KSSU Group

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74-31-00		
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CHAPTER 74 - IGNITION

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CHAPTER 74 - IGNITION

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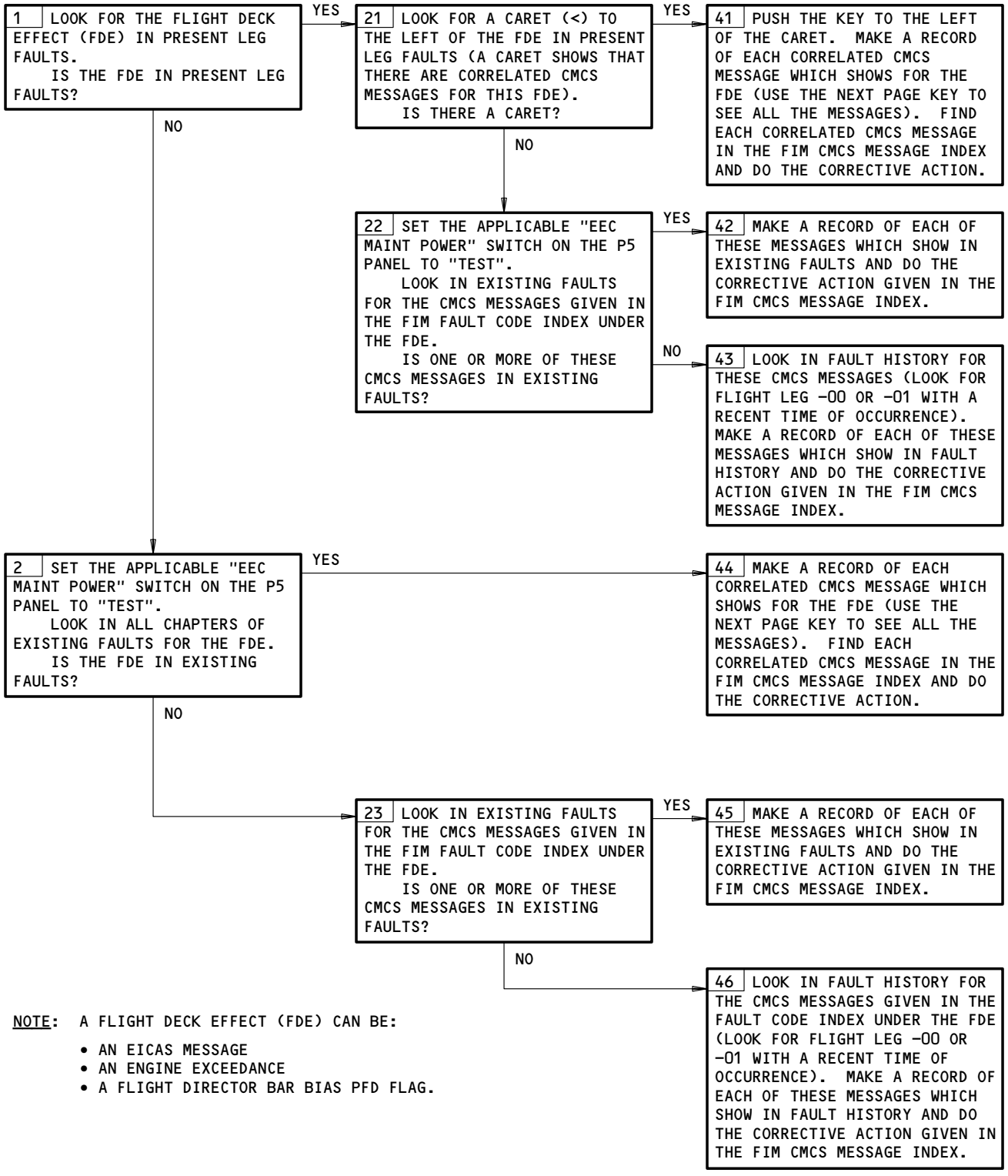
FAULT CODE INDEX

1. General
   A. The Fault Code Index includes fault isolation or corrective action for each fault code in the Fault Reporting Manual (FRM). The fault codes for each chapter are in numerical order.
      (1) The first paragraph given with each fault code is the log book report from the FRM. The log book report is a short description of the fault.
      (2) The numbered paragraphs after the log book report contain the fault isolation or the corrective action.
   B. The fault isolation for most EICAS messages, engine exceedances, or PFD flags includes a list of one or more possible correlated CMCS messages.
      (1) For each CMCS message in the list, there is the message number and an ATA number. The ATA number is the prompt under which you can find the message in Existing Faults or Fault History on the CDU.
      (2) The corrective action refers to the procedure in Figure 1 of this section. Figure 1 shows how to use the Present Leg Faults, Existing Faults, and Fault History functions of the CMC to isolate the fault to a specific CMCS message.
   C. For those EICAS status messages which latch into EIU memory when they occur, this index includes the letters NVM, NVM-A, or NVM-G to the right of the log book report.
      (1) NVM indicates that the message latches if it occurs in the air or on the ground.
      (2) NVM-A indicates that the message latches only if it occurs in the air.
      (3) NVM-G indicates that the message latches only if it occurs on the ground.
      (4) To remove the latched message from the EICAS after you correct the fault, you must use the ERASE function of the CMC.

          NOTE: Do not erase a latched EICAS message until you are sure that you have corrected the fault.

D. When the CDU shows a large number of Flight Deck Effects (FDEs) or CMCS messages, it is possible that there is a bus failure. Do these steps to isolate the cause of the bus failure:
   (1) Look at the CMCS messages to determine which system or LRU is related to all the messages.
   (2) Look at the wiring diagram for each system and determine if the suspect LRUs are on a common bus.
   (3) Do a check of the wiring between each of the suspect LRUs and the common bus.
   (4) Repair any problems that you find.
   (5) If the problem continues, remove each LRU individually to determine which LRU is the cause of the fault.
   (6) Repalce the LRU which caused the fault.



Fault Isolation Procedure with the CMCS
Figure 1

FAULT CODE	LOG BOOK REPORT/ CORRECTIVE ACTION
74 ME 01 00	The EICAS message CON IGNITION ON (MEMO) shows. 1. No procedure is necessary.
74 ME 02 00	The EICAS message STBY IGNITION ON (MEMO) shows. 1. No procedure is necessary.
74 03 01 00	The EICAS message ENG 1 IGNITOR 1 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 71508 (71-00) 71526 (71-00)
74 03 02 00	The EICAS message ENG 1 IGNITOR 2 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 71509 (71-00) 71527 (71-00)
74 03 03 00	The EICAS message ENG 2 IGNITOR 1 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 72508 (71-00) 72526 (71-00)
74 03 04 00	The EICAS message ENG 2 IGNITOR 2 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 72509 (71-00) 72527 (71-00)
74 03 05 00	The EICAS message ENG 3 IGNITOR 1 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 73508 (71-00) 73526 (71-00)
74 03 06 00	The EICAS message ENG 3 IGNITOR 2 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 73509 (71-00) 73527 (71-00)
74 03 07 00	The EICAS message ENG 4 IGNITOR 1 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 74508 (71-00) 74526 (71-00)
74 03 08 00	The EICAS message ENG 4 IGNITOR 2 (STATUS) shows. (NVM) 1. Look for one or more of these CMCS messages (Fig. 1): 24721 (24-60) 74509 (71-00) 74527 (71-00)
74 03 09 --	The No. (01=1, 02=2, 03=3, 04=4) engine did not manaully start with the ignition switch in the SINGLE position. The manual engine start was satisfactory with the switch in BOTH. 1. Look for one or more of these CMCS messages (Fig. 1): 71508 (71-00) 71509 (71-00) 72508 (71-00) 72509 (71-00) 73508 (71-00) 73509 (71-00) 74508 (71-00) 74509 (71-00) 2. If you do not see any of these messages, go to FIM 74-00-00, Figure 105, Block 1.

FAULT CODE	LOG BOOK REPORT/ CORRECTIVE ACTION

74 03 10 -- The No. (01=1, 02=2, 03=3, 04=4) engine did not start manually with the ignition switch in the SINGLE or BOTH position.

1. Look for one or more of these CMCS messages (Fig. 1):

71508 (71-00)	71509 (71-00)	71526 (71-00)	71527 (71-00)
72508 (71-00)	72509 (71-00)	72526 (71-00)	72527 (71-00)
73508 (71-00)	73509 (71-00)	73526 (71-00)	73527 (71-00)
74508 (71-00)	74509 (71-00)	74526 (73-00)	74527 (71-00)

2. If you do not see any of these messages, go to FIM 74-00-00, Figure 105, Block 1.

74 03 11 00 The EICAS message ENG IGNITION (ADVISORY) shows.

NOTE: The CMC message 7X578 can also be set, but its corrective action is the same as the steps that follow:

1. Replace the Ignition Control Module, M7325
2. If you continue to find the fault messages, repair the electrical wire (WDM 74-31-12, 74-31-22, 74-31-32, or 74-31-42).

74 03 12 00 The EICAS message CON IGN ENG 1 (STATUS) shows. (NVM)

NOTE: The CMC message 7X578 can also be set, but its corrective action is the same as the steps that follow:

1. Replace the Ignition Control Module, M7325
2. If you continue to find the fault messages, repair the electrical wire (WDM 74-31-12).

74 03 13 00 The EICAS message CON IGN ENG 2 (STATUS) shows. (NVM)

NOTE: The CMC message 7X578 can also be set, but its corrective action is the same as the steps that follow:

1. Replace the Ignition Control Module, M7325
2. If you continue to find the fault messages, repair the electrical wire (WDM 74-31-22).

74 03 14 00 The EICAS message CON IGN ENG 3 (STATUS) shows. (NVM)

FAULT CODE	LOG BOOK REPORT/ CORRECTIVE ACTION

NOTE: The CMC message 7X578 can also be set, but its corrective action is the same as the steps that follow:

1. Replace the Ignition Control Module, M7325
2. If you continue to find the fault messages, repair the electrical wire (WDM 74-31-32).

74 03 15 00 The EICAS message CON IGN ENG 4 (STATUS) shows. (NVM)

NOTE: The CMC message 7X578 can also be set, but its corrective action is the same as the steps that follow:

1. Replace the Ignition Control Module, M7325
2. If you continue to find the fault messages, repair the electrical wire (WDM 74-31-42).

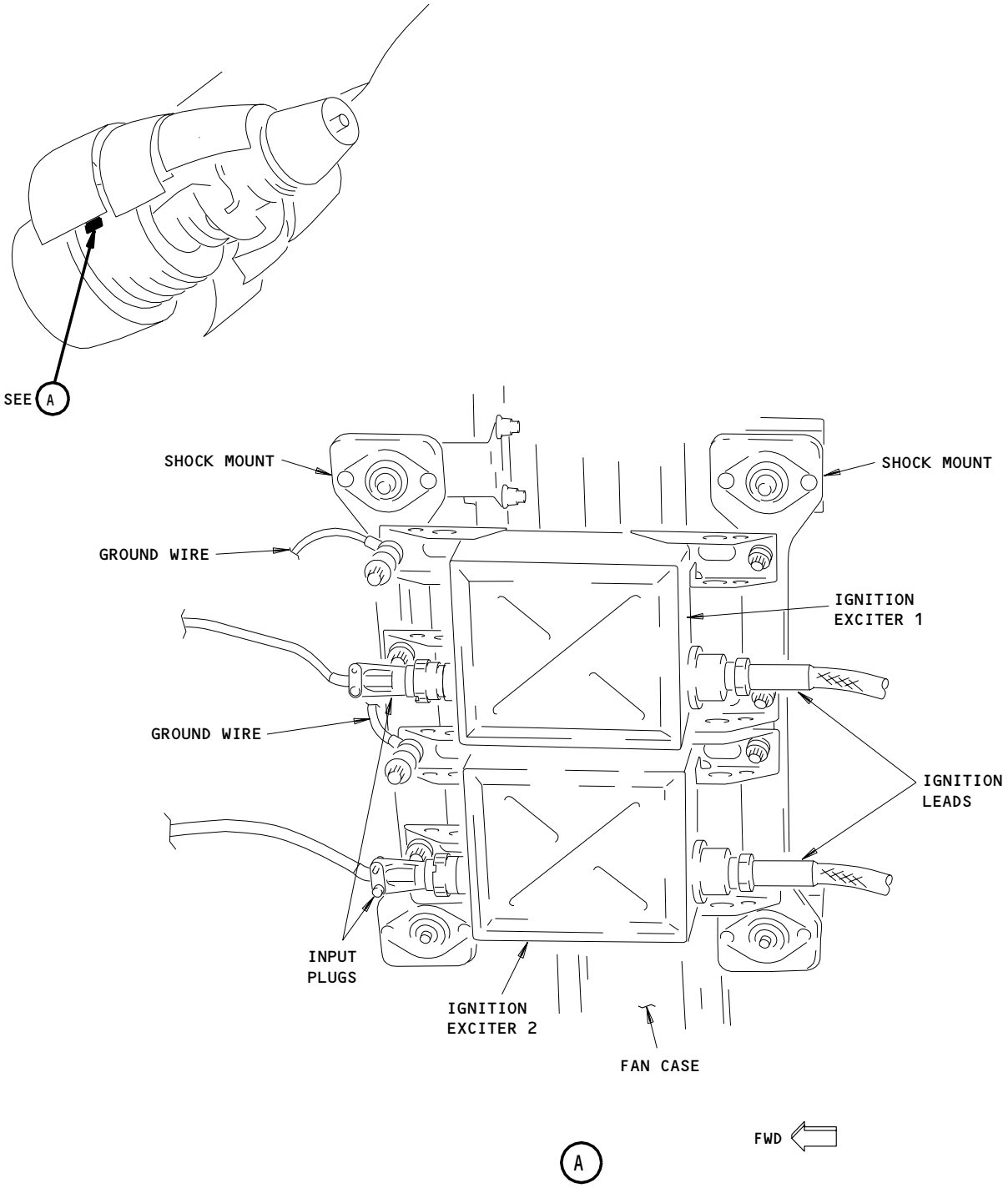
74 03 16 00 The No. (01=1, 02=2, 03=3, 04=4) engine did not autostart with the ignition switch in the SINGLE position. The EICAS message "ENG -X AUTOSTART" did not appear.

NOTE: The CMC message 7X567 can also be set, but its corrective action is the same as the steps that follow:

1. FIM 74-00-00, Fig. 105 Block 1

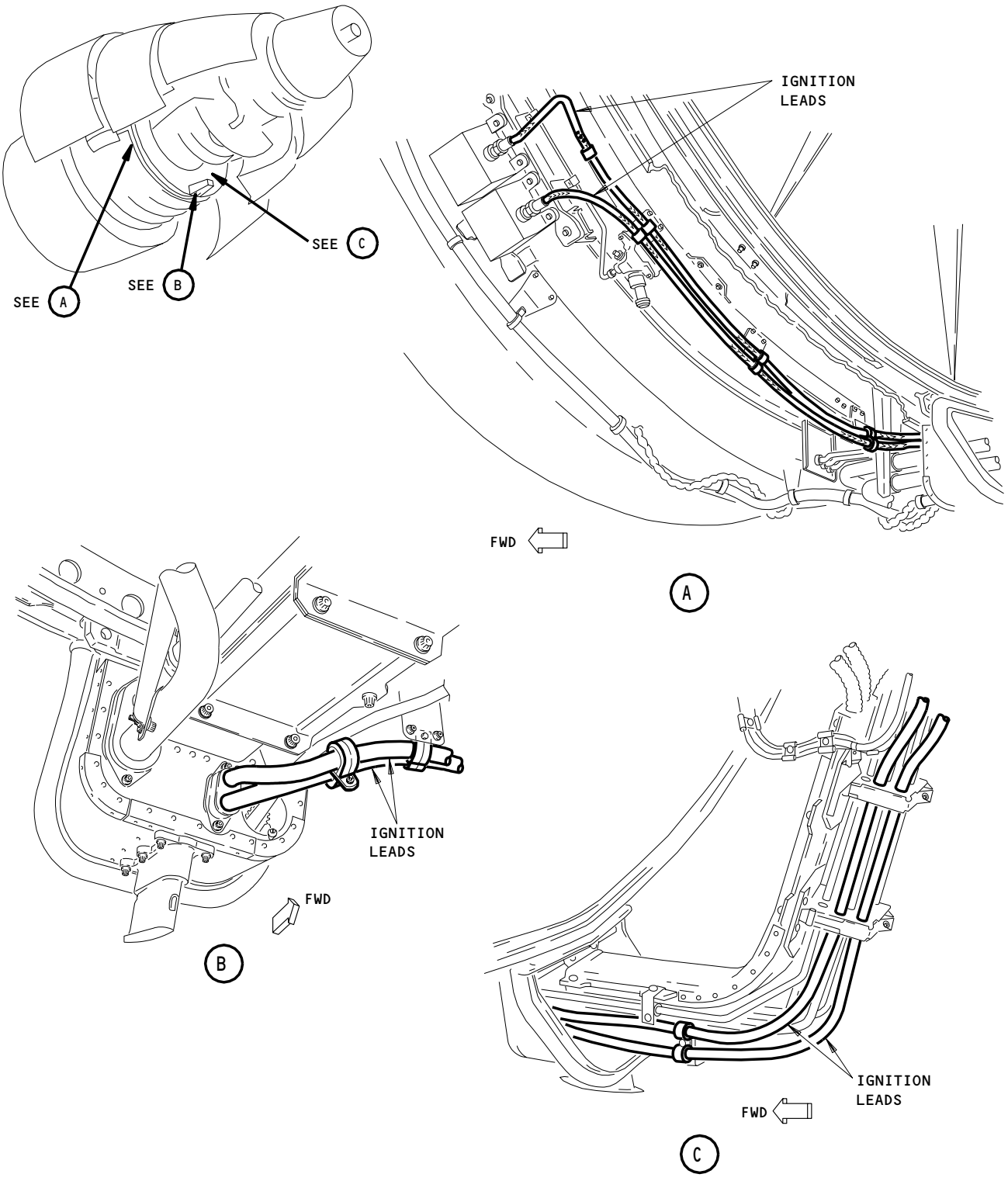
IGNITION SYSTEM - DESCRIPTION AND OPERATION

1. General
   A. The ignition system supplies the high voltage electrical energy to make the ignition spark. The spark fires and burns the fuel/air mixture in the combustion chamber. The system makes the engine start and continuously supplies ignition during engine operation. Each engine has two ignition circuits.
   B. The ignition system contains an ignition power supply and a high tension distribution system. The ignition exciters receive the input power of 115 volt AC at 400 HZ from the power supply. The high tension distribution system includes the ignition leads and the igniter plugs. The ignition exciters give high voltage output through the coaxial ignition leads to the igniter plugs and make the spark.
2. Ignition Exciters (Fig. 1)
   A. Each engine has two independent ignition exciters. The exciters are mounted to the aft fan case at the 7 o'clock position. The exciters are installed on the shock mounts, which are tightened to the fan case brackets. The exciter is a capacitor which can give 14 to 20 KV output to the igniter plug.
   B. Each ignition exciter contains an input circuit (a filter network and a power transformer), and a rectifier circuit. The ignition exciter also contains a storage capacitor circuit, and an output circuit. All components are tightly sealed inside the exciter.
   C. Each ignition exciter has two electrical connectors: an input terminal and an output terminal.
3. Ignition Leads (Fig. 2)
   A. Each engine has two ignition leads which connect the ignition exciters to the igniter plugs. The lower ignition exciter is connected to the top igniter plug at the 3 o'clock position on the compressor rear frame. The top ignition exciter is connected to the lower igniter plug at the 4 o'clock position on the compressor rear frame.
   B. The ignition leads have flexible conduit assemblies, elbow assemblies, and air in/out adapters.
   C. The ignition leads are made of insulated wire in a sealed flexible conduit. Each flexible conduit has a copper inner braid and a nickel outer braid. The inner cable is a coaxial cable which transmits the high energy output from the exciter to the igniter plug. A plastic tubular seal is installed over each lead to prevent heat damage from the hot section. The areas where the lead and the strut touch is wound with silicon tape to prevent damage from the adjacent hardware.

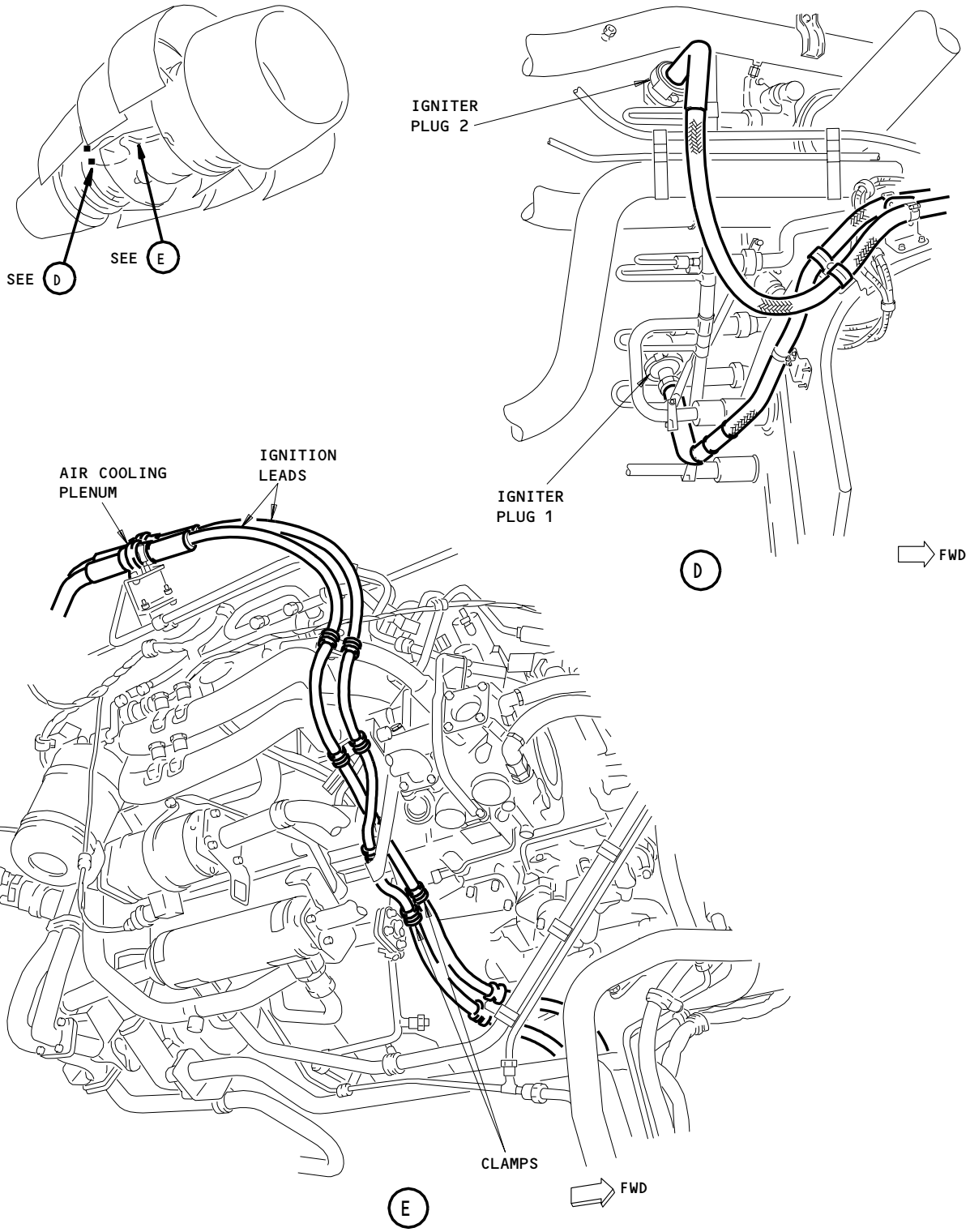


Ignition Exciters
Figure 1

323998



Ignition Leads
Figure 2 (Sheet 1)



Ignition Leads
Figure 2 (Sheet 2)

D. Fan air is used to cool the aft part of the ignition leads. The fan air go through the cooling air plenum into the ignition lead conduits.

4. Igniter Plugs (Fig. 2)
   A. There are two igniter plugs installed on the compressor rear frame. The plugs are installed at approximately the 3 o'clock and the 4 o'clock positions. The plugs are installed into the adapter bushings on the compressor rear frame. The ignition leads are installed onto the plug threads.
   B. The igniter plug threads install fully into the combustion chamber. The distance from the compressor rear frame boss to the outer flange of the igniter ferrule is the plug depth necessary. The igniter ferrule is located on the combustor boss. To find the immersion depth, refer to 74-21-02/601.
5. Operation
   A. The switches on the engine ignition control module, control the ignition system. The engine ignition control module is installed on the P5 overhead panel. When the ignition switch(es) turn(s) ON, electrical power is supplied to the ignition exciter on the applicable engines. For more data on the ignition control system, refer to 74-31-00/001.
   B. When the engine ignition system is energized, the 115 volt, 400 hertz AC power is supplied to the exciter input terminals. The input power goes into the exciters through the inductance-type filter to the primary coil of the transformer. The alternating current (AC) of the input power goes to the secondary coil of the transformer and changes to DC voltage. The rectifier doubler circuit is used to make this change. The output voltage from the rectifier circuit goes through the capacitor circuit and remains there. When the charge is up to the spark-gap breakdown potential, some current will send through the primary coil. There is about 14-15 KV voltage in the secondary coil of the transformer. The igniter plug gap uses up the remaining capacitor charge. This gives the high current, high voltage, pulsed output of the exciter. The rate of the output pulses is 1 or 2 pulses per second.
   C. The output electrical pulses from the exciters go through the ignition leads to the igniter plugs. A high energy spark fires across the plug gap and burns the fuel/air mixture in the combustion chamber. This starts the engine ignition.

