Flight Data, if the NO button is pushed the front display will show Balance?.

(e) After XX Flights Display?, push and release the YES button to show Flight XX? on the front display of the AVM signal conditioner.

(f) After Flight XX?, push and release the YES button to show the most recent flight history data for engine 1 that was set.

NOTE: The UP or DOWN ARROW button can be used to review all the flight history data for engine 1.

1) Record the flight history data that you want.

(g) If you are done looking at flight history data for engine 1, push and release the NO button to show the most recent flight history data for engine 2 that was set.

NOTE: The UP or DOWN ARROW button can be used to review all the flight history data for engine 2.

1) Record the flight history data, that you want, before you get the subsequent flight history data.

(h) Push and release the NO button to show the subsequent flight number data that was set.

(i) If you do not want to continue, or if you want to keep the flight history data, push and release the NO button twice to show Clear Flight Memory? on the front display of the AVM signal conditioner and then Balance?.

(j) If you push and release the DOWN ARROW button after the last flight history data, the most recent flight history data will show on the front display of the AVM signal conditioner.

(k) Do one of the steps that follow to interrogate the AVM signal conditioner further:

1) If you want to see the flight history data again after Balance?, push and release the NO button four times.

2) If you want to see balance data after XX Flights Display?, push and release the NO button twice.

NOTE: Clear Flight Memory? and then, Balance? will show on the front display of the AVM signal conditioner.

3) After Flight History?, push and release the NO button to show Balance? on the front display of the AVM signal conditioner.

**CAUTION**

RECORD THE BITE MAINTENANCE MESSAGES BEFORE YOU PUSH THE DATA BUTTON AGAIN. YOU WILL ERASE ALL THE BITE MAINTENANCE MESSAGES WHEN YOU PUSH THE DATA BUTTON AFTER THE LAST BITE MAINTENANCE MESSAGE. WHEN YOU READ FF, ALL BITE MAINTENANCE MESSAGES HAVE BEEN DISPLAYED AND ONE MORE PUSH OF THE DATA BUTTON WILL ERASE THE BITE MAINTENANCE MESSAGES.

4) After XX Flights Display?, push and release the NO button to show Clear Flight Memory? on the front display of the AVM signal conditioner.

NOTE: After Clear Flight Memory?, if the NO button is pushed again the front display will show Balance?. After Clear Flight Memory?, if the YES button is pushed the front display will show Flight Memory Cleared (all flight history is deleted). Push and release the NO button to show Balance?

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069**

### H. Use the Advanced Engine Vibration Monitor (AEVM) Menu (AEVM With ALGO1, ALGO2, and ALGO3 Bearing Data)

**SUBTASK 77-31-00-970-022-F00**

(1) Do these steps to use the AEVM menu:

(a) Push and release one of the four buttons to show Self Test? on the front display of the AVM signal conditioner.

NOTE: The NO button is used to review all the main menus.

(b) After Self Test?, push and release the NO button to show Fault History? on the front display of the AVM signal conditioner.

NOTE: If Fault History? is displayed, see the BITE maintenance message steps above.

(c) After Fault History?, push and release the NO button to show Flight History? on the front display of the AVM signal conditioner.

NOTE: The flight history will not be erased unless the YES button is pushed after Clear Flight Memory? is displayed on the front display of the AVM signal conditioner. The AVM signal conditioner can keep 32 flights in the storage memory. The YES button is used to review each menu.

(d) After Flight History?, push and release the NO button to show Balance? on the front display of the AVM signal conditioner.

(e) After Balance?, push and release the NO button to show AEVM Menu? on the front display of the AVM signal conditioner.

(f) After AEVM Menu?, push and release the YES button to show AEVM MESSAGES? on the front display of the AVM signal conditioner. The AEVM menu will display this order of menus on the front display of the AVM signal conditioner:

NOTE: Use the applicable YES or NO button to get access to the applicable menu. Use the NO button to go to the next menu.

1) AEVM MESSAGES?
2) Config?
3) Data?
4) Altern.Accel.wiring?

(g) After AEVM MESSAGES?, push and release the YES button to look for Alert Messages (Table 203).

**Table 203/77-31-00-993-821-F00 AAVM ALERT MENU**

| ALERT MENU DISPLAY | |
|---|---|
| No<br>Maint<br>Message | No Messages |
| MSG 1/X<br>ALGO X EY<br>LEVEL Z | X is number of messages<br>ALGO X is algorithm type, EY is Engine 1 or 2<br>Z is message level 1,2,3 |

1) If there are no messages, the display will show NO MAINT MESSAGES.
   a) If NO MAINT MESSAGES shows, no action is necessary.
2) The message level Z is 1 for the most critical and 3 for the least critical.
3) Use the UP [back] and DOWN [next] buttons to see all maintenance messages.
4) If there are maintenance messages, do the applicable steps:
   a) In case of message level escalation from NO MAINT MESSAGES to Level 3 message (NO MAINT MESSAGES at prior interrogation to Level 3 message at current interrogation), do these steps:
      <1> Examine all chip detectors within 100 - 150 hours. Do this task: Chip Detectors and Scavenge Screens - Inspection, TASK 79-00-00-200-804-F00.

<2> Interrogate the AAVM Front Panel for maintenance messages again every 150 hours.

b) In case of message level escalation from NO MAINT MESSAGES to Level 2 message (NO MAINT MESSAGES at prior interrogation to Level 2 message at current interrogation), do these steps:

<1> Examine all chip detectors within 25 hours. Do this task: Chip Detectors and Scavenge Screens - Inspection, TASK 79-00-00-200-804-F00.

<2> Download the AAVM data within 25 hours. Do this task: Download the Advanced AVM (AAVM) Bearing Data with the Ground Support Software (GSS), TASK 77-31-00-970-805-F00.

<a> Email the data to CFM Customer Support Center.

<3> Interrogate the AAVM Front Panel for maintenance messages again within 75 hours.

c) In case of message level escalation from NO MAINT MESSAGES to Level 1 message (NO MAINT MESSAGES at prior interrogation to Level 1 message at current interrogation), do these steps:

<1> Examine all chip detectors within three cycles. Do this task: Chip Detectors and Scavenge Screens - Inspection, TASK 79-00-00-200-804-F00.

<2> Download the AAVM data within 25 hours. Do this task: Download the Advanced AVM (AAVM) Bearing Data with the Ground Support Software (GSS), TASK 77-31-00-970-805-F00.

<a> Email the data to CFM Customer Support Center.

<3> Interrogate the AAVM Front Panel for maintenance messages again within 75 hours.

<4> Examine all chip detectors again within 50 - 75 hours.

d) In case of message level escalation from the last prior interrogation (Level 3 message at prior interrogation to Level 2 or Level 1 message at current interrogation, or Level 2 message at prior interrogation to Level 1 message at current interrogation), do these steps:

<1> Examine all chip detectors within three cycles. Do this task: Chip Detectors and Scavenge Screens - Inspection, TASK 79-00-00-200-804-F00.

<2> Download the AAVM data within 25 hours. Do this task: Download the Advanced AVM (AAVM) Bearing Data with the Ground Support Software (GSS), TASK 77-31-00-970-805-F00.

<a> Email the data to CFM Customer Support Center.

<3> Interrogate the AAVM Front Panel for maintenance messages again within 75 hours.

<4> Examine all chip detectors again within 50 - 75 hours.

e) In case of message level identical to the last prior interrogation, do these steps:

<1> Interrogate the AAVM Front Panel for maintenance messages again every 150 hours.

5) Use the UP [back] and DOWN [next] buttons to go to and from Engine 1 (E1) and Engine 2 (E2).

6) Push and release the NO button to show CONFIG? on the front display.

(h) After Config?, push and release the YES button to look at the Config menu (Table 204).

**Table 204/77-31-00-993-822-F00 AAVM CONFIG MENU**

| CONFIG MENU DISPLAY | |
|---|---|
| Main SW<br>249-109-<br>000-SSS | Main Processor<br>Software<br>SSS is version |
| DSP SW<br>249-110-<br>000-SSS | DSP Software<br>SSS is version |
| Conf Tbl<br>249-113-<br>000-SSS | DSP Configuration<br>Table<br>SSS is version |

NOTE: These software files maybe updated over time. Refer to AIPC for usage and application data. AAVM units which do not have the most current software will have no effect on vibration indication and engine balance function. Thus there are no flight limitations based on software revision level. Refer to AIPC for AVM and AAVM Interchangeability.

1) Use the UP [back] and DOWN [next] buttons to go to and from Config displays of the part numbers.

a) The Post-Vibro-Meter SB 298-77-004 part numbers are:

<1> Main SW 249-109-000-102

<2> DSP SW 249-110-000-403

<3> Conf Tbl 249-113-000-408

2) Push and release the NO button to show Data? on the front display.

(i) After Data?, push and release the YES button to look at the Data menu (Table 205).

**Table 205/77-31-00-993-823-F00 AAVM DATA MENU**

| DATA MENU DISPLAY | |
|---|---|
| E1<br>Flight<br>Nbxxxxxx | Engine1<br>xxxxxx is the<br>number of flights |
| E2<br>Flight<br>Nbxxxxxx | |

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069 (Continued)**

**Table 205/77-31-00-993-823-F00 AAVM DATA MENU (Continued)**

| DATA MENU DISPLAY | |
|---|---|
| E1<br>duration<br>hhhhh:mm | Total duration<br>hhhhh in hours<br>mm in minutes |
| E2<br>duration<br>hhhhh:mm | |

1) Use the UP [back] and DOWN [next] buttons to go to and from the data displays.

2) Push and release the NO button to show Altern.Accel.wiring? on the front display.

