GPA Group plc

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CHAPTER 76 - ENGINE CONTROLS

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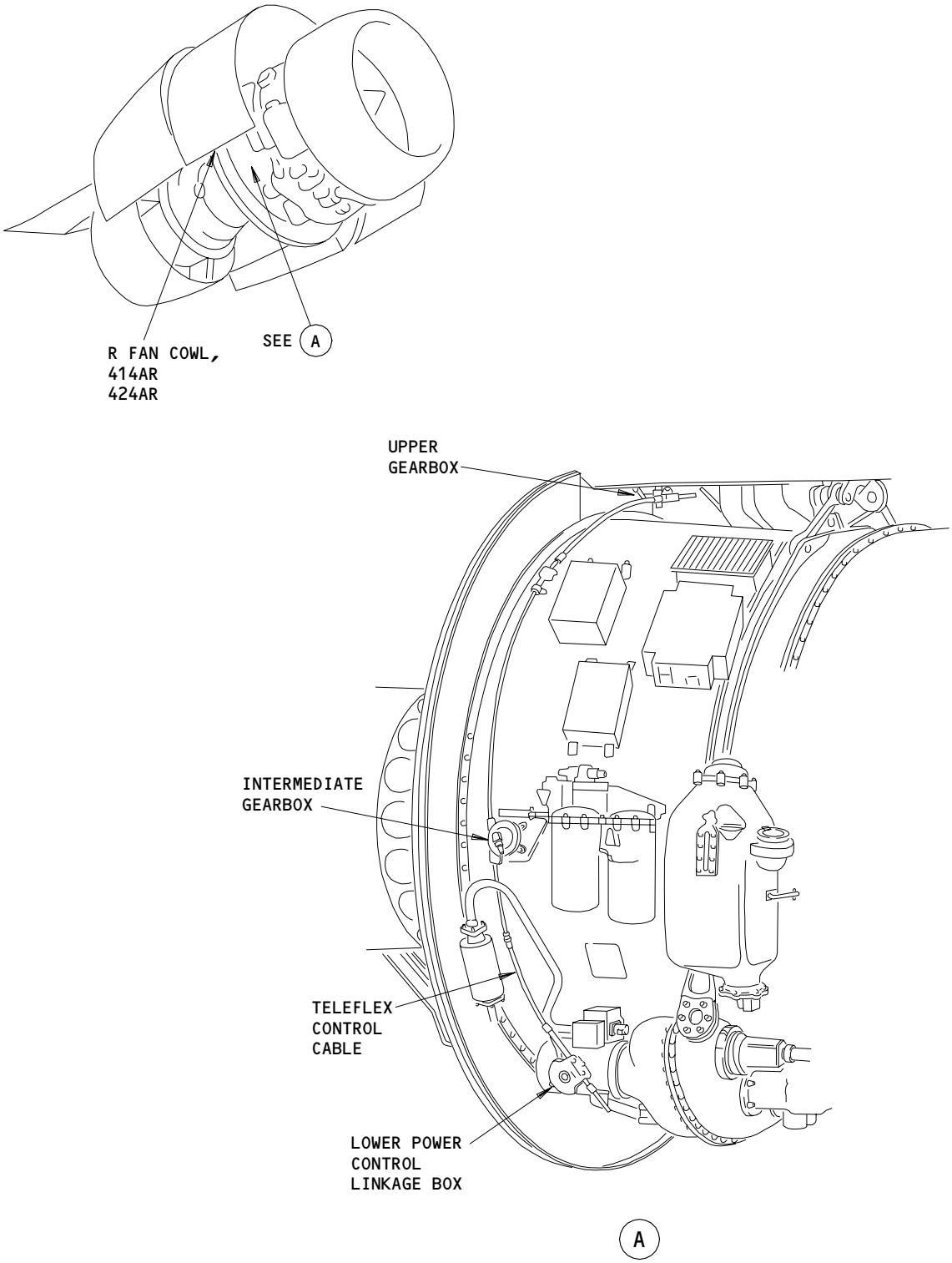
FAULT CODE	LOG BOOK REPORT	FAULT ISOLATION REFERENCE
76 11 XA --	(O1=L,O2=R) Thrust lever movement problem was encountered by the flight crew which is not covered in the fault code diagrams.	SSM 76-00-00
76 11 01 --	(O1=L,O2=R) Engine thrust lever has lost motion.	FIM 76-11-00/101, Fig. 103, Block 1
76 11 02 --	(O1=L,O2=R) Engine thrust lever difficult to move in fwd thrust.	FIM 76-11-00/101, Fig. 103, Block 1
76 11 03 --	(O1=L,O2=R) Engine thrust lever difficult to move in reverse thrust.	FIM 76-11-00/101, Fig. 103, Block 1
76 11 04 --	(O1=L,O2=R) Engine thrust lever difficult to move in fwd and reverse thrust.	FIM 76-11-00/101, Fig. 103, Block 1
76 11 05 00	Engine thrust levers misaligned during all power settings with EECs ON or OFF (see log book report for description).	FIM 76-11-00/101, Fig. 104, Block 1
76 11 06 00	Engine thrust levers misaligned during T.O. with eng limiters ON or OFF (see log book report for description).	FIM 76-11-00/101, Fig. 104, Block 1
76 11 08 --	(O1=L,O2=R) Engine thrust lever jammed (unable to move).	FIM 76-11-00/101, Fig. 103, Block 1
76 11 09 --	EICAS msg (O1=L,O2=R) ENG SHUT DOWN did not display. Aural warning and appropriate eng related msgs were not inhibited with eng shutdown.	FIM 76-11-00/101, Fig. 105, Block 1

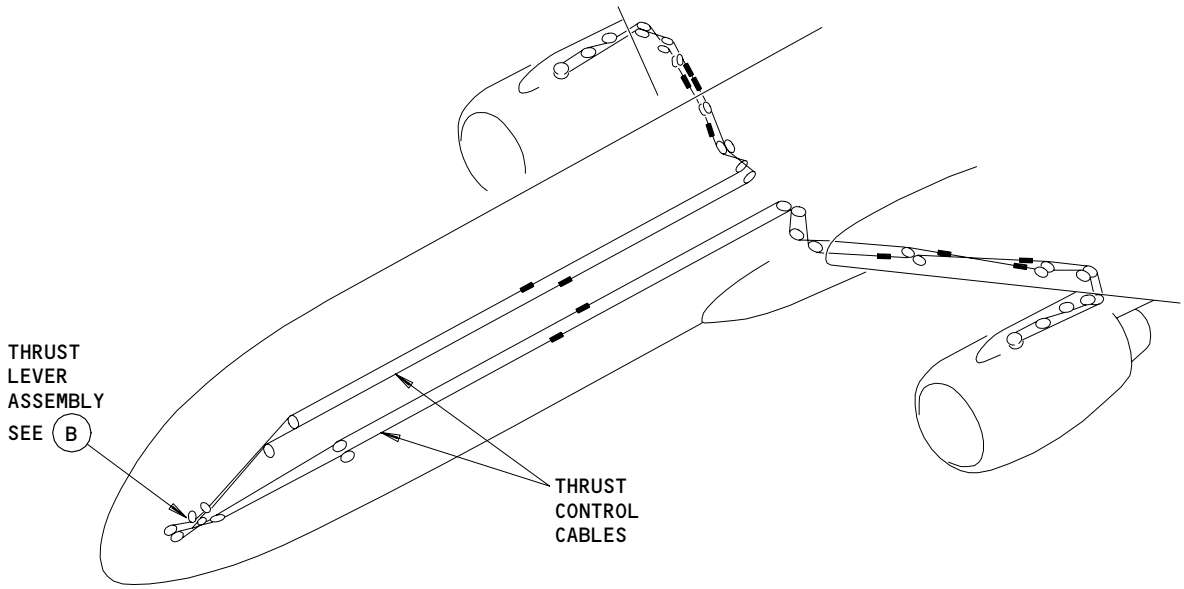
ENGINE CONTROL SYSTEM

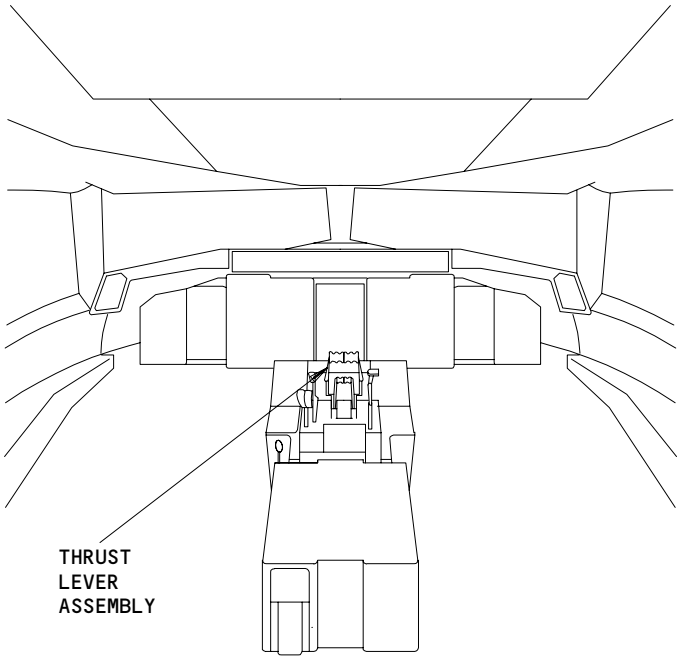
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CABLE - FUEL FLOW GOVERNOR THRUST CONTROL	1	1	414AR, R FAN COWL, L ENG	76-11-06
		1	424AR, R FAN COWL, R ENG	76-11-06
CABLE - L ENGINE, THRUST CONTROL	2	2	113AL, AUTOTHROTTLE CLUTCH PACK AND QUADRANT, LEFT SIDE, 821, FWD CARGO COMPARTMENT CEILING, 511BB,511CB,511DB,511EB,511FB, 511GB,511HB,511JB, FORWARD SPAR, 432AL, STRUT	76-11-03
CABLE - R ENGINE, THRUST CONTROL	2	2	113AL, AUTOTHROTTLE CLUTCH PACK AND QUADRANT, RIGHT SIDE, 821, FWD CARGO COMPARTMENT CEILING, 611BB,611CB,611DB,611EB,611FB, 611GB,611HB,611JB, FORWARD SPAR, 442AL, STRUT	76-11-03
LEVER - THRUST, M985	2	1	FLT COMPT, P10	76-11-01
GEARBOX, UPPER	1	1	414AR, R FAN COWL, L ENG	76-11-12
		1	424AR, R FAN COWL, R ENG	
GEARBOX, INTERMEDIATE	1	1	414AR, R FAN COWL, L ENG	76-11-11
		1	424AR, R FAN COWL, R ENG	
BOX, LOWER POWER CONTROL LINKAGE	1	1	414AR, R FAN COWL, L ENG	76-11-10
		1	424AR, R FAN COWL, R ENG	

Component Index
Figure 101



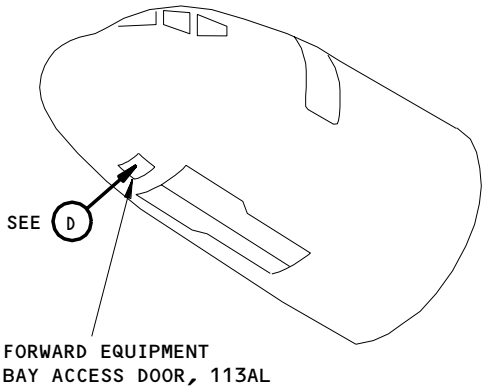
Component Location
Figure 102 (Sheet 1)

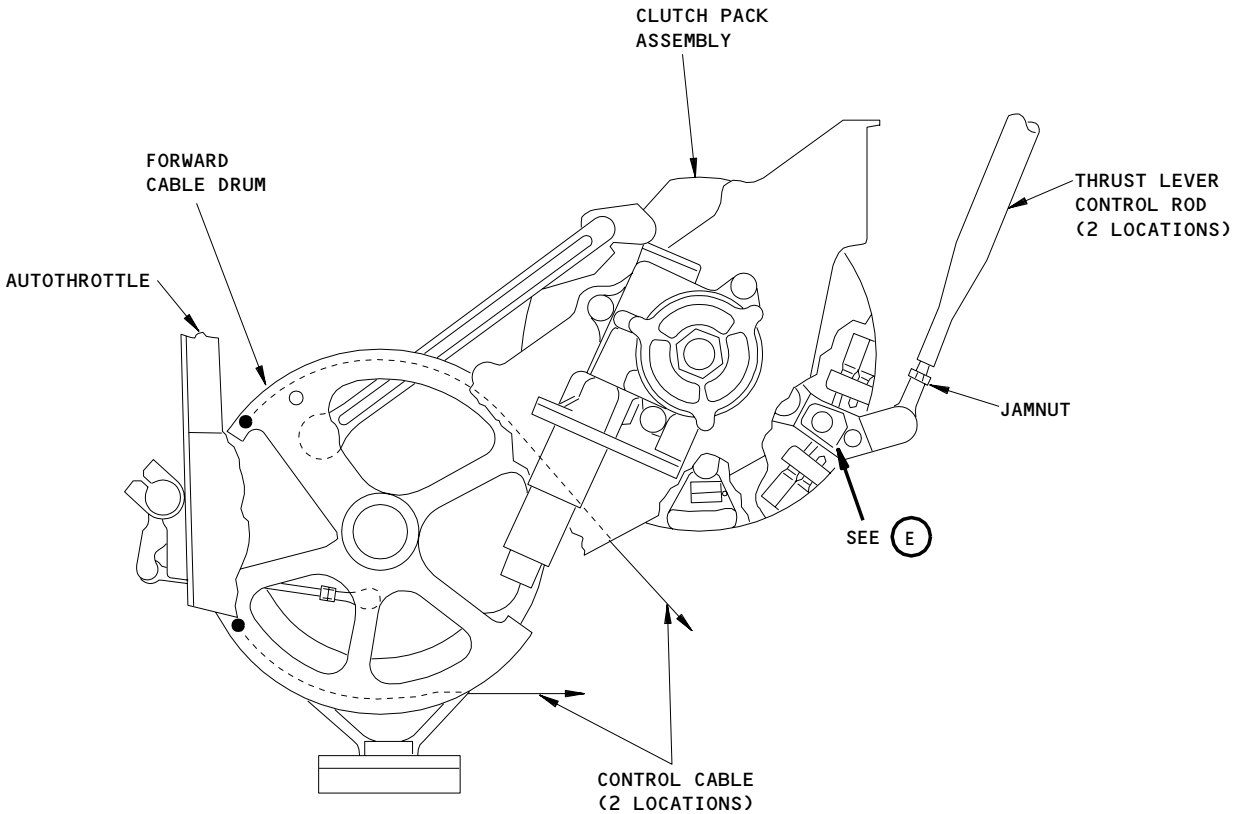




B

Component Location
Figure 102 (Sheet 2)

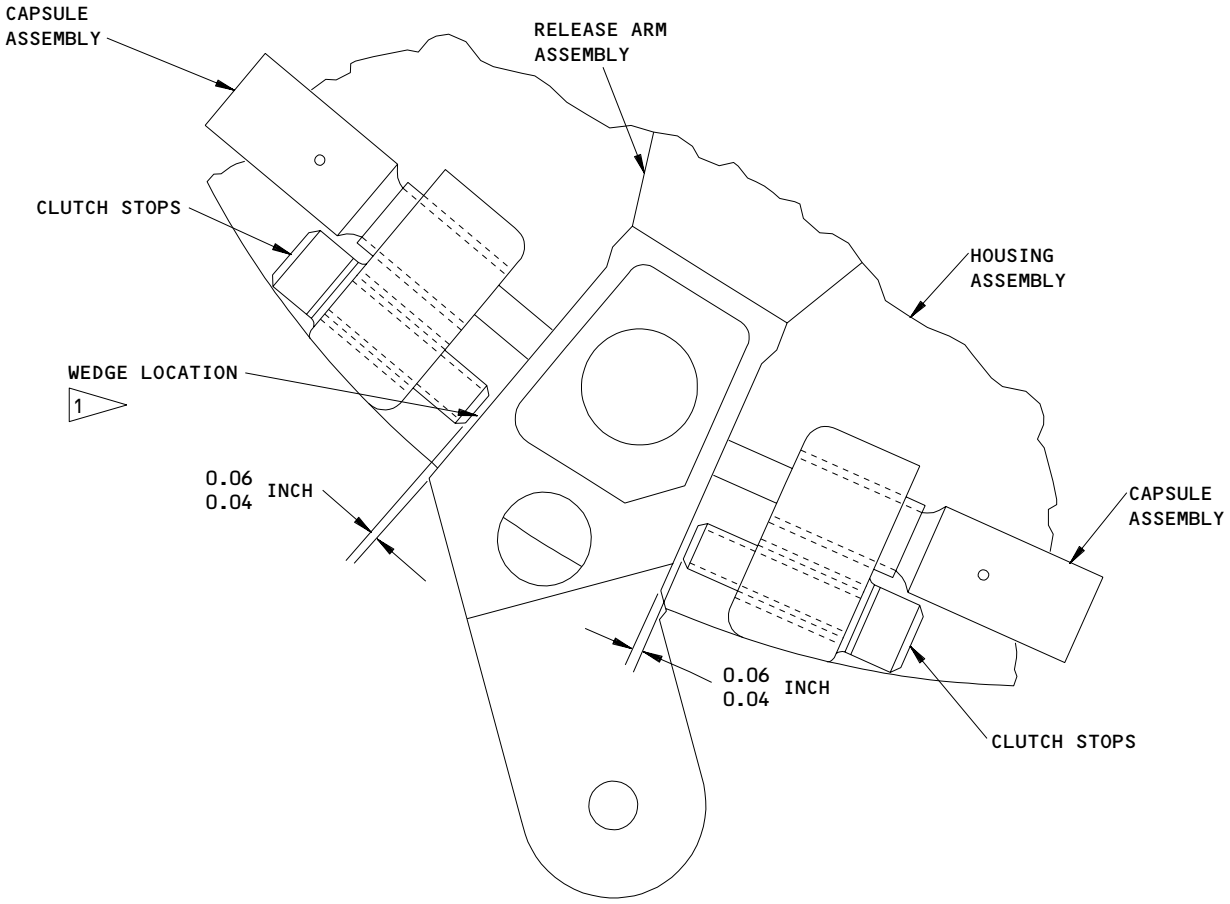




D

Engine Control System – Component Location
Figure 102 (Sheet 3)

K82043



E

1 THE WEDGE IS USED TO HOLD THE RELEASE ARM ASSEMBLY AGAINST THE OPPOSITE CLUTCH STOP AND RELEASE THE CLUTCH. THE WEDGE CAN BE MADE OF ANY MATERIAL WHICH WILL NOT DAMAGE THE RELEASE ARM OF THE CLUTCH STOPS (PHENOLIC, BRASS, PLASTIC...ETC.)

Engine Control System - Component Location
Figure 102 (Sheet 4)

THRUST LEVER MOVEMENT PROBLEMS

PREREQUISITES
NONE

1 DO A CHECK OF THE CONTROL STAND LEVER'S COVERS, SEALS, AND RAILS INSTALLATION (AMM 76-11-04/401).
ARE THE CLEARANCES WITHIN LIMITS?
- NO → 21 ADJUST THE CONTROL STAND LEVER'S COVERS, SEALS, AND RAILS (AMM 76-11-04/501).
- YES →

1A EXAMINE THE THRUST REVERSER UPPER FEEDBACK CABLES FOR EVIDENCE OF HEAT DAMAGE (AMM 78-34-03/601).
IS THERE ANY HEAT DAMAGE?
- YES → 10 EXAMINE HP2 AND HP6 OFFTAKE DUCTS LOCAL TO UPPER FEEDBACK CABLE FOR EVIDENCE OF LEAKAGE.
IS THERE ANY LEAKAGE?
  - YES → 21A REPLACE THE LEAKING DUCT AND GO TO BLOCK 1B.
  - NO → 21B GO TO BLOCK 1B.
- NO →

1B EXAMINE THE THRUST REVERSER FEEDBACK CABLES (AMM 78-34-03/601).
ARE THE CABLES WITHIN LIMITS?
- NO → 10A REPLACE THE THRUST REVERSER FEEDBACK CABLES (AMM 78-34-03/401).
DOES THE PROBLEM CONTINUE?
  - NO → 21C THE SYSTEM IS OK.
  - YES → 21D GO TO BLOCK 2.
- YES →

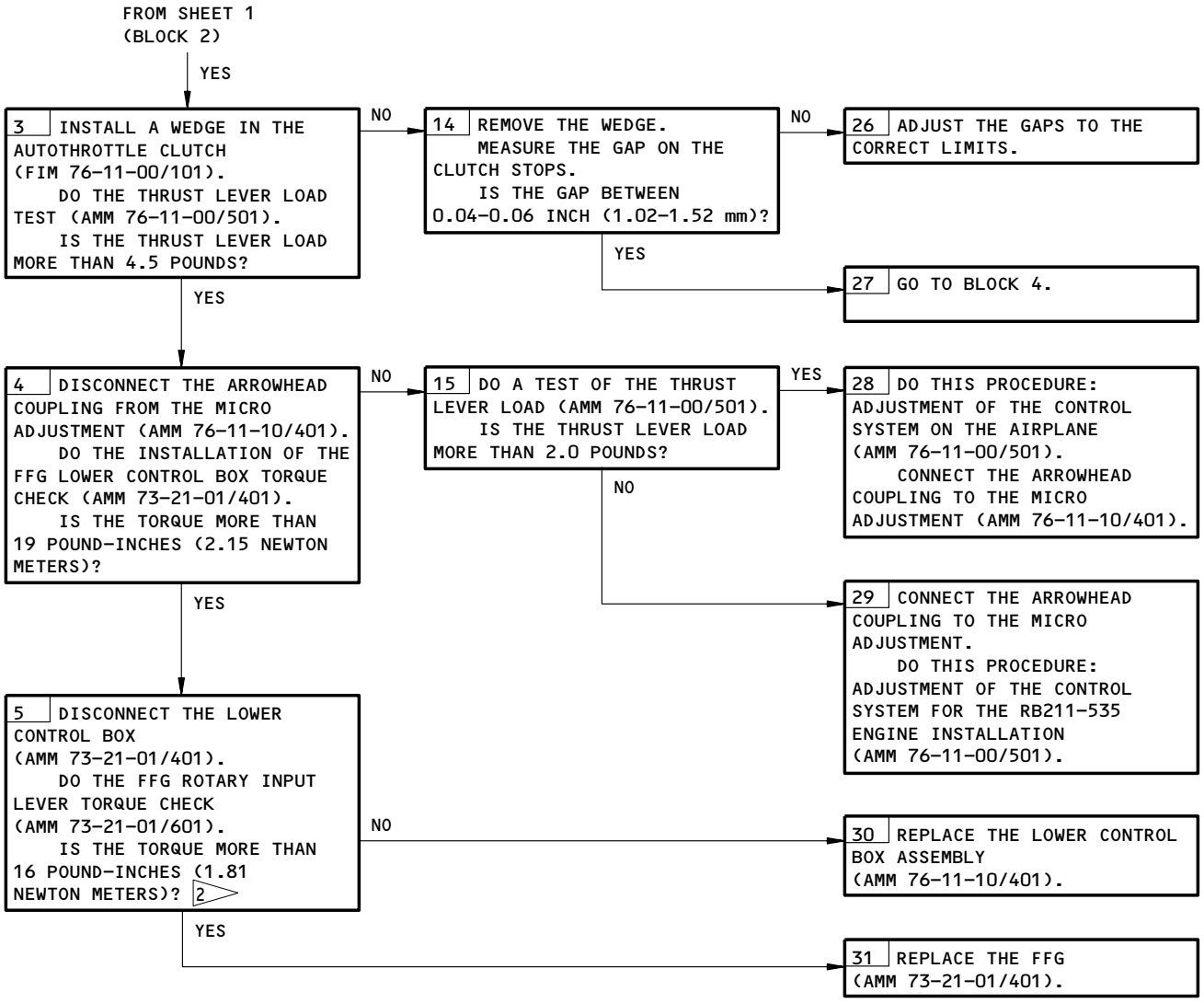
2 DO THE THRUST LEVER LOAD TEST (AMM 76-11-00/501).
IS THE THRUST LEVER LOAD MORE THAN 4.5 POUNDS?
- NO → 11 DO THE MCDP TEST #10 (FIM 22-00-03/101, FIG. 110). 1
WAS THE PROBLEM FIXED?
  - YES → 22 THE SYSTEM IS OK.
  - NO → 12 DISCONNECT CONTROL RODS (INPUT SIDE OF CLUTCH).
DO THRUST LEVERS MOVE SMOOTHLY WITHOUT BINDING?
    - NO → 23 EXAMINE THE THRUST LEVER BEARINGS FOR BINDING.
    - YES → 13 DO THE AUTOTHROTTLE CLUTCH SLIP TORQUE TEST (AMM 22-32-00/501).
IS THE LOAD TEST LESS THAN 18.0 POUNDS?
      - YES → 24 REPLACE THE AUTOTHROTTLE CLUTCH PACK (AMM 22-32-05/401).
      - NO → 25 THE SYSTEM IS OK.
- YES → SEE SHEET 2 (BLOCK 3)

1 IF THIS TEST FAILS, FIRST DRY MOTOR (AMM 71-00-00/201), AND THEN REPEAT THE TEST.

IF THIS TEST FAILS AGAIN AFTER DRY MOTORING, THEN WET MOTOR THE ENGINE (AMM 71-00-00/201) TO LUBRICATE THE FUEL FLOW GOVENOR, THEN REPEAT THE TEST. (MAKE SURE EXCESS FUEL IS REMOVED BY DRY MOTORING THE ENGINE (AMM 71-00-00/201) AFTER THE TEST).

IF THIS TEST FAILS FOR A THIRD TIME, OPERATE THE ENGINE FOR 5 MINUTES OR MORE, THEN REPEAT THIS TEST WITHIN 5 MINUTES AFTER ENGINE SHUTDOWN.

Thrust Lever Movement Problems
Figure 103 (Sheet 1)



NON-FREQUENT CAUSES OF THIS PROBLEM IN ALPHABETICAL ORDER	RECOMMENDED CORRECTIVE ACTION
INTERFERENCE BETWEEN STRUT DRUM CONTROL AND THRUST REVERSER CONTROL CAM.	MAKE SURE THAT 0.75 INCH CLEARANCE EXISTS PER THE ANTI-ICE DUCT INSTALLATION PROCEDURE (AMM 36-11-01/401).
INTERFERENCE BETWEEN DRIVE LINK FOR THE TLA TRANSDUCER AND THE AUTOTHROTTLE SUPPORT BRACKET (AMM 73-21-09/401).	MODIFY THE INSTALLATION AND/OR REPLACE THE DRIVE LINK TO ELIMINATE THE INTERFERENCE.

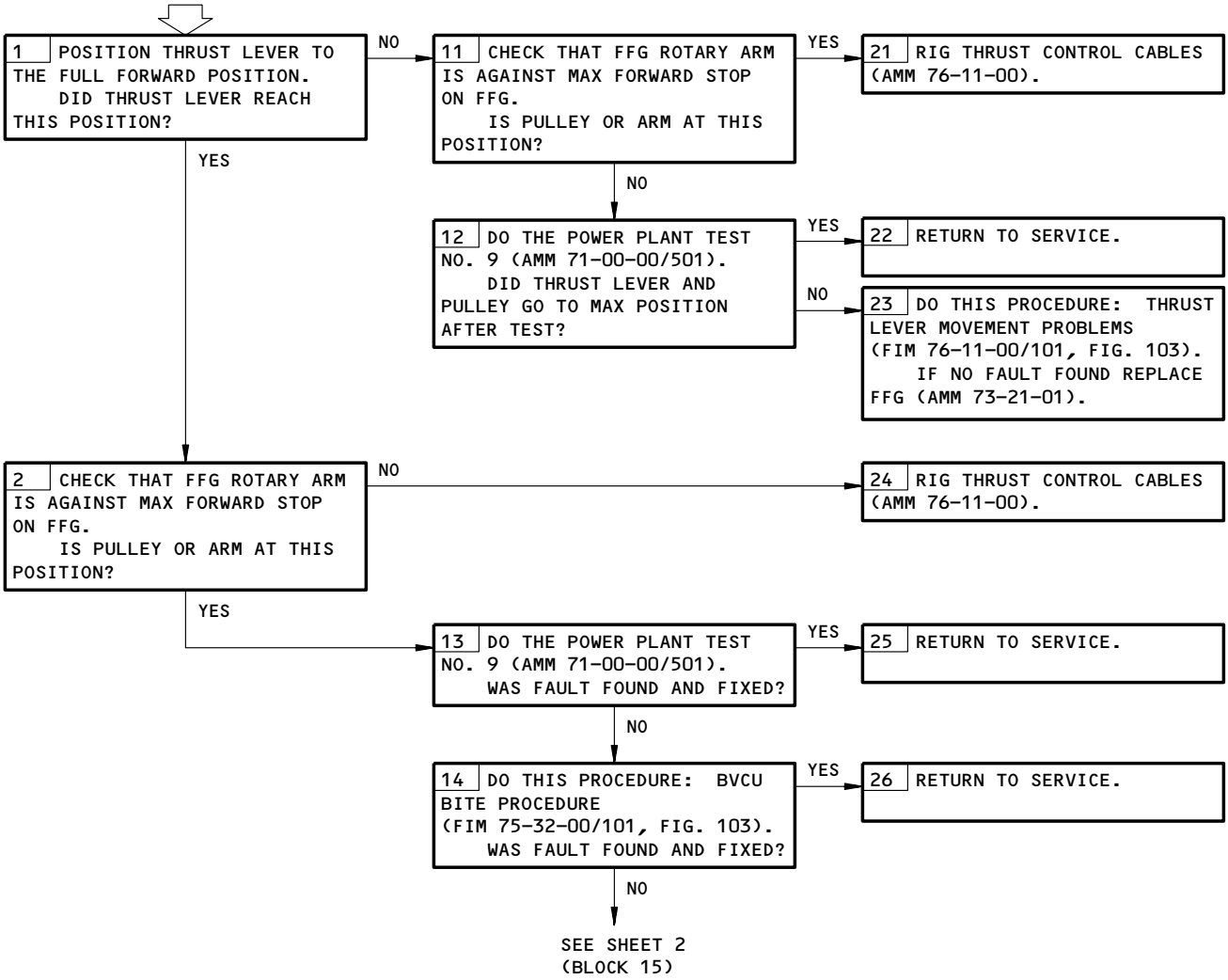
2 IF THIS TEST FAILS, FIRST DRY MOTOR (AMM 71-00-00/201), AND THEN REPEAT THE TEST

Thrust Lever Movement Problems
Figure 103 (Sheet 2)

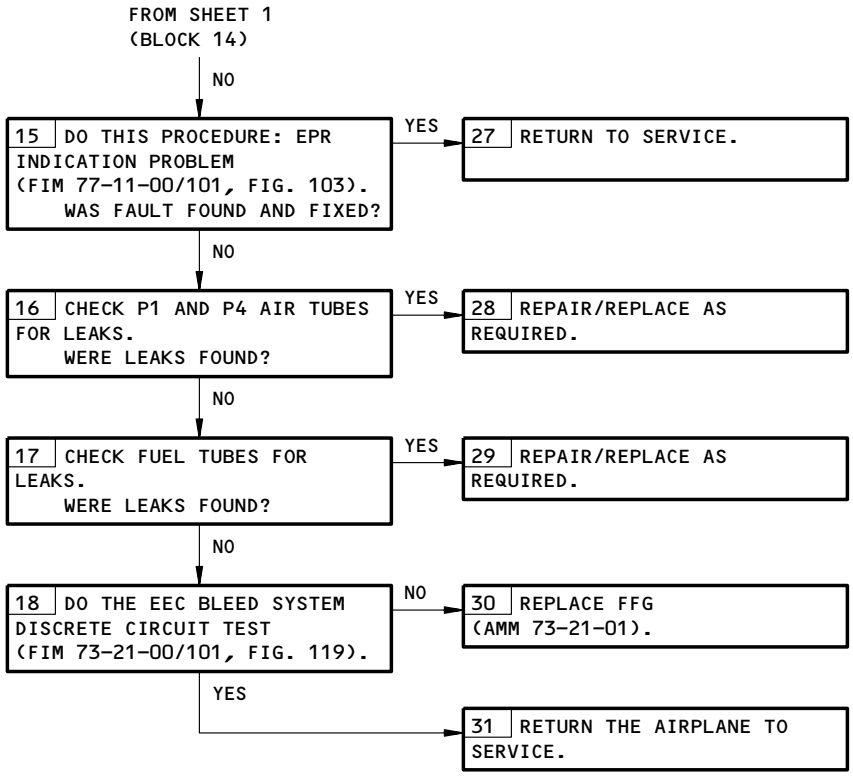
PREREQUISITES
NONE

NOTE: THIS PROCEDURE MUST BE DONE FOR BOTH THRUST LEVERS. DO ONE THRUST LEVER THEN REPEAT PROCEDURE FOR OTHER THRUST LEVER.

THRUST LEVERS MISALIGNED



Thrust Levers Misaligned
Figure 104 (Sheet 1)



Thrust Levers Misaligned
Figure 104 (Sheet 2)

(L,R) ENG SHUTDOWN EICAS MESSAGE WAS NOT SHOWN. ENGINE SHUTDOWN WAS OK.

PREREQUISITES

OPEN THESE CIRCUIT BREAKERS AND ATTACH DO-NOT-CLOSE TAGS
6E1,6E2

MAKE SURE THESE CIRCUIT BREAKERS ARE CLOSED:
6C1,6C2

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
FUEL CONTROL SWITCH AT CUTOFF POSITION

1 REMOVE THE K10124 (K10125) L (R) CLOSE DISAGREE RELAY ON PANEL P36 (P37)(WDM 76-11-11, -12).
DO A CHECK FOR 28V DC ON CONNECTOR D2154 (D2216), PIN 3 (PIN 7 GND).
DID YOU MEASURE 28V DC?

YES

21 REPLACE THE K10124 (K10125) L (R) CLOSE DISAGREE RELAY ON PANEL P36 (P37) (WDM 76-11-11,-12).
IF THE PROBLEM CONTINUES, DO A CHECK FOR GROUND ON CONNECTOR D2154 (D2216), PIN 2 (WDM 76-11-11,-12). REPAIR THE PROBLEMS THAT YOU FIND.
IF THE PROBLEM CONTINUES, DO A CHECK OF THE CIRCUIT FROM CONNECTOR D2154 (D2216), PIN 5, TO M10181 (M10182) L (R) EICAS COMPUTER, CONNECTOR D319B (D321B), PIN D14, FOR AN OPEN CIRCUIT (WDM 76-11-11,-12). REPAIR THE PROBLEMS THAT YOU FIND.

NO

22 DO A CHECK FOR GROUND ON CONNECTOR D2154 (D2216), PIN 7 (WDM 76-11-11,-12). REPAIR THE PROBLEMS THAT YOU FIND.
IF THE PROBLEM CONTINUES, DO A CHECK OF THE CIRCUIT FROM CONNECTOR D2154 (D2216), PIN 3, TO THE L (R) ENGINE V10026 FFR FUEL SHUTOFF VALVE, CONNECTOR D1390, PIN 4, ON THE FUEL FLOW GOVERNOR, FOR AN OPEN CIRCUIT (WDM 76-11-11, -12; 71-51-11). REPAIR THE PROBLEMS THAT YOU FIND.
IF THE PROBLEM CONTINUES, REPLACE THE L (R) ENGINE FUEL FLOW GOVERNOR (AMM 73-21-01/401) FOR AN OPEN CIRCUIT IN THE V10026 FFR FUEL SHUTOFF VALVE.

(L,R) ENG SHUTDOWN EICAS Message Was Not Shown. Engine Shutdown Was OK.
Figure 105