Scandinavian Airlines System

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CHAPTER 77 - ENGINE INDICATING

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CHAPTER 77 - ENGINE INDICATING

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FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
77 03 XA --	1. A (01=L, 02=R) EPR, EGT, or VIB indication problem was encountered by the flight crew which is not covered in the fault code diagram. (Ref Chapter 71 fault code diagram for flight crew action.) 2. SSM 77-00-01, SSM 77-00-02
77 03 XB --	1. A (01=L, 02=R) N1, N2 indicator and eng speed card problem was encountered by the flight crew which is not covered in the fault code diagram. (Ref Chapter 71 fault code diagram for flight crew action.) 2. SSM 77-00-01
77 03 01 00	1. EICAS msg ENG VIB BITE displayed (Ref Chapter 31 for fault code diagrams). 2. FIM 77-31-00/101, Fig. 103, Block 1
77 03 02 00	1. EICAS msg L PIMU displayed (Ref Chapter 31 for fault code diagrams). 2. 71-PIMU MESSAGE INDEX
77 03 03 00	1. EICAS msg L ENG SPEED CARD displayed (Ref Chapter 31 for fault code diagram). 2. Replace the Engine Speed Card, M1093 (AMM 77-12-01/401). If the problem continues, examine the circuit from the left engine speed card, M1093, connector D10064, pins 9 and 13, to the EEC alternator, T01519, connector W3P1, pins D and E (WDM 71-51-14 and WDM 77-12-12).
77 03 04 00	1. EICAS msg R PIMU displayed (Ref Chapter 31 for fault code diagram). 2. 71-PIMU MESSAGE INDEX
77 03 05 00	1. EICAS msg R ENG SPEED CARD displayed (Ref Chapter 31 for fault code diagram). 2. Replace the Engine Speed Card, M1092 (AMM 77-12-01/401). If the problem continues, examine the circuit from the right engine speed card, M1092, connector D10062, pins 9 and 13, to the EEC alternator, T01519, connector W3P1, pins D and E (WDM 71-51-14 and WDM 77-12-12).
77 03 06 --	1. (01=L, 02=R) eng VIB ind reads (blank, zero, high, low, fluctuates or inop). Other eng parameters normal (Ref Chapter 71 for fault code diagram). 2. FIM 77-31-00/101, Fig. 103, Block 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
77 03 07 --	Not Used
77 03 08 --	Not Used
77 03 09 --	1. (01=L, 02=R) stby eng EPR ind reads (blank, zero, high, low or segment missing) (Ref Chapter 71 for fault code diagram). 2. Replace the Standby Engine Indicator, N10016 (AMM 77-41-01/401).
77 03 10 --	1. (01=L, 02=R) stby eng EGT ind reads (blank, zero, high, low or segment missing) (Ref Chapter 71 for fault code diagram). 2. Replace the Standby Engine Indicator, N10016 (AMM 77-41-01/401).
77 03 11 --	1. (01=L, 02=R) prim eng EPR ind (blank, zero, fluctuates) (Ref Chapter 71 for fault code diagram). 2. FIM 77-11-00/101, Fig. 103, Block 1
77 03 12 --	Not Used
77 03 13 --	1. (01=L, 02=R) prim eng EGT ind (blank, zero, high, low or fluctuates) (Ref Chapter 71 for fault code diagram). 2. FIM 77-21-00/101, Fig. 103, Block 1
77 03 14 --	Not Used
77 03 15 --	Not Used
77 03 16 --	1. EICAS MSG: (01=L, 02=R) ENG SPEED CARD displayed. Eng ind were normal (Ref Chapter 71 for fault code diagram). 2. Replace the L(R) Engine Speed Card, M1093 (M1092) (AMM 77-12-01/401). If the problem continues, examine the circuit from the left (right) engine speed card, M1093 (M1092) connector D1064 (D1062), pins 9 and 13, to the L(R) EEC alternator, T686, connector W3P1, pins D and E (WDM 77-12-12).

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
77 03 17 --	1. (01=L, 02=R) prim eng N1 on EICAS and stby eng ind differs. EICAS _____ %N1 stby eng ind _____ %N1. (Ref Chapter 71 for fault code diagrams). 2. FIM 77-12-00/101, Fig. 103, Block 1
77 03 18 --	1. (01=L, 02=R) prim eng N2 on EICAS and stby eng ind differs. EICAS _____ %N2 stby eng ind _____ %N2. (Ref Chapter 71 for fault code diagrams). 2. FIM 77-12-00/101, Fig. 104, Block 1
77 03 19 --	1. (01=L, 02=R) stby eng N1 ind reads (blank, zero, high, low or segment missing). (Ref Chapter 71 for fault code diagram). 2. Replace the Standby Engine Indicator, N10016 (AMM 77-41-01/401).
77 03 20 --	1. (01=L, 02=R) stby eng N2 ind reads (blank, zero, high, low or segment missing). (Ref Chapter 71 for fault code diagrams). 2. Replace the Standby Engine Indicator, N10016 (AMM 77-41-01/401).
77 03 21 --	1. (01=L, 02=R) prim eng N1 ind reads (blank, high, low, zero, fluctuates). Stby eng ind also abnormal. (Ref Chapter 71 for fault code diagrams). 2. FIM 77-12-00/101, Fig. 103, Block 1
77 03 22 --	1. (01=L, 02=R) prim eng N1 ind (blank, high, low, zero, fluctuates) using Stby eng ind normal (Ref Chapter 71 for fault code diagram). 2. FIM 77-12-00/101, Fig. 105, Block 1
77 03 23 --	1. (01=L, 02=R) prim eng N2 ind reads (blank, high, low, zero, fluctuates). Stby eng ind abnormal. (Ref Chapter 71 for fault code diagram). 2. FIM 77-12-00/101, Fig. 103, Block 1

FAULT CODE	
	1. LOG BOOK REPORT
	2. FAULT ISOLATION REFERENCE

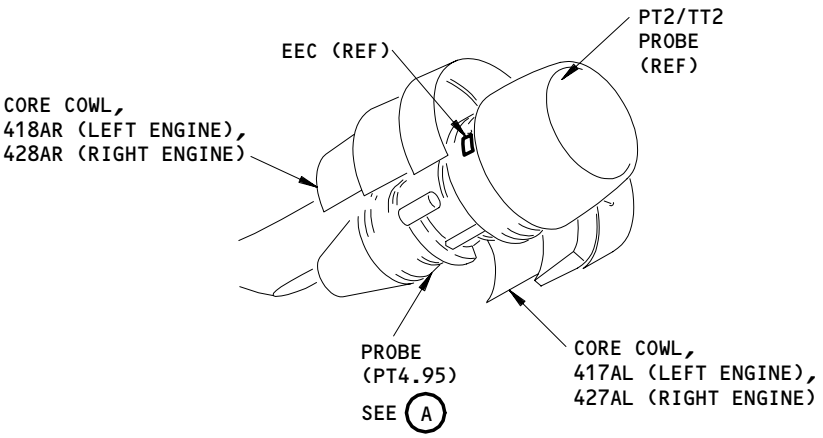
77 03 24 --	1.	(01=L, 02=R) prim eng N2 ind (blank, high, low, zero, fluctuates) using Stby eng ind normal (Ref Chapter 71 for fault code diagrams).
	2.	FIM 77-12-00/101, Fig. 105, Block 1

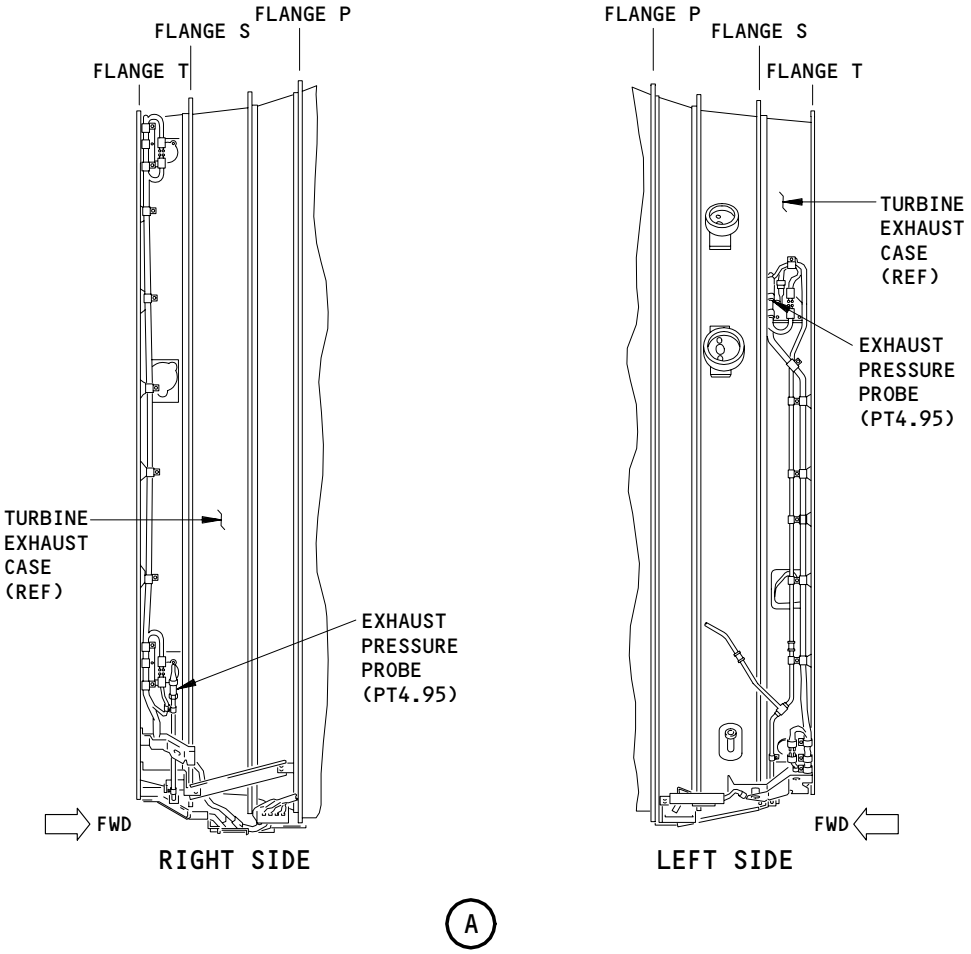
ENGINE PRESSURE RATIO (EPR) INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
COMPUTER - (FIM 31-41-00/101)				
L EICAS, M10181				
R EICAS, M10182				
CONTROL - (FIM 73-21-00/101)				
ELECTRONIC ENGINE (EEC), M7198				
INDICATOR - (FIM 77-41-00/101)				
STANDBY ENGINE, N10016				
PROBE - L ENG EXHAUST PRESSURE, PT4.95	--	2	417AL,418AR, CORE COWL PANELS	77-11-01
PROBE - R ENG EXHAUST PRESSURE, PT4.95	--	2	427AL,428AR, CORE COWL PANELS	77-11-01
PROBE - (FIM 73-21-00/101)				
EEC INLET TOTAL PRESSURE/TEMPERATURE, PT2/TT2				

* SEE THE WDM EQUIPMENT LIST

Engine Pressure Ratio (EPR) Indicating System - Component Index
Figure 101





Engine Pressure Ration (EPR) Indicating System - Component Location
Figure 102

EPR INDICATION PROBLEMS

PREREQUISITES

NONE

1 DO THE PIMU BITE PROCEDURE (71-PIMU MESSAGE INDEX, FIG. 103).
LOOK FOR THE MESSAGES THAT FOLLOW:

EEC CH-A/B P5 LINE FAULT (350-21)
EEC CH-A/B P2 LINE FAULT (350-22)
EEC CH-A/B LBL 353 BIT 27 (353-27)
EEC CH-A/B P0 LINE FAIL (353-27)
EEC CH-A/B LBL 350 BIT 24 (350-24)
EEC CH-A/B T2/P2 PROBE HT (350-24)
EEC CH-A/B DEM PLUG INVALID (350-26)
EEC CH-A/B UNIT FAIL (350-15)
EEC CH-A/B MODE IND W/A FAIL (354-27)

DOES ONE OR MORE OF THE ABOVE MESSAGES SHOW?