(j) After Altern.Accel.wiring?, push and release the YES button to look at the Alternate Accelerometer menu (Table 206). Use the NO button to go to the next menu

NOTE: This menu is used to activate or deactivate the AEVM function which depends on the No.1 bearing sensor being functional. The selection options are standard, alternate or disconnected. Select YES for the menu option that matches the existing sensor condition. The default configuration is standard accelerometer selected. Use the NO button after selecting accelerometer configuration to exit the menu.

**Table 206/77-31-00-993-824-F00 AAVM ACCELEROMETER SELECTION**

| ACCELEROMETER SELECTION MENU DISPLAY | IF YES SELECTED |
|---|---|
| Engine 1<br>Accel<br>config.? | E1 Accel<br>standard<br>selected |
| Engine 2<br>Accel<br>config.? | E2 Accel<br>standard<br>selected |
| Ex Accel<br>standard<br>select? | Ex Accel<br>standard<br>selected |
| Ex Accel<br>altern.<br>select? | Ex Accel<br>altern.<br>selected |
| Ex Accel<br>discon.<br>select? | Ex Accel<br>discon.<br>selected |

1) Ex is the Engine Number, E1 is Engine 1 and E2 is Engine 2.

2) The standard accelerometer is the No.1 bearing vibration sensor.

3) The alternate accelerometer is not an option for this airplane.

4) If the No.1 bearing vibration sensor on the engine is disconnected, use the Accel discon. select.

5) The AEVM is active only if the No.1 bearing (NOB) vibration sensor is connected.

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069 (Continued)**

6) Select NO to return to the Altern.Accel.wiring? menu.

7) If it is necessary, do the steps again for Engine 2.

(k) After Altern.Accel.wiring?, push and release the NO button to show Turn off Display? on the front display

(l) After Turn off Display?, push and release the YES button to turn off the front display.

**LOM ALL**

**I. Put the Airplane Back To Its Usual Condition**

**SUBTASK 77-31-00-410-005-F00**

(1) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

——— **END OF TASK** ———

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069**

**TASK 77-31-00-970-805-F00**

**3. Download the Advanced AVM (AAVM) Bearing Data with the Ground Support Software (GSS)**

**A. General**

(1) This task is to download the Advanced Airborne Vibration Monitoring (AAVM) bearing data with the Ground Support Software (GSS).

(2) Use this task when the AAVM has applicable bearing messages.

(3) This task includes these procedures to use the GSS:

(a) Troubleshooting Tips

(b) Configure the GSS for Aircraft Identification

(c) Download the contents of the AAVM Bearing Memory using the GSS

(d) Erase the memory of the AAVM using the GSS.

**B. Tools/Equipment**

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| SPL-4905 | Cable - Advanced Airborne Vibration Monitoring Equipment<br>Part #: 980-101-000-011 Supplier: S3960 |
| SPL-4906 | Software - Advanced Airborne Vibration Monitoring Equipment<br>Part #: 259-109-10X-SSS Supplier: S3960 |

**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Prepare to Use the AAVM with the GSS**

SUBTASK 77-31-00-860-016-F00

(1) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-00-010-006-F00

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**F. Troubleshooting Tips**

SUBTASK 77-31-00-800-003-F00

(1) This data is a guide to aid in troubleshooting of the AAVM and GSS (Table 207).

**Table 207/77-31-00-993-814-F00 GSS Troubleshooting**

| SYMPTOM | | POSSIBLE CAUSE | SOLUTION |
|---|---|---|---|
| No display on AAVM front panel | 1 | AAVM not powered | Apply electrical power to AAVM. Wait 30 seconds for AAVM to complete start up checks. |
| | 2 | Engine(s) running (valid tacho signal) | Wait until engine(s) are stopped. |
| AEVM? Menu not found. This AAVM Submenu is not accessible when GSS cable is connected. Unplug cable to access AEVM menu and display data on front panel. | 1 | GSS cable was connected to AAVM when AVM was powered up. | Disconnect GSS cable and cycle AAVM power (cycle the circuit breaker ENGINE VIB MON C1076). |
| | 2 | Communication disruption between processors | Disconnect GSS cable and cycle AAVM power (cycle the circuit breaker ENGINE VIB MON C1076). |
| “Not in service” displayed on AAVM front panel. (Displayed while in AEVM? Menu) | 1 | GSS cable is connected to front panel (GSS connection in progress) | Disconnect GSS cable and wait 30 seconds for AAVM to be ready. |
| | 2 | Communication disruption between processors | Reset the AAVM (cycle the circuit breaker ENGINE VIB MON C1076). |

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069 (Continued)**

**Table 207/77-31-00-993-814-F00 GSS Troubleshooting (Continued)**

| SYMPTOM | | POSSIBLE CAUSE | SOLUTION |
|---|---|---|---|
| GSS shows “Communication Status: Down” | 1 | AAVM still not ready for GSS mode | Wait 30 seconds for AAVM to be ready after connecting GSS cable to AAVM. |
| | 2 | GSS cable incorrectly installed | Close the GSS software and ensure GSS cable is properly seated in AAVM connector and laptop Ethernet, restart GSS with cable attached. |
| | 3 | GSS cable damaged | Replace GSS cable. |
| | 4 | Communication port and/or IP address incorrect | Install GSS and configure communication port and/or IP address in accordance with GSS software installation procedures. |
| | 5 | Communication disruption between AAVM processors or between AAVM processor and laptop | Disconnect the GSS cable, close the GSS software and reset the AAVM (cycle the circuit breaker ENGINE VIB MON C1076). Restart communication procedure. |
| GSS does not download files | 1 | No engine selected for data download | Check Engine 1 and Engine 2 boxes on the “Auto Download” page of the GSS |
| Download files are empty | 1 | Alternate accel is selected | Select the Standard accel via the AEVM menu on the front panel display |
| | 2 | Standard accel is declared faulty or disconnected | Repair Standard accel or move AAVM to a different aircraft. The AAVM does not function if the No.1 bearing accel is disconnected. |
| | 3 | Accel line is declared faulty | Repair accel line or move AAVM to a different aircraft |
| “AVM syst Fault xx” | 1 | Internal failure | Replace the AAVM. |

### G. Configure the GSS for Aircraft Identification

**SUBTASK 77-31-00-970-017-F00**

(1) Perform this step to configure the GSS AAVM software, SPL-4906 for aircraft identification (Figure 201):

(a) The laptop with the GSS does not need to be connected to the AAVM to perform this function.

NOTE: Pre-loading of the airplane data will enable the flight line mechanic to select the applicable aircraft identifier from an existing list. Pre-loading of the airplane data must be preformed by a user with Administrator privileges.

1) On the laptop computer, double-click on the 'GSS AAVM icon' to start the GSS software.

2) GSS Version 1:

The GSS screen will show the hardware part number applicability information. Click on 'Continue' or push the '(F5)' key.

3) GSS Version 2:

The GSS will try to connect to the AAVM. Click the Abort button, because it is not necessary to be connected to the AAVM when you configure the GSS for Aircraft Identification. Then click on the 'Continue' button or push the '(F5)' key.

4) The date and time are indicated on the login screen. Make sure that these values are correct, as this information will be used with the downloaded data.

5) Select the desired user level (Administrator) from the drop-down options and enter the corresponding password. Push the 'Enter' key.

6) Select the 'Aircraft Information' drop-down option at the top of the GSS screen.

7) To manually add an individual aircraft, select the 'Add Aircraft' option.

   a) This step is not necessary if the data was entered prior to downloading.

8) Enter an identifier in the 'New Aircraft Identifier' field. This can be the aircraft tail number or designation that will individually identify an aircraft.

   a) This step is not necessary if the data was entered prior to downloading.

9) Click on 'OK' or push the '(F5)' key.

10) To load engine data click on 'Aircraft Info' or push the '(F6)' key.

11) Select the 'Aircraft Identifier' from the drop-down options.

12) Enter engine type and serial number and any additional data in the fields provided.

13) Click on 'Save Changes' or push the '(F5)' key.

14) Click on the 'Back (Esc)' button.

15) Click on the 'Exit (Esc)' button to close the GSS software.

## H. Download the Contents of the AAVM Bearing Memory using the GSS

**SUBTASK 77-31-00-970-021-F00**

(1) Do this step to check the AAVM firmware version and the GSS version.

   (a) Use the Advanced Engine Vibration Monitoring (AEVM) menu (TASK 77-31-00-970-803-F00) to look for bearing messages.

      1) If 'AEVM Messages?' shows, then the 3-Algorithm firmware is installed.

         a) Use the GSS version 2.1.3 or later to download the data.

      2) If '#4 BRG?' shows, then the 1-Algorithm firmware is installed.

         a) Use GSS version 1.x.x to download the data.

**SUBTASK 77-31-00-970-018-F00**

(2) Do these steps to Download the Contents of the AAVM Bearing Memory using the GSS AAVM software, SPL-4906 (Figure 202):

   (a) If it is necessary refer to the GSS Troubleshooting Tips and GSS Configure Aircraft.

   (b) Make sure both engines are not running.

   (c) Gain access to the electronics bay and locate the AAVM.

      1) Make sure there is no cable connected to the maintenance connector (the larger of the two) on the front panel of the AAVM.

   (d) Remove the protective cover from the maintenance connector on the front panel of the AAVM.

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069 (Continued)**

(e) Connect the RJ45 ethernet connector of the GSS cable to the network connector of the laptop PC.

(f) Switch on the laptop PC and allow the boot process to complete.

(g) Make sure that electrical power is being supplied to the AAVM and that the AAVM has finished processing any flight data. Push one of the four buttons on the front panel to activate the front panel display. If the front panel display becomes active, then the necessary conditions have been met.

1) When 'Self Test?' shows on the front panel display, click the 'Yes' button.

2) Wait for 30 seconds to let the AAVM BITE function run.