IGNITION

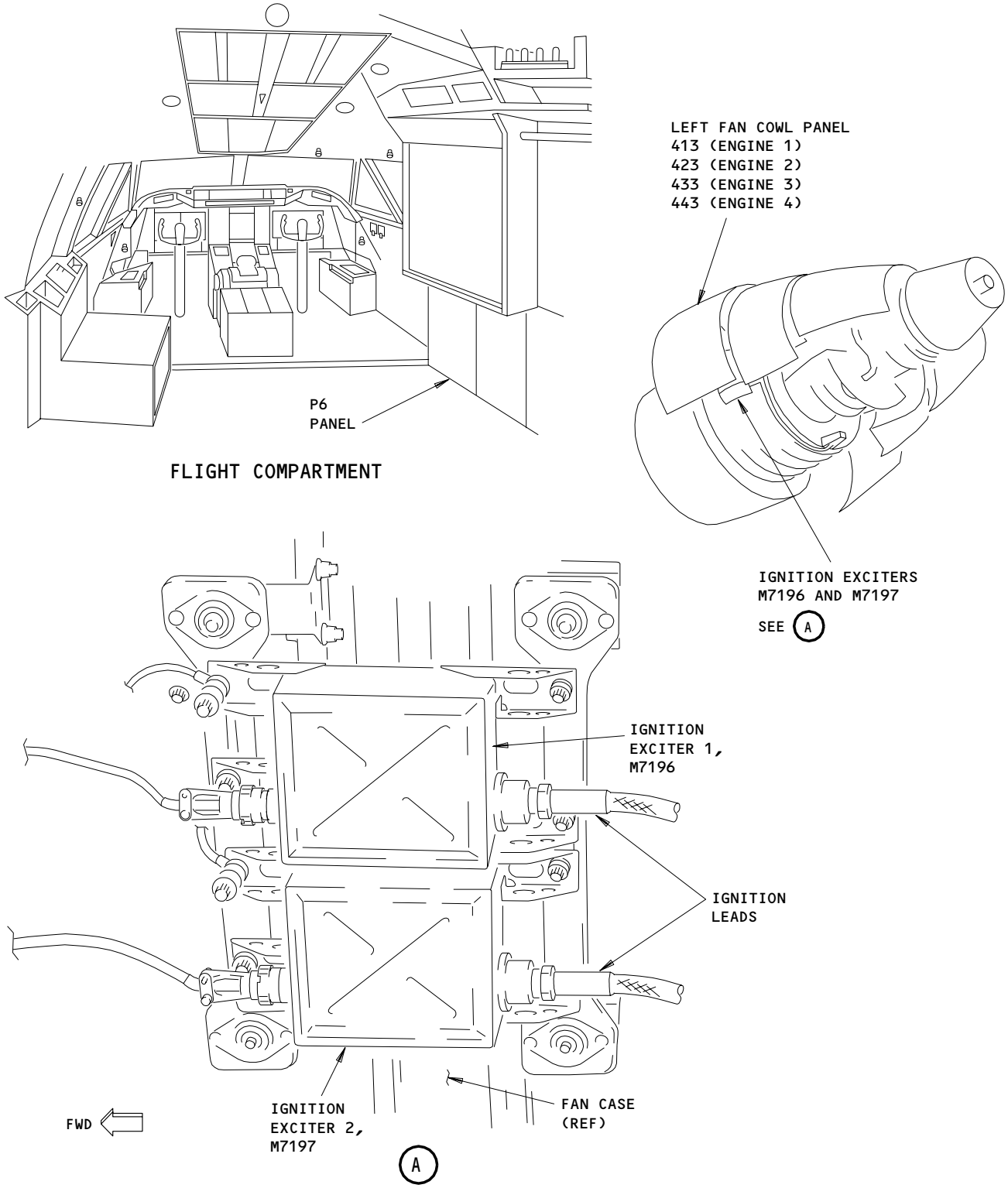
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CIRCUIT BREAKERS	1		FLT COMPT, P6	
IGN 1 ENG 1, C394		1	6F1	*
IGN 1 ENG 2, C397		1	6F2	*
IGN 1 ENG 3, C399		1	6F3	*
IGN 1 ENG 4, C401		1	6F4	*
IGN 2 ENG 1, C393		1	6K19	*
IGN 2 ENG 2, C396		1	6K20	*
IGN 2 ENG 3, C398		1	6K21	*
IGN 2 ENG 4, C400		1	6K22	*
STBY IGN ENG 1, C1044		1	6G19	*
STBY IGN ENG 2, C1045		1	6G20	*
STBY IGN ENG 3, C10581		1	6G21	*
STBY IGN ENG 4, C10582		1	6G22	*
EXCITERS - IGNITION	1			74-11-01
ENGINE 1 IGNITION 1, M7196		1	413, FAN COWL PANEL, ENGINE 1, FAN CASE	
ENGINE 1 IGNITION 2, M7197		1	413, FAN COWL PANEL, ENGINE 1, FAN CASE	
ENGINE 2 IGNITION 1, M7196		1	423, FAN COWL PANEL, ENGINE 2, FAN CASE	
ENGINE 2 IGNITION 2, M7197		1	423, FAN COWL PANEL, ENGINE 2, FAN CASE	
ENGINE 3 IGNITION 1, M7196		1	433, FAN COWL PANEL, ENGINE 3, FAN CASE	
ENGINE 3 IGNITION 2, M7197		1	433, FAN COWL PANEL, ENGINE 3, FAN CASE	
ENGINE 4 IGNITION 1, M7196		1	443, FAN COWL PANEL, ENGINE 4, FAN CASE	
ENGINE 4 IGNITION 2, M7197		1	443, FAN COWL PANEL, ENGINE 4, FAN CASE	
LEADS - IGNITION	2,3			74-21-01
ENGINE 1		2	415 AND 416, THRUST REVERSER HALVES	
ENGINE 2		2	425 AND 426, THRUST REVERSER HALVES	
ENGINE 3		2	435 AND 436, THRUST REVERSER HALVES	
ENGINE 4		2	445 AND 446, THRUST REVERSER HALVES	
MODULE - (REF 28-31-00, FIG. 101) ENGINE IGNITION/FUEL JETTISON, M7325				
PLUG - IGNITER	2			74-21-02
ENGINE 1		2	416, RIGHT THRUST REVERSER HALF, COMPRESSOR REAR FRAME	
ENGINE 2		2	426, RIGHT THRUST REVERSER HALF, COMPRESSOR REAR FRAME	
ENGINE 3		2	436, RIGHT THRUST REVERSER HALF, COMPRESSOR REAR FRAME	
ENGINE 4		2	446, RIGHT THRUST REVERSER HALF, COMPRESSOR REAR FRAME	

* SEE WDM EQUIPMENT LIST

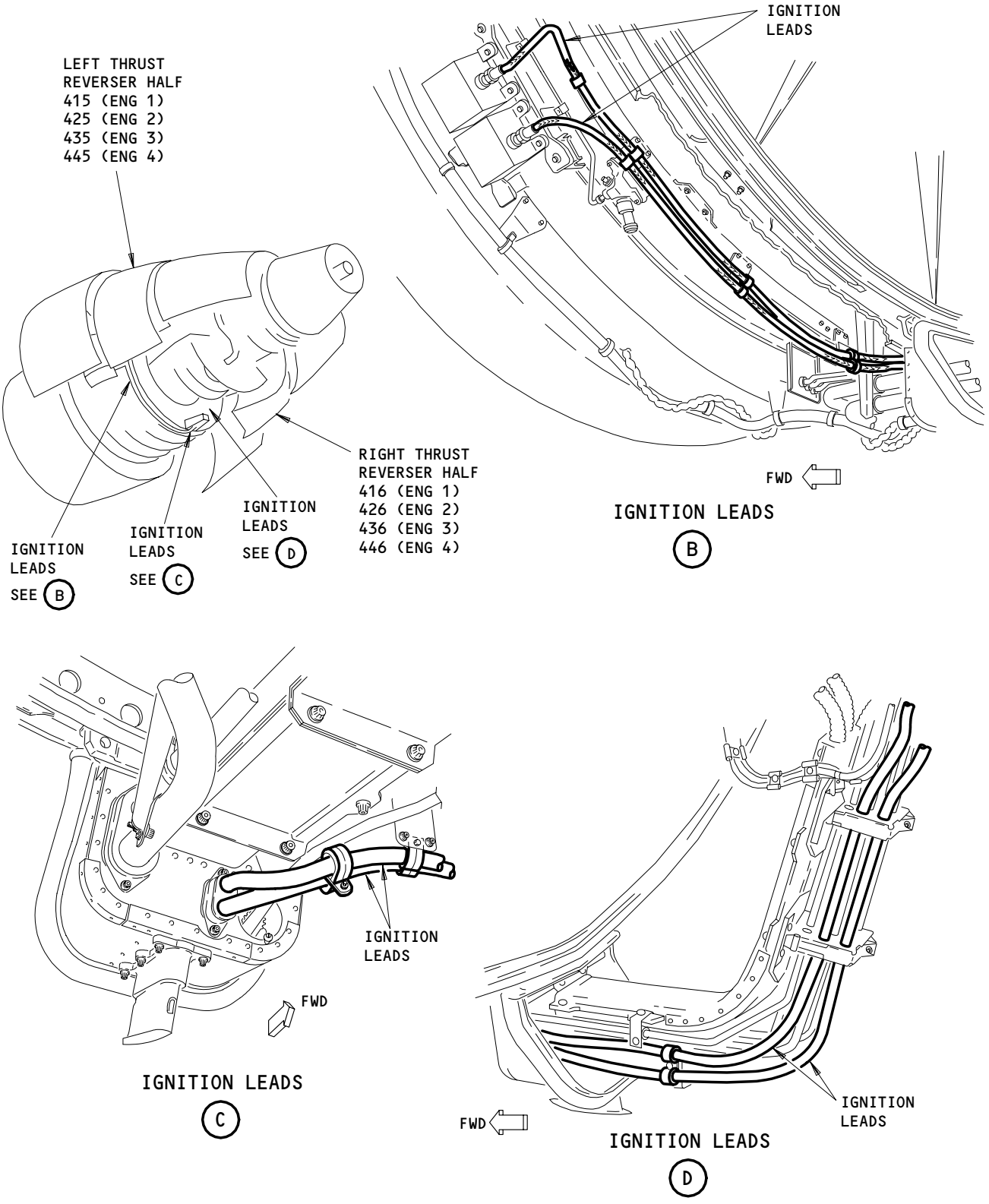
Ignition - Component Index
Figure 101 (Sheet 1)

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAY - (REF 31-01-06, FIG. 101) AUTO IGNITION DUAL, R7532 AUTO IGNITION SINGLE, R7533 ENGINE 1 AUTO IGNITION TAI, R7634 ENGINE 1 FUEL CUTOFF, R7808 ENGINE 1 IGNITION DUAL CONT, R7841 ENGINE 1 IGNITION SINGLE CONT, R7840 ENGINE 1 IGNITION 1 AUTO STBY, R7848 ENGINE 1 IGNITION 2 AUTO STBY, R7471 ENGINE 2 AUTO IGNITION TAI, R7635 ENGINE 2 FUEL CUTOFF, R7809 ENGINE 2 IGNITION DUAL CONT, R7843 ENGINE 2 IGNITION SINGLE CONT, R7842 ENGINE 2 IGNITION 1 AUTO STBY, R7849 ENGINE 2 IGNITION 2 AUTO STBY, R7472 ENGINE 3 AUTO IGNITION TAI, R7636 ENGINE 3 FUEL CUTOFF, R7810 ENGINE 3 IGNITION DUAL CONT, R7845 ENGINE 3 IGNITION SINGLE CONT, R7844 ENGINE 3 IGNITION 1 AUTO STBY, R7850 ENGINE 3 IGNITION 2 AUTO STBY, R7473 ENGINE 4 AUTO IGNITION TAI, R7637 ENGINE 4 FUEL CUTOFF, R7811 ENGINE 4 IGNITION DUAL CONT, R7847 ENGINE 4 IGNITION SINGLE CONT, R7846 ENGINE 4 IGNITION 1 AUTO STBY, R7851 ENGINE 4 IGNITION 2 AUTO STBY, R7474 UNIT - (REF 31-61-00, FIG. 101) EFIS/EICAS INTERFACE NO. 1, M7351 EFIS/EICAS INTERFACE NO. 2, M7352 EFIS/EICAS INTERFACE NO. 3, M7353 UNIT - (REF 27-51-00, FIG. 101) FLAP CONTROL L, M7881 FLAP CONTROL R, M7879 UNIT - (REF 73-00-00, FIG. 101) ENGINE CONTROL, M7198				

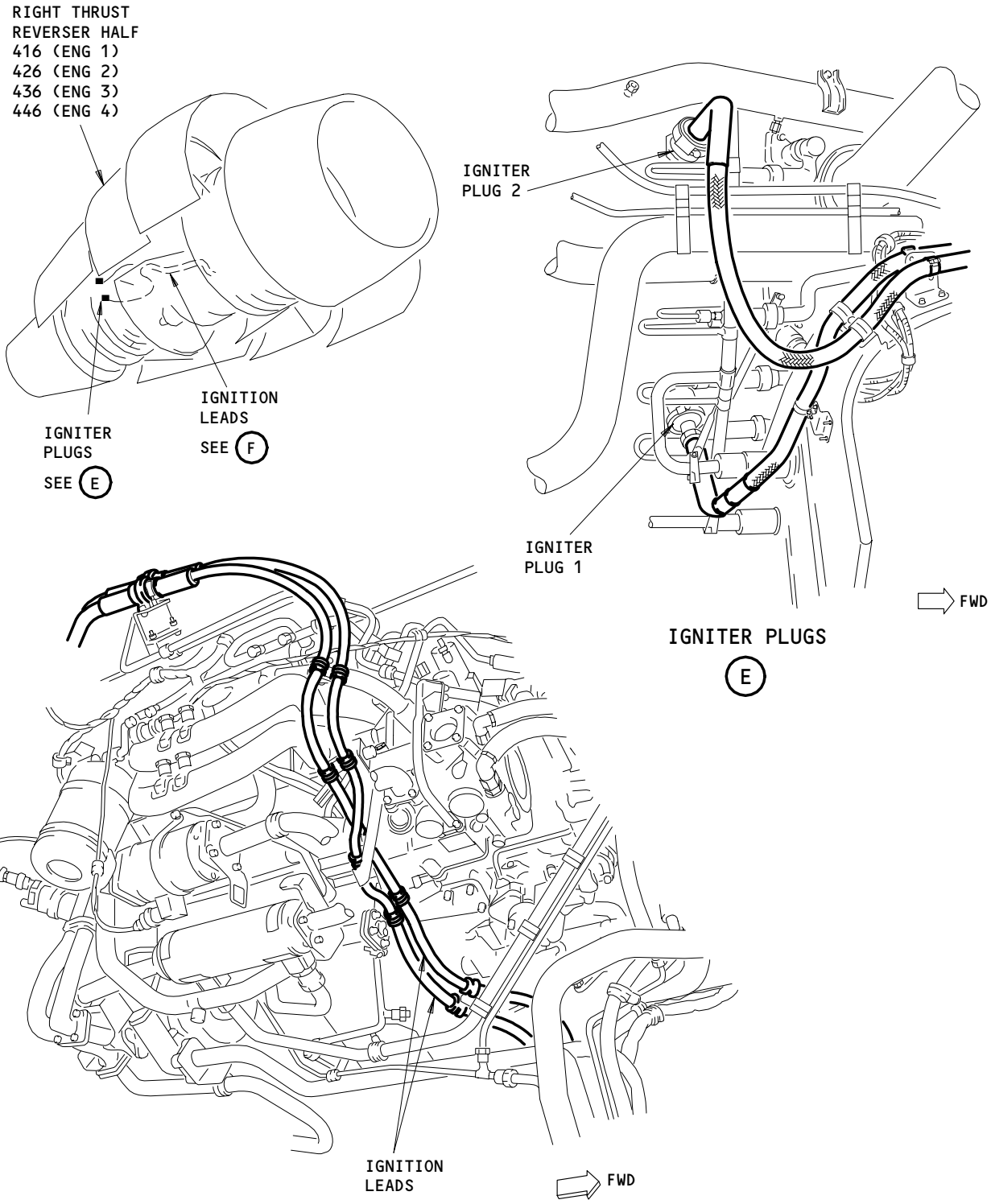
Ignition - Component Index
Figure 101 (Sheet 2)



Ignition - Component Location
Figure 102 (Sheet 1)



Ignition - Component Location
Figure 102 (Sheet 2)



Ignition - Component Location
Figure 102 (Sheet 3)

599956

IGNITION SYSTEM - FAULT ISOLATION

1. General
   A. To troubleshoot the ignition faults, the ignition fault isolation procedure uses:
      - The CMCS messages
      - The operational tests
      - The engine starts.

   WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENT. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS. AFTER YOU REMOVE THE IGNITION LEAD FROM THE EXCITERS, MAKE SURE THAT YOU GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

   CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

2. Fault Isolation Tips
   A. When you use the fault isolation procedures, think that:
      - The system wire is OK
      - Electrical power is available at the applicable bus.
   B. If the specified corrective action does not correct the fault, do a check of the wire with the wiring diagrams.
3. Fault Isolation Procedures

Figure 103	EICAS Message ENG (1, 2, 3, 4) IGNITER 1 Displayed.

Figure 104	EICAS Message ENG (1, 2, 3, 4) IGNITER 2 Displayed.

PREREQUISITES

MAKE SURE THESE CIRCUIT BREAKERS ARE OPEN AND ATTACH DO-NOT-CLOSE TAGS:
6K19 ENG1 IGN2, 6K20 ENG2 IGN2, 6K21 ENG3 IGN2, 6K22 ENG4 IGN2, 6G19 STBY IGN ENG1, 6G20 STBY IGN ENG2, 6G21 STBY IGN ENG3, 6G22 STBY IGN ENG4

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

EICAS MESSAGE "ENG (1,2,3, OR 4) IGNITER 1" DISPLAYED

1 MAKE SURE THE PREQUISITE CIRCUIT BREAKERS ARE OPEN.
SET THE AUTO-START SWITCH TO "OFF".
SET THE AUTO-IGNITION SWITCH TO "BOTH".
DISCONNECT CONNECTOR DM7196 FROM THE IGNITION EXCITER NUMBER 1 FOR THE APPLICABLE ENGINE.
SET THE "FUEL CONTROL" SWITCH IN THE RUN POSITION.
DO A CHECK FOR 115V AC AT THE IGNITION EXCITER, CABLE CONNECTOR DM7196, PINS A AND B (WDM 74-31-13,-23,-33,-43).
WAS THE VOLTAGE PRESENT?

YES → 21 DO THE IGNITER PLUG DEPTH CHECK (AMM 74-21-02/601) ON THE IGNITER PLUG 1.
WAS THE IGNITER DEPTH OK?

NO → 41 INSTALL THE IGNITER PLUG 1 TO THE APPLICABLE DEPTH (AMM 74-21-02/601).

YES → 43 REPLACE THE IGNITER PLUG 1 (AMM 74-21-02/401).
IF THE PROBLEM CONTINUES, REPLACE THE IGNITION EXCITER 1, M7196 (AMM 74-11-01/401).
IF THE PROBLEM CONTINUES, REPLACE THE IGNITION LEAD 1 (AMM 74-21-01/401).

NO → 3 DO A CHECK FOR 115V AC AT THE ECU, CABLE CONNECTOR DM7198A, PINS 7 AND 8 (WDM 74-31-13,-23,-33,-43).
WAS THE VOLTAGE PRESENT?

NO → 45 DO THE CORRECTIVE ACTION FOR EACH 71-CMCS MESSAGE INDEX, MESSAGE 7X526 ENG-X IGNITOR 1 AIRPLANE POWER FAIL.

YES → 5 DO A CONTINUITY TEST OF THE WIRING BETWEEN THE ECU AND THE IGNITION EXCITER AS FOLLOWS:

FROM ECU	TO EXCITER 1
DM7198A PIN 9	DM7196 PIN B
DM7198A PIN 10	DM7196 PIN A

NO → 47 REPAIR THE WIRING BETWEEN THE ECU AND THE IGNITION EXCITER 1.
DO AN AUDIBLE IGNITION TEST (AMM 74-00-00/501).

YES → 49 REPLACE THE ECU, M7198 (AMM 73-21-15/401).

EICAS Message ENG (1,2,3, or 4) IGNITER 1 Displayed
Figure 103

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PREREQUISITES

MAKE SURE THESE CIRCUIT BREAKERS ARE OPEN AND ATTACH DO-NOT-CLOSE TAGS:
- 6F1 ENG1 IGN1, 6F2 ENG2 IGN1, 6F3 ENG3 IGN1, 6F4 ENG4 IGN1, 6G19 STBY IGN ENG1, 6G20 STBY IGN ENG2, 6G21 STBY IGN ENG3, 6G22 STBY IGN ENG4

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

EICAS MESSAGE "ENG (1,2,3, OR 4) IGNITER 2" DISPLAYED

1 MAKE SURE THE PREQUISITE CIRCUIT BREAKERS ARE OPEN.
SET THE AUTO-START SWITCH TO "OFF".
SET THE AUTO-IGNITION SWITCH TO "BOTH".
DISCONNECT CONNECTOR DM7197 FROM THE IGNITION EXCITER NUMBER 2 FOR THE APPLICABLE ENGINE.
SET THE "FUEL CONTROL" SWITCH IN THE RUN POSITION.
DO A CHECK FOR 115V AC AT THE IGNITION EXCITER, CABLE CONNECTOR DM7197, PINS A AND B (WDM 74-31-13,-23,-33,-43).
WAS THE VOLTAGE PRESENT?

YES → 21 DO THE IGNITER PLUG DEPTH CHECK (AMM 74-21-02/601) ON THE IGNITER PLUG 2.
WAS THE IGNITER DEPTH OK?

NO → 41 INSTALL THE IGNITER PLUG 2 TO THE APPLICABLE DEPTH (AMM 74-21-02/601).

YES → 43 REPLACE THE IGNITER PLUG 2 (AMM 74-21-02/401).
IF THE PROBLEM CONTINUES, REPLACE THE IGNITION EXCITER 2, M7196 (AMM 74-11-01/401).
IF THE PROBLEM CONTINUES, REPLACE THE IGNITION LEAD 2 (AMM 74-21-01/401).

NO → 3 DO A CHECK FOR 115V AC AT THE ECU, CABLE CONNECTOR DM7198B, PINS 7 AND 8 (WDM 74-31-13,-23,-33,-43).
WAS THE VOLTAGE PRESENT?

NO → 45 DO THE CORRECTIVE ACTION FOR EACH 71-CMCS MESSAGE INDEX, MESSAGE 7X527 ENG-X IGNITOR 2 AIRPLANE POWER FAIL.

YES → 5 DO A CONTINUITY TEST OF THE WIRING BETWEEN THE ECU AND THE IGNITION EXCITER AS FOLLOWS:

FROM ECU	TO EXCITER 2
DM7198B PIN 9	DM7197 PIN B
DM7198B PIN 10	DM7197 PIN A

NO → 47 REPAIR THE WIRING BETWEEN THE ECU AND THE IGNITION EXCITER 2.
DO AN AUDIBLE IGNITION TEST (AMM 74-00-00/501).

YES → 49 REPLACE THE ECU, M7198 (AMM 73-21-15/401).

EICAS Message ENG (1,2,3, or 4) IGNITER 2 Displayed
Figure 104

AUTOSTART ATTEMPT FAILED TO LIGHT-OFF

PREREQUISITES

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
- ELECTRICAL POWER IS ON (AMM 24-22-00/201)
- ALL FLAPS ARE FULLY RETRACTED (AMM 27-51-00/201 AND 27-81-00/201)
- CONTINUOUS IGNITION SWITCH IS SET TO OFF (AMM 74-00-00-00/501)
- ANTI-ICE SYSTEM IS SET TO OFF
- AUTOSTART SWITCH IS IN THE ON POSITION

1 WARNING

THE ENGINE IGNITORS WILL FIRE DURING THIS TEST. DO NOT DO THIS TEST OF THE AUTOSTART SYSTEM WHEN YOU HAVE ANY OF THE CONDITIONS THAT FOLLOW:
- DURING AIRPLANE FUELING
- FUEL IS IN THE ENGINE
- PERSONNEL ARE WITHIN THE JET EXHAUST AREA.

FUEL CAN CAUSE AN INTERNAL FIRE OR A FIRE IN THE TURBINE EXHAUST AREA. IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING THE OPERATION. IF YOU DO NOT OBEY THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

SET THE START MODE SELECT SWITCH TO AUTO.

OPEN THESE C/Bs FOR THE APPLICABLE ENGINE AND INSTALL THE DO-NOT-CLOSE TAGS:

C395, ENG START AIR CONT
6L10, FUEL CONT VALVE ENG 1
6L11, FUEL CONT VALVE ENG 2
6L12, FUEL CONT VALVE ENG 3
6L13, FUEL CONT VALVE ENG 4
6G1, FUEL SHUTOFF VALVE ENG 1
6G2, FUEL SHUTOFF VALVE ENG 2
6G3, FUEL SHUTOFF VALVE ENG 3
6G4, FUEL SHUTOFF VALVE ENG 4
6G19, STBY IGN ENG 1
6G20, STBY IGN ENG 2
6G21, STBY IGN ENG 3
6G22, STBY IGN ENG 4

(CONTINUED)

YES

21 DID BIT 19 GO TO ONE ON BOTH CH A AND CH B?

NO

41 REPLACE THE ECU (AMM 73-21-15/401).

YES

42 AFTER YOU DISCONNECT, CLEAN CONNECTOR DM7198D (J4) ON THE APPLICABLE ECU (AMM 73-21-18/701).
DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 1)

1 (CONTINUED)

SET THESE SWITCHES THAT FOLLOW:
- THE APPLICABLE ENGINE EEC MAINT SWITCH ON P461 TO TEST
- THE AUTO IGN SWITCH TO SINGLE
- THE STBY IGN SWITCH TO NORM
- THE APPLICABLE FUEL CONTROL SW TO RUN.

GET ACCESS TO THE CMCS INPUT MONITORING (AMM 45-10-00/201). ENTER THESE INPUT CODES FOR THE APPLICABLE ENGINE CONTROL UNIT (ECU):

ENG	CH	CODE	PAGE
1	A	E/82/274/10	1/8
1	B	E/90/274/10	2/8
2	A	E/84/274/01	1/8
2	B	E/92/274/01	2/8
3	A	E/83/274/11	1/8
3	B	E/91/274/11	2/8
4	A	E/85/274/00	1/8
4	B	E/93/274/00	2/8

AFTER YOU PULL THE START SWITCH OUT, HOLD THE SWITCH FOR THE APPLICABLE ENGINE. MAKE SURE THAT THE SINGLE IGNITOR ENABLE DISCRETE (BIT 19) IS SET TO ONE WHEN THE START SWITCH IS HELD OUT.

IS BIT 19 SET TO ONE ON ONE OF THE TWO CHANNELS (CH) A OR B?

NO

2 RELEASE THE START SWITCH.

SET THE CONTINUOUS IGNITION SWITCH TO ON.

LOOK TO SEE THAT BIT 19 IS SET TO ONE.

IS BIT 19 SET TO ONE ON ONE OF THE TWO CHANNELS A OR B?

NO

SEE SHEET 3 (BLOCK 3)

YES

22 MAKE SURE THERE IS CONTINUITY FOR THE APPLICABLE PIN ON THE ENG IGN CONT/FUEL JTSN, MODULE 7325:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DM7325A	24	TD334	Z25
			1	
1	DM7325A	9	GROUND	
2	DM7325B	26	TD334	Z28
2	DM7325B	15	GROUND	
3	DM7325C	9	TD334	Z21
3	DM7325C	24	GROUND	
4	DM7325D	15	TD334	Z34
4	DM7325D	26	GROUND	

DID YOU FIND CONTINUITY?

YES

43 REPLACE THE START SWITCH.

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

NO

44 REPAIR THE WIRING:

ENG	WDM REF
1	74-31-11,-12,-13
2	74-31-21,-22,-23
3	74-31-31,-32,-33
4	74-31-41,-42,-43

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

1 FIND CONNECTOR TD334 IN BOX 22 ON PANEL P6.

Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 2)

FROM SHEET 2
(BLOCK 2)

NO

3 SET THE CONTINUOUS IGNITION SWITCH TO OFF.

OPEN THESE C/Bs ON THE P6 PANEL FOR THE APPLICABLE ENGINE AND INSTALL THE DO-NOT-CLOSE TAGS:

6F1, ENG 1 IGN 1
6K19, ENG 1 IGN 2
6F2, ENG 2 IGN 1
6K20, ENG 2 IGN 2
6F3, ENG 3 IGN 1
6K21, ENG 3 IGN 2
6F4, ENG 4 IGN 1
6K22, ENG 4 IGN 2

REMOVE THIS RELAY FOR THE APPLICABLE ENGINE (P6 PANEL):

- R7840 RELAY - SINGLE CONT ENG 1
- R7842 RELAY - SINGLE CONT ENG 2
- R7844 RELAY - SINGLE CONT ENG 3
- R7846 RELAY - SINGLE CONT ENG 4.

REMOVE THE DO-NOT-CLOSE TAGS AND CLOSE THESE C/Bs:

6K19, ENG 1 IGN 2
6F2, ENG 2 IGN 1
6K20, ENG 2 IGN 2
6F3, ENG 3 IGN 1
6K21, ENG 3 IGN 2
6F4, ENG 4 IGN 1
6K22, ENG 4 IGN 2

AFTER YOU PULL THE START SWITCH OUT, HOLD THE SWITCH FOR THE APPLICABLE ENGINE.

MAKE SURE THAT GROUND IS PRESENT ON THE RELAY CONNECTOR FOR THE APPLICABLE ENGINE:

	FROM		TO
ENG	CONN	PIN	
1	DR7840	X2	GROUND
2	DR7842	X2	GROUND
3	DR7844	X2	GROUND
4	DR7846	X2	GROUND

DID YOU MEASURE GROUND?

NO

45 REPAIR THE WIRING AS IT IS NECESSARY FOR THE APPLICABLE ENGINE:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DR7840	X2	TD334	Z25
2	DR7842	X2	TD334	Z28
3	DR7844	X2	TD334	Z21
4	DR7846	X2	TD334	Z34

(WDM 74-31-12,-22,-32,-42).

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

YES

SEE SHEET 4
(BLOCK 4)

Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 3)

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FROM SHEET 3
(BLOCK 3)

YES

4 RELEASE THE START SWITCH.
USE A MULTIMETER TO MEASURE VOLTAGE OF 108-122V AC BETWEEN PINS X1 AND AIRPLANE GROUND FOR THE APPLICABLE RELAY (P6 PANEL):

- R7840 RELAY - SINGLE CONT ENG 1
- R7842 RELAY - SINGLE CONT ENG 2
- R7844 RELAY - SINGLE CONT ENG 3
- R7846 RELAY - SINGLE CONT ENG 4

(WDM 74-31-12,-22,-32,-42).
DID YOU FIND THE VOLTAGE IN THE LIMITS?