YES → 20 REFER TO PIMU TABLE 101 FOR CORRECTION.

NO

2 EXAMINE THE PNEUMATIC TUBES FROM THE PT2/TT2 PROBE TO THE EEC FOR LEAKS (TEST NO. 14, AMM 71-00-00/501) OR DAMAGE.
DID YOU FIND LEAKS OR DAMAGE?

YES → 21 REPAIR OR REPLACE THE PNEUMATIC TUBES AND/OR FITTINGS AS NECESSARY.

NO

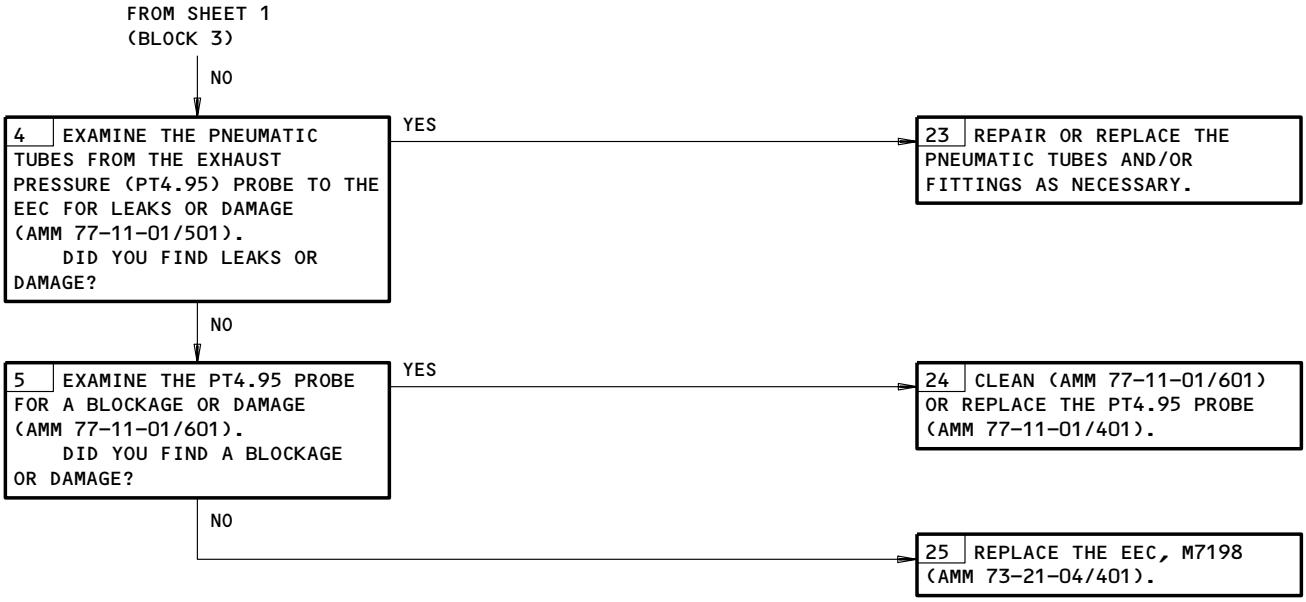
3 EXAMINE THE PT2/TT2 PROBE FOR A BLOCKAGE OR DAMAGE.
DID YOU FIND A BLOCKAGE OR DAMAGE?

YES → 22 REPLACE THE PT2/TT2 PROBE (AMM 73-21-03/401).

NO

SEE SHEET 2 (BLOCK 4)

EPR Indication Problems
Figure 103 (Sheet 1)



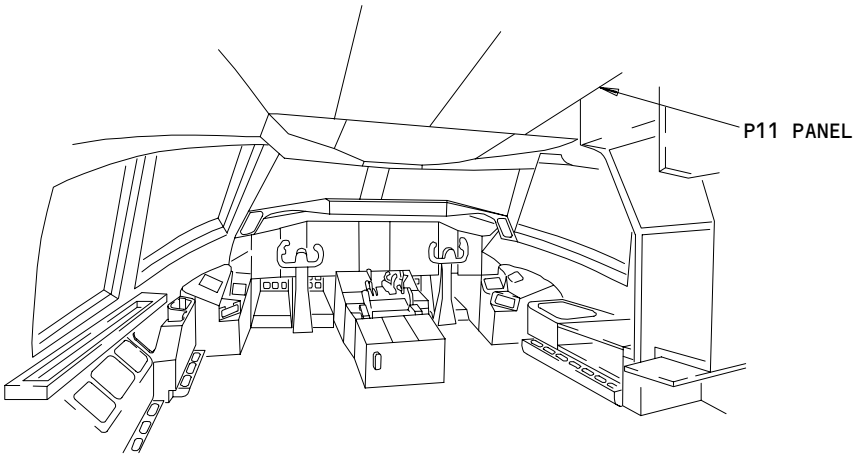
EPR Indication Problems
Figure 103 (Sheet 2)

ENGINE TACHOMETER SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ALTERNATOR - (FIM 73-21-00/101)				
EEC (N2 TRANSDUCER), T1519				
CARD - LEFT N2 ENGINE SPEED, M1093	2	1	119AL, MAIN EQUIP CTR, P50 ELECTRICAL SYSTEM CARD FILE	77-12-01
CARD - RIGHT N2 ENGINE SPEED, M1092	2	1	119AL, MAIN EQUIP CTR, P50 ELECTRICAL SYSTEM CARD FILE	77-12-01
CIRCUIT BREAKER -	1		FLIGHT COMPT, P11	
ENGINE SPEED SENSE L1, C1428			11D23	*
ENGINE SPEED SENSE R1, C1429			11D24	*
ENGINE SPEED SENSE L2, C1426			11D15	*
ENGINE SPEED SENSE R2, C1427			11D16	*
COMPUTER - (FIM 31-41-00/101)				
L EICAS, M10181				
R EICAS, M10182				
INDICATOR - (FIM 77-41-00/101)				
STANDBY ENGINE, N10016				
TRANSDUCER - (FIM 73-21-00/101)				
EEC SPEED, N1				

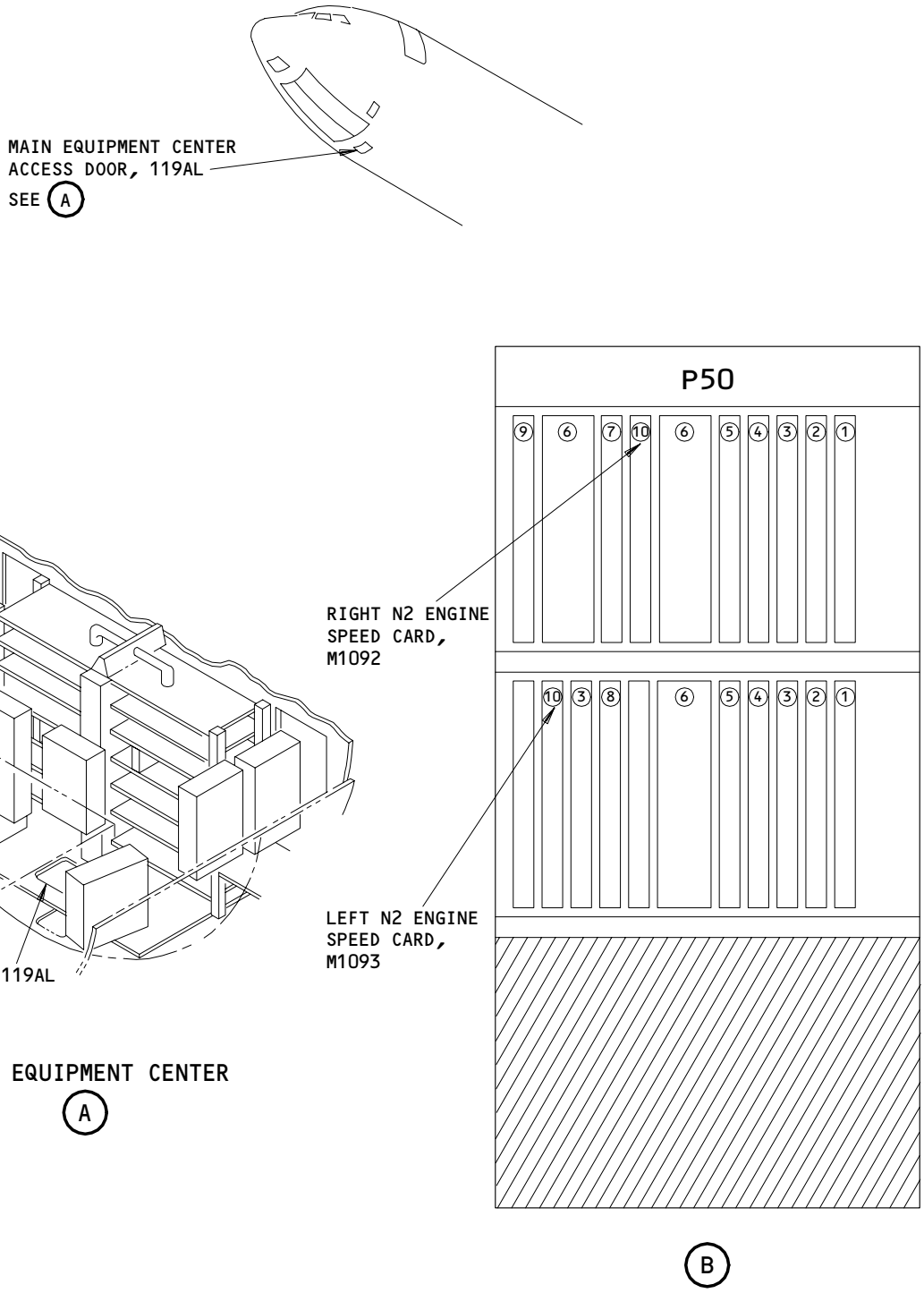
* SEE THE WDM EQUIPMENT LIST

Engine Tachometer System - Component Index
Figure 101



FLIGHT COMPARTMENT

Engine Tachometer System - Component Location
Figure 102 (Sheet 1)