(h) Connect the 50-pin sub-D type connector of the GSS AAVM adapter cable, SPL-4905 to the maintenance connector on the front panel of the AAVM.

(i) Wait until the 10 Mbits/s network connection show the status 'connected'. Depending on how the TCP/IP settings have been configured (use of the Alternate Configuration feature or not), some computers may take up to 1 minute to establish the communication.

1) Refer to Vibro-Meter Service Bulletin 298-77-004 for more details.

(j) On the laptop computer, double-click on the 'GSS AAVM' icon to start the GSS software.

(k) GSS Version 1:

The GSS screen will show the hardware applicability information. Click on the 'Continue' button or push the '(F5)' key.

(l) GSS Version 2:

The GSS will try to connect to the AAVM. Click on the 'Continue' button or push the '(F5)' key when the connection is done.

(m) The date and time are indicated on the login screen. Make sure that these values are correct, as this information will be used with the downloaded data.

(n) Click on the 'Download' button or push the '(F5)' key.

(o) Select a pre-configured aircraft identifier from the Auto Download menu pull-down options.

NOTE: If aircraft information has already been programmed, the information will be displayed when the aircraft is selected from the pull-down options. Otherwise, it can be entered at this point. See the task, Configure the GSS for Aircraft Identification.

(p) Click on the 'Continue Download' button or push the '(F5)' key.

(q) The GSS will show the progression of the download.

NOTE: A complete download when the AAVM memory is full will take approximately two minutes to complete.

(r) When the download is complete click on the 'Done' button or push the 'Enter' key to return to the main menu.

(s) Disconnect the 50-pin sub-D type connector of the GSS cable from the maintenance connector on the front panel of the AAVM.

(t) Replace the protective cover on the maintenance connector on the front panel of the AAVM.

(u) Push one of the four buttons on the front panel to activate the front panel display.

(v) Push the 'No' button four times to access the 'AAVM Menu' option.

(w) Push the 'Yes' button to access the applicable bearing menu option.

(x) If the applicable bearing menu option is available no further action is necessary.

(y) If the message 'Not in service' is shown, cycle the circuit breaker ENGINE VIB MON C1076 panel P6-2, grid location A2 to reset the AAVM before the next flight.

**I. Erase the Memory of the AAVM using the GSS**

SUBTASK 77-31-00-970-019-F00

(1) If it is necessary, do these steps to erase the memory of the AAVM using the GSS AAVM software, SPL-4906 (Figure 203).

NOTE: CFM recommends to erase the AAVM memory after an engine change or AAVM change to ensure no bearing data is mixed between engines. This step can be deferred until the next convenient maintenance opportunity and is not required if operators do not use the AAVM system.

(a) This procedure applies for these conditions:

1) This procedure must be done after an engine change or when the AAVM is changed on the aircraft.

2) Do not erase the memory after every download. AAVM functions require repeated detections on successive flights to indicate a bearing fault. Erasure of the memory after each download would potentially prevent fault detection rendering the advanced functions void.

3) The GSS can be configured to automatically do a memory erase after a data download. This function should only be enabled when the AAVM is moved to another aircraft or an engine change on the current aircraft. It should be noted that if the GSS is configured to do a complete memory erase the process would take approximately 20 minutes.

(b) To erase the AAVM memory, do these steps:

1) Make sure both engines are not running.

2) Get access to the electronics bay and find the AAVM.

3) Switch on the laptop PC and allow the boot process to complete.

4) Make sure that electrical power is being supplied to the AAVM and that the AAVM has finished processing any flight data. Push one of the four buttons on the front panel to activate the front panel display. If the front panel display becomes active, then the required conditions have been met.

5) Remove the protective cover from the maintenance connector on the front panel of the AAVM.

6) Connect the 50-pin sub-D type connector of the GSS AAVM adapter cable, SPL-4905 to the maintenance connector on the front panel of the AAVM.

7) Connect the RJ45 ethernet connector of the GSS cable to the network connector of the laptop PC.

8) Wait until the 10 Mbits/s network connection show the status 'connected'. Depending on how the TCP/IP settings have been configured (use of the Alternate Configuration feature or not), some computers may take up to 1 minute to establish the communication.

a) Refer to Vibro-Meter Service Bulletin 298-77-004 for more details.

9) On the laptop computer, double-click on the 'GSS AAVM' icon to start the GSS software.

10) GSS Version 1:

The GSS screen will show the hardware applicability information. Click on the 'Continue' button or push the '(F5)' key.

11) GSS Version 2:

The GSS will try to connect to the AAVM. Click on the 'Continue' button or push the '(F5)' key when the connection is done.

12) The date and time are indicated on the login screen. Make sure that these values are correct, as this information will be used with the downloaded data.

13) Click on the 'Clear' button or push the '(F7)' key.

14) Select all check-boxes for Engine 1 Memory Clear and Engine 2 Memory Clear.

NOTE: Before using the AAVM on a different aircraft it is important to erase all memory options.

NOTE: Immediately following an engine change it is important to erase all memory options for the affected engine.

NOTE: Do not interrupt power to the AEVM during the memory erase to prevent memory corruption. Do not interrupt the memory erase with the Cancel '(F8)' key.

15) Click on the 'Continue Clearing' button or push the '(F5)' key.

16) The GSS will show the progression of the memory erase.

NOTE: A complete memory erase (all options selected for each engine) will take approximately six minutes.

17) When the memory erase is complete click on the 'Done' button or push the 'Enter' key.

18) Disconnect the 50-pin sub-D type connector of the GSS cable from the maintenance connector on the front panel of the AAVM.

19) Replace the protective cover on the maintenance connector on the front panel of the AAVM.

20) Push one of the four buttons on the front panel to activate the front panel display.

21) Push the 'No' button four times to access the 'AEVM Menu' option.

22) Push the 'Yes' button to access the applicable 'AEVM Menu' option.

23) If the applicable bearing menu option is available no further action is necessary.

24) If the message 'AEVM Comm Error' is shown, cycle the circuit breaker ENGINE VIB MON C1076 panel P6-2, grid location A2 to reset the AAVM before the next flight.

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069 (Continued)**

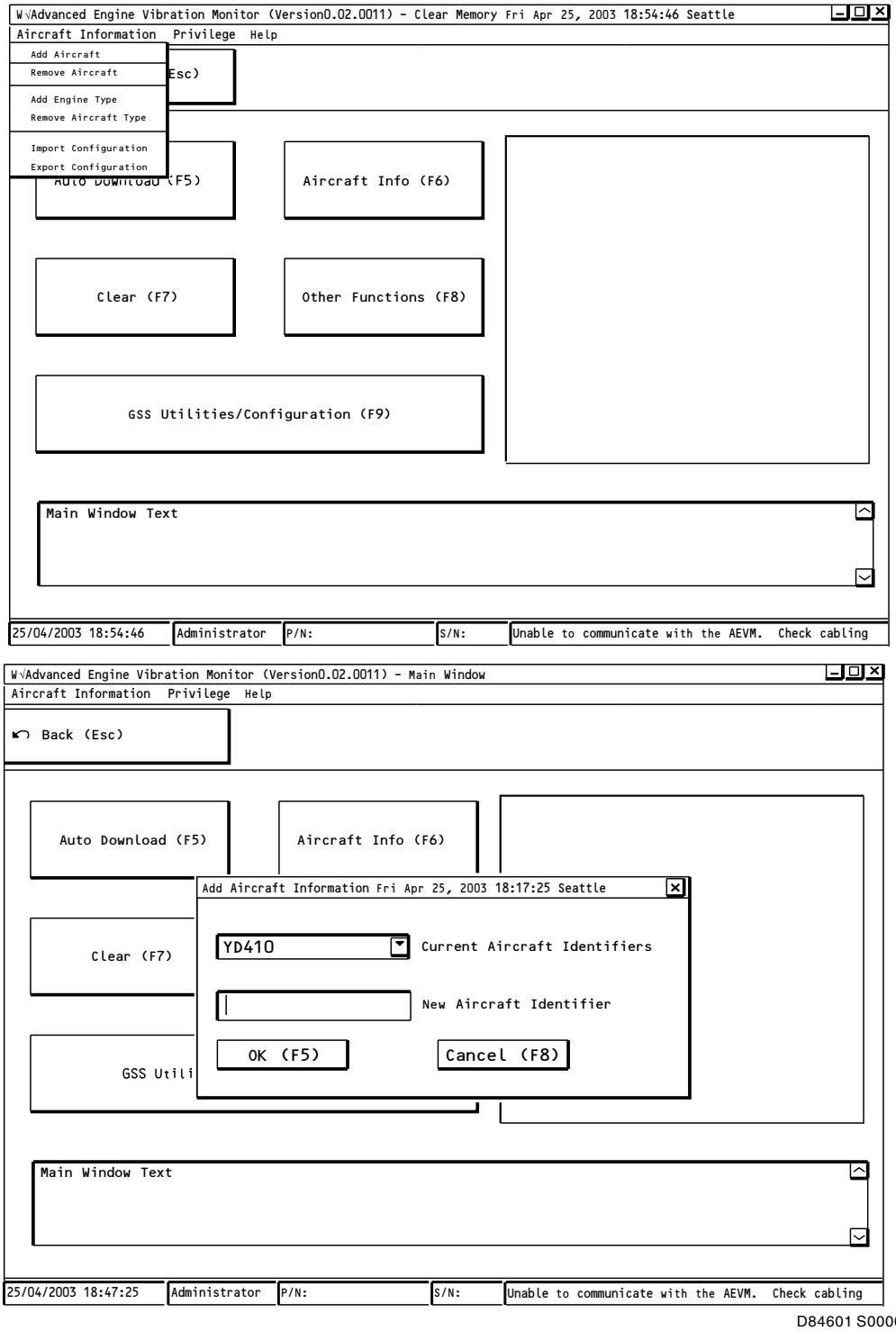
### J. Put the Airplane Back To Its Usual Condition