YES

NO

SEE SHEET 7
(BLOCK 5)

23 OPEN THESE C/Bs ON THE P6 PANEL FOR THE APPLICABLE ENGINE AND INSTALL DO-NOT-CLOSE TAGS:

6F1, ENG 1 IGN 1
6K19, ENG 1 IGN 2
6F2, ENG 2 IGN 1
6K20, ENG 2 IGN 2
6F3, ENG 3 IGN 1
6K21, ENG 3 IGN 2
6F4, ENG 4 IGN 1
6K22, ENG 4 IGN 2

JUMPER PIN A2 TO PIN A1 ON THE RELAY CONNECTOR FOR THE APPLICABLE ENGINE:

ENG	CONNECTOR	WDM REF
1	DR7840	74-31-12
2	DR7842	74-31-22
3	DR7844	74-31-32
4	DR7846	74-31-42

MAKE SURE THAT THE SINGLE IGNITOR ENABLE DISCRETE (BIT 19) IS SET TO ONE.
IS BIT 19 SET TO ONE ON ONE OF THE TWO CHANNELS A OR B?

YES

46 REPLACE THE APPLICABLE RELAY:

- R7840 RELAY - SINGLE CONT ENG 1
- R7842 RELAY - SINGLE CONT ENG 2
- R7844 RELAY - SINGLE CONT ENG 3
- R7846 RELAY - SINGLE CONT ENG 4.

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

NO

24 LEAVE THE JUMPER ACROSS THE SINGLE CONTROL RELAY INSTALLED ABOVE.
DISCONNECT THE APPLICABLE CONNECTOR FROM THE "ENG IGN CONT/FUEL JTSN" MODULE, M7325, AND JUMPER PINS AS FOLLOWS:

ENG	CONNECTOR	JUMPER	WDM REF
1	DM7325A	PIN 4 TO PIN 10	74-31-11
2	DM7325B	PIN 27 TO PIN 28	74-31-21
3	DM7325C	PIN 27 TO PIN 10	74-31-31
4	DM7325D	PIN 28 TO PIN 29	74-31-41

MAKE SURE THAT THE SINGLE IGNITOR ENABLE DISCRETE (BIT 19) IS SET TO ONE.
IS BIT 19 SET TO ONE ON ONE OF THE TWO CHANNELS A OR B?

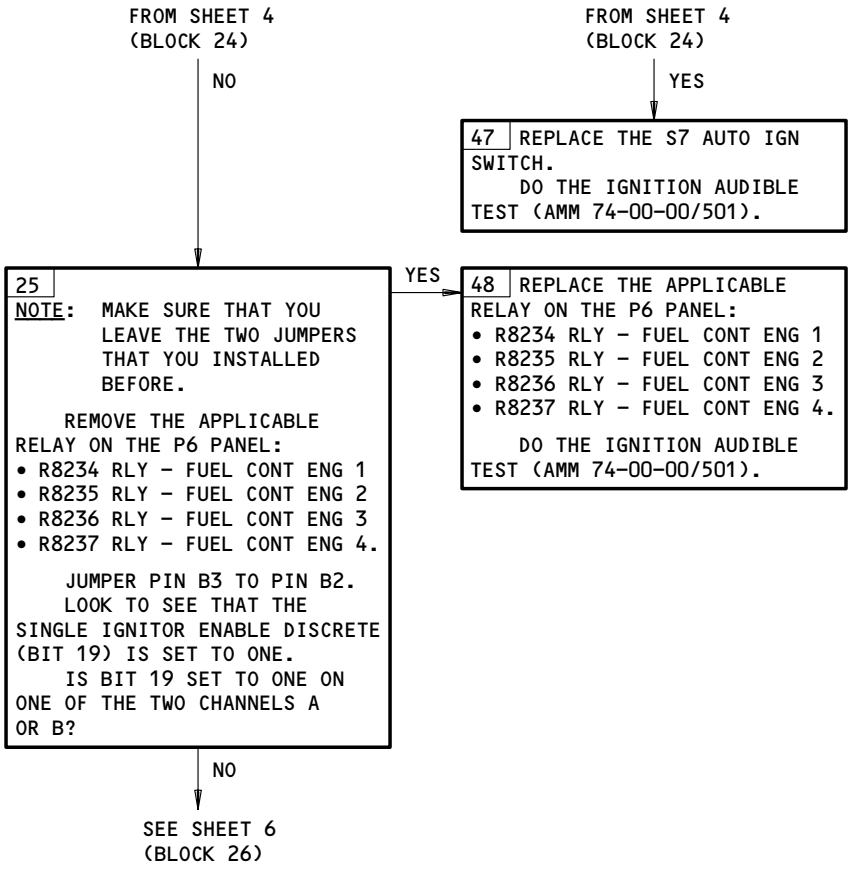
NO

SEE SHEET 5
(BLOCK 25)

YES

SEE SHEET 5
(BLOCK 47)

Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 4)



Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 5)

FROM SHEET 5
(BLOCK 25)

NO

26 REMOVE THE PREVIOUS THREE JUMPERS.

JUMPER PINS ON THE P6 PANEL AS FOLLOWS FOR THE APPLICABLE ENGINE:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DR7840	A2	DR8234	B2
2	DR7842	A2	DR8235	B2
3	DR7844	A2	DR8236	B2
4	DR7846	A2	DR8237	B2

LOOK TO SEE THAT THE SINGLE IGNITOR ENABLE DISCRETE (BIT 19) IS SET TO ONE.

IS BIT 19 SET TO ONE ON ONE OF THE TWO CHANNELS A OR B?

YES

49 AFTER YOU EXAMINE THE WIRING, REPAIR THE WIRING ON THE P6 AND P5 PANELS AS FOLLOWS:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DR7840	A1	D40525J	18
2 ▷2◁	D40525P	18	DM7325A	4
	DM7325A	10	D40525P	2
	D40525J	2	DR8234	B3
2	DR7842	A1	D40526J	6
3 ▷3◁	D40526P	6	DM7325B	28
	DM7325B	27	DM40526P	4
	D40526J	4	DR8235	B3
3	DR7844	A1	D40501J	5
4 ▷4◁	D40501P	5	DM7325C	27
	DM7325C	10	D40501P	8
	D40501J	8	DR8236	B3
4	DR7846	A1	D40503J	17
5 ▷5◁	D40503P	17	DM7325D	29
	DM7325D	28	D40503P	7
	D40503J	7	DR8237	B3

ENG	WDM REF
1	74-31-11,-12
2	74-31-21,-22
3	74-31-31,-32
4	74-31-41,-42

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

NO

27 MAKE SURE THAT THERE IS CONTINUITY FOR THE APPLICABLE ENGINE AS FOLLOWS:

FROM (P6)		TO (ECU)		
CONN	PIN	ENG	CONN	PIN
DR8234	B2	1	DM7198D	8
DR8235	B2	2	DM7198D	8
DR8236	B2	3	DM7198D	8
DR8237	B2	4	DM7198D	8

DID YOU FIND CONTINUITY?

YES

50 REPLACE THE ECU (AMM 73-21-15/401).

NO

51 REPAIR THE WIRING.

ENG	WDM REF
1	74-31-12,-13
2	74-31-22,-23
3	74-31-32,-33
4	74-31-42,-43

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

▷2◁ FIND CONNECTOR D40525 ON PANEL 6 AS306 POSITION 21.

▷3◁ FIND CONNECTOR D40526 ON PANEL 6 AS306 POSITION 22.

▷4◁ FIND CONNECTOR D40501 ON PANEL 6 AS306 POSITION 4.

▷5◁ FIND CONNECTOR D40503 ON PANEL 6 AS306 POSITION 6.

Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 6)

FROM SHEET 4
(BLOCK 4)

NO

5 OPEN THESE C/Bs ON THE P6 PANEL FOR THE APPLICABLE ENGINE AND INSTALL THE DO-NOT-CLOSE TAGS:

6F1, ENG 1 IGN 1
6K19, ENG 1 IGN 2
6F2, ENG 2 IGN 1
6K20, ENG 2 IGN 2
6F3, ENG 3 IGN 1
6K21, ENG 3 IGN 2
6F4, ENG 4 IGN 1
6K22, ENG 4 IGN 2

REMOVE THIS RELAY FOR THE APPLICABLE ENGINE (P6 PANEL):

- R8331 RLY - IGN CONT XFER ENG 1
- R8332 RLY - IGN CONT XFER ENG 2
- R8333 RLY - IGN CONT XFER ENG 3
- R8334 RLY - IGN CONT XFER ENG 4.

REMOVE THE DO-NOT-CLOSE TAGS AND CLOSE THE C/Bs:

6F1, ENG 1 IGN 1
6K19, ENG 1 IGN 2
6F2, ENG 2 IGN 1
6K20, ENG 2 IGN 2
6F3, ENG 3 IGN 1
6K21, ENG 3 IGN 2
6F4, ENG 4 IGN 1
6K22, ENG 4 IGN 2

USE A MULTIMETER TO MEASURE VOLTAGE OF 108-122V AC AS FOLLOWS FOR THE APPLICABLE ENGINE:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DR8331	X1	DR8331	X2
	DR8331	A1	DR8331	X2
	DR8331	A3	DR8331	X2
2	DR8332	X1	DR8331	X2
	DR8332	A1	DR8331	X2
	DR8332	A3	DR8331	X2
3	DR8333	X1	DR8331	X2
	DR8333	A1	DR8331	X2
	DR8333	A3	DR8331	X2
4	DR8334	X1	DR8331	X2
	DR8334	A1	DR8331	X2
	DR8334	A3	DR8331	X2

DID YOU FIND THE VOLTAGE IN THE LIMITS IN ALL CASES?

YES

28 MAKE SURE THERE IS CONTINUITY FOR THE APPLICABLE ENGINE:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DR7840	X1	TD334	YA18
2	DR7842	X1	TD334	YA38
3	DR7844	X1	TD334	YC38
4	DR7846	X1	TD334	YC39

DID YOU FIND CONTINUITY?

YES

52 REPLACE THE APPLICABLE RELAY ON THE P6 PANEL:

- R8331 RLY-IGN CONT XFER ENG 1
- R8332 RLY-IGN CONT XFER ENG 2
- R8333 RLY-IGN CONT XFER ENG 3
- R7846 RLY-IGN CONT XFER ENG 4.

DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

NO

53 REPAIR THE WIRING (WDM 74-31-12,-22,-32,-42).
DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

NO

54 REPAIR THE WIRING AS FOLLOWS FOR THE APPLICABLE ENGINE:

	FROM		TO	
ENG	CONN	PIN	CONN	PIN
1	DR8331	X1	TD334	Z23
	DR8331	A1	TD334	Z23
	DR8331	A3	TD334	Z23
2	DR8332	X1	TD334	Z26
	DR8332	A1	TD334	Z26
	DR8332	A3	TD334	Z26
3	DR8333	X1	TD334	Z29
	DR8333	A1	TD334	Z29
	DR8333	A3	TD334	Z29
4	DR8334	X1	TD334	Z32
	DR8334	A1	TD334	Z32
	DR8334	A3	TD334	Z32

(WDM 74-31-12,-22,-32,-42).
DO THE IGNITION AUDIBLE TEST (AMM 74-00-00/501).

Autostart Attempt Failed to Light-Off
Figure 105 (Sheet 7)

IGNITION SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains three tasks.
      (1) A task to do an operational test of the ignition system.
      (2) A task to do a system test of the ignition system.
      (3) A task to do an operational test of the approach/landing and thermal anti-ice systems for the engine standby ignition.
   B. The high energy spark made by the ignition system is easy to hear. The operational test and the system test include an audible check of the applicable engine igniter plugs. If the audible check is satisfactory, the ignition exciters and the ignition leads are in a serviceable condition. But, the audible check does not show that the igniter plug is in a serviceable condition. If the igniter plug ceramic is cracked, the igniter plug can spark through the cooling holes instead of at the tip.
   C. Do the operational test after you replace these parts:
      (1) The ignition exciter
      (2) An ignition lead
      (3) An igniter plug.
   D. Do the system test to do trouble-shooting of the ignition system circuits.
   E. If you find an ignition system malfunction, you must replace the igniter plug (AMM 74-21-02/401). Replace the igniter plug before you do the operational test or the system test.

TASK 74-00-00-715-001-J00

2. Operational Test - Ignition System
   A. General

WARNING: DO NOT DO A TEST OF THE IGNITION SYSTEM WHEN YOU HAVE ANY OF THE CONDITIONS THAT FOLLOW:

- DURING AIRPLANE FUELING
- THE AIRPLANE IS NEAR BUILDINGS AND/OR OTHER AIRPLANES THAT ARE WITHIN THE JET EXHAUST AREA FOR GROUND IDLE (REF 71-00-00/201)
- THE AIRPLANE IS IN THE HANGAR.

MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE JET EXHAUST AREA FOR GROUND IDLE (REF 71-00-00/201) OF THE APPLICABLE ENGINE.

IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING THE OPERATION.
IF YOU DO NOT OBEY THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Obey this warning during all of this task.

(2) Do the operational test after you replace an ignition system component on the engine.
(3) To do this task, you must:
(a) Open the thrust reverser halves
(b) Do a visual check of the ignition system components
(c) Close the thrust reverser halves
(d) Remove power from the fuel control system and the starting system
(e) Listen to hear the igniter plug fire
(f) Put the start switch in the off position
(g) Supply power to the fuel control system and the starting system.

B. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 27-51-00/201, Trailing Edge Flap System
(3) AMM 71-00-00/201, Power Plant
(4) AMM 74-21-02/601, Igniter Plug
(5) AMM 78-31-00/201, Thrust Reverser System
(6) WDM 74-31-11
(7) WDM 74-31-12
(8) WDM 74-31-21
(9) WDM 74-31-22
(10) WDM 74-31-31
(11) WDM 74-31-32
(12) WDM 74-31-41
(13) WDM 74-31-42
(14) SSM 74-31-01
(15) SSM 74-31-02
(16) SSM 74-31-03
(17) SSM 74-31-04

C. Access
(1) Location Zone
412 Engine 1
422 Engine 2
432 Engine 3
442 Engine 4

(2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4

D. Preconditions

S 865-230-J00

(1) Electrical Power on (AMM 24-22-00/201).

S 865-231-J00

(2) Integrated Display System (IDS) serviceable (AMM 31-61-00/501).

E. Do the visual check.

S 015-002-J00

(1) Open the thrust reverser halves (AMM 78-31-00/201).

S 215-003-J00

(2) Do a visual check of the ignition system components.
   (a) Make sure you do not see a fraying condition in the wire braid of the ignition leads.
   (b) Make sure the air hose you use to decrease the temperature of the ignition leads is serviceable.

S 225-004-J00

(3) If it is necessary, make sure the igniter plugs are serviceable (AMM 74-21-02/601).

S 415-005-J00

(4) Close the thrust reverser halves (AMM 78-31-00/201).

F. Do the audible check.

S 865-058-J00

(1) Supply the electrical power (AMM 24-22-00/201).

S 865-059-J00

CAUTION: IF YOU FIND THE CONDITIONS THAT FOLLOW, YOU MUST DRY MOTOR THE ENGINE (AMM 71-00-00/201) BEFORE YOU DO THE AUDIBLE TEST:

- FUEL IS IN THE ENGINE
- IT IS LESS THAN 2 HOURS SINCE YOU STOPPED THE ENGINE.

FUEL CAN CAUSE AN INTERNAL ENGINE FIRE OR A FIRE IN THE TURBINE EXHAUST AREA.

(2) Dry motor the engine to remove all of the fuel in the engine fuel lines and the engine (AMM 71-00-00/201).

S 865-197-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Make sure that all flaps are fully retracted (AMM 27-81-00/201).

S 865-199-J00

(4) Make sure that the four FUEL CONTROL switches on the P8 control stand are in the CUTOFF position.

S 865-201-J00

(5) For the applicable engine, open these circuit breakers and attach DO-NOT-CLOSE tags:
   (a) P6 Main Power Distribution Panel
      1) 6G1 FUEL SHUTOFF VALVE ENG 1
      2) 6J10 NACELLE ANTI-ICE 1
      3) 6G19 STBY IGN ENG 1
      4) 6G2 FUEL SHUTOFF VALVE ENG 2
      5) 6J11 NACELLE ANTI-ICE 2
      6) 6G20 STBY IGN ENG 2
      7) 6G3 FUEL SHUTOFF VALVE ENG 3
      8) 6J12 NACELLE ANTI-ICE 3
      9) 6G21 STBY IGN ENG 3
      10) 6G4 FUEL SHUTOFF VALVE ENG 4
      11) 6J13 NACELLE ANTI-ICE 4
      12) 6G22 STBY IGN ENG 4

S 865-124-J00

WARNING: MAKE SURE YOU CLOSE THE FUEL CONT VALVE ENG (X) CIRCUIT BREAKER. FAILURE TO CLOSE THIS CIRCUIT BREAKER CAN CAUSE AN ENGINE FIRE FROM THE FUEL AND IGNITER PLUG THAT IS NOT A PART OF THE TEST. IF YOU DO NOT FOLLOW THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

(6) Close these circuit breakers:
   (a) P6 Main Power Distribution Panel
      1) 6L10 FUEL CONT VALVE ENG 1

2) 6L11 FUEL CONT VALVE ENG 2
3) 6L12 FUEL CONT VALVE ENG 3
4) 6L13 FUEL CONT VALVE ENG 4

S 865-205-J00

(7) Open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P6 main power distribution panel
1) 6J18 ENG START AIR CONT

S 865-207-J00

(8) Make sure that the CON IGNITION switch on the P5 overhead panel is off.

S 865-209-J00

(9) Make sure that the STBY IGNITION rotary switch on the P5 overhead panel is in the NORM position.

S 865-227-J00

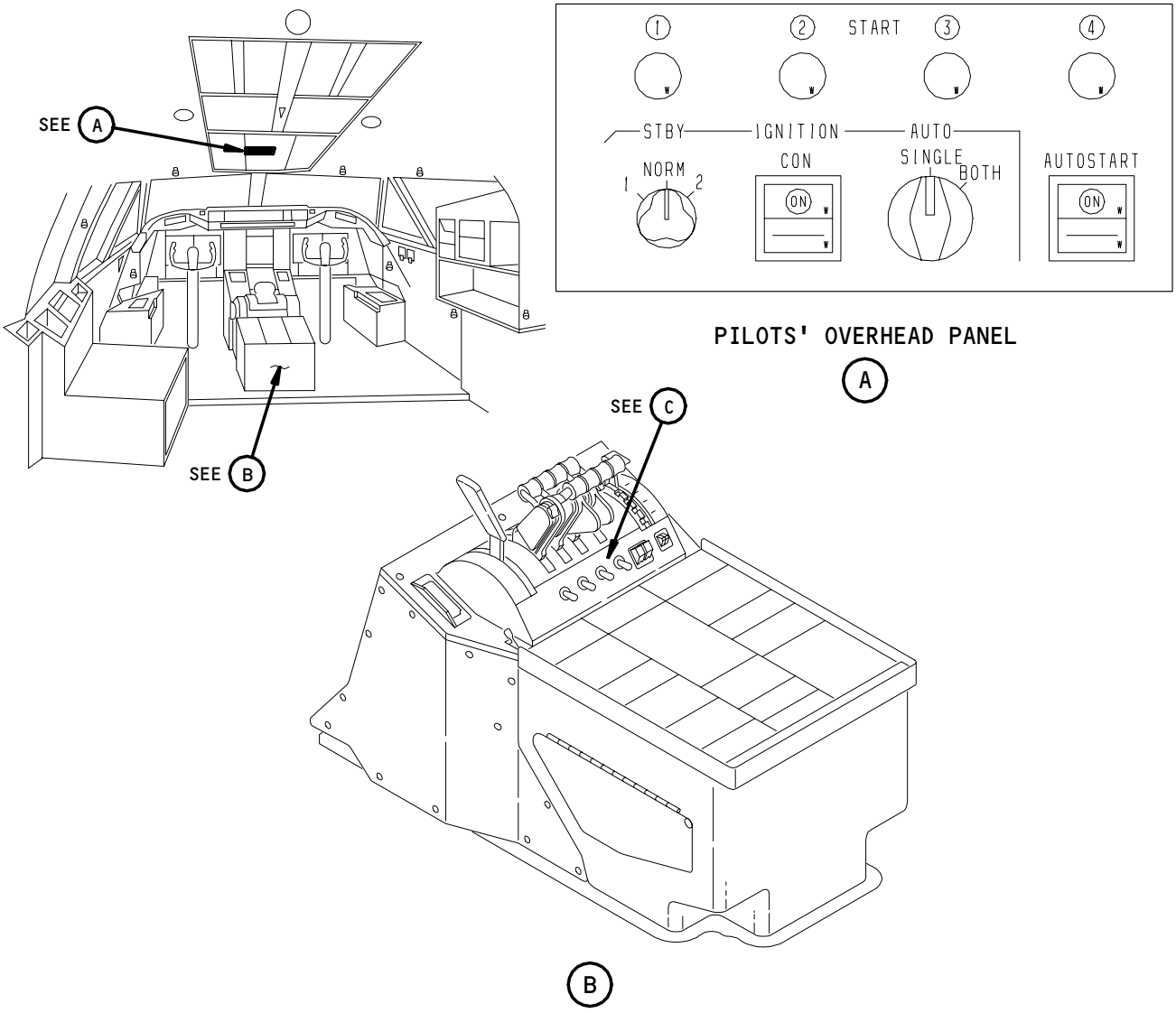
(10) Put the AUTO IGNITION rotary switch on the P5 panel in the SINGLE position.

S 865-070-J00

(11) Use the interphone to speak between persons on the ground and on the flight compartment.

S 865-071-J00

(12) For the applicable engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6F2 IGN 1 ENG 2
4) 6K20 IGN 2 ENG 2
5) 6F3 IGN 1 ENG 3
6) 6K21 IGN 2 ENG 3



Ignition System Test
Figure 501

7) 6F4 IGN 1 ENG 4
8) 6K22 IGN 2 ENG 4

S 865-212-J00
(13) Move the applicable engine start switch on the P5 panel to the ON position.

NOTE: You must manually hold the engine start switch in the ON position to do the next step.

(a) Make sure no igniter plugs fire.

S 865-073-J00
(14) Move the FUEL CONTROL CUTOFF SWITCH to the RUN position.
(a) Make sure that you can hear the igniter plugs fire.

S 865-074-J00
(15) Turn the AUTO IGNITION rotary switch on the P5 overhead panel from the SINGLE to the BOTH position.
(a) Make sure that you can hear the plugs fire for system 1 and system 2.

S 865-214-J00
(16) For the applicable engine, open these circuit breakers and attach DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6K19 IGN 2 ENG 1
2) 6K20 IGN 2 ENG 2
3) 6K21 IGN 2 ENG 3
4) 6K22 IGN 2 ENG 4

S 865-102-J00
(17) Make sure that you can hear the igniter plugs fire for system 1.

S 865-076-J00
(18) For the applicable engine, open these circuit breakers and attach a DO-NOT-CLOSE tag:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6F2 IGN 1 ENG 2

3) 6F3 IGN 1 ENG 3
4) 6F4 IGN 1 ENG 4

S 865-217-J00
(19) For the applicable engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6K19 IGN 2 ENG 1
2) 6K20 IGN 2 ENG 2
3) 6K21 IGN 2 ENG 3
4) 6K22 IGN 2 ENG 4

S 865-219-J00
(20) Make sure that you can hear the igniter plugs fire for system 2.

S 865-221-J00
(21) Move the FUEL CUTOFF CONTROL SWITCH to the CUTOFF position.

S 865-080-J00
(22) For the applicable engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel:
1) 6F1 IGN 1 ENG 1
2) 6F2 IGN 1 ENG 2
3) 6F3 IGN 1 ENG 3
4) 6F4 IGN 1 ENG 4
5) 6K19 IGN 2 ENG 1
6) 6K20 IGN 2 ENG 2
7) 6K21 IGN 2 ENG 3
8) 6K22 IGN 2 ENG 4
9) 6J18 ENG START AIR CONT
10) 6L10 FUEL CONT VALVE ENG 1
11) 6G1 FUEL SHUTOFF VALVE ENG 1
12) 6J10 NACELLE ANTI-ICE 1
13) 6G19 STBY IGN ENG 1
14) 6G2 FUEL SHUTOFF VALVE ENG 2
15) 6L11 FUEL CONT VALVE ENG 2
16) 6J11 NACELLE ANTI-ICE 2
17) 6G20 STBY IGN ENG 2
18) 6G3 FUEL SHUTOFF VALVE ENG 3
19) 6L12 FUEL CONT VALVE ENG 3
20) 6J12 NACELLE ANTI-ICE 3
21) 6G21 STBY IGN ENG 3
22) 6G4 FUEL SHUTOFF VALVE ENG 4
23) 6L13 FUEL CONT VALVE ENG 4
24) 6J13 NACELLE ANTI-ICE 4
25) 6G22 STBY IGN ENG 4

S 865-224-J00
(23) Remove the electrical power (AMM 24-22-00/201).

TASK 74-00-00-705-104-J00

3. System Test - Ignition System

A. General

WARNING: DO NOT DO A TEST OF THE IGNITION SYSTEM WHEN YOU HAVE ANY OF THE CONDITIONS THAT FOLLOW:

- DURING AIRPLANE FUELING
- THE AIRPLANE IS NEAR BUILDINGS AND/OR OTHER AIRPLANES THAT ARE WITHIN THE JET EXHAUST AREA FOR GROUND IDLE (AMM 71-00-00/201)
- THE AIRPLANE IS IN THE HANGAR.

MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE JET EXHAUST AREA FOR GROUND IDLE (AMM 71-00-00/201) OF THE APPLICABLE ENGINE.

IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING THE OPERATION.
IF YOU DO NOT OBEY THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Obey this warning during all of this task.
(2) In the system test, do the igniter plug audible test for each of the ignition system circuits. Do the system test to do trouble-shooting of the ignition system circuits.
(3) To do this task, you must:
  (a) Remove power from the fuel control system and the starting system
  (b) Do a visual check of the ignition system components
  (c) Do a test of the starting ignition circuit
  (d) Do a test of the continuous ignition circuit
  (e) Do a test of the automatic ignition circuits

(f) Do a test of the standby ignition circuit
(g) Supply power to the fuel control system and the starting system.

B. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 27-51-00/201, Trailing Edge Flap System
(3) AMM 29-11-00/201, Main Hydraulic Supply System
(4) AMM 36-00-00/201, Pneumatic Power
(5) AMM 71-00-00/201, Power Plant
(6) AMM 74-21-02/601, Igniter Plug
(7) AMM 78-31-00/201, Thrust Reverser System
(8) WDM 74-31-11
(9) WDM 74-31-12
(10) WDM 74-31-21
(11) WDM 74-31-22
(12) WDM 74-31-31
(13) WDM 74-31-32
(14) WDM 74-31-41
(15) WDM 74-31-42
(16) SSM 74-31-01
(17) SSM 74-31-02
(18) SSM 74-31-03
(19) SSM 74-31-04

C. Access
(1) Location Zone

412	Engine 1
422	Engine 2
432	Engine 3
442	Engine 4

(2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4

D. Preconditions

S 865-232-J00
(1) Electrical Power on (AMM 24-22-00/201).

S 865-233-J00
(2) Integrated Display System (IDS) serviceable (AMM 31-61-00/501).

E. Prepare for the System Test.

S 865-031-J00
(1) Supply the electrical power (AMM 24-22-00/201).

S 865-226-J00

CAUTION: IF YOU FIND THE CONDITIONS THAT FOLLOW, YOU MUST DRY MOTOR THE ENGINE (AMM 71-00-00) BEFORE YOU DO THE AUDIBLE TEST:

- REMAINING FUEL IS IN THE ENGINE.
- DO NOT DO THE SYSTEM TEST IF N2 TURNS. IF N2 TURNS, FUEL CAN ENTER THE COMBUSTION CHAMBER IF THE FUEL CONTROL SWITCH IS MOVED TO THE RUN POSITION.

THE REMAINING FUEL CAN CAUSE AN INTERNAL ENGINE FIRE OR A FIRE IN THE TURBINE EXHAUST AREA.

(2) Dry motor the engine to remove any remaining fuel in the engine fuel lines and the engine (AMM 71-00-00/201).

S 865-105-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Make sure the flaps are fully retracted (AMM 27-81-00/201).

S 865-034-J00
(4) Make sure that the four FUEL CONTROL switches on the P8 control stand are in the CUTOFF position.