Engine Tachometer System - Component Location
Figure 102 (Sheet 2)

N1 INDICATION PROBLEMS

PREREQUISITES

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
ELECTRICAL POWER IS ON (AMM 24-22-00/201)

POSSIBLE CAUSES:

1. BAD EEC SPEED TRANSDUCER (AMM 73-21-06/401).

FAULT ISOLATION:

1 DO THIS PROCEDURE: PIMU BITE PROCEDURE (71-PIMU MESSAGE INDEX, FIG. 103).
LOOK FOR THE MESSAGES THAT FOLLOW:

EEC CH-A/B N1 RANGE FAIL (352-14)
EEC CH-A/B N1 CROSS-CK FAIL (353-14)
EEC CH-A/B CHAN FAIL (350-14)

DOES ONE OR MORE OF THE ABOVE MESSAGES SHOW?

YES → 21 REFER TO PIMU TABLE 101 FOR CORRECTION.

NO → 22 REPLACE THE EEC SPEED TRANSDUCER (N1)(AMM 73-21-06/401).
IF THE PROBLEM CONTINUES, EXAMINE THE CIRCUIT FROM THE EEC, M7198, AND THE EEC SPEED TRANSDUCER (N1), T688; CHANNEL A, CONNECTOR W1P6, PINS E,A TO CONNECTOR W4P19, PINS 1,2; CHANNEL B, CONNECTOR W2P2, PINS E,A, TO CONNECTOR W4P19, PINS 4,5 (WDM 71-51-14).
REPAIR THE PROBLEMS THAT YOU FIND.

N1 Indication Problems
Figure 103

N2 INDICATION PROBLEMS

PREREQUISITES

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
ELECTRICAL POWER IS ON (AMM 24-22-00/201)

POSSIBLE CAUSES:

1. BAD EEC ALTERNATOR (AMM 73-21-05/401).

FAULT ISOLATION:

1 DO THIS PROCEDURE: PIMU BITE PROCEDURE (71-PIMU MESSAGE INDEX, FIG. 103).
LOOK FOR THE MESSAGES THAT FOLLOW:

EEC CH-A/B N2 RANGE FAIL (352-15)
EEC CH-A/B N2 CROSS-CK FAIL (353-15)
EEC CH-A/B CHAN FAIL (350-14)

DOES ONE OR MORE OF THE ABOVE MESSAGES SHOW?

YES → 21 REFER TO PIMU TABLE 101 FOR CORRECTION.

NO → 22 REPLACE THE EEC ALTERNATOR (N2 TRANSDUCER), T1519 (AMM 73-21-05/401).
IF THE PROBLEM CONTINUES, REMOVE THE L (R) EICAS COMPUTER, M10181 (M10182) (AMM 31-41-02/401). EXAMINE THE CIRCUIT FROM EEC ALTERNATOR, T1519, CONNECTOR W3P1, PINS D AND E, TO L (R) EICAS COMPUTER, M10181 (M10182), CONNECTOR D883A OR D881A (D883D OR D881D), PINS J5 AND J6 (J8 AND J9)(WDM 77-12-12).
REPAIR THE PROBLEMS THAT YOU FIND.
INSTALL THE EICAS COMPUTER.

N2 Indication Problems
Figure 104

N1 OR N2 INDICATION PROBLEMS ON EICAS (INDICATION NORMAL ON SEI)

PREREQUISITES
NONE

1 FOR THE LEFT ENGINE, EXAMINE THE CIRCUIT FROM THE EICAS RACK, E8, TO THE LEFT MISC ELECTRICAL EQUIPMENT PANEL, P36; CHANNEL A, D6218P PINS B14, B15 TO TB302 PINS YC16,YA16; CHANNEL B, D6202P PINS B2,B3 TO TB302 PINS Z21,Z22 (WDM 73-21-14). REPAIR THE PROBLEMS THAT YOU FIND.
FOR THE RIGHT ENGINE, EXAMINE THE CIRCUIT FROM THE EICAS RACK, E8, TO THE RIGHT MISC ELECTRICAL EQUIPMENT PANEL, P37; CHANNEL A, D6214P PINS A18,A19 TO TB304 PIN YA18,YC18; CHANNEL B, D6236P PINS B2,B3 TO TB304 PINS Z21,Z22 (WDM 73-21-14). REPAIR THE PROBLEMS THAT YOU FIND.

N1 or N2 Indication Problems on EICAS (Indication Normal on SEI)
Figure 105

EICAS MESSAGE "(L,R) ENG ANALOG N2" SHOWN

PREREQUISITES

NONE

1 EXAMINE THE CIRCUIT FROM THE EEC ALTERNATOR (N2 TRANSDUCER), T1519, CONNECTOR W3P1, PINS E AND D, TO THE L (R) EICAS COMPUTERS, M10181 (M10182), CONNECTOR D881A AND D883A (D881D AND D883D), PINS J5 AND J6 (J8 AND J9) (WDM 77-12-12).
WERE THERE ANY WIRING PROBLEMS FOUND?

YES → 21 REPAIR THE WIRING PROBLEMS THAT YOU FOUND.

NO

2 MAKE SURE THE RESISTANCE BETWEEN PINS D AND E ON THE EEC ALTERNATOR (N2 TRANSDUCER), T1519, IS 900-1100 OHMS.
IS THE RESISTANCE IN THE LIMITS GIVEN?

NO → 22 REPLACE THE EEC ALTERNATOR (N2 TRANSDUCER), T1519 (AMM 73-21-05/401).

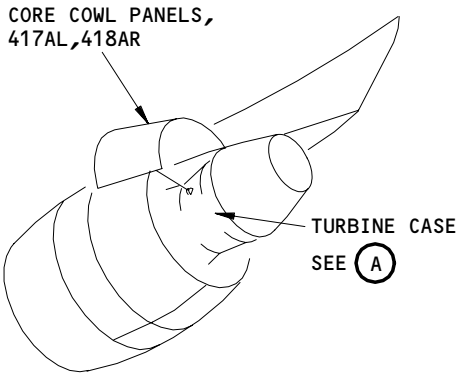
YES → 23 RETURN THE ENGINE TO SERVICE.

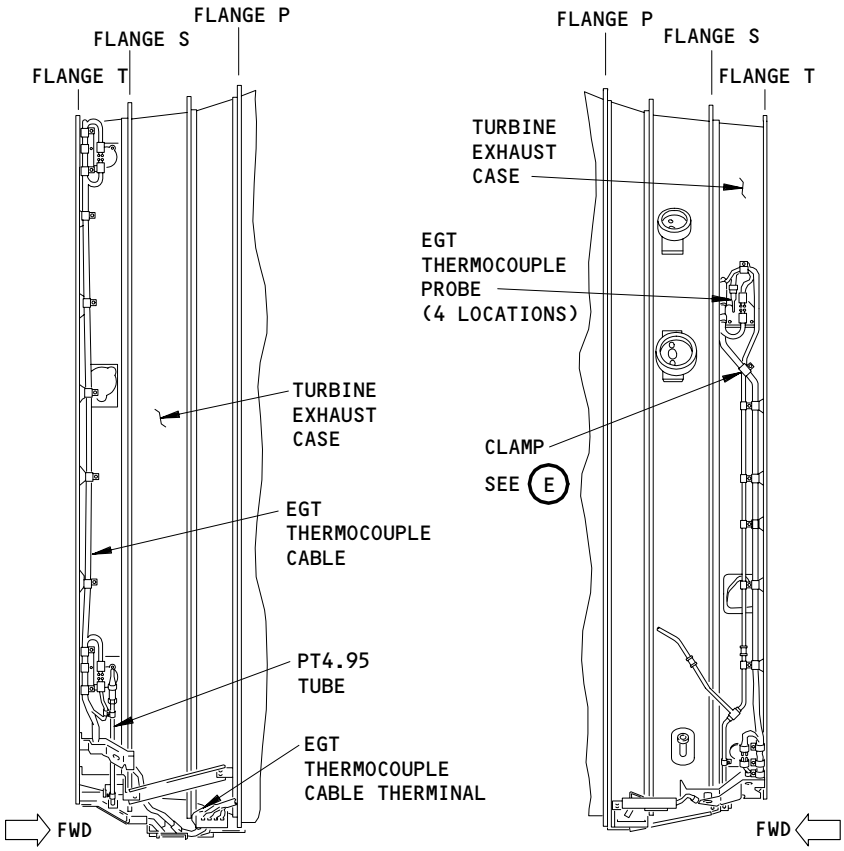
EICAS Message (L,R) ENG ANALOG N2 Shown
Figure 106

EXHAUST GAS TEMPERATURE (EGT) INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
BOX - EGT THERMOCOUPLE CABLE TERMINAL	--	1	417AL,418AR, CORE COWL PANELS	77-21-04
CABLE - EGT THERMOCOUPLE	--	2	417AL,418AR, CORE COWL PANELS	77-21-02
COMPUTER - (FIM 31-41-00/101)				
L EICAS, M10181				
R EICAS, M10182				
INDICATOR - (FIM 77-41-00/101)				
STANDBY ENGINE, N10016				
PROBE - EGT THERMOCOUPLE	--	4	417AL,418AR, CORE COWL PANELS	77-21-01

Exhaust Gas Temperature (EGT) Indicating System - Component Index
Figure 101





TURBINE CASE

A

Exhaust Gas Temperature (EGT) Indicating System - Component Location
Figure 102

EGT INDICATION PROBLEMS

PREREQUISITES

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
ELECTRICAL POWER IS ON (AMM 24-22-00/201)

1 DO THIS PROCEDURE: PIMU BITE PROCEDURE (FIM 71-PIMU MESSAGE INDEX, FIG. 3).
LOOK FOR THE MESSAGES THAT FOLLOW:
- EEC CH-A/B T5 RANGE FAIL (352-19)
- EEC CH-A/B T5 CROSS-CK FAIL (353-19)
- EEC A/B-CHAN FAIL (350-14)

DOES ONE OR MORE OF THE ABOVE MESSAGES SHOW?