**SUBTASK 77-31-00-410-006-F00**

(1) Close this access panel:

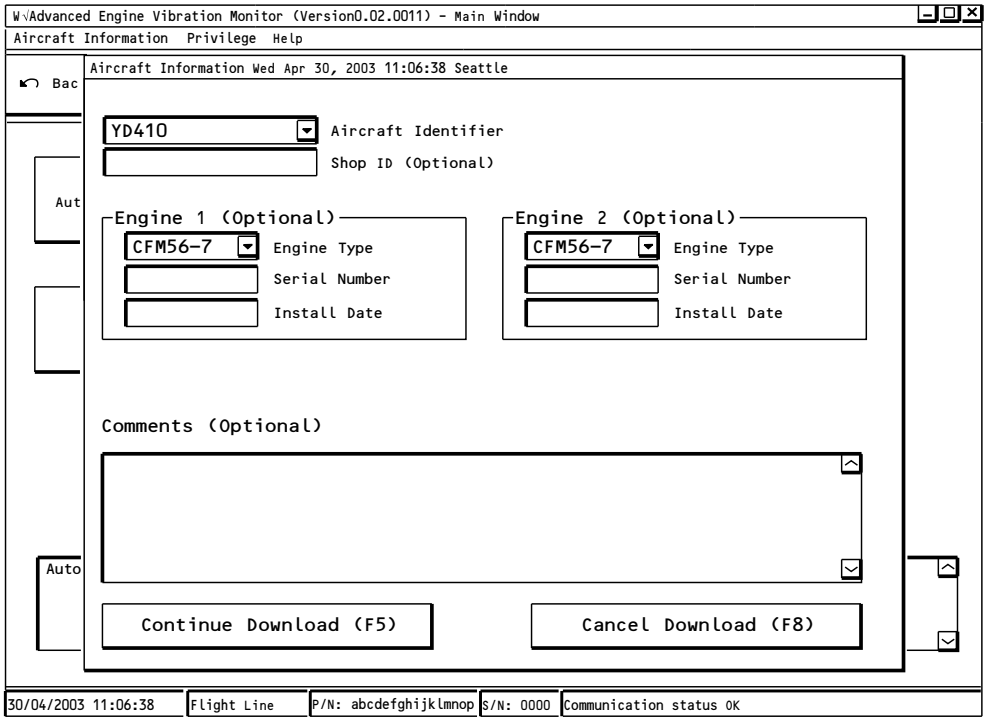
| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

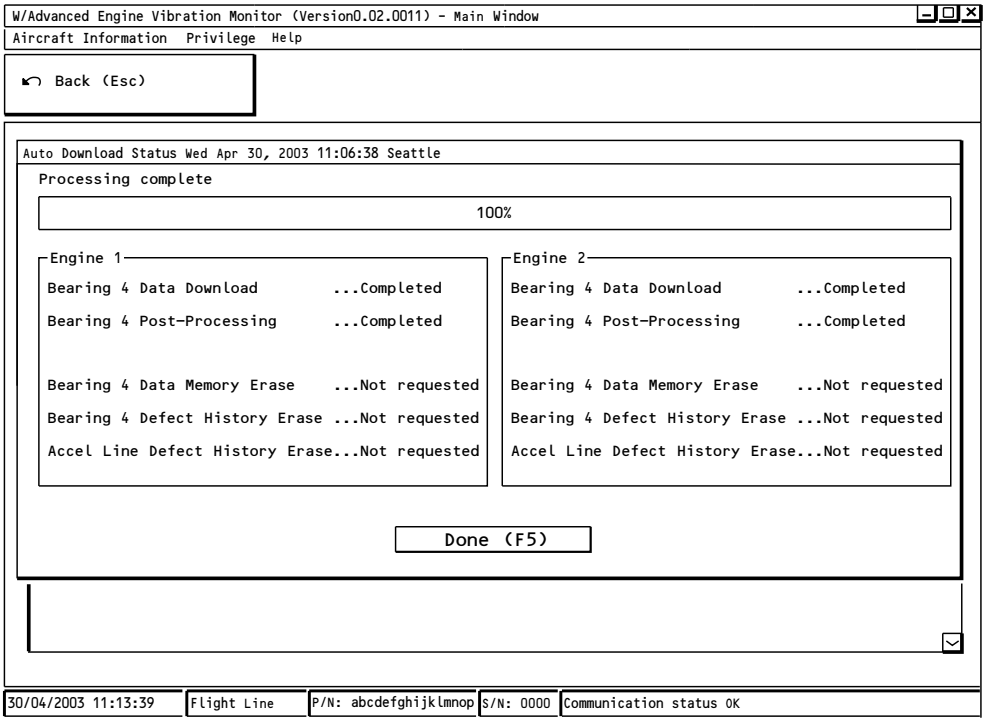
**END OF TASK**




D84601 S0000166901_V2

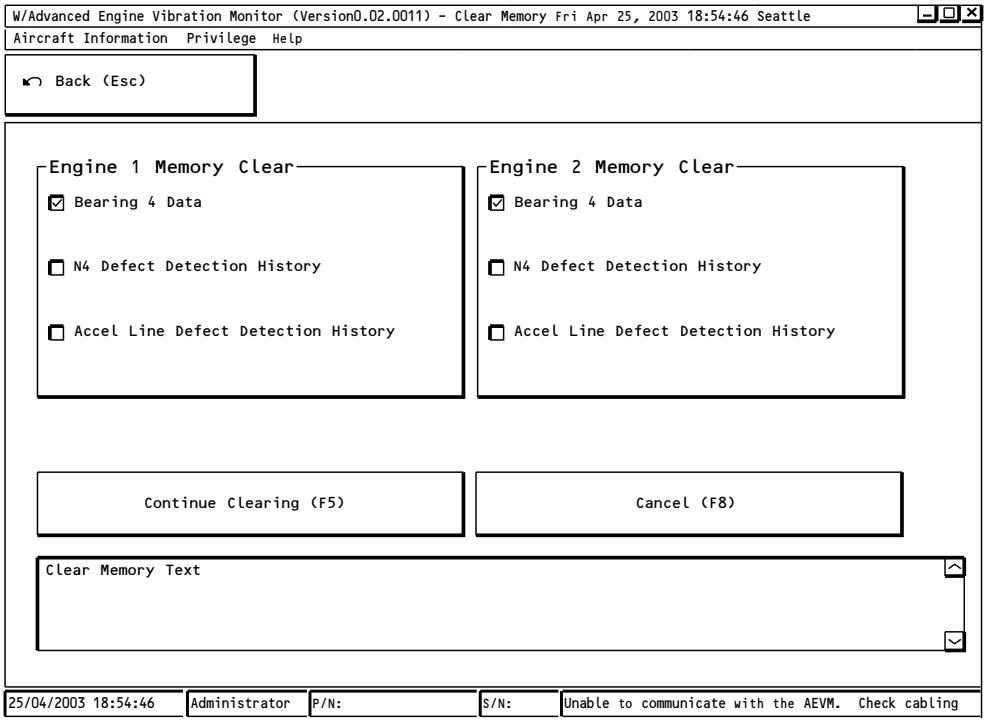
**GSS Aircraft Configuration**
**Figure 201/77-31-00-990-801-F00**




D85264 S0000166903_V3

**AAVM Download With GSS**
**Figure 202/77-31-00-990-802-F00**




D83174 S0000166904_V2

**Erase AAVM Memory With GSS**
**Figure 203/77-31-00-990-803-F00**

LOM ALL

TASK 77-31-00-910-801-F00

## 4. ARINC 429 Data Bus Charts

### A. General

(1) The ARINC 429 data bus charts give the information necessary to analyze the ARINC transmitters, receivers and data buses.

(2) To do a test of the ARINC 429 data bus, you can use an available terminal block or a connector on the LRU.

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

| Reference | Description |
|---|---|
| COM-1562 | Analyzer - Data Bus, ARINC 429<br>Part #: 01-1001-05 Supplier: 0Z3C6<br>Part #: 01-1001-12 Supplier: 0Z3C6<br>Part #: 403557 Supplier: CG603<br>Part #: 800-0630 Supplier: 1JSZ6<br>Part #: DT400H-01 Supplier: 0Z3C6<br>Part #: UA1410 Supplier: 0H231<br>Opt Part #: 01-1001-10 Supplier: 0Z3C6<br>Opt Part #: 01-1404-00 Supplier: 41364<br>Opt Part #: 1116-4000-21 Supplier: A0197<br>Opt Part #: 429EBP Supplier: 41364<br>Opt Part #: 429EX Supplier: 41364<br>Opt Part #: 702125-01 Supplier: CG603<br>Opt Part #: DT400H Supplier: 0Z3C6<br>Opt Part #: MODEL 429HBA Supplier: 5J927<br>Opt Part #: TYPE 030/026 Supplier: $0494 |
| SPL-2415 | Test Box - Generic AVM Interface<br>Part #: C77004-10 Supplier: 81205 |

### C. Procedure

SUBTASK 77-31-00-480-001-F00

(1) Connect the test box, SPL-2415 to the front panel of the airborne vibration monitor (AVM) signal conditioner.

SUBTASK 77-31-00-480-002-F00

(2) Connect the analyzer, COM-1562 to the test box, SPL-2415.