S 865-140-J00

WARNING: MAKE SURE YOU CLOSE THE FUEL CONT VALVE ENG (X) CIRCUIT BREAKER. FAILURE TO CLOSE THIS CIRCUIT BREAKER CAN CAUSE AN ENGINE FIRE FROM THE FUEL AND IGNITER PLUG THAT IS NOT A PART OF THE TEST. IF YOU DO NOT FOLLOW THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

(5) Close these circuit breakers:
  (a) P6 Main Power Distribution Panel
    1) 6L10 FUEL CONT VALVE ENG 1
    2) 6L11 FUEL CONT VALVE ENG 2
    3) 6L12 FUEL CONT VALVE ENG 3
    4) 6L13 FUEL CONT VALVE ENG 4

S 865-228-J00

(6) For the applicable engine, open these circuit breakers and attach DO-NOT-CLOSE tags:
  (a) P6 Main Power Distribution Panel
    1) 6G1 FUEL SHUTOFF VALVE ENG 1
    2) 6J10 NACELLE ANTI-ICE 1
    3) 6G19 STBY IGN ENG 1
    4) 6G2 FUEL SHUTOFF VALVE ENG 2
    5) 6J11 NACELLE ANTI-ICE 2
    6) 6G20 STBY IGN ENG 2
    7) 6G3 FUEL SHUTOFF VALVE ENG 3
    8) 6J12 NACELLE ANTI-ICE 3
    9) 6G21 STBY IGN ENG 3
    10) 6G4 FUEL SHUTOFF VALVE ENG 4
    11) 6J13 NACELLE ANTI-ICE 4
    12) 6G22 STBY IGN ENG 4

S 865-037-J00

(7) Open this circuit breaker and attach the DO-NOT-CLOSE tag.
  (a) P6 main power distribution panel.
    1) 6J18 ENG START AIR CONT

S 865-038-J00

(8) Put the AUTO IGNITION rotary switch on the P5 overhead panel in the BOTH position.

S 865-039-J00

(9) Make sure that the CON IGNITION switch on the P5 panel is off.

S 865-040-J00

(10) Make sure that the STBY IGNITION rotary switch on the P5 panel is in the NORM position.

S 865-041-J00
(11) Use the interphone to speak between persons on the ground and on the flight compartment.

F. Do the Visual Check

S 015-042-J00
(1) Open the thrust reverser halves (Ref 78-31-00/201).

S 215-043-J00
(2) Do a visual check of the ignition system components.
(a) Make sure you do not see a fraying condition in the wire braid of the ignition leads.
(b) Make sure the air hose you use to decrease the temperature of the ignition leads is serviceable.

S 225-044-J00
(3) If it is necessary, make sure the igniter plugs are serviceable (Ref 74-21-02/601).

S 415-045-J00
(4) Close the thrust reverser halves (Ref 78-31-00/201).

G. Do the Starting Ignition Test

S 865-046-J00
(1) Put the applicable engine start switch on the P5 panel to the ON position.
(a) Move the FUEL CONTROL CUTOFF SWITCH to the RUN position.

S 755-048-J00
(2) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 865-049-J00
(3) Push the engine START switch to the OFF position.

H. Do the Continuous Ignition Test.

S 865-050-J00
(1) Put the CON IGNITION switch in the ON position.
(a) Make sure that the switch light comes on.

S 755-051-J00
(2) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 215-052-J00
(3) Make sure that you see the data CON IGNITION ON on the main EICAS display.

S 865-053-J00

(4) Put the CON IGNITION switch in the OFF position.
  (a) Make sure that the switch light goes off.

S 215-054-J00

(5) Make sure that the EICAS data CON IGNITION ON goes off.

I. Do the Automatic Ignition Test.

S 865-055-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. AILERONS, RUDDERS, ELEVATORS, FLAPS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Supply the hydraulic power (Ref 29-11-00/201).

S 865-081-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Extend the trailing edge flaps to the 5 unit position (Ref 27-51-00/201).

S 755-057-J00

(3) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 865-082-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Retract the trailing edge flaps to the 0 unit position (Ref 27-51-00/201).

S 865-196-J00

(5) For the applicable engine that you will do a test, remove the DO-NOT-CLOSE tag and close this circuit breaker:
   (a) P6 Main Power Distribution Panel
      1) 6J10 NACELLE ANTI-ICE 1
      2) 6J11 NACELLE ANTI-ICE 2
      3) 6J12 NACELLE ANTI-ICE 3
      4) 6J13 NACELLE ANTI-ICE 4

S 865-198-J00

CAUTION: BE CAREFUL WHEN YOU DO WORK ON THE NACELLE ANTI-ICE. IF YOU FIND THAT HOT AIR (APPROXIMATELY 350°F) IS USED, DO THE STEPS THAT FOLLOW:

- DO NOT OPEN THE NACELLE ANTI-ICE VALVE FOR MORE THAN 1/2 MINUTE.

- PERMIT THE TEMPERATURE IN THE AREA TO DECREASE FOR A TIME OF 5 MINUTES.

IF YOU DO NOT OBEY THIS PROCEDURE, DAMAGE TO THE NOSE COWL CAN OCCUR.

(6) Put the applicable NACELLE ANTI-ICE switch on the P5 panel in the ON position.

S 755-062-J00

(7) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 865-200-J00

(8) Put the NACELLE ANTI-ICE switch in the OFF position.

S 865-202-J00

(9) For the applicable engine that you will do a test, open this circuit breaker and attach a DO-NOT-CLOSE tag:
   (a) P6 Main Power Distribution Panel
      1) 6J10 NACELLE ANTI-ICE 1
      2) 6J11 NACELLE ANTI-ICE 2
      3) 6J12 NACELLE ANTI-ICE 3
      4) 6J13 NACELLE ANTI-ICE 4

S 865-204-J00

(10) Remove the hydraulic power (Ref 29-11-00/201).

J. Do the Standby Ignition Test.

S 865-208-J00
(1) For the applicable engine that you will do a test, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P6 Main Power Distribution Panel.
1) 6G19 STBY IGN ENG 1
2) 6G20 STBY IGN ENG 2
3) 6G21 STBY IGN ENG 3
4) 6G22 STBY IGN ENG 4

S 865-210-J00
(2) Put the STBY IGNITION rotary switch in the 1 position.

S 755-070-J00
(3) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 215-071-J00
(4) Make sure that you see the data STBY IGNITION ON on the main EICAS display.

S 865-211-J00
(5) Put the STBY IGNITION rotary switch in the 2 position.

S 755-073-J00
(6) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 215-074-J00
(7) Make sure that you see the data STBY IGNITION ON on the main EICAS display.

S 865-213-J00
(8) Put the STBY IGNITION rotary switch in the NORM position.

S 215-076-J00
(9) Make sure that you do not see STBY IGNITION ON on the EICAS display.

S 865-107-J00
(10) Move the Fuel Control cutoff switch to the CUTOFF position.

K. Put the airplane back to its usual condition.

S 865-216-J00
(1) Remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P6 main power distribution panel.
1) 6J18 ENG START AIR CONT

S 865-218-J00

(2) For the applicable engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:

(a) P6 Main Power Distribution Panel.

1) 6G1 FUEL SHUTOFF VALVE ENG 1
2) 6L10 FUEL CONT VALVE ENG 1
3) 6J10 NACELLE ANTI-ICE 1
4) 6G19 STBY IGN ENG 1
5) 6G2 FUEL SHUTOFF VALVE ENG 2
6) 6L11 FUEL CONT VALVE ENG 2
7) 6J11 NACELLE ANTI-ICE 2
8) 6G20 STBY IGN ENG 2
9) 6G3 FUEL SHUTOFF VALVE ENG 3
10) 6L12 FUEL CONT VALVE ENG 3
11) 6J12 NACELLE ANTI-ICE 3
12) 6G21 STBY IGN ENG 3
13) 6G4 FUEL SHUTOFF VALVE ENG 4
14) 6L13 FUEL CONT VALVE ENG 4
15) 6J13 NACELLE ANTI-ICE 4
16) 6G22 STBY IGN ENG 4

S 865-220-J00

(3) Remove the electrical power (AMM 24-22-00/201).

TASK 74-00-00-705-106-J00

4. Operational Test of the Approach/Landing and Thermal Anti-Ice Systems for the Engine Standby Ignition

A. General

WARNING: DO NOT DO A TEST OF THE IGNITION SYSTEM WHEN YOU HAVE ANY OF THE CONDITIONS THAT FOLLOW:

- DURING AIRPLANE FUELING
- THE AIRPLANE IS NEAR BUILDINGS AND/OR OTHER AIRPLANES THAT ARE WITHIN THE JET EXHAUST AREA FOR GROUND IDLE (AMM 71-00-00/201)
- THE AIRPLANE IS IN THE HANGAR.

MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE JET EXHAUST AREA FOR GROUND IDLE (AMM 71-00-00/201) OF THE APPLICABLE ENGINE.

IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING THE OPERATION.
IF YOU DO NOT OBEY THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Obey this warning during all of this task.

(2) In the system test, do the audible test for the igniter plug for each of the ignition system circuits. Do the system test to do trouble-shooting of the ignition system circuits.

NOTE: This task is for scheduled maintenance only.

(3) To do this task, you must:
(a) Remove power from the fuel control system and the starting system
(b) Do a visual check of the ignition system components
(c) Do a test of the automatic ignition circuits
(d) Do a test of the standby ignition circuit
(e) Supply power to the fuel control system and the starting system.

B. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 27-51-00/201, Trailing Edge Flap System
(3) AMM 29-11-00/201, Main Hydraulic Supply System
(4) AMM 36-00-00/201, Pneumatic Power
(5) AMM 71-00-00/201, Power Plant
(6) AMM 74-21-02/601, Igniter Plug
(7) AMM 78-31-00/201, Thrust Reverser System
(8) WDM 74-31-11
(9) WDM 74-31-12
(10) WDM 74-31-21
(11) WDM 74-31-22
(12) WDM 74-31-31
(13) WDM 74-31-32
(14) WDM 74-31-41
(15) WDM 74-31-42
(16) SSM 74-31-01
(17) SSM 74-31-02
(18) SSM 74-31-03
(19) SSM 74-31-04

C. Access
(1) Location Zone

412	Engine 1
422	Engine 2
432	Engine 3
442	Engine 4

(2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4

D. Preconditions

S 865-234-J00
(1) Electrical Power on (AMM 24-22-00/201).

S 865-235-J00
(2) Integrated Display System (IDS) serviceable (AMM 31-61-00/501).

E. Prepare for the System Test.

S 865-005-J00
(1) Supply the electrical power (AMM 24-22-00/201).

S 865-006-J00

CAUTION: IF YOU FIND THE CONDITIONS THAT FOLLOW, YOU MUST DRY MOTOR THE ENGINE (AMM 71-00-00) BEFORE YOU DO THE AUDIBLE TEST:

- REMAINING FUEL IS IN THE ENGINE.
- DO NOT DO THE SYSTEM TEST IF N2 TURNS. IF N2 TURNS, FUEL CAN ENTER THE COMBUSTION CHAMBER IF THE FUEL CONTROL SWITCH IS - MOVED TO THE RUN POSITION.

THE REMAINING FUEL CAN CAUSE AN INTERNAL ENGINE FIRE OR A FIRE IN THE TURBINE EXHAUST AREA.

(2) Dry motor the engine to remove any remaining fuel in the engine fuel lines and the engine (AMM 71-00-00/201).

S 865-007-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Make sure the flaps are fully retracted (AMM 27-81-00/201).

S 865-008-J00
(4) Make sure that the four FUEL CONTROL switches on the P8 control stand are in the CUTOFF position.

S 865-009-J00
(5) Make sure these circuit breakers are closed:
(a) P6 Main Power Distribution Panel
1) 6L10 FUEL CONT VALVE ENG 1
2) 6L11 FUEL CONT VALVE ENG 2
3) 6L12 FUEL CONT VALVE ENG 3
4) 6L13 FUEL CONT VALVE ENG 4

S 865-222-J00
(6) For the applicable engine, open these circuit breakers and attach DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6G1 FUEL SHUTOFF VALVE ENG 1
2) 6J10 NACELLE ANTI-ICE 1
3) 6G19 STBY IGN ENG 1
4) 6G2 FUEL SHUTOFF VALVE ENG 2
5) 6J11 NACELLE ANTI-ICE 2
6) 6G20 STBY IGN ENG 2
7) 6G3 FUEL SHUTOFF VALVE ENG 3
8) 6J12 NACELLE ANTI-ICE 3
9) 6G21 STBY IGN ENG 3
10) 6G4 FUEL SHUTOFF VALVE ENG 4
11) 6J13 NACELLE ANTI-ICE 4
12) 6G22 STBY IGN ENG 4

S 865-010-J00
(7) Open this circuit breaker and attach the DO-NOT-CLOSE tag.
(a) P6 main power distribution panel.
1) 6J18 ENG START AIR CONT

S 865-011-J00
(8) Put the AUTO IGNITION rotary switch on the P5 overhead panel in the BOTH position.

S 865-012-J00
(9) Make sure that the CON IGNITION switch on the P5 panel is off.

S 865-013-J00
(10) Make sure that the STBY IGNITION rotary switch on the P5 panel is in the NORM position.

S 865-014-J00
(11) Use the interphone to speak between persons on the ground and on the flight compartment.

F. Do the Visual Check

S 015-015-J00
(1) Open the thrust reverser halves (AMM 78-31-00/201).

S 215-016-J00
(2) Do a visual check of the ignition system components.
(a) Make sure you do not see a fraying condition in the wire braid of the ignition leads.
(b) Make sure the air hose you use to decrease the temperature of the ignition leads is serviceable.

G. Do the Automatic Ignition Test.

S 865-017-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. AILERONS, RUDDERS, ELEVATORS, FLAPS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Supply the hydraulic power (Ref 29-11-00/201).

S 865-018-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Extend the trailing edge flaps to the 5 unit position (Ref 27-51-00/201).

S 865-115-J00

(3) Move the Fuel Control switch to the RUN position.

S 755-019-J00

(4) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 865-020-J00

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH THE HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Retract the trailing edge flaps to the 0 unit position (Ref 27-51-00/201).

S 865-121-J00

(6) Make sure that you do not hear the plugs fire for system 1 and system 2.

S 865-021-J00

(7) For the applicable engine that you will do a test for, remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6J10 NACELLE ANTI-ICE 1

2) 6J11 NACELLE ANTI-ICE 2
3) 6J12 NACELLE ANTI-ICE 3
4) 6J13 NACELLE ANTI-ICE 4

S 865-022-J00

CAUTION: BE CAREFUL WHEN YOU DO WORK ON THE NACELLE ANTI-ICE. IF YOU FIND THAT HOT AIR (APPROXIMATELY 350°F) IS USED, DO THE STEPS THAT FOLLOW:

- DO NOT OPEN THE NACELLE ANTI-ICE VALVE FOR MORE THAN 1/2 MINUTE.

- PERMIT THE TEMPERATURE IN THE AREA TO DECREASE FOR A TIME OF 5 MINUTES.

IF YOU DO NOT OBEY THIS PROCEDURE, DAMAGE TO THE NOSE COWL CAN OCCUR.

(8) Put the applicable NACELLE ANTI-ICE switch on the P5 panel in the ON position.

S 755-023-J00
(9) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 865-024-J00
(10) Put the NACELLE ANTI-ICE switch in the OFF position.

S 865-120-J00
(11) Make sure that you do not hear the plugs fire for system 1 and system 2.

S 865-025-J00
(12) For the applicable engine that you will do a test for, open these circuit breakers and attach DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6J10 NACELLE ANTI-ICE 1
2) 6J11 NACELLE ANTI-ICE 2
3) 6J12 NACELLE ANTI-ICE 3
4) 6J13 NACELLE ANTI-ICE 4

S 865-026-J00
(13) Remove the hydraulic power (Ref 29-11-00/201).

H. Do the Standby Ignition Test.

S 865-028-J00
(1) For the applicable engine that you will do a test, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P6 Main Power Distribution Panel.
1) 6G19 STBY IGN ENG 1
2) 6G20 STBY IGN ENG 2
3) 6G21 STBY IGN ENG 3
4) 6G22 STBY IGN ENG 4

S 865-223-J00
(2) Put the STBY IGNITION rotary switch in the 1 position.

S 755-030-J00
(3) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 215-031-J00
(4) Make sure that you see the data STBY IGNITION ON on the main EICAS display.

S 865-225-J00
(5) Put the STBY IGNITION rotary switch in the 2 position.

S 755-033-J00
(6) Make sure that you can hear the plugs fire for system 1 and the system 2.

S 215-034-J00
(7) Make sure that you see the data STBY IGNITION ON on the main EICAS display.

S 865-117-J00
(8) Put the STBY IGNITION switch to the NORM position.

I. Put the airplane back to its usual condition.

S 865-118-J00
(1) Move the FUEL CONTROL switch to the CUTOFF position.

S 865-122-J00
(2) For the applicable engine, close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6G1 FUEL SHUTOFF VALVE ENG 1
2) 6J10 NACELLE ANTI-ICE 1
3) 6G19 STBY IGN ENG 1
4) 6G2 FUEL SHUTOFF VALVE ENG 2
5) 6J11 NACELLE ANTI-ICE 2
6) 6G20 STBY IGN ENG 2

7) 6G3 FUEL SHUTOFF VALVE ENG 3
8) 6J12 NACELLE ANTI-ICE 3
9) 6G21 STBY IGN ENG 3
10) 6G4 FUEL SHUTOFF VALVE ENG 4
11) 6J13 NACELLE ANTI-ICE 4
12) 6G22 STBY IGN ENG 4
13) 6J18 ENG START AIR CONT

S 415-119-J00

(3) Close the thrust reverser halves (AMM 78-31-00/201).

TASK 74-00-00-715-108-J00

5. Ignition System Test (Optional)

A. General

WARNING: DO NOT DO A TEST OF THE IGNITION SYSTEM WHEN YOU HAVE ANY OF THE CONDITIONS THAT FOLLOW:

- DURING AIRPLANE FUELING
- THE AIRPLANE IS NEAR BUILDINGS AND/OR OTHER AIRPLANES THAT ARE WITHIN THE JET EXHAUST AREA FOR GROUND IDLE (AMM 71-00-00/201)
- THE AIRPLANE IS IN THE HANGAR.

MAKE SURE THAT NO PERSONS OR EQUIPMENT ARE IN THE JET EXHAUST AREA FOR GROUND IDLE (AMM 71-00-00/201) OF THE APPLICABLE ENGINE.

IGNITION VOLTAGE IS VERY DANGEROUS. DO NOT TOUCH THE IGNITER PLUGS, THE ENERGIZED PART OF THE IGNITION EXCITER OR THE LEADS DURING THE OPERATION.
IF YOU DO NOT OBEY THIS PROCEDURE, YOU CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Obey this warning during all of this task.
(2) This task includes an optional procedure to use an Ignition System Flight Line Tester for trouble-shooting of the ignition system.

B. Equipment

(1) Tester - Flight Line, Power-to-Light -
Part Number 137332

BF Goodrich, Aerospace
Engine Electrical Systems Division
Norwich Oxford Road
Norwich NY 13815

C. References

(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 71-00-00/201, Power Plant
(3) AMM 74-11-01/401, Ignition Exciter
(4) AMM 74-21-01/401, Exciter-to-Igniter Plug Cable

(5) AMM 74-21-02/401, Igniter Plug.

D. Access

(1) Location Zones

211 Control Cabin (Left)
212 Control Cabin (Right)
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

E. Ignition System - Optional Trouble-Shooting with the Flight Line Tester

NOTE: This procedure is done when there is a problem with the ignition system to find which part of the ignition system is unsatisfactory.

S 215-109-J00

(1) Visually examine the ignition system.
(a) Replace all components that are unsatisfactory.
(b) Make sure all connections are tight.

S 715-110-J00

WARNING: MAKE SURE THAT THE TESTER IS GROUNDED TO THE ENGINE. DO NOT TOUCH THE SENSOR BOX OR THE IGNITION CABLE WHILE THE IGNITION SYSTEM IS ENERGIZED. THE ELECTRICAL DISCHARGE FROM THE IGNITION SYSTEM CAN KILL YOU. IF YOU DO NOT OBEY THIS PROCEDURE, YOU CAN CAUSE DAMAGE TO EQUIPMENT AND INJURIES TO PEOPLE.

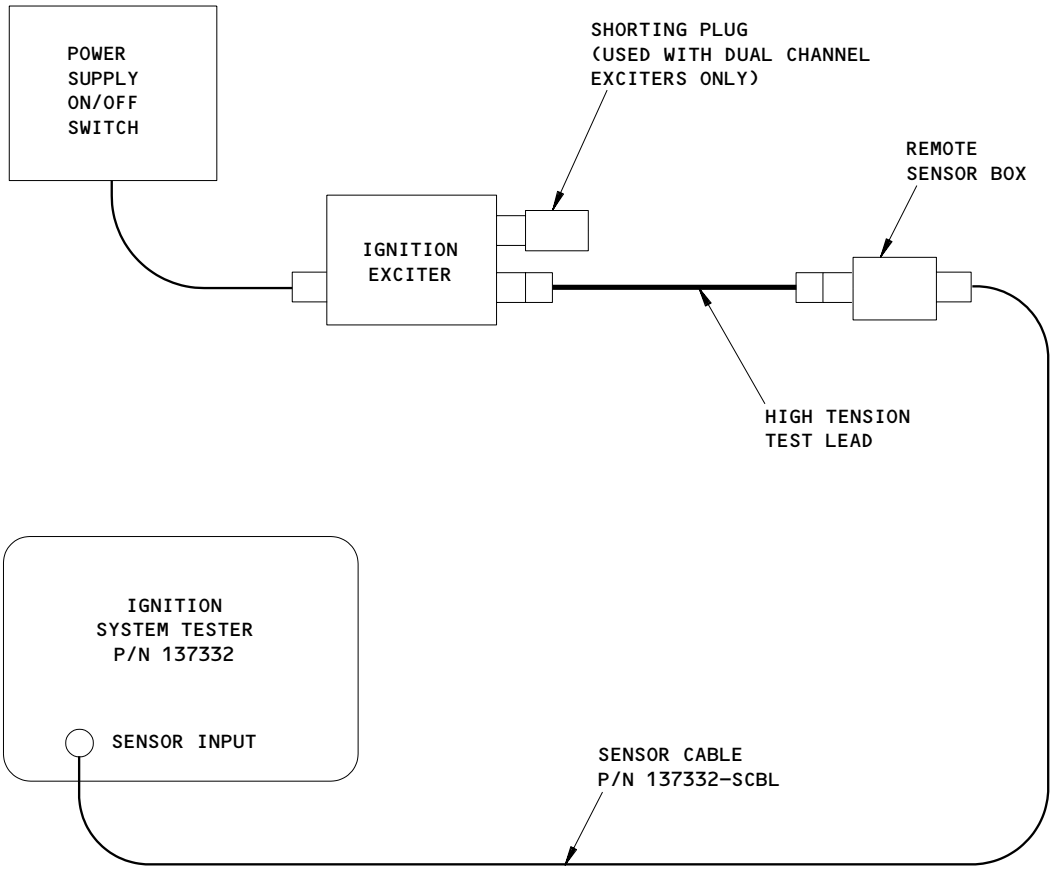
(2) Do these steps to do a test of the ignition lead and the ignition exciter (Fig. 502):
(a) Disconnect the ignition lead from the igniter plug (AMM 74-21-01/401).

NOTE: Do not touch the end of the ignition lead with your hands or with a dirty cloth. Oil or grease can cause the ignition lead to operate incorrectly.

CAUTION: USE A WRENCH TO CONNECT THE IGNITION LEAD TO THE APPLICABLE REMOTE SENSOR BOX. IF YOU USE YOUR HAND, THE LOOSE CONNECTION WILL CAUSE RFI INTERFERENCE AND THE TEST BOX WILL SHUTDOWN AUTOMATICALLY.

(b) Use a wrench to connect the ignition lead to the applicable remote sensor box.

NOTE: The sensors have different connections for the different types of cable connectors. Make sure you use the correct sensor box.



Ignition System Test
Figure 502

L40718

(c) Connect the sensor cable from the sensor box to the flight line tester.
(d) Momentarily push the ON/OFF button to turn on the flight line tester.
(e) When the display shows "ENTER P/N TO TEST?", input the part number and suffix for the ignition exciter.

NOTE: Use the manufacturer's part number which is written on the installed ignition exciter (Example: 10-631045-1-CAB).

(f) Energize the ignition system.
(g) Push "ENTER" on the keypad.
(h) Allow the test box to measure the spark rate and energy of the system.

NOTE: The results will show on the LCD screen.

(i) Remove elecrical power from the ignition system.

S 715-112-J00

(3) If the system is unsatisfactory, do the steps that follow to do a test of the ignition exciter:
(a) Disconnect the ignition lead from the ignition exciter.
(b) Connect the ignition exciter to the tester, with the test cable.
(c) Push "ENTER" on the keyboard to show the "ENTER P/N TO TEST?" screen.
(d) Energize the ignition system.
(e) Push "ENTER" on the keyboard again to test the same ignition exciter (same part number) again.
(f) Allow the test box to measure the spark rate and energy of the system.

NOTE: The results will show on the LCD screen.

(g) Remove elecrical power from the ignition system.
(h) If the ignition exciter is satisfactory, replace the ignition lead (AMM 74-21-01/401).
(i) If the ignition exciter is unsatisfactory, replace the ignition exciter (AMM 74-11-01/401).
(j) If the ignition lead and the ignition exciter are satisfactory, replace the igniter plug (AMM 74-21-02/401).

S 715-114-J00

(4) Do the operational test of the ignition system (AMM 74-00-00/501).

IGNITION EXCITER - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks:
      (1) Remove the ignition exciters (M7196 and M7197).
      (2) Install the ignition exciters (M7196 and M7197).
   B. Each engine has two ignition exciters (M7196 and M7197) which are installed on the fan case at the 7 o'clock position.
   C. The installation task includes the operational test of the ignition exciter.

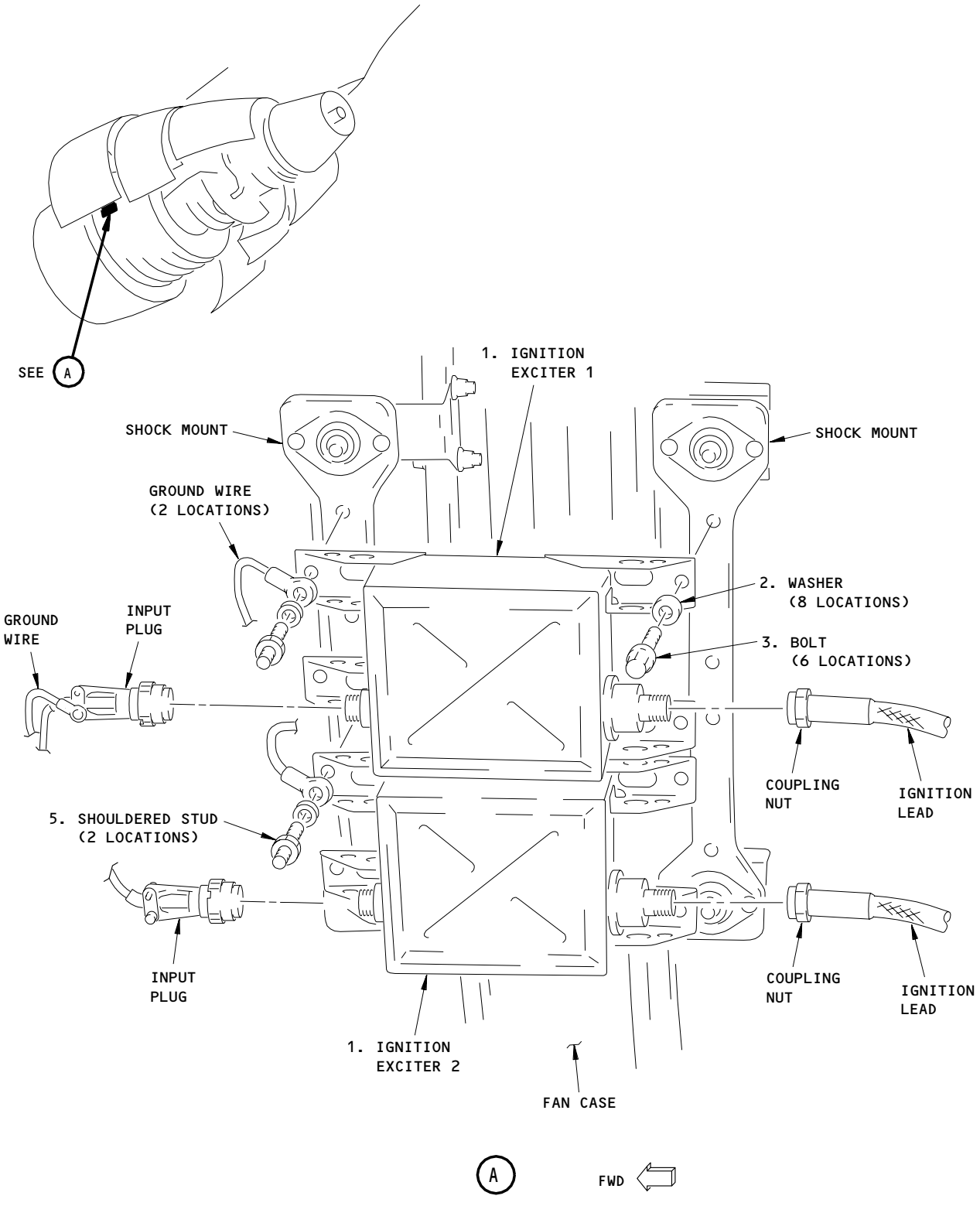
TASK 74-11-01-004-001-J00

2. Ignition Exciter Removal (Fig. 401)
   A. References
      (1) 71-11-04/201, Fan Cowl Panels
      (2) IPC 74-11-01 Fig. 1
   B. Access
      (1) Location Zone
          412 Engine 1 - Fan Case 7 o'clock
          422 Engine 2 - Fan Case 7 o'clock
          432 Engine 3 - Fan Case 7 o'clock
          442 Engine 4 - Fan Case 7 o'clock

      (2) Access Panel
          413 Left Fan Cowl Panel - Engine 1
          423 Left Fan Cowl Panel - Engine 2
          433 Left Fan Cowl Panel - Engine 3
          443 Left Fan Cowl Panel - Engine 4

   C. Procedure

      S 864-002-J00
      (1) FOR THE APPLICABLE ENGINE;
      Open these circuit breakers and attach the DO-NOT-CLOSE tags:
      (a) P6 Main Power Distribution Panel
          1) 6F1 IGN 1 ENG 1
          2) 6K19 IGN 2 ENG 1
          3) 6G19 STBY IGN ENG 1
          4) 6F2 IGN 1 ENG 2
          5) 6K20 IGN 2 ENG 2



Ignition Exciter Installation
Figure 401

6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 014-003-J00

(2) Open the left fan cowl panel (Ref 71-11-04/201).

S 034-023-J00

(3) Disconnect the input plugs (DM7196 and DM719) and the ignition leads.

WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENT. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS.

CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(a) Disconnect the input plugs (DM7196 and DM7197) and the ignition leads from the ignition exciters.

WARNING: AFTER YOU REMOVE THE IGNITION LEADS FROM THE EXCITERS, MAKE SURE THAT YOU MANUALLY GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Ground the output terminal of each exciter to the fan case.
(c) Install the caps on the lead coupling nuts and the input plugs.

S 024-024-J00

(4) Remove the exciters (1) from the engine.
(a) Remove the bolts (3), the shouldered studs (4), and the washers (2) that attach the exciters to the shock mount brackets.
(b) Remove the exciters (1).

(c) Install the caps on the exciter terminals.

TASK 74-11-01-404-007-J00

3. Ignition Exciter Installation (Fig. 401)

A. Parts

AMM			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	1	Ignition Exciter (M7196 or M7197)	74-11-01	01	5
	2	Washer			15
	3	Bolt			10
	4	Stud			12

B. References

(1) 71-11-04/201, Fan Cowl Panels

(2) 74-00-00/501, Ignition System

C. Access

(1) Location Zone

412 Engine 1 - Fan Case 7 o'clock
422 Engine 2 - Fan Case 7 o'clock
432 Engine 3 - Fan Case 7 o'clock
442 Engine 4 - Fan Case 7 o'clock

(2) Access Panel

413 Left Fan Cowl Panel - Engine 1
423 Left Fan Cowl Panel - Engine 2
433 Left Fan Cowl Panel - Engine 3
443 Left Fan Cowl Panel - Engine 4

D. Procedure

S 424-025-J00

(1) Install the exciters (1).

(a) Put the exciters (1) on the shock mounts.

1) Align the bolt holes.

(b) Install the bolts (3), the washers (2), and the shouldered studs (4) which attach the exciters to the shock mounts.

NOTE: Install the shouldered stud (4) and the ground wire on the top forward bracket of each exciter.

1) Tighten the bolts (3) and the shouldered stud (4) to 55-70 pound-inches (6.2-7.9 N.m).

S 434-026-J00

(2) Install the input plugs (DM7196 and DM7197) and the ignition leads.
  (a) Remove the caps from the ignition leads, the input plugs (DM7196 and DM7197), and the exciter terminals.
  (b) Connect the ignition lead to the exciters (1).

NOTE: The ignition lead for the lower igniter plug connects to the top ignition exciter. The ignition lead for the top igniter plug connects to the lower ignition exciter.

  (c) Connect the input plugs (DM7196 and DM7197) to the exciters (1).

CAUTION: MAKE SURE THE LEAD COUPLING NUTS AT THE IGNITION EXCITERS ARE TIGHTENED. LOOSE COUPLING NUTS CAN CAUSE AIRPLANE RADIO INTERFERENCE.

  (d) Tighten the lead coupling nuts and the input plugs (DM7196 and DM7197) to 140-160 pound-inches (15.8-18.0 N.m).
  (e) Install the lockwire on the coupling nuts.

S 864-014-J00

(3) FOR THE APPLICABLE ENGINE;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
  (a) P6 Main Power Distribution Panel
    1) 6F1 IGN 1 ENG 1
    2) 6K19 IGN 2 ENG 1
    3) 6G19 STBY IGN ENG 1
    4) 6F2 IGN 1 ENG 2
    5) 6K20 IGN 2 ENG 2
    6) 6G20 STBY IGN ENG 2
    7) 6F3 IGN 1 ENG 3
    8) 6K21 IGN 2 ENG 3
    9) 6G21 STBY IGN ENG 3
    10) 6F4 IGN 1 ENG 4
    11) 6K22 IGN 2 ENG 4
    12) 6G22 STBY IGN ENG 4

S 414-015-J00

(4) Close the left fan cowl panel (Ref 71-11-04/201).

S 714-016-J00

(5) Do the operational test of the ignition system (Ref 74-00-00/501).

IGNITION EXCITER - INSPECTION/CHECK

1. General
   A. This procedure contains a task to do a check of the ignition exciters (M7196 and M7197).
   B. You must open the left fan cowl panel to get access to the ignition exciters.
   C. The installation task includes the operational test of the ignition system.

   TASK 74-11-01-206-001-J00

2. Ignition Exciter Check
   A. References
      (1) 71-11-04/201, Fan Cowl Panels
      (2) 74-00-00/501, Ignition System
      (3) 74-11-01/401, Ignition Exciter
      (4) 74-11-01/701, Ignition Exciter
      (5) IPC 74-11-01 Fig. 1
   B. Access
      (1) Location Zone

412	Engine 1 - Fan Case 7 o'clock
422	Engine 2 - Fan Case 7 o'clock
432	Engine 3 - Fan Case 7 o'clock
442	Engine 4 - Fan Case 7 o'clock

      (2) Access Panel

413	Left Fan Cowl Panel - Engine 1
423	Left Fan Cowl Panel - Engine 2
433	Left Fan Cowl Panel - Engine 3
443	Left Fan Cowl Panel - Engine 4

   C. Procedure

      S 866-015-J00
      (1) FOR THE APPLICABLE ENGINE;
      Open these circuit breakers and attach the DO-NOT-CLOSE tags:
      (a) P6 Main Power Distribution Panel
         1) 6F1 IGN 1 ENG 1
         2) 6K19 IGN 2 ENG 1
         3) 6G19 STBY IGN ENG 1
         4) 6F2 IGN 1 ENG 2
         5) 6K20 IGN 2 ENG 2
         6) 6G20 STBY IGN ENG 2
         7) 6F3 IGN 1 ENG 3
         8) 6K21 IGN 2 ENG 3
         9) 6G21 STBY IGN ENG 3
         10) 6F4 IGN 1 ENG 4

11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 016-003-J00
(2) Open the left fan cowl panel (Ref 71-11-04/201).

S 036-013-J00
(3) Disconnect the input plugs (DM7196 and DM7197) and the ignition leads:

WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENT. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS.

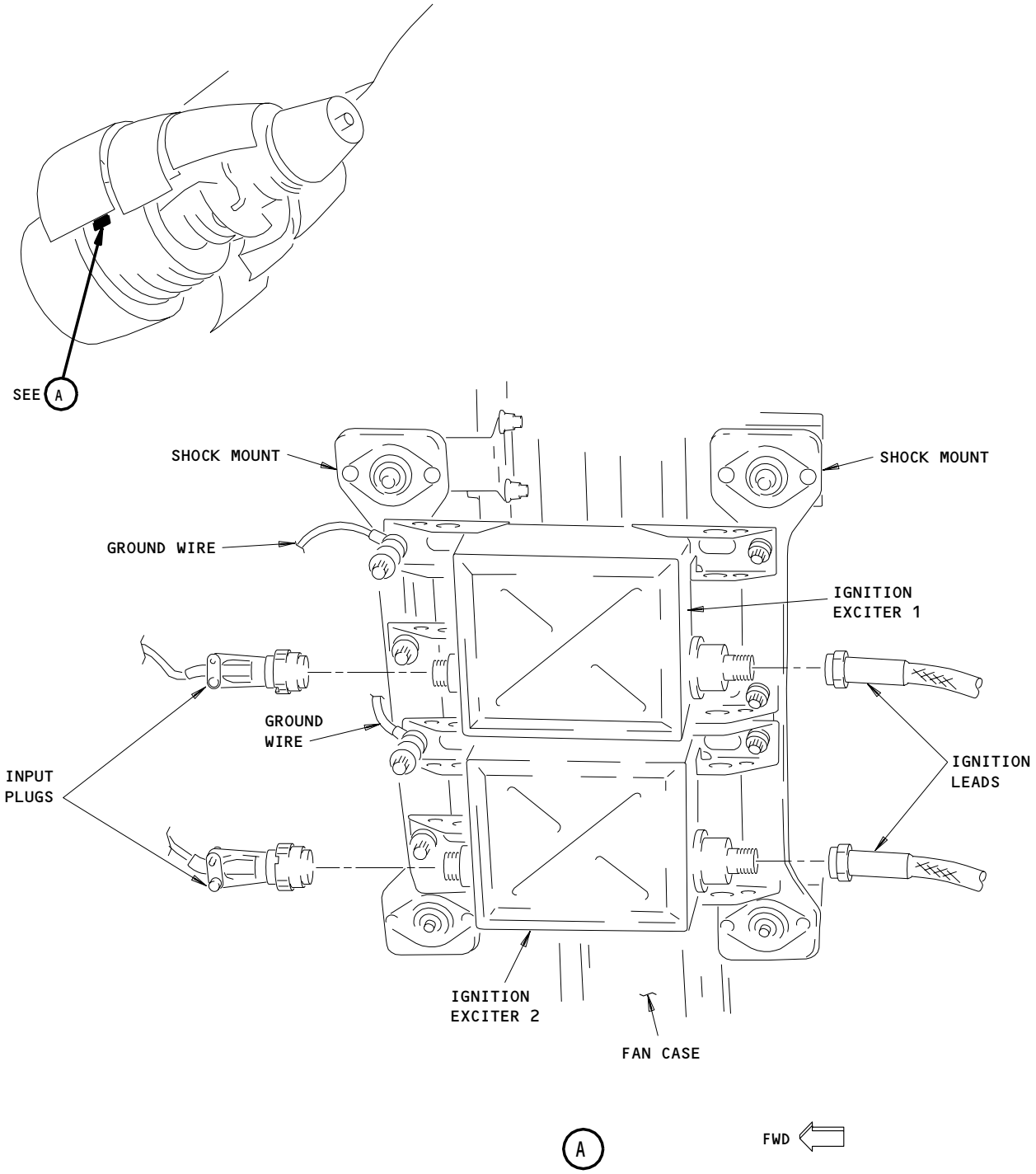
CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(a) Disconnect the input plugs (DM7196 and DM7197) and the ignition leads from the ignition exciters.

WARNING: AFTER YOU REMOVE THE IGNITION LEADS FROM THE EXCITERS, MAKE SURE THAT YOU MANUALLY GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Ground the output terminal of each exciter to the fan case.
(c) Install the caps on the ignition leads and the input plugs.

S 226-005-J00
(4) Examine the exciters:
(a) Examine the exciter housing and the mounting bracket for this type of damage:
1) Cracks in the exciter housing
2) Cracks in the exciter mounting bracket
3) Nicks, dents, or scratches more than 0.030 inch (0.76 mm) in depth.



Ignition Exciter Inspection
Figure 601

(b) Replace the ignition exciter if this type of damage is found (Ref 74-11-01/401).
(c) Examine the connector pins for this type of damage:
1) Broken pins

NOTE: You can repair the bent pins.

2) Seized pins
3) Erosion.
(d) Replace the ignition exciter if this type of damage is found (Ref 74-11-01/401).
(e) Examine the connectors for this type of damage:
1) Damaged threads on the connector
2) Nicks in the ceramic insulator
3) Cracks in the ceramic insulator
4) Electrical erosion of the ceramic insulator.
(f) Replace the ignition exciter if this type of damage is found (Ref 74-11-01/401).
(g) Examine the connectors on the exciters for contamination.
1) If the connectors are dirty, clean the connectors (Ref 74-11-01/701).

S 436-012-J00

(5) Connect the ignition leads and the input plugs (DM7196 and DM7197) to the exciters:
(a) Remove the caps from the ignition leads and the input plugs.
(b) Connect the ignition leads to the exciters.

NOTE: Make sure that the ignition lead for the lower igniter plug connects to the top ignition exciter. Make sure the ignition lead for the top igniter plug connects to the lower ignition exciter.

(c) Connect the input plugs (DM7196 and DM7197) to the exciters.

CAUTION: MAKE SURE THE LEAD COUPLING NUTS AT THE IGNITION EXCITERS ARE TIGHTENED. LOOSE COUPLING NUTS CAN CAUSE AIRPLANE RADIO INTERFERENCE.

(d) Tighten the lead coupling nuts to 140-160 pound-inches (15.8-18.0 N.m).
(e) Tighten the input plugs (DM7196 and DM7197) to 140-160 pound-inches (15.8-18.0 N.m).
(f) Install lockwire on the coupling nuts.

S 866-016-J00
(6) FOR THE APPLICABLE ENGINE;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 416-010-J00
(7) Close the left fan cowl panel (Ref 71-11-04/201).

S 716-011-J00
(8) Do the operational test of the ignition system (Ref 74-00-00/501).

IGNITION EXCITER - CLEANING/PAINTING

1. General
   A. This procedure has one task:
      (1) Clean the connectors of the ignition exciters.
   B. The input connector (plug) and the output connector (ignition lead) connect on each side of the ignition exciter. Clean the connectors when the connectors are dirty or have contamination.
   C. The task has three parts:
      (1) Open the left fan cowl panel.
      (2) Clean the connectors.
      (3) Do the operational test of the ignition system.

TASK 74-11-01-107-001-J00

2. Ignition Exciter Cleaning
   A. Standard Tools and Equipment
      (1) Compressed Air Source
   B. Consumable Materials
      (1) B00722 Solvent - Stoddard, P-D-680, Type I (C04-002)
      (2) G00834 Cloth - Clean, Lint-free
   C. References
      (1) 71-11-04/201, Fan Cowl Panels
      (2) 74-00-00/501, Ignition System
   D. Access
      (1) Location Zone

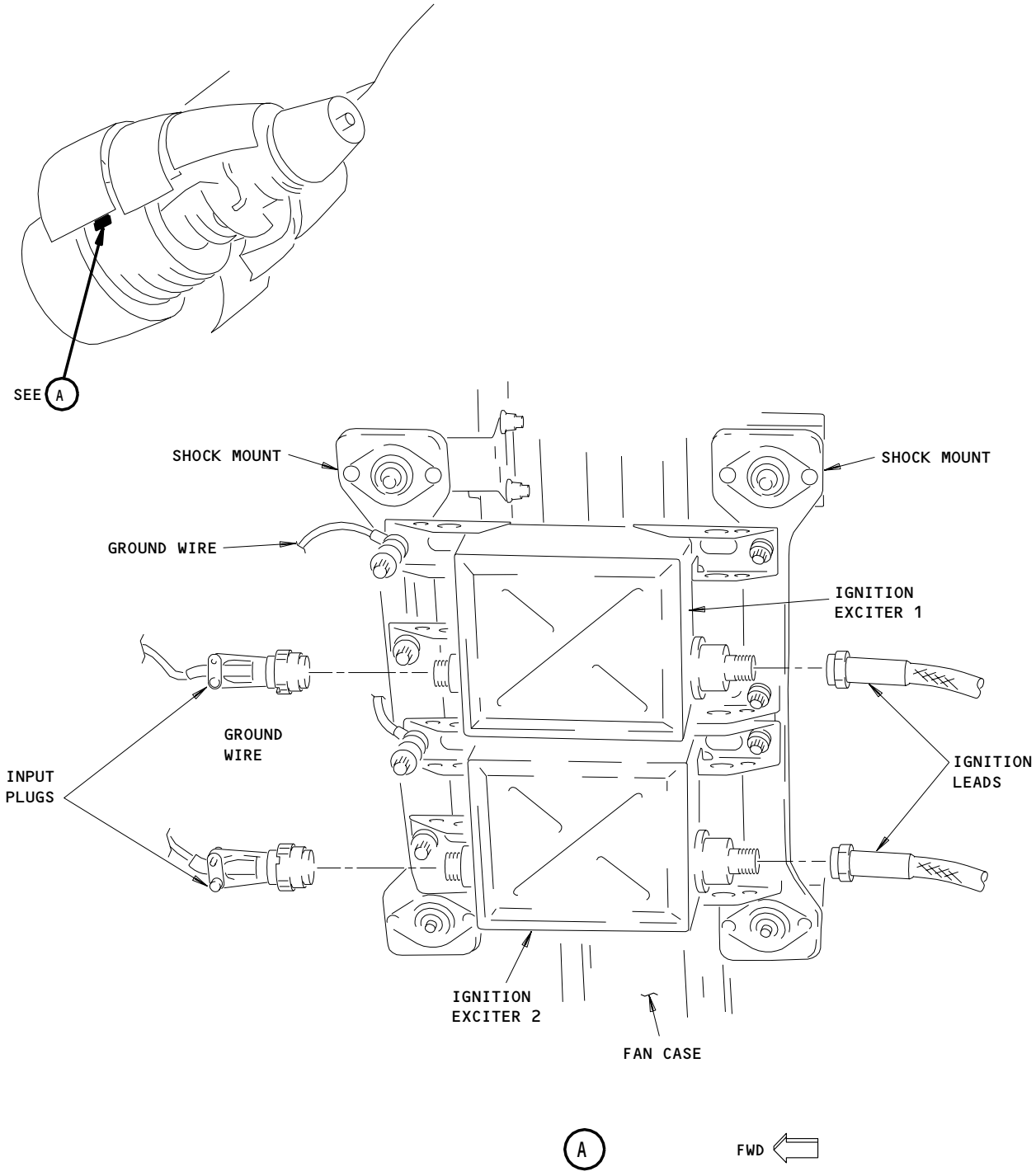
412	Engine 1 - Fan Case 7 o'clock
422	Engine 2 - Fan Case 7 o'clock
432	Engine 3 - Fan Case 7 o'clock
442	Engine 4 - Fan Case 7 o'clock

      (2) Access Panel

413	Left Fan Cowl Panel - Engine 1
423	Left Fan Cowl Panel - Engine 2
433	Left Fan Cowl Panel - Engine 3
443	Left Fan Cowl Panel - Engine 4

   E. Procedure

      S 867-002-J00
      (1) FOR THE APPLICABLE ENGINE;
      Open these circuit breakers and attach the DO-NOT-CLOSE tags:
      (a) P6 Main Power Distribution Panel
         1) 6F1 IGN 1 ENG 1
         2) 6K19 IGN 2 ENG 1
         3) 6G19 STBY IGN ENG 1
         4) 6F2 IGN 1 ENG 2



Ignition Exciter Cleaning
Figure 701

5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 017-003-J00

(2) Open the left fan cowl panel (Ref 71-11-04/201).

S 037-004-J00

WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENT. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS.

CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(3) Disconnect the ignition leads from the output terminals of the ignition exciters.

S 037-012-J00

(4) Disconnect the input plugs from the input terminal of the ignition exciters.

S 867-005-J00

WARNING: AFTER YOU DISCONNECT THE IGNITION LEADS FROM THE EXCITERS, MAKE SURE THAT YOU MANUALLY GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Ground the terminals of each exciter to the fan case.

S 117-013-J00

WARNING: WHEN YOU CLEAN THE CONNECTORS, MAKE SURE YOU ARE IN AN AREA WITH A GOOD FLOW OF AIR. DO NOT BREATHE THE SOLVENT GAS. DO NOT GET THE SOLVENT ON YOUR SKIN FOR A LONG TIME. THE SOLVENT IS POISONOUS. IT CAN GO THROUGH YOUR SKIN AND INTO YOUR BODY.

(6) Clean the connectors on the ignition exciters.
  (a) Make a cloth moist with solvent.
  (b) Use the cloth to clean the dirt from the open end of the connector.
  (c) Dry the connector with the filtered compressed air at the maximum of 30 psi.

S 437-007-J00

CAUTION: MAKE SURE THE LEAD COUPLING NUTS AT THE IGNITION EXCITERS ARE TIGHTENED. LOOSE COUPLING NUTS CAN CAUSE AIRPLANE RADIO INTERFERENCE.

DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(7) Connect the ignition leads to the exciter output terminals.
  (a) Connect the ignition lead of the lower igniter plug to the top ignition exciter.
  (b) Connect the ignition lead of the top igniter plug to the lower ignition exciter.
  (c) Tighten the coupling nuts to 140-160 pound-inches (15.8-18.0 N.m).
  (d) Install the lockwire on the coupling nuts.

S 437-008-J00
(8) Connect the input plug to the exciter input terminals.
  (a) Tighten the input plug to 140-160 pound-inches (15.8-18.0 N.m).

(b) Install the lockwire on the plug.

S 867-009-J00

(9) FOR THE APPLICABLE ENGINE;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 417-010-J00

(10) Close the left fan cowl panel (Ref 71-11-04/201).

S 717-011-J00

(11) Do the operational test of the ignition system (Ref 74-00-00/501).

IGNITION LEAD - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. One task is the removal of the ignition lead. The other task is the installation of the ignition lead.
   B. Each engine has two ignition leads which connect the ignition exciters to the igniter plugs. The connections are:
      (1) Ignition system 1 to the top exciter.
      (2) Ignition system 2 to the lower exciter.
   C. To remove an ignition lead, you must do as follows:
      (1) Open the thrust reverser halves.
      (2) Remove the electrical power from the ignition system.
      (3) Disconnect the ignition leads at the two ends.
      (4) Remove the clamps on the leads.
   D. To install an ignition lead, you must do as follows:
      (1) Connect the ignition leads at the two ends.
      (2) Install the clamps on the leads.
      (3) Do the system test for the ignition system.
      (4) Close the thrust reverser halves.

TASK 74-21-01-004-001-J00

2. Ignition Lead Removal (Fig. 401)
   A. References
      (1) AMM 78-31-00/201, Thrust Reverser System

   B. Access
      (1) Location Zone

412	Engine 1 - Lower Left Fan Case to Lower Compressor Rear Frame
422	Engine 2 - Lower Left Fan Case to Lower Compressor Rear Frame
432	Engine 3 - Lower Left Fan Case to Lower Compressor Rear Frame
442	Engine 4 - Lower Left Fan Case to Lower Compressor Rear Frame

      (2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4

C. Procedure

S 864-002-J00

(1) FOR THE APPLICABLE ENGINE;
Open these circuit breakers and attach the DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 014-003-J00

(2) Open the thrust reverser halves (AMM 78-31-00/201).

S 034-043-J00

(3) Remove the clamp (16) and shroud (17) that protect the igniter plug.

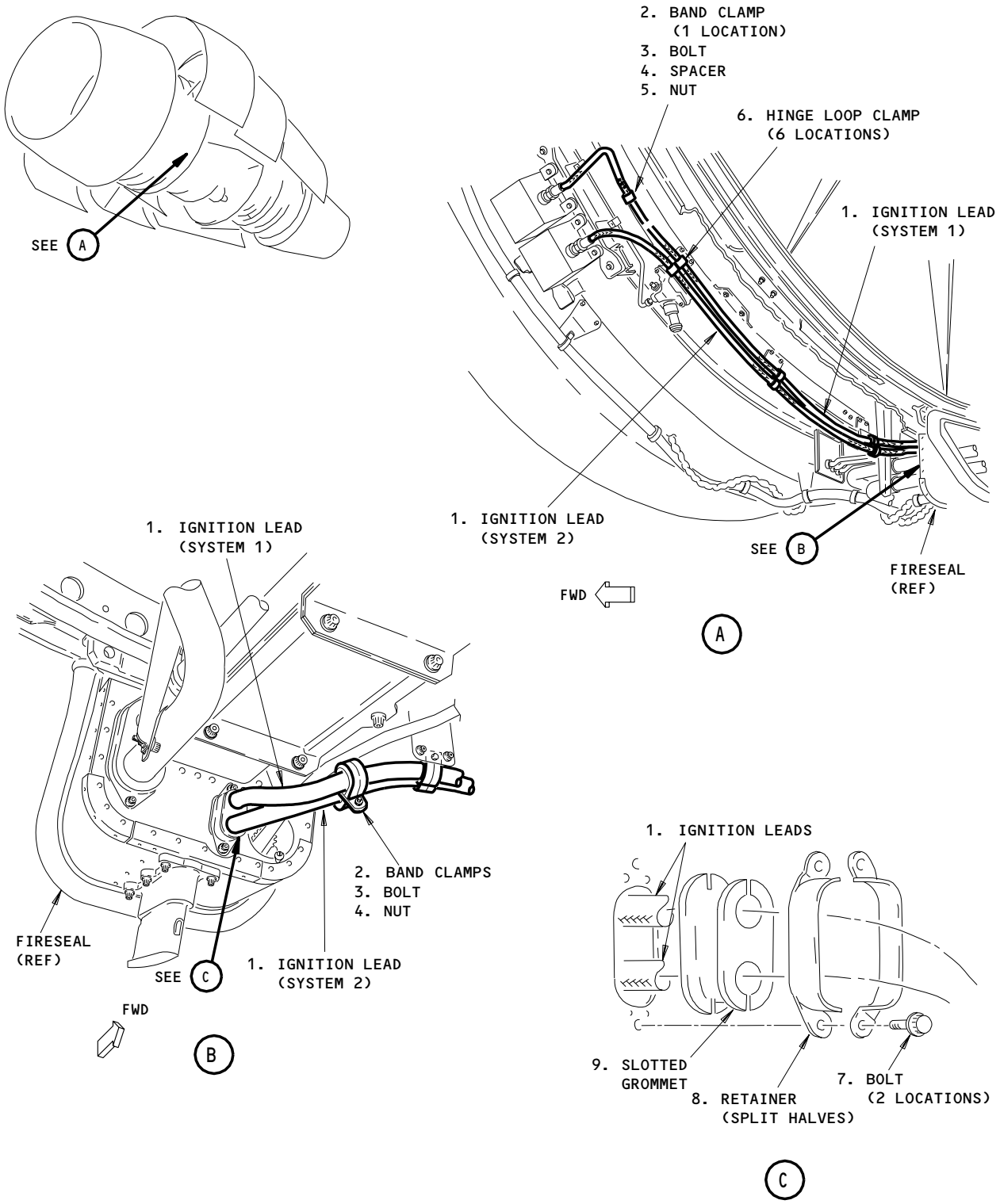
S 034-004-J00

WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENT. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS.

CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(4) Disconnect the ignition leads (1) from the ignition exciters.

NOTE: Mark all locations where you will remove the clamps to make the subsequent installation easier.

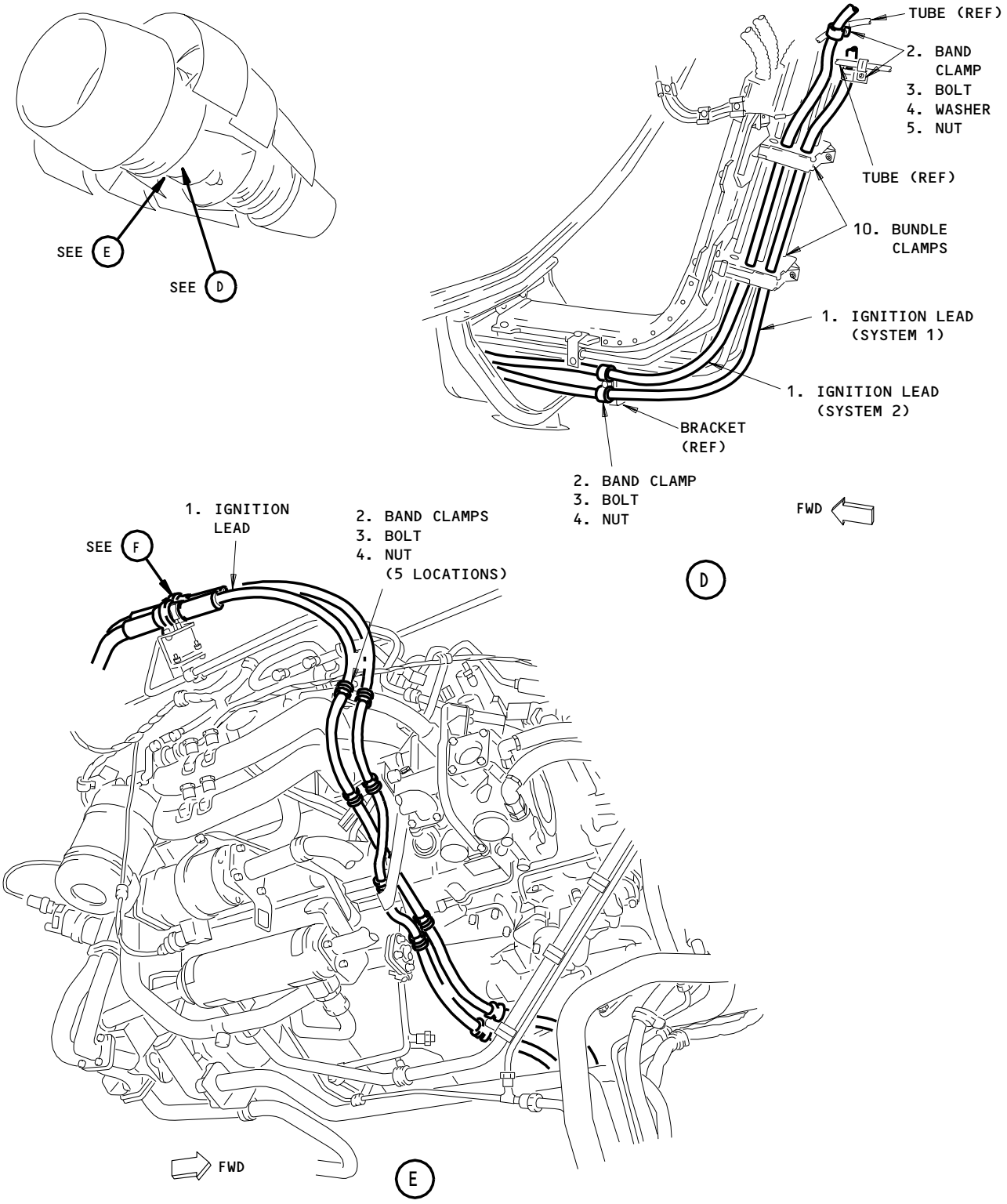


Ignition Lead Installation
Figure 401 (Sheet 1)

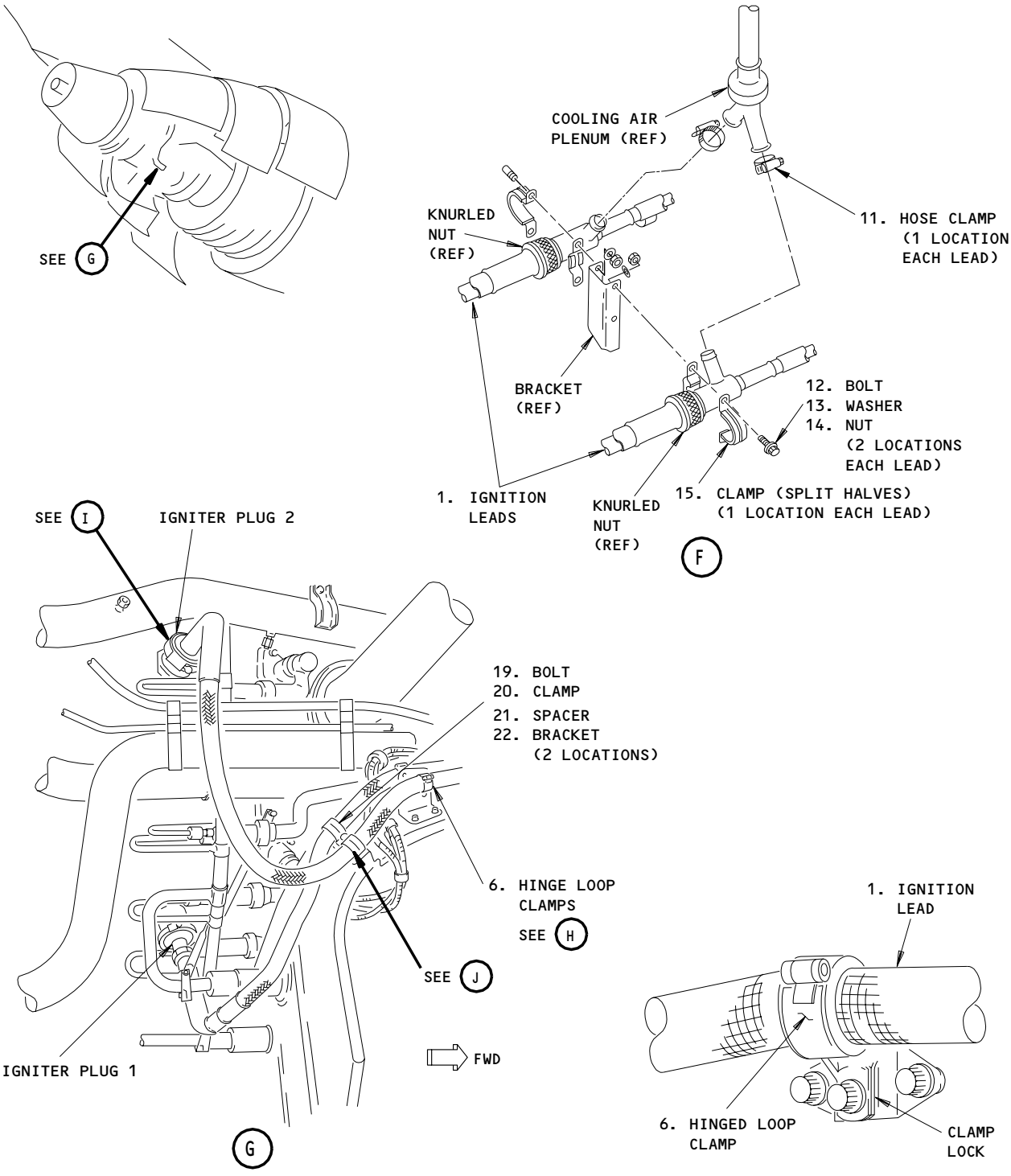
EFFECTIVITY

ALL

322875



Ignition Lead Installation
Figure 401 (Sheet 2)

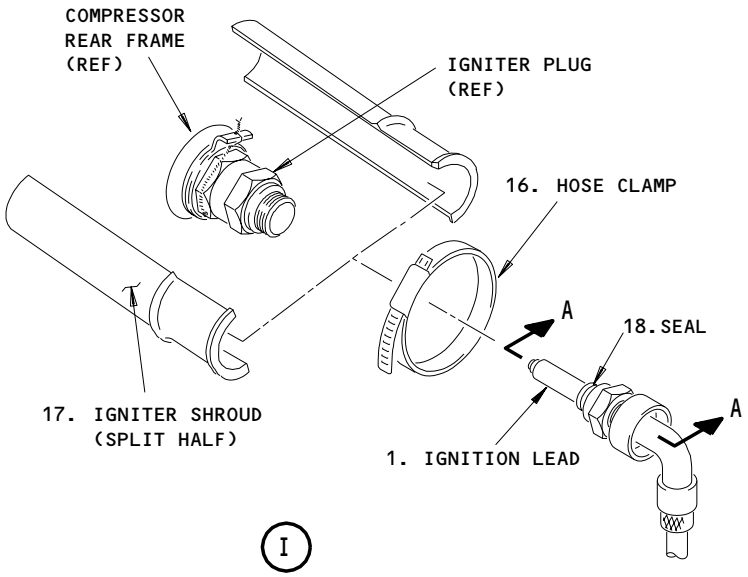


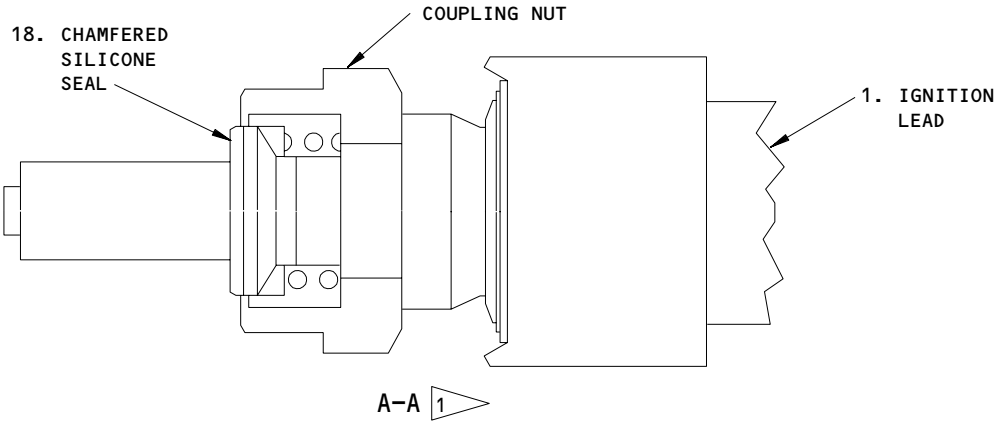
Ignition Lead Installation
Figure 401 (Sheet 3)

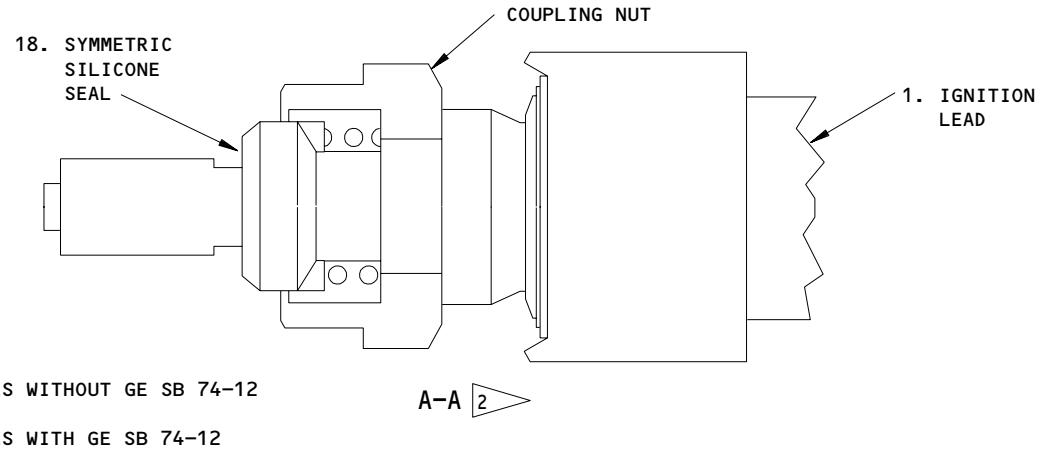
EFFECTIVITY

ALL

322878



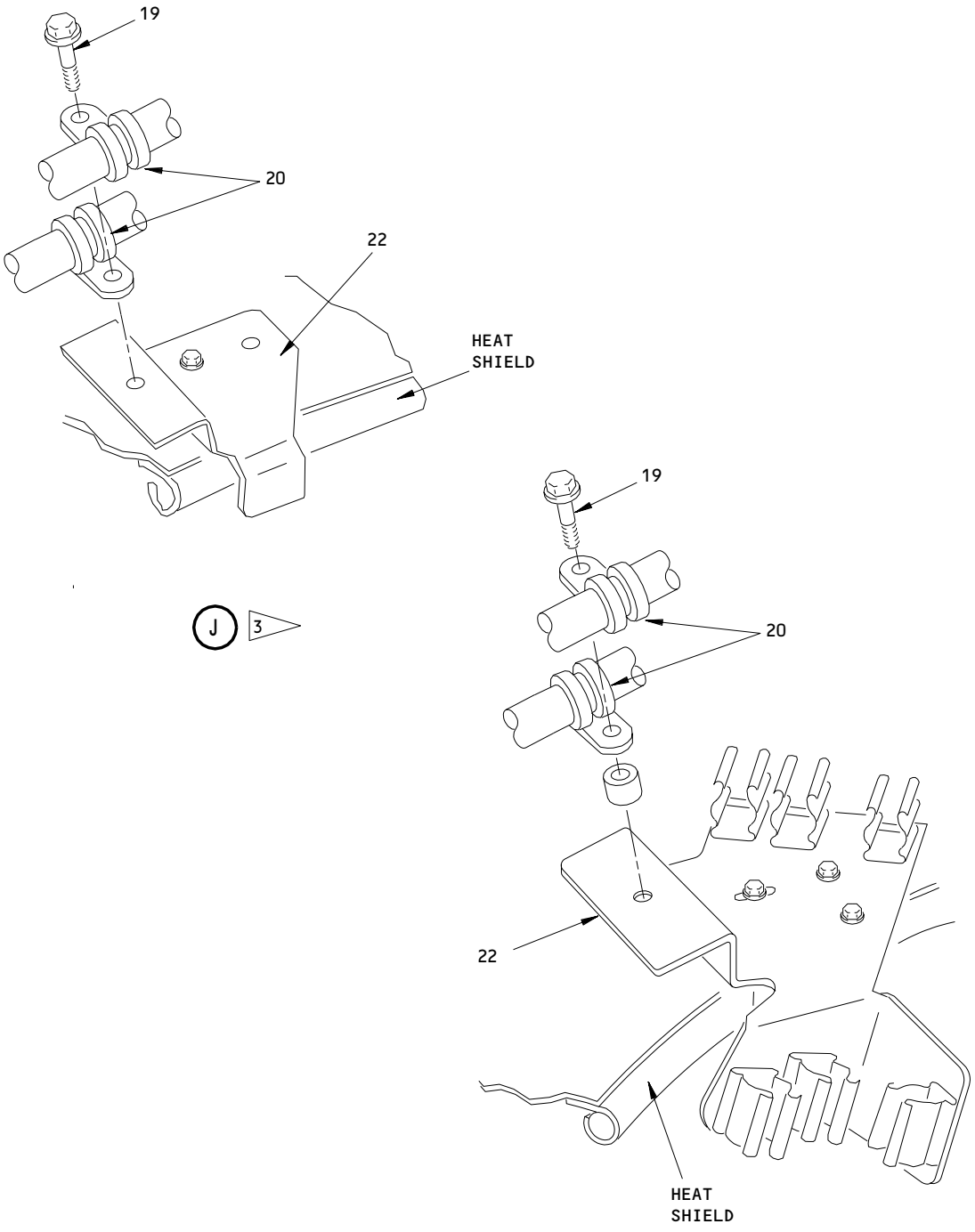




1 ENGINES WITHOUT GE SB 74-12

2 ENGINES WITH GE SB 74-12

Ignition Lead Installation
Figure 401 (Sheet 4)



3 ENGINES PRE-GE-SB 73-199
4 ENGINE POST-GE-SB 73-199

1162794-00-A

Ignition Lead Installation
Figure 401 (Sheet 5)

S 864-019-J00

WARNING: AFTER YOU REMOVE THE IGNITION LEADS FROM THE EXCITERS, MAKE SURE THAT YOU MANUALLY GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Ground the output terminal of each exciter to the fan case.

S 034-018-J00

(6) Disconnect the loop clamps (6) which attach the ignition leads (1) to the fan case brackets (3 locations).
   (a) Turn the clamp lock bolt 90 degrees in the counterclockwise direction to disconnect the clamp.

S 034-033-J00

(7) Remove the band clamp (2) at the eight o'clock position on the fan case.
   (a) Remove the bolt (3), the spacer (4), and the nut (5) from the clamp (2).
   (b) Remove the clamp (2) from the ignition leads (1).

S 034-044-J00

(8) Remove the band clammps (2) forward of the fireseal.
   (a) Remove the bolt (3) and the nut (5) from the clamp (2).
   (b) Remove the clamps (2) from the ignition leads (1).

S 034-006-J00

(9) Remove the bolts (7), the retainers (8), and the slotted grommet (9) from the ignition leads (1) at the fire seal.

S 034-007-J00

(10) Remove the band clamp (2) at the bracket aft of the fire seal.
   (a) Remove the bolt (3), and the nut (5) from the clamps (2).
   (b) Remove the clamp (2) from the ignition leads (1).

S 024-008-J00

(11) Remove two bundle clamps (10) from the pneumatic-and-oil-tube bundles.
   (a) Disengage the ignition leads (1) from the tube bundles.

S 034-009-J00

(12) Remove the band clamps (2) and the tube clamps forward of the accessory gearbox.
   (a) Remove the bolts (3), the washers (4), and the nuts (5) from the clamps.
   (b) Remove the clamps (2) from the ignition leads (1).

S 034-010-J00
(13) Remove the clamps (2) along the lower right side of the engine.
(a) Remove the bolts (3) and the nuts (5) from the clamps (2).
(b) Remove the clamps (2) from the tubes and the brackets (5 locations).

S 034-011-J00
(14) Disconnect the ignition leads (1) at the cooling air plenum.
(a) Remove two hose clamps (11) which attach the cooling air hoses to the cooling air plenum.
(b) Remove the bolts (12), the washers (13), the nuts (14), and the clamps (15) at the engine bracket.
(c) Disengage the ignition leads (1) from the engine bracket.

S 034-012-J00
(15) On the hinged loop clamps (6) at the heatshield bracket, turn the clamp-lock-bolt 1/4-turn in the counterclockwise direction.

NOTE: Two hinged loop clamps (6) attach the ignition leads (1) to the heat sheild bracket.

(a) Disconnect the hinged loop clamps (6) which attach the ignition leads (1) to the heat shield bracket.

NOTE: The bracket is installed on the heat shield panel.

S 034-048-J00
(16) Remove the ignition leads (1) from the heat shield brackets (22).
(a) ENGINES PRE-GE-SB 73-199;
Remove the bolt (19) from the clamps (20).
(b) ENGINES POST-GE-SB 73-199;
Remove the bolt (19) and spacer (21) from the clamps (20).
(c) Remove the clamps (20) from the ignition leads (1).

S 034-013-J00
(17) Remove the hose clamps (16) which attach the igniter shrouds (17) to the ignition leads (1).

S 034-014-J00
(18) Disconnect the ignition leads (1) from the igniter plugs.

S 024-015-J00

CAUTION: WHEN YOU REMOVE THE IGNITION LEADS, DO NOT BEND THE COOLING AIR SHROUDS. A SHARP BEND CAN CAUSE HOT GAS TO FLOW ON THE INSULATION AND CAUSE A HIGH VOLTAGE FAILURE.

(19) Carefully remove the ignition leads (1) from the engine.

S 434-017-J00

(20) Install the caps on the exciter output terminals, the igniter plugs, and the cooling air plenum.

S 864-016-J00

(21) If you do not install the new ignition leads (1), do not remove all clamps (2 and 6) on the ignition leads (1).

TASK 74-21-01-404-018-J00

3. Ignition Lead Installation (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Ignition Lead	74-21-01	01	68
	2	Clamp			54
	3	Bolt			25,30
	4	Washer			40
	5	Nut			45
	6	Hinged Loop Clamp			55,60
	7	Bolt			10
	8	Retainer			5
	9	Slotted Grommet			15
	10	Bundle Clamp	79-21-01	01	90
	11	Hose Clamp	75-24-01	10	140
	12	Bolt	73-21-51	11	095
	13	Washer	75-21-01	10	73
	14	Nut	75-24-01	10	86
	15	Clamp	75-21-01	10	153
	16	Hose Clamp	74-21-02	01	30
	17	Igniter Shroud			25
	18	Seal	74-21-01	01	69
	19	Bolt	74-21-01	01	20
	20	Clamp	74-21-01	01	56
	21	Spacer	74-21-01	01	40
	22	Bracket	74-21-01	01	TBD

B. References
(1) AMM 74-00-00/501, Ignition System
(2) AMM 78-31-00/201, Thrust Reverser System

C. Access
(1) Location Zone

412	Engine 1 - Lower Left Fan Case to Lower Compressor Rear Frame
422	Engine 2 - Lower Left Fan Case to Lower Compressor Rear Frame
432	Engine 3 - Lower Left Fan Case to Lower Compressor Rear Frame
442	Engine 4 - Lower Left Fan Case to Lower Compressor Rear Frame

(2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4

D. Procedure

S 034-019-J00
(1) Remove the caps from the exciter output terminals, the igniter plugs, and the cooling air plenum.

S 424-038-J00
(2) If you install the new ignition leads (1), attach all clamps (2 and 6) to the leads.

NOTE: Put the clamps (2 and 6) on the ignition leads (1) at the identified locations.

S 034-040-J00
(3) Loosen the knurled nuts on the ignition leads (1) at the cooling air inlet.

NOTE: This permits the two ends of the ignition leads (1) to turn freely.

S 434-039-J00
(4) Carefully put the exciter ends of the ignition leads (1) forward through the fire seal.

S 434-037-J00

CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(5) Connect the ignition leads (1) to the exciters.

NOTE: Make sure that the ignition lead for the lower igniter plug connects to the top ignition exciter. The ignition lead for the top igniter plug connects to the lower ignition exciter.

(a) Hand-tighten the coupling nuts.

S 434-036-J00

CAUTION: WHEN YOU INSTALL THE IGNITION LEADS, DO NOT BEND THE COOLING AIR SHROUDS. A SHARP BEND CAN CAUSE HOT GAS TO FLOW ON THE INSULATION AND CAUSE A HIGH-VOLTAGE FAILURE.

(6) If you install a new ignition lead (1), make sure the seal (18) is on the ignition lead (1) (Fig. 401).

NOTE: There are two different types of the silicone seals (chamfered and symmetric). You must make sure the seal is correctly installed.

S 434-041-J00

(7) If you install the same ignition lead (1) you disconnected, install a new seal (18).

NOTE: There are two different types of the silicone seals (chamfered and symmetric). You must make sure the seal is correctly installed.

S 434-040-J00

(8) Connect the ignition leads (1) to the igniter plugs.
(a) Tighten to 260-290 pound-inches (29.4-32.8 N.m).

S 424-035-J00

(9) Install the igniter shroud (17) around each igniter plug and ignition lead.
(a) Install the hose clamp (16) around each shroud.
(b) Tighten the hose clamps to 30-40 pound-inches (3.4-4.5 N.m).

S 434-034-J00
(10) Attach the ignition leads (1) to the hinged loop clamps (6) at the heat shield bracket.

NOTE: The bracket is on the heat shield panel.

(a) Turn the clamp-lock-bolt 1/4-turn in the clockwise direction to lock the hinged loop clamps (6).

NOTE: Two hinged loop clamps (6) attach the ignition leads to the heat sheild bracket (22).

S 434-045-J00
(11) Install the clamps (20) which attach the ignition leads (1) to the heat shield bracket (22).
(a) ENGINES PRE-GE-SB 73-199;
Install the bolt (19) to the clamp (20).
(b) ENGINES POST GE-SB-73-199;
Install the bolt (19) and spacer (21) to the clamp (20).

S 434-033-J00
(12) Install the clamps (15) which attach the ignition leads (1) to the engine bracket at the cooling air plenum.
(a) Install the bolts (12), the washers (13), and the nuts (14) to the clamps (15).
(b) Tighten the nuts (14) to 55-70 pound-inches (6.3-7.9 N.m).

S 434-032-J00
(13) Install two hose clamps (11) which attach the cooling air hoses to the cooling air plenum.

S 434-031-J00
(14) Connect the hinged loop clamps (6) which attach the ignition leads (1) to the fan case brackets (3 locations).

S 434-024-J00
(15) Install the band clamp (2) that attaches the ignition leads (1) to the fan case at the eight o'clock position.
(a) Tighten the clamp (2) with the bolt (3), the spacer (4), and the nut (5).

S 434-025-J00

(16) Install the band clamps (2) which attach the ignition leads (1) to the tube clamps forward of the accessory gearbox.
   (a) Tighten the clamps (2) with the bolts (3), the spacers (4), and the nuts (5).

S 434-026-J00

(17) Install the band clamp (2) which attaches the ignition leads (1) to the bracket aft of the fire seal.
   (a) Tighten the clamp (2) with the bolt (3), and the nut (5).

S 424-027-J00

(18) Install the slotted grommet (9) and the retainers (8) around the ignition leads (1) on the forward face of the fire seal.
   (a) Install the bolts (7) that attach the retainers to the fire seal.
   (b) Tighten the bolts (7).

S 434-028-J00

(19) Install the ignition leads (1) in the cutouts of the bundle clamps (10).

NOTE: Attach the bundle clamps to the pneumatic-and-oil-tube bundles.

   (a) Tighten the clamps.

S 434-029-J00

(20) Install the band clamps (2) that attach the ignition leads (1) forward of the fire seal.
   (a) Tighten the clamps (2) with the bolt (3), and the nut (5).

S 434-030-J00

(21) Install the clamps (2) which attach the ignition leads (1) along the lower right side of the engine tubes and brackets (5 locations).
   (a) Tighten the clamps (2) with the bolts (3), the washers (4), and the nuts (5).

S 434-023-J00

CAUTION: MAKE SURE THE LEAD COUPLING NUTS AT THE IGNITION EXCITERS ARE TIGHTENED. LOOSE COUPLING NUTS CAN CAUSE AIRPLANE RADIO INTERFERENCE.

(22) Tighten the lead coupling nuts at the exciters to 140-160 pound-inches (15.8-18.0 Newton meter).
   (a) Install the lockwire on the coupling nuts.

S 434-022-J00
(23) Tighten the knurled nuts with teflon-jawed pliers.
(a) Install the lockwire on the knurled nuts.

S 864-036-J00
(24) FOR THE APPLICABLE ENGINE;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 414-037-J00
(25) Close the thrust reverser halves (AMM 78-31-00/201).

S 714-038-J00
(26) Do the operational test of the ignition system (AMM 74-00-00/501).

IGNITION LEAD - INSPECTION/CHECK

1. General
   A. This procedure has a task; do a check on the ignition leads, the connectors, and the cooling air shroud.
   B. To do a check of the ignition leads, you must do as follows:
      (1) Open the thrust reverser halves.
      (2) Remove the electrical power from the ignition system.
      (3) Do the operational test of the ignition system.

   TASK 74-21-01-206-001-J00

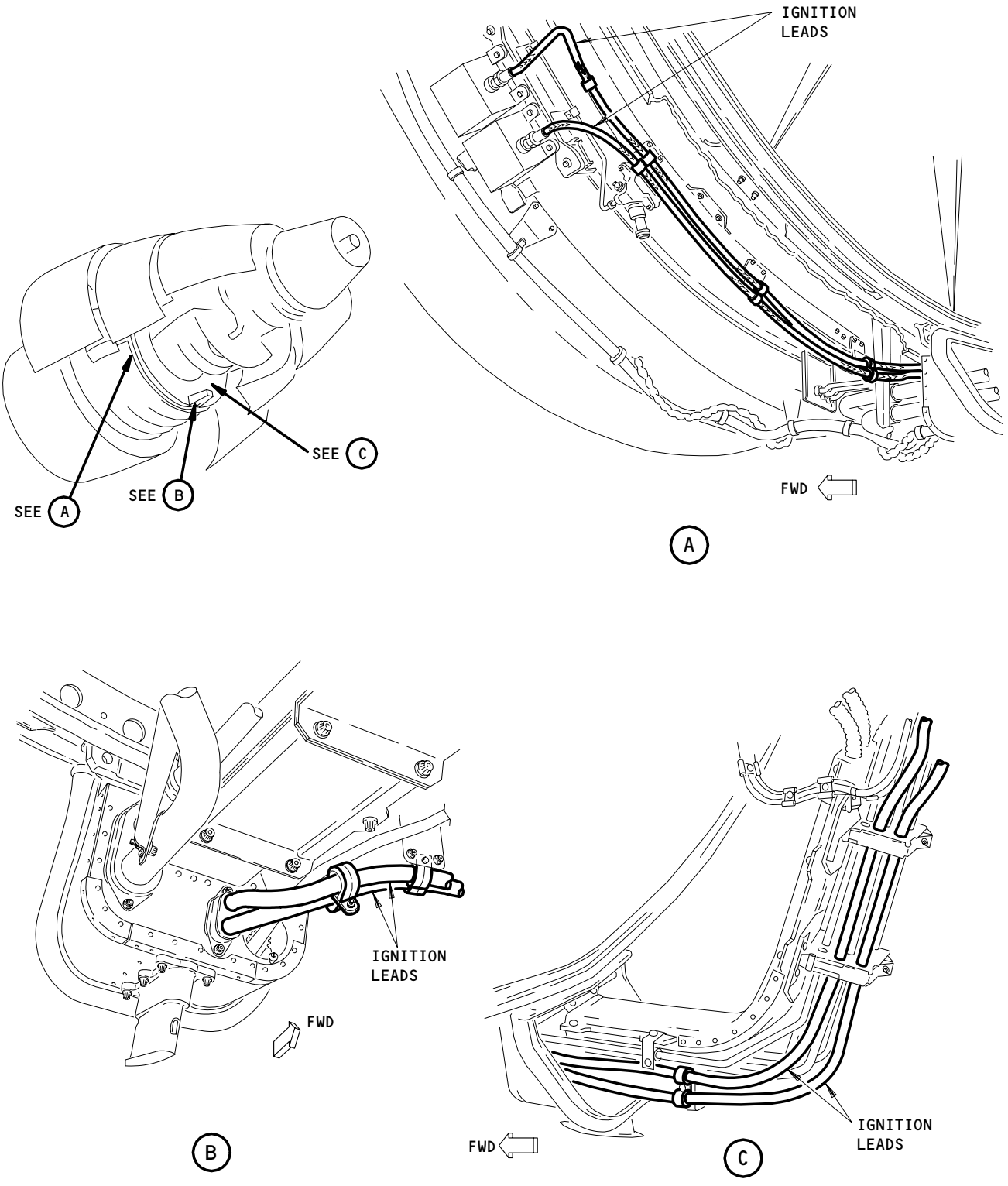
2. Ignition Lead Check
   A. Standard Tools and Equipment
      (1) Soft-bristle brush
   B. Consumable Materials
      (1) B00722 Solvent - Stoddard, P-D-680, Type I (C04-002)
   C. References
      (1) 74-00-00/501, Ignition System
      (2) 74-21-01/401, Ignition Lead
      (3) 74-21-02/401, Igniter Plug
      (4) 78-31-00/201, Thrust Reverser System

   D. Access
      (1) Location Zone

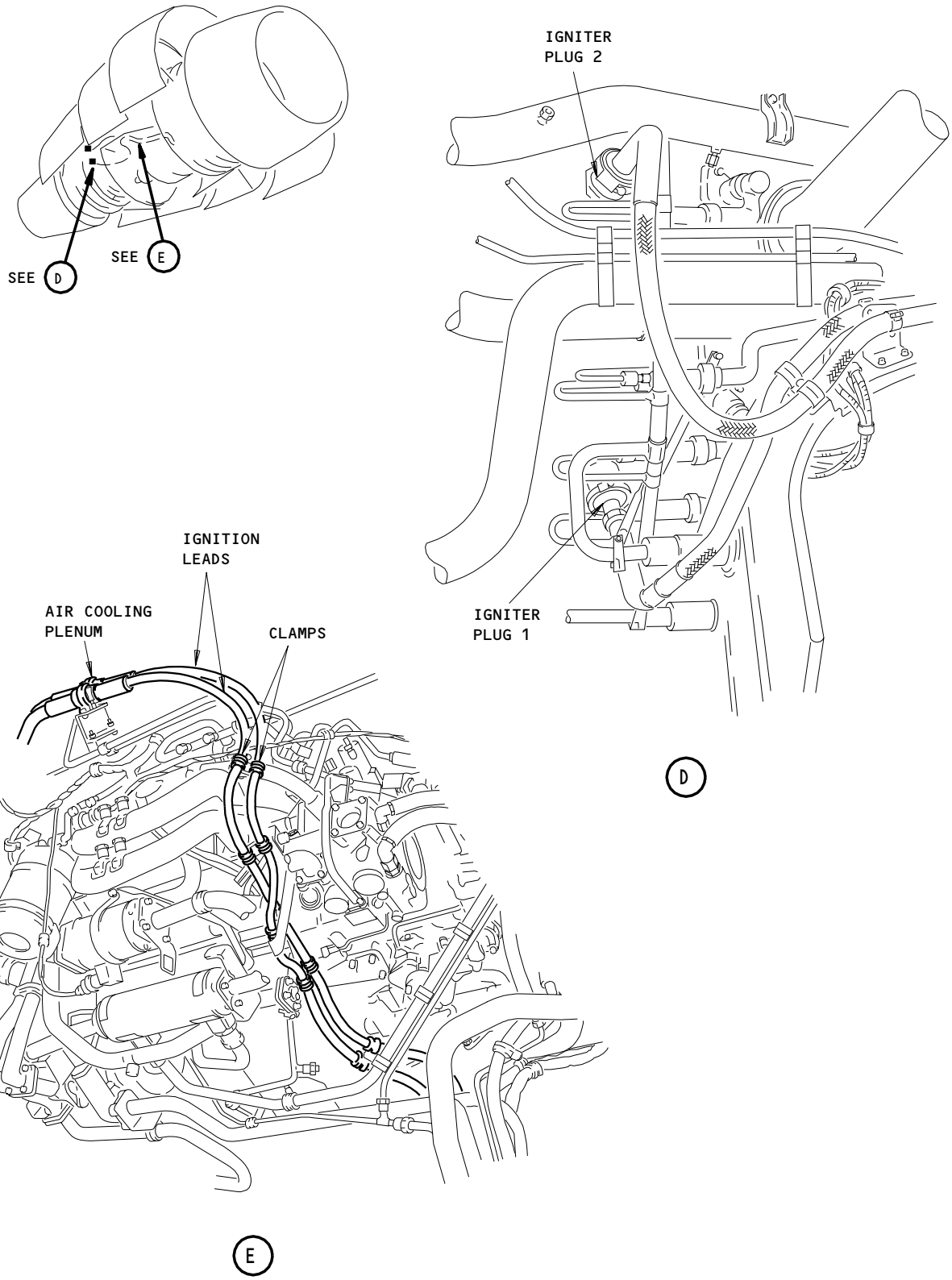
412	Engine 1 - Lower Left Fan Case to Lower Compressor Rear Frame
422	Engine 2 - Lower Left Fan Case to Lower Compressor Rear Frame
432	Engine 3 - Lower Left Fan Case to Lower Compressor Rear Frame
442	Engine 4 - Lower Left Fan Case to Lower Compressor Rear Frame

      (2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4



Ignition Lead Check
Figure 601 (Sheet 1)



Ignition Lead Check
Figure 601 (Sheet 2)

E. Procedure

S 866-002-J00

(1) FOR THE APPLICABLE ENGINE;
Open these circuit breakers and attach the DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 016-004-J00

(2) Open the thrust reverser halves (AMM 78-31-00/201).

S 036-005-J00

WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENTS. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS.

CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(3) Disconnect the ignition leads.
(a) Disconnect the ignition leads from the ignition exciters.
(b) Install the caps on the exciter terminals.

WARNING: AFTER YOU REMOVE THE IGNITION LEADS FROM THE EXCITERS, MAKE SURE THAT YOU MANUALLY GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, YOU CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Ground the output terminal of each exciter to the fan case.
(d) Remove the hose clamps which attach the igniter shrouds to the ignition leads.
(e) Disconnect the ignition leads from the igniter plugs.

S 216-007-J00

(4) Examine the braided conduit of the ignition lead for damage.
(a) Replace the ignition lead (AMM 74-21-01/401), if it has one of these conditions:
1) Broken wires
2) Brazed joints broken apart
3) Sharp bends less than 6 inches (152 mm) in the radius.

S 216-008-J00

(5) Examine the electrical connectors of the ignition lead for damage.
(a) Replace the ignition lead (AMM 74-21-01/401), if it has one of these conditions:
1) The insulator is damaged.
2) The socket has damage from the electrical arcs.
3) The socket has damage or is cross-threaded.
4) The socket threads have damage through their full thread depth.

S 216-025-J00

(6) Examine the igniter plug socket for carbon particles.

WARNING: MAKE SURE THE AREA IS OPEN TO THE AIR WHEN YOU CLEAN THE AREA. ALL PERSONS MUST FULLY KNOW THE SAFETY PRECAUTIONS. DO NOT BREATHE THE GAS OR GET THE SOLVENT ON YOUR SKIN FOR VERY LONG TIME. THE SOLVENT IS POISONOUS. IT CAN GO THROUGH YOUR SKIN AND INTO YOUR BODY.

(a) Clean the socket with a soft bristle brush and solvent.
1) A small quantity of carbon in the igniter plug socket is permitted.

2) If the quantity of carbon in the igniter plug socket is too much, the igniter plug is defective.
a) Replace the igniter plug (Ref 74-21-02/401).

S 216-009-J00

(7) Examine the cooling air shroud for damage.
(a) Replace the cooling air shroud, if it has one of these conditions:
1) The shroud has leaks
2) The shroud is blocked at the open hole
3) The shroud has bends less than 12 inches (305 mm) in the radius.

S 436-026-J00

(8) Connect the ignition leads.
(a) Remove the caps from the exciter terminals.
(b) Connect the ignition leads to the exciters.

NOTE: The ignition lead for the lower igniter plug connects to the top ignition exciter. The ignition lead for the top igniter plug connects to the lower ignition exciter.

1) Tighten the lead coupling nuts on the leads to 140-160 pound-inches (15.8-18.0 N.m).
2) Install the lockwire on the coupling nuts.

CAUTION: WHEN YOU INSTALL THE IGNITION LEADS, DO NOT BEND THE COOLING AIR SHROUDS. A SHARP BEND CAN CAUSE HOT GAS TO FLOW ON THE INSULATION AND CAUSE A HIGH-VOLTAGE FAILURE.

(c) Replace the seal on the ignition lead (AMM 74-21-01/401).
(d) Connect the ignition leads to the igniter plugs.
1) Tighten to 260-290 pound-inches (29.4-32.8 N.m).
(e) Install the igniter shroud around each igniter plug and ignition lead.
1) Install the hose clamp around the top of each shroud.

2) Tighten the hose clamps to 30-40 pound-inches (3.4-4.5 N.m).

S 866-014-J00

(9) FOR THE APPLICABLE ENGINE;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 416-015-J00

(10) Close the thrust reverser halves (AMM 78-31-00/201).

S 716-017-J00

(11) Do the operational test of the ignition system (AMM 74-00-00/501).

IGNITER PLUG - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks, one for the removal and one for the installation of the igniter plug.
   B. Each engine has two igniter plugs. They are in the compressor rear frame at the 3 and 4 o'clock positions. To remove the igniter plug, you must open the thrust reverser halves.
   C. The igniter plug is installed in an adapter bushing on the compressor rear frame. To remove the igniter plug, you do not have to remove the adapter bushing on the compressor rear frame. If you remove the adapter bushing, you must do an immersion depth check.
   D. After you install the igniter plug, do the operational test of the ignition system.

TASK 74-21-02-004-001-J00

2. Igniter Plug Removal (Fig. 401)
   A. References
      (1) AMM 74-00-00/501, Ignition System
      (2) AMM 78-31-00/201, Thrust Reverser System
      (3) IPC 74-21-02 Fig. 1
   B. Access
      (1) Location Zone

412	Engine 1 - Compressor Rear Frame 3 and 4 o'clock
422	Engine 2 - Compressor Rear Frame 3 and 4 o'clock
432	Engine 3 - Compressor Rear Frame 3 and 4 o'clock
442	Engine 4 - Compressor Rear Frame 3 and 4 o'clock

      (2) Access Panel

415 and 416	Thrust Reverser Halves - Engine 1
425 and 426	Thrust Reverser Halves - Engine 2
435 and 436	Thrust Reverser Halves - Engine 3
445 and 446	Thrust Reverser Halves - Engine 4

   C. Prepare to remove the igniter plug

S 214-029-J00

(1) Do this task for engine number 1, engine number 2, engine number 3, and engine number 4.

NOTE: This task can be done in one of the four sequences. However, an individual technician should inspect one engine at a time. Complete one engine before moving to the next engine.

S 864-002-J00

(2) FOR THE APPLICABLE ENGINE;
Open these circuit breakers and attach the DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1

2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 014-003-J00

(3) Open the thrust reverser halves (AMM 78-31-00/201).

S 034-004-J00

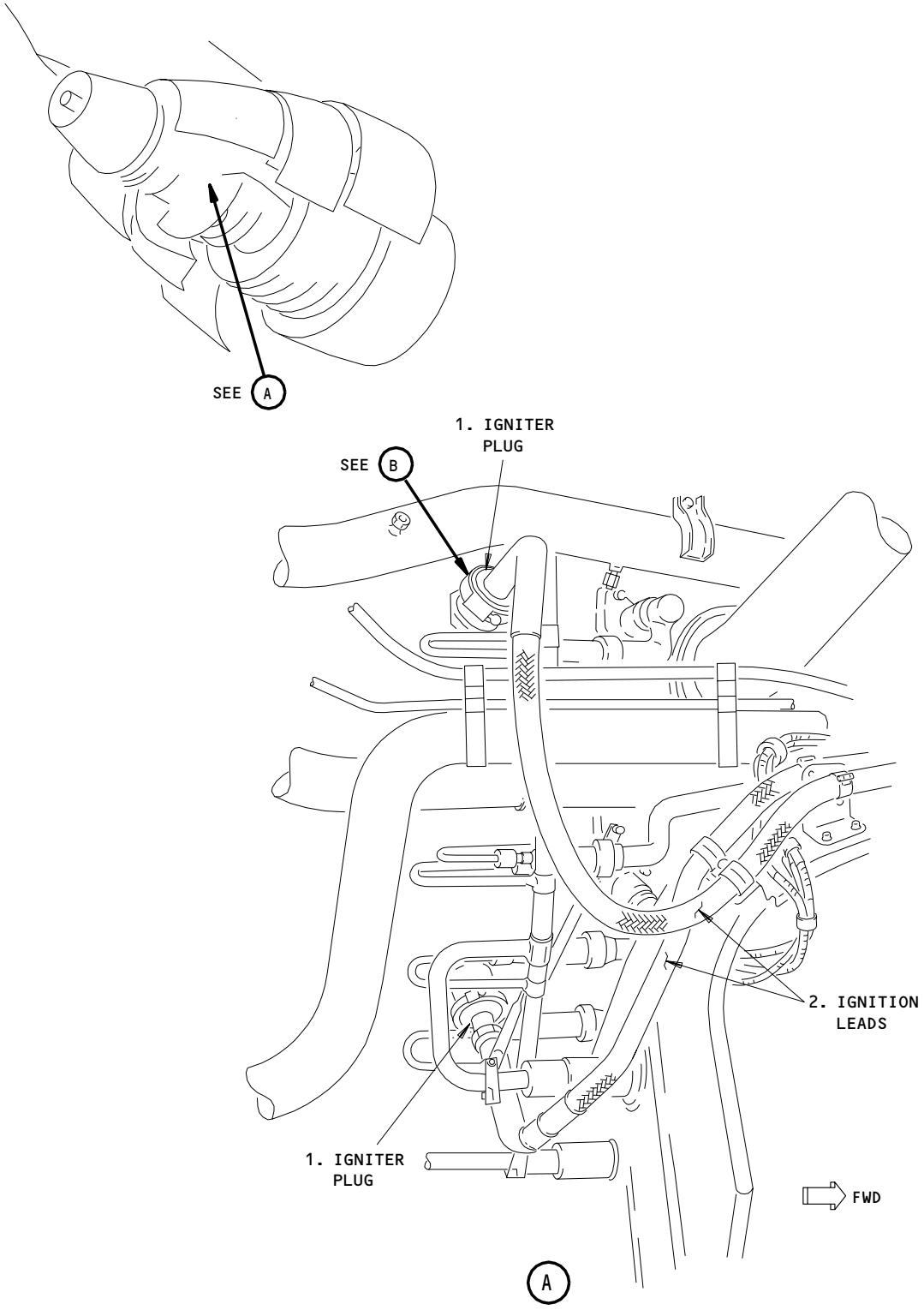
WARNING: MAKE SURE THAT THE IGNITION SYSTEM DOES NOT OPERATE FOR FIVE MINUTES BEFORE YOU REMOVE THE COMPONENT. IGNITION VOLTAGE IS DANGEROUSLY HIGH AND CAN CAUSE INJURY TO PERSONS.

CAUTION: DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

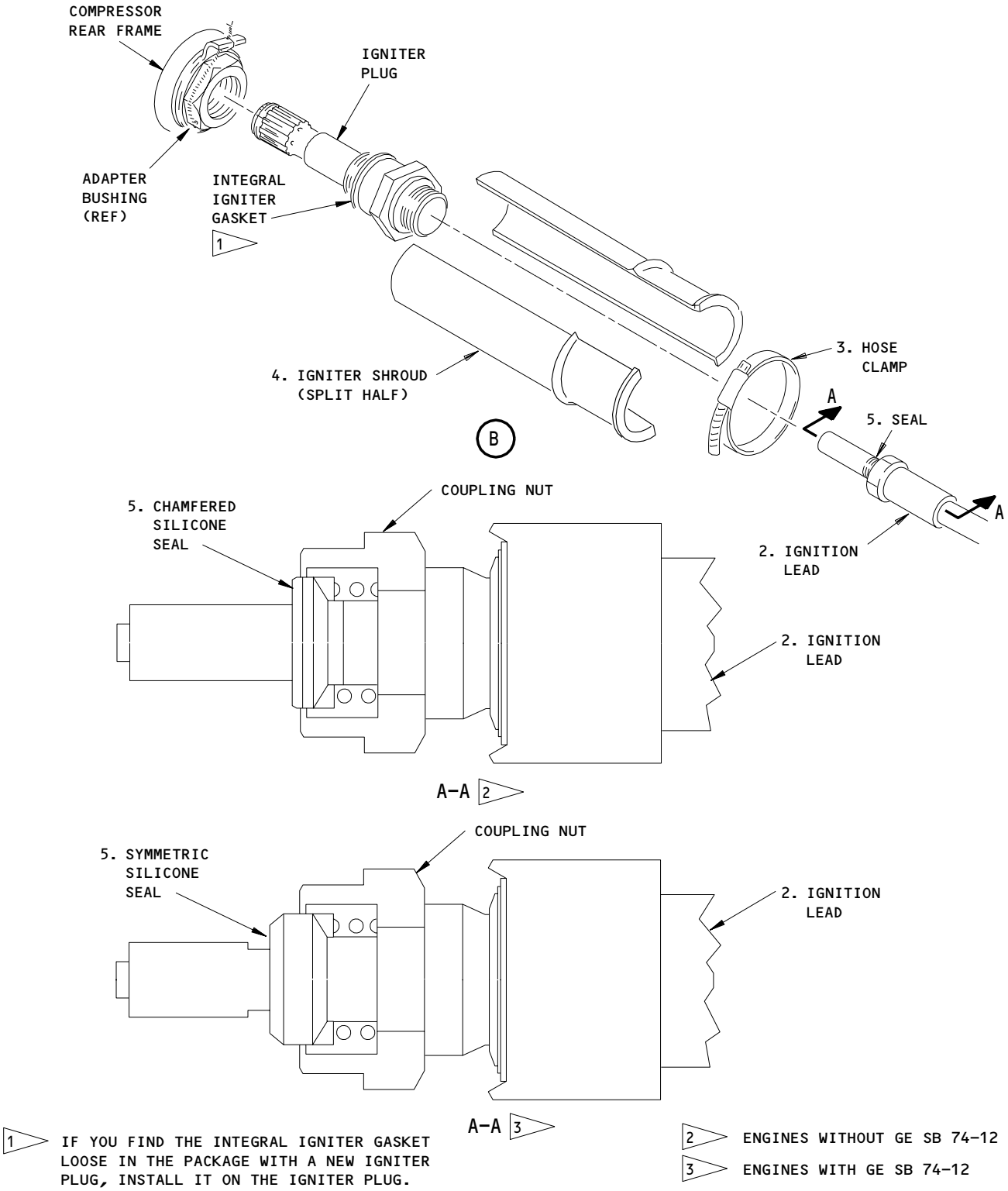
(4) Disconnect the ignition lead from the ignition exciter.

WARNING: AFTER YOU REMOVE THE IGNITION LEADS FROM THE EXCITERS, MAKE SURE THAT YOU MANUALLY GROUND THE EXCITER TERMINALS. IF YOU DO NOT GROUND THE EXCITER TERMINALS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Ground the output terminal of each exciter to the fan case.
(b) Install the caps on the exciter output terminals and on the ignition lead.



Igniter Plug Installation
Figure 401 (Sheet 1)



Igniter Plug Installation
Figure 401 (Sheet 2)

S 024-025-J00

(5) Remove the igniter shrouds (4).
  (a) Remove the hose clamps (3) which attach the igniter shrouds (4) to the ignition lead (2).
  (b) Remove the igniter shrouds (4) from the ignition lead (2).

S 024-026-J00

(6) Remove the igniter plug (1).

CAUTION: WHEN YOU DISCONNECT THE IGNITION LEADS, DO NOT BEND THE COOLING AIR SHROUD. A SHARP BEND CAN CAUSE HOT GAS TO FLOW ON THE INSULATION AND CAUSE A HIGH VOLTAGE FAILURE.

  (a) Disconnect the ignition lead (2) from the igniter plug (1).
  (b) Remove the seal (5) from the ignition lead (2).
    1) Discard the seal.
  (c) Remove the igniter plug (1) from the adapter bushing in the compressor rear frame.

NOTE: Do not remove the adapter unless the adapter is damaged.

  (d) Install the caps on the adapter bushing and on the ignition lead.

TASK 74-21-02-404-010-J00

3. Igniter Plug Installation (Fig. 401)
  A. Consumable Materials
    (1) D00000 Compound - Antiseize, GE Spec A50TF201, Class A, GP460 (C02-058)
  B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Plug	74-21-02	01	5
	3	Clamp	74-21-02		30
	4	Shroud			25
	5	Seal	74-21-01	01	69

  C. References
    (1) AMM 74-00-00/501, Ignition System

(2) AMM 74-21-02/601, Igniter Plug
(3) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zone

412 Engine 1 - Compressor Rear Frame 3 and 4 o'clock
422 Engine 2 - Compressor Rear Frame 3 and 4 o'clock
432 Engine 3 - Compressor Rear Frame 3 and 4 o'clock
442 Engine 4 - Compressor Rear Frame 3 and 4 o'clock

(2) Access Panel

415 and 416 Thrust Reverser Halves - Engine 1
425 and 426 Thrust Reverser Halves - Engine 2
435 and 436 Thrust Reverser Halves - Engine 3
445 and 446 Thrust Reverser Halves - Engine 4

E. Prepare to install the igniter plug

S 214-028-J00

(1) Do this task for engine number 1, engine number 2, engine number 3, and engine number 4.

NOTE: This task can be done in one of the four sequences. However, an individual technician should inspect one engine at a time. Complete one engine before moving to the next engine.

S 224-012-J00

(2) If you removed the adapter bushing, do the immersion depth check (AMM 74-21-02/601).

NOTE: The immersion depth check gives the correct number of the gasket-spacers to be installed below the adapter bushing.

S 424-024-J00

(3) Install the igniter plug (1).
(a) Remove the cap from the adapter bushing, if it is necessary.
(b) Apply antiseize compound to the threads of the igniter plug (1).
1) Make sure the integral igniter gasket is installed on the igniter plug.

NOTE: The integral igniter gasket can be loose in the package with a new igniter plug. If the gasket is loose, you must install it on the igniter plug.

(c) Install the igniter plug (1) into the adapter bushing on the compressor rear frame.
(d) Tighten the igniter plug (1) to 260-290 pound-inches (29.4-32.8 N.m).

S 434-020-J00

(4) Connect the ignition leads (2) to the igniter plugs (1).
  (a) Remove the caps from the ends of the ignition leads (2).
  (b) Install a new seal (5) on the ignition lead (2).

NOTE: There are two different types of the silicone seals (chamfered and symmetric). You must make sure the seal is correctly installed.

  (c) Connect the ignition lead (2) to the igniter plug (1).
  (d) Tighten the plug nut to 260-290 pound-inches (29.4-32.8 N.m).

S 424-021-J00

(5) Install the igniter shrouds (4).
  (a) Install the igniter shrouds (4) around each igniter plug (1) and each ignition lead (2).
  (b) Install the hose clamp (3) around the igniter shrouds (4).
  (c) Tighten the hose clamp (3) to 30-40 pound-inches (3.4-4.5 N.m).

S 434-019-J00

CAUTION: MAKE SURE YOU TIGHTEN THE LEAD COUPLING NUTS AT THE IGNITION EXCITERS. LOOSE COUPLING NUTS CAN CAUSE AIRPLANE RADIO INTERFERENCE.

DO NOT TWIST OR BEND THE IGNITION LEAD. YOU CAN CAUSE DAMAGE TO THE LEAD.

(6) Connect the ignition lead (2) to the ignition exciter.
  (a) Remove the caps from the exciter output terminals and on the ignition lead (2).
  (b) Remove the ground wires between the fan case and the exciters.
  (c) Connect the ignition lead of the lower igniter plug to the top ignition exciter.
  (d) Connect the ignition lead of the top igniter plug to the lower ignition exciter.
  (e) Tighten the coupling nuts at the exciters to 140-160 pound-inches (15.8-18.0 N.m).
  (f) Install the lockwire on the coupling nuts.

F. Restore the airplane to service

S 864-020-J00

(1) FOR THE APPLICABLE ENGINE;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6 Main Power Distribution Panel
1) 6F1 IGN 1 ENG 1
2) 6K19 IGN 2 ENG 1
3) 6G19 STBY IGN ENG 1
4) 6F2 IGN 1 ENG 2
5) 6K20 IGN 2 ENG 2
6) 6G20 STBY IGN ENG 2
7) 6F3 IGN 1 ENG 3
8) 6K21 IGN 2 ENG 3
9) 6G21 STBY IGN ENG 3
10) 6F4 IGN 1 ENG 4
11) 6K22 IGN 2 ENG 4
12) 6G22 STBY IGN ENG 4

S 414-021-J00

(2) Close the thrust reverser halves (AMM 78-31-00/201).

S 714-022-J00

(3) Do the operational test of the ignition system (AMM 74-00-00/501).

IGNITER PLUG - INSPECTION/CHECK

1. General
   A. This procedure has two tasks:
      (1) Do a check of the igniter plug for erosion and cracks.
      (2) Do a check of the immersion depth for the igniter plug.
   B. To do a check of the igniter plug, you must do as follows:
      (1) Remove the plug.
      (2) Examine the plug shell, the ceramic insulator, the surface of the seal, and the connector groove.
      (3) Measure the plug shell for erosion.
      (4) Find the remaining life of the plug.
   C. To do a check of the immersion depth, you must do as follows:

      NOTE: Do this check when the mounting assembly of the igniter plug is damaged.

      (1) Remove the igniter plug and the mounting assembly.
      (2) Measure the distance from the compressor rear frame to the ignition ferrule on the combustion chamber.
   D. The igniter plugs have aluminum oxide insulators. You do not have to use a special tool unless it is necessary.

   TASK 74-21-02-206-001-J00
2. Igniter Plug Check
   A. References
      (1) 74-21-02/401, Igniter Plug
      (2) 72-00-00/601, Engine
      (3) IPC 74-21-02 Fig. 1
   B. Access
      (1) Location Zone

412	Engine 1 - Compressor Rear Frame 3 and 4 o'clock
422	Engine 2 - Compressor Rear Frame 3 and 4 o'clock
432	Engine 3 - Compressor Rear Frame 3 and 4 o'clock
442	Engine 4 - Compressor Rear Frame 3 and 4 o'clock

      (2) Access Panel

416	Right Thrust Reverser Half - Engine 1
426	Right Thrust Reverser Half - Engine 2
436	Right Thrust Reverser Half - Engine 3
446	Right Thrust Reverser Half - Engine 4

   C. Prepare to do the igniter plug check.

      S 026-002-J00
      (1) Remove the igniter plug (Ref 74-21-02/401).

S 216-025-J00

(2) Do this task for engine number 1, engine number 2, engine number 3, and engine number 4.

NOTE: This task can be done in one of the four sequences. However, an individual technician should inspect one engine at a time. Complete one engine before moving to the next engine.

S 216-003-J00

(3) Examine the igniter plug for damage.
   (a) Replace the plug, if it has one of these conditions:
      1) Cracks
      2) Burns or holes.

S 216-004-J00

(4) Examine the ceramic part of the plug for cracks or broken pieces.
   (a) Shake the plug and listen for the sound of a rattle.
      1) If you hear the sound, replace the igniter plug (Ref 74-21-02/401).

         NOTE: If the ceramic is broken, make sure you find the broken pieces.

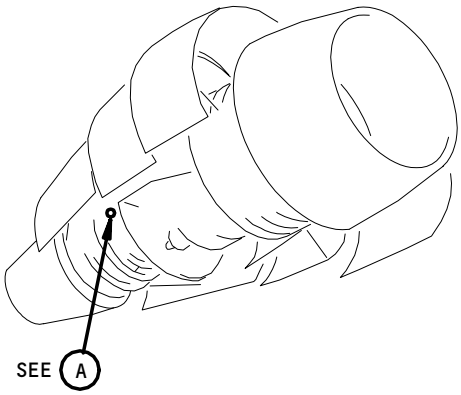
      2) If you can not find the broken pieces, you must do the engine borescope check on the high pressure turbine (Ref 72-00-00/601).

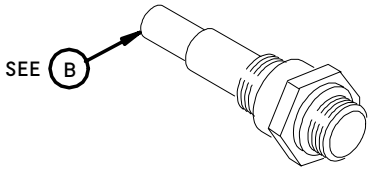
S 226-005-J00

(5) Examine the tip shell of the igniter plug for erosion (Fig. 601).
   (a) Measure dimension Y of the worn plug.
   (b) If dimension Y is larger than 0.27 inch (6.9 mm), replace the igniter plug (AMM 74-21-02/401).

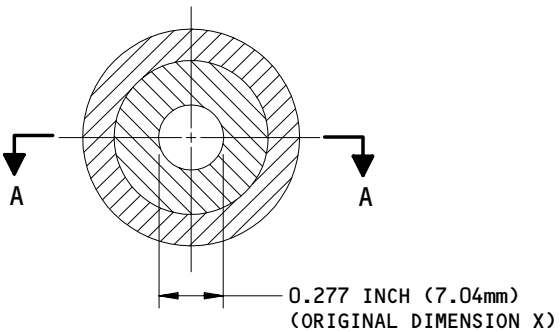
      NOTE: This dimension is the maximum erosion limit for the center electrode. For the best performance, recommend that you replace the igniter plug if the measured dimension is more than 0.21 inch (5.3 mm).

   (c) Measure the dimension X of the worn plug.

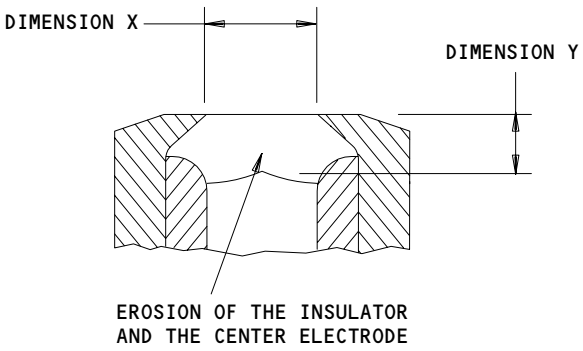




IGNITER PLUG
A



B



A-A

Igniter Plug Inspection
Figure 601

(d) If the dimension X is larger than 0.47 inch (11.9 mm), replace the igniter plug (AMM 74-21-02/401).

NOTE: This dimension is the maximum erosion limit for the center electrode. For the best performance, recommend you replace the igniter plug if the measured dimension is more than 0.40 inches (10.2 mm). You can have erosion patterns, that are not even, up to the maximum limit if the erosion is not a total of more than 20% of the circumference.

S 216-006-J00

(6) Examine the gasket seal for damage.

(a) Replace the plug if the surface has nicks, dents, or scratches.

S 216-007-J00

(7) Examine the groove of the connector for damage.

(a) Replace the igniter plug, if the bottom of the groove has a layer of soot.

NOTE: Soot in the groove shows the igniter plug is damaged.

(b) Replace the igniter plug, if you see cracks or chips in the groove.

S 216-009-J00

(8) Examine the connector pin for damage.

(a) Replace the igniter plug if it has a bent or broken pin.

D. Restore the airplanes to service

S 426-011-J00

(1) Install the igniter plug (Ref 74-21-02/401).

TASK 74-21-02-206-012-J00

3. Igniter Plug Immersion Depth Check (Fig. 602)

A. Special Tools and Equipment

(1) 2C6613 - Igniter Plug Immersion Depth Gage, General Electric Co., 111 Merchant Street, Room 425, Cincinnati, OH 45246

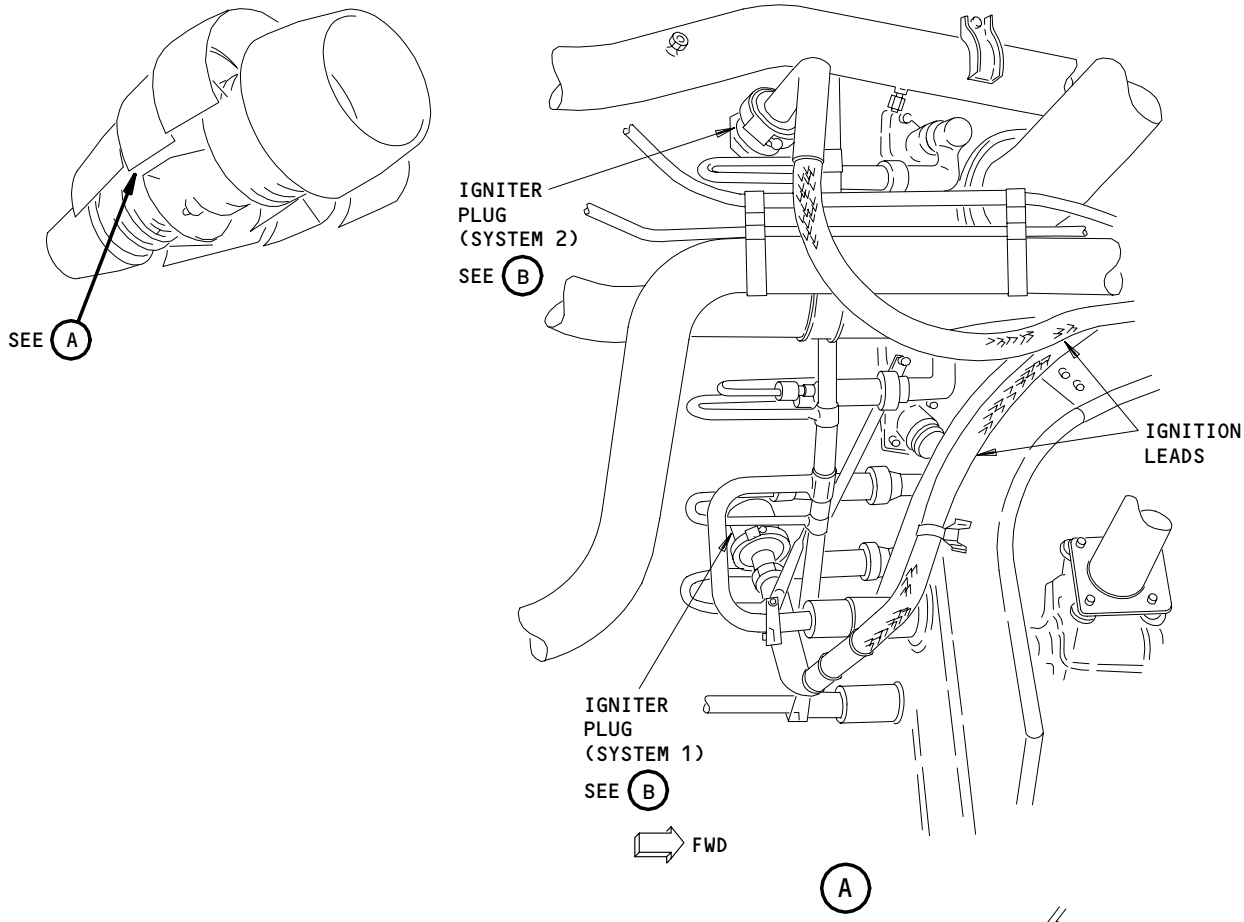
B. Consumable Materials

(1) D00000 Compound - Antiseize, GE Spec. A50TF201, Class A, GP460 (C02-058)

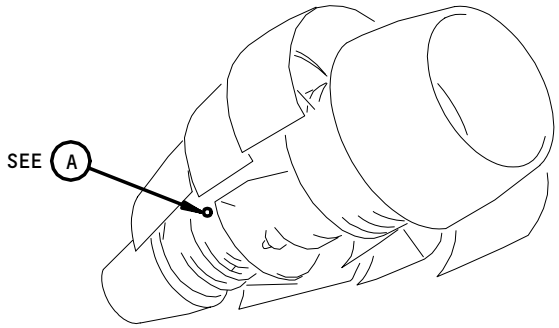
C. References

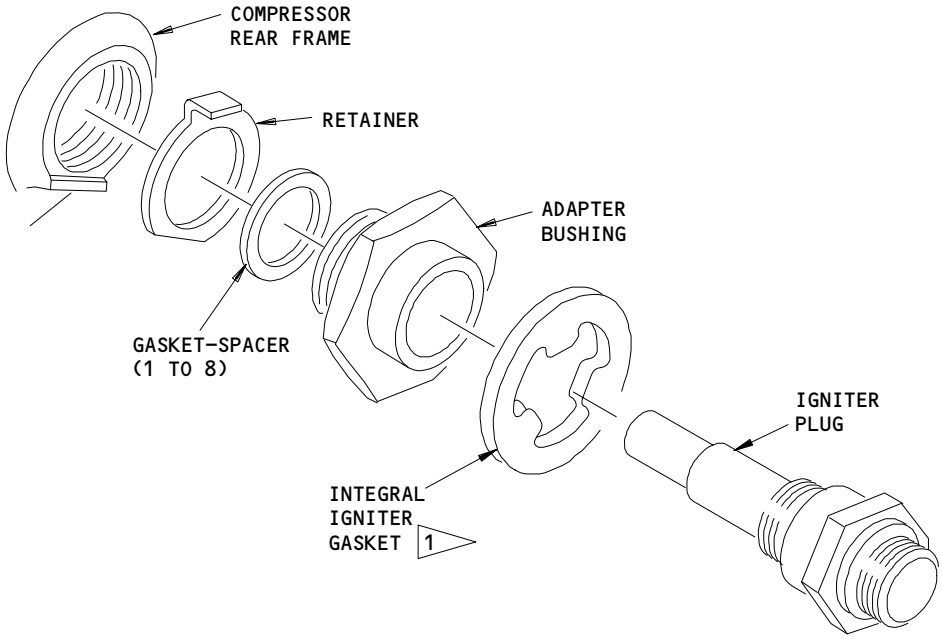
(1) 74-21-02/401, Igniter Plug

(2) IPC 74-21-02 Fig. 1



Immersion Depth Check
Figure 602





MOUNTING ASSEMBLY INSTALLATION

A

1 IF YOU FIND THE INTEGRAL IGNITER GASKET LOOSE IN THE PACKAGE WITH A NEW IGNITER PLUG, INSTALL IT ON THE IGNITER PLUG.

Mounting Assembly Installation
Figure 603

D. Access

(1) Location Zone

412 Engine 1 - Compressor Rear Frame 3 and 4 o'clock
422 Engine 2 - Compressor Rear Frame 3 and 4 o'clock
432 Engine 3 - Compressor Rear Frame 3 and 4 o'clock
442 Engine 4 - Compressor Rear Frame 3 and 4 o'clock

(2) Access Panel

416 Right Thrust Reverser Half - Engine 1
426 Right Thrust Reverser Half - Engine 2
436 Right Thrust Reverser Half - Engine 3
446 Right Thrust Reverser Half - Engine 4

E. Procedure

S 026-013-J00

(1) Remove the igniter plug (Ref 74-21-02/401).

S 036-014-J00

(2) Remove the adapter bushing, the gasket-spacers, and the retainer from the compressor rear frame.

S 226-022-J00

(3) Measure the immersion depth as follows:

(a) Use the depth gage to measure the dimension A.

NOTE: Dimension A is the distance from the boss on the compressor rear frame boss to the outer flange of the igniter ferrule. The igniter ferrule is installed on the combustor boss.

(b) Write down the result.

(c) Find the number of the gasket-spacers to be used from the table below.

DIMENSION A		NUMBER OF GASKETS REQUIRED
INCHES	MILLIMETERS	
≥ 1.067	≥ 27.1	0
1.066-1.035	27.1-26.3	1
1.034-1.003	26.3-25.5	2
1.002-0.971	25.5-24.7	3
0.970-0.938	24.7-23.8	4
0.937-0.906	23.8-23.0	5
0.905-0.874	23.0-22.2	6
0.873-0.842	22.2-21.4	7
0.841 ≥	21.4 ≥	8

S 436-023-J00

(4) Install the adapter bushing.
  (a) Put antiseize compound on the threads of the adapter bushing.
  (b) Install the retainer, the correct number of the gasket-spacers, and the adapter bushing into the compressor rear frame.

    NOTE: You must use at least one gasket-spacer.

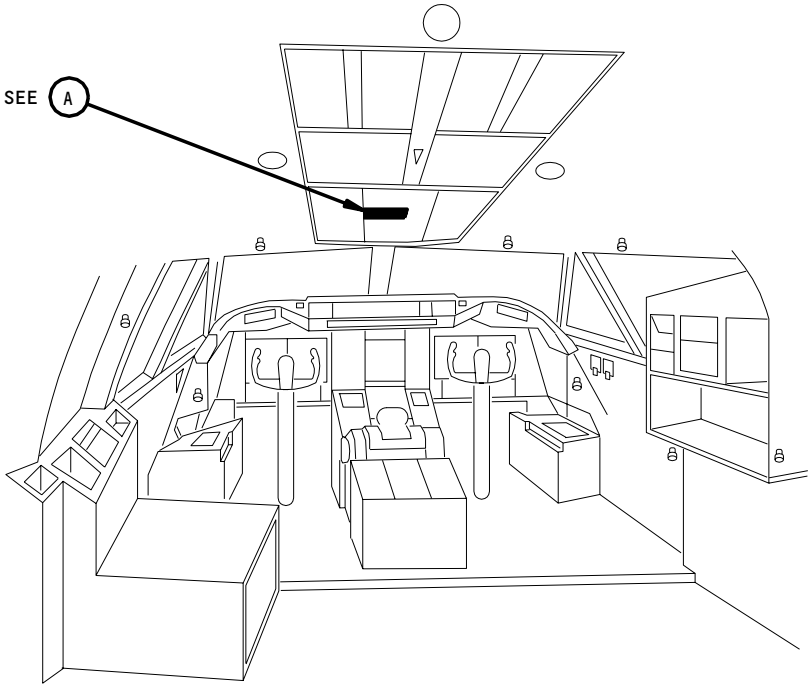
  (c) Tighten the adapter bushing to 480-600 pound-inches (54.2-67.8 N.m).
  (d) Install the lockwire on the adapters.

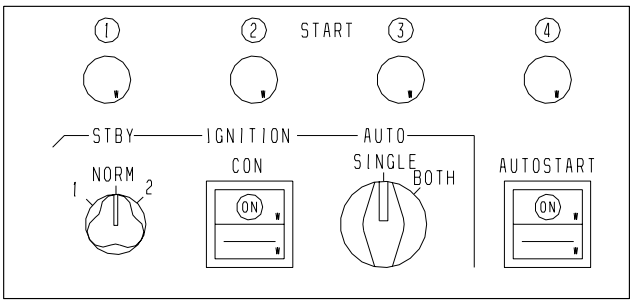
S 426-018-J00

(5) Install the igniter plug (Ref 74-21-02/401).

ENGINE IGNITION CONTROL - DESCRIPTION AND OPERATION

1. General
   A. Engine ignition control is controlled by:
      - The switches on the ignition control module on the P5 overhead panel
      - Four FUEL CONTROL switches on the P8 control stand
      - The electronic control unit (ECU) on each engine.
   B. When the switch(es) turn(s) ON, electrical power is supplied to the ignition exciter(s). The ignition exciter changes the input power into a high voltage output. A high energy spark fires across the igniter plug gap which burns the fuel/air mixture in the combustion chamber. This will start the engine ignition.
   C. The power for the ignition is 115 volts AC. This power is supplied from the P6 main power distribution panel.
2. Ignition Control Module (Fig. 1)
   A. The ignition control module has three ignition switches, four START switches, and the AUTOSTART switch. The three ignition switches include STBY, CON, and AUTO. The four START switches are located above the ignition switches. The AUTOSTART switch are located on the right of the ignition switches. For complete data for the engine starting system, refer to 80-11-00/001.
   B. The STBY switch controls the standby ignition system. It is a three-position rotary switch with positions marked NORM, 1, and 2. When you set the STBY switch to 1 or 2, power is supplied to the exciter (1 or 2) on that engine. The standby ignition system is used in emergencies only.
   C. The CON switch is a push-button switch which makes the ignition system operate continously during flight. When the CON switch is pushed to the ON position, the switch shows ON. If the CON switch is ON, the message CON IGNITION ON shows on the EICAS screen.
   D. The AUTO switch is a two-position rotary switch with positions marked SINGLE and BOTH. If the SINGLE is set, one engine ignition system is energized at a time. If the BOTH is set, both engine ignition systems are energized at the same time when you start the engine.
3. FUEL CONTROL Switches (Fig. 2)
   A. There are four FUEL CONTROL switches, one for each engine, on the P8 control stand. The switches have two positions, CUTOFF and RUN. The FUEL CONTROL switches must be in the RUN position for ignition system operation.
4. Electronic Control Unit (ECU)
   A. The ECU automatically gets input, and controls the ignition system operation on the engine.
      (1) When the AUTO switch is set to the SINGLE position, the ECU will energize the exciter systems. The ECU will energize system 1 and then system 2 exciter each time you start the engine.
      (2) If the engine start is slow, the ECU will energize both ignition exciters on the engine.
      (3) If the ignition system does not operate, the ECU will stop the engine. After the engine stops, the ECU will dry-motor the engine. The ECU then uses both ignition exciters to restart the engines.

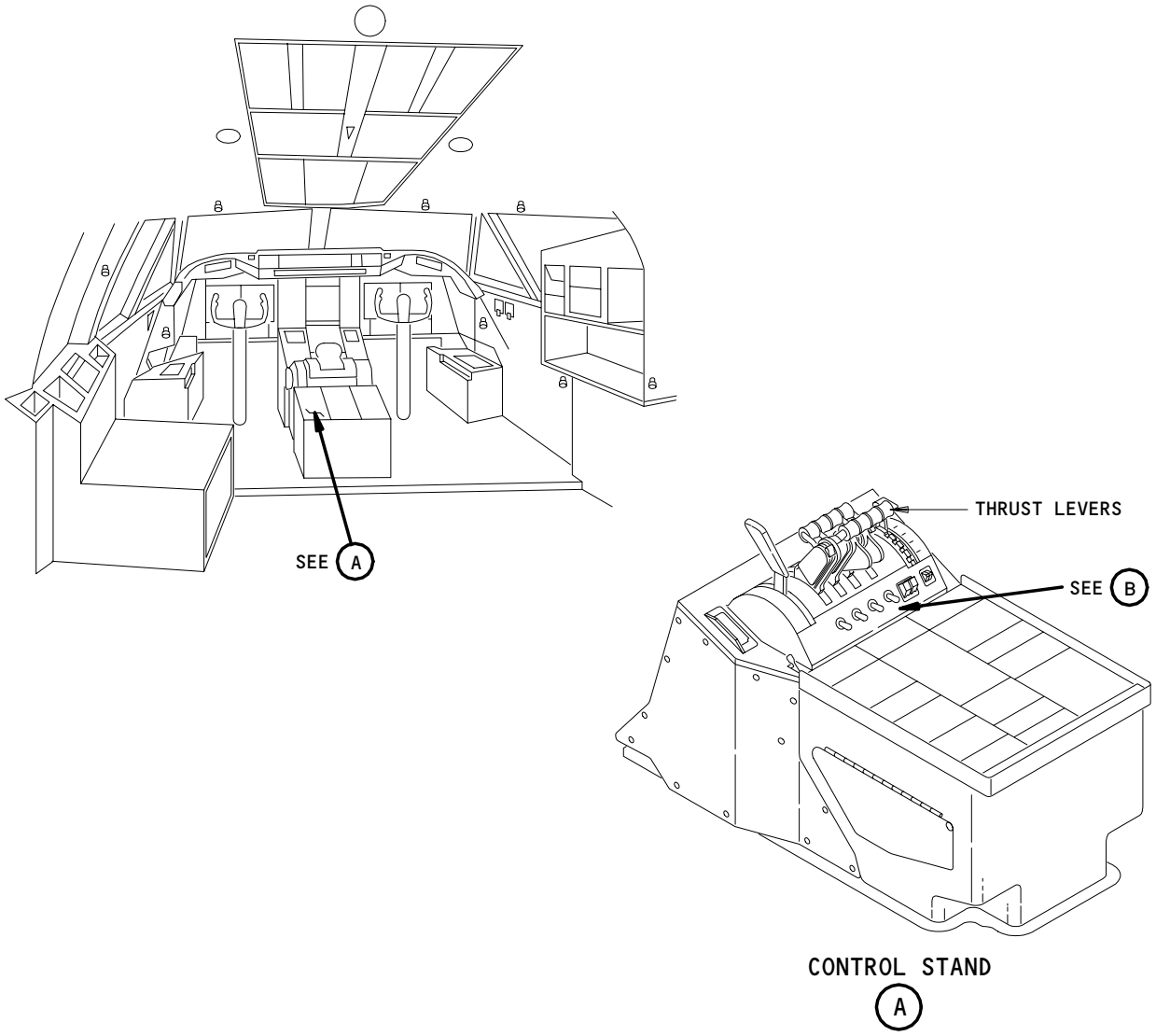




PILOTS' OVERHEAD PANEL

A

Engine Ignition Control Module Location
Figure 1

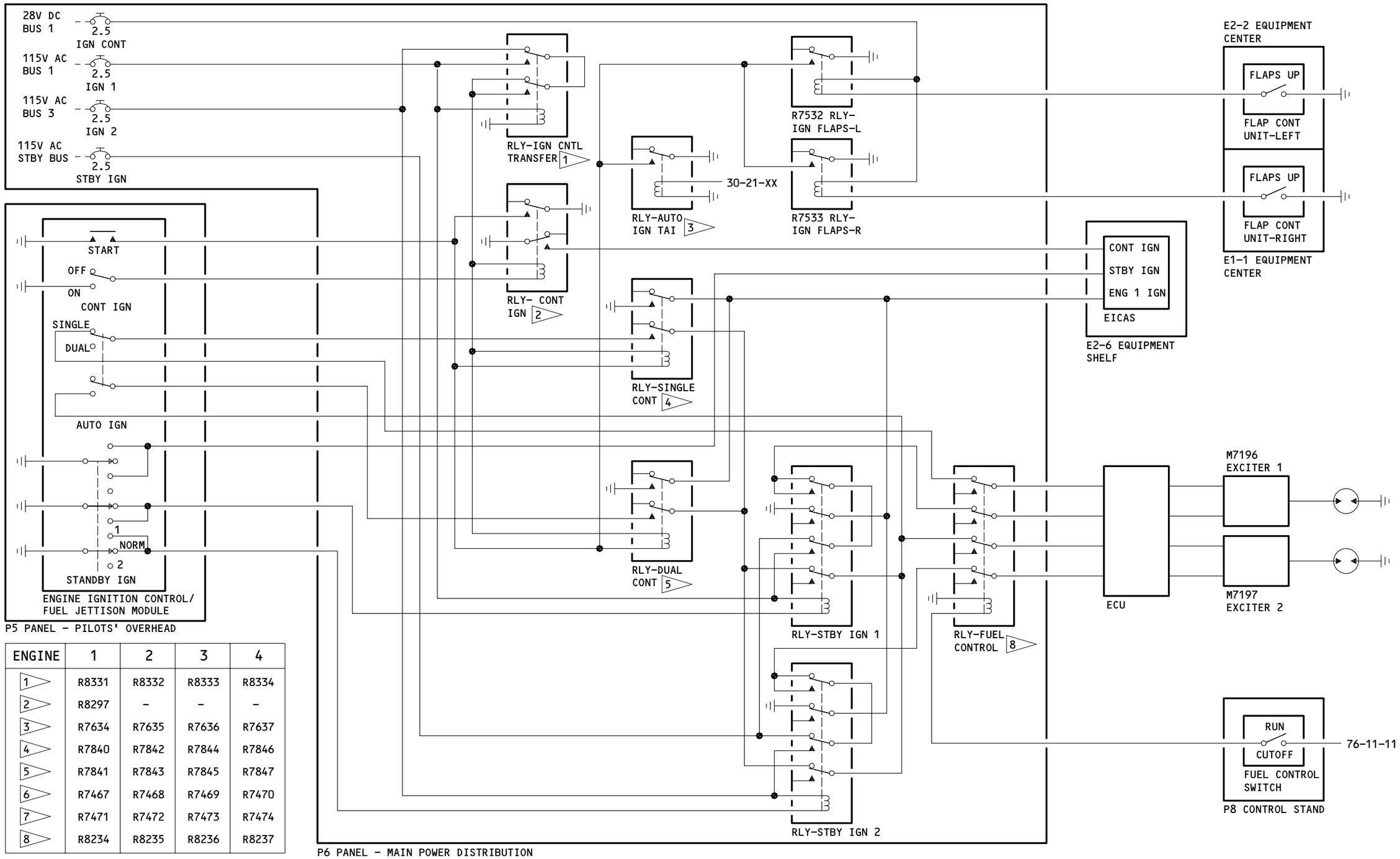


Fuel Control Switch Location
Figure 2

(4) If the engine combustion stops, the ECU will automatically energize both ignition exciters for an engine restart.

5. Engine Ignition Indicating
   A. There are two EICAS messages related with the normal ignition system operation.
      (1) When continuous ignition is manually set on the P5 overhead panel, the memo CON IGNITION ON shows. The message is cancelled when continuous ignition is set off.
      (2) When standby ignition is manually set on the P5 overhead panel, the memo STBY IGNITION ON shows. The message is cancelled when standby ignition is set off.
   B. If the engine indication light does not operate during ignition system operation, a message will show on the EICAS status page. This status message is ENG X IGNITOR Y. X is for the applicable engine and Y is for the applicable ignition system. For example, the status message ENG 1 IGNITOR 1 is on the EICAS status page. It tells you that the light on the ignition system 1 on engine No. 1 does not operate.
6. Operation (Fig. 3)
   A. During normal engine starting, with the START switch set to ON, the engine ignition starts when:
      - The FUEL CONTROL switch is set to RUN position
      - N2 speed operates at 17-22%.
   B. During normal engine starting, with the AUTOSTART switch set to ON, engine ignition starts automatically when:
      - The FUEL CONTROL switch is set to RUN position
      - N2 speed operates at 17%.
   C. The ignition stops when:
      - The start switch releases, when N2 is over 50%
      - Or the start switch is pushed to the OFF position.
   D. During bad weather conditions, the CON push-button switch is used for the continuous ignition. When the continuous ignition is manually set, the CON switch shows ON. The message CON IGNITION ON shows on the EICAS status page. Continuous ignition stops when the CON switch is pushed to the OFF position.
   E. During flight, continuous ignition starts automatically when:
      - The thermal anti-ice (TAI) system is used, or
      - The wing flaps are in an unstowed position, or
      - N2 speed falls below 50%.

      Ignition continues until all of the conditions above do not apply.
   F. Standby ignition is used if normal engine ignition circuitry is defective. When the engine windmills, standby AC power is supplied to one exciter on each engine automatically. Turn the STBY switch to 1 or 2 to operate exciter 1 or 2. When all four engines are started, return the STBY switch to NORM. Use of the standby ignition system is an emergency procedure. The normal ignition system circuitry is bypassed when the STBY switch is used.
   G. If normal electrical power to the ignition exciter is lost, the ignition system automatically changes to the standby circuit (STBY 1). The ignition system automatically changes even though the STBY IGN switch is set to NORM.



ENGINE	1	2	3	4
1	R8331	R8332	R8333	R8334
2	R8297	-	-	-
3	R7634	R7635	R7636	R7637
4	R7840	R7842	R7844	R7846
5	R7841	R7843	R7845	R7847
6	R7467	R7468	R7469	R7470
7	R7471	R7472	R7473	R7474
8	R8234	R8235	R8236	R8237

Engine Ignition Control Simplified Schematic
Figure 3