YES → 21 REFER TO PIMU TABLE A FOR CORRECTION.

NO

2 DO A TEST OF THE EXHAUST GAS TEMPERATURE THERMOCOUPLE BOX AND CABLES (AMM 77-21-03/501).
DID YOU FIND PROBLEMS WITH THE THERMOCOUPLE BOX OR CABLES?

YES → 22 REPLACE THE APPLICABLE THERMOCOUPLE BOX OR CABLE (AMM 77-21-03/401).

NO

3 DO A TEST OF THE EXHAUST GAS TEMPERATURE THERMOCOUPLE PROBES (AMM 77-21-01/501).
DID YOU FIND PROBLEMS WITH THE THERMOCOUPLE PROBES?

YES → 23 REPLACE THE APPLICABLE THERMOCOUPLE PROBES (AMM 77-21-01/401).

NO → 24 EXAMINE THE CIRCUIT FROM THE EEC, M7198, TO THE EGT (TT4.95) THERMOCOUPLE CABLE TERMINAL BOX; CHANNEL A, W1P7, PINS A, X, TO STUDS CR, AL; CHANNEL B, W2P3, PINS A, X, TO STUDS CR, AL. REPAIR THE PROBLEMS THAT YOU FIND. 1

1 TIGHTEN THE LARGER NUT (ON THE ALUMEL STUD) TO 10-15 POUND-INCHES (1.1-1.7 NEWTON-METERS). TIGHTEN THE SMALLER NUT (ON THE CHROMEL STUD) TO 8-12 POUND-INCHES (0.9-1.4 NEWTON-METERS).

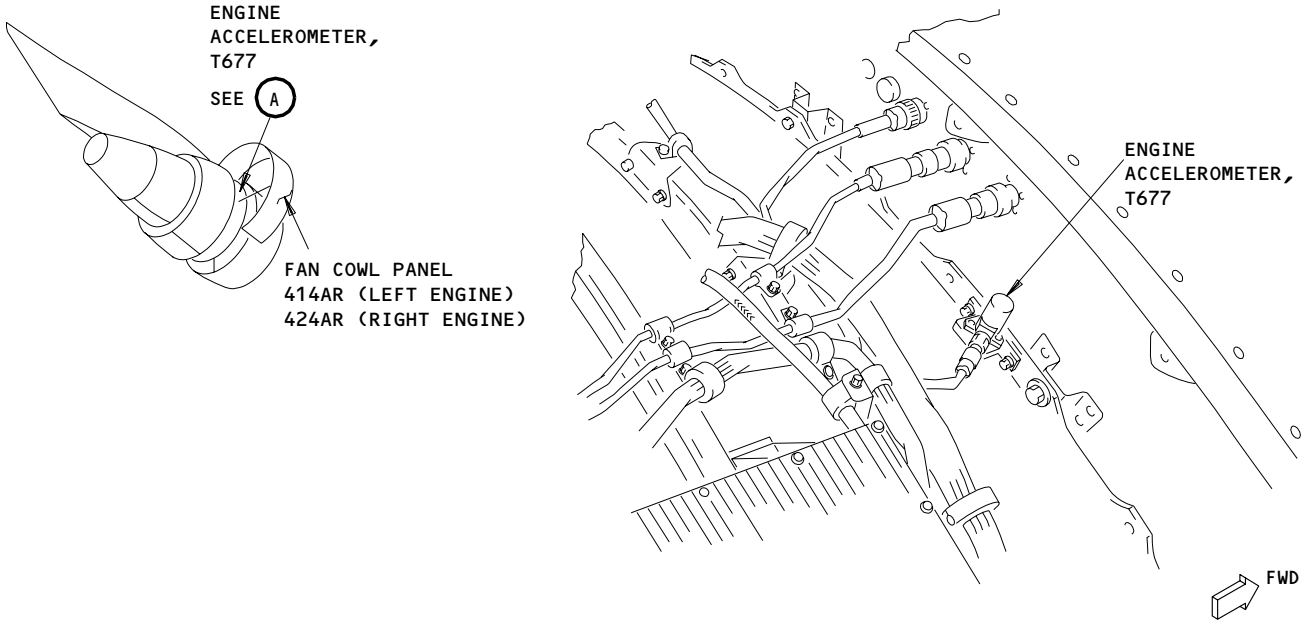
EGT Indication Problems
Figure 103

AIRBORNE VIBRATION MONITORING (AVM) SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACCELEROMETER - L ENGINE, T677	--	1	414AR, RIGHT FAN COWL PANEL	77-31-01
ACCELEROMETER - R ENGINE, T677	--	1	424AR, RIGHT FAN COWL PANEL	77-31-01
CIRCUIT BREAKER -	--		FLT COMPT, P11	
VIB MONITOR, C1464		1	11K1	*
COMPUTER - (FIM 31-41-00/101)				
EICAS L, M10181				
EICAS R, M10182				
CONDITIONER - AIRBORNE VIBRATION MONITOR (AVM) SIGNAL, M132	--	1	119AL, MAIN EQUIP CTR, E2-4	77-31-03

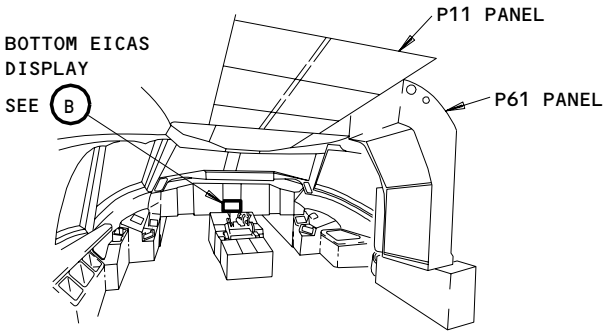
* SEE THE WDM EQUIPMENT LIST

Airborne Vibration Monitoring (AVM) System - Component Index
Figure 101

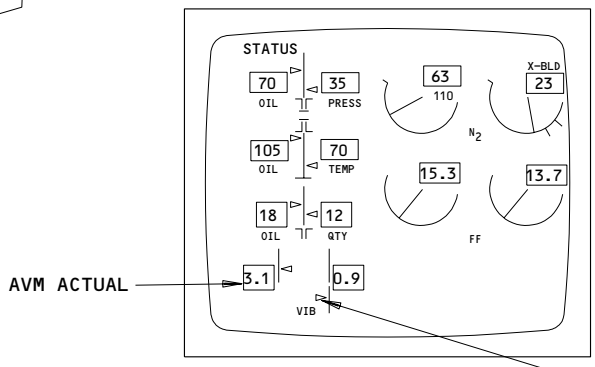


ENGINE ACCELEROMETER, T677

A



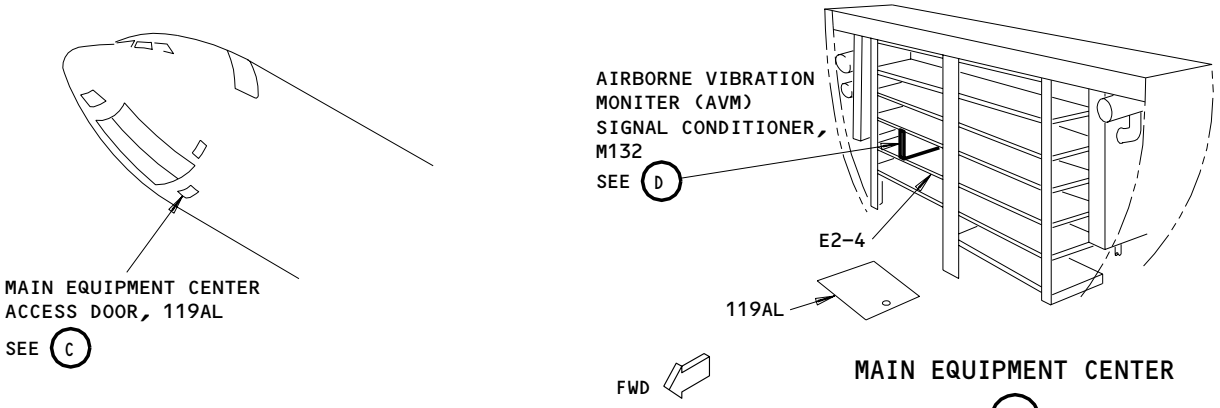
FLIGHT COMPARTMENT



BOTTOM EICAS DISPLAY

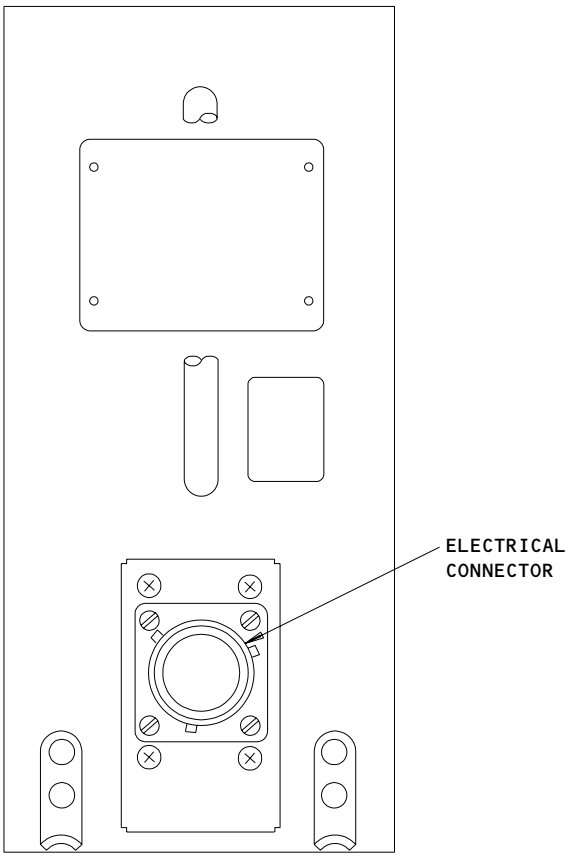
B

Airborne Vibration Monitoring (AVM) System – Component Location
Figure 102 (Sheet 1)



MAIN EQUIPMENT CENTER

C



AVM SIGNAL CONDITIONER, M132

D

Airborne Vibration Monitoring (AVM) System - Component Location
Figure 102 (Sheet 2)

VIB INDICATION PROBLEMS

PREREQUISITES

MAKE SURE THIS SYSTEM WILL OPERATE:
EICAS (AMM 31-41-00/501)

MAKE SURE THIS CIRCUIT BREAKER IS CLOSED:
11K1

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
ELECTRICAL POWER IS ON (AMM 24-22-00/201)

POSSIBLE CAUSES:

1. BAD OR DAMAGED VIBRATION MONITOR SIGNAL CONDITIONER (AMM 77-31-03/401)
2. LOOSE ACCELEROMETER MOUNTING HARDWARE (AMM 77-31-01/401)
3. LOOSE VIBRATION MONITOR WIRING (WDM 77-31-11)
4. BAD OR DAMAGED ACCELEROMETER (AMM 77-31-01/401).