**Table 208/77-31-00-993-808-F00**

| BUS NAME SOURCE | TYPE | BUS | CON | PINS | BUS FORMAT | BIT RATE | DATA BUS |
|---|---|---|---|---|---|---|---|
| AVM (L/R) | A | 1 | A | C06 D06 | 429 | LO | AVM DATA |

**Table 209/77-31-00-993-809-F00**

| SIGNAL AVM (ID=03D) | TYPE | LABEL | FORMAT | UPDATE RATE | SDI 10/9 | BINARY RANGE | POSITIVE SENSE | UNITS |
|---|---|---|---|---|---|---|---|---|
| N1 VIB - ENG 1 FAN | A | 354 | BNR | 5 | 01 | 5.00 | ALWAYS POS | *[1] |
| N1 VIB - ENG 2 FAN | A | 354 | BNR | 5 | 10 | 5.00 | ALWAYS POS | *[1] |
| N2 VIB - ENG 1 HPC | A | 355 | BNR | 5 | 01 | 5.00 | ALWAYS POS | *[1] |
| N2 VIB - ENG 2 HPC | A | 355 | BNR | 5 | 10 | 5.00 | ALWAYS POS | *[1] |
| N1 VIB - ENG 1 LPT | A | 356 | BNR | 5 | 01 | 5.00 | ALWAYS POS | *[1] |
| N1 VIB - ENG 2 LPT | A | 356 | BNR | 5 | 10 | 5.00 | ALWAYS POS | *[1] |
| N2 VIB - ENG 1 HPT | A | 357 | BNR | 5 | 01 | 5.00 | ALWAYS POS | *[1] |
| N2 VIB - ENG 2 HPT | A | 357 | BNR | 5 | 10 | 5.00 | ALWAYS POS | *[1] |
| STATUS WORD | A | 270 | DIS | 5 | | N/A | N/A | |

*[1] Scalar Units.

**——— END OF TASK ———**

## AIRBORNE VIBRATION MONITORING (AVM) SYSTEM - ADJUSTMENT/TEST

### 1. General

A. This procedure has two tasks:

(1) The operational test of the airborne vibration monitoring system.

(2) The self test of the airborne vibration monitor signal conditioner.

**TASK 77-31-00-710-801-F00**

### 2. Airborne Vibration Monitoring (AVM) System - Operational Test

#### A. General

(1) This task is the operational test procedure for the Airborne Vibration Monitor (AVM) system.

(2) The operational test consists of three parts as follows:

(a) A Built-In-Test Equipment (BITE) test of the AVM signal conditioner.

(b) A BITE check of the complete AVM system for faults external to the AVM signal conditioner from the recent flight(s).

(c) An engine operation (one engine at idle) to check that AVM system is operational.

(3) You can use the operational test to make sure that the AVM signal conditioner operates after a component replacement.

#### B. References

| Reference | Title |
|---|---|
| 71-00-00-700-819-F00 | Stop the Engine Procedure (Usual Engine Stop) (P/B 201) |
| 71-00-00-800-807-F00 | Start the Engine Procedure (Selection) (P/B 201) |
| 77-31-00-970-803-F00 | Airborne Vibration Monitoring (AVM) System - System Test (P/B 201) |
| FIM 77-05 TASK 805 | Engine VIB Indication Blank - Fault Isolation |
| FIM 77-05 TASK 809 | AVM Signal Conditioner Display Blank - Fault Isolation |
| FIM 77-31 TASK 801 | AVM Signal Conditioner BITE Procedure |

#### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Prepare for the Operational Test

**SUBTASK 77-31-00-860-015-F00**

(1) Make sure that the center display system is on.

SUBTASK 77-31-00-860-002-F00

(2) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-00-010-002-F00

(3) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

## F. AVM System Operational Test

SUBTASK 77-31-00-860-012-F00

(1) VIBRO-METER AVM;

Do these steps to do a self test of the AVM signal conditioner:

(a) Make sure that the two VIB indicators, on the P2center instrument panel, show 0 units.

NOTE: If the circuit breaker is closed, the two VIB indicators, on the P2 center instrument panel, will show 0. If the circuit breaker was open, the two VIB indicators, on the P2 center instrument panel, will not show. If the circuit breaker is closed and the two VIB indicators, on the P2 center instrument panel, do not show, then do the fault isolation for the Engine VIB Indication Blank (FIM 77-05 TASK 805).

(b) Push and release one of the four buttons on the front display of the AVM signal conditioner.

1) If the front display on the AVM signal conditioner stays blank, do this task: AVM Signal Conditioner Display Blank - Fault Isolation, FIM 77-05 TASK 809.

(c) The AVM signal conditioner will show Self Test?.

(d) Push and release the YES button on the front display of the AVM signal conditioner.

(e) The AVM signal conditioner will show the hardware and software versions and engine type for 10 seconds, then show Test in progress for a couple seconds.

1) Make sure that the engine type is correct.

(f) Make sure that the AVM signal conditioner shows Test OK.

NOTE: The AVM signal conditioner passed the self test. After Test OK, push and release the NO button to show Fault History? on the front display of the AVM signal conditioner. If the AVM signal conditioner is left alone for 5 minutes, the display will then turn off.

(g) If the AVM signal conditioner shows XX Faults Display? or is blank, there is a failure of the AVM signal conditioner.

NOTE: XX is the total number of faults.

1) If the AVM displays CONFIG FAULT, make sure that the wiring change per SB 737-77-1056 is done.

2) If the front display on the AVM signal conditioner is blank, replace the AVM signal conditioner and do the self test again.

3) Interrogate the AVM system, do this task: Airborne Vibration Monitoring (AVM) System - System Test, TASK 77-31-00-970-803-F00.

SUBTASK 77-31-00-970-015-F00

(2) VIBRO-METER AVM;

For the BITE maintenance messages only, do this task: Airborne Vibration Monitoring (AVM) System - System Test, TASK 77-31-00-970-803-F00.

NOTE: If you find BITE maintenance messages, these are the faults from other flights or other engine operations.

SUBTASK 77-31-00-800-001-F00

(3) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Operate only one engine to do this test.

(b) Operate the engine at idle power.

SUBTASK 77-31-00-710-001-F00

(4) Monitor the VIB indication, on the P2 center instrument panel, in the flight compartment.

(a) Make sure that the VIB indication is more than zero.

(b) Make sure that the VIB indication is shown for the engine that you operate.

(c) Slowly move the thrust lever forward to 70% N1.

(d) Let the engine operation become stable for 2 minutes.

(e) Move the thrust lever rearward to idle power.

SUBTASK 77-31-00-800-002-F00

(5) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 77-31-00-970-010-F00

(6) VIBRO-METER AVM;

For the BITE maintenance messages only, do this task: Airborne Vibration Monitoring (AVM) System - System Test, TASK 77-31-00-970-803-F00.

SUBTASK 77-31-00-810-001-F00

(7) If there are new BITE maintenance messages, do the applicable corrective action that shows in the reference (FIM 77-31 TASK 801).

SUBTASK 77-31-00-860-004-F00

(8) Do this test again for the other engine.

SUBTASK 77-31-00-410-002-F00

(9) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**

**TASK 77-31-00-700-801-F00**

## 3. Airborne Vibration Monitor (AVM) Signal Conditioner - Self Test

### A. General

(1) This task is the self test procedure for the Airborne Vibration Monitor (AVM) signal conditioner.

(2) This task refers to the Built-In Test Equipment as the BITE.

(3) The self test does a check of the AVM signal conditioner.

(a) The self test makes sure that the AVM signal conditioner operates correctly.

(b) The self test does not display BITE maintenance messages or flight history.

**B. References**

| Reference | Title |
|---|---|
| 77-31-00-970-803-F00 | Airborne Vibration Monitoring (AVM) System - System Test (P/B 201) |
| FIM 77-05 TASK 805 | Engine VIB Indication Blank - Fault Isolation |
| FIM 77-05 TASK 809 | AVM Signal Conditioner Display Blank - Fault Isolation |

**C. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**D. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**E. Prepare for the Self Test**

SUBTASK 77-31-00-860-005-F00

(1) Make sure that this circuit breaker is closed:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-00-010-003-F00

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**F. AVM Signal Conditioner Self Test**

SUBTASK 77-31-00-860-013-F00

(1) VIBRO-METER AVM;

Do these steps to do a self test of the AVM signal conditioner:

(a) Make sure that the two VIB indicators, on the P2 center instrument panel, show 0 units.

NOTE: If the circuit breaker is closed, the two VIB indicators, on the P2 center instrument panel, will show 0. If the circuit breaker was open, the two VIB indicators, on the P2 center instrument panel, will not show. If the circuit breaker is closed and the two VIB indicators, on the P2 center instrument panel, do not show, then do the fault isolation for Engine VIB Indication Blank (FIM 77-05 TASK 805).

(b) Push and release the one of the four buttons on the front display of the AVM signal conditioner.

1) If the front display on the AVM signal conditioner stays blank, do this task: AVM Signal Conditioner Display Blank - Fault Isolation, FIM 77-05 TASK 809.

(c) The AVM signal conditioner will show Self Test?.

(d) Push and release the YES button on the front display of the AVM signal conditioner.

(e) The AVM signal conditioner will show the hardware and software versions and engine type for 10 seconds, then show Test in progress for a couple seconds.

1) Make sure that the engine type is correct.

a) The -7 is for the engine type.

b) The A or B is for the scaling that the AVM applies to the vibration.

(f) Make sure that the AVM signal conditioner shows Test OK.

NOTE: The AVM signal conditioner passed the self test. After Test OK, push and release the NO button to show Fault History? on the front display of the AVM signal conditioner. If the AVM signal conditioner is left alone for 5 minutes, the display will then turn off.

(g) If the AVM signal conditioner shows XX Faults? or is blank, there is a failure of the AVM signal conditioner.

NOTE: XX is the total number of faults.

1) If the AVM displays CONFIG FAULT, make sure that the wiring change per SB 737-77-1056 is done.

2) If the front display on the AVM signal conditioner is blank, replace the AVM signal conditioner and do the self test again.

3) Interrogate the AVM system, do this task: Airborne Vibration Monitoring (AVM) System - System Test, TASK 77-31-00-970-803-F00.

**SUBTASK 77-31-00-410-003-F00**

(2) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**——— END OF TASK ———**

## AIRBORNE VIBRATION MONITOR (AVM) SIGNAL CONDITIONER - REMOVAL/INSTALLATION

### 1. General

A. This procedure has two tasks:

(1) The removal of the airborne vibration monitor (AVM) signal conditioner.

(2) The installation of the airborne vibration monitor (AVM) signal conditioner.

**TASK 77-31-03-000-801-F00**

### 2. Airborne Vibration Monitor (AVM) Signal Conditioner Removal

(Figure 401)

#### A. General

(1) This task is the removal procedure for the airborne vibration monitor (AVM) signal conditioner.

(2) The AVM signal conditioner is installed on the E3-2 shelf in the main equipment center.

(a) When you remove the AVM signal conditioner, do not supply the electrical power to the AVM system.

(b) A lever that is part of the handle holds the AVM signal conditioner in the E3 rack mount.

#### B. References

| Reference | Title |
|---|---|
| 20-10-07-000-801 | E/E Box Removal (P/B 201) |
| 20-40-12-000-802 | ESDS Handling for Metal Encased Unit Removal (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

#### E. Procedure

**SUBTASK 77-31-03-860-001-F00**

(1) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

**SUBTASK 77-31-03-010-001-F00**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

SUBTASK 77-31-03-840-001-F00

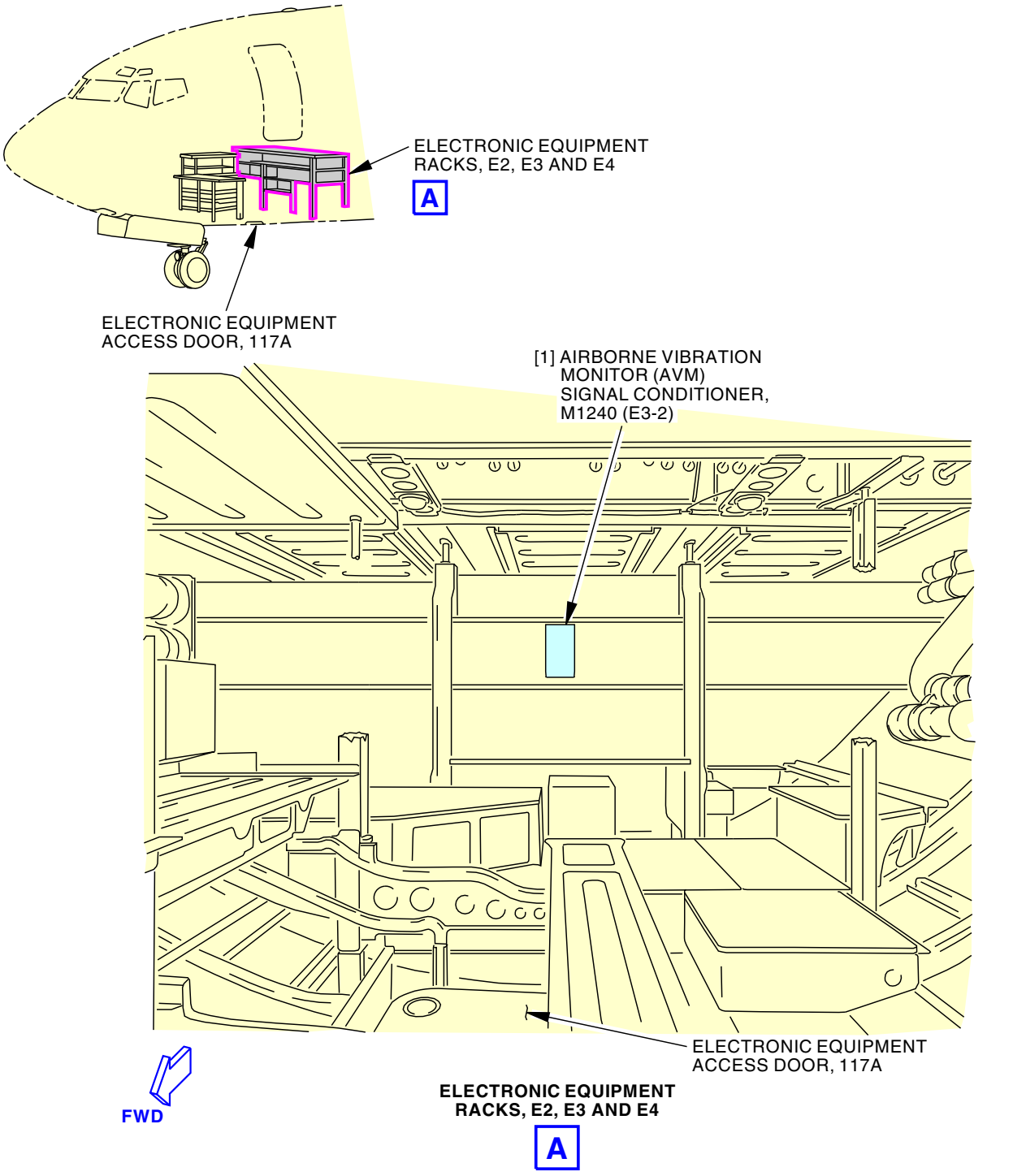
| | |
|---|---|
| CAUTION | DO NOT TRY TO REMOVE THE AVM SIGNAL CONDITIONER BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE AVM SIGNAL CONDITIONER. |

(3) Before you touch the AVM signal conditioner [1], do this task: ESDS Handling for Metal Encased Unit Removal, TASK 20-40-12-000-802.

SUBTASK 77-31-03-020-002-F00

(4) To remove the AVM signal conditioner [1], do this task: E/E Box Removal, TASK 20-10-07-000-801.

END OF TASK




**Airborne Vibration Monitor (AVM) Signal Conditioner Installation**
**Figure 401/77-31-03-990-801-F00**

**TASK 77-31-03-400-801-F00**

**3. Airborne Vibration Monitor (AVM) Signal Conditioner Installation**

(Figure 401)

**A. General**

(1) This task provides the instructions on how to install the Airborne Vibration Monitor (AVM) signal conditioner.

**B. References**

| Reference | Title |
|---|---|
| 20-10-07-400-801 | E/E Box Installation (P/B 201) |
| 20-40-12-400-802 | ESDS Handling for Metal Encased Unit Installation (P/B 201) |
| 71-00-00-750-802-F00 | Test 14A - Fan Trim Balance (Three-Shot Plot Procedure) (P/B 501) |
| 71-00-00-750-803-F00 | Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM) (P/B 501) |
| 71-00-00-750-805-F00 | Test 14C - Fan Trim Balance (Analyzer Procedure) (P/B 501) |
| 71-00-00-750-806-F00 | Test 14D - Two-Plane Trim Balance (P/B 501) |
| 77-31-00 P/B 201 | AIRBORNE VIBRATION MONITORING (AVM) SYSTEM - MAINTENANCE PRACTICES |
| 77-31-00-970-803-F00 | Airborne Vibration Monitoring (AVM) System - System Test (P/B 201) |
| 77-31-00-970-805-F00 | Download the Advanced AVM (AAVM) Bearing Data with the Ground Support Software (GSS) (P/B 201) |
| FIM 77-05 TASK 805 | Engine VIB Indication Blank - Fault Isolation |
| FIM 77-05 TASK 809 | AVM Signal Conditioner Display Blank - Fault Isolation |

**C. Expendables/Parts**

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 1 | Conditioner | 77-31-03-03-020 | LOM 406, 407, 411, 412, 415, 416, 420 |
| | | 77-31-03-03-030 | LOM 406, 407, 411, 412, 415, 416, 420, 422-434, 437-447, 450-999 |
| | | 77-31-03-03-100 | LOM 406, 407, 411, 412, 415, 416, 420, 422-434, 437-447, 450-999 |
| | | 77-31-03-04-020 | LOM 402, 404 |
| | | 77-31-03-04-030 | LOM 402, 404 |
| | | 77-31-03-04-100 | LOM 402, 404 |

**D. Location Zones**

| Zone | Area |
|---|---|
| 117 | Electrical and Electronics Compartment - Left |
| 118 | Electrical and Electronics Compartment - Right |
| 211 | Flight Compartment - Left |
| 212 | Flight Compartment - Right |

**E. Access Panels**

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**F. AVM Signal Conditioner Installation**

SUBTASK 77-31-03-840-002-F00

**CAUTION** DO NOT TOUCH THE SIGNAL CONDITIONER UNIT UNTIL YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(1) Before you touch the AVM signal conditioner [1], do this task: ESDS Handling for Metal Encased Unit Installation, TASK 20-40-12-400-802.

SUBTASK 77-31-03-420-001-F00

(2) To install the AVM signal conditioner [1], do this task: E/E Box Installation, TASK 20-10-07-400-801.

**G. AVM Signal Conditioner Installation Test**

SUBTASK 77-31-03-860-003-F00

(1) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-03-860-009-F00

(2) VIBRO-METER AVM; Do these steps to do a self test of the AVM signal conditioner [1]:

(a) Make sure that the two VIB indicators, on the P2 center instrument panel, show 0.

NOTE: If the circuit breaker is closed, the two VIB indicators, on the P2 center instrument panel, will show 0. If the circuit breaker was open, the two VIB indicators, on the P2 center instrument panel, will not show. If the circuit breaker is closed and the two VIB indicators, on the P2 center instrument panel, do not show, then do the fault isolation for Engine VIB Indication Blank (FIM 77-05 TASK 805).

(b) Push and release one of the four buttons on the front display of the AVM signal conditioner [1].

1) If the front display on the AVM signal conditioner stays blank, do this task: AVM Signal Conditioner Display Blank - Fault Isolation, FIM 77-05 TASK 809.

(c) The AVM signal conditioner [1] will show Self Test?.

(d) Push and release the YES button on the front display of the AVM signal conditioner [1].

(e) The AVM signal conditioner [1] will show the hardware and software versions, and engine type for 10 seconds, then show Test in progress for approximately two seconds.

1) Make sure that the engine type is correct.

NOTE: The -7 is for the engine type. The A or B is for the scaling which the AVM applies to the vibration.

(f) Make sure that the AVM signal conditioner [1] shows Test OK.

NOTE: The AVM signal conditioner passed the self test. After Test OK, push and release the NO button to show Fault History? on the front display of the AVM signal conditioner. If the AVM signal conditioner is left alone for 5 minutes, the display will then turn off.

(g) If the AVM signal conditioner [1] shows XX Faults? or is blank, there is a failure of the unit.

NOTE: XX is the total number of faults.

NOTE: If the AVM displays CONFIG FAULT, make sure that the wiring change per SB 737-77-1056 is done.

1) If the front display on the AVM signal conditioner [1] is blank, replace the AVM signal conditioner [1] and do the self test again.

2) To interrogate the AVM system, do this task: Airborne Vibration Monitoring (AVM) System - System Test, TASK 77-31-00-970-803-F00.

**SUBTASK 77-31-03-070-003-F00**

(3) VIBRO-METER AVM; Do these steps to remove all of the AVM data:

(a) Do these steps on the Built-In-Test Equipment (BITE) maintenance message and flight history menus (TASK 77-31-00-970-803-F00):

1) Erase the BITE maintenance messages.

2) Erase the flight history.

(b) Do these steps on the trim balance menu (Test 14A - Fan Trim Balance (Three-Shot Plot Procedure), TASK 71-00-00-750-802-F00 or Test 14D - Two-Plane Trim Balance, TASK 71-00-00-750-806-F00 or Test 14C - Fan Trim Balance (Analyzer Procedure), TASK 71-00-00-750-805-F00 or Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM), TASK 71-00-00-750-803-F00):

NOTE: This step checks the engine balance weights agree with the balance weights recorded in the AVM.

1) Make sure that the engine balance weights agree with the AVM data.

2) If you do an on-board fan trim balance, make sure that the flight data was recorded while this AVM unit was installed on the airplane.

**LOM 422-434, 437-447, 450-999; LOM 402, 404, 406, 407, 411, 412, 415, 416, 420 POST SB 737-77-1069; AIRPLANES WITH ADVANCED ENGINE VIBRATION MONITOR (AEVM)**

**SUBTASK 77-31-03-740-001-F00**

(4) Erase the memory of the AVM using the Ground Support Software (GSS) (TASK 77-31-00-970-805-F00):

NOTE: This step is not necessary for units with a blank memory.

NOTE: The Vibro-meter Advanced Engine Vibration Monitoring (AEVM) can have different software files installed that include more functions. These functions do not affect vibration indication and the engine balance function. Refer to PAGEBLOCK 77-31-00/201 and the Aircraft Illustrated Parts Catalog (AIPC) for more data.

NOTE: CFM recommends to erase the Advanced Airborne Vibration Monitoring (AAVM) memory after an engine change or AAVM change to ensure no bearing data is mixed between engines. This step can be deferred until the next convenient maintenance opportunity.

**LOM ALL**

**SUBTASK 77-31-03-010-003-F00**

(5) Close this access panel:

| Number | Name/Location |
|---|---|
| 117A | Electronic Equipment Access Door |

**END OF TASK**

## FAN FRAME COMPRESSOR CASE (FFCC) VIBRATION SENSOR - REMOVAL/INSTALLATION

### 1. General

A. This procedure has two tasks:

(1) The removal of the fan frame compressor case (FFCC) vibration sensor

(2) The installation of the fan frame compressor case (FFCC) vibration sensor.

**TASK 77-31-04-000-801-F00**

### 2. FFCC Vibration Sensor Removal

(Figure 401)

#### A. General

(1) This task is the removal procedure for the fan frame compressor case vibration sensor (referred to as the FFCC vibration sensor).

(2) The FFCC vibration sensor is installed on the aft face of the fan frame at the 3:00 o'clock position.

#### B. References

| Reference | Title |
|---|---|
| 70-10-02-910-801-F00 | General Precautions during the Removal and Installation of Engine Components (P/B 201) |
| 78-31-00-010-801-F00 | Open the Thrust Reverser (Selection) (P/B 201) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

#### D. Prepare for the Removal

**SUBTASK 77-31-04-860-001-F00**

(1) For Engine 1, open these circuit breakers and install safety tags:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |

**SUBTASK 77-31-04-860-002-F00**

(2) For Engine 2, open these circuit breakers and install safety tags:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

SUBTASK 77-31-04-010-001-F00

**WARNING**

DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION OF THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) For the right thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

## E. FFCC Vibration Sensor Removal

SUBTASK 77-31-04-020-001-F00

(1) Remove the FFCC vibration sensor [2]:

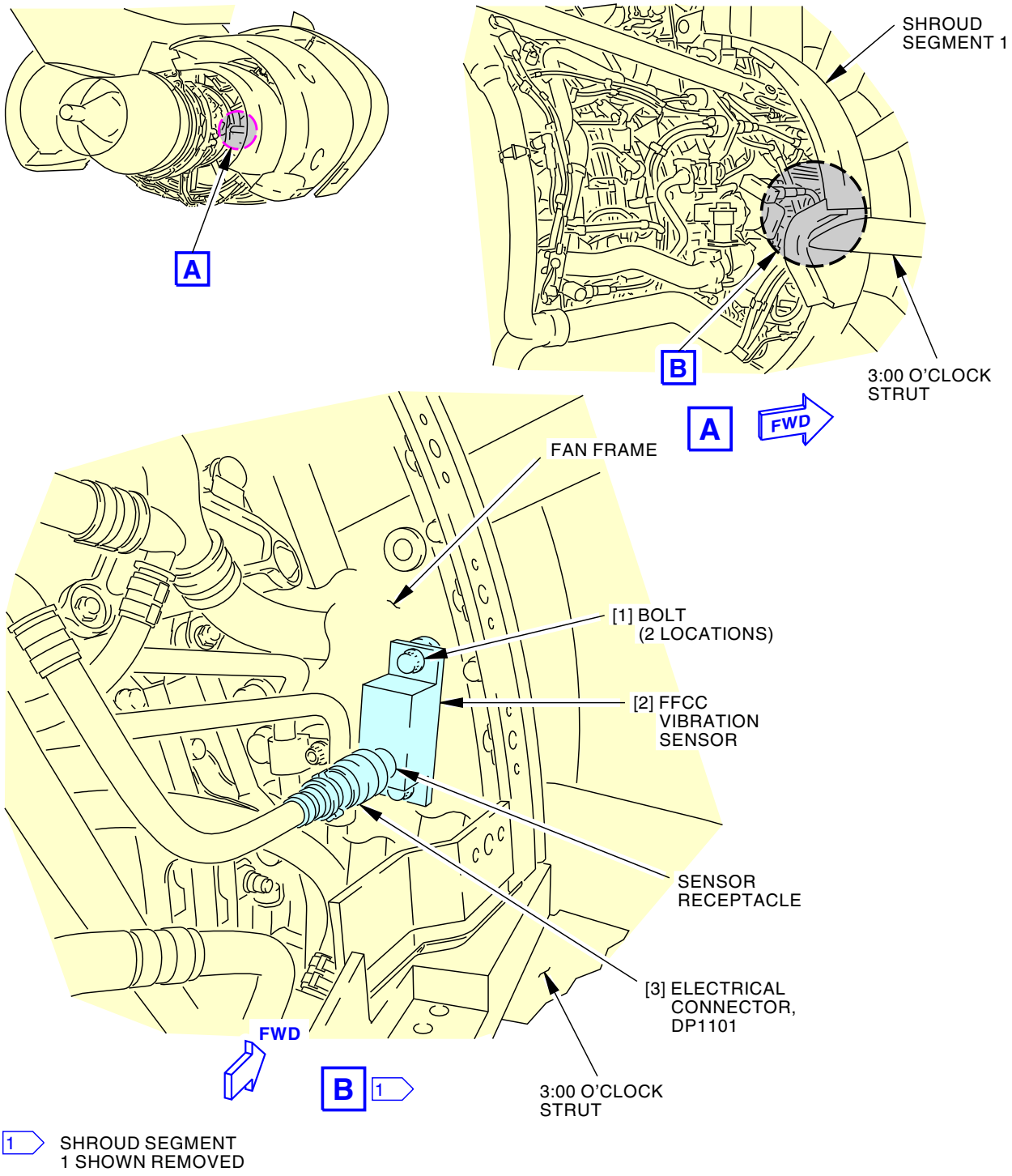
(a) Disconnect the electrical connector, DP1101 [3] from the FFCC vibration sensor receptacle.

(b) Remove the two bolts [1] to disconnect the FFCC vibration sensor [2] from the aft face of the fan frame.

(c) Remove the FFCC vibration sensor [2].

(d) Install protective covers on the FFCC vibration sensor receptacle and the electrical connector, DP1101 [3] (TASK 70-10-02-910-801-F00).

**——— END OF TASK ———**

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**Fan Frame Compressor Case (FFCC) Vibration Sensor Installation**
**Figure 401/77-31-04-990-801-F00**

**TASK 77-31-04-400-801-F00**

## 3. FFCC Vibration Sensor Installation

(Figure 401)

### A. General

(1) This task is the installation procedure for the fan frame compressor case vibration sensor (referred to as the FFCC vibration sensor).

### B. References

| Reference | Title |
|---|---|
| 70-10-02-910-801-F00 | General Precautions during the Removal and Installation of Engine Components (P/B 201) |
| 71-00-00-800-811-F00 | Power Plant Test Reference Table (P/B 501) |
| 78-31-00-010-804-F00 | Close the Thrust Reverser (Selection) (P/B 201) |

### C. Consumable Materials

| Reference | Description | Specification |
|---|---|---|
| B00130 | Alcohol - Isopropyl | TT-I-735 |
| D00601 [CP2101] | Vaseline - Graphite Mineral | |
| G00034 | Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) | AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A) |

### D. Expendables/Parts

| AMM Item | Description | AIPC Reference | AIPC Effectivity |
|---|---|---|---|
| 2 | Sensor | 77-31-04-01-055 | LOM 402, 404, 406, 407, 411, 416, 445 |
| | | 77-31-04-01A-055 | LOM 411, 412, 415, 416, 420, 422-434, 437-447, 450-999 |

### E. Location Zones

| Zone | Area |
|---|---|
| 411 | Engine 1 - Engine |
| 421 | Engine 2 - Engine |

### F. Prepare for the Installation

**SUBTASK 77-31-04-840-001-F00**

(1) Do these steps to prepare the FFCC vibration sensor [2] for the installation (TASK 70-10-02-910-801-F00):

(a) Remove the protective covers from the FFCC vibration sensor receptacle and from the electrical connector, DP1101 [3].

**WARNING**

DO NOT GET ISOPROPYL ALCOHOL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ISOPROPYL ALCOHOL. KEEP THE ISOPROPYL ALCOHOL AWAY FROM SPARKS, FLAME, AND HEAT. ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Clean the flanges on the FFCC vibration sensor [2] and the fan frame with alcohol, B00130 and a cotton wiper, G00034.

(c) Make sure that all the flanges on the FFCC vibration sensor [2] and the fan frame are clean and in good condition.

## G. FFCC Vibration Sensor Installation

SUBTASK 77-31-04-420-001-F00

(1) Install the FFCC vibration sensor [2]:

(a) Lubricate the threads of the two bolts [1] with graphite mineral vaseline, D00601 [CP2101].

(b) Put the FFCC vibration sensor [2] in its position.

(c) Install the two bolts [1] to attach the FFCC Vibration Sensor [2] to the aft face of the fan frame.

1) Tighten the bolts [1] to 98-110 pound-inches (11-12.5 Newton meters).

SUBTASK 77-31-04-420-002-F00

(2) Connect the electrical connector, DP1101 [3] to the FFCC vibration sensor receptacle.

## H. Put the Airplane Back to Its Usual Condition

SUBTASK 77-31-04-410-001-F00

**WARNING**

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 77-31-04-860-003-F00

(2) For Engine 1, remove the safety tags and close these circuit breakers:

**CAPT Electrical System Panel, P18-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 4 | C01390 | ENGINE 1 ALTN PWR CHAN B |
| A | 5 | C01314 | ENGINE 1 ALTN PWR CHAN A |

SUBTASK 77-31-04-860-004-F00

(3) For Engine 2, remove the safety tags and close these circuit breakers:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| D | 7 | C01391 | ENGINE 2 ALTN PWR CHAN B |
| D | 8 | C01315 | ENGINE 2 ALTN PWR CHAN A |

### I. FFCC Vibration Sensor Installation Test

**SUBTASK 77-31-04-800-001-F00**

(1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

NOTE: As an option to performing the Airborne Vibration Monitor (AVM) System - Operational test specified in the Power Plant Test Reference Table, operators may instead monitor the vibration data on the subsequent flight or engine operation for a satisfactory indication with regulatory approval.

**——— END OF TASK ———**

## NO. 1 BEARING VIBRATION SENSOR - MAINTENANCE PRACTICES

### 1. General

A. The deactivation of the No. 1 Bearing Vibration Sensor

B. The activation of the No. 1 Bearing Vibration Sensor.

**TASK 77-31-05-040-801-F00**

### 2. No. 1 Bearing Vibration Sensor Deactivation

#### A. General

(1) This task is used for deactivation of the No. 1 bearing (NOB) vibration sensor (referred to as the NOB vibration sensor).

(2) The steps that follow are the effects that a deactivated NOB vibration sensor has on the airborne vibration monitoring (AVM) system for the applicable engine:

(a) The on-wing fan trim balance feature of the AVM signal conditioner will not function correctly.

(b) The computed balance solution will not be correct.

(c) The fan imbalance data will not be stored in the AVM signal conditioner.

(d) The flight history data for the fan and high pressure compressor (HPC) will show 0.0 scaler units, regardless of the actual fan and HPC vibration.

(3) Use this task for flight dispatch.

#### B. References

| Reference | Title |
|---|---|
| 77-31-00-710-801-F00 | Airborne Vibration Monitoring (AVM) System - Operational Test (P/B 501) |

#### C. Location Zones

| Zone | Area |
|---|---|
| 121 | Forward Cargo Compartment - Left |
| 122 | Forward Cargo Compartment - Right |

#### D. Access Panels

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

#### E. Procedure

**SUBTASK 77-31-05-860-001-F00**

(1) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

**SUBTASK 77-31-05-010-001-F00**

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

**SUBTASK 77-31-05-040-001-F00**

(3) Do these steps to deactivate the NOB vibration sensor for engine 1:

(a) Remove the forward bulkhead cargo liner in the forward cargo bay.

(b) Find the bracket, AE0302A, at the rear of the E3-2 electronic equipment rack.

(c) Disconnect the electrical connector, D40594P, from the bracket, AE0302A.

NOTE: The electrical connector, D40594P, is attached to the bracket, AE0302A, at position 16.

(d) Remove the pins A3, B3 and A4 from the electrical connector, D40594P (two NOB sensor wires and shield).

(e) Cap and stow the wires.

(f) Connect the electrical connector, D40594P, to the bracket, AE0302A.

(g) Install the forward bulkhead cargo liner in the forward cargo bay.

SUBTASK 77-31-05-040-002-F00

(4) Do these steps to deactivate the NOB vibration sensor for engine 2:

(a) Remove the forward bulkhead cargo liner in the forward cargo bay.

(b) Find the bracket, AE0302A, at the rear of the E3-2 electronic equipment rack.

(c) Disconnect the electrical connector, D43080P, from the bracket, AE0302A.

NOTE: The electrical connector, D43080P, is attached to the bracket, AE0302A, at position 54.

(d) Remove the pins B8, B9 and B10 from the electrical connector, D43080P (two NOB sensor wires and shield).

(e) Cap and stow the wires.

(f) Connect the electrical connector, D43080P, to the bracket, AE0302A.

(g) Install the forward bulkhead cargo liner in the forward cargo bay.

SUBTASK 77-31-05-860-002-F00

(5) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-05-010-002-F00

(6) Close this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

SUBTASK 77-31-05-710-001-F00

(7) Do this task: Airborne Vibration Monitoring (AVM) System - Operational Test, TASK 77-31-00-710-801-F00.

**END OF TASK**

**TASK 77-31-05-440-801-F00**

## 3. Number One Bearing Vibration Sensor Activation

### A. References

| Reference | Title |
|---|---|
| 77-31-00-710-801-F00 | Airborne Vibration Monitoring (AVM) System - Operational Test (P/B 501) |

**B. Location Zones**

| Zone | Area |
|---|---|
| 121 | Forward Cargo Compartment - Left |
| 122 | Forward Cargo Compartment - Right |

**C. Access Panels**

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

**D. Procedure**

SUBTASK 77-31-05-860-003-F00

(1) Open this circuit breaker and install safety tag:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-05-010-003-F00

(2) Open this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

SUBTASK 77-31-05-040-003-F00

(3) Do these steps to activate the NOB vibration sensor for engine 1:

(a) Remove the forward bulkhead cargo liner in the forward cargo bay.

(b) Find the bracket, AE0302A, at the rear of the E3-2 electronic equipment rack.

(c) Disconnect the electrical connector, D40594P, from the bracket, AE0302A.

NOTE: The electrical connector, D40594P, is attached to the bracket, AE0302A, at position 16.

(d) Remove the caps and install the wires.

(e) Install the pins A3, B3 and A4 in the electrical connector, D40594P (two NOB vibration sensor wires and shield).

(f) Connect the electrical connector, D40594P, to the bracket, AE0302A.

(g) Install the forward bulkhead cargo liner in the forward cargo bay.

SUBTASK 77-31-05-040-004-F00

(4) Do these steps to activate the NOB vibration sensor for engine 2:

(a) Remove the forward bulkhead cargo liner in the forward cargo bay.

(b) Find the bracket, AE0302A, at the rear of the E3-2 electronic equipment rack.

(c) Disconnect the electrical connector, D43080P, from the bracket, AE0302A.

NOTE: The electrical connector, D43080P, is attached to the bracket, AE0302A, at position 54.

(d) Remove the caps and install the wires.

(e) Install the pins B8, B9 and B10 in the electrical connector, D43080P (two NOB vibration sensor wires and shield).

(f) Connect the electrical connector, D43080P, to the bracket, AE0302A.

(g) Install the forward bulkhead cargo liner in the forward cargo bay.

SUBTASK 77-31-05-860-004-F00

(5) Remove the safety tag and close this circuit breaker:

**F/O Electrical System Panel, P6-2**

| Row | Col | Number | Name |
|---|---|---|---|
| A | 2 | C01076 | ENGINE VIB MON |

SUBTASK 77-31-05-010-004-F00

(6) Close this access panel:

| Number | Name/Location |
|---|---|
| 821 | Forward Cargo Door |

SUBTASK 77-31-05-710-002-F00

(7) Do this task: Airborne Vibration Monitoring (AVM) System - Operational Test, TASK 77-31-00-710-801-F00.

——— END OF TASK ———