FAULT ISOLATION:

1 LOOK FOR THE EICAS MAINTENANCE MESSAGE "ENG VIB BITE".
DOES THIS MESSAGE SHOW?

YES → 21 DO THIS PROCEDURE: AIRBORNE VIBRATION MONITOR INTERROGATION PROCEDURE (FIG. 104).

NO ↓

2 EXAMINE THE ENGINE ACCELEROMETER AND CABLE FOR LOOSE MOUNTING SCREWS, CLAMPS, AND DAMAGE.
WAS LOOSE MOUNTING HARDWARE FOUND?

YES → 22 TIGHTEN, REPAIR, OR REPLACE THE MOUNTING HARDWARE AS NECESSARY (AMM 77-31-01/401).

NO → 23 EXAMINE THE CIRCUIT FROM THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132, CONNECTOR D2708A (D2708B), PINS, A1 AND B1, TO THE L (R) ENGINE ACCELEROMETER, T677, CONNECTOR D10994, PINS, 1, AND 2 (WDM 77-31-11). REPAIR THE PROBLEMS THAT YOU FIND.
IF THE PROBLEM CONTINUES, REPLACE THE ENGINE ACCELEROMETER, T677 (AMM 77-31-01/401).
IF THE PROBLEM CONTINUES, REMOVE THE L (R) EICAS COMPUTER, M10181 (M10182) (AMM 31-41-02/401).
EXAMINE THE CIRCUIT FROM THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132, CONNECTOR D2708A, PINS, C6 AND D6, TO THE L (R) EICAS COMPUTER, M10181 (M10182), CONNECTOR D881E (D883E), PINS, B2 AND B3 (WDM 77-31-11). REPAIR THE PROBLEMS THAT YOU FIND.
INSTALL THE EICAS COMPUTERS.

VIB Indication Problems
Figure 103

AIRBORNE VIBRATION MONITOR INTERROGATION PROCEDURE

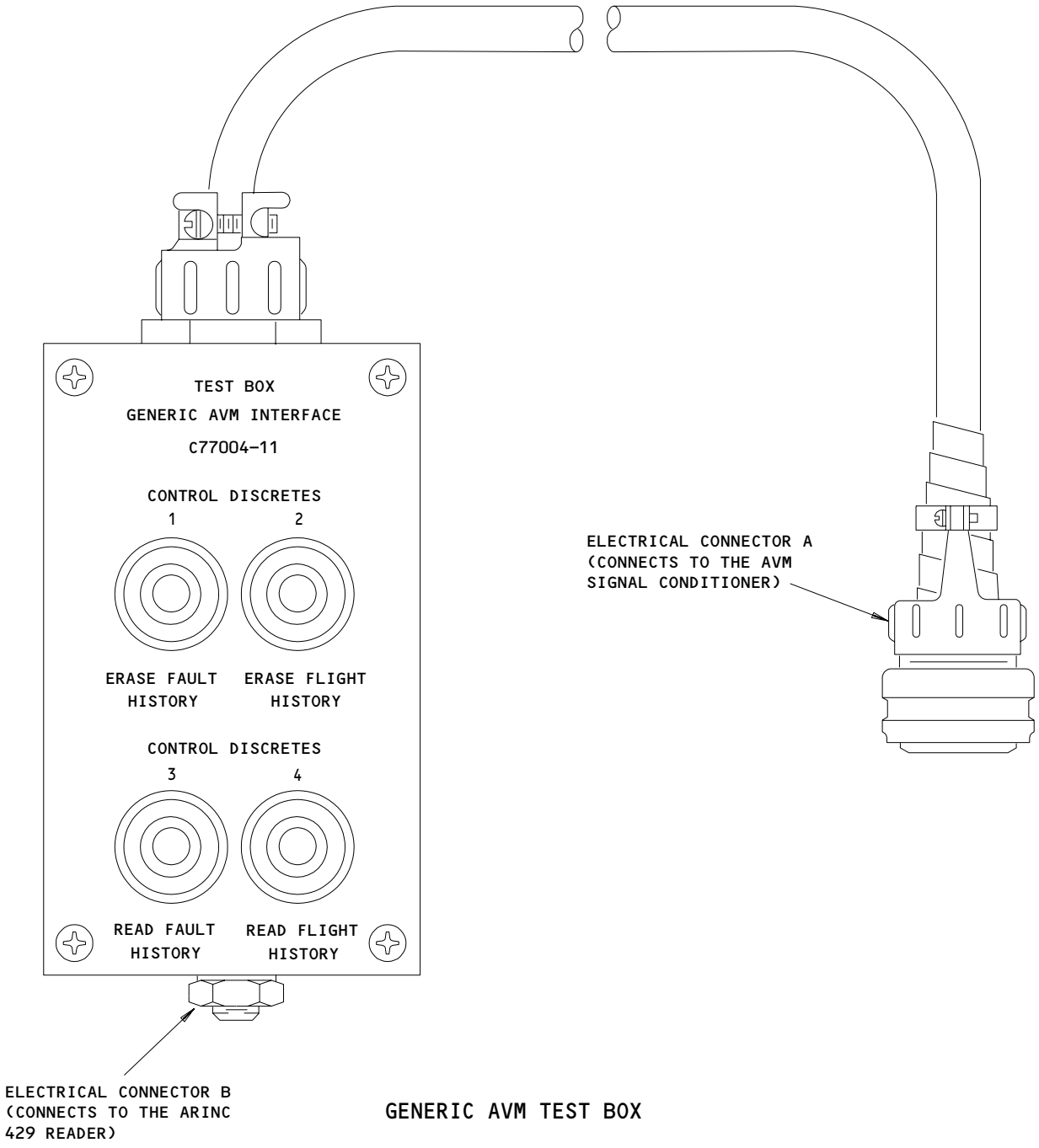
1. GENERAL
   A. THIS PROCEDURE GIVES THE INSTRUCTIONS TO USE AN ARINC 429 READER WITH STORAGE CAPABILITY TO READ AND ERASE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER FAULT HISTORY. YOU MUST DO THIS PROCEDURE WITH THE ENGINES NOT IN OPERATION.
2. EQUIPMENT
   A. ARINC READER - JCAIR MODEL 429EB
   B. TEST BOX GENERIC AVM INTERFACE - C77004-11
   C. JUMPER WIRES
3. READ THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER FAULT HISTORY
   A. MAKE SURE THE CIRCUIT BREAKER THAT FOLLOWS IS CLOSED:
      (1) 11K1, ENG VIB MONITOR
   B. CONNECT AN ARINC 429 READER TO THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER AS FOLLOWS:
      (1) REMOVE THE COVER FROM THE CONNECTOR ON THE FRONT PANEL OF THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER.
      (2) IF THE GENERIC AVM TEST BOX IS USED, DO THE STEPS THAT FOLLOW (SHEET 2):
         (a) CONNECT THE GENERIC AVM TEST BOX (ELECTRICAL CONNECTOR A) TO THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER.
         (b) CONNECT THE ARINC 429 READER RECEIVER INPUT PORT TO THE GENERIC AVM TEST BOX (ELECTRICAL CONNECTOR B).
      (3) IF THE GENERIC AVM TEST BOX IS NOT USED, DO THE STEP THAT FOLLOWS:
         (a) CONNECT THE ARINC 429 READER INPUT PORT TO THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER CONNECTOR PIN 1 (DATA BUS OUTPUT HIGH) AND PIN 2 (DATA BUS OUPUT LOW).
   C. IF THE GENERIC AVM IS USED, PREPARE THE ARINC 429 READER TO MONITOR AND MAKE A RECORD OF THE LABEL 301 (SHEET 3).
      (1) MOVE THE ARINC 429 READER "ON/OFF" SWITCH TO THE ON POSITION.

         NOTE: THE ARINC 429 READER WILL DO A SELF-TEST WHEN POWER IS SUPPLIED. IF THE ARINC 429 READER PASSES THE SELF-TEST THE MESSAGE "SELF TEST OK" WILL SHOW FOR 2 SECONDS. THE ARINC 429 READER WILL THEN SHOW THE LABELS RECEIVED.

      (2) MOVE THE ARINC 429 READER "RX SPEED" SWITCH TO THE LO POSITION.
      (3) MOVE THE ARINC 429 READER "DISPLAY" SWITCH TO THE ENG POSITION.
      (4) MAKE SURE THE "RX" LIGHT EMITTING DIODE (LED) IS ON. IF THE "RX" LED IS NOT ON, PUSH THE "TX/RX" KEY ON THE ARINC 429 READER UNTIL THE "RX" LED COMES ON.
      (5) PUSH THE "TRAP" KEY ON THE ARINC 429 READER. THIS WILL CAUSE THE ARINC 429 READER TO GO INTO THE TRAP MODE WHICH WILL STORE THE LABELS AND BITS THAT ARE RECEIVED BY THE READER. THE ARINC 429 READER WILL THEN SHOW THE MESSAGE "LABEL?_".
      (6) PUSH THE "D" KEY ON THE ARINC 429 READER. THE READER WILL THEN SHOW THE MESSAGE "DATA ONLY" FOR ONE SECOND. THIS SHOWS THAT THE READER HAS GONE TO THE EXPANDED MEMORY MODE. THE ARINC 429 READER WILL AGAIN SHOW THE MESSAGE "LABEL?_".
      (7) PUT "301" ON THE ARINC 429 READER AND PUSH THE "ENT" KEY. THE ARINC 429 READER WILL THEN SHOW THE MESSAGE "SDI?_".
      (8) IF YOU READ THE FAULT MESSAGES FOR EACH ENGINE, PUSH THE "ENT" KEY ON THE ARINC 429 READER.
      (9) IF YOU READ THE FAULT MESSAGES FOR THE LEFT ENGINE ONLY, PUT "01" ON THE ARINC 429 READER AND PUSH THE "ENT" KEY.
      (10) IF YOU READ THE FAULT MESSAGES FOR THE RIGHT ENGINE ONLY, PUT "10" ON THE ARINC 429 READER AND PUSH THE "ENT" KEY.
   D. IF THE GENERIC AVM TEST BOX IS USED, DO THE STEPS THAT FOLLOW:
      (1) PUSH THE "READ FAULT HISTORY" SWITCH ON THE GENERIC AVM TEST BOX. THIS WILL CAUSE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER TO TRANSMIT LABEL 301 FAULT CODES TO THE ARINC 429 READER.

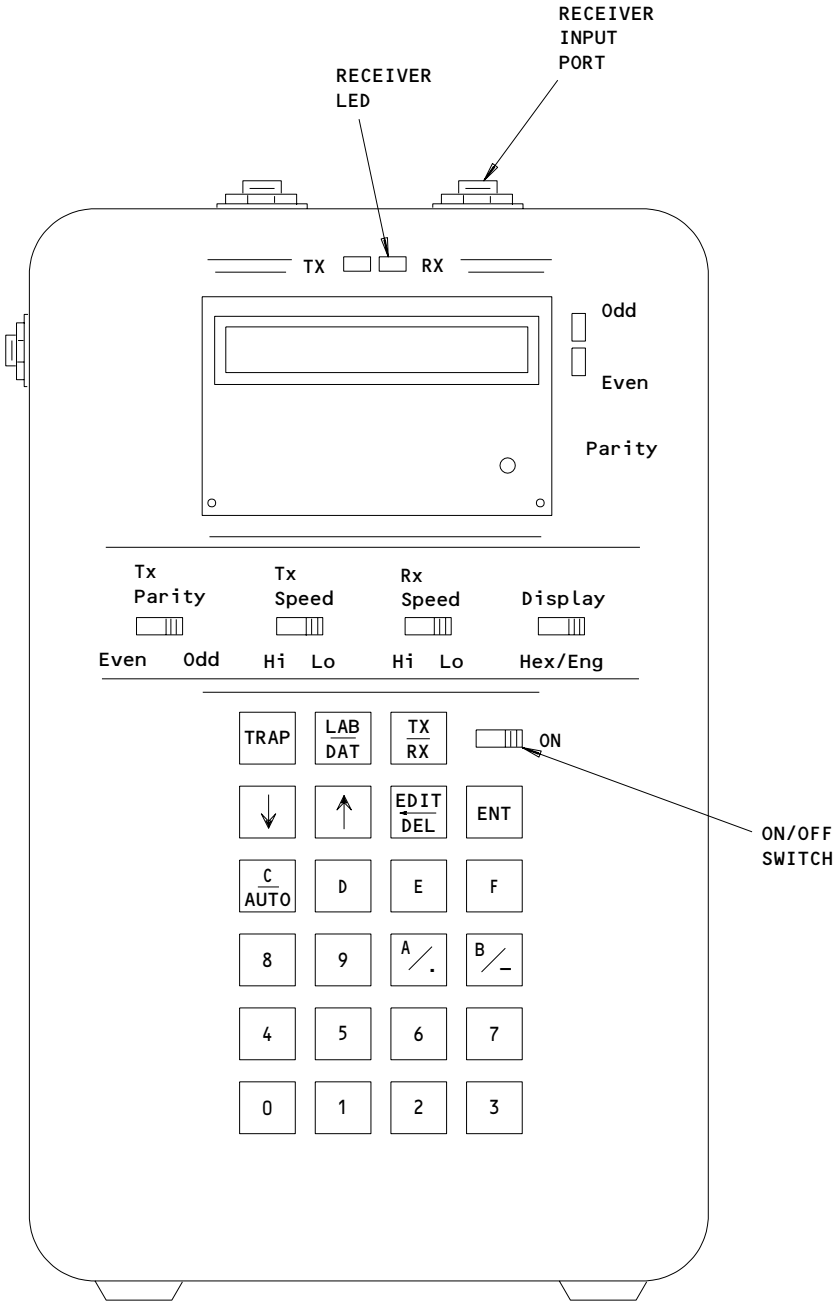
         NOTE: THE DISPLAY ON THE ARINC 429 READER WILL SHOW THE MESSAGE "### RX LABELS". THE "###" SYMBOLS WILL BE REPLACED BY THE NUMBER OF FAULT MESSAGES TRANSMITTED TO THE ARINC 429 READER. THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER WILL TRANSMIT ONE COPY OF ALL STORED FAULT WORDS TO THE ARINC 429 READER. IF NO FAULT MESSAGES WERE STORED IN THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, THEN ONLY ONE FAULT WORD WILL BE SENT TO THE ARINC 429 READER. THIS ONE FAULT WORD WILL INCLUDE THE MESSAGE "INACTIVE".

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 1)



GENERIC AVM TEST BOX

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 2)



ARINC 429 READER

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 3)

E. IF THE GENERIC AVM TEST BOX IS NOT USED, DO THE STEPS THAT FOLLOW:
(1) CONNECT A JUMPER WIRE BETWEEN PIN 23 (FAULT HISTORY READ CONTROL) AND PIN 20 (CONTROL DISCRETE COMMON) ON THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER. REMOVE THE JUMPER WIRE AFTER 5 SECONDS. THIS WILL CAUSE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER TO TRANSMIT LABEL 301 FAULT CODES TO THE ARINC 429 READER.

NOTE: THE DISPLAY ON THE ARINC 429 READER WILL SHOW THE MESSAGE "### RX LABELS". THE "###" SYMBOLS WILL BE REPLACED BY THE NUMBER OF FAULT MESSAGES TRANSMITTED TO THE ARINC 429 READER. THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER WILL TRANSMIT ONE COPY OF ALL STORED FAULT WORDS TO THE ARINC 429 READER. IF NO FAULT MESSAGES WERE STORED IN THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, THEN ONLY ONE FAULT WORD WILL BE SENT TO THE ARINC 429 READER. THIS ONE FAULT WORD WILL INCLUDE THE MESSAGE "INACTIVE".

F. TO READ THE STORED FAULT WORDS FOR LABEL 301, DO THE STEPS THAT FOLLOW:
(1) PUSH THE UP ARROW KEY ON THE ARINC 429 READER.

NOTE: THE MESSAGE "301 FAULT HIST" WILL SHOW ON THE ARINC 429 READER.

(2) PUSH THE UP/DOWN ARROW KEYS ON THE ARINC 429 READER TO SHOW THE STORED FAULT WORDS.

NOTE: THE MESSAGE "TRAPPED WORD ##" WILL SHOW ON THE ARINC 429 READER. THE SYMBOLS "##" SHOW THE SEQUENCE IN WHICH THE WORDS WERE RECEIVED BY THE ARINC 429 READER. THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER CAN TRANSMIT UP TO 32 FAULT WORDS. EACH FAULT WORD INCLUDES THE FAULT MESSAGE, ENGINE LOCATION, AND FAULT SEQUENCE.

(3) PUSH THE "LAB/DAT" KEY ON THE ARINC 429 READER TO ENTER THE DATA MODE.

NOTE: THE "LAB/DAT" KEY CHANGES THE ARINC 429 READER FROM THE LABEL MODE TO THE DATA MODE AND BACK. THE ARINC 429 READER MUST BE IN THE DATA MODE TO SHOW FAULT MESSAGES, ENGINE LOCATIONS, AND FAULT SEQUENCE. THE ARINC 429 READER MUST BE IN THE LABEL MODE TO MOVE UP TO THE SUBSEQUENT FAULT WORD.

(4) PUSH THE UP/DOWN ARROW KEYS ON THE ARINC 429 READER UNTIL THE FAULT NUMBER, ENGINE LOCATION, AND FAULT SEQUENCE HAVE SHOWN.

NOTE: THE MESSAGE "FAULT #" SHOWS THE SEQUENCE IN WHICH THE FAULTS WERE RECEIVED IN THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER. "FAULT 0" IS THE LAST MESSAGE STORED AND "FAULT 1" IS THE SUBSEQUENT TO THE LAST MESSAGE STORED.

(5) PUSH THE "LAB/DAT" KEY ON THE ARINC 429 READER TO GO BACK TO THE LABEL MODE.
(6) DO THE FOUR STEPS ABOVE UNTIL ALL FAULT MESSAGES HAVE SHOWN.
G. MAKE A RECORD OF ALL THE FAULT MESSAGES AND DO THE CORRECTION SHOWN IN TABLE 101.
H. IF YOU USE AN ARINC 429 READER OTHER THAN THE ONE IN THE EQUIPMENT LIST ABOVE, FIND THE FAULT MESSAGE IN TABLE 102 AND DO THE CORRECTION SHOWN IN TABLE 101.

4. ERASE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER FAULT HISTORY

A. IF THE GENERIC AVM TEST BOX IS USED, DO THE STEPS THAT FOLLOW:
(1) PUSH THE "ERASE FAULT HISTORY" SWITCH ON THE GENERIC AVM TEST BOX.
B. IF THE GENERIC AVM TEST BOX IS NOT USED, DO THE STEPS THAT FOLLOW:
(1) CONNECT A JUMPER WIRE BETWEEN PIN 18 (FAULT HISTORY ERASE CONTROL DISCRETE) AND PIN 20 (CONTROL DISCRETE COMMON) ON THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER. REMOVE THE JUMPER WIRE AFTER 5 SECONDS.
C. ERASE THE EICAS MAINTENANCE MESSAGE "ENG VIB BITE" (AMM 31-41-00/201).
D. MAKE SURE THE EICAS MAINTENANCE MESSAGE "ENG VIB BITE" DOES NOT SHOW (AMM 31-41-00/201).
E. DISCONNECT THE CONNECTORS FROM THE FRONT PANEL CONNECTOR FOR THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER.
F. INSTALL THE CONNECTOR COVER ON THE CONNECTOR FOR THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER.

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 4)

FAULT MESSAGE	CORRECTION
UNIT FAIL	REPLACE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132 (AMM 77-31-03/401).
N1 TACH LOSS	EXAMINE AND REPAIR THE CIRCUITS FROM THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132, TO THE EEC, M7198 (WDM 77-12-11; WDM 77-31-11). ENG CONNECTOR PIN TO CONNECTOR PIN L D2708A A8 D11686 A B8 E R D2708B A8 D11686 A B8 E IF THE PROBLEM CONTINUES, REPLACE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132 (AMM 77-31-03/401).
N2 TACH LOSS	EXAMINE AND REPAIR THE CIRCUITS FROM THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132, TO THE L (R) ENGINE SPEED CARD, M1093 (M1092) (WDM 77-12-12; WDM 77-31-11). ENG CONNECTOR PIN TO CONNECTOR PIN L D2708A C10 D10064 9 D10 13 R D2708B C10 D10062 9 D10 13 IF THE PROBLEM CONTINUES, REPLACE THE AIRBORNE VIBRATION MONITOR SIGNAL CONDITIONER, M132 (AMM 77-31-03/401).
1/REV LOSS EX	REPLACE THE N1 SPEED TRANSDUCER ON THE ENGINE (AMM 73-21-06/401).

TABLE 101

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 5)

ARINC 429 BITS		DEFINITION
1 - 8	8 7 6 5 4 3 2 1 1 0 0 0 0 0 1 1	ARINC 429 LABEL 301
9 - 10	10 9 0 1 1 0	ENGINE LOCATION (SDI) LEFT ENGINE RIGHT ENGINE
11 - 15	15 14 13 12 11 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 1 1 0 0 1 0 0 0 0 1 0 1 0 0 1 1 0 0 0 1 1 1 0 1 0 0 0 0 1 0 0 1 0 1 0 1 0 0 1 0 1 1 0 1 1 0 0 0 1 1 0 1 0 1 1 1 0 0 1 1 1 1 1 0 0 0 0 1 0 0 0 1 1 0 0 1 0 1 0 0 1 1 1 0 1 0 0 1 0 1 0 1 1 0 1 1 0 1 0 1 1 1 1 1 0 0 0 1 1 0 0 1 1 1 0 1 0 1 1 0 1 1 1 1 1 0 0 1 1 1 0 1 1 1 1 1 0 1 1 1 1 1	FAULT SEQUENCE FAULT 0: LAST FAULT RECEIVED FAULT 1: SECOND TO THE LAST FAULT RECEIVED FAULT 2: THIRD TO THE LAST FAULT RECEIVED FAULT 3: ETC FAULT 4: FAULT 5: FAULT 6: FAULT 7: FAULT 8: FAULT 9: FAULT 10: FAULT 11: FAULT 12: FAULT 13: FAULT 14: FAULT 15: FAULT 16: FAULT 17: FAULT 18: FAULT 19: FAULT 20: FAULT 21: FAULT 22: FAULT 23: FAULT 24: FAULT 25: FAULT 26: FAULT 27: FAULT 28: FAULT 29: FAULT 30: FAULT 31:
16 - 24		NOT USED
25 - 29	29 28 27 26 25 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 1 1 0 0 1 0 0 0 0 1 0 1 0 0 1 1 0 0 0 1 1 1 0 1 0 0 0 0 1 0 0 1 0 1 0 1 0	FAULT CODE DESCRIPTION NOT USED UNIT FAILURE N1 TACHOMETER SIGNAL LOSS N2 TACHOMETER SIGNAL LOSS NOT USED NOT USED NOT USED NOT USED NOT USED NOT USED NOT USED
30 - 31		SIGN STATUS MATRIX (ALWAYS SET TO ZERO)
32		PARITY BIT (THIS BIT IS ADDED TO BITS 1-31 SO THE SUM IS ALWAYS ODD).

TABLE 102

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 6)

HEXIDECIMAL	BINARY	HEXIDECIMAL	BINARY
0	0 0 0 0	8	1 0 0 0
1	0 0 0 1	9	1 0 0 1
2	0 0 1 0	A	1 0 1 0
3	0 0 1 1	B	1 0 1 1
4	0 1 0 0	C	1 1 0 0
5	0 1 0 1	D	1 1 0 1
6	0 1 1 0	E	1 1 1 0
7	0 1 1 1	F	1 1 1 1

CONVERSION TABLE FROM HEXIDECIMAL TO BINARY

HEXIDECIMAL 010042 TO BINARY																									
HEXI-DECIMAL	0				1				0				0				4				2				
BINARY	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	
BITS	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	
	PA	SSM		DATA					NOT USED									FAULT NO.					ENG		

BITS 32 THROUGH 9

NOTE:

- ENGINE – BIT 10 SET TO 1 IDENTIFIES THE ENGINE AS THE RIGHT ENGINE.
- FAULT SEQUENCE – BIT 15 SET TO 1 IDENTIFIES FAULT NUMBER 16.
- BITS 16 TO 24 ARE NOT USED.
- FAULT DESCRIPTION – BIT 15 IS SET TO 1. THE FAULT IS "UNIT FAILURE".

Airborne Vibration Monitor Interrogation Procedure
Figure 104 (Sheet 7)

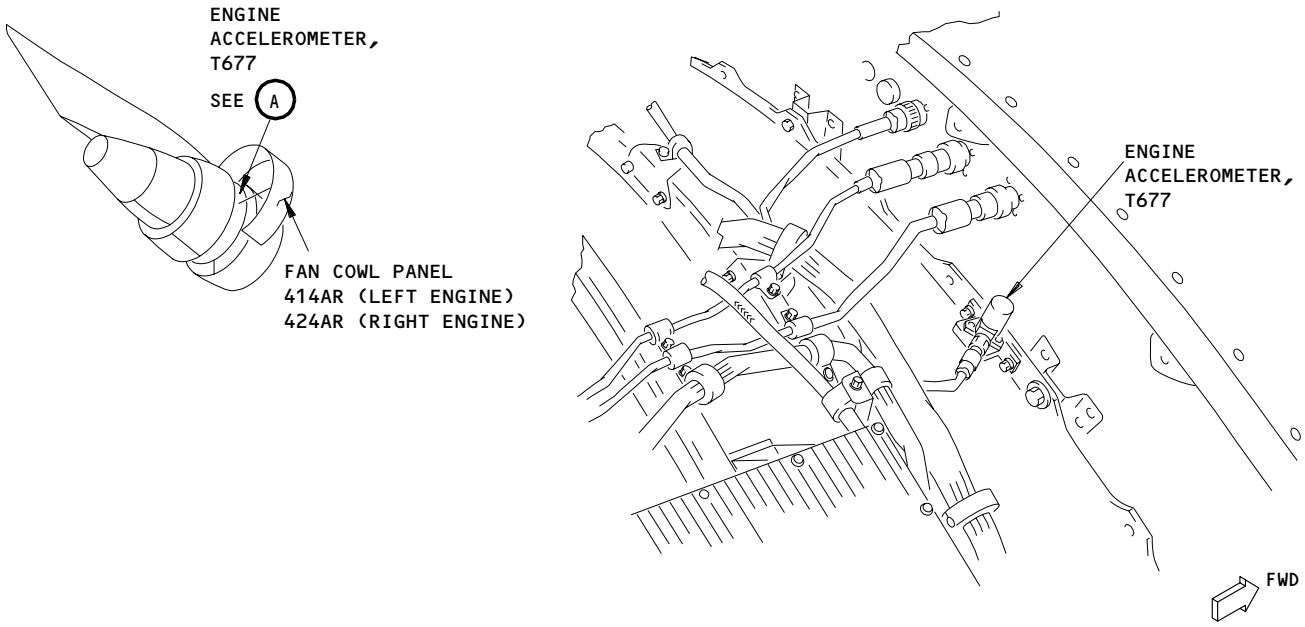
AIRBORNE VIBRATION MONITORING (AVM) SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACCELEROMETER - L ENGINE, T677	--	1	414AR, RIGHT FAN COWL PANEL	77-31-01
ACCELEROMETER - R ENGINE, T677	--	1	424AR, RIGHT FAN COWL PANEL	77-31-01
CIRCUIT BREAKER -	--		FLT COMPT, P11	
VIB MONITOR, C1464		1	11K1	*
COMPUTER - (FIM 31-41-00/101)				
EICAS L, M10181				
EICAS R, M10182				
CONDITIONER - AIRBORNE VIBRATION MONITOR (AVM) SIGNAL, M132	--	1	119AL, MAIN EQUIP CTR, E2-4	77-31-03

* SEE THE WDM EQUIPMENT LIST

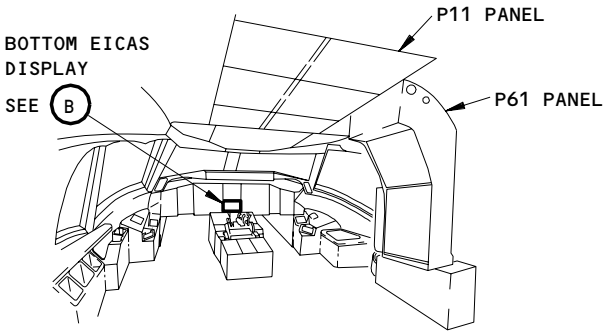
Airborne Vibration Monitoring (AVM) System - Component Index
Figure 101

M59379

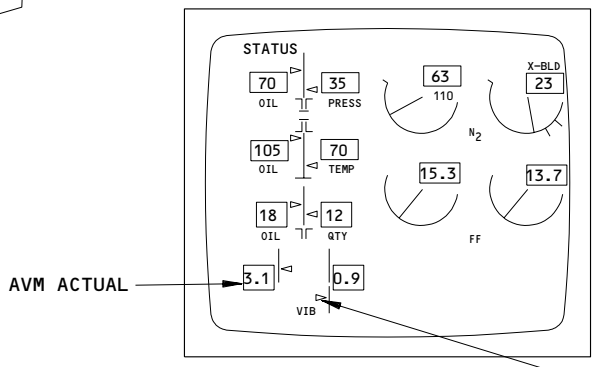


ENGINE ACCELEROMETER, T677

A



FLIGHT COMPARTMENT



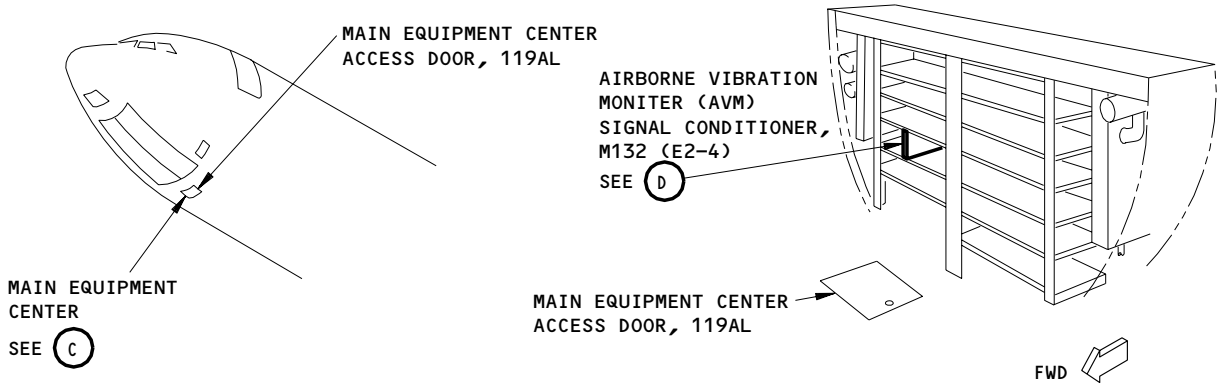
BOTTOM EICAS DISPLAY

B

Airborne Vibration Monitoring (AVM) System – Component Location
Figure 102 (Sheet 1)

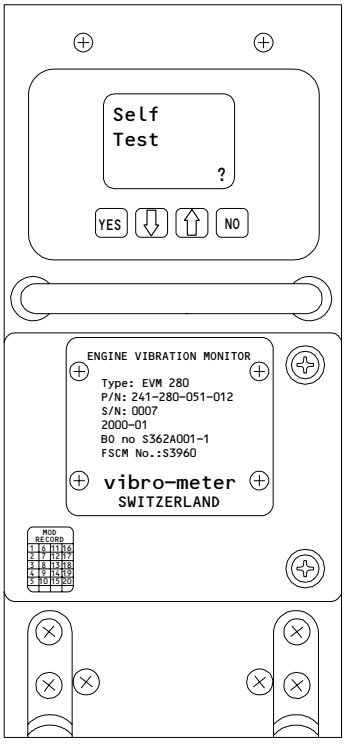
EFFECTIVITY
AIRPLANES WITH S362A001 UNIVERSAL AVM
SIGNAL CONDITIONER

M59381



MAIN EQUIPMENT CENTER

C



AVM SIGNAL CONDITIONER, M132

D

Airborne Vibration Monitoring (AVM) System - Component Location
Figure 102 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH S362A001 UNIVERSAL AVM
SIGNAL CONDITIONER

M59388

PREREQUISITES

MAKE SURE THIS SYSTEM WILL OPERATE:
EICAS (AMM 31-41-00/501)

MAKE SURE THIS CIRCUIT BREAKER IS CLOSED:
11K1

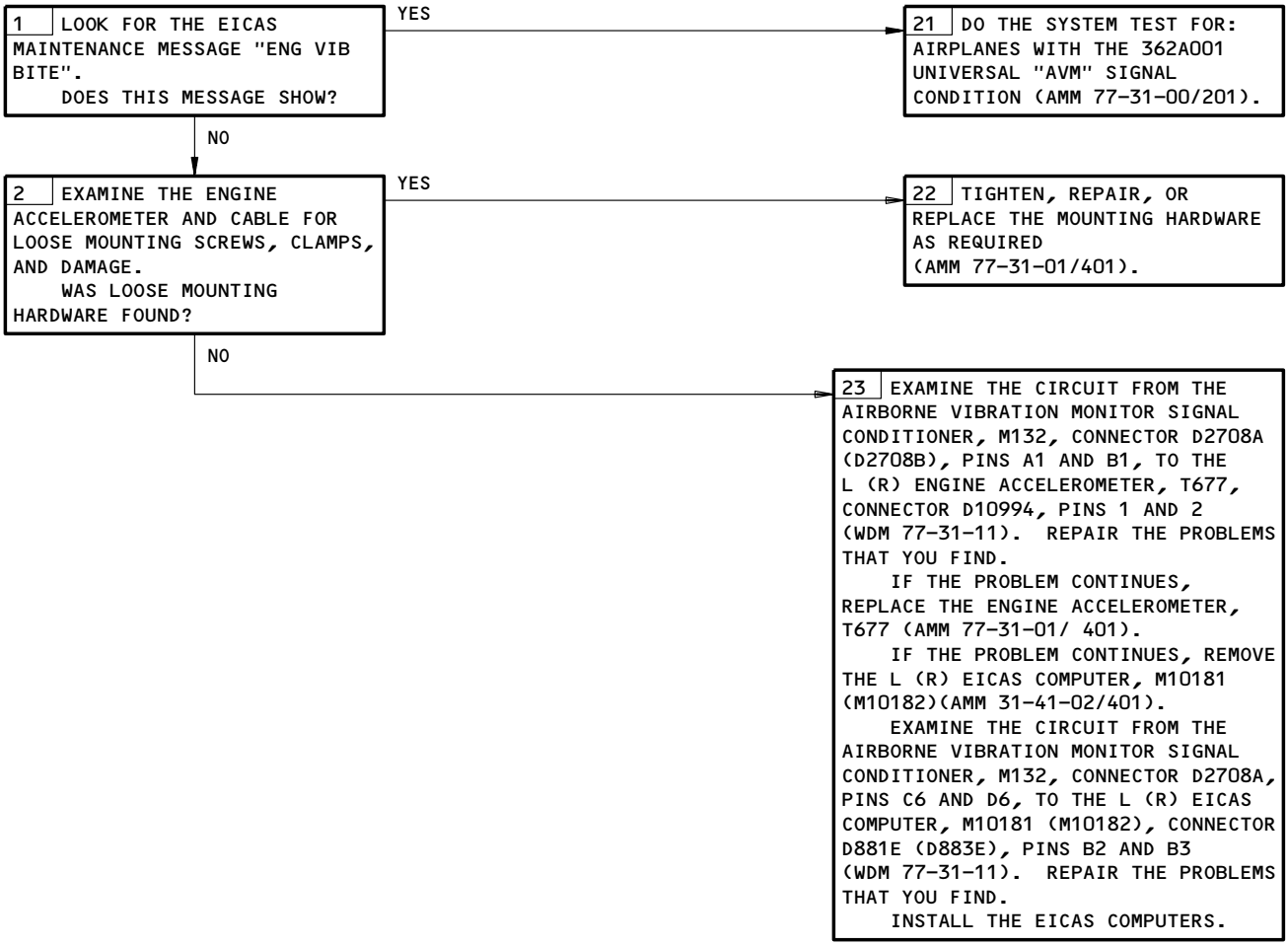
MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
ELECTRICAL POWER IS ON (AMM 24-22-00/201)

VIB INDICATION PROBLEMS

POSSIBLE CAUSES:

1. BAD OR DAMAGED VIBRATION MONITOR SIGNAL CONDITIONER (AMM 77-31-03/401)
2. LOOSE ACCELEROMETER MOUNTING HARDWARE (AMM 77-31-01/401)
3. LOOSE VIBRATION MONITOR WIRING (WDM 77-31-11)
4. BAD OR DAMAGED ACCELEROMETER (AMM 77-31-01/401).

FAULT ISOLATION:



VIB Indication Problems
Figure 103

ELECTRONIC PROPULSION CONTROL SYSTEM (EPCS)

1. General
   A. The fault isolation for the Electronic Propulsion Control System (EPCS) can be found in 71-PIMU MESSAGE INDEX.

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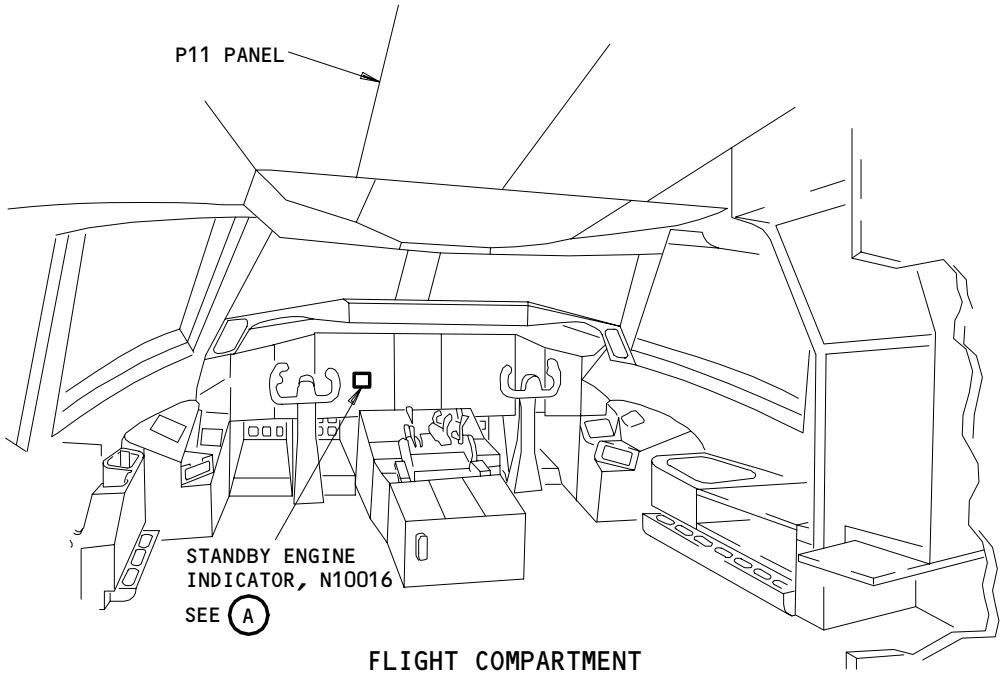
Not Used
Figure 101

STANDBY ENGINE INDICATION SYSTEM

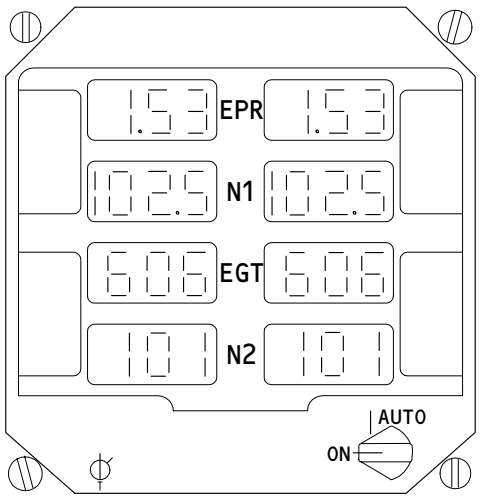
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
ALTERNATOR - (73-21-00/101) EEC (N2 TRANSDUCER), T686 CIRCUIT BREAKER - ENGINE STBY IND 1, C4151 COMPUTERS - (31-41-00/101) EICAS L, M10181 EICAS R, M10182 CONTROL - (73-21-00/101) ELECTRONIC ENGINE, M7198	--	1	FLT COMPT, P11 11D27	*
INDICATOR, STANDBY ENGINE, N10016	--	1	FLT COMPT, P1	77-41-01
PROBE - (77-21-00/101) EGT (TT4.95) THERMOCOUPLE TRANSDUCER - (73-21-00/101) EEC SPEED (N1)				

* SEE THE WDM EQUIPMENT LIST

Standby Engine Indication System - Component Index
Figure 101



FLIGHT COMPARTMENT



STANDBY ENGINE INDICATOR, N10016

A

NOTE: THE NUMBERS SHOWN ON THE INDICATOR
ARE FOR REFERENCE ONLY.

Standby Engine Indication System - Component Location
Figure